



AOC AIR-GROUND DATA AND MESSAGE EXCHANGE FORMAT

ARINC SPECIFICATION 633-2

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A description of the changes introduced by each supplement is included at the end of this document.

FOREWORD

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An Errata Report solicits any corrections to existing text or diagrams that may be included in a future Supplement to this ARINC Standard.

An ARINC IA Project Initiation/Modification (APIM) form solicits any proposals for the addition of technical material to this ARINC Standard.

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1.0 INTRODUCTION

1.0 INTRODUCTION

1.1 Purpose of Document

The purpose of this specification is to support the exchange of certain Aeronautical Operational Control (AOC) air-ground and ground-ground messages. These messages are defined in this specification, apart from those defined in ARINC Specification 620, because they have unique qualities. Like the messages defined in ARINC Specification 620, their usage necessitates a single definition. Further, the messages have at least one of the following characteristics:

- The message is typically defined by an airframe manufacturer, Electronic Flight Bag (EFB) or avionics suppliers such that it is not modifiable by the airline and does not easily fit into an existing ARINC Specification e.g., ARINC Specification 622 (FANS), ARINC Specification 623 (ATS) or ARINC Characteristic 702 (FMS).
- The distribution of the message is outside the control of a single airline, e.g., messages shared by multiple parties such as de-icing services shared in common among a group of airlines from a single supplier.

COMMENTARY

Airlines may choose to define AOC applications in this specification that have safety implications. In the USA, the FAA may classify the results of the delivery of such a message as constituting more than a “minor hazard” should certain data contained in the message become corrupted. In this case, the principles specified in RTCA DO-296 need to be observed by the implementer. During the development of this specification some assessment of the safety impact of specified applications was performed, however, the airlines choosing to implement communication services defined in this specification will need to consult their local authorities and may have to perform a hazard analysis for certification of such applications.

This specification provides guidance for the encoding of the messages to be transmitted over the traditional Aircraft Communications Addressing and Reporting System (ACARS) air-ground links (i.e., Very High Frequency (VHF), Satellite Communication (Satcom), and High Frequency (HF)). The communications network technology onboard aircraft is evolving to include Ethernet and Transmission Control Protocol/Internet Protocol (TCP/IP) based networks. Air-ground links that support these commercial protocols have been available for some time. The configuration and equipage of cockpits is expanding to accept data through these commercial media. It is the intent of this specification to support multiple methods of transmission (e.g., traditional character-oriented ACARS air-ground links and commercial network based environments that utilize IP routing protocol and typically User Datagram Protocol (UDP) or TCP Transport protocol).

When using TCP/IP based ground-ground and air-ground links, this specification encourages the use of Extensible Markup Language (XML) for message coding. Therefore, for most applications, ACARS and XML message definitions (Schemas) have been designed.

COMMENTARY

Supplement 1 (ARINC 633-1) introduced a break in compatibility with the initial release schema of ARINC 633, and thus initial

1.0 INTRODUCTION

ARINC 633 applications and data sets. The AOC Subcommittee responsible for developing this specification elected this path in order to provide a better foundation for future updates that will ultimately improve support for airline operations. Their rationale was that an early break in compatibility would have less of an effect (with fewer fielded systems) as opposed to a future release. Support of ARINC 633-2 schema rather than previous ARINC 633 schemas is thus the recommended solution.

However, airlines and suppliers need to keep in mind that ground data providers may need to produce **three** unique sets of data (initial ARINC 633 – compliant, ARINC 633-1 – compliant, and **ARINC 633-2 – compliant**) until such time **that previous** aircraft ARINC 633 installations are phased out.

1.2 Scope

The scope of this specification covers all the provisions necessary to enable communication between airborne and ground applications.

Various types of communication can take place between aircraft and ground:

1. ACARS system traditionally enables the exchange of messages. These messages can be exchanged asynchronously or in a synchronous way (see note below)
2. Most EFB type applications also use messages to communicate (e.g., electronic Flight Folder (eFF), Weight and Balance Application (WBA))
3. EFB applications will need to be able to use other types of communications (transactional communications, such as database access, web access, etc.) that do not involve individual messages exchanges.

This specification addresses the first 2 types of communications. When the need for standardization arises, other types of exchanges than message exchanges will be added.

Depending on the type of exchanges, asynchronous or synchronous message exchanges are addressed in this document.

Note:

‘Asynchronous’ communications means that there is no need for the end applications to be active and ready to communicate during the communication. Typically, an application can send a message to a ground message server, and the receiving application can retrieve it when it gets activated.

‘Synchronous’ communications is used here to depict exchanges where both end applications are active and communicating, allowing real bidirectional exchanges.

Transport technologies (especially TCP/IP based networks) are evolving rapidly; therefore the present document segregates application level functionalities from transport functionalities.

The document covers the air-ground communication function that can be functionally split into (see figure below):

- Applicative communications (the communication part of the application)

1.0 INTRODUCTION

- Message Structure, content and encoding (ACARS and/or XML depending on the application)
- Minimum requirements on message processing / Dynamic aspects
- The objective here is to define ONLY those features necessary for interoperability – the document focuses on data description (XML schemas), but also specifies minimum communication services. The way the data are processed/operated is not defined in this specification.
- Transport (over ACARS, IP and physical media)
 - This specification defines how the messages are transferred using ACARS, IP networks, and physical media, i.e., USB stick or CD/DVD:
 - Data packaging (e.g., ARINC 665 for IP/Physical media)
 - Transport of data (e.g., Hypertext Transfer Protocol (HTTP)s over TCP/IP, or ACARS)
- Security services: Encryption and compaction provisions (provisions only at the time of this writing)

Note: Some definitions to complement text above.

1. Message Structure designates the way a message is organized and what data it contains in an abstract language (before encoding for transmission) – in this specification, the message structure and content definition is done directly through definition of message encoding.
2. Data Encoding designates the way the data are represented (ASCII, fixed, variable length, etc.) – e.g., there is a specific encoding in ACARS, and in XML.
3. Message encoding designates the way a message is represented (in terms of structure and data) and data inside these messages are separated, and encoded, before transmission (ASCII, fixed, variable length, etc.) – e.g., there is a specific encoding for a given message in ACARS, and in XML.
4. Packaging designates the way the data (or files) are encapsulated and associated to other data for transport (e.g., Packaging a given file or message in an ARINC 633 signed load).

Listing operational requirements or specifying the applications that lead to these message formats is outside the scope of this document. The messages are standardized, but not the functionality that necessitates them. This is not a functional specification. However, some guidelines about how the standardized AOC messages may be used are provided. This is done in two ways:

- Some definition tables contain a column called “Meaning” or “Purpose” explaining the operational or functional context in which the message, element or parameter could generally be used.
- Some definition tables contain a column called “Example” and some paragraphs contain textual examples that give guidance as to which values could appear under specific conditions in a message, element or parameter.

It should be noted that using messages compliant to this specification may not be sufficient to ensure that a complex air-ground systems runs properly.

1.0 INTRODUCTION

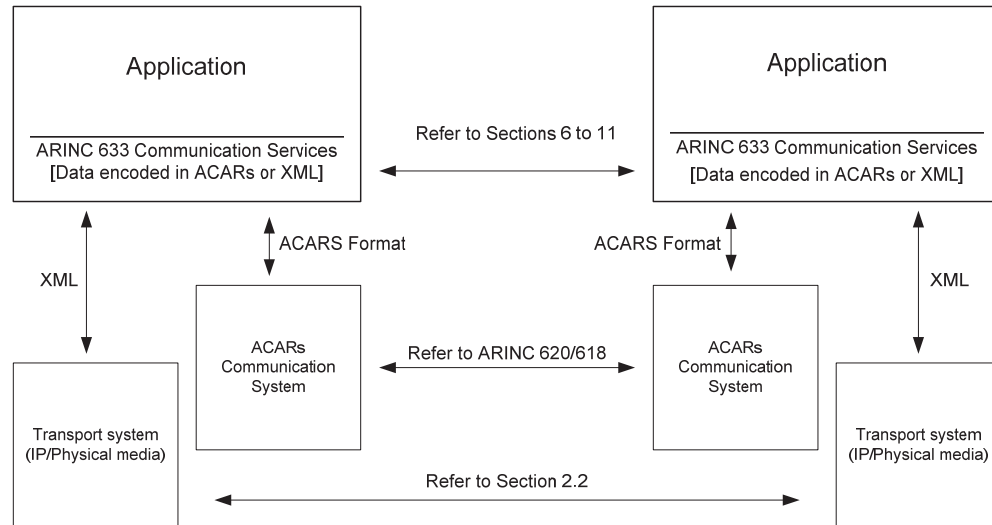


Figure 1.2-1 – Overview of ARINC 633

1.3 Document Organization

This specification is composed of 2 deliverables:

- A text (electronic or paper) document, constituting the body of the specification
- Electronic schema, an electronic attachment to this document, containing all XML data and message definitions.

1.3.1 “Text” Document

This document is organized as follows:

Section 1	Introductory Material
Section 2	Gives main rules and constraints for definition of messages to be transported over ACARS, IP, or physical media. Also specifies how these messages are transported (what protocols) over each medium (ACARS, IP, Physical media)
Section 3	ACARS security – at the time of this writing, this section is informative only (security for ACARS is not defined yet)
Section 4	This section defines how the messages will be structured (especially the headers and trailers content are defined), for ACARS and for XML (structures are different).
Section 5	Section 5 defines common elements, i.e., communication services / messages that can be used by various applications, but also data structures that can be used in the messages of various applications.
From Section 6 to last section	Defines the applicative communication services as well as message contents, on an application per application basis.
Appendix A	Glossary and acronyms
Appendix B	Transportation of ARINC 633 messages over ACARS – examples of ACARS messages
Appendix C	ACARS messages routing
Appendix D	Aircraft Parameters list

1.0 INTRODUCTION

1.3.2 “Electronic” Document

The electronic attachments can be obtained from web site:
<http://www.aviation-ia.com/aeec/SupportFiles/633-2/>.

The electronic documents only contain the XML specifications of the messages or examples. The electronic document **having the XML specifications** complements the “text” document and has precedence over it for schema definitions.

The electronic documents are structured as follows: (see the zip archives)

- The file associated with the initial adoption is a ZIP file, with the following name: ‘633.zip’.
- Subsequent versions of this electronic file will follow ARINC specification naming convention, e.g., ‘633-2.zip’ is used to represent ARINC 633 Supplement 2.
- **The 633-2.zip file contains folders and schema files as follows:**
 - **‘schemas’ – contains subfolders with all applicable definitions (.xsd files)**
 - **m633header, defines mandatory and supplementary headers**
 - **m633common, defines data types common to several applications**
 - **CommonData, contains folders defining the content of data potentially used by multiple applications (e.g., flight plan, NOTAM, etc.)**
 - **1 folder per application, defines the messages per application type (eFF, FUEL, etc.)**

Note: As application schemas may reference schemas from the ‘CommonData’, ‘m633common’, and ‘m633headers’ folders by relative paths, filenames, directory, and document names and location should not be changed.

- The “633-2_examples.zip” file contains folders and example .xml files as follows:
 - **‘examples’ – contains subfolders with example .xml files, where some example files are supplemented with .txt files with an example of the traditional paper/text layout of corresponding data**
 - **CommonData folders provide an example for data potentially used by multiple applications (e.g., flight plan, NOTAM, etc.)**
 - **1 folder per application with an example per application type (eFF, FUEL, etc.)**

XML Schemas and Instance examples can be viewed and edited with every Editor. However, there are several tools (many of them freeware) available, which makes manipulating them much easier.

1.4 Related Documents

1.4.1 Relationship of this Document to Other ARINC Documents

ARINC documents that contain provisions that are related to the provisions defined in this specification include:

1.0 INTRODUCTION

ARINC Specification 618: *Air/Ground Character-Oriented Protocol Specification*

ARINC Specification 619: *ACARS Protocols for Avionic End Systems*

ARINC Specification 620: *Data Link Ground System Standard and Interface Specification (DGSS/IS)*

ARINC Specification 622: *ATS Data Link Applications over ACARS Air-Ground Network*

When avionics systems and subsystems are designed to use the capabilities provided by an ARINC Standard, designers should reference the most recent version (modified by Supplement) of the standard.

COMMENTARY

EUROCAE has codified Air Traffic Service (ATS) messages in ED-85, ED-89, and ED-106. Although the restrictions that apply to ATS messages are more severe than those that apply to the AOC messages define herein, it may be edifying to use these documents as reference material in establishing a context in which critical communications should be conducted.

1.4.2 Relationship to Internet Documents

The Institute of Electrical and Electronic Engineers (IEEE) develops standards for a number of commercial industries, including the telecommunications industry and the computer industry. Some of these standards are shared with the American National Standards Institute (ANSI). On occasion, these standards are endorsed as international standards under the International Organization for Standardization (ISO) and the International Electrotechnical Committee (IEC) standardization program. The Ethernet network protocols utilized in a commercial environment are defined by IEEE 802.3. Specifically, IEEE Std 802.3, 2000 Edition, Information Technology – Telecommunications, and information exchange between systems – Local and metropolitan area networks – Specific Requirements – Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method And Physical Layer Specifications.

The Internet Engineering Task Force has created Request for Comment (RFC) documents that serve as the commercial standards. Table 1.4.2-1 lists those that may serve as a convenient resource.

Table 1.4.2-1 – Useful RFC References

RFC	Title
IETF RFC 768	User Datagram Protocol, Aug-28-1980 (Status: STANDARD)
IETF RFC 791	Internet Protocol, Sep-01-1981, (Status: STANDARD)
IETF RFC 793	Transmission Control Protocol, Sep-1981 (Status: STANDARD)
IETF RFC 959	File Transfer Protocol, Oct-01-1985 (Updated by RFC2228, RFC2640) (Status: STANDARD)
IETF RFC 1122	Requirements for Internet hosts - communication layers, Oct-01-1989, (Status: STANDARD)
IETF RFC 1123	Requirements for Internet hosts - application and support, Oct-01-1989, (Updated by RFC2181) (Status: STANDARD)
IETF RFC 1155	Structure and identification of management information for TCP/IP-based internets, May 1990. (Status: STANDARD)
IETF RFC 2616	RFC2616 -- Hypertext Transfer Protocol -- HTTP/1.1

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RFC	Title
	http://www.ietf.org/rfc/rfc2616.txt
IETF RFC 2246	RFC2246 -- The TLS Protocol -- Version 1.0 http://www.ietf.org/rfc/rfc2246.txt

Other documents

Document ref	Title
	Extensible Markup Language (XML) 1.0 (Third Edition) World Wide Web Consortium (W3C) Recommendation 04 February 2004

COMMENTARY

RFCs are never modified or changed, only superseded. The list of which RFCs are current is published in an RFC identified as Standard 1. Standard 1 is contained within the most current RFC. Knowing which RFC contains Standard 1 identifies a well-known and invariant set of Internet Standards that are being used at that point in time (i.e., the current configuration of the Internet).

1.5 Document Precedence

This document incorporates commercial standards by reference. In the case of a conflict between this specification and the applicable ISO, IETF, or IEEE standards, it should be assumed that the deviation is intentional and that this specification should have precedence.

1.6 Regulatory Approval

Compliance with this specification, in and of itself, will NOT ensure regulatory approval. Implementers are urged to obtain all necessary information necessary for regulatory approval and work in close coordination with the appropriate regulatory authorities to gain certification as applicable.

1.7 Compliancy

In order to be ARINC 633 application compliant:

- A system should have implemented all services specified for that application as described in the corresponding section of this specification. Note that applications often contain optional services, messages or parameters. In this case, an ARINC 633 compliant application should allow the user or administrator to inhibit or enable these optional elements, as long as implementing these optional elements is technically feasible in a given environment (e.g., aircraft design).
- A Communications Management Unit (CMU)-like system does not need to use the XML-based message definitions, even when IP networks are used (e.g., in the case of ACARS over IP protocol)
- An EFB-like system does not need to use the ACARS message definitions
- An airborne system should be able to communicate electronically with ground systems, either through a physical media or through a wireless connection
- A ground system should be able to communicate electronically with airborne systems or ground systems either through a physical media, through a wireless connection or through a wired connection

1.0 INTRODUCTION

- As a minimum, an airborne system should support at least the Transport layer for physical media or the Transport layer for wireless IP connections as defined herein, or the airborne system should use ACARS
- A ground system should support the Transport layers for all paths it offers
- A ground system should support ACARS based message definitions, if they have been defined for the air-ground link

In order to be ARINC 633 security compliant:

- A system should be able to execute all security features described in this specification for the transport path(s) it offers. A user or system administrator may or may not be able to switch off these features and/or replace them by a non-standardized security feature.

Requirements for compliance with security features for physical transport, IP transport or ACARS will be added in a future supplement to this specification.

2.0 MESSAGE ENCODING AND TRANSPORT

2.0 MESSAGE ENCODING AND TRANSPORT

2.1 Message Encoding Rules

2.1.1 ACARS/ACARS over AVLC (AOA)

This section summarizes the major constraints imposed by ACARS protocols for encoding the messages.

ACARS is a character oriented protocol. Therefore, the following constraints apply:

- Character set restricted to ISO#5 per ARINC Specification 618 Attachment 3. Note that an application may restrict itself to the VHF-Baudot-subset as shown in ARINC Specification 618 Attachment 3.

ACARS messages are limited in size. Therefore, the following constraints apply:

- Message envelope can only contain one content element
- Message length is limited to 16 ARINC 618 blocks. After subtracting sub-label, a maximum of three additional supplemental addresses and a 4 byte end-to-end Cyclic Redundancy Code (CRC), messages should contain a maximum of 3411 uplink application text chars and a maximum of 3267 downlink application text chars

ACARS message encoding rules

- The number of parameters is fixed at a pre-determined number.
- Parameters can be defined as fixed length or variable length.
- Parameters can be defined as optional or mandatory. An optional parameter is a parameter that may be omitted, even if it has been defined as fixed length.
- Optional and mandatory parameters of variable length should always be followed by a comma “,” delimiter.
- Optional parameters of fixed length should always be followed by a comma “,” delimiter.
- Mandatory parameters of fixed length may immediately be followed by the next parameter, if especially defined that way in their ACARS message definition section, otherwise, they are also to be followed by a comma (i.e., “,”) delimiter
- The parameters of the messages will always be transmitted in the order shown in the element format tables (fixed order)
- Missing (optional) parameters are indicated by consecutive commas (i.e., “,,”)

ACARS message encoding rules for legacy systems

- For compatibility with legacy systems <CR> and <LF> should not appear outside the “FreeText” parameter of uplinks that end in a CMU. <CR> and <LF> may appear anywhere in messages that are forwarded to other end-systems, e.g., EFBs.
- The Generic Message Envelope contains a Free Text parameter that can contain any ISO#5 characters, including <CR> and <LF>, but excluding “,” and “<” or “>” characters.

COMMENTARY

These additional rules are needed for compatibility with legacy systems.

2.0 MESSAGE ENCODING AND TRANSPORT

2.1.2 ACARS over IP

When it is intended to use the ACARS Over IP protocol, Section 2.1 message encoding rules should be applied.

COMMENTARY

There is no industry standard for ACARS Over IP. This section will be completed when need arise.

2.1.3 XML

This section defines the main rules and conventions applied for creation of XML schemas. It is intended to be used when defining an ARINC 633 XML schema.

2.1.3.1 General: Schema Use

XML messages and data defined in this specification apply XML version 1.0 as defined in “Extensible Markup Language (XML) 1.0 (Third Edition) W3C Recommendation 04 February 2004”

- Schemas are used versus Document Type Definition (DTD).
- When creating a Schema, define the following:
 - Default Element names: qualified
 - Default Attributes names: unqualified
 - Define a target namespace
 - Define an abbreviation for the target namespace

2.1.3.2 Typing & Grouping

- XML Schemas allow to create types for elements
 - A type is suffixed with the “Type” string
 - Example: “MyElementType” is the type for <MyElement/>
- XML Schemas allow to create groups of elements
 - A group is suffixed with the “.Grp” string
 - Example: subFolder.Grp
- XML Schemas allow to create attribute groups
 - An attribute group is suffixed with the “.AttGrp” string
 - Example: document.AttGrp

2.0 MESSAGE ENCODING AND TRANSPORT

2.1.3.3 XML Data Naming Rules

Table 2.1.3.3-1 – XML Element Naming Convention

Convention	Examples
If it is a commonly known acronym, all uppercase should be used	<FOB>, </STD>
If it is not an abbreviation: First letter in uppercase, then first letter of all following words in uppercase	<ThisIsANewElement>, </TaxiFuel>
If it is a mixture of both: Abbreviation is uppercase	<ATCFlightPlan>, <ICAOAirportCode>

Table 2.1.3.3-2 – XML Attribute Naming Convention

Convention	Examples
same as for XML Elements, but first letter of attributes should always start in lowercase	<element thisIsAnAttribute="myAttribute"/>

COMMENTARY

ACARS Parameters should generally be named like XML attributes. If a corresponding XML schema exists, in which an ACARS parameter appears as an element, it should still follow the XML attribute naming convention.

2.2 Transport System

This section defines how the messages from applications can be transported over the various available communication systems.

There are three ways today for transferring data to/from aircraft:

1. ACARS communication system
 - Using VHF/VHF Digital Link Mode 2 (VDL2) AOA, Satcom, High Frequency Data Link (HFDL) media
2. TCP/IP communication system
 - Using e.g., Wifi technologies, Satcom media, Cellular technologies
3. Physical media
 - USB memory stick, CD/DVD

This section addresses all three transport systems.

ACARS system has a very low throughput and therefore imposes strong limitations on the way the data are encoded (see Section 2.1) and also on the way they are packaged for transmission. As a result, the overhead for data encoding is designed to be minimized on ACARS (refer to Section 4 for details)(this precludes the use of XML).

TCP/IP and physical media such as USB memory stick and DVD/CD have less limitation in terms of data volume, but due to the wide usage of Information Technology (IT) technologies, there are other issues such as security.

Therefore, specific means for transport of data over these media are defined in this section.

Moreover, it has been decided, for those messages sent over ACARS, to define an optimized specific language and encoding scheme. Another language has been defined for the other media: XML.

2.0 MESSAGE ENCODING AND TRANSPORT

However, applying one encoding scheme should not constrain on the medium to be used: for example, it should be possible to send ACARS encoded messages over IP.

If an airborne end system (CMU or EFB) uses UDP or TCP over IP only, then it is expected to use XML for message encoding. If an airborne end system uses ACARS or ACARS over IP, then it may use ACARS for message encoding. However, no general rule can be defined: please refer to the appropriate sections for recommended formats for air-ground and ground-ground exchanges.

2.2.1 Transport over ACARS Communication System

Messages from application should be sent encoded as specified in the appropriate section of this document (depending on the application: from Section 6 to 11).

See appendix B for illustration of how ARINC 633 ACARS messages are structured and the relationship with the other ACARS protocol layers.

2.2.2 Transport over TCP/IP and Physical Media

New applications are now developed to exchange data with the ground using TCP/IP networks, and physical media such as USB memory stick and DVD/CD.

ACARS format is less and less used. For these new communication systems, security is becoming a bigger issue seen the fact that airborne systems are using Commercial off-the Shelf (COTS) and communication protocols widespread, and are therefore more subject to security threats.

COMMENTARY

Current edition of this specification includes preliminary specification on transport technologies – it defines minimum requirements to be satisfied.

Future work will consist of defining the complete communication stack for full interoperability. System designers, suppliers, and users are thus advised to follow the development of future editions of this specification.

Although it does not specify any security mechanism above the transport services (e.g., HTTPs), implementers may choose to implement security functions between applications and HTTP as well as for transport of files over physical media.

2.2.2.1 Transmission over TCP/IP Networks

2.2.2.1.1 General

Transport of ARINC 633 messages to/from the aircraft is managed by ground and aircraft communication services. These services support the air-ground communication stack.

The air-ground TCP/IP communication system provides inter-networked communication from aircraft applications to the ground applications located in the airline information system.

The airborne communication function and ground communication function should support HTTPS (HTTP 1.1 over TLS 1.0) to exchange messages and files.

The airborne communication function should behave as a client in HTTPS sessions – this client should poll regularly the server for presence of message to this aircraft.

2.0 MESSAGE ENCODING AND TRANSPORT

The ground communication function should behave as a server in HTTPS sessions and manage a repository of messages/files to/from aircraft.

The airborne communication server should initiate all exchanges. GET and POST commands should be supported.

In the future, figures and examples will be added to illustrate how ARINC 633 messages are transferred to the aircraft using TCP/IP/HTTPs.

COMMENTARY

Today only one technology is required. However, in the future several transport technologies may be available. In this case, the ground communication services should support all of them, while the aircraft systems should select at least one among the list of possible options.

2.3 Physical Media Transportation Rules

The purpose of this section is to standardize how flight related information should be organized, formatted and stored, before it is brought aboard the aircraft or from the aircraft to the ground by a physical media. Due to the characteristics of physical media, it should be noted that:

- No online connection between ground and airborne application available. Therefore, the sender typically does not know whether and when the receiver has received the information correctly.
- The transport may take some time. The information transported over physical media should be “self contained” and not of a “request/response” type.
- The files which reside on physical media may be signed and/or encrypted.

The following physical media may be supported:

- CD
- DVD
- USB memory stick

2.3.1 File System, Naming Structure, and Documents Organization

The file system depends on the peripheral used (USB stick, DVD, etc.). See following sections for details.

The Character set to be used for naming directories and filenames should be the following: see parameter type F in Table 4.1.2.

COMMENTARY

It was decided not to allow the use of lower case character due to the discrepancies between various Operating System (OS)/file systems.

Maximum filename (including the path) length should be 120 characters. Maximum filename should be 64 characters.

This 64 characters limitation for filename is due to Joliet CD system limitation.

2.3.1.1 Folder and File Structure

Various options are available for transferring files over physical media: activating security or not.

2.0 MESSAGE ENCODING AND TRANSPORT

If no security is used, the folders should be present in the root directory of the physical media used.

The names of the folders can be found in the corresponding application sections.

Data from multiple applications on a single physical device is allowed. If in this case authentication is used, each data package is treated separately.

Alternate solutions for folders and file structures are allowed if security is used.

2.3.2 Media Specificities

2.3.2.1 CD

Any type of CD should be accepted by the receiving system.

The ISO9660 file system and the IEEE standard Rock Ridge extension should be used. Alternately, the Joliet extension may be used.

2.3.2.2 DVD

Any type of DVD should be accepted by the receiving system.

It is recommended to use UDF.

2.3.2.3 PC-Card, USB Stick, and Similar

The file system should be FAT32.

2.3.3 Rules or Import/Export of Files

The system should prohibit Autorun; however, Autodetect should be allowed.

It is recommended that receiving systems do not erase automatically files read on a physical medium. However, if supported by the physical media, erasing files may be possible as an administrator or user option.

If the airborne application, receiving a data package on a physical media, requires writing on the media, this will be mentioned in the section in this specification that describes the application.

3.0 ACARS MESSAGE SECURITY AND COMPRESSION

3.0 ACARS MESSAGE SECURITY AND COMPRESSION

This section introduces ACARS security and is for information purposes only; refer to **ARINC Specification 823: Datalink Security** (Parts 1 and 2) for detailed provisions. Security services applicable to IP links and IP networks will be added in a future supplement.

The aeronautical datalink communications environment is vulnerable to attacks by unauthorized entities that may access or modify AOC messages, the consequence of which may be to jeopardize the safety and integrity of aircraft operations or to expose sensitive information. The primary targets of exploitation are the air-ground data links, which are open RF channels, and the ground-ground networks, which may include both private and public communication networks.

Airlines and aircraft operators recognize the benefits of protecting aeronautical datalink messages to ensure safety of flight, to maintain competitive advantage, to reduce operational liability, and to comply with legislative and/or regulatory requirements for protecting information linked to individuals. Consequently, airlines have indicated their desire for the capability to protect the datalink messages defined herein from unauthorized disclosure and modification. This section sets forth, through reference, the provisions available for the airlines to achieve this objective.

3.1 Airline Operations Considerations

The primary goal of message security is to provide protection appropriate for AOC messages, with consideration of the systems involved (e.g., legacy issues), end-users needs, and existing airline operations.

Until recently the aircraft has operated autonomously from the airline ground data communications network infrastructure. Datalink connections to the aircraft were made over dedicated, private ACARS links (i.e., VHF, HF, and Satcom) provided by a Datalink communication Service Provider (DSP). Other commercial links provided dedicated passenger services (e.g., telephone, television, and more recently, access to the Internet) as an independent function. However, airlines are investigating new air-ground links and airborne networking architectures that will increase the use of shared services and further blur the distinctions among onboard functions.

COMMENTARY

The scope of this current specification of security services is limited to paths supporting ACARS messages. However, as airlines take advantage of new broadband communication links to provide connectivity to the aircraft, security services must also be extended to protect AOC message exchanges via IP-based links.

From an airline operations perspective, it is also important to note that information security solutions are not simply the introduction of cryptographic algorithms, but rather they include an inter-related set of management, operational and technical security controls, where:

- Management controls focus on processes that are performed by an airline to maintain aircraft information system security to an acceptable level of risk. Examples include specification of a security policy and configuration management of information systems in accordance with the specified security policy.
- Operational controls focus on processes that are performed by people. Examples include training of airline personnel in the proper operation of

3.0 ACARS MESSAGE SECURITY AND COMPRESSION

information security systems and periodic security maintenance (e.g., updating keys and certificates in accordance with airline security policy).

- Technical controls include those mechanisms that are implemented primarily in hardware, software, and firmware. Examples include encryption, message authentication, and data integrity algorithms.

In general, an operational control has one or more associated management controls, and a technical control has one or more associated operational and management controls. Investment in supporting management and operational controls is necessary to achieve effective implementation, deployment, operation, and maintenance of technical controls.

3.2 ACARS Message Security

In May 2005 in response to the security needs identified by the AOC Standardization Subcommittee, the AEEC Data Link Systems (DLK) Subcommittee proposed a work effort to develop ARINC Project Paper 823, an ACARS Message Security (AMS) Standard. Development of the AMS Standard was guided by **ARINC Report 811: Commercial Aircraft Information Security Concepts of Operation and Process Framework**, which describes a risk-based information security process that facilitates identification of appropriate cost-effective security controls to reduce risk to an acceptable level.

The ACARS Message Security (AMS) Standard is a two-part document.

ARINC Specification 823: Datalink Security – Part 1, ACARS Message Security specifies provisions for protecting messages that are exchanged via the existing ACARS communications infra-structure, independent of the underlying ACARS datalink sub-network (e.g., VHF, HF, or Satcom). ARINC Specification 823, Part 1, includes policy-based security, which permits each airline to apply its organizational security policies regarding protection of AOC messages. Airlines select the messages that require protection and select the security services, which include:

- **Data Confidentiality (i.e., encryption)** – Provides assurance that AOC message content is protected from disclosure to unauthorized entities during transmission. ARINC 823 supports multiple encryption algorithms, which permits airlines to select the algorithm and level of protection that is consistent with its organizational security policies regarding protection of AOC messages.
- **Data Integrity** – Provides assurance that an AOC message is protected against modification subsequent to creation and transmission by an authorized source.
- **Message Authentication** – Mitigates spoofing threats and provides a message recipient with assurance that the source of an AOC message is as-claimed.
- In addition, ARINC Specification 823 Part 1 includes data compression techniques, which reduce the transmitted message size and minimize the effects of security overhead. As in the case of encryption algorithms, the AMS standard also supports multiple compression algorithms, which permits algorithm selection based on the message characteristics (e.g., character-oriented versus bit-oriented).

ARINC Specification 823: Datalink Security – Part 2, Key Management includes guidance and provisions for life-cycle management (i.e., assignment, generation, distribution, installation, maintenance, termination) of the cryptographic keys that are necessary for operation of the data confidentiality,

3.0 ACARS MESSAGE SECURITY AND COMPRESSION

data integrity, and message authentication security services. ARINC Specification 823 Part 2 includes two key management alternatives: Public Key Infrastructure (PKI) and shared secret key. These key management alternatives provide an organization (e.g., airline and/or third-party service provider) with the flexibility to manage keys in a manner that is consistent with its organizational security policies and operations.

3.3 IP-Based Security

To be addressed in a future supplement.

4.0 MESSAGE STRUCTURE

4.0 MESSAGE STRUCTURE

This section defines common rules for structuring, composing and encoding the messages. Three technologies are available for transmission of these messages: ACARS, IP, and physical media. It has been decided, for those messages sent over ACARS, to define an optimized specific language and encoding scheme. XML language has been defined for the other media.

However, applying one encoding scheme should not constrain the medium to be used: for example, it should be possible to send ACARS encoded messages over IP.

If an airborne end system (CMU or EFB) uses UDP or TCP over IP only, then it is expected to use XML for message encoding. If an airborne end system uses ACARS or ACARS over IP, then it may use ACARS for message encoding. However, no general rule can be defined: please refer to the appropriate sections for recommended formats for air-ground and ground-ground exchanges.

Section 4.1 specifies the Meta definitions, i.e., the vocabulary that we will use to define parameter types.

Section 4.2 specifies the standard parameter types that are used in message definitions.

Section 4.3 defines the generic element structure (messages are composed of elements).

Section 4.4 defines the generic message structure for ACARS and XML formats. All messages defined in this document (in the following sections) are compliant to this generic message structure.

4.1 Meta-Definitions

Parameters are defined using the following conventions:

Table 4.1-1 – Parameter Length

Code	Range	Example
"integer"	A number directly preceding a meta character defines how many times the meta character should appear and therefore defines how long that part of the parameter is. Note that e.g., 3A has the same meaning as AAA	3A
("min"-"max")	Value range between minimum and maximum value	(3-5)A
(0-n)	Optional parameter of variable length	(0-n)C
V	Variable (1 - max length shown)	

4.0 MESSAGE STRUCTURE

Table 4.1-2 – Parameter Format

Code	Range
A	A to Z
B	Boolean (0, 1)
C	(A to Z) + (0 to 9) + (.) + (-) + (sp)
DD, DDD	Degrees (00 to 90) or (000 to 180)
E	(A to Z) + (a to z)
F	(A to Z) + (0 to 9) + (.) + (-) + ()
<hh> or HH	Hours (00 to 23)
I	A single ISO #5 character between hex 20 and hex 7E, except “,” or “/”
J	Hex (0 to 9) + (A to F)
<mm> or MM	Minutes (00 to 59)
N	0 to 9
SS	Seconds (00 to 59)
T	Tenth of Minutes (0 to 9)
X	(A to Z) + (0 to 9)
Q	Sign (+,-), where (+) is optional
Y	Compass Direction (N, S)
Z	Compass Direction (E, W)
[]	Optional content. May or may not appear within a parameter

Table 4.1-3 – Other Meta Descriptions

Entry	Interpretation
Underlined characters or characters in “apostrophes”	Constants
<lower case character>	Description of variable text to be displayed or printed

4.2 Parameters Definitions

4.2.1 General

- A parameter is an object that contains data.
- A parameter can be defined directly by the use of Meta definitions in Section 4.1 or indirectly by the use of existing parameter type definitions.
- For the definition of physical values, a parameter type definition should use units typically used in aviation. If multiple units are in use, metric units should be used for communications. Applications may deviate from this general rule.
- Parameter type definitions which are useful for multiple applications are defined in Section 4.2.2.
- A parameter is referenced by its name. When naming parameters, it is suggested, to concatenate the words that build the parameter name and capitalize the first letter of each word, e.g., DepartureAirport.

4.0 MESSAGE STRUCTURE

COMMENTARY

The following conversion rules between metric and non metric units are deemed acceptable – this will have to be checked with the appropriate authorities when operational approval is needed:

- kg ==> lb 1 / 0.45359237
- lb ==> kg 1 x 0.45359237
- l ==> usg 1 x 0.2641721
- usg ==> l 1 x 3.785412
- M ==> in 1 x 39.37008
- in ==> m 1 x 0.0254

The structure of the parameter is defined by the parameter type definition. All parameter types are simple one dimensional character strings of fixed or variable length and defined structure. Parameter content which does not conform to its parameter type is considered invalid data.

COMMENTARY

All mass parameters in this specification have been named as weights, because the term weight is more commonly used than the term mass.

4.2.2 Parameter Type Definitions

The Parameter Type Definition Table defines parameters, which may appear in multiple applications.

Table 4.2.2-1 – Standard ACARS Parameter Type Definition Table

Parameter Type	Parameter Definition	Description	Content Example
dateTime	YYMMDD HHMMSS	full UTC date format (Year, Month, Day, Hour, Minute, Second)	050217235959
date	YYMMDD	date format (Year, Month, Day) 2 digits each	050217
day	DD	day, always in 2 digits	01, 17
time	HHMMSS	UTC time format (Hours, Minutes, Seconds), 2 digits each	235959, 000000
timeMin	HHMM	abbreviated UTC time format (Hours, Minutes), 2 digits each	2359, 1234
boolean	B	1= Yes or normal, 0 = No, degraded or broken Empty or any other number means not defined.	0
string	(0-n)l	any unstructured string	AEEC633
name	(0-50)E	up to 50 alpha characters	Smith
integer	(1-9)N	Integer value between 0 and 999999999.	123

4.0 MESSAGE STRUCTURE

Standard XML Type Definitions:

Note: Standard ACARS and standard XML types may be coded differently, e.g., W3C defines “dateTime” as:

“YYYY-MM-DDTHH:MM:SS-0x:00”, while in ACARS
“dateTime” is defined in this document as
“YYMMDDHHMMSS”.

Table 4.2.2-2 – Specific ACARS Parameter Type Definition Table

Parameter Type	Parameter Definition	Description	Content Example
FlightIdentifierType	(1-10)C	Flight Identifier = ATC call sign. This parameter is the parameter used when filing the flight plan to the ATC. On the aircraft, it is the parameter entered on the FMS by the crew. This parameter is most of the time compliant to ICAO Doc 4444 Appendix 2 field 7 but there may be local regulations allowing different formats for their national flights.	KLM5K, AFR5556
FlightNumberType	(1-10)C	Flight number = commercial flight number generally compliant to IATA Flight No	LH012T, BA12345
AircraftRegistration Type	(5-7)C	Aircraft registration in official format (preferably without leading periods). Checks from receiving systems should be tolerant to the presence of leading periods. Note: hyphens are often used in the official aircraft registration.	N712UA, F-GGEG, D-AIPA, F-WWOW
mass-ttType	(3-4)N	mass in tenth of tons	890
mass-kgType	Q(1-6)N	mass in kilograms	89015
volume-ltType	(1-6)N	volume in liters	0,135998
center-of-gravityType	NNN	center of gravity values in tenth of percent of mean aerodynamic chord	324
density-mType	NNN	metric density: 1000 * mass in kilogram / volume in liters	802
provider-idType	AAA	provider ID, e.g., the international standardized fuel supplier codes	SHL
nameType	(0-50)E	up to 50 alpha characters	Smith
labelType	XX	ACARS label	RF
Char3Type	XXX	can be used for service or message ID	SUB
ICAOType	XXXX	ICAO 4-character airport code	LFBO
IATAType	XXX	IATA 3 characters code	TLS
aircraftType	(2-4)X	ICAO A/C type (as per document 4444 appendix 2 (see ICAO doc using the aircraft designator as specified in ICAO 8643) – if no such designator has been assigned, insert ZZZZ.)	B734 (for B737-400)
aircraftSubType	(0-4)C	Additional A/L specific aircraft type definition	
waterquantityType	(1-4)N	Water quantity in tenth of percent	80

For specific XML Type Definitions: refer to Section 5.

4.0 MESSAGE STRUCTURE

4.3 Generic Element Structure

4.3.1 General

- An element is an object within a message, which forms a logical block.
- Elements consisting of parameters that are not part of the message envelope are called content elements.
- For IP messages, elements are defined using XML Schema version 1.0 syntax
- For ACARS messages, elements are defined using Message Definition Tables.
- An element or an ACARS message is referenced by its name. See the definition of element names below

Example of a XML-attribute coded content element containing 8 out of 13 parameters:

```
<SSSMMM orderFlag="1" acknowledgeFlag="1" finalFlag="1"
actualFlag="1" serviceAirport="" intoPlaneService="BPC"
serviceFlight="" blockFuel="87" taxiFuel="200" tripFuel="3450"
remaining="" aircraftMassUnitDisplay="" limitMass="" limitType="" />
```

Example of the same element, coded for ACARS (no header is shown here):

```
1,1,1,1,,BPC,,87,200,3450,,,
```

4.3.2 Element Names

- In ACARS, the element name appears as part of the message envelope before the contents of the element. See Section 4.4.2.
- Elements are referenced by an alphanumeric name. In ACARS, element name consists of serviceId followed by MessageId and version number as specified in Section 4.4.2 (e.g., FDASUB01). In XML, the ServiceId followed by message Id is used to name the element – version number is defined as an attribute of the element.
- In an IP environment, the element name appears before and after the contents of the element, as it is usual for XML. Refer to Section 4.4.3 for details.

For some messages, the application needs to be formally identified. The application is identified using the Standard Message Identifier (SMI) it supports (3 characters). When a given application supports multiple labels, then one SMI supported by this application will be selected as an identifier.

See the following table for list of element and application identifiers.

Table 4.3.2-1 – Application Ids, and Element name formats

Number of Chars	Parameter Name	Format / parameter type	Example	Note
3	ApplicationID	Char3Type	JRF	
3	ServiceID	Char3Type	FPA	
3	MessageID	Char3Type	SUB	
2	VersionNb	NN	01	

4.0 MESSAGE STRUCTURE

Notes:

1. The term “**Application**” is used for a group of functions (called services) which are typically closely related to each other and which originate in one end-system and end in one end-system. Application Identifiers need to be unique within this document. For ACARS, the SMI is used as Application Identifier. An end-system like the CMU AOC can consist of multiple applications.
2. A “**Service**” consists of a flow of one or more messages to fulfil a given function. The service definition consists of element structure definitions and dynamic information giving guidelines about the conditions when the messages are generated and what they trigger when received by the sink. Service Identifiers need to be unique within each application.
3. The **Messages Identifier** (MessageID) identifies the purpose of a message or element within a service. Message Identifiers need to be unique within each service.
4. The **Version Number** identifies the version of the message. All messages used within a service should have the same version number (VersionNb).

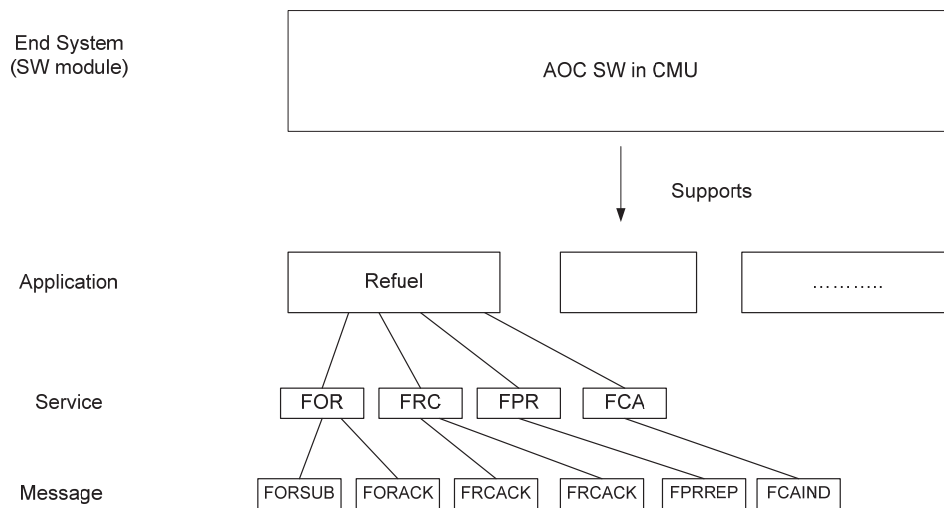


Figure 4.3.2-1 – Illustration of Application-Service-Message Concept

The following table gives some guidelines when defining Message Identifiers:

Table 4.3.2-2 – Message Identifier Table

Message Identifier	Description
IND	Element used to indicate an event
COM	Element used to command an action
REQ	Element used to request parameters
REP	Element used to report parameters
SUB	Element used to submit (insert) parameters
ACK	Element used to acknowledge parameters

4.0 MESSAGE STRUCTURE

4.4 Generic Message Structure

4.4.1 General

- A message is an object which can be transmitted over a communication channel independently from other objects.
- An ARINC 633 Message is a message which follows the message definitions of this document. It consists of one message envelope containing one message header, null or one content elements and one trailer. It can be either coded using ACARS or XML conventions.
- An ACARS message, in the context of this document, is an ARINC 633 message contained in an ARINC 618/620 envelope. An ARINC 633 ACARS message can only contain null or one content element. In an ACARS environment, an “element definition” is a message definition, except that it does not include the 633 message envelope.
- An XML message, in the context of this document, is an ARINC 633 message coded using XML conventions and typically sent over an IP protocol stack or physical media

COMMENTARY

It has been decided to reserve a block of ACARS message labels in ARINC 620 and use separate ACARS labels for separate functions. That means that at least for the time being and for ACARS a message can contain only one content element. However, it has also been decided to repeat the functional meaning in the element itself. In this specification this is done by writing the element name in front of the list of element parameters.

It has been decided to use one label per application. An Application cannot be spread over multiple end-systems, but an end-system can have multiple applications.

4.4.2 ACARS Message Envelope

4.4.2.1 General

- ACARS messages are defined by the use of two tables: Message Envelope Table and Supplementary Downlink Header Table
- The Message Envelope Table shows everything, except preceding Message Function Identifier (MFI) and/or supplementary addresses, which is inserted in the text field portion of an ARINC 620/618 message. The Supplementary Downlink Header and the Content Element are nested within the Message Envelope
- The Supplementary Header Table contains additional header parameters that may be used by an application for downlinks and uplinks
- The ARINC 618 label and optionally sub-label will be specific to each application, for example the label “RF” is used for the Refuel-CG Targeting application.

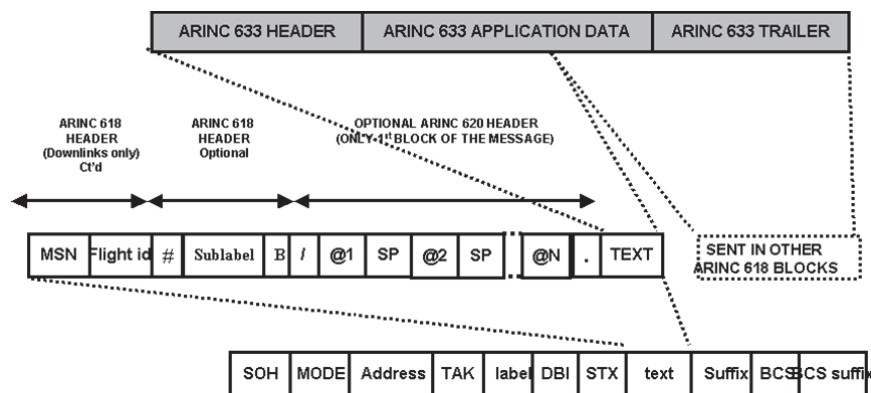
ACARS messages are sent and received by the aircraft using ARINC 618 protocol. ARINC 633 messages are encapsulated with ARINC 620 format, and then sent/received using ARINC 618 protocol. ARINC 618 protocol is outside the scope of the application (managed by the CMU). The present document only encompasses ARINC 633 header, application data and trailer. ARINC Specifications 618 and 620 cover other protocol fields.

4.0 MESSAGE STRUCTURE

The ARINC 633 message fields are inserted as text field of ARINC 620/618 messages – and may be preceded by MFI and/or supplementary addresses.

The ARINC 618 label and optionally sub label and MFI will be specific to each application.

Please refer to ARINC Specifications 618 and 620 for further details on ACARS message format. Below is an example of how an ARINC 633 ACARS Message, composed of a header, application data and trailer, is split and inserted by the CMU in ARINC 618 downlink blocks. Also refer to appendix B for illustration of ARINC 618, 620 and 633 protocols relationships.



Example of ARINC 618/620/633 protocol encapsulation for Downlinks

NB: @= supplementary address (1st one maybe an MFI)
"SP" stands for space character

Figure 4.4.2.1-1 – ARINC 633 Message Split into ARINC 618 Blocks

4.4.2.2 ACARS Message Envelope Structure

Table 4.4.2.2-1 – ACARS Message Envelope

Size in Char	Parameter Name	Format or parameter type	Example	Option	Note
0-n1	reserved				
1	delimiter	comma	,	No	
3	serviceID	Char3Type	FPA	No	6
3	messageID	Char3Type	SUB	No	6
2	versionNb	NN	01	No	6
12	headerTimestamp	datetime	050217115932	No	
0-n2	Supplementary Header Element	see Table 4.4.3.2.2 below	see example	Yes	6
1	ContentElementStartCharacter	slash	/	No	7
0-n3	Message Content Element	See messages definition		Yes	
1	Parameter Delimiter	comma	,	No	
1	FreeTextStartCharacter	slash	/	see note	3
0-n4	FreeText	(0-n)l	Free Text	Yes	
4	Application CRC (16 bit)	JJJJ	12AB	No	4

Notes:

1. This value may be omitted to indicate raw content or may specify an encoding type.

4.0 MESSAGE STRUCTURE

2. Specifies the schema version for the content. If this field is specified, the preceding field must be specified as well.
3. The FreeTextStartCharacter is only needed if followed by FreeText.
4. Applications may or may not use this element. However, if an individual ACARS message definition mandates it, it is not optional.
5. CRC is mandatory for ACARS encoded ARINC 633 messages, the same calculation as used in ARINC 622, and covers all ARINC 633 fields of the message envelope table, except the CRC itself.
6. As defined in Section 4.3.2, the element name, which split into application identifier (label), service identifier, message identifier and version number, is part of the Generic Message Structure in ACARS encoded messages and is part of the content element in IP encoded messages
7. In order to stay compatible with possible future header changes, it is recommended that applications check for this character instead of counting the elements in the header in order to identify the start of the content element.

Table 4.4.2.2 – ACARS Supplementary Header Table

Size in Char	Parameter Name	Format or parameter type	Example	Option	Note
4	deplCAOCd	ICAOType	LFPO	Yes	1, 2
1	delimiter	comma	,	No	
3	deplIATACd	IATAType	CDG	Yes	2
1	delimiter	comma	,	No	
4	destICAOCd	ICAOType	LFBO	Yes	1, 2
1	delimiter	comma	,	No	
3	destIATACd	IATAType	TLS	Yes	2
1	delimiter	comma	,	No	
1-7	flightID	flightIDType	AFR5556	Yes	3, 4
1	delimiter	comma	,	No	
1-8	flightNum	flightNumType	AF5556	Yes	3, 4
1	delimiter	comma	,	No	
6	departureDate	Date	050217	No	
1	delimiter	comma	,	No	
4	departureTime	timeMin	1235	Yes	5
1	delimiter	comma	,	No	
3-4	acType	aircraftType	A380	No	
1	delimiter	comma	,	No	
3-4	acSubType	aircraftSubType	800	Yes	
1	delimiter	comma	,	No	
5-7	regist	RegistType	F-WWOW	No	
1	delimiter	comma	,	No	
0-n	Reserved			Yes	

The supplementary header fields should be used at least to associate the data to a given aircraft and flight. Some airborne applications may decide to check if the messages are intended to the right entity. In this case, it is advised to use primarily the aircraft registration (flightID and flightNum format can vary).

4.0 MESSAGE STRUCTURE

COMMENTARY

Supplementary header structure is designed to be consistent with XML supplementary header. Some differences exist but they only apply to parameter type definition. For example, IATA airport code is defined as 'XXX' in ACARS while it is a 3 characters string in XML.

Notes:

1. Per ICAO Document 4444
2. Destination and Departure airport codes are mandatory, but ICAO or IATA format can be used: ICAO code only, IATA code only, or both are allowed.
3. At least one identifier for the flight is required, but either Flight Id or Flight Number can be used, or both.
4. The Flight Id or Flight Number used should designate the flight to which the message is applicable, that may be different from the current flight (for example next flight).
5. May be STD (Scheduled Time of Departure) or EOBT (Estimated OffBlock Time). This parameter is optional and should not be used for identification of flight (automatic matching of received messages with local flight information).

4.4.2.3 Examples

ACARS encoded uplink example with supplementary header (excluding ARINC 620 header and label)

```
,FRCSUB01050217065159
LFPG,,KJFK,,AFR5556,,050217,,A380,,F-WWOW,
/CAFS,BPC,H10556,1,8522A,58100,LT,802,45596,KG,, ,xxxx
```

Note: xxxx is the CRC

Notes:

1. The “633 part” of an ARINC 633 ACARS message is contained in the “free text” section of an ARINC 618/619/620 message. The samples show only this “633 part”, the 618/619/620 header and trailer are not shown. Therefore, the ACARS address (e.g., the aircraft registration) and the label or SMI is not shown in the examples. For informational purposes, appendix B contains examples including the full ARINC 618/619/620 header and trailer.
2. The 633 part of an ARINC 633 ACARS messages does not contain control characters like carriage return, line feed or similar. If sample messages are split in separate lines, this is done for better readability only.
3. For the sample messages, the CRC has not been calculated. Therefore, it is added as “xxxx”.

4.4.3 XML Message Definition

4.4.3.1 General

XML messages are defined using XML Schemas version 1.0 as defined by W3C.

All schemas have precedence over the text.

4.0 MESSAGE STRUCTURE

4.4.3.2 XML Message Envelope Structure

Message Envelope XML Schema

XML message structure should be the same for uplinks and downlinks.

The root element of an XML encoded message should be named as follows:

```
<xs:element name="XXXYYY">
```

where XXX is the ServiceId (3 characters) followed by YYY, the MessageId ident (3 characters).

The message should include the mandatory header

```
<xs:element ref="M633Header"/>
```

and the supplementary header

```
<xs:element ref="M633SupplementaryHeader"/>
```

Depending on the application, and especially if there is a user involved in the message processing, it may be useful to add free text.

It is recommended that the free text be included as a specific element (string) under the service+message element definition. It is recommended to use the element name 'FreeText'.

4.4.3.3 Examples

Hereafter is an example of how an XML definition of a set of messages looks like. This definition is embedded in a schema. There is one schema per application (here it is REFUELING). This schema also refers to the M633 headers definition (in a separate schema, called m633headers). The schema below defines several messages (please note that the refuelling application (Section 6.3) supports more than these 3 messages). The schema below is provided as EXAMPLE ONLY: it is not complete – please refer to the Electronic Document for complete definition of fuel XML schemas.

```
<?xml version="1.0" encoding="UTF-8" ?>
xs:schema xmlns="http://aeec.aviation-ia.net/633"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://aeec.aviation-ia.net/633"
elementFormDefault="qualified" attributeFormDefault="unqualified"
version="2">
<!-- *****-->
  <xs:include schemaLocation="../m633headers/m633headers.xsd" />
<!-- *****-->
<!-- FCA (Fuel CG Advisory) messages Definition -->
<!-- *****-->
  <xs:element name="FCAIND" nillable="false">
    <xs:complexType>
      <xs:sequence>
        <xs:element ref="M633Header"/>
        <xs:element ref="M633SupplementaryHeader"/>
        <xs:element name="FwdTakeoffCenterOfGravityLimit"
nillable="false">
          <xs:annotation>
            <xs:documentation>fwd limit for takeoff CG in percent of
mean aerodynamic chord according operational envelope
</xs:documentation>
          </xs:annotation>
          <xs:simpleType>
            <xs:restriction base="xs:float">
              <xs:minInclusive value="0"/>
              <xs:maxInclusive value="100"/>
            </xs:restriction>
          </xs:simpleType>
        </xs:element>
      </xs:sequence>
    </xs:complexType>
  </xs:element>
</xs:schema>
```

4.0 MESSAGE STRUCTURE

```

        </xs:simpleType>
      </xs:element>
      <xs:element name="AftTakeoffCenterOfGravityLimit"
nillable="false">
        <xs:annotation>
          <xs:documentation>aft limit for takeoff CG in percent of
mean aerodynamic chord according operational envelope
</xs:documentation>
        </xs:annotation>
        <xs:simpleType>
          <xs:restriction base="xs:float">
            <xs:minInclusive value="0"/>
            <xs:maxInclusive value="100"/>
          </xs:restriction>
        </xs:simpleType>
      </xs:element>
      <xs:element name="CalculatedTakeoffCenterOfGravity"
nillable="false">
        <xs:annotation>
          <xs:documentation>CG value calculated for takeoff in
percent of mean aerodynamic chord</xs:documentation>
        </xs:annotation>
        <xs:simpleType>
          <xs:restriction base="xs:float">
            <xs:minInclusive value="0"/>
            <xs:maxInclusive value="100"/>
          </xs:restriction>
        </xs:simpleType>
      </xs:element>
      <xs:element name="TakeoffWeight" nillable="false">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="xs:nonNegativeInteger">
              <xs:attribute name="unit" type="weightUnitType"
use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
      <xs:element name="TaxiFuel" nillable="false">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="xs:nonNegativeInteger">
              <xs:attribute name="unit" type="weightUnitType"
use="required"/>
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
</xs:element>
<!--*****-->
<!-- FRC (Fuel ReCeipt) messages Definition -->
<!--*****-->
  <xs:element name="FRCSUB">
    .
    .
  </xs:element>
<!--*****-->
  <xs:element name="FORACK">
    .
    .
</xs:element>
</xs:schema>

```

4.0 MESSAGE STRUCTURE

4.4.4 M633Headers

M633 headers are inserted mainly to identify the flight in terms of:

- Used XML schema version (@versionNumber)
- Timestamp of the message generation (@timestamp)
- FlightIdentifier
- Commercial Flight Number (CommercialFlightNumber)
- Scheduled Time of Departure (@flightOriginDate;
@scheduledTimeOfDeparture)
- Departure Airport (DepartureAirport)
- Arrival Airport (ArrivalAirport)
- Etc.

4.4.4.1 M633Header

M633Header is a mandatory header of the ARINC633 message.

element M633Header

diagram	M633Header mandatory header of ARINC633 message attributes versionNumber schema version identifier: versionNb: 1 for A633 V1, versionNumber=2 for A633 Supplement 1, versionNumber=3 for A633 Supplement 2 timestamp timestamp of message generation					
used by	elements	AirportData AirportWeather AirspaceData ATIS CrewList DORACK DORIND DORSUB DPRREP DRCACK DRCSUB FCAIND FDAACK FDACOM FDASUB FENIND FERIND FlightPlan FlightPlanAtclcao FORACK FORSUB FPRREP FRCACK FRCSUB FSTREP FSTREQ FTBIND FTEIND FTIIND GERIND HazardBriefing NOTAMBriefing PaxList PIREPBriefing RegionWeatherBriefing UpperAirData WIFSUB WIISUB WIMSUB WIRREP				
	complexTypes	EFFREQType EFFType				
attributes	Name	Type	Use	Default	Fixed	annotation
	versionNumber	derived by: xs:nonNegativeInteger	required			documentation schema version identifier: versionNb: 1 for A633 V1, versionNumber=2 for A633 Supplement 1, versionNumber=3 for A633 Supplement 2
	timestamp	xs:dateTime	required			documentation timestamp of message generation
annotation	documentation mandatory header of ARINC633 message					

4.0 MESSAGE STRUCTURE

attribute M633Header/@timestamp

type	xs:dateTime
annotation	documentation timestamp of message generation

attribute M633Header/@versionNumber

type	restriction of xs:nonNegativeInteger
annotation	documentation schema version identifier: versionNb: 1 for initial release of ARINC Specification 633 , versionNumber=2 for ARINC Specification 633 Supplement 1, versionNumber=3 for ARINC Specification 633 Supplement 2

The version number of the schemas in the original gray cover (ARINC Specification 633) is versionNumber = 1. Thus, the version number of the schema will always lead the number of the associated gray cover supplement by one. For example, the version number of the schema associated with Supplement 1 has versionNumber = 2 **and Supplement 2 has versionNumber = 3.**

Standard	versionNumber
ARINC 633	1
ARINC 633-1	2
ARINC 633-2	3

As shown in this table, the lack of synchronism among the supplement number and the schema number can lead to confusion when references are made. Care must be taken when such references are formulated not to rely solely on the number.

4.4.4.2 M633SupplementaryHeader

M633SupplementaryHeader is a mandatory supplementary header of the ARINC633 XML message.

element M633SupplementaryHeader

diagram		
children	Flight Aircraft	
used by	elements	AirportData AirportWeather AirspaceData ATIS CrewList DORACK DORIND DORSUB DPRREP DRCACK DRCSUB FCAIND FlightPlan FlightPlanAtclcao FORACK FORSUB FPRREP FRCACK FRCSUB GERIND HazardBriefing NOTAMBriefing PaxList PIREPBriefing RegionWeatherBriefing UpperAirData WIFSUB WIISUB WIMSUB WIRREP
	complexTypes	EFFREQType EFFType
annotation	documentation	downlink and uplink supplementary header of ARINC633 message

4.0 MESSAGE STRUCTURE

element M633SupplementaryHeader/Flight

diagram	FlightType attributes flightOriginDate scheduled UTC date for first sector of a flight scheduledTimeOfDeparture scheduled time of departure Flight flight identification: data allowing to identify the flight FlightIdentification flight identifier or commercial flight number DepartureAirport departure airport identifier ArrivalAirport arrival airport identifier					
type	FlightType					
children	FlightIdentification DepartureAirport ArrivalAirport					
attributes	Name	Type	Use	Default	Fixed	annotation
	flightOriginDate	xs:date	required			documentation scheduled UTC date for first sector of a flight
	scheduledTimeOfDeparture	xs:dateTime	optional			documentation scheduled time of departure
annotation	documentation flight identification: data allowing to identify the flight					

element M633SupplementaryHeader/Aircraft

diagram	AircraftType attributes aircraftRegistration Registration aircraftIdentifier airline specific aircraft identifier (fin number, nose number, tail number) Aircraft aircraft identification: data allowing to identify the aircraft AircraftModel aircraft model: ICAO aircraft type and airline specific sub type					
type	AircraftType					
children	AircraftModel					

4.0 MESSAGE STRUCTURE

attributes	Name	Type	Use	Default	Fixed	annotation
	aircraftRegistration	derived by:	required			documentation
	aircraftIdentifier	derived by:	optional			Registration
		derived by:				documentation
		xs:string				airline specific
		xs:string				aircraft
						identifier (fin
						number, nose
						number, tail
						number)
annotation	documentation aircraft identification: data allowing to identify the aircraft					

4.5 TSE2 Encoding

To be added by a future supplement.

5.0 COMMON ELEMENTS

5.0 COMMON ELEMENTS

Application Name	Not Applicable
ACARS Label	corresponds to the application in which the element is used
Introduced	2005
Purpose	Common elements are elements that may be used in multiple applications, e.g., error or caution elements.
Stake Holder	All
Airborne System	All
Ground Systems	All
Network	ACARS and IP
Downlink Routing	

Element List

Element Name	Element ID	Service Version	DL/UL	Purpose
General Error Indication	GERIND	01	DL/UL	General error service

Section 5 defines how complex data sets used by various applications should be structured and encoded. It also defines common communication services, such as general error services.

The data addressed are generally complex and structured data, gathering strongly related parameters. For example, Flight plan is considered as a global data set. [AirportWeather](#) and NOTAMs are also separate data sets.

Definitions are essentially done using XML. The definitions are expected to be used/included in individual application schemas.

Thanks to the strength of XML, it is possible to dissociate data (XML instance) and the representation of the content of the data (XML Stylesheets).

The purpose here is not to standardize the way the data are to be displayed, but to standardize the naming and organization of some elements in order to easily find information in an XML instance of the data.

5.0 COMMON ELEMENTS

complexType AircraftType

diagram						
children	AircraftModel					
used by	element M633SupplementaryHeader/Aircraft					
attributes	Name	Type	Use	Default	Fixed	annotation
	aircraftRegistration	derived by: xs:string	required			documentation Registration
	aircraftIdentifier	derived by: xs:string	optional			documentation airline specific aircraft identifier (fin number, nose number, tail number)
annotation	documentation aircraft identification: data allowing to identify the aircraft					

attribute AircraftType/@aircraftRegistration

type	restriction of xs:string
annotation	documentation Registration

attribute AircraftType/@aircraftIdentifier

type	restriction of xs:string
annotation	documentation airline specific aircraft identifier (fin number, nose number, tail number)

element AircraftType/AircraftModel

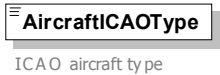
diagram						
children	AircraftICAOType					
attributes	Name	Type	Use	Default	Fixed	annotation
	airlineSpecificSubType	derived by: xs:string	optional			documentation airline specific subtype identifier
annotation	documentation aircraft model: ICAO aircraft type and airline specific subtype					

5.0 COMMON ELEMENTS

attribute AircraftType/AircraftModel/@airlineSpecificSubType

type	restriction of xs:string
annotation	documentation airline specific sub type identifier

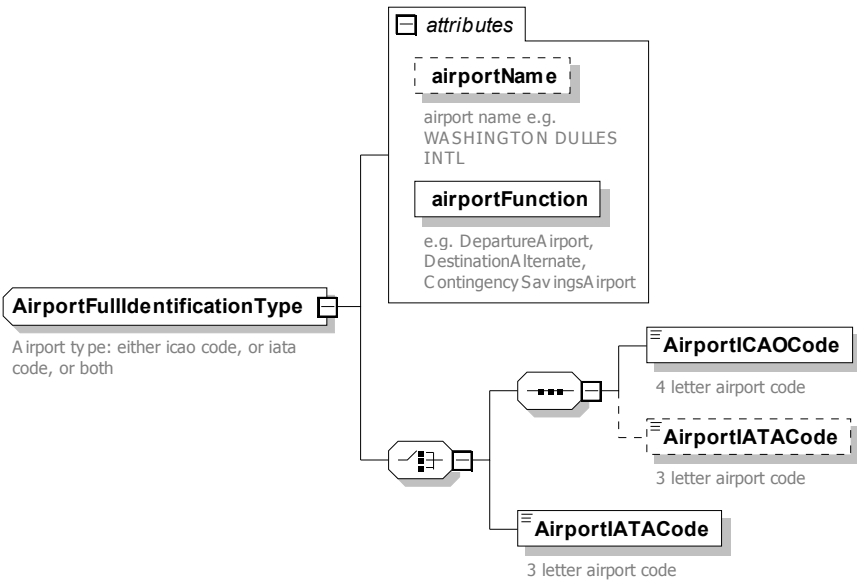
element AircraftType/AircraftModel/AircraftICAOType

diagram	
type	restriction of xs:string
annotation	documentation ICAO aircraft type

simpleType AircraftRegistrationType

type	restriction of xs:string
annotation	documentation definition of registration type 5-7 char

complexType AirportFullIdentificationType

diagram						
children	AirportICAOCODE AirportIATACODE AirportIATACODE					
used by	elements	flightPlanCore.Grp/ETOPSSummary/AdequateAirports/AdequateAirportAlternateRoute/Airport FuelHeaderLineAirportType/Airport flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/SuitableAirport/Airport flightPlanCore.Grp/AirportDataList/AirportData/Airport				
attributes	Name	Type	Use	Default	Fixed	annotation
	airportName	derived by: xs:string				documentation airport name e.g., WASHINGTON DULLES INTL
	airportFunction	airportFunctionType	required			documentation e.g., DepartureAirport, DestinationAlternate, ContingencySavingsAirport
annotation	documentation Airport type: either icao code, or iata code, or both					

5.0 COMMON ELEMENTS

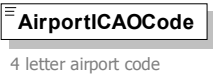
attribute [AirportFullIdentificationType/@airportName](#)

type	restriction of xs:string
annotation	documentation airport name e.g., WASHINGTON DULLES INTL

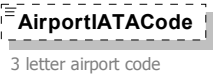
attribute [AirportFullIdentificationType/@airportFunction](#)

type	airportFunctionType
facets	enumeration DepartureAirport enumeration DepartureAlternateAirport enumeration ArrivalAirport enumeration PrimaryArrivalAlternateAirport enumeration ArrivalAlternateAirport enumeration ArrivalViaAlternateAirport enumeration EnRouteAlternateAirport enumeration ContingencySavingAirport enumeration ContingencySavingEnRouteAlternateAirport enumeration PrimaryContingencySavingAlternate enumeration ContingencySavingAlternate enumeration ETOPSAdequateAirport enumeration ETOPSSuitableAirport enumeration EscapeAirport
annotation	documentation e.g., DepartureAirport , DestinationAlternate , ContingencySavingsAirport

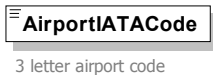
element [AirportFullIdentificationType/AirportICAOCCode](#)

diagram	
type	AirportICAOCCodeType
annotation	documentation 4 letter airport code

element [AirportFullIdentificationType/AirportIATACode](#)

diagram	
type	AirportIATACodeType
annotation	documentation 3 letter airport code

element [AirportFullIdentificationType/AirportIATACode](#)

diagram	
type	AirportIATACodeType
annotation	documentation 3 letter airport code

5.0 COMMON ELEMENTS

complexType AirportIdentificationType

diagram						
children	AirportICAOCode AirportIATACode AirportIATACode					
used by	elements	AirportWeather/WeatherBulletins/WeatherBulletin/Airport ATIS/ATISBulletins/ATISBulletin/Airport NOTAM/Keys/Airports/Airport PIREP/Location/Airport AirportData/Airport/AirportIdentification FlightType/ArrivalAirport flightPlanCore.Grp/ContingencySavingHeader/DecisionPoint/ContingencySavingAirport FlightType/DepartureAirport FuelHeaderLineContingencyType/ContingencyPolicy/EnrouteAlternateAirport LMCLLineDestination				
attributes	Name	Type	Use	Default	Fixed	annotation
	airportName	derived by: xs:string				documentation airport name e.g., WASHINGTON DULLES INTL
	airportFunction	airportFunctionType				documentation e.g., DepartureAirport, DestinationAlternate, ContingencySavingsAirport
annotation	documentation Airport type: either icao code, or iata code, or both					

attribute AirportIdentificationType/@airportName

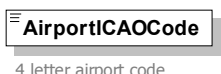
type	restriction of xs:string
annotation	documentation airport name e.g., WASHINGTON DULLES INTL

attribute AirportIdentificationType/@airportFunction

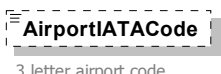
type	airportFunctionType	
facets	enumeration	DepartureAirport
	enumeration	DepartureAlternateAirport
	enumeration	ArrivalAirport
	enumeration	PrimaryArrivalAlternateAirport
	enumeration	ArrivalAlternateAirport
	enumeration	ArrivalViaAlternateAirport
	enumeration	EnRouteAlternateAirport
	enumeration	ContingencySavingAirport
	enumeration	ContingencySavingEnRouteAlternateAirport
	enumeration	PrimaryContingencySavingAlternate
	enumeration	ContingencySavingAlternate
	enumeration	ETOPSAdequateAirport
	enumeration	ETOPSSuitableAirport
	enumeration	EscapeAirport
annotation	documentation e.g., DepartureAirport, DestinationAlternate, ContingencySavingsAirport	

5.0 COMMON ELEMENTS

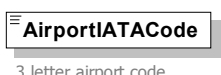
element [AirportIdentificationType/AirportCAOCode](#)

diagram	
type	AirportCAOCodeType
annotation	documentation 4 letter airport code

element [AirportIdentificationType/AirportIATACode](#)

diagram	
type	AirportIATACodeType
annotation	documentation 3 letter airport code

element [AirportIdentificationType/AirportIATACode](#)

diagram	
type	AirportIATACodeType
annotation	documentation 3 letter airport code

simpleType [airportFunctionType](#)

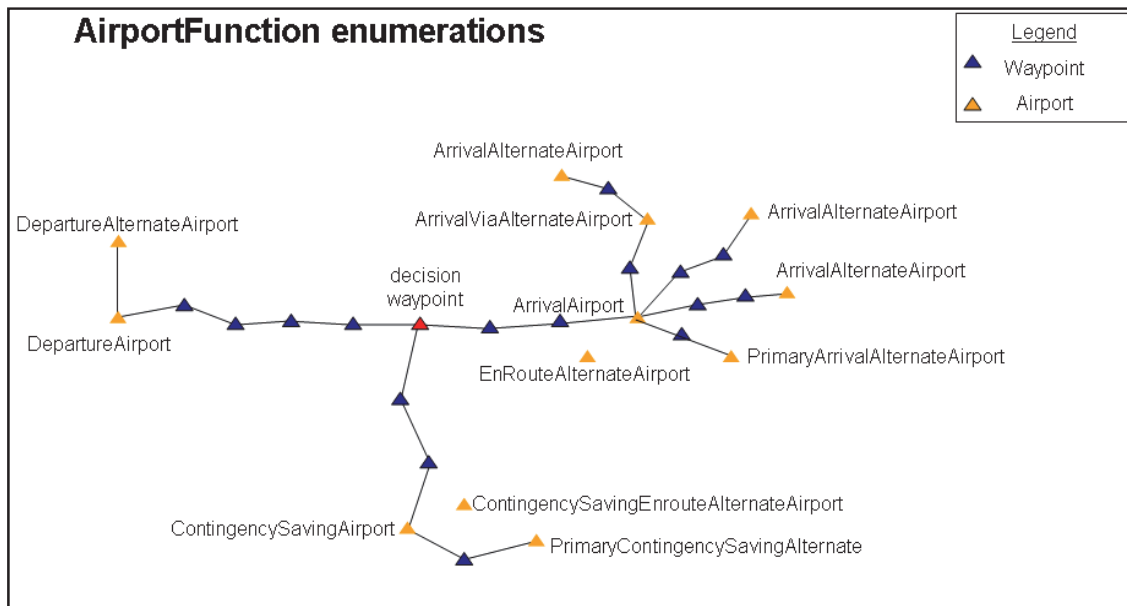
type	restriction of xs:string	
used by	attributes	AirportIdentificationType/@airportFunction AirportFullIdentificationType/@airportFunction
facets	enumeration	DepartureAirport DepartureAlternateAirport ArrivalAirport PrimaryArrivalAlternateAirport ArrivalAlternateAirport ArrivalViaAlternateAirport EnRouteAlternateAirport ContingencySavingAirport ContingencySavingEnRouteAlternateAirport PrimaryContingencySavingAlternate ContingencySavingAlternate ETOPSAdequateAirport ETOPSSuitableAirport EscapeAirport
annotation	documentation list of possible airport functions	

The need for clear identification of each provided airport and its function on the application side requires an exact list of possible values. (See the graphics below).

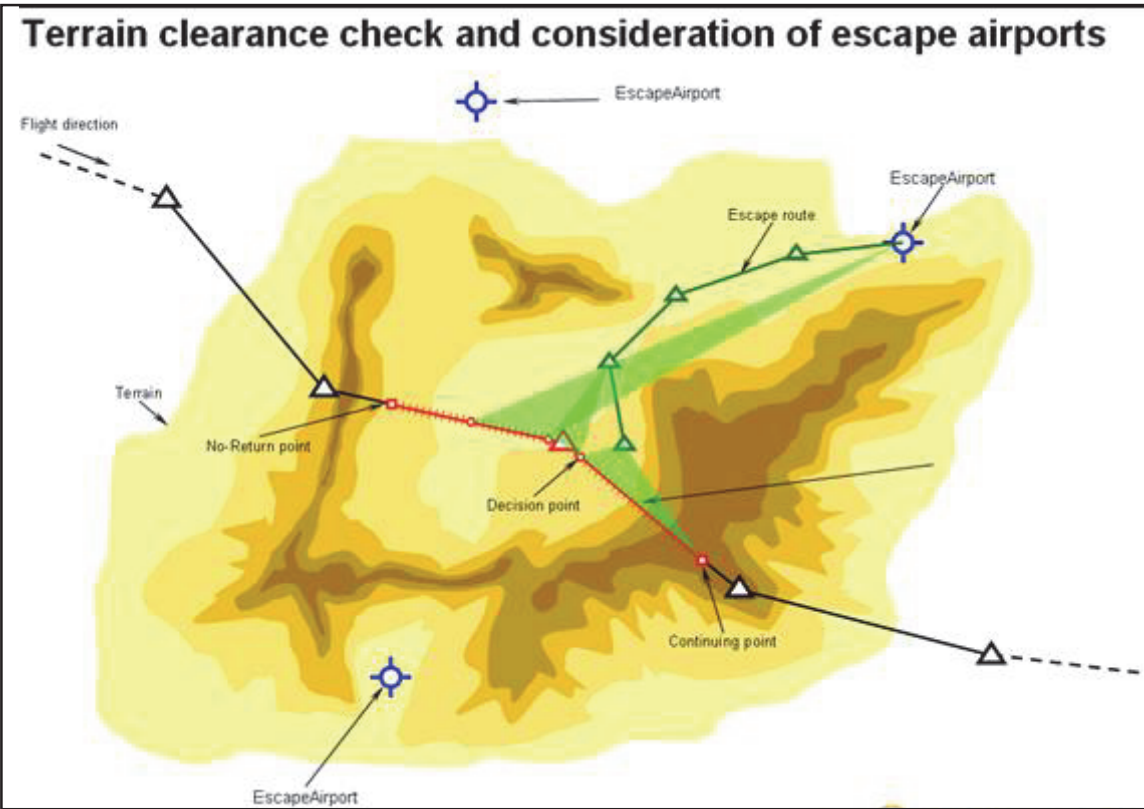
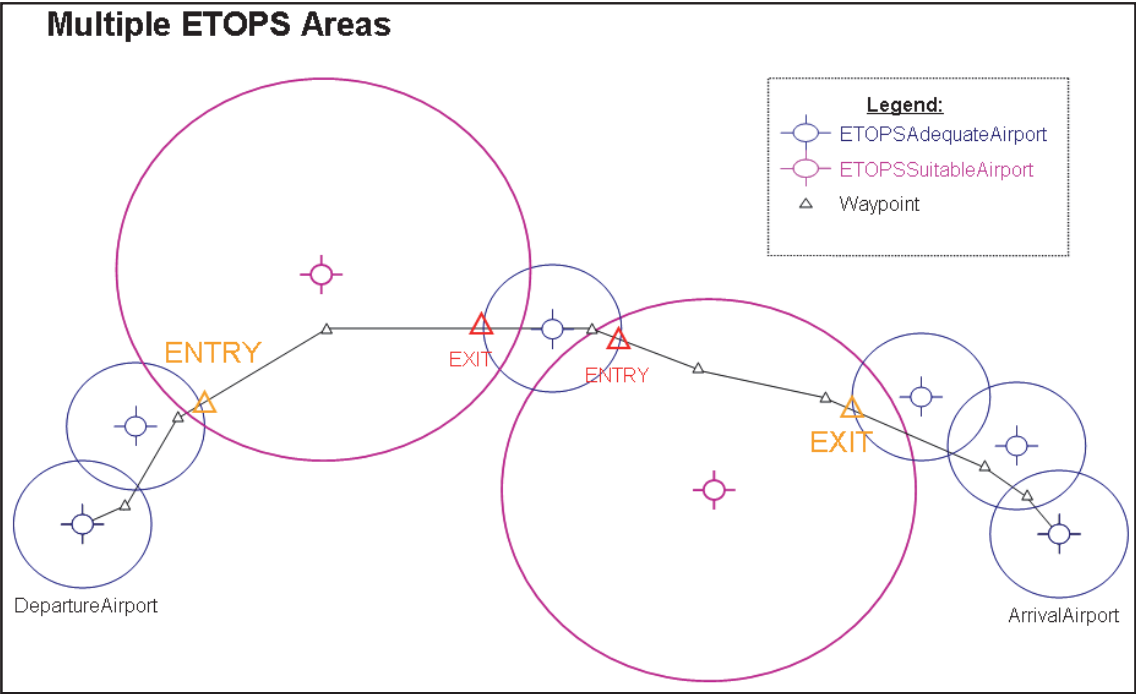
- [DepartureAirport](#)
- [DepartureAlternateAirport](#)
- [ArrivalAirport](#)

5.0 COMMON ELEMENTS

- **PrimaryArrivalAlternateAirport** (if the flight plan requires an Arrival alternate airport, exact one of all provided Arrival airports must be coded with this value and this is the one used for the flight plan calculation. Do not use this airport function if the flight plan does not require any alternate airports)
- **ArrivalAlternateAirport** (to be used for all Arrival Alternate Airports provided for information only)
- **ArrivalViaAlternateAirport**
- **EnRouteAlternateAirport** (to be used only if the planned Contingency Fuel policy for the route to the Arrival Airport is 3%)
- **ContingencySavingAirport**
- **ContingencySavingEnRouteAlternateAirport** (to be used only if the planned Contingency Fuel policy for the route to the Contingency Saving Airport is 3%)
- **PrimaryContingencySavingAlternate** (if the flight plan requires a Contingency Saving alternate airport, exact one of all provided airports has to use this value and this is the one used for the flight plan calculation. Do not use this airport function if the flight plan does not require any Contingency saving alternate airports)
- **ContingencySavingAlternate** (to be used for all Contingency Saving Alternate Airports provided for information only)
- **ETOPSAdequateAirport** (also used for 3 and 4 engine aircraft)
- **ETOPSSuitableAirport** (also used for 3 and 4 engine aircraft)
- **EscapeAirport** (to be used for enroute airports in case of terrain restrictions)



5.0 COMMON ELEMENTS



simpleType AirportIATACodeType

type	restriction of xs:string
used by	elements AirportIdentificationType/AirportIATACode AirportIdentificationType/AirportIATACode AirportFullIdentificationType/AirportIATACode AirportFullIdentificationType/AirportIATACode

5.0 COMMON ELEMENTS

simpleType AirportCAOCodeType

type	restriction of xs:string	
used by	elements	AirportIdentificationType/AirportCAOCode AirportFullIdentificationType/AirportCAOCode DORSUB/ServiceAirport FORSUB/ServiceAirport FORACK/ServiceAirport
	attributes	AirspaceData/Airspace/@airspaceCAOCode HazardAdvisory/Airspaces/Airspace/@airspaceCAOCode NOTAM/Keys/Airspaces/Airspace/@airspaceCAOCode PIREP/Location/Airspaces/Airspace/@airspaceCAOCode RegionWeather/Location/Airspaces/Airspace/@airspaceCAOCode waypoint.Grp/Airspace/@airspaceCAOCode ItemListType/Item16/@alternateAirport ItemListType/Item16/@arrivalAirport ItemListType/Item13/@departureAirport ItemListType/Item16/@secondAlternateAirport

complexType AltitudeInfoType

diagram		
children	Altitude Upper Lower	
used by	elements	HazardAdvisory/Observation/Altitudes HazardAdvisory/Forecasts/Forecast/Altitudes NOTAM/Altitudes PIREP/Altitudes RegionWeather/Altitudes

element AltitudeInfoType/Altitude

diagram		
type	AltitudeType	
children	Value CorrectedValue	
annotation	documentation used for individual applicability altitudes without upper and lower bound	

5.0 COMMON ELEMENTS

element AltitudeInfoType/Upper

diagram	Upper upper bound of the data applicability, value 999 with unit ft/100 could be used if not provided
type	AltitudeType
children	Value CorrectedValue
annotation	documentation upper bound of the data applicability, value 999 with unit ft/100 could be used if not provided

element AltitudeInfoType/Lower

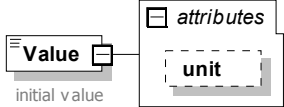
diagram	Lower lower bound of the data applicability, value 0 with unit ft/100 could be used if not provided
type	AltitudeType
children	Value CorrectedValue
annotation	documentation lower bound of the data applicability, value 0 with unit ft/100 could be used if not provided

complexType AltitudeType

diagram	AltitudeType altitude type definition (value and correction)
children	Value CorrectedValue
used by	elements AltitudeBasicType/ActualAltitude AltitudeInfoType/Altitude flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/SuitableAirport/Altitude UpperAirData.grp/AltitudeSpecificPredictedInformation/Altitude HazardAdvisory/HazardousArea/Elevation AltitudeBasicType/EstimatedAltitude RouteInformation/InitialAltitude AltitudeInfoType/Lower flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/SuitableAirport/MinimumSafeAltitude waypoint.Grp/MinimumSafeAltitude ATIS/ATISBulletins/ATISBulletin/ATISDetails/TransitionLevel UpperAirData/CruisePhase/Waypoints/Waypoint/Tropopause waypoint.Grp/Tropopause AltitudeInfoType/Upper
annotation	documentation altitude type definition (value and correction)

5.0 COMMON ELEMENTS

element AltitudeType/Value

diagram						
type	extension of xs:float					
attributes	Name <u>unit</u>	Type <u>altitudeUnitType</u>	Use	Default ft/100	Fixed	annotation
annotation	documentation initial value					

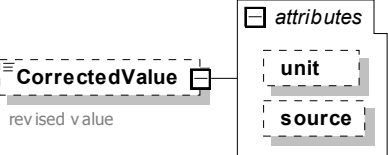
attribute AltitudeType/Value/@unit

type	<u>altitudeUnitType</u>					
facets	enumeration	ft/100				
	enumeration	ft/1000				
	enumeration	ft				
	enumeration	m/100				
	enumeration	m/10				
	enumeration	m				

simpleType altitudeUnitType

type	restriction of xs:string	
used by	attributes	AirportData/Airport/Runway/Elevation/@unit AirportData/Airport/Elevation/@unit AltitudeType/Value/@unit AltitudeType/CorrectedValue/@unit waypoint.Grp/SegmentShearRate/AltitudeDifference/@unit
facets	enumeration	ft/100
	enumeration	ft/1000
	enumeration	ft
	enumeration	m/100
	enumeration	m/10
	enumeration	m
annotation	documentation	altitude unit type definition (enumerated units)

element AltitudeType/CorrectedValue

diagram						
type	extension of xs:float					
attributes	Name <u>unit</u> <u>source</u>	Type <u>altitudeUnitType</u> derived by: xs:string	Use	Default ft/100	Fixed	annotation
annotation	documentation revised value					

5.0 COMMON ELEMENTS

attribute AltitudeType/CorrectedValue/@unit

type	altitudeUnitType
facets	enumeration ft/100 enumeration ft/1000 enumeration ft enumeration m/100 enumeration m/10 enumeration m

attribute AltitudeType/CorrectedValue/@source

type	restriction of xs:string

complexType CloudsType

diagram	
children	SkyClear NilSignificantClouds VerticalVisibility CloudDescriptions
used by	element VisibilitiesAndWeatherType/Clouds

element CloudsType/SkyClear

diagram	
type	xs:string
annotation	documentation SKC indication

element CloudsType/NilSignificantClouds

diagram	
type	xs:string
annotation	documentation clouds in or above 5000ft only

5.0 COMMON ELEMENTS

element CloudsType/VerticalVisibility

diagram	
type	DistanceType
children	Value CorrectedValue
annotation	documentation vertical visibility

element CloudsType/CloudDescriptions

diagram	
children	CloudDescription

element CloudsType/CloudDescriptions/CloudDescription

diagram						
children	Ceiling					
attributes	Name cloudCover	Type derived by: xs:string	Use required	Default	Fixed	annotation documentation amount of clouds - few (FEW): 1/8 - 2/8 - scattered (SCT): 3/8 - 4/8 - broken (BKN): 5/8 - 7/8 - overcast (OVC): 8/8 documentation reports about special clouds: - cumulonimbus (CB) - towering cumulus (TCU)
	cloudType	derived by: xs:string				
annotation	documentation lower altitude limit of the clouds					

5.0 COMMON ELEMENTS

attribute CloudsType/CloudDescriptions/CloudDescription/@cloudCover

type	restriction of xs:string
annotation	documentation amount of clouds - few (FEW): 1/8 - 2/8 - scattered (SCT): 3/8 - 4/8 - broken (BKN): 5/8 - 7/8 - overcast (OVC): 8/8

attribute CloudsType/CloudDescriptions/CloudDescription/@cloudType

type	restriction of xs:string
facets	enumeration CB enumeration TCU
annotation	documentation reports about special clouds: - cumulonimbus (CB) - towering cumulus (TCU)

element CloudsType/CloudDescriptions/CloudDescription/Ceiling

diagram	
type	DistanceType
children	Value CorrectedValue

complexType ConnectionInfoType

diagram	
children	IncomingFlights OutgoingFlights
used by	elements CrewInfoType/ConnectionInfo PaxFlightInfoType/ConnectionInfo
annotation	documentation Defines Passenger Connection information

element ConnectionInfoType/IncomingFlights

diagram	
children	IncomingFlight

5.0 COMMON ELEMENTS

element [ConnectionInfoType/OutgoingFlights/OutgoingFlight](#)

diagram	The diagram shows the OutgoingFlight element (a rectangle with a small square icon) connected to a larger yellow-shaded box representing the FlightType complex type. Inside the FlightType box, there is an attributes group (a rectangle with a small square icon) containing two attributes: flightOriginDate (a rectangle with a small square icon) and scheduledTimeOfDeparture (a dashed rectangle with a small square icon). Below the attributes group, there are three child elements: FlightIdentification (a rectangle with a small square icon), DepartureAirport (a rectangle with a small square icon), and ArrivalAirport (a rectangle with a small square icon). The OutgoingFlight element is connected to the FlightType box with a cardinality of 1..∞.					
type	FlightType					
children	FlightIdentification DepartureAirport ArrivalAirport					
attributes	Name flightOriginDate	Type xs:date	Use required	Default	Fixed	annotation documentation scheduled UTC date for first sector of a flight
	scheduledTimeOfDeparture	xs:dateTime	optional			documentation scheduled time of departure

complexType [ContactInfoType](#)

diagram	The diagram shows the ContactInfoType element (a rectangle with a small square icon) connected to a larger box representing the ContactInfoType complex type. Inside the box, there is an attributes group (a rectangle with a small square icon) containing two attributes: email (a dashed rectangle with a small square icon) and telephoneNumber (a dashed rectangle with a small square icon). Below the attributes group, there is one child element: Address (a rectangle with a small square icon). The ContactInfoType element is connected to the box with a cardinality of 1..∞.					
children	Address					
used by	element	PersonalInfoType/ContactInfo				
attributes	Name email	Type derived by: xs:string	Use optional	Default	Fixed	annotation
	telephoneNumber	derived by: xs:string	optional			
annotation	documentation Common contact information elements					

attribute [ContactInfoType/@email](#)

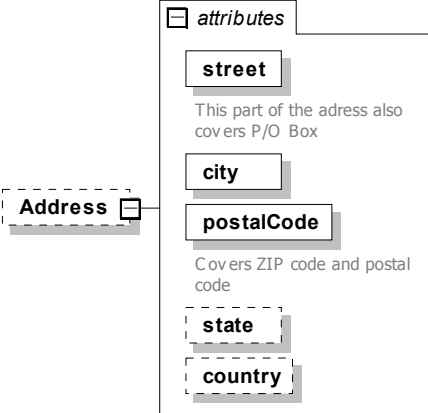
type	restriction of xs:string

5.0 COMMON ELEMENTS

attribute ContactInfoType/@telephoneNumber

type	restriction of xs:string

element ContactInfoType/Address

diagram						
attributes	Name	Type	Use	Default	Fixed	annotation
	<u>street</u>	derived by: xs:string	required			documentation This part of the address also covers P/O Box
	<u>city</u>	derived by: xs:string	required			
	<u>postalCode</u>	derived by: xs:string	required			documentation Covers ZIP code and postal code
	<u>state</u>	derived by: xs:string				
	<u>country</u>	derived by: xs:string				

attribute ContactInfoType/Address/@street

type	restriction of xs:string
annotation	documentation This part of the address also covers P/O Box

attribute ContactInfoType/Address/@city

type	restriction of xs:string

attribute ContactInfoType/Address/@postalCode

type	restriction of xs:string
annotation	documentation Covers ZIP code and postal code

attribute ContactInfoType/Address/@state

type	restriction of xs:string

5.0 COMMON ELEMENTS

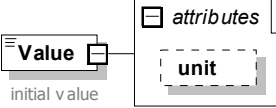
attribute ContactInfoType/Address/@country

type	restriction of xs:string

complexType CostIndexType

diagram	
children	Value CorrectedValue
used by	element SpeedProcedureType/CostIndex
annotation	documentation cost index type definition (value and correction)

element CostIndexType/Value

diagram						
type	extension of xs:float					
attributes	Name unit	Type flowUnitType	Use	Default	Fixed	annotation
annotation	documentation initial value					

attribute CostIndexType/Value/@unit

type	flowUnitType												
facets	<table border="1"> <tbody> <tr><td>enumeration</td><td>kg/h</td></tr> <tr><td>enumeration</td><td>kg/s</td></tr> <tr><td>enumeration</td><td>lb/h</td></tr> <tr><td>enumeration</td><td>lb/s</td></tr> <tr><td>enumeration</td><td>kg/mn</td></tr> <tr><td>enumeration</td><td>h1b/h</td></tr> </tbody> </table>	enumeration	kg/h	enumeration	kg/s	enumeration	lb/h	enumeration	lb/s	enumeration	kg/mn	enumeration	h1b/h
enumeration	kg/h												
enumeration	kg/s												
enumeration	lb/h												
enumeration	lb/s												
enumeration	kg/mn												
enumeration	h1b/h												

element CostIndexType/CorrectedValue

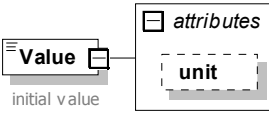
diagram	
type	restriction of xs:nonNegativeInteger
annotation	documentation revised value

5.0 COMMON ELEMENTS

complexType DensityType

diagram	
children	Value CorrectedValue
used by	element fuelHeader.Grp/PossibleExtraFuel/MaximumFuelWeight/Density
annotation	documentation density type definition (value and correction)

element DensityType/Value

diagram						
type	extension of xs:float					
attributes	Name <u>unit</u>	Type <u>densityUnitType</u>	Use	Default kg/l	Fixed	annotation
annotation	documentation initial value					

attribute DensityType/Value/@unit

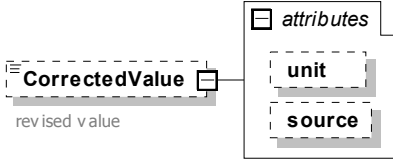
type	densityUnitType																		
facets	<table><tbody><tr><td>enumeration</td><td>g/cm3</td></tr><tr><td>enumeration</td><td>lb/l</td></tr><tr><td>enumeration</td><td>lb/ug</td></tr><tr><td>enumeration</td><td>lb/m3</td></tr><tr><td>enumeration</td><td>lb/ig</td></tr><tr><td>enumeration</td><td>kg/l</td></tr><tr><td>enumeration</td><td>kg/m3</td></tr><tr><td>enumeration</td><td>kg/ig</td></tr><tr><td>enumeration</td><td>kg/ug</td></tr></tbody></table>	enumeration	g/cm3	enumeration	lb/l	enumeration	lb/ug	enumeration	lb/m3	enumeration	lb/ig	enumeration	kg/l	enumeration	kg/m3	enumeration	kg/ig	enumeration	kg/ug
enumeration	g/cm3																		
enumeration	lb/l																		
enumeration	lb/ug																		
enumeration	lb/m3																		
enumeration	lb/ig																		
enumeration	kg/l																		
enumeration	kg/m3																		
enumeration	kg/ig																		
enumeration	kg/ug																		

simpleType densityUnitType

type	restriction of xs:string																		
used by	attributes FRCSUB/FuelDensity/@unit FRCACK/FuelDensity/@unit DensityType/Value/@unit DensityType/CorrectedValue/@unit																		
facets	<table><tbody><tr><td>enumeration</td><td>g/cm3</td></tr><tr><td>enumeration</td><td>lb/l</td></tr><tr><td>enumeration</td><td>lb/ug</td></tr><tr><td>enumeration</td><td>lb/m3</td></tr><tr><td>enumeration</td><td>lb/ig</td></tr><tr><td>enumeration</td><td>kg/l</td></tr><tr><td>enumeration</td><td>kg/m3</td></tr><tr><td>enumeration</td><td>kg/ig</td></tr><tr><td>enumeration</td><td>kg/ug</td></tr></tbody></table>	enumeration	g/cm3	enumeration	lb/l	enumeration	lb/ug	enumeration	lb/m3	enumeration	lb/ig	enumeration	kg/l	enumeration	kg/m3	enumeration	kg/ig	enumeration	kg/ug
enumeration	g/cm3																		
enumeration	lb/l																		
enumeration	lb/ug																		
enumeration	lb/m3																		
enumeration	lb/ig																		
enumeration	kg/l																		
enumeration	kg/m3																		
enumeration	kg/ig																		
enumeration	kg/ug																		
annotation	documentation density unit type definition (enumerated units)																		

5.0 COMMON ELEMENTS

element **DensityType/CorrectedValue**

diagram						
type	extension of xs:float					
attributes	Name <u>unit</u> <u>source</u>	Type <u>densityUnitType</u> derived by: xs:string	Use	Default kg/l	Fixed	annotation
annotation	documentation revised value					

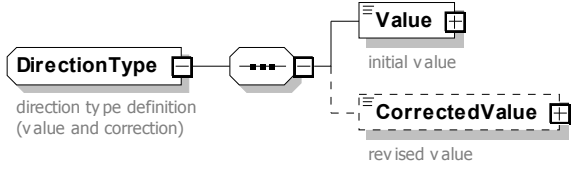
attribute **DensityType/CorrectedValue/@unit**

type	<u>densityUnitType</u>					
facets	enumeration	g/cm3				
	enumeration	lb/l				
	enumeration	lb/ug				
	enumeration	lb/m3				
	enumeration	lb/ig				
	enumeration	kg/l				
	enumeration	kg/m3				
	enumeration	kg/ig				
	enumeration	kg/ug				

attribute **DensityType/CorrectedValue/@source**

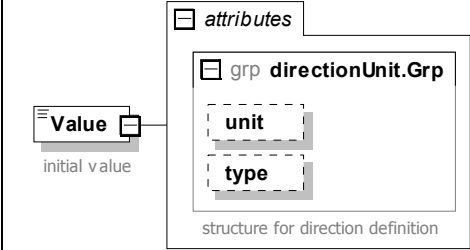
type	restriction of xs:string

complexType **DirectionType**

diagram			
children	<u>Value</u> <u>CorrectedValue</u>		
used by	elements	<u>WindType/Direction</u> <u>SurfaceWindType/Directions/Direction</u> <u>SurfaceWindType/Directions/VariableWindRange/Direction1</u> <u>SurfaceWindType/Directions/VariableWindRange/Direction2</u> <u>Tracks/InboundTrack</u> <u>GeographyType/MovementDirection</u> <u>Tracks/OutboundTrack</u> <u>Tracks/SegmentTrack</u>	
annotation	documentation	direction type definition (value and correction)	

5.0 COMMON ELEMENTS

element DirectionType/Value

diagram						
type	extension of xs:float					
attributes	Name <u>unit</u> <u>type</u>	Type <u>directionUnitType</u> derived by: xs:string	Use optional optional	Default deg magnetic	Fixed	annotation
annotation	documentation initial value					

attributeGroup directionUnit.Grp

used by	elements	DirectionType/CorrectedValue DirectionType/Value				
attributes	Name <u>unit</u> <u>type</u>	Type <u>directionUnitType</u> derived by: xs:string	Use optional optional	Default deg magnetic	Fixed	annotation
annotation	documentation structure for direction definition					

attribute directionUnit.Grp/@unit

type	directionUnitType					
facets	enumeration	deg				
	enumeration	rad				

attribute directionUnit.Grp/@type

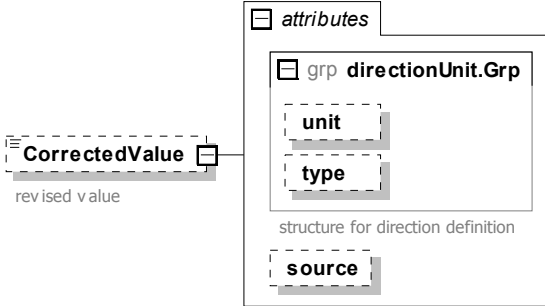
type	restriction of xs:string					
facets	enumeration	magnetic				
	enumeration	true				

simpleType directionUnitType

type	restriction of xs:string		
used by	attributes	AirportData/Airport/Runway/QFU/@unit	AirportData/Airport/Runway/Slope/@unit directionUnit.Grp/@unit
facets	enumeration	deg	
	enumeration	rad	
annotation	documentation direction unit type definition (enumerated units)		

5.0 COMMON ELEMENTS

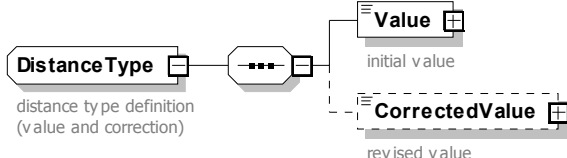
element DirectionType/CorrectedValue

diagram						
type	extension of xs:float					
attributes	Name	Type	Use	Default	Fixed	annotation
	<u>unit</u>	<u>directionUnitType</u>	optional	deg		
	<u>type</u>	derived by: xs:string	optional	magnetic		
	<u>source</u>	derived by: xs:string				
annotation	documentation revised value					

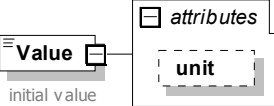
attribute DirectionType/CorrectedValue/@source

type	restriction of xs:string

complexType DistanceType

diagram	
children	<u>Value</u> <u>CorrectedValue</u>
used by	elements waypoint.Grp/AirDistance RouteInformation/AirDistance GeographyType/Polygon/BorderMargin CloudsType/CloudDescriptions/CloudDescription/Ceiling RouteInformation/GreatCircleDistance waypoint.Grp/GroundDistance RouteInformation/GroundDistance VisibilityType/MaximumVisibility VisibilityType/MinimumVisibility VisibilityType/PrevailingVisibility GeographyType/Spot/Radius flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/SuitableAirport/RemainingAirDistance waypoint.Grp/RemainingAirDistance flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/SuitableAirport/RemainingGroundDistance waypoint.Grp/RemainingGroundDistance CloudsType/VerticalVisibility ObservationDetailsType/RunwayVisualRanges/RunwayVisualRange/Visibilities/Visibility
annotation	documentation distance type definition (value and correction)

element DistanceType/Value

diagram						
type	extension of xs:float					
attributes	Name	Type	Use	Default	Fixed	annotation
	<u>unit</u>	<u>distanceUnitType</u>		NM		
annotation	documentation initial value					

5.0 COMMON ELEMENTS

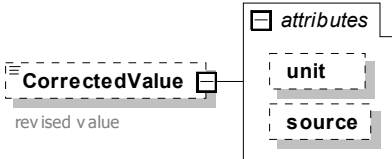
attribute DistanceType/Value/@unit

type	distanceUnitType	
facets	enumeration	m
	enumeration	km
	enumeration	NM
	enumeration	ft
	enumeration	SM

simpleType distanceUnitType

type	restriction of xs:string	
used by	attributes	AirportData/Airport/Runway/Approach/RequiredHorizontalVisibility/@unit AirportData/Airport/Runway/Approach/RequiredVerticalVisibility/@unit AirportData/Airport/Runway/LandingDistanceAvailable/@unit AirportData/Airport/Runway/TakeoffDistanceAvailable/@unit AirportData/Airport/Runway/TakeoffRunAvailable/@unit AirspaceData/Airspace/GreatCircleDistance/@unit AirspaceData/Airspace/GroundDistance/@unit BorderPointType/CumulatedGroundDistance/@unit DistanceType/Value/@unit DistanceType/CorrectedValue/@unit flightPlanCore.Grp/AirportDataList/AirportData/RequiredWeatherCondition/RequiredHorizontalVisibility/@unit flightPlanCore.Grp/AirportDataList/AirportData/RequiredWeatherCondition/RequiredVerticalVisibility/@unit flightPlanCore.Grp/AirportDataList/AirportData/ConsideredWeatherCondition/ConsideredHorizontalVisibility/@unit flightPlanCore.Grp/AirportDataList/AirportData/ConsideredWeatherCondition/ConsideredVerticalVisibility/@unit
facets	enumeration	m
	enumeration	km
	enumeration	NM
	enumeration	ft
	enumeration	SM
annotation	documentation	distance unit type definition (enumerated units)

element DistanceType/CorrectedValue

diagram						
type	extension of xs:float					
attributes	Name	Type	Use	Default	Fixed	annotation
	unit	distanceUnitType		NM		
	source	derived by: xs:string				
annotation	documentation	revised value				

attribute DistanceType/CorrectedValue/@unit

type	distanceUnitType	
facets	enumeration	m
	enumeration	km
	enumeration	NM
	enumeration	ft
	enumeration	SM

5.0 COMMON ELEMENTS

attribute DistanceType/CorrectedValue/@source

type	restriction of xs:string

complexType DurationType

diagram	duration type definition (value and correction)				
children	Value CorrectedValue				
used by	elements	DurationBasicType/ActualTime flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/CriticalTime fuelHeaderLineBasic.Grp/Duration DurationBasicType/EstimatedTime flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/SuitableAirport/RemainingFlightTime			
annotation	documentation	duration type definition (value and correction)			

element DurationType/Value

diagram	initial value				
type	xs:duration				
annotation	documentation	initial value			

element DurationType/CorrectedValue

diagram	revised value				
type	extension of xs:duration				
attributes	Name	Type	Use	Default	Fixed
	source	derived by: xs:string			
annotation	documentation	revised value			

attribute DurationType/CorrectedValue/@source

type	restriction of xs:string

5.0 COMMON ELEMENTS

complexType FlightIdentificationType

diagram	FlightIdentificationType flight identification type: either flight identifier according to ATS-FPL, or airline commercial flight number, or both FlightIdentifier flight identifier acc. ATS-FPL FlightNumber commercial flight number
children	FlightIdentifier FlightNumber FlightNumber
used by	element FlightType/FlightIdentification
annotation	documentation flight identification type: either flight identifier according to ATS-FPL, or airline commercial flight number, or both

element FlightIdentificationType/FlightIdentifier

diagram	FlightIdentifier flight identifier acc. ATS-FPL
type	restriction of FlightIdentifierType
annotation	documentation flight identifier acc. ATS-FPL

simpleType FlightIdentifierType

type	xs:string
used by	element FlightIdentificationType/FlightIdentifier

element FlightIdentificationType/FlightNumber

diagram	The diagram illustrates the structure of the FlightNumberType. It is a choice between two elements: FlightNumber and CommercialFlightNumber. FlightNumber: Described as "commercial flight number". CommercialFlightNumber: Described as "commercial flight number (concatenation of airlineIATACode, number and operational suffix), e.g. SK014Q". It is composed of three attributes: airlineIATACode: "2 letter airline code, e.g. SK". number: "1 to 5 digits, e.g. 014, 14". operationalSuffix: "operational suffix, e.g. Q".					
type	FlightNumberType					
children	CommercialFlightNumber					
attributes	Name	Type	Use	Default	Fixed	annotation

5.0 COMMON ELEMENTS

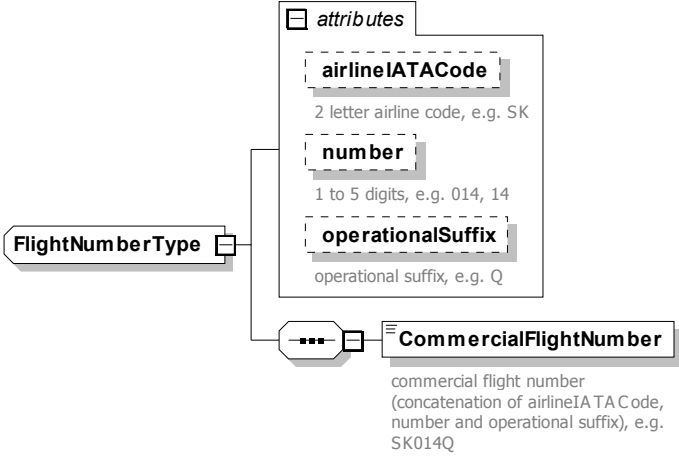
	<u>airlineIATACode</u> derived by: optional xs:string documentation 2 letter airline code, e.g., SK <u>number</u> derived by: optional xs:string documentation 1 to 5 digits, e.g., 014, 14 <u>operationalSuffix</u> derived by: optional xs:string documentation operational suffix, e.g., Q
annotation	documentation commercial flight number

element FlightIdentificationType/FlightNumber

diagram	The diagram illustrates the structure of the FlightNumberType element. It is a container for three attributes: airlineIATACode (2 letter airline code, e.g., SK), number (1 to 5 digits, e.g., 014, 14), and operationalSuffix (operational suffix, e.g., Q). A composition relationship (indicated by a solid line with an open circle at the FlightNumberType end and a solid line with a filled circle at the CommercialFlightNumber end) exists between FlightNumberType and CommercialFlightNumber. The CommercialFlightNumber element is described as the concatenation of the three attributes, e.g., SK014Q.					
type	<u>FlightNumberType</u>					
children	<u>CommercialFlightNumber</u>					
attributes	Name <u>airlineIATACode</u>	Type derived by: xs:string	Use optional	Default	Fixed	annotation documentation 2 letter airline code, e.g., SK documentation 1 to 5 digits, e.g., 014, 14 documentation operational suffix, e.g., Q
	<u>number</u>	derived by: xs:string	optional			
	<u>operationalSuffix</u>	derived by: xs:string	optional			
annotation	documentation commercial flight number					

5.0 COMMON ELEMENTS

complexType FlightNumberType

diagram						
children	CommercialFlightNumber					
used by	elements	FlightIdentificationType/FlightNumber FlightIdentificationType/FlightNumberDORSUB/ServiceFlight FORSUB/ServiceFlight FORACK/ServiceFlight				
attributes	Name	Type	Use	Default	Fixed	annotation
	airlineIATACode	derived by: xs:string	optional			documentation 2 letter airline code, e.g., SK
	number	derived by: xs:string	optional			documentation 1 to 5 digits, e.g., 014, 14
	operationalSuffix	derived by: xs:string	optional			documentation operational suffix, e.g., Q

attribute FlightNumberType/@airlineIATACode

type	restriction of xs:string
annotation	documentation 2 letter airline code, e.g., SK

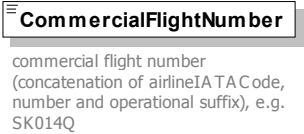
attribute FlightNumberType/@number

type	restriction of xs:string
annotation	documentation 1 to 5 digits, e.g., 014, 14

attribute FlightNumberType/@operationalSuffix

type	restriction of xs:string
annotation	documentation operational suffix, e.g., Q

element FlightNumberType/CommercialFlightNumber

diagram	
type	restriction of xs:string
annotation	documentation commercial flight number (concatenation of airlineIATACode, number and operational suffix), e.g., SK014Q

5.0 COMMON ELEMENTS

complexType FlightType

diagram						
children	FlightIdentification DepartureAirport ArrivalAirport					
used by	elements	M633SupplementaryHeader/Flight ConnectionInfoType/IncomingFlights/IncomingFlight ConnectionInfoType/OutgoingFlights/OutgoingFlight				
attributes	Name	Type	Use	Default	Fixed	annotation
	flightOriginDate	xs:date	required			documentation scheduled UTC date for first sector of a flight
	scheduledTimeOfDeparture	xs:dateTime	optional			documentation scheduled time of departure
annotation	documentation flight data allowing to identify the flight					

attribute FlightType/@flightOriginDate

type	xs:date
annotation	documentation scheduled UTC date for first sector of a flight

attribute FlightType/@scheduledTimeOfDeparture

type	xs:dateTime
annotation	documentation scheduled time of departure

5.0 COMMON ELEMENTS

element FlightType/FlightIdentification

diagram	
type	FlightIdentificationType
children	FlightIdentifier FlightNumber FlightNumber
annotation	documentation flight identifier or commercial flight number

element FlightType/DepartureAirport

diagram	attributes airportName airport name e.g. WASHINGTON DULLES INTL airportFunction e.g. DepartureAirport, DestinationAlternate, Contingency SavingsAirport DepartureAirport departure airport identifier AirportICAOCODE 4 letter airport code AirportIATACODE 3 letter airport code AirportIATACODE 3 letter airport code																							
type	AirportIdentificationType																							
children	AirportICAOCODE AirportIATACODE AirportIATACODE																							
attributes	<table><thead><tr><th>Name</th><th>Type</th><th>Use</th><th>Default</th><th>Fixed</th><th>annotation</th></tr></thead><tbody><tr><td>airportName</td><td>derived by: xs:string</td><td></td><td></td><td></td><td>documentation airport name e.g., WASHINGTON DULLES INTL</td></tr><tr><td>airportFunction</td><td>airportFunctionType</td><td></td><td></td><td></td><td>documentation e.g., DepartureAirport, DestinationAlternate, ContingencySavingsAirport</td></tr></tbody></table>	Name	Type	Use	Default	Fixed	annotation	airportName	derived by: xs:string				documentation airport name e.g., WASHINGTON DULLES INTL	airportFunction	airportFunctionType				documentation e.g., DepartureAirport, DestinationAlternate, ContingencySavingsAirport					
Name	Type	Use	Default	Fixed	annotation																			
airportName	derived by: xs:string				documentation airport name e.g., WASHINGTON DULLES INTL																			
airportFunction	airportFunctionType				documentation e.g., DepartureAirport, DestinationAlternate, ContingencySavingsAirport																			
annotation	documentation departure airport identifier																							

5.0 COMMON ELEMENTS

element FlightType/ArrivalAirport

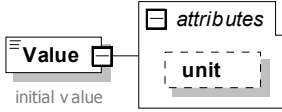
diagram						
type	AirportIdentificationType					
children	AirportCAOCode AirportIATACode AirportIATACode					
attributes	Name	Type	Use	Default	Fixed	annotation
	airportName	derived by: xs:string				documentation airport name e.g., WASHINGTON DULLES INTL
	airportFunction	airportFunctionType				documentation e.g., DepartureAirport, DestinationAlternate, ContingencySavingsAirport
annotation	documentation arrival airport identifier					

complexType FlowType

diagram	The diagram illustrates the structure of the FlowType element. It consists of three main components: FlowType, Value, and CorrectedValue. The FlowType element is represented by a rounded rectangle with a small square handle on its right side. Below it, the text "flow type definition (v value and correction)" is written. A solid line connects the right handle of FlowType to the left handle of the Value element. The Value element is a rounded rectangle with a small square handle on its right side and a small square handle on its top side. Below it, the text "initial value" is written. A solid line connects the right handle of Value to the left handle of the CorrectedValue element. The CorrectedValue element is a rounded rectangle with a small square handle on its right side and a small square handle on its top side. Below it, the text "revised value" is written. A dashed line connects the right handle of CorrectedValue back to the left handle of Value, forming a loop.		
children	Value CorrectedValue		
used by	elements	FlightPlanHeader/FuelFlowInformation/AverageFuelFlow FlightPlanHeader/FuelFlowInformation/HoldingFuelFlow FlightPlanHeader/FuelFlowInformation/TaxiFuelFlow	
annotation	documentation	flow type definition (value and correction)	

5.0 COMMON ELEMENTS

element FlowType/Value

diagram						
type	extension of xs:float					
attributes	Name <u>unit</u>	Type <u>flowUnitType</u>	Use	Default kg/h	Fixed	annotation
annotation	documentation initial value					

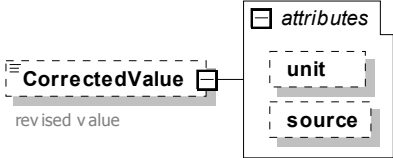
attribute FlowType/Value/@unit

type	<u>flowUnitType</u>					
facets	enumeration	kg/h				
	enumeration	kg/s				
	enumeration	lb/h				
	enumeration	lb/s				
	enumeration	kg/mn				
	enumeration	hlb/h				

simpleType flowUnitType

type	restriction of xs:string		
used by	attributes	<u>CostIndexType/Value/@unit</u> <u>FlowType/Value/@unit</u> <u>FlowType/CorrectedValue/@unit</u>	
facets	enumeration	kg/h	
	enumeration	kg/s	
	enumeration	lb/h	
	enumeration	lb/s	
	enumeration	kg/mn	
	enumeration	hlb/h	
annotation	documentation flow unit type definition (enumerated units)		

element FlowType/CorrectedValue

diagram						
type	extension of xs:float					
attributes	Name <u>unit</u> <u>source</u>	Type <u>flowUnitType</u> derived by: xs:string	Use	Default kg/h	Fixed	annotation
annotation	documentation revised value					

attribute FlowType/CorrectedValue/@unit

type	<u>flowUnitType</u>					
facets	enumeration	kg/h				
	enumeration	kg/s				
	enumeration	lb/h				
	enumeration	lb/s				
	enumeration	kg/mn				
	enumeration	hlb/h				

attribute FlowType/CorrectedValue/@source

type	restriction of xs:string					

5.0 COMMON ELEMENTS

complexType GeographyType

diagram	MovementSpeed The velocity the polygon moves with. The movement starts with the validity time of the data object, e.g. startValidityTime of NOTAM or observationTime/forecastTime of HazardAdvisory. MovementDirection Direction in which the polygon moves. Compass directions like E, WNW or SE shall be converted in numerical values acc. to the selected units.
children	Polygon Spot MovementSpeed MovementDirection
used by	elements HazardAdvisory/Observation/Geography HazardAdvisory/Forecasts/Forecast/Geography NOTAM/Location/Geography PIREP/Location/Geography RegionWeather/Location/Geography

element GeographyType/Polygon

diagram	Coordinates 1..∞ BorderMargin An additional margin the polygon is expanded by
children	Coordinates BorderMargin

element GeographyType/Polygon/Coordinates

diagram	Coordinates 1..∞ sequence grp coordinateType.grp latitude longitude definition for latitude and longitude, to be expressed in seconds, positive values representing North/East, negative values representing South/West					
attributes	Name sequence	Type xs:nonNegativeInteger	Use 	Default 	Fixed 	annotation
	latitude	derived by: xs:float	required			
	longitude	derived by: xs:float	required			

5.0 COMMON ELEMENTS

attribute GeographyType/Polygon/Coordinates/@sequence

type	xs:nonNegativeInteger

element GeographyType/Polygon/BorderMargin

diagram	
type	DistanceType
children	Value CorrectedValue
annotation	documentation An additional margin the polygon is expanded by

element GeographyType/Spot

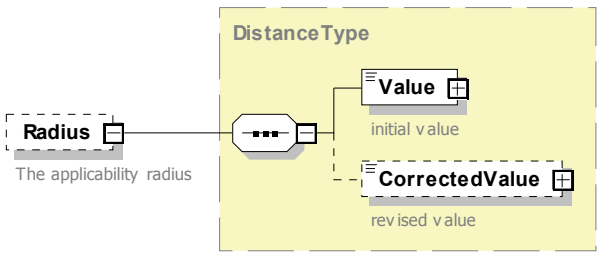
diagram	
children	Coordinates Radius

element GeographyType/Spot/Coordinates

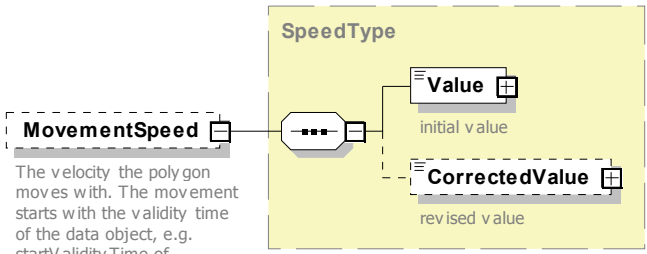
diagram						
attributes	Name latitude longitude	Type derived by: xs:float derived by: xs:float	Use required required	Default	Fixed	annotation

5.0 COMMON ELEMENTS

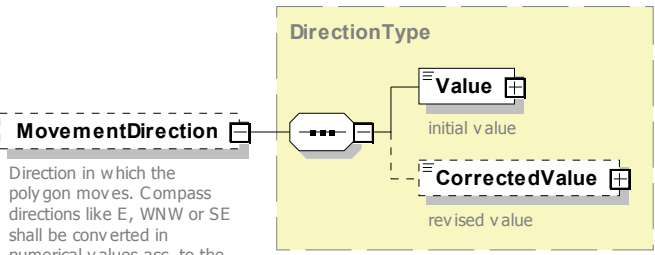
element GeographyType/Spot/Radius

diagram	 The diagram shows the structure of the Radius element. It is a dashed box containing the text "The applicability radius". A line connects it to a central octagonal node with three dots. This node is connected to a yellow box labeled "DistanceType". Inside "DistanceType", there are two sub-elements: "Value" (labeled "initial v value") and "CorrectedValue" (labeled "revised v value"). Both sub-elements have a small square icon with a plus sign.
type	DistanceType
children	Value CorrectedValue
annotation	documentation The applicability radius

element GeographyType/MovementSpeed

diagram	 The diagram shows the structure of the MovementSpeed element. It is a dashed box containing the text: "The velocity the polygon moves with. The movement starts with the validity time of the data object, e.g. startValidityTime of NOTAM or observationTime/forecastTime of HazardAdvisory." A line connects it to a central octagonal node with three dots. This node is connected to a yellow box labeled "SpeedType". Inside "SpeedType", there are two sub-elements: "Value" (labeled "initial v value") and "CorrectedValue" (labeled "revised v value"). Both sub-elements have a small square icon with a plus sign.
type	SpeedType
children	Value CorrectedValue
annotation	documentation The velocity the polygon moves with. The movement starts with the validity time of the data object, e.g., startValidityTime of NOTAM or observationTime/forecastTime of HazardAdvisory.

element GeographyType/MovementDirection

diagram	 The diagram shows the structure of the MovementDirection element. It is a dashed box containing the text: "Direction in which the polygon moves. Compass directions like E, WNW or SE shall be converted in numerical values acc. to the selected units." A line connects it to a central octagonal node with three dots. This node is connected to a yellow box labeled "DirectionType". Inside "DirectionType", there are two sub-elements: "Value" (labeled "initial v value") and "CorrectedValue" (labeled "revised v value"). Both sub-elements have a small square icon with a plus sign.
type	DirectionType
children	Value CorrectedValue
annotation	documentation Direction in which the polygon moves. Compass directions like E, WNW or SE shall be converted in numerical values acc. to the selected units.

5.0 COMMON ELEMENTS

complexType MachNumberType

diagram	
children	Value CorrectedValue
used by	elements MachNumberBasicType/ActualMachNumber MachNumberBasicType/EstimatedMachNumber SpeedProcedureType/MachNumber
annotation	documentation mach number type definition (value and correction)

element MachNumberType/Value

diagram	
type	restriction of xs:decimal
annotation	documentation initial value

element MachNumberType/CorrectedValue

diagram	
type	restriction of xs:decimal
annotation	documentation revised value

complexType ObservationDetailsType

diagram	

5.0 COMMON ELEMENTS

children	SurfaceWinds VisibilitiesAndWeather RunwayVisualRanges Temperatures Pressures SupplementaryInformation Trend
used by	elements ATIS/ATISBulletins/ATISBulletin/ATISDetails/Observation AirportWeather/WeatherBulletins/WeatherBulletin/Observation/ObservationDetails

element [ObservationDetailsType/SurfaceWinds](#)

diagram	1..∞ wind description
children	SurfaceWind

element [ObservationDetailsType/SurfaceWinds/SurfaceWind](#)

diagram	SurfaceWindType attributes runwayIdentifier runway identifier in case runway specific wind data will be provided SurfaceWind 1..∞ wind description Directions wind directions element Speeds wind speeds element					
type	SurfaceWindType					
children	Directions Speeds					
attributes	Name runwayIdentifier	Type derived by: xs:string	Use	Default	Fixed	annotation documentation runway identifier in case runway specific wind data will be provided
annotation	documentation wind description					

5.0 COMMON ELEMENTS

element ObservationDetailsType/VisibilitiesAndWeather

diagram	The diagram shows the structure of the VisibilitiesAndWeatherType. It is a container type (yellow background) that contains several elements. The VisibilitiesAndWeather element (rectangle) is connected to a choice element (hexagon with a vertical line) which branches into CeilingAndVisibilityOK (rectangle) and another choice element (hexagon with three dots). CeilingAndVisibilityOK contains the text: "CAVOK to be used in case visibility is greater than 10km and no clouds below 5000ft (or below highest MSA respectively) and no CB and no weather". The second choice element branches into Visibilities (rectangle) and Clouds (rectangle). Visibilities contains the text: "horizontal visibility". Clouds contains the text: "clouds and vertical visibility". The third choice element branches into NilSignificantWeather (rectangle) and Weather (rectangle). NilSignificantWeather contains the text: "NSW or NOSIG". Weather contains the text: "weather description and type, e.g. BLSN for blowing snow, FZFG for freezing fog". The Weather element has a cardinality of 1..∞.
type	VisibilitiesAndWeatherType
children	CeilingAndVisibilityOK Visibilities Clouds NilSignificantWeather Weather
annotation	documentation visibility, cloud and weather description

element ObservationDetailsType/RunwayVisualRanges

diagram	The diagram shows the structure of the RunwayVisualRanges element (rectangle). It is connected to a choice element (hexagon with three dots) which branches into RunwayVisualRange (rectangle). The RunwayVisualRange element has a cardinality of 1..∞. Below the diagram is the text: "RVR description".
children	RunwayVisualRange

element ObservationDetailsType/RunwayVisualRanges/RunwayVisualRange

diagram	The diagram shows the structure of the RunwayVisualRange element (rectangle). It is connected to a choice element (hexagon with three dots) which branches into Visibilities (rectangle). The RunwayVisualRange element has a cardinality of 1..∞. Below the diagram is the text: "RVR description". To the right of the diagram is a box labeled attributes which contains the following elements: runwayIdentifier (rectangle) with the text: "runway identifier", and tendency (rectangle) with the text: "visual range tendency (upward, downward, no distinct tendency)".
children	Visibilities

5.0 COMMON ELEMENTS

attributes	Name <u>runwayIdentifier</u>	Type derived by: xs:string	Use required	Default	Fixed	annotation documentation runway identifier documentation visual range tendency (upward, downward, no distinct tendency)
	<u>tendency</u>	derived by: xs:string				
annotation	documentation RVR description					

attribute [ObservationDetailsType/RunwayVisualRanges/RunwayVisualRange/@runwayIdentifier](#)

type	restriction of xs:string
annotation	documentation runway identifier

attribute [ObservationDetailsType/RunwayVisualRanges/RunwayVisualRange/@tendency](#)

type	restriction of xs:string
facets	enumeration upward enumeration downward enumeration no distinct tendency
annotation	documentation visual range tendency (upward, downward, no distinct tendency)

element [ObservationDetailsType/RunwayVisualRanges/RunwayVisualRange/Visibilities](#)

diagram	
children	Visibility

element [ObservationDetailsType/RunwayVisualRanges/RunwayVisualRange/Visibilities/Visibility](#)

diagram	
type	extension of DistanceType

5.0 COMMON ELEMENTS

children	Value CorrectedValue					
attributes	Name runwaySection	Type derived by: xs:string	Use	Default	Fixed	annotation documentation runway section (threshold, mid, end) documentation above or below indication
	aboveBelow	derived by: xs:string				
annotation	documentation visibility					

attribute
[ObservationDetailsType/RunwayVisualRanges/RunwayVisualRange/Visibilities/Visibility/@runwaySection](#)

type	restriction of xs:string					
facets	enumeration	THR				
	enumeration	MID				
	enumeration	END				
annotation	documentation runway section (threshold, mid, end)					

attribute
[ObservationDetailsType/RunwayVisualRanges/RunwayVisualRange/Visibilities/Visibility/@aboveBelow](#)

type	restriction of xs:string					
facets	enumeration	above				
	enumeration	below				
annotation	documentation above or below indication					

element [ObservationDetailsType/Temperatures](#)

diagram						
children	AirTemperature DewPointTemperature					
annotation	documentation temperature description					

element [ObservationDetailsType/Temperatures/AirTemperature](#)

diagram						
type	TemperatureType					
children	Value CorrectedValue					
annotation	documentation air temperature					

5.0 COMMON ELEMENTS

element ObservationDetailsType/Temperatures/DewPointTemperature

diagram	
type	TemperatureType
children	Value CorrectedValue
annotation	documentation dew point information

element ObservationDetailsType/Pressures

diagram	
children	QNH QFE
annotation	documentation atmospheric pressure, if expressed globally per airport

element ObservationDetailsType/Pressures/QNH

diagram							
type	extension of PressureType						
children	Value CorrectedValue						
attributes	Name	Type	derived by:	Use	Default	Fixed	annotation
	runwayIdentifier	xs:string					documentation runway identifier
annotation	documentation atmospheric pressure referenced to mean sea level						

5.0 COMMON ELEMENTS

attribute ObservationDetailsType/Pressures/QNH/@runwayIdentifier

type	restriction of xs:string
annotation	documentation runway identifier

element ObservationDetailsType/Pressures/QFE

diagram	The diagram shows the QFE element structure. QFE (0..∞) is an extension of PressureType. It contains a Value (initial value) and a CorrectedValue (revised value). It also has an attribute runwayIdentifier (runway identifier).					
type	extension of PressureType					
children	Value CorrectedValue					
attributes	Name runwayIdentifier	Type derived by: xs:string	Use	Default	Fixed	annotation documentation runway identifier
annotation	documentation atmospheric pressure referenced to the ground					

attribute ObservationDetailsType/Pressures/QFE/@runwayIdentifier

type	restriction of xs:string
annotation	documentation runway identifier

element ObservationDetailsType/SupplementaryInformation

diagram	The diagram shows the SupplementaryInformation element structure. SupplementaryInformation (0..∞) contains RecentWeather (0..∞), WindShear (0..∞), and any ##other.					
children	RecentWeather WindShear					
annotation	documentation supplementary weather information					

5.0 COMMON ELEMENTS

element ObservationDetailsType/SupplementaryInformation/RecentWeather

diagram						
type	extension of WeatherType					
attributes	Name intensity	Type airportWeatherIntensityProximityType	Use required	Default	Fixed	annotation documentation light (-), moderate (), heavy (+) and “in the vicinity” (VC) indicators
annotation	documentation recent weather, currently not observed					

simpleType airportWeatherIntensityProximityType

type	restriction of xs:string					
used by	attribute WeatherType/@intensity					
facets	enumeration	light				
	enumeration	moderate				
	enumeration	heavy				
	enumeration	in the vicinity				

element ObservationDetailsType/SupplementaryInformation/WindShear

diagram						
type	extension of xs:string					
attributes	Name allRunway	Type xs:boolean	Use	Default	Fixed	annotation documentation applicable to all runways
	runwayIdentifier	derived by: xs:string				documentation runway identifier
annotation	documentation wind shear reported between ground and 1600ft above ground					

attribute ObservationDetailsType/SupplementaryInformation/WindShear/@allRunway

type	xs:boolean
annotation	documentation applicable to all runways

5.0 COMMON ELEMENTS

attribute [ObservationDetailsType/SupplementaryInformation/WindShear/@runwayIdentifier](#)

type	restriction of xs:string
annotation	documentation runway identifier

element [ObservationDetailsType/Trend](#)

diagram	The diagram illustrates the structure of the Trend element. It is a dashed box containing a small square icon and the text "weather change description". A line connects this element to a larger yellow box labeled WeatherChangeType. Inside this box, there is a list of attributes: becoming (BECMG indication), temporary (TEMPO indication), at (AT indication), from (FM indication), startTime (begin time for BECMG, TEMPO, AT, FM, TL), until (TL indication), endTime (end time for BECMG, TEMPO, TL), and probability (probability indication for the reported weather). Below these attributes are two child elements: SurfaceWind (wind description) and VisibilitiesAndWeather.					
type	WeatherChangeType					
children	SurfaceWind VisibilitiesAndWeather					
attributes	Name	Type	Use	Default	Fixed	annotation
	becoming	xs:string			BECMG	documentation BECMG indication
	temporary	xs:string			TEMPO	documentation TEMPO indication
	at	xs:string			AT	documentation AT indication
	from	xs:string			FM	documentation FM indication
	startTime	xs:dateTime				documentation begin time for BECMG, TEMPO, AT, FM, TL
	until	xs:string			TL	documentation TL indication

5.0 COMMON ELEMENTS

	<u>endTime</u> xs:dateTime <u>probability</u> probabilityType	documentation end time for BECMG, TEMPO, TL documentation probability indication for the reported weather
annotation	documentation weather change description	

complexType PersonalInfoType

diagram						
children	Gender Nationality DateOfBirth ContactInfo					
used by	elements	PersonType/PersonalInfo PaxInfoType/PersonToContact				
attributes	Name <u>surname</u> <u>givenName</u> <u>preferredName</u> <u>title</u>	Type derived by: xs:string derived by: xs:string derived by: xs:string derived by: xs:string	Use required optional optional	Default	Fixed	annotation documentation Anything other than surname documentation academic or nobility title
annotation	documentation General Personal Information					

attribute PersonalInfoType/@surname

type	restriction of xs:string

attribute PersonalInfoType/@givenName

type	restriction of xs:string
annotation	documentation Anything other than surname

5.0 COMMON ELEMENTS

attribute [PersonalInfoType/@preferredName](#)

type	restriction of xs:string

attribute [PersonalInfoType/@title](#)

type	restriction of xs:string
annotation	documentation academic or nobility title

element [PersonalInfoType/Gender](#)

diagram		
type	GenderType	
facets	enumeration	male enumeration female

simpleType [GenderType](#)

type	restriction of xs:string	
used by	element	PersonalInfoType/Gender
facets	enumeration	male enumeration female
annotation	documentation coding Male/Female	

element [PersonalInfoType/Nationality](#)

diagram		
type	restriction of xs:string	

element [PersonalInfoType/DateOfBirth](#)

diagram		
type	xs:date	

5.0 COMMON ELEMENTS

element **PersonallInfoType/ContactInfo**

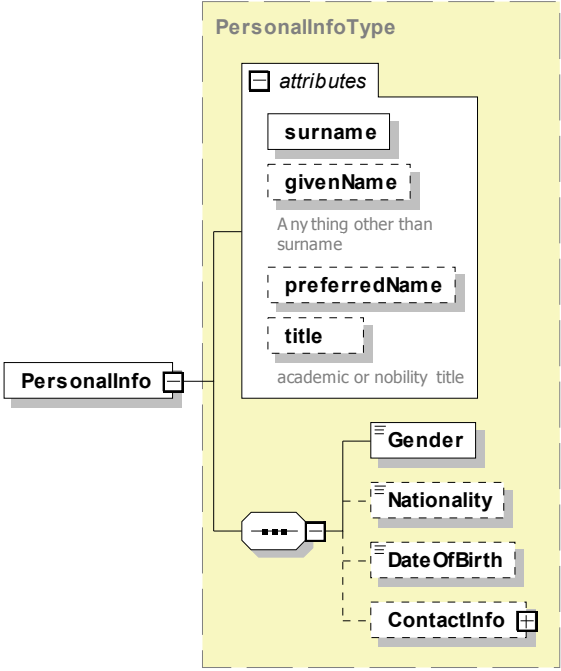
diagram						
type	ContactInfoType					
children	Address					
attributes	Name email telephoneNumber	Type derived by: xs:string derived by: xs:string	Use optional optional	Default	Fixed	annotation

complexType **PersonType**

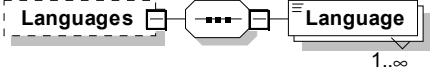
diagram						
children	PersonalInfo Languages TravelDocument					
used by	elements CrewInfoType/PersonallInfo PaxInfoType/PersonInfo					
annotation	documentation Defines common person elements					

5.0 COMMON ELEMENTS

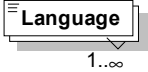
element **PersonType/PersonallInfo**

diagram						
type	PersonallInfoType					
children	Gender Nationality DateOfBirth ContactInfo					
attributes	Name surname givenName preferredName title	Type derived by: xs:string derived by: xs:string derived by: xs:string derived by: xs:string	Use required optional optional	Default	Fixed	annotation documentation Anything other than surname documentation academic or nobility title

element **PersonType/Languages**

diagram	
children	Language

element **PersonType/Languages/Language**

diagram	
type	restriction of xs:string

5.0 COMMON ELEMENTS

element PersonType/TravelDocument

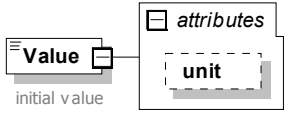
diagram						
type	TravelDocumentType					
attributes	Name travelDocumentType travelDocumentId dateOfBirth placeOfBirth nationality placeOfIssue dateOfIssue countryOfIssue dateOfExpiration	Type derived by: xs:string derived by: xs:string xs:date derived by: xs:string derived by: xs:string derived by: xs:string xs:date derived by: xs:string xs:date	Use required required required required	Default	Fixed	annotation documentation type of travel document, e.g., passport, id card, driving license
annotation	documentation Crew\Passenger Information where Passport is Required - to be amended					

complexType PressureType

diagram						
children	Value CorrectedValue					
used by	elements	ObservationDetailsType/Pressures/QFE ObservationDetailsType/Pressures/QNH				

5.0 COMMON ELEMENTS

element PressureType/Value

diagram						
type	extension of xs:float					
attributes	Name <u>unit</u>	Type <u>pressureUnitType</u>	Use	Default hPa	Fixed	annotation
annotation	documentation initial value					

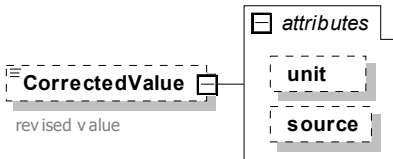
attribute PressureType/Value/@unit

type	<u>pressureUnitType</u>					
facets	enumeration	hPa				
	enumeration	mbar				
	enumeration	in/100Hg				

simpleType pressureUnitType

type	restriction of xs:string		
used by	attributes	PressureType/Value/@unit PressureType/CorrectedValue/@unit	
facets	enumeration	hPa	
	enumeration	mbar	
	enumeration	in/100Hg	
annotation	documentation	pressure unit type definition (enumerated units)	

element PressureType/CorrectedValue

diagram						
type	extension of xs:float					
attributes	Name <u>unit</u> <u>source</u>	Type <u>pressureUnitType</u> derived by: xs:string	Use	Default hPa	Fixed	annotation
annotation	documentation revised value					

attribute PressureType/CorrectedValue/@unit

type	<u>pressureUnitType</u>					
facets	enumeration	hPa				
	enumeration	mbar				
	enumeration	in/100Hg				

5.0 COMMON ELEMENTS

attribute PressureType/CorrectedValue/@source

type	restriction of xs:string

complexType RemarksType

diagram	
children	Remark
used by	elements FlightPlanHeader/MELCDLItems/MELCDLItem/Remark FlightPlan/Remarks FuelHeader/Remarks WeightHeader/Remarks flightPlanCore.Grp/ETOPSSummary/Remarks flightPlanCore.Grp/ContingencySavingHeader/Remarks waypoint.Grp/Remarks
annotation	documentation type definition for remark entries

element RemarksType/Remark

diagram						
type	extension of TextType					
children	Paragraph					
attributes	Name remarkType	Type derived by: xs:string	Use	Default	Fixed	annotation documentation e.g., dispatcher remark, briefing remark

attribute RemarksType/Remark/@remarkType

type	restriction of xs:string
annotation	documentation e.g., dispatcher remark, briefing remark

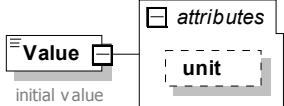
complexType SpeedType

diagram	
children	Value CorrectedValue

5.0 COMMON ELEMENTS

used by	elements	SpeedBasicType/ActualSpeed RouteInformation/AverageWindComponent flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/SuitableAirport/AverageWindComponent SpeedBasicType/EstimatedSpeed SurfaceWindType/Speeds/Gusts SpeedProcedureType/IndicatedAirSpeed PIREP/DecodedInformation/Icing/IndicatedAirSpeed GeographyType/MovementSpeed waypoint.Grp/SegmentShearRate/SegmentVerticalWindChange waypoint.Grp/SegmentWindComponent WindType/Speed SurfaceWindType/Speeds/Speed SpeedProcedureType/TrueAirSpeed UpperAirData.grp/AltitudeSpecificPredictedInformation/WindData/VerticalWind UpperAirData.grp/AltitudeSpecificPredictedInformation/WindComponent
annotation	documentation	speed type definition (value and correction)

element SpeedType/Value

diagram						
type	extension of xs:float					
attributes	Name	Type	Use	Default	Fixed	annotation
	unit	speedUnitType		kt		
annotation	documentation initial value					

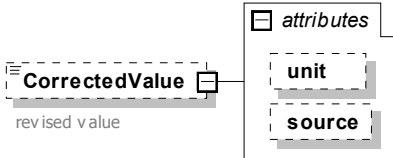
attribute SpeedType/Value/@unit

type	speedUnitType
facets	enumeration kt enumeration m/s enumeration km/h enumeration ft/min

simpleType speedUnitType

type	restriction of xs:string		
used by	attributes	SpeedType/Value/@unit SpeedType/CorrectedValue/@unit	
facets	enumeration	kt	
	enumeration	m/s	
	enumeration	km/h	
	enumeration	ft/min	
annotation	documentation	speed unit type definition (enumerated units)	

element SpeedType/CorrectedValue

diagram						
type	extension of xs:float					
attributes	Name	Type	Use	Default	Fixed	annotation
	unit	speedUnitType		kt		
	source	derived by: xs:string				
annotation	documentation revised value					

5.0 COMMON ELEMENTS

attribute [SpeedType/CorrectedValue/@unit](#)

type	speedUnitType
facets	enumeration kt enumeration m/s enumeration km/h enumeration ft/min

attribute [SpeedType/CorrectedValue/@source](#)

type	restriction of xs:string

complexType [SurfaceWindType](#)

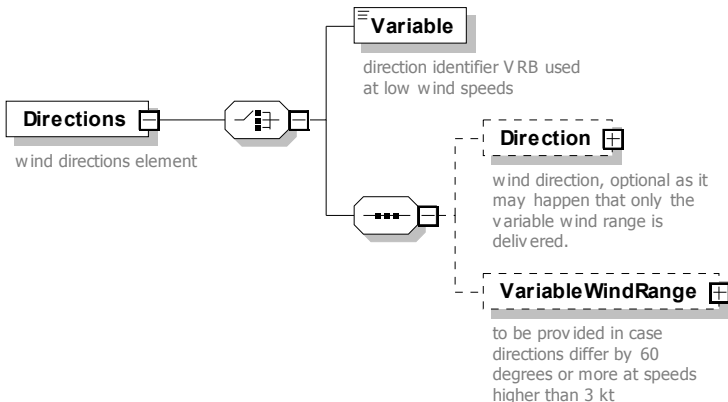
diagram						
children	Directions Speeds					
used by	elements	ForecastDetailsType/ForecastGeneral/SurfaceWind ObservationDetailsType/SurfaceWinds/SurfaceWind WeatherChangeType/SurfaceWind				
attributes	Name	Type	Use	Default	Fixed	annotation
	runwayIdentifier	derived by: xs:string				documentation runway identifier in case runway specific wind data will be provided

attribute [SurfaceWindType/@runwayIdentifier](#)

type	restriction of xs:string
annotation	documentation runway identifier in case runway specific wind data will be provided

5.0 COMMON ELEMENTS

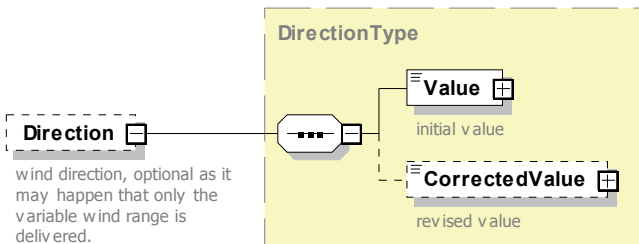
element SurfaceWindType/Directions

diagram	
children	Variable Direction VariableWindRange
annotation	documentation wind directions element

element SurfaceWindType/Directions/Variable

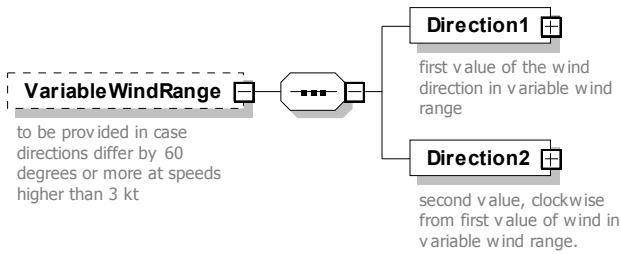
diagram	
type	xs:string
annotation	documentation direction identifier VRB used at low wind speeds

element SurfaceWindType/Directions/Direction

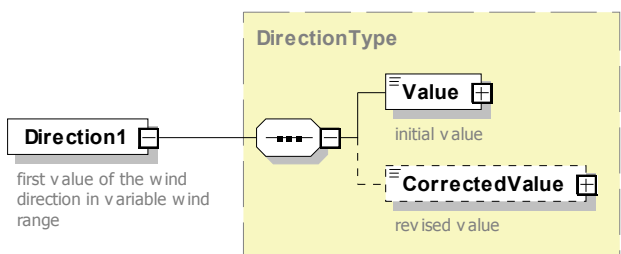
diagram	
type	DirectionType
children	Value CorrectedValue
annotation	documentation wind direction, optional as it may happen that only the variable wind range is delivered.

5.0 COMMON ELEMENTS

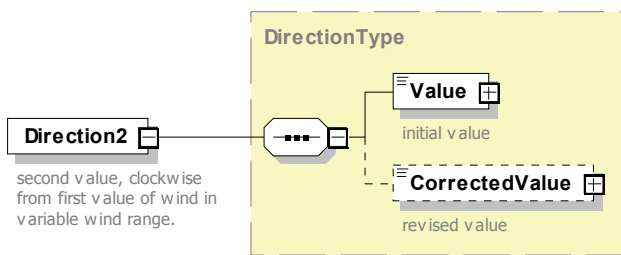
element SurfaceWindType/Directions/VariableWindRange

diagram	 VariableWindRange is a dashed box containing a solid box with three dots. A line connects this solid box to a larger solid box with three dots. From this larger box, two lines branch out to two separate boxes: Direction1 and Direction2. Direction1 is a box with a plus sign in the top right corner. Below it, the text reads: "first value of the wind direction in variable wind range". Direction2 is a box with a plus sign in the top right corner. Below it, the text reads: "second value, clockwise from first value of wind in variable wind range." to be provided in case directions differ by 60 degrees or more at speeds higher than 3 kt
children	Direction1 Direction2
annotation	documentation to be provided in case directions differ by 60 degrees or more at speeds higher than 3 kt

element SurfaceWindType/Directions/VariableWindRange/Direction1

diagram	 Direction1 is a box with a plus sign in the top right corner. Below it, the text reads: "first v value of the wind direction in v ariable wind range". A line connects Direction1 to a larger solid box with three dots. This larger box is connected to a yellow-shaded box labeled DirectionType. Inside DirectionType, there are two boxes: Value and CorrectedValue. Value is a box with a plus sign in the top right corner, and below it, the text reads: "initial v value". CorrectedValue is a box with a plus sign in the top right corner, and below it, the text reads: "rev ised v value". A dashed line connects Value to CorrectedValue.
type	DirectionType
children	Value CorrectedValue
annotation	documentation first value of the wind direction in variable wind range

element SurfaceWindType/Directions/VariableWindRange/Direction2

diagram	 Direction2 is a box with a plus sign in the top right corner. Below it, the text reads: "second v value, clockwise from first v value of wind in variable wind range.". A line connects Direction2 to a larger solid box with three dots. This larger box is connected to a yellow-shaded box labeled DirectionType. Inside DirectionType, there are two boxes: Value and CorrectedValue. Value is a box with a plus sign in the top right corner, and below it, the text reads: "initial v value". CorrectedValue is a box with a plus sign in the top right corner, and below it, the text reads: "rev ised v value". A dashed line connects Value to CorrectedValue.
type	DirectionType
children	Value CorrectedValue
annotation	documentation second value, clockwise from first value of wind in variable wind range.

5.0 COMMON ELEMENTS

element SurfaceWindType/Speeds

diagram	The diagram shows the structure of the Speeds element (labeled 'wind speeds element'). It is a container element with a 'Calm' child element and a 'Speed' child element. The 'Calm' element is labeled 'speed identifier Calm may be used at wind speeds of 3 kt or less'. The 'Speed' element is labeled 'wind speed' and contains a 'Gusts' child element labeled 'gust speed'.
children	Calm Speed Gusts
annotation	documentation wind speeds element

element SurfaceWindType/Speeds/Calm

diagram	The diagram shows the structure of the Calm element (labeled 'speed identifier Calm may be used at wind speeds of 3 kt or less'). It is a container element with a 'Value' child element labeled 'initial v value' and a 'CorrectedValue' child element labeled 'rev ised v value'.
type	xs:string
annotation	documentation speed identifier Calm may be used at wind speeds of 3 kt or less

element SurfaceWindType/Speeds/Speed

diagram	The diagram shows the structure of the Speed element (labeled 'wind speed'). It is a container element with a 'Value' child element labeled 'initial v value' and a 'CorrectedValue' child element labeled 'rev ised v value'.
type	SpeedType
children	Value CorrectedValue
annotation	documentation wind speed

element SurfaceWindType/Speeds/Gusts

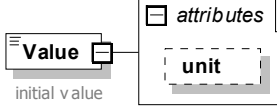
diagram	The diagram shows the structure of the Gusts element (labeled 'gust speed'). It is a container element with a 'Value' child element labeled 'initial v value' and a 'CorrectedValue' child element labeled 'rev ised v value'.
type	SpeedType
children	Value CorrectedValue
annotation	documentation gust speed

5.0 COMMON ELEMENTS

complexType TemperatureType

diagram	
children	Value CorrectedValue
used by	elements ObservationDetailsType/Temperatures/AirTemperature RouteInformation/AverageISADelevation flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/SuitableAirport/AverageISADelevation RouteInformation/AverageTemperature flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/SuitableAirport/AverageTemperature ObservationDetailsType/Temperatures/DewPointTemperature UpperAirData.grp/AltitudeSpecificPredictedInformation/TemperatureData/ISADelevation waypoint.Grp/SegmentISADelevation waypoint.Grp/SegmentTemperature PIREP/DecodedInformation/SpotTemperature PIREP/DecodedInformation/Icing/Temperatures/StaticAirTemperature ForecastDetailsType/ForecastGeneral/Temperatures/Temperature UpperAirData.grp/AltitudeSpecificPredictedInformation/TemperatureData/Temperature PIREP/DecodedInformation/Icing/Temperatures/TotalAirTemperature
annotation	documentation temperature type definition (value and correction)

element TemperatureType/Value

diagram						
type	extension of xs:float					
attributes	Name <u>unit</u>	Type <u>temperatureUnitType</u>	Use	Default C	Fixed	annotation
annotation	documentation initial value					

attribute TemperatureType/Value/@unit

type	temperatureUnitType
facets	enumeration C enumeration F enumeration K

simpleType temperatureUnitType

type	restriction of xs:string
used by	attributes TemperatureType/Value/@unit TemperatureType/CorrectedValue/@unit
facets	enumeration C enumeration F enumeration K
annotation	documentation temperature unit type definition (enumerated units)

5.0 COMMON ELEMENTS

element TemperatureType/CorrectedValue

diagram						
type	extension of xs:float					
attributes	Name	Type	Use	Default	Fixed	annotation
	<u>unit</u>	<u>temperatureUnitType</u>		C		
	<u>source</u>	derived by: xs:string				
annotation	documentation revised value					

attribute TemperatureType/CorrectedValue/@unit

type	<u>temperatureUnitType</u>
facets	enumeration C enumeration F enumeration K

attribute TemperatureType/CorrectedValue/@source

type	restriction of xs:string

complexType TextType

diagram	Definition for a text type 1..∞ paragraph (line) structure	
children	<u>Paragraph</u>	
used by	elements	FlightPlanAtclcao/AtcMessageText ATIS/ATISBulletins/ATISBulletin/ATISText ATIS/ATISBulletins/ATISBulletin/ATISDetails/Comment PaxFlightInfoType/Comments/Comment CrewList/CrewListText AirportWeather/WeatherBulletins/WeatherBulletin/Forecast/ForecastText HazardAdvisory/HazardAdvisoryText NOTAM/NOTAMText AirportWeather/WeatherBulletins/WeatherBulletin/Observation/ObservationText PaxList/PaxListText PIREP/PirepText RegionWeather/RegionWeatherText flightPlanCore.Grp/TankeringInfo/TankeringAdvice/Remark flightPlanCore.Grp/FuelStatistics/FuelStatistic/Remark RemarksType/Remark RegionWeather/Remark PIREP/Remark NOTAM/Remark HazardAdvisory/Remark DPRREP/Remark DORIND/Remark
annotation	documentation	Definition for a text type

element TextType/Paragraph

diagram						
children	<u>Text</u>					

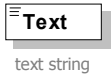
5.0 COMMON ELEMENTS

attributes	Name sequence	Type xs:nonNegativeInteger	Use	Default	Fixed	annotation documentation paragraph's sequence
annotation	documentation paragraph (line) structure					

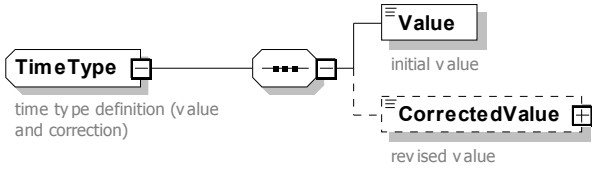
attribute TextType/Paragraph/@sequence

type	xs:nonNegativeInteger
annotation	documentation paragraph's sequence

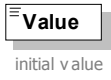
element TextType/Paragraph/Text

diagram	 text string
type	restriction of xs:string
annotation	documentation text string

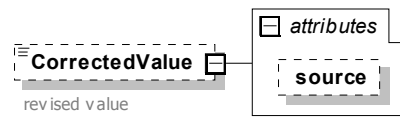
complexType TimeType

diagram	 time type definition (value and correction)
children	Value CorrectedValue
used by	elements TimeBasicType/ActualTime flightPlanSummary.Grp/CTOT TimeBasicType/EstimatedTime
annotation	documentation time type definition (value and correction)

element TimeType/Value

diagram	 initial v alue
type	xs:dateTime
annotation	documentation initial value

element TimeType/CorrectedValue

diagram						
type	extension of xs:dateTime					
attributes	Name source	Type derived by: xs:string	Use	Default	Fixed	annotation
annotation	documentation revised value					

5.0 COMMON ELEMENTS

attribute TimeType/CorrectedValue/@source

type	restriction of xs:string

complexType TravelDocumentType

diagram	attributes travelDocumentType type of travel document, e.g. passport, id card, driving license travelDocumentId dateOfBirth placeOfBirth nationality placeOfIssue dateOfIssue countryOfIssue dateOfExpiration TravelDocumentType Defines common passport elements					
used by	element	PersonType/TravelDocument				
attributes	Name	Type	Use	Default	Fixed	annotation
	travelDocumentType	derived by: xs:string				documentation type of travel document, e.g., passport, id card, driving license
	travelDocumentId	derived by: xs:string	required			
	dateOfBirth	xs:date	required			
	placeOfBirth	derived by: xs:string	required			
	nationality	derived by: xs:string				
	placeOfIssue	derived by: xs:string				
	dateOfIssue	xs:date	required			
	countryOfIssue	derived by: xs:string				
	dateOfExpiration	xs:date				
annotation	documentation Defines common passport elements					

attribute TravelDocumentType/@travelDocumentType

type	restriction of xs:string
annotation	documentation type of travel document, e.g., passport, id card, driving license

5.0 COMMON ELEMENTS

attribute TravelDocumentType/@travelDocumentId

type	restriction of xs:string

attribute TravelDocumentType/@dateOfBirth

type	xs:date

attribute TravelDocumentType/@placeOfBirth

type	restriction of xs:string

attribute TravelDocumentType/@nationality

type	restriction of xs:string

attribute TravelDocumentType/@placeOfIssue

type	restriction of xs:string

attribute TravelDocumentType/@dateOfIssue

type	xs:date

attribute TravelDocumentType/@countryOfIssue

type	restriction of xs:string

attribute TravelDocumentType/@dateOfExpiration

type	xs:date

5.0 COMMON ELEMENTS

complexType VisibilitiesAndWeatherType

diagram	VisibilitiesAndWeatherType CeilingAndVisibilityOK CAVOK to be used in case visibility is greater than 10km and no clouds below 5000ft (or below highest MSA respectively) and no CB and no weather Visibilities horizontal visibility Clouds clouds and vertical visibility NilSignificantWeather NSW or NOSIG Weather weather description and type, e.g. BLSN for blowing snow, FZFG for freezing fog 1..∞
children	CeilingAndVisibilityOK Visibilities Clouds NilSignificantWeather Weather
used by	elements ForecastDetailsType/ForecastGeneral/VisibilitiesAndWeather ObservationDetailsType/VisibilitiesAndWeather WeatherChangeType/VisibilitiesAndWeather

element VisibilitiesAndWeatherType/CeilingAndVisibilityOK

diagram	CeilingAndVisibilityOK CAVOK to be used in case visibility is greater than 10km and no clouds below 5000ft (or below highest MSA respectively) and no CB and no weather
type	xs:string
annotation	documentation CAVOK to be used in case visibility is greater than 10km and no clouds below 5000ft (or below highest MSA respectively) and no CB and no weather

element VisibilitiesAndWeatherType/Visibilities

diagram	Visibilities horizontal visibility VisibilityType PrevailingVisibility MinimumVisibility MaximumVisibility
type	VisibilityType
children	PrevailingVisibility MinimumVisibility MaximumVisibility
annotation	documentation horizontal visibility

5.0 COMMON ELEMENTS

element VisibilitiesAndWeatherType/Clouds

diagram	
type	CloudsType
children	SkyClear NilSignificantClouds VerticalVisibility CloudDescriptions
annotation	documentation clouds and vertical visibility

element VisibilitiesAndWeatherType/NilSignificantWeather

diagram	
type	restriction of xs:string
facets	enumeration NSW enumeration NOSIG
annotation	documentation NSW or NOSIG

element VisibilitiesAndWeatherType/Weather

diagram	Weather (1..∞) weather description and type, e.g. BLSN for blowing snow, FZFG for freezing fog WeatherType (extension) attributes intensity light (-), moderate (), heavy (+) and "in the vicinity" (VC) indicators					
type	extension of <u>WeatherType</u>					
attributes	Name <u>intensity</u>	Type <u>airportWeatherIntensityProximityType</u>	Use required	Default	Fixed	annotation documentation light (-), moderate (), heavy (+) and "in the vicinity" (VC) indicators
annotation	documentation weather description and type, e.g., BLSN for blowing snow, FZFG for freezing fog					

5.0 COMMON ELEMENTS

complexType VisibilityType

diagram	
children	PrevailingVisibility MinimumVisibility MaximumVisibility
used by	element VisibilitiesAndWeatherType/Visibilities
annotation	documentation horizontal visibility

element VisibilityType/PrevailingVisibility

diagram	
type	DistanceType
children	Value CorrectedValue

element VisibilityType/MinimumVisibility

diagram													
type	extension of DistanceType												
children	Value CorrectedValue												
attributes	<table><tr><th>Name</th><th>Type</th><th>Use</th><th>Default</th><th>Fixed</th><th>annotation</th></tr><tr><td>direction</td><td>derived by: xs:string</td><td></td><td></td><td></td><td></td></tr></table>	Name	Type	Use	Default	Fixed	annotation	direction	derived by: xs:string				
Name	Type	Use	Default	Fixed	annotation								
direction	derived by: xs:string												

5.0 COMMON ELEMENTS

attribute **VisibilityType/MinimumVisibility/@direction**

type	restriction of xs:string	
facets	enumeration	N
	enumeration	NNE
	enumeration	NE
	enumeration	ENE
	enumeration	E
	enumeration	ESE
	enumeration	SE
	enumeration	SSE
	enumeration	S
	enumeration	SSW
	enumeration	SW
	enumeration	WSW
	enumeration	W
	enumeration	WNW
	enumeration	NW
	enumeration	NNW

element **VisibilityType/MaximumVisibility**

diagram						
type	extension of DistanceType					
children	Value CorrectedValue					
attributes	Name direction	Type derived by: xs:string	Use	Default	Fixed	annotation

attribute **VisibilityType/MaximumVisibility/@direction**

type	restriction of xs:string	
facets	enumeration	N
	enumeration	NNE
	enumeration	NE
	enumeration	ENE
	enumeration	E
	enumeration	ESE
	enumeration	SE
	enumeration	SSE
	enumeration	S
	enumeration	SSW
	enumeration	SW
	enumeration	WSW
	enumeration	W
	enumeration	WNW
	enumeration	NW
	enumeration	NNW

5.0 COMMON ELEMENTS

complexType VolumeType

diagram	
children	Value CorrectedValue
used by	element fuelHeader.Grp/PossibleExtraFuel/TankVolume
annotation	documentation volume type definition (value and correction)

element VolumeType/Value

diagram						
type	extension of xs:float					
attributes	<u>Name</u> <u>unit</u>	<u>Type</u> <u>volumeUnitType</u>	Use	Default 1	Fixed	annotation
annotation	<u>documentation</u> <u>initial value</u>					

attribute VolumeType/Value/@unit

type	volumeUnitType										
facets	<table><tbody><tr><td>enumeration</td><td>l</td></tr><tr><td>enumeration</td><td>ug</td></tr><tr><td>enumeration</td><td>ig</td></tr><tr><td>enumeration</td><td>m3</td></tr><tr><td>enumeration</td><td>cm3</td></tr></tbody></table>	enumeration	l	enumeration	ug	enumeration	ig	enumeration	m3	enumeration	cm3
enumeration	l										
enumeration	ug										
enumeration	ig										
enumeration	m3										
enumeration	cm3										

simpleType volumeUnitType

type	restriction of xs:string										
used by	attributes DRCSUB/DelcingOnly/DelcingFluidVolume/@unit DRCSUB/Antilcing/DelcingFluidVolume/@unit DRCSUB/Antilcing/AntilcingFluidVolume/@unit FRCSUB/FuelVolume/@unit FRCACK/FuelVolume/@unit VolumeType/Value/@unit VolumeType/CorrectedValue/@unit Units/@volumeUnit										
facets	<table><tbody><tr><td>enumeration</td><td>l</td></tr><tr><td>enumeration</td><td>ug</td></tr><tr><td>enumeration</td><td>ig</td></tr><tr><td>enumeration</td><td>m3</td></tr><tr><td>enumeration</td><td>cm3</td></tr></tbody></table>	enumeration	l	enumeration	ug	enumeration	ig	enumeration	m3	enumeration	cm3
enumeration	l										
enumeration	ug										
enumeration	ig										
enumeration	m3										
enumeration	cm3										
annotation	documentation volume unit type definition (enumerated units)										

element VolumeType/CorrectedValue

diagram	

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type	extension of xs:float					
attributes	Name	Type	Use	Default	Fixed	annotation
	<u>unit</u>	<u>volumeUnitType</u>		I		
	<u>source</u>	derived by: xs:string				
annotation	documentation revised value					

attribute VolumeType/CorrectedValue/@unit

type	<u>volumeUnitType</u>					
facets	enumeration	I				
	enumeration	ug				
	enumeration	ig				
	enumeration	m3				
	enumeration	cm3				

attribute VolumeType/CorrectedValue/@source

type	restriction of xs:string

complexType WeatherChangeType

diagram	
children	SurfaceWind VisibilitiesAndWeather
used by	elements ObservationDetailsType/Trend ForecastDetailsType/WeatherChanges/WeatherChange

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attributes	Name	Type	Use	Default	Fixed	annotation
	<u>becoming</u>	xs:string			BECMG	documentation BECMG indication
	<u>temporary</u>	xs:string			TEMPO	documentation TEMPO indication
	<u>at</u>	xs:string			AT	documentation AT indication
	<u>from</u>	xs:string			FM	documentation FM indication
	<u>startTime</u>	xs:dateTime				documentation begin time for BECMG, TEMPO, AT, FM, TL
	<u>until</u>	xs:string			TL	documentation TL indication
	<u>endTime</u>	xs:dateTime				documentation end time for BECMG, TEMPO, TL
	<u>probability</u>	<u>probabilityType</u>				documentation probability indication for the reported weather

attribute WeatherChangeType/@becoming

type	xs:string
annotation	documentation BECMG indication

attribute WeatherChangeType/@temporary

type	xs:string
annotation	documentation TEMPO indication

attribute WeatherChangeType/@at

type	xs:string
annotation	documentation AT indication

attribute WeatherChangeType/@from

type	xs:string
annotation	documentation FM indication

attribute WeatherChangeType/@startTime

type	xs:dateTime
annotation	documentation begin time for BECMG, TEMPO, AT, FM, TL

5.0 COMMON ELEMENTS

attribute WeatherChangeType/@until

type	xs:string
annotation	documentation TL indication

attribute WeatherChangeType/@endTime

type	xs:dateTime
annotation	documentation end time for BECMG, TEMPO, TL

attribute WeatherChangeType/@probability

type	probabilityType
facets	enumeration 30 enumeration 40
annotation	documentation probability indication for the reported weather

simpleType probabilityType

type	restriction of xs:string
used by	attributes ForecastDetailsType/ForecastGeneral/@probability WeatherChangeType/@probability
facets	enumeration 30 enumeration 40

element WeatherChangeType/SurfaceWind

diagram						
type	SurfaceWindType					
children	Directions Speeds					
attributes	Name runwayIdentifier	Type derived by: xs:string	Use	Default	Fixed	annotation documentation runway identifier in case runway specific wind data will be provided
annotation	documentation wind description					

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element WeatherChangeType/VisibilitiesAndWeather

diagram	VisibilitiesAndWeatherType VisibilitiesAndWeather CeilingAndVisibilityOK CAVOK to be used in case visibility is greater than 10km and no clouds below 5000ft (or below highest MSA respectively) and no CB and no weather Visibilities horizontal v isibility Clouds clouds and vertical visibility NilSignificantWeather NSW or NOSIG Weather 1...∞ weather description and type, e.g. BLSN for blowing snow, FZFG for freezing fog
type	VisibilitiesAndWeatherType
children	CeilingAndVisibilityOK Visibilities Clouds NilSignificantWeather Weather

complexType WeatherType

diagram	WeatherType weather description and type, e.g. BLSN for blowing snow, FZFG for freezing fog attributes intensity light (-), moderate (), heavy (+) and "in the vicinity" (VC) indicators												
used by	elements ObservationDetailsType/SupplementaryInformation/RecentWeather VisibilitiesAndWeatherType/Weather												
attributes	<table><tr><th>Name</th><th>Type</th><th>Use</th><th>Default</th><th>Fixed</th><th>annotation</th></tr><tr><td>intensity</td><td>airportWeatherIntensityProximityType</td><td>required</td><td></td><td></td><td>documentation light (-), moderate (), heavy (+) and "in the vicinity" (VC) indicators</td></tr></table>	Name	Type	Use	Default	Fixed	annotation	intensity	airportWeatherIntensityProximityType	required			documentation light (-), moderate (), heavy (+) and "in the vicinity" (VC) indicators
Name	Type	Use	Default	Fixed	annotation								
intensity	airportWeatherIntensityProximityType	required			documentation light (-), moderate (), heavy (+) and "in the vicinity" (VC) indicators								
annotation	documentation weather description and type, e.g., BLSN for blowing snow, FZFG for freezing fog												

attribute WeatherType/@intensity

type	airportWeatherIntensityProximityType								
facets	<table><tr><td>enumeration</td><td>light</td></tr><tr><td>enumeration</td><td>moderate</td></tr><tr><td>enumeration</td><td>heavy</td></tr><tr><td>enumeration</td><td>in the vicinity</td></tr></table>	enumeration	light	enumeration	moderate	enumeration	heavy	enumeration	in the vicinity
enumeration	light								
enumeration	moderate								
enumeration	heavy								
enumeration	in the vicinity								
annotation	documentation light (-), moderate (), heavy (+) and "in the vicinity" (VC) indicators								

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simpleType intensityType

type	restriction of xs:string	
used by	attributes	PIREP/DecodedInformation/Icing/@intensity PIREP/DecodedInformation/Turbulence/@intensity PIREP/DecodedInformation/WindShear/@intensity RegionWeather/DecodedInformation/Icing/@intensity RegionWeather/DecodedInformation/Turbulence/@intensity
facets	enumeration	light
	enumeration	light to moderate
	enumeration	moderate
	enumeration	moderate to severe
	enumeration	severe
	enumeration	extreme

complexType WeightType

diagram		
children	Value CorrectedValue	
used by	elements	weightHeaderLineBasic.Grp/ActualWeight waypoint.Grp/CalculatedFuelOnBoard flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/SuitableAirport/CriticalFuel waypoint.Grp/CumulatedBurnOffDifference weightHeaderLineBasic.Grp/EstimatedWeight flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/SuitableAirport/FinalReserve flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/FuelOnBoard FuelHeaderLineBlockType/FuelOnBoardAfterRefueling waypoint.Grp/FuelOnBoardDifference flightPlanCore.Grp/ContingencySavingHeader/DecisionPoint/FuelRequiredToArrivalAirport flightPlanCore.Grp/ContingencySavingHeader/DecisionPoint/FuelRequiredToContingencySavingAirport FlightPlanSummary/EngineFuel/FuelUsedEngine1 FlightPlanSummary/EngineFuel/FuelUsedEngine2 FlightPlanSummary/EngineFuel/FuelUsedEngine3 FlightPlanSummary/EngineFuel/FuelUsedEngine4 flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/SuitableAirport/IcingConditionFuel waypoint.Grp/LeakDetection waypoint.Grp/MinimumFuelOnBoard WeightHeaderLineLimitedType/OperationalLimit fuelHeader.Grp/PossibleExtraFuel/PossibleExtra WeightHeaderLineLimitedType/StructuralLimit flightPlanCore.Grp/TankeringInfo/TankeringWeight flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/SuitableAirport/TripFuel fuelHeader.Grp/PossibleExtraFuel/MaximumFuelWeight/Weight
annotation	documentation	weight type definition (value and correction)

element WeightType/Value

diagram		
type	extension of xs:float	
attributes	Name unit	Type weightUnitType Use optional Default kg Fixed annotation
annotation	documentation	initial value

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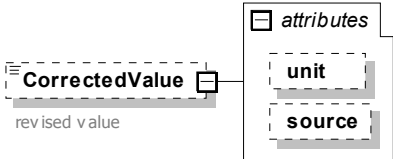
attribute [WeightType/Value/@unit](#)

type	weightUnitType
facets	enumeration kg enumeration t enumeration lb enumeration hlb

simpleType [weightUnitType](#)

type	restriction of xs:string
used by	attributes FORACK/@aircraftMassUnitDisplay FORSUB/@aircraftMassUnitDisplay flightPlanCore.Grp/FuelStatistics/FuelStatistic/AnalysedFuelValue/@unit WeightType/CorrectedValue/@unit WeightType/Value/@unit FORACK/ArrivalFuel/@unit FORACK/TripFuel/@unit FORACK/TaxiFuel/@unit FORACK/BlockFuel/@unit FORACK/OperationalLimit/@unit FORSUB/ArrivalFuel/@unit FORSUB/TripFuel/@unit FORSUB/TaxiFuel/@unit FORSUB/BlockFuel/@unit FORSUB/OperationalLimit/@unit FRCACK/FuelMass/@unit FRCSUB/FuelMass/@unit FCAIND/TaxiFuel/@unit FCAIND/TakeoffWeight/@unit Units/@weightUnit
facets	enumeration kg enumeration t enumeration lb enumeration hlb
annotation	documentation weight unit type definition (enumerated units)

element [WeightType/CorrectedValue](#)

diagram						
type	extension of xs:float					
attributes	Name unit source	Type weightUnitType derived by: xs:string	Use optional	Default kg	Fixed	annotation
annotation	documentation revised value					

attribute [WeightType/CorrectedValue/@unit](#)

type	weightUnitType
facets	enumeration kg enumeration t enumeration lb enumeration hlb

attribute [WeightType/CorrectedValue/@source](#)

type	restriction of xs:string

5.0 COMMON ELEMENTS

complexType WindType

diagram	
children	Direction Speed
used by	elements RouteInformation/AverageWind flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/SuitableAirport/AverageWind UpperAirData.Grp/AltitudeSpecificPredictedInformation/WindData/HorizontalWind waypoint.Grp/SegmentWind PIREP/DecodedInformation/SpotWind
annotation	documentation structure for wind data (definition of direction and speed)

element WindType/Direction

diagram	
type	DirectionType
children	Value CorrectedValue
annotation	documentation wind direction

element WindType/Speed

diagram	
type	SpeedType
children	Value CorrectedValue
annotation	documentation wind speed

simpleType brakingActionType

type	restriction of xs:string
used by	element PIREP/DecodedInformation/BrakingAction
facets	enumeration nil enumeration poor enumeration medium to poor enumeration medium enumeration medium to good enumeration good enumeration unreliable

5.0 COMMON ELEMENTS

simpleType FuelAdjustmentAffectedItemType

type	restriction of xs:string	
facets	enumeration	TripFuel
	enumeration	TakeOffFuel
	enumeration	TripTime
	enumeration	AverageWindComponent
	enumeration	AverageISADeviation
annotation	documentation list of possible value for affected item in flight adjustments	

simpleType FuelAdjustmentReasonType

type	restriction of xs:string	
facets	enumeration	ZeroFuelWeight
	enumeration	TakeoffWeight
	enumeration	Altitude
	enumeration	FL
	enumeration	CostIndex
	enumeration	MachNumber
	enumeration	IndicatedAirSpeed
	enumeration	TrueAirSpeed
	enumeration	LRC
	enumeration	MEC
	enumeration	MRC
	enumeration	MSP
annotation	documentation list of possible values for flight adjustments	

simpleType thunderstormTrendType

type	restriction of xs:string	
used by	elements	PIREP/DecodedInformation/Thunderstorm/Trend RegionWeather/DecodedInformation/Thunderstorm/Trend
facets	enumeration	developing
	enumeration	developed
	enumeration	diminishing

attributeGroup waypointIdentification.grp

used by	elements	BorderPointType/NearestWaypoint AirportData/Airport/TerminalProcedures/Waypoint UpperAirData/CruisePhase/Waypoints/Waypoint NOTAM/Keys/Waypoints/Waypoint				
attributes	Name waypointId	Type WaypointIdType	Use optional	Default	Fixed	annotation documentation 1 to 5 char code, the name as seen by the Pilot and as entered in FMC documentation waypoint identification as typically in ATC- FPL, or any artificial waypoint name (TOC, TOD, etc.); to be considered as secondary when waypointId is provided
	waypointName	derived by: xs:string	optional			
	countryCAOCCode	CountryCAOCCodeType	optional			
annotation	documentation group definition for waypoint.					

5.0 COMMON ELEMENTS

attribute [waypointIdentification.grp/@waypointId](#)

type	WaypointIdType
annotation	documentation 1 to 5 char code, the name as seen by the Pilot and as entered in FMC

simpleType [WaypointIdType](#)

type	restriction of xs:string
used by	attributes WaypointType/@waypointId waypointIdentification.grp/@waypointId
annotation	documentation waypoint id – 1 to 5 letter code

The attribute [waypointId](#) is optional but nevertheless is recommended to be provided as it is already expected by a number of applications. For artificial waypoints, provide the value of [@waypointName](#) (e.g., TOC, TOD, ENTRY etc.), Attribute size restriction remains valid.

attribute [waypointIdentification.grp/@waypointName](#)

type	restriction of xs:string
annotation	documentation waypoint identification as typically in ATC-FPL, or any artificial waypoint name (TOC, TOD, etc.); to be considered as secondary when waypointId is provided

attribute [waypointIdentification.grp/@countryICAOCode](#)

type	CountryICAOCodeType

simpleType [CountryICAOCodeType](#)

type	restriction of xs:string
used by	attributes WaypointType/@countryICAOCode waypointIdentification.grp/@countryICAOCode
annotation	documentation 2 letter ICAO Country Code

simpleType [WaypointFunctionType](#)

type	restriction of xs:string
facets	enumeration DepartureAirport enumeration ArrivalAirport enumeration PrimaryArrivalAlternateAirport enumeration ArrivalAlternateAirport enumeration Enroute enumeration FreeFlightEnroute enumeration GridPoint enumeration Ndb enumeration Vhf enumeration Compulsory enumeration AtsItem15 enumeration AirspaceBoundary enumeration OceanicAirspaceBoundary enumeration ETOPSEntry enumeration ETOPSExit enumeration EqualTimePoint enumeration EqualFuelPoint enumeration PointOfNoReturn enumeration ContingencySavingsDecisionWaypoint enumeration TopOfClimb enumeration TopOfDescent enumeration TopOfStepClimb enumeration TopOfStepDescent enumeration BottomOfClimb

5.0 COMMON ELEMENTS

	enumeration BottomOfDescent enumeration BottomOfStepClimb enumeration BottomOfStepDescent enumeration OTS enumeration DriftDownDecisionPoint enumeration DepressurisationDecisionPoint enumeration ReportingPoint enumeration ContingencySavingAirport enumeration ContingencySavingEnRouteAlternateAirport enumeration PrimaryContingencySavingAlternate enumeration ContingencySavingAlternate
annotation	documentation list of recommended values for airport functions

[attributeGroup coordinateType.grp](#)

used by	elements AirportData/Airport/Runway/LandingThreshold/Coordinates AirportData/Airport/TerminalProcedures/Waypoint/Coordinates AirportData/Airport/AirportReferencePoint/Coordinates UpperAirData/CruisePhase/Waypoints/Waypoint/Coordinates BorderPointType/Coordinates BorderPointType/NearestWaypoint/Coordinates HazardAdvisory/HazardousArea/Coordinates GeographyType/Polygon/Coordinates GeographyType/Spot/Coordinates flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/Coordinates flightPlanCore.Grp/ContingencySavingHeader/DecisionPoint/Coordinates waypoint.Grp/Coordinates					
attributes	Name latitude longitude	Type derived by: xs:float derived by: xs:float	Use required required	Default	Fixed	annotation
annotation	documentation definition for latitude and longitude, to be expressed in seconds, positive values representing North/East, negative values representing South/West					

[attribute coordinateType.grp/@latitude](#)

type	restriction of xs:float

[attribute coordinateType.grp/@longitude](#)

type	restriction of xs:float

[attributeGroup forecastGroup](#)

used by	element AirportWeather/WeatherBulletins/WeatherBulletin/Forecast					
attributes	Name forecastTime forecastType forecastStartTime forecastEndTime	Type xs:dateTime derived by: xs:string xs:dateTime xs:dateTime	Use required required required required	Default	Fixed	annotation documentation time when forecast was established documentation FT or FC documentation start of validity period of forecast documentation end of validity period of forecast
annotation	documentation defines forecast type (FC or FT), time of forecast as well as validity time for the forecast					

5.0 COMMON ELEMENTS

attribute forecastGroup/@forecastTime

type	xs:dateTime
annotation	documentation time when forecast was established

attribute forecastGroup/@forecastType

type	restriction of xs:string
facets	enumeration FT enumeration FC
annotation	documentation FT or FC

attribute forecastGroup/@forecastStartTime

type	xs:dateTime
annotation	documentation start of validity period of forecast

attribute forecastGroup/@forecastEndTime

type	xs:dateTime
annotation	documentation end of validity period of forecast

attributeGroup observationGroup

used by	elements ATIS/ATISBulletins/ATISBulletin AirportWeather/WeatherBulletins/WeatherBulletin/Observation					
attributes	Name observationTime	Type xs:dateTime	Use required	Default	Fixed	annotation documentation release time of observation bulletin
	observationType	derived by: xs:string	required			documentation METAR or SPECI
annotation	documentation defines observation type (METAR or SPECI) and time of observation					

attribute observationGroup/@observationTime

type	xs:dateTime
annotation	documentation release time of observation bulletin

attribute observationGroup/@observationType

type	restriction of xs:string
facets	enumeration METAR enumeration SPECI
annotation	documentation METAR or SPECI

5.0 COMMON ELEMENTS

5.1 Important Parameters Used in Common Elements

To be added in a future supplement.

5.2 Common Communication Services

5.2.1 General Error Service

5.2.1.1 General Error INDication ACARS Element Structure

Table 5.2.1.1-1 – GERIND01 ACARS Definition

Parameter Name	Meaning	Contents		Option	Range	Resolution	Unit	Example
		Fixed Text	Parameter Type					
ErroneousSMI	SMI of the application that caused the generation of this error element		Char3TypeType	YES				JRE
parameter separator		comma		NO				,
ErroneousService	Service that caused the generation of this error element		Char3Type	NO				FOR
ErroneousElement	Element which, upon reception, has triggered the generation of this error element		Char3Type	NO				SUB
ErroneousVersion	Version of the element which, upon reception, has triggered the generation of this error element		NN	NO				01
parameter separator		comma		NO				,
ErrorClass	see separate table		integer	YES	0 to 3			
parameter separator		comma		NO				,
ErrorType	see separate table		integer	YES	0 to 99			
parameter separator		comma		NO				,
ErrorData	to be interpreted by application		(0-n)I	YES				Message Undeliverable
parameter separator		comma		NO				,
TryAgain	Missing: not specified 0: Receiving application should not try again 1: Receiving application may retry to send the element that caused the error		boolean	YES				0

5.2.1.2 General Error INDication XML Format

General Error XML Schema definition is based on the ACARS definition.

5.0 COMMON ELEMENTS

element GERIND

diagram	
children	M633Header M633SupplementaryHeader Error

element GERIND/Error

diagram	
type	GeneralErrorType

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used by	element WI Error					
attributes	Name	Type	Use	Default	Fixed	annotation
	erroneousSMI	char3Type	optional			documentation SMI of the application that caused the generation of this error element (e.g., JRE)
	erroneousService	char3Type	required			documentation Service that caused the generation of this error element (e.g., FOR)
	erroneousElement	char3Type	required			documentation Element which, upon reception, has triggered the generation of this error element (e.g., SUB)
	erroneousVersion	xs:nonNegativeInteger	required			documentation Version of the element which, upon reception, has triggered the generation of this error element (e.g., 1)
	errorClass	xs:nonNegativeInteger	optional			documentation see Table 5.2.1.2: Error Classes
	errorType	xs:nonNegativeInteger	optional			documentation see Table 5.2.1.3: Error Types
	errorData	derived by: xs:string	optional			documentation to be interpreted by the application (e.g., Message Undeliverable)
	tryAgain	xs:boolean	optional			documentation Missing: not specified 0: Receiving application should not try again 1: Receiving application may retry to send the element that caused the error

5.0 COMMON ELEMENTS

complexType **GeneralErrorType**

diagram	GeneralErrorType attributes erroneousSMI SMI of the application that caused the generation of this error element. (e.g. JRE) erroneousService Service that caused the generation of this error element. (e.g. FOR) erroneousElement Element which, upon reception, has triggered the generation of this error element. (e.g. SUB) erroneousVersion Version of the element which, upon reception, has triggered the generation of this error element. (e.g. 1) errorClass see Table 5.2.1.2: Error Classes errorType see Table 5.2.1.3: Error Types errorData to be interpreted by the application (e.g. Message Undeliverable) tryAgain Missing: not specified 0: Receiving application should not try again 1: Receiving application may retry to send the element that caused the error					
used by	element GERIND/Error					
attributes	Name	Type	Use	Default	Fixed	annotation
	erroneousSMI	char3Type	optional			documentation SMI of the application that caused the generation of this error element (e.g., JRE)
	erroneousService	char3Type	required			documentation Service that caused the generation of this error element (e.g., FOR)
	erroneousElement	char3Type	required			documentation Element which, upon reception, has triggered the generation of

5.0 COMMON ELEMENTS

	erroneousVersion	xs:nonNegativeInteger	required	this error element (e.g., SUB) documentation Version of the element which, upon reception, has triggered the generation of this error element (e.g., 1)
	errorClass	xs:nonNegativeInteger	optional	documentation see Table 5.2.1.2: Error Classes
	errorType	xs:nonNegativeInteger	optional	documentation see Table 5.2.1.3: Error Types
	errorData	derived by: xs:string	optional	documentation to be interpreted by the application (e.g., Message Undeliverable)
	tryAgain	xs:boolean	optional	documentation Missing: not specified 0: Receiving application should not try again 1: Receiving application may retry to send the element that caused the error

attribute **GeneralErrorType/@erroneousSMI**

type	char3Type
annotation	documentation SMI of the application that caused the generation of this error element. (e.g., JRE)

attribute **GeneralErrorType/@erroneousService**

type	char3Type
annotation	documentation Service that caused the generation of this error element. (e.g., FOR)

attribute **GeneralErrorType/@erroneousElement**

type	char3Type
annotation	documentation Element which, upon reception, has triggered the generation of this error element. (e.g., SUB)

attribute **GeneralErrorType/@erroneousVersion**

type	xs:nonNegativeInteger
annotation	documentation Version of the element which, upon reception, has triggered the generation of this error element. (e.g., 1)

5.0 COMMON ELEMENTS

attribute **GeneralErrorType/@errorClass**

type	xs:nonNegativeInteger
annotation	documentation see Table 5.2.1.2: Error Classes

attribute **GeneralErrorType/@errorType**

type	xs:nonNegativeInteger
annotation	documentation see Table 5.2.1.3: Error Types

attribute **GeneralErrorType/@errorData**

type	restriction of xs:string
annotation	documentation to be interpreted by the application (e.g., Message Undeliverable)

attribute **GeneralErrorType/@tryAgain**

type	xs:boolean
annotation	documentation Missing: not specified 0: Receiving application should not try again 1: Receiving application may retry to send the element that caused the error

5.2.1.3 Error Classes

Table 5.2.1.3-1 – Error Classes

Sender's Situation	Class Name	Class ID	Action to be taken by receiver	Suggested text to user (e.g., flightcrew)	Comment
not specified	undefined class	<nil> or 0	not specified	Undefined Error	
Upon reception of an element that caused an error, the transaction had to be aborted	fatal error	1	abort transaction and alert user	Transaction aborted	
The contents of a received element had been ignored, the transaction stays open	non-fatal error	2	inform user about the failure of last message	Message rejected	
The contents of a received element had been processed, but look strange	Caution	3	inform user about the caution	Message accepted	

5.0 COMMON ELEMENTS

5.2.1.4 Error Types

Note: The following table defines standard error types, common to most applications (from 0 to 19) – application-specific error types are also possible, and they range from 20 to 99. Refer to individual application sections for more details.

Table 5.2.1.4-1 – Error Types

Sender's Situation	Type Name	Type ID	Suggested text to user (e.g., flightcrew)	Comment
not specified	unknown-error	0	Unknown Error	
Message was received too late	time-out	1	Time Out	
Message was received too early or out of order	flow	2	Too early or out of order	
Received message contains unknown syntax	syntax	3	Syntax Error	
Message triggered an internal error of receiving application	internal	4	Internal Error	
Message received uses a service version not supported	service	5	Service version not supported	
Message received contains a service or message ID not known	unknown-service	6	Unknown service	
Mandatory parameters not available	missing-data	7	Parameters mandatory to generate/process messages are not available or are invalid	
Invalid CRC	CRC	8	Checksum error	
Message related to a service which is temporarily not available	temporarily-unavailable	9	Service Temporarily Unavailable	
Message related to a service which is not available	unavailable	10	Service Unavailable	
Received message could not be delivered to the right end system	undeliverable	11	Message Undeliverable	

5.2.1.5 ACARS Encoded Example (excluding ARINC 620 header)

```
GERIND01 downlink:
,GERIND01050217065159KLAX,LAX,LFPG,CDG,AF1234,,051217,,A380,,F-WOWW,
/JRE,FORSUB01,1,8,F3A2,1,xxxx
Note: xxxx is the CRC
```

Note: xxxx is the CRC.

5.0 COMMON ELEMENTS

5.2.1.6 XML Encoded Example (GERIND Example 1.xml)

```

<GERIND xsi:schemaLocation="http://aeec.aviation-ia.net/633 ERR.xsd"
xmlns="http://aeec.aviation-ia.net/633"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <M633Header timestamp="2005-12-17T06:51:59" versionNumber="2"/>
  <M633SupplementaryHeader>
    <Flight flightOriginDate="2005-12-17"
scheduledTimeOfDeparture="2005-12-17T11:10:00">
      <FlightIdentification>
        <FlightNumber airlineIATACode="AF" number="1234">
          <CommercialFlightNumber>AF1234</CommercialFlightNumber>
        </FlightNumber>
      </FlightIdentification>
      <DepartureAirport>
        <AirportICAOCODE>LFPG</AirportICAOCODE>
        <AirportIATACode>CDG</AirportIATACode>
      </DepartureAirport>
      <ArrivalAirport>
        <AirportICAOCODE>KLAX</AirportICAOCODE>
        <AirportIATACode>LAX</AirportIATACode>
      </ArrivalAirport>
    </Flight>
    <Aircraft aircraftRegistration="F-WWOW">
      <AircraftModel>
        <AircraftICAOType>A380</AircraftICAOType>
      </AircraftModel>
    </Aircraft>
  </M633SupplementaryHeader>
  <Error erroneousSMI="JRE" erroneousService="FOR"
erroneousElement="SUB" erroneousVersion="1" errorClass="1"
errorType="8" errorData="F3A2" tryAgain="1"/>
</GERIND>

```

5.3 Flight Info

To be added in a future supplement.

5.4 Operational Flight Plan

The XML Schema of the operational flight plan discussed in this section follows the requirements of EU-OPS 1.1060, FAR 121.639, FAR 91.167 and the needs of major airlines. As usual with XML, the presentation depends on a stylesheet and can be freely chosen by the airlines.

In fact, the sending application does not even need to know how the data is presented. Also, by standardizing the naming and organization of the contained elements, the data becomes accessible by a number of applications without human intervention.

In cases where an airline needs to add elements not contained in FlightPlan.xsd, the schema contains attach points (usually named “##other”) where such elements can be added. However, it should be noted, that standard EFB applications will usually not be able to process elements added here, as long as the ARINC 633 schema has not been added.

Note: In order to keep the correct relationship between different files where the @flightPlanId is used, the same value for the @flightPlanId has to be used in all these files (e.g., FlightPlanAtclcao/@flightPlanId has to have the same value as presented in FlightPlan/@flightPlanId (only for FlightPlan/@category=“normal”), NOTAMBriefing/@flightPlanId etc.)

5.0 COMMON ELEMENTS

element FlightPlan

diagram	<pre>graph TD FlightPlan[FlightPlan] --- attributes[attributes] attributes --- computedTime[computedTime] attributes --- flightPlanId[flightPlanId] attributes --- cancelId[cancelId] attributes --- category[category] attributes --- linkedFlightPlan[linkedFlightPlan] FlightPlan --- M633Header[M633Header] FlightPlan --- M633SupplementaryHeader[M633SupplementaryHeader] FlightPlan --- FlightInfo[FlightInfo] FlightPlan --- Remarks[Remarks] FlightPlan --- Ellipsis1[...] FlightPlan --- flightPlanCoreGrp[flightPlanCore.Grp] flightPlanCoreGrp --- Ellipsis2[...] Ellipsis2 --- FlightPlanHeader[FlightPlanHeader] Ellipsis2 --- FuelHeader[FuelHeader] Ellipsis2 --- WeightHeader[WeightHeader] Ellipsis2 --- Waypoints[Waypoints] Ellipsis2 --- FlightPlanSummary[FlightPlanSummary] Ellipsis2 --- NonStandardFlightPlanningType[NonStandardFlightPlanningType] Ellipsis2 --- ETOPSSummary[ETOPSSummary] Ellipsis2 --- AlternateRoutes[AlternateRoutes] Ellipsis2 --- AirportDataList[AirportDataList] Ellipsis2 --- ContingencySavingHeader[ContingencySavingHeader] Ellipsis2 --- FuelStatistics[FuelStatistics] Ellipsis2 --- TankeringInfo[TankeringInfo] FlightPlan --- anyOther[any ##other]</pre>																													
children	M633Header M633SupplementaryHeader FlightInfo Remarks FlightPlanHeader FuelHeader WeightHeader Waypoints FlightPlanSummary NonStandardFlightPlanningType ETOPSSummary AlternateRoutes AirportDataList ContingencySavingHeader FuelStatistics TankeringInfo																													
attributes	<table><tr><th>Name</th><th>Type</th><th>Use</th><th>Default</th><th>Fixed</th><th>annotation</th></tr><tr><td>computedTime</td><td>xs:dateTime</td><td>optional</td><td></td><td></td><td>documentation computation time</td></tr><tr><td>flightPlanId</td><td>derived by: xs:string</td><td>optional</td><td></td><td></td><td>documentation identifier of the operational flight plan</td></tr><tr><td>cancelId</td><td>derived by: xs:string</td><td>optional</td><td></td><td></td><td>documentation gives the reference to the operational flight plan it cancels</td></tr></table>	Name	Type	Use	Default	Fixed	annotation	computedTime	xs:dateTime	optional			documentation computation time	flightPlanId	derived by: xs:string	optional			documentation identifier of the operational flight plan	cancelId	derived by: xs:string	optional			documentation gives the reference to the operational flight plan it cancels					
Name	Type	Use	Default	Fixed	annotation																									
computedTime	xs:dateTime	optional			documentation computation time																									
flightPlanId	derived by: xs:string	optional			documentation identifier of the operational flight plan																									
cancelId	derived by: xs:string	optional			documentation gives the reference to the operational flight plan it cancels																									

5.0 COMMON ELEMENTS

	<u>category</u>	derived by: xs:string	optional	normal	documentation Indicates whether this flight plan is a normal, an alternative or an inflight rerouting flight plan.
	<u>linkedFlightPlan</u>	derived by: xs:string	optional		documentation Identifier of the linked flight plan if any (depends on the category)
annotation	documentation flight plan definition				

attribute FlightPlan/@computedTime

type	xs:dateTime
annotation	documentation computation time

attribute FlightPlan/@flightPlanId

type	restriction of xs:string
annotation	documentation identifier of the operational flight plan

attribute FlightPlan/@cancelsId

type	restriction of xs:string
annotation	documentation gives the reference to the operational flight plan it cancels

attribute FlightPlan/@category

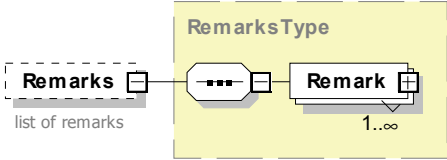
type	restriction of xs:string
facets	enumeration normal enumeration alternate enumeration reroute
annotation	documentation Indicates whether this flight plan is a normal, an alternative or an inflight rerouting flight plan.

attribute FlightPlan/@linkedFlightPlan

type	restriction of xs:string
annotation	documentation Identifier of the linked flight plan if any (depends on the category)

5.0 COMMON ELEMENTS

element FlightPlan/Remarks

diagram	
type	RemarksType
children	Remark
annotation	documentation list of remarks

In order to keep track of the relationship between different files provided for the same flight within one and a FULL eFF data package or as an UPDATE eFF data package message, several scenarios are possible and are defined as follows:

- Standard flight plan. For each flight ONLY one flight plan can be “normal” and this is the one which is filed to the ATS Authorities.

```
<FlightPlan flightPlanId="OFP 12" category="normal" computedTime="2008-10-12T08:36:38" xsi:schemaLocation="http://aeec.aviation-ia.net/633 FlightPlan.xsd" xmlns="http://aeec.aviation-ia.net/633" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
```

- Updating a flight plan which was already released additionally requires the attribute @cancelsId providing the @flightPlanId of the previous “normal” flight plan. Please consider that the @computedTime of the previous flight plan can be after the @computedTime of the update.

```
<FlightPlan flightPlanId="OFP 16" category="normal" computedTime="2008-10-12T08:36:38" xsi:schemaLocation="http://aeec.aviation-ia.net/633 FlightPlan.xsd" cancelsId="OFP 12" xmlns="http://aeec.aviation-ia.net/633" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
```

- For all inflight calculations (reroutes/diversions) provided after the flight has departed, the @category=“reroute” has to be used and additionally the @linkedFlightPlan has to provide the flightPlanId of the “normal” flight plan which this “reroute” flight plan replaces. Usually it starts from a waypoint provided in the “normal” flight plan and continues to the arrival or other diversion airport.

```
<FlightPlan flightPlanId="OFP 17" category="reroute" computedTime="2008-10-12T08:36:38" xsi:schemaLocation="http://aeec.aviation-ia.net/633 FlightPlan.xsd" linkedFlightPlan="OFP 12" xmlns="http://aeec.aviation-ia.net/633" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
```

- One “normal” flight plan and an unlimited number of “alternate” flight plans can be included a FULL eFF data package or included in an UPDATE eFF data package. The @linkedFlightPlan has to provide the @flightPlanId of the “normal” flight plan.

```
<FlightPlan flightPlanId="OFP 13" category="alternate" computedTime="2008-10-12T08:37:38" linkedFlightPlan="OFP 12" xsi:schemaLocation="http://aeec.aviation-ia.net/633 FlightPlan.xsd" xmlns="http://aeec.aviation-ia.net/633" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
```

```
<FlightPlan flightPlanId="OFP 14" category="alternate" computedTime="2008-10-12T08:38:38" linkedFlightPlan="OFP 12" xsi:schemaLocation="http://aeec.aviation-ia.net/633 FlightPlan.xsd" xmlns="http://aeec.aviation-ia.net/633" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
```

5.0 COMMON ELEMENTS

element **FlightInfo**

diagram						
used by	element FlightPlan					
attributes	Name captain	Type derived by: xs:string	Use optional	Default	Fixed	annotation documentation name of the PIC
	aTCCallsign	derived by: xs:string	optional			documentation flight identifier for voice based ATS safety services
annotation	documentation captain name and ATC callsign					

attribute **FlightInfo/@captain**

type	restriction of xs:string
annotation	documentation name of the PIC

attribute **FlightInfo/@aTCCallsign**

type	restriction of xs:string
annotation	documentation flight identifier for voice based ATS safety services

5.0 COMMON ELEMENTS

group **flightPlanCore.Grp**

diagram	 The diagram shows a box labeled 'flightPlanCore.Grp' with a description 'structure for main sections of an operational flight plan'. It is connected by a line to a larger box containing a list of elements, each with a description and a plus icon in a box. FlightPlanHeader flight plan header definition FuelHeader fuel header definition WeightHeader weight header definition Waypoints Way points definition FlightPlanSummary Flight Plan Summary definition NonStandardFlightPlanningType indicators for special scenarios used for the current flight ETOPSSummary structure for the ETOPS relevant information (for 2/3/4 engine aircrafts) AlternateRoutes Alternate Route definition list; receives route for both departure and arrival alternate airport for nominal flight. Ror rcdcd contingency final altn, see specifically the Contingency SavingHeader. AirportDataList airport data list ContingencySavingHeader contingency saving definition FuelStatistics statistical fuel data TankeringInfo tankering instructions
children	FlightPlanHeader FuelHeader WeightHeader Waypoints FlightPlanSummary NonStandardFlightPlanningType ETOPSSummary AlternateRoutes AirportDataList ContingencySavingHeader FuelStatistics TankeringInfo
used by	element FlightPlan
annotation	documentation structure for main sections of an operational flight plan

5.0 COMMON ELEMENTS

5.4.1 FlightPlanHeader

The FlightPlanHeader is intended to store general information for the flight.

element FlightPlanHeader

diagram	
children	AuthorInformation PerformanceFactor FuelFlowInformation RouteInformation MELCDLItems
used by	group flightPlanCore.Grp
annotation	documentation flight plan header definition

element FlightPlanHeader/AuthorInformation

diagram	
children	AuthorName AuthorContact
annotation	documentation author data and contact information

element FlightPlanHeader/AuthorInformation/AuthorName

diagram	
type	extension of xs:string

5.0 COMMON ELEMENTS

attributes	Name authorType	Type derived by: xs:string	Use	Default	Fixed	annotation documentation author profile, e.g., administrator, crew member, dispatcher, ...
annotation	documentation name of the author of the flight plan					

attribute [FlightPlanHeader/AuthorInformation/AuthorName/@authorType](#)

type	restriction of xs:string
annotation	documentation author profile, e.g., administrator, crew member, dispatcher, ...

element [FlightPlanHeader/AuthorInformation/AuthorContact](#)

diagram	
children	PhoneNumber FaxNumber TelexAddress EmailAddress DispatchOffice
annotation	documentation contact information

element [FlightPlanHeader/AuthorInformation/AuthorContact/PhoneNumber](#)

diagram	
type	restriction of xs:string

element [FlightPlanHeader/AuthorInformation/AuthorContact/FaxNumber](#)

diagram	
type	restriction of xs:string

element [FlightPlanHeader/AuthorInformation/AuthorContact/TelexAddress](#)

diagram	
type	restriction of xs:string

5.0 COMMON ELEMENTS

element FlightPlanHeader/AuthorInformation/AuthorContact/EmailAddress

diagram	
type	restriction of xs:string

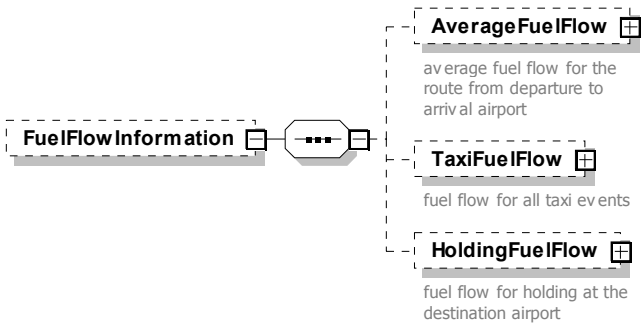
element FlightPlanHeader/AuthorInformation/AuthorContact/DispatchOffice

diagram	 dispatch office or desk identification
type	restriction of xs:string
annotation	documentation dispatch office or desk identification

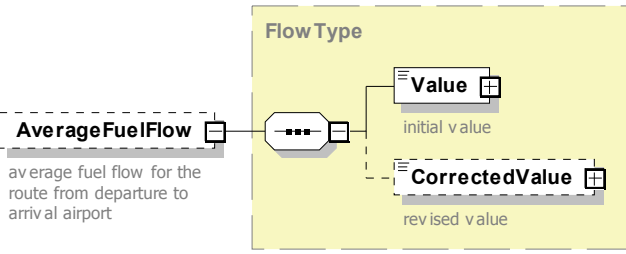
element FlightPlanHeader/PerformanceFactor

diagram	 performance factor of the aircraft used for the flight (e.g. 1.035 means 3.5% increased fuel consumption)
type	restriction of xs:float
annotation	documentation performance factor of the aircraft used for the flight (e.g., 1.035 means 3.5% increased fuel consumption)

element FlightPlanHeader/FuelFlowInformation

diagram	
children	AverageFuelFlow TaxiFuelFlow HoldingFuelFlow

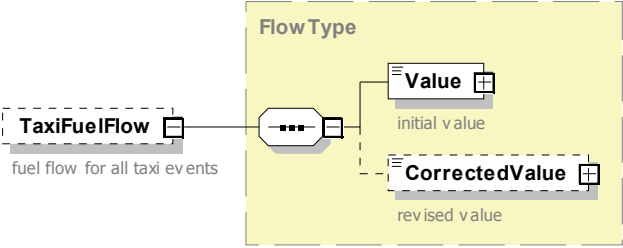
element FlightPlanHeader/FuelFlowInformation/AverageFuelFlow

diagram	
type	FlowType

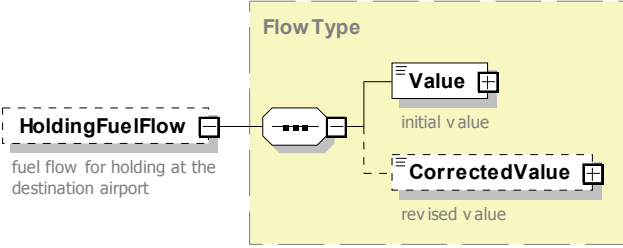
5.0 COMMON ELEMENTS

children	Value CorrectedValue
annotation	documentation average fuel flow for the route from departure to arrival airport

element FlightPlanHeader/FuelFlowInformation/TaxiFuelFlow

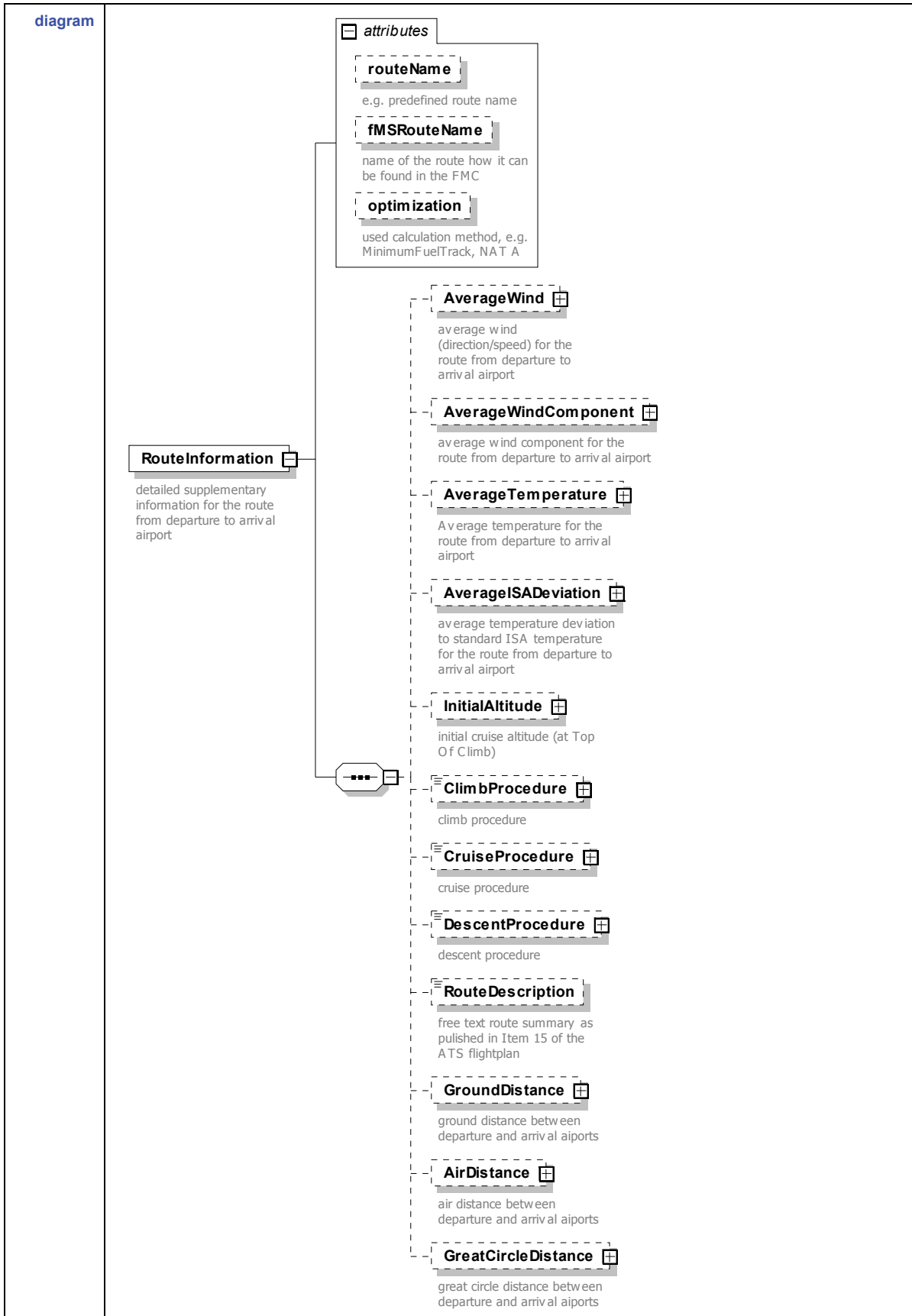
diagram	 The diagram illustrates the structure of the TaxiFuelFlow element. On the left, a dashed box labeled 'TaxiFuelFlow' contains the text 'fuel flow for all taxi events'. A line connects this box to a central octagonal connector with three dots. To the right of the connector is a yellow box labeled 'Flow Type'. Inside this box, a line connects the connector to a 'Value' box (labeled 'initial value') and another line connects it to a 'CorrectedValue' box (labeled 'revised value'). Both 'Value' and 'CorrectedValue' boxes have a small square icon with a plus sign in the top right corner.
type	FlowType
children	Value CorrectedValue
annotation	documentation fuel flow for all taxi events

element FlightPlanHeader/FuelFlowInformation/HoldingFuelFlow

diagram	 The diagram illustrates the structure of the HoldingFuelFlow element. On the left, a dashed box labeled 'HoldingFuelFlow' contains the text 'fuel flow for holding at the destination airport'. A line connects this box to a central octagonal connector with three dots. To the right of the connector is a yellow box labeled 'Flow Type'. Inside this box, a line connects the connector to a 'Value' box (labeled 'initial value') and another line connects it to a 'CorrectedValue' box (labeled 'revised value'). Both 'Value' and 'CorrectedValue' boxes have a small square icon with a plus sign in the top right corner.
type	FlowType
children	Value CorrectedValue
annotation	documentation fuel flow for holding at the destination airport

5.0 COMMON ELEMENTS

element RouteInformation



5.0 COMMON ELEMENTS

children	AverageWind AverageWindComponent AverageTemperature AverageISADeviation InitialAltitude ClimbProcedure CruiseProcedure DescentProcedure RouteDescription GroundDistance AirDistance GreatCircleDistance					
used by	elements	AlternateRoute flightPlanCore.Grp/ContingencySavingHeader FlightPlanHeader				
attributes	Name routeName	Type derived by: xs:string	Use optional	Default	Fixed	annotation documentation e.g., predefined route name
	fMSRouteName	derived by: xs:string	optional			documentation name of the route how it can be found in the FMC
	optimization	derived by: xs:string	optional			documentation used calculation method, e.g., MinimumFuelTrack, NAT A
annotation	documentation detailed supplementary information for the route from departure to arrival airport					

attribute RouteInformation/@routeName

type	restriction of xs:string
annotation	documentation e.g., predefined route name

attribute RouteInformation/@fMSRouteName

type	restriction of xs:string
annotation	documentation name of the route how it can be found in the FMC

attribute RouteInformation/@optimization

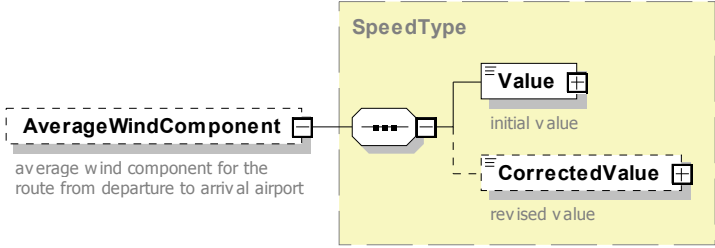
type	restriction of xs:string
annotation	documentation used calculation method, e.g., MinimumFuelTrack, NAT A

element RouteInformation/AverageWind

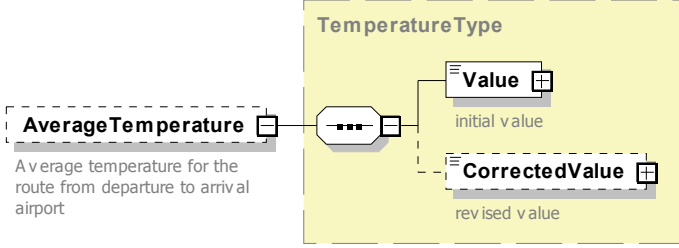
diagram						
type	WindType					
children	Direction Speed					
annotation	documentation average wind (direction/speed) for the route from departure to arrival airport					

5.0 COMMON ELEMENTS

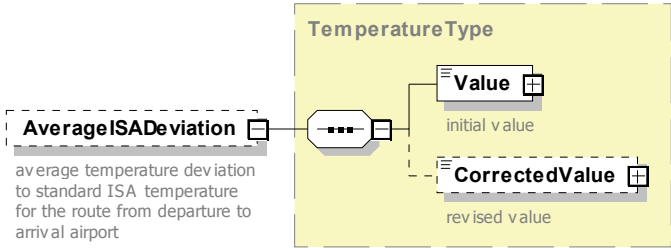
element RouteInformation/AverageWindComponent

diagram	 The diagram shows the AverageWindComponent element, which is a dashed box containing the text "average wind component for the route from departure to arrival airport". This element is connected to a SpeedType container (a yellow box). Inside the SpeedType container, there is a central octagonal node with three dots. Two lines connect this node to two sub-elements: Value (labeled "initial value") and CorrectedValue (labeled "revised value"). Both sub-elements are represented by small boxes with a plus sign in the top right corner.
type	SpeedType
children	Value CorrectedValue
annotation	documentation average wind component for the route from departure to arrival airport

element RouteInformation/AverageTemperature

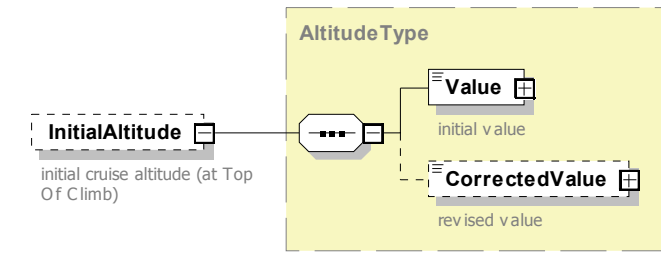
diagram	 The diagram shows the AverageTemperature element, which is a dashed box containing the text "Average temperature for the route from departure to arrival airport". This element is connected to a TemperatureType container (a yellow box). Inside the TemperatureType container, there is a central octagonal node with three dots. Two lines connect this node to two sub-elements: Value (labeled "initial value") and CorrectedValue (labeled "revised value"). Both sub-elements are represented by small boxes with a plus sign in the top right corner.
type	TemperatureType
children	Value CorrectedValue
annotation	documentation Average temperature for the route from departure to arrival airport

element RouteInformation/AverageISADeviation

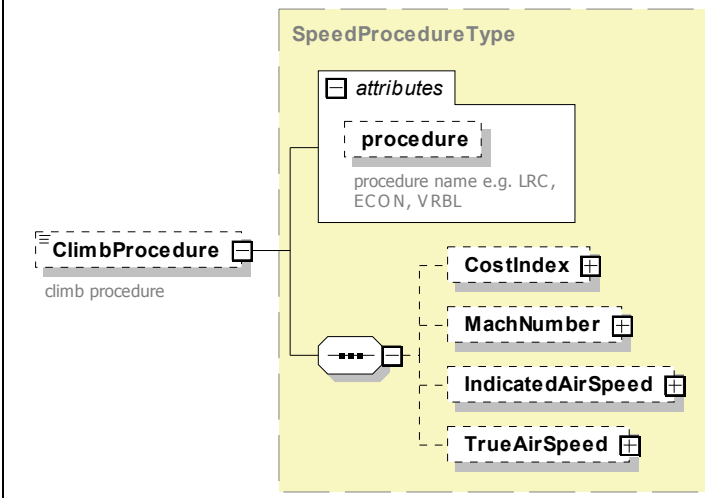
diagram	 The diagram shows the AverageISADeviation element, which is a dashed box containing the text "average temperature deviation to standard ISA temperature for the route from departure to arrival airport". This element is connected to a TemperatureType container (a yellow box). Inside the TemperatureType container, there is a central octagonal node with three dots. Two lines connect this node to two sub-elements: Value (labeled "initial value") and CorrectedValue (labeled "revised value"). Both sub-elements are represented by small boxes with a plus sign in the top right corner.
type	TemperatureType
children	Value CorrectedValue
annotation	documentation average temperature deviation to standard ISA temperature for the route from departure to arrival airport

5.0 COMMON ELEMENTS

element RouteInformation/InitialAltitude

diagram	 The diagram shows the structure of the InitialAltitude element. It is a dashed box containing the text 'InitialAltitude' and 'initial cruise altitude (at Top Of Climb)'. A line connects this element to a yellow box labeled 'AltitudeType'. Inside 'AltitudeType', there is a 'Value' element (labeled 'initial value') and a 'CorrectedValue' element (labeled 'revised value'). A connector symbol (a circle with three dots) is shown between the InitialAltitude element and the 'Value' element within the AltitudeType box.
type	AltitudeType
children	Value CorrectedValue
annotation	documentation initial cruise altitude (at Top Of Climb)

element RouteInformation/ClimbProcedure

diagram	 The diagram illustrates the structure of the ClimbProcedure element. It is represented as a dashed box containing the text "ClimbProcedure" and "climb procedure". A line connects this element to a yellow box labeled SpeedProcedureType. Inside SpeedProcedureType, there is an attributes section containing a procedure attribute, described as "procedure name e.g. LRC, ECON, VRBL". Below the attributes, a connector symbol (a circle with three dots) is followed by four child elements: CostIndex, MachNumber, IndicatedAirSpeed, and TrueAirSpeed. Each child element is shown in a dashed box with a plus icon in the top right corner.												
type	SpeedProcedureType												
children	CostIndex MachNumber IndicatedAirSpeed TrueAirSpeed												
attributes	<table><tr><th>Name</th><th>Type</th><th>Use</th><th>Default</th><th>Fixed</th><th>annotation</th></tr><tr><td>procedure</td><td>derived by: xs:string</td><td>optional</td><td></td><td></td><td>documentation procedure name e.g., LRC, ECON, VRBL</td></tr></table>	Name	Type	Use	Default	Fixed	annotation	procedure	derived by: xs:string	optional			documentation procedure name e.g., LRC, ECON, VRBL
Name	Type	Use	Default	Fixed	annotation								
procedure	derived by: xs:string	optional			documentation procedure name e.g., LRC, ECON, VRBL								
annotation	documentation climb procedure												

5.0 COMMON ELEMENTS

element RouteInformation/CruiseProcedure

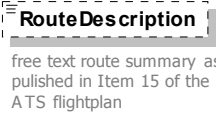
diagram						
type	SpeedProcedureType					
children	CostIndex MachNumber IndicatedAirSpeed TrueAirSpeed					
attributes	Name procedure	Type derived by: xs:string	Use optional	Default	Fixed	annotation documentation procedure name e.g., LRC, ECON, VRBL
annotation	documentation cruise procedure					

element RouteInformation/DescentProcedure

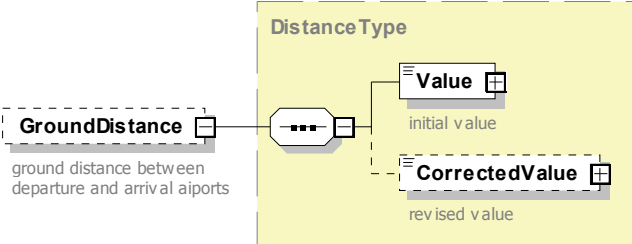
diagram						
type	SpeedProcedureType					
children	CostIndex MachNumber IndicatedAirSpeed TrueAirSpeed					
attributes	Name procedure	Type derived by: xs:string	Use optional	Default	Fixed	annotation documentation procedure name e.g., LRC, ECON, VRBL
annotation	documentation descent procedure					

5.0 COMMON ELEMENTS

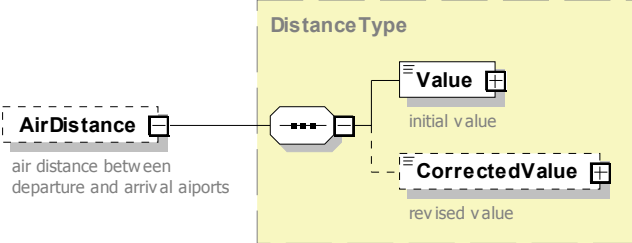
element RouteInformation/RouteDescription

diagram	 RouteDescription free text route summary as published in Item 15 of the ATS flightplan
type	restriction of xs:string
annotation	documentation free text route summary as published in Item 15 of the ATS flightplan

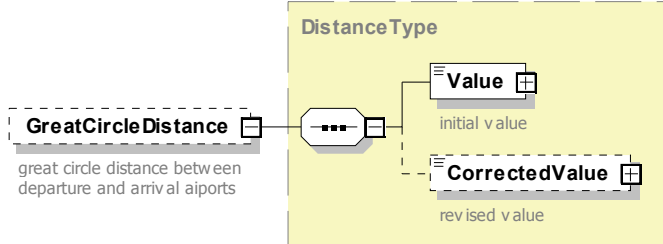
element RouteInformation/GroundDistance

diagram	 GroundDistance ground distance between departure and arrival airports Distance Type Value initial value CorrectedValue revised value
type	DistanceType
children	Value CorrectedValue
annotation	documentation ground distance between departure and arrival airports

element RouteInformation/AirDistance

diagram	 AirDistance air distance between departure and arrival airports Distance Type Value initial value CorrectedValue revised value
type	DistanceType
children	Value CorrectedValue
annotation	documentation air distance between departure and arrival airports

element RouteInformation/GreatCircleDistance

diagram	 GreatCircleDistance great circle distance between departure and arrival airports Distance Type Value initial value CorrectedValue revised value
type	DistanceType

5.0 COMMON ELEMENTS

children	Value CorrectedValue
annotation	documentation great circle distance between departure and arrival airports

element FlightPlanHeader/MELCDLItems

diagram	
children	MELCDLItem

element FlightPlanHeader/MELCDLItems/MELCDLItem

diagram						
children	ReferenceId	Title	Remark			
attributes	Name mELCDLType	Type derived by: xs:string	Use	Default	Fixed	annotation documentation either MEL or CDL

attribute FlightPlanHeader/MELCDLItems/MELCDLItem/@mELCDLType

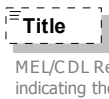
type	restriction of xs:string
facets	enumeration MEL enumeration CDL
annotation	documentation either MEL or CDL

element FlightPlanHeader/MELCDLItems/MELCDLItem/ReferenceId

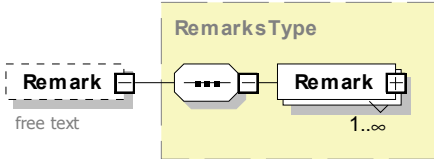
diagram	
type	restriction of xs:string
annotation	documentation identification of section containing ATA chapter, subchapter

5.0 COMMON ELEMENTS

element FlightPlanHeader/MELCDLItems/MELCDLItem/Title

diagram	 MEL/CDL Reference title indicating the aircraft system
type	restriction of xs:string
annotation	documentation MEL/CDL Reference title indicating the aircraft system

element FlightPlanHeader/MELCDLItems/MELCDLItem/Remark

diagram	 free text RemarksType 1..∞
type	RemarksType
children	Remark
annotation	documentation free text

5.0 COMMON ELEMENTS

5.4.2 FuelHeader

The FuelHeader is intended to store general information regarding fuel.

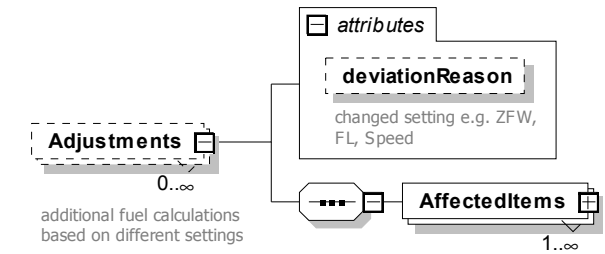
If additional fuel is required as a result of the terrain clearance calculation, it has to be provided as a separate instance of FuelHeader/AdditionalFuels/AdditionalFuel with @reason="terrainClearance" and treated as a mandatory fuel type.

element FuelHeader

diagram	<pre> classDiagram class FuelHeader class TripFuel class ContingencyFuel class AlternateFuels class NoAlternateFinalReserve class ReserveFuel class ETOPSFuel class ContingencySavingsAdditionalF... class AdditionalFuels class ExtraFuels class PossibleExtraFuel class TakeOffFuel class TaxiFuel class BlockFuel class LandingFuel class ArrivalFuel class Adjustments class TransportCoefficientInfo class Remarks class Other["any ##other"] FuelHeader --> TripFuel FuelHeader --> ContingencyFuel FuelHeader --> AlternateFuels FuelHeader --> NoAlternateFinalReserve FuelHeader --> ReserveFuel FuelHeader --> ETOPSFuel FuelHeader --> ContingencySavingsAdditionalF... FuelHeader --> AdditionalFuels FuelHeader --> ExtraFuels FuelHeader --> PossibleExtraFuel FuelHeader --> TakeOffFuel FuelHeader --> TaxiFuel FuelHeader --> BlockFuel FuelHeader --> LandingFuel FuelHeader --> ArrivalFuel FuelHeader --> Adjustments FuelHeader --> TransportCoefficientInfo FuelHeader --> Remarks FuelHeader --> Other </pre>
children	TripFuel ContingencyFuel AlternateFuels NoAlternateFinalReserve ReserveFuel ETOPSFuel ContingencySavingsAdditionalFuel AdditionalFuels ExtraFuels PossibleExtraFuel TakeOffFuel TaxiFuel BlockFuel LandingFuel ArrivalFuel Adjustments TransportCoefficientInfo Remarks
used by	element flightPlanCore.Grp/ContingencySavingHeader group flightPlanCore.Grp
annotation	documentation fuel header definition

5.0 COMMON ELEMENTS

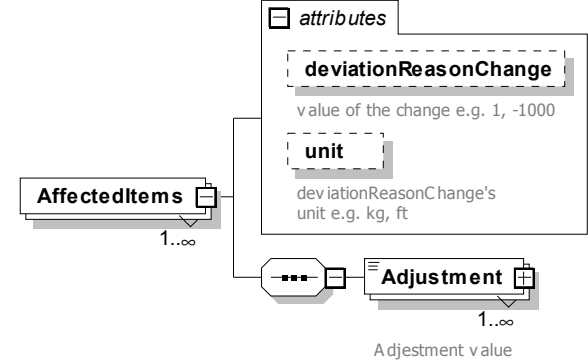
element FuelHeader/Adjustments

diagram						
children	AffectedItems					
attributes	Name deviationReason	Type derived by: xs:string	Use	Default	Fixed	annotation documentation changed setting e.g., ZFW, FL, Speed
annotation	documentation additional fuel calculations based on different settings					

attribute FuelHeader/Adjustments/@deviationReason

type	restriction of xs:string
annotation	documentation changed setting e.g., ZFW, FL, Speed

element FuelHeader/Adjustments/AffectedItems

diagram						
children	Adjustment					
attributes	Name deviationReasonChange	Type xs:float	Use	Default	Fixed	annotation documentation value of the change e.g., 1, -1000
	unit	derived by: xs:string	optional			documentation deviationReasonChange's unit e.g., kg, ft

attribute FuelHeader/Adjustments/AffectedItems/@deviationReasonChange

type	xs:float
annotation	documentation value of the change e.g., 1, -1000

5.0 COMMON ELEMENTS

attribute FuelHeader/Adjustments/AffectedItems/@unit

type	restriction of xs:string
annotation	documentation deviationReasonChange's unit e.g., kg, ft

element FuelHeader/Adjustments/AffectedItems/Adjustment

diagram						
type	extension of xs:float					
attributes	Name affectedItem	Type derived by: xs:string	Use	Default	Fixed	annotation documentation by the changed settings affected parameters e.g., TakeOffFuel, TripFuel, TripTime documentation unit of the Adjustment's value
	unit	derived by: xs:string	optional			
annotation	documentation Adjustment value					

attribute FuelHeader/Adjustments/AffectedItems/Adjustment/@affectedItem

type	restriction of xs:string
annotation	documentation by the changed settings affected parameters e.g., TakeOffFuel, TripFuel, TripTime

attribute FuelHeader/Adjustments/AffectedItems/Adjustment/@unit

type	restriction of xs:string
annotation	documentation unit of the Adjustment's value

Note: The 2 attributes

FuelHeader/Adjustments/AffectedItems/@unit and FuelHeader/Adjustments/AffectedItemsAdjustment/@unit are not explicitly defined to provide the data structure more flexibility.

Nevertheless, the data provider has to ensure the proper use of these attributes in order to prevent the application from incorrect interpretation of the values. It is recommended to use the unit types already defined in Section 5.0.

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Example: Weight Adjustments (input):

```

<Adjustments deviationReason="ZeroFuelWeight">
<Adjustments deviationReason="TakeoffWeight">
<AffectedItems deviationReasonChange="1000.0" unit="kg">
<AffectedItems deviationReasonChange="-1000.0" unit="kg">

```

Example: Altitude Adjustments (input):

```

<Adjustments deviationReason="Altitude">
<AffectedItems deviationReasonChange="2000.0" unit="ft">
<AffectedItems deviationReasonChange="-2000.0" unit="ft">
<AffectedItems deviationReasonChange="-4000.0" unit="ft">

```

**Note: @unit shall not be used for
@deviationReason="FL".**

```

<Adjustments deviationReason="FL">
<AffectedItems deviationReasonChange="-2">
<AffectedItems deviationReasonChange="1">

```

Example: CruiseProcedure Adjustments (input):

Note: Units are only available for CruiseProcedure adjustments: IndicatedAirSpeed and CostIndex

Note : For CruiseProcedure adjustments: LongRangeCruise, MaximumEnduranceCruise, MaxSpeed and MRC only the @deviationReason is used. The attribute @deviationReasonChange shall not be used.

```

<Adjustments deviationReason="CostIndex"
<AffectedItems deviationReasonChange="150">

<Adjustments deviationReason="MachNumber"
<AffectedItems deviationReasonChange="0.81">

<Adjustments deviationReason="IndicatedAirSpeed"
<AffectedItems deviationReasonChange="300" unit="kt">

<Adjustments deviationReason="LongRangeCruise"
<Adjustments deviationReason="MaximumEnduranceCruise"
<Adjustments deviationReason="MaxSpeed"
<Adjustments deviationReason="MRC"

```

Example: affectedItem (output – calculated results):

Note: This is a list of the most common affectedItems. Other affectedItems are also possible as the results are usually available for the data providers. Nevertheless, only the currently defined affectedItems (e.g., AlternateFuel, RouteDescription, etc.) together with their corresponding units (if applicable) shall be used.

Note: The schema allows the results to be provide as either absolute values or as delta values to the main

5.0 COMMON ELEMENTS

calculation. The use of delta values is recommended to increase the interoperability.

```
affectedItem="TripFuel" unit="kg">-79.0</Adjustment>
affectedItem="TakeOffFuel" unit="kg">-89.0</Adjustment>
affectedItem="TripTime" unit="s">-3</Adjustment>
affectedItem="AverageWindComponent" unit="m/s">-
13.292</Adjustment>
affectedItem="AverageISADeviation" unit="C">-3</Adjustment>
```

element FuelHeader/TransportCoefficientInfo

diagram	
children	IncreaseTransportCoefficient DecreaseTransportCoefficient
annotation	Documentation Introduces data about adjustment allowing to perform fuel adjustment computation

The new element TransportCoefficientInfo provides additional adjustment data to perform simple fuel adjustment computations.

For instance, a TransportCoefficientInfo/IncreaseTransportCoefficient=1.250 means that transporting 1000kg additional weight to the destination requires loading additional 250 kg fuel on departure. This coefficient is typically used when the aircraft's Zero Fuel Weight (ZFW) is increased.

Due to the fact that the increaseTransportCoefficient is optional and often cannot be provided because of reaching aircraft's performance restrictions, at least the DecreaseTransportCoefficient has to be provided.

For instance, 1.210 means that transporting 1000kg less weight to the destination requires 210 kg less fuel to be loaded when departing. This coefficient is typically for use when the aircraft's ZFW is decreased.

element FuelHeader/TransportCoefficientInfo/IncreaseTransportCoefficient

diagram	
type	xs:float
annotation	documentation an IncreaseTransportCoefficient of 1.250 means: transporting 1000kg additional weight to the destination requires loading an additional 250 kg fuel on departure. This coefficient is typically used when the aircraft's ZFW is increased

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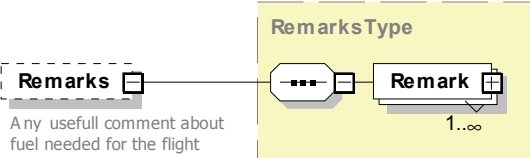
element FuelHeader/TransportCoefficientInfo/DecreaseTransportCoefficient

diagram	
type	xs:float
annotation	documentation a DecreaseTransportCoefficient of 1.210 means: transporting 1000kg less weight to the destination requires 210 kg less fuel to be loaded when departing. This coefficient is typically for use when the aircraft's ZFW is decreased.

The Transport Coefficients are derived by the data provider and are calculated as described below:

Value	Calculation
<u>IncreaseTransportCoefficient</u>	$\text{IncreaseTransportCoefficient} = \frac{\text{TakeOffWeight}_{\text{increased}} - \text{TakeOffWeight}_{\text{planned}}}{\text{LandingWeight}_{\text{increased}} - \text{LandingWeight}_{\text{planned}}}$
<u>DecreaseTransportCoefficient</u>	$\text{DecreaseTransportCoefficient} = \frac{\text{TakeOffWeight}_{\text{planned}} - \text{TakeOffWeight}_{\text{decreased}}}{\text{LandingWeight}_{\text{planned}} - \text{LandingWeight}_{\text{decreased}}}$

element FuelHeader/Remarks

diagram	
type	<u>RemarksType</u>
children	<u>Remark</u>
annotation	documentation Any useful comment about fuel needed for the flight

5.0 COMMON ELEMENTS

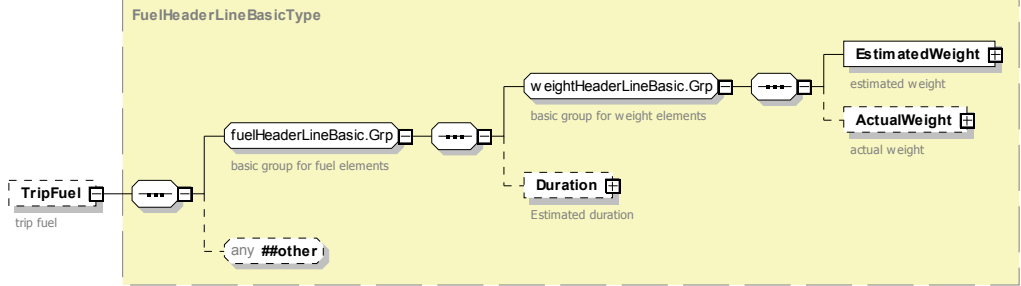
group fuelHeader.Grp

diagram	 fuelHeader.Grp structure for main fuel elements TripFuel trip fuel ContingencyFuel contingency fuel AlternateFuels list of alternate fuels for each planned alternate airport NoAlternateFinalReserve Holding reserve fuel over destination, only when flight plan is computed without alternate (new regulation possibility) ReserveFuel reserve fuel according FAR 121.639 ETOPSFuel additional fuel needed when flying under ETOPS rules with 2/3/4 engine aircraft ContingencySavingsAdditionalF... additional fuel needed to fly to the redclearance/redispach airport AdditionalFuels list of all planned additional fuels (could be terrain clearance additional fuel for instance or demanded tankering) ExtraFuels list of all planned extra fuels PossibleExtraFuel TakeOffFuel Take off fuel TaxiFuel Taxi out fuel BlockFuel Block fuel LandingFuel fuel on board at landing ArrivalFuel fuel on board after arrival
children	TripFuel ContingencyFuel AlternateFuels NoAlternateFinalReserve ReserveFuel ETOPSFuel ContingencySavingsAdditionalFuel AdditionalFuels ExtraFuels PossibleExtraFuel TakeOffFuel TaxiFuel BlockFuel LandingFuel ArrivalFuel

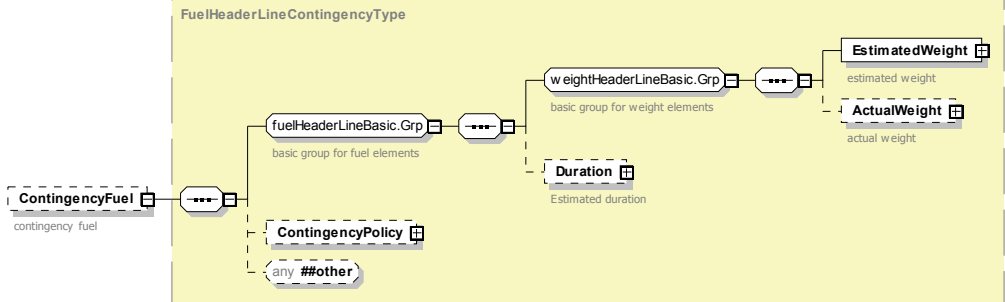
5.0 COMMON ELEMENTS

used by	element FuelHeader
annotation	documentation structure for main fuel elements

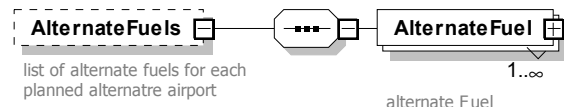
element [fuelHeader.Grp/TripFuel](#)

diagram	 The diagram illustrates the structure of the FuelHeaderLineBasicType. It is a container for several elements: TripFuel (labeled 'trip fuel'), a fuelHeaderLineBasic.Grp (labeled 'basic group for fuel elements'), a weightHeaderLineBasic.Grp (labeled 'basic group for weight elements'), and a Duration (labeled 'Estimated duration'). The weightHeaderLineBasic.Grp contains EstimatedWeight (labeled 'estimated weight') and ActualWeight (labeled 'actual weight'). There is also an any ##other element. The entire structure is enclosed in a dashed box labeled FuelHeaderLineBasicType.
type	FuelHeaderLineBasicType
children	EstimatedWeight ActualWeight Duration
used by	group Fuel.Grp
annotation	documentation trip fuel

element [fuelHeader.Grp/ContingencyFuel](#)

diagram	 The diagram illustrates the structure of the FuelHeaderLineContingencyType. It is a container for several elements: ContingencyFuel (labeled 'contingency fuel'), a fuelHeaderLineBasic.Grp (labeled 'basic group for fuel elements'), a weightHeaderLineBasic.Grp (labeled 'basic group for weight elements'), a Duration (labeled 'Estimated duration'), and a ContingencyPolicy. The weightHeaderLineBasic.Grp contains EstimatedWeight (labeled 'estimated weight') and ActualWeight (labeled 'actual weight'). There is also an any ##other element. The entire structure is enclosed in a dashed box labeled FuelHeaderLineContingencyType.
type	FuelHeaderLineContingencyType
children	EstimatedWeight ActualWeight Duration ContingencyPolicy
annotation	documentation contingency fuel

element [fuelHeader.Grp/AlternateFuels](#)

diagram	 The diagram illustrates the structure of the AlternateFuels element. It is a container for a list of AlternateFuel elements. The AlternateFuels element is labeled 'list of alternate fuels for each planned alternate airport'. The AlternateFuel element is labeled 'alternate Fuel' and has a cardinality of 1..∞.
children	AlternateFuel
annotation	documentation list of alternate fuels for each planned alternate airport

5.0 COMMON ELEMENTS

element fuelHeader.Grp/AlternateFuels/AlternateFuel

diagram	
type	FuelHeaderLineAirportType
children	EstimatedWeight ActualWeight Duration Airport FinalReserve Sequence
annotation	documentation alternate Fuel

element fuelHeader.Grp/NoAlternateFinalReserve

diagram	
type	FuelHeaderLineBasicType
children	EstimatedWeight ActualWeight Duration
annotation	documentation Holding reserve fuel over destination, only when flight plan is computed without alternate (new regulation possibility)

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element fuelHeader.Grp/ReserveFuel

diagram	
type	FuelHeaderLineContingencyType
children	EstimatedWeight ActualWeight Duration ContingencyPolicy
annotation	documentation reserve fuel according FAR 121.639

element fuelHeader.Grp/ETOPSFuel

diagram	
type	FuelHeaderLineBasicType
children	EstimatedWeight ActualWeight Duration
annotation	documentation additional fuel needed when flying under ETOPS rules with 2/3/4 engine aircraft

element fuelHeader.Grp/ContingencySavingsAdditionalFuel

diagram	
type	FuelHeaderLineBasicType
children	EstimatedWeight ActualWeight Duration
annotation	documentation additional fuel needed to fly to the reclearance/redispatch airport

5.0 COMMON ELEMENTS

element fuelHeader.Grp/AdditionalFuels

diagram	list of all planned additional fuels (could be terrain clearance additional fuel for instance or demanded tankering) Additional reserve
children	AdditionalFuel
annotation	documentation list of all planned additional fuels (could be terrain clearance additional fuel for instance or demanded tankering)

element fuelHeader.Grp/AdditionalFuels/AdditionalFuel

diagram						
type	FuelHeaderLineReasonType					
children	EstimatedWeight ActualWeight Duration CaptainCheck					
attributes	Name reason	Type derived by: xs:string	Use optional	Default	Fixed	annotation documentation reason for the planned additional/extra fuel e.g., ATC, WX
annotation	documentation Additional reserve					

element fuelHeader.Grp/ExtraFuels

diagram	list of all planned extra fuels Extra Fuels
children	ExtraFuel
annotation	documentation list of all planned extra fuels

5.0 COMMON ELEMENTS

element fuelHeader.Grp/ExtraFuels/ExtraFuel

diagram						
type	FuelHeaderLineReasonType					
children	EstimatedWeight ActualWeight Duration CaptainCheck					
attributes	Name reason	Type derived by: xs:string	Use optional	Default	Fixed	annotation documentation reason for the planned additional/extra fuel e.g., ATC, WX
annotation	documentation Extra Fuels					

element fuelHeader.Grp/PossibleExtraFuel

diagram						
children	PossibleExtra MaximumFuelWeight TankVolume					
attributes	Name reason	Type	Use	Default	Fixed	annotation documentation limitation reason e.g., MATOW, TankCapacity, MALW

5.0 COMMON ELEMENTS

attribute fuelHeader.Grp/PossibleExtraFuel/@reason

annotation	documentation limitation reason e.g., MATOW, TankCapacity, MALW

element fuelHeader.Grp/PossibleExtraFuel/PossibleExtra

diagram	The diagram shows the 'PossibleExtra' element as a dashed box containing a 'WeightType' box. The 'WeightType' box contains a 'Value' box (labeled 'initial value') and a 'CorrectedValue' box (labeled 'revised value'). A solid line connects 'PossibleExtra' to 'WeightType', and a dashed line connects 'WeightType' to 'CorrectedValue'.
type	WeightType
children	Value CorrectedValue
annotation	documentation maximum possible extra fuel that could be carried on board

element fuelHeader.Grp/PossibleExtraFuel/MaximumFuelWeight

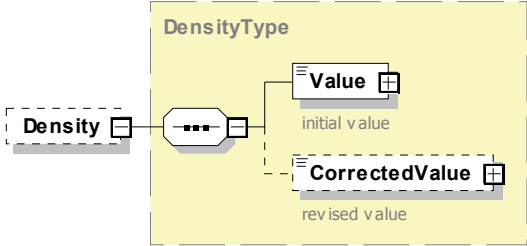
diagram	The diagram shows the 'MaximumFuelWeight' element as a dashed box containing a 'Weight' box. A solid line connects 'MaximumFuelWeight' to 'Weight'. The 'Weight' box is connected to a 'Density' box via a dashed line.
children	Weight Density
annotation	documentation Tank capacity considering the fuel density

element fuelHeader.Grp/PossibleExtraFuel/MaximumFuelWeight/Weight

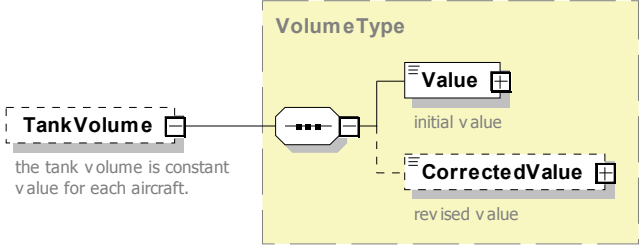
diagram	The diagram shows the 'Weight' element as a dashed box containing a 'WeightType' box. The 'WeightType' box contains a 'Value' box (labeled 'initial value') and a 'CorrectedValue' box (labeled 'revised value'). A solid line connects 'Weight' to 'WeightType', and a dashed line connects 'WeightType' to 'CorrectedValue'.
type	WeightType
children	Value CorrectedValue

5.0 COMMON ELEMENTS

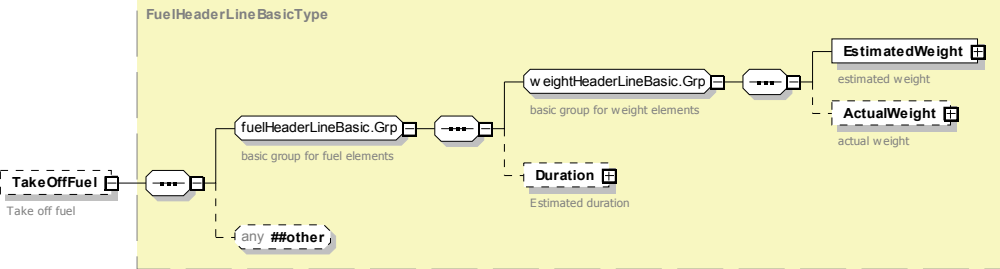
element fuelHeader.Grp/PossibleExtraFuel/MaximumFuelWeight/Density

diagram	 The diagram shows a dashed box labeled 'Density' connected to a 'DensityType' container. Inside 'DensityType', there is a 'Value' box labeled 'initial value' and a 'CorrectedValue' box labeled 'revised value'. A dashed line connects the 'Density' box to the 'Value' box, and another dashed line connects the 'Density' box to the 'CorrectedValue' box.
type	DensityType
children	Value CorrectedValue

element fuelHeader.Grp/PossibleExtraFuel/TankVolume

diagram	 The diagram shows a dashed box labeled 'TankVolume' with the text 'the tank volume is constant value for each aircraft.' connected to a 'VolumeType' container. Inside 'VolumeType', there is a 'Value' box labeled 'initial value' and a 'CorrectedValue' box labeled 'revised value'. A dashed line connects the 'TankVolume' box to the 'Value' box, and another dashed line connects the 'TankVolume' box to the 'CorrectedValue' box.
type	VolumeType
children	Value CorrectedValue
annotation	documentation the tank volume is constant value for each aircraft.

element fuelHeader.Grp/TakeOffFuel

diagram	 The diagram shows a dashed box labeled 'TakeOffFuel' with the text 'Take off fuel' connected to a 'FuelHeaderLineBasicType' container. Inside 'FuelHeaderLineBasicType', there is a 'fuelHeaderLineBasic.Grp' box labeled 'basic group for fuel elements' connected to a 'weightHeaderLineBasic.Grp' box labeled 'basic group for weight elements'. The 'weightHeaderLineBasic.Grp' box is connected to an 'EstimatedWeight' box labeled 'estimated weight' and an 'ActualWeight' box labeled 'actual weight'. There is also a 'Duration' box labeled 'Estimated duration'. A dashed line connects the 'TakeOffFuel' box to the 'fuelHeaderLineBasic.Grp' box. A dashed line connects the 'fuelHeaderLineBasic.Grp' box to the 'weightHeaderLineBasic.Grp' box. A dashed line connects the 'weightHeaderLineBasic.Grp' box to the 'EstimatedWeight' box. A dashed line connects the 'weightHeaderLineBasic.Grp' box to the 'ActualWeight' box. A dashed line connects the 'weightHeaderLineBasic.Grp' box to the 'Duration' box. A dashed line connects the 'weightHeaderLineBasic.Grp' box to a 'any ##other' box.
type	FuelHeaderLineBasicType
children	EstimatedWeight ActualWeight Duration
annotation	documentation Take off fuel

5.0 COMMON ELEMENTS

element fuelHeader.Grp/TaxiFuel

diagram	
type	FuelHeaderLineBasicType
children	EstimatedWeight ActualWeight Duration
used by	group Fuel.Grp
annotation	documentation Taxi out fuel

element fuelHeader.Grp/BlockFuel

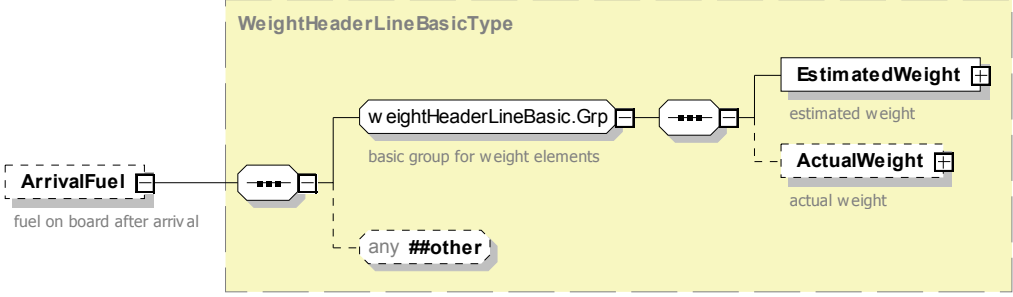
diagram	
type	FuelHeaderLineBlockType
children	EstimatedWeight ActualWeight Duration FuelOnBoardAfterRefueling
annotation	documentation Block fuel

element fuelHeader.Grp/LandingFuel

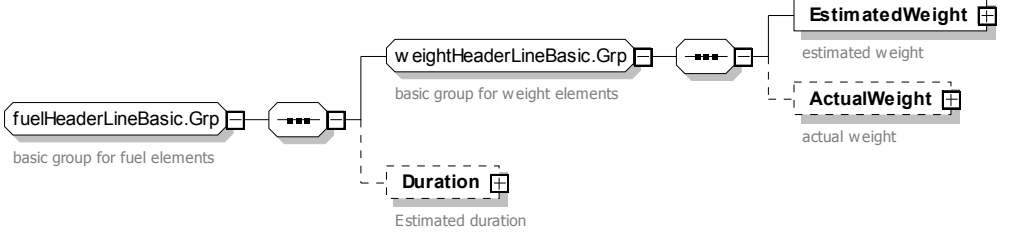
diagram	
type	WeightHeaderLineBasicType
children	EstimatedWeight ActualWeight
annotation	documentation fuel on board at landing

5.0 COMMON ELEMENTS

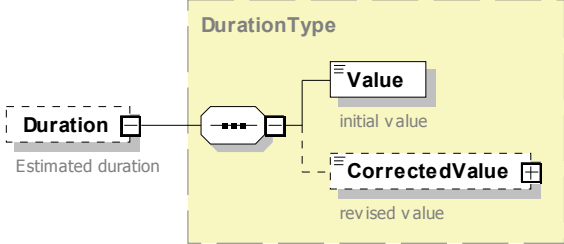
element fuelHeader.Grp/ArrivalFuel

diagram	
type	WeightHeaderLineBasicType
children	EstimatedWeight ActualWeight
annotation	documentation fuel on board after arrival

group fuelHeaderLineBasic.Grp

diagram	
children	EstimatedWeight ActualWeight Duration
used by	complexTypes FuelHeaderLineAirportType FuelHeaderLineBasicType FuelHeaderLineBlockType FuelHeaderLineContingencyType FuelHeaderLineReasonType
annotation	documentation basic group for fuel elements

element fuelHeaderLineBasic.Grp/Duration

diagram	
type	DurationType
children	Value CorrectedValue
annotation	documentation Estimated duration

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complexType FuelHeaderLineAirportType

The structure is extended with the elements **Sequence of the ArrivalAlternateAirport**, as it is meant to be by the data provider, and its corresponding **FinalReserve Fuel** over the respective **ArrivalAlternateAirport**.

diagram	
children	EstimatedWeight ActualWeight Duration Airport FinalReserve Sequence
used by	element fuelHeader.Grp/AlternateFuels/AlternateFuel
annotation	documentation basic type for fuel elements extended by airport information

element FuelHeaderLineAirportType/Airport

diagram	
type	AirportFullIdentificationType
children	AirportICAOCode AirportIATACode AirportIATACode

5.0 COMMON ELEMENTS

attributes	Name <u>airportName</u> Type derived by: xs:string Use Default Fixed annotation documentation airport name e.g., WASHINGTON DULLES INTL documentation e.g., DepartureAirport, DestinationAlternate, ContingencySavingsAirport
	<u>airportFunction</u> <u>airportFunctionType</u> required
annotation	documentation Identification of the alternate airport. Function should be limited to alternate. To identify Alternate used for OFP computing, find airportFunction showing PrimaryAlternate. If no Primary alternate, this means also that OFP was computed without alternate.

element FuelHeaderLineAirportType/FinalReserve

diagram	FuelHeaderLineBasicType					
type	FuelHeaderLineBasicType					
children	EstimatedWeight ActualWeight Duration					
annotation	documentation Holding reserve fuel when over alternate					

element FuelHeaderLineAirportType/Sequence

diagram	Sequence Indicate the order in which alternates have to be considered by crew. Order is defined by dispatch. Has to be unique.					
type	xs:int					
annotation	documentation Indicate the order in which alternates have to be considered by crew. Order is defined by dispatch. Has to be unique.					

complexType FuelHeaderLineBasicType

diagram	FuelHeaderLineBasicType					
children	EstimatedWeight ActualWeight Duration					
used by	elements fuelHeader.Grp/ContingencySavingsAdditionalFuel fuelHeader.Grp/ETOPSFuel FuelHeaderLineAirportType/FinalReserve fuelHeader.Grp/NoAlternateFinalReserve fuelHeader.Grp/TakeOffFuel fuelHeader.Grp/TaxiFuel fuelHeader.Grp/TripFuel					
annotation	documentation basic type for fuel elements					

5.0 COMMON ELEMENTS

complexType FuelHeaderLineBlockType

diagram	
children	EstimatedWeight ActualWeight Duration FuelOnBoardAfterRefueling
used by	element fuelHeader.Grp/BlockFuel
annotation	documentation basic type for fuel elements extended by fuel on board after refueling information

element FuelHeaderLineBlockType/FuelOnBoardAfterRefueling

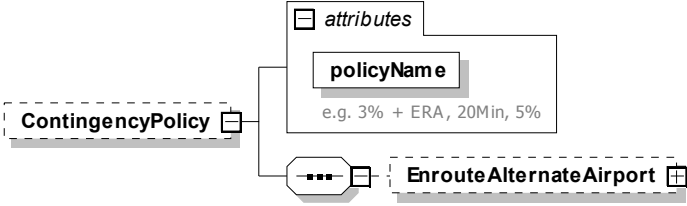
diagram	
type	WeightType
children	Value CorrectedValue
annotation	documentation Fuel in tank after refueling

complexType FuelHeaderLineContingencyType

diagram	
children	EstimatedWeight ActualWeight Duration ContingencyPolicy
used by	elements fuelHeader.Grp/ContingencyFuel fuelHeader.Grp/ReserveFuel
annotation	documentation basic type for fuel elements extended by contingency policy data

5.0 COMMON ELEMENTS

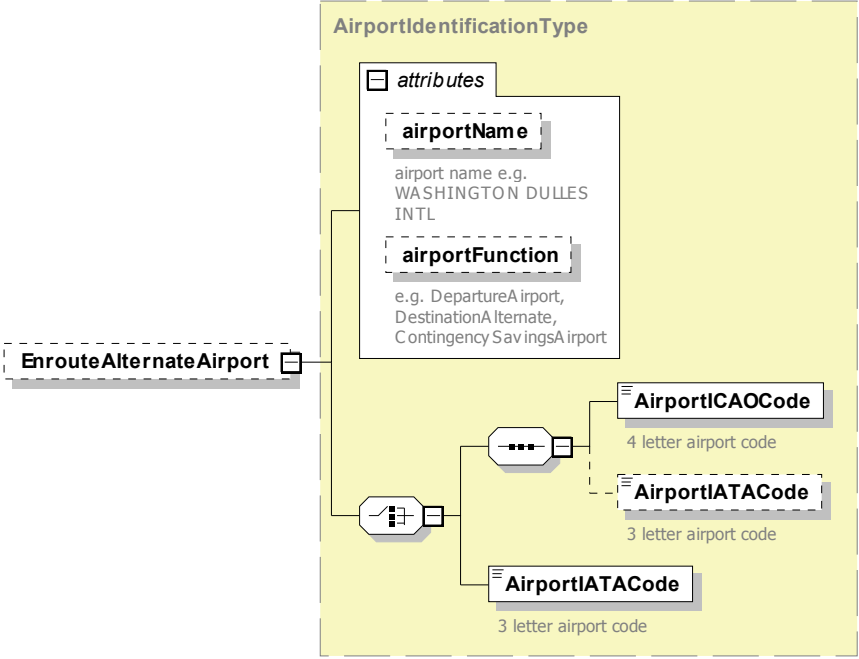
element FuelHeaderLineContingencyType/ContingencyPolicy

diagram	 The diagram shows a dashed box labeled 'ContingencyPolicy' with a small square icon. A line connects it to a box labeled 'attributes' containing a 'policyName' field with the example 'e.g. 3% + ERA, 20Min, 5%'. Another line connects 'ContingencyPolicy' to a dashed box labeled 'EnrouteAlternateAirport' with a small square icon.					
children	EnrouteAlternateAirport					
attributes	Name policyName	Type derived by: xs:string	Use required	Default	Fixed	annotation documentation e.g., 3% + ERA, 20Min, 5%

attribute FuelHeaderLineContingencyType/ContingencyPolicy/@policyName

type	restriction of xs:string
annotation	documentation e.g., 3% + ERA, 20Min, 5%

element FuelHeaderLineContingencyType/ContingencyPolicy/EnrouteAlternateAirport

diagram	 The diagram shows a dashed box labeled 'EnrouteAlternateAirport' with a small square icon. A line connects it to a large yellow box labeled 'AirportIdentificationType'. Inside this box, there is an 'attributes' section with 'airportName' (example: 'WASHINGTON DULLES INTL') and 'airportFunction' (example: 'DepartureAirport, DestinationAlternate, Contingency SavingsAirport'). Below this, there are three code fields: 'AirportCAOCode' (4 letter airport code), 'AirportIATACode' (3 letter airport code), and another 'AirportIATACode' (3 letter airport code). Lines connect the 'EnrouteAlternateAirport' box to each of these code fields.					
type	AirportIdentificationType					
children	AirportCAOCode AirportIATACode AirportIATACode					
attributes	Name airportName	Type derived by: xs:string	Use	Default	Fixed	annotation documentation airport name e.g., WASHINGTON DULLES INTL
	airportFunction	airportFunctionType				documentation e.g., DepartureAirport, DestinationAlternate, ContingencySavingsAirport

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complexType FuelHeaderLineReasonType

diagram						
children	EstimatedWeight ActualWeight Duration CaptainCheck					
used by	elements	fuelHeader.Grp/AdditionalFuels/AdditionalFuel fuelHeader.Grp/ExtraFuels/ExtraFuel				
attributes	Name reason	Type derived by: xs:string	Use optional	Default	Fixed	annotation documentation reason for the planned additional/extra fuel e.g., ATC, WX
annotation	documentation basic type for fuel elements extended by reason information					

attribute FuelHeaderLineReasonType/@reason

type	restriction of xs:string
annotation	documentation reason for the planned additional/extra fuel e.g., ATC, WX

element FuelHeaderLineReasonType/CaptainCheck

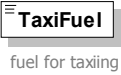
diagram	
type	restriction of xs:string

element TripFuel

diagram	Fuel to fly from departure to arrival airport
type	weightType
used by	group Fuel.Grp
annotation	documentation Fuel to fly from departure to arrival airport

5.0 COMMON ELEMENTS

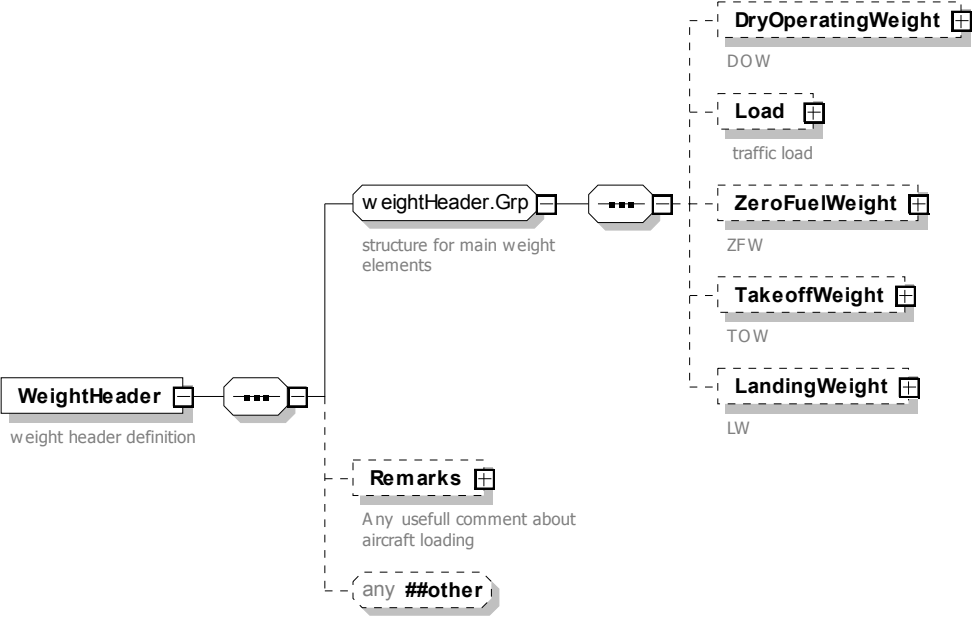
element TaxiFuel

diagram	
type	weightType
used by	group Fuel.Grp
annotation	documentation fuel for taxiing out

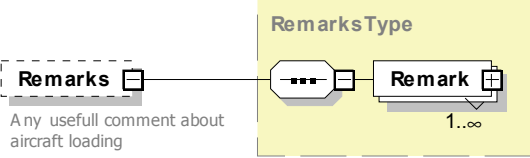
5.4.3 WeightHeader

The WeightHeader should contain weight (mass) information.

element WeightHeader

diagram	
children	DryOperatingWeight Load ZeroFuelWeight TakeoffWeight LandingWeight Remarks
used by	group flightPlanCore.Grp
annotation	documentation weight header definition

element WeightHeader/Remarks

diagram	
type	RemarksType
children	Remark
annotation	documentation Any useful comment about aircraft loading

5.0 COMMON ELEMENTS

group weightHeader.Grp

diagram	
children	DryOperatingWeight Load ZeroFuelWeight TakeoffWeight LandingWeight
used by	element WeightHeader
annotation	documentation structure for main weight elements

element weightHeader.Grp/DryOperatingWeight

diagram	
type	WeightHeaderLineBasicType
children	EstimatedWeight ActualWeight
annotation	documentation DOW

element weightHeader.Grp/Load

diagram	
type	WeightHeaderLineBasicType
children	EstimatedWeight ActualWeight
annotation	documentation traffic load

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element weightHeader.Grp/ZeroFuelWeight

diagram	The diagram shows the structure of the ZeroFuelWeight (ZFW) element. It is a dashed box containing the text 'ZFW'. This box is connected to a larger yellow-shaded box labeled 'WeightHeaderLineLimitedType'. Inside this box, there is a 'weightHeaderLineBasic.Grp' box, which is connected to a dashed box containing 'EstimatedWeight' and 'ActualWeight'. Below this, there are four more elements: 'OperationalLimit', 'StructuralLimit', 'Reason', and 'any ##other', each connected to the main structure by a dashed line.
type	WeightHeaderLineLimitedType
children	EstimatedWeight ActualWeight OperationalLimit StructuralLimit Reason
annotation	documentation ZFW

element weightHeader.Grp/TakeoffWeight

diagram	The diagram shows the structure of the TakeoffWeight (TOW) element. It is a dashed box containing the text 'TOW'. This box is connected to a larger yellow-shaded box labeled 'WeightHeaderLineLimitedType'. Inside this box, there is a 'weightHeaderLineBasic.Grp' box, which is connected to a dashed box containing 'EstimatedWeight' and 'ActualWeight'. Below this, there are four more elements: 'OperationalLimit', 'StructuralLimit', 'Reason', and 'any ##other', each connected to the main structure by a dashed line.
type	WeightHeaderLineLimitedType
children	EstimatedWeight ActualWeight OperationalLimit StructuralLimit Reason
annotation	documentation TOW

5.0 COMMON ELEMENTS

element weightHeader.Grp/LandingWeight

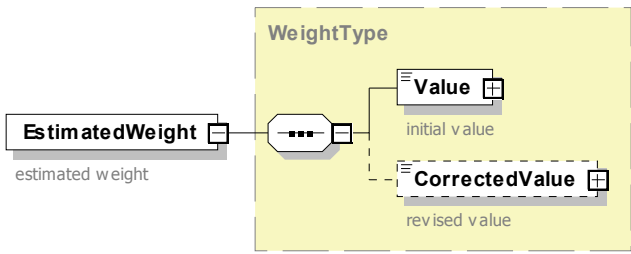
diagram	
type	WeightHeaderLineLimitedType
children	EstimatedWeight ActualWeight OperationalLimit StructuralLimit Reason
annotation	documentation LW

group weightHeaderLineBasic.Grp

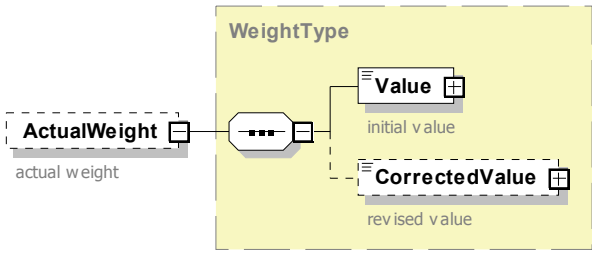
diagram	
children	EstimatedWeight ActualWeight
used by	elements waypoint.Grp/AircraftWeight waypoint.Grp/BurnOff waypoint.Grp/CumulatedBurnOff waypoint.Grp/FuelOnBoard complexTypes WeightHeaderLineBasicType WeightHeaderLineLimitedType group fuelHeaderLineBasic.Grp
annotation	documentation basic group for weight elements

5.0 COMMON ELEMENTS

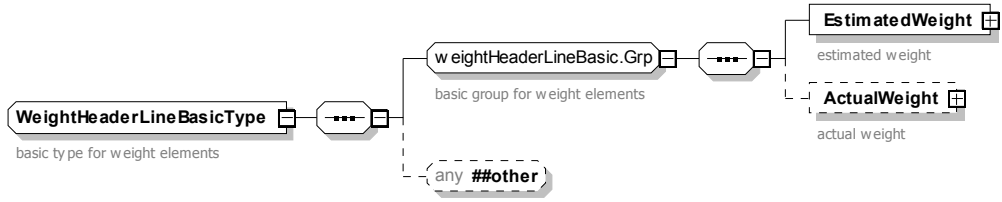
element weightHeaderLineBasic.Grp/EstimatedWeight

diagram	 The diagram shows the structure of the EstimatedWeight element. It is a rectangular box labeled "estimated weight". To its right is a yellow-shaded box labeled "WeightType". Inside "WeightType", there is a "Value" box labeled "initial value" and a "CorrectedValue" box labeled "revised value". A solid line connects the right side of "EstimatedWeight" to the left side of "Value". A dashed line connects the right side of "CorrectedValue" to the left side of "Value".
type	WeightType
children	Value CorrectedValue
annotation	documentation estimated weight

element weightHeaderLineBasic.Grp/ActualWeight

diagram	 The diagram shows the structure of the ActualWeight element. It is a dashed rectangular box labeled "actual weight". To its right is a yellow-shaded box labeled "WeightType". Inside "WeightType", there is a "Value" box labeled "initial value" and a "CorrectedValue" box labeled "revised value". A solid line connects the right side of "ActualWeight" to the left side of "Value". A dashed line connects the right side of "CorrectedValue" to the left side of "Value".
type	WeightType
children	Value CorrectedValue
annotation	documentation actual weight

complexType WeightHeaderLineBasicType

diagram	 The diagram shows the structure of the WeightHeaderLineBasicType complex type. It is a rectangular box labeled "basic type for weight elements". To its right is a dashed line labeled "any ##other". To the right of that is a box labeled "weightHeaderLineBasic.Grp" with the annotation "basic group for weight elements". To its right is a dashed line labeled "...". To the right of that is a box labeled "EstimatedWeight" with the annotation "estimated weight" and a box labeled "ActualWeight" with the annotation "actual weight". A solid line connects the right side of "weightHeaderLineBasic.Grp" to the left side of "EstimatedWeight". A dashed line connects the right side of "ActualWeight" to the left side of "EstimatedWeight".
children	EstimatedWeight ActualWeight
used by	elements fuelHeader.Grp/ArrivalFuel weightHeader.Grp/DryOperatingWeight fuelHeader.Grp/LandingFuel weightHeader.Grp/Load
annotation	documentation basic type for weight elements

5.0 COMMON ELEMENTS

complexType WeightHeaderLineLimitedType

diagram	
children	EstimatedWeight ActualWeight OperationalLimit StructuralLimit Reason
used by	elements weightHeader.Grp/LandingWeight weightHeader.Grp/TakeoffWeight weightHeader.Grp/ZeroFuelWeight
annotation	documentation basic type for weight elements extended by Limitation data

element WeightHeaderLineLimitedType/OperationalLimit

diagram	
type	WeightType
children	Value CorrectedValue
annotation	documentation Operational limit for the specific flight

element WeightHeaderLineLimitedType/StructuralLimit

diagram	
type	WeightType
children	Value CorrectedValue
annotation	documentation maximum certified weight (could vary from the structural weight)

5.0 COMMON ELEMENTS

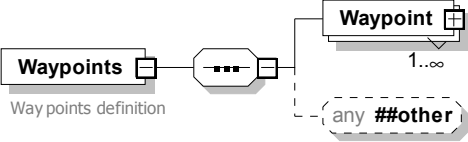
element **WeightHeaderLineLimitedType/Reason**

diagram	
type	restriction of xs:string
annotation	documentation Reason for operational limit e.g., takeOffPerformance

5.4.4 Waypoints

Waypoints are used to identify the route of the operational flight plan
Waypoints is a list of Waypoint.

element **Waypoints**

diagram	
children	Waypoint
used by	elements AlternateRoute flightPlanCore.Grp/ContingencySavingHeader group flightPlanCore.Grp
annotation	documentation Waypoints definition

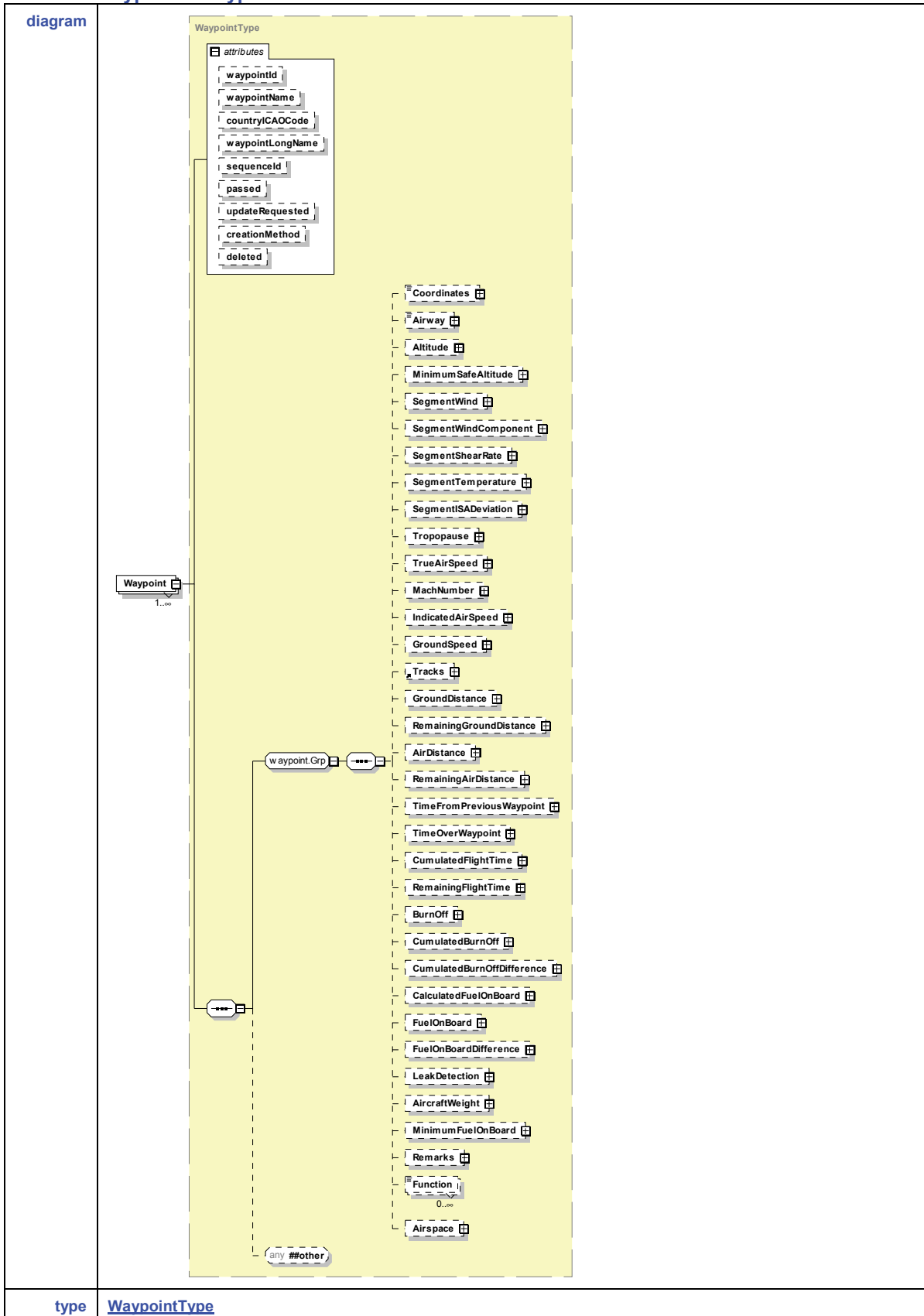
A Waypoint is every designated Aeronautical Information Publication (AIP) position used in the flight route, but can also be another artificial routing position such as Top of Climb, Top of Descend, Point of Equal Time or just a routing position identified by its geographical coordinates.

Notes:

1. The first waypoint of each flightplan should specify the departure airport. The last waypoint should specify the arrival airport.
2. In case of inflight flightplan, the first waypoint should specify the waypoint from which the flightplan has been calculated.
3. The first waypoint of the [flightPlanCore.Grp/ContingencySavingHeader/Waypoints](#) should specify the decision waypoint.
4. All segment related elements in the waypoint structure are related for the segment from the previous to the current waypoint.

5.0 COMMON ELEMENTS

element Waypoints/Waypoint

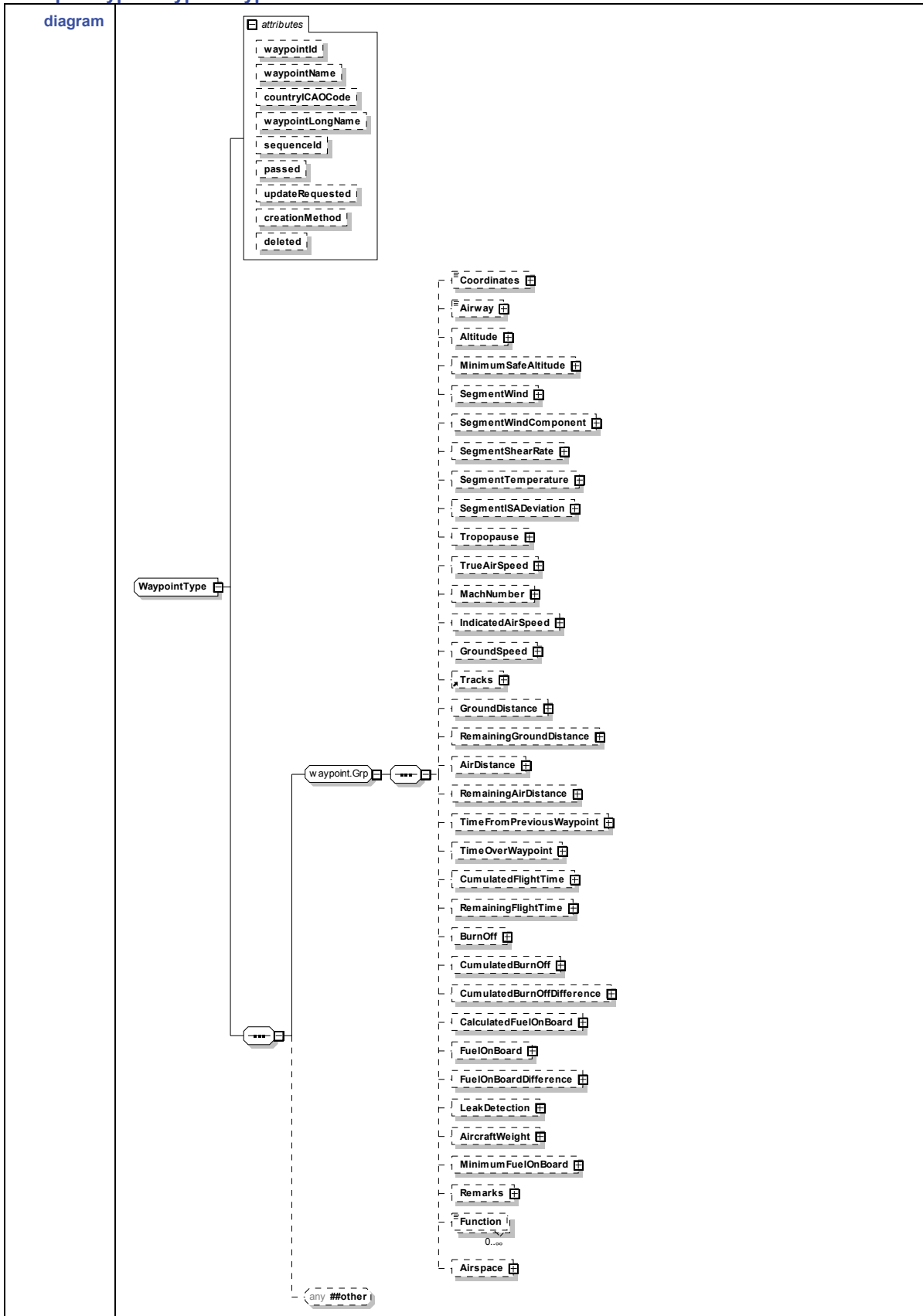


5.0 COMMON ELEMENTS

children	Coordinates Airway Altitude MinimumSafeAltitude SegmentWind SegmentWindComponent SegmentShearRate SegmentTemperature SegmentISADeviation Tropopause TrueAirSpeed MachNumber IndicatedAirSpeed GroundSpeed Tracks GroundDistance RemainingGroundDistance AirDistance RemainingAirDistance TimeFromPreviousWaypoint TimeOverWaypoint CumulatedFlightTime RemainingFlightTime BurnOff CumulatedBurnOff CumulatedBurnOffDifference CalculatedFuelOnBoard FuelOnBoard FuelOnBoardDifference LeakDetection AircraftWeight MinimumFuelOnBoard Remarks Function Airspace					
attributes	Name waypointId	Type WaypointIdType	Use optional	Default	Fixed	annotation documentation 1 to 5 char code, the name as seen by the Pilot and as entered in FMC documentation waypoint identification as typically in ATC-FPL, or any artificial waypoint (TOC, TOD, etc.); to be considered as secondary when waypointId is provided
	waypointName	derived by: xs:string	optional			
	countryICAOCode	CountryICAOCodeType	optional			
	waypointLongName	derived by: xs:string	optional			documentation waypoint long name
	sequenceId	xs:nonNegativeInteger				documentation sequence number of the waypoint in the waypoint list
	passed	xs:boolean	optional			documentation Indicates whether this waypoint has been passed or not. (true / false)
	updateRequested	xs:boolean	optional			documentation Intends to store if the update has been requested on this waypoint or not.
	creationMethod	derived by: xs:string	optional	auto		documentation auto / manual
	deleted	xs:boolean	optional			documentation true / false

5.0 COMMON ELEMENTS

complexType WaypointType



5.0 COMMON ELEMENTS

children	Coordinates Airway Altitude MinimumSafeAltitude SegmentWind SegmentWindComponent SegmentShearRate SegmentTemperature SegmentISADeviation Tropopause TrueAirSpeed MachNumber IndicatedAirSpeed GroundSpeed Tracks GroundDistance RemainingGroundDistance AirDistance RemainingAirDistance TimeFromPreviousWaypoint TimeOverWaypoint CumulatedFlightTime RemainingFlightTime BurnOff CumulatedBurnOff CumulatedBurnOffDifference CalculatedFuelOnBoard FuelOnBoard FuelOnBoardDifference LeakDetection AircraftWeight MinimumFuelOnBoard Remarks Function Airspace					
used by	element Waypoints/Waypoint					
attributes	Name waypointId	Type WaypointIdType	Use optional	Default	Fixed	annotation documentation 1 to 5 char code, the name as seen by the Pilot and as entered in FMC documentation waypoint identification as typically in ATC-FPL, or any artificial waypoint (TOC, TOD, etc.); to be considered as secondary when waypointId is provided
	waypointName	derived by: xs:string	optional			
	country/CAOCode	Country/CAOCodeType	optional			
	waypointLongName	derived by: xs:string	optional			documentation waypoint long name
	sequenceId	xs:nonNegativeInteger				documentation sequence number of the waypoint in the waypoint list
	passed	xs:boolean	optional			documentation Indicates whether this waypoint has been passed or not. (true / false)
	updateRequested	xs:boolean	optional			documentation Intends to store if the update has been requested on this waypoint or not.
	creationMethod	derived by: xs:string	optional	auto		documentation auto / manual
	deleted	xs:boolean	optional			documentation true / false
annotation	documentation type definition for waypoint					

attribute [WaypointType/@waypointId](#)

type	WaypointIdType
annotation	documentation 1 to 5 char code, the name as seen by the Pilot and as entered in FMC

attribute [WaypointType/@waypointName](#)

type	restriction of xs:string
annotation	documentation waypoint identification as typically in ATC-FPL, or any artificial waypoint (TOC, TOD, etc.); to be considered as secondary when waypointId is provided

5.0 COMMON ELEMENTS

attribute WaypointType/@countryICAOCCode

type	CountryICAOCCodeType

attribute WaypointType/@waypointLongName

type	restriction of xs:string
annotation	documentation waypoint long name

attribute WaypointType/@sequenceId

type	xs:nonNegativeInteger
annotation	documentation sequence number of the waypoint in the waypoint list

attribute WaypointType/@passed

type	xs:boolean
annotation	documentation Indicates whether this waypoint has been passed or not. (true / false)

attribute WaypointType/@updateRequested

type	xs:boolean
annotation	documentation Intends to store if the update has been requested on this waypoint or not.

attribute WaypointType/@creationMethod

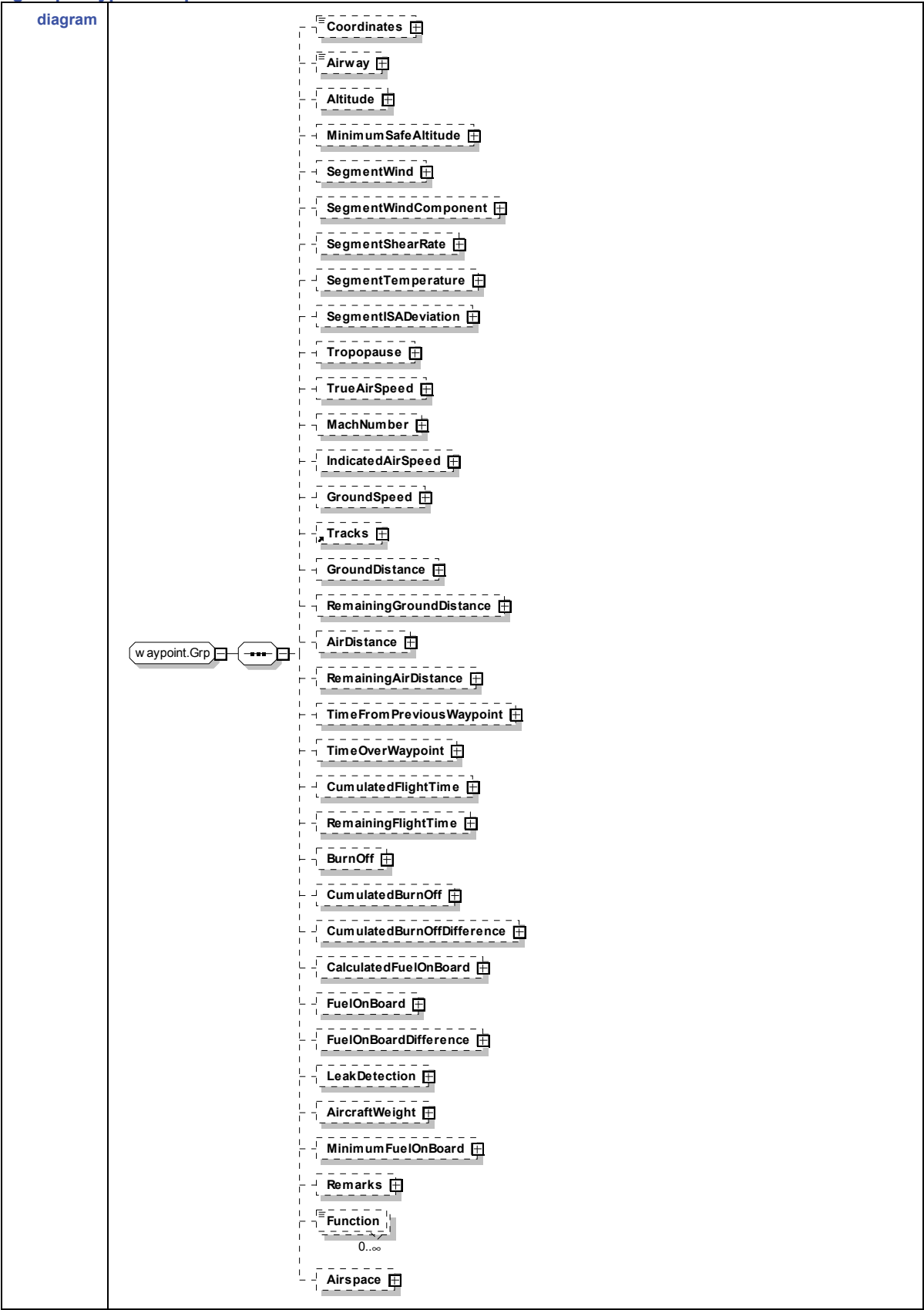
type	restriction of xs:string
facets	enumeration auto enumeration manual
annotation	documentation auto / manual

attribute WaypointType/@deleted

type	xs:boolean
annotation	documentation true / false

5.0 COMMON ELEMENTS

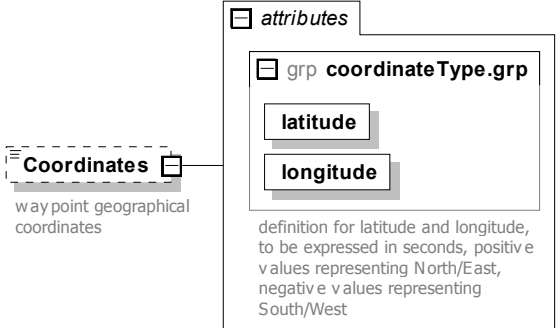
group waypoint.Grp



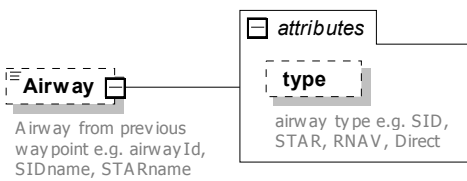
5.0 COMMON ELEMENTS

children	Coordinates Airway Altitude MinimumSafeAltitude SegmentWind SegmentWindComponent SegmentShearRate SegmentTemperature SegmentISADeviation Tropopause TrueAirSpeed MachNumber IndicatedAirSpeed GroundSpeed Tracks GroundDistance RemainingGroundDistance AirDistance RemainingAirDistance TimeFromPreviousWaypoint TimeOverWaypoint CumulatedFlightTime RemainingFlightTime BurnOff CumulatedBurnOff CumulatedBurnOffDifference CalculatedFuelOnBoard FuelOnBoard FuelOnBoardDifference LeakDetection AircraftWeight MinimumFuelOnBoard Remarks Function Airspace
used by	complexType WaypointType
annotation	documentation structure for waypoint elements

element [waypoint.Grp/Coordinates](#)

diagram						
type	extension of xs:string					
attributes	Name latitude longitude	Type derived by: xs:float derived by: xs:float	Use required required	Default	Fixed	annotation
annotation	documentation waypoint geographical coordinates					

element [waypoint.Grp/Airway](#)

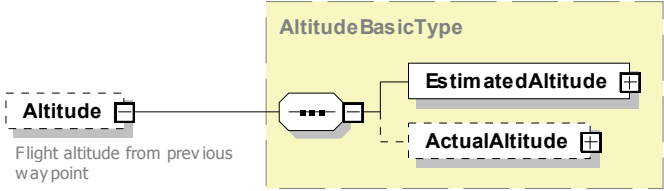
diagram						
type	extension of xs:string					
attributes	Name type	Type derived by: xs:string	Use	Default	Fixed	annotation documentation airway type e.g., SID, STAR, RNAV, Direct
annotation	documentation Airway from previous waypoint e.g., airwayId, SIDname, STARname					

attribute [waypoint.Grp/Airway/@type](#)

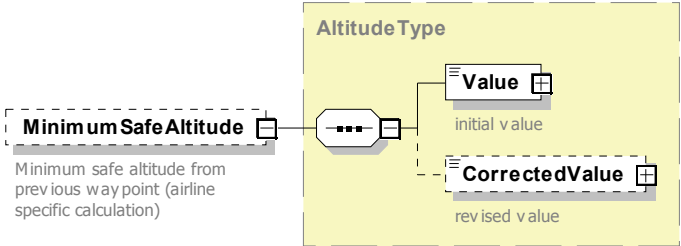
type	restriction of xs:string
annotation	documentation airway type e.g., SID, STAR, RNAV, Direct

5.0 COMMON ELEMENTS

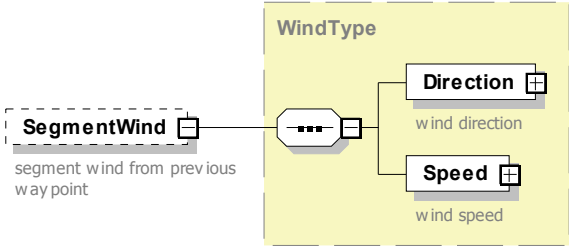
element waypoint.Grp/Altitude

diagram	 The diagram shows a dashed box labeled 'Altitude' containing the text 'Flight altitude from previous waypoint'. A line connects this box to a central octagonal connector with three dots. From this connector, two lines branch out to two stacked boxes: 'EstimatedAltitude' (top) and 'ActualAltitude' (bottom). Both boxes have a small square icon with a plus sign in the top right corner. The entire structure is enclosed in a yellow dashed box labeled 'AltitudeBasicType'.
type	AltitudeBasicType
children	EstimatedAltitude ActualAltitude
annotation	documentation Flight altitude from previous waypoint

element waypoint.Grp/MinimumSafeAltitude

diagram	 The diagram shows a dashed box labeled 'MinimumSafeAltitude' containing the text 'Minimum safe altitude from previous waypoint (airline specific calculation)'. A line connects this box to a central octagonal connector with three dots. From this connector, two lines branch out to two stacked boxes: 'Value' (top) and 'CorrectedValue' (bottom). The 'Value' box has the text 'initial v alue' below it and a small square icon with a plus sign in the top right corner. The 'CorrectedValue' box has the text 'rev ised v alue' below it and a small square icon with a plus sign in the top right corner. The entire structure is enclosed in a yellow dashed box labeled 'Altitude Type'.
type	AltitudeType
children	Value CorrectedValue
annotation	documentation Minimum safe altitude from previous waypoint (airline specific calculation)

element waypoint.Grp/SegmentWind

diagram	 The diagram shows a dashed box labeled 'SegmentWind' containing the text 'segment wind from previous waypoint'. A line connects this box to a central octagonal connector with three dots. From this connector, two lines branch out to two stacked boxes: 'Direction' (top) and 'Speed' (bottom). The 'Direction' box has the text 'wind direction' below it and a small square icon with a plus sign in the top right corner. The 'Speed' box has the text 'wind speed' below it and a small square icon with a plus sign in the top right corner. The entire structure is enclosed in a yellow dashed box labeled 'WindType'.
type	WindType
children	Direction Speed
annotation	documentation segment wind from previous waypoint

5.0 COMMON ELEMENTS

element waypoint.Grp/SegmentWindComponent

diagram	
type	SpeedType
children	Value CorrectedValue
annotation	documentation average wind component from previous waypoint

element waypoint.Grp/SegmentShearRate

diagram	
children	SegmentVerticalWindChange AltitudeDifference
annotation	documentation vertical wind speed change from previous waypoint for specified altitude difference

element waypoint.Grp/SegmentShearRate/SegmentVerticalWindChange

diagram	
type	SpeedType
children	Value CorrectedValue

element waypoint.Grp/SegmentShearRate/AltitudeDifference

diagram						
type	extension of xs:float					
attributes	Name <u>unit</u>	Type <u>altitudeUnitType</u>	Use optional	Default ft	Fixed	annotation

5.0 COMMON ELEMENTS

attribute waypoint.Grp/SegmentShearRate/AltitudeDifference/@unit

type	altitudeUnitType
facets	enumeration ft/100 enumeration ft/1000 enumeration ft enumeration m/100 enumeration m/10 enumeration m

element waypoint.Grp/SegmentTemperature

diagram	
type	TemperatureType
children	Value CorrectedValue
annotation	documentation Outside Air Temperature from previous waypoint

element waypoint.Grp/SegmentISADeviation

diagram	
type	TemperatureType
children	Value CorrectedValue
annotation	documentation Deviation to ISA Temperature from previous waypoint

element waypoint.Grp/Tropopause

diagram	
type	AltitudeType
children	Value CorrectedValue
annotation	documentation Tropopause altitude

5.0 COMMON ELEMENTS

element waypoint.Grp/TrueAirSpeed

diagram	
type	SpeedBasicType
children	EstimatedSpeed ActualSpeed
annotation	documentation True Air Speed from previous waypoint

element waypoint.Grp/MachNumber

diagram	
type	MachNumberBasicType
children	EstimatedMachNumber ActualMachNumber
annotation	documentation Speed in mach from previous waypoint

element waypoint.Grp/IndicatedAirSpeed

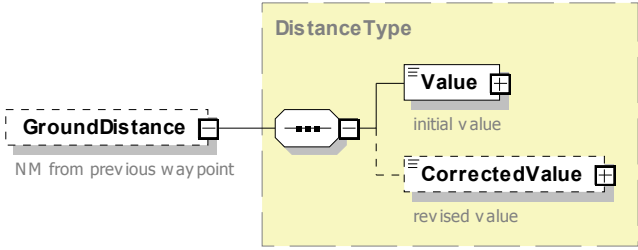
diagram	
type	SpeedBasicType
children	EstimatedSpeed ActualSpeed
annotation	documentation Indicated Air Speed from previous waypoint

element waypoint.Grp/GroundSpeed

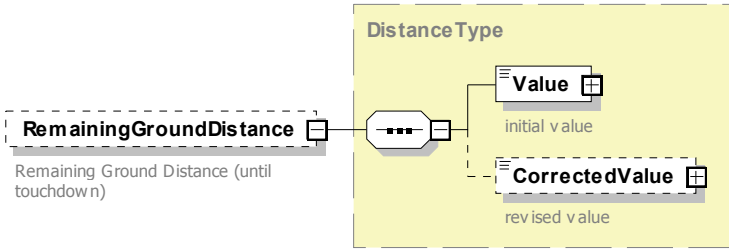
diagram	
type	SpeedBasicType
children	EstimatedSpeed ActualSpeed
annotation	documentation Ground Speed from previous waypoint

5.0 COMMON ELEMENTS

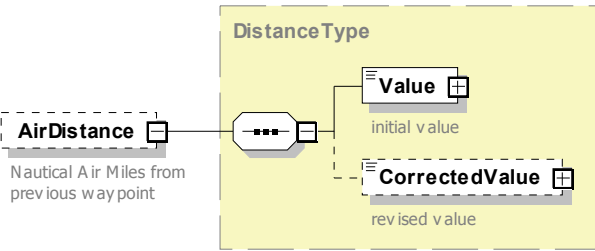
element waypoint.Grp/GroundDistance

diagram	 The diagram shows the GroundDistance element, which is a dashed box containing the text "NM from previous waypoint". This element is connected to a central octagonal node with three dots. To the right of this node is a yellow-shaded box labeled Distance Type. Inside this box, there are two sub-elements: Value (labeled "initial v value") and CorrectedValue (labeled "revised value"). Both sub-elements are connected to the central octagonal node.
type	DistanceType
children	Value CorrectedValue
annotation	documentation NM from previous waypoint

element waypoint.Grp/RemainingGroundDistance

diagram	 The diagram shows the RemainingGroundDistance element, which is a dashed box containing the text "Remaining Ground Distance (until touchdown)". This element is connected to a central octagonal node with three dots. To the right of this node is a yellow-shaded box labeled Distance Type. Inside this box, there are two sub-elements: Value (labeled "initial v value") and CorrectedValue (labeled "revised value"). Both sub-elements are connected to the central octagonal node.
type	DistanceType
children	Value CorrectedValue
annotation	documentation Remaining Ground Distance (until touchdown)

element waypoint.Grp/AirDistance

diagram	 The diagram shows the AirDistance element, which is a dashed box containing the text "Nautical Air Miles from previous waypoint". This element is connected to a central octagonal node with three dots. To the right of this node is a yellow-shaded box labeled Distance Type. Inside this box, there are two sub-elements: Value (labeled "initial v value") and CorrectedValue (labeled "revised value"). Both sub-elements are connected to the central octagonal node.
type	DistanceType
children	Value CorrectedValue
annotation	documentation Nautical Air Miles from previous waypoint

5.0 COMMON ELEMENTS

element waypoint.Grp/RemainingAirDistance

diagram	
type	DistanceType
children	Value CorrectedValue
annotation	documentation Remaining Air Distance (untill touchdown)

element waypoint.Grp/TimeFromPreviousWaypoint

diagram	
type	DurationBasicType
children	EstimatedTime ActualTime
annotation	documentation duration

element waypoint.Grp/TimeOverWaypoint

diagram	
type	TimeBasicType
children	EstimatedTime ActualTime
annotation	documentation Time Over a waypoint (UTC)

element waypoint.Grp/CumulatedFlightTime

diagram	
type	DurationBasicType
children	EstimatedTime ActualTime
annotation	documentation Cumulated Time (from takeoff)

5.0 COMMON ELEMENTS

element waypoint.Grp/RemainingFlightTime

diagram	
type	DurationBasicType
children	EstimatedTime ActualTime
annotation	documentation Remaining Time (till touchdown)

element waypoint.Grp/BurnOff

diagram	
children	EstimatedWeight ActualWeight
annotation	documentation Burn off from previous waypoint

element waypoint.Grp/CumulatedBurnOff

diagram	
children	EstimatedWeight ActualWeight
annotation	documentation Cumulated Burn Off (from takeoff)

element waypoint.Grp/CumulatedBurnOffDifference

diagram	
type	WeightType
children	Value CorrectedValue
annotation	documentation difference between the estimated and actual CumulatedBurnOff up to the current waypoint

5.0 COMMON ELEMENTS

element waypoint.Grp/CalculatedFuelOnBoard

diagram	
type	WeightType
children	Value CorrectedValue
annotation	documentation difference between the CumulatedBurnOff and actual TakeOffFuel

element waypoint.Grp/FuelOnBoard

diagram	
children	EstimatedWeight ActualWeight
annotation	documentation Fuel on Board at current waypoint

element waypoint.Grp/FuelOnBoardDifference

diagram	
type	WeightType
children	Value CorrectedValue
annotation	documentation difference between estimated and actual FuelOnBoard

element waypoint.Grp/LeakDetection

diagram	
type	WeightType
children	Value CorrectedValue
annotation	documentation Sum of FuelOnBoardDifference and CumulatedBurnOffDifference

5.0 COMMON ELEMENTS

type	WeightType
children	Value CorrectedValue
annotation	documentation Sum of FuelOnBoardDifference and CumulatedBurnOffDifference

element waypoint.Grp/AircraftWeight

diagram	
children	EstimatedWeight ActualWeight
annotation	documentation Aircraft Gross Weight at current waypoint (ZeroFuelWeight + FuelOnBoard)

element waypoint.Grp/MinimumFuelOnBoard

diagram	
type	WeightType
children	Value CorrectedValue
annotation	documentation Minimum Fuel on Board. Airline specific value based on its fuel policy

element waypoint.Grp/Remarks

diagram	
type	RemarksType
children	Remark
annotation	documentation Remarks

element waypoint.Grp/Function

diagram	
type	restriction of xs:string
annotation	documentation e.g., TopOfClimb, ATCFlightplanRelevant, AirspaceBoundary

5.0 COMMON ELEMENTS

element waypoint.Grp/Airspace

diagram						
children	AirspaceName RadioFrequency					
attributes	Name airspaceICAOCode	Type AirportICAOCodeType	Use	Default	Fixed	annotation documentation 4 letter ICAO code
annotation	documentation airspace related data					

attribute waypoint.Grp/Airspace/@airspaceICAOCode

type	AirportICAOCodeType
annotation	documentation 4 letter ICAO code

element waypoint.Grp/Airspace/AirspaceName

diagram	
type	restriction of xs:string
annotation	documentation airspace long name

element waypoint.Grp/Airspace/RadioFrequency

diagram	
type	xs:float
annotation	documentation Communication frequency

5.0 COMMON ELEMENTS

element Tracks

diagram	Tracks definition for tracks element OutboundTrack 0..2 Outbound track from current way point SegmentTrack 0..2 Segment track from previous to current way point InboundTrack 0..2 Inbound track to current way point
children	OutboundTrack SegmentTrack InboundTrack
used by	element group flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/SuitableAirport waypoint.Grp
annotation	documentation definition for tracks element

The Structure of [OutboundTrack](#), [SegmentTrack](#) and [InboundTrack](#) enables entry of up to two sets of data, e.g., True Track and Magnetic Track data.

element Tracks/OutboundTrack

diagram	OutboundTrack 0..2 Outbound track from current way point DirectionType Value initial value CorrectedValue revised value
type	DirectionType
children	Value CorrectedValue
annotation	documentation Outbound track from current waypoint

element Tracks/SegmentTrack

diagram	SegmentTrack 0..2 Segment track from previous to current way point DirectionType Value initial value CorrectedValue revised value
type	DirectionType
children	Value CorrectedValue
annotation	documentation Segment track from previous to current waypoint

5.0 COMMON ELEMENTS

element Tracks/InboundTrack

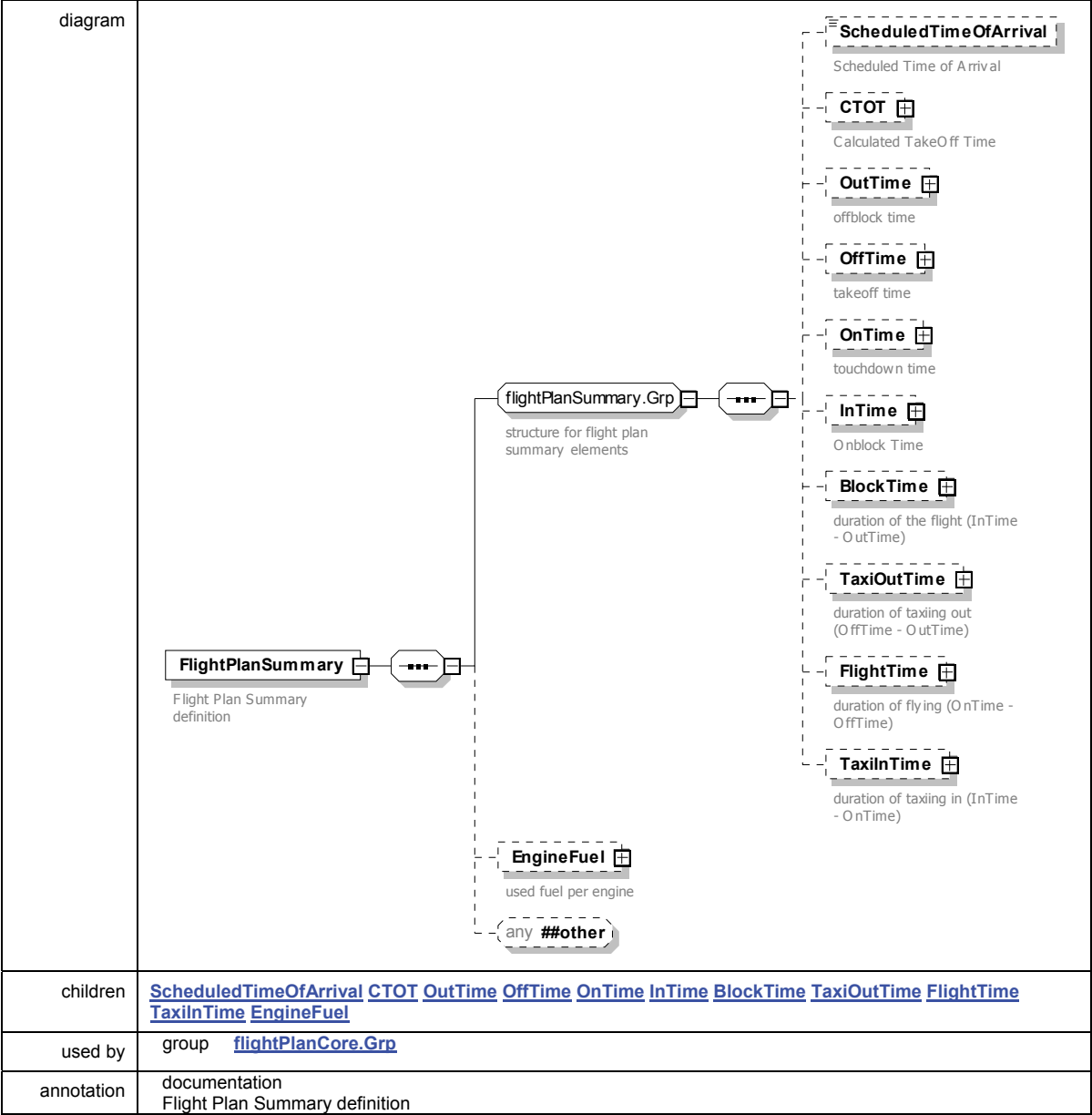
diagram	The diagram illustrates the structure of the InboundTrack element. It is an entity (dashed box) with a multiplicity of 0..2, representing the 'Inbound track to current waypoint'. It is connected to a DirectionType entity (solid box). The DirectionType entity contains two attributes: 'Value' (labeled 'initial value') and 'CorrectedValue' (labeled 'revised value').
type	DirectionType
children	Value CorrectedValue
annotation	documentation Inbound track to current waypoint

5.0 COMMON ELEMENTS

5.4.5 FlightPlanSummary

FlightPlanSummary gathers global parameters of the flight calculated before flight and updated during flight.

element **FlightPlanSummary**



5.0 COMMON ELEMENTS

group **flightPlanSummary.Grp**

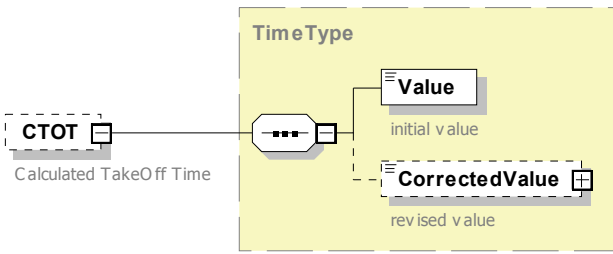
diagram	ScheduledTimeOfArrival Scheduled Time of Arrival CTOT Calculated TakeOff Time OutTime offblock time OffTime takeoff time OnTime touchdown time InTime Onblock Time BlockTime duration of the flight (InTime - OutTime) TaxiOutTime duration of taxiing out (OffTime - OutTime) FlightTime duration of flying (OnTime - OffTime) TaxiInTime duration of taxiing in (InTime - OnTime) flightPlanSummary.Grp structure for flight plan summary elements
children	ScheduledTimeOfArrival CTOT OutTime OffTime OnTime InTime BlockTime TaxiOutTime FlightTime TaxiInTime
used by	element FlightPlanSummary
annotation	documentation structure for flight plan summary elements

element **flightPlanSummary.Grp/ScheduledTimeOfArrival**

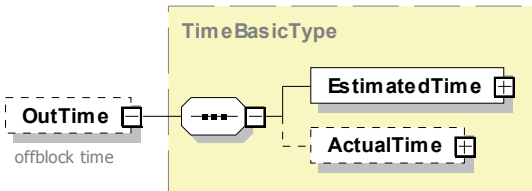
diagram	ScheduledTimeOfArrival Scheduled Time of Arrival
type	xs:dateTime
annotation	documentation Scheduled Time of Arrival

5.0 COMMON ELEMENTS

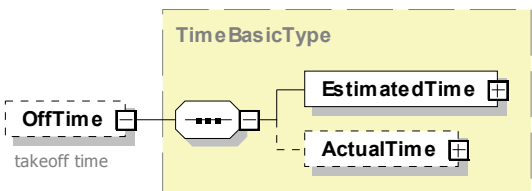
element **flightPlanSummary.Grp/CTOT**

diagram	 The diagram shows the structure of the CTOT element. On the left, a dashed box labeled 'CTOT' with the text 'Calculated TakeOff Time' below it is connected by a solid line to a hexagonal connector containing three dots. This connector is linked to a yellow-shaded box labeled 'Time Type'. Inside the 'Time Type' box, there are two sub-elements: 'Value' (labeled 'initial value') and 'CorrectedValue' (labeled 'revised value'). Both sub-elements are connected to the hexagonal connector by dashed lines.
type	TimeType
children	Value CorrectedValue
annotation	documentation Calculated TakeOff Time

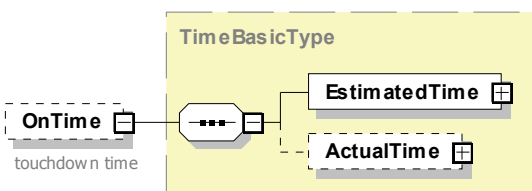
element **flightPlanSummary.Grp/OutTime**

diagram	 The diagram shows the structure of the OutTime element. On the left, a dashed box labeled 'OutTime' with the text 'offblock time' below it is connected by a solid line to a hexagonal connector containing three dots. This connector is linked to a yellow-shaded box labeled 'TimeBasicType'. Inside the 'TimeBasicType' box, there are two sub-elements: 'EstimatedTime' and 'ActualTime'. Both sub-elements are connected to the hexagonal connector by dashed lines.
type	TimeBasicType
children	EstimatedTime ActualTime
annotation	documentation offblock time

element **flightPlanSummary.Grp/OffTime**

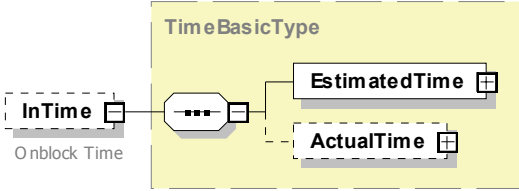
diagram	 The diagram shows the structure of the OffTime element. On the left, a dashed box labeled 'OffTime' with the text 'takeoff time' below it is connected by a solid line to a hexagonal connector containing three dots. This connector is linked to a yellow-shaded box labeled 'TimeBasicType'. Inside the 'TimeBasicType' box, there are two sub-elements: 'EstimatedTime' and 'ActualTime'. Both sub-elements are connected to the hexagonal connector by dashed lines.
type	TimeBasicType
children	EstimatedTime ActualTime
annotation	documentation takeoff time

element **flightPlanSummary.Grp/OnTime**

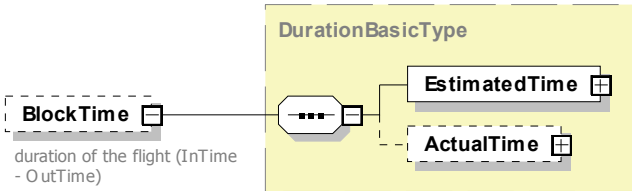
diagram	 The diagram shows the structure of the OnTime element. On the left, a dashed box labeled 'OnTime' with the text 'touchdown n time' below it is connected by a solid line to a hexagonal connector containing three dots. This connector is linked to a yellow-shaded box labeled 'TimeBasicType'. Inside the 'TimeBasicType' box, there are two sub-elements: 'EstimatedTime' and 'ActualTime'. Both sub-elements are connected to the hexagonal connector by dashed lines.
type	TimeBasicType
children	EstimatedTime ActualTime
annotation	documentation touchdown time

5.0 COMMON ELEMENTS

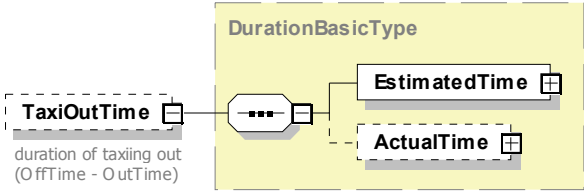
element **flightPlanSummary.Grp/InTime**

diagram	 The diagram shows the InTime element (a dashed box) containing the text "Onblock Time". It is connected to a central octagonal node with three dots. This node is part of a larger yellow box labeled TimeBasicType. Inside this box, the octagonal node is connected to two sub-elements: EstimatedTime and ActualTime, both shown as dashed boxes with small square icons.
type	TimeBasicType
children	EstimatedTime ActualTime
annotation	documentation Onblock Time

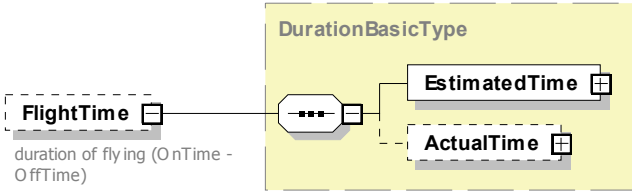
element **flightPlanSummary.Grp/BlockTime**

diagram	 The diagram shows the BlockTime element (a dashed box) containing the text "duration of the flight (InTime - OutTime)". It is connected to a central octagonal node with three dots. This node is part of a larger yellow box labeled DurationBasicType. Inside this box, the octagonal node is connected to two sub-elements: EstimatedTime and ActualTime, both shown as dashed boxes with small square icons.
type	DurationBasicType
children	EstimatedTime ActualTime
annotation	documentation duration of the flight (InTime - OutTime)

element **flightPlanSummary.Grp/TaxiOutTime**

diagram	 The diagram shows the TaxiOutTime element (a dashed box) containing the text "duration of taxiing out (OffTime - OutTime)". It is connected to a central octagonal node with three dots. This node is part of a larger yellow box labeled DurationBasicType. Inside this box, the octagonal node is connected to two sub-elements: EstimatedTime and ActualTime, both shown as dashed boxes with small square icons.
type	DurationBasicType
children	EstimatedTime ActualTime
annotation	documentation duration of taxiing out (OffTime - OutTime)

element **flightPlanSummary.Grp/FlightTime**

diagram	 The diagram shows the FlightTime element (a dashed box) containing the text "duration of flying (OnTime - OffTime)". It is connected to a central octagonal node with three dots. This node is part of a larger yellow box labeled DurationBasicType. Inside this box, the octagonal node is connected to two sub-elements: EstimatedTime and ActualTime, both shown as dashed boxes with small square icons.
type	DurationBasicType
children	EstimatedTime ActualTime
annotation	documentation duration of flying (OnTime - OffTime)

5.0 COMMON ELEMENTS

element **flightPlanSummary.Grp/TaxiInTime**

diagram	
type	DurationBasicType
children	EstimatedTime ActualTime
annotation	documentation duration of taxiing in (InTime - OnTime)

element **FlightPlanSummary/EngineFuel**

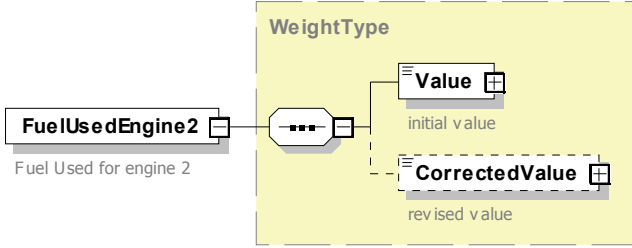
diagram	
children	FuelUsedEngine1 FuelUsedEngine2 FuelUsedEngine3 FuelUsedEngine4
annotation	documentation used fuel per engine

element **FlightPlanSummary/EngineFuel/FuelUsedEngine1**

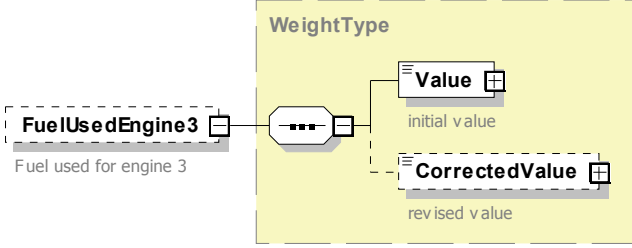
diagram	
type	WeightType
children	Value CorrectedValue
annotation	documentation Fuel Used for engine 1

5.0 COMMON ELEMENTS

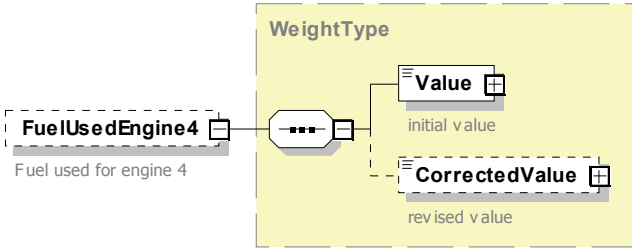
element **FlightPlanSummary/EngineFuel/FuelUsedEngine2**

diagram	 The diagram shows a yellow rectangular container labeled "WeightType". Inside, on the left, is a box labeled "FuelUsedEngine2" with the text "Fuel Used for engine 2" below it. A solid line connects this box to a central octagonal connector containing three dots. From the connector, a solid line goes up to a box labeled "Value" with "initial value" below it, and a dashed line goes down to a box labeled "CorrectedValue" with "revised v value" below it. Both "Value" and "CorrectedValue" boxes have a small square icon with a plus sign in the top right corner.
type	WeightType
children	Value CorrectedValue
annotation	documentation Fuel Used for engine 2

element **FlightPlanSummary/EngineFuel/FuelUsedEngine3**

diagram	 The diagram shows a yellow rectangular container labeled "WeightType". Inside, on the left, is a dashed box labeled "FuelUsedEngine3" with the text "Fuel used for engine 3" below it. A solid line connects this box to a central octagonal connector containing three dots. From the connector, a solid line goes up to a box labeled "Value" with "initial value" below it, and a dashed line goes down to a box labeled "CorrectedValue" with "rev ised v value" below it. Both "Value" and "CorrectedValue" boxes have a small square icon with a plus sign in the top right corner.
type	WeightType
children	Value CorrectedValue
annotation	documentation Fuel used for engine 3

element **FlightPlanSummary/EngineFuel/FuelUsedEngine4**

diagram	 The diagram shows a yellow rectangular container labeled "WeightType". Inside, on the left, is a dashed box labeled "FuelUsedEngine4" with the text "Fuel used for engine 4" below it. A solid line connects this box to a central octagonal connector containing three dots. From the connector, a solid line goes up to a box labeled "Value" with "initial value" below it, and a dashed line goes down to a box labeled "CorrectedValue" with "revised v value" below it. Both "Value" and "CorrectedValue" boxes have a small square icon with a plus sign in the top right corner.
type	WeightType
children	Value CorrectedValue
annotation	documentation Fuel used for engine 4

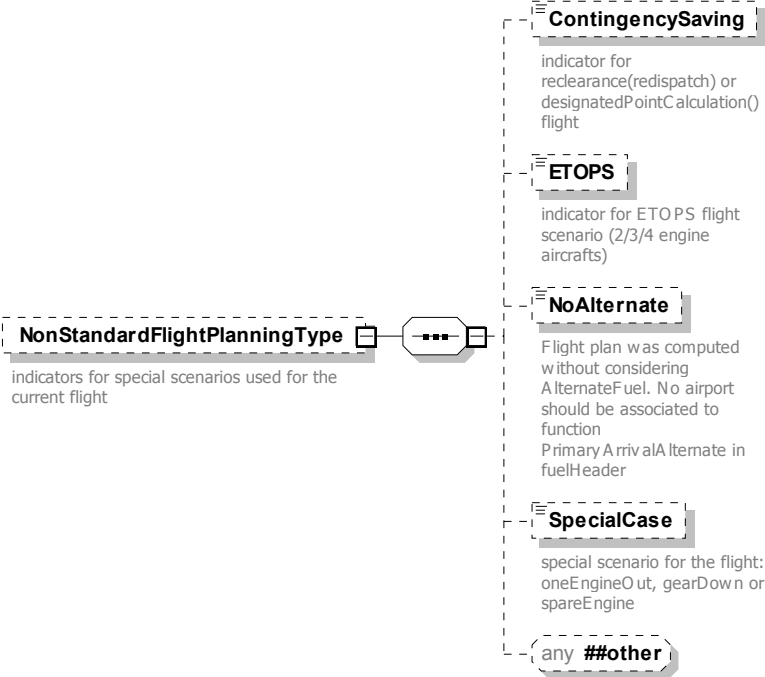
5.0 COMMON ELEMENTS

5.4.6 NonStandardFlightPlanningType

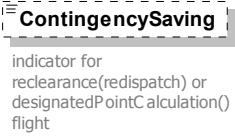
NonStandardFlightPlanningType identifies the scenario for the current flight plan. If the element is not used, a “normal” flight plan is assumed. A combination of several Non-standard flight planning types is also possible.

The use of the element /NonStandardFlightPlanningType/NoAlternate is required when the flight plan does not require an Arrival Alternate Airport (e.g., island destination scenario). In this case all provided Arrival Alternate Airports are for information only.

element flightPlanCore.Grp/NonStandardFlightPlanningType

diagram	
children	ContingencySaving ETOPS NoAlternate SpecialCase
annotation	documentation indicators for special scenarios used for the current flight

element flightPlanCore.Grp/NonStandardFlightPlanningType/ContingencySaving

diagram	
type	restriction of xs:string
facets	enumeration reclearance enumeration designatedPointCalculation
annotation	documentation indicator for reclearance(redispatch) or designatedPointCalculation() flight

5.0 COMMON ELEMENTS

element flightPlanCore.Grp/NonStandardFlightPlanningType/ETOPS

diagram	 indicator for ETOPS flight scenario (2/3/4 engine aircrafts)
type	xs:boolean
annotation	documentation indicator for ETOPS flight scenario (2/3/4 engine aircrafts)

element flightPlanCore.Grp/NonStandardFlightPlanningType/NoAlternate

diagram	 Flight plan was computed without considering AlternateFuel. No airport should be associated to function PrimaryArrivalAlternate in fuelHeader
type	xs:boolean
annotation	documentation Flight plan was computed without considering AlternateFuel. No airport should be associated to function PrimaryArrivalAlternate in fuelHeader

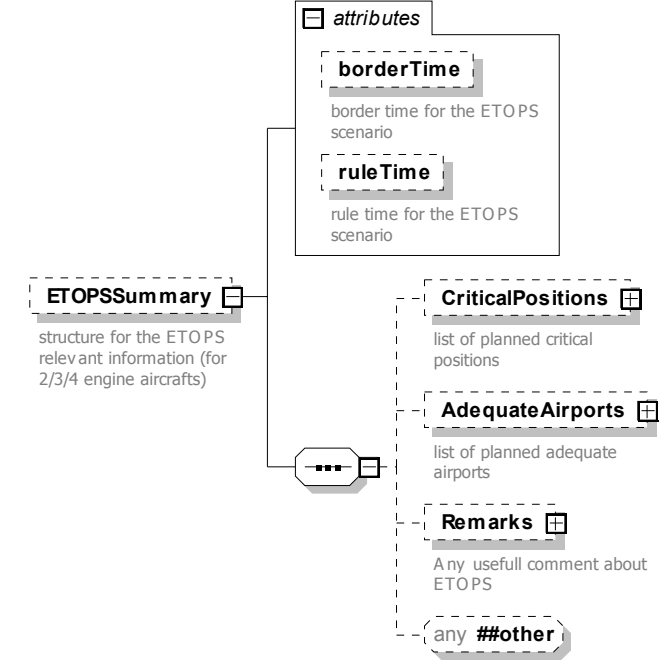
element flightPlanCore.Grp/NonStandardFlightPlanningType/SpecialCase

diagram	 special scenario for the flight: oneEngineOut, gearDown or spareEngine
type	restriction of xs:string
facets	enumeration oneEngineOut enumeration gearDown enumeration spareEngine
annotation	documentation special scenario for the flight: oneEngineOut, gearDown or spareEngine

5.0 COMMON ELEMENTS

5.4.7 ETOPSSummary

element flightPlanCore.Grp/ETOPSSummary

diagram						
children	CriticalPositions AdequateAirports Remarks					
attributes	Name	Type	Use	Default	Fixed	annotation
	borderTime	xs:duration	optional			documentation border time for the ETOPS scenario
	ruleTime	xs:duration	optional			documentation rule time for the ETOPS scenario
annotation	documentation structure for the ETOPS relevant information (for 2/3/4 engine aircrafts)					

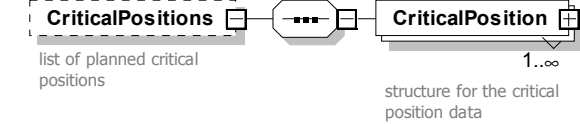
attribute flightPlanCore.Grp/ETOPSSummary/@borderTime

type	xs:duration
annotation	documentation border time for the ETOPS scenario (e.g., 60 min)

attribute flightPlanCore.Grp/ETOPSSummary/@ruleTime

type	xs:duration
annotation	documentation rule time for the ETOPS scenario (e.g., 120min, 180min, 207min)

element flightPlanCore.Grp/ETOPSSummary/CriticalPositions

diagram						
children	CriticalPosition					
annotation	documentation list of planned critical positions					

5.0 COMMON ELEMENTS

element flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition

diagram						
children	PositionName Coordinates CriticalTime FuelOnBoard Condition SuitableAirport					
attributes	Name sequenceId	Type xs:nonNegativeInteger	Use	Default	Fixed	annotation documentation sequence number of the Critical Position documentation Type of the critical position. Recommended values are For ETOPS Area Entry position - ENTRY, for ETOPS Area Exit position - EXIT, for Equal Time Position - ETP, for Equal Fuel Position - EFP
	criticalPositionType	derived by: xs:string				
annotation	documentation structure for the critical position data					

5.0 COMMON ELEMENTS

attribute flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/@sequenceId

type	xs:nonNegativeInteger
annotation	documentation sequence number of the Critical Position

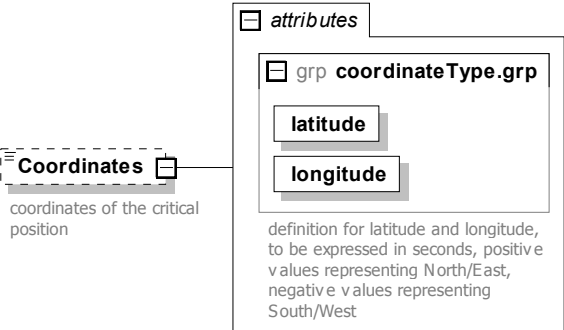
attribute
flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/@criticalPositionType

type	restriction of xs:string
annotation	documentation Type of the critical position. Recommended values are For ETOPS Area Entry position - ENTRY, for ETOPS Area Exit position - EXIT, for Equal Time Position - ETP, for Equal Fuel Position - EFP

element flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/PositionName

diagram	 name of the critical position e.g. ENTRY1, PET1, EXIT1
type	restriction of xs:string
annotation	documentation name of the critical position e.g., ENTRY1, PET1, EXIT1

element flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/Coordinates

diagram	 coordinates of the critical position definition for latitude and longitude, to be expressed in seconds, positive values representing North/East, negative values representing South/West					
type	extension of xs:string					
attributes	Name latitude longitude	Type derived by: xs:float derived by: xs:float	Use required required	Default	Fixed	annotation
annotation	documentation coordinates of the critical position					

5.0 COMMON ELEMENTS

element flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/CriticalTime

diagram	
type	DurationType
children	Value CorrectedValue
annotation	documentation cumulated flight time (from takeoff to the critical position)

element flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/FuelOnBoard

diagram	
type	WeightType
children	Value CorrectedValue
annotation	documentation planned fuel on board to be available at the critical position

element flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/Condition

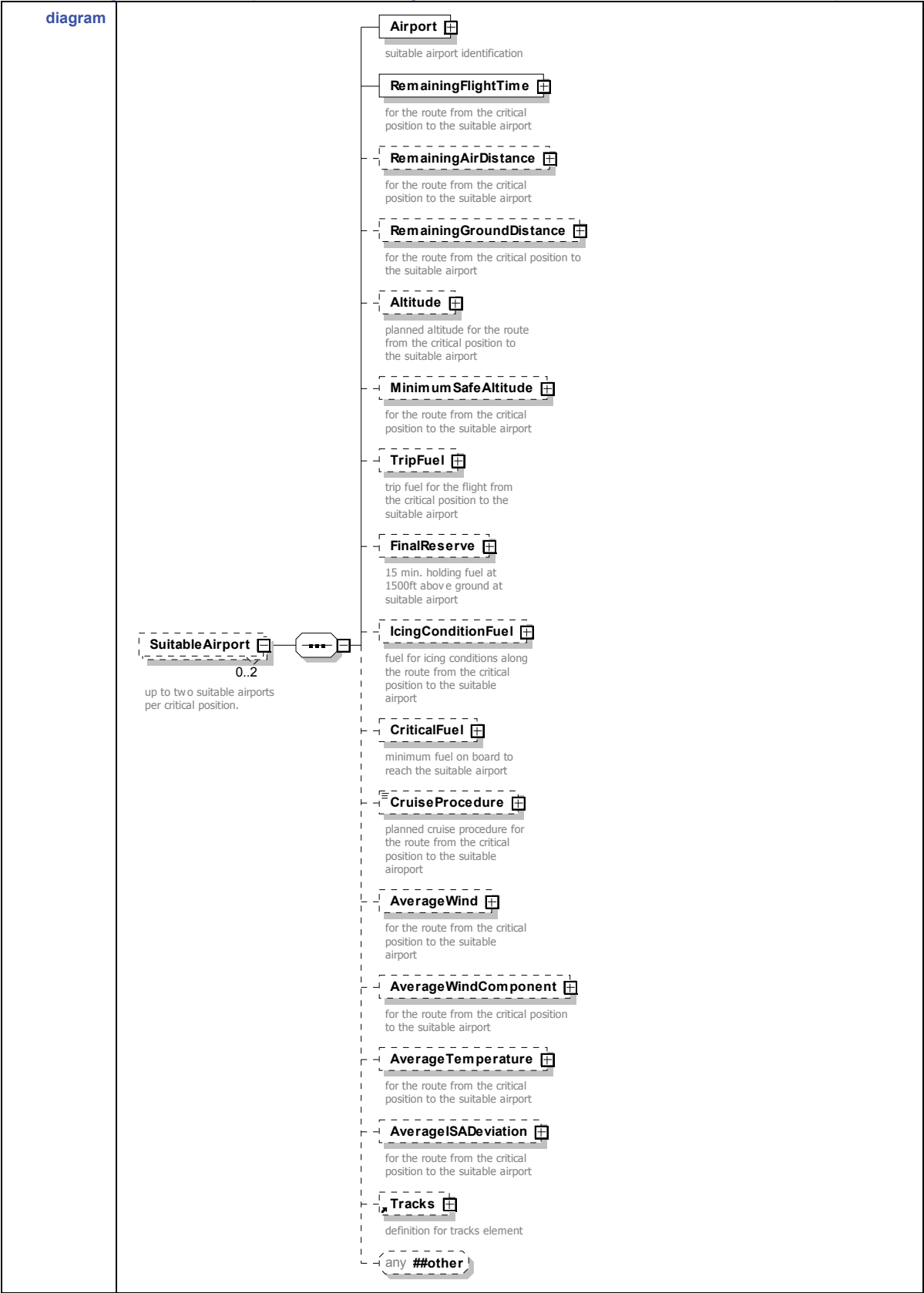
diagram	
type	FlightConditionsType
facets	enumeration decompression with one engine out enumeration decompression enumeration one engine out enumeration two engines out
annotation	documentation indicator showing the critical condition. e.g., decompression

simpleType FlightConditionsType

type	restriction of xs:string
used by	element flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/Condition
facets	enumeration decompression with one engine out enumeration decompression enumeration one engine out enumeration two engines out
annotation	documentation critical conditions for ETOPS operation

5.0 COMMON ELEMENTS

element flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/SuitableAirport



5.0 COMMON ELEMENTS

children	Airport RemainingFlightTime RemainingAirDistance RemainingGroundDistance Altitude MinimumSafeAltitude TripFuel FinalReserve IcingConditionFuel CriticalFuel CruiseProcedure AverageWind AverageWindComponent AverageTemperature AverageISADeviation Tracks
annotation	documentation up to two suitable airports per critical position.

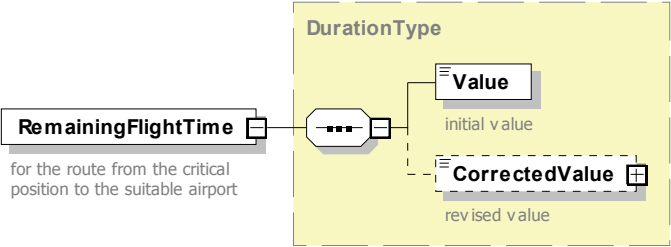
element

flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/SuitableAirport/Airport

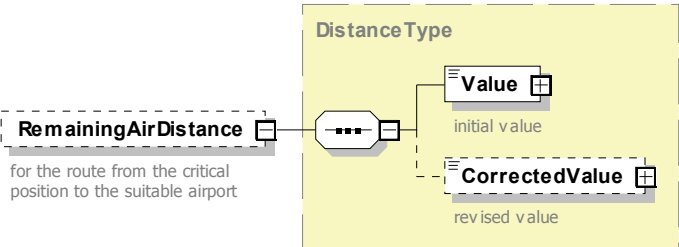
diagram						
type	AirportFullIdentificationType					
children	AirportCAOCCode AirportIATACode AirportIATACode					
attributes	Name	Type	Use	Default	Fixed	annotation
	airportName	derived by: xs:string				documentation airport name e.g., WASHINGTON DULLES INTL
	airportFunction	airportFunctionType	required			documentation e.g., DepartureAirport , DestinationAlternate , ContingencySavingsAirport
annotation	documentation suitable airport identification					

5.0 COMMON ELEMENTS

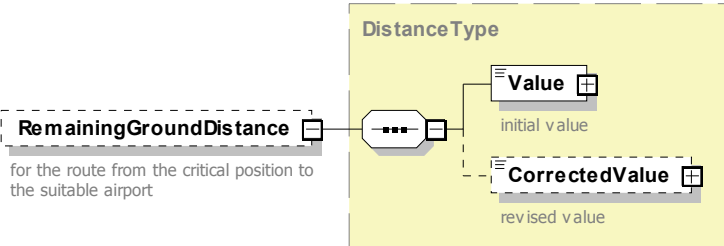
element
flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/SuitableAirport/Remaining
FlightTime

diagram	 The diagram shows the structure of the RemainingFlightTime element. It is a rectangular box with a small square icon on its right side. Below the box is the text "for the route from the critical position to the suitable airport". To the right of the box is a dashed line leading to a yellow-shaded box labeled DurationType. Inside this box, there is a small square icon with three dots inside, followed by another small square icon. To the right of this icon is a dashed line leading to a box labeled Value with a small square icon on its right side. Below the Value box is the text "initial v alue". To the right of the Value box is a dashed line leading to a box labeled CorrectedValue with a small square icon on its right side. Below the CorrectedValue box is the text "rev ised v alue".
type	DurationType
children	Value CorrectedValue
annotation	documentation for the route from the critical position to the suitable airport

element
flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/SuitableAirport/Remaining
AirDistance

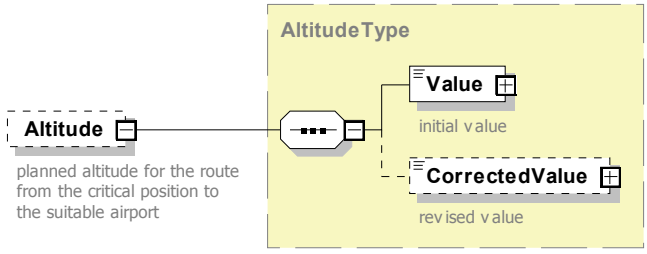
diagram	 The diagram shows the structure of the RemainingAirDistance element. It is a rectangular box with a small square icon on its right side. Below the box is the text "for the route from the critical position to the suitable airport". To the right of the box is a dashed line leading to a yellow-shaded box labeled Distance Type. Inside this box, there is a small square icon with three dots inside, followed by another small square icon. To the right of this icon is a dashed line leading to a box labeled Value with a small square icon on its right side. Below the Value box is the text "initial v alue". To the right of the Value box is a dashed line leading to a box labeled CorrectedValue with a small square icon on its right side. Below the CorrectedValue box is the text "rev ised v alue".
type	DistanceType
children	Value CorrectedValue
annotation	documentation for the route from the critical position to the suitable airport

element
flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/SuitableAirport/Remaining
GroundDistance

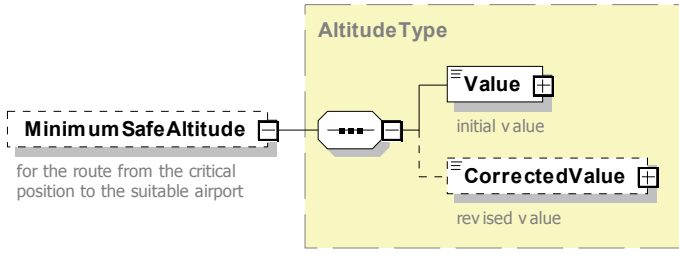
diagram	 The diagram shows the structure of the RemainingGroundDistance element. It is a rectangular box with a small square icon on its right side. Below the box is the text "for the route from the critical position to the suitable airport". To the right of the box is a dashed line leading to a yellow-shaded box labeled DistanceType. Inside this box, there is a small square icon with three dots inside, followed by another small square icon. To the right of this icon is a dashed line leading to a box labeled Value with a small square icon on its right side. Below the Value box is the text "initial v alue". To the right of the Value box is a dashed line leading to a box labeled CorrectedValue with a small square icon on its right side. Below the CorrectedValue box is the text "rev ised v alue".
type	DistanceType
children	Value CorrectedValue
annotation	documentation for the route from the critical position to the suitable airport

5.0 COMMON ELEMENTS

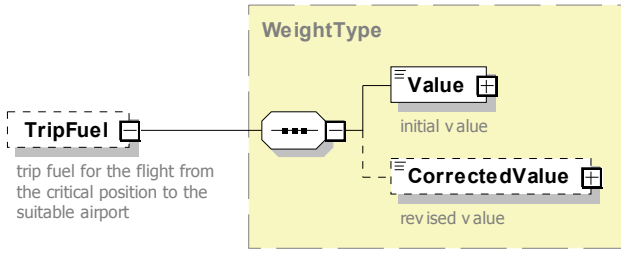
element
flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/SuitableAirport/Altitude

diagram	 The diagram shows the structure of the Altitude element. On the left, a dashed box labeled Altitude contains the text "planned altitude for the route from the critical position to the suitable airport". A line connects this box to a central octagonal connector with three dots. To the right of the connector is a yellow box labeled AltitudeType. Inside this box, a line connects the connector to a Value box (labeled "initial v value") and another line connects it to a CorrectedValue box (labeled "revised v value"). Both Value and CorrectedValue boxes have a small square icon with a plus sign in the top right corner.
type	AltitudeType
children	Value CorrectedValue
annotation	documentation planned altitude for the route from the critical position to the suitable airport

element
flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/SuitableAirport/Minimum SafeAltitude

diagram	 The diagram shows the structure of the Minimum SafeAltitude element. On the left, a dashed box labeled Minimum SafeAltitude contains the text "for the route from the critical position to the suitable airport". A line connects this box to a central octagonal connector with three dots. To the right of the connector is a yellow box labeled AltitudeType. Inside this box, a line connects the connector to a Value box (labeled "initial v value") and another line connects it to a CorrectedValue box (labeled "revised v value"). Both Value and CorrectedValue boxes have a small square icon with a plus sign in the top right corner.
type	AltitudeType
children	Value CorrectedValue
annotation	documentation for the route from the critical position to the suitable airport

element
flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/SuitableAirport/TripFuel

diagram	 The diagram shows the structure of the TripFuel element. On the left, a dashed box labeled TripFuel contains the text "trip fuel for the flight from the critical position to the suitable airport". A line connects this box to a central octagonal connector with three dots. To the right of the connector is a yellow box labeled WeightType. Inside this box, a line connects the connector to a Value box (labeled "initial v value") and another line connects it to a CorrectedValue box (labeled "revised v value"). Both Value and CorrectedValue boxes have a small square icon with a plus sign in the top right corner.
type	WeightType
children	Value CorrectedValue
used by	group Fuel.Grp
annotation	documentation trip fuel for the flight from the critical position to the suitable airport

5.0 COMMON ELEMENTS

element
flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/SuitableAirport/FinalReserve

diagram	The diagram shows the FinalReserve element, represented by a dashed box containing the text "15 min. holding fuel at 1500ft above ground at suitable airport". This element is connected to a central hub (a circle with three dots) inside a yellow-shaded container labeled WeightType. From this hub, two lines branch out to the right, connecting to two sub-elements: Value (labeled "initial v value") and CorrectedValue (labeled "rev ised v value"). Both sub-elements are represented by boxes with a small square icon in the top right corner.
type	WeightType
children	Value CorrectedValue
annotation	documentation 15 min. holding fuel at 1500ft above ground at suitable airport

element
flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/SuitableAirport/Icing
ConditionFuel

diagram	The diagram shows the IcingConditionFuel element, represented by a dashed box containing the text "fuel for icing conditions along the route from the critical position to the suitable airport". This element is connected to a central hub (a circle with three dots) inside a yellow-shaded container labeled WeightType. From this hub, two lines branch out to the right, connecting to two sub-elements: Value (labeled "initial value") and CorrectedValue (labeled "rev ised v value"). Both sub-elements are represented by boxes with a small square icon in the top right corner.
type	WeightType
children	Value CorrectedValue
annotation	documentation fuel for icing conditions along the route from the critical position to the suitable airport

element
flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/SuitableAirport/CriticalFuel

diagram	The diagram shows the CriticalFuel element, represented by a dashed box containing the text "minimum fuel on board to reach the suitable airport". This element is connected to a central hub (a circle with three dots) inside a yellow-shaded container labeled WeightType. From this hub, two lines branch out to the right, connecting to two sub-elements: Value (labeled "initial v value") and CorrectedValue (labeled "rev ised v value"). Both sub-elements are represented by boxes with a small square icon in the top right corner.
type	WeightType
children	Value CorrectedValue
annotation	documentation minimum fuel on board to reach the suitable airport

5.0 COMMON ELEMENTS

element
 flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/SuitableAirport/Cruise
 Procedure

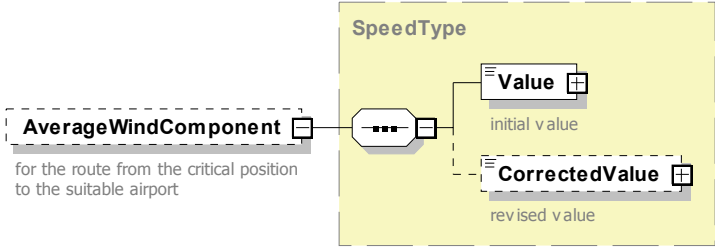
diagram						
type	SpeedProcedureType					
children	CostIndex MachNumber IndicatedAirSpeed TrueAirSpeed					
attributes	Name procedure	Type derived by: xs:string	Use optional	Default	Fixed	annotation documentation procedure name e.g., LRC, ECON, VRBL
annotation	documentation planned cruise procedure for the route from the critical position to the suitable airport					

element
 flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/SuitableAirport/AverageWind

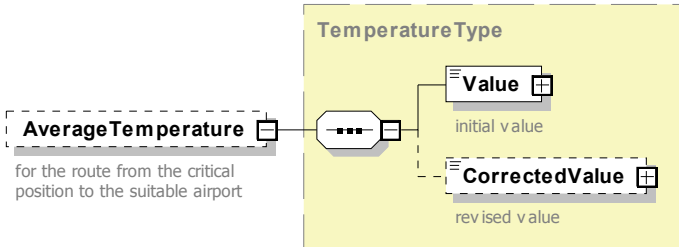
diagram						
type	WindType					
children	Direction Speed					
annotation	documentation for the route from the critical position to the suitable airport					

5.0 COMMON ELEMENTS

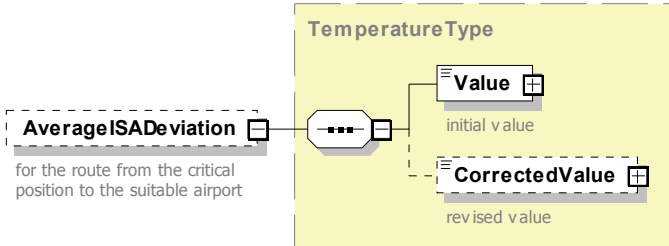
element
flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/SuitableAirport/AverageWind
Component

diagram	 The diagram shows the AverageWindComponent element, represented by a dashed box with a small square icon. Below it is the text "for the route from the critical position to the suitable airport". This element is connected to a larger yellow box labeled SpeedType. Inside SpeedType, there is a small octagon with three dots, which is connected to two data fields: Value (labeled "initial value") and CorrectedValue (labeled "revised value"). Both fields have a small square icon next to them.
type	SpeedType
children	Value CorrectedValue
annotation	documentation for the route from the critical position to the suitable airport

element
flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/SuitableAirport/Average
Temperature

diagram	 The diagram shows the AverageTemperature element, represented by a dashed box with a small square icon. Below it is the text "for the route from the critical position to the suitable airport". This element is connected to a larger yellow box labeled TemperatureType. Inside TemperatureType, there is a small octagon with three dots, which is connected to two data fields: Value (labeled "initial value") and CorrectedValue (labeled "revised value"). Both fields have a small square icon next to them.
type	TemperatureType
children	Value CorrectedValue
annotation	documentation for the route from the critical position to the suitable airport

element
flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/SuitableAirport/AverageISA
Deviation

diagram	 The diagram shows the AverageISADeviation element, represented by a dashed box with a small square icon. Below it is the text "for the route from the critical position to the suitable airport". This element is connected to a larger yellow box labeled TemperatureType. Inside TemperatureType, there is a small octagon with three dots, which is connected to two data fields: Value (labeled "initial value") and CorrectedValue (labeled "revised value"). Both fields have a small square icon next to them.
type	TemperatureType
children	Value CorrectedValue
annotation	documentation for the route from the critical position to the suitable airport

5.0 COMMON ELEMENTS

element flightPlanCore.Grp/ETOPSSummary/AdequateAirports

diagram	
children	AdequateAirport
annotation	documentation list of planned adequate airports

element flightPlanCore.Grp/ETOPSSummary/AdequateAirports/AdequateAirport

diagram						
type	AirportFullIdentificationType					
children	AirportCAOCCode AirportIATACode AirportIATACode					
attributes	Name airportName	Type derived by: xs:string	Use	Default	Fixed	annotation documentation airport name e.g., WASHINGTON DULLES INTL
	airportFunction	airportFunctionType	required			documentation e.g., DepartureAirport, DestinationAlternate, ContingencySavingsAirport

element flightPlanCore.Grp/ETOPSSummary/Remarks

diagram						
type	RemarksType					
children	Remark					
annotation	documentation Any useful comment about ETOPS					

5.0 COMMON ELEMENTS

Other values can be calculated based on the values that are already described above.

Value	Calculation
ICE Coefficient	Ratio of required Icing Fuel in relation to the TripFuel without Icing Fuel (for the routing between the Critical Position and the Suitable Airport) can be calculated by an application as follows: $ICECoefficient = \frac{IcingConditionFuel}{TripFuel - IcingConditionFuel}$

5.4.8 AlternateRoutes

The structure AlternateRoutes contains a list with all planned alternate airports. **This structure has to be used also for providing data for the route from Departure Airport to Departure Alternate Airport. The use of @airportFunction=“DepartureAlternateAirport” is required.**

element flightPlanCore.Grp/AlternateRoutes

diagram	AlternateRoutes AlternateRoute 1..∞ Alternate Route definition list; receives route for both departure and arrival alternate airport for nominal flight. Ror rdcd contingency final altn, see specifically the ContingencySavingHeader. definition for alternate route elements
children	AlternateRoute
annotation	documentation Alternate Route definition list; receives route for both departure and arrival alternate airport for nominal flight. Ror rdcd contingency final altn, see specifically the ContingencySavingHeader.

element AlternateRoute

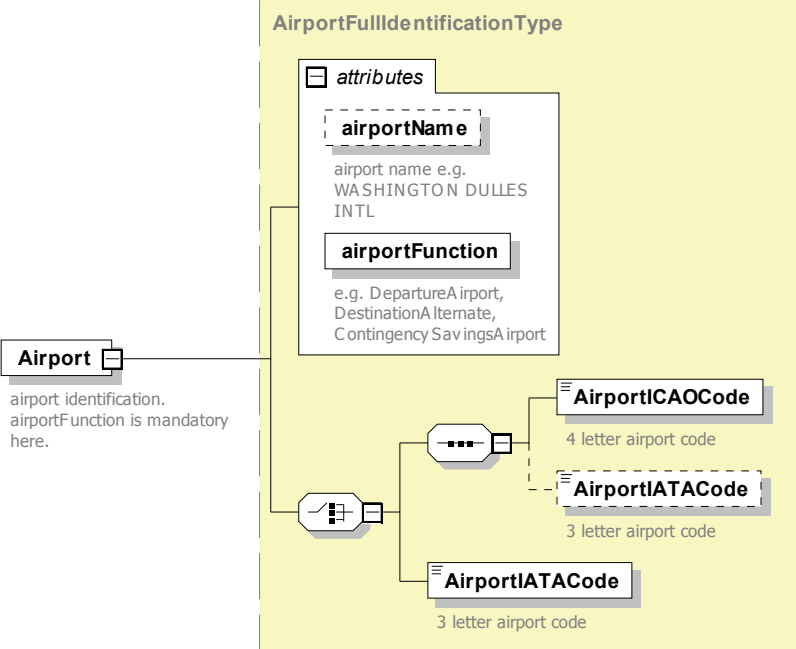
diagram	AlternateRoute Airport Waypoints Status RouteInformation any ##other definition for alternate route elements airport identification. airportFunction is mandatory here. Way points definition status of the alternate airport e.g. BestOptimized, DispatchDefined, CrewSelected detailed supplementary information for the route to alternate airport
children	Waypoints Status Airport RouteInformation
used by	elements flightPlanCore.Grp/AlternateRoutes flightPlanCore.Grp/ContingencySavingHeader/AlternateRoutes
annotation	documentation definition for alternate route elements

5.0 COMMON ELEMENTS

element AlternateRoute/Status

diagram	 status of the alternate airport e.g. BestOptimized, DispatcherDefined, CrewSelected
type	restriction of xs:string
annotation	documentation The content of this element is open. Nonetheless it is recommended to use the following alternate airport's status to ensure a proper interpretation from all applications. BestOptimized, DispatcherDefined, CrewSelected, Info. Where "BestOptimized" is used for the alternate airport proposed by the flight planning system, which requires the minimum fuel, "Info" are any additional alternate airports listed, DispatcherDefined if the sequence of the alternate airports is set by the dispatcher and "PilotSelected" corresponds to the alternate used for the flight.

element AlternateRoute/Airport

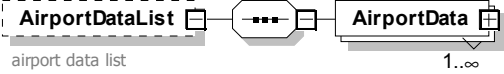
diagram						
type	AirportFullIdentificationType					
children	AirportCAOCode AirportIATACode AirportIATACode					
attributes	Name	Type	Use	Default	Fixed	annotation
	airportName	derived by: xs:string				documentation airport name e.g., WASHINGTON DULLES INTL
	airportFunction	airportFunctionType	required			documentation e.g., DepartureAirport, DestinationAlternate, ContingencySavingsAirport
annotation	documentation airport identification. airportFunction is mandatory here.					

5.0 COMMON ELEMENTS

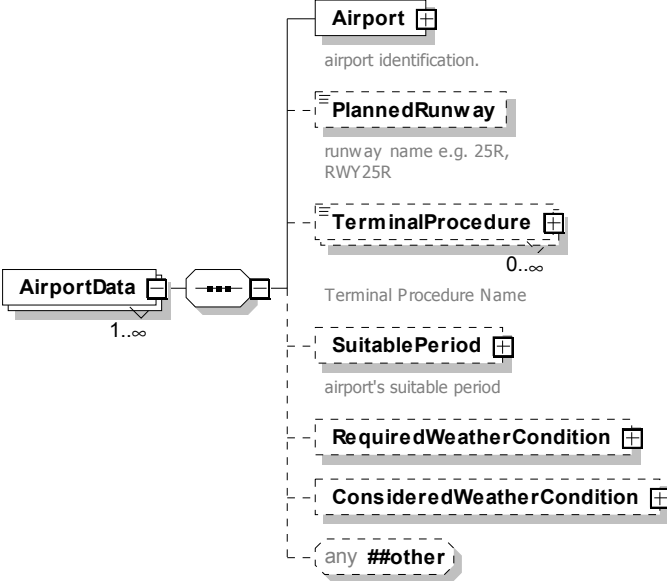
5.4.9 AirportDataList

The structure AirportDataList contains a list of Airport data for all airports used in the flightplan.

element flightPlanCore.Grp/AirportDataList

diagram	
children	AirportData
annotation	documentation airport data list

element flightPlanCore.Grp/AirportDataList/AirportData

diagram	
children	Airport PlannedRunway TerminalProcedure SuitablePeriod RequiredWeatherCondition ConsideredWeatherCondition

5.0 COMMON ELEMENTS

element flightPlanCore.Grp/AirportDataList/AirportData/Airport

diagram						
type	AirportFullIdentificationType					
children	AirportCAOCCode AirportIATACode AirportIATACode					
attributes	Name airportName	Type derived by: xs:string	Use	Default	Fixed	annotation documentation airport name e.g., WASHINGTON DULLES INTL
	airportFunction	airportFunctionType	required			documentation e.g., DepartureAirport, DestinationAlternate, ContingencySavingsAirport
annotation	documentation airport identification.					

element flightPlanCore.Grp/AirportDataList/AirportData/PlannedRunway

diagram						
type	restriction of xs:string					
annotation	documentation runway name e.g., 25R, RWY25R					

element flightPlanCore.Grp/AirportDataList/AirportData/TerminalProcedure

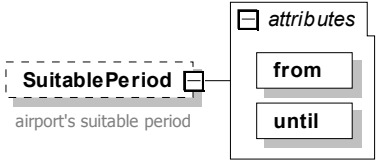
diagram						
type	extension of xs:string					
attributes	Name procedureType	Type derived by: xs:string	Use	Default	Fixed	annotation
annotation	documentation Terminal Procedure Name					

5.0 COMMON ELEMENTS

attribute flightPlanCore.Grp/AirportDataList/AirportData/TerminalProcedure/@procedureType

type	restriction of xs:string

element flightPlanCore.Grp/AirportDataList/AirportData/SuitablePeriod

diagram						
attributes	Name from until	Type xs:dateTime xs:dateTime	Use required required	Default	Fixed	annotation
annotation	documentation airport's suitable period					

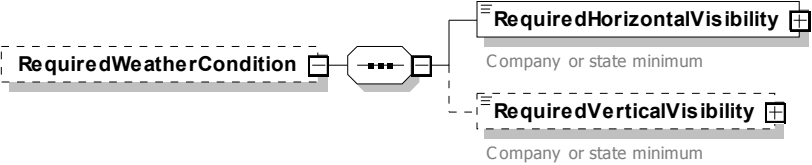
attribute flightPlanCore.Grp/AirportDataList/AirportData/SuitablePeriod/@from

type	xs:dateTime

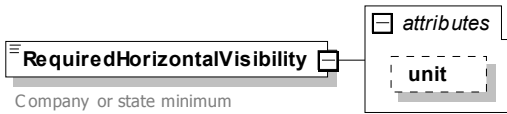
attribute flightPlanCore.Grp/AirportDataList/AirportData/SuitablePeriod/@until

type	xs:dateTime

element flightPlanCore.Grp/AirportDataList/AirportData/RequiredWeatherCondition

diagram						
children	RequiredHorizontalVisibility RequiredVerticalVisibility					

element flightPlanCore.Grp/AirportDataList/AirportData/RequiredWeatherCondition/RequiredHorizontalVisibility

diagram						
type	extension of xs:float					
attributes	Name unit	Type distanceUnitType	Use	Default m	Fixed	Annotation
annotation	documentation Defined Company or State minimum (worst) weather conditions for ceiling and visibility required for takeoff or landing					

5.0 COMMON ELEMENTS

attribute

flightPlanCore.Grp/AirportDataList/AirportData/RequiredWeatherCondition/RequiredHorizontal
Visibility/@unit

type	distanceUnitType	
facets	enumeration	m
	enumeration	km
	enumeration	NM
	enumeration	ft
	enumeration	SM

element

flightPlanCore.Grp/AirportDataList/AirportData/RequiredWeatherCondition/RequiredVertical
Visibility

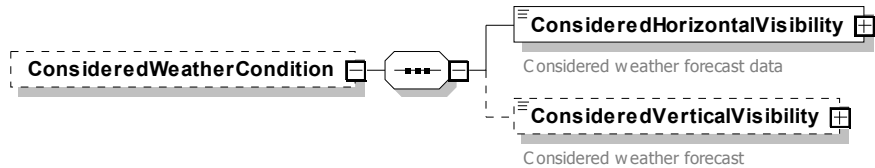
diagram					
type	extension of xs:float				
attributes	Name unit	Type distanceUnitType	Use	Default ft	Fixed annotation
annotation	documentation Defined Company or State minimum (worst) weather conditions for ceiling and visibility required for takeoff or landing				

attribute

flightPlanCore.Grp/AirportDataList/AirportData/RequiredWeatherCondition/RequiredVertical
Visibility/@unit

type	distanceUnitType	
facets	enumeration	m
	enumeration	km
	enumeration	NM
	enumeration	ft
	enumeration	SM

element flightPlanCore.Grp/AirportDataList/AirportData/ConsideredWeatherCondition

diagram					
children	ConsideredHorizontalVisibility ConsideredVerticalVisibility				

element flightPlanCore.Grp/AirportDataList/AirportData/ConsideredWeatherCondition/Considered
HorizontalVisibility

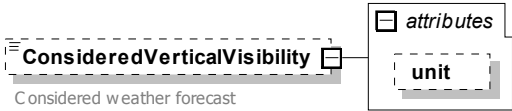
diagram					
type	extension of xs:float				
attributes	Name unit	Type distanceUnitType	Use	Default m	Fixed annotation
annotation	documentation Forecast weather conditions for ceiling and visibility considered for the flight planning				

5.0 COMMON ELEMENTS

attribute
flightPlanCore.Grp/AirportDataList/AirportData/ConsideredWeatherCondition/ConsideredHorizontalVisibility/@unit

type	<u>distanceUnitType</u>	
facets	enumeration	m
	enumeration	km
	enumeration	NM
	enumeration	ft
	enumeration	SM

element
flightPlanCore.Grp/AirportDataList/AirportData/ConsideredWeatherCondition/ConsideredVerticalVisibility

diagram						
type	extension of xs:float					
attributes	Name <u>unit</u>	Type <u>distanceUnitType</u>	Use	Default ft	Fixed	annotation
annotation	documentation Forecast weather conditions for ceiling and visibility considered for the flight planning					

attribute
flightPlanCore.Grp/AirportDataList/AirportData/ConsideredWeatherCondition/ConsideredVerticalVisibility/@unit

type	<u>distanceUnitType</u>	
facets	enumeration	m
	enumeration	km
	enumeration	NM
	enumeration	ft
	enumeration	SM

5.0 COMMON ELEMENTS

5.4.10 ContingencySavingHeader

The structure ContingencySavingHeader contains fuel data related to the routing from DepartureAirport to ContingencySavingAirport (Reclearance/Redispatch airport), a list of Waypoints (from DecisionPoint to ContingencySavingAirport), and a list of ContingencySavingAlternateAirports, but only if ContingencySaving scenario was used for the planning of the flight. The structure uses only the already defined structures: [RouteInformation](#) [FuelHeader](#) [Waypoints](#) [AlternateRoutes](#). As a summary of the most important data related to the ContingencySaving scenario, the structure [DecisionPoint](#) is introduced.

If the Fuel required for the routing to the ContingencySavingAirport is more than the fuel to ArrivalAirport, their difference has to be inserted in [FlightPlan/FuelHeader/ContingencySavingsAdditionalFuel](#) and the [FlightPlan/FuelHeader/TakeOffFuel](#) and [FlightPlan/FuelHeader/BlockFuel](#) have to consider this [FlightPlan/FuelHeader/ContingencySavingsAdditionalFuel](#) as well.

element flightPlanCore.Grp/ContingencySavingHeader

diagram	
children	DecisionPoint RouteInformation FuelHeader Waypoints AlternateRoutes Remarks
annotation	documentation contingency saving definition

5.0 COMMON ELEMENTS

element flightPlanCore.Grp/ContingencySavingHeader/DecisionPoint

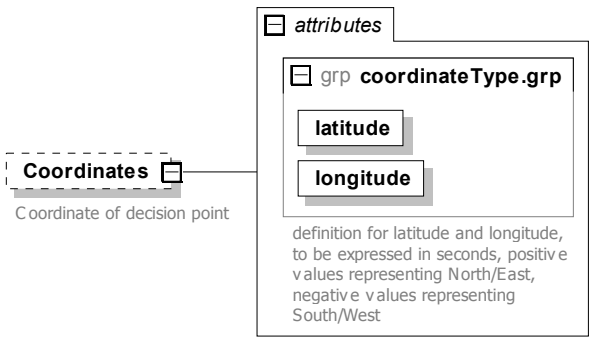
diagram	Name This is the name of the Decision point as displayed to the pilot. Should be name of a way point of /FlightPlan/Way points Coordinates Coordinate of decision point TimeOverDecisionPoint UTC CumulatedFlightTime cumulated time from takeoff ContingencySavingAirport Designates the contingency saving airport. FuelRequiredToArrivalAirport Q uantity of fuel required to go to Arr ival airport when over decision point. (equivalent to Minimum Fuel on board on decision point indicated in nominal flight) FuelRequiredToContingencySav... Q uantity of fuel required to go to contingency saving airport when over decision point. (equivalent to Minimum Fuel on board on decision point indicated in way points branch going to contingency saving airport)
children	Name Coordinates TimeOverDecisionPoint CumulatedFlightTime ContingencySavingAirport FuelRequiredToArrivalAirport FuelRequiredToContingencySavingAirport

element flightPlanCore.Grp/ContingencySavingHeader/DecisionPoint/Name

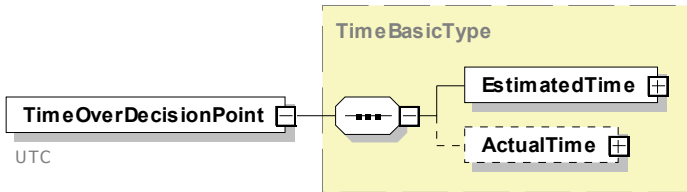
diagram	Name This is the name of the Decision point as displayed to the pilot. Should be name of a way point of /FlightPlan/Way points
type	xs:string
annotation	documentation This is the name of the Decision point as displayed to the pilot. Should be name of a waypoint of /FlightPlan/Waypoints

5.0 COMMON ELEMENTS

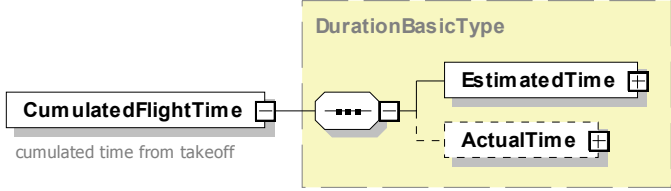
element flightPlanCore.Grp/ContingencySavingHeader/DecisionPoint/Coordinates

diagram						
attributes	Name latitude longitude	Type derived by: xs:float derived by: xs:float	Use required required	Default	Fixed	annotation
annotation	documentation Coordinate of decision point					

element flightPlanCore.Grp/ContingencySavingHeader/DecisionPoint/TimeOverDecisionPoint

diagram						
type	TimeBasicType					
children	EstimatedTime ActualTime					
annotation	documentation UTC					

element flightPlanCore.Grp/ContingencySavingHeader/DecisionPoint/CumulatedFlightTime

diagram						
type	DurationBasicType					
children	EstimatedTime ActualTime					
annotation	documentation cumulated time from takeoff					

5.0 COMMON ELEMENTS

element flightPlanCore.Grp/ContingencySavingHeader/DecisionPoint/ContingencySavingAirport

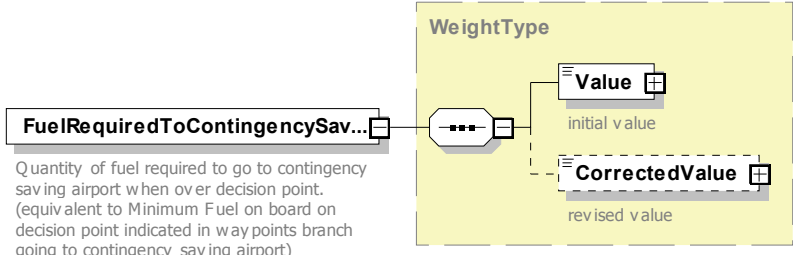
diagram	The diagram shows the structure of the ContingencySavingAirport element. It is connected to a AirportIdentificationType container. Inside this container, there is an attributes block containing airportName (with example: WASHINGTON DULLES INTL) and airportFunction (with examples: DepartureAirport, DestinationAlternate, ContingencySavingsAirport). Additionally, there are two AirportIATACode elements (3 letter airport code) and one AirportCAOCCode element (4 letter airport code). The ContingencySavingAirport element is described as: "Designates the contingency saving airport."					
type	AirportIdentificationType					
children	AirportCAOCCode AirportIATACode AirportIATACode					
attributes	Name	Type	Use	Default	Fixed	annotation
	airportName	derived by: xs:string				documentation airport name e.g., WASHINGTON DULLES INTL
	airportFunction	airportFunctionType				documentation e.g., DepartureAirport, DestinationAlternate, ContingencySavingsAirport
annotation	documentation Designates the contingency saving airport.					

element
flightPlanCore.Grp/ContingencySavingHeader/DecisionPoint/FuelRequiredToArrivalAirport

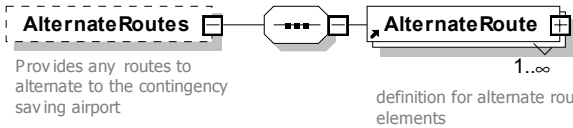
diagram	The diagram shows the structure of the FuelRequiredToArrivalAirport element. It is connected to a WeightType container. Inside this container, there is a Value element (initial value) and a CorrectedValue element (revised value). The FuelRequiredToArrivalAirport element is described as: "Quantity of fuel required to go to Arrival airport when over decision point. (equivalent to Minimum Fuel on board on decision point indicated in nominal flight)"					
type	WeightType					
children	Value CorrectedValue					
annotation	documentation Quantity of fuel required to go to Arrival airport when over decision point. (equivalent to Minimum Fuel on board on decision point indicated in nominal flight)					

5.0 COMMON ELEMENTS

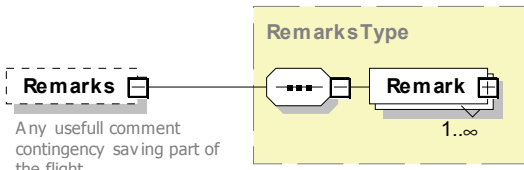
element
flightPlanCore.Grp/ContingencySavingHeader/DecisionPoint/FuelRequiredToContingencySaving
Airport

diagram	 Quantity of fuel required to go to contingency saving airport when over decision point. (equivalent to Minimum Fuel on board on decision point indicated in waypoints branch going to contingency saving airport)
type	WeightType
children	Value CorrectedValue
annotation	documentation Quantity of fuel required to go to contingency saving airport when over decision point. (equivalent to Minimum Fuel on board on decision point indicated in waypoints branch going to contingency saving airport)

element flightPlanCore.Grp/ContingencySavingHeader/AlternateRoutes

diagram	 Provides any routes to alternate to the contingency saving airport definition for alternate route elements
children	AlternateRoute
annotation	documentation Provides any routes to alternate to the contingency saving airport

element flightPlanCore.Grp/ContingencySavingHeader/Remarks

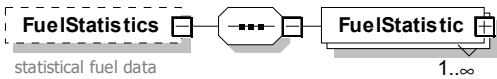
diagram	 Any usefull comment contingency saving part of the flight
type	RemarksType
children	Remark
annotation	documentation Any useful comment contingency saving part of the flight

5.0 COMMON ELEMENTS

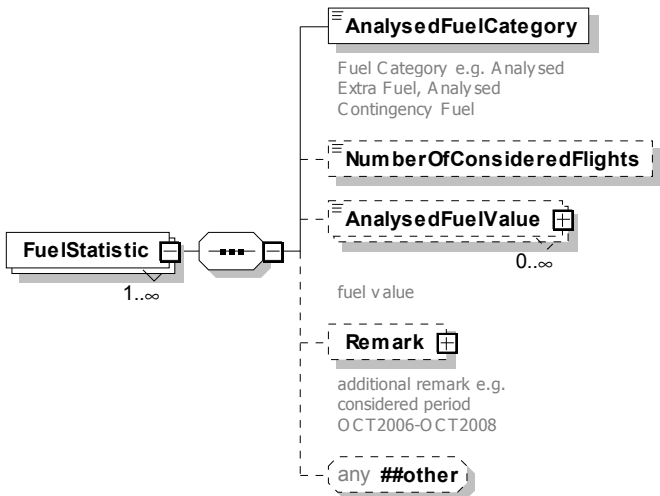
5.4.11 FuelStatistics

The structure FuelStatistics contains a list of statistical information considered for the flight or just as additional information for the pilot.

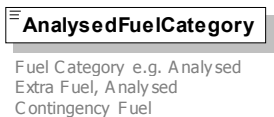
element flightPlanCore.Grp/FuelStatistics

diagram	
children	FuelStatistic
annotation	documentation statistical fuel data

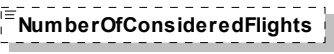
element flightPlanCore.Grp/FuelStatistics/FuelStatistic

diagram	
children	AnalysedFuelCategory NumberOfConsideredFlights AnalysedFuelValue Remark

element flightPlanCore.Grp/FuelStatistics/FuelStatistic/AnalysedFuelCategory

diagram	
type	restriction of xs:string
annotation	documentation Fuel Category e.g., Analysed Extra Fuel, Analysed Contingency Fuel

element flightPlanCore.Grp/FuelStatistics/FuelStatistic/NumberOfConsideredFlights

diagram	
type	xs:nonNegativeInteger

5.0 COMMON ELEMENTS

element flightPlanCore.Grp/FuelStatistics/FuelStatistic/AnalysedFuelValue

diagram						
type	extension of xs:float					
attributes	Name <u>unit</u>	Type <u>weightUnitType</u>	Use optional	Default kg	Fixed	annotation documentation value's unit
	<u>analysedFuelText</u>	derived by: xs:string	optional			documentation value related text e.g., MEAN VALUE
	<u>elapsedTime</u>	xs:duration				documentation corresponding duration
annotation	documentation fuel value					

attribute flightPlanCore.Grp/FuelStatistics/FuelStatistic/AnalysedFuelValue/@unit

type	<u>weightUnitType</u>	
facets	enumeration	kg
	enumeration	t
	enumeration	lb
	enumeration	hlb
annotation	documentation value's unit	

attribute flightPlanCore.Grp/FuelStatistics/FuelStatistic/AnalysedFuelValue/@analysedFuelText

type	restriction of xs:string
annotation	documentation value related text e.g., MEAN VALUE

attribute flightPlanCore.Grp/FuelStatistics/FuelStatistic/AnalysedFuelValue/@elapsedTime

type	xs:duration
annotation	documentation corresponding duration

element flightPlanCore.Grp/FuelStatistics/FuelStatistic/Remark

diagram		
type	<u>TextType</u>	
children	<u>Paragraph</u>	
annotation	documentation additional remark e.g., considered period OCT2006-OCT2008	

5.0 COMMON ELEMENTS

5.4.12 TankeringInfo

The structure TankeringInfo contains data giving advice to the pilot regarding additional fuel for tankering reasons.

element flightPlanCore.Grp/TankeringInfo

diagram	The diagram shows the structure of the TankeringInfo element. It is a container element (rectangle with a small square icon) labeled 'TankeringInfo' with the description 'tankering instructions'. It contains three child elements: TankeringAdvice, TankeringWeight, and TankeringProfit. TankeringAdvice is a simple element (rectangle with a small square icon) with the description 'planned tankering advice e.g. NO TANKERING RECOMMENDED'. TankeringWeight is a simple element (rectangle with a small square icon) with the description 'planned tankering fuel'. TankeringProfit is a simple element (rectangle with a small square icon) with the description 'planned gain/loss based on the tankering instruction'. There is also an 'any ##other' element (rectangle with a small square icon) representing any other child elements.
children	TankeringAdvice TankeringWeight TankeringProfit
annotation	documentation tankering instructions

element flightPlanCore.Grp/TankeringInfo/TankeringAdvice

diagram	attributes reason tankering reason e.g. price, handling, business priority priority of the flight with tankering fuel e.g. Load, Fuel TankeringAdvice planned tankering advice e.g. NO TANKERING RECOMMENDED ... Remark additional remark e.g. BASED ON SECOND LEG																		
children	Remark																		
attributes	<table><tr><th>Name</th><th>Type</th><th>Use</th><th>Default</th><th>Fixed</th><th>annotation</th></tr><tr><td>reason</td><td>derived by: xs:string</td><td></td><td></td><td></td><td>documentation tankering reason e.g., price, handling, business</td></tr><tr><td>priority</td><td>derived by: xs:string</td><td></td><td></td><td></td><td>documentation priority of the flight with tankering fuel e.g., Load, Fuel</td></tr></table>	Name	Type	Use	Default	Fixed	annotation	reason	derived by: xs:string				documentation tankering reason e.g., price, handling, business	priority	derived by: xs:string				documentation priority of the flight with tankering fuel e.g., Load, Fuel
Name	Type	Use	Default	Fixed	annotation														
reason	derived by: xs:string				documentation tankering reason e.g., price, handling, business														
priority	derived by: xs:string				documentation priority of the flight with tankering fuel e.g., Load, Fuel														
annotation	documentation planned tankering advice e.g., NO TANKERING RECOMMENDED																		

5.0 COMMON ELEMENTS

attribute flightPlanCore.Grp/TankeringInfo/TankeringAdvice/@reason

type	restriction of xs:string
annotation	documentation tankering reason e.g., price, handling, business

attribute flightPlanCore.Grp/TankeringInfo/TankeringAdvice/@priority

type	restriction of xs:string
annotation	documentation priority of the flight with tankering fuel e.g., Load, Fuel

element flightPlanCore.Grp/TankeringInfo/TankeringAdvice/Remark

diagram	
type	TextType
children	Paragraph
annotation	documentation additional remark e.g., BASED ON SECOND LEG

element flightPlanCore.Grp/TankeringInfo/TankeringWeight

diagram	
type	WeightType
children	Value CorrectedValue
annotation	documentation planned tankering fuel

element flightPlanCore.Grp/TankeringInfo/TankeringProfit

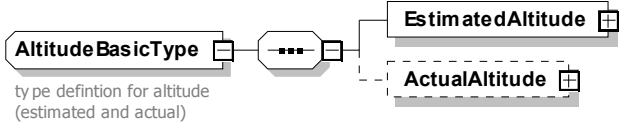
diagram	The diagram shows the structure of the TankeringProfit element. It is a dashed box containing the text "planned gain/loss based on the tankering instruction". To its right is a box labeled "attributes" containing a dashed box labeled "unit". The "unit" box is further connected to a box labeled "TankeringProfit's unit".					
type	extension of xs:string					
attributes	Name <u>unit</u>	Type derived by: xs:string	Use	Default	Fixed	annotation documentation TankeringProfit's unit
annotation	documentation planned gain/loss based on the tankering instruction					

5.0 COMMON ELEMENTS

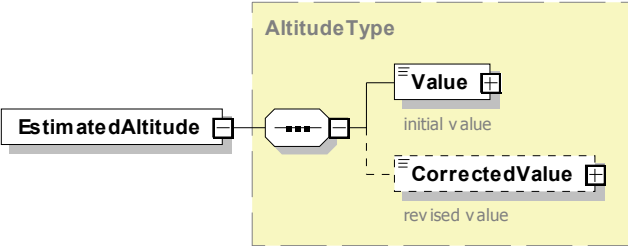
attribute flightPlanCore.Grp/TankeringInfo/TankeringProfit/@unit

type	restriction of xs:string
annotation	documentation TankeringProfit's unit

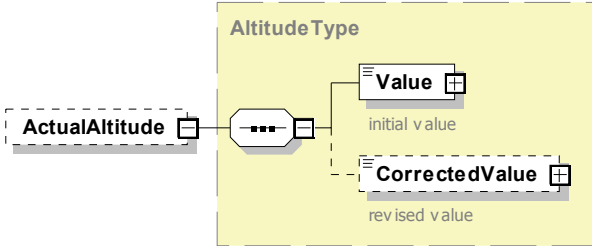
complexType AltitudeBasicType

diagram	
children	EstimatedAltitude ActualAltitude
used by	element waypoint.Grp/Altitude
annotation	documentation type definition for altitude (estimated and actual)

element AltitudeBasicType/EstimatedAltitude

diagram	
type	AltitudeType
children	Value CorrectedValue

element AltitudeBasicType/ActualAltitude

diagram	
type	AltitudeType
children	Value CorrectedValue

5.0 COMMON ELEMENTS

complexType DurationBasicType

diagram	type definition for duration (estimated and actual)
children	EstimatedTime ActualTime
used by	elements flightPlanSummary.Grp/BlockTime flightPlanCore.Grp/ContingencySavingHeader/DecisionPoint/CumulatedFlightTime waypoint.Grp/CumulatedFlightTime flightPlanSummary.Grp/FlightTime waypoint.Grp/RemainingFlightTime flightPlanSummary.Grp/TaxiInTime flightPlanSummary.Grp/TaxiOutTime waypoint.Grp/TimeFromPreviousWaypoint
annotation	documentation type definition for duration (estimated and actual)

element DurationBasicType/EstimatedTime

diagram	initial value revised value
type	DurationType
children	Value CorrectedValue

element DurationBasicType/ActualTime

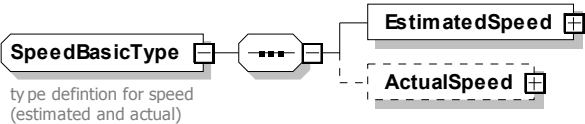
diagram	initial value revised value
type	DurationType
children	Value CorrectedValue

complexType MachNumberBasicType

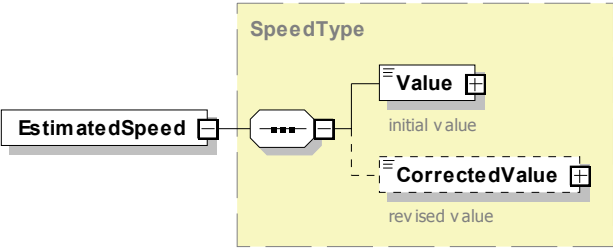
diagram	type definition for mach number (estimated and actual)
children	EstimatedMachNumber ActualMachNumber
used by	element waypoint.Grp/MachNumber
annotation	documentation type definition for mach number (estimated and actual)

5.0 COMMON ELEMENTS

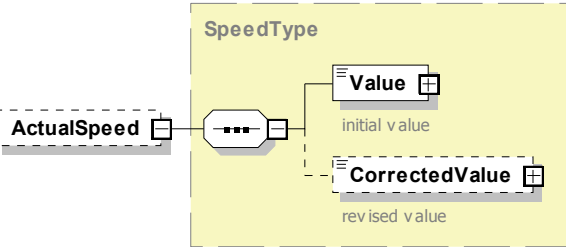
complexType SpeedBasicType

diagram	
children	EstimatedSpeed ActualSpeed
used by	elements waypoint.Grp/GroundSpeed waypoint.Grp/IndicatedAirSpeed waypoint.Grp/TrueAirSpeed
annotation	documentation type definition for speed (estimated and actual)

element SpeedBasicType/EstimatedSpeed

diagram	
type	SpeedType
children	Value CorrectedValue

element SpeedBasicType/ActualSpeed

diagram	
type	SpeedType
children	Value CorrectedValue

5.0 COMMON ELEMENTS

complexType SpeedProcedureType

diagram						
children	CostIndex MachNumber IndicatedAirSpeed TrueAirSpeed					
used by	elements	RouteInformation/ClimbProcedure RouteInformation/CruiseProcedure flightPlanCore.Grp/ETOPSSummary/CriticalPositions/CriticalPosition/SuitableAirport/CruiseProcedure RouteInformation/DescentProcedure				
attributes	Name procedure	Type derived by: xs:string	Use optional	Default	Fixed	annotation documentation procedure name e.g., LRC, ECON, VRBL
annotation	documentation type definition for speed procedure					

attribute SpeedProcedureType/@procedure

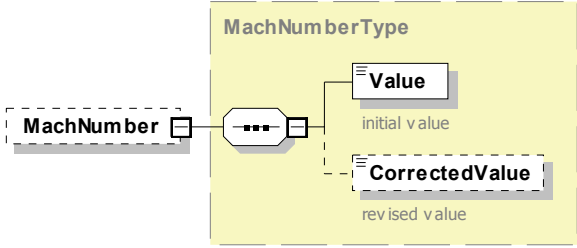
type	restriction of xs:string
annotation	documentation procedure name e.g., LRC, ECON, VRBL

element SpeedProcedureType/CostIndex

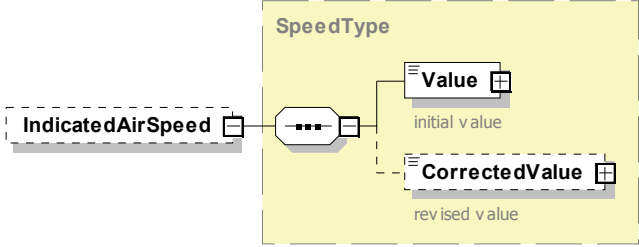
diagram						
type	CostIndexType					
children	Value CorrectedValue					

5.0 COMMON ELEMENTS

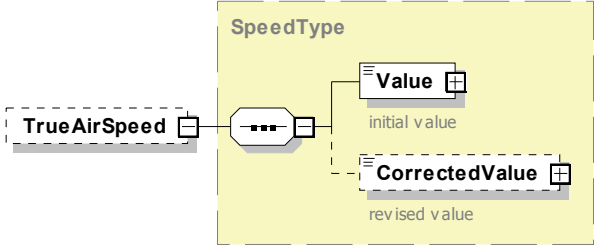
element SpeedProcedureType/MachNumber

diagram	
type	MachNumberType
children	Value CorrectedValue

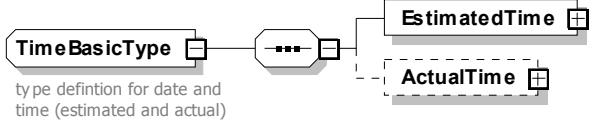
element SpeedProcedureType/IndicatedAirSpeed

diagram	
type	SpeedType
children	Value CorrectedValue

element SpeedProcedureType/TrueAirSpeed

diagram	
type	SpeedType
children	Value CorrectedValue

complexType TimeBasicType

diagram	
children	EstimatedTime ActualTime
used by	elements flightPlanSummary.Grp/InTime flightPlanSummary.Grp/OffTime flightPlanSummary.Grp/OnTime flightPlanSummary.Grp/OutTime flightPlanCore.Grp/ContingencySavingHeader/DecisionPoint/TimeOverDecisionPoint waypoint.Grp/TimeOverWaypoint
annotation	documentation type definition for date and time (estimated and actual)

5.0 COMMON ELEMENTS

element TimeBasicType/EstimatedTime

diagram	
type	TimeType
children	Value CorrectedValue

element TimeBasicType/ActualTime

diagram	
type	TimeType
children	Value CorrectedValue

5.0 COMMON ELEMENTS

5.5 ATC Flight Plan

ICAO has introduced changes to the ICAO model flight plan form and ATS Messages in Amendment 1 to 15th Edition of PANS ATM Doc 4444 which will become applicable as of 15 Nov 2012. Due to this, a number of changes were introduced in the FlightPlanAtclcao structure and definition as well.

Note: In order to keep the correct relationship between different files where the @flightPlanId is used, they have to be the same (e.g., FlightPlanAtclcao/@flightPlanId has to be the same as the one used in FlightPlan/@flightPlanId (only for FlightPlan/@category=“normal”), NOTAMBriefing/@flightPlanId etc.)

element FlightPlanAtclcao

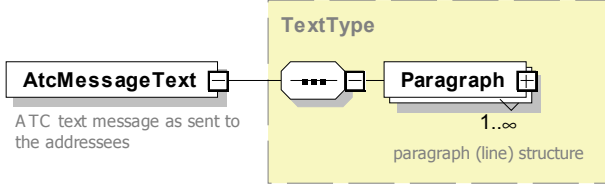
diagram						
children	M633Header M633SupplementaryHeader AtcMessageText AtcMessageDetails AtcMessageDetails					
attributes	Name flightPlanId	Type derived by: xs:string	Use required	Default	Fixed	annotation documentation identifier of the operational flight plan
annotation	documentation ATC ICAO flight plan structure					

attribute FlightPlanAtclcao/@flightPlanId

type	restriction of xs:string
annotation	documentation identifier of the operational flight plan

5.0 COMMON ELEMENTS

element FlightPlanAtclcao/AtcMessageText

diagram	 The diagram shows a box labeled AtcMessageText with the description "ATC text message as sent to the addressees". This box is connected to a dashed-line box labeled TextType. Inside TextType, there is a sequence of elements: an ellipsis (...) followed by a box labeled Paragraph. The Paragraph box has a multiplicity of "1..∞" and the description "paragraph (line) structure".
type	TextType
children	Paragraph
annotation	documentation ATC text message as sent to the addressees

element FlightPlanAtclcao/AtcMessageDetails

diagram	AtcMessageDetailsType attributes messageType e.g. FPL messagePriority e.g. FF + Addressees + + Originator + publisher of the message + AdditionalAddressees + + Items + Items as defined in 15th Edition of the ICAO 4444 document AtcMessageDetails detailed ATC message																		
type	AtcMessageDetailsType																		
children	Addressees Originator AdditionalAddressees Items																		
attributes	<table><tr><th>Name</th><th>Type</th><th>Use</th><th>Default</th><th>Fixed</th><th>annotation</th></tr><tr><td>messageType</td><td>derived by: xs:string</td><td>required</td><td></td><td></td><td>documentation e.g., FPL</td></tr><tr><td>messagePriority</td><td>derived by: xs:string</td><td>required</td><td></td><td></td><td>documentation e.g., FF</td></tr></table>	Name	Type	Use	Default	Fixed	annotation	messageType	derived by: xs:string	required			documentation e.g., FPL	messagePriority	derived by: xs:string	required			documentation e.g., FF
Name	Type	Use	Default	Fixed	annotation														
messageType	derived by: xs:string	required			documentation e.g., FPL														
messagePriority	derived by: xs:string	required			documentation e.g., FF														
annotation	documentation detailed ATC message																		

5.0 COMMON ELEMENTS

element FlightPlanAtclcao/AtcMessageDetails

diagram	The diagram illustrates the structure of the AtcMessageDetails element. It is a container for a AtcMessageDetailsType (highlighted in yellow). This type contains two attributes: messageType (e.g., FPL) and messagePriority (e.g., FF). It also contains a sequence of four child elements: Addressees, Originator (publisher of the message), AdditionalAddressees (indicated by a dashed border), and Items (Items as defined in 15th Edition of the ICAO 4444 document). The AtcMessageDetails element itself is described as a 'detailed ATC message'.					
type	AtcMessageDetailsType					
children	Addressees Originator AdditionalAddressees Items					
attributes	Name	Type	Use	Default	Fixed	annotation
	messageType	derived by: xs:string	required			documentation e.g., FPL
	messagePriority	derived by: xs:string	required			documentation e.g., FF
annotation	documentation detailed ATC message					

complexType AtcMessageDetailsType

diagram	The diagram illustrates the structure of the AtcMessageDetailsType complex type. It contains two attributes: messageType (e.g., FPL) and messagePriority (e.g., FF). It also contains a sequence of four child elements: Addressees, Originator (publisher of the message), AdditionalAddressees (indicated by a dashed border), and Items (Items as defined in 15th Edition of the ICAO 4444 document). The AtcMessageDetailsType is described as a 'detailed ATC ICAO message structure'.					
children	Addressees Originator AdditionalAddressees Items					
used by	elements	FlightPlanAtclcao/AtcMessageDetails FlightPlanAtclcao/AtcMessageDetails				

5.0 COMMON ELEMENTS

attributes	Name messageType messagePriority	Type derived by: xs:string derived by: xs:string	Use required required	Default	Fixed	annotation documentation e.g., FPL documentation e.g., FF
annotation	documentation detailed ATC ICAO message structure					

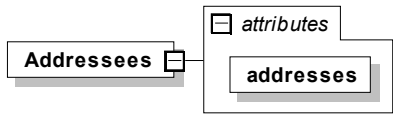
attribute [AtcMessageDetailsType/@messageType](#)

type	restriction of xs:string
annotation	documentation e.g., FPL

attribute [AtcMessageDetailsType/@messagePriority](#)

type	restriction of xs:string
annotation	documentation e.g., FF

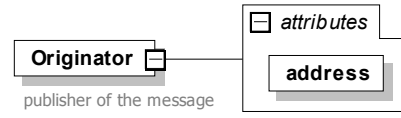
element [AtcMessageDetailsType/Addressees](#)

diagram						
attributes	Name addresses	Type derived by: xs:string	Use required	Default	Fixed	annotation

attribute [AtcMessageDetailsType/Addressees/@addresses](#)

type	restriction of xs:string

element [AtcMessageDetailsType/Originator](#)

diagram						
attributes	Name address	Type derived by: xs:string	Use required	Default	Fixed	annotation
annotation	documentation publisher of the message					

attribute [AtcMessageDetailsType/Originator/@address](#)

type	restriction of xs:string

element [AtcMessageDetailsType/AdditionalAddressees](#)

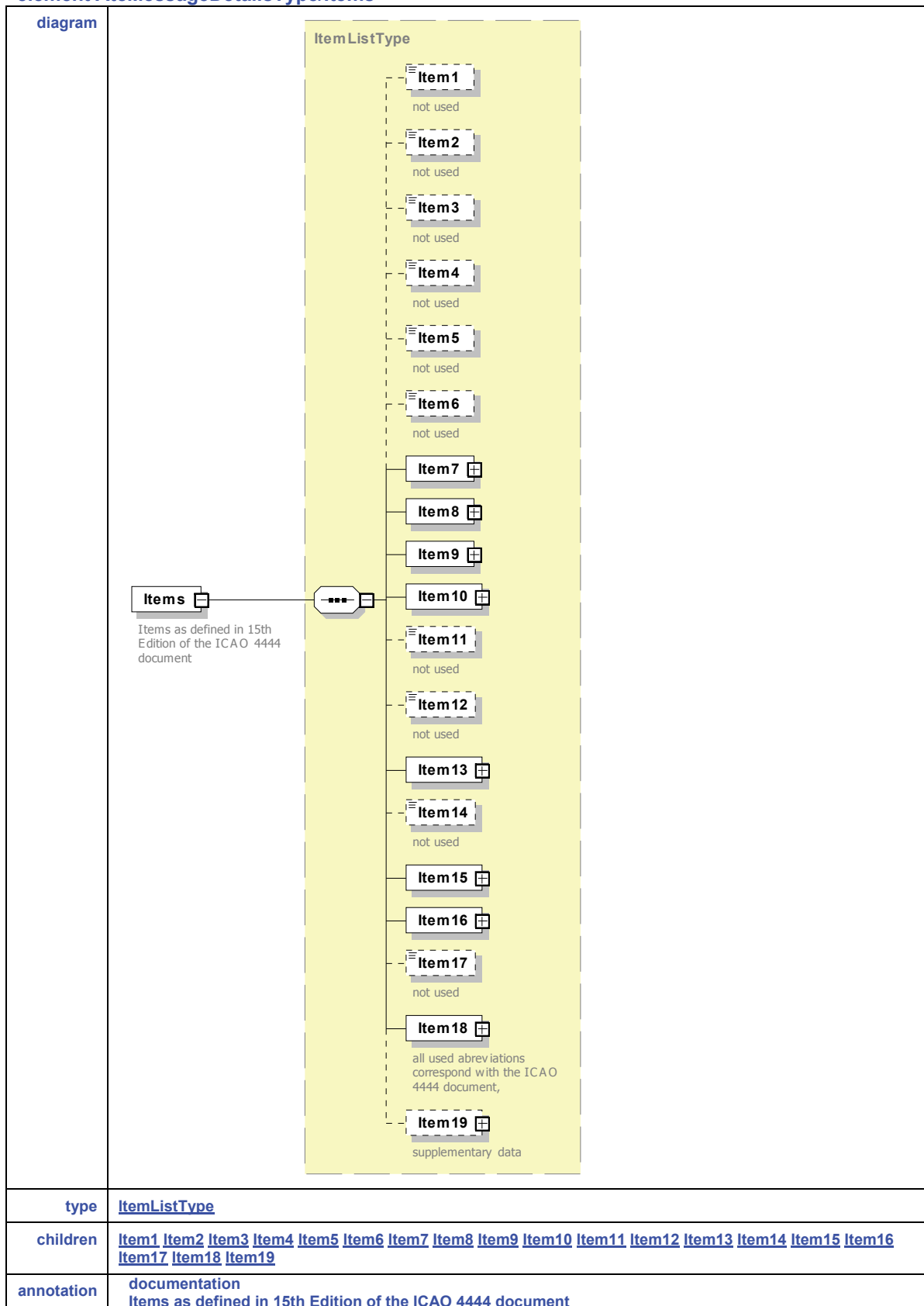
diagram						
attributes	Name addresses	Type derived by: xs:string	Use required	Default	Fixed	annotation

attribute [AtcMessageDetailsType/AdditionalAddressees/@addresses](#)

type	restriction of xs:string

5.0 COMMON ELEMENTS

element AtcMessageDetailsType/Items



5.0 COMMON ELEMENTS

complexType ItemListType

diagram	
children	Item1 Item2 Item3 Item4 Item5 Item6 Item7 Item8 Item9 Item10 Item11 Item12 Item13 Item14 Item15 Item16 Item17 Item18 Item19
used by	element AtcMessageDetailsType/Items
annotation	documentation items definitions

5.0 COMMON ELEMENTS

element ItemListType/Item1

diagram	
annotation	documentation not used

element ItemListType/Item2

diagram	
annotation	documentation not used

element ItemListType/Item3

diagram	
annotation	documentation not used

element ItemListType/Item4

diagram	
annotation	documentation not used

element ItemListType/Item5

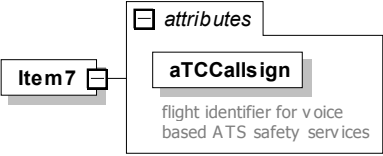
diagram	
annotation	documentation not used

element ItemListType/Item6

diagram	
annotation	documentation not used

5.0 COMMON ELEMENTS

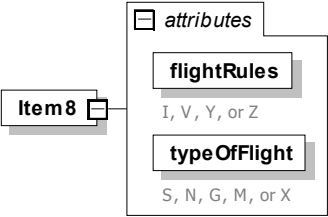
element ItemListType/Item7

diagram						
attributes	Name aTCCallsign	Type derived by: xs:string	Use required	Default	Fixed	annotation documentation flight identifier for voice based ATS safety services

attribute ItemListType/Item7/@aTCCallsign

type	restriction of xs:string
annotation	documentation flight identifier for voice based ATS safety services

element ItemListType/Item8

diagram						
attributes	Name flightRules typeOfFlight	Type derived by: xs:string derived by: xs:string	Use required required	Default	Fixed	annotation documentation I, V, Y, or Z documentation S, N, G, M, or X

attribute ItemListType/Item8/@flightRules

type	restriction of xs:string
annotation	documentation I, V, Y, or Z

attribute ItemListType/Item8/@typeOfFlight

type	restriction of xs:string
annotation	documentation S, N, G, M, or X

5.0 COMMON ELEMENTS

element ItemListType/Item9

diagram						
attributes	Name numberOfAircraft	Type derived by: xs:string	Use optional	Default	Fixed	annotation
	typeOfAircraft	derived by: xs:string	required			documentation e.g., B744
	wakeTurbulence	derived by: xs:string	required			documentation H, M, or L

attribute ItemListType/Item9/@numberOfAircraft

type	restriction of xs:string

attribute ItemListType/Item9/@typeOfAircraft

type	restriction of xs:string
annotation	documentation e.g., B744

attribute ItemListType/Item9/@wakeTurbulence

type	restriction of xs:string
annotation	documentation H, M, or L

element ItemListType/Item10

diagram						
attributes	Name aircraftEquipment	Type derived by: xs:string	Use required	Default	Fixed	annotation

attribute ItemListType/Item10/@aircraftEquipment

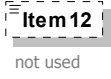
type	restriction of xs:string

element ItemListType/Item11

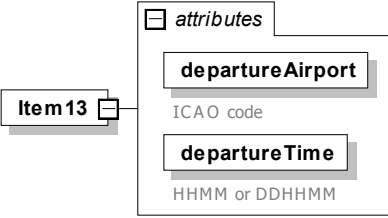
diagram						
annotation	documentation not used					

5.0 COMMON ELEMENTS

element ItemListType/Item12

diagram	
annotation	documentation not used

element ItemListType/Item13

diagram						
attributes	Name departureAirport	Type AirportICAOCodeType	Use required	Default	Fixed	annotation documentation ICA O code
	departureTime	derived by: xs:string	required			documentation HHMM or DDHHMM

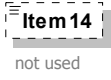
attribute ItemListType/Item13/@departureAirport

type	AirportICAOCodeType
annotation	documentation ICA O code

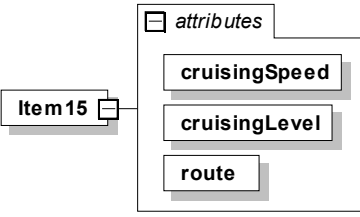
attribute ItemListType/Item13/@departureTime

type	restriction of xs:string
annotation	documentation HHMM or DDHHMM

element ItemListType/Item14

diagram	
annotation	documentation not used

element ItemListType/Item15

diagram						
attributes	Name cruisingSpeed	Type derived by: xs:string	Use required	Default	Fixed	annotation
	cruisingLevel	derived by: xs:string	required			
	route	derived by: xs:string	required			

5.0 COMMON ELEMENTS

attribute ItemListType/Item15/@cruisingSpeed

type	restriction of xs:string

attribute ItemListType/Item15/@cruisingLevel

type	restriction of xs:string

attribute ItemListType/Item15/@route

type	restriction of xs:string

element ItemListType/Item16

diagram						
attributes	<u>Name</u>	<u>Type</u>	<u>Use</u>	<u>Default</u>	<u>Fixed</u>	<u>annotation</u>
	<u>arrivalAirport</u>	<u>AirportICAOCodeType</u>	required			documentation ICAO code
	<u>estimatedFlightTime</u>	derived by: xs:string	required			documentation HHMM
	<u>alternateAirport</u>	<u>AirportICAOCodeType</u>	optional			documentation ICAO code
	<u>secondAlternateAirport</u>	<u>AirportICAOCodeType</u>	optional			documentation ICAO code

attribute ItemListType/Item16/@arrivalAirport

type	<u>AirportICAOCodeType</u>
annotation	documentation ICAO code

attribute ItemListType/Item16/@estimatedFlightTime

type	restriction of xs:string
annotation	documentation HHMM

attribute ItemListType/Item16/@alternateAirport

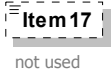
type	<u>AirportICAOCodeType</u>
annotation	documentation ICAO code

5.0 COMMON ELEMENTS

attribute ItemListType/Item16/@secondAlternateAirport

type	AirportICAOCodeType
annotation	documentation ICAO code

element ItemListType/Item17

diagram	 not used
annotation	documentation not used

5.0 COMMON ELEMENTS

element ItemListType/Item18

diagram	The diagram illustrates the structure of the Item18 element. It features a central box labeled 'Item 18' connected to a vertical list of abbreviations: STS, PBN, NAV, COM, DAT, SUR, DEP, DEST, DOF, REG, EET, SEL, TYP, CODE, DLE, OPR, ORGN, PER, ALTN, RALTN, TALT, RIF, RVR, and RMK. Above this list is a box labeled 'otherInformation' with a dashed border. A legend at the top left shows a box icon labeled 'attributes'.					
children	STS PBN NAV COM DAT SUR DEP DEST DOF REG EET SEL TYP CODE DLE OPR ORGN PER ALTN RALTN TALT RIF RVR RMK					
attributes	Name otherInformation	Type derived by: xs:string	Use optional	Default	Fixed	annotation
annotation	documentation all used abbreviations correspond with the ICAO 4444 document,					

5.0 COMMON ELEMENTS

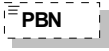
attribute ItemListType/Item18/@otherInformation

type	restriction of xs:string

element ItemListType/Item18/STS

diagram	 Reason for special handling by ATS, e.g. a search and rescue mission
type	restriction of xs:string
annotation	documentation Reason for special handling by ATS, e.g., a search and rescue mission

element ItemListType/Item18/PBN

diagram	 Indication of RNAV and/or RNP capabilities. Include as many of the descriptors below, as apply to the flight, up to a maximum of 8 entries, i.e. a total of not more than 16 characters.
type	restriction of xs:string
annotation	documentation Indication of RNAV and/or RNP capabilities. Include as many of the descriptors below, as apply to the flight, up to a maximum of 8 entries, i.e., a total of not more than 16 characters.

element ItemListType/Item18/NAV

diagram	 Significant data related to navigation equipment, other than specified in PBN/, as required by the appropriate ATS authority. Indicate GNSS augmentation under this indicator, with a space between two or more methods of augmentation, e.g. NAV/GBAS SBAS.
type	restriction of xs:string
annotation	documentation Significant data related to navigation equipment, other than specified in PBN/, as required by the appropriate ATS authority. Indicate GNSS augmentation under this indicator, with a space between two or more methods of augmentation, e.g., NAV/GBAS SBAS.

element ItemListType/Item18/COM

diagram	 Indicate communications applications or capabilities not specified in Item 10a.
type	restriction of xs:string
annotation	documentation Indicate communications applications or capabilities not specified in Item 10a.

5.0 COMMON ELEMENTS

element ItemListType/Item18/DAT

diagram	 Indicate data applications or capabilities not specified in 10a.
type	restriction of xs:string
annotation	documentation Indicate data applications or capabilities not specified in 10a.

element ItemListType/Item18/SUR

diagram	 Include surveillance applications or capabilities not specified in Item 10b.
type	restriction of xs:string
annotation	documentation Include surveillance applications or capabilities not specified in Item 10b.

element ItemListType/Item18/DEP

diagram	 Name and location of departure aerodrome, if ZZZZ is inserted in Item 13, or the ATS unit from which supplementary flight plan data can be obtained, if AFIL is inserted in Item 13, OR, bearing and distance from the nearest significant point, OR, The first point of the route or the marker radio beacon, if the aircraft has not taken off from an aerodrome.
type	restriction of xs:string
annotation	documentation Name and location of departure aerodrome, if ZZZZ is inserted in Item 13, or the ATS unit from which supplementary flight plan data can be obtained, if AFIL is inserted in Item 13, OR, bearing and distance from the nearest significant point, OR, The first point of the route or the marker radio beacon, if the aircraft has not taken off from an aerodrome.

element ItemListType/Item18/DEST

diagram	 Name and location of destination aerodrome, if ZZZZ is inserted in Item 16. For aerodromes not listed in the relevant Aeronautical Information Publication, indicate location in LAT/LONG or bearing and distance from the nearest significant point, as described under DEP/ above.
type	restriction of xs:string
annotation	documentation Name and location of destination aerodrome, if ZZZZ is inserted in Item 16. For aerodromes not listed in the relevant Aeronautical Information Publication, indicate location in LAT/LONG or bearing and distance from the nearest significant point, as described under DEP/ above.

5.0 COMMON ELEMENTS

element ItemListType/Item18/DOF

diagram	 The date of flight departure in a six figure format.
type	restriction of xs:string
annotation	documentation The date of flight departure in a six figure format.

element ItemListType/Item18/REG

diagram	 The nationality or common mark and registration mark of the aircraft, if different from the aircraft identification in Item 7.
type	restriction of xs:string
annotation	documentation The nationality or common mark and registration mark of the aircraft, if different from the aircraft identification in Item 7.

element ItemListType/Item18/EET

diagram	 Significant points or FIR boundary designators and accumulated estimated elapsed times from take-off to such points or FIR boundaries, when so prescribed on the basis of regional air navigation agreements, or by the appropriate ATS authority.
type	restriction of xs:string
annotation	documentation Significant points or FIR boundary designators and accumulated estimated elapsed times from take-off to such points or FIR boundaries, when so prescribed on the basis of regional air navigation agreements, or by the appropriate ATS authority.

element ItemListType/Item18/SEL

diagram	 SELCAL Code, for aircraft so equipped.
type	restriction of xs:string
annotation	documentation SELCAL Code, for aircraft so equipped.

5.0 COMMON ELEMENTS

element ItemListType/Item18/TYP

diagram	 Type(s) of aircraft, preceded if necessary without a space by number(s) of aircraft and separated by one space, if ZZZZ is inserted in Item 9.
type	restriction of xs:string
annotation	documentation Type(s) of aircraft, preceded if necessary without a space by number(s) of aircraft and separated by one space, if ZZZZ is inserted in Item 9.

element ItemListType/Item18/CODE

diagram	 Aircraft address (expressed in the form of an alphanumerical code of six hexadecimal characters) when required by the appropriate ATS authority.
type	restriction of xs:string
annotation	documentation Aircraft address (expressed in the form of an alphanumerical code of six hexadecimal characters) when required by the appropriate ATS authority.

element ItemListType/Item18/DLE

diagram	 Enroute delay or holding, insert the significant point(s) on the route where a delay is planned to occur, followed by the length of delay using four figure time in hours and minutes
type	restriction of xs:string
annotation	documentation Enroute delay or holding, insert the significant point(s) on the route where a delay is planned to occur, followed by the length of delay using four figure time in hours and minutes

element ItemListType/Item18/OPR

diagram	 ICAO designator or name of the aircraft operating agency, if different from the aircraft identification in item 7.
type	restriction of xs:string
annotation	documentation ICAO designator or name of the aircraft operating agency, if different from the aircraft identification in item 7.

5.0 COMMON ELEMENTS

element ItemListType/Item18/ORGN

diagram	 The originator's 8 letter AFTN address or other appropriate contact details, in cases where the originator of the flight plan may not be readily identified, as required by the appropriate ATS authority.
type	restriction of xs:string
annotation	documentation The originator's 8 letter AFTN address or other appropriate contact details, in cases where the originator of the flight plan may not be readily identified, as required by the appropriate ATS authority.

element ItemListType/Item18/PER

diagram	 Aircraft performance data, indicated by a single letter as specified in the Procedures for Air Navigation Services — Aircraft Operations, if so prescribed by the appropriate ATS authority.
type	restriction of xs:string
annotation	documentation Aircraft performance data, indicated by a single letter as specified in the Procedures for Air Navigation Services — Aircraft Operations, if so prescribed by the appropriate ATS authority.

element ItemListType/Item18/ALTN

diagram	 Name of destination alternate aerodrome(s), if ZZZZ is inserted in Item 16. For aerodromes not listed in the relevant Aeronautical Information Publication, indicate location in LAT/LONG or bearing and distance from the nearest significant point, as described in DEP/ above.
type	restriction of xs:string
annotation	documentation Name of destination alternate aerodrome(s), if ZZZZ is inserted in Item 16. For aerodromes not listed in the relevant Aeronautical Information Publication, indicate location in LAT/LONG or bearing and distance from the nearest significant point, as described in DEP/ above.

5.0 COMMON ELEMENTS

element ItemListType/Item18/RALTN

diagram	 ICAO four letter indicator(s) for en-route alternate(s), as specified in Doc 7910, Location Indicators, or name(s) of en-route alternate aerodrome(s), if no indicator is allocated. For aerodromes not listed in the relevant Aeronautical Information Publication, indicate location in LAT/LO NG or bearing and distance from the nearest significant point, as described in DEP/ above.
type	restriction of xs:string
annotation	documentation ICAO four letter indicator(s) for en-route alternate(s), as specified in Doc 7910, Location Indicators, or name(s) of en-route alternate aerodrome(s), if no indicator is allocated. For aerodromes not listed in the relevant Aeronautical Information Publication, indicate location in LAT/LONG or bearing and distance from the nearest significant point, as described in DEP/ above.

element ItemListType/Item18/TALT

diagram	 ICAO four letter indicator(s) for take-off alternate, as specified in Doc 7910, Location Indicators, or name of take-off alternate aerodrome, if no indicator is allocated. For aerodromes not listed in the relevant Aeronautical Information Publication, indicate location in LAT/LO NG or bearing and distance from the nearest significant point, as described in DEP/ above.
type	restriction of xs:string
annotation	documentation ICAO four letter indicator(s) for take-off alternate, as specified in Doc 7910, Location Indicators, or name of take-off alternate aerodrome, if no indicator is allocated. For aerodromes not listed in the relevant Aeronautical Information Publication, indicate location in LAT/LONG or bearing and distance from the nearest significant point, as described in DEP/ above.

element ItemListType/Item18/RIF

diagram	 The route details to the revised destination aerodrome, following by the ICAO four-letter location indicator of the aerodrome. The revised route is subject to reclearance in flight.
type	restriction of xs:string
annotation	documentation The route details to the revised destination aerodrome, following by the ICAO four-letter location indicator of the aerodrome. The revised route is subject to reclearance in flight.

5.0 COMMON ELEMENTS

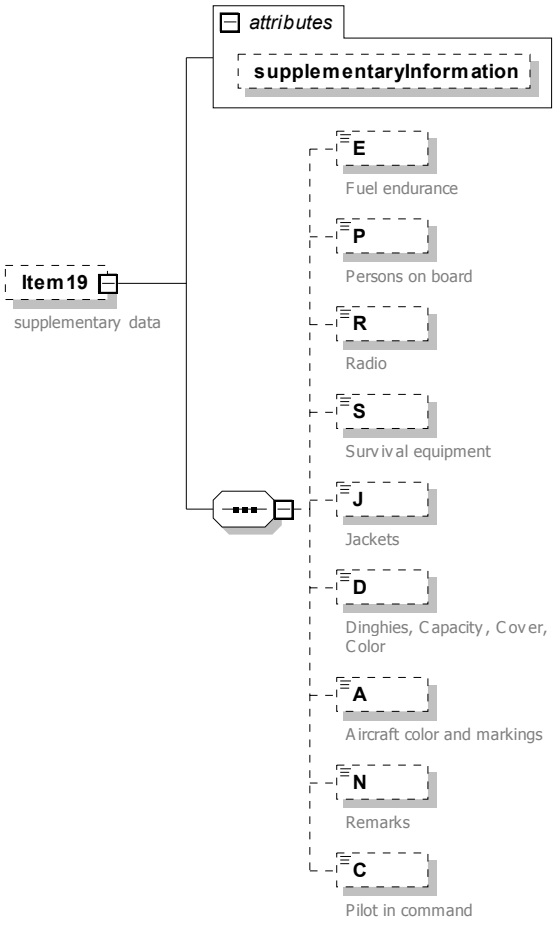
element ItemListType/Item18/RVR

diagram	
type	restriction of xs:string

element ItemListType/Item18/RMK

diagram	 Any other plain language remarks when required by the appropriate ATS authority or deemed necessary.
type	restriction of xs:string
annotation	documentation Any other plain language remarks when required by the appropriate ATS authority or deemed necessary.

element ItemListType/Item19

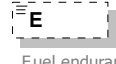
diagram						
children	<u>E P R S J D A N C</u>					
attributes	Name <u>supplementaryInformation</u>	Type derived by: xs:string	Use optional	Default	Fixed	annotation
annotation	documentation supplementary data					

5.0 COMMON ELEMENTS

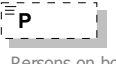
attribute ItemListType/Item19/@supplementaryInformation

type	restriction of xs:string

element ItemListType/Item19/E

diagram	
type	restriction of xs:string
annotation	documentation Fuel endurance

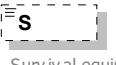
element ItemListType/Item19/P

diagram	
type	restriction of xs:string
annotation	documentation Persons on board

element ItemListType/Item19/R

diagram	
type	restriction of xs:string
annotation	documentation Radio

element ItemListType/Item19/S

diagram	
type	restriction of xs:string
annotation	documentation Survival equipment

element ItemListType/Item19/J

diagram	
type	restriction of xs:string
annotation	documentation Jackets

5.0 COMMON ELEMENTS

element ItemListType/Item19/D

diagram	 Dinghies, Capacity, Cover, Color
type	restriction of xs:string
annotation	documentation Dinghies, Capacity, Cover, Color

element ItemListType/Item19/A

diagram	 Aircraft color and markings
type	restriction of xs:string
annotation	documentation Aircraft color and markings

element ItemListType/Item19/N

diagram	 Remarks
type	restriction of xs:string
annotation	documentation Remarks

element ItemListType/Item19/C

diagram	 Pilot in command
type	restriction of xs:string
annotation	documentation Pilot in command

5.0 COMMON ELEMENTS

5.6 Airport Weather

The following structure and definitions are to be used for METAR and TAF digital data.

In order to preserve the original text structure of the METAR and TAF messages, it is recommended to use only non-proportional font for display.

element AirportWeather

diagram						
children	M633Header M633SupplementaryHeader WeatherBulletins					
attributes	Name	Type	Use	Default	Fixed	annotation
	creationTime	xs:dateTime	required			documentation The date and time the briefing was created
	fullPackage	xs:boolean	required			documentation This attributes states if the airport weather briefing is full - all necessary info for the flight - or an update - complementary information or updated information only.
annotation	documentation AirportWeather root element					

attribute AirportWeather/@creationTime

type	xs:dateTime
annotation	documentation The date and time the briefing was created

5.0 COMMON ELEMENTS

attribute AirportWeather/@fullPackage

type	xs:boolean
annotation	documentation This attributes states if the airport weather briefing is full - all necessary info for the flight - or an update - complementary information or updated information only.

element AirportWeather/WeatherBulletins

diagram	
children	WeatherBulletin

element AirportWeather/WeatherBulletins/WeatherBulletin

diagram						
children	Airport Observation Forecast					
attributes	<u>Name</u> <u>source</u>	Type derived by: xs:string	Use	Default	Fixed	annotation documentation name of the source of information documentation Provide best order to display information to crew. Typically ordered along the flight.
	<u>sequence</u>	xs:nonNegativeInteger				

5.0 COMMON ELEMENTS

element [AirportWeather/WeatherBulletins/WeatherBulletin/Observation](#)

diagram	Observation airport weather observation element attributes grp observationGroup observationTime release time of observation bulletin observationType METAR or SPECI defines observation type (METAR or SPECI) and time of observation ObservationDetails detailed information for the airport weather observation ObservationText airport weather observation as text description (raw METAR)					
children	ObservationDetails ObservationText					
attributes	Name observationTime	Type xs:dateTime	Use required	Default	Fixed	annotation documentation release time of observation bulletin
	observationType	derived by: xs:string	required			documentation documentation METAR or SPECI
annotation	documentation airport weather observation element					

5.0 COMMON ELEMENTS

element AirportWeather/WeatherBulletins/WeatherBulletin/Observation/ObservationDetails

diagram	ObservationDetailsType (extension) - SurfaceWinds - VisibilitiesAndWeather - visibility, cloud and weather description - RunwayVisualRanges - Temperatures - temperature description - Pressures - atmospheric pressure, if expressed globally per airport - SupplementaryInformation - supplementary weather information - Trend - weather change description - any ##other ObservationDetails - detailed information for the airport weather observation
type	extension of ObservationDetailsType
children	SurfaceWinds VisibilitiesAndWeather RunwayVisualRanges Temperatures Pressures SupplementaryInformation Trend
annotation	documentation detailed information for the airport weather observation

element AirportWeather/WeatherBulletins/WeatherBulletin/Observation/ObservationText

diagram	TextType (extension) - Paragraph - paragraph (line) structure ObservationText - airport weather observation as text description (raw METAR)
type	extension of TextType
children	Paragraph
annotation	documentation airport weather observation as text description (raw METAR)

5.0 COMMON ELEMENTS

element AirportWeather/WeatherBulletins/WeatherBulletin/Forecast

diagram	Forecast airport weather forecast element attributes grp forecastGroup forecastTime time when forecast was established forecastType FT or FC forecastStartTime start of validity period of forecast forecastEndTime end of validity period of forecast defines forecast type (FC or FT), time of forecast as well as validity time for the forecast ForecastDetails detailed information for the airport weather forecast ForecastText airport weather forecast as text description (raw TAF)					
children	ForecastDetailsForecastText					
attributes	Name forecastTime	Type xs:dateTime	Use required	Default	Fixed	annotation documentation time when forecast was established documentation FT or FC documentation start of validity period of forecast documentation end of validity period of forecast
	forecastType	derived by: xs:string	required			
	forecastStartTime	xs:dateTime	required			
	forecastEndTime	xs:dateTime	required			
annotation	documentation airport weather forecast element					

element AirportWeather/WeatherBulletins/WeatherBulletin/Forecast/ForecastDetails

diagram	
type	ForecastDetailsType

5.0 COMMON ELEMENTS

children	ForecastGeneral WeatherChanges
annotation	documentation detailed information for the airport weather forecast

element [AirportWeather/WeatherBulletins/WeatherBulletin/Forecast/ForecastText](#)

diagram	The diagram shows the ForecastText element (dashed box) containing an extension of TextType (yellow box). Inside the extension, there is a sequence of an ellipsis (...) and a Paragraph element (1..∞). The ForecastText is annotated with "airport weather forecast as text description (raw TAF)". The Paragraph is annotated with "paragraph (line) structure".
type	extension of TextType
children	Paragraph
annotation	documentation airport weather forecast as text description (raw TAF)

complexType [ForecastDetailsType](#)

diagram	The diagram shows the ForecastDetailsType complex type (rounded rectangle) containing a sequence of an ellipsis (...) and a choice of ForecastGeneral, WeatherChanges, and any ##other.
children	ForecastGeneral WeatherChanges
used by	element AirportWeather/WeatherBulletins/WeatherBulletin/Forecast/ForecastDetails

element [ForecastDetailsType/ForecastGeneral](#)

diagram	The diagram shows the ForecastGeneral element (rounded rectangle) containing an attributes box with a probability attribute (dashed box) and a choice of SurfaceWind, VisibilitiesAndWeather, and Temperatures. The probability attribute is annotated with "probability indication for the reported weather". SurfaceWind is annotated with "wind description". VisibilitiesAndWeather is annotated with "visibility, cloud and weather description".												
children	SurfaceWind VisibilitiesAndWeather Temperatures												
attributes	<table><tr><th>Name</th><th>Type</th><th>Use</th><th>Default</th><th>Fixed</th><th>annotation</th></tr><tr><td>probability</td><td>probabilityType</td><td></td><td></td><td></td><td>documentation probability indication for the reported weather</td></tr></table>	Name	Type	Use	Default	Fixed	annotation	probability	probabilityType				documentation probability indication for the reported weather
Name	Type	Use	Default	Fixed	annotation								
probability	probabilityType				documentation probability indication for the reported weather								

5.0 COMMON ELEMENTS

attribute ForecastDetailsType/ForecastGeneral/@probability

type	probabilityType
facets	enumeration 30 enumeration 40
annotation	documentation probability indication for the reported weather

element ForecastDetailsType/ForecastGeneral/SurfaceWind

diagram						
type	SurfaceWindType					
children	Directions Speeds					
attributes	Name runwayIdentifier	Type derived by: xs:string	Use	Default	Fixed	annotation documentation runway identifier in case runway specific wind data will be provided
annotation	documentation wind description					

5.0 COMMON ELEMENTS

element ForecastDetailsType/ForecastGeneral/VisibilitiesAndWeather

diagram	VisibilitiesAndWeatherType VisibilitiesAndWeather visibility, cloud and weather description CeilingAndVisibilityOK CAVOK to be used in case visibility is greater than 10km and no clouds below 5000ft (or below highest MSA respectively) and no CB and no weather Visibilities horizontal visibility Clouds clouds and vertical visibility NilSignificantWeather NSW or NOSIG Weather weather description and type, e.g. BLSN for blowing snow, FZFG for freezing fog 1..∞
type	VisibilitiesAndWeatherType
children	CeilingAndVisibilityOK Visibilities Clouds NilSignificantWeather Weather
annotation	documentation visibility, cloud and weather description

element ForecastDetailsType/ForecastGeneral/Temperatures

diagram	Temperatures temperature description 1..∞
children	Temperature

5.0 COMMON ELEMENTS

element [ForecastDetailsType/ForecastGeneral/Temperatures/Temperature](#)

diagram						
type	extension of TemperatureType					
children	Value CorrectedValue					
attributes	Name	Type	Use	Default	Fixed	annotation
	forecastTime	xs:dateTime				documentation temperature forecast time
	maximumMinimumTemperature	derived by: xs:string				documentation to be used in order to indicate if the forecasted temperature is a minimum or a maximum temperature during the validity of the forecast
annotation	documentation temperature description					

attribute [ForecastDetailsType/ForecastGeneral/Temperatures/Temperature/@forecastTime](#)

type	xs:dateTime
annotation	documentation temperature forecast time

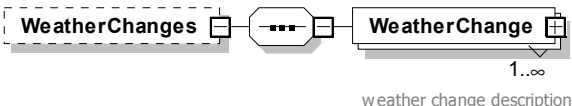
attribute

[ForecastDetailsType/ForecastGeneral/Temperatures/Temperature/@maximumMinimumTemperature](#)

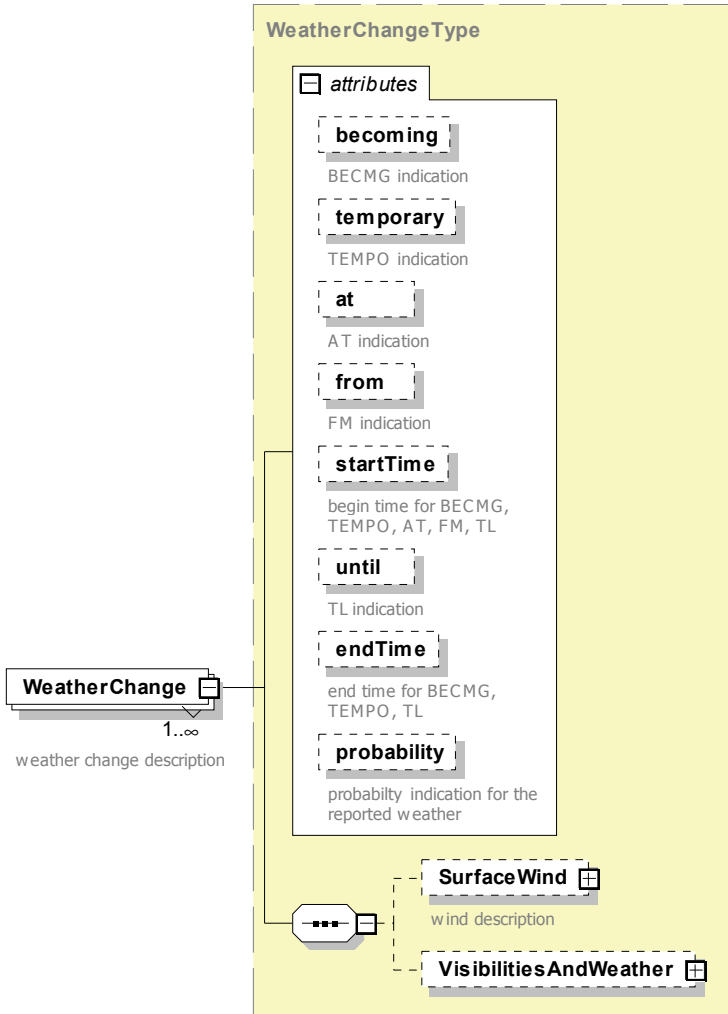
type	restriction of xs:string
facets	enumeration maximum enumeration minimum
annotation	documentation to be used in order to indicate if the forecasted temperature is a minimum or a maximum temperature during the validity of the forecast

5.0 COMMON ELEMENTS

element ForecastDetailsType/WeatherChanges

diagram	 weather change description
children	WeatherChange

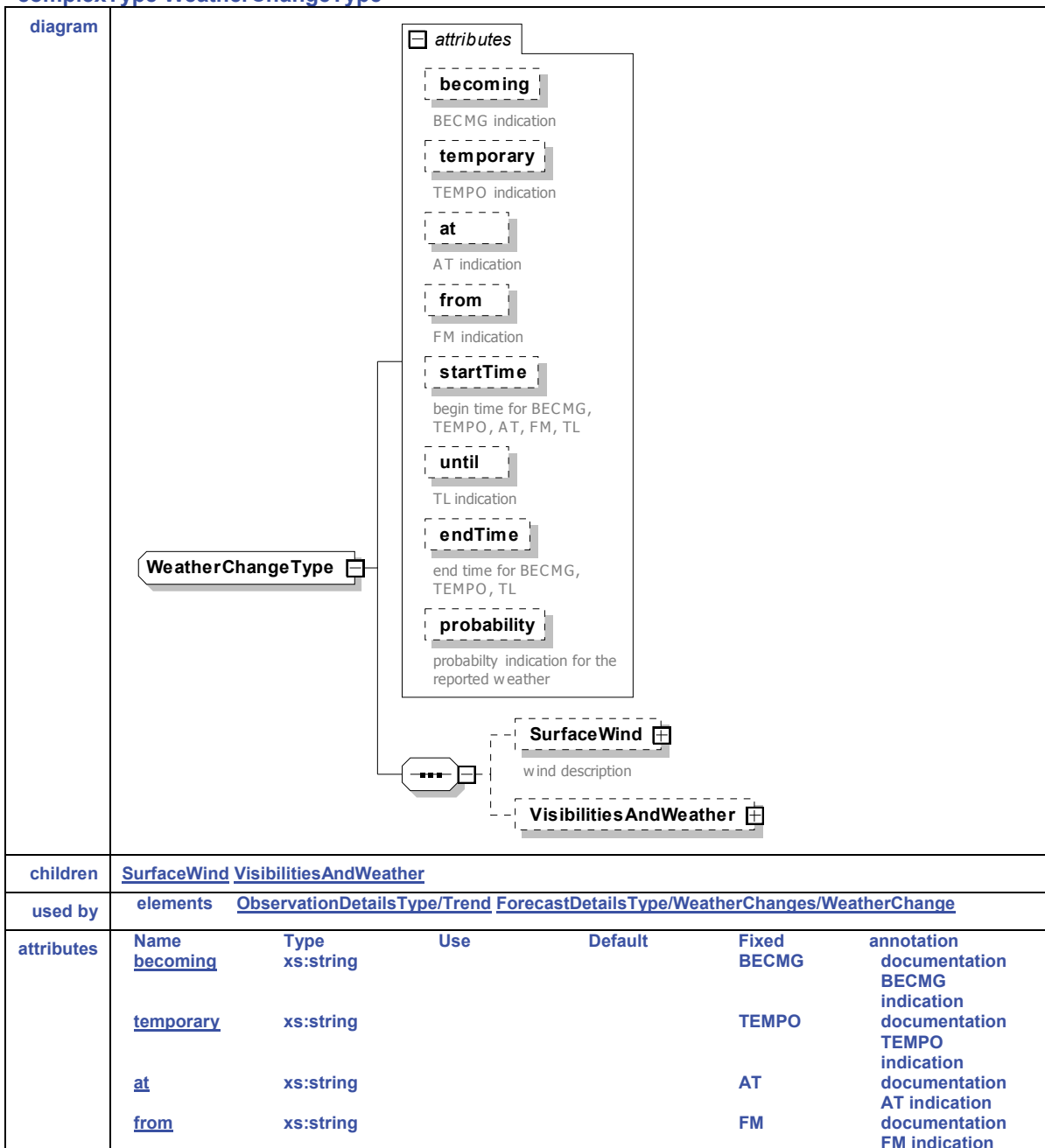
element ForecastDetailsType/WeatherChanges/WeatherChange

diagram						
type	WeatherChangeType					
children	SurfaceWind VisibilitiesAndWeather					
attributes	Name	Type	Use	Default	Fixed	annotation
	becoming	xs:string			BECMG	documentation BECMG
	temporary	xs:string			TEMPO	indication documentation TEMPO
	at	xs:string			AT	indication documentation AT indication
	from	xs:string			FM	documentation FM indication
	startTime	xs:dateTime				documentation begin time for

5.0 COMMON ELEMENTS

	<u>until</u> xs:string TL <u>endTime</u> xs:dateTime <u>probability</u> <u>probabilityType</u>	BECMG, TEMPO, AT, FM, TL documentation TL indication end time for BECMG, TEMPO, TL documentation probability indication for the reported weather
annotation	documentation weather change description	

complexType WeatherChangeType



5.0 COMMON ELEMENTS

	startTime	xs:dateTime			documentation begin time for BECMG, TEMPO, AT, FM, TL
	until	xs:string		TL	documentation TL indication
	endTime	xs:dateTime			documentation end time for BECMG, TEMPO, TL
	probability	probabilityType			documentation probability indication for the reported weather

attribute WeatherChangeType/@becoming

type	xs:string
annotation	documentation BECMG indication

attribute WeatherChangeType/@temporary

type	xs:string
annotation	documentation TEMPO indication

attribute WeatherChangeType/@at

type	xs:string
annotation	documentation AT indication

attribute WeatherChangeType/@from

type	xs:string
annotation	documentation FM indication

attribute WeatherChangeType/@startTime

type	xs:dateTime
annotation	documentation begin time for BECMG, TEMPO, AT, FM, TL

attribute WeatherChangeType/@until

type	xs:string
annotation	documentation TL indication

attribute WeatherChangeType/@endTime

type	xs:dateTime
annotationnn	documentation end time for BECMG, TEMPO, TL

5.0 COMMON ELEMENTS

attribute WeatherChangeType/@probability

type	probabilityType
facets	enumeration 30 enumeration 40
annotation	documentation probability indication for the reported weather

element WeatherChangeType/SurfaceWind

diagram						
type	SurfaceWindType					
children	Directions Speeds					
attributes	Name runwayIdentifier	Type derived by: xs:string	Use	Default	Fixed	annotation documentation runway identifier in case runway specific wind data will be provided
annotation	documentation wind description					

5.0 COMMON ELEMENTS

element WeatherChangeType/VisibilitiesAndWeather

diagram	The diagram illustrates the structure of the VisibilitiesAndWeatherType. It is a complex type containing several elements: CeilingAndVisibilityOK: A required element (indicated by a solid line and a small square icon) with the description: "CAVOK to be used in case visibility is greater than 10km and no clouds below 5000ft (or below highest MSA respectively) and no CB and no weather". Visibilities: An optional element (indicated by a dashed line and a small square icon) with the description: "horizontal v isibility". Clouds: An optional element (indicated by a dashed line and a small square icon) with the description: "clouds and vertical v isibility". NilSignificantWeather: An optional element (indicated by a dashed line and a small square icon) with the description: "NSW or NOSIG". Weather: An optional element (indicated by a dashed line and a small square icon) with the description: "weather description and type, e.g. BLSN for blowing snow, FZFG for freezing fog". It has a cardinality of 1..∞. The VisibilitiesAndWeatherType is shown as a dashed box containing these elements. A separate box labeled VisibilitiesAndWeather is connected to the main structure via a dashed line.
type	VisibilitiesAndWeatherType
children	CeilingAndVisibilityOK Visibilities Clouds NilSignificantWeather Weather

complexType VisibilitiesAndWeatherType

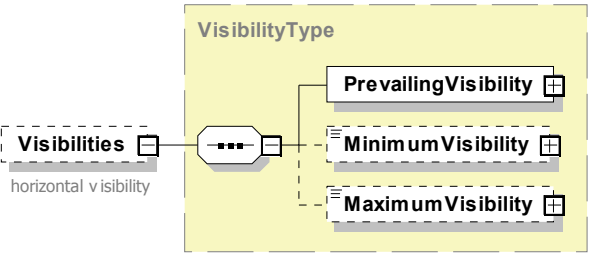
diagram	The diagram illustrates the structure of the VisibilitiesAndWeatherType. It is a complex type containing several elements: CeilingAndVisibilityOK: A required element (indicated by a solid line and a small square icon) with the description: "CAVOK to be used in case visibility is greater than 10km and no clouds below 5000ft (or below highest MSA respectively) and no CB and no weather". Visibilities: An optional element (indicated by a dashed line and a small square icon) with the description: "horizontal v isibility". Clouds: An optional element (indicated by a dashed line and a small square icon) with the description: "clouds and vertical v isibility". NilSignificantWeather: An optional element (indicated by a dashed line and a small square icon) with the description: "NSW or NOSIG". Weather: An optional element (indicated by a dashed line and a small square icon) with the description: "weather description and type, e.g. BLSN for blowing snow, FZFG for freezing fog". It has a cardinality of 1..∞. The VisibilitiesAndWeatherType is shown as a dashed box containing these elements. A separate box labeled VisibilitiesAndWeatherType is connected to the main structure via a dashed line.
children	CeilingAndVisibilityOK Visibilities Clouds NilSignificantWeather Weather
used by	elements ForecastDetailsType/ForecastGeneral/VisibilitiesAndWeather ObservationDetailsType/VisibilitiesAndWeather WeatherChangeType/VisibilitiesAndWeather

5.0 COMMON ELEMENTS

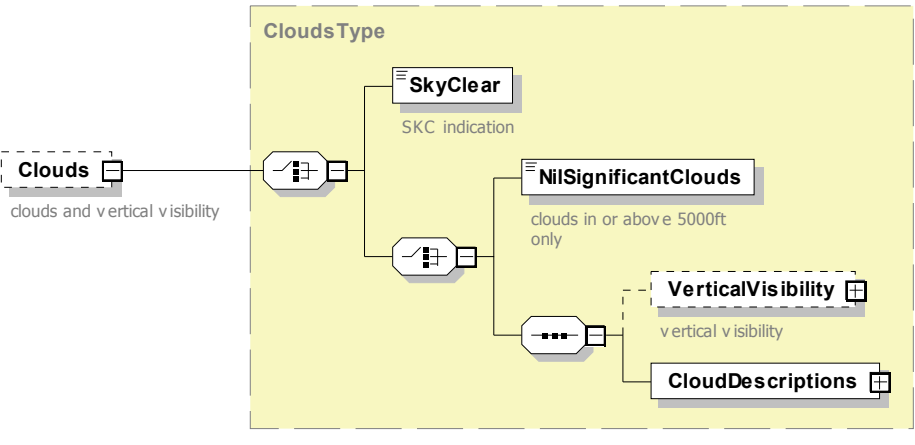
element VisibilitiesAndWeatherType/CeilingAndVisibilityOK

diagram	 CAVOK to be used in case visibility is greater than 10km and no clouds below 5000ft (or below highest MSA respectively) and no CB and no weather
type	xs:string
annotation	documentation CAVOK to be used in case visibility is greater than 10km and no clouds below 5000ft (or below highest MSA respectively) and no CB and no weather

element VisibilitiesAndWeatherType/Visibilities

diagram	 horizontal visibility
type	VisibilityType
children	PrevailingVisibility MinimumVisibility MaximumVisibility
annotation	documentation horizontal visibility

element VisibilitiesAndWeatherType/Clouds

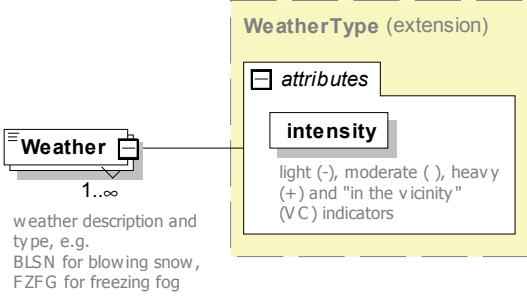
diagram	 clouds and vertical visibility
type	CloudsType
children	SkyClear NilSignificantClouds VerticalVisibility CloudDescriptions
annotation	documentation clouds and vertical visibility

5.0 COMMON ELEMENTS

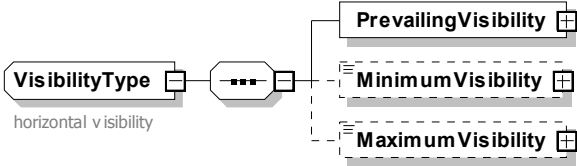
element [VisibilitiesAndWeatherType/NilSignificantWeather](#)

diagram	 NSW or NOSIG
type	restriction of xs:string
facets	enumeration NSW enumeration NOSIG
annotation	documentation NSW or NOSIG

element [VisibilitiesAndWeatherType/Weather](#)

diagram	 Weather (extension) Weather 1..∞ weather description and type, e.g. BLSN for blowing snow, FZFG for freezing fog attributes intensity light (-), moderate (), heavy (+) and "in the vicinity" (VC) indicators					
type	extension of WeatherType					
attributes	Name	Type	Use	Default	Fixed	annotation
	intensity	airportWeatherIntensityProximityType	required			documentation light (-), moderate (), heavy (+) and "in the vicinity" (VC) indicators
annotation	documentation weather description and type, e.g., BLSN for blowing snow, FZFG for freezing fog					

complexType [VisibilityType](#)

diagram	 VisibilityType horizontal v isibility PrevailingVisibility MinimumVisibility MaximumVisibility					
children	PrevailingVisibility MinimumVisibility MaximumVisibility					
used by	element VisibilitiesAndWeatherType/Visibilities					
annotation	documentation horizontal visibility					

5.0 COMMON ELEMENTS

element VisibilityType/PrevailingVisibility

diagram	
type	DistanceType
children	Value CorrectedValue

element VisibilityType/MinimumVisibility

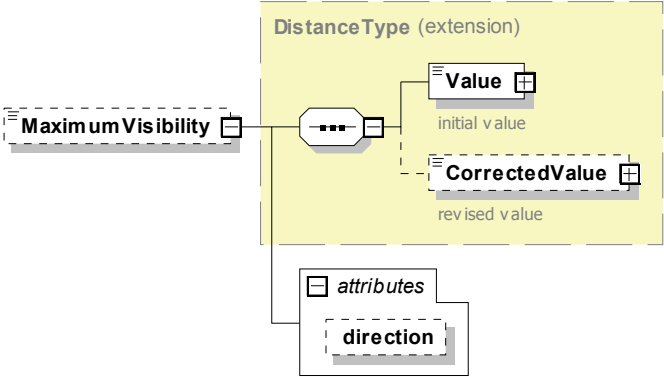
diagram	The diagram illustrates the structure of the <code>MinimumVisibility</code> element, which is an extension of the <code>DistanceType</code>. The <code>MinimumVisibility</code> element is represented by a dashed box. It is connected to a dashed box labeled <code>DistanceType (extension)</code>. Inside the <code>DistanceType (extension)</code> box, there are two child elements: <code>Value</code> (initial value) and <code>CorrectedValue</code> (revised value). Below the <code>DistanceType (extension)</code> box, there is an <code>attributes</code> box containing a <code>direction</code> element.												
type	extension of DistanceType												
children	Value CorrectedValue												
attributes	<table><thead><tr><th>Name</th><th>Type</th><th>Use</th><th>Default</th><th>Fixed</th><th>annotation</th></tr></thead><tbody><tr><td>direction</td><td>derived by: xs:string</td><td></td><td></td><td></td><td></td></tr></tbody></table>	Name	Type	Use	Default	Fixed	annotation	direction	derived by: xs:string				
Name	Type	Use	Default	Fixed	annotation								
direction	derived by: xs:string												

attribute VisibilityType/MinimumVisibility/@direction

type	restriction of xs:string				
facets	enumeration	N			
	enumeration	NNE			
	enumeration	NE			
	enumeration	ENE			
	enumeration	E			
	enumeration	ESE			
	enumeration	SE			
	enumeration	SSE			
	enumeration	S			
	enumeration	SSW			
	enumeration	SW			
	enumeration	WSW			
	enumeration	W			
	enumeration	WNW			
	enumeration	NW			
	enumeration	NNW			

5.0 COMMON ELEMENTS

element VisibilityType/MaximumVisibility

diagram						
type	extension of DistanceType					
children	Value CorrectedValue					
attributes	Name direction	Type derived by: xs:string	Use	Default	Fixed	annotation

attribute VisibilityType/MaximumVisibility/@direction

type	restriction of xs:string	
facets	enumeration	N
	enumeration	NNE
	enumeration	NE
	enumeration	ENE
	enumeration	E
	enumeration	ESE
	enumeration	SE
	enumeration	SSE
	enumeration	S
	enumeration	SSW
	enumeration	SW
	enumeration	WSW
	enumeration	W
	enumeration	WNW
	enumeration	NW
	enumeration	NNW

5.0 COMMON ELEMENTS

5.7 SIGMET, AIRMET, AIREP, CONVECTIVE SIGMET

The Region Weather type can be used to deliver either raw or decoded regional weather phenomena information.

The schema also allows further usage for non-standard bulletins in either raw or decoded format.

element RegionWeatherBriefing

diagram						
children	M633Header M633SupplementaryHeader RegionWeathers					
attributes	Name	Type	Use	Default	Fixed	annotation
	creationTime	xs:dateTime	required			documentation The date and time the briefing was created
	fullPackage	xs:boolean	required			documentation specifies whether the briefing is considered a complete briefing package or whether the content is considered an Update and needs to be merged with the existing RegionWeatherBriefing
annotation	documentation Comment describing your root element					

attribute RegionWeatherBriefing/@creationTime

type	xs:dateTime
annotation	documentation The date and time the briefing was created

5.0 COMMON ELEMENTS

attribute [RegionWeatherBriefing/@fullPackage](#)

type	xs:boolean
annotation	documentation specifies whether the briefing is considered a complete briefing package or whether the content is considered an Update and needs to be merged with the existing RegionWeatherBriefing

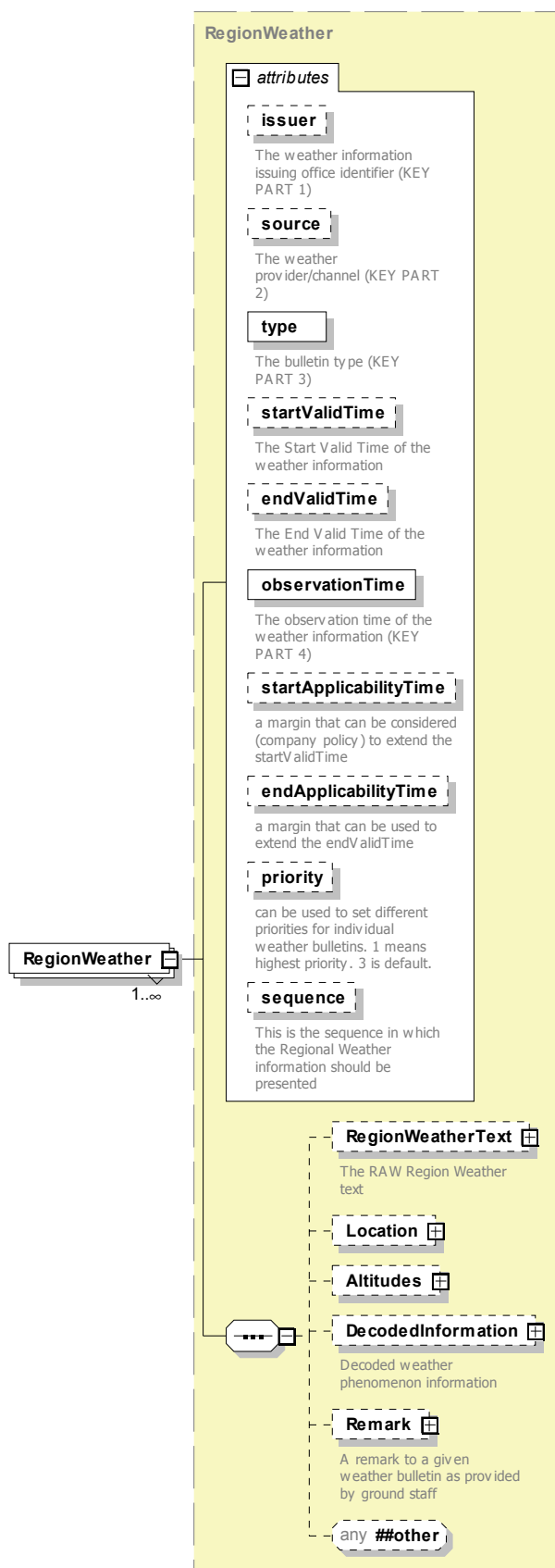
element [RegionWeatherBriefing/RegionWeathers](#)

diagram	SIGMETs, CONVECTIVE SIGMETs, AIRMETs, AIREPs 1..∞
children	RegionWeather
annotation	documentation SIGMETs, CONVECTIVE SIGMETs, AIRMETs, AIREPs

5.0 COMMON ELEMENTS

element RegionWeatherBriefing/RegionWeathers/RegionWeather

diagram



5.0 COMMON ELEMENTS

type	<u>RegionWeather</u>					
children	<u>RegionWeatherText</u>	<u>Location</u>	<u>Altitudes</u>	<u>DecodedInformation</u>	<u>Remark</u>	
attributes	<u>Name</u> <u>issuer</u>	Type derived by: xs:string	Use	Default	Fixed	annotation documentation The weather information issuing office identifier (KEY PART 1) documentation The weather provider/channel (KEY PART 2) documentation The bulletin type (KEY PART 3) documentation The Start Valid Time of the weather information documentation The End Valid Time of the weather information documentation The observation time of the weather information (KEY PART 4) documentation a margin that can be considered (company policy) to extend the startValidTime documentation a margin that can be used to extend the endValidTime documentation can be used to set different priorities for individual weather bulletins. 1 means highest priority. 3 is default. documentation This is the sequence in which the Regional Weather information should be presented
	<u>source</u>	derived by: xs:string				
	<u>type</u>	<u>regionWeatherType</u>	required			
	<u>startValidTime</u>	xs:dateTime				
	<u>endValidTime</u>	xs:dateTime				
	<u>observationTime</u>	xs:dateTime	required			
	<u>startApplicabilityTime</u>	xs:dateTime				
	<u>endApplicabilityTime</u>	xs:dateTime				
	<u>priority</u>	derived by: xs:int		3		
	<u>sequence</u>	xs:nonNegativeInteger				

5.0 COMMON ELEMENTS

complexType RegionWeather

diagram

attributes

issuer

The weather information issuing office identifier (KEY PART 1)

source

The weather provider/channel (KEY PART 2)

type

The bulletin type (KEY PART 3)

startValidTime

The Start Valid Time of the weather information

endValidTime

The End Valid Time of the weather information

observationTime

The observation time of the weather information (KEY PART 4)

startApplicabilityTime

a margin that can be considered (company policy) to extend the startValidTime

endApplicabilityTime

a margin that can be used to extend the endValidTime

priority

can be used to set different priorities for individual weather bulletins. 1 means highest priority. 3 is default.

sequence

This is the sequence in which the Regional Weather information should be presented

RegionWeather

RegionWeatherText

The RAW Region Weather text

Location

Altitudes

DecodedInformation

Decoded weather phenomenon information

Remark

A remark to a given weather bulletin as provided by ground staff

any ##other

5.0 COMMON ELEMENTS

children	RegionWeatherText Location Altitudes DecodedInformation Remark					
used by	element	RegionWeatherBriefing/RegionWeathers/RegionWeather				
attributes	Name issuer	Type derived by: xs:string	Use	Default	Fixed	annotation documentation The weather information issuing office identifier (KEY PART 1)
	source	derived by: xs:string				documentation The weather provider/channel (KEY PART 2)
	type	regionWeatherType	required			documentation The bulletin type (KEY PART 3)
	startValidTime	xs:dateTime				documentation The Start Valid Time of the weather
	endValidTime	xs:dateTime				information documentation The End Valid Time of the weather
	observationTime	xs:dateTime	required			information documentation The observation time of the weather
	startApplicabilityTime	xs:dateTime				information (KEY PART 4) documentation a margin that can be considered (company policy) to extend the startValidTime
	endApplicabilityTime	xs:dateTime				documentation a margin that can be used to extend the endValidTime
	priority	derived by: xs:int		3		documentation can be used to set different priorities for individual weather bulletins. 1 means highest priority. 3 is default.
	sequence	xs:nonNegativeInteger				documentation This is the sequence in which the Regional Weather information should be presented

attribute [RegionWeather/@issuer](#)

type	restriction of xs:string
annotation	documentation The weather information issuing office identifier (KEY PART 1)

attribute [RegionWeather/@source](#)

type	restriction of xs:string
annotation	documentation The weather provider/channel (KEY PART 2)

5.0 COMMON ELEMENTS

attribute RegionWeather/@type

type	regionWeatherType
facets	enumeration AIREP enumeration SIGMET enumeration AIRMET enumeration CONVECTIVE SIGMET enumeration THUNDERSTORM WARNING enumeration
annotation	documentation The bulletin type (KEY PART 3)

attribute RegionWeather/@startValidTime

type	xs:dateTime
annotation	documentation The Start Valid Time of the weather information

attribute RegionWeather/@endValidTime

type	xs:dateTime
annotation	documentation The End Valid Time of the weather information

attribute RegionWeather/@observationTime

type	xs:dateTime
annotation	documentation The observation time of the weather information (KEY PART 4)

attribute RegionWeather/@startApplicabilityTime

type	xs:dateTime
annotation	documentation a margin that can be considered (company policy) to extend the startValidTime

attribute RegionWeather/@endApplicabilityTime

type	xs:dateTime
annotation	documentation a margin that can be used to extend the endValidTime

attribute RegionWeather/@priority

type	restriction of xs:int
annotation	documentation can be used to set different priorities for individual weather bulletins. 1 means highest priority. 3 is default.

attribute RegionWeather/@sequence

type	xs:nonNegativeInteger
annotation	documentation This is the sequence in which the Regional Weather information should be presented

5.0 COMMON ELEMENTS

element RegionWeather/RegionWeatherText

diagram	The diagram shows a dashed box labeled 'RegionWeatherText' with the text 'The RAW Region Weather text' below it. This box is connected to a 'TextType' container (yellow background). Inside 'TextType', there is a sequence of elements: a dashed box with three dots, followed by a 'Paragraph' box. The 'Paragraph' box has a '1..∞' cardinality and the text 'paragraph (line) structure' below it.
type	TextType
children	Paragraph
annotation	documentation The RAW Region Weather text

element RegionWeather/Location

diagram	The diagram shows a dashed box labeled 'Location' connected to a sequence of elements: a dashed box with three dots, followed by 'Airspace' and 'Geography' boxes. 'Airspace' and 'Geography' are both connected to a common point, indicating they are optional or conditional children.
children	Airspace Geography

element RegionWeather/Location/Airspace

diagram	The diagram shows a dashed box labeled 'Airspace' connected to a sequence of elements: a dashed box with three dots, followed by an 'Airspace' box. The 'Airspace' box has a '1..∞' cardinality. Below the diagram, text reads: 'This key can be used to identify affected airspaces and to group Region Weather under a certain airspace e.g.: LOVV'.
children	Airspace

element RegionWeather/Location/Airspace/Airspace

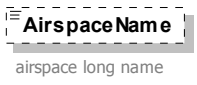
diagram	The diagram shows an 'Airspace' box with a '1..∞' cardinality. It is connected to an 'attributes' box (yellow background) which contains a dashed box labeled 'airspaceICAOCode' with the text '4 letter ICAO code' below it. The 'Airspace' box is also connected to a sequence of elements: a dashed box with three dots, followed by an 'AirspaceName' box. The 'AirspaceName' box has the text 'airspace long name' below it.					
children	AirspaceName					
attributes	Name airspaceICAOCode	Type AirportICAOCodeType	Use	Default	Fixed	annotation documentation 4 letter ICAO code
annotation	documentation This key can be used to identify affected airspaces and to group Region Weather under a certain airspace e.g., LOVV					

5.0 COMMON ELEMENTS

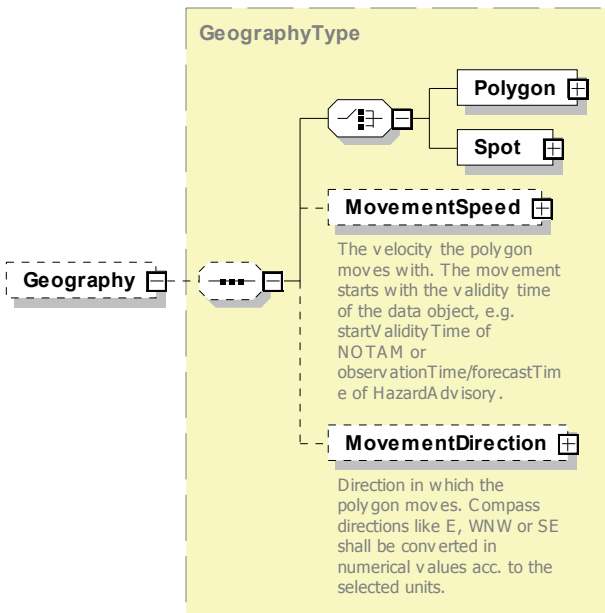
attribute RegionWeather/Location/Airspaces/Airspace/@airspaceICAOCode

type	AirportICAOCodeType
annotation	documentation 4 letter ICAO code

element RegionWeather/Location/Airspaces/Airspace/AirspaceName

diagram	
type	restriction of xs:string
annotation	documentation airspace long name

element RegionWeather/Location/Geography

diagram	
type	GeographyType
children	Polygon Spot MovementSpeed MovementDirection

5.0 COMMON ELEMENTS

element RegionWeather/Altitudes

diagram	
type	AltitudeInfoType
children	Altitude Upper Lower

element RegionWeather/DecodedInformation

diagram	
children	Icing Turbulence Thunderstorm
annotation	documentation Decoded weather phenomenon information

element RegionWeather/DecodedInformation/Icing

diagram						
attributes	Name intensity icingType	Type intensityType derived by: xs:string	Use required required	Default	Fixed	annotation documentation icing intensity documentation icing type, e.g., clear rice, rime ice.
annotation	documentation This is the decoded icing phenomena information					

5.0 COMMON ELEMENTS

attribute RegionWeather/DecodedInformation/Icing/@intensity

type	intensityType	
facets	enumeration	light
	enumeration	light to moderate
	enumeration	moderate
	enumeration	moderate to severe
	enumeration	severe
	enumeration	extreme
annotation	documentation	icing intensity

attribute RegionWeather/DecodedInformation/Icing/@icingType

type	restriction of xs:string	
annotation	documentation	icing type, e.g., clear ice, rime ice.

element RegionWeather/DecodedInformation/Turbulence

diagram						
attributes	Name	Type	Use	Default	Fixed	annotation
	turbulenceType	xs:string		false		documentation type of turbulence (sky clear, wake, etc.)
	intensity	intensityType	required			documentation turbulence intensity
annotation	documentation This is the decoded turbulence information					

attribute RegionWeather/DecodedInformation/Turbulence/@turbulenceType

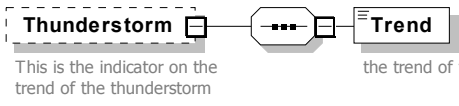
type	xs:string	
annotation	documentation	type of turbulence (sky clear, wake, etc.)

attribute RegionWeather/DecodedInformation/Turbulence/@intensity

type	intensityType	
facets	enumeration	light
	enumeration	light to moderate
	enumeration	moderate
	enumeration	moderate to severe
	enumeration	severe
	enumeration	extreme
annotation	documentation	turbulence intensity

5.0 COMMON ELEMENTS

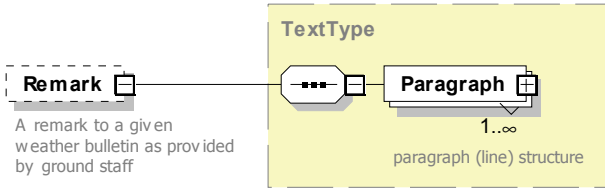
element RegionWeather/DecodedInformation/Thunderstorm

diagram	 This is the indicator on the trend of the thunderstorm the trend of the TS
children	Trend
annotation	documentation This is the indicator on the trend of the thunderstorm

element RegionWeather/DecodedInformation/Thunderstorm/Trend

diagram	 the trend of the TS
type	thunderstormTrendType
facets	enumeration developing enumeration developed enumeration diminishing
annotation	documentation the trend of the TS

element RegionWeather/Remark

diagram	 A remark to a given weather bulletin as provided by ground staff 1..∞ paragraph (line) structure
type	TextType
children	Paragraph
annotation	documentation A remark to a given weather bulletin as provided by ground staff

simpleType regionWeatherType

type	restriction of xs:string
used by	attribute RegionWeather/@type
facets	enumeration AIREP enumeration SIGMET enumeration AIRMET enumeration CONVECTIVE SIGMET enumeration THUNDERSTORM WARNING

5.0 COMMON ELEMENTS

5.8 Weather Chart

A structure and format definition of digital UAD data, most likely referring to BUFR data format, will be provided in a future supplement.

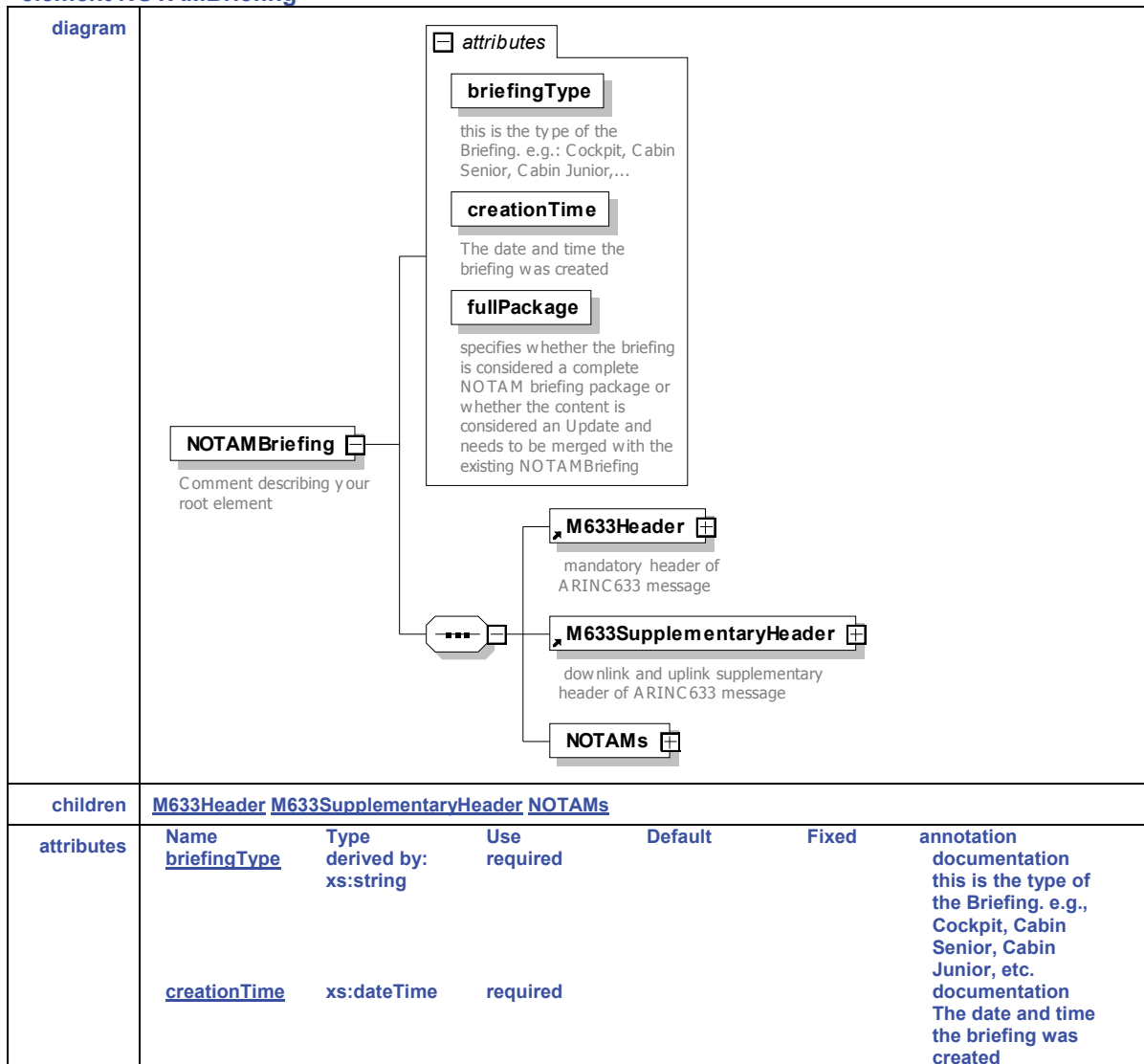
5.9 NOTAM

The element NOTAM/NOTAMSubjects/NOTAMSubject specifies the type of the affected object which the NOTAM is referring to. Values to use (but not limited to) are: “Airport”, “Approach”, “Country”, “Airspace”, “Waypoint”, “Route”, “Runway”, “Terminal procedure”, “Chart”, and “Company”.

In order to preserve the original NOTAM’s text structure (e.g., tables in NOTAMs), it is recommended to use only non-proportional font for display.

SNOWTAM data shall be delivered as NOTAM. A separate structure and format of decoded SNOWTAM format will be provided in a future supplement.

element NOTAMBriefing



5.0 COMMON ELEMENTS

	<u>fullPackage</u> xs:boolean required	documentation specifies whether the briefing is considered a complete NOTAM briefing package or whether the content is considered an Update and needs to be merged with the existing NOTAMBriefing
annotation	documentation Comment describing your root element	

attribute NOTAMBriefing/@briefingType

type	restriction of xs:string
annotation	documentation this is the type of the Briefing. e.g., Cockpit, Cabin Senior, Cabin Junior,...

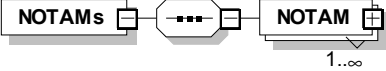
attribute NOTAMBriefing/@creationTime

type	xs:dateTime
annotation	documentation The date and time the briefing was created

attribute NOTAMBriefing/@fullPackage

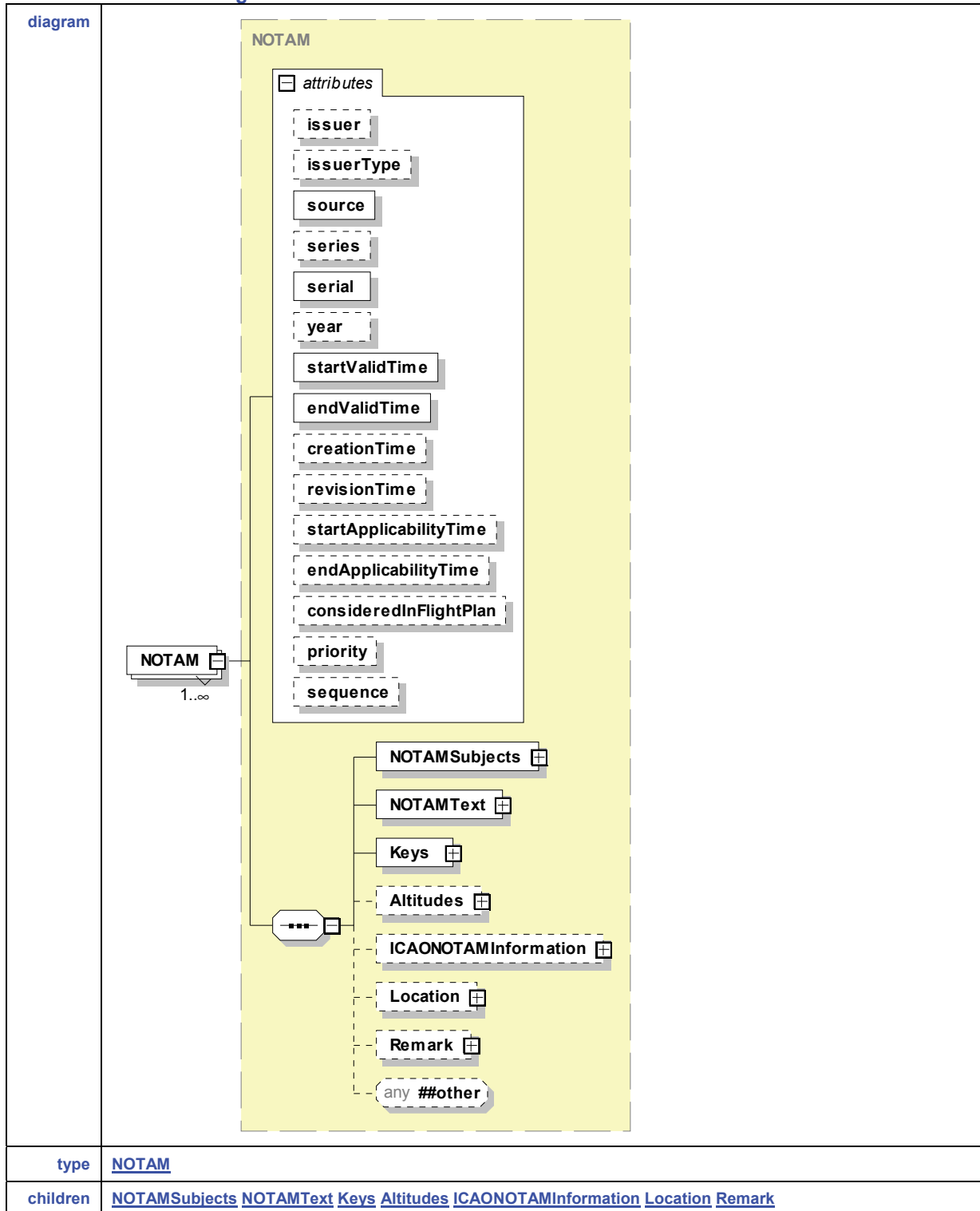
type	xs:boolean
annotation	documentation specifies whether the briefing is considered a complete NOTAM briefing package or whether the content is considered an Update and needs to be merged with the existing NOTAMBriefing

element NOTAMBriefing/NOTAMs

diagram	
children	<u>NOTAM</u>

5.0 COMMON ELEMENTS

element NOTAMBriefing/NOTAMs/NOTAM



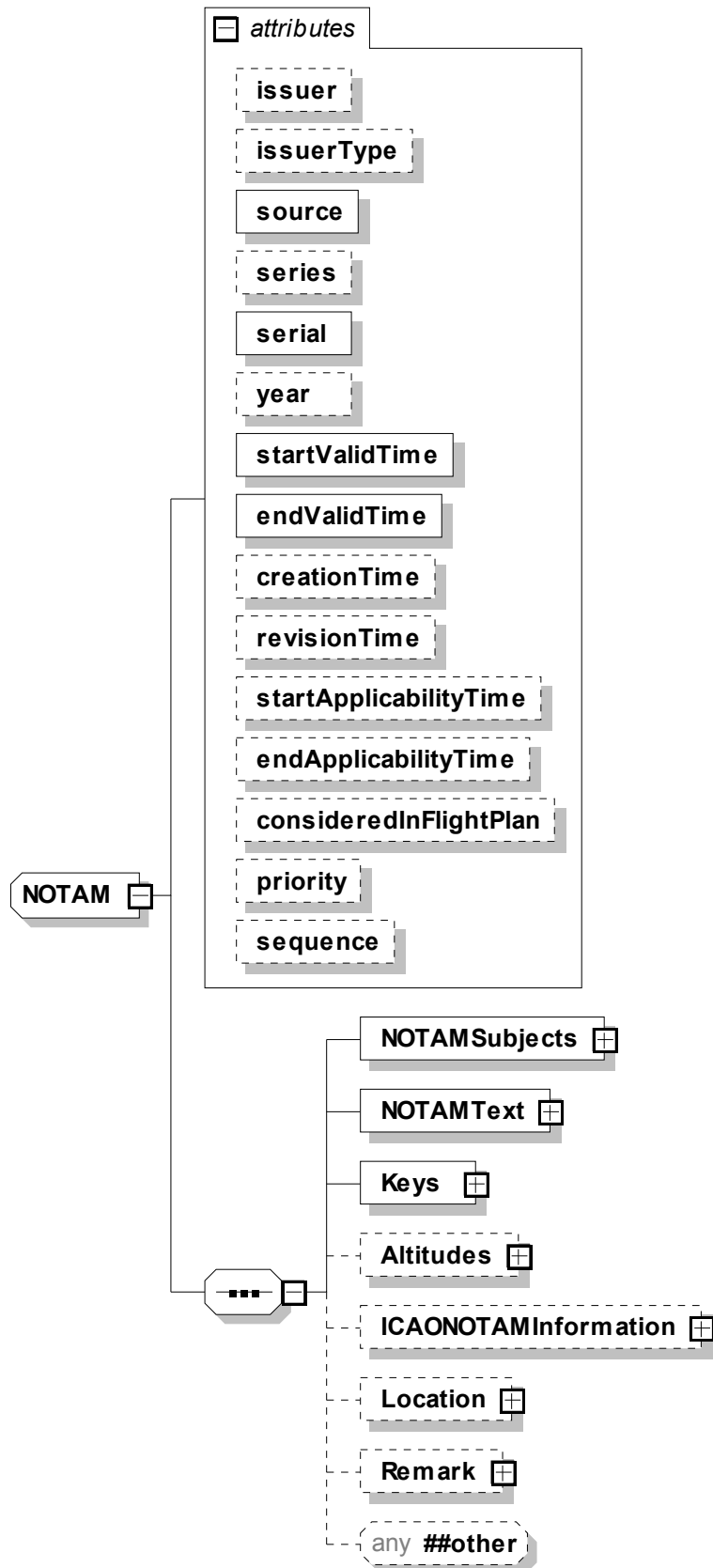
5.0 COMMON ELEMENTS

attributes	Name	Type	Use	Default	Fixed	annotation
	<u>issuer</u>	derived by: xs:string				documentation The NOTAM office issuing the NOTAM. [NOTAM KEY PART 1]
	<u>issuerType</u>	<u>issuerTypeType</u>				
	<u>source</u>	derived by: xs:string	required			documentation This is the source of the NOTAM. Might be used to maintain ambiguity. (e.g., international NOTAM may be coming through several sources). Examples: EUC, SKG, FDC, etc. [NOTAM KEY PART 2]
	<u>series</u>	derived by: xs:string				documentation The NOTAM series (e.g., A). [NOTAM KEY PART 3]
	<u>serial</u>	derived by: xs:string	required			documentation The number of the NOTAM. [NOTAM KEY PART 4]
	<u>year</u>	xs:int				documentation The year the NOTAM was issued (e.g., 12). [NOTAM KEY PART 5]
	<u>startValidTime</u>	xs:dateTime	required			documentation The Start Valid Time of the NOTAM
	<u>endValidTime</u>	xs:dateTime	required			documentation The End Valid Time of the NOTAM
	<u>creationTime</u>	xs:dateTime				documentation The creation time of the NOTAM
	<u>revisionTime</u>	xs:dateTime				documentation The last revision time of the NOTAM
	<u>startApplicabilityTime</u>	xs:dateTime				documentation a margin that can be considered (company policy) to extend the SVT
	<u>endApplicabilityTime</u>	xs:dateTime				documentation a margin that can be used to extend the EVT
	<u>consideredInFlightPlan</u>	xs:boolean				documentation this flag defines whether the NOTAM was considered during the flight planning process
	<u>priority</u>	derived by: xs:int		3		documentation can be used to set different priorities for individual NOTAMs. 1 means highest priority. 3 is default
	<u>sequence</u>	xs:nonNegativeInteger				documentation This is the sequence of the NOTAMs as shown in the paper NOTAM briefing

5.0 COMMON ELEMENTS

complexType NOTAM

diagram



5.0 COMMON ELEMENTS

children	NOTAMSubjects NOTAMText Keys Altitudes ICAONOTAMInformation Location Remark						
used by	element NOTAMBriefing/NOTAMs/NOTAM						
attributes	Name	Type	Use	Default	Fixed	annotation	
	issuer	derived by: xs:string				documentation The NOTAM office issuing the NOTAM. [NOTAM KEY PART 1]	
	issuerType	issuerTypeType					
	source	derived by: xs:string	required			documentation This is the source of the NOTAM. Might be used to maintain ambiguity. (e.g., international NOTAM may be coming through several sources). Examples: EUC, SKG, FDC, etc. [NOTAM KEY PART 2]	
	series	derived by: xs:string				documentation The NOTAM series (e.g., A). [NOTAM KEY PART 3]	
	serial	derived by: xs:string	required			documentation The number of the NOTAM. [NOTAM KEY PART 4]	
	year	xs:int				documentation The year the NOTAM was issued (e.g., 12). [NOTAM KEY PART 5]	
	startValidTime	xs:dateTime	required			documentation The Start Valid Time of the NOTAM	
	endValidTime	xs:dateTime	required			documentation The End Valid Time of the NOTAM	
	creationTime	xs:dateTime				documentation The creation time of the NOTAM	
	revisionTime	xs:dateTime				documentation The last revision time of the NOTAM	
	startApplicabilityTime	xs:dateTime				documentation a margin that can be considered (company policy) to extend the SVT	
	endApplicabilityTime	xs:dateTime				documentation a margin that can be used to extend the EVT	
	consideredInFlightPlan	xs:boolean				documentation this flag defines whether the NOTAM was considered during the flight planning process	
	priority	derived by: xs:int		3		documentation can be used to set different priorities for individual NOTAMs. 1 means highest priority. 3 is default	
	sequence	xs:nonNegativeInteger				documentation This is the sequence of the NOTAMs as shown in the paper NOTAM briefing	

5.0 COMMON ELEMENTS

attribute NOTAM/@issuer

type	restriction of xs:string
annotation	documentation The NOTAM office issuing the NOTAM. [NOTAM KEY PART 1]

attribute NOTAM/@issuerType

type	<u>issuerTypeType</u>
facets	enumeration company enumeration authority enumeration chart provider enumeration other

simpleType issuerTypeType

type	restriction of xs:string
used by	attribute <u>NOTAM/@issuerType</u>
facets	enumeration company enumeration authority enumeration chart provider enumeration other
annotation	documentation list of possible value for NOTAM issuer

attribute NOTAM/@source

type	restriction of xs:string
annotation	documentation This is the source of the NOTAM. Might be used to maintain ambiguity. (e.g., international NOTAM may be coming through several sources). Examples: EUC, SKG, FDC, ... [NOTAM KEY PART 2]

attribute NOTAM/@series

type	restriction of xs:string
annotation	documentation The NOTAM series (e.g., A). [NOTAM KEY PART 3]

attribute NOTAM/@serial

type	restriction of xs:string
annotation	documentation The number of the NOTAM. [NOTAM KEY PART 4]

attribute NOTAM/@year

type	xs:int
annotation	documentation The year the NOTAM was issued (e.g., 12). [NOTAM KEY PART 5]

attribute NOTAM/@startValidTime

type	xs:dateTime
annotation	documentation The Start Valid Time of the NOTAM

5.0 COMMON ELEMENTS

attribute NOTAM/@endValidTime

type	xs:dateTime
annotation	documentation The End Valid Time of the NOTAM

attribute NOTAM/@creationTime

type	xs:dateTime
annotation	documentation The creation time of the NOTAM

attribute NOTAM/@revisionTime

type	xs:dateTime
annotation	documentation The last revision time of the NOTAM

attribute NOTAM/@startApplicabilityTime

type	xs:dateTime
annotation	documentation a margin that can be considered (company policy) to extend the SVT

attribute NOTAM/@endApplicabilityTime

type	xs:dateTime
annotation	documentation a margin that can be used to extend the EVT

attribute NOTAM/@consideredInFlightPlan

type	xs:boolean
annotation	documentation this flag defines whether the NOTAM was considered during the flight planning process

attribute NOTAM/@priority

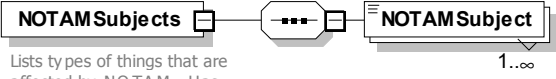
type	restriction of xs:int
annotation	documentation can be used to set different priorities for individual NOTAMs. 1 means highest priority. 3 is default

attribute NOTAM/@sequence

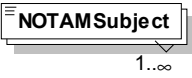
type	xs:nonNegativeInteger
annotation	documentation This is the sequence of the NOTAMs as shown in the paper NOTAM briefing

5.0 COMMON ELEMENTS

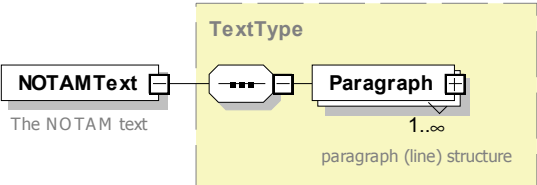
element NOTAM/NOTAMSubjects

diagram	 Lists types of things that are affected by NOTAM. Has priority over QCode. Keys should reflect subject by naming what is affected by NOTAM. Values to use (but not limited to) are : "Airport" "Approach" "Country" "Airspace" "Waypoint" "Route" "Runway" "Terminal procedure" "Chart" "Company"...
children	NOTAMSubject
annotation	documentation Lists types of things that are affected by NOTAM. Has priority over QCode. Keys should reflect subject by naming what is affected by NOTAM.

element NOTAM/NOTAMSubjects/NOTAMSubject

diagram	 Values to use (but not limited to) are : "Airport" "Approach" "Country" "Airspace" "Waypoint" "Route" "Runway" "Terminal procedure" "Chart" "Company"...
type	restriction of xs:string
annotation	documentation Values to use (but not limited to) are : "Airport" "Approach" "Country" "Airspace" "Waypoint" "Route" "Runway" "Terminal procedure" "Chart" "Company"...

element NOTAM/NOTAMText

diagram	 The NOTAM text paragraph (line) structure
type	TextType
children	Paragraph
annotation	documentation The NOTAM text

5.0 COMMON ELEMENTS

element NOTAM/Keys

diagram	At least one key shall be supplied to identify what is affected by the NOTAM. Shall be consistent with NOTAM Subjects. The "Other" key can be used to perform additional flexible NOTAM grouping according to the user requirements
children	Countries Airspace Airports Routes Waypoints Other
annotation	documentation At least one key shall be supplied to identify what is affected by the NOTAM. Shall be consistent with NOTAM Subjects.

element NOTAM/Keys/Countries

diagram	This key can be used to group NOTAMs under a certain country. e.g.: LI
children	Country

element NOTAM/Keys/Countries/Country

diagram						
children	CountryName					
attributes	Name countryICAOCode	Type derived by: xs:string	Use required	Default	Fixed	annotation documentation 2 letter ICAO code
annotation	documentation This key can be used to group NOTAMs under a certain country. e.g., LI					

attribute NOTAM/Keys/Countries/Country/@countryICAOCode

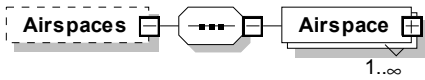
type	restriction of xs:string
annotation	documentation 2 letter ICAO code

5.0 COMMON ELEMENTS

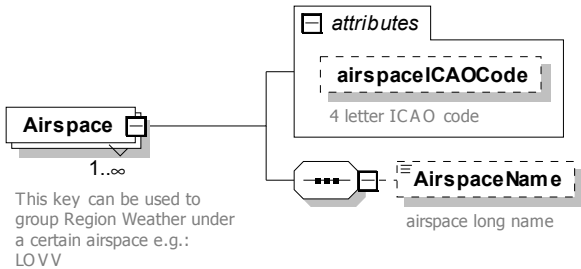
element NOTAM/Keys/Countries/Country/CountryName

diagram	
type	restriction of xs:string

element NOTAM/Keys/Airspaces

diagram	
children	Airspace

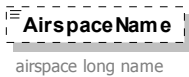
element NOTAM/Keys/Airspaces/Airspace

diagram						
children	AirspaceName					
attributes	Name	Type	Use	Default	Fixed	annotation
	airspaceICAOCode	AirportICAOCodeType				documentation 4 letter ICAO code
annotation	documentation This key can be used to group NOTAMs under a certain FIR/UIR airspace e.g., LOVV					

attribute NOTAM/Keys/Airspaces/Airspace/@airspaceICAOCode

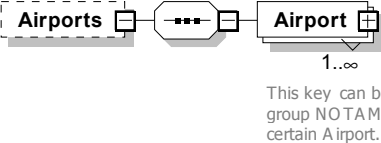
type	AirportICAOCodeType
annotation	documentation 4 letter ICAO code

element NOTAM/Keys/Airspaces/Airspace/AirspaceName

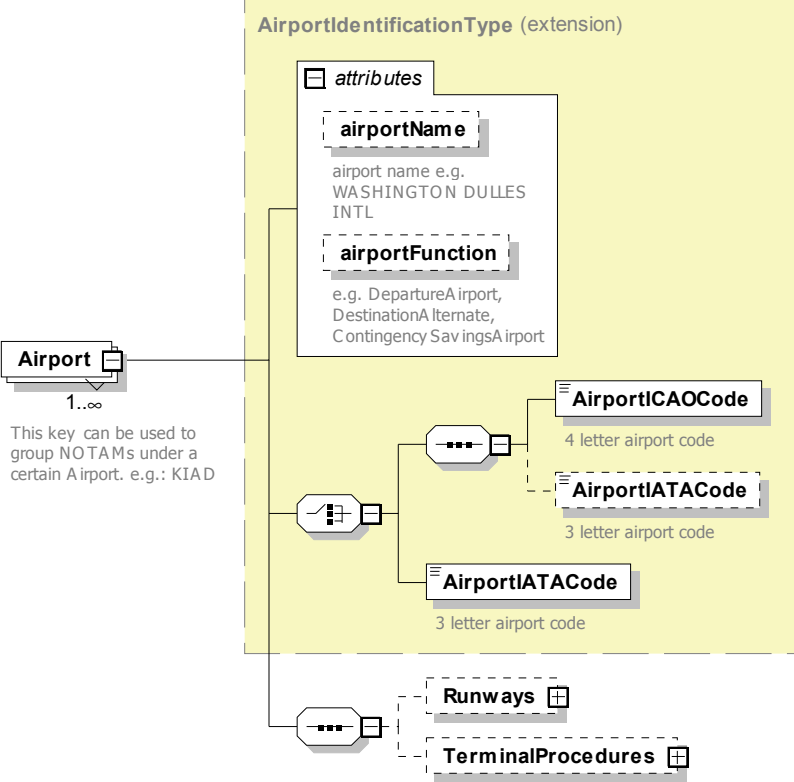
diagram	
type	restriction of xs:string
annotation	documentation airspace long name

5.0 COMMON ELEMENTS

element NOTAM/Keys/Airports

diagram	 1..∞ This key can be used to group NOTAMs under a certain Airport. e.g.: KIAD
children	Airport

element NOTAM/Keys/Airports/Airport

diagram	 1..∞ This key can be used to group NOTAMs under a certain Airport. e.g.: KIAD					
type	extension of AirportIdentificationType					
children	AirportCAOCCode AirportIATACode AirportIATACode Runways TerminalProcedures					
attributes	Name airportName	Type derived by: xs:string	Use	Default	Fixed	annotation documentation airport name e.g., WASHINGTON DULLES INTL
	airportFunction	airportFunctionType				documentation e.g., DepartureAirport, DestinationAlternate, ContingencySavingsAirp ort
annotation	documentation This key can be used to group NOTAMs under a certain Airport. e.g., KIAD					

5.0 COMMON ELEMENTS

element NOTAM/Keys/Airports/Airport/Runways

diagram	
children	Runway

element NOTAM/Keys/Airports/Airport/Runways/Runway

diagram						
attributes	Name runwayIdentifier	Type derived by: xs:string	Use required	Default	Fixed	annotation

attribute NOTAM/Keys/Airports/Airport/Runways/Runway/@runwayIdentifier

type	restriction of xs:string

element NOTAM/Keys/Airports/Airport/TerminalProcedures

diagram	
children	TerminalProcedure

element NOTAM/Keys/Airports/Airport/TerminalProcedures/TerminalProcedure

diagram						
attributes	Name procedureName	Type derived by: xs:string	Use required	Default	Fixed	annotation
	fmsProcedureName	derived by: xs:string				
	procedureType	derived by: xs:string				

attribute
NOTAM/Keys/Airports/Airport/TerminalProcedures/TerminalProcedure/@procedureName

type	restriction of xs:string

5.0 COMMON ELEMENTS

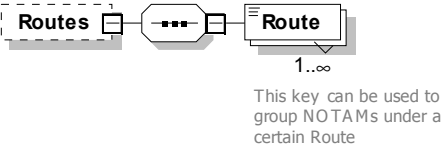
attribute
NOTAM/Keys/Airports/Airport/TerminalProcedures/TerminalProcedure/@fmsProcedureName

type	restriction of xs:string

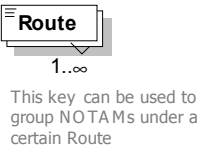
attribute NOTAM/Keys/Airports/Airport/TerminalProcedures/TerminalProcedure/@procedureType

type	restriction of xs:string

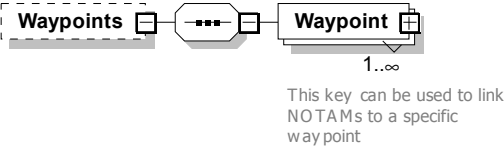
element NOTAM/Keys/Routes

diagram	 This key can be used to group NOTAMs under a certain Route
children	Route

element NOTAM/Keys/Routes/Route

diagram	 This key can be used to group NOTAMs under a certain Route
type	restriction of xs:string
annotation	documentation This key can be used to group NOTAMs under a certain Route

element NOTAM/Keys/Waypoints

diagram	 This key can be used to link NOTAMs to a specific way point
children	Waypoint
used by	elements group AlternateRoute flightPlanCore.Grp/ContingencySavingHeader flightPlanCore.Grp

5.0 COMMON ELEMENTS

element NOTAM/Keys/Waypoints/Waypoint

diagram						
attributes	Name waypointId	Type WaypointIdType	Use optional	Default	Fixed	annotation documentation 1 to 5 char code, the name as seen by the Pilot and as entered in FMC documentation waypoint identification as typically in ATC-FPL, or any artificial waypoint name (TOC, TOD, etc.); to be considered as secondary when waypointId is provided
	waypointName	derived by: xs:string	optional			
	countryICAOCCode	CountryICAOCCodeType	optional			
annotation	documentation This key can be used to link NOTAMs to a specific waypoint					

element NOTAM/Keys/Other

diagram						
type	restriction of xs:string					
annotation	documentation The "Other" key can be used to perform additional flexible NOTAM grouping according to the user requirements					

5.0 COMMON ELEMENTS

element NOTAM/Altitudes

diagram	The diagram illustrates the structure of the AltitudeInfoType element. It is a dashed yellow box containing three main components: Altitudes, Altitude, and a choice between Upper and Lower. The Altitudes element is a dashed rectangle with a small square icon. It is connected to a choice element (a rectangle with a dashed border and a small square icon) which branches into two paths. The top path leads to the Altitude element (a rectangle with a small square icon) with a multiplicity of 1..∞ and the text "used for individual applicability altitudes without upper and lower bound". The bottom path leads to another choice element (a rectangle with a dashed border and a small square icon) which branches into two paths: one to the Upper element (a rectangle with a small square icon) with the text "upper bound of the data applicability, value 999 with unit ft/100 could be used if not provided", and another to the Lower element (a rectangle with a small square icon) with the text "lower bound of the data applicability, value 0 with unit ft/100 could be used if not provided".
type	AltitudeInfoType
children	Altitude Upper Lower

5.0 COMMON ELEMENTS

	<u>trafficIndicator</u> derived by: xs:string <u>purpose</u> derived by: xs:string <u>scope</u> derived by: xs:string <u>lowerAlt</u> derived by: xs:int <u>upperAlt</u> derived by: xs:int	documentation The traffic indicator (e.g., I for IFR) documentation The purpose (e.g., O as operationally significant) documentation The scope of the NOTAM (e.g., A as for Airport) documentation The lower Altitude of the applicability of the NOTAM (e.g., 0) documentation The upper Altitude of the applicability of the NOTAM (e.g., 0)
annotation	documentation Additional ICAO NOTAM information	

attribute NOTAM/ICAONOTAMInformation/@fir

type	restriction of xs:string
annotation	documentation The location identifier (e.g., ESSA)

attribute NOTAM/ICAONOTAMInformation/@qcode1

type	QCode1Type							
facets	enumeration	LA	enumeration	FA	enumeration	AA	enumeration	WA
	enumeration	LB	enumeration	FB	enumeration	AC	enumeration	WB
	enumeration	LC	enumeration	FC	enumeration	AD	enumeration	WC
	enumeration	LD	enumeration	FD	enumeration	AE	enumeration	WD
	enumeration	LE	enumeration	FF	enumeration	AF	enumeration	WE
	enumeration	LF	enumeration	FG	enumeration	AH	enumeration	WF
	enumeration	LH	enumeration	FH	enumeration	AL	enumeration	WG
	enumeration	LI	enumeration	FL	enumeration	AN	enumeration	WJ
	enumeration	LJ	enumeration	FM	enumeration	AO	enumeration	WL
	enumeration	LK	enumeration	FO	enumeration	AP	enumeration	WM
	enumeration	LL	enumeration	FP	enumeration	AR	enumeration	WP
	enumeration	LM	enumeration	FS	enumeration	AT	enumeration	WS
	enumeration	LP	enumeration	FT	enumeration	AU	enumeration	WT
	enumeration	LR	enumeration	FU	enumeration	AV	enumeration	WV
	enumeration	LS	enumeration	FW	enumeration	AX	enumeration	WZ
	enumeration	LT	enumeration	FZ	enumeration	AZ	enumeration	OA
	enumeration	LV	enumeration	CA	enumeration	SA	enumeration	OB
	enumeration	LW	enumeration	CE	enumeration	SB	enumeration	OE
	enumeration	LX	enumeration	CG	enumeration	SC	enumeration	OL
	enumeration	LY	enumeration	CL	enumeration	SE	enumeration	OR
	enumeration	LZ	enumeration	CM	enumeration	SF	enumeration	AC
	enumeration	MA	enumeration	CP	enumeration	SL	enumeration	AD
	enumeration	MB	enumeration	CR	enumeration	SO	enumeration	AF
	enumeration	MC	enumeration	CS	enumeration	SP	enumeration	AG
	enumeration	MD	enumeration	CT	enumeration	SS	enumeration	AH
	enumeration	MG	enumeration	ID	enumeration	ST	enumeration	AK
	enumeration	MH	enumeration	IG	enumeration	SU	enumeration	AM
	enumeration	MK	enumeration	II	enumeration	SV	enumeration	AN
	enumeration	MM	enumeration	IL	enumeration	SY	enumeration	AO
	enumeration	MN	enumeration	IM	enumeration	PA	enumeration	AP
	enumeration	MP	enumeration	IO	enumeration	PB	enumeration	AR
	enumeration	MR	enumeration	IS	enumeration	PC	enumeration	AS
	enumeration	MS	enumeration	IT	enumeration	PD	enumeration	AU
	enumeration	MT	enumeration	IU	enumeration	PE	enumeration	AW
	enumeration	MU	enumeration	IW	enumeration	PF	enumeration	AX
	enumeration	MW	enumeration	IX	enumeration	PH	enumeration	CA
	enumeration	MX	enumeration	IY	enumeration	PI	enumeration	CC
	enumeration	RA	enumeration	NA	enumeration	PL	enumeration	CD
	enumeration	RD	enumeration	NB	enumeration	PK	enumeration	CE

5.0 COMMON ELEMENTS

	enumeration RO	enumeration NC	enumeration PM	enumeration CF
	enumeration RP	enumeration ND	enumeration PN	enumeration CG
	enumeration RR	enumeration NF	enumeration PO	enumeration CH
	enumeration RT	enumeration NL	enumeration PP	enumeration CI
	enumeration NT	enumeration NM	enumeration PR	enumeration CL
	enumeration NV	enumeration NN	enumeration PT	enumeration CM
	enumeration NX	enumeration NO	enumeration PU	enumeration CO
	enumeration PZ	enumeration CR	enumeration PX	enumeration CP
	enumeration CS	enumeration CT		
annotation	documentation The first bigram of the Q Code of the NOTAM without the Q			

attribute NOTAM/ICAONOTAMInformation/@qcode2

type	<u>QCode2Type</u>			
facets	enumeration HA	enumeration HS	enumeration LL	
	enumeration HB	enumeration HT	enumeration LN	
	enumeration HC	enumeration HU	enumeration LP	
	enumeration HD	enumeration HV	enumeration LR	
	enumeration HE	enumeration HW	enumeration LS	
	enumeration HF	enumeration HX	enumeration LT	
	enumeration HG	enumeration HY	enumeration LV	
	enumeration HH	enumeration HZ	enumeration LW	
	enumeration HI	enumeration LA	enumeration LX	
	enumeration HJ	enumeration LB	enumeration XX	
	enumeration HK	enumeration LC		
	enumeration HL	enumeration LD		
	enumeration HM	enumeration LE		
	enumeration HN	enumeration LF		
	enumeration HO	enumeration LG		
	enumeration HP	enumeration LH		
	enumeration HQ	enumeration LI		
	enumeration HR	enumeration LK		
annotation	documentation The second bigram of the Q Code of the NOTAM without the Q			

attribute NOTAM/ICAONOTAMInformation/@trafficIndicator

type	restriction of xs:string
annotation	documentation The traffic indicator (e.g., I for IFR)

attribute NOTAM/ICAONOTAMInformation/@purpose

type	restriction of xs:string
annotation	documentation The purpose (e.g., O as operationally significant)

attribute NOTAM/ICAONOTAMInformation/@scope

type	restriction of xs:string
annotation	documentation The scope of the NOTAM (e.g., A as for Airport)

attribute NOTAM/ICAONOTAMInformation/@lowerAlt

type	restriction of xs:int
annotation	documentation The lower Altitude of the applicability of the NOTAM (e.g., 0)

5.0 COMMON ELEMENTS

attribute NOTAM/ICAONOTAMInformation/@upperAlt

type	restriction of xs:int
annotation	documentation The upper Altitude of the applicability of the NOTAM (e.g., 0)

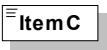
element NOTAM/ICAONOTAMInformation/ItemA

diagram	
type	restriction of xs:string

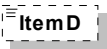
element NOTAM/ICAONOTAMInformation/ItemB

diagram	
type	restriction of xs:string

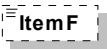
element NOTAM/ICAONOTAMInformation/ItemC

diagram	
type	restriction of xs:string

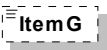
element NOTAM/ICAONOTAMInformation/ItemD

diagram	
type	restriction of xs:string

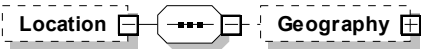
element NOTAM/ICAONOTAMInformation/ItemF

diagram	
type	restriction of xs:string

element NOTAM/ICAONOTAMInformation/ItemG

diagram	
type	restriction of xs:string

element NOTAM/Location

diagram	
children	Geography

5.0 COMMON ELEMENTS

element NOTAM/Location/Geography

diagram	
type	GeographyType
children	Polygon Spot MovementSpeed MovementDirection

element NOTAM/Remark

diagram	
type	TextType
children	Paragraph
annotation	documentation A remark to a given NOTAM as provided by ground staff

simpleType NOTAMSubjectType

type	restriction of xs:string
facets	enumeration Airport enumeration Approach enumeration Country enumeration Airspace enumeration Waypoint enumeration Route enumeration Runway enumeration Terminal procedure enumeration Chart enumeration Company
annotation	documentation list of recommended value in order determining what kind of thing is affected by NOTAM

5.0 COMMON ELEMENTS

simpleType QCode1Type

[illegible]

5.0 COMMON ELEMENTS

simpleType QCode2Type

type	restriction of xs:string					
used by	attribute NOTAM/ICAONOTAMInformation/@qcode2					
facets	enumeration	HA	enumeration	HS	enumeration	LL
	enumeration	HB	enumeration	HT	enumeration	LN
	enumeration	HC	enumeration	HU	enumeration	LP
	enumeration	HD	enumeration	HV	enumeration	LR
	enumeration	HE	enumeration	HW	enumeration	LS
	enumeration	HF	enumeration	HX	enumeration	LT
	enumeration	HG	enumeration	HY	enumeration	LV
	enumeration	HH	enumeration	HZ	enumeration	LW
	enumeration	HI	enumeration	LA	enumeration	LX
	enumeration	HJ	enumeration	LB	enumeration	XX
	enumeration	HK	enumeration	LC		
	enumeration	HL	enumeration	LD		
	enumeration	HM	enumeration	LE		
	enumeration	HN	enumeration	LF		
	enumeration	HO	enumeration	LG		
	enumeration	HP	enumeration	LH		
	enumeration	HQ	enumeration	LI		
	enumeration	HR	enumeration	LK		
annotation	documentation list of bigrams that are possible in second part of ICAO NOTAM QCode					

5.10 NOTOC

To be added in a future supplement.

5.11 Load and Trim Sheet

To be added in a future supplement.

5.12 Crew List

element CrewList

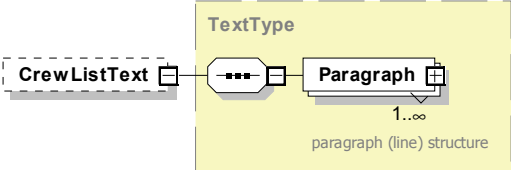
diagram	
children	M633Header M633SupplementaryHeader CrewListDetails CrewListText
annotation	documentation Crew List Definition

element CrewList/CrewListDetails

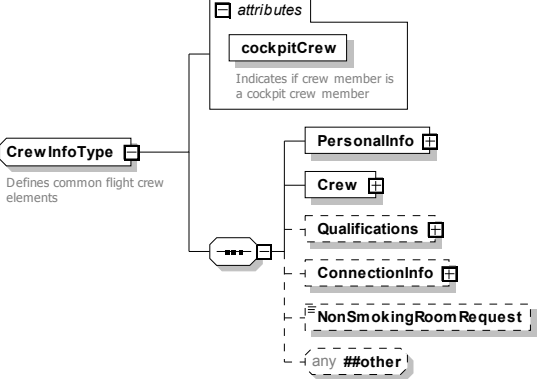
diagram	
type	CrewListType
children	CrewInfo

5.0 COMMON ELEMENTS

element CrewList/CrewListText

diagram	 The diagram shows the structure of the CrewListText element. It is a dashed box containing a TextType box. Inside TextType, there is a sequence of elements: a CrewListText box, followed by a sequence of Paragraph boxes. The Paragraph box is labeled with a cardinality of 1..∞ and the text "paragraph (line) structure".
type	TextType
children	Paragraph

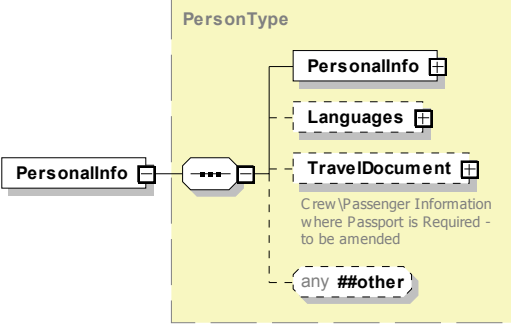
complexType CrewInfoType

diagram	 The diagram shows the structure of the CrewInfoType complex type. It is a box containing several elements: attributes (a box containing cockpitCrew with the annotation "Indicates if crew member is a cockpit crew member"), PersonalInfo, Crew, Qualifications, ConnectionInfo, NonSmokingRoomRequest, and any ##other. The CrewInfoType box is labeled with the text "Defines common flight crew elements".					
children	PersonalInfo Crew Qualifications ConnectionInfo NonSmokingRoomRequest					
used by	element	CrewListType/CrewInfo				
attributes	Name	Type	Use	Default	Fixed	annotation
	cockpitCrew	xs:boolean	required			documentation Indicates if crew member is a cockpit crew member
annotation	documentation Defines common flight crew elements					

attribute CrewInfoType/@cockpitCrew

type	xs:boolean
annotation	documentation Indicates if crew member is a cockpit crew member

element CrewInfoType/PersonalInfo

diagram	 The diagram shows the structure of the PersonalInfo element. It is a dashed box containing a PersonType box. Inside PersonType, there is a sequence of elements: PersonalInfo, Languages, and TravelDocument. The TravelDocument box is labeled with the text "Crew/Passenger Information where Passport is Required - to be amended". Below TravelDocument is any ##other. The PersonalInfo box is labeled with the text "Crew/Passenger Information where Passport is Required - to be amended".
type	PersonType
children	PersonalInfo Languages TravelDocument

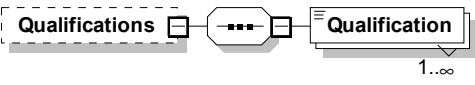
5.0 COMMON ELEMENTS

element CrewInfoType/Crew

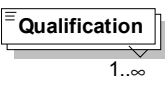
diagram	CrewType attributes employeeId department rank Title or rank of the crew (e.g.: Captian (CPT), First Officer (FO), Navigator, Chief Purser (CP), Inflight Service Manager (ISM), Cabin Service Manager (CSM), Purser, Flight Attendant, Senior Crew Member, etc.) dutyCode Operating Position or Duty Code (e.g.: PIC, Training Captain, Door 1L, deadhead) seniority licenseNumber Crew																																								
type	CrewType																																								
attributes	<table><tr><th>Name</th><th>Type</th><th>Use</th><th>Default</th><th>Fixed</th><th>annotation</th></tr><tr><td><u>employeeId</u></td><td>derived by: xs:string</td><td></td><td></td><td></td><td rowspan="3">documentation Title or rank of the crew (e.g., Captain (CPT), First Officer (FO), Navigator, Chief Purser (CP), Inflight Service Manager (ISM), Cabin Service Manager (CSM), Purser, Flight Attendant, Senior Crew Member, etc.)</td></tr><tr><td><u>department</u></td><td>derived by: xs:string</td><td></td><td></td><td></td></tr><tr><td><u>rank</u></td><td>derived by: xs:string</td><td></td><td></td><td></td></tr><tr><td><u>dutyCode</u></td><td>derived by: xs:string</td><td>optional</td><td></td><td></td><td>documentation Operating Position or Duty Code (e.g., PIC, Training Captain, Door 1L, deadhead)</td></tr><tr><td><u>seniority</u></td><td>derived by: xs:string</td><td>optional</td><td></td><td></td><td></td></tr><tr><td><u>licenseNumber</u></td><td>derived by: xs:string</td><td></td><td></td><td></td><td></td></tr></table>	Name	Type	Use	Default	Fixed	annotation	<u>employeeId</u>	derived by: xs:string				documentation Title or rank of the crew (e.g., Captain (CPT), First Officer (FO), Navigator, Chief Purser (CP), Inflight Service Manager (ISM), Cabin Service Manager (CSM), Purser, Flight Attendant, Senior Crew Member, etc.)	<u>department</u>	derived by: xs:string				<u>rank</u>	derived by: xs:string				<u>dutyCode</u>	derived by: xs:string	optional			documentation Operating Position or Duty Code (e.g., PIC, Training Captain, Door 1L, deadhead)	<u>seniority</u>	derived by: xs:string	optional				<u>licenseNumber</u>	derived by: xs:string				
Name	Type	Use	Default	Fixed	annotation																																				
<u>employeeId</u>	derived by: xs:string				documentation Title or rank of the crew (e.g., Captain (CPT), First Officer (FO), Navigator, Chief Purser (CP), Inflight Service Manager (ISM), Cabin Service Manager (CSM), Purser, Flight Attendant, Senior Crew Member, etc.)																																				
<u>department</u>	derived by: xs:string																																								
<u>rank</u>	derived by: xs:string																																								
<u>dutyCode</u>	derived by: xs:string	optional			documentation Operating Position or Duty Code (e.g., PIC, Training Captain, Door 1L, deadhead)																																				
<u>seniority</u>	derived by: xs:string	optional																																							
<u>licenseNumber</u>	derived by: xs:string																																								

5.0 COMMON ELEMENTS

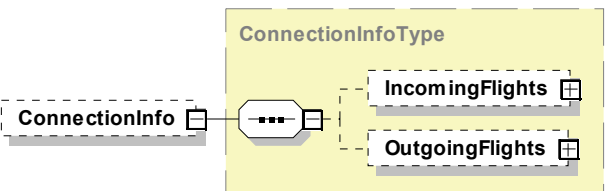
element CrewInfoType/Qualifications

diagram	 The diagram shows a dashed box labeled 'Qualifications' containing a sequence of three elements: a small square, a hexagon with three dots, and a rectangle labeled 'Qualification'. The 'Qualification' rectangle has a '1..∞' cardinality indicator below it.
children	Qualification

element CrewInfoType/Qualifications/Qualification

diagram	 The diagram shows a single rectangle labeled 'Qualification' with a '1..∞' cardinality indicator below it.
type	restriction of xs:string

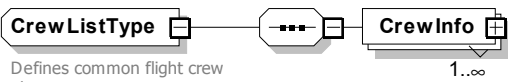
element CrewInfoType/ConnectionInfo

diagram	 The diagram shows a dashed box labeled 'ConnectionInfo' containing a sequence of three elements: a small square, a hexagon with three dots, and a dashed box labeled 'ConnectionInfoType'. The 'ConnectionInfoType' box contains two elements: 'IncomingFlights' and 'OutgoingFlights', each with a small square icon to its right.
type	ConnectionInfoType
children	IncomingFlights OutgoingFlights

element CrewInfoType/NonSmokingRoomRequest

diagram	 The diagram shows a dashed box labeled 'NonSmokingRoomRequest'.
type	xs:boolean

complexType CrewListType

diagram	 The diagram shows a sequence of three elements: a rectangle labeled 'CrewListType', a hexagon with three dots, and a rectangle labeled 'CrewInfo'. The 'CrewInfo' rectangle has a '1..∞' cardinality indicator below it. Below the 'CrewListType' rectangle, the text 'Defines common flight crew elements' is written.
children	CrewInfo
used by	element CrewList/CrewListDetails
annotation	documentation Defines common flight crew elements

5.0 COMMON ELEMENTS

element CrewListType/CrewInfo

diagram						
type	CrewInfoType					
children	PersonalInfo Crew Qualifications ConnectionInfo NonSmokingRoomRequest					
attributes	Name cockpitCrew	Type xs:boolean	Use required	Default	Fixed	annotation documentation Indicates if crew member is a cockpit crew member

complexType CrewType

diagram						
used by	element	CrewInfoType/Crew				

5.0 COMMON ELEMENTS

attributes	Name	Type	Use	Default	Fixed	annotation
	<u>employeeId</u>	derived by: xs:string				
	<u>department</u>	derived by: xs:string				
	<u>rank</u>	derived by: xs:string				documentation Title or rank of the crew (e.g., Captain (CPT), First Officer (FO), Navigator, Chief Purser (CP), Inflight Service Manager (ISM), Cabin Service Manager (CSM), Purser, Flight Attendant, Senior Crew Member, etc.)
	<u>dutyCode</u>	derived by: xs:string	optional			documentation Operating Position or Duty Code (e.g., PIC, Training Captain, Door 1L, deadhead)
	<u>seniority</u>	derived by: xs:string	optional			
	<u>licenseNumber</u>	derived by: xs:string				
annotation	documentation Defines common flight crew elements					

attribute CrewType/@employeeId

type	restriction of xs:string

attribute CrewType/@department

type	restriction of xs:string

attribute CrewType/@rank

type	restriction of xs:string
annotation	documentation Title or rank of the crew (e.g., Captain (CPT), First Officer (FO), Navigator, Chief Purser (CP), Inflight Service Manager (ISM), Cabin Service Manager (CSM), Purser, Flight Attendant, Senior Crew Member, etc.)

attribute CrewType/@dutyCode

type	restriction of xs:string
annotation	documentation Operating Position or Duty Code (e.g., PIC, Training Captain, Door 1L, deadhead)

attribute CrewType/@seniority

type	restriction of xs:string

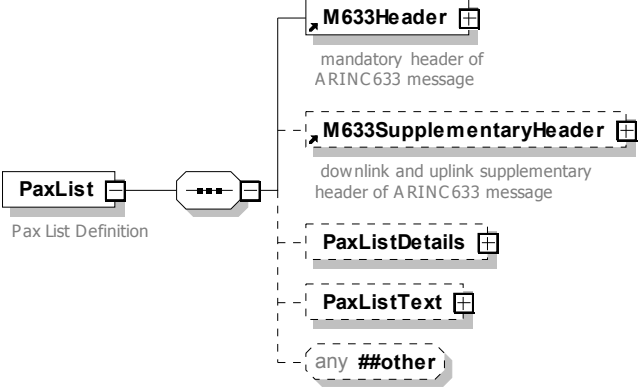
attribute CrewType/@licenseNumber

type	restriction of xs:string

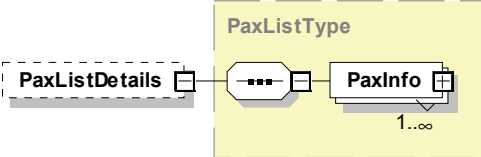
5.0 COMMON ELEMENTS

5.13 Pax List

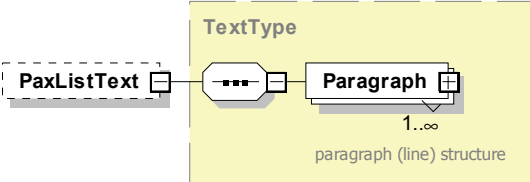
element PaxList

diagram	 The diagram shows the structure of the PaxList element. It starts with a 'PaxList' box labeled 'Pax List Definition'. This box is connected to a dashed box containing four elements: 'M633Header' (mandatory header of ARINC633 message), 'M633SupplementaryHeader' (downlink and uplink supplementary header of ARINC633 message), 'PaxListDetails', and 'PaxListText'. Below these is a dashed box labeled 'any ##other'.
children	M633Header M633SupplementaryHeader PaxListDetails PaxListText
annotation	documentation Pax List Definition

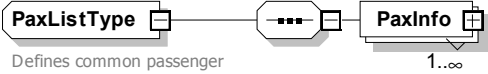
element PaxList/PaxListDetails

diagram	 The diagram shows the structure of the PaxList/PaxListDetails element. It starts with a 'PaxListDetails' box. This box is connected to a dashed box containing a 'PaxInfo' box. The 'PaxInfo' box is labeled '1..∞'.
type	PaxListType
children	PaxInfo

element PaxList/PaxListText

diagram	 The diagram shows the structure of the PaxList/PaxListText element. It starts with a 'PaxListText' box. This box is connected to a dashed box containing a 'Paragraph' box. The 'Paragraph' box is labeled '1..∞' and has the text 'paragraph (line) structure' below it.
type	TextType
children	Paragraph

complexType PaxListType

diagram	 The diagram shows the structure of the PaxListType complex type. It starts with a 'PaxListType' box labeled 'Defines common passenger elements'. This box is connected to a dashed box containing a 'PaxInfo' box. The 'PaxInfo' box is labeled '1..∞'.
children	PaxInfo
used by	element PaxList/PaxListDetails
annotation	documentation Defines common passenger elements

5.0 COMMON ELEMENTS

element PaxListType/PaxInfo

diagram	The diagram shows a PaxInfo element connected to a PaxInfoType container. The PaxInfoType container contains the following elements: PersonInfo, Company, PaxFlightInfo, PersonToContact, and any ##other. The PaxInfo element has a multiplicity of 1..∞.
type	PaxInfoType
children	PersonInfo Company PaxFlightInfo PersonToContact

complexType PaxRequestType

diagram	The diagram shows a PaxRequestType container (yellow box) with the following structure: request (complex type): - Attributes: request - Description: Denotes any special requests a passenger might have, e.g. Is a child, Asian Vegetarian Meal, Wheel Chair, Extra Seat, Basinet requestType (simple type): - Description: Allows the airlines to assign codes to each request.					
used by	elements	PaxFlightInfoType/ServiceRequests/ServiceRequest PaxFlightInfoType/SpecialAssistances/SpecialAssistance				
attributes	Name	Type	Use	Default	Fixed	annotation
	request	derived by: xs:string	required			documentation Denotes any special requests a passenger might have, e.g., Is a child, Asian Vegetarian Meal, Wheel Chair, Extra Seat, Basinet
	requestType	derived by: xs:string	optional			documentation Allows the airlines to assign codes to each request.
annotation	documentation Defines Passenger Special Request data					

attribute PaxRequestType/@request

type	restriction of xs:string
annotation	documentation Denotes any special requests a passenger might have, e.g., Is a child, Asian Vegetarian Meal, Wheel Chair, Extra Seat, Basinet

5.0 COMMON ELEMENTS

attribute PaxRequestType/@requestType

type	restriction of xs:string
annotation	documentation Allows the airlines to assign codes to each request.

complexType PaxFlightInfoType

diagram						
children	ImportantPassenger IDPax TravellerGroup Comments ServiceRequests SpecialAssistances ConnectionInfo					
used by	element PaxInfoType/PaxFlightInfo					
attributes	Name	Type	Use	Default	Fixed	annotation
	seat	derived by: xs:string	optional			
	class	derived by: xs:string	optional	Economy		
	cabinSection	derived by: xs:string				
annotation	documentation Defines common Passenger elements					

attribute PaxFlightInfoType/@seat

type	restriction of xs:string

attribute PaxFlightInfoType/@class

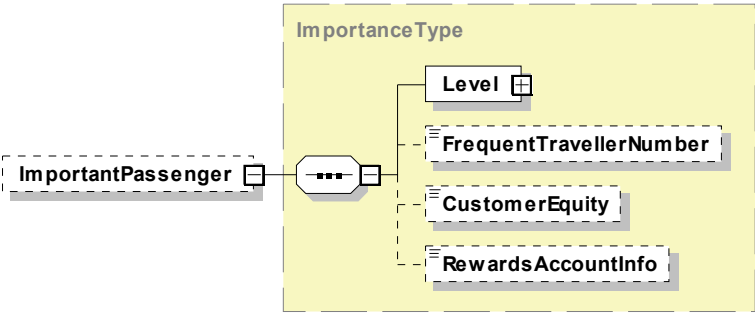
type	restriction of xs:string
facets	enumeration First enumeration Business enumeration PremiumEconomy enumeration Economy enumeration Other

attribute PaxFlightInfoType/@cabinSection

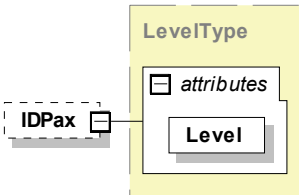
type	restriction of xs:string

5.0 COMMON ELEMENTS

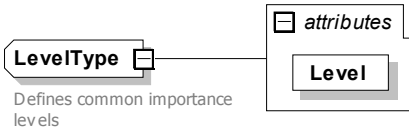
element PaxFlightInfoType/ImportantPassenger

diagram	
type	ImportanceType
children	Level FrequentTravellerNumber CustomerEquity RewardsAccountInfo

element PaxFlightInfoType/IDPax

diagram						
type	<u>LevelType</u>					
attributes	Name <u>Level</u>	Type derived by: xs:string	Use required	Default	Fixed	annotation

complexType LevelType

diagram						
used by	elements	PaxFlightInfoType/IDPaxImportanceType/Level				
attributes	Name Level	Type derived by: xs:string	Use required	Default	Fixed	annotation
annotation	documentation Defines common importance levels					

attribute LevelType/@Level

type	restriction of xs:string

element PaxFlightInfoType/TravellerGroup

diagram	
type	restriction of xs:string

5.0 COMMON ELEMENTS

element PaxFlightInfoType/Comments

diagram	Comment
children	Comment

element PaxFlightInfoType/Comments/Comment

diagram	Comment paragraph (line) structure
type	TextType
children	Paragraph
annotation	documentation Comment

element PaxFlightInfoType/ServiceRequests

diagram	defines Passenger Special Service Requests not relevant for an emergency message
children	ServiceRequest

element PaxFlightInfoType/ServiceRequests/ServiceRequest

diagram	ServiceRequest defines Passenger Special Service Requests not relevant for an emergency message PaxRequestType attributes request Denotes any special requests a passenger might have, e.g. Is a child, Asian Vegetarian Meal, Wheel Chair, Extra Seat, Basinet requestType Allows the airlines to assign codes to each request.
type	PaxRequestType

5.0 COMMON ELEMENTS

attributes	Name <u>request</u> Type derived by: xs:string Use required Default Fixed annotation documentation Denotes any special requests a passenger might have, e.g., Is a child, Asian Vegetarian Meal, Wheel Chair, Extra Seat, Basinet documentation Allows the airlines to assign codes to each request.
annotation	documentation defines Passenger Special Service Requests not relevant for an emergency message

element PaxFlightInfoType/SpecialAssistances

diagram	SpecialAssistances 1..∞ SpecialAssistance 1..∞ defines Passenger Special Assistance Requests possibly relevant for an emergency message
children	<u>SpecialAssistance</u>

element PaxFlightInfoType/SpecialAssistances/SpecialAssistance

diagram	SpecialAssistance 1..∞ defines Passenger Special Assistance Requests possibly relevant for an emergency message PaxRequestType attributes request Denotes any special requests a passenger might have, e.g. Is a child, Asian Vegetarian Meal, Wheel Chair, Extra Seat, Basinet requestType Allows the airlines to assign codes to each request.
type	<u>PaxRequestType</u>
attributes	Name <u>request</u> Type derived by: xs:string Use required Default Fixed annotation documentation Denotes any special requests a passenger might have, e.g., Is a child, Asian Vegetarian Meal, Wheel Chair, Extra Seat, Basinet

5.0 COMMON ELEMENTS

	requestType	derived by: xs:string	optional	documentation Allows the airlines to assign codes to each request.
annotation	documentation defines Passenger Special Assistance Requests possibly relevant for an emergency message			

element PaxFlightInfoType/ConnectionInfo

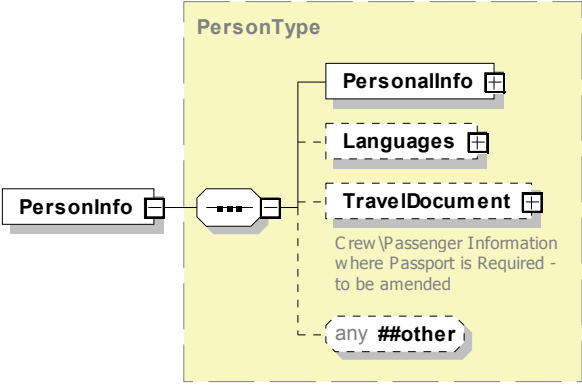
diagram				
type	ConnectionInfoType			
children	IncomingFlights OutgoingFlights			

complexType PaxInfoType

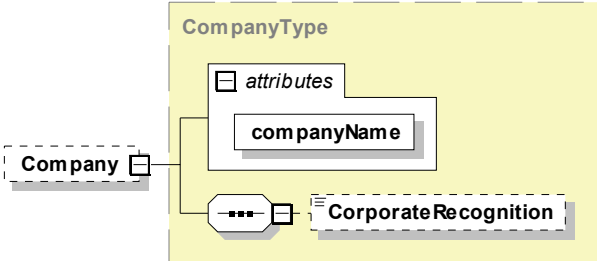
diagram				
children	PersonInfo Company PaxFlightInfo PersonToContact			
used by	element	PaxListType/PaxInfo		
annotation	documentation	Defines common passenger elements		

5.0 COMMON ELEMENTS

element PaxInfoType/PersonInfo

diagram	 The diagram shows a yellow box labeled 'PersonType'. Inside, there is a 'PersonInfo' box with a small square icon. A line connects 'PersonInfo' to a circle containing three dots. This circle is connected to a dashed box containing three elements: 'PersonalInfo' (with a square icon), 'Languages' (with a square icon), and 'TravelDocument' (with a square icon). Below these is a note: 'Crew \Passenger Information where Passport is Required - to be amended'. At the bottom of the dashed box is an 'any ##other' box.
type	PersonType
children	PersonalInfo Languages TravelDocument

element PaxInfoType/Company

diagram	 The diagram illustrates the structure of the CompanyType element. It is represented by a yellow box labeled CompanyType. Inside this box, there is a smaller box labeled Company (indicated by a dashed border). The Company box is connected to a larger box labeled CorporateRecognition (indicated by a dashed border). The CorporateRecognition box contains two sub-elements: attributes (indicated by a dashed border) and companyName (indicated by a dashed border). The attributes box is connected to the CorporateRecognition box via a line with a small square icon. The companyName box is connected to the CorporateRecognition box via a line with a small square icon. The CorporateRecognition box also contains a small square icon.					
type	CompanyType					
children	CorporateRecognition					
attributes	Name companyName	Type derived by: xs:string	Use required	Default	Fixed	annotation

5.0 COMMON ELEMENTS

element PaxInfoType/PaxFlightInfo

diagram	The diagram illustrates the structure of the PaxFlightInfoType. It is a complex type containing several elements. At the top, there is an 'attributes' block which includes 'seat', 'class', and 'cabinSection'. Below this, the main body of the type contains a sequence of elements: 'ImportantPassenger', 'IDPax', 'TravellerGroup', 'Comments', 'ServiceRequests', 'SpecialAssistances', 'ConnectionInfo', and finally an 'any ##other' element. Each element is represented by a box with a small icon indicating its cardinality or type.					
type	PaxFlightInfoType					
children	ImportantPassenger IDPax TravellerGroup Comments ServiceRequests SpecialAssistances ConnectionInfo					
attributes	Name	Type	Use	Default	Fixed	annotation
	seat	derived by: xs:string	optional			
	class	derived by: xs:string	optional	Economy		
	cabinSection	derived by: xs:string				

5.0 COMMON ELEMENTS

element PaxInfoType/PersonToContact

diagram						
type	PersonallInfoType					
children	Gender Nationality DateOfBirth ContactInfo					
attributes	Name surname givenName preferredName title	Type derived by: xs:string derived by: xs:string derived by: xs:string derived by: xs:string	Use required optional optional	Default	Fixed	annotation documentation Anything other than surname documentation academic or nobility title

complexType CompanyType

diagram						
children	CorporateRecognition					
used by	element PaxInfoType/Company					
attributes	Name companyName	Type derived by: xs:string	Use required	Default	Fixed	annotation
annotation	documentation Defines Company data					

attribute CompanyType/@companyName

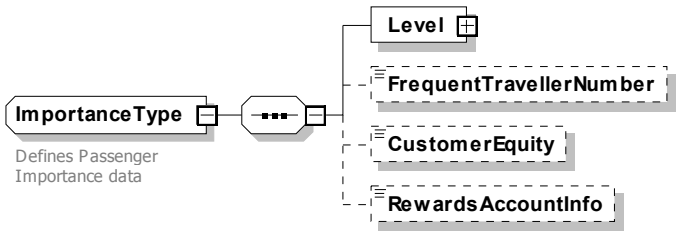
type	restriction of xs:string

5.0 COMMON ELEMENTS

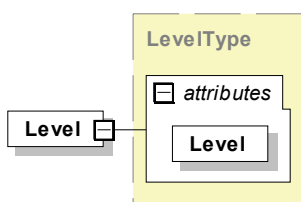
element [CompanyType/CorporateRecognition](#)

diagram	
type	restriction of xs:string

complexType [ImportanceType](#)

diagram	
children	Level FrequentTravellerNumber CustomerEquity RewardsAccountInfo
used by	element PaxFlightInfoType/ImportantPassenger
annotation	documentation Defines Passenger Importance data

element [ImportanceType/Level](#)

diagram																				
type	LevelType																			
attributes	<table><tr><th>Name</th><th>Type</th><th>derived by:</th><th>Use</th><th>Default</th><th>Fixed</th><th>annotation</th></tr><tr><td>Level</td><td>xs:string</td><td></td><td>required</td><td></td><td></td><td></td></tr></table>	Name	Type	derived by:	Use	Default	Fixed	annotation	Level	xs:string		required								
Name	Type	derived by:	Use	Default	Fixed	annotation														
Level	xs:string		required																	

element [ImportanceType/FrequentTravellerNumber](#)

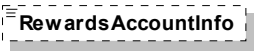
diagram	
type	restriction of xs:string

element [ImportanceType/CustomerEquity](#)

diagram	
type	xs:long

5.0 COMMON ELEMENTS

element ImportanceType/RewardsAccountInfo

diagram	
type	xs:long

5.14 Oceanic Track

To be added in a future supplement.

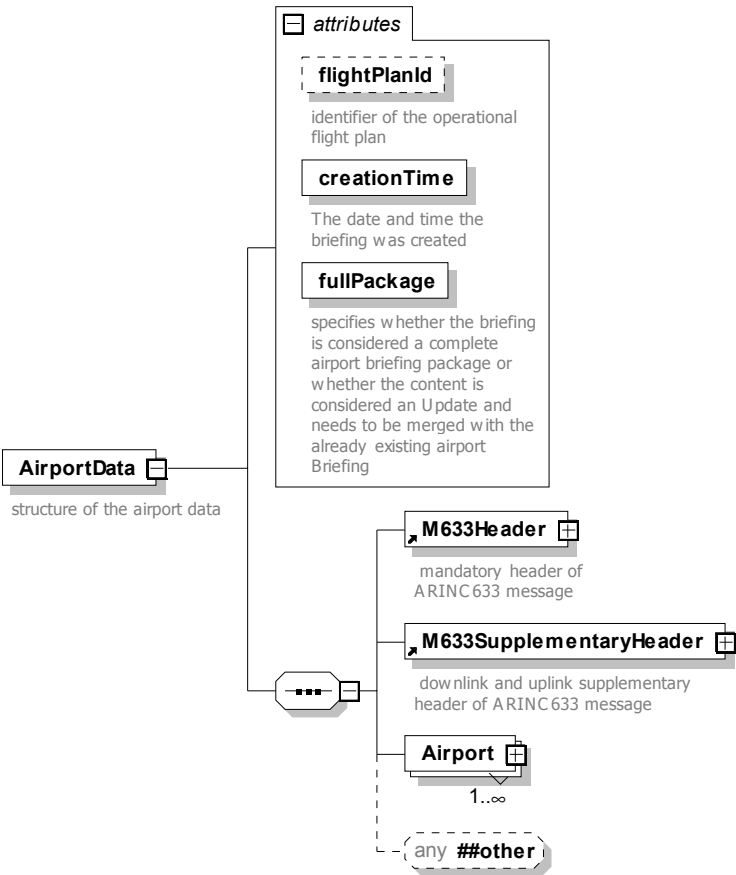
5.15 Navigational Chart

To be added in a future supplement.

5.16 Airport Information

Currently the structure and definition of AirportData data is not to be used as a single source for Takeoff and Landing Performance applications. This may be revisited in a future supplement.

element AirportData

diagram						
children	M633Header M633SupplementaryHeader Airport					
attributes	Name flightPlanId	Type derived by: xs:string	Use	Default	Fixed	annotation documentation identifier of the operational flight plan

5.0 COMMON ELEMENTS

	creationTime	xs:dateTime	required	documentation The date and time the briefing was created
	fullPackage	xs:boolean	required	documentation specifies whether the briefing is considered a complete airport briefing package or whether the content is considered an Update and needs to be merged with the already existing airport Briefing
annotation	documentation structure of the airport data			

attribute **AirportData/@flightPlanId**

type	restriction of xs:string
annotation	documentation identifier of the operational flight plan

attribute **AirportData/@creationTime**

type	xs:dateTime
annotation	documentation The date and time the briefing was created

attribute **AirportData/@fullPackage**

type	xs:boolean
annotation	documentation specifies whether the briefing is considered a complete airport briefing package or whether the content is considered an Update and needs to be merged with the already existing airport Briefing

5.0 COMMON ELEMENTS

element **AirportData/Airport**

diagram	attributes sequence Provide best order to consider airports when displaying them to crew typically ordered along the flight) Airport 1..∞ AirportIdentification Runway 0..∞ TerminalProcedures 0..∞ MagneticVariation magnetic variation for airport reference point in degrees. Positive numbers indicate east variation, negative numbers indicate west variation. Elevation AirportReferencePoint coordinates RescueAndFireFightingCategory According ICAO: From 0 (No Fire Fighting available) to 10 (sufficient for A380) RequiredFlightCrewQualification e.g. A=Airport requires no specific qualification. B=Some additional training required C= Complex airport. Typically simulator training required OpeningHours UTC times when the airport usually commences and terminates operation LocalTimeOffsetToUTC any ##other					
children	AirportIdentification Runway TerminalProcedures MagneticVariation Elevation AirportReferencePoint RescueAndFireFightingCategory RequiredFlightCrewQualification OpeningHours LocalTimeOffsetToUTC					
attributes	Name	Type	Use	Default	Fixed	annotation
	sequence					documentation Provide best order to consider airports when displaying them to crew typically ordered along the flight)

5.0 COMMON ELEMENTS

attribute **AirportData/Airport/@sequence**

annotation	documentation Provide best order to consider airports when displaying them to crew typically ordered along the flight)

element **AirportData/Airport/AirportIdentification**

diagram						
type	AirportIdentificationType					
children	AirportCAOCCode AirportIATACode AirportIATACode					
attributes	Name airportName	Type derived by: xs:string	Use	Default	Fixed	annotation documentation airport name e.g., WASHINGTON DULLES INTL documentation e.g., DepartureAirport, DestinationAlternate, ContingencySavingsAirport
	airportFunction	airportFunctionType				

5.0 COMMON ELEMENTS

element **AirportData/Airport/Runway**

diagram						
children	QFU Approach LandingDistanceAvailable LandingThreshold TakeoffDistanceAvailable TakeoffRunAvailable Elevation Slope ApprovedForRegularOperation					
attributes	Name	Type	Use	Default	Fixed	annotation
	runwayIdentifier	derived by: xs:string	required			documentation e.g., 23C
annotation	documentation					

attribute **AirportData/Airport/Runway/@runwayIdentifier**

type	restriction of xs:string
annotation	documentation e.g., 23C

5.0 COMMON ELEMENTS

element **AirportData/Airport/Runway/QFU**

diagram						
type	extension of xs:float					
attributes	Name unit type	Type directionUnitType xs:string	Use	Default	Fixed deg magnetic	annotation
annotation	documentation Magnetic Runway Track					

attribute **AirportData/Airport/Runway/QFU/@unit**

type	directionUnitType
facets	enumeration deg enumeration rad

attribute **AirportData/Airport/Runway/QFU/@type**

type	xs:string

element **AirportData/Airport/Runway/Approach**

diagram						
children	RequiredHorizontalVisibility RequiredVerticalVisibility					
attributes	Name procedureName fMSProcedureName category precisionApproach	Type derived by: xs:string derived by: xs:string derived by: xs:string derived by: xs:boolean	Use	Default	Fixed	annotation
annotation	documentation Only approach procedures and minima applicable for this aircraft type should be listed					

attribute **AirportData/Airport/Runway/Approach/@procedureName**

type	restriction of xs:string

5.0 COMMON ELEMENTS

attribute **AirportData/Airport/Runway/Approach/@fMSPProcedureName**

type	restriction of xs:string

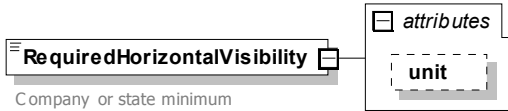
attribute **AirportData/Airport/Runway/Approach/@category**

type	restriction of xs:string
facets	enumeration 1 enumeration 2 enumeration 3 enumeration 3a enumeration 3b enumeration 3c

attribute **AirportData/Airport/Runway/Approach/@precisionApproach**

type	xs:boolean

element **AirportData/Airport/Runway/Approach/RequiredHorizontalVisibility**

diagram						
type	extension of xs:float					
attributes	Name unit	Type distanceUnitType	Use	Default m	Fixed	annotation
annotation	documentation Company or state minimum					

attribute **AirportData/Airport/Runway/Approach/RequiredHorizontalVisibility/@unit**

type	distanceUnitType
facets	enumeration m enumeration km enumeration NM enumeration ft enumeration SM

element **AirportData/Airport/Runway/Approach/RequiredVerticalVisibility**

diagram						
type	extension of xs:float					
attributes	Name unit	Type distanceUnitType	Use	Default ft	Fixed	annotation
annotation	documentation Company or state minimum					

5.0 COMMON ELEMENTS

attribute **AirportData/Airport/Runway/Approach/RequiredVerticalVisibility/@unit**

type	distanceUnitType
facets	enumeration m enumeration km enumeration NM enumeration ft enumeration SM

element **AirportData/Airport/Runway/LandingDistanceAvailable**

diagram	<pre> graph LR LDAL[LandingDistanceAvailable] --- unit[unit] subgraph attributes unit end </pre>					
type	extension of xs:float					
attributes	Name	Type	Use	Default	Fixed	annotation
	unit	distanceUnitType		m		

attribute **AirportData/Airport/Runway/LandingDistanceAvailable/@unit**

type	distanceUnitType
facets	enumeration m enumeration km enumeration NM enumeration ft enumeration SM

element **AirportData/Airport/Runway/LandingThreshold**

diagram	<pre> graph LR LT[LandingThreshold] --- Coordinates[Coordinates] </pre>					
children	Coordinates					
annotation	documentation coordinates					

element **AirportData/Airport/Runway/LandingThreshold/Coordinates**

diagram	<pre> graph LR C[Coordinates] --- latitude[latitude] C --- longitude[longitude] </pre>					
attributes	Name	Type	Use	Default	Fixed	annotation
	latitude	derived by: xs:float	required			
	longitude	derived by: xs:float	required			

5.0 COMMON ELEMENTS

element **AirportData/Airport/Runway/TakeoffDistanceAvailable**

diagram						
type	extension of xs:float					
attributes	Name unit	Type distanceUnitType	Use	Default m	Fixed	annotation

attribute **AirportData/Airport/Runway/TakeoffDistanceAvailable/@unit**

type	distanceUnitType				
facets	enumeration	m			
	enumeration	km			
	enumeration	NM			
	enumeration	ft			
	enumeration	SM			

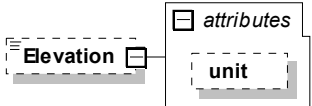
element **AirportData/Airport/Runway/TakeoffRunAvailable**

diagram						
type	extension of xs:float					
attributes	Name unit	Type distanceUnitType	Use	Default m	Fixed	annotation

attribute **AirportData/Airport/Runway/TakeoffRunAvailable/@unit**

type	distanceUnitType				
facets	enumeration	m			
	enumeration	km			
	enumeration	NM			
	enumeration	ft			
	enumeration	SM			

element **AirportData/Airport/Runway/Elevation**

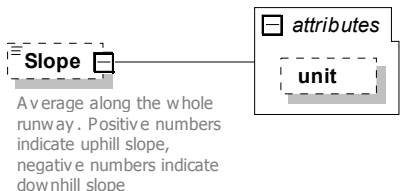
diagram						
type	extension of xs:float					
attributes	Name unit	Type altitudeUnitType	Use	Default ft	Fixed	annotation

attribute **AirportData/Airport/Runway/Elevation/@unit**

type	altitudeUnitType				
facets	enumeration	ft/100			
	enumeration	ft/1000			
	enumeration	ft			
	enumeration	m/100			
	enumeration	m/10			
	enumeration	m			

5.0 COMMON ELEMENTS

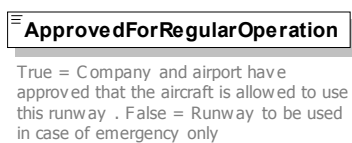
element **AirportData/Airport/Runway/Slope**

diagram						
type	extension of xs:float					
attributes	Name unit	Type directionUnitType	Use	Default deg	Fixed	annotation
annotation	documentation Average along the whole runway. Positive numbers indicate uphill slope, negative numbers indicate downhill slope					

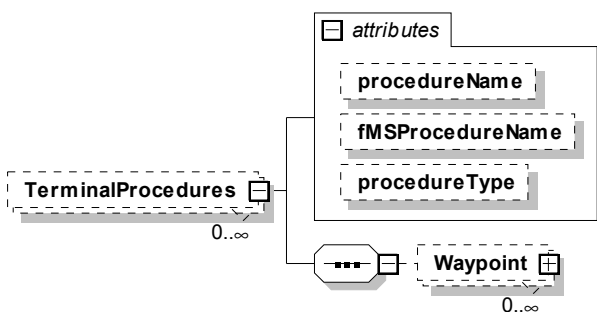
attribute **AirportData/Airport/Runway/Slope/@unit**

type	directionUnitType
facets	enumeration deg enumeration rad

element **AirportData/Airport/Runway/ApprovedForRegularOperation**

diagram						
type	xs:boolean					
annotation	documentation True = Company and airport have approved that the aircraft is allowed to use this runway. False = Runway to be used in case of emergency only					

element **AirportData/Airport/TerminalProcedures**

diagram						
children	Waypoint					
attributes	Name procedureName fMSPProcedureName procedureType	Type derived by: xs:string derived by: xs:string derived by: xs:string	Use	Default	Fixed	annotation

5.0 COMMON ELEMENTS

attribute **AirportData/Airport/TerminalProcedures/@procedureName**

type	restriction of xs:string

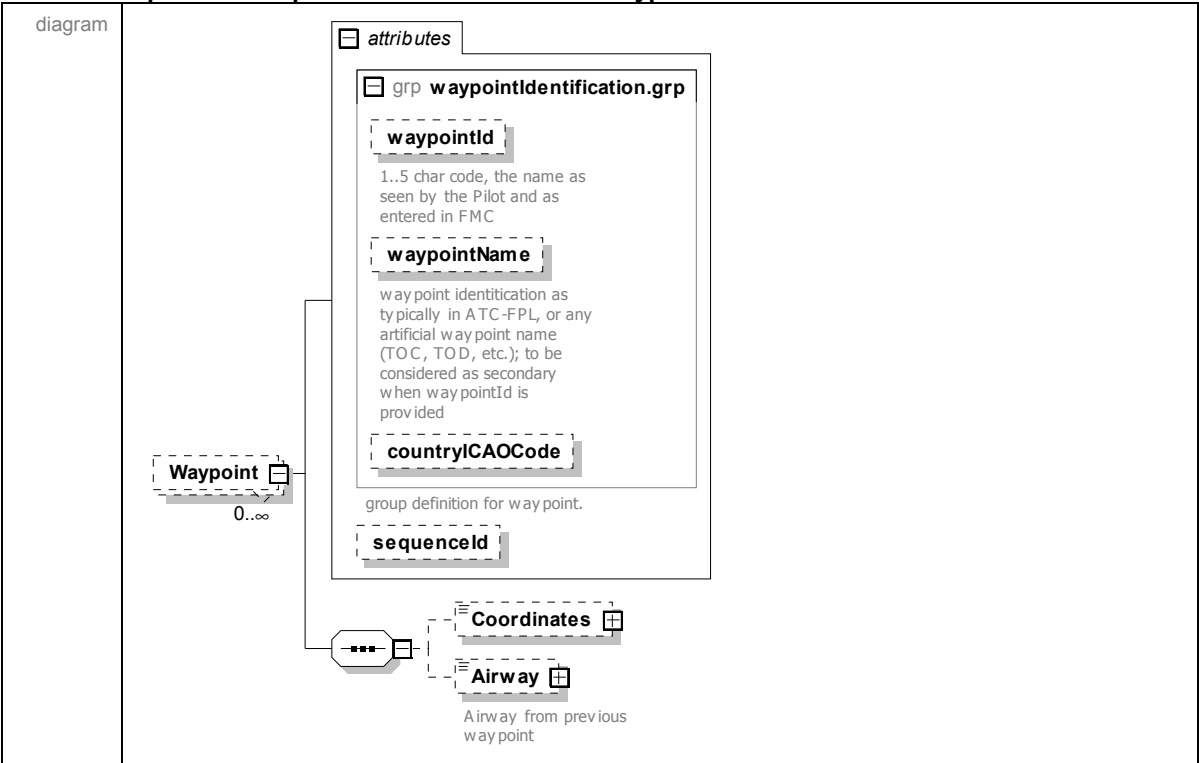
attribute **AirportData/Airport/TerminalProcedures/@fMSPprocedureName**

type	restriction of xs:string

attribute **AirportData/Airport/TerminalProcedures/@procedureType**

type	restriction of xs:string

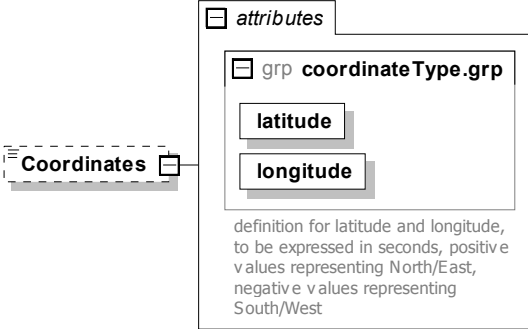
element **AirportData/Airport/TerminalProcedures/Waypoint**



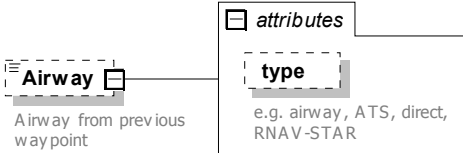
children	Coordinates Airway					
attributes	Name waypointId	Type WaypointIdType	Use optional	Default	Fixed	annotation documentation 1 to 5 char code, the name as seen by the Pilot and as entered in FMC documentation waypoint identification as typically in ATC-FPL, or any artificial waypoint name (TOC, TOD, etc.); to be considered as secondary when waypointId is provided
	waypointName	derived by: xs:string	optional			
	countryCAOCCode sequenceId	CountryCAOCCodeType	optional			

5.0 COMMON ELEMENTS

attribute **AirportData/Airport/TerminalProcedures/Waypoint/@sequenceId**element **AirportData/Airport/TerminalProcedures/Waypoint/Coordinates**

diagram						
attributes	Name latitude longitude	Type derived by: xs:float derived by: xs:float	Use required required	Default	Fixed	annotation

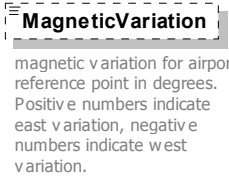
element **AirportData/Airport/TerminalProcedures/Waypoint/Airway**

diagram						
type	extension of xs:string					
attributes	Name type	Type derived by: xs:string	Use optional	Default	Fixed	annotation documentation e.g., airway, ATS, direct, RNAV-STAR
annotation	documentation Airway from previous waypoint					

attribute **AirportData/Airport/TerminalProcedures/Waypoint/Airway/@type**

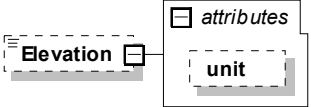
type	restriction of xs:string
annotation	documentation e.g., airway, ATS, direct, RNAV-STAR

element **AirportData/Airport/MagneticVariation**

diagram						
type	restriction of xs:float					
annotation	documentation magnetic variation for airport reference point in degrees. Positive numbers indicate east variation, negative numbers indicate west variation.					

5.0 COMMON ELEMENTS

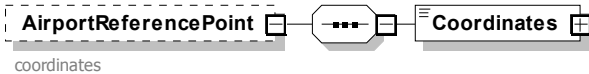
element **AirportData/Airport/Elevation**

diagram						
type	extension of xs:float					
attributes	Name unit	Type altitudeUnitType	Use	Default ft	Fixed	annotation

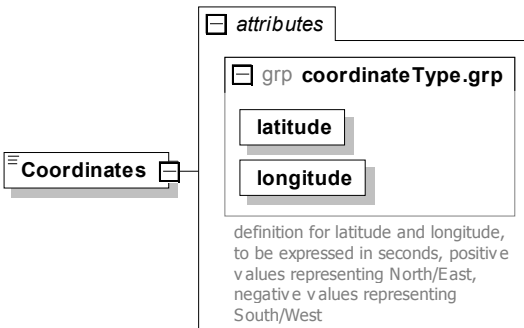
attribute **AirportData/Airport/Elevation/@unit**

type	altitudeUnitType
facets	enumeration ft/100 enumeration ft/1000 enumeration ft enumeration m/100 enumeration m/10 enumeration m

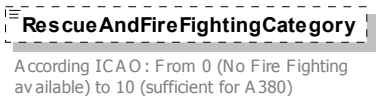
element **AirportData/Airport/AirportReferencePoint**

diagram						
children	Coordinates					
annotation	documentation coordinates					

element **AirportData/Airport/AirportReferencePoint/Coordinates**

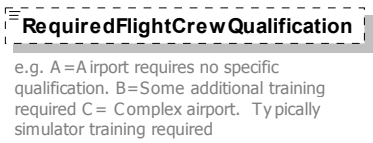
diagram						
attributes	Name latitude longitude	Type derived by: xs:float derived by: xs:float	Use required required	Default	Fixed	annotation

element **AirportData/Airport/RescueAndFireFightingCategory**

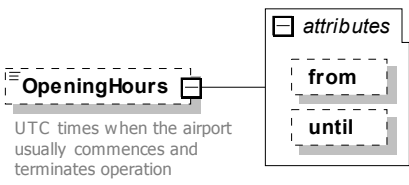
diagram						
type	restriction of xs:nonNegativeInteger					
annotation	documentation According ICAO: From 0 (No Fire Fighting available) to 10 (sufficient for A380)					

5.0 COMMON ELEMENTS

element **AirportData/Airport/RequiredFlightCrewQualification**

diagram	 RequiredFlightCrewQualification e.g. A=Airport requires no specific qualification. B=Some additional training required C= Complex airport. Typically simulator training required
type	restriction of xs:string
annotation	documentation e.g., A=Airport requires no specific qualification. B=Some additional training required C= Complex airport. Typically simulator training required

element **AirportData/Airport/OpeningHours**

diagram	 OpeningHours UTC times when the airport usually commences and terminates operation attributes from until					
type	extension of xs:string					
attributes	Name	Type	Use	Default	Fixed	annotation
	from	xs:time				
	until	xs:time				
annotation	documentation UTC times when the airport usually commences and terminates operation					

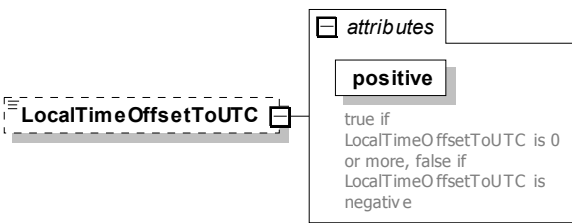
attribute **AirportData/Airport/OpeningHours/@from**

type	xs:time

attribute **AirportData/Airport/OpeningHours/@until**

type	xs:time

element **AirportData/Airport/LocalTimeOffsetToUTC**

diagram	 LocalTimeOffsetToUTC positive true if LocalTimeOffsetToUTC is 0 or more, false if LocalTimeOffsetToUTC is negative					
type	extension of xs:duration					
attributes	Name	Type	Use	Default	Fixed	annotation
	positive	xs:boolean	required			documentation true if LocalTimeOffsetToUTC is 0 or more, false if LocalTimeOffsetToUTC is negative

5.0 COMMON ELEMENTS

attribute **AirportData/Airport/LocalTimeOffsetToUTC/@positive**

type	xs:boolean
annotation	documentation true if LocalTimeOffsetToUTC is 0 or more, false if LocalTimeOffsetToUTC is negative

5.17 Security Information

To be added in a future supplement.

5.18 Airline Defined

To be added in a future supplement.

5.19 Upper Air Data

The UpperAirData schema is to be used for upper air data along the planned flight route.

The number of waypoints provided with this structure can differ from the number of waypoints provided with the FlightPlan/Waypoints structure.

A structure and definition of digital UpperAirDataArea data independent of the planned route, most likely referring to GRIB2 data format, will be provided in a future supplement.

5.0 COMMON ELEMENTS

element UpperAirData

diagram						
children	M633Header M633SupplementaryHeader ObservationTimes ClimbPhase CruisePhase DescentPhase					
attributes	Name flightPlanId	Type derived by: xs:string	Use required	Default	Fixed	annotation documentation identifier of the operational flight plan
	prognosisTime	xs:dateTime				documentation time when the UAD was established
annotation	documentation Upper Air data - Meteo Synopsis					

attribute UpperAirData/@flightPlanId

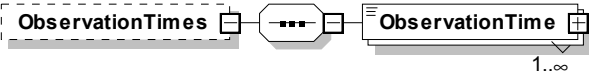
type	restriction of xs:string
annotation	documentation identifier of the operational flight plan

attribute UpperAirData/@prognosisTime

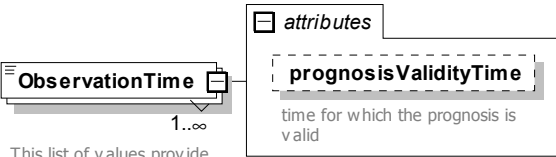
type	xs:dateTime
annotation	documentation time when the UAD was established

5.0 COMMON ELEMENTS

element UpperAirData/ObservationTimes

diagram	 This list of values provide indication about data that was used to compute the flight plan. ObservationTime: is the time when prognosis was established
children	ObservationTime

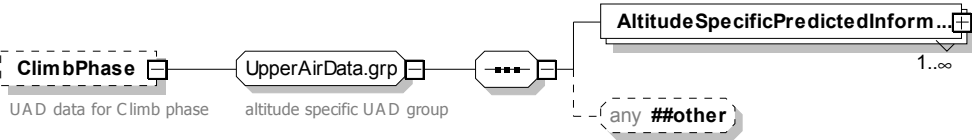
element UpperAirData/ObservationTimes/ObservationTime

diagram	 This list of values provide indication about data that was used to compute the flight plan. ObservationTime: is the time when prognosis was established					
type	extension of xs:dateTime					
attributes	Name prognosisValidityTime	Type xs:dateTime	Use	Default	Fixed	annotation documentation time for which the prognosis is valid
annotation	documentation This list of values provide indication about data that was used to compute the flight plan. ObservationTime: is the time when prognosis was established					

attribute UpperAirData/ObservationTimes/ObservationTime/@prognosisValidityTime

type	xs:dateTime
annotation	documentation time for which the prognosis is valid

element UpperAirData/ClimbPhase

diagram	 UAD data for Climb phase altitude specific UAD group
children	AltitudeSpecificPredictedInformation
annotation	documentation UAD data for Climb phase

5.0 COMMON ELEMENTS

element UpperAirData/CruisePhase

diagram	UAD data for Cruise phase way points
children	Waypoints
annotation	documentation UAD data for Cruise phase waypoints

element UpperAirData/CruisePhase/Waypoints

diagram	1..∞ the UAD data could contain a different number of way oints than presented for operational reasons in the flightplan
children	Waypoint
used by	elements AlternateRoute flightPlanCore.Grp/ContingencySavingHeader group flightPlanCore.Grp

group UpperAirData.grp

diagram	AltitudeSpecificPredictedInform... 1..∞ Flight Level specific UAD group
children	AltitudeSpecificPredictedInformation
used by	elements UpperAirData/ClimbPhase UpperAirData/DescentPhase UpperAirData/CruisePhase/Waypoints/Waypoint
annotation	documentation Flight Level specific UAD group

5.0 COMMON ELEMENTS

element UpperAirData.grp/AltitudeSpecificPredictedInformation

diagram						
children	Altitude WindData WindComponent TemperatureData					
attributes	Name	Type	Use	Default	Fixed	annotation
	predictedTime	xs:dateTime				documentation time when the altitude or the waypoint is planned to be passed - applicability time of the upper air data

attribute UpperAirData.grp/AltitudeSpecificPredictedInformation/@predictedTime

type	xs:dateTime
annotation	documentation time when the altitude or the waypoint is planned to be passed - applicability time of the upper air data

element UpperAirData.grp/AltitudeSpecificPredictedInformation/Altitude

diagram	The diagram illustrates an Altitude element connected to an AltitudeType extension box. The Altitude element is represented by a rectangle with a small square on its right side. It is connected by a solid line to a hexagonal box containing three dots, which also has a small square on its right side. This hexagonal box is connected by a solid line to the Value element and by a dashed line to the CorrectedValue element. The Value element is a rectangle with a small square on its right side, labeled "initial value". The CorrectedValue element is a rectangle with a small square on its right side, labeled "revised value", and is enclosed in a dashed border. Both the Value and CorrectedValue elements are contained within a larger yellow box labeled AltitudeType (extension).
type	extension of AltitudeType
children	Value CorrectedValue

element UpperAirData.grp/AltitudeSpecificPredictedInformation/WindData

diagram	
children	HorizontalWind VerticalWind

5.0 COMMON ELEMENTS

element UpperAirData.grp/AltitudeSpecificPredictedInformation/WindData/HorizontalWind

diagram	
type	extension of WindType
children	Direction Speed

element UpperAirData.grp/AltitudeSpecificPredictedInformation/WindData/VerticalWind

diagram	
type	extension of SpeedType
children	Value CorrectedValue

element UpperAirData.grp/AltitudeSpecificPredictedInformation/WindComponent

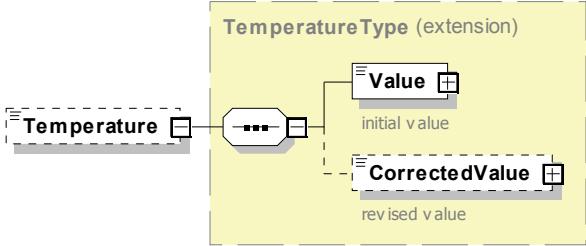
diagram	
type	SpeedType
children	Value CorrectedValue

element UpperAirData.grp/AltitudeSpecificPredictedInformation/TemperatureData

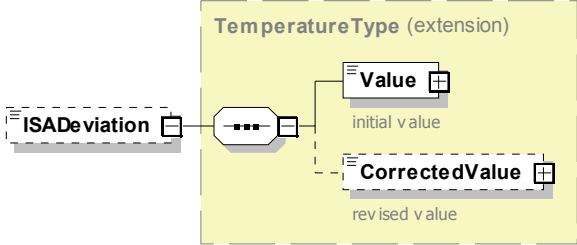
diagram	
children	Temperature ISADeviation

5.0 COMMON ELEMENTS

element UpperAirData.grp/AltitudeSpecificPredictedInformation/TemperatureData/Temperature

diagram	 The diagram shows a dashed box labeled 'Temperature' connected to a yellow box labeled 'TemperatureType (extension)'. Inside the yellow box, a central octagon with three dots is connected to two sub-elements: 'Value' (labeled 'initial v value') and 'CorrectedValue' (labeled 'rev ised v value'). Both sub-elements are shown with dashed outlines and small square handles.
type	extension of TemperatureType
children	Value CorrectedValue

element UpperAirData.grp/AltitudeSpecificPredictedInformation/TemperatureData/ISADeviation

diagram	 The diagram shows a dashed box labeled 'ISADeviation' connected to a yellow box labeled 'TemperatureType (extension)'. Inside the yellow box, a central octagon with three dots is connected to two sub-elements: 'Value' (labeled 'initial v value') and 'CorrectedValue' (labeled 'rev ised v value'). Both sub-elements are shown with dashed outlines and small square handles.
type	extension of TemperatureType
children	Value CorrectedValue

5.0 COMMON ELEMENTS

element UpperAirData/CruisePhase/Waypoints/Waypoint

diagram						
children	Coordinates AltitudeSpecificPredictedInformation Tropopause					
attributes	<u>Name</u> waypointId <u>waypointName</u> <u>countryCAOCode</u> <u>sequenceld</u>	<u>Type</u> WaypointIdType derived by: xs:string CountryCAOCodeType xs:nonNegativeInteger	Use optional optional optional	Default	Fixed	annotation documentation 1 to 5 char code, the name as seen by the Pilot and as entered in FMC documentation waypoint identification as typically in ATC-FPL, or any artificial waypoint name (TOC, TOD, etc.); to be considered as secondary when waypointId is provided
annotation	documentation the UAD data could contain a different number of waypoints than presented for operational reasons in the flightplan					

attribute UpperAirData/CruisePhase/Waypoints/Waypoint/@sequenceld

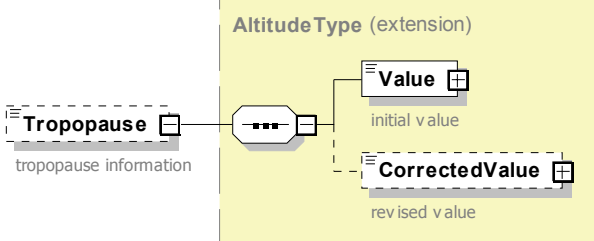
type	xs:nonNegativeInteger

5.0 COMMON ELEMENTS

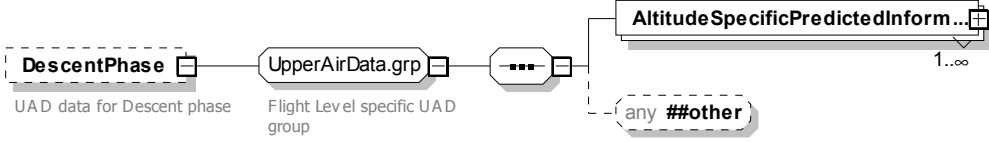
element UpperAirData/CruisePhase/Waypoints/Waypoint/Coordinates

diagram	Coordinates geographical coordinates for which the data ios provided attributes grp coordinateType.grp latitude longitude definition for latitude and longitude, to be expressed in seconds, positive values representing North/East, negative values representing South/West					
attributes	Name	Type	Use	Default	Fixed	annotation
	<u>latitude</u>	derived by: xs:float	required			
	<u>longitude</u>	derived by: xs:float	required			
annotation	documentation geographical coordinates for which the data ios provided					

element UpperAirData/CruisePhase/Waypoints/Waypoint/Tropopause

diagram						
type	extension of AltitudeType					
children	Value CorrectedValue					
annotation	documentation tropopause information					

element UpperAirData/DescentPhase

diagram						
children	AltitudeSpecificPredictedInformation					
annotation	documentation UAD data for Descent phase					

5.0 COMMON ELEMENTS

5.20 Airspace Data

This **AirspaceData** schema is to be used for providing data related to the airspace areas along the planned flight route which is provided with the **FlightPlan** schema.

element **AirspaceData**

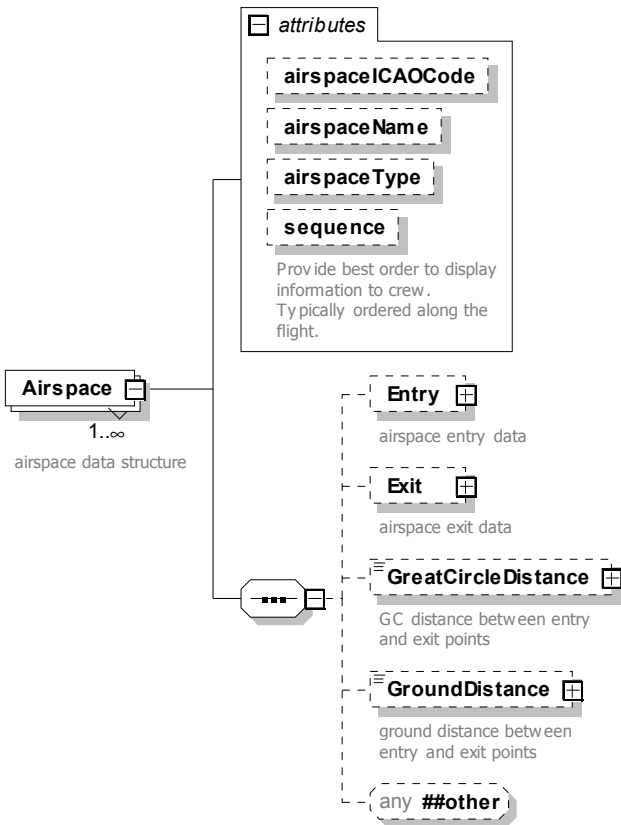
diagram						
children	M633Header M633SupplementaryHeader Airspace					
attributes	Name flightPlanId	Type derived by: xs:string	Use optional	Default	Fixed	annotation documentation identifier of the operational flight plan
annotation	documentation airspace data list					

attribute **AirspaceData/@flightPlanId**

type	restriction of xs:string
annotation	documentation identifier of the operational flight plan

5.0 COMMON ELEMENTS

element **AirspaceData/Airspace**

diagram						
children	Entry Exit GreatCircleDistance GroundDistance					
attributes	Name	Type	Use	Default	Fixed	annotation
	airspaceICAOCCode	AirportICAOCCodeType	optional			
	airspaceName	derived by: xs:string	optional			
	airspaceType	derived by: xs:string	optional			
	sequence					documentation Provide best order to display information to crew. Typically ordered along the flight.
annotation	documentation airspace data structure					

attribute **AirspaceData/Airspace/@airspaceICAOCCode**

type	AirportICAOCCodeType

attribute **AirspaceData/Airspace/@airspaceName**

type	restriction of xs:string

attribute **AirspaceData/Airspace/@airspaceType**

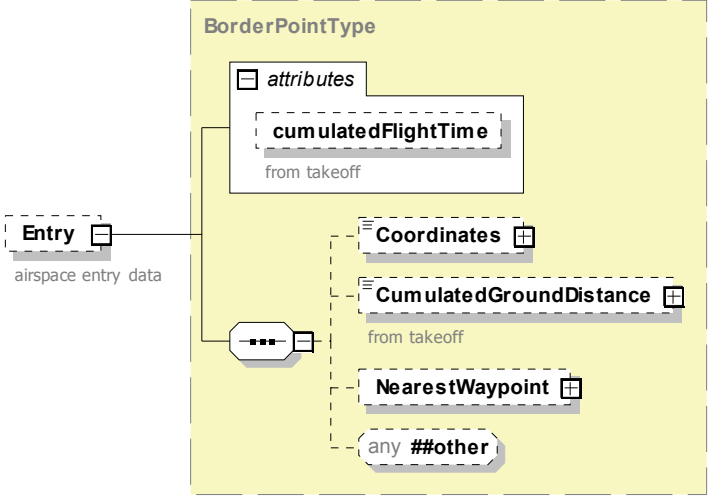
type	restriction of xs:string

5.0 COMMON ELEMENTS

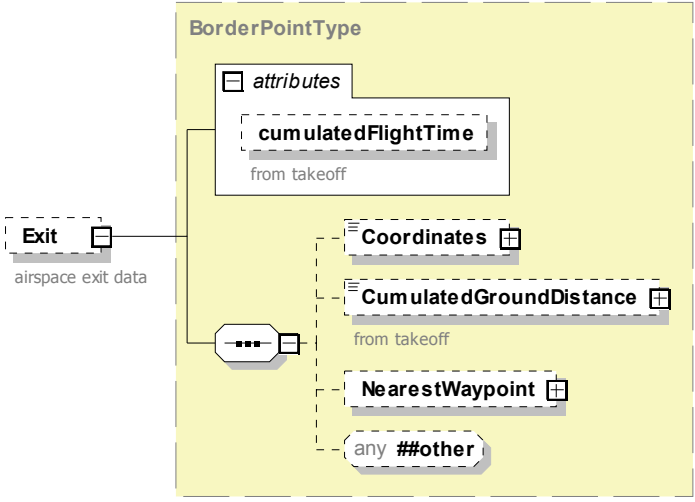
attribute **AirspaceData/Airspace/@sequence**

annotation	documentation Provide best order to display information to crew. Typically ordered along the flight.

element **AirspaceData/Airspace/Entry**

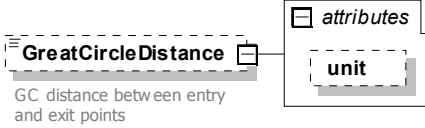
diagram						
type	BorderPointType					
children	Coordinates CumulatedGroundDistance NearestWaypoint					
attributes	Name cumulatedFlightTime	Type xs:duration	Use optional	Default	Fixed	annotation documentation from takeoff
annotation	documentation airspace entry data					

element **AirspaceData/Airspace/Exit**

diagram						
type	BorderPointType					
children	Coordinates CumulatedGroundDistance NearestWaypoint					
attributes	Name cumulatedFlightTime	Type xs:duration	Use optional	Default	Fixed	annotation documentation from takeoff
annotation	documentation airspace exit data					

5.0 COMMON ELEMENTS

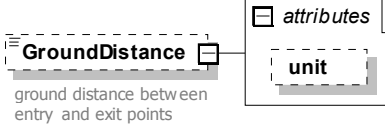
element **AirspaceData/Airspace/GreatCircleDistance**

diagram	 The diagram shows an element box labeled GreatCircleDistance with the text "GC distance between entry and exit points" below it. To the right of the element box is an attribute box labeled unit. A line connects the element box to the attribute box. Above the attribute box is a label attributes with a small square icon.					
type	extension of xs:float					
attributes	Name unit	Type distanceUnitType	Use	Default NM	Fixed	annotation
annotation	documentation GC distance between entry and exit points					

attribute **AirspaceData/Airspace/GreatCircleDistance/@unit**

type	distanceUnitType				
facets	enumeration	m			
	enumeration	km			
	enumeration	NM			
	enumeration	ft			
	enumeration	SM			

element **AirspaceData/Airspace/GroundDistance**

diagram	 The diagram shows an element box labeled GroundDistance with the text "ground distance between entry and exit points" below it. To the right of the element box is an attribute box labeled unit. A line connects the element box to the attribute box. Above the attribute box is a label attributes with a small square icon.					
type	extension of xs:float					
attributes	Name unit	Type distanceUnitType	Use	Default NM	Fixed	annotation
annotation	documentation ground distance between entry and exit points					

attribute **AirspaceData/Airspace/GroundDistance/@unit**

type	distanceUnitType				
facets	enumeration	m			
	enumeration	km			
	enumeration	NM			
	enumeration	ft			
	enumeration	SM			

5.0 COMMON ELEMENTS

complexType BorderPointType

diagram						
children	Coordinates CumulatedGroundDistance NearestWaypoint					
used by	elements AirspaceData/Airspace/Entry AirspaceData/Airspace/Exit					
attributes	Name cumulatedFlightTime	Type xs:duration	Use optional	Default	Fixed	annotation documentation from takeoff
annotation	documentation airspace border point definition					

attribute BorderPointType/@cumulatedFlightTime

type	xs:duration
annotation	documentation from takeoff

element BorderPointType/Coordinates

diagram						
type	extension of xs:string					
attributes	Name latitude longitude	Type derived by: xs:float derived by: xs:float	Use required required	Default	Fixed	annotation

element BorderPointType/CumulatedGroundDistance

diagram						

5.0 COMMON ELEMENTS

type	extension of xs:float					
attributes	Name <u>unit</u>	Type <u>distanceUnitType</u>	Use	Default NM	Fixed	annotation
annotation	documentation from takeoff					

attribute BorderPointType/CumulatedGroundDistance/@unit

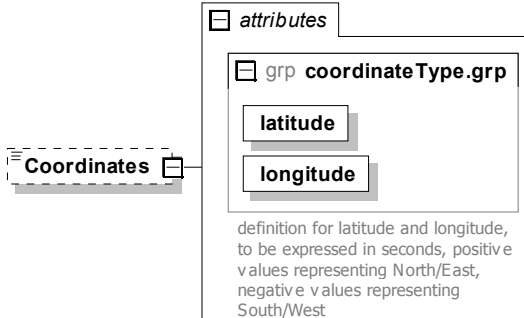
type	<u>distanceUnitType</u>					
facets	enumeration	m				
	enumeration	km				
	enumeration	NM				
	enumeration	ft				
	enumeration	SM				

element BorderPointType/NearestWaypoint

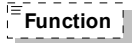
diagram						
children	<u>Coordinates</u> <u>Function</u>					
attributes	Name <u>waypointId</u>	Type <u>WaypointIdType</u>	Use optional	Default	Fixed	annotation documentation 1 to 5 char code, the name as seen by the Pilot and as entered in FMC
	<u>waypointName</u>	derived by: xs:string	optional			documentation waypoint identification as typically in ATC- FPL, or any artificial waypoint name (TOC, TOD, etc.); to be considered as secondary when waypointId is provided
	<u>countryCAOCode</u>	<u>CountryCAOCodeType</u>	optional			

5.0 COMMON ELEMENTS

element BorderPointType/NearestWaypoint/Coordinates

diagram						
type	extension of xs:string					
attributes	Name	Type	Use	Default	Fixed	annotation
	latitude	derived by: xs:float	required			
	longitude	derived by: xs:float	required			

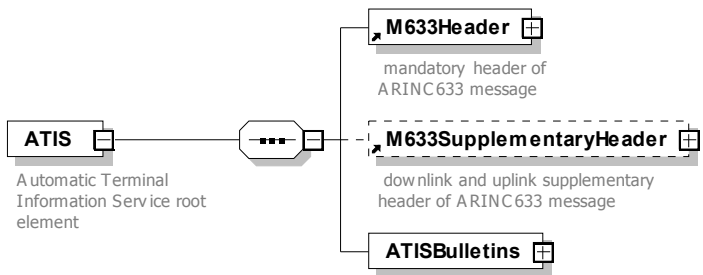
element BorderPointType/NearestWaypoint/Function

diagram						
type	restriction of xs:string					

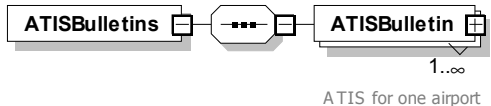
5.21 ATIS

This schema is to be used for providing ATIS data. It is independent from any flight data provided with other schemas like FlightPlan, FlightPlanAtclCAO, etc.

element ATIS

diagram						
children	M633Header M633SupplementaryHeader ATISBulletins					
annotation	documentation Automatic Terminal Information Service root element					

element ATIS/ATISBulletins

diagram						
children	ATISBulletin					

5.0 COMMON ELEMENTS

element ATIS/ATISBulletins/ATISBulletin

diagram	attributes departureType Arrival/Departure indicator, 1=departure, 0=arrival or general demandType demand/contract indicator, 1=demand, 0=contract informationIndicator information identifier, e.g. N grp observationGroup observationTime release time of observation bulletin observationType METAR or SPECI defines observation type (METAR or SPECI) and time of observation sequence Provide best order to display information to crew. Typically ordered along the flight. ATISBulletin 1..∞ ATIS for one airport Airport airport identification ATISDetails detailed ATIS information ATISText ATIS text description any ##other					
children	Airport ATISDetails ATISText					
attributes	Name departureType	Type xs:boolean	Use required	Default	Fixed	annotation documentation Arrival/Departure indicator, 1=departure, 0=arrival or general
	demandType	xs:boolean				documentation demand/contract indicator, 1=demand, 0=contract
	informationIndicator	derived by: xs:string	required			documentation information identifier, e.g., N
	observationTime	xs:dateTime	required			documentation release time of observation bulletin

5.0 COMMON ELEMENTS

	<u>observationType</u> derived by: xs:string required <u>sequence</u> xs:nonNegativeInteger	documentation METAR or SPECI documentation Provide best order to display information to crew. Typically ordered along the flight.
annotation	documentation ATIS for one airport	

attribute ATIS/ATISBulletins/ATISBulletin/@departureType

type	xs:boolean
annotation	documentation Arrival/Departure indicator, 1=departure, 0=arrival or general

attribute ATIS/ATISBulletins/ATISBulletin/@demandType

type	xs:boolean
annotation	documentation demand/contract indicator, 1=demand, 0=contract

attribute ATIS/ATISBulletins/ATISBulletin/@informationIndicator

type	restriction of xs:string
annotation	documentation information identifier, e.g., N

attribute ATIS/ATISBulletins/ATISBulletin/@sequence

type	xs:nonNegativeInteger
annotation	documentation Provide best order to display information to crew. Typically ordered along the flight.

5.0 COMMON ELEMENTS

element ATIS/ATISBulletins/ATISBulletin/Airport

diagram						
type	AirportIdentificationType					
children	AirportCAOCCode AirportIATACode AirportIATACode					
attributes	Name airportName	Type derived by: xs:string	Use	Default	Fixed	annotation documentation airport name e.g., WASHINGTON DULLES INTL
	airportFunction	airportFunctionType				documentation e.g., DepartureAirport, DestinationAlternate, ContingencySavingsAirport
annotation	documentation airport identification					

5.0 COMMON ELEMENTS

element ATIS/ATISBulletins/ATISBulletin/ATISDetails

diagram	
children	ExpectedApproaches Runways SignificantRunwayCondition Observation HoldingDelay TransitionLevel OtherEssentialOperationalInformation Comment
annotation	documentation detailed ATIS information

element ATIS/ATISBulletins/ATISBulletin/ATISDetails/ExpectedApproaches

diagram	
children	ExpectedApproach

element ATIS/ATISBulletins/ATISBulletin/ATISDetails/ExpectedApproaches/ExpectedApproach

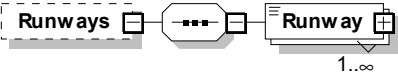
diagram	The diagram illustrates the structure of the ExpectedApproach element. It is a container element (indicated by a square icon with a small square) that can occur 1 to infinity times (1..∞). It contains two child elements: attributes (a solid box containing approachType and the text "approach type") and Runways (a dashed box containing an ellipsis "...").					
children	Runways					
attributes	Name approachType	Type derived by: xs:string	Use required	Default	Fixed	annotation documentation approach type
annotation	documentation expected approach					

5.0 COMMON ELEMENTS

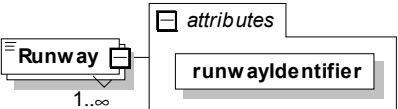
attribute
ATIS/ATISBulletins/ATISBulletin/ATISDetails/ExpectedApproaches/ExpectedApproach/@approach
Type

type	restriction of xs:string
annotation	documentation approach type

element
ATIS/ATISBulletins/ATISBulletin/ATISDetails/ExpectedApproaches/ExpectedApproach/Runways

diagram	
children	Runway

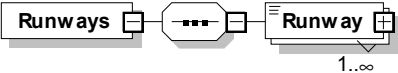
element
ATIS/ATISBulletins/ATISBulletin/ATISDetails/ExpectedApproaches/ExpectedApproach/Runways/
Runway

diagram						
type	extension of xs:string					
attributes	Name runwayIdentifier	Type derived by: xs:string	Use required	Default	Fixed	annotation

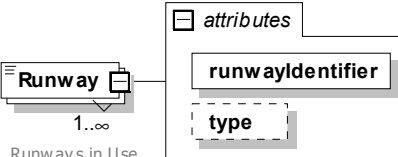
attribute
ATIS/ATISBulletins/ATISBulletin/ATISDetails/ExpectedApproaches/ExpectedApproach/Runways/
Runway/@runwayIdentifier

type	restriction of xs:string

element ATIS/ATISBulletins/ATISBulletin/ATISDetails/Runways

diagram	
children	Runway

element ATIS/ATISBulletins/ATISBulletin/ATISDetails/Runways/Runway

diagram						
type	extension of xs:string					

5.0 COMMON ELEMENTS

attributes	Name <u>runwayIdentifier</u> <u>type</u>	Type derived by: xs:string derived by: xs:string	Use required	Default	Fixed	annotation
annotation	documentation Runways in Use					

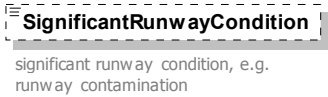
attribute ATIS/ATISBulletins/ATISBulletin/ATISDetails/Runways/Runway/@runwayIdentifier

type	restriction of xs:string

attribute ATIS/ATISBulletins/ATISBulletin/ATISDetails/Runways/Runway/@type

type	restriction of xs:string	
facets	enumeration enumeration	Landing Takeoff

element ATIS/ATISBulletins/ATISBulletin/ATISDetails/SignificantRunwayCondition

diagram	 SignificantRunwayCondition significant runway condition, e.g. runway contamination
type	restriction of xs:string
annotation	documentation significant runway condition, e.g., runway contamination

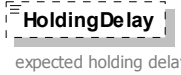
element ATIS/ATISBulletins/ATISBulletin/ATISDetails/Observation

diagram	 Observation airport weather observation ObservationDetailsType - SurfaceWinds - VisibilitiesAndWeather visibility, cloud and weather description - RunwayVisualRanges - Temperatures temperature description - Pressures atmospheric pressure, if expressed globally per airport - SupplementaryInformation supplementary weather information - Trend weather change description - any ##other
type	<u>ObservationDetailsType</u>

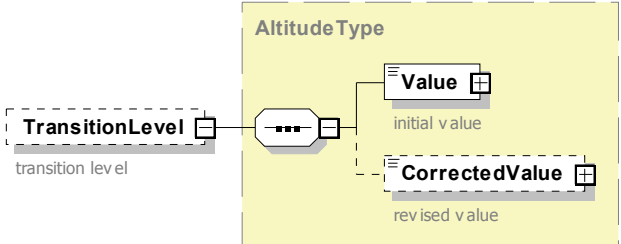
5.0 COMMON ELEMENTS

children	SurfaceWinds VisibilitiesAndWeather RunwayVisualRanges Temperatures Pressures SupplementaryInformation Trend
annotation	documentation airport weather observation

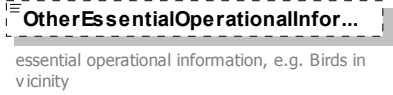
element ATIS/ATISBulletins/ATISBulletin/ATISDetails/HoldingDelay

diagram	 HoldingDelay expected holding delay
type	restriction of xs:string
annotation	documentation expected holding delay

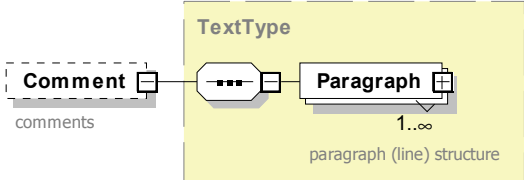
element ATIS/ATISBulletins/ATISBulletin/ATISDetails/TransitionLevel

diagram	 TransitionLevel transition level Altitude Type Value initial v value CorrectedValue revised v value
type	AltitudeType
children	Value CorrectedValue
annotation	documentation transition level

element ATIS/ATISBulletins/ATISBulletin/ATISDetails/OtherEssentialOperationalInformation

diagram	 OtherEssentialOperationalInfor... essential operational information, e.g. Birds in vicinity
type	restriction of xs:string
annotation	documentation essential operational information, e.g., Birds in vicinity

element ATIS/ATISBulletins/ATISBulletin/ATISDetails/Comment

diagram	 Comment comments TextType Paragraph 1..∞ paragraph (line) structure
type	TextType
children	Paragraph
annotation	documentation comments

5.0 COMMON ELEMENTS

element ATIS/ATISBulletins/ATISBulletin/ATISText

diagram	
type	extension of TextType
children	Paragraph
annotation	documentation ATIS text description

5.22 Pilot Report

element PIREPBriefing

diagram						
children	M633Header M633SupplementaryHeader PIREPs					
attributes	Name	Type	Use	Default	Fixed	annotation
	creationTime	xs:dateTime	required			documentation The date and time the briefing was created
	fullPackage	xs:boolean	required			documentation specifies whether the briefing is considered a complete briefing package or whether the content is considered an Update and needs to be merged with the existing RegionWeatherBriefing
annotation	documentation Comment describing your root element					

5.0 COMMON ELEMENTS

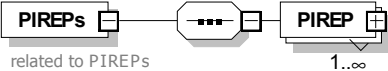
attribute PIREPBriefing/@creationTime

type	xs:dateTime
annotation	documentation The date and time the briefing was created

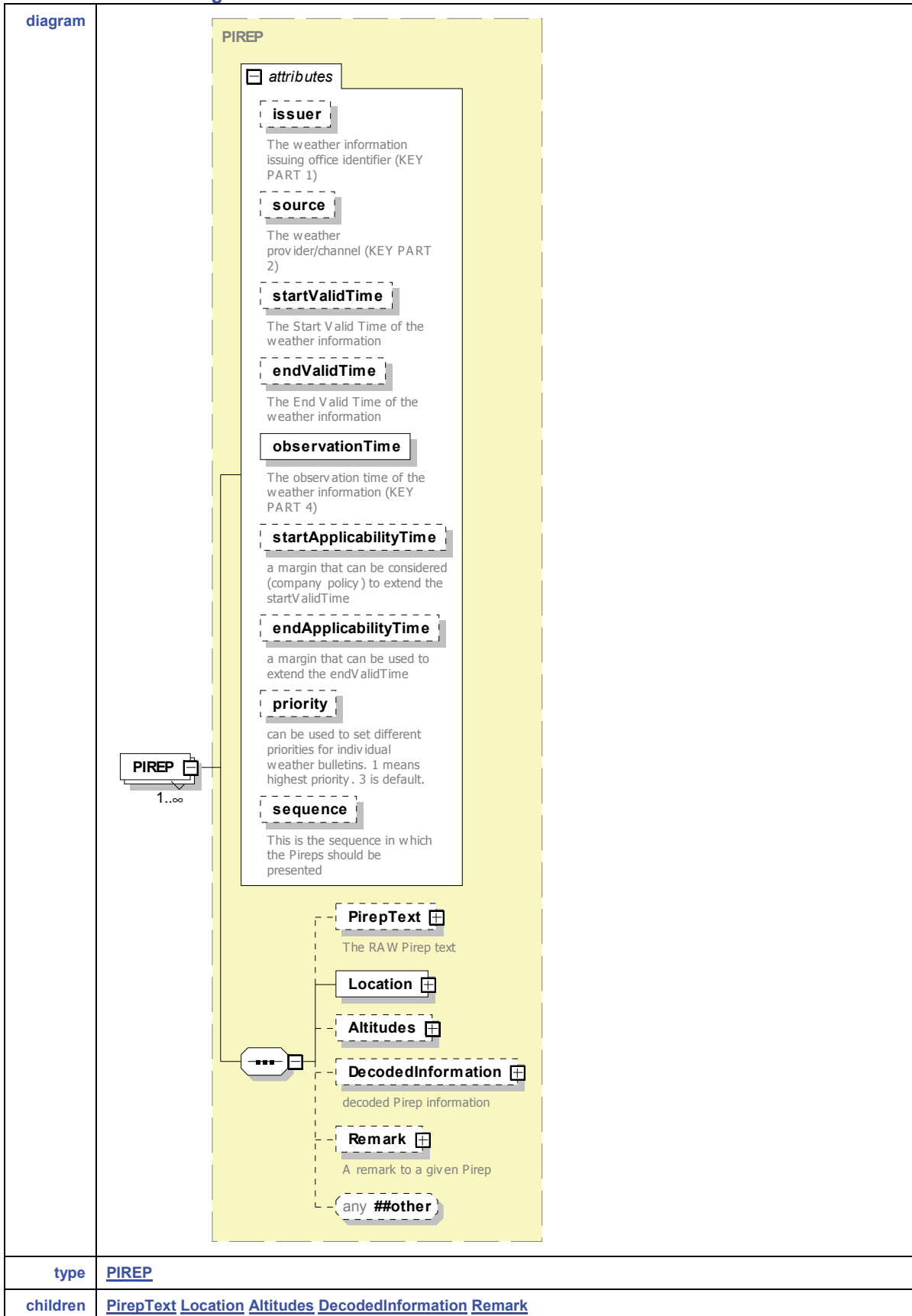
attribute PIREPBriefing/@fullPackage

type	xs:boolean
annotation	documentation specifies whether the briefing is considered a complete briefing package or whether the content is considered an Update and needs to be merged with the existing RegionWeatherBriefing

element PIREPBriefing/PIREPs

diagram	
children	PIREP
annotation	documentation related to PIREPs

5.0 COMMON ELEMENTS

element **PIREPBriefing/PIREPs/PIREP**

5.0 COMMON ELEMENTS

attributes	Name	Type	Use	Default	Fixed	annotation
	<u>issuer</u>	derived by: xs:string				documentation The weather information issuing office identifier (KEY PART 1)
	<u>source</u>	derived by: xs:string				documentation The weather provider/channel (KEY PART 2)
	<u>startValidTime</u>	xs:dateTime				documentation The Start Valid Time of the weather information
	<u>endValidTime</u>	xs:dateTime				documentation The End Valid Time of the weather information
	<u>observationTime</u>	xs:dateTime	required			documentation The observation time of the weather information (KEY PART 4)
	<u>startApplicabilityTime</u>	xs:dateTime				documentation a margin that can be considered (company policy) to extend the startValidTime
	<u>endApplicabilityTime</u>	xs:dateTime				documentation a margin that can be used to extend the endValidTime
	<u>priority</u>	derived by: xs:int		3		documentation can be used to set different priorities for individual weather bulletins. 1 means highest priority. 3 is default.
	<u>sequence</u>	xs:nonNegativeInteger				documentation This is the sequence in which the Pireps should be presented

5.0 COMMON ELEMENTS

complexType PIREP

diagram

attributes

issuer

The weather information issuing office identifier (KEY PART 1)

source

The weather provider/channel (KEY PART 2)

startValidTime

The Start Valid Time of the weather information

endValidTime

The End Valid Time of the weather information

observationTime

The observation time of the weather information (KEY PART 4)

startApplicabilityTime

a margin that can be considered (company policy) to extend the startValidTime

endApplicabilityTime

a margin that can be used to extend the endValidTime

priority

can be used to set different priorities for individual weather bulletins. 1 means highest priority. 3 is default.

sequence

This is the sequence in which the Pireps should be presented

PIREP

PirepText

The RAW Pirep text

Location

Altitudes

DecodedInformation

decoded Pirep information

Remark

A remark to a given Pirep

any ##other

5.0 COMMON ELEMENTS

children	PirepText Location Altitudes DecodedInformation Remark					
used by	element	PIREPBriefing/PIREPs/PIREP				
attributes	Name issuer	Type derived by: xs:string	Use	Default	Fixed	annotation documentation The weather information issuing office identifier (KEY PART 1)
	source	derived by: xs:string				documentation The weather provider/channel (KEY PART 2)
	startValidTime	xs:dateTime				documentation The Start Valid Time of the weather
	endValidTime	xs:dateTime				information documentation The End Valid Time of the weather
	observationTime	xs:dateTime	required			information documentation The observation time of the weather
	startApplicabilityTime	xs:dateTime				information (KEY PART 4)
	endApplicabilityTime	xs:dateTime				documentation a margin that can be considered (company policy) to extend the startValidTime
	priority	derived by: xs:int		3		documentation a margin that can be used to extend the endValidTime
	sequence	xs:nonNegativeInteger				documentation can be used to set different priorities for individual weather bulletins. 1 means highest priority. 3 is default.
						documentation This is the sequence in which the Pireps should be presented

attribute [PIREP/@issuer](#)

type	restriction of xs:string
annotation	documentation The weather information issuing office identifier (KEY PART 1)

attribute [PIREP/@source](#)

type	restriction of xs:string
annotation	documentation The weather provider/channel (KEY PART 2)

5.0 COMMON ELEMENTS

attribute PIREP/@startValidTime

type	xs:dateTime
annotation	documentation The Start Valid Time of the weather information

attribute PIREP/@endValidTime

type	xs:dateTime
annotation	documentation The End Valid Time of the weather information

attribute PIREP/@observationTime

type	xs:dateTime
annotation	documentation The observation time of the weather information (KEY PART 4)

attribute PIREP/@startApplicabilityTime

type	xs:dateTime
annotation	documentation a margin that can be considered (company policy) to extend the startValidTime

attribute PIREP/@endApplicabilityTime

type	xs:dateTime
annotation	documentation a margin that can be used to extend the endValidTime

attribute PIREP/@priority

type	restriction of xs:int
annotation	documentation can be used to set different priorities for individual weather bulletins. 1 means highest priority. 3 is default.

attribute PIREP/@sequence

type	xs:nonNegativeInteger
annotation	documentation This is the sequence in which the Pireps should be presented

element PIREP/PirepText

diagram	
type	TextType
children	Paragraph
annotation	documentation The RAW Pirep text

5.0 COMMON ELEMENTS

element PIREP/Location/Geography

diagram	
type	GeographyType
children	Polygon Spot MovementSpeed MovementDirection

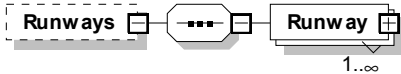
element PIREP/Location/Airport

diagram	
type	extension of AirportIdentificationType
children	AirportCAOCode AirportIATACode AirportIATACode Runways

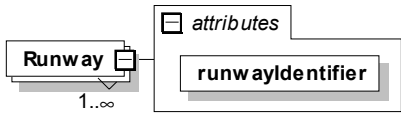
5.0 COMMON ELEMENTS

attributes	Name airportName airportFunction airportFunctionType	Type derived by: xs:string	Use	Default	Fixed	annotation documentation airport name e.g., WASHINGTON DULLES INTL documentation e.g., DepartureAirport, DestinationAlternate, ContingencySavingsAirport
annotation	documentation involved airport					

element PIREP/Location/Airport/Runways

diagram	 The diagram shows a dashed box labeled 'Runways' containing a sequence of elements: a dashed box, a box with three dots, and a box labeled 'Runway'. The 'Runway' box has a cardinality of '1..∞'.
children	Runway

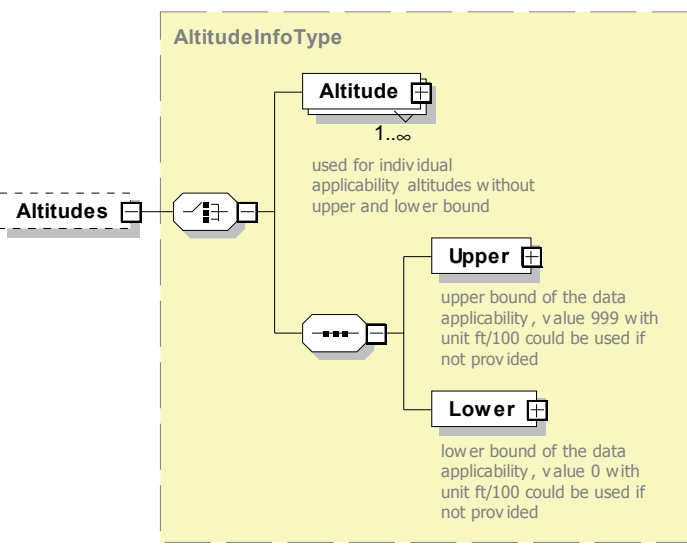
element PIREP/Location/Airport/Runways/Runway

diagram	 The diagram shows a dashed box labeled 'Runway' with a cardinality of '1..∞'. It contains an 'attributes' box with a 'runwayIdentifier' attribute.					
attributes	Name runwayIdentifier	Type derived by: xs:string	Use required	Default	Fixed	annotation

attribute PIREP/Location/Airport/Runways/Runway/@runwayIdentifier

type	restriction of xs:string

element PIREP/Altitudes

diagram	 The diagram shows a dashed box labeled 'Altitudes' containing a sequence of elements: a dashed box, a box with a plus sign, and a box with three dots. The box with the plus sign contains an 'AltitudeInfoType' box. Inside 'AltitudeInfoType', there is an 'Altitude' box with a cardinality of '1..∞' and a description: 'used for individual applicability altitudes without upper and lower bound'. Below it are 'Upper' and 'Lower' boxes with descriptions: 'upper bound of the data applicability, value 999 with unit ft/100 could be used if not provided' and 'lower bound of the data applicability, value 0 with unit ft/100 could be used if not provided'.					
type	AltitudeInfoType					
children	Altitude Upper Lower					

5.0 COMMON ELEMENTS

element PIREP/DecodedInformation

diagram	
children	Icing Turbulence Thunderstorm SpotTemperature SpotWind WindShear Microburst BrakingAction
annotation	documentation decoded Pirep information

element PIREP/DecodedInformation/Icing

diagram																			
children	IndicatedAirSpeed Temperatures																		
attributes	<table><thead><tr><th>Name</th><th>Type</th><th>Use</th><th>Default</th><th>Fixed</th><th>annotation</th></tr></thead><tbody><tr><td>icingType</td><td>derived by: xs:string</td><td>required</td><td></td><td></td><td>documentation type of ice, e.g., clear ice, rime ice.</td></tr><tr><td>intensity</td><td>intensityType</td><td>required</td><td></td><td></td><td>documentation icing intensity</td></tr></tbody></table>	Name	Type	Use	Default	Fixed	annotation	icingType	derived by: xs:string	required			documentation type of ice, e.g., clear ice, rime ice.	intensity	intensityType	required			documentation icing intensity
Name	Type	Use	Default	Fixed	annotation														
icingType	derived by: xs:string	required			documentation type of ice, e.g., clear ice, rime ice.														
intensity	intensityType	required			documentation icing intensity														
annotation	documentation This is the decoded icing phenomena information																		

5.0 COMMON ELEMENTS

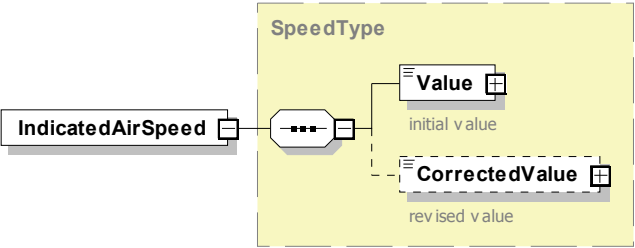
attribute PIREP/DecodedInformation/Icing/@icingType

type	restriction of xs:string
annotation	documentation type of ice, e.g., clear ice, rime ice.

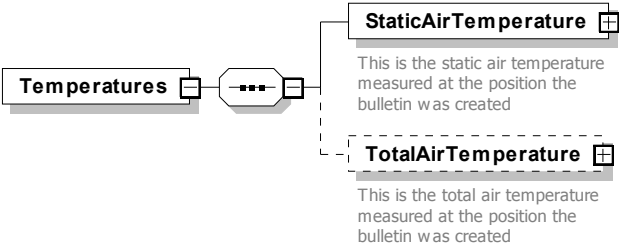
attribute PIREP/DecodedInformation/Icing/@intensity

type	intensityType	
facets	enumeration	light
	enumeration	light to moderate
	enumeration	moderate
	enumeration	moderate to severe
	enumeration	severe
annotation	enumeration	extreme
	documentation	icing intensity

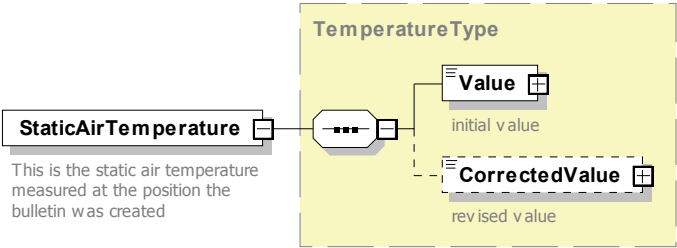
element PIREP/DecodedInformation/Icing/IndicatedAirSpeed

diagram	 The diagram shows the IndicatedAirSpeed element connected to a container box labeled SpeedType. Inside SpeedType, there is a sequence of two optional elements: Value (labeled 'initial value') and CorrectedValue (labeled 'revised value'). Both elements have a small square icon with a plus sign in the top right corner, indicating they are optional.
type	SpeedType
children	Value CorrectedValue

element PIREP/DecodedInformation/Icing/Temperatures

diagram	 The diagram shows the Temperatures element connected to a container box. Inside the container, there is a sequence of two optional elements: StaticAirTemperature (labeled 'This is the static air temperature measured at the position the bulletin was created') and TotalAirTemperature (labeled 'This is the total air temperature measured at the position the bulletin was created'). Both elements have a small square icon with a plus sign in the top right corner, indicating they are optional.
children	StaticAirTemperature TotalAirTemperature

element PIREP/DecodedInformation/Icing/Temperatures/StaticAirTemperature

diagram	 The diagram shows the StaticAirTemperature element connected to a container box labeled TemperatureType. Inside TemperatureType, there is a sequence of two optional elements: Value (labeled 'initial value') and CorrectedValue (labeled 'revised value'). Both elements have a small square icon with a plus sign in the top right corner, indicating they are optional. A descriptive text 'This is the static air temperature measured at the position the bulletin was created' is placed next to the StaticAirTemperature element.

5.0 COMMON ELEMENTS

type	TemperatureType
children	Value CorrectedValue
annotation	documentation This is the static air temperature measured at the position the bulletin was created

element PIREP/DecodedInformation/Icing/Temperatures/TotalAirTemperature

diagram	
type	TemperatureType
children	Value CorrectedValue
annotation	documentation This is the total air temperature measured at the position the bulletin was created

element PIREP/DecodedInformation/Turbulence

diagram						
children	Duration					
attributes	Name turbulenceType intensity inOrNearClouds	Type derived by: xs:string intensityType xs:boolean	Use required	Default false	Fixed	annotation documentation type of turbulence (sky clear, wake, etc.) documentation Boolean indicating if turbulence occurred in or near cloud (true).
annotation	documentation This is the decoded turbulence information					

attribute PIREP/DecodedInformation/Turbulence/@turbulenceType

type	restriction of xs:string
annotation	documentation type of turbulence (sky clear, wake, etc.)

5.0 COMMON ELEMENTS

attribute PIREP/DecodedInformation/Turbulence/@intensity

type	intensityType	
facets	enumeration	light
	enumeration	light to moderate
	enumeration	moderate
	enumeration	moderate to severe
	enumeration	severe
	enumeration	extreme

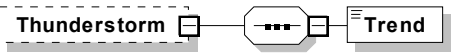
attribute PIREP/DecodedInformation/Turbulence/@inOrNearClouds

type	xs:boolean	
annotation	documentation	Boolean indicating if turbulence occurred in or near cloud (true).

element PIREP/DecodedInformation/Turbulence/Duration

diagram		
type	xs:duration	

element PIREP/DecodedInformation/Thunderstorm

diagram	 This is the indicator on the trend of the thunderstorm the trend of the TS	
children	Trend	
annotation	documentation	This is the indicator on the trend of the thunderstorm

element PIREP/DecodedInformation/Thunderstorm/Trend

diagram	 the trend of the TS	
type	thunderstormTrendType	
facets	enumeration	developing
	enumeration	developed
	enumeration	diminishing
annotation	documentation	the trend of the TS

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element PIREP/DecodedInformation/SpotTemperature

diagram	
type	TemperatureType
children	Value CorrectedValue
annotation	documentation This is the temperature measured at the position the bulletin was created

element PIREP/DecodedInformation/SpotWind

diagram	
type	WindType
children	Direction Speed
annotation	documentation This is the wind measured at the position the bulletin was created

element PIREP/DecodedInformation/WindShear

diagram						
attributes	Name intensity	Type intensityType	Use required	Default	Fixed	annotation

attribute PIREP/DecodedInformation/WindShear/@intensity

type	intensityType												
facets	<table border="1"> <tbody> <tr><td>enumeration</td><td>light</td></tr> <tr><td>enumeration</td><td>light to moderate</td></tr> <tr><td>enumeration</td><td>moderate</td></tr> <tr><td>enumeration</td><td>moderate to severe</td></tr> <tr><td>enumeration</td><td>severe</td></tr> <tr><td>enumeration</td><td>extreme</td></tr> </tbody> </table>	enumeration	light	enumeration	light to moderate	enumeration	moderate	enumeration	moderate to severe	enumeration	severe	enumeration	extreme
enumeration	light												
enumeration	light to moderate												
enumeration	moderate												
enumeration	moderate to severe												
enumeration	severe												
enumeration	extreme												

element PIREP/DecodedInformation/Microburst

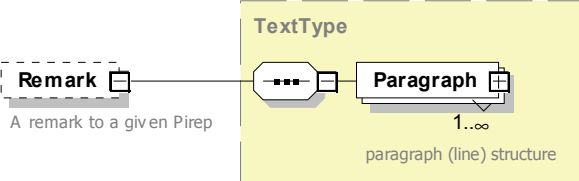
diagram	
type	xs:boolean

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element PIREP/DecodedInformation/BrakingAction

diagram	 A dashed rectangular box labeled BrakingAction .														
type	brakingActionType														
facets	<table><tr><td>enumeration</td><td>nil</td></tr><tr><td>enumeration</td><td>poor</td></tr><tr><td>enumeration</td><td>medium to poor</td></tr><tr><td>enumeration</td><td>medium</td></tr><tr><td>enumeration</td><td>medium to good</td></tr><tr><td>enumeration</td><td>good</td></tr><tr><td>enumeration</td><td>unreliable</td></tr></table>	enumeration	nil	enumeration	poor	enumeration	medium to poor	enumeration	medium	enumeration	medium to good	enumeration	good	enumeration	unreliable
enumeration	nil														
enumeration	poor														
enumeration	medium to poor														
enumeration	medium														
enumeration	medium to good														
enumeration	good														
enumeration	unreliable														

element PIREP/Remark

diagram	 A diagram showing a dashed rectangular box labeled Remark with a small square icon. Below it is the text "A remark to a given Pirep". A line connects this box to a yellow rectangular box labeled TextType . Inside the TextType box, there is a dashed rectangular box labeled Paragraph with a small square icon. Below the Paragraph box is the text "1..∞" and "paragraph (line) structure".
type	TextType
children	Paragraph
annotation	documentation A remark to a given Pirep

5.23 Hazard Briefing

Similar to the described region weather information types in Section 5.7, the Hazard Briefing schema can also be used in either raw (simple) or enriched (decoded) format.

The defined structure and the definitions can also be used for providing digital data for any hazard type (e.g., Sandstorms, Tropical Cyclone Advisories). The type has to be provided in the element HazardType.

5.0 COMMON ELEMENTS

element HazardBriefing

diagram						
children	M633Header M633SupplementaryHeader HazardAdvisories					
attributes	Name	Type	Use	Default	Fixed	annotation
	creationTime	xs:dateTime	required			documentation The date and time the briefing was created
	fullPackage	xs:boolean	required			documentation specifies whether the briefing is considered a complete briefing package or whether the content is considered an Update and needs to be merged with the existing RegionWeatherBriefing
annotation	documentation Comment describing your root element					

attribute HazardBriefing/@creationTime

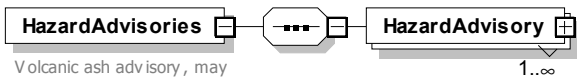
type	xs:dateTime
annotation	documentation The date and time the briefing was created

attribute HazardBriefing/@fullPackage

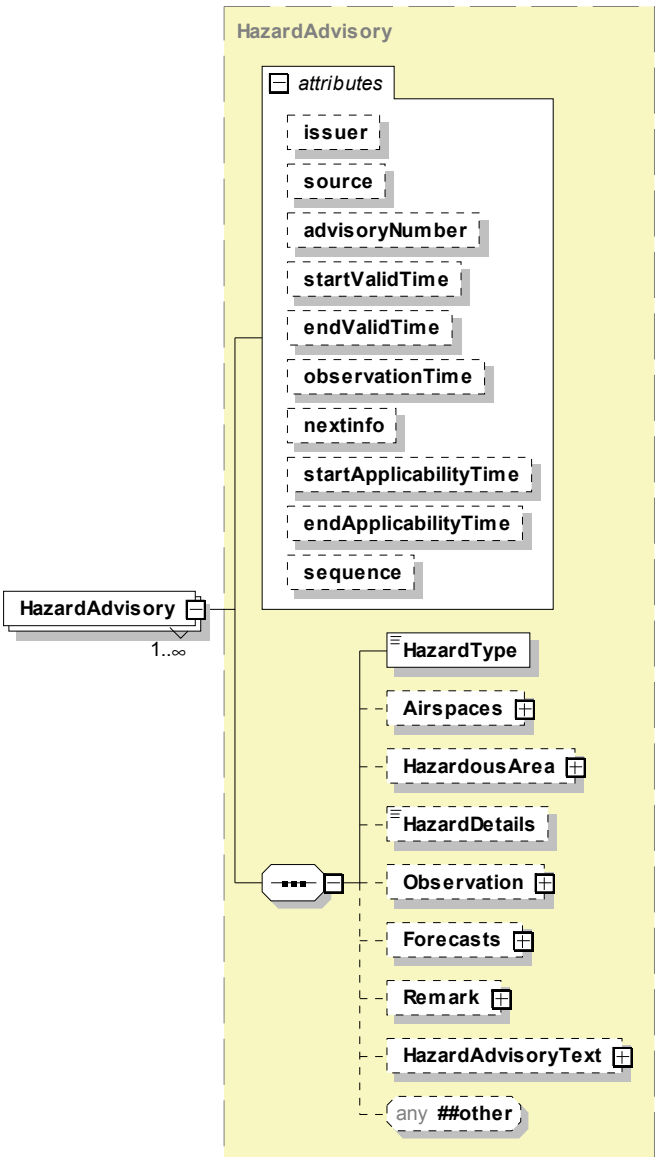
type	xs:boolean
annotation	documentation specifies whether the briefing is considered a complete briefing package or whether the content is considered an Update and needs to be merged with the existing RegionWeatherBriefing

5.0 COMMON ELEMENTS

element HazardBriefing/HazardAdvisories

diagram	 Volcanic ash advisory , may also be used for any hazardous area, such as volcanic or nuclear, or...
children	HazardAdvisory
annotation	documentation Volcanic ash advisory, may also be used for any hazardous area, such as volcanic or nuclear, or...

element HazardBriefing/HazardAdvisories/HazardAdvisory

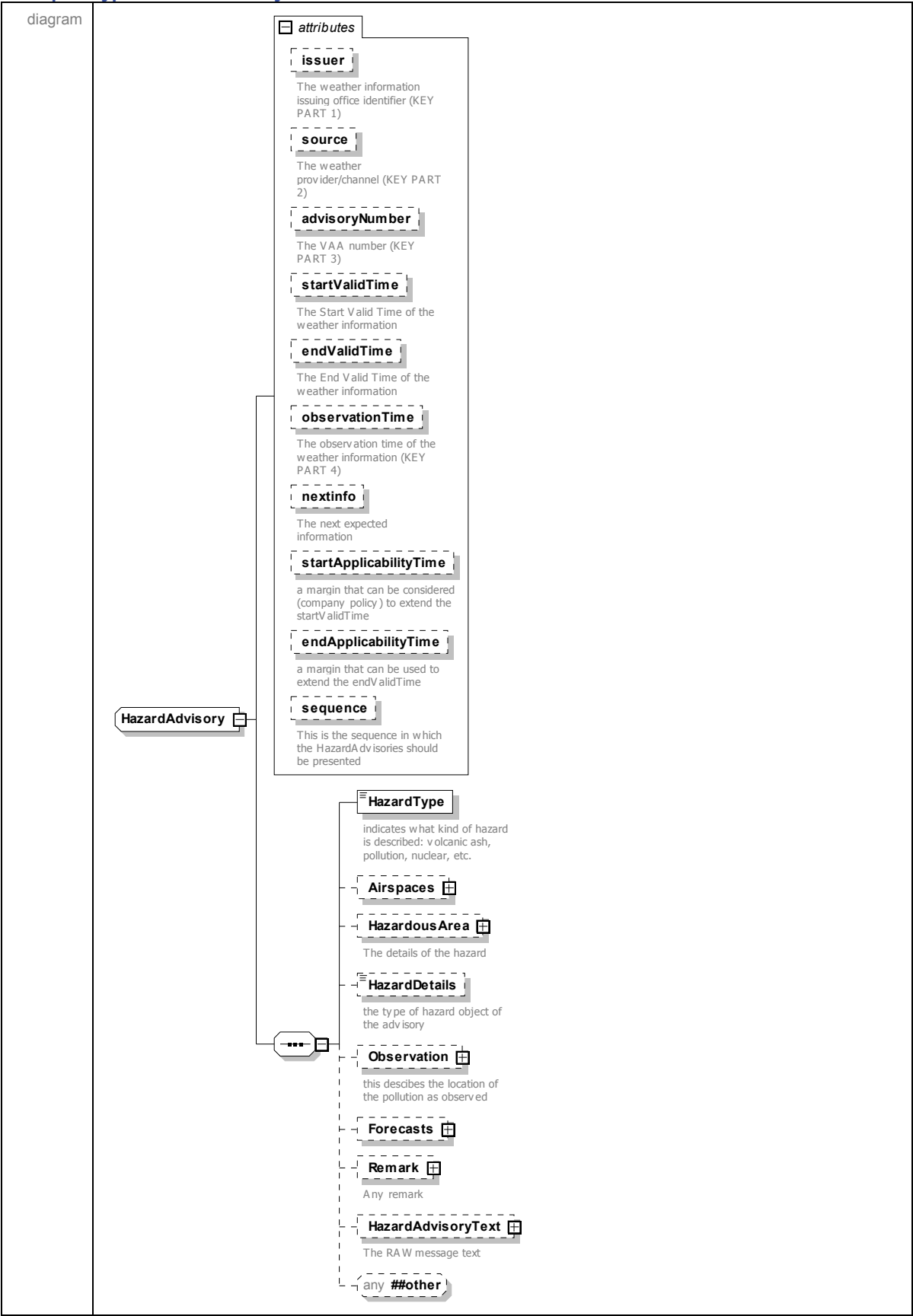
diagram	
type	HazardAdvisory
children	HazardType Airspaces HazardousArea HazardDetails Observation Forecasts Remark HazardAdvisoryText

5.0 COMMON ELEMENTS

attributes	Name	Type	Use	Default	Fixed	annotation
	issuer	derived by: xs:string				documentation The weather information issuing office identifier (KEY PART 1)
	source	derived by: xs:string				documentation The weather provider/channel (KEY PART 2)
	advisoryNumber	derived by: xs:string				documentation The VAA number (KEY PART 3)
	startValidTime	xs:dateTime				documentation The Start Valid Time of the weather information
	endValidTime	xs:dateTime				documentation The End Valid Time of the weather information
	observationTime	xs:dateTime				documentation The observation time of the weather information (KEY PART 4)
	nextinfo	derived by: xs:string				documentation The next expected information
	startApplicabilityTime	xs:dateTime				documentation a margin that can be considered (company policy) to extend the startValidTime
	endApplicabilityTime	xs:dateTime				documentation a margin that can be used to extend the endValidTime
	sequence	xs:nonNegativeInteger				documentation This is the sequence in which the HazardAdvisories should be presented

5.0 COMMON ELEMENTS

complexType HazardAdvisory



5.0 COMMON ELEMENTS

children	HazardType Airspaces HazardousArea HazardDetails Observation Forecasts Remark HazardAdvisoryText					
used by	element	HazardBriefing/HazardAdvisories/HazardAdvisory				
attributes	Name	Type	Use	Default	Fixed	annotation
	issuer	derived by: xs:string				documentation The weather information issuing office identifier (KEY PART 1)
	source	derived by: xs:string				documentation The weather provider/channel (KEY PART 2)
	advisoryNumber	derived by: xs:string				documentation The VAA number (KEY PART 3)
	startValidTime	xs:dateTime				documentation The Start Valid Time of the weather information
	endValidTime	xs:dateTime				documentation The End Valid Time of the weather information
	observationTime	xs:dateTime				documentation The observation time of the weather information (KEY PART 4)
	nextinfo	derived by: xs:string				documentation The next expected information
	startApplicabilityTime	xs:dateTime				documentation a margin that can be considered (company policy) to extend the startValidTime
	endApplicabilityTime	xs:dateTime				documentation a margin that can be used to extend the endValidTime
	sequence	xs:nonNegativeInteger				documentation This is the sequence in which the HazardAdvisories should be presented

attribute HazardAdvisory/@issuer

type	restriction of xs:string
annotation	documentation The weather information issuing office identifier (KEY PART 1)

attribute HazardAdvisory/@source

type	restriction of xs:string
annotation	documentation The weather provider/channel (KEY PART 2)

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attribute HazardAdvisory/@advisoryNumber

type	restriction of xs:string
annotation	documentation The VAA number (KEY PART 3)

attribute HazardAdvisory/@startValidTime

type	xs:dateTime
annotation	documentation The Start Valid Time of the weather information

attribute HazardAdvisory/@endValidTime

type	xs:dateTime
annotation	documentation The End Valid Time of the weather information

attribute HazardAdvisory/@observationTime

type	xs:dateTime
annotation	documentation The observation time of the weather information (KEY PART 4)

attribute HazardAdvisory/@nextinfo

type	restriction of xs:string
annotation	documentation The next expected information

attribute HazardAdvisory/@startApplicabilityTime

type	xs:dateTime
annotation	documentation a margin that can be considered (company policy) to extend the startValidTime

attribute HazardAdvisory/@endApplicabilityTime

type	xs:dateTime
annotation	documentation a margin that can be used to extend the endValidTime

attribute HazardAdvisory/@sequence

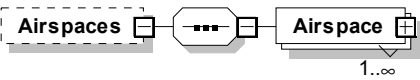
type	xs:nonNegativeInteger
annotation	documentation This is the sequence in which the HazardAdvisories should be presented

element HazardAdvisory/HazardType

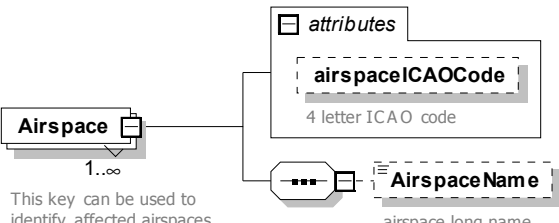
diagram	 indicates what kind of hazard is described: volcanic ash, pollution, nuclear, etc.
type	restriction of xs:string
annotation	documentation indicates what kind of hazard is described: volcanic ash, pollution, nuclear, etc.

5.0 COMMON ELEMENTS

element HazardAdvisory/Airspaces

diagram	 This key can be used to identify affected airspaces and to group hazard advisories under a certain airspace e.g.: LOVV
children	Airspace

element HazardAdvisory/Airspaces/Airspace

diagram	 This key can be used to identify affected airspaces and to group hazard advisories under a certain airspace e.g.: LOVV					
children	AirspaceName					
attributes	Name airspaceICAOCode	Type AirportICAOCodeType	Use	Default	Fixed	annotation documentation 4 letter ICAO code
annotation	documentation This key can be used to identify affected airspaces and to group hazard advisories under a certain airspace e.g., LOVV					

attribute HazardAdvisory/Airspaces/Airspace/@airspaceICAOCode

type	AirportICAOCodeType
annotation	documentation 4 letter ICAO code

element HazardAdvisory/Airspaces/Airspace/AirspaceName

diagram	 airspace long name
type	restriction of xs:string
annotation	documentation airspace long name

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element HazardAdvisory/HazardousArea

diagram						
children	PlaceName Coordinates Elevation					
attributes	Name volcanoNumber	Type derived by: xs:string	Use	Default	Fixed	annotation documentation the volcano intl number, to be used for volcanic ash advisory.
annotation	documentation The details of the hazard					

attribute HazardAdvisory/HazardousArea/@volcanoNumber

type	restriction of xs:string
annotation	documentation the volcano intl number, to be used for volcanic ash advisory.

element HazardAdvisory/HazardousArea/PlaceName

diagram						
type	extension of xs:string					
attributes	Name areaName	Type derived by: xs:string	Use	Default	Fixed	annotation documentation provides for region or country information

attribute HazardAdvisory/HazardousArea/PlaceName/@areaName

type	restriction of xs:string
annotation	documentation provides for region or country information

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element HazardAdvisory/HazardousArea/Coordinates

diagram						
attributes	Name latitude longitude	Type derived by: xs:float derived by: xs:float	Use required required	Default	Fixed	annotation

element HazardAdvisory/HazardousArea/Elevation

diagram						
type	AltitudeType					
children	Value CorrectedValue					

element HazardAdvisory/HazardDetails

diagram						
type	restriction of xs:string					
annotation	documentation the type of hazard object of the advisory					

element HazardAdvisory/Observation

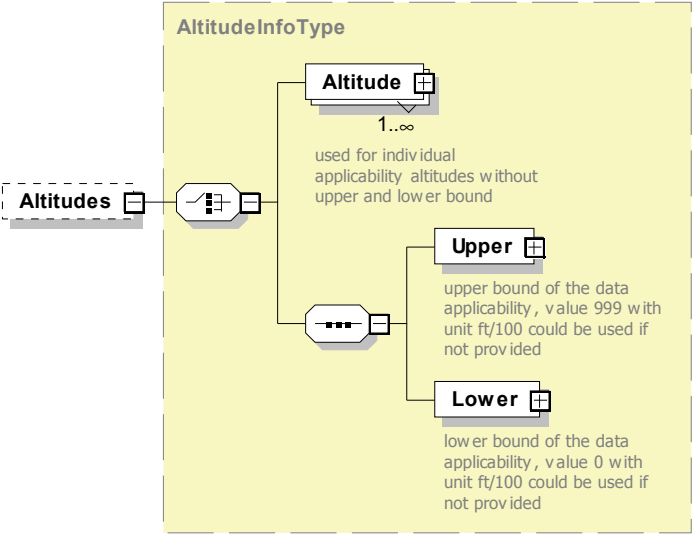
diagram						
children	Altitudes Geography					
attributes	Name observationTime	Type xs:dateTime	Use 	Default	Fixed	annotation
annotation	documentation this describes the location of the pollution as observed					

5.0 COMMON ELEMENTS

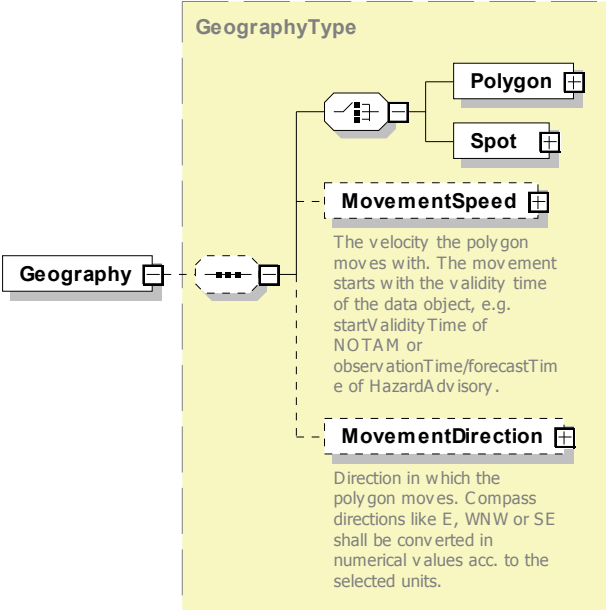
attribute HazardAdvisory/Observation/@observationTime

type	xs:dateTime

element HazardAdvisory/Observation/Altitudes

diagram	 The diagram illustrates the structure of the AltitudeInfoType element. It is a dashed box containing a solid box labeled Altitudes. The Altitudes box is connected to a choice box (a rectangle with a dashed border and a small square in the top-left corner). This choice box has two branches: one leading to an Altitude box and another leading to a choice box. The Altitude box is labeled with a cardinality of 1..∞ and has a description: "used for individual applicability altitudes without upper and lower bound". The second choice box has two branches: one leading to an Upper box and another leading to a Lower box. The Upper box has a description: "upper bound of the data applicability, value 999 with unit ft/100 could be used if not provided". The Lower box has a description: "lower bound of the data applicability, value 0 with unit ft/100 could be used if not provided".
type	AltitudeInfoType
children	Altitude Upper Lower

element HazardAdvisory/Observation/Geography

diagram	 The diagram illustrates the structure of the GeographyType element. It is a dashed box containing a solid box labeled Geography. The Geography box is connected to a choice box (a rectangle with a dashed border and a small square in the top-left corner). This choice box has two branches: one leading to a choice box and another leading to a dashed box. The first choice box has two branches: one leading to a Polygon box and another leading to a Spot box. The dashed box contains two elements: MovementSpeed and MovementDirection. The MovementSpeed box has a description: "The velocity the polygon moves with. The movement starts with the validity time of the data object, e.g. startValidityTime of NOTAM or observationTime/forecastTime of HazardAdvisory". The MovementDirection box has a description: "Direction in which the polygon moves. Compass directions like E, WNW or SE shall be converted in numerical values acc. to the selected units."
type	GeographyType
children	Polygon Spot MovementSpeed MovementDirection

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element HazardAdvisory/Forecasts

diagram	
children	Forecast

element HazardAdvisory/Forecasts/Forecast

diagram						
children	Altitudes Geography					
attributes	Name	Type	Use	Default	Fixed	annotation
	forecastTime	xs:dateTime				
annotation	documentation this describes the forecasted location of the pollution cloud					

attribute HazardAdvisory/Forecasts/Forecast/@forecastTime

type	xs:dateTime

element HazardAdvisory/Forecasts/Forecast/Altitudes

diagram						
type	AltitudeInfoType					
children	Altitude Upper Lower					

5.0 COMMON ELEMENTS

element HazardAdvisory/Forecasts/Forecast/Geography

diagram	The diagram shows a Geography element connected to a GeographyType container. Inside GeographyType, there is a dashed box containing a MovementSpeed and a MovementDirection element. Above this dashed box, there is a Polygon and a Spot element. The MovementSpeed element has a description: "The velocity the polygon moves with. The movement starts with the validity time of the data object, e.g. startValidityTime of NOTAM or observationTime/forecastTime of HazardAdvisory." The MovementDirection element has a description: "Direction in which the polygon moves. Compass directions like E, WNW or SE shall be converted in numerical values acc. to the selected units."
type	GeographyType
children	Polygon Spot MovementSpeed MovementDirection

element HazardAdvisory/Remark

diagram	The diagram shows a Remark element connected to a TextType container. Inside TextType, there is a Paragraph element. The Remark element has a description: "Any remark". The Paragraph element has a description: "paragraph (line) structure" and a cardinality of "1..∞".
type	TextType
children	Paragraph
annotation	documentation Any remark

element HazardAdvisory/HazardAdvisoryText

diagram	The diagram shows a HazardAdvisoryText element connected to a TextType container. Inside TextType, there is a Paragraph element. The HazardAdvisoryText element has a description: "The RAW message text". The Paragraph element has a description: "paragraph (line) structure" and a cardinality of "1..∞".
type	TextType
children	Paragraph
annotation	documentation The RAW message text

6.0 FUEL

6.0 FUEL

6.1 Introduction

Refuel applications are used to support the aircraft's refuel processes. The following applications have been defined:

Section	Application	SMI	Label	Description
6.2	CG Targeting	JRF	RF	On Center of Gravity “(CG) targeting” capable aircraft such as the Airbus A380, the refueling of the aircraft does not support a predefined, static fuel distribution like “wings, center, trim”, but a dynamic fuel distribution that targets a certain take off center of gravity (TOCG). The entry parameters for this algorithm are ZFW, ZFCG and PFQ (Pre-selected fuel quantity).
6.3	Refueling	JRE	RE	Application supports the exchange of refueling related data between aircraft and providers like fueling into-plane-services or ground ops companies.

Common XML FuelTypes: See electronic document ‘ARINC633-1 AOC.zip’ for details and examples. Common fuel types are defined in the folder schema/FUEL/ fuelcommon.xsd.

6.2 Aircraft Refueling – CG Targeting

ZFW, ZFCG are usually calculated by a ground weight & balance system and PFQ is usually calculated by a ground flight planning system. All three parameters can be updated during and after the refuel process. To simplify the refueling task, the fuel quantity monitoring system may be controlled by ACARS messages.

This section specifies the messages to be supported for remote control of ‘CG targeting’ capable Fuel Quantity Monitoring airborne systems.

Fuel Distribution operation for CG targeting uses the following datalink services:

1. **FUEL STATUS:** the ground operations center can request a fuel status report indicating current refuel parameters. This service is named ‘FST’ (Fuel STatus).
2. **FUEL DATA SUBMISSION:** the ground operation center can initialize or update the refueling system with new values before refueling. This service is named ‘FDA’ (Fuel DATA submission).
3. **AUTOMATIC REFUEL END:** the aircraft fuel system informs the ground operation center that refueling has completed normally. This service is named FEN (reFuel ENd).
4. **AUTO GROUND TRANSFER START:** the aircraft fuel system informs the ground operation center that an auto ground transfer has started. This service is named FTB (Fuel auto ground Transfer Begins).
5. **AUTO GROUND TRANSFER END:** the aircraft fuel system informs the ground operation center that auto ground transfer has completed normally. This service is named FTE (Fuel auto ground Transfer End).
6. **AUTO GROUND TRANSFER INTERRUPTION:** the aircraft fuel system informs the ground operation center that auto ground transfer was prematurely interrupted or has failed to complete successfully for any reason (e.g., due to crew deselection, due to a failure, etc.). This service is named FTI (Fuel auto ground Transfer Interrupted).

In addition to the 6 above operational services, an error service is defined to handle indication of errors to the ground.

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These steps may require one or more of the following and any number of common elements to be sent. The following table shows the fuel elements defined in this section:

Table 6.2-1 – CG-Targeting Element Table

Element Name	ACARS Label	Service Version	DL/UL	Purpose
FSTREQ	RF	1	UL	Fuel-Status-REQuest Requests a fuel status report downlink
FSTREP	RF	1	DL	Fuel-Status-REPort Informs the ground about the aircraft fuel status
FDASUB	RF	1	UL	Fuel-DAta submission-SUBmit : Submits parameters to an aircraft's refueling system
FDAACK	RF	1	DL	Fuel-DAta submission-ACK Mirrors submitted parameters to the ground for confirmation
FDACOM	RF	1	UL	Fuel-DAta submission-COMmand Activates submitted parameters after fuel-data -ack has been received
FENIND	RF	1	DL	reFuel End INDication Informs the ground of normal completion of refueling process
FTIIND	RF	1	DL	Fuel Transfer Interrupted INDication is sent by the airborne system when automatic fuel ground transfer has not completed successfully for any reason (e.g., due to crew deselection or abort due to a failure, etc.)
FTEIND	RF	1	DL	Fuel auto ground Transfer End INDication Informs the ground of normal completion of fuel transfer process
FTBIND	RF	1	DL	Fuel-Transfer-Begins-INDication FTBIND is sent by the airborne system when an automatic ground transfer process starts.
FERIND	RF	1	DL	Fuel-Error INDication Indicates an error for fuel datalink services

6.2.1 Fuel-Status

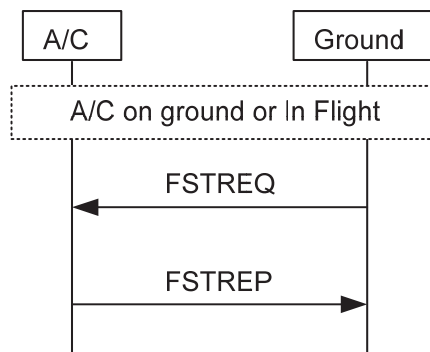


Figure 6.2.1-1 – Typical Fuel Status Exchange

The fuel-status element is used to inform ground systems about the fuel situation onboard, e.g., to transmit fuel figures to a ground based weight & balance system.

The following subsections define version 1 of FST service.

Operational parameters ranges and resolution in all messages will vary depending on aircraft type. Therefore, the airline and ground operator should

6.0 FUEL

ensure that only messages with ranges and resolutions fitting the aircraft type will be used.

6.2.1.1 Fuel-Status-REquest Uplink (FSTREQ)

Element Name: **FSTREQ**

The Fuel-status-request uplink should contain no parameters – and thus only contain the header.

The fuel status request uplink may contain one or several optional supplementary address(es) (as per ARINC Specification 620).

6.2.1.2 Fuel-Status-REPort Downlink (FSTREP)

Element Name: **FSTREP**

The fuel status report downlink may contain one or several optional supplementary address(es) (as per ARINC Specification 620), which will be the copy of the supplementary address(es) (if present) in the associated FSTREQ.

6.2.1.3 Dynamic Aspects

FSTREP should only be sent in response to FSTREQ.

The airborne application should also perform the actions specified in the following table. The standard application state is “listening for ACARS messages” (called “listening mode”).

Table 6.2.1.3-1 – Airborne Processing Of Non-nominal Conditions

Aircraft condition	Event	Aircraft action	Comment
Fuel system degraded mode or airborne application internal error	FSTREQ received	Send FERIND with appropriate error code and return to listening mode	
ANY	Erroneous FSTREQ received	Send FERIND with appropriate error code and return to listening mode	
ANY	FSTREQ received with a non supported version number	Send FERIND with appropriate error code 5 and supported version numbers and return to listening mode	

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The ground application should also perform the actions specified in the following table.

Table 6.2.1.3-2 – Ground Processing Of Non-nominal Conditions

Ground Condition	Event	Ground action	Comment
FSTREQ was sent – wait for FSTREP	Receive FERIND with error code 5 (and list of supported versions)	Analyze list of supported versions – at user's discretion – it is recommended that if one matches the versions supported by the ground, then re-send the message with good version number	
FSTREQ was sent – wait for FSTREP	Receive FERIND with error code 2, 3 or 6 (message considered erroneous)	at ground user's discretion - it is recommended that the message is corrected and re-sent	
FSTREQ was sent – wait for FSTREP	FERIND received with error code 0, 1, 4, 7, 9, 10, 11 (A/C cannot reply)	at ground user's discretion – it is recommended that at least one retry is performed before giving up	
FSTREQ was sent – wait for FSTREP	More than 10 minutes (value at user's discretion) waiting	at ground user's discretion – it is recommended that at least one retry is performed before giving up refuel targets by data link and switching to manual back up – the ground application could check if FSTREQ was declared received by the aircraft (use of ARINC Message Assurance service)	
FSTREQ was sent – wait for FSTREP	FSTREP received containing invalid data	at ground user's discretion – it is recommended that at least one retry is performed before giving up refuel targets by data link and switching to manual back up	

6.2.1.4 ACARS Format

The message should only contain one element. No supplementary header should be used here.

Label used is "RF".

Element Name: FSTREQ01

No data field should be embedded in FSTREQ01 message (only header and CRC information and optional supplementary addresses).

Element Name: FSTREP01

The element parameters should be encoded in ACARS, as follows.

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Table 6.2.1.4-1 – FSTREP01 ACARS Definition

Field name	Meaning	Field length (in Char)	Contents		Option	Range	Resolution	Unit	Example
			Fixed text	Parameter type					
CurrentZFW	The current metric value of the aircraft's Zero Fuel Weight (Mass) parameter.	1-6		mass-kg	NO	0 to 999999	1	kg	320500
parameter separator		1	comma		NO				,
CurrentZFWSource	source that last changed ZFW (F = FMS, A = ACARS, N = EFB, Q = FQMS)	1		A	NO	'F', 'A', 'N', 'Q'	N/A		F
parameter separator		1	comma		NO				,
ZFWEntryDate	date when ZFW was last changed	6		date	NO				050125
parameter separator		1	comma		NO				,
ZFWEntryTime	time when ZFW was last changed	4		timeMin	NO				0055
parameter separator		1	comma		NO				,
CurrentZFCG	The current value of the aircraft's Zero Fuel Center-of-Gravity parameter.	3		center-of-gravity	NO	0 to 999	tenth of percent	tenth of percent	385
parameter separator		1	comma		NO				,
CurrentZFCGSource	source that last changed ZFW (F = FMS, A = ACARS, N = EFB, Q = FQMS)	1		A	NO	'F', 'A', 'N', 'Q'			A
parameter separator		1	comma		NO				,
ZFCGEntryDate	date when ZFCG was last changed	6		date	NO				050124
parameter separator		1	comma		NO				,
ZFCGEntryTime	time when ZFCG was last changed	4		timeMin	NO				2359
parameter separator		1	comma		NO				,
CurrentPFQ	The current metric value of the aircraft's Preselected Fuel Quantity parameter. This value specifies the end-quantity of the next aircraft refueling process	1-6		mass-kg	NO	0 to 999999	1	kg	230000
parameter separator		1	comma		NO				,
CurrentPFQSource	source that last changed ZFW (F = FMS, A = ACARS, N = EFB, Q = FQMS, I = Integrated Refuel panel)	1		A	NO	'F', 'A', 'N', 'Q', 'I'			N
parameter separator		1	comma		NO				,
PFQEntryDate	date when PFQ was last changed	6		date	NO				050124
parameter separator		1	comma		NO				,
CurrentPFQTime	time when PFQ was last changed	4		timeMin	NO				2329
parameter separator		1	comma		NO				,
GWCG	The current value of the aircraft's	3		center-of-gravity	NO	000 to 999	tenth of percent	tenth of percent	397

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Field name	Meaning	Field length (in Char)	Contents		Option	Range	Resolution	Unit	Example
			Fixed text	Parameter type					
	Gross Weight Center-of-Gravity parameter								
parameter separator		1	comma		NO				,
GWCGAccuracyState	Value of parameter accuracy ['N' (normal = all sensors agree on a value), 'D' (degraded = error on accuracy), 'F' (Failed = impossible to report a consolidated value)]	1		A	NO	'N', 'D', 'F'			N
parameter separator		1	comma		NO				,
FOB	The current metric value of the aircraft's Fuel On Board parameter	1-6		mass-kg	NO	0 to 999999	1	kg	230100
parameter separator		1	comma		NO				,
FOBAccuracyState	Value of parameter accuracy ['N' (normal = all sensors agree on a value), 'D' (degraded = error on accuracy), 'F' (Failed = impossible to report a consolidated value)]	1		A	NO	'N', 'D', 'F'			N
parameter separator		1	comma		NO				,
TTK	The current value of the aircraft's Trim Tank Fuel quantity	1-6		mass-kg	YES	0 to 999999	1		4200
parameter separator		1	comma		NO				,
TTKAccuracyState	Value of parameter accuracy ['N' (normal = all sensors agree on a value), 'D' (degraded = error on accuracy), 'F' (Failed = impossible to report a consolidated value)]	1		A	YES	'N', 'D', 'F'			N
parameter separator		1	comma		NO				,
Aircraft MassUnitDisplayed	Unit used for pilot display, e.g., FMS or ECAM/EICAS	2		AA	NO	KG' (for KG) or 'LB' (for Lbs)			KG

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Example: (example below includes ARINC 633 header information)

```
FSTREQ01 uplink:
,FSTREQ01050125221536
/,xxxx

FSTREP01 downlink:
,FSTREP01050125221545
/320500,F,050125,0055,385,A,050124,2359,230000,N,050124,2329,397,N,23
0100,N,4200,N,KG,xxxx
```

Note: xxxx is the CRC

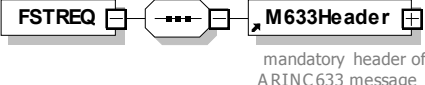
6.2.1.5 XML Format

Presently, this format should be used for ground-ground message exchanges only. Technically, it could also be used for air-ground message exchanges.

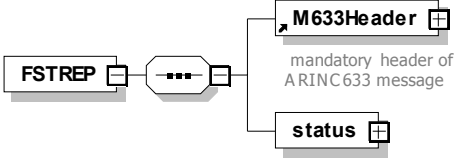
COMMENTARY

At the time of this writing, all refuel applications are connected to ACARS only and do not use any XML messages. The XML messages defined in Section 6.2 may be used instead of the ACARS messages on IP-based ground-ground links only.

element FSTREQ

diagram		
properties	content	complex
children	M633Header	

element FSTREP

diagram		
children	M633Header status	

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element **FSTREP/status**

diagram	The diagram illustrates the structure of the fuelStatusType. A central box labeled status is connected to a dashed box containing a list of fuel-related parameters. The parameters are: - CurrentZFW - CurrentZFWSource - ZFWEntryDate - CurrentZFCG - CurrentZFCGSource - ZFCGEntryDate - CurrentPFQ - CurrentPFQSource - PFQEntryDate - GWCG - GWCGAccuracyState - FOB - FOBAccuracyState - TTK - TTKAccuracyState - AircraftMassUnitDisplayed
type	fuelStatusType
children	CurrentZFW CurrentZFWSource ZFWEntryDate CurrentZFCG CurrentZFCGSource ZFCGEntryDate CurrentPFQ CurrentPFQSource PFQEntryDate GWCG GWCGAccuracyState FOB FOBAccuracyState TTK TTKAccuracyState AircraftMassUnitDisplayed

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complexType **fuelStatusType**

diagram		
children	CurrentZFW CurrentZFWSource ZFWEntryDate CurrentZFCG CurrentZFCGSource ZFCGEntryDate CurrentPFQ CurrentPFQSource PFQEntryDate GWCG GWCGAccuracyState FOB FOBAccuracyState TTK TTKAccuracyState AircraftMassUnitDisplayed	
used by	elements	FSTREP/status FENIND/status FTEIND/status FTIIND/status

element **fuelStatusType/CurrentZFW**

diagram	
type	xs:nonNegativeInteger

element **fuelStatusType/CurrentZFWSource**

diagram	
type	xs:string

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element **fuelStatusType/ZFWEntryDate**

diagram	 A diagram showing a box labeled 'ZFWEntryDate' with a small icon to its left.
type	xs:dateTime

element **fuelStatusType/CurrentZFCG**

diagram	 A diagram showing a box labeled 'CurrentZFCG' with a small icon to its left.
type	xs:nonNegativeInteger

element **fuelStatusType/CurrentZFCGSource**

diagram	 A diagram showing a box labeled 'CurrentZFCGSource' with a small icon to its left.
type	xs:string

element **fuelStatusType/ZFCGEntryDate**

diagram	 A diagram showing a box labeled 'ZFCGEntryDate' with a small icon to its left.
type	xs:dateTime

element **fuelStatusType/CurrentPFQ**

diagram	 A diagram showing a box labeled 'CurrentPFQ' with a small icon to its left.
type	xs:nonNegativeInteger

element **fuelStatusType/CurrentPFQSource**

diagram	 A diagram showing a box labeled 'CurrentPFQSource' with a small icon to its left.
type	xs:string

element **fuelStatusType/PFQEntryDate**

diagram	 A diagram showing a box labeled 'PFQEntryDate' with a small icon to its left.
type	xs:dateTime

element **fuelStatusType/GWCG**

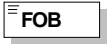
diagram	 A diagram showing a box labeled 'GWCG' with a small icon to its left.
type	xs:nonNegativeInteger

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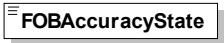
element **fuelStatusType/GWCGAccuracyState**

diagram	
type	xs:string

element **fuelStatusType/FOB**

diagram	
type	xs:nonNegativeInteger
used by	group Fuel.Grp

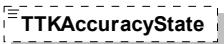
element **fuelStatusType/FOBAccuracyState**

diagram	
type	xs:string

element **fuelStatusType/TTK**

diagram	
type	xs:nonNegativeInteger

element **fuelStatusType/TTKAccuracyState**

diagram	
type	xs:string

element **fuelStatusType/AircraftMassUnitDisplayed**

diagram	
type	xs:string

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6.2.2 Fuel Data Submission Service

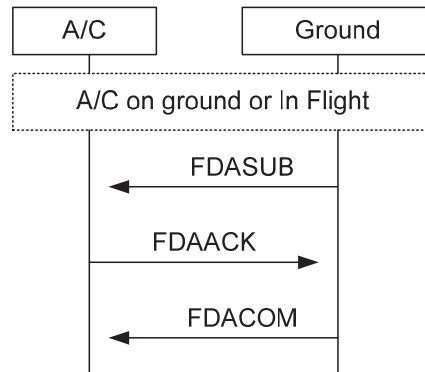


Figure 6.2.2-1 – Typical Fuel Data Submission Exchange

The elements defined here are needed to specify the data required by the aircraft fuel system to perform refueling using CG targeting. Data uplinked to the aircraft “fuel system” is acknowledged by mirroring the uplinked values to the ground. A separate command uplink is needed for activation. This uplink also specifies if a message needs to be sent at the completion of the refuel operation (FENIND). Typically the three messages are sent in the order submit, ack, and command. Typically the messages are used on the ground during preflight but may be exchanged at any time before, during or after the flight. Detailed use of these data by the fuel system is Aircraft implementation dependent and is outside the scope of this document.

This section defines version 1 of Fuel data service.

Operational parameters ranges and resolution in all messages will vary depending on aircraft type. Therefore, the airline and ground operator should ensure that only messages with ranges and resolutions fitting the aircraft type will be used.

6.2.2.1 Fuel-DAta-SUBmit Uplink (FDASUB)

Element Name: **FDASUB**

The fuel data submit uplink may contain one and a maximum of one optional supplementary address (as per ARINC Specification 620).

All the data fields of this element are optional – at least one should be specified in FDASUB01 message.

6.2.2.2 Fuel-DAta-ACK Downlink (FDAACK)

Element Name: **FDAACK**

The fuel data ack downlink may contain one optional supplementary address (as per ARINC Specification 620), which will be the copy of the supplementary address (if present) in the associated FDASUB.

This element should contain copies of the parameter values received in the FDASUB message. If a given value has been detected as invalid (out of range) by the airborne application, character ‘X’ should be sent instead of the concerned parameter.

6.2.2.3 Fuel-DAta-COMmand Uplink (FDACOM)

Element Name: **FDACOM**

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The fuel data command uplink may contain one and a maximum of one optional supplementary address (as per ARINC Specification 620).

6.2.2.4 Dynamic Aspects

- FDASUB, FDAACK and FDACOM should always be sent in the order specified above.
- When a valid FDASUB message has been received, the airborne refuel application should consider that a transaction has been 'opened'. A transaction should be considered 'closed' when the airborne application has received the FDACOM from the ground, or when a time out after transmission of FDAACK has elapsed without receiving any FDACOM.
- The ground should generate FDACOM message within a delay following reception of FDAACK, compatible with the time-out value used by the airborne system.
- The aircraft should generate FDAACK message within a delay following reception of FDASUB, compatible with the time out value used by the ground system.

COMMENTARY

Ten minutes can be considered as a reasonable value for airborne and ground time-out delays.

COMMENTARY

The airborne application may only support one transaction at a time. If no supplementary addresses are embedded in the messages, may consider that two ground applications are the same application.

- If multiple ground applications interact with the aircraft fuel system, supplementary addresses should be used to unambiguously identify the ground application.
- The airborne system is likely to clear received data at a point in the flight cycle as specified by the system supplier. Data should not be sent to the system during this flight phase(s).

COMMENTARY

The time when the airborne system can clear the received data is implementation dependent and may be obtained from supplier documentation.

The following tables define the required or recommended behavior (detailed in the tables) for the aircraft application and ground application for non-nominal conditions.

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Table 6.2.2.4-1 – Airborne Processing of Non-nominal Conditions

Aircraft Condition	Event	Aircraft Action	Comment
Any	Erroneous FDASUB (Includes condition where 'final refuel' flag is absent and current_PFQ is specified and the contrary) or FDACOM received	Send FERIND with appropriate error code No change on on-going transaction if started	
No transaction opened or FDAACK not yet sent	FDACOM received	- Send FERIND with error code 2 - current transaction continues	
Transaction opened	FDASUB received	- Send FERIND with error code 21 - current transaction continues	
FDAACK was sent following reception of FDASUB	No FDACOM received after FDAACK transmission before airborne time out delay	Send FERIND with error code 1 Abort transaction	
Any	FDASUB or FDACOM received with a non supported version number	-Send FERIND with error code 5 and list of supported versions of this service -- current transaction continues (if any)	
Fuel system degraded mode or airborne application internal error	Message received	-Send FERIND with appropriate error code - Abort transaction if any	
No transaction opened	FDASUB with "Out of range" parameters	-Send FDAACK with 'X' for the concerned parameter (s) -Transaction opened (wait for FDACOM with 'cancel')	

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Table 6.2.2.4-2 – Ground processing of Non-nominal Conditions

Ground condition	Event	Ground action	Comment
Any	FERIND received with error codes 0, 1, 4, 7, 9, 10, 11 (Fuel system degraded mode or airborne application internal error)	At ground user's discretion – it is recommended that at least one retry appropriate to the error code is performed before giving up refuel targets by data link and switching to manual back up	
FDASUB transmitted to the aircraft	FDAACK not received by the ground before ground time out delay, following FDASUB transmission to the aircraft	At ground user's discretion – it is recommended that at least one retry is performed before giving up refuel targets by data link and switching to manual back up – the ground application should check if FDASUB was declared received by the aircraft (use of ARINC Message Assurance service)	
FDASUB transmitted to the aircraft	FDAACK received containing invalid data (Includes condition where 'final refuel' flag is absent and current_PFQ is specified and the contrary)	at ground user's discretion – it is recommended that at least one retry is performed before giving up refuel targets by data link and switching to manual back up and send FDACOM with cancel	
Any	Receive FERIND with error code 5 (and list of supported versions)	Analyze list of supported versions – at user's discretion – it is recommended that if one matches the versions supported by the ground, then re-send the message with good version number	
after any message sent	Receive FERIND with error code 2, 3 or 6 (message considered erroneous)	at ground user's discretion - it is recommended that the message is corrected and re-sent	
FDASUB transmitted to the aircraft	FERIND received with code 21	Wait for airborne time out delay before sending FSTREQ for checking new values then resubmitting the message if always needed, or check with other ground system that controls refueling.	
FDASUB transmitted to the aircraft	FDAACK received with 'X' value for some parameters	Ground system should cancel the transaction by sending FDACOM (cancel).	

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6.2.2.5 ACARS Format

The message will only contain one element. No supplementary header should be used here.

Label used is "RF".

Table 6.2.2.5-1 – FDASUB01 ACARS Definition

Field name	Meaning	Field length (in Char)	Contents		Option	Range	Resolution	Unit	Example
			Fixed text	Parameter type					
CurrentZFW	The current metric value of the aircraft's Zero Fuel Weight (Mass) parameter or, if out of value, the constant "X"	1-6		mass-kg	YES	0 to 999999	1	kg	320500
parameter separator		1	comma		NO				,
CurrentZFCG	The current value of the aircraft's Zero Fuel Center-of-Gravity parameter.	3		center-of-gravity	YES	000 to 999	tenth of percent	tenth of percent	385
parameter separator		1	comma		NO				,
CurrentPFQ	The current metric value of the aircraft's Preselected Fuel Quantity parameter. This value specifies the end-quantity of the next aircraft refueling process	1-6		mass-kg	YES	0 to 999999	1	kg	230000
parameter separator		1	comma		NO				,
FinalRefuelOperation	Indicates if this Fuel data submission will be the final one – (1 = final refuel operation) - see Section 6.2.3.1 FENIND dynamic description for details	1		boolean	YES, but always present, if Current PFQ parameter is defined	'0' or '1'			1

FDASUB should contain at least one parameter (current ZFW, ZFCG or PFQ).

Note: If FDASUB is sent without any value, it is regarded as erroneous and generates FERIND with appropriate error code.

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Table 6.2.2.5-2 – FDAACK01 ACARS Definition

Field name	Meaning	Field length (in Char)	Contents		Option	Range	Resolution	Unit	Example
			Fixed text	Parameter Type					
CurrentZFW	The current metric value of the aircraft's Zero Fuel Weight (Mass) parameter.	1-6		mass-kg or constant	YES (present if parameter was received in FDA-SUB message)	0 to 999999 or 'X'	1	kg	320500
parameter separator		1	comma		NO				,
CurrentZFCG	The current value of the aircraft's Zero Fuel Center-of-Gravity parameter.	3		center-of-gravity or constant	YES (present if parameter was received in FDA-SUB message)	000 to 999 or 'X'	tenth of percent	tenth of percent	385
parameter separator		1	comma		NO				,
CurrentPFQ	The current metric value of the aircraft's Preselected Fuel Quantity parameter. This value specifies the end-quantity of the next aircraft refueling process	1-6		mass-kg	YES	0 to 999999	1	kg	230000
parameter separator		1	comma		NO				,
FinalRefuelOperation	Indicates if this Fuel data submission will be the final one: (1 = final refuel operation). See Section 6.2.3.1 FENIND dynamic description for details.	1		boolean	YES, but always present, if CurrentPFQ parameter is defined	'0' or '1'			1

Table 6.2.2.5-3 – FDACOM01 ACARS Definition

Field name	Meaning	Field length (in Char)	Contents		Option	Range	Resolution	Unit	Example
			Fixed text	Variable text					
Confirm Status	'1' = Confirm (FDAACK received correctly and matches FDASUB), '0' or any other value means cancel	1		B	NO	0 to 1			1

Example:

In the following scenario an A380 is fueled to 230000 kg. The estimated ZFW of 320500 kg and the estimated ZFCG of 38.5%, which are needed for the A380 specific CG Targeting process, become available later. Due to a ZFCG out of range (A380 Fuel system allows a max of ZFCG = 44%), the ground canceled the transaction and a corrected message is resent.

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```
FDASUB01 uplink:
,FDASUB01050125221536
/, ,230000,0,xxxx
FDAACK01 downlink:
,FDAACK01050125221539
/, ,230000,0,xxxx
FDACOM01 uplink:
,FDACOM01050125221539
/1,xxxx

FDASUB01 uplink:
,FDASUB01050125221902
/320500,500,, ,xxxx
FDAACK01 downlink:
,FDAACK01050125221909
/320500,X,, ,xxxx
FDACOM01 uplink:
,FDACOM01050125221912
/0,xxxx

FDASUB01 uplink:
,FDASUB01050125223502/320500,385,, ,xxxx
FDAACK01 downlink:
,FDAACK01050125223509
/320500,385,, ,xxxx
FDACOM01 uplink:
,FDACOM01050125223512
/1,xxxx
```

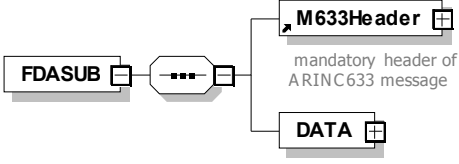
6.2.2.6 XML Format

This format should be used for ground-ground message exchanges only.

COMMENTARY

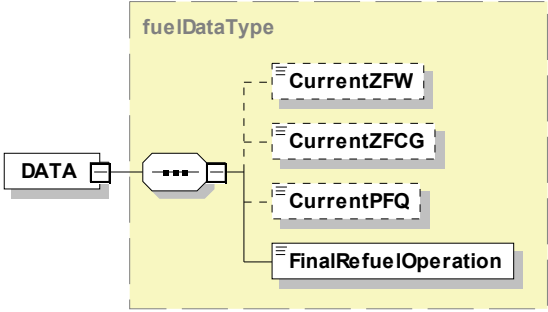
Presently, all refuel applications are connected to ACARS only and do NOT use any XML messages. The XML messages defined in Section 6.2 may be used instead of the ACARS messages on IP-based ground-ground links only.

element **FDASUB**

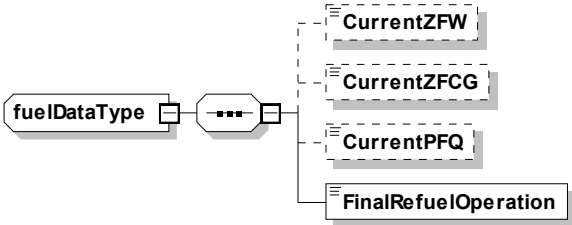
diagram	
children	M633Header DATA

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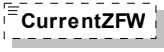
element **FDASUB/DATA**

diagram	
type	fuelDataType
children	CurrentZFW CurrentZFCG CurrentPFQ FinalRefuelOperation

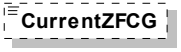
complexType **fuelDataType**

diagram	
children	CurrentZFW CurrentZFCG CurrentPFQ FinalRefuelOperation
used by	elements FDASUB/DATA FDAACK/DATA

element **fuelDataType/CurrentZFW**

diagram	
type	xs:nonNegativeInteger

element **fuelDataType/CurrentZFCG**

diagram	
type	xs:nonNegativeInteger

element **fuelDataType/CurrentPFQ**

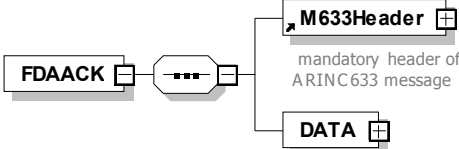
diagram	
type	xs:nonNegativeInteger

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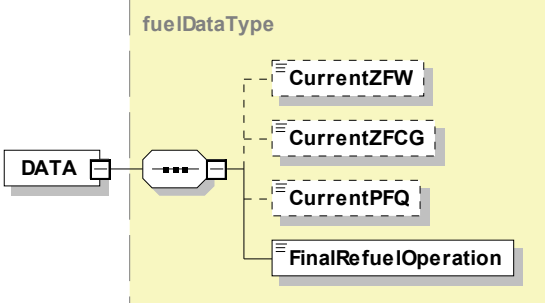
element **fuelDataType/FinalRefuelOperation**

diagram	 A diagram showing a box labeled 'FinalRefuelOperation' with a small square icon to its right.
type	xs:boolean

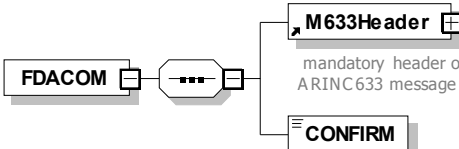
element **FDAACK**

diagram	 A diagram showing a box labeled 'FDAACK' connected to a circle with three dots. This circle is connected to a box labeled 'M633Header' and another box labeled 'DATA'. A note next to 'M633Header' says 'mandatory header of ARINC633 message'.
children	M633Header DATA

element **FDAACK/DATA**

diagram	 A diagram showing a box labeled 'DATA' connected to a circle with three dots. This circle is connected to a dashed box labeled 'fuelDataType'. Inside 'fuelDataType' are four boxes: 'CurrentZFW', 'CurrentZFCG', 'CurrentPFQ', and 'FinalRefuelOperation'.
type	fuelDataType
children	CurrentZFW CurrentZFCG CurrentPFQ FinalRefuelOperation

element **FDACOM**

diagram	 A diagram showing a box labeled 'FDACOM' connected to a circle with three dots. This circle is connected to a box labeled 'M633Header' and another box labeled 'CONFIRM'. A note next to 'M633Header' says 'mandatory header of ARINC633 message'.
children	M633Header CONFIRM

element **FDACOM/CONFIRM**

diagram	 A diagram showing a box labeled 'CONFIRM' with a small square icon to its right.
type	xs:boolean

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6.2.3 reFuel ENd

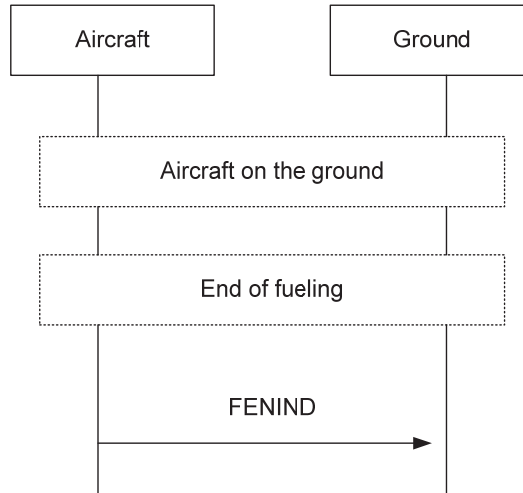


Figure 6.2.3-1 – Typical Fuel End Exchange

End of refueling event is necessary to allow generation by ground system of a precise Load and Trim Sheet (fuel quantities in tanks may differ from the one known by ground system during refueling process).

This section defines version 1 of reFuel End service.

6.2.3.1 reFuel-END-INDication Downlink (FENIND)

Element Name: **FENIND**

6.2.3.2 Dynamic Aspects

FENIND is sent by the airborne system at the end of a successful refueling process.

FENIND should not be generated if the PFQ used for refuel was received in a FDASUB message with 'Final refuel operation' flag set to '0'. FENIND should be generated in all other cases (remote, i.e., activation by FDASUB with flag set to '1', or locally by airborne system or locally on the aircraft (from FMS, Integrated Refuel panel, etc.)).

If fuel system data necessary for FENIND transmission are missing at the end of a Refuel operation, then a FENIND message should not be sent and the error message with the error type 'missing data', code 7 should be sent, with FENIND referenced as erroneous service and element

6.2.3.3 ACARS Format

The message will only contain one element. The refuel end indication downlink may contain one or several optional supplementary address(es) (as per ARINC Specification 620), which will be the copy of the supplementary address(es) (if present) in the last RF uplink (if received).

Label used is "RF".

FENIND01

The element should be encoded in ACARS exactly as FSTREP01 element (refer to Section 6.2.1.4).

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Example: (example below includes header information)

```
FENIND01 downlink:
,FENIND01050125221545
/320500,F,050125,0055,385,A,050124,2359,230000,N,050124,2329,397,N,23
0100,N,4200,N,KG,xxxx
```

(Note: xxxx is the CRC)

6.2.3.4 XML Format

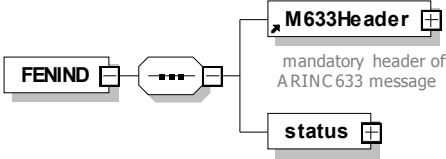
This format should be used for ground-ground message exchanges only.

COMMENTARY

Presently, all refuel applications are connected to ACARS only and do NOT use any XML messages. The XML messages defined in Section 6.2 may be used instead of the ACARS messages on IP-based ground-ground links only.

FEN XML Schema Definition (including the ARINC 633 header)

element FENIND

diagram	
children	M633Header status

6.0 FUEL

element **FENIND/status**

diagram	<pre> classDiagram class status class fuelStatusType { CurrentZFW CurrentZFWSource ZFWEntryDate CurrentZFCG CurrentZFCGSource ZFCGEntryDate CurrentPFQ CurrentPFQSource PFQEntryDate GWCG GWCGAccuracyState FOB FOBAccuracyState TTK TTKAccuracyState AircraftMassUnitDisplayed } status --> fuelStatusType </pre>
type	fuelStatusType
children	CurrentZFW CurrentZFWSource ZFWEntryDate CurrentZFCG CurrentZFCGSource ZFCGEntryDate CurrentPFQ CurrentPFQSource PFQEntryDate GWCG GWCGAccuracyState FOB FOBAccuracyState TTK TTKAccuracyState AircraftMassUnitDisplayed

6.0 FUEL

6.2.4 Automatic Ground Transfer Start

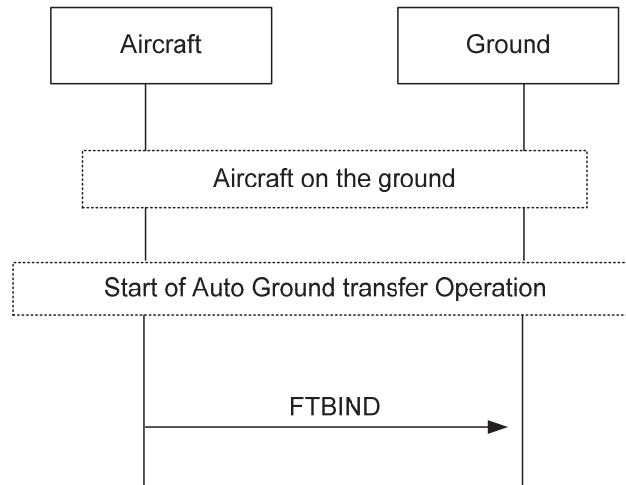


Figure 6.2.4-1 – Typical Auto Ground Fuel Transfer Start Exchange

This section defines version 1 of Automatic ground transfer start indication.

6.2.4.1 Fuel-Transfer-Begins-INDication Downlink (FTBIND)

Element name: **FTBIND**

FTBIND message transfer should be optional.

6.2.4.2 Dynamic Aspects

FTBIND is sent by the airborne system when an automatic ground transfer process starts.

6.2.4.3 ACARS Format

The message will only contain one element. The fuel automated transfer end indication downlink may contain one optional supplementary address (as per ARINC Specification 620), which will be the copy of the supplementary address(es) (if present) in the last RF uplink (if received).

Label used is "RF".

FTBIND01

The Fuel-transfer-begin-indication downlink should contain no parameters – and thus only contain the basic header (not the supplementary header).

COMMENTARY

Time and Date are needed for this message – it has been deemed acceptable to use the information already contained in the ARINC 633 header.

Example: (example below includes header information)

```
FTBIND01 downlink:
,FTBIND01050125221545
/,xxxx
```

Note: xxxx is the CRC

6.0 FUEL

6.2.4.4 XML Format

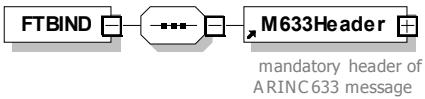
This format should be used for ground-ground message exchanges only.

COMMENTARY

Presently, all refuel applications are connected to ACARS only and do NOT use any XML messages. The XML messages defined in Section 6.2 may be used instead of the ACARS messages on IP-based ground-ground links only.

FTB XML Schema Definition (including the ARINC 633 header)

element **FTBIND**

diagram	
children	M633Header

6.2.5 Automatic Ground Transfer End

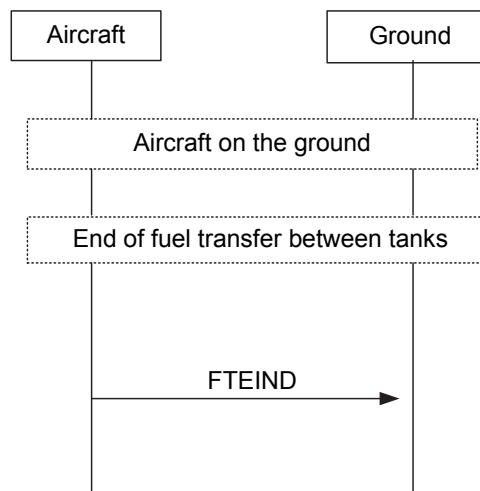


Figure 6.2.5-1 – Typical Auto Ground Fuel Transfer End exchange

End of auto ground transfer event is necessary to allow generation by ground system of a precise Load and Trim Sheet (fuel quantities in various tanks may differ from the one known by ground system during refueling process).

This section defines version 1 of automatic ground Transfer End INDication.

6.2.5.1 Fuel-automatic-Transfer-End-INDication Downlink (FTEIND)

Element Name: **FTEIND**

6.2.5.2 Dynamic Aspects

FTEIND is sent by the airborne system at the end of a successful automatic ground transfer process.

COMMENTARY

A380 examples of premature cessation include deselection by the pilot of the ground transfer process and termination of the AGT due to engine start.

6.0 FUEL

If fuel system data necessary for the system are missing at the end of an Auto ground fuel transfer operation, then FTEIND message should not be sent and the error message with the error type ‘missing data’, code 7, should be sent with FTEIND referenced as erroneous service and element.

6.2.5.3 ACARS Format

The message will only contain one element. The fuel automated transfer end indication downlink may contain one optional supplementary address (as per ARINC Specification 620), which will be the copy of the supplementary address(es) (if present) in the last RF uplink (if received).

If fuel system data necessary for the system are missing at the end of a Refuel operation, then a FENIND message should not be sent and the error message with the error type ‘missing data’, code 7, should be sent.

Label used is “RF”.

FTEIND01

The element should be encoded in ACARS exactly as FSTREP01 element (refer to Section 6.2.1.4).

Example: (example below includes header information)

```
FTEIND01 downlink:
,FTEIND01050125221545
/320500,F,050125,0055,385,A,050124,2359,230000,N,050124,2329,397,N,23
0100,N,4200,N,KG,xxxx
```

Note: xxxx is the CRC

6.2.5.4 XML Format

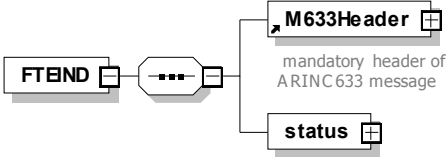
This format should be used for ground-ground message exchanges only.

COMMENTARY

Presently, all refuel applications are connected to ACARS only and do NOT use any XML messages. The XML messages defined in Section 6.2 may be used instead of the ACARS messages on IP-based ground-ground links only.

FTE XML Schema Definition (including the 633 header)

element FTEIND

diagram	
children	M633Header status

6.0 FUEL

element **FTEIND/status**

diagram	<pre> classDiagram class status class fuelStatusType { CurrentZFW CurrentZFWSource ZFWEntryDate CurrentZFCG CurrentZFCGSource ZFCGEntryDate CurrentPFQ CurrentPFQSource PFQEntryDate GWCG GWCGAccuracyState FOB FOBAccuracyState TTK TTKAccuracyState AircraftMassUnitDisplayed } status --> fuelStatusType </pre>
type	fuelStatusType
children	CurrentZFW CurrentZFWSource ZFWEntryDate CurrentZFCG CurrentZFCGSource ZFCGEntryDate CurrentPFQ CurrentPFQSource PFQEntryDate GWCG GWCGAccuracyState FOB FOBAccuracyState TTK TTKAccuracyState AircraftMassUnitDisplayed

6.0 FUEL

6.2.6 Automatic Ground Transfer Interrupted

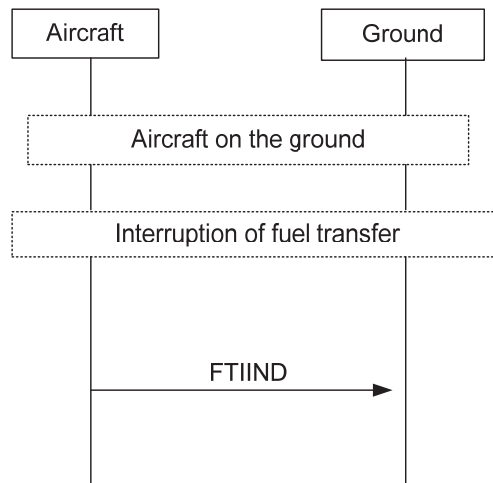


Figure 6.2.6-1 – Typical Auto Ground Fuel Transfer Interruption Exchange

This section defines version 1 of automatic ground Transfer Interruption Indication.

6.2.6.1 Fuel-automatic-Transfer-Interruption-INDication Downlink (FTIIND)

Element Name: **FTIIND**

6.2.6.2 Dynamic Aspects

FTIIND is sent by the airborne system when automatic fuel ground transfer has not completed successfully for any reason (e.g., due to crew deselection or abort due to a failure). Automatic Fuel ground transfer operation is prematurely interrupted.

If fuel system data necessary for FTIIND transmission are missing at the end of an interrupted Auto ground fuel transfer operation, then a FTIIND message should not be sent and the error message with the error type 'missing data', code 7 should be sent with FTIIND referenced as erroneous service and element.

6.2.6.3 ACARS Format

The message will only contain one element. The fuel automated transfer Interruption indication downlink may contain one optional supplementary address (as per ARINC Specification 620), which will be the copy of the supplementary address(es) (if present) in the last RF uplink (if received).

Label used is "RF".

FTIIND01

The element should be encoded in ACARS exactly as FSTREP01 element (refer to Section 6.2.1.4).

Example: (example below includes header information)

FTIIND01 downlink:

,FTIIND01050125221545

/320500,F,050125,0055,385,A,050124,2359,230000,N,050124,2329,397,N,230100,N,4200,N,KG,xxxx

Note xxxx is the CRC

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6.2.6.4 XML Format

This format should be used for ground-ground message exchanges only.

COMMENTARY

Presently, all refuel applications are connected to ACARS only and do NOT use any XML messages. The XML messages defined in Section 6.2 may be used instead of the ACARS messages on IP-based ground-ground links only.

FTE XML Schema Definition (including the 633 header)

element **FTIIND**

diagram	
children	M633Header status

element **FTIIND/status**

diagram	
type	fuelStatusType
children	CurrentZFW CurrentZFWSrc ZFWEntryDate CurrentZFCG CurrentZFCGSrc ZFCGEntryDate CurrentPFQ CurrentPFQSrc PFQEntryDate GWCG GWCGAccuracyState FOB FOBAccuracyState TTK TTKAccuracyState AircraftMassUnitDisplayed

6.0 FUEL

6.2.7 Error Service

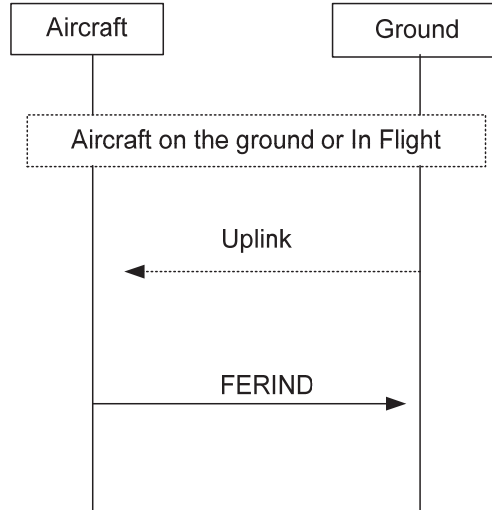


Figure 6.2.7-1 – Typical Error Exchange

This service is used to report any error detected by the aircraft Fuel application to the Ground.

Depending on the type of received uplink and on its content, various types of errors will be reported by the aircraft (see in Sections 6.2.1 and 6.2.2 and in table below for list of possible error codes).

FERIND uplinks are not used by this Error service.

6.2.7.1 Fuel-Error-INDication Uplink/Downlink (FERIND)

Element Name: **FERIND**

6.2.7.2 Dynamic Aspects

Refer to other sections for details.

6.2.7.3 ACARS Format

The message will only contain one element. The Fuel error indication downlink may contain one or several optional supplementary address (as per ARINC Specification 620), which will be the copy of the supplementary address(es) (if present) contained in last received uplink.

Label used is "RF".

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Table 6.2.7.3-1 – FERIND01 ACARS Definition

Field name	Meaning	Field length (in Char)	Contents		Option	Range	Resolution	Unit	Example
			Fixed text	Parameter type					
parameter separator		1	comma		NO				,
erroneous Service	Service that caused the error	3		Char3Type	NO	'XXX' is reserved to indicate that service is unknown			FST
erroneous Element	Element that caused the error	3		Char3Type	NO	'XXX' is reserved to indicate that service is unknown			REP
service Version Nb	Version number of the service that caused the error	2		NN	NO				01
parameter separator		1	comma		NO				,
ErrorClass	category of error – indicates if the error is recoverable or not see Section 5.1.2	1		Integer	NO	0-3			1
parameter separator		1	comma		NO				,
errorType	See table below	2		integer	NO	00-99			1
parameter separator		1	comma		NO				,
errorData	See table below	N		(0-n)I	YES				
Parameter separator		1	comma		NO				,

Table 6.2.7.3-2 – Application Specific Error Types

Sender's Situation	Type Name	Type ID	Suggested text to user (e.g., flightcrew)	Comment
Aircraft fuel system is not able to process the uplink (i.e., Submit Fuel data process on going with another Ground system)	Busy	21		
Communication is broken with the avionics fuel system, datalink application is not able to send data to the fuel system – therefore, FDASUB is not available.	read-only	22		

Application Specific Use of Error Data

Contains supplier specific detailed information for troubleshooting (software status, source of the error, parameters values, etc.).

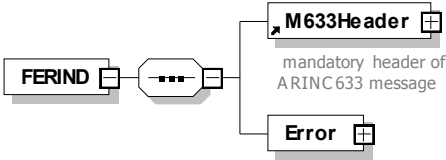
In case of error 5, should only list the supported versions of the service (NN separated by spaces).

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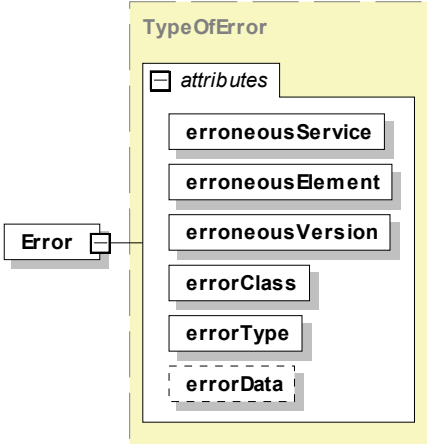
6.2.7.4 XML Format

This format should be used for ground-ground message exchanges only.

element FERIND

diagram	 The diagram shows the structure of the FERIND element. It consists of a box labeled 'FERIND' connected to a box labeled 'M633Header'. Below 'M633Header' is a box labeled 'Error'. A note next to 'M633Header' states: 'mandatory header of ARINC 633 message'.
children	M633Header Error

element FERIND/Error

diagram	 The diagram shows the structure of the FERIND/Error element. It consists of a box labeled 'Error' connected to a box labeled 'TypeOfError'. Inside 'TypeOfError' is a box labeled 'attributes' containing several boxes: 'erroneousService', 'erroneousElement', 'erroneousVersion', 'errorClass', 'errorType', and 'errorData'.					
type	TypeOfError					
used by	element WI Error					
attributes	Name	Type	Use	Default	Fixed	annotation
	erroneousService	char3Type	required			
	erroneousElement	char3Type	required			
	erroneousVersion	xs:nonNegativeInteger	required			
	errorClass	xs:nonNegativeInteger	required			
	errorType	xs:nonNegativeInteger	required			
	errorData	xs:string	optional			

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complexType **TypeOfError**

diagram						
used by	element FERIND/Error					
attributes	Name	Type	Use	Default	Fixed	annotation
	erroneousService	char3Type	required			
	erroneousElement	char3Type	required			
	erroneousVersion	xs:nonNegativeInteger	required			
	errorClass	xs:nonNegativeInteger	required			
	errorType	xs:nonNegativeInteger	required			
	errorData	xs:string	optional			

attribute **TypeOfError/@erroneousService**

type	char3Type

attribute **TypeOfError/@erroneousElement**

type	char3Type

attribute **TypeOfError/@erroneousVersion**

type	xs:nonNegativeInteger

attribute **TypeOfError/@errorClass**

type	xs:nonNegativeInteger

attribute **TypeOfError/@errorType**

type	xs:nonNegativeInteger

attribute **TypeOfError/@errorData**

type	xs:string

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6.3 Refueling

Application Name	Refueling
ACARS Label	RE
Introduced	2005
Purpose	The idea behind standardizing air-/ground messages related to the aircraft refueling process is the wish to refuel an aircraft - just in time and without transporting paper - with the help of airline independent into-plane-service or handling companies
Stake Holder	airlines, into-plane-services, ops handling agents
Airborne System	AOC
Ground Systems	Into plane service fuel handling system, airline or airport host, airline or airport departure control system, airline or handling agent weight & balance system
Network	ACARS
Downlink Routing	Label, Airport, Airline

Table 6.3-1 – Refueling Service Table

Service Name	Service ID	Description
Fuel Order	FOR	Fuel Order: The into plane service (fuel supplier) needs to know, that a customer wants him to serve a particular flight. The into plane service or the aircraft's refueling computer or the airline's weight and balance department needs to know with how much fuel the pilot wants to depart
Fuel Receipt	FRC	Fuel receipt: The into plane service should tell someone how much fuel has been refilled and who was the owner of the transferred fuel. "Someone" may be the pilot who may have to verify the commercial transaction after checking his fuel gauges with an (electronic) signature.
Fuel Process	FRP	Fuel Process: During aircraft turnaround, other processes may depend on the fueling process. Therefore handling partners may need to know when fueling starts and when it is finished.
Fuel CG Advisory	FCA	Fuel CG Advisory: The CG Advisory service should inform the flight crew that the aircraft is presently out of trim and that this situation can be corrected by a re-distribution of fuel.

Table 6.3-2 – Refueling Element Table

Element Name	ACARS Label	Service Version	DL/UL	Purpose
FORSUB	RE	1	DL	fuel-order-submit: Submits parameters to a ground handling system. Requests or cancels a fuel track
FORACK	RE	1	UL	fuel-order-acknowledge: Confirms the reception of a fuel-order-submit downlink
FRCSUB	RE	1	UL	fuel-receipt-submit: Tells the aircraft how much volume has been supplied. May replace paper fuel receipt
FRCACK	RE	1	DL	fuel-receipt-acknowledge: Confirms the reception of a fuel-receipt-submit uplink
FPRREP	RE	1	DL/UL	fuel-process-report: Informs about fueling progress, e.g., start or end of fueling
FCAIND	RE	1	UL	Fuel CG Advisory Indication: Informs about out of trim conditions

6.0 FUEL

6.3.1 Fuel Order Service

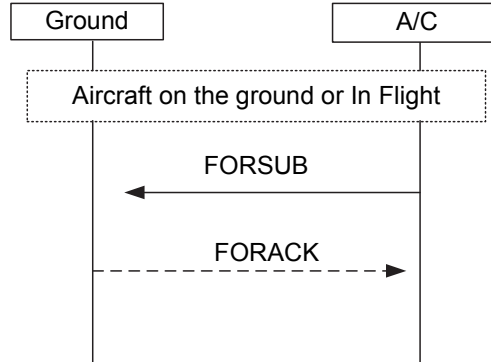


Figure 6.3.1-1 – Typical Fuel Order Exchange

The fuel-order element is needed to request fuel from an into-plane fuel service provider. It can be sent in all flight phases. It can be used to tell the fuel supplier that no fuel is needed today or to cancel a fuel truck previously ordered. It may contain the remaining fuel, so that the into-plane service can calculate the amount of fuel to be uploaded in the refueling process. It may either state the minimum fuel required (if block fuel has not yet been finalized), or the final block fuel.

The following subsections define version 1 of FOR service.

6.3.1.1 Fuel-ORDER-SUBmit Downlink (FORSUB)

Element Name: **FORSUB**

Table 6.3.1.1-1 – FORSUB01 and FORACK01 ACARS Definition

Parameter Name	Meaning	Contents		Option	Range	Resolution	Unit	Example
		Fixed Text	Parameter Type					
OrderFlag	0 = No fueling required, 1 = Fueling required		boolean	No				1
AcknowledgeFlag	0 = No acknowledge wanted 1 = Acknowledge requested		boolean	No				1
FinalFlag	0 = Preliminary fuel, e.g., minimum fuel before top of or not applicable 1 = Final fuel		boolean	No				0
ActualFlag	0 = Estimated remaining or not applicable 1 = Actual Remaining		boolean	No				1
parameter separator		comma		No				,
ServiceAirport	ICAO code of airport, where fueling shall take place		airport	Yes				KJFK
parameter separator		comma		No				,
IntoPlaneService	A three digit code unique to an into-plane-service company		provider-id	Yes				ABC
parameter separator		comma		No				,
ServiceFlight	Commercial flight number of flight to be fueled		flight-no	Yes				AF123A

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Parameter Name	Meaning	Contents		Option	Range	Resolution	Unit	Example
		Fixed Text	Parameter Type					
parameter separator		comma		No				,
BlockFuel	Amount of fuel that should be in the aircraft after refueling or also called total fuel		mass-tt	Yes	0 to 9999 (= 999.9 tons)	100 kg	tenth of metric tons	87
parameter separator		comma		No				,
TaxiFuel	Amount of fuel required from offblock until begin of takeoff run		mass-kg	Yes	0 to 99999 (= 99.9 tons)	1 kg	Kilogram	200
parameter separator		comma		No				,
TripFuel	Amount of fuel required from begin of takeoff run until touchdown		mass-kg	Yes	0 to 999999 (= 999.9 tons)	1 kg	Kilogram	3450
parameter separator		comma		No				,
Remaining	Amount of fuel that is estimated to be in the aircraft or which is actual in the aircraft by the time the fueling starts		mass-tt	Yes	0 to 9999 (= 999.9 tons)	100 kg	tenth of metric tons	85
parameter separator		comma		No				,
AircraftMassUnitDisplay	Unit used for pilot display (Kilograms or pounds)		"KG" or "LB"	Yes				KG
parameter separator		comma		No				,
LimitMass	Most restrictive limitation on TOW, ZFW or LAW		mass-tt	Yes	0 to 9999 (= 999.9 tons)	100 kg	tenth of metric tons	5232
parameter separator		comma		No				,
LimitType	Type of most restrictive limitation: "T" for TOW, "Z" for ZFW, "L" for LAW		U	Yes				T
parameter separator		comma		No				,
FuelTruckSTBY	Information whether the fuel truck can leave the airplane after refueling		Boolean	Yes				1

6.3.1.2 Fuel-ORDER-ACKnowledge Uplink (FORACK)

Element Name: **FORACK**

The FORACK element follows the same ACARS and XML definition as the FORSUB element.

6.3.1.3 Dynamic Aspects

FORSUB and FORACK should always be sent in the order specified above.

Upon reception of a correct FORSUB, the ground system should:

- Forward the data to the appropriate end-systems. If this is not possible, the ground system should send the appropriate GENERR message
- Check the AcknowledgeFlag parameter of the FORSUB downlink. If it is set to "1", the ground system should send the FORACK message

Upon reception of an erroneous FORSUB, the ground system should send the appropriate GENERR message.

Upon receiving a GENERR message, the airborne system should, if the FORSUB was manually triggered, display a failure message to the flightcrew. The text of the failure message depends on error class and error type.

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Scenario 1

An A320 sends a general fuel truck cancellation before landing in EDDF. The cancellation is confirmed by the ground.

After touchdown in EDDF, this decision is revised. In the second downlink, it asks ABC to send a fuel truck and fill up the aircraft to the minimum fuel of 8.7 tons. Its actual remaining is 8.5 tons. Again, the message is confirmed.

The third downlink is sent, after the block fuel has been finalized to 9.0 tons. Taxi fuel is specified as 200 kg, TripFuel as 3450 kg. Again, the message is confirmed.

All message envelopes have been omitted.

ACARS Example:

```

FORSUB01 downlink:
, FORSUB01050324115159LFPG,,KJFK,,AFR5556,,050324,,A320,,F-WWOW,
/0100,EDDF,,LH5678,,,,,,,,,xxxx
FORACK01 uplink:
, FORACK01050324115202LFPG,,KJFK,,AFR5556,,050324,,A320,,F-WWOW,
/0100,EDDF,,LH5678,,,,,,,,,xxxx

FORSUB01 downlink:
, FORSUB01050324122359LFPG,,KJFK,,AFR5556,,050324,,A320,,F-WWOW,
/1101,EDDF,ABC,,87,200,,85,KG,680,T,1,xxxx
FORACK01 uplink:
, FORACK01050324122407LFPG,,KJFK,,AFR5556,,050324,,A320,,F-WWOW,
/1101,EDDF,ABC,,87,200,,85,KG,680,T,1,xxxx

FORSUB01 downlink:
, FORSUB01050324123200LFPG,,KJFK,,AFR5556,,050324,,A320,,F-WWOW,
/1111,EDDF,ABC,,90,200,3450,85,KG,680,T,0,xxxx
FORACK01 uplink:
, FORACK01050324123205LFPG,,KJFK,,AFR5556,,050324,,A320,,F-WWOW,
/1111,EDDF,ABC,,90,200,3450,85,KG,680,T,0,xxxx

```

Scenario 2

An A380 in JFK asks to be filled up to a final block fuel of 125 tons. However, the fuel order service is temporarily not available.

ACARS Example:

```

FORSUB01 downlink:
, FORSUB01050325050015LFPG,,KJFK,,AFR5556,,050325,,A380,,F-WWOW,
/1111,KJFK,,1250,1000,95650,285,KG,5400,T,,xxxx

GERIND01 uplink:
, GERIND01050325050024LFPG,,KJFK,,AFR5556,,050325,,A380,,F-WWOW,
/JRE,FORSUB01,1,9,Fuel Order Error Transaction aborted Service
temporarily unavailable,0,/sorry crewxxxx

```

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The flightcrew might receive the following error text:

Fuel Order Error

Transaction aborted

Service temporarily unavailable

sorry crew

6.3.1.4 ACARS Format

The ACARS format specified in Table 6.3.1.1 may be used for air-ground and ground-ground messages.

When using the ACARS format, the supplementary header should be used.

ACARS Label used should be "RE".

6.3.1.5 XML Format

The IP/XML format may be used for air-ground and ground-ground messages.

When using the IP/XML format, the supplementary header should be used.

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element **FORSUB**

diagram						
children	M633Header M633SupplementaryHeader ServiceAirport IntoPlaneServiceCode ServiceFlight OperationalLimit BlockFuel TaxiFuel TripFuel ArrivalFuel FuelTruckOnStandby					
attributes	Name	Type	Use	Default	Fixed	annotation
	refuelingRequiredIndicator	xs:boolean				documentation true, if refueling/(defueling) is required, false, if no refueling/(defueling) action is necessary
	acknowledgementRequired	xs:boolean				documentation true, if recipient of the FORSUB message shall provide an FORACK message
	finalFuelIndicator	xs:boolean				documentation false, if a preliminary fuel amount is being ordered/reported
	aircraftMassUnitDisplay	weightUnitType				documentation unit used for display to the pilot

attribute **FORSUB/@refuelingRequiredIndicator**

type	xs:boolean
annotation	documentation true, if refueling/(defueling) is required, false, if no refueling/(defueling) action is necessary

attribute **FORSUB/@acknowledgementRequired**

type	xs:boolean
annotation	documentation true, if recipient of the FORSUB message shall provide an FORACK message

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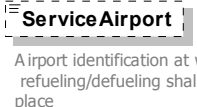
attribute **FORSUB/@finalFuelIndicator**

type	xs:boolean
annotation	documentation false, if a preliminary fuel amount is being ordered/reported

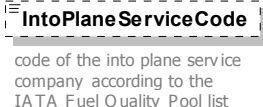
attribute **FORSUB/@aircraftMassUnitDisplay**

type	weightUnitType
facets	enumeration kg enumeration t enumeration lb enumeration hlb
annotation	documentation unit used for display to the pilot

element **FORSUB/ServiceAirport**

diagram	
type	AirportIcaoCodeType
annotation	documentation Airport identification at which refueling/defueling shall take place

element **FORSUB/IntoPlaneServiceCode**

diagram	
type	restriction of xs:string
annotation	documentation code of the into plane service company according to the IATA Fuel Quality Pool list

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element FORSUB/ServiceFlight

diagram						
type	FlightNumberType					
children	CommercialFlightNumber					
attributes	Name airlineIATACode number operationalSuffix	Type derived by: xs:string derived by: xs:string derived by: xs:string	Use optional optional optional	Default	Fixed	annotation documentation 2 letter airline code, e.g., SK documentation 1 to 5 digits, e.g., 014, 14 documentation operational suffix, e.g., Q
annotation	documentation Commercial Flight Number of flight to be refueled/defueled					

element FORSUB/OperationalLimit

diagram						
type	extension of xs:nonNegativeInteger					
attributes	Name unit reason	Type weightUnitType	Use required	Default	Fixed	annotation documentation reason for operational limit
annotation	documentation Maximum Allowable Takeoff Weight					

attribute FORSUB/OperationalLimit/@unit

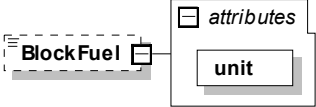
type	weightUnitType
facets	enumeration kg enumeration t enumeration lb enumeration hlb

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attribute **FORSUB/OperationalLimit/@reason**

annotation	documentation reason for operational limit

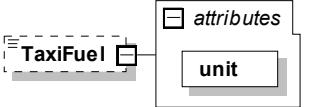
element **FORSUB/BlockFuel**

diagram						
type	extension of xs:nonNegativeInteger					
attributes	Name unit	Type weightUnitType	Use required	Default	Fixed	annotation

attribute **FORSUB/BlockFuel/@unit**

type	weightUnitType	
facets	enumeration	kg
	enumeration	t
	enumeration	lb
	enumeration	hlb

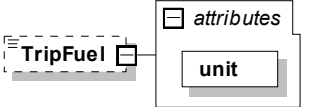
element **FORSUB/TaxiFuel**

diagram						
type	extension of xs:nonNegativeInteger					
used by	group	Fuel.Grp				
attributes	Name unit	Type weightUnitType	Use required	Default	Fixed	annotation

attribute **FORSUB/TaxiFuel/@unit**

type	weightUnitType	
facets	enumeration	kg
	enumeration	t
	enumeration	lb
	enumeration	hlb

element **FORSUB/TripFuel**

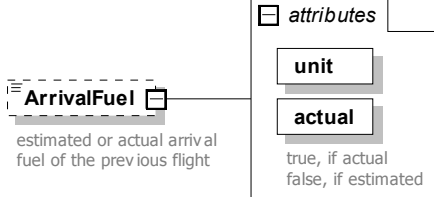
diagram						
type	extension of xs:nonNegativeInteger					
used by	group	Fuel.Grp				
attributes	Name unit	Type weightUnitType	Use required	Default	Fixed	annotation

6.0 FUEL

attribute **FORSUB/TripFuel/@unit**

type	weightUnitType
facets	enumeration kg enumeration t enumeration lb enumeration hlb

element **FORSUB/ArrivalFuel**

diagram						
type	extension of xs:nonNegativeInteger					
attributes	Name unit actual	Type weightUnitType xs:boolean	Use required required	Default Fixed	annotation documentation true, if actual false, if estimated	
annotation	documentation estimated or actual arrival fuel of the previous flight					

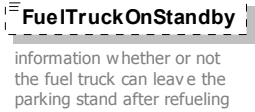
attribute **FORSUB/ArrivalFuel/@unit**

type	weightUnitType
facets	enumeration kg enumeration t enumeration lb enumeration hlb

attribute **FORSUB/ArrivalFuel/@actual**

type	xs:boolean
annotation	documentation true, if actual false, if estimated

element **FORSUB/FuelTruckOnStandby**

diagram						
type	xs:boolean					
annotation	documentation information whether or not the fuel truck can leave the parking stand after refueling					

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element FORACK

diagram						
children	M633Header M633SupplementaryHeader ServiceAirport IntoPlaneServiceCode ServiceFlight OperationalLimit BlockFuel TaxiFuel TripFuel ArrivalFuel FuelTruckOnStandby					
attributes	Name	Type	Use	Default	Fixed	annotation
	refuelingRequiredIndicator	xs:boolean				documentation true, if refueling/(defueling) is required, false, if no refueling(defueling) action is necessary
	acknowledgementRequired	xs:boolean				documentation true, if recipient of the FORSUB message shall provide an FORACK message
	finalFuelIndicator	xs:boolean				documentation false, if a preliminary fuel amount is being ordered/reported
	aircraftMassUnitDisplay	weightUnitType				documentation unit used for display to the pilot

attribute FORACK/@refuelingRequiredIndicator

type	xs:boolean
annotation	documentation true, if refueling/(defueling) is required, false, if no refueling(defueling) action is necessary

attribute FORACK/@acknowledgementRequired

type	xs:boolean
annotation	documentation true, if recipient of the FORSUB message shall provide an FORACK message

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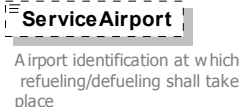
attribute **FORACK/@finalFuelIndicator**

type	xs:boolean
annotation	documentation false, if a preliminary fuel amount is being ordered/reported

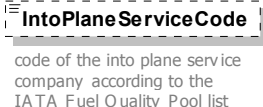
attribute **FORACK/@aircraftMassUnitDisplay**

type	weightUnitType
facets	enumeration kg enumeration t enumeration lb enumeration hlb
annotation	documentation unit used for display to the pilot

element **FORACK/ServiceAirport**

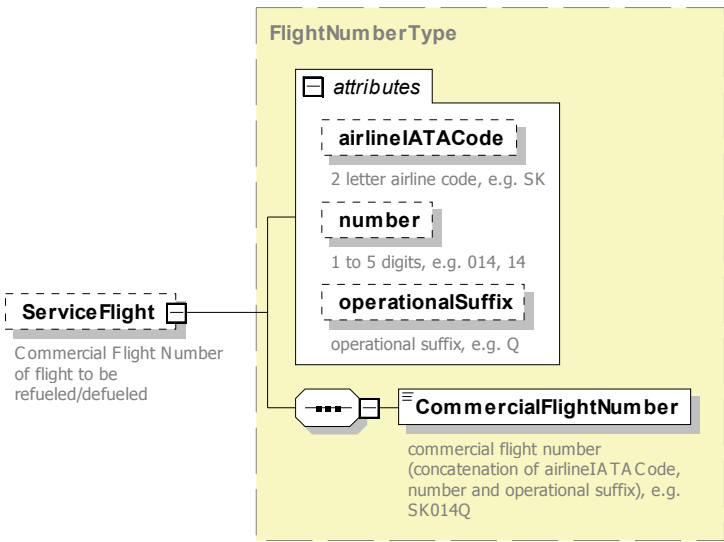
diagram	 ServiceAirport Airport identification at which refueling/defueling shall take place
type	AirportICAOCCodeType
annotation	documentation Airport identification at which refueling/defueling shall take place

element **FORACK/IntoPlaneServiceCode**

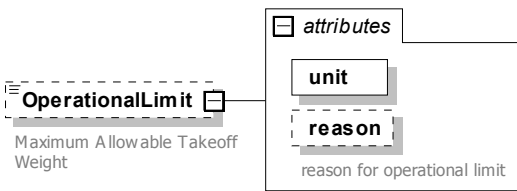
diagram	 IntoPlaneServiceCode code of the into plane service company according to the IATA Fuel Quality Pool list
type	restriction of xs:string
annotation	documentation code of the into plane service company according to the IATA Fuel Quality Pool list

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element FORACK/ServiceFlight

diagram						
type	FlightNumberType					
children	CommercialFlightNumber					
attributes	Name airlineIATACode	Type derived by: xs:string	Use optional	Default	Fixed	annotation documentation 2 letter airline code, e.g., SK
	number	derived by: xs:string	optional			documentation 1 to 5 digits, e.g., 014, 14
	operationalSuffix	derived by: xs:string	optional			documentation operational suffix, e.g., Q
annotation	documentation Commercial Flight Number of flight to be refueled/defueled					

element FORACK/OperationalLimit

diagram						
type	extension of xs:nonNegativeInteger					
attributes	Name unit	Type weightUnitType	Use required	Default	Fixed	annotation documentation reason for operational limit
	reason					
annotation	documentation Maximum Allowable Takeoff Weight					

attribute FORACK/OperationalLimit/@unit

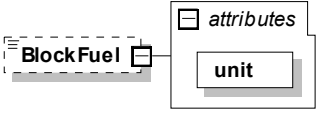
type	weightUnitType
facets	enumeration kg enumeration t enumeration lb enumeration hlb

6.0 FUEL

attribute **FORACK/OperationalLimit/@reason**

annotation	documentation reason for operational limit

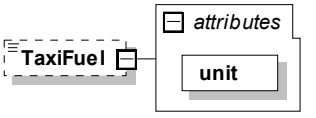
element **FORACK/BlockFuel**

diagram						
type	extension of xs:nonNegativeInteger					
attributes	Name unit	Type weightUnitType	Use required	Default	Fixed	annotation

attribute **FORACK/BlockFuel/@unit**

type	weightUnitType					
facets	enumeration	kg				
	enumeration	t				
	enumeration	lb				
	enumeration	hlb				

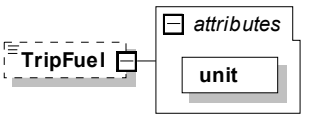
element **FORACK/TaxiFuel**

diagram						
type	extension of xs:nonNegativeInteger					
used by	group	Fuel.Grp				
attributes	Name unit	Type weightUnitType	Use required	Default	Fixed	annotation

attribute **FORACK/TaxiFuel/@unit**

type	weightUnitType					
facets	enumeration	kg				
	enumeration	t				
	enumeration	lb				
	enumeration	hlb				

element **FORACK/TripFuel**

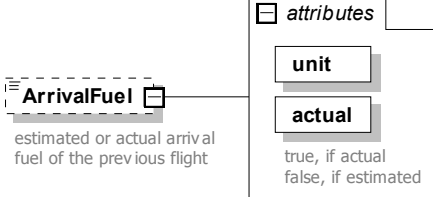
diagram						
type	extension of xs:nonNegativeInteger					
used by	group	Fuel.Grp				
attributes	Name unit	Type weightUnitType	Use required	Default	Fixed	annotation

6.0 FUEL

attribute **FORACK/TripFuel/@unit**

type	weightUnitType
facets	enumeration kg enumeration t enumeration lb enumeration hlb

element **FORACK/ArrivalFuel**

diagram						
type	extension of xs:nonNegativeInteger					
attributes	Name unit actual	Type weightUnitType xs:boolean	Use required required	Default	Fixed	annotation documentation true, if actual false, if estimated
annotation	documentation estimated or actual arrival fuel of the previous flight					

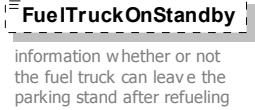
attribute **FORACK/ArrivalFuel/@unit**

type	weightUnitType
facets	enumeration kg enumeration t enumeration lb enumeration hlb

attribute **FORACK/ArrivalFuel/@actual**

type	xs:boolean
annotation	documentation true, if actual false, if estimated

element **FORACK/FuelTruckOnStandby**

diagram						
type	xs:boolean					
annotation	documentation information whether or not the fuel truck can leave the parking stand after refueling					

6.0 FUEL

6.3.2 Fuel Receipt Service

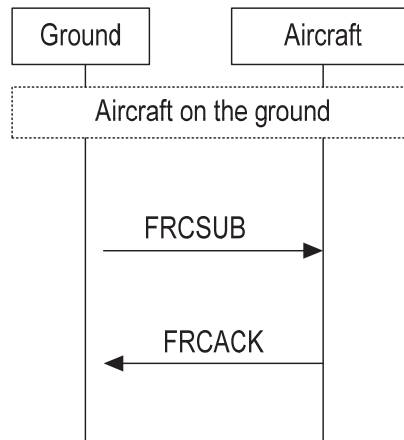


Figure 6.3.2-1 – Typical Fuel Receipt Exchange

The purpose of the Fuel Receipt Service is to eliminate the need for a paper fuel receipt after the end of aircraft refueling. Such a receipt fulfills at least two functions.

The fuel receipt is used to check that the aircraft has enough fuel for the next flight. This check is usually performed by the flight crew.

The fuel receipt is used to check the commercial bill from the fuel supplier. This check is usually performed by ground personnel.

The fuel-receipt element is used to uplink the fuel receipt to the aircraft after the end of refueling. It contains data needed to check the international fuel supplier code, a refuel-defuel flag, a fuel receipt number, the volume or the mass of fuel uplift and the corresponding units, as well as the fuel density. Note that the fuel volume or mass unit used is, if different from the metric units, liters and kg, not the unit used for the transmission of the supplied fuel uplift value. All transmitted values are always metric and should be converted by the application if required into the airline's or pilot's chosen unit.

The following subsections define version 1 of FRC service.

6.3.2.1 Fuel Receipt Submit Uplink

Table 6.3.2.1-1 – FRCSUB01 and FRCACK01 ACARS Definition

Parameter Name	Meaning	Contents		Option	Range	Resolution	Unit	Example
		Fixed Text	Parameter Type					
IntoPlaneService	A three digit code unique to an into-plane-service company based on the IATA Fuel Quality Pool list (IFQP)		provider-id	No				AFS
parameter separator		comma		No	" "			,
FuelSupplier	A three digit international supplier code unique to a fuel supplier based on the IATA Fuel Quality Pool list (IFQP)		provider-id	Yes				BPC
parameter separator		comma		No	" "			,
FuelTruckID	Fuel truck identification number		(0-10)Y	Yes	up to 10 chars			H10556

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Parameter Name	Meaning	Contents		Option	Range	Resolution	Unit	Example
		Fixed Text	Parameter Type					
parameter separator		comma		No	" "			,
Refuel/Defuel mode	<nil> or 1 = Refueling with one fuel truck, 2 = Refueling with 2 trucks, 5 = Defueling with one trucks, 6 = Defueling with 2 trucks		integer	No				1
parameter separator		comma		No	" "			,
FuelReceiptNumber	Fuel receipt number		(0-20)Y	No	up to 20 chars			8522A
parameter separator		comma		No	" "			,
SuppliedVolume	supplied (uplifted) fuel volume (should be given, if measured directly)		volume-lt	Yes	0 to 999999	1 liter	liter	58100 see note 2
parameter separator		comma		No	" "			,
FuelVolumeMeasureUnit	Unit used by the IntoPlaneService if the fuel volume has been measured (Liters, Imperial Gallons or US Gallons)		"LT" or "IG" or "UG"	Yes,				LT See note 3
parameter separator		comma		No	" "			,
SuppliedDensity	mean density of supplied fuel		density	No	700 to 900	kg/liter/1000	kg/liter *1000	802
parameter separator		comma		No	" "			,
SuppliedMass	supplied (uplifted) fuel mass (should be only given, if measured directly)		mass-kg	Yes	0 to 999999	1 kg	kg	46596 See note 2
parameter separator		comma		No	" "			,
FuelMassMeasureUnit	Unit used by the IntoPlaneService if the fuel mass has been determined (Kilograms or pounds))		"KG" or "LB"	Yes,				KG See note 3
parameter separator		comma		No	" "			,
FuelType	Supplied fuel type		(0-10)Y	Yes	Up to 10 chars			JET A1 See note 1

Notes:

1. There are several fuel types used over the world. The most common are JET A1 and JET A. All of the fuel types have different freezing points requiring the pilots to work special procedures when a "LOW FUEL TEMPERATURE" WARNING is announced in-flight.
2. SuppliedVolume has to be specified if, during refueling, the fuel volume has been measured by the refueler. SuppliedMass should not be filled in this case. If otherwise the mass of the supplied fuel has been determined during refueling, SuppliedMass should be specified instead of SuppliedVolume.
3. This/these parameter(s) should show the unit in which the supplied volume or the supplied mass was originally measured. This parameter should be present if associated parameter (SuppliedVolume or SuppliedMass) has been specified.

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6.3.2.2 Fuel Receipt Acknowledge Downlink

Same data as fuel-receipt-submit uplink.

6.3.2.3 ACARS Format

The ACARS format specified in Table 6.3.2.1 may be used for air-ground and ground-ground messages.

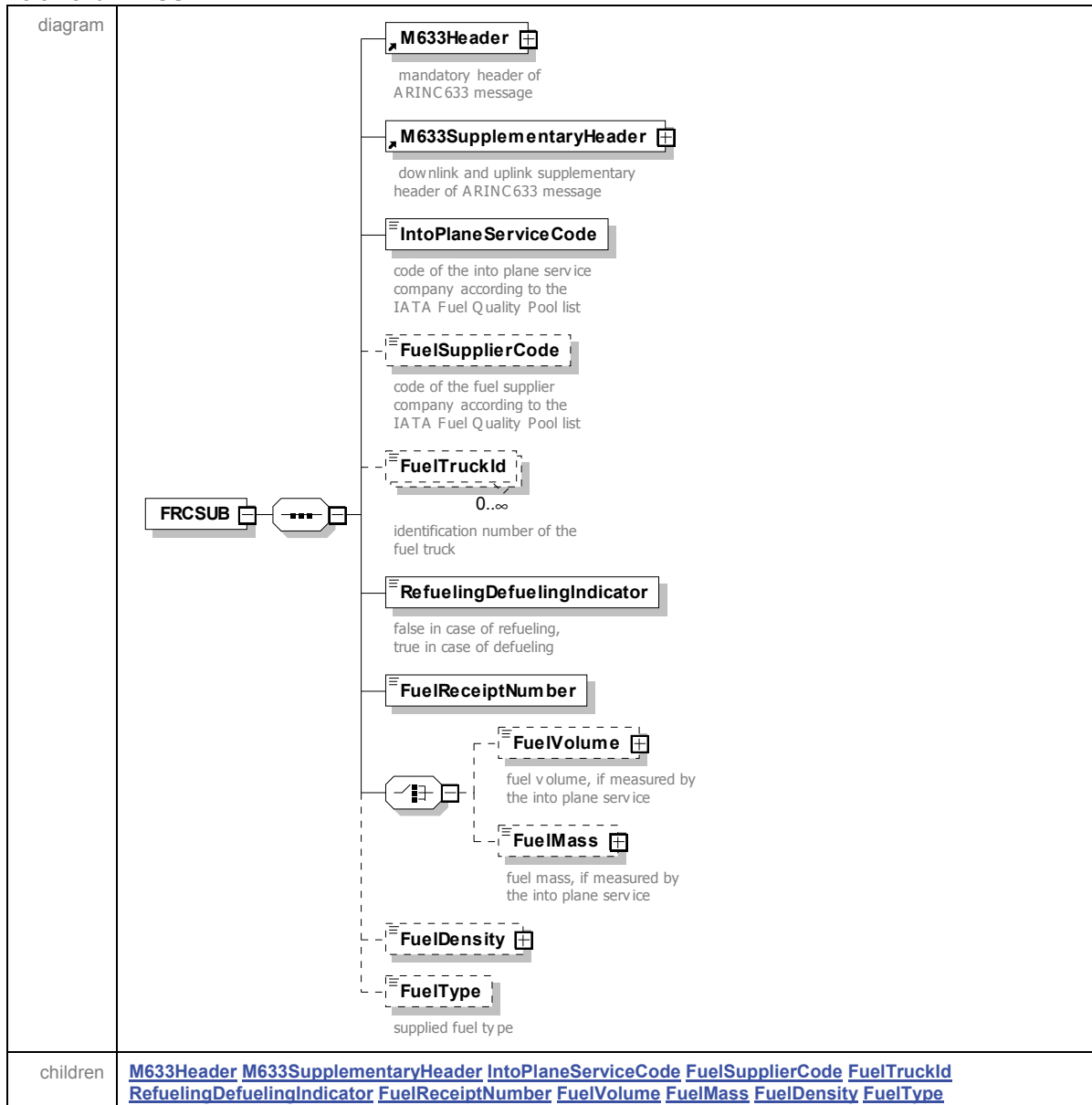
When using the ACARS format, the supplementary header should be used.

ACARS Label used should be “RE”.

6.3.2.4 XML Format

The IP/XML format may be used for air-ground and ground-ground messages.

When using the IP/XML format, the supplementary header should be used.

element **FRCSUB**

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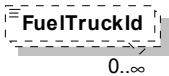
element **FRCSUB/IntoPlaneServiceCode**

diagram	 code of the into plane service company according to the IATA Fuel Quality Pool list
type	restriction of xs:string
annotation	documentation code of the into plane service company according to the IATA Fuel Quality Pool list

element **FRCSUB/FuelSupplierCode**

diagram	 code of the fuel supplier company according to the IATA Fuel Quality Pool list
type	restriction of xs:string
annotation	documentation code of the fuel supplier company according to the IATA Fuel Quality Pool list

element **FRCSUB/FuelTruckId**

diagram	 0..∞ identification number of the fuel truck
type	restriction of xs:string
annotation	documentation identification number of the fuel truck

element **FRCSUB/RefuelingDefuelingIndicator**

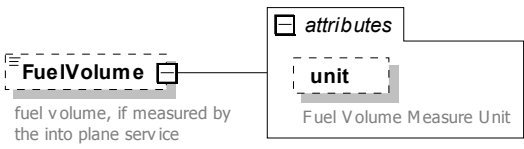
diagram	 false in case of refueling, true in case of defueling
type	xs:boolean
annotation	documentation false in case of refueling, true in case of defueling

element **FRCSUB/FuelReceiptNumber**

diagram	
type	restriction of xs:string

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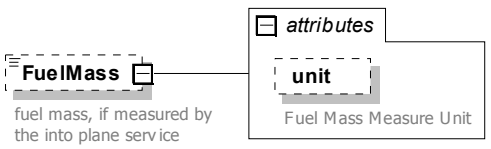
element **FRCSUB/FuelVolume**

diagram						
type	extension of xs:nonNegativeInteger					
attributes	Name unit	Type volumeUnitType	Use	Default	Fixed	annotation documentation Fuel Volume Measure Unit
annotation	documentation fuel volume, if measured by the into plane service					

attribute **FRCSUB/FuelVolume/@unit**

type	volumeUnitType				
facets	enumeration	l			
	enumeration	ug			
	enumeration	ig			
	enumeration	m3			
	enumeration	cm3			
annotation	documentation	Fuel Volume Measure Unit			

element **FRCSUB/FuelMass**

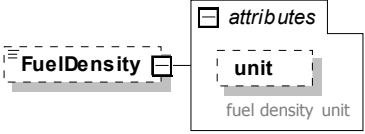
diagram						
type	extension of xs:integer					
attributes	Name unit	Type weightUnitType	Use	Default	Fixed	annotation documentation Fuel Mass Measure Unit
annotation	documentation fuel mass, if measured by the into plane service					

attribute **FRCSUB/FuelMass/@unit**

type	weightUnitType		
facets	enumeration	kg	
	enumeration	t	
	enumeration	lb	
	enumeration	hlb	
annotation	documentation Fuel Mass Measure Unit		

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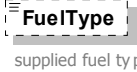
element **FRCSUB/FuelDensity**

diagram	 The diagram shows the FuelDensity element with an attributes box and a unit box. The unit box is labeled "fuel density unit".					
type	extension of xs:nonNegativeInteger					
used by	group Fuel.Grp					
attributes	Name unit	Type densityUnitType	Use	Default	Fixed	annotation documentation fuel density unit

attribute **FRCSUB/FuelDensity/@unit**

type	densityUnitType
facets	enumeration g/cm3 enumeration lb/l enumeration lb/ug enumeration lb/m3 enumeration lb/ig enumeration kg/l enumeration kg/m3 enumeration kg/ig enumeration kg/ug
annotation	documentation fuel density unit

element **FRCSUB/FuelType**

diagram	 The diagram shows the FuelType element with the label "supplied fuel type".
type	restriction of xs:string
annotation	documentation supplied fuel type

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element **FRCACK**

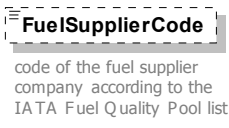
diagram	M633Header mandatory header of ARINC 633 message M633SupplementaryHeader downlink and uplink supplementary header of ARINC 633 message IntoPlaneServiceCode code of the into plane service company according to the IATA Fuel Quality Pool list FuelSupplierCode code of the fuel supplier company according to the IATA Fuel Quality Pool list FuelTruckId 0..∞ identification number of the fuel truck DefuelingIndicator false in case of refueling, true in case of defueling FuelReceiptNumber FuelVolume fuel volume, if measured by the into plane service FuelMass fuel mass, if measured by the into plane service FuelDensity FuelType supplied fuel type
children	M633Header M633SupplementaryHeader IntoPlaneServiceCode FuelSupplierCode FuelTruckId DefuelingIndicator FuelReceiptNumber FuelVolume FuelMass FuelDensity FuelType

element **FRCACK/IntoPlaneServiceCode**

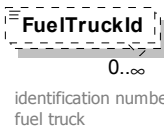
diagram	IntoPlaneServiceCode code of the into plane service company according to the IATA Fuel Quality Pool list
type	restriction of xs:string
annotation	documentation code of the into plane service company according to the IATA Fuel Quality Pool list

6.0 FUEL

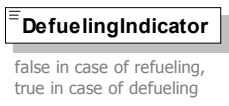
element **FRCACK/FuelSupplierCode**

diagram	 code of the fuel supplier company according to the IATA Fuel Quality Pool list
type	restriction of xs:string
annotation	documentation code of the fuel supplier company according to the IATA Fuel Quality Pool list

element **FRCACK/FuelTruckId**

diagram	 0..∞ identification number of the fuel truck
type	restriction of xs:string
annotation	documentation identification number of the fuel truck

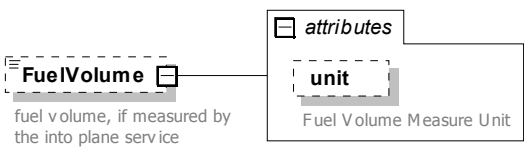
element **FRCACK/DefuelingIndicator**

diagram	 false in case of refueling, true in case of defueling
type	xs:boolean
annotation	documentation false in case of refueling, true in case of defueling

element **FRCACK/FuelReceiptNumber**

diagram	
type	restriction of xs:string

element **FRCACK/FuelVolume**

diagram	 fuel volume, if measured by the into plane service attributes unit Fuel Volume Measure Unit					
type	extension of xs:nonNegativeInteger					
attributes	Name unit	Type volumeUnitType	Use	Default	Fixed	annotation documentation Fuel Volume Measure Unit
annotation	documentation fuel volume, if measured by the into plane service					

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attribute **FRCACK/FuelVolume/@unit**

type	volumeUnitType
facets	enumeration l enumeration ug enumeration ig enumeration m3 enumeration cm3
annotation	documentation Fuel Volume Measure Unit

element **FRCACK/FuelMass**

diagram						
type	extension of xs:integer					
attributes	Name unit	Type weightUnitType	Use	Default	Fixed	annotation documentation Fuel Mass Measure Unit
annotation	documentation fuel mass, if measured by the into plane service					

attribute **FRCACK/FuelMass/@unit**

type	weightUnitType
facets	enumeration kg enumeration t enumeration lb enumeration hlb
annotation	documentation Fuel Mass Measure Unit

element **FRCACK/FuelDensity**

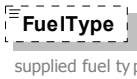
diagram						
type	extension of xs:nonNegativeInteger					
used by	group Fuel.Grp					
attributes	Name unit	Type densityUnitType	Use	Default	Fixed	annotation documentation fuel density unit

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attribute **FRCACK/FuelDensity/@unit**

type	densityUnitType
facets	enumeration g/cm3 enumeration lb/l enumeration lb/ug enumeration lb/m3 enumeration lb/ig enumeration kg/l enumeration kg/m3 enumeration kg/ig enumeration kg/ug
annotation	documentation fuel density unit

element **FRCACK/FuelType**

diagram	
type	restriction of xs:string
annotation	documentation supplied fuel type

6.3.2.5 Dynamic Aspects

As multiple fuel receipt submit messages could be uplinked, the aircraft application should use a combination of IntoPlaneService and FuelReceiptNumber to identify a consecutive fuel receipt submit message.

In the following scenario a B747 is refueled by two BP fuel trucks (with fuel truck numbers H10556 and H10889) simultaneously. One fuel truck measures volume, the other measures mass and density and calculates the volume. The fuel receipts are uplinked independently. Together, both trucks have supplied 123530 liter.

ACARS Example:

```

FRCSUB01 uplink:
,FRCSUB01050324123200LFPG,,KJFK,,AFR5556,,050324,,B747,,F-WWOW,
/AFS,BPC,H10556,,8522,65430,,JETA1,LT,xxxx
FRCACK01 downlink:
,FRACK01050324123205LFPG,,KJFK,,AFR5556,,050324,,B747,,F-WWOW,
/AFS,BPC,H10556,,8522,65430,,LT,xxxx

FRCSUB01 uplink:
,FRCSUB01050324123404LFPG,,KJFK,,AFR5556,,050324,,B747,,F-WWOW,
/AFS,,H10889,,8522A,58100,802,46596,JETA1,LT,xxxx
FRCACK01 downlink:
,FRACK01050324123409LFPG,,KJFK,,AFR5556,,050324,,B747,,F-WWOW,
/AFS,,H10889,,8522A,58100,802,46596,JETA1,LT,xxxx

```


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6.3.3 Fuel Process Service

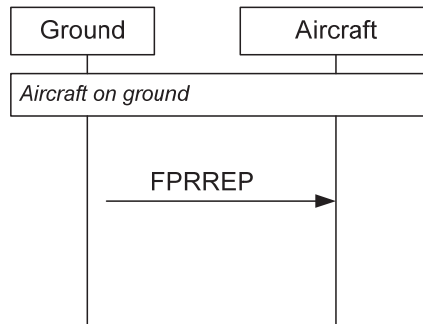


Figure 6.3.3-1 – Typical Fuel Process Report Exchange

The fuel-process-report element is used to inform ground or airborne systems about the progress of the current refueling, e.g., fueling has started or fueling is finished. It should be used only while the aircraft is on ground. There is no message confirmation on application level.

The following subsections define version 1 of FPR service.

6.3.3.1 Fuel Process Report Element (FPRREP)

Element Name: **FPRREP**

6.3.3.2 ACARS Format

ACARS format should be used for air-ground communications. It may also be used end to end, i.e., on ground.

The ACARS format specified in Table 6.3.3.2.1 may be used for air-ground and ground-ground messages

When using the ACARS format, the supplementary header should be used.

ACARS Label used should be “RE”.

Table 6.3.3.2-1 – FPRREP01 ACARS Definition

Parameter Name	Meaning	Contents		Option	Range	Resolution	Unit	Example
		Fixed Text	Parameter Type					
IntoPlaneService	A three digit code unique to an into-plane-service company		provider-id	No				AFS
parameter separator		Comma		No	" "			,
FuelSupplier	A three digit international supplier code unique to a fuel supplier		provider-id	Yes				BPC
parameter separator		Comma		No	" "			,
FuelTruckID	Fuel truck identification number		(0-10)Y	Yes	up to 10 chars			H10556
parameter separator		Comma		No	" "			,
RefuelDefuel Mode	<nil> or 1 = Refueling with one fuel truck, 2 = Refueling with 2 trucks, 5 = Defueling with one fuel truck, 6 = Defueling with 2 trucks		integer	Yes				1

6.0 FUEL

Parameter Name	Meaning	Contents		Option	Range	Resolution	Unit	Example
		Fixed Text	Parameter Type					
parameter separator		Comma		No	" "			,
FuelProgressReportStatus	see table below		integer	No	0 to 99			1
parameter separator		Comma		No	" "			,
ProcessTimestamp	date and time when the process has been archived		datetime	Yes		seconds	YYM MDD HHM MSS	050324 235959

Table 6.3.3.2-2 – Fuel Progress Report Status Table

Trigger Condition	Status Name	Type ID	Meaning	Comment
Into plane service company receives notice that no fuel is needed	fueling-cancelled	0	Fuel truck has been cancelled	
Into plane service company receives notice that fuel is needed	ordered-for-fueling	1	Fuel truck has been ordered	
Into plane service company receives preliminary fuel notice (MINTOF, BLOCK w/o Final flag)	ordered-for-fueling-preliminary	11	Non-Final fuel data received	
Into plane service company receives final fuel notice (BLOCK w/ Final flag)	ordered-for-fueling-Final	12	Final fuel data received	
Into plane service confirms fuel truck assignment	fueling-assignment	21	Work order to refuel/defuel an aircraft has been generated	
Fuel truck driver indicates that fuel truck is available for fueling	available-for-fueling	22	Fuel truck has arrived at the aircraft or is waiting for the aircraft	
Fuel hose connected (either sensed by the aircraft or signaled by the fuel truck driver)	ready-for-refueling	23	Fuel hose is connected	
Refueling starts (fuel is flowing through fuel hose to the aircraft)	start-of-fueling	34	Start of Refueling	
Refueling is finished (either no more fuel flowing through fuel hose, pump switched off or amount ordered equals indicated fuel on board)	end-of-fueling	35	End of Refueling	
Fuel truck driver has released fuel receipt		36	Fuel Receipt transferred	
Defueling starts (fuel is flowing through fuel hose from the aircraft)		44	Start of Defueling	
Defueling is finished (either no more fuel flowing through fuel hose, pump switched off)		45	End of Defueling	
Fuel transfer starts		54	Start of Fuel Transfer	
Fuel transfer ends		55	End of Fuel Transfer	

In the following scenario a fuel truck uplinks that he is now ready for fueling.

Later the aircraft reports the time, when it has sensed that fueling is finished.

6.0 FUEL

ACARS Example:

```
FPRREP01 uplink:
,FPRREP01050324123205LFPG,,KJFK,,AFR5556,,050324,,A380,,F-WWOW,
/TFG,,H10483,,23,,xxxx
```

```
FPRREP01 downlink:
,FPRREP01050324125200LFPG,,KJFK,,AFR5556,,050324,,A380,,F-WWOW,
/TFG,,H10483,5,55,050324125159,xxxx
```

6.3.3.3 XML Format

The IP/XML format may be used for ground-ground messages and for air-ground messages as an alternative to ACARS.

When using the IP/XML format, the supplementary header should be used.

element **FPRREP**

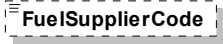
diagram	<pre> graph LR FPRREP[FPRREP] --- M633Header[M633Header] FPRREP --- M633SupplementaryHeader[M633SupplementaryHeader] FPRREP --- IntoPlaneServiceCode[IntoPlaneServiceCode] FPRREP --- FuelSupplierCode[FuelSupplierCode] FPRREP --- FuelTruckId[FuelTruckId] FPRREP --- RefuelingDefuelingIndicator[RefuelingDefuelingIndicator] FPRREP --- FuelProgressReportStatus[FuelProgressReportStatus] </pre>
children	M633Header M633SupplementaryHeader IntoPlaneServiceCode FuelSupplierCode FuelTruckId RefuelingDefuelingIndicator FuelProgressReportStatus

element **FPRREP/IntoPlaneServiceCode**

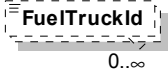
diagram	<pre> graph LR IntoPlaneServiceCode[IntoPlaneServiceCode] </pre>
type	restriction of xs:string
annotation	documentation code of the into plane service company according to the IATA Fuel Quality Pool list

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element **FPRREP/FuelSupplierCode**

diagram	 code of the fuel supplier company according to the IATA Fuel Quality Pool list
type	restriction of xs:string
annotation	documentation code of the fuel supplier company according to the IATA Fuel Quality Pool list

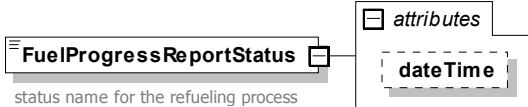
element **FPRREP/FuelTruckId**

diagram	 identification number of the fuel truck
type	restriction of xs:string
annotation	documentation identification number of the fuel truck

element **FPRREP/RefuelingDefuelingIndicator**

diagram	 false in case of refueling, true in case of defueling
type	xs:boolean
annotation	documentation false in case of refueling, true in case of defueling

element **FPRREP/FuelProgressReportStatus**

diagram	 status name for the refueling process according to table 6.3.3.2.2 of the ARINC 633 document					
type	extension of xs:string					
attributes	Name dateTime	Type xs:dateTime	Use	Default	Fixed	annotation
annotation	documentation status name for the refueling process according to table 6.3.3.2.2 of the ARINC633 document					

attribute **FPRREP/FuelProgressReportStatus/@dateTime**

type	xs:dateTime

6.0 FUEL

6.3.4 Fuel CG Advisory Service

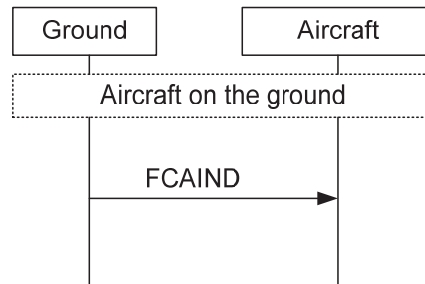


Figure 6.3.4-1 – Typical Fuel CG Advisory INDication Message Exchange

The purpose of the Fuel CG Advisory service is to inform the flight crew that a fuel distribution change is needed to reach a takeoff center of gravity value within operational limits. Besides, with this service the flight crew should be able to decide to end a fuel distribution change (fuel ground transfer) prematurely, e.g., as soon as the takeoff center of gravity has reached the operational limit. A decision against a complete fuel transfer could be useful in getting the aircraft ready for takeoff with minimum departure delay.

The service is mainly applicable to operation of ground-based load and trim control.

The Fuel CG Advisory INDication element is used to uplink the actual limit of the operational CG envelope.

The following subsections define version 1 of FCA service.

6.3.4.1 Fuel CG Advisory INDication Uplink (FCAIND)

Table 6.3.4.1-1 – FCAIND01 ACARS Definition

Parameter Name	Meaning	Contents		Option	Range	Resolution	Unit	Example
		Fixed text	Parameter Type					
ForwardTOCGLimit	The forward limit value of the aircraft's Takeoff Weight Center-of-Gravity parameter		center-of-gravity	Yes	NO	000 to 999	tenth of percent	365
parameter separator		comma		No	" "			,
AftTOCGLimit	The aft limit value of the aircraft's Takeoff Weight Center-of-Gravity parameter		center-of-gravity	Yes	NO	000 to 999	tenth of percent	425
parameter separator		comma		No	" "			,
CalculatedTOCG	The limit value of the aircraft's Gross Weight Center-of-Gravity parameter		center-of-gravity	Yes	NO	000 to 999	tenth of percent	351
parameter separator		comma		No	" "			,
TOW	Take Off Weight value used for TOCG computation		mass-kg	Yes	0 to 999999	1	kg	500300
parameter separator		comma		No	" "			,
TaxiFuel	Planned Taxi Fuel		mass-kg	Yes	0 to 999999	1	kg	1125

Example:

In the following scenario the ground based load and trim control system detected the aircraft being currently outside of the operation CG envelope. The TOCG, as

6.0 FUEL

presently calculated on the ground, is 35.1%; the operational limits are 36.5% and 42.5%. The CG needs to be shifted at least 1.4% aft. Aircraft GW is 500.3 tons. Estimated taxi fuel is 1125kg. The onboard AOC application should create a text advisory to the flight crew.

6.3.4.2 ACARS Format

The ACARS format specified in Table 6.3.4.1 may be used for air-ground and ground-ground messages.

When using the ACARS format, the supplementary header should not be used.

ACARS Label used should be “RE”.

ACARS Example:

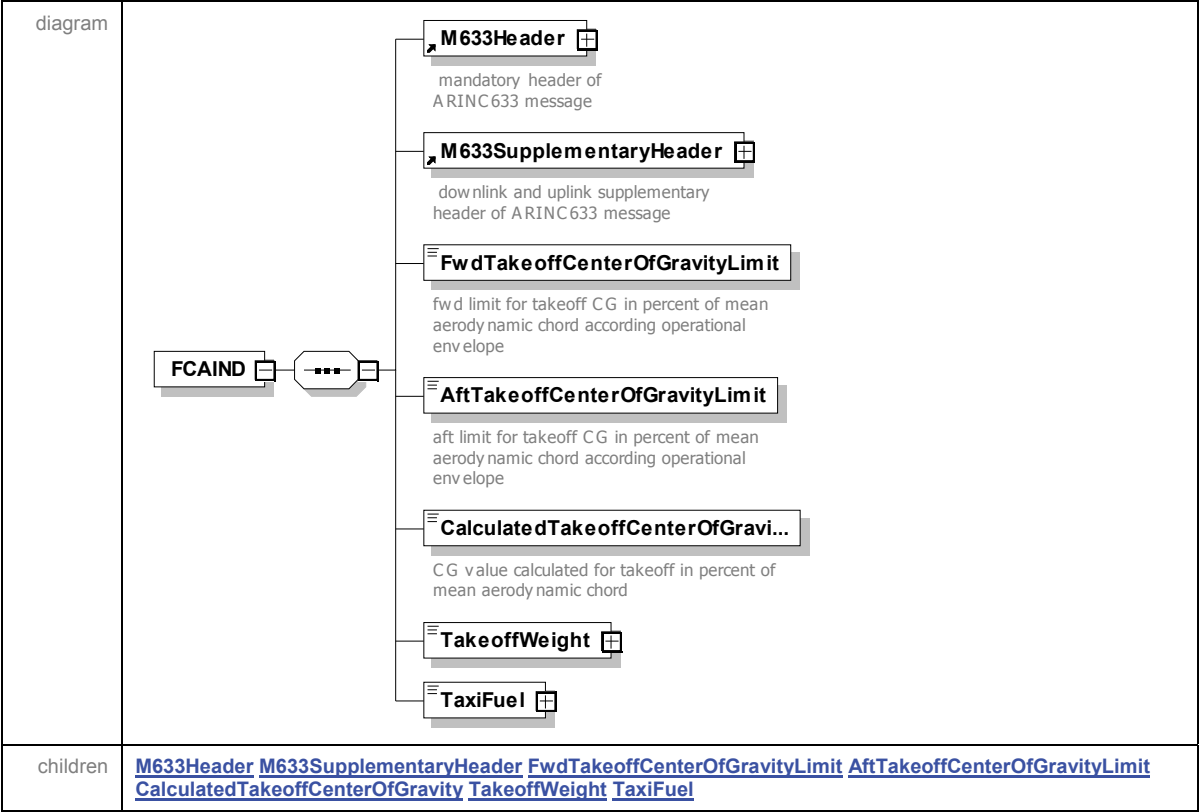
```
FCAIND01 uplink:
,FCAIND01050125221536LFPG,,KJFK,,AFR5556,,050125,,A380,,F-WWOW,
/365,425,351,500300,1125,xxxx
```

6.3.4.3 XML Format

The IP/XML format may be used for air-ground and ground-ground messages.

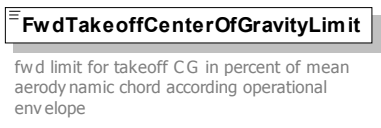
When using the IP/XML format, the supplementary header should be used.

element FCAIND

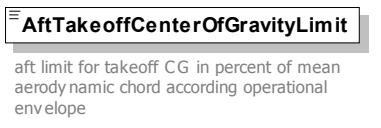


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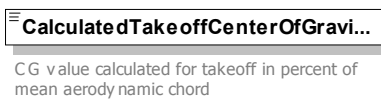
element FCAIND/FwdTakeoffCenterOfGravityLimit

diagram	 <pre> FwdTakeoffCenterOfGravityLimit fwd limit for takeoff CG in percent of mean aerodynamic chord according operational env elope </pre>
type	restriction of xs:float
annotation	documentation fwd limit for takeoff CG in percent of mean aerodynamic chord according operational envelope

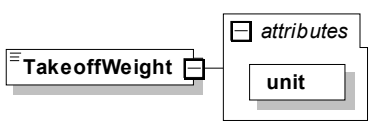
element FCAIND/AftTakeoffCenterOfGravityLimit

diagram	 <pre> AftTakeoffCenterOfGravityLimit aft limit for takeoff CG in percent of mean aerodynamic chord according operational envelope </pre>
type	restriction of xs:float
annotation	documentation aft limit for takeoff CG in percent of mean aerodynamic chord according operational envelope

element FCAIND/CalculatedTakeoffCenterOfGravity

diagram	 <pre> CalculatedTakeoffCenterOfGravi... CG value calculated for takeoff in percent of mean aerodynamic chord </pre>
type	restriction of xs:float
annotation	documentation CG value calculated for takeoff in percent of mean aerodynamic chord

element FCAIND/TakeoffWeight

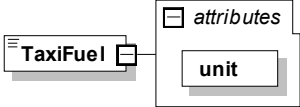
diagram						
type	extension of xs:nonNegativeInteger					
attributes	Name unit	Type weightUnitType	Use required	Default	Fixed	annotation

attribute FCAIND/TakeoffWeight/@unit

type	weightUnitType
facets	enumeration kg enumeration t enumeration lb enumeration hlb

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element FCAIND/TaxiFuel

diagram						
type	extension of xs:nonNegativeInteger					
used by	group Fuel.Grp					
attributes	Name	Type	Use	Default	Fixed	annotation
	unit	weightUnitType	required			

attribute FCAIND/TaxiFuel/@unit

type	weightUnitType					
facets	enumeration	kg				
	enumeration	t				
	enumeration	lb				
	enumeration	hlb				

7.0 ELECTRONIC LOGBOOK

7.0 ELECTRONIC LOGBOOK

This section addresses the Electronic Logbook data. These data are exchanged between airborne logbook application and ground logbook application, and then between ground logbook application and ground maintenance system.

Logbook data structure has been defined by ATA Spec 2000 Chapter 17.

7.1 Introduction

To be added in a future supplement.

7.2 Logbook Messages

Application	SMI	Downlink		Uplink		Description
		Label	Sub Label/MFI	Label	Sub Label/MFI	
Tech logbook	JLS JLT	LS	N/A	LT	N/A	Technical (Cockpit) E-Logbook application messages in CMU
	EF1	F1	F1/LT	H1	F1/LT	Technical (Cockpit) E-Logbook application messages in EFB 1
	EF2	F2	F2/LT	H1	F2/LT	Technical (Cockpit) E-Logbook application messages in EFB 2
Cabin Logbook	JLB JLC	LB	N/A	LC	N/A	Cabin E-Logbook application messages
	TTx	Tx	Tx/LC	H1	Tx/LC	Cabin E-Logbook application messages in Cabin Terminal x

7.3 Encoding of ATA Schema

Detail mapping of ELPT schema to TSE2 mnemonics.

To be added in a future supplement.

8.0 CONFIGURATION CONTROL

8.0 CONFIGURATION CONTROL

Application	SMI	Downlink		Uplink		Description
		Label		Sub Label	Label	
DLCS	JDL	DL		N/A	DL	Data Loading and Configuration System

To be added in a future supplement.

9.0 WEIGHT AND BALANCE (WBA)

9.0 WEIGHT AND BALANCE (WBA)

On some aircraft, the pilot will have the possibility to use an airborne electronic weight and balance application to perform weight and CG calculations and issue, on board the aircraft, a Load and Trim Sheet (LTS).

To do so, an air ground communication means will be available to allow the initialization of the on board application and the sending of the LTS to the ground.

Weight and balance operations are usually composed of the following operations:

- The ground airline application computes the initialization parameters needed to initialize the onboard weight and balance application
- The ground sends these data to the onboard weight and balance application (WIM, WII or WIF services)
- The WBA initializes its inputs with the data sent from the ground. If an error is raised a downlink message (WIRREP) is sent to the ground base
- The WBA computes and issues an LTS. Presently, the WBA generates Load and Trim Sheet in formats specified by IATA as AHM517 (full format) and AHM518 (ACARS-compatible format).
- The pilot performs necessary checks the LTS and sends it back to the ground before dispatch using same service as eFF (eFF download service: EFDREP01). The LTS is included as a file in an eFFpackage

Note: The Weight and Balance application deviates from the general “unit use rule” (4.1) and enables the use of non-metric units in its air-ground messages.

Element Name	Gatelink Label	Service Version	DL/UL	Purpose
WIMSUB	N/A	1	UL	Weight-balance-Init Minimum – SUBmit: Submits initialization parameters to an aircraft's weight and balance system with minimum profile (Only Mandatory data sent)
WIISUB	N/A	1	UL	Weight-balance-Init Intermediate – SUBmit: Submits initialization parameters to an aircraft's weight and balance system with intermediate profile (Mandatory + data contained on AHM517 for ZFW and CG computation sent)
WIFSUB	N/A	1	UL	Weight-balance-Init Full – SUBmit: Submits initialization parameters to an aircraft's weight and balance system (full data are sent)
EFDREP	N/A	1	DL	eFF Download REPort: Send the LTS to ground – as a specific file embedded in an eFF package.
WIRREP	N/A	1	DL	Weight-balance-Init- eRror- REPort Indicates an error for weight and balance initialization

COMMENTARY

AHM517 (full format) and AHM518 (ACARS-compatible format) are Load and Trim Sheet formats specified by IATA.

9.0 WEIGHT AND BALANCE (WBA)

9.1 Weight and Balance – Common Elements and Data

This section defines the parameters and data structures that are shared by various types of Weight and Balance services.

9.1.1 ACARS Format

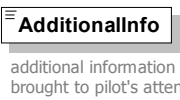
N/A

9.1.2 XML Format

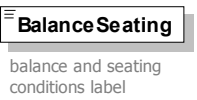
A number of common schemas are defined for Weight and Balance services – these schemas are called by the appropriate services (see “include” command in the service schemas).

Due to limitations of the current WBA schema, an update is planned for a future supplement.

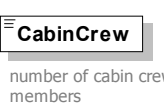
element **AdditionalInfo**

diagram		
type	restriction of xs:string	
properties	content	simple
	nillable	false
used by	elements	WIFSUB WIISUB WIMSUB
facets	minLength	1
annotation	documentation additional information to be brought to pilot's attention	

element **BalanceSeating**

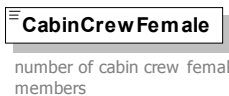
diagram		
type	restriction of xs:string	
properties	content	simple
	nillable	false
used by	elements	WIFSUB WIISUB
facets	minLength	1
annotation	documentation balance and seating conditions label	

element **CabinCrew**

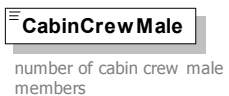
diagram		
type	xs:nonNegativeInteger	
used by	group	CabinCrewLineUp
annotation	documentation number of cabin crew members	

9.0 WEIGHT AND BALANCE (WBA)

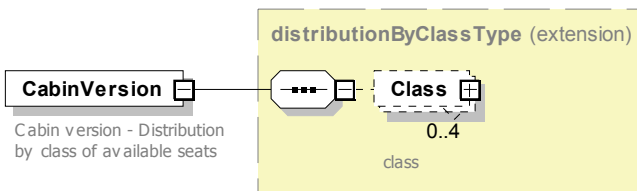
element **CabinCrewFemale**

diagram	
type	xs:nonNegativeInteger
used by	group CabinCrewLineUp
annotation	documentation number of cabin crew female members

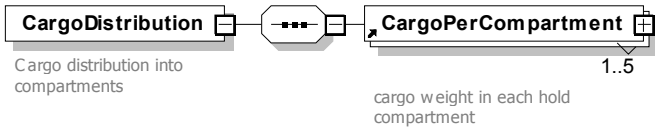
element **CabinCrewMale**

diagram	
type	xs:nonNegativeInteger
used by	group CabinCrewLineUp
annotation	documentation number of cabin crew male members

element **CabinVersion**

diagram	
type	extension of distributionByClassType
children	Class
used by	element WIMSUB group PayloadPax.Grp
annotation	documentation Cabin version - Distribution by class of available seats

element **CargoDistribution**

diagram	
children	CargoPerCompartment
used by	element WIMSUB group PayloadCargo.Grp
annotation	documentation Cargo distribution into compartments

9.0 WEIGHT AND BALANCE (WBA)

element **CargoPerCompartment**

diagram						
used by	element CargoDistribution					
attributes	Name compartment	Type derived by: xs:string	Use required	Default	Fixed	annotation documentation compartment id documentation cargo weight
	compartmentCargoWeight	weightType	required			
annotation	documentation cargo weight in each hold compartment					

attribute **CargoPerCompartment/@compartment**

type	restriction of xs:string
annotation	documentation compartment id

attribute **CargoPerCompartment/@compartmentCargoWeight**

type	weightType
annotation	documentation cargo weight

element **Catering**

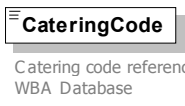
diagram						
children	CateringDeviationPerGalleyZone CateringCode					
used by	element Configuration					
annotation	documentation Catering distribution in galleys					

element **Catering/CateringCode**

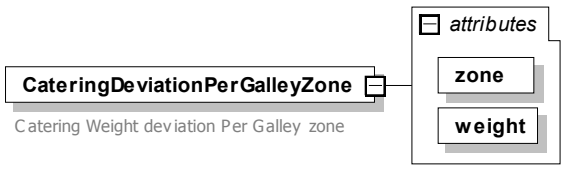
diagram						
type	restriction of xs:string					
annotation	documentation Catering code referenced in WBA Database					

9.0 WEIGHT AND BALANCE (WBA)

element **CateringCode**

diagram	
type	restriction of xs:string
annotation	documentation Catering code referenced in WBA Database

element **CateringDeviationPerGalleyZone**

diagram						
used by	group CateringDeviation.Grp					
attributes	Name zone	Type derived by: xs:string weightType	Use required	Default	Fixed	annotation
annotation	documentation Catering Weight deviation Per Galley zone					

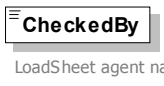
attribute **CateringDeviationPerGalleyZone/@zone**

type	restriction of xs:string

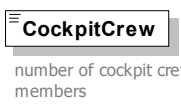
attribute **CateringDeviationPerGalleyZone/@weight**

type	weightType

element **CheckedBy**

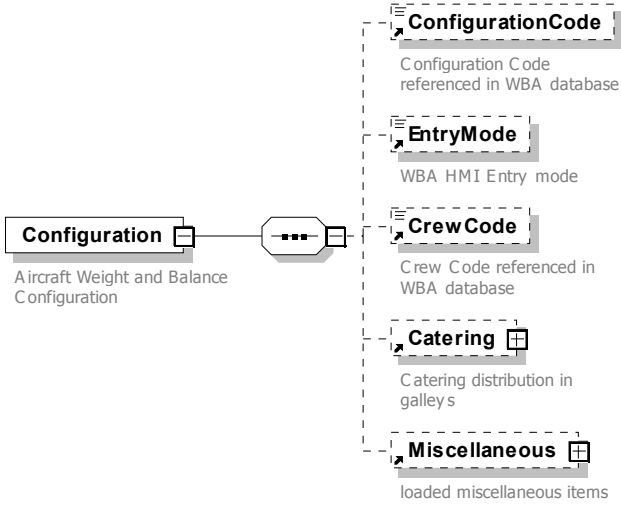
diagram	
type	restriction of xs:string
used by	elements WIFSUB WIISUB
annotation	documentation LoadSheet agent name

element **CockpitCrew**

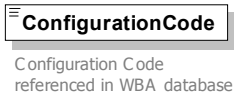
diagram	
type	xs:nonNegativeInteger
used by	element CrewNumber
annotation	documentation number of cockpit crew members

9.0 WEIGHT AND BALANCE (WBA)

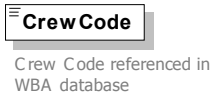
element Configuration

diagram	
children	ConfigurationCode EntryMode CrewCode Catering Miscellaneous
used by	element WIFSUB
annotation	documentation Aircraft Weight and Balance Configuration

element ConfigurationCode

diagram	
type	restriction of xs:string
used by	elements Configuration WIISUB WIMSUB
annotation	documentation Configuration Code referenced in WBA database

element CrewCode

diagram	
type	restriction of xs:string
used by	element Configuration
annotation	documentation Crew Code referenced in WBA database

9.0 WEIGHT AND BALANCE (WBA)

element CrewNumber

diagram	
children	CockpitCrew CabinCrewMale CabinCrewFemale CabinCrew
used by	elements WIFSUB WIISUB WIMSUB
annotation	documentation number of crew members per type cockpit/cabin (cockpit/cabin male/cabin female)

element DOCG

diagram	
type	restriction of xs:integer
used by	element DryOperating
annotation	documentation CG in 0.1%MAC expression

element DOW

diagram	
type	weightType
used by	element DryOperating
annotation	documentation Dry Operating Weight

element EditionNumber

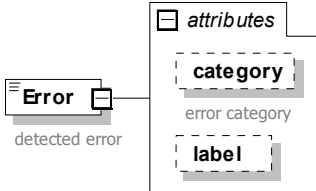
diagram	
type	xs:nonNegativeInteger
properties	content simple nillable false
used by	elements WIFSUB WIISUB
annotation	documentation Edition number of detailed LoadSheet (AHM517)

9.0 WEIGHT AND BALANCE (WBA)

element **EntryMode**

diagram	EntryMode WBA HMI Entry mode		
type	restriction of xs:string		
properties	content	simple	
	nillable	false	
used by	element	Configuration	
facets	minLength	1	
annotation	documentation WBA HMI Entry mode		

element **Error**

diagram						
used by	element	WI Error				
attributes	Name	Type	Use	Default	Fixed	annotation
	category	derived by: xs:string				documentation
	label	derived by: xs:string				error category
annotation	documentation detected error					

attribute **Error/@category**

type	restriction of xs:string	
facets	enumeration	WARNING
	enumeration	ERROR
annotation	documentation error category	

attribute **Error/@label**

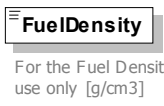
type	restriction of xs:string

element **FOB**

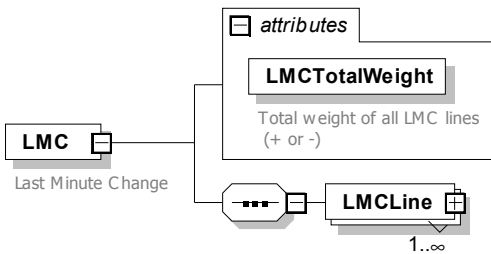
diagram	FOB Fuel On Board		
type	weightType		
used by	group	Fuel.Grp	
annotation	documentation Fuel On Board		

9.0 WEIGHT AND BALANCE (WBA)

element **FuelDensity**

diagram	
type	densityType
used by	group Fuel.Grp
annotation	documentation For the Fuel Density units use only [g/cm3]

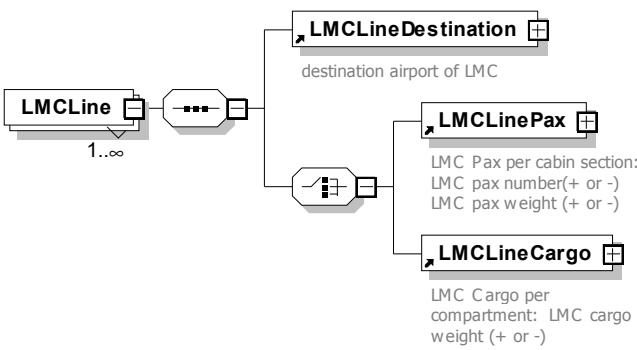
element **LMC**

diagram						
children	LMCLine					
used by	elements WIFSUB WISUB					
attributes	Name LMCTotalWeight	Type xs:integer	Use required	Default	Fixed	annotation documentation Total weight of all LMC lines (+ or -)
annotation	documentation Last Minute Change					

attribute **LMC/@LMCTotalWeight**

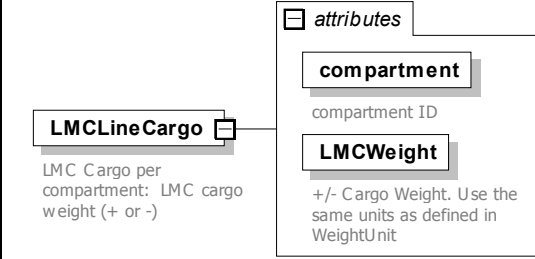
type	xs:integer
annotation	documentation Total weight of all LMC lines (+ or -)

element **LMC/LMCLine**

diagram						
children	LMCLineDestination LMCLinePax LMCLineCargo					

9.0 WEIGHT AND BALANCE (WBA)

element **LMCLineCargo**

diagram						
used by	element LMC/LMCLine					
attributes	Name compartment	Type derived by: xs:string	Use required	Default	Fixed	annotation documentation compartment ID
	LMCWeight	derived by: xs:integer	required			documentation +/- Cargo Weight. Use the same units as defined in WeightUnit
annotation	documentation LMC Cargo per compartment: LMC cargo weight (+ or -)					

attribute **LMCLineCargo/@compartment**

type	restriction of xs:string
annotation	documentation compartment ID

attribute **LMCLineCargo/@LMCWeight**

type	restriction of xs:integer
annotation	documentation +/- Cargo Weight. Use the same units as defined in WeightUnit

9.0 WEIGHT AND BALANCE (WBA)

element **LMCLineDestination**

diagram						
type	extension of AirportIdentificationType					
children	AirportCAOCode AirportIATACode AirportIATACode					
used by	element LMC/LMCLine					
attributes	Name airportName	Type derived by: xs:string	Use	Default	Fixed	annotation documentation airport name e.g., WASHINGTON DULLES INTL
	airportFunction	airportFunctionType				documentation e.g., DepartureAirport, DestinationAlternate, ContingencySavingsAirport
annotation	documentation destination airport of LMC					

element **LMCLinePax**

diagram						
used by	element LMC/LMCLine					
attributes	Name section	Type derived by: xs:string	Use required	Default	Fixed	annotation documentation section ID
	LMCPaxNumber	xs:integer	required			documentation +/- Pax number

9.0 WEIGHT AND BALANCE (WBA)

	LMCWeight xs:integer required	documentation +/- Pax Weight. Use the same units as defined in WeightUnit
annotation	documentation LMC Pax per cabin section: LMC pax number(+ or -) LMC pax weight (+ or -)	

attribute **LMCLinePax/@section**

type	restriction of xs:string
annotation	documentation section ID

attribute **LMCLinePax/@LMCPaxNumber**

type	xs:integer
annotation	documentation +/- Pax number

attribute **LMCLinePax/@LMCWeight**

type	xs:integer
annotation	documentation +/- Pax Weight. Use the same units as defined in WeightUnit

element **Miscellaneous**

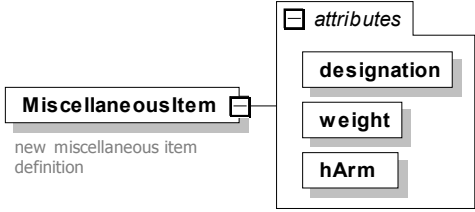
diagram		
children	MiscellaneousCode MiscellaneousItem	
used by	element Configuration	
annotation	documentation loaded miscellaneous items	

element **MiscellaneousCode**

diagram		
type	restriction of xs:string	
used by	group Miscellaneous.Grp	
annotation	documentation Miscellaneous item code referenced in WBA database	

9.0 WEIGHT AND BALANCE (WBA)

element **MiscellaneousItem**

diagram	 The diagram shows a box labeled MiscellaneousItem with the text "new miscellaneous item definition" below it. To its right is a box labeled attributes containing three sub-boxes: designation, weight, and hArm.					
used by	group Miscellaneous.Grp					
attributes	Name designation	Type derived by: xs:string	Use required	Default	Fixed	annotation
	weight	weightType	required			
	hArm	hArmType	required			
annotation	documentation new miscellaneous item definition					

attribute **MiscellaneousItem/@designation**

type	restriction of xs:string

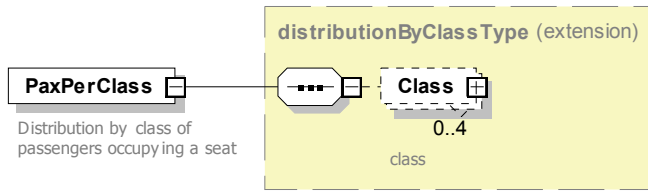
attribute **MiscellaneousItem/@weight**

type	weightType

attribute **MiscellaneousItem/@hArm**

type	hArmType

element **PaxPerClass**

diagram	 The diagram illustrates the PaxPerClass element as an extension of the distributionByClass Type. PaxPerClass is represented by a solid box with the text "Distribution by class of passengers occupying a seat" below it. It is connected by a line to a dashed box labeled Class, which has a multiplicity of 0..4 and the label class underneath. The entire diagram is enclosed in a yellow box with the title distributionByClass Type (extension).
type	extension of distributionByClassType
children	Class
used by	element group WIMSUB PayloadPax.Grp
annotation	documentation Distribution by class of passengers occupying a seat

9.0 WEIGHT AND BALANCE (WBA)

element PaxPerSection

diagram						
children	PaxPerType					
used by	element PaxDistribution					
attributes	Name	Type	Use	Default	Fixed	annotation
	section	derived by: xs:string	required			documentation section ID
	sectionPaxNumber	xs:nonNegativeInteger	required			documentation pax number
annotation	documentation Number of passengers in each cabin section					

attribute PaxPerSection/@section

type	restriction of xs:string
annotation	documentation section ID

attribute PaxPerSection/@sectionPaxNumber

type	xs:nonNegativeInteger
annotation	documentation pax number

element PaxPerSection/PaxPerType

diagram						
attributes	Name	Type	Use	Default	Fixed	annotation
	PaxType	paxTypeType				documentation pax type (e.g., children, adults etc.)
	PaxNumber	xs:nonNegativeInteger				documentation pax number per type

attribute PaxPerSection/PaxPerType/@PaxType

type	paxTypeType
annotation	documentation pax type (e.g., children, adults etc.)

9.0 WEIGHT AND BALANCE (WBA)

attribute **PaxPerSection/PaxPerType/@PaxNumber**

type	xs:nonNegativeInteger
annotation	documentation pax number per type

element **PaxTypeWeights**

diagram	
children	PaxTypeWeight
used by	group PayloadPax.Grp
annotation	documentation unit weights by Passenger Type

element **PaxTypeWeights/PaxTypeWeight**

diagram						
attributes	Name PaxType	Type paxTypeType	Use	Default	Fixed	annotation documentation pax type (children, adults etc.)
	averagePaxWeight	weightType				documentation pax weight per type

attribute **PaxTypeWeights/PaxTypeWeight/@PaxType**

type	paxTypeType
annotation	documentation pax type (children, adults etc.)

attribute **PaxTypeWeights/PaxTypeWeight/@averagePaxWeight**

type	weightType
annotation	documentation pax weight per type

9.0 WEIGHT AND BALANCE (WBA)

element **Payload**

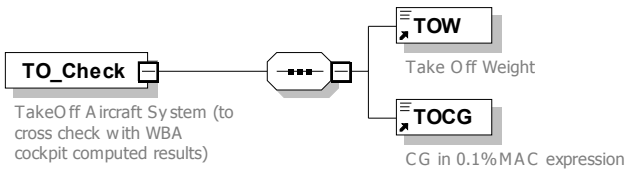
diagram	The diagram illustrates the structure of the Payload element. It starts with a central Payload box labeled "Payload data". This box branches into two main groups: PayloadPax.Grp and PayloadCargo.Grp. PayloadPax.Grp is connected to a list of elements: PaxPerClass (Distribution by class of passengers occupying a seat), CabinVersion (Cabin version - Distribution by class of available seats), TotalPaxNumber (total number of passengers, even ones non occupying a seat), PaxDistribution (Distribution of passengers occupying a seat into cabins sections), TotalPaxWeight (total weight of passengers and cabin bags), and PaxTypeWeights (unit weights by Passenger Type). PayloadCargo.Grp is connected to a list of elements: CargoDistribution (Cargo distribution into compartments) and TotalCargoWeight (total weight of load in holds compartments). Both PayloadPax.Grp and PayloadCargo.Grp contribute to the TotalTrafficWeight element, which is calculated as totalPaxWeight + totalCargoWeight.
children	PaxPerClass CabinVersion TotalPaxNumber PaxDistribution TotalPaxWeight PaxTypeWeights CargoDistribution TotalCargoWeight TotalTrafficWeight
used by	elements WIFSUB WISUB
annotation	documentation Payload data

element **TaxiFuel**

diagram	The diagram shows a single element box labeled TaxiFuel with the description "fuel for taxiing out".
type	weightType
used by	group Fuel.Grp
annotation	documentation fuel for taxiing out

9.0 WEIGHT AND BALANCE (WBA)

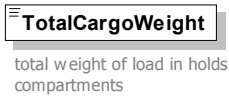
element **TO_Check**

diagram	 The diagram shows a box labeled TO_Check with the text "TakeOff Aircraft System (to cross check with WBA cockpit computed results)" below it. A line connects this box to a central hexagonal connector. From the connector, two lines branch out to two separate boxes: TOW (labeled "Take Off Weight") and TOCG (labeled "CG in 0.1%MAC expression").
children	TOW TOCG
used by	elements WIFSUB WISUB WIMSUB
annotation	documentation TakeOff Aircraft System (to cross check with WBA cockpit computed results)

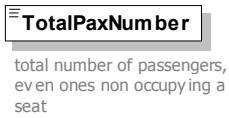
element **TOCG**

diagram	 The diagram shows a box labeled TOCG with the text "CG in 0.1%MAC expression" below it.
type	restriction of xs:integer
used by	element TO_Check
annotation	documentation CG in 0.1%MAC expression

element **TotalCargoWeight**

diagram	 The diagram shows a box labeled TotalCargoWeight with the text "total weight of load in holds compartments" below it.
type	weightType
used by	group PayloadCargo.Grp
annotation	documentation total weight of load in holds compartments

element **TotalPaxNumber**

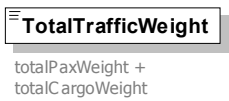
diagram	 The diagram shows a box labeled TotalPaxNumber with the text "total number of passengers, even ones non occupying a seat" below it.
type	xs:nonNegativeInteger
used by	element WIMSUB group PayloadPax.Grp
annotation	documentation total number of passengers, even ones non occupying a seat

element **TotalPaxWeight**

diagram	 The diagram shows a box labeled TotalPaxWeight with the text "total weight of passengers and cabin bags" below it.
type	weightType
used by	group PayloadPax.Grp
annotation	documentation total weight of passengers and cabin bags

9.0 WEIGHT AND BALANCE (WBA)

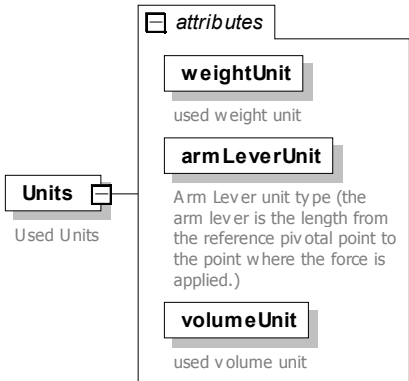
element **TotalTrafficWeight**

diagram	
type	weightType
used by	element Payload
annotation	documentation totalPaxWeight + totalCargoWeight

element **TOW**

diagram	
type	weightType
used by	element TO Check
annotation	documentation Take Off Weight

element **Units**

diagram						
used by	elements WIFSUB WISUB WIMSUB					
attributes	Name weightUnit	Type weightUnitType	Use required	Default	Fixed	annotation documentation used weight unit
	armLeverUnit	derived by: xs:string	required			documentation Arm Lever unit type (the arm lever is the length from the reference pivotal point to the point where the force is applied.)
	volumeUnit	volumeUnitType	required			documentation used volume unit
annotation	documentation Used Units					

9.0 WEIGHT AND BALANCE (WBA)

attribute **Units/@weightUnit**

type	weightUnitType
facets	enumeration kg enumeration t enumeration lb enumeration hlb
annotation	documentation used weight unit

attribute **Units/@armLeverUnit**

type	restriction of xs:string
annotation	documentation Arm Lever unit type (the arm lever is the length from the reference pivotal point to the point where the force is applied.)

attribute **Units/@volumeUnit**

type	volumeUnitType
facets	enumeration l enumeration ug enumeration ig enumeration m3 enumeration cm3
annotation	documentation used volume unit

element **ZF_CGTarget**

diagram	estimated Zero Fuel Aircraft System values that have been provided to Refuel Application for an auto-refuel with CG target ZFW Zero Fuel Weight ZFCG CG in 0.1%MAC expression
children	ZFW ZFCG
used by	elements WIFSUB WIISUB WIMSUB
annotation	documentation estimated Zero Fuel Aircraft System values that have been provided to Refuel Application for an auto-refuel with CG target

element **ZFCG**

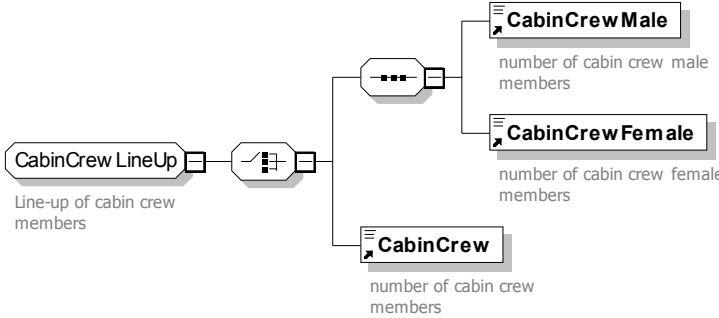
diagram	ZFCG CG in 0.1%MAC expression
type	restriction of xs:integer
used by	element ZF_CGTarget group ZeroFuel.Grp
annotation	documentation CG in 0.1%MAC expression

9.0 WEIGHT AND BALANCE (WBA)

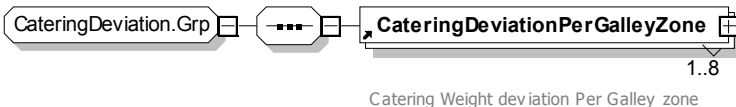
element ZFW

diagram	
type	weightType
used by	element ZF.CGTarget group ZeroFuel.Grp
annotation	documentation Zero Fuel Weight

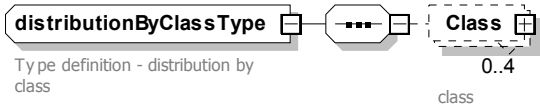
group CabinCrewLineUp

diagram	
children	CabinCrewMale CabinCrewFemale CabinCrew
used by	element CrewNumber
annotation	documentation Line-up of cabin crew members

group CateringDeviation.Grp

diagram	
children	CateringDeviationPerGalleyZone
used by	element Catering

complexType distributionByClassType

diagram	
children	Class
used by	elements CabinVersion PaxPerClass
annotation	documentation Type definition - distribution by class

9.0 WEIGHT AND BALANCE (WBA)

element **distributionByClassType/Class**

diagram						
attributes	Name classId	Type derived by: xs:string	Use	Default	Fixed	annotation documentation class ID - e.g., F, C, Y
	classSeats	xs:nonNegativeInteger				documentation number of available seats
annotation	documentation class					

attribute **distributionByClassType/Class/@classId**

type	restriction of xs:string
annotation	documentation class ID - e.g., F, C, Y

attribute **distributionByClassType/Class/@classSeats**

type	xs:nonNegativeInteger
annotation	documentation number of available seats

simpleType **CGType**

type	restriction of xs:integer
annotation	documentation CG in 0.1%MAC expression

simpleType **ChangeValuesType**

type	restriction of xs:string
used by	attributes SubFolderType/@changed DocumentType/@changed
facets	enumeration New enumeration Unchanged enumeration Revised enumeration Deactivated

simpleType **crewMembersType**

type	xs:nonNegativeInteger
annotation	documentation number of crew members expression

simpleType **densityType**

type	restriction of xs:double
used by	element FuelDensity
annotation	documentation fuel density expression

9.0 WEIGHT AND BALANCE (WBA)

simpleType weightType

type	xs:nonNegativeInteger		
used by	elements	DOW FOB TaxiFuel TotalCargoWeight TotalPaxWeight TotalTrafficWeight TOW TripFuel ZFW PaxTypeWeights/PaxTypeWeight/@averagePaxWeight CargoPerCompartment/@compartmentCargoWeight CateringDeviationPerGalleyZone/@weight MiscellaneousItem/@weight	
annotation	documentation	weight expression	

simpleType hArmType

type	restriction of xs:double		
used by	attribute	MiscellaneousItem/@hArm	
facets	minInclusive	0	
annotation	documentation	harm expression	

simpleType paxTypeType

type	restriction of xs:string		
used by	attributes	PaxTypeWeights/PaxTypeWeight/@PaxType PaxPerSection/PaxPerType/@PaxType	
facets	minLength	1	
annotation	documentation	Passenger type expression	

9.2 Weight and Balance Initialization

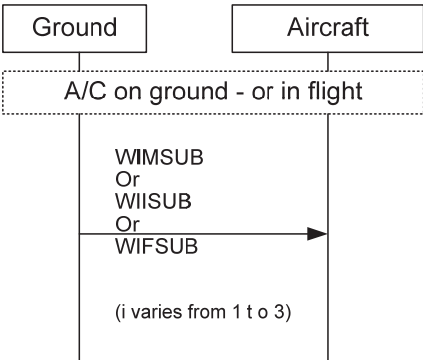


Figure 9.2-1 – Typical Weight and Balance Init Transmission

The Weight and Balance Init data is used to initialize the onboard WBA application. The aim of this transmission is to send preliminary W&B data from a WBA ground system to the airborne Weight and balance application.

3 levels of service are possible for Weight & Balance application initialization: minimum, intermediate and full – see appropriate sections for detailed description of these services.

9.2.1 Weight and Balance – Minimum Init Service

This section defines version 1 of the Minimum initialization service (WIM service).

9.2.1.1 Weight and balance Initialization Minimum – SUBmit Uplink (WIMSUB)

Element Name: **WIMSUB**

While operating using this mode the ground system sends only mandatory data to the aircraft and the aircraft can only generate and send to the ground AHM518. The crew may also have to enter some parameters to complete the WBA application initialization and/or to complete the LTS computation (see list of optional parameters in the element definition).

9.0 WEIGHT AND BALANCE (WBA)

9.2.1.1.1 ACARS Format

N/A

9.2.1.1.2 XML Format

element WIMSUB

diagram	WIMSUB Weight-Balance-Init-SUBmit Minimal Mode M633Header mandatory header of ARINC 633 message M633SupplementaryHeader downlink and uplink supplementary header of ARINC 633 message Units Used Units ConfigurationCode Configuration Code referenced in WBA database Loading Loading data ZF_CGTarget estimated Zero Fuel Aircraft System values that have been provided to Refuel Application for an auto-refuel with CG target TO_Check TakeOff Aircraft System (to cross check with WBA cockpit computed results) CrewNumber number of crew members per type cockpit/cabin (cockpit/cabin male/cabin female) PaxPerClass Distribution by class of passengers occupying a seat CabinVersion Cabin version - Distribution by class of available seats TotalPaxNumber total number of passengers, even ones non occupying a seat PaxDistribution Distribution of passengers occupying a seat into cabins sections CargoDistribution Cargo distribution into compartments AdditionalInfo additional information to be brought to pilot's attention
children	M633Header M633SupplementaryHeader Units ConfigurationCode Loading ZF_CGTarget TO_Check CrewNumber PaxPerClass CabinVersion TotalPaxNumber PaxDistribution CargoDistribution AdditionalInfo
annotation	documentation Weight-Balance-Init-SUBmit Minimal Mode

9.0 WEIGHT AND BALANCE (WBA)

element Loading

diagram	
children	ZFW ZFCG FOB TaxiFuel TripFuel FuelDensity
used by	elements WIFSUB WISUB WIMSUB
annotation	documentation Loading data

group ZeroFuel.Grp

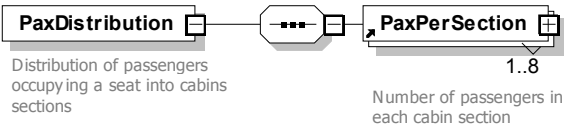
diagram	
children	ZFW ZFCG
used by	element Loading
annotation	documentation Zero Fuel Aircraft System

group Fuel.Grp

diagram	
children	FOB TaxiFuel TripFuel FuelDensity
used by	element Loading
annotation	documentation Fuel data -FOB weight -estimated Taxi Fuel weight burnt at departure -estimated Trip Fuel weight -fuel density

9.0 WEIGHT AND BALANCE (WBA)

element PaxDistribution

diagram	 <pre> classDiagram class PaxDistribution { Distribution of passengers occupying a seat into cabins sections } class PaxPerSection { Number of passengers in each cabin section } PaxDistribution "1" -- "1..8" PaxPerSection </pre>	
properties	content mixed nillable	complex false false
children	PaxPerSection	
used by	element	WIMSUB
	group	PayloadPax.Grp
annotation	documentation Distribution of passengers occupying a seat into cabins sections	

9.2.2 Weight and Balance – Intermediate Init Service

9.2.2.1 Weight and Balance Initialization Intermediate – SUBmit Uplink

Element Name: **WIISUB**

While operating using this mode the ground system sends Minimum init service data plus the additional data to the aircraft corresponding to the AHM517 input and the aircraft can generate and send to the ground AHM518 and AHM517.

9.2.2.1.1 ACARS Format

N/A

9.2.2.1.2 XML Format

9.0 WEIGHT AND BALANCE (WBA)

element **DryOperating**

diagram	
children	DOW DOCG
used by	elements WIFSUB WISUB
annotation	documentation actual Dry operating Aircraft System

group **PayloadPax.Grp**

diagram	
children	PaxPerClass CabinVersion TotalPaxNumber PaxDistribution TotalPaxWeight PaxTypeWeights
used by	element Payload

group **PayloadCargo.Grp**

diagram	
children	CargoDistribution TotalCargoWeight
used by	element Payload

9.0 WEIGHT AND BALANCE (WBA)

9.2.3 Weight and Balance – Full Init – Service

9.2.3.1 Weight and Balance Initialization Full – SUBmit Uplink

Element Name: **WIFSUB**

While operating using this mode the ground system sends a complete set of data to the aircraft in order to fully initialize the W&B airborne application and the aircraft can generate and send to the ground AHM518 and AHM517.

9.2.3.1.1 ACARS Format

N/A

9.2.3.1.2 XML Format

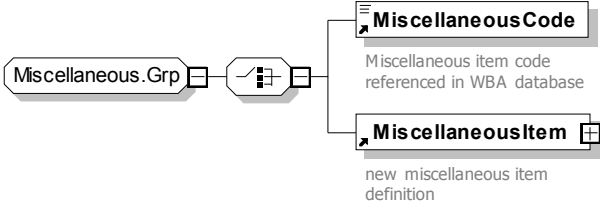
9.0 WEIGHT AND BALANCE (WBA)

element **WIFSUB**

diagram	WIFSUB Weight-Balance-Init-SUBmit Full Mode - DETAILED and REDUCED mode and AHM517 AHM518 generation M633Header mandatory header of ARINC 633 message M633SupplementaryHeader downlink and uplink supplementary header of ARINC 633 message Units Used Units Configuration Aircraft Weight and Balance Configuration DryOperating actual Dry operating Aircraft System Loading Loading data Payload Pay load data ZF_CGTarget estimated Zero Fuel Aircraft System values that have been provided to Refuel Application for an auto-refuel with CG target TO_Check TakeOff Aircraft System (to cross check with WBA cockpit computed results) CrewNumber number of crew members per type cockpit/cabin (cockpit/cabin male/cabin female) EditionNumber Edition number of detailed LoadSheet (AHM517) CheckedBy LoadSheet agent name BalanceSeating balance and seating conditions label LMC Last Minute Change AdditionalInfo additional information to be brought to pilot's attention
children	M633Header M633SupplementaryHeader Units Configuration DryOperating Loading Payload ZF_CGTarget TO_Check CrewNumber EditionNumber CheckedBy BalanceSeating LMC AdditionalInfo
annotation	documentation Weight-Balance-Init-SUBmit Full Mode - DETAILED and REDUCED mode and AHM517 AHM518 generation

9.0 WEIGHT AND BALANCE (WBA)

group **Miscellaneous.Grp**

diagram	
children	MiscellaneousCode MiscellaneousItem
used by	element Miscellaneous

9.2.4 Dynamic Aspects

The initialization should only consist in simple transmission of the SUBmit element from the ground to the aircraft WBA.

COMMENTARY

Transport services will ensure reliable and error free transmission of the data to the airborne application.

The initialization service should be usable at any time (in ground, during flight preparation, or in flight, if the crew decides to anticipate next flight preparation).

WIXSUB element should apply to flight under preparation. The supplementary header should specify the aircraft and the flight to which the data are associated (flight under preparation).

COMMENTARY

The crew may not have yet entered a valid flight number when the init data is received (the communication systems may use last flight number).

Upon reception of an erroneous initialization message (WIMSUB, WIISUB or WIFSUB), the airborne system should log an error message on board the aircraft, inform the crew that the received message is erroneous, and generate a corresponding error message (WIRREP) (see Section 9.4).

9.3 Weight and Balance Report (LTS) Transmission Services

This service consists in the airborne application transmitting to the ground airline application the Load and Trim Sheet (LTS) calculated on board.

There is no specific service for the Weight and Balance Application (WBA) – WBA should use the eFF download service (EFDREP) specified in Section 10.3.

The only exception to the use of EFDREP service is the file extension to be used: WBA should generate an '.lds' file (and not an '.eFF' file), containing eFF structure and the LTS as a specific document. Other documents may be included in the eFF.

The LTS should be embedded in the eFF folder associated with the topic 'LoadTrimSheet' (see Section 10 for more details).

9.4 Weight and Balance Init Error Service

Weight-balance-Init-eRror- REPort service (WIRREP)

This service is composed of a single message: WIRREP downlink.

Element Name: **WIRREP**

9.0 WEIGHT AND BALANCE (WBA)

This service enables the airborne WBA to indicate to the ground that an error was detected on a received initialization message (WIMSUB, WIISUB, and WIFSUB).

9.4.1 Weight and balance Init eRror REPort (WIRREP) Downlink

9.4.1.1 ACARS Format

N/A

9.4.1.2 XML Format

element WIRREP

diagram	
properties	content complex
children	M633Header M633SupplementaryHeader WI_Error WI_Message
annotation	documentation Weight-Balance-Init-Error Report

element WI_Error

diagram	
children	Error
used by	element WIRREP
annotation	documentation detected errors in Weight-Balance-Init-SUBmit Message

element WI_Message

diagram	
type	restriction of xs:string
used by	element WIRREP
annotation	documentation considered Weight-Balance-Init-SUBmit Message

9.0 WEIGHT AND BALANCE (WBA)

9.4.2 Dynamic Aspects

The weight and balance init report service should only consist of simple transmission of the REPort element (WIRREP) from the aircraft WBA to the ground.

COMMENTARY

Transport services will ensure reliable and error free transmission of the data to the airborne application.

9.5 WBA Files Packaging

WBA messages should be transported as files with the extension '.wba' and filenames with the following structure:

See Section 2.3 for general live IP transportation rules.

Each WBA file message (except LTS download) should be transported through a unique file with extension ".wba".

It should be compliant with the corresponding element of the WBA.xsd schema:

- WIMSUB
- WIISUB
- WIFSUB
- WIRREP

It should be named as depicted in Section below:

The name of the files for the above mentioned messages should be structured as follows:

Sub field name	Description	Format (see Table 4.1-2)	Example
aircraftRegistration	The registration number assigned by the local authority,	Specific format is defined by the local authority and contains a combination of alpha-numeric string and an optional hyphen.	"N12345"
Delimiter	One Underscore		"_"
FlightIdentification	Either Flight Identifier or Flight number	(1-10)C	"DLH1234ABC"
Delimiter	One Underscore		"_"
departureDate	Identifying flight date	YYMMDD	"050822"
Delimiter	One Underscore		"_"
DepartureAirport	Either Airport IATA Code or Airport ICAO Code	XXX or (exclusive) XXXX	"FRA"
Delimiter	One Underscore		"_"
ArrivalAirport	Either Airport IATA Code or Airport ICAO Code	XXX or (exclusive) XXXX	"TLS"
Delimiter	One Underscore		"_"
DateTimestamp	YYMMDDHHMMSS		050822173214
File Type	One period and the letters "wba"		".wba"

9.0 WEIGHT AND BALANCE (WBA)**Examples:**

```
DAIHA_LH436_050822_DUS_ORD_050822122634.wba  
N1234_UA575_050822_KORD_KSEA_050821122634.wba  
F1234_CFG3214D_050401_XRY_PMI_050402052658.wba
```

The file extension “.wba” indicates that this is an .xml file.

Concerning Weight and balance Report (LTS) transmission services (download of LTS using EFDREP service), refer to Section 10.3 (eFF file packaging), except that the extension shall be ‘.lds’ and not ‘.eff’. The LTS file enclosed in the eFF can be of any format.

10.0 ELECTRONIC FLIGHT FOLDER

10.0 ELECTRONIC FLIGHT FOLDER

10.1 Introduction

The electronic flight folder consists of a set of information related to an individual segment (origin/destination) of flight. The set of information is bound within an eFF data package (known as 'eFF') which is composed of a set of documents (organized by Topics and optionally by folders/subfolders), provided by one or more ground systems and packaged into one or more *.eff files (see 10.3.1 eFF Packaging).

The purpose of this section is to standardize how operational information regarding a flight segment is technically organized in a flight folder that is accessed by the pilot electronically. This does not intend to provide a standard organization of the documents in the flight folder, but rather a technical mean that would allow carrying a structured organization of flight documents.

As the electronic flight folder is also the support of the operational flight plan, and as operational flight plan contain many important data for the flight that can be passed to other applications, it was deemed necessary to standardize data in an operational flight plan. As there are many different ways to display an operational flight plan, the aim here is to try to have a generic model to handle the data that are available in the operational flight plan, but not on this format. This could be easily handled by XML, as XML is able to separate the data and the way it is displayed.

A future version of this document may define data other than the operational flight plan.

This section defines:

- An overview of eFF operational concept (i.e., how the data package is elaborated, updated, and finalized)
- The structure of eFF data package, which parameters are defined and how they are used
- The packaging of eFF data into an '.eff' file
- The rules of transportation via an IP network or with physical media (e.g., USB media) are described. The transportation subsection also covers the option to request and transport updates to an existing eFF. Updates can apply either to a part of the eFF which the user wants to update or the whole eFF.

The definition of some document contents can be found in Section 5.2 'Common Data'.

Note: The way eFF is transported is outside the scope of this section and is addressed in Section 2.3.

10.1.1 Review of the eFF Workflow

Once the contents for the eFF are gathered or created and the eFF is packed properly the question of the eFF data package usability arises. The following actions are possible with an eFF data package:

- Transport an eFF data package from one System to another (e.g., from ground to an airborne system and vice versa). Update whole or in-part, the documents within the eFF data package(i.e., pilot inputs/modifications)
- Use content of the eFF. Data package

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- Note: This is out of scope of this document. It is the responsibility of the applications working with the eFF.

The eFF data package is exchanged between ground and airborne applications. These applications are known as:

- Ground tool at main base: (ground application used by dispatcher to generate the eFF)
- eFF ground application (used by the flight crew on ground at main briefing room)
- eFF airborne application (used by the crew onboard the aircraft)

During its lifecycle, the eFF data package (known as 'eFF') is produced, modified and processed by any of the above mentioned applications. Figure 10.1.1-1 shows an example of the process for uplinking of the eFF data package during preflight operations. Figure 10.1.1-2 shows an example process for downlinking of the eFF data package during postflight operations.

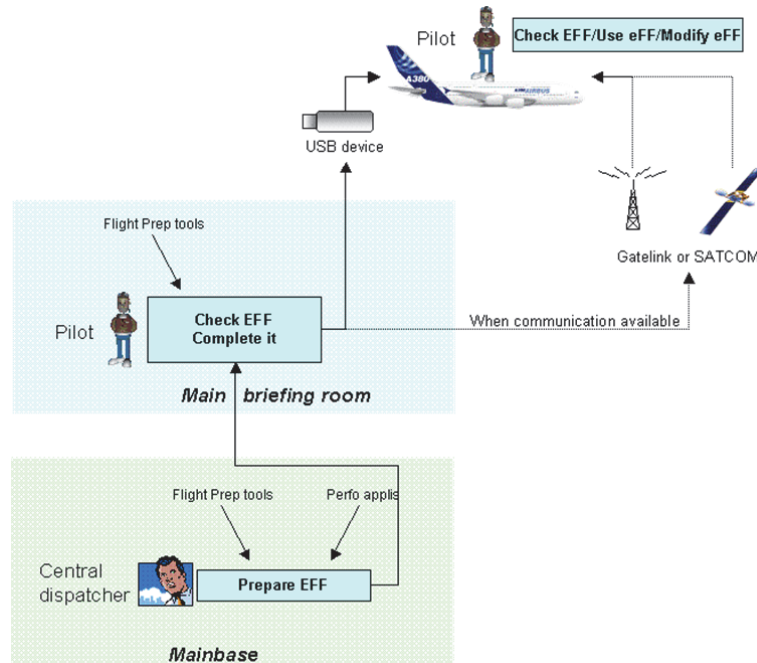


Figure 10.1.1-1 – Preflight process example

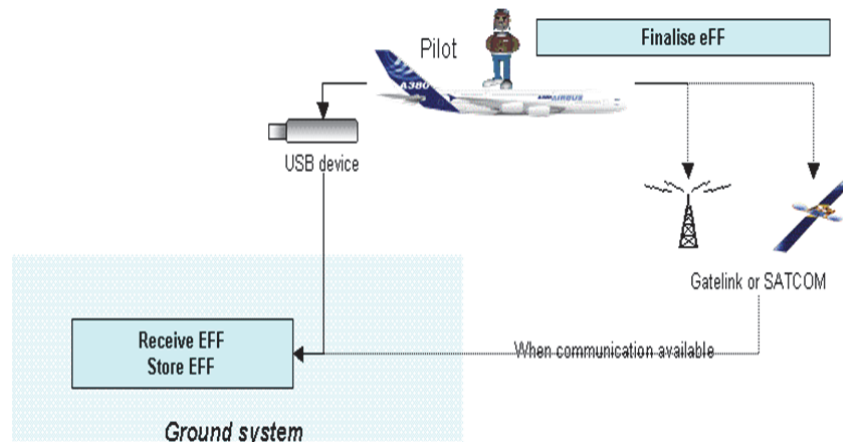


Figure 10.1.1-2 – Postflight Process Example

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10.1.2 The eFF Lifecycle and Associated Communication Services

The eFF has the following life cycle:

- A ground tool, e.g., an Airline Flight Data Processing System, generates an eFF data package.
- The initial eFF data package is marked as FULL (“fullPackage” attribute of the root element is set). This initial data package may have all needed documents or folders marked as pending to be sent in subsequent eFF data package updates marked as UPDATE (“fullPackage” attribute of the root element is not set). The system which composes the eFF decides when not to include a document in the eFF data package. The decision to not include a document may be based on (but not limited to) performance reasons, timed out request or unavailable document. An UPDATE avoids sending all documents that were previously sent to the aircraft.
- Preflight / In-Flight
 - eFF data packages (FULL and UPDATES) are transported from the eFF ground application to the EFB using the *eFF Uplink Service*.
 - An eFF data package marked as FULL replaces all previous eFF data package(s) for the same flight. In this case it may be useful to keep track of the modifications performed on the previous eFF data package(s) by the crew and apply them to the new eFF data package.
 - An eFF data package marked as an UPDATE will contain replacement document(s) and/or document(s) that were previously marked as “pending” and/or new documents. It may be useful to keep track of the modifications performed on the previous documents(s) by the crew and apply them to the new documents.
 - The eFF document(s) are enriched by flight crew or airborne systems.
- Post-Flight
 - The eFF document(s) are enriched by flight crew or airborne systems.
 - Parts of or the entire eFF data package is sent from airborne eFF application to the ground application using the *eFF Downlink Service*.

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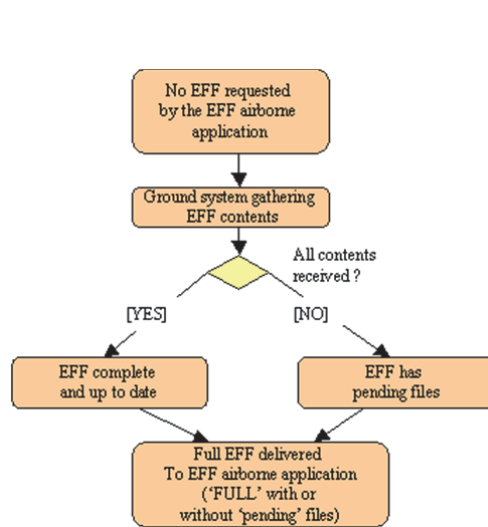


**Illustration of Initial eFF generation and uplink
(sent in EFUSUB message)**

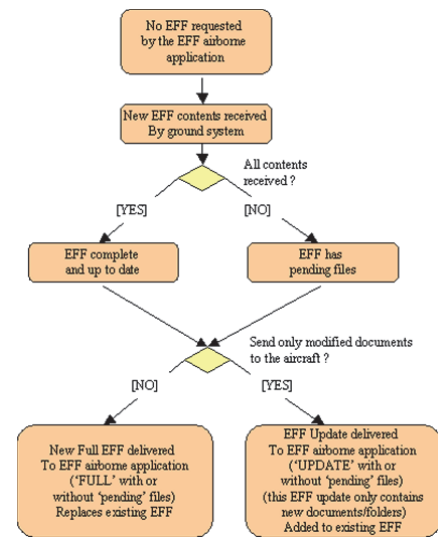


**Illustration of Unsolicited eFF modification
(sent in EFUSUB message)**

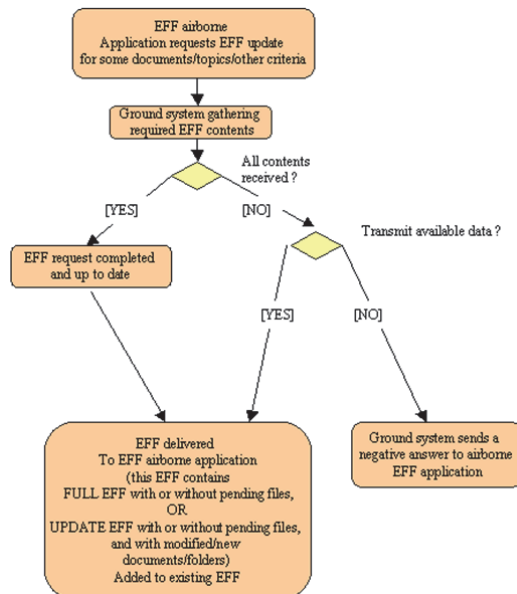


**Illustration of eFF requested by Aircraft
(EFUSUB message sent following EFFREQ message)**

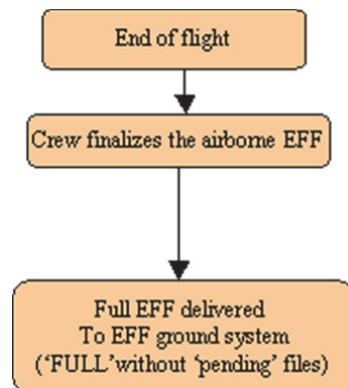


**Illustration of eFF sent to ground system at flight closure
(sent in EFDREP message)**

COMMENTARY

‘Unsolicited’ means ‘the eFF airborne application has not sent a request to the ground tool’ – see Section 2 for details on how the transport level exchanges are managed.

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10.2 eFF Structure

10.2.1 Introduction

The individual documents of a briefing are not sufficient to generate a usable system for a crew member who has to operate a flight leg. To achieve usability, the documents have been assigned a structure with optional parameters which enables the grouping of various documents into a usable data package.

The main idea is to add an XML-File with the essential structural information and metadata to the documents.

The interrelation between the documents and this XML-file (which is called “eff.xml” or “structure file”) is described in the following subsections.

10.2.2 Documents Storable in an eFF

The standard presently does not define the structure of any documents that can be stored in the eFF data package. The standard only describes how a document is stored within the eFF data package structure. The format of the document is dependent of the tool used to create it and the eFF application which displays the document. Even so, one eFF tool can allow storing PDF documents, while another eFF application may not support the display of PDF documents. To eliminate this problem, a MIME type is associated with each document.

The enclosed definition of eFF XML schemas provide a predefined list of common MIME types that should be supported. (See definition of DocumentMimeType in the XML schemas, [which are repeated here below for reference.](#))

Document Mime Type (extension)	Value in eff.xml file
graphics interchange format (.gif)	image/gif
joint photographic experts group - jpeg (.jpg)	image/jpeg
portable network graphics (.png)	image/png
scalable vector graphics (.svg)	image/svg+xml
simple text html (.html or .htm)	text/html
simple text (.txt)	text/plain
xml text (.xml)	text/xml
portable data format (.pdf)	application/pdf

Note: This specification does not support complex html. Any .html files used shall be configured such that all information is contained in a single file, and shall not reference external or supporting files.

10.2.3 Documents/Operational Flight Plan Documents

Documents as they are described in the XML structure file ('eff.xml' file) should be of one of the following types:

- **All Documents**
 - For each individual and different document, the technical identifier (“id”), shall be unique within the lifetime of all related eFF data packages (EFUSUB (FULL and UPDATE) & EFDREP). If one or more documents are identical (in content and filename) then the technical identifier (“id”) for each of those documents may also be identical. Only alphanumeric characters and ‘.’, ‘-’, ‘_’ are allowed.
- Basic documents

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- A basic document is made of
 - The document file itself (e.g., a text file, a graphic file, a PDF file)
 - Optional comment file(s) which contains annotations to the document.
- One optional parameter file. These parameters can be used by other applications, e.g., result of a take off performance computation.
- Operational Flight plan documents
 - Operational Flight plan documents are data that use a style sheet to be displayed. They are not associated to a static representation to be displayed.
 - Operational Flight plan documents are associated with a set of style sheets (called a display model). Display models are part of the configuration of the application. Display models shall be managed in configuration by the operator to ensure the display of information after a long period of time.
 - Further information for the Operational Flight plan can be found in paragraph 5.4, Operational Flight Plan.

10.2.4 Contents of the electronic Flight Folder (*.eff file)

There are two files that are mandatory – the XML structure file ('eff.xml' file) and the integrity check file (*.lst' file). The rest of the contents of the eFF are highly dependent on the operational procedures of the airline that operates the flight.

An eFF data package should be made of the following files:

- One XML structure file ('eff.xml' file)
 - XML elements called subfolders are used to organize the documents in the structure file.
- All the document files
 - Type is arbitrary.
 - Each of them is referenced in the XML structure file ('eff.xml' file).
 - There can be several operational flight plans (one can be declared as 'active').
- Comment files
 - Comment files are Optional.
 - Comments are associated to documents by the XML structure file ('eff.xml' file).
- Parameters files
 - For documents that have associated parameters.
 - Parameter files are associated to documents by the XML structure file ('eff.xml' file).
- One integrity check file
 - This file references all the files in the packages and provides a hashcode for each of them to ensure their integrity.
 - The modification of any of these file will modify their hashcode so that it is no more compliant with the stored hashcode in the integrity check file

COMMENTARY

These files will be zipped together in a single '*.eff' file – see Section 10.3 for details.

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10.2.5 Topic Concept

The eFF brings the notion of a topic concept.

The topic represents a functional identifier for one or more document(s) of the same category. The functional identifier is a technical identification of the subject of the document which provides a common means of identification. This identification can be attached to each document mentioned in the XML structure file (eff.xml). This may help other applications that need to get data from the eFF data package to search for a technical identifier instead of a human readable identifier.

For example, an ATC flight plan can be named “Flight Plan” or “Plan de vol”, or something else. If we identify the ATC Flight plan with a Topic “FlightPlan/ATC”, then any application that requires getting the ATC Flight Plan can look in the eFF for the relevant topic “FlightPlan/ATC”. Flight briefing tool providers are free to define additional topics. Table 10.2.5-1, **Recommended Topic Name Values for TopicType/@name**, shows an example set of topics which should be used when applicable. **Data providers and flight folder applications should be able to handle this minimum set of topics. The table is not meant to be exhaustive and can be further defined by data providers and data consumers.**

The topic identifiers consist of one or more parts divided by a slash. The first part of the topic identifier describes the general scope (e.g., “FlightPlan” or “Weather”). Additional parts of the topic identifiers are applied cumulatively. For example the topic “Weather” could be applied to all documents that contain weather information, “Weather/Text” is applied to all documents that contain textual information about weather conditions and “Weather/Text/METAR” is applied to textual METAR information. **Data providers and applications should be able to handle up to a minimum of three levels of topic identifiers; any further refinement may be used as desired. The respective documents’ title property must be unique to the document in the flight folder.**

In addition to adding new topics (e.g., Weather/Regional), each topic identifier in Table 10.2.5-1, Recommended Topic Name Values for TopicType/@name, can also be extended to further qualify the document(s). For example, for a given flight plan, several documents may provide NOTAMs associated with each airport within the flight plan. The topic provided may be NOTAM/<nameOfAirport> (e.g., NOTAM/EDDF). Another example is a WindTemp weather forecast where several areas may need to be covered within a given flight plan. The topic provided may be Weather/Chart/WindTemp/<area or territory> (e.g., Weather/Chart/WindTemp/Europa). If each area is further identified by a given flight level, the topic provided may be Weather/Chart/WindTemp/<area or territory>/<FlightLevel> (e.g., Weather/Chart/WindTemp/Europa/FL360).

Please note that a topic identifier can be associated to several documents but a document can refer only to one topic identifier.

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complexType **TopicType**

diagram						
used by	elements	EFFREQType/UpdateRequest/Topic BaseDocumentType/Topic SubFolder.Template.Grp/Topic				
attributes	Name	Type	Use	Default	Fixed	annotation
	name	TopicValuesType	required			documentation Topic name identifier
annotation	documentation Any topic associated to a subfolder or a document					

attribute **TopicType/@name**

type	TopicValuesType
annotation	documentation Topic name identifier

simpleType **TopicValuesType**

type	union of (xs:string , restriction of xs:string)
used by	attribute TopicType/@name

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Table 10.2.5-1 – Recommended Topic Name Values for TopicType/@name

Topic	Definition
FlightInfo	General flight information summary on the flight
FlightPlan	Gives general information on a flight plan
FlightPlan/ATCNon-ICAO	This topic should be used for the ATC-Flightplan only (for CAAs not compliant with ICAO)
FlightPlan/ATCICAO	This topic should be used for the ATC-Flightplan only (for CAAs compliant with ICAO)
FlightPlan/Operational	This topic should be used for the OFP only.
Hazard	Hazard advisory information
Weather	General weather information
(Weather/Text) This topic has been deprecated and will be removed with the next supplement. It is highly recommended to only use the Weather/Airport, or Weather/Regional, topics in ARINC 633-2 implementations.	General textual weather information
(Weather/Text/METAR) This topic has been deprecated and will be removed with the next supplement. It is highly recommended to only use the topic Weather/Airport in ARINC 633-2 implementations.	The airport weather topic contains the latest METAR information for all airports relevant for the planned flight
(Weather/Text/TAF) This topic has been deprecated and will be removed with the next supplement. It is highly recommended to only use the topic Weather/Airport in ARINC 633-2 implementations.	The airport weather topic contains the latest TAF information for all airports relevant for the planned flight
(Weather/Text/SIGMET) This topic has been deprecated and will be removed with the next supplement. It is highly recommended to only use the topic Weather/Regional in ARINC 633-2 implementations.	The SIGNificant METerological topic contains information about all significant weather phenomena in airspace (e.g., FIRs or UIRs) relevant for the planned flight
Weather/Chart	The weather chart topic contains wind charts and significant weather charts relevant for the planned flight
Weather/Chart/Profile	Weather profile chart
Weather/Chart/Sat	Satellite image
Weather/Chart/SigWX	Signification weather chart
Weather/Chart/WindTemp	Wind & Temperature chart
Weather/Airport	airport weather information (METAR, SPECI, TAF)
Weather/Regional	regional weather information such as SIGMET, AIREP, AIRMET
ATIS	Automatic Terminal Information Service (ATIS) data

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Topic	Definition
NOTAM	NOTAM information
(NOTAM/ATC) This topic has been deprecated and will be removed with the next supplement. It is highly recommended to only use the topic NOTAM in ARINC 633-2 implementations.	The NOTice To AirMan topic contains other (non-weather) geo-referenced information relevant for the planned flight issued by ATC.
(NOTAM/Company) This topic has been deprecated and will be removed with the next supplement. It is highly recommended to only use the topic NOTAM in ARINC 633-2 implementations.	The NOTice To AirMan topic contains other (non-weather) geo-referenced information relevant for the planned flight issued by the company.
NOTOC	The NOTification TO Captain topic contains dangerous goods and other information relevant of the loading of the aircraft. (See also IATA Airport Handling Manual)
NOTOC/DG	Dangerous goods
NOTOC/Others	Other notification to captain (not a dangerous good)
LoadTrimSheet	The Load and Trim Sheet topic contains information about the distribution of masses along the aircraft's longitudinal axes. See also IATA Airport Handling Manual
CrewList	The Crew list topic contains names and other information about the crew member aboard the aircraft
PaxList	The Pax list topic contains information on passengers
Pirep	Pilot reports on weather or infrastructure conditions
OceanicTracks	The Oceanic Tracksystem Track topic contains general information about Oceanic Tracks
OceanicTracks/Chart	The oceanic Tracksystem Track Chart topic contains a chart showing the current organization of the oceanic track system in graphical form
OceanicTracks/Text	The oceanic Tracksystem Track Text topic contains the coordinates of the current oceanic track system in text form
NavChart	The Navigation Chart topic contains navigational charts that are relevant to the planed flight, e.g., updates of charts
AirportInformation	General information regarding airports
SecurityInformation	General information regarding security
AirlineDefined	User defined information – use of additional parts of the topic identifier is recommended
UpperAirData	Upper Air Data spot information
RVSMAltimeterCheck	Fields proposed for recording of altimeter checks in RVSM airspace
AirspaceData	List of Airspace related data

10.2.6 Subfolders Properties

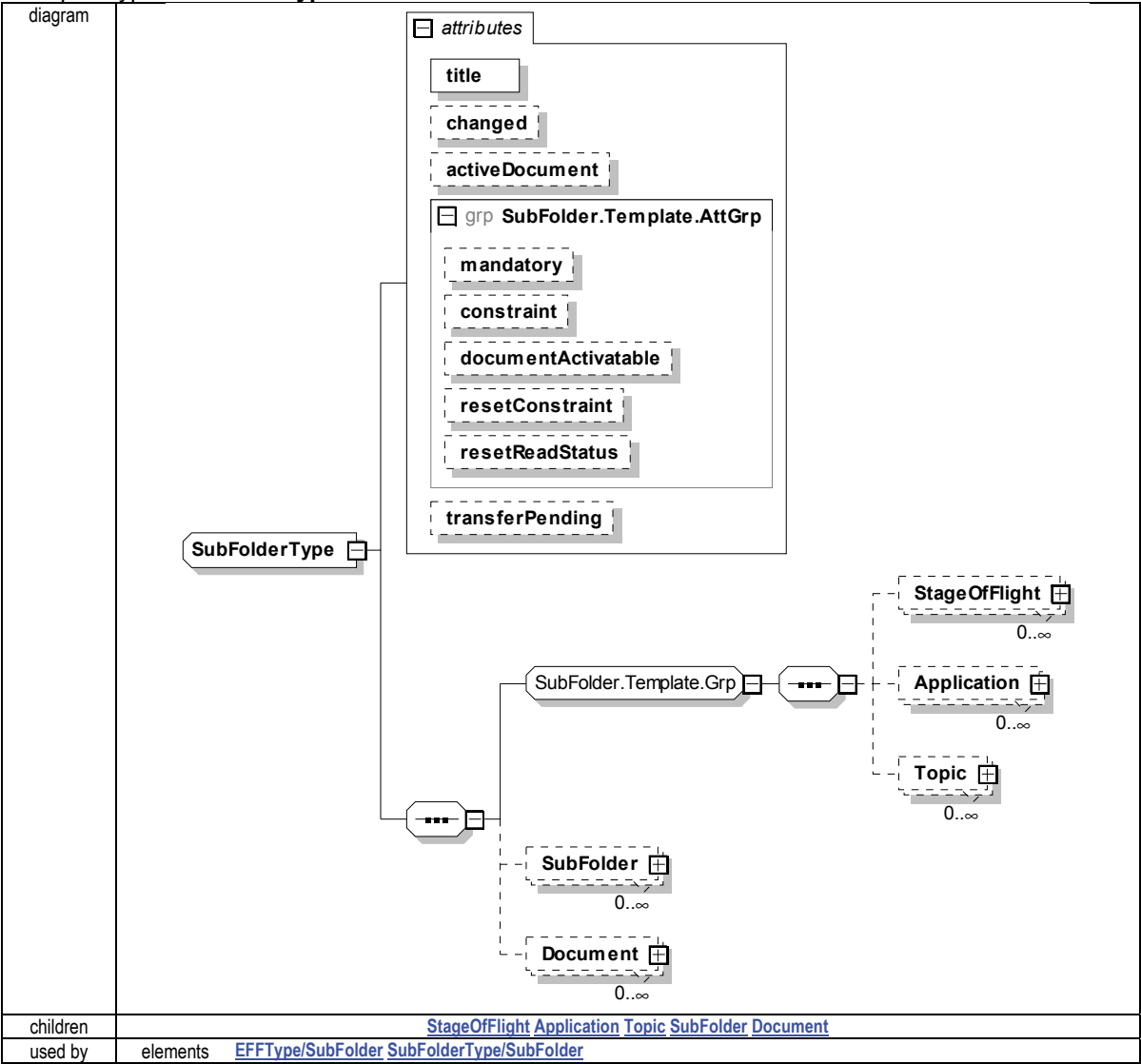
Subfolders are structural information (elements) in the XML structure file that provides a way to group similar documents (e.g., all operational flight plans). The eFF itself contains no folders in terms of a traditional file system. Subfolder elements in the XML structure file can contain:

- Other subfolders
- Documents

A subfolder has several properties which are described in the following tables.

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complexType SubFolderType



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attributes	Name title	Type derived by: xs:string	Use required	Default	Fixed	annotation documentation Title of the subfolder
	changed	ChangeValuesType	optional	New		documentation Change code : - Unchanged - Revised - Deactivated - New
	activeDocument	derived by: xs:IDREF	optional			documentation Boolean state. Specifies that we can have an active document in this subfolder. Typically, active document are mostly used for flight plan. See Note [1] below.
	mandatory	xs:boolean	optional			documentation Specifies that documents in this subfolders or recursive subfolders must be exchanged
	constraint	derived by: xs:string	optional	None		documentation Possible values are: - None - CheckOne (at least one document shall be checked in the subfolder) - CheckAll (all the documents of the subfolder shall be checked) - Sign (one document of the subfolder shall be signed)
	documentActivatable	xs:boolean	optional			documentation Tells in the user can "activate" a specific document in this folder
	resetConstraint	resetCommandsType	optional	never		documentation Tells when to reset the constraint. Possible values are : - Never - OnLoadOnBoard : When loaded on board - OnLoadOnGround : When loaded on ground - OnNewDocument: When a new document is inserted in this folder
	resetReadStatus	resetCommandsType	optional	never		documentation Tells when to reset the read status - Never - OnLoadOnBoard : When loaded on board - OnLoadOnGround : When loaded on ground - OnNewDocument : When a new document is inserted in this folder
	transferPending	xs:boolean	optional			- OnLoad : On any load documentation Tells when to reset the read status - Never - OnLoadOnBoard : When loaded on board - OnLoadOnGround : When loaded on ground - OnNewDocument : When a new document is inserted in this folder - OnLoad : On any load

attribute **SubFolderType/@title**

type	restriction of xs:string
properties	isRef 0 use required
facets	minLength 1
annotation	documentation Title of the subfolder

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attribute **SubFolderType/@changed**

type	ChangeValuesType											
properties	isRef 0 default New use optional											
facets	enumeration New enumeration Unchanged enumeration Revised enumeration Deactivated											
annotation	documentation Change information. This information describes the differences between updates of an eFF. When an eFF is fetched the first time all subfolders will have the changed status New. In the frame of incremental deliveries, it helps to know the difference between data that are New, data that existed but Revised. Unchanged may be used in the case of a complete delivery of an eFF, but partially updated. Legend: <table><thead><tr><th>Value</th><th>Semantics</th></tr></thead><tbody><tr><td>'New'</td><td>New Subfolder; in the last received eFF package weren't such a subfolder.</td></tr><tr><td>'Unchanged'</td><td>Unchanged.</td></tr><tr><td>'Revised'</td><td>The contents of the subfolder have been updated.</td></tr><tr><td>'Deactivated'</td><td>The subfolder is outdated. Its contents should not be used anymore.</td></tr></tbody></table>		Value	Semantics	'New'	New Subfolder; in the last received eFF package weren't such a subfolder.	'Unchanged'	Unchanged.	'Revised'	The contents of the subfolder have been updated.	'Deactivated'	The subfolder is outdated. Its contents should not be used anymore.
Value	Semantics											
'New'	New Subfolder; in the last received eFF package weren't such a subfolder.											
'Unchanged'	Unchanged.											
'Revised'	The contents of the subfolder have been updated.											
'Deactivated'	The subfolder is outdated. Its contents should not be used anymore.											

simpleType **ChangeValuesType**

type	restriction of xs:string	
used by	attributes	SubFolderType/@changed DocumentType/@changed
facets	enumeration New enumeration Unchanged enumeration Revised enumeration Deactivated	

attribute **SubFolderType/@activeDocument**

type	restriction of xs:IDREF	
properties	isRef 0 use optional	
facets	minLength 1	
annotation	documentation Specifies the identifier of one document which is active in this subfolder (optional). Active notion is similar to the notion of active flight plan in the FMS. Only one document can be active any time. Active documents relates mainly to flight plan documents. An active flight plan is the flight plan known as "active" (meaning currently in use) by the FMS. It is there to be consistent with the FMS philosophy of activation. See Note [1] below.	

attribute **SubFolderType/@transferPending**

type	xs:boolean	
properties	isRef 0 use optional	
annotation	documentation Declares that the documents in this folder are missing for some reason. The same as if all documents in this folder were marked "transferPending". This attribute may be used for partly delivery of an eFF, e.g., when gathering of some Files would take too much time. The pending files should be delivered with the next update of the eFF. The Pilot should be informed if there is pending information and the eFF therefore is not complete.	

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attribute **Group SubFolder.Template.AttGrp**

used by	complexType	SubFolderType				
attributes	Name	Type	Use	Default	Fixed	annotation
	mandatory	xs:boolean	optional			
	constraint	derived by: xs:string	optional	None		documentation Possible values are: - None - CheckOne (at least one document shall be checked in the subfolder) - CheckAll (all the documents of the subfolder shall be checked) - Sign (one document of the subfolder shall be signed)
	documentActivatable	xs:boolean	optional			documentation Tells in the user can "activate" a specific document in this folder
	resetConstraint	resetCommandsType	optional	never		documentation Tells when to reset the constraint. Possible values are : - Never - OnLoadOnBoard : When loaded on board - OnLoadOnGround : When loaded on ground - OnNewDocument: When a new document is inserted in this folder - OnLoad : On any load
	resetReadStatus	resetCommandsType	optional	never		documentation Tells when to reset the read status - Never - OnLoadOnBoard : When loaded on board - OnLoadOnGround : When loaded on ground - OnNewDocument : When a new document is inserted in this folder - OnLoad : On any load
annotation	documentation Attribute group for template attributes for a subfolder					

attribute **SubFolder.Template.AttGrp/@mandatory**

type	xs:boolean					
properties	isRef	0				
	use	optional				
annotation	documentation Specifies that documents in this subfolders or recursive subfolders must be exchanged. This attribute should be set by the ground system to specify to the airborne system which folders are mandatory in eFF downlinks. Mandatory at the level of the subfolder means that "all" the documents in such a subfolder are mandatory.					

attribute **SubFolder.Template.AttGrp/@constraint**

type	restriction of xs:string					
properties	isRef	0				
	default	None				
	use	optional				
facets	enumeration	None				
	enumeration	CheckOne				
	enumeration	CheckAll				
	enumeration	Sign				
annotation	documentation Defines the constraints on these document subfolders. Constraints can be one of the following: "None" : No specific constraint "CheckOne" : The pilot is required to check at least one document in this subfolder "CheckAll" : The pilot is required to check all the documents in this subfolder "Sign" : The pilot is required to sign documents in this subfolder					

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attribute **SubFolder.Template.AttGrp/@documentActivatable**

type	xs:boolean		
properties	isRef	0	
	use	optional	
annotation	documentation Tells in the user can "activate" a specific document in this folder. Specifies that we can have an active document in this subfolder. Typically, active document are mostly used for flight plan. See Note [1] below.		

attribute **SubFolder.Template.AttGrp/@resetConstraint**

type	resetCommandsType		
properties	isRef	0	
	default	never	
	use	optional	
facets	enumeration	never	
	enumeration	onLoadOnBoard	
	enumeration	onLoadOnGround	
	enumeration	onNewDocument	
	enumeration	onLoad	
annotation	documentation Tells when to reset the constraint. Possible values are : - Never - OnLoadOnBoard : When loaded on board - OnLoadOnGround : When loaded on ground - OnNewDocument : When a new document is inserted in this folder - OnLoad : On any load		

attribute **SubFolder.Template.AttGrp/@resetReadStatus**

type	resetCommandsType		
properties	isRef	0	
	default	never	
	use	optional	
facets	enumeration	never	
	enumeration	onLoadOnBoard	
	enumeration	onLoadOnGround	
	enumeration	onNewDocument	
	enumeration	onLoad	
annotation	documentation Tells when to reset the read status - Never - OnLoadOnBoard : When loaded on board - OnLoadOnGround : When loaded on ground - OnNewDocument : When a new document is inserted in this folder - OnLoad : On any load		

simpleType **resetCommandsType**

type	restriction of xs:string		
used by	attributes	SubFolder.Template.AttGrp/@resetConstraint	SubFolder.Template.AttGrp/@resetReadStatus
facets	enumeration	never	
	enumeration	onLoadOnBoard	
	enumeration	onLoadOnGround	
	enumeration	onNewDocument	
	enumeration	onLoad	

Note:

1. The notion of 'active' document was defined mainly for flight plan, Load and Trim sheet, Take Off performance documents – it enables the pilots to identify without ambiguity which document is to be applied for the flight. The attribute 'documentactivatable' is used to specify that this folder can contain a document tagged as 'active'. If documentactivatable' attribute is absent or not set, it means that no document should be declared active in this folder.

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element **SubFolderType/SubFolder**

diagram						
type	SubFolderType					
properties	isRef	0	minOcc	0	maxOcc	unbounded
	content	complex				
children	StageOfFlight Application Topic SubFolder Document					
attributes	Name	Type	Use	Default	Fixed	annotation
	title	derived by: xs:string	required			documentation Title of the subfolder
	changed	ChangeValuesType	optional	New		documentation Change code : - Unchanged - Revised - Deactivated - New
	activeDocument	derived by: xs:IDREF	optional			
	mandatory	xs:boolean	optional			
	constraint	derived by: xs:string	optional	None		documentation Possible values are: - None - CheckOne (at least one document shall be checked in the subfolder) - CheckAll (all the documents of the subfolder shall be checked)

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	documentActivatable xs:boolean optional	- Sign (one document of the subfolder shall be signed) documentation Tells in the user can "activate" a specific document in this folder documentation Tells when to reset the constraint. Possible values are : - Never - OnLoadOnBoard : When loaded on board - OnLoadOnGround : When loaded on ground - OnNewDocument: When a new document is inserted in this folder - OnLoad : On any load documentation Tells when to reset the read status - Never - OnLoadOnBoard : When loaded on board - OnLoadOnGround : When loaded on ground - OnNewDocument : When a new document is inserted in this folder - OnLoad : On any load
	resetConstraint resetCommandsType optional never	
	resetReadStatus resetCommandsType optional never	
	transferPending xs:boolean optional	
annotation	documentation A list of subfolders	

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element **SubFolderType/Document**

diagram							
type	DocumentType						
properties	isRef	0					
	minOcc	0					
	maxOcc	unbounded					
	content	complex					
children	Parameter ParameterFile Signature Topic CommentDocument						
attributes	Name	Type	Use	Default	Fixed	annotation	
	id	xs:ID	required			documentation For each individual and different document, the technical identifier ("id"), shall be unique within the lifetime of all related eFF data packages (EFUSUB (FULL and UPDATE) & EFDREP)". If one or more documents are identical (in content and filename) then the technical identifier ("id") for each of those documents may also be identical. Only alphanumeric characters and '.', '-', '_' are allowed	

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	type	DocumentMimeType	required		documentation Type is the associated mime/type of the document. type shall be filled in uppercase The document filename. The filename shall not include any path information. documentation it must be unique within the associated topic.
	file	xs:anyURI	required		
	title	xs:string	required		
	priority	xs:int	optional		documentation Number between 0 and 15 indicating the priority for data transfers or other treatments. The higher the number the more important the Document.
	application	xs:string	optional		documentation Describes what is the application originator for the data. (Associated with the parameters)
	mandatory Constraint	xs:boolean derived by: xs:string	optional optional	None	documentation Possible values are : - None - Check - Sign
	captainOnly	xs:boolean	optional		documentation Document is only visible by the captain of the Flight
	originalDateTime	xs:dateTime	optional		documentation Original date/time of the inserted document
	updateDateTime	xs:dateTime	optional		documentation last modification date and time
	expectedUpdateAt	xs:dateTime	optional		documentation TimeDate stamp at which it is expected that an update to the present document may be available
	timeToLive	xs:dateTime	optional		documentation TimeDate stamp from which on the document should no longer be presented as a valid document
	status	derived by: xs:string	optional	None	documentation Status of the document: - None - Read - Checked - Signed
	preliminary changed	xs:boolean ChangeValuesType	optional	New	documentation Change code : - Unchanged - Revised - Deactivated - New
	authorProfile	derived by: xs:string	optional		documentation To specify the profile of the author (to be able to set message when a document is inserted depending on the profile of the user who inserted the document and the profile of the user who is consulting the document)
	authorName displayModel	xs:string xs:string	optional		documentation A reference to the associated display model
	transferPending	xs:boolean	optional		documentation This attribute notes that the document is not present in the .eFF package and should be downloaded at a later time.
annotation	documentation A list of documents				

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10.2.7 Subfolder Associations

A subfolder has several associations, which are described in the following tables.

group **SubFolder.Template.Grp**

diagram	Group for Template information associated to a subfolder
children	StageOfFlight Application Topic
used by	complexType SubFolderType
annotation	documentation Group for Template information associated to a subfolder

element **SubFolder.Template.Grp/StageOfFlight**

diagram						
type	StageOfFlightType					
attributes	Name code	Type derived by: xs:string	Use required	Default	Fixed	annotation

element **SubFolder.Template.Grp/Application**

diagram						
type	ApplicationType					
attributes	Name name callable	Type derived by: xs:string xs:boolean	Use required optional	Default	Fixed	documentation Indicates if the external application can be called from the EFF application.

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complexType **ApplicationType**

diagram						
used by	element	SubFolder.Template.Grp/Application				
attributes	Name	Type	Use	Default	Fixed	annotation
	name	derived by: xs:string	required			
	callable	xs:boolean	optional			documentation Indicates if the external application can be called from the eFF application.
annotation	documentation External application which can store document in this subfolder					

attribute **ApplicationType/@name**

type	restriction of xs:string

attribute **ApplicationType/@callable**

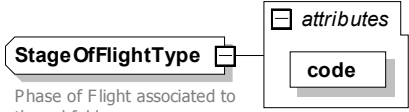
type	xs:boolean
annotation	documentation Indicates if the external application can be called from the eFF application.

element **SubFolder.Template.Grp/Topic**

diagram						
type	TopicType					
attributes	Name	Type	Use	Default	Fixed	annotation
	name	TopicValuesType	required			documentation Topic name identifier

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complexType **StageOfFlightType**

diagram						
used by	element SubFolder.Template.Grp/StageOfFlight					
attributes	Name code	Type derived by: xs:string	Use required	Default	Fixed	annotation
annotation	documentation Phase of Flight associated to the subfolder.					

attribute **StageOfFlightType/@code**

type	restriction of xs:string

10.2.8 Documents Properties

The following definitions apply to all documents.

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complexType DocumentType

diagram	
type	extension of BaseDocumentType
children	Parameter ParameterFile Signature Topic CommentDocument
used by	element SubFolderType/Document

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attributes	Name <u>id</u>	Type xs:ID	Use required	Default	Fixed	annotation documentation For each individual and different document, the technical identifier shall be unique within the lifetime of all related eFF data packages (EFUSUB (FULL and UPDATE) and EFDREP). If one or more documents are identical (in content and filename) then the technical identifier (id) for each of those documents may also be identical. Only alphanumeric characters and ' ', '-', '_' are allowed.
	<u>type</u>	<u>DocumentMimeType</u>	required			documentation Type is the associated mime/type of the document.
	<u>file</u>	xs:anyURI	required			type shall be filled in uppercase documentation The document filename. The filename shall not include any path information
	<u>title</u>	xs:string	required			documentation The title must be unique within the associated topic.
	<u>priority</u>	xs:int	optional			documentation Number between 0 and 15 indicating the priority for data transfers or other treatments. The higher the number the more important the Document.
	<u>application</u>	xs:string	optional			documentation Describes what is the application originator for the data. (Associated with the parameters)

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	<u>mandatory</u>	xs:boolean	optional		
	<u>Constraint</u>	derived by: xs:string	optional	None	documentation Possible values are : - None - Check - Sign
	<u>captainOnly</u>	xs:boolean	optional		documentation Document is only visible by the captain of the Flight
	<u>originalDateTime</u>	xs:dateTime	optional		documentation Original date/time of the inserted document. DEPRECATED starting from A633Supp2
	<u>updateDateTime</u>	xs:dateTime	required		documentation is the timestamp when document is published
	<u>expectedUpdateAt</u>	xs:dateTime	optional		documentation TimeDate stamp at which it is expected that an update to the present document may be available
	<u>timeToLive</u>	xs:dateTime	optional		documentation TimeDate stamp from which on the document should no longer be presented as a valid document
	<u>status</u>	derived by: xs:string	optional	None	documentation Status of the document: - None - Read - Checked - Signed
	<u>preliminary</u> <u>changed</u>	xs:boolean <u>ChangeValuesType</u>	optional	New	documentation Change code : - Unchanged - Revised - Deactivated - New
	<u>authorProfile</u>	derived by: xs:string	optional		documentation To specify the profile of the author (to be able to set message when a document is inserted depending on the profile of the user who inserted the document and the profile of the user who is consulting the document)

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	authorName	xs:string		
	displayModel	xs:string	optional	documentation A reference to the associated display model
	transferPending	xs:boolean	optional	documentation This attribute notes that the document is not present in the .eFF package and should be downloaded at a later time.

attribute [DocumentType/@title](#)

type	xs:string
annotation	documentation The title must be unique within the associated topic.

attribute [DocumentType/@priority](#)

type	xs:int
annotation	documentation Number between 0 and 15 indicating the priority for data transfers or other treatments. The higher the number the more important the Document.

attribute [DocumentType/@application](#)

type	xs:string
annotation	documentation Describes what is the application originator for the data. (Associated with the parameters)

attribute [DocumentType/@mandatory](#)

type	xs:boolean

attribute [DocumentType/@Constraint](#)

type	restriction of xs:string
facets	enumeration None enumeration Check enumeration Sign
annotation	documentation Possible values are : - None - Check - Sign

attribute [DocumentType/@captainOnly](#)

type	xs:boolean
annotation	documentation Document is only visible by the captain of the Flight

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attribute [DocumentType/@originalDateTime](#)

type	xs:dateTime
annotation	documentation Original date/time of the inserted document. DEPRECATED starting from A633Supp2

attribute [DocumentType/@updateDateTime](#)

type	xs:dateTime
annotation	documentation is the timestamp when document is published

attribute [DocumentType/@expectedUpdateAt](#)

type	xs:dateTime
annotation	documentation TimeDate stamp at which it is expected that an update to the present document may be available

attribute [DocumentType/@timeToLive](#)

type	xs:dateTime
annotation	documentation TimeDate stamp from which on the document should no longer be presented as a valid document

attribute [DocumentType/@status](#)

type	restriction of xs:string	
facets	enumeration	None
	enumeration	Read
	enumeration	Check
	enumeration	Signed
annotation	documentation Status of the document: - None - Read - Checked - Signed	

attribute [DocumentType/@preliminary](#)

type	xs:boolean

attribute [DocumentType/@changed](#)

type	ChangeValuesType	
facets	enumeration	New
	enumeration	Unchanged
	enumeration	Revised
	enumeration	Deactivated
annotation	documentation Change code : - Unchanged - Revised - Deactivated - New	

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attribute `DocumentType/@authorProfile`

type	restriction of xs:string
facets	enumeration crewmember enumeration dispatcher enumeration admin enumeration #
annotation	documentation To specify the profile of the author (to be able to set message when a document is inserted depending on the profile of the user who inserted the document and the profile of the user who is consulting the document)

attribute `DocumentType/@authorName`

type	xs:string

attribute `DocumentType/@displayModel`

type	xs:string
annotation	documentation A reference to the associated display model

attribute `DocumentType/@transferPending`

type	xs:boolean
annotation	documentation This attribute notes that the document is not present in the .eFF package and should be downloaded at a later time.

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complexType BaseDocumentType

diagram	BaseDocumentType attributes id For each individual and different document, the technical identifier shall be unique within the lifetime of all related EFF data packages (EFUSUB (FULL and UPDATE) and EFDREP). If one or more documents are identical (in content and filename) then the technical identifier (id) for each of those documents may also be identical. type Type is the associated mime/type of the document. type shall be filled in uppercase file The document filename. The filename shall not include any path information ... Parameter 1..∞ Simple parameters in the form key values pair ParameterFile An associated parameter file Signature 0..∞ Signature information Topic Provide indication about operational subject covered by document.					
children	Parameter ParameterFile Signature Topic					
used by	element complexType	DocumentType/CommentDocument DocumentType				
attributes	Name id	Type xs:ID	Use required	Default	Fixed	annotation documentation For each individual and different document, the technical identifier shall be unique within the lifetime of all related eFF data packages (EFUSUB (FULL and UPDATE) and EFDREP). If one or more documents are identical (in

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			content and filename) then the technical identifier (id) for each of those documents may also be identical. Only alphanumeric characters and '.', '-', '_' are allowed.
<u>type</u>	<u>DocumentMimeType</u>	required	documentation Type is the associated mime/type of the document. type shall be filled in uppercase
<u>file</u>	xs:anyURI	required	documentation The document filename. The filename shall not include any path information

attribute BaseDocumentType/@id

type	xs:ID
annotation	documentation For each individual and different document, the technical identifier shall be unique within the lifetime of all related eFF data packages (EFUSUB (FULL and UPDATE) and EFDREP). If one or more documents are identical (in content and filename) then the technical identifier (id) for each of those documents may also be identical. Only alphanumeric characters and '.', '-', '_' are allowed.

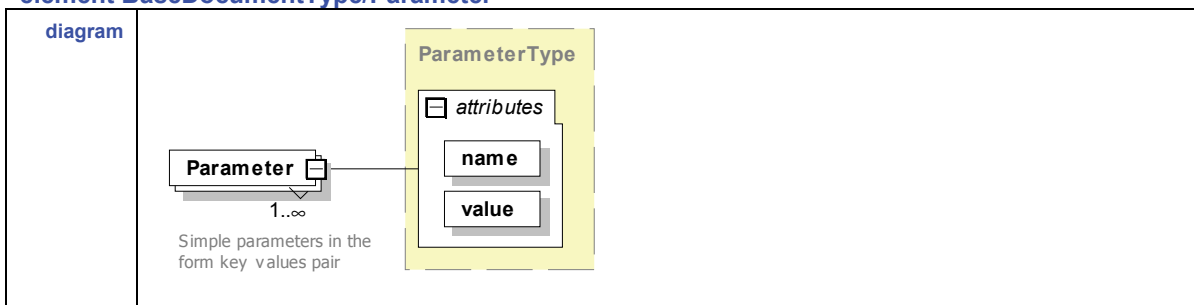
attribute BaseDocumentType/@type

type	<u>DocumentMimeType</u>
annotation	documentation Type is the associated mime/type of the document. type shall be filled in uppercase

attribute BaseDocumentType/@file

type	xs:anyURI
annotation	documentation The document filename. The filename shall not include any path information

element BaseDocumentType/Parameter



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type	<u>ParameterType</u>					
attributes	Name	Type	Use	Default	Fixed	annotation
	<u>name</u>	derived by: xs:string	required			
	<u>value</u>	derived by: xs:string	required			
annotation	documentation Simple parameters in the form key values pair					

element BaseDocumentType/ParameterFile

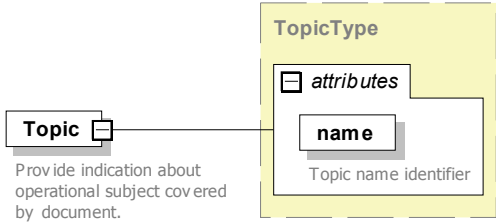
diagram						
type	<u>ParameterFileType</u>					
attributes	Name	Type	Use	Default	Fixed	annotation
	<u>file</u>	derived by: xs:anyURI	required			documentation Points to the file that contains the parameters for the application
annotation	documentation An associated parameter file					

element BaseDocumentType/Signature

diagram						
type	<u>SignatureType</u>					
children	<u>LegalSign</u> <u>SimpleSign</u>					
attributes	Name	Type	Use	Default	Fixed	annotation
	<u>timestamp</u>	xs:dateTime	required			documentation Date and time of the signature
	<u>type</u>	derived by: xs:string	optional	SHA		
annotation	documentation Signature information					

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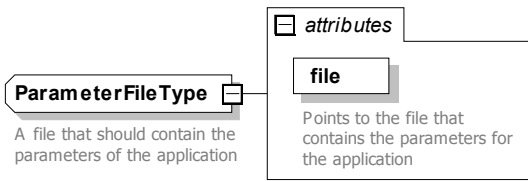
element BaseDocumentType/Topic

diagram						
type	TopicType					
attributes	Name name	Type TopicValuesType	Use required	Default	Fixed	annotation documentation Topic name identifier
annotation	documentation Provide indication about operational subject covered by document.					

10.2.9 Document Associations

A document has several associations (XML elements) which are described in the following tables.

complexType ParameterFileType

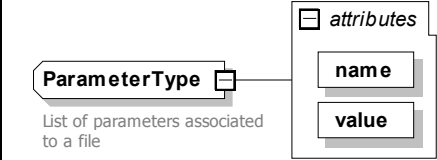
diagram						
used by	element BaseDocumentType/ParameterFile					
attributes	Name file	Type derived by: xs:anyURI	Use required	Default	Fixed	annotation documentation Points to the file that contains the parameters for the application
annotation	documentation A file that should contain the parameters of the application					

attribute ParameterFileType/@file

type	restriction of xs:anyURI
annotation	documentation Points to the file that contains the parameters for the application

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complexType **ParameterType**

diagram						
used by	element BaseDocumentType/Parameter					
attributes	Name name value	Type derived by: xs:string derived by: xs:string	Use required required	Default	Fixed	annotation
annotation	documentation List of parameters associated to a file					

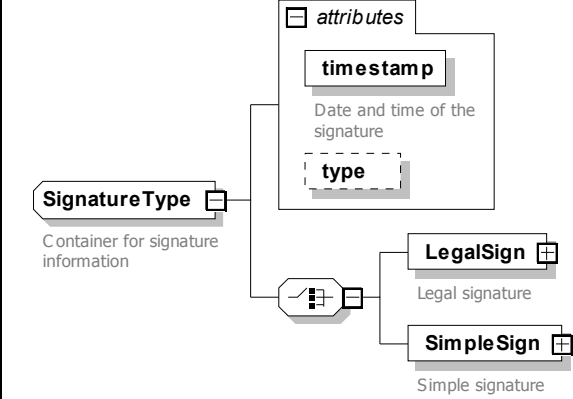
attribute **ParameterType/@name**

type	restriction of xs:string

attribute **ParameterType/@value**

type	restriction of xs:string

complexType **SignatureType**

diagram						
children	LegalSign SimpleSign					
used by	element BaseDocumentType/Signature					
attributes	Name timestamp type	Type xs:dateTime derived by: xs:string	Use required optional	Default SHA	Fixed	annotation documentation Date and time of the signature
annotation	documentation Container for signature information					

attribute **SignatureType/@timestamp**

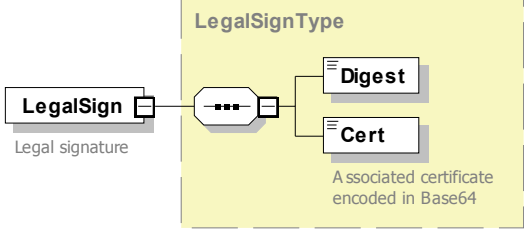
type	xs:dateTime
annotation	documentation Date and time of the signature

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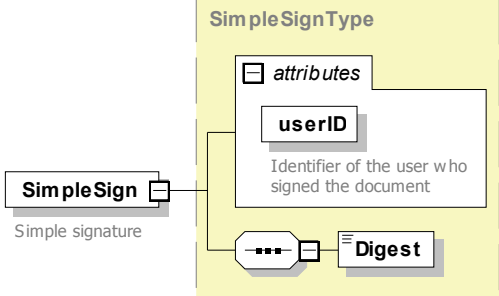
attribute **SignatureType/@type**

type	restriction of xs:string	
facets	enumeration	FLAG
	enumeration	SHA
	enumeration	MD5
	enumeration	RSA

element **SignatureType/LegalSign**

diagram						
type	LegalSignType					
children	Digest Cert					
annotation	documentation Legal signature					

element **SignatureType/SimpleSign**

diagram						
type	SimpleSignType					
children	Digest					
attributes	Name userID	Type derived by: xs:string	Use required	Default	Fixed	annotation documentation Identifier of the user who signed the document
annotation	documentation Simple signature					

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element **LegalSignType/Cert**

diagram	
type	CertType
annotation	documentation Associated certificate encoded in Base64

simpleType **CertType**

type	restriction of xs:string
used by	element LegalSignType/Cert
annotation	documentation Type for a certificate

simpleType **DigestType**

type	restriction of xs:string
used by	elements SimpleSignType/Digest LegalSignType/Digest
annotation	documentation Type of Digest

simpleType **DocumentMimeType**

type	union of (restriction of xs:string)
used by	attribute BaseDocumentType/@type
annotation	documentation Definition for a mime type association. Defines the standard mime types allowed for a document

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element **DocumentType/CommentDocument**

diagram	BaseDocumentType attributes id For each individual and different document, the technical identifier shall be unique within the lifetime of all related EFF data packages (EFUSUB (FULL and UPDATE) and EFDREP). If one or more documents are identical (in content and filename) then the technical identifier (id) for each of those documents may also be identical. type Type is the associated mime/type of the document. type shall be filled in uppercase file The document filename. The filename shall not include any path information CommentDocument 0..∞ Parameter 1..∞ Simple parameters in the form key values pair ParameterFile An associated parameter file Signature 0..∞ Signature information Topic Provide indication about operational subject covered by document.					
type	BaseDocumentType					
children	Parameter ParameterFile Signature Topic					
attributes	Name id	Type xs:ID	Use required	Default	Fixed	annotation documentation For each individual and different document, the technical identifier shall be unique within the lifetime of all related eFF data packages (EFUSUB (FULL and UPDATE) and

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				EFDREP). If one or more documents are identical (in content and filename) then the technical identifier (id) for each of those documents may also be identical. Only alphanumeric characters and ' ', ' ', ' ', ' ' are allowed. documentation Type is the associated mime/type of the document. type shall be filled in uppercase documentation The document filename. The filename shall not include any path information
	type	DocumentMimeType	required	
	file	xs:anyURI	required	

10.2.10 Flight Folder Properties

Several information entries should be attached at the level of the eFF itself.

The eFF flight identification is defined in the ARINC 633 supplementary header (see Section 4.4.4.2) and the eff.xsd schema. By the nature of mobile devices there will be multiple instances of an eFF data packages (different versions) at the same time at different locations. It is the responsibility of the involved systems to handle this circumstance correctly. For example, at a given time, the version of eFF data package onboard is older than the new eFF data package computed onground and pending for transmission. The version of eFF data package is identified by the timestamp of its generation. Additionally, a given eFF data package contains the timestamp of the previous version. The timestamps allows the system to track all versions of an eFF data package.

If parts of an eFF data package are to be updated these updates are generated as another eFF data package with the same flight identification as the target eFF. The “Changed” attribute is used to control how the documents are to be merged with existing eFF data package.

10.2.11 eFF Schema

The definition of the operational flight plan and the M633Header and M633SupplementaryHeader are explained in Section 5.4, Section 4.4.4.1, and Section 4.4.4.2.

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complexType **EFFType**

diagram	attributes templateReference An optional reference to a template. When referencing the template, template information in the eff will be overwrittent by the template previousTimestamp Gives the previous timestamp of any update to ensure sequencing. This attribute is mandatory when EFF is an update. It shall be omitted if EFF is not an update but a full version of an EFF. fullPackage This attributes states that this EFF cancels and replace any other flight folders identified with the same flight information. This prevents from doing an update to an EFF state Denotes the current state in the lifecycle of the EFF. The values are : - New : EFF not sent yet to AC - Uplink : EFF on transportation to AC - OnAC : EFF stored onboard and ready for access - Active : EFF used for the flight - DownlinkPartial : Partial EFF downlink - DownlinkClosed : EFF sent on ground at the end of the flight EFFType M633Header mandatory header of ARINC633 message M633SupplementaryHeader downlink and uplink supplementary header of ARINC633 message SubFolder A list of sub folders					
children	M633Header M633SupplementaryHeader SubFolder					
used by	elements	EFDREP EFUSUB				
attributes	Name	Type	Use	Default	Fixed	annotation
	templateReference	derived by: xs:string	optional			documentation An optional reference to a template. When referencing the template, template information in the eFF will be overwritten by the template
	previousTimestamp	xs:dateTime	optional			documentation Gives the previous timestamp of any update to ensure sequencing.

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					This attribute is mandatory when eFF is an update. It shall be omitted if eFF is not an update but a full version of an eFF.
	fullPackage	xs:boolean	optional	false	documentation This attributes states that this eFF cancels and replace any other flight folders identified with the same flight information. This prevents from doing an update to an eFF
	state	derived by: xs:string	optional		documentation Denotes the current state in the lifecycle of the eFF. The values are : - New : eFF not sent yet to AC - Uplink : eFF on transportation to AC - OnAC : eFF stored onboard and ready for access - Active : eFF used for the flight - DownlinkPartial : Partial eFF downlink - DownlinkClosed : eFF sent on ground at the end of the flight

attribute **EFFType/@templateReference**

type	restriction of xs:string
annotation	documentation An optional reference to a template. When referencing the template, template information in the eFF will be overwritten by the template

attribute **EFFType/@previousTimestamp**

type	xs:dateTime
annotation	documentation Gives the previous timestamp of any update to ensure sequencing. This attribute is mandatory when eFF is an update. It shall be omitted if eFF is not an update but a full version of an eFF.

attribute **EFFType/@fullPackage**

type	xs:boolean
annotation	documentation This attributes states that this eFF cancels and replace any other flight folders identified with the same flight information. This prevents from doing an update to an eFF

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attributes	Name	Type	Use	Default	Fixed	annotation
	title	derived by: xs:string	required			documentation Title of the subfolder
	changed	ChangeValuesType	optional	New		documentation Change code : - Unchanged - Revised - Deactivated - New
	activeDocument	derived by: xs:IDREF	optional			
	mandatory	xs:boolean	optional			
	constraint	derived by: xs:string	optional	None		documentation Possible values are: - None - CheckOne (at least one document shall be checked in the subfolder) - CheckAll (all the documents of the subfolder shall be checked) - Sign (one document of the subfolder shall be signed)
	documentActivatable	xs:boolean	optional			documentation Tells in the user can "activate" a specific document in this folder
	resetConstraint	resetCommandsType	optional	never		documentation Tells when to reset the constraint. Possible values are : - Never - OnLoadOnBoard : When loaded on board - OnLoadOnGround : When loaded on ground - OnNewDocument: When a new document is inserted in this folder
	resetReadStatus	resetCommandsType	optional	never		documentation Tells when to reset the read status - Never - OnLoadOnBoard : When loaded on board - OnLoadOnGround : When loaded on ground - OnNewDocument : When a new document is inserted in this folder - OnLoad : On any load
	transferPending	xs:boolean	optional			
annotation	documentation A list of sub folders					

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complexType SubFolderType

diagram						
children	StageOfFlight Application Topic SubFolder Document					
used by	elements	EFFType/SubFolder SubFolderType/SubFolder				
attributes	Name	Type	Use	Default	Fixed	annotation
	title	derived by: xs:string	required			documentation Title of the subfolder
	changed	ChangeValuesType	optional	New		documentation Change code : - Unchanged - Revised - Deactivated - New
	activeDocument	derived by: xs:IDREF	optional			documentation Possible values are: - None - CheckOne (at least one document shall be checked in the subfolder)
	mandatory	xs:boolean	optional			
	constraint	derived by: xs:string	optional	None		

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	<u>documentActivatable</u>	xs:boolean	optional		- CheckAll (all the documents of the subfolder shall be checked) - Sign (one document of the subfolder shall be signed) documentation Tells in the user can “activate” a specific document in this folder documentation Tells when to reset the constraint. Possible values are : - Never - OnLoadOnBoard : When loaded on board - OnLoadOnGround : When loaded on ground - OnNewDocument: When a new document is inserted in this folder - OnLoad : On any load documentation Tells when to reset the read status - Never - OnLoadOnBoard : When loaded on board - OnLoadOnGround : When loaded on ground - OnNewDocument : When a new document is inserted in this folder - OnLoad : On any load
	<u>resetConstraint</u>	<u>resetCommandsType</u>	optional	never	
	<u>resetReadStatus</u>	<u>resetCommandsType</u>	optional	never	
	<u>transferPending</u>	xs:boolean	optional		

attribute SubFolderType/@title

type	restriction of xs:string
annotation	documentation Title of the subfolder

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attribute SubFolderType/@changed

type	ChangeValuesType	
facets	enumeration	New
	enumeration	Unchanged
	enumeration	Revised
	enumeration	Deactivated
annotation	documentation Change code : - Unchanged - Revised - Deactivated - New	

attribute SubFolderType/@activeDocument

type	restriction of xs:IDREF

attribute SubFolderType/@transferPending

type	xs:boolean

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element SubFolderType/SubFolder

diagram						
type	<u>SubFolderType</u>					
children	<u>StageOfFlight</u> <u>Application</u> <u>Topic</u> <u>SubFolder</u> <u>Document</u>					
attributes	Name <u>title</u> <u>changed</u> <u>activeDocument</u> <u>mandatory</u> <u>constraint</u>	Type derived by: xs:string <u>ChangeValuesType</u> derived by: xs:IDREF xs:boolean derived by: xs:string	Use required optional optional optional	Default New None	Fixed None	annotation documentation Title of the subfolder documentation Change code : - Unchanged - Revised - Deactivated - New documentation Possible values are: - None - CheckOne (at least one document shall be checked in the subfolder) - CheckAll (all the documents of the subfolder shall be checked) - Sign (one document of the subfolder shall be signed)

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	documentActivatable	xs:boolean	optional		documentation Tells in the user can “activate” a specific document in this folder
	resetConstraint	resetCommandsType	optional	never	documentation Tells when to reset the constraint. Possible values are : - Never - OnLoadOnBoard : When loaded on board - OnLoadOnGround : When loaded on ground - OnNewDocument : When a new document is inserted in this folder - OnLoad : On any load
	resetReadStatus	resetCommandsType	optional	never	documentation Tells when to reset the read status - Never - OnLoadOnBoard : When loaded on board - OnLoadOnGround : When loaded on ground - OnNewDocument : When a new document is inserted in this folder - OnLoad : On any load
	transferPending	xs:boolean	optional		
annotation	documentation A list of subfolders				

attributeGroup SubFolder.Template.AttGrp

used by	complexType	SubFolderType				
attributes	Name	Type	Use	Default	Fixed	annotation
	mandatory	xs:boolean	optional			
	constraint	derived by: xs:string	optional	None		documentation Possible values are: - None - CheckOne (at least one document shall be checked in the subfolder) - CheckAll (all the documents of the subfolder shall be checked) - Sign (one document of the subfolder shall be signed)
	documentActivatable	xs:boolean	optional			documentation Tells in the user can “activate” a specific document in this folder
	resetConstraint	resetCommandsType	optional	never		documentation Tells when to

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	reset the constraint. Possible values are : - Never - - OnLoadOnBoard : When loaded on board - - OnLoadOnGround : When loaded on ground - - OnNewDocument: When a new document is inserted in this folder - OnLoad : On any load documentation Tells when to reset the read status - Never - - OnLoadOnBoard : When loaded on board - - OnLoadOnGround : When loaded on ground - - OnNewDocument : When a new document is inserted in this folder - OnLoad : On any load
	<u>resetReadStatus</u> <u>resetCommandsType</u> optional never
annotation	documentation Attribute group for template attributes for a subfolder

attribute SubFolder.Template.AttGrp/@mandatory

type	xs:boolean

attribute SubFolder.Template.AttGrp/@constraint

type	restriction of xs:string
facets	enumeration None enumeration CheckOne enumeration CheckAll enumeration Sign
annotation	documentation Possible values are: - None - CheckOne (at least one document shall be checked in the subfolder) - CheckAll (all the documents of the subfolder shall be checked) - Sign (one document of the subfolder shall be signed)

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attribute SubFolder.Template.AttGrp/@documentActivatable

type	xs:boolean
annotation	documentation Tells in the user can “activate” a specific document in this folder

attribute SubFolder.Template.AttGrp/@resetConstraint

type	resetCommandsType
facets	enumeration never enumeration onLoadOnBoard enumeration onLoadOnGround enumeration onNewDocument enumeration onLoad
annotation	documentation Tells when to reset the constraint. Possible values are : - Never - OnLoadOnBoard : When loaded on board - OnLoadOnGround : When loaded on ground - OnNewDocument: When a new document is inserted in this folder - OnLoad : On any load

attribute SubFolder.Template.AttGrp/@resetReadStatus

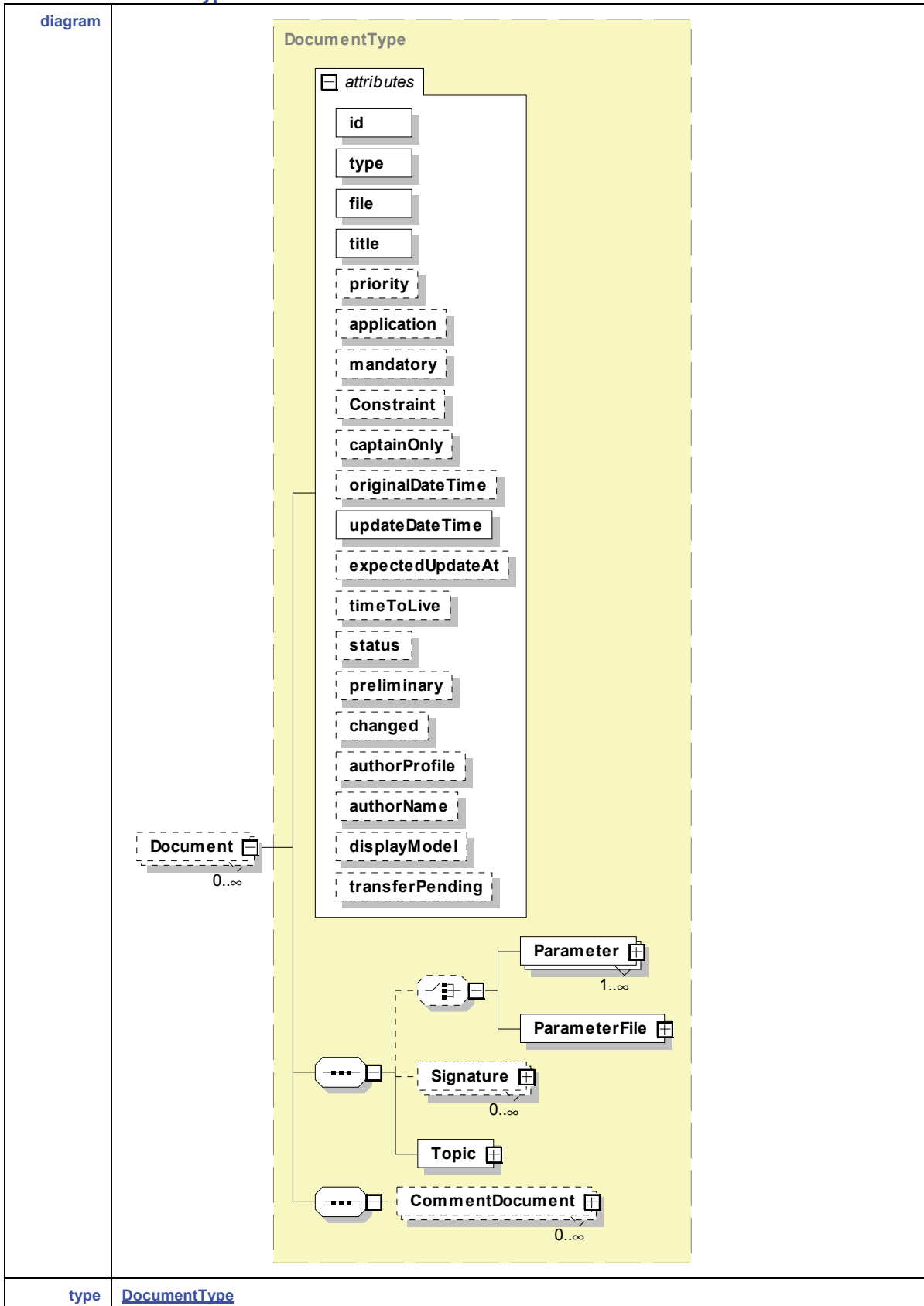
type	resetCommandsType
facets	enumeration never enumeration onLoadOnBoard enumeration onLoadOnGround enumeration onNewDocument enumeration onLoad
annotation	documentation Tells when to reset the read status - Never - OnLoadOnBoard : When loaded on board - OnLoadOnGround : When loaded on ground - OnNewDocument : When a new document is inserted in this folder - OnLoad : On any load

simpleType resetCommandsType

type	restriction of xs:string
used by	attributes SubFolder.Template.AttGrp/@resetConstraint SubFolder.Template.AttGrp/@resetReadStatus
facets	enumeration never enumeration onLoadOnBoard enumeration onLoadOnGround enumeration onNewDocument enumeration onLoad

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element SubFolderType/Document



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children	Parameter	ParameterFile	Signature	Topic	Comment	Document
attributes	<u>Name</u> <u>id</u>	Type xs:ID	Use required	Default	Fixed	annotation documentation For each individual and different document, the technical identifier shall be unique within the lifetime of all related eFF data packages (EFUSUB (FULL and UPDATE) and EFDREP). If one or more documents are identical (in content and filename) then the technical identifier (id) for each of those documents may also be identical.
	<u>type</u>	<u>DocumentMimeType</u>	required			documentation Type is the associated mime/type of the document. type shall be filled in uppercase
	<u>file</u>	xs:anyURI	required			documentation The document filename. The filename shall not include any path information
	<u>title</u>	xs:string	required			documentation The title must be unique within the associated topic.
	<u>priority</u>	xs:int	optional			documentation Number between 0 and 15 indicating the priority for data transfers or other treatments. The higher the number the more important the Document.
	<u>application</u>	xs:string	optional			documentation Describes what is the application originator for the data. (Associated with the parameters)
	<u>mandatory</u> <u>Constraint</u>	xs:boolean derived by: xs:string	optional optional	None		documentation Possible values are : - None - Check - Sign
	<u>captainOnly</u>	xs:boolean	optional			documentation Document is only visible by the captain of the Flight
	<u>originalDateTime</u>	xs:dateTime	optional			documentation Original date/time of the inserted document. DEPRECATED starting from A633Supp2
	<u>updateDateTime</u>	xs:dateTime	required			documentation is the timestamp when document is published
	<u>expectedUpdateAt</u>	xs:dateTime	optional			documentation TimeDate stamp at which it is expected that an update to the present document may be available
	<u>timeToLive</u>	xs:dateTime	optional			documentation TimeDate stamp from which on the document should no longer be presented as a valid document

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	<u>status</u>	derived by: xs:string	optional	None	documentation Status of the document: - None - Read - Checked - Signed
	<u>preliminary</u>	xs:boolean			
	<u>changed</u>	<u>ChangeValuesType</u>	optional	New	documentation Change code : - Unchanged - Revised - Deactivated - New
	<u>authorProfile</u>	derived by: xs:string	optional		documentation To specify the profile of the author (to be able to set message when a document is inserted depending on the profile of the user who inserted the document and the profile of the user who is consulting the document)
	<u>authorName</u>	xs:string			
	<u>displayModel</u>	xs:string	optional		documentation A reference to the associated display model
	<u>transferPending</u>	xs:boolean	optional		documentation This attribute notes that the document is not present in the .eFF package and should be downloaded at a later time.
annotation	documentation A list of documents				

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element DocumentType/CommentDocument

diagram	BaseDocumentType attributes id For each individual and different document, the technical identifier shall be unique within the lifetime of all related EFF data packages (EFUSUB (FULL and UPDATE) and EFDREP). If one or more documents are identical (in content and filename) then the technical identifier (id) for each of those documents may also be identical. type Type is the associated mime/type of the document. type shall be filled in uppercase file The document filename. The filename shall not include any path information CommentDocument 0..∞ Parameter 1..∞ Simple parameters in the form key values pair ParameterFile An associated parameter file Signature 0..∞ Signature information Topic Provide indication about operational subject covered by document.					
type	BaseDocumentType					
children	Parameter ParameterFile Signature Topic					
attributes	Name <u>id</u>	Type xs:ID	Use required	Default	Fixed	annotation documentation For each individual and different document, the technical identifier shall be unique within the lifetime of all related eFF data packages (EFUSUB (FULL and UPDATE) and EFDREP). If one or more documents are identical (in content and filename) then the technical identifier (id) for each of those documents may also be identical.

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<u>type</u>	<u>DocumentMimeType</u>	required	documentation Type is the associated mime/type of the document. type shall be filled in uppercase documentation
<u>file</u>	xs:anyURI	required	The document filename. The filename shall not include any path information

10.3 eFF File Creation

10.3.1 eFF Packaging

Figure 10.3.1-1 shows the principle of .eFF packaging.

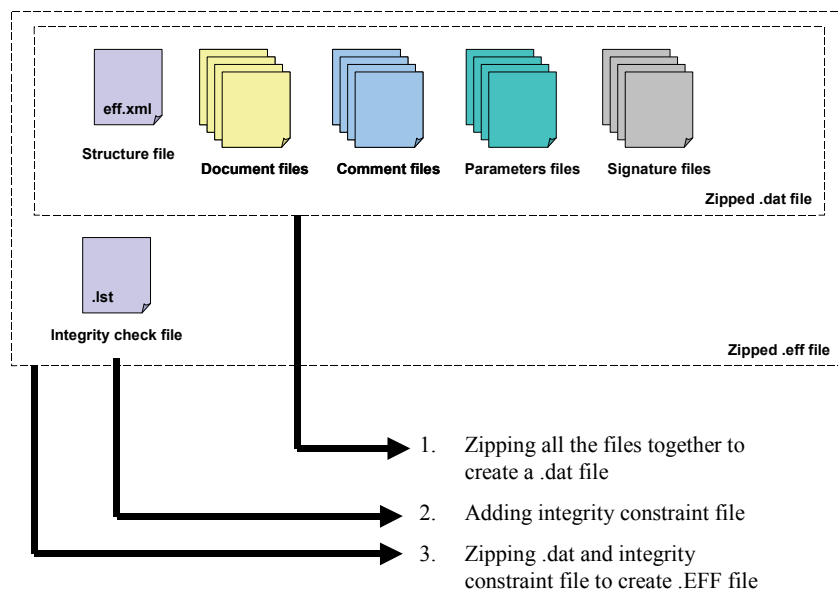


Figure 10.3.1-1 – eFF Package Format

COMMENTARY

All of these files are embedded in a single zipped file (file extension '.eff') for transportation convenience. This improves consistency by making sure files are not missing during the transportation process.

The eFF **data package** should be transported in the form of a unique file **using the extension “.eff”**. The same **convention applies to all cases regardless of how the file is transported (e.g., over IP connections or via physical media)**.

This file should be generated as follows:

- Creation of structure file: eff.xml file (compliant with eff.xsd' schema)
- All files referenced in eff.xml are gathered
- All these files are zipped together in one “*.dat” file **such that all files are at the root level (i.e., this is a “flat” structure and no subdirectories**

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or embedded paths are allowed). Only one *.dat file is allowed within an eFF data file

- One “*.lst” integrity .xml file is created (encompasses all files)
- A final “*.eff” file is created, by zipping together the “*.dat” file and the “*.lst” file. This final *.eff file is named as depicted in Section 10.3.2.

To facilitate cross-platform installations the following file naming convention shall be followed:

- **eFF data file:** All upper-case base file name and a lower-case extension (e.g., DAIHA_LH436_050822_DUS_ORD_U050822122634.eff)
- **All other files:** All lower-case for both the base file name and the extension (e.g., myfile1.txt). The lower-case filename should be for both the actual filename and the embedded filenames (within an .xml file).
- **All other files:** Any case for both the base file name and the extension (e.g., myFile1.txt). The chosen case of both the embedded filename (within an .xml file) and the associated actual filename must be identical strings (a binary equivalent).

Zip algorithm

The compression format and algorithm that should be used for eFF compression are specified in RFC 1950 (ZLIB Compressed Data Format Specification version 3.3), and RFC 1951 (DEFLATE Compressed Data Format Specification version 1.3).

COMMENTARY

At the time of this writing, the ZIP algorithm can be found through the following hyperlink:

<http://java.sun.com/j2se/1.4.2/docs/api/java/util/zip/package-summary.html>

10.3.2 Structure of eFF File Name

When the file is created as described above it has to get a name that makes the most important properties of the eFF visible without unpacking.

The eFF filename is defined in the following table:

Table 10.3.2-1 – eFF Filename Definition

Sub field name	Description	Format (see Table 4.1.2)	Example
aircraftRegistration	The registration number assigned by the local authority,	Specific format is defined by the local authority and contains a combination of alpha-numeric string and an optional hyphen.	“N12345”
Delimiter	One Underscore		“ ”
FlightIdentification	Either Flight Identifier or Flight number	(1-10)C	“DLH1234ABC”
Delimiter	One Underscore		“ ”
departureDate	Identifying flight date	YYMMDD	“050822”

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Sub field name	Description	Format (see Table 4.1.2)	Example
Delimiter	One Underscore		" "
DepartureAirport	Either Airport IATA Code or Airport ICAO Code	XXX or (exclusive) XXXX	"FRA"
Delimiter	One Underscore		" "
ArrivalAirport	Either Airport IATA Code or Airport ICAO Code	XXX or (exclusive) XXXX	"TLS"
Delimiter	One Underscore		" "
eFF update or Full eFF	'F' (for Full eFF) or 'U' for Update	'F' or 'U'	'F'
DateTimestamp	YYMMDDHHMMSS		050822173214
File Type	One period and the letters "eff"		".eff"

Examples:

```
DAIHA_LH436_050822_DUS_ORD_U050822122634.eff
N1234_UA575_050822_ORD_SEA_F050821122634.eff
F1234_CFG3214D_050401_XRY_PMI_U050402052658.eff
```

COMMENTARY

There is a possibility of inconsistency in the assignment of the Flight Date. When the current flight is the second leg of a multi-leg flight, some airlines use the scheduled date of the initial leg. While the use of the date of the current flight leg would be equally valid, it is essential that a consistent method be used within an airline.

10.3.3 Structure of the Integrity .xml File (*.lst file)

This file references all the files in the package and provides a non cryptographic MD5 hash code for each of them to ensure their integrity, providing protection against unintentional modification.

In the integrity file (*.lst file) all contents of the eff.dat file are listed and the MD5 hash generated with the according file is given. So every application can easily check if the data in the eFF is corrupted.

The integrity file is identified by its extension (.lst) and should follow the structure of the sample given below:

```
<?xml version="1.0" encoding="UTF-8"?>
<hashfilelist version="1.0" toolVersion="1.0">
  <checkcode>bzGFcO/mO5v8KFfZgEQ+lg==</checkcode>
  <hashedfile href="file1.xml">bro+2/iN72G15gj/1ZdvgA==</hashedfile>
  <hashedfile href="file2.doc">CbMgaSKuEKYwg5k74cG1IQ==</hashedfile>
  <hashedfile href="file3.txt">Ruxb8AIwEPc+XdtFCiwV4w==</hashedfile>
  <hashedfile href="file4.txt">VqzvypjT7DA2RBBRj2brHA==</hashedfile>
  <hashedfile href="file5.txt">ua0XS0ZpgE8wJcL+GbHXQw==</hashedfile>
  <hashedfile href="file6.txt">VqzvypjT7DA2RBBRj2brHA==</hashedfile>
  <hashedfile href="file7.doc">eFvP4D0RDo0XMxo4JnQIYQ==</hashedfile>
</hashfilelist>
```

Where:

'version' attribute of hashfilelist represents the version of the integrity computation function, i.e., version 1 supports only MD5 hash.

'toolversion' attribute of hashfilelist represents the version of the tool that generates the integrity computation

<checkcode> represents the MD5 digest of the .dat file (see Section 10.3.1), represented in base64.

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<hashedfile href="file.txt"> represents the MD5 digest of the file mentioned in href **represented in base64**.

10.3.4 Updating eFF

10.3.4.1 Introduction

An eFF data package is named with an identification key in order to allow recognition of the folder to be updated: aircraftRegistration, FlightIdentification, DepartureAirport, ArrivalAirport and departureDate. EFUSUB message can be tagged as 'Full' or 'Update'.

If a "Full" EFUSUB message is delivered to the receiving application with an identifier that is identical to a previous "Full" eFF data package, the new "Full" replaces completely the previous "Full" eFF data package. In order for the receiving application to process an update, the EFUSUB must be tagged as "Update".

If the management of an update in eFF data package may be handled in different ways by electronic flight bag, providing various functional levels to the crew, it is necessary to define a policy between ground systems and EFB. It shall allow identification of which part of the eFF data package is sent as an update by the ground.

An update of eFF data package shall be envisaged when receiving an EFUSUB message related to an eFF data package already known by an EFB.

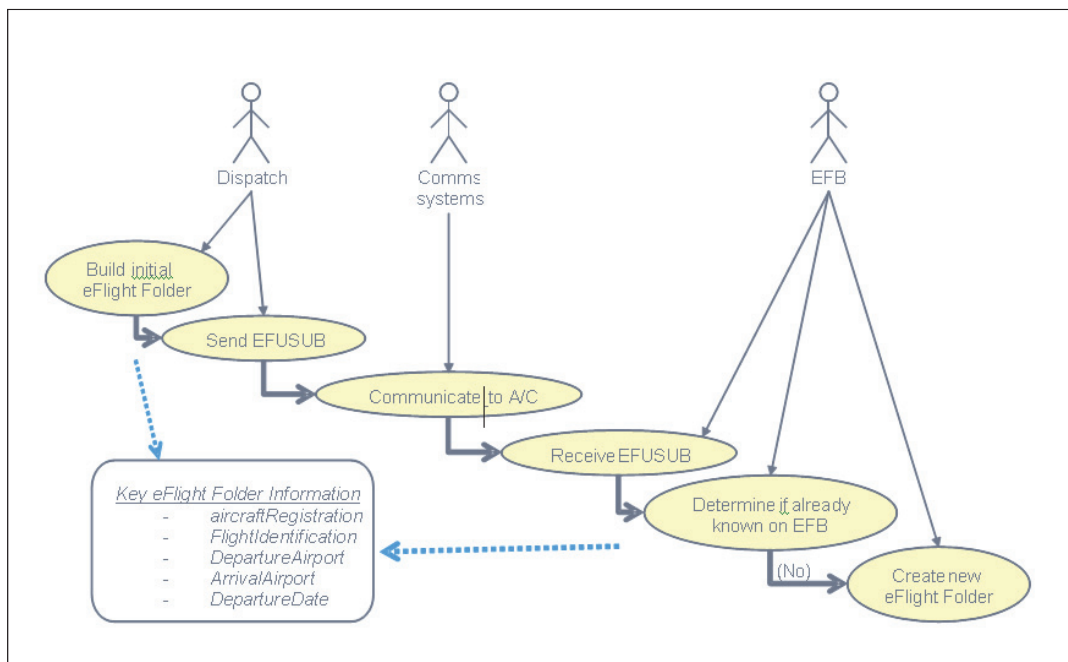


Figure 10.3.4-1 – Processing a FULL eFF Data Package from Dispatch to Aircraft

10.3.4.2 Updating an eFF Data Package

It can be recognized that an EFUSUB message is related to an already known eFF data package when EFUSUB shares the same identification key (aircraftRegistration, FlightIdentification, DepartureAirport, ArrivalAirport and departureDate) as that of an eFF data package already in the EFB.

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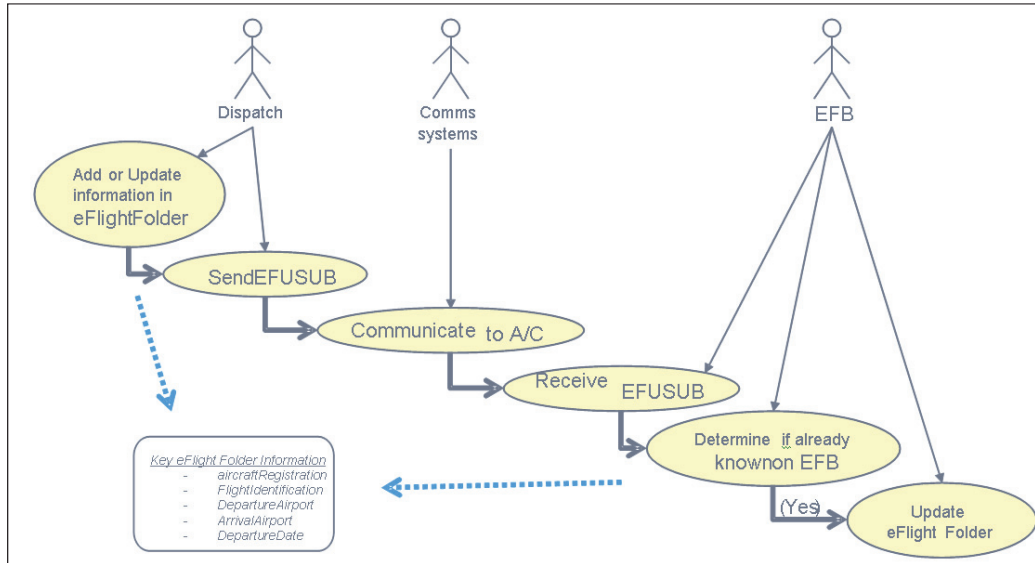


Figure 10.3.4.2-1 – Processing an UPDATE eFF Data Package from Dispatch to Aircraft

When considering the content of the EFUSUB message, three different cases of eFF data package update may occur:

- Receiving a document previously unknown in the receiving application
- Receiving a document known by receiving application as 'pending'
- Receiving a new release of a document

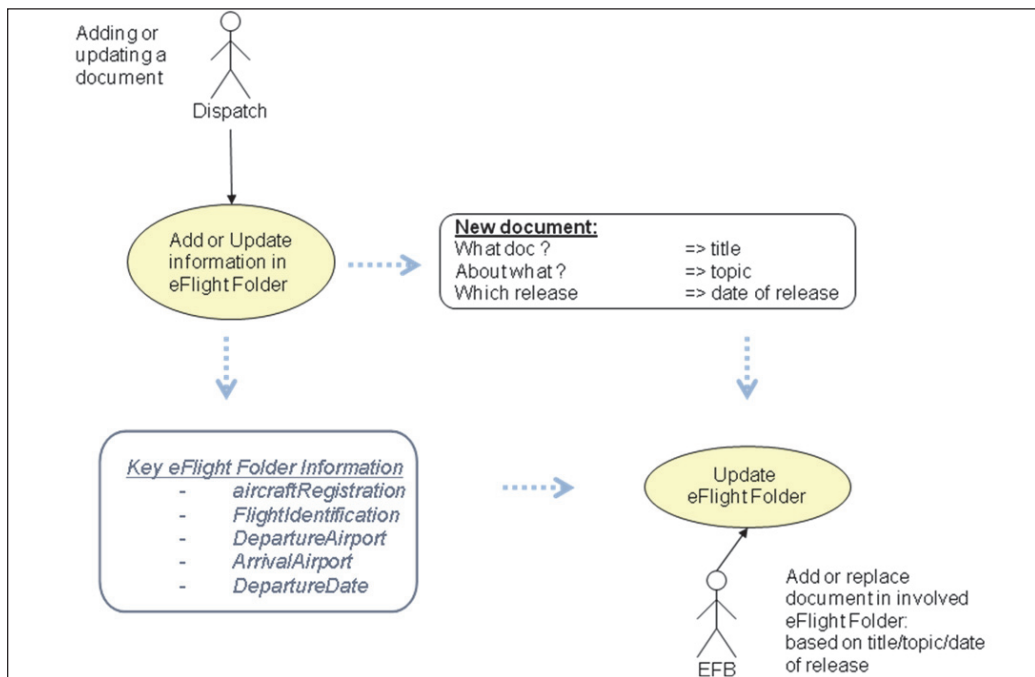


Figure 10.3.4.2-2 – Updating a Document in an eFF Data Package: Key Data

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10.3.4.2.1 Updating a Document in an eFF – General Case

Document recognition is based on two document properties:

- Document title
- Topic associated to the document

A third property – updateDateTime – allows determination of which of the documents is the most recent release.

The above three properties provide the identification key for documents. When the three properties are equal, then the considered document is the same. This means the associated file is the same and the document Id is the same.

Note: Another attribute “originalDateTime” exists. This attribute is deprecated in ARINC 633-2, and thus not used as an identification key.

With help of a document identification key, EFB may develop various functional approaches to handle document update, such as:

- When document was previously unknown, adding the document in the receiving application (i.e., eFlight Folder application) at location (folder, subfolder) indicated in the received EFUSUB message
- When document was known but was ‘pending’, by adding this document in the eFlight Folder application, at location of pending document
- When document was known and already present in the eFlight Folder application, the second release of the document may be added in eFF data package, near the previous document, or may replace the previous release, or may intelligently update information in the already known document, etc.

Two cases shall be considered:

- Simple document, provided as a .txt, .pdf, .html or image file.
 - In such case, considering document key provide all the necessary information for the update policy.
- Digital document, provided as an .xml file.
 - For digital documents, internal values provided by the .xml file may be involved in the update policy.

This is specific to each considered data and is defined in its section related to this ARINC 633 information.

10.3.4.2.2 Updating a Document in an eFF – Digital Flight Plan Case

eFlight Plan update relies on consideration of various Flight Plan attributes:

- identifier flightPlanId
- computedTime
- cancelId
- linkedFlightPlan

The set of data provided by those four attributes provides the key of the flight plan. It allows identification if the occurrence of the Flight Plan is the same as an already known one.

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10.3.4.2.3 Updating a Document in an eFF – Digital Briefing Case

In the context of a given eFF data package, some digital information is delivered as a briefing:

- NOTAM
 - NOTAM briefing provides any NOTAM information needed to conduct the flight.
- Airport weather
 - Airport weather briefing provides any weather information needed for airport involved in the flight.
 - Airport weather briefing provides digital TAF and METAR.
- Airport data
 - Airport briefing provides any needed information about each airport involved in the flight.
- Region weather
 - Region weather briefing provides enRoute weather information such as SIGMET, convective SIGMET, AIREP, and AIRMET.
- Hazard advisory
 - Hazard advisory briefing provides information about hazardous area such as volcanic ash or nuclear cloud.
- Pilot Report
 - Pilot Report briefing provides the set of Pilot Reports that is of interest for the flight.

The ground will provide a full briefing or an update of the briefing. This indication is provided by the “fullPackage” Boolean attribute of the briefing.

Another attribute of the briefing “creationTime” indicates when the briefing was generated. It helps to determine whether or not a received briefing replaces the briefing already known by the EFB.

Reception of a full briefing shall totally replace the corresponding EFB information, provided it was more recently generated than the information already known by the EFB.

Reception of an update just adds or replaces a subset of information from the information already known by the EFB.

Replacement of information is decided according to an information key. This key is specifically defined for each type of briefing

10.3.4.2.3.1 NOTAM Briefing Key Definition

NOTAM briefing provides in digital XML format any NOTAM that needs to be considered by the crew of a given flight.

The full briefing provides the whole collection of NOTAM to be considered.

Note: A full briefing can have a pending status for content that is not in the full briefing package, implying that this information would be forthcoming through an update briefing package. FULL does not imply it must contain everything.

Reception of a new full NOTAM briefing allows updating the whole, already on board, NOTAM briefing.

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This communication allows suppressing un-useful NOTAM(s), if any.

The update of briefing provides:

- Supplementary NOTAM
- When such NOTAM(s) is received, it may be added to the already on board NOTAM briefing
- Updated NOTAMs
- When such NOTAM(s) update is received, it shall replace the corresponding already on board NOTAM(s)

Key of a NOTAM is composed of the following information:

- /NOTAMBriefing/NOTAMs/NOTAM/@issuer
- /NOTAMBriefing/NOTAMs/NOTAM/@series
- /NOTAMBriefing/NOTAMs/NOTAM/@serial
- /NOTAMBriefing/NOTAMs/NOTAM/@year

10.3.4.2.3.2 Airport Weather Key

Airport weather briefing provides in digital XML format any weather bulletins that need to be considered by the crew of a given flight.

The full briefing provides the whole collection of bulletins to be considered.

Reception of a new full airport weather briefing allows updating the whole, already on board, airport weather briefing.

This communication allows suppressing un-useful bulletins(s), if any.

The update of briefing provides:

- Supplementary airport weather bulletins
- When such bulletin(s) is received, it may be added to the already on board airport weather briefing
- Updated bulletin(s)
- When such bulletin(s) update is received, it shall replace the corresponding already on board bulletins(s)

Key of a weather bulletin is composed of the following information:

For observation:

- /AirportWeather/WeatherBulletins/WeatherBulletin/Airport/AirportIC
AOCcode
- /AirportWeather/WeatherBulletins/WeatherBulletin/Airport/AirportAT
AOCcode
- /AirportWeather/WeatherBulletins/WeatherBulletin/Observation/
@observationTime
- /AirportWeather/WeatherBulletins/WeatherBulletin/Observation/
@observationType

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For forecast:

- /AirportWeather/WeatherBulletins/WeatherBulletin/Airport/AirportICAOCode
- /AirportWeather/WeatherBulletins/WeatherBulletin/Airport/AirportATACode
- /AirportWeather/WeatherBulletins/WeatherBulletin/Forecast/@forecastType
- /AirportWeather/WeatherBulletins/WeatherBulletin/Forecast/@forecastStartTime

10.3.4.2.3.3 Airport Data Key

Airport briefing provides in digital XML format any airport related data that needs to be considered by the crew of a given flight.

The full briefing provides the whole collection of information to be considered.

Reception of a new full airport data briefing allows updating the whole, already on board, airport data briefing.

This communication allows suppressing un-useful information, if any.

The update of briefing provides:

- Supplementary airport data
- When such data(s) is received, it may be added to the already on board airport briefing
- Updated airport data(s)
- When such data(s) update is received, it shall replace the corresponding already on board airport data(s)

Key of an airport data is composed by the following information:

- /AirportData/Airport/AirportIdentification/Airport/AirportICAOCode
- /AirportData/Airport/AirportIdentification/Airport/AirportIATACode

10.3.4.2.3.4 Region Weather Key

Region weather briefing provides in digital XML format any in flight weather bulletins (SIGMET, AIREP, and AIRMET) that the crew needs to consider for a given flight.

The full briefing provides the whole collection of bulletins to be considered.

Reception of a new full region weather briefing allows updating the whole, already on board, region weather briefing.

This communication allows suppressing un-useful bulletins(s), if any.

The update of briefing provides supplementary region weather bulletins. When such bulletin(s) is received, it may be added to the already on board briefing. Already know bulletins may be ignored.

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Key of a region weather bulletin is composed of the following information:

- /RegionWeather/@issuer
- /RegionWeather/@source
- /RegionWeather/@type
- /RegionWeather/@observationTime

10.3.4.2.3.5 Pilot Report Key

Pilot report briefing provides in digital XML format any pilot report that crew needs to consider for a given flight.

The full briefing provides the whole collection of reports to be considered.

Reception of a new full pilot report briefing allows updating the whole, already on board, briefing.

This communication allows suppressing un-useful bulletins(s), if any.

The update of briefing provides supplementary pilot reports. When such report(s) is received, it may be added to the already on board briefing. Already know reports may be ignored.

Key of a pilot report is composed of the following information:

- /PIREP/@issuer
- /PIREP/@source
- /PIREP/@observationTime

10.3.4.2.3.6 Hazard Advisory Key

Hazard advisory briefing provides in digital XML format any hazard advisory (volcanic ash, pollution, nuclear contamination) that the crew needs to consider for a given flight.

The full briefing provides the whole collection of advisories to be considered.

Reception of a new full Hazard advisory briefing allows updating the whole, already on board, region weather briefing.

This communication allows suppressing un-useful bulletins(s), if any.

The update of briefing provides supplementary hazard advisories. When such bulletin(s) is received, it may be added to the already on board briefing. Already know bulletins may be ignored.

Key of a hazard advisory bulletin is composed of the following information:

- /HazardAdvisory/@issuer
- /HazardAdvisory/@source
- /HazardAdvisory/@advisoryNumber
- /HazardAdvisory/@observationTime

10.3.4.2.3.7 ATIS Key

ATIS information may be provided by several documents.

This particularity is due to the fact that ATIS may be provided by several separated sources. They may be collected at different times of the flight: when preparing the departure or when preparing landing.

The whole set of documents allows consolidating the ATIS briefing.

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ATIS for a given airport may be received several times: initial reception then one or several updates.

Reception of an ATIS document can result in:

- Creation of new ATIS information, if it was not already known by the EFB for the present eFF data package.
- Update of an already known ATIS information.

Key of ATIS information is composed of the following information:

- /ATIS/ATISBulletins/ATISBulletin/@departureType
- /ATIS/ATISBulletins/ATISBulletin/@informationIndicator
- /ATIS/ATISBulletins/ATISBulletin/Airport/AirportCAOCCode
- /ATIS/ATISBulletins/ATISBulletin/Airport/AirportATACode
- /ATIS/ATISBulletins/ATISBulletin/ATISDetails/@observationTime

10.3.4.2.4 Updating a Document in an eFF Data Package, Case of Other Digital Information

Other eFF data package information may also be updated.

In such a case, the policy is simple: new information replaces the already known one.

This update may rely on topic + title + updateDateTime, as for textual or image documents, or, may rely on recognition of their XML root element.

10.3.4.2.4.1 Updating Digital UpperAirData

Only one upper air data set has to be considered for a given @flightPlanId.

Different upper air data sets are allowed only for different @flightPlanId. When receiving a new .xml file providing upper air data for the same @flightPlanId, the older upper air data set has to be replaced.

Should several upper air data .xml files be provided in the frame of an eFF data package, for instance in association with several flight plans, each of them shall be equipped with a specific title and topic.

10.3.4.2.4.2 Updating Digital AirspaceData

ARINC 633 AirSpaceData file is defined to provide the whole list of air space information related to the flight.

When receiving a new .xml file providing AirSpaceData, the old AirSpace Data to be replaced, if any, is the one present in the eFF data package.

10.3.4.2.4.3 Updating Digital CrewList

Only one crew list has to be considered for a given flight.

When receiving a new .xml file providing Crew list, the old Crew list to be replaced, if any, is the one present in the eFF data package.

10.3.4.2.4.4 Updating Digital PaxList

Only one pax list has to be considered for a given flight.

When receiving a new .xml file providing Pax list, the old Pax list to be replaced, if any, is the one present in the eFF data package.

10.3.4.2.4.5 Updating Digital ATSICAOFlightPlan

Only one ATS flight plan is filed for a given flight.

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When receiving a new .xml file providing ATS ICAO Flight Plan, the old ATS Flight Plan to be replaced, if any, is the one present in the eFF data package.

10.4 eFF Communication Services

This eFF data package can be transmitted between airborne eFF application and ground application using the communication services defined in this section.

Three communication services are defined:

- EFU
 - eFF Uplink (EFU) service enables an eFF data package to be sent by a ground tool to an EFB
 - eFF can be sent asynchronously or upon request (answer to EFR service)
- EFD
 - eFF Downlink (EFD) service enables the eFF data package to be downlinked to the ground or to another EFB
 - eFF is sent asynchronously
- eFF
 - eFF request service enables the eFF airborne updates of an eFF data package
 - This service is synchronous (requires real time interaction between airborne and ground eFF applications)

COMMENTARY

Asynchronous means here that there is no guarantee that the receiving application is active and has received the data. However, the sending application may receive indication that the message was properly received by the ground communication system.

There exists a possibility that an UPDATE may arrive prior to reception of a FULL data package. This possibility will need to be considered in the design.

The use of 'EFUSUB' as root element denotes that this eFF data package was generated by a ground tool for use by an EFB, while the use of 'EFDREP' root element denotes that the eFF data package is generated by an EFB.

These services are fulfilled by the exchange of messages (see Table 10.4-1):

Table 10.4-1 – Service Elements

Element Name	Gatelink Label	Service Version	DL/UL	Purpose
EFUSUB	N/A	1	UL	eFF Uplink- SUBmit : Ground tool submits a FULL or UPDATE eFF data package to an EFB
EFDREP	N/A	1	DL	eFF Downlink REPort: An EFB exports/sends eFF data package to the ground or other EFB
EFFREQ	N/A	1	DL	eFF uplink- REQuest Requests a FULL or UPDATE (with specific criteria (e.g., some topics only)) eFF data package to be uplinked.

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10.4.1 eFF Uplink Service (EFU)

This service is used to uplink an eFF data package to an EFB application (i.e., airborne eFF application or to a Class 1 or 2 EFB application on ground). The eFF can either be a FULL eFF or an UPDATE. The EFU service only transmits an EFUSUB message from the ground to the EFB.

EFUSUB message should contain the eFF data package to be sent to the aircraft.

EFUSUB can either be sent asynchronously, or following a specific request (EFFREQ).

Asynchronous transmission of EFUSUB message should be supported, while the support of synchronous EFUSUB message transmission following an EFRREQ reception is optional.

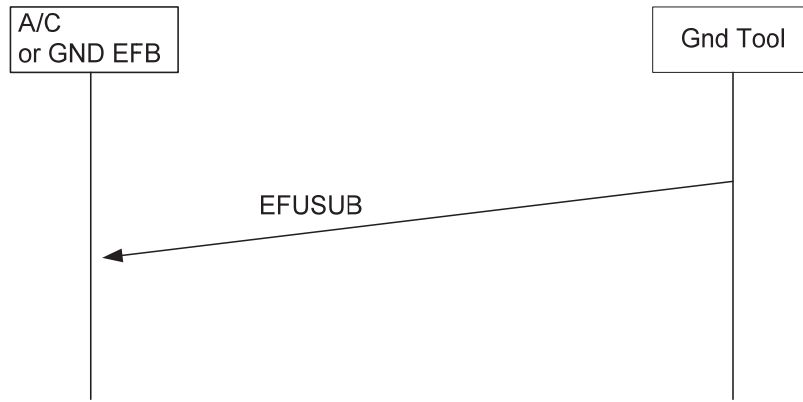


Figure 10.4.1-1 – Typical EFUSUB Exchange

COMMENTARY

While eFF application level communications only consist in simple transmission of EFUSUB message, lower communication layers are in charge of ensuring reliable transmission of this message – these lower communication layers will thus involve bidirectional communications (initiated by the aircraft for security reasons).

10.4.1.1 EFUSUB Message

Message: EFUSUB (version 1).

This message should be only sent as an .eff file in the appropriate format for the transport over physical media or IP communication links.

10.4.1.2 Dynamic Aspects

For asynchronous transmission, EFUSUB message should be transmitted either through physical media (see Section 2.3) or using IP air-ground communication links (see Section 2.2).

Synchronous transmission of EFUSUB message (following reception of EFRREQ message) should be performed only through IP air-ground communication links (see Section 2.2).

Several eFF files can be transported simultaneously over the same media (especially when a physical media is used). When the transport system will have sent the '.eff' files to the application, the eFF application should sort out the

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various files according to the flight segment to which they apply, the generation time stamp, and the 'fullPackage' attribute of the root element.

Upon reception of an EFUSUB message, the eFF airborne application should determine to which flight segment the eFF data package is associated, by using the M633SupplementaryHeader element received in eff.xml file.

Reception of a single eFF data package (one EFUSUB reception):

If a single eFF data package is received, the eFF airborne application should compose the eFF data package as follows:

- If the received eFF package is FULL ('fullPackage' attribute of the root element is set), then this new eFF data package should replace the preceding one for same flight segment, if the timestamp is more recent than the last received eFF data package. The eFF application should keep track of the modifications done on the preceding eFF data package (the way to retain the history of modifications is implementation dependent).
- If the received eFF is an UPDATE ('fullPackage' attribute of the root element is NOT set), then this new eFF data package should be added to the current one without impacting the documents and folders not updated in the received data package. The eFF application should keep track of the modifications done on the preceding eFF data package (the way to retain the history of modifications is implementation dependent).

Reception of multiple eFF data packages (several EFUSUB receptions):

For same flight segment ('flight' attribute of M633 header with same values), if several eFF files are received simultaneously, the eFF airborne application should compose the eFF data package as follows:

- Find the most recent FULL eFF data package received ('fullPackage' attribute of the root element is set)
- Ignore all data packages generated before the last FULL eFF data package
- Then add the more recent eFF data packages if they are 'UPDATE' data packages as defined in the single data package reception processing.

Example of multiple eFF files received (multiple EFUSUB messages received):

```
N1234UA_UA575_050822_ORD_SEA_F050821222634.eff
N1234UA_UA575_050822_ORD_SEA_U050821235712.eff
N1234UA_UA575_050822_ORD_SEA_U050822021246.eff
N1234UA_UA575_050822_ORD_SEA_U050822022355.eff
```

The eFF with the earliest time stamp must be the FULL eFF ('F' character in the filename and 'fullPackage' attribute set). The following eFFs are updates. By reading the eFFs in the order of their timestamps, an eFF can be composed that has exactly the same status and contents as if all the updates happened via an IP network.

Non nominal cases

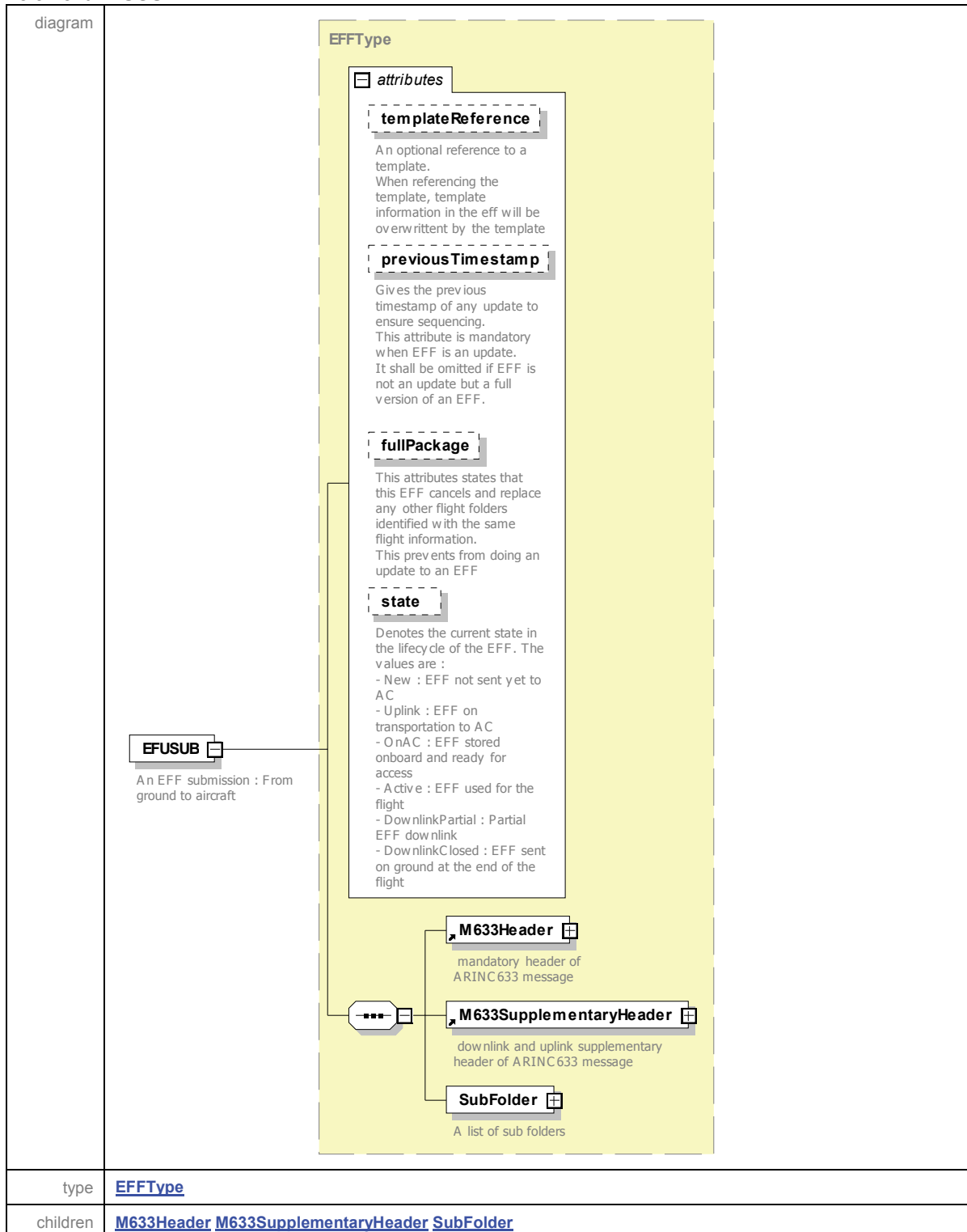
Reception of invalid or out of sequence message:

- If the airborne application receives an erroneous message, for example EFDREP instead of EFUSUB, the application should send a GERIND (general error message) to the ground system if supported by the application.

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10.4.1.3 XML Format

The .eff file for EFUSUB message should contain an eff.xml file using the EFUSUB element as root element.

element **EFUSUB**

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attributes	Name	Type	Use	Default	Fixed	annotation
	templateReference	derived by: xs:string	optional			documentation An optional reference to a template. When referencing the template, template information in the eFF will be overwritten by the template
	previousTimestamp	xs:dateTime	optional			documentation Gives the previous timestamp of any update to ensure sequencing. This attribute is mandatory when eFF is an update. It shall be omitted if eFF is not an update but a full version of an eFF.
	fullPackage	xs:boolean	optional	false		documentation This attributes states that this eFF cancels and replace any other flight folders identified with the same flight information. This prevents from doing an update to an eFF
	state	derived by: xs:string	optional			documentation Denotes the current state in the lifecycle of the eFF. The values are : - New : eFF not sent yet to AC - Uplink : eFF on transportation to AC - OnAC : eFF stored onboard and ready for access - Active : eFF used for the flight - DownlinkPartial : Partial eFF downlink - DownlinkClosed : eFF sent on ground at the end of the flight
annotation	documentation An eFF submission : From ground to aircraft					

10.4.1.3.1 Transportation Over IP

This service should use the IP communication services defined in Section 2.2.

10.4.1.3.2 Transportation via Physical Media

Uplink via physical media is nothing more than copying the eFF on a physical media, carrying the media to the EFB and then copying the eFF from the physical media to the EFB. The service should use the physical media transportation rules defined in Section 2.3.

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10.4.2 eFF Downlink Service (EFD)

This service is used to downlink an eFF data package to the ground system or to another EFB (export-import function). The eFF can either be a FULL eFF, or an UPDATE. EFD service only consists in transmission from the aircraft to the ground of EFDREP message.

EFDREP message should contain the eFF data package to be sent to the ground.

EFDREP should always be sent asynchronously.

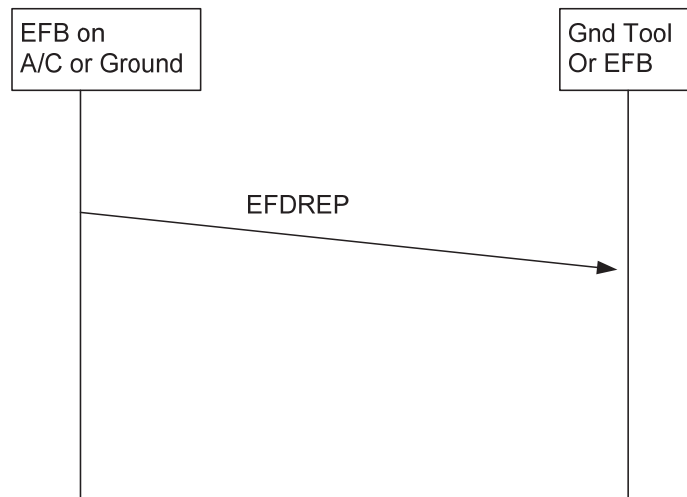


Figure 10.4.2-1 – Typical EFDREP Exchange

COMMENTARY

While eFF application level communications only consist in simple transmission of EFDREP message, lower communication layers are in charge of ensuring reliable transmission of this message – these lower communication layers will thus involve directional communications (initiated by the aircraft for security reasons).

10.4.2.1 EFDREP Message

Message: EFDREP (version 1).

This message should be only sent as an .eff file (packaged as per Section 10.3) in the appropriate format for the transport over physical media or IP communication links.

10.4.2.2 Dynamic Aspects

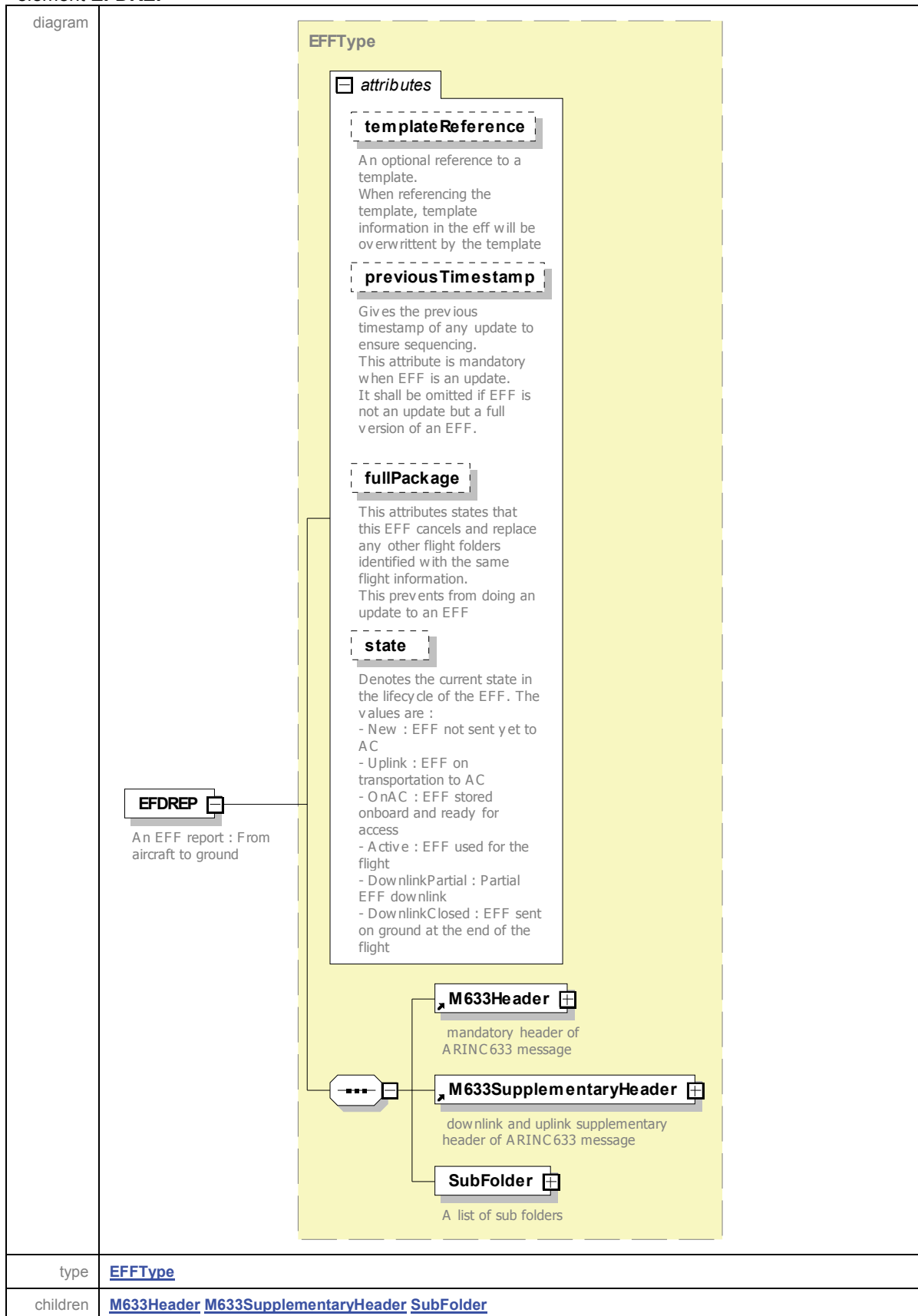
EFDREP message should be transmitted asynchronously (i.e., without setting up a transaction with the ground application), either through physical media (see Section 2.3) or using IP air-ground communication links (see Section 2.2).

10.4.2.3 XML Format

The .eff file for EFDREP message should contain an eff.xml file using the EFDREP element as root element. This enables unambiguous determination that it is a downlink eFF. 'versionNumber' attribute of M633Header element should be set to two (see Section 4.4.4.1).

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element **EFDREP**



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attributes	Name	Type	Use	Default	Fixed	annotation
	templateReference	derived by: xs:string	optional			documentation An optional reference to a template. When referencing the template, template information in the eFF will be overwritten by the template
	previousTimestamp	xs:dateTime	optional			documentation Gives the previous timestamp of any update to ensure sequencing. This attribute is mandatory when eFF is an update. It shall be omitted if eFF is not an update but a full version of an eFF.
	fullPackage	xs:boolean	optional	false		documentation This attributes states that this eFF cancels and replace any other flight folders identified with the same flight information. This prevents from doing an update to an eFF
	state	derived by: xs:string	optional			documentation Denotes the current state in the lifecycle of the eFF. The values are : - New : eFF not sent yet to AC - Uplink : eFF on transportation to AC - OnAC : eFF stored onboard and ready for access - Active : eFF used for the flight - DownlinkPartial : Partial eFF downlink - DownlinkClosed : eFF sent on ground at the end of the flight
annotation	documentation An eFF report : From aircraft to ground					

10.4.2.3.1 Transportation over IP

This service should use the IP communication services defined in Section 2.2.

10.4.2.3.2 Transportation via Physical Media

Uplink via physical media is nothing more than copying the eFF on a physical media, carrying the media to the EFB and then copying the eFF from the physical media to the EFB. The service should use the physical media transportation rules defined in Section 2.3.

10.4.3 eFF Request Service

Currency is essential since documents in an eFF may age rapidly. The document properties “ExpectedUpdateAt” and “TimeToLive” should be used to notify the pilot when a document is outdated. In various cases the pilot might be willing to update the contents of the eFF without such a notification (e.g., WX).

Thus there has to be a possibility to get updates for an eFF that was fetched earlier. This update has to be transferred over potentially slow or expensive connections which demand the update of only parts of the eFF or of a single document.

This service (eFF request service) enables the eFF airborne application to request an eFF data package update. The answer to this request should be an eFF data package tagged ‘UPDATE’ (i.e., not a FULL eFF), or a FULL eFF package (i.e., tagged ‘FULL’).

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The eFF request service should thus allow to request:

- **Full eFF** data package containing all available documents (even those that did not change since generation of last eFF data package on the aircraft). Some documents may be marked as pending.
- **Update of ALL modified/new documents:** An eFF data package (identified by its flight segment and timestamp), containing all new or modified documents since the generation of the eFF data package referenced in the request. The answer to this request should be a 'UPDATE' eFF data package containing only the documents required in the request.
- **Selective updates:** updates of documents of a given list of topic, or update of an explicit list of documents of a given eFF data package (identified by its flight segment and timestamp). The answer to this request should be a 'UPDATE' eFF data package containing only the documents required in the request.

The key to partial updates of an eFF is the XML-Structure file – this information is common to the ground system and the EFB – as the ground system delivers this information to the EFB.

Parts of the eFF are referenced using the topic identifier. If a topic identifier is given in an update request, all documents marked with this topic identifier are checked if they are outdated.

If a document ID is only given, the referenced document is delivered in the update. Other criteria, such as 'mandatory' attribute of a subfolder, can be used.

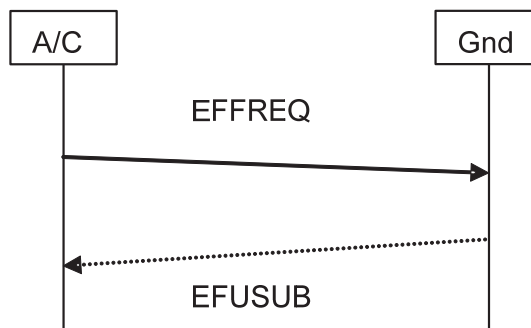


Figure 10.4.3-1 – Typical EFFREQ Exchange

10.4.3.1 EFFREQ Message

Message: EFFREQ (version 1).

This message should only be sent as an .xml file (i.e., NOT packaged as per Section 10.3) for the transport over IP communication links.

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10.4.3.2 Dynamic Aspects

The answer to an update request should always be an eFF with complete information in the eff.xml structure file (EFUSUB message of EFU service). The eff.xml in this package has the 'changed' flag set properly for all files. If no full eFF is requested, documents are included only when their 'change' status is "new" or "revised".

The aircraft can specify in the request a priority level associated to the requested documents/topics for requested eFF. Three levels are defined and, when specified, the ground should use the priority attribute as a hint to package eFF data and answer the request (trying to send first higher priority data).

A 'document' (file tagged as 'document' in the eFF structure by using the 'document' element in the eff.xml file) can be associated with various files (if necessary), in which case these are mentioned in the eFF ('struct.eff' file):

- The document content itself
- The associated parameters (if any)
- The associated signature (if any)
- The associated comments (if any)

With this package the EFB does not only receive a new document or new documents of the requested topic, it receives complete information about the status of all documents in the eFF.

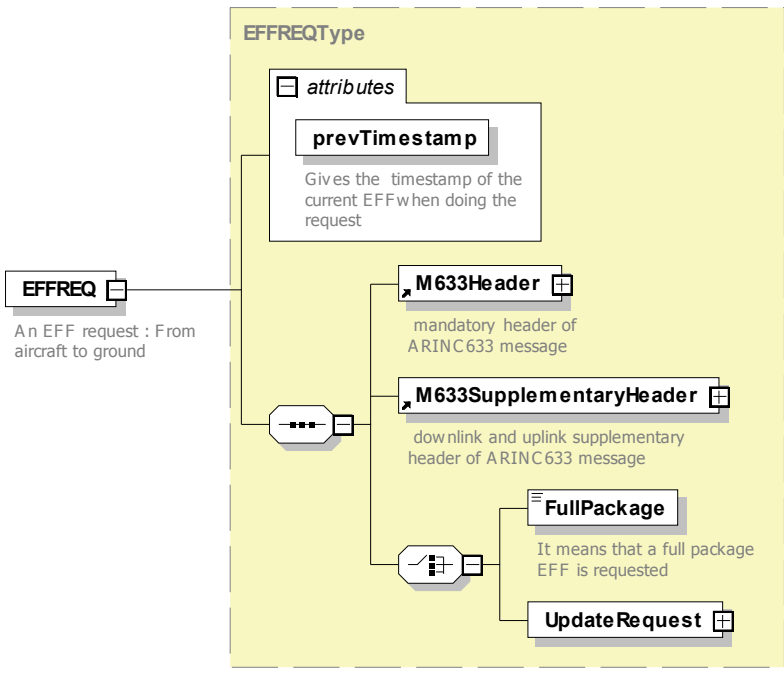
The server which delivers the updates has to track which file was sent to whom, to be able to compose the appropriate updates.

10.4.3.3 XML Format

The EFFREQ message should be embedded in an .xml file, with EFFREQ as root element only.

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element **EFFREQ**

diagram						
type	EFFREQType					
children	M633Header M633SupplementaryHeader FullPackage UpdateRequest					
attributes	Name prevTimestamp	Type xs:dateTime	Use required	Default	Fixed	annotation documentation Gives the timestamp of the current eFF when doing the request
annotation	documentation An eFF request : From aircraft to ground					

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complexType EFFREQType

diagram						
children	M633Header M633SupplementaryHeader FullPackage UpdateRequest					
used by	element EFFREQ					
attributes	Name prevTimestamp	Type xs:dateTime	Use required	Default	Fixed	annotation documentation Gives the timestamp of the current eFF when doing the request

attribute EFFREQType/@prevTimestamp

type	xs:dateTime
annotation	documentation Gives the timestamp of the current eFF when doing the request

element EFFREQType/FullPackage

diagram	
type	xs:boolean
annotation	documentation It means that a full package eFF is requested

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element EFFREQType/UpdateRequest

diagram						
children	Document Topic					
attributes	Name	Type	Use	Default	Fixed	annotation
	pendingDocument	xs:boolean	optional			documentation If true, the request is for all the pending documents
	mandatoryDocument	xs:boolean	optional			documentation If true, the request is for all the mandatory documents including those already in the current eFF

attribute EFFREQType/UpdateRequest/@pendingDocument

type	xs:boolean
annotation	documentation If true, the request is for all the pending documents

attribute EFFREQType/UpdateRequest/@mandatoryDocument

type	xs:boolean
annotation	documentation If true, the request is for all the mandatory documents including those already in the current eFF

element EFFREQType/UpdateRequest/Document

diagram						
children						
attributes	Name	Type	Use	Default	Fixed	annotation
	id	xs:string	required			
	transportPriority	xs:string	optional			documentation With the following values : - Low - Medium - High It is used by the ground system to send the documents by this priority

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attributes	Name <u>id</u> Type xs:ID Use required Default Fixed annotation For each individual and different document, the technical identifier ("id"), shall be unique within the lifetime of all related eFF data packages (EFUSUB (FULL and UPDATE) & EFDREP)". If one or more documents are identical (in content and filename) then the technical identifier ("id") for each of those documents may also be identical. documentation With the following values : - Low - Medium - High It is used by the ground system to send the documents by this priority
	<u>transportPriority</u> <u>PriorityType</u> optional

attribute [EFFREQType/UpdateRequest/Document/@id](#)

type	xs:ID
annotation	documentation For each individual and different document, the technical identifier ("id"), shall be unique within the lifetime of all related eFF data packages (EFUSUB (FULL and UPDATE) & EFDREP)". If one or more documents are identical (in content and filename) then the technical identifier ("id") for each of those documents may also be identical.

attribute [EFFREQType/UpdateRequest/Document/@transportPriority](#)

type	PriorityType
facets	enumeration Low enumeration Medium enumeration High
annotation	documentation With the following values : - Low - Medium - High It is used by the ground system to send the documents by this priority

simpleType [PriorityType](#)

type	restriction of xs:string
used by	attributes EFFREQType/UpdateRequest/Document/@transportPriority EFFREQType/UpdateRequest/Topic/@transportPriority
facets	enumeration Low enumeration Medium enumeration High

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element EFFREQType/UpdateRequest/Topic

diagram	The diagram illustrates the relationship between Topic and TopicType (extension). Topic is a base class with an attribute name (Topic name identifier). TopicType (extension) extends Topic and has two attributes: name (Topic name identifier) and transportPriority. The transportPriority attribute has the following values: Low, Medium, and High. It is used by the ground system to send the documents by this priority.
type	extension of TopicType

10.4.3.3.1 Request Associations

A request has several associations (see XML schema for more details).
All criteria are 'AND associated', i.e., if 'mandatory' is set, and topic(s) are requested, then the answer is: all mandatory documents PLUS all documents (mandatory or not) of the requested topics.

10.4.3.3.2 Transportation over IP

The service should use the IP communication services defined in Section 2.2.

10.4.3.3.3 Transportation via Physical Media

Not recommended – can be used if needed – however, the EFUSUB message (eFF sent from ground) could be conveyed by physical media. The airborne system should handle these situations.

11.0 DE-ICING

11.0 DE-ICING

Table 11.0-1 – De-Icing Information Table

Application Name	De-Icing
ACARS Label	DI (SMI = JDI)
Introduced	2005
Purpose	De-icing messages should be standardized to enable de-icing providers in directly providing the flight crew with digital information on the de-icing process. Voice frequency congestion in busy de-icing periods and therefore departure delays can be reduced.
Stake Holder	airlines, de-icing providers, airport operators
Airborne System	AOC
Ground Systems	De-icing provider dispatch system, airline or airport host, airline, airport and ATC departure management system
Network	ACARS
Downlink Routing	Label, Airport, Airline

Table 11.0-2 – De-Icing Service Table

Service Name	Service ID	Description
De-Icing Order	DOR	De-Icing Order: The de-icing provider needs to know, that a customer wants him to serve a particular flight. The flight crew needs information on the estimated times and/or the sequence of the de-icing process.
De-Icing Receipt	DRC	De-Icing Receipt: The de-icing provider should inform the flight crew (and other entities), which fluids have been used for de-icing and anti-icing the aircraft and when the de-icing/anti-icing processes were conducted. With this information the pilot can calculate the hold-over time.
De-Icing Report	DPR	De-Icing Process Report: A de-icing application service enabling the flight crew in sending a de-icing process monitoring report and documenting the anti-icing code.

Table 11.0-3 – De-Icing Element Table

Element Name	ACARS Label	Service Version	DL/UL	Purpose
DORSUB	DI	1	DL	De-icing order-submit: Submits information to a de-icing providers dispatch system. Requests or cancels the de-icing of an aircraft.
DORACK	DI	1	UL	De-icing order-acknowledge: Confirms the reception of a de-icing request-submit downlink
DORIND	DI	1	UL	De-icing-order-indication: Gives details on the de-icing order, e.g., estimated begin times
DRCSUB	DI	1	UL	De-icing-receipt-submit: Informs on the de-icing/anti-icing fluids and times.
DRCACK	DI	1	DL	De-icing-receipt-acknowledge: Confirms the reception of a de-icing-receipt-submit uplink
DPRREP	DI	1	DL	De-icing report: Flight crew confirmation of anti-icing code and de-icing/anti-icing times.

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11.1 De-Icing Order Service

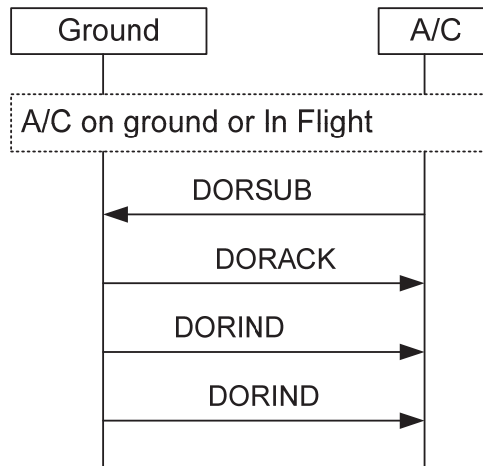


Figure 11.1-1 – Typical De-Icing Order exchange

With the use of the de-icing order submit element, the de-icing provider will be informed on the need for de-icing/anti-icing an aircraft. It can be sent in all flight phases.

It can also be used to cancel the de-icing/anti-icing previously ordered.

The de-icing-order-indication element is used by the de-icing provider to inform the flight crew about time and place of the de-icing/anti-icing event.

Following subsections define version 1 of DOR service.

11.1.1 De-icing-ORder-SUBmit Downlink (DORSUB)

Element Name: **DORSUB**

DORSUB message should convey a request for de-icing or anti-icing, together with the appropriate data.

11.1.2 De-icing-ORder-ACKnowledge Uplink (DORACK)

Element Name: **DORACK**

The de-icing order acknowledgement downlink should only contain the ARINC 633 application header and trailer, no application data itself.

DORACK message is optional (see Section 11.1.3 for details).

11.1.3 De-icing-ORder-INDication Uplink (DORIND)

Element Name: **DORIND**

The de-icing-order-indication element should be used by the de-icing provider to inform the flight crew about time and place of the de-icing/anti-icing event.

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11.1.4 DOR ACARS Format

The ACARS format may be used for air-ground and ground-ground messages.

When using the ACARS format, the supplementary header should be used.

ACARS Label used is “DI”

Free Text is allowed.

Table 11.1.4-1 – DORSUB01 ACARS Definition

Parameter Name	Meaning	Field Length (in Char)	Contents		Option	Range	Resolution	Unit	Example
			Fixed Text	Parameter Type					
OrderFlag	0 = No De-Icing/Anti-icing required, 1 = De-Icing/Anti-Icing required	1		Boolean	No				1
AcknowledgeFlag	0 = No acknowledge wanted 1 = Acknowledge requested	1		Boolean	No				1
Parameter separator		1	comma		No				,
ServiceAirport	ICAO code of airport, where de-icing/anti-icing shall take place or has to be cancelled	4		Airport	Yes				KJFK
Parameter separator		1	comma		No				,
De-IcingProviderID	A three digit code unique to an de-icing provider	3		provider-id	Yes				ABC
Parameter separator		1	comma		No				,
ServiceFlight	IATA flight number of flight to be de-iced/anti-iced if different from current flight	5-8		flight-no	YES				AF123A

Table 11.1.4-2 – DORIND01 ACARS Definition

Parameter Name	Meaning	Field Length (in Char)	Contents		Option	Range	Resolution	Unit	Example
			Fixed Text	Parameter Type					
De-IcingPlaceType	P = Position, R = Remote Position (Pad)	1		A	YES	'P', 'R'	N/A		P
Parameter separator		1	comma		No				,
De-IcingPlace	Apron position identifier or Pad name	1-4		String	YES				V153, PAD3, D3
Parameter separator		1	comma		No				,
EstDe-IcingBeginTime	De-Icing/Anti-Icing begin time as calculated by the de-icing provider	4		timeMin	YES				0058
Parameter separator		1	comma		No				,
EstDe-IcingEndTime	De-Icing/Anti-Icing end time as calculated by the de-icing provider	4		timeMin	YES				0113
Parameter separator		1	comma		No				,
De-IcingSequenceNbr		2		Integer	YES	1 to 99			12
Parameter separator		1	comma		No				,
De-IcingOpsIndicator	N = normal operation, A = adverse weather operation	1		A	NO	'N', 'A'	N/A		N

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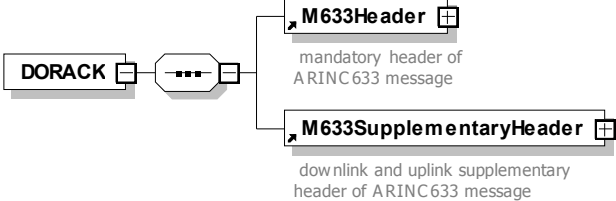
COMMENTARY

At some airports, de-icing providers distinguish between “normal” de-icing operation and “adverse weather” de-icing operation. In the second case, de-icing/anti-icing must be conducted near the takeoff runway threshold because of very short hold-over time. For instance, after announcing “adverse weather” de-icing operation, all previously sent information on times and positions becomes invalid and only remote position de-icing/anti-icing will be performed. Instead of providing estimated begin and end times, the de-icing provider publishes the de-icing sequence number with the de-icing position, only.

11.1.5 DOR XML Schema

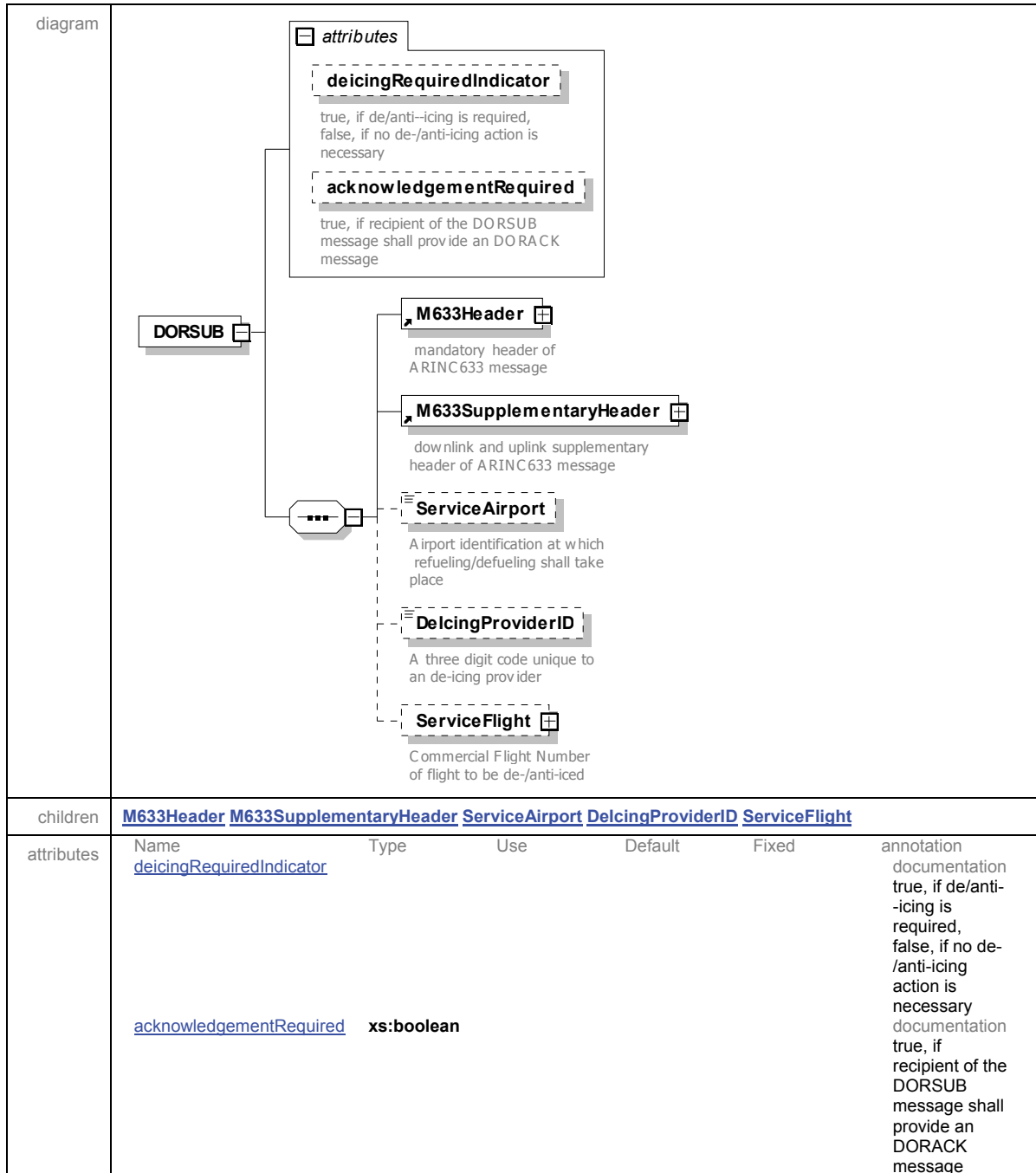
The IP/XML format may be used for air-ground and ground-ground messages.
When using the IP/XML format, the supplementary header should be used.

element **DORACK**

diagram		
properties	content nillable	complex false
children	M633Header M633SupplementaryHeader	

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element DORSUB



attribute DORSUB/@deicingRequiredIndicator

annotation	documentation true, if de-/anti-icing is required, false, if no de-/anti-icing action is necessary

attribute DORSUB/@acknowledgementRequired

type	xs:boolean
annotation	documentation true, if recipient of the DORSUB message shall provide an DORACK message

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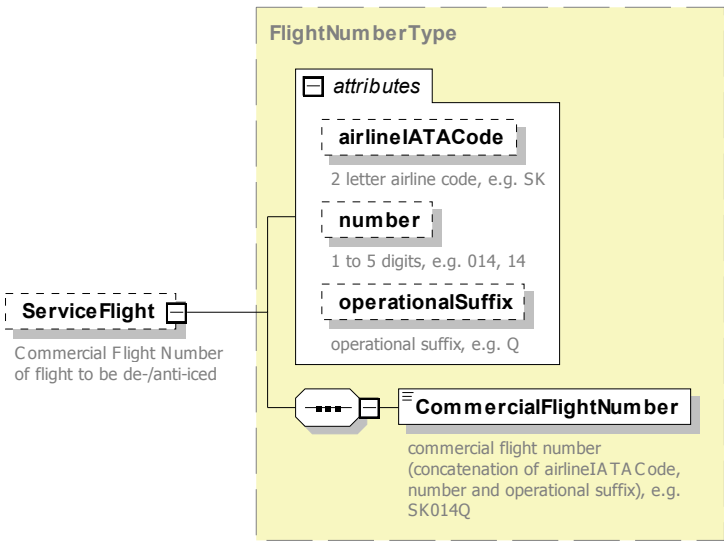
element DORSUB/ServiceAirport

diagram	 ServiceAirport Airport identification at which refueling/defueling shall take place
type	AirportICAOCCodeType
annotation	documentation Airport identification at which refueling/defueling shall take place

element DORSUB/DelcingProviderID

diagram	 DelcingProviderID A three digit code unique to an de-icing provider
type	restriction of xs:string
annotation	documentation A three digit code unique to an de-icing provider

element DORSUB/ServiceFlight

diagram	 The diagram shows the ServiceFlight element (Commercial Flight Number of flight to be de-/anti-iced) connected to a FlightNumberType container. Inside this container, the CommercialFlightNumber element (commercial flight number, concatenation of airlineIATA Code, number and operational suffix, e.g. SK014Q) is shown. The FlightNumberType container also lists three attributes: airlineIATACode (2 letter airline code, e.g. SK), number (1 to 5 digits, e.g. 014, 14), and operationalSuffix (operational suffix, e.g. Q).					
type	FlightNumberType					
children	CommercialFlightNumber					
attributes	Name airlineIATACode	Type derived by: xs:string	Use optional	Default	Fixed	annotation documentation 2 letter airline code, e.g., SK
	number	derived by: xs:string	optional			documentation 1 to 5 digits, e.g., 014, 14
	operationalSuffix	derived by: xs:string	optional			documentation operational suffix, e.g., Q
annotation	documentation Commercial Flight Number of flight to be de-/anti-iced					

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element **DORIND**

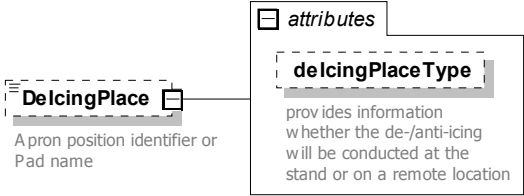
diagram						
children	M633Header M633SupplementaryHeader DeIcingPlace EstimatedDe-IcingBeginTime EstimatedDe-IcingEndTime DeIcingSequenceNumber Remark					
attributes	Name	Type	Use	Default	Fixed	annotation
	delcingOpsIndicator	derived by: xs:string	required			documentation informs about normal or special de- icing operations

attribute **DORIND/@delcingOpsIndicator**

type	restriction of xs:string
facets	enumeration normal enumeration adverse
annotation	documentation informs about normal or special de-icing operations

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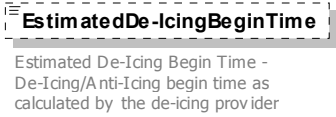
element DORIND/DelcingPlace

diagram	 The diagram shows an element DelcingPlace with a dashed border and a small square icon. Below it is the text "Apron position identifier or Pad name". To its right is an attribute delcingPlaceType with a dashed border and a small square icon. Below it is the text "provides information whether the de-/anti-icing will be conducted at the stand or on a remote location". A line connects the element to the attribute.					
type	extension of xs:string					
attributes	Name delcingPlaceType	Type derived by: xs:string	Use	Default	Fixed	annotation documentation provides information whether the de-/anti-icing will be conducted at the stand or on a remote location
annotation	documentation Apron position identifier or Pad name					

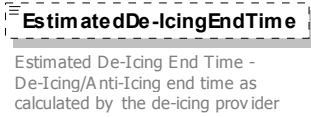
attribute DORIND/DelcingPlace/@delcingPlaceType

type	restriction of xs:string	
facets	enumeration enumeration	at Stand (Gate) at Pad (remote)
annotation	documentation provides information whether the de-/anti-icing will be conducted at the stand or on a remote location	

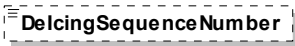
element DORIND/EstimatedDe-IcingBeginTime

diagram	 The diagram shows an element EstimatedDe-IcingBeginTime with a dashed border and a small square icon. Below it is the text "Estimated De-Icing Begin Time - De-Icing/Anti-Icing begin time as calculated by the de-icing provider".					
type	xs:dateTime					
annotation	documentation Estimated De-Icing Begin Time - De-Icing/Anti-Icing begin time as calculated by the de-icing provider					

element DORIND/EstimatedDe-IcingEndTime

diagram	 The diagram shows an element EstimatedDe-IcingEndTime with a dashed border and a small square icon. Below it is the text "Estimated De-Icing End Time - De-Icing/Anti-Icing end time as calculated by the de-icing provider".					
type	xs:dateTime					
annotation	documentation Estimated De-Icing End Time - De-Icing/Anti-Icing end time as calculated by the de-icing provider					

element DORIND/DelcingSequenceNumber

diagram	 The diagram shows an element DelcingSequenceNumber with a dashed border and a small square icon.					
type	xs:positiveInteger					

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element DORIND/Remark

diagram	<pre> graph LR Remark[Remark] --- TextType[TextType] subgraph TextType Paragraph[Paragraph] end Paragraph --- P1[1..∞] Paragraph --- P2[paragraph (line) structure] </pre>
type	TextType
children	Paragraph

11.1.6 Dynamic Aspects

In contrast to many local procedures, all times included in the DOR service should be UTC times.

DORSUB and DORACK should always be sent in the order specified above.

Upon reception of a correct DORSUB, the ground system (see Appendix C for routing options) should forward the data to the appropriate end-system. If this is not possible, the ground system should send the appropriate GERIND message.

The de-icing provider's ground system should check the AcknowledgeFlag parameter of the DORSUB downlink. If it is set to "1", the ground system should send the DORACK message.

Upon reception of an erroneous DORSUB, the ground system should send the appropriate GERIND message.

Upon receiving a GERIND message, the airborne system should, if the DORSUB was manually triggered, display a failure message to the flightcrew. The text of the failure message depends on error class and error type.

The DORACK message should be seen as technical acknowledgement to the corresponding DORSUB element, whereas the DORIND service, by providing planning data for the de-icing/anti-icing event, can confirm the reception of an order from a commercial and dispatch point of view.

After receiving the de-icing order submit downlink, the de-icing sequence within the provider's ground system is normally being updated according to request time, scheduled departure time etc. If de-icing place and time are defined/calculated, this information will be forwarded to the requesting aircraft. More than 1 DORIND messages can be triggered within the De-icing Order service.

EXAMPLES:**Scenario 1**

Based on latest ATIS information, the flight crew of an MD83 aircraft decides to request de-icing/anti-icing before the next takeoff from EKCH by sending a DORSUB downlink. A technical acknowledgement is generated from the provider's EDP-system.

Due to aircraft rotation changes, this decision is revised after onblock in EKCH. An appropriate ground cancellation confirmation is not generated because it was not required. All message envelopes have been omitted.

11.0 DE-ICING**ACARS Example:**

```
DORSUB01 downlink:
,DORSUB01050324052300LFPG,,KJFK,,AFR5556,,050324,,A380,,F-WWOW,
/11,EKCH,LRV,SA345,xxxx

DORACK01 uplink:
,DORACK01050324052613LFPG,,KJFK,,AFR5556,,050324,,A380,,F-WWOW,
/,xxxx

DORSUB01 downlink:
,DORSUB01050324055944LFPG,,KJFK,,AFR5556,,050324,,A380,,F-WWOW,
/00,EKCH,LRV,SA345,xxxx
```

Scenario 2

Pre-flight, the aircrew of flight SQ103H requests de-icing, which is acknowledged by the ground system.

Later on, an information uplink on “normal” position de-icing with estimated de-icing begin time 1429 and position B12 are sent by the de-icing provider. The second DORIND message is a revision to the first one and informs about position de-icing changed to remote position de-icing at PAD2 with estimated de-icing begin time 1438 and estimated de-icing end time 1452.

Due to severe snow precipitation, at 1424 the de-icing provider announces “adverse weather” de-icing operation switching to remote position de-icing only. For detailed Information on the de-icing process the free_text field is used. After recalculating the de-icing sequence, a new uplink informing about remote position de-icing at PAD2 and sequence number 7 is triggered.

11.0 DE-ICING

ACARS Example:

```

DORSUB01 downlink:
,DORSUB01051204135850LFPG,,KJFK,,AFR5556,,051204,,A380,,F-WWOW,
/11,EDDF,,SQ103H,xxxx

DORACK01 uplink:
,DORACK01051204135859LFPG,,KJFK,,AFR5556,,051204,,A380,,F-WWOW,
/,xxxx

DORIND01 uplink:
,DORIND01051204140327LFPG,,KJFK,,AFR5556,,051204,,A380,,F-WWOW,
/1425,1450,P,B12,1429,,N,xxxx

DORIND01 uplink:
,DORIND01051204141303LFPG,,KJFK,,AFR5556,,051204,,A380,,F-WWOW,
/1425,1427,R,PAD2,1438,1452,,N,xxxx

DORIND01 uplink:
,DORIND01051204142411LFPG,,KJFK,,AFR5556,,051204,,A380,,F-WWOW,
/1425,,,,,A,/DISREGARD ALL RECEIVED DE-ICING MESSAGES,xxxx

DORIND01 uplink:
,DORIND01051204142520LFPG,,KJFK,,AFR5556,,051204,,A380,,F-WWOW,
/1425,,R,,,,A,/EXPECT DE-ICING DELAY OF 1 HOUR - STANDBY ON 135.225
FOR NEXT INFO,xxxx

DORIND01 uplink:
,DORIND01051204143736LFPG,,KJFK,,AFR5556,,051204,,A380,,F-WWOW,
/1440,1443,R,PAD2,,,7,A,xxxx

```

XML Examples

See electronic document 'ARINC633-2 AOC.zip' for details and examples of DOR service messages.

11.2 De-icing Receipt Service

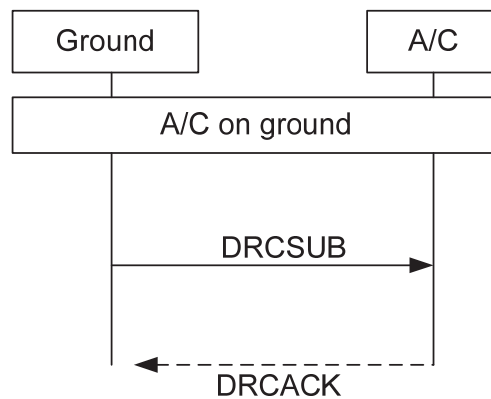


Figure 11.2-1 – Typical De-Icing Receipt Exchange

The purpose of the De-Icing Receipt Service is to inform flight crews and airlines on the de-icing details, which are required to: a) calculate the hold-over-time, and b) establish a cost-effective de-icing provider monitoring process.

The De-Icing receipt element is used to provide the anti-icing code to the flight crew as well as informing on additional data regarding the De-Icing/Anti-icing process. The uplink message will be generated after the de-icing/anti-icing has been performed. Note that the volume unit used for display is optional and, if different from the metric unit liters, not the unit used for the transmission of the

11.0 DE-ICING

amount of de-icing fluid. All transmitted values are always metric and should be converted by the application into the airline's chosen unit.

The following subsections define version 1 of DRC service.

COMMENTARY

One key data of DRC service is the anti icing code received in the message that describes the fluid type and timestamp. These data are important because, when the take off clearance is received by the crew, the crew will check that the anti icing operation is still valid (timestamp acceptable). Therefore the integrity of the timestamp is important. Before going, as part of the procedure, the crew will make a visual observation of whether or not light freezing rain conditions exist. Errors in the messages, or during visual observation by the crew, can have negative effects on the flight. Airlines should perform hazard analysis to confirm with their authorities that the definition specified in this document is acceptable.

11.2.1 De-Icing Receipt Submit Uplink

Element Name: **DRCSUB**

Message DRCSUB should convey anti icing code to the crew as well as additional data on the de/anti icing process.

11.2.2 De-Icing Receipt Acknowledge Downlink

Element Name: **DRACK**

Message DRCSUB should acknowledge correct reception and validation of DRCSUB message.

This message is optional (see details on Section 11.2.5).

11.2.3 DRC ACARS Format

The ACARS format may be used for air-ground and ground-ground messages.

When using the ACARS format, the supplementary header should be used.

ACARS Label used is "DI"

Table 11.2.3-1 – DRCSUB01 ACARS Definition

Parameter Name	Meaning	Field length (in char)	Contents		Option	Range	Resolution	Unit	Example
			Fixed text	Parameter Type					
De-IcingProviderID	A three digit code unique to a de-icing provider	3		provider-id	Yes				NCE
parameter separator		1	comma		No	" "			,
De-IcingReceiptNbr	Commercial De-Icing receipt number	0-20		(0-20)Y	Yes	up to 20 chars			8522A
parameter separator		1	comma		No	" "			,
De-Icing performed	0 = No 1 = Yes	1		boolean	No				0
parameter separator		1	comma		No	" "			,
De-IcingFluidType	Fluid type used for aircraft de-icing	1		Y	Yes	[1 to 4]			2
parameter separator		1	comma		No	" "			,
De-IcingFluidMix	De-Icing fluid percentage of the fluid-water mixture used for aircraft de-icing	2-3		(2-3)Y	Yes	[25 to 100]	1 percent		50
parameter separator		1	comma		No	" "			,

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Parameter Name	Meaning	Field length (in char)	Contents		Option	Range	Resolution	Unit	Example
			Fixed text	Parameter Type					
De-IcingFluidVolume	De-Icing fluid volume	0-6		volume-lt	Yes	0 to 999999	1 liter	liter	600
parameter separator		1	comma		No	" "			,
ActualDe-icingBeginTime	Time when the process of de-icing was started	4		timeMin	Yes				1753
parameter separator		1	comma		No	" "			,
ActualDe-icingEndTime	Time when the process of de-icing was finished	4		timeMin	Yes				1753
parameter separator		1	comma		No	" "			,
Anti-Icing performed	0 = No 1 = Yes	1		boolean	No				0
parameter separator		1	comma		No	" "			,
Anti-IcingFluidTyp	Fluid type used for aircraft anti-icing	1		Y	Yes, but mandatory if anti-icing was performed	[1 to 4]			4
parameter separator		1	comma		No	" "			,
Anti-icingFluidMix	Anti-Icing fluid percentage of the fluid-water mixture used for aircraft anti-icing	2-3		(2-3)Y	Yes, but mandatory if anti-icing was performed	[25 to 100]	1 percent		100
parameter separator		1	comma		No	" "			,
Anti-IcingFluidVolume	Anti-Icing fluid volume	0-6		volume-lt	Yes	0 to 999999	1 liter	liter	600
parameter separator		1	comma		No	" "			,
ActualAnti-icingBeginTime	Time when the process of anti-icing was started	4		timeMin	Yes, but mandatory if anti-icing was performed				1753
parameter separator		1	comma		No	" "			,
ActualAnti-icingEndTime	Time when the process of anti-icing was finished	4		timeMin	Yes				1753
parameter separator		1	comma		No	" "			,
AircraftVolumeUnitDisplay	Unit used by the IntoPlaneService (Liters, Imperial Gallons or US Gallons)	2		"LT" or "IG" or "UG"	Yes				LT

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Table 11.2.3-2 – DRCACK01 ACARS Definition

Parameter Name	Meaning	Field length (in char)	Contents		Option	Range	Resolution	Unit	Example
			Fixed text	Parameter Type					
Anti-IcingFluidTyp	Fluid type used for aircraft anti-icing	1		Y	Yes, but mandatory if anti-icing was performed	[1 to 4]			4
parameter separator		1	comma		No	" , "			,
Anti-icingFluidMix	Anti-Icing fluid percentage of the fluid-water mixture used for aircraft anti-icing	2-3		(2-3)Y	Yes, but mandatory if anti-icing was performed	[25 to 100]	1 percent		100
parameter separator		1	comma		No	" , "			,
ActualAnti-icingBeginTime	Time when the process of anti-icing was started	4		timeMin	Yes, but mandatory if anti-icing was performed				1753

11.2.4 XML Schema

The IP/XML format may be used for air-ground and ground-ground messages.

When using the IP/XML format, the supplementary header should be used.

element **DRCACK**

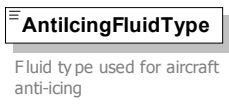
diagram		
properties	content nillable	complex false
children	M633Header M633SupplementaryHeader AntilcingCode	

element **DRCACK/AntilcingCode**

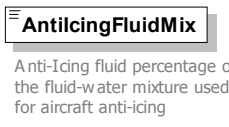
diagram		
children	AntilcingFluidType AntilcingFluidMix ActualAntilcingBeginTime	

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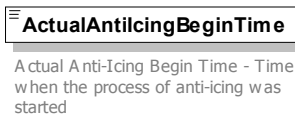
element **DRCACK/AntilcingCode/AntilcingFluidType**

diagram	 AntilcingFluidType Fluid type used for aircraft anti-icing
type	xs:positiveInteger
annotation	documentation Fluid type used for aircraft anti-icing

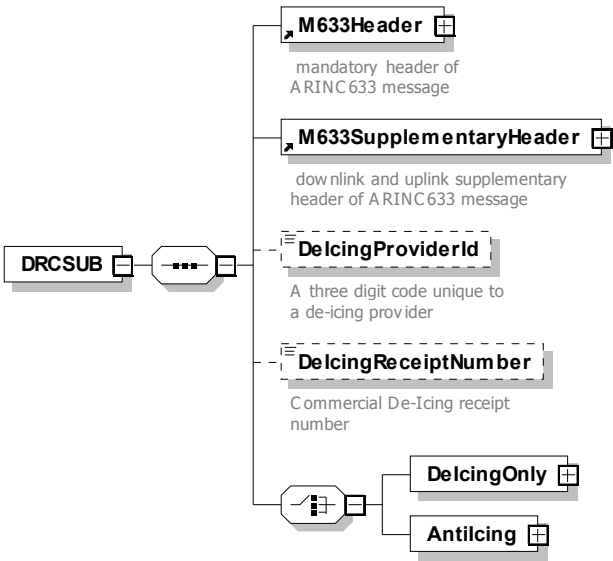
element **DRCACK/AntilcingCode/AntilcingFluidMix**

diagram	 AntilcingFluidMix Anti-Icing fluid percentage of the fluid-water mixture used for aircraft anti-icing
type	xs:positiveInteger
annotation	documentation Anti-Icing fluid percentage of the fluid-water mixture used for aircraft anti-icing

element **DRCACK/AntilcingCode/ActualAntilcingBeginTime**

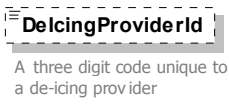
diagram	 ActualAntilcingBeginTime Actual Anti-Icing Begin Time - Time when the process of anti-icing was started
type	xs:dateTime
annotation	documentation Actual Anti-Icing Begin Time - Time when the process of anti-icing was started

element **DRCSUB**

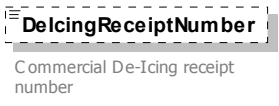
diagram	 The diagram shows the structure of the DRCSUB element. It is a container element (rectangle with a small square icon) that contains several child elements. At the top, there is a mandatory header element (rectangle with a small square icon and a plus sign) labeled M633Header, with the description "mandatory header of ARINC 633 message". Below it is another mandatory header element (rectangle with a small square icon and a plus sign) labeled M633SupplementaryHeader, with the description "downlink and uplink supplementary header of ARINC 633 message". Below these are two optional elements (dashed rectangles with a small square icon and a plus sign) labeled DeIcingProviderId and DeIcingReceiptNumber, with descriptions "A three digit code unique to a de-icing provider" and "Commercial De-Icing receipt number" respectively. At the bottom, there is a choice element (octagon with a small square icon and a plus sign) that contains two elements: DeIcingOnly (rectangle with a small square icon and a plus sign) and Antilcing (rectangle with a small square icon and a plus sign).
children	M633Header M633SupplementaryHeader DeIcingProviderId DeIcingReceiptNumber DeIcingOnly Antilcing

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element DRCSUB/DelcingProviderId

diagram	 DelcingProviderId A three digit code unique to a de-icing provider
type	restriction of xs:string
annotation	documentation A three digit code unique to a de-icing provider

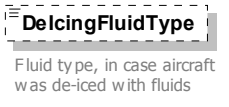
element DRCSUB/DelcingReceiptNumber

diagram	 DelcingReceiptNumber Commercial De-Icing receipt number
type	restriction of xs:string
annotation	documentation Commercial De-Icing receipt number

element DRCSUB/DelcingOnly

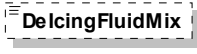
diagram	 DelcingOnly DelcingFluidType Fluid type, in case aircraft was de-iced with fluids DelcingFluidMix De-Icing fluid percentage of the fluid-water mixture in case the aircraft was de-iced with fluids ActualDelcingBeginTime Actual De-Icing Begin Time - Time when the process of de-icing was started ActualDelcingEndTime Actual De-Icing End Time - Time when the process of de-icing was finished DelcingFluidVolume De-Icing fluid volume
children	DelcingFluidType DelcingFluidMix ActualDelcingBeginTime ActualDelcingEndTime DelcingFluidVolume

element DRCSUB/DelcingOnly/DelcingFluidType

diagram	 DelcingFluidType Fluid type, in case aircraft was de-iced with fluids
type	restriction of xs:positiveInteger
facets	enumeration 1 enumeration 2 enumeration 3 enumeration 4
annotation	documentation Fluid type, in case aircraft was de-iced with fluids

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element DRCSUB/DelcingOnly/DelcingFluidMix

diagram	 DelcingFluidMix De-Icing fluid percentage of the fluid-water mixture in case the aircraft was de-iced with fluids
type	restriction of xs:nonNegativeInteger
annotation	documentation De-Icing fluid percentage of the fluid-water mixture in case the aircraft was de-iced with fluids

element DRCSUB/DelcingOnly/ActualDelcingBeginTime

diagram	 ActualDelcingBeginTime Actual De-Icing Begin Time - Time when the process of de-icing was started
type	xs:dateTime
annotation	documentation Actual De-Icing Begin Time - Time when the process of de-icing was started

element DRCSUB/DelcingOnly/ActualDelcingEndTime

diagram	 ActualDelcingEndTime Actual De-Icing End Time - Time when the process of de-icing was finished
type	xs:dateTime
annotation	documentation Actual De-Icing End Time - Time when the process of de-icing was finished

element DRCSUB/DelcingOnly/DelcingFluidVolume

diagram						
type	extension of xs:nonNegativeInteger					
attributes	Name unit	Type volumeUnitType	Use	Default	Fixed	annotation
annotation	documentation De-Icing fluid volume					

attribute DRCSUB/DelcingOnly/DelcingFluidVolume/@unit

type	volumeUnitType										
facets	<table border="1"> <tbody> <tr><td>enumeration</td><td>l</td></tr> <tr><td>enumeration</td><td>ug</td></tr> <tr><td>enumeration</td><td>ig</td></tr> <tr><td>enumeration</td><td>m3</td></tr> <tr><td>enumeration</td><td>cm3</td></tr> </tbody> </table>	enumeration	l	enumeration	ug	enumeration	ig	enumeration	m3	enumeration	cm3
enumeration	l										
enumeration	ug										
enumeration	ig										
enumeration	m3										
enumeration	cm3										

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element DRCSUB/Antilcing

diagram	DelcingFluidType Fluid type, in case aircraft was de-iced with fluids DelcingFluidMix De-Icing fluid percentage of the fluid-water mixture in case the aircraft was de-iced with fluids ActualDelcingBeginTime Actual De-Icing Begin Time - Time when the process of de-icing was started ActualDelcingEndTime Actual De-Icing End Time - Time when the process of de-icing was finished DelcingFluidVolume De-Icing fluid volume AntilcingCode ActualAntilcingEndTime Actual Anti-Icing End Time - Time when the process of anti-icing was finished AntilcingFluidVolume Anti-Icing fluid volume
children	DelcingFluidType DelcingFluidMix ActualDelcingBeginTime ActualDelcingEndTime DelcingFluidVolume AntilcingCode ActualAntilcingEndTime AntilcingFluidVolume

element DRCSUB/Antilcing/DelcingFluidType

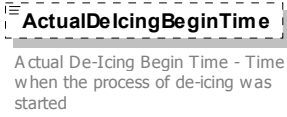
diagram	DelcingFluidType Fluid type, in case aircraft was de-iced with fluids
type	restriction of xs:positiveInteger
facets	enumeration 1 enumeration 2 enumeration 3 enumeration 4
annotation	documentation Fluid type, in case aircraft was de-iced with fluids

element DRCSUB/Antilcing/DelcingFluidMix

diagram	DelcingFluidMix De-Icing fluid percentage of the fluid-water mixture in case the aircraft was de-iced with fluids
type	restriction of xs:nonNegativeInteger
annotation	documentation De-Icing fluid percentage of the fluid-water mixture in case the aircraft was de-iced with fluids

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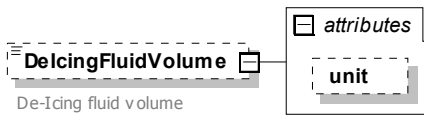
element **DRCSUB/Antilcing/ActualDelcingBeginTime**

diagram	 ActualDelcingBeginTime Actual De-Icing Begin Time - Time when the process of de-icing was started
type	xs:dateTime
annotation	documentation Actual De-Icing Begin Time - Time when the process of de-icing was started

element **DRCSUB/Antilcing/ActualDelcingEndTime**

diagram	 ActualDelcingEndTime Actual De-Icing End Time - Time when the process of de-icing was finished
type	xs:dateTime
annotation	documentation Actual De-Icing End Time - Time when the process of de-icing was finished

element **DRCSUB/Antilcing/DelcingFluidVolume**

diagram	 The diagram shows a UML-like representation of the DelcingFluidVolume element. It is a rectangle with a dashed border and a small square icon in the top right corner. Below the rectangle is the text "De-Icing fluid volume". To the right of the rectangle is a box labeled "attributes" containing a dashed rectangle labeled "unit". A line connects the "attributes" box to the "unit" box.												
type	extension of xs:nonNegativeInteger												
attributes	<table><thead><tr><th>Name</th><th>Type</th><th>Use</th><th>Default</th><th>Fixed</th><th>annotation</th></tr></thead><tbody><tr><td>unit</td><td>volumeUnitType</td><td></td><td></td><td></td><td></td></tr></tbody></table>	Name	Type	Use	Default	Fixed	annotation	unit	volumeUnitType				
Name	Type	Use	Default	Fixed	annotation								
unit	volumeUnitType												
annotation	documentation De-Icing fluid volume												

attribute **DRCSUB/Antilcing/DelcingFluidVolume/@unit**

type	volumeUnitType										
facets	<table border="1"> <tbody> <tr><td>enumeration</td><td>l</td></tr> <tr><td>enumeration</td><td>ug</td></tr> <tr><td>enumeration</td><td>ig</td></tr> <tr><td>enumeration</td><td>m3</td></tr> <tr><td>enumeration</td><td>cm3</td></tr> </tbody> </table>	enumeration	l	enumeration	ug	enumeration	ig	enumeration	m3	enumeration	cm3
enumeration	l										
enumeration	ug										
enumeration	ig										
enumeration	m3										
enumeration	cm3										

11.0 DE-ICING

element **DRCSUB/Antilcing/AntilcingCode**

diagram	AntilcingFluidType Fluid type used for aircraft anti-icing AntilcingFluidMix Anti-Icing fluid percentage of the fluid-water mixture used for aircraft anti-icing ActualAntilcingBeginTime Actual Anti-Icing Begin Time - Time when the process of anti-icing was started
children	AntilcingFluidType AntilcingFluidMix ActualAntilcingBeginTime

element **DRCSUB/Antilcing/AntilcingCode/AntilcingFluidType**

diagram	AntilcingFluidType Fluid type used for aircraft anti-icing
type	xs:positiveInteger
annotation	documentation Fluid type used for aircraft anti-icing

element **DRCSUB/Antilcing/AntilcingCode/AntilcingFluidMix**

diagram	AntilcingFluidMix Anti-Icing fluid percentage of the fluid-water mixture used for aircraft anti-icing
type	xs:positiveInteger
annotation	documentation Anti-Icing fluid percentage of the fluid-water mixture used for aircraft anti-icing

element **DRCSUB/Antilcing/AntilcingCode/ActualAntilcingBeginTime**

diagram	ActualAntilcingBeginTime Actual Anti-Icing Begin Time - Time when the process of anti-icing was started
type	xs:dateTime
annotation	documentation Actual Anti-Icing Begin Time - Time when the process of anti-icing was started

element **DRCSUB/Antilcing/ActualAntilcingEndTime**

diagram	ActualAntilcingEndTime Actual Anti-Icing End Time - Time when the process of anti-icing was finished
type	xs:dateTime
annotation	documentation Actual Anti-Icing End Time - Time when the process of anti-icing was finished

11.0 DE-ICING

element **DRCSUB/Antilcing/AntilcingFluidVolume**

diagram						
type	extension of xs:nonNegativeInteger					
attributes	Name	Type	Use	Default	Fixed	annotation
	unit	volumeUnitType				
annotation	documentation Anti-Icing fluid volume					

attribute **DRCSUB/Antilcing/AntilcingFluidVolume/@unit**

type	volumeUnitType				
facets	enumeration	l			
	enumeration	ug			
	enumeration	ig			
	enumeration	m3			
	enumeration	cm3			

11.2.5 Dynamic Aspects

In contrast to many local procedures, all times included in the DRC service should be UTC times.

EXAMPLES:**Scenario 1**

In the following scenario a B737 has been de-iced and anti-iced. For de-icing purposes, 600 liters of fluid type 1 with a mixture of 50% fluid and 50% hot water were used. Process started at 0624 and took until 0631. Beginning at 0631, the aircraft has then been protected against new icing with 700 liters of 100% concentrated fluid type 4. Anti-icing was finished with the generation of the DRCSUB message at 0639.

ACARS Example:

```
DRCSUB01 uplink:
,DRCSUB01050107063912LFPG,,KJFK,,AFR5556,,050107,,A380,,F-WWOW,
/NCE,,1,1,50,600,0624,0631,1,4,100,700,0631,0639,LT,xxxx

DRCACK01 downlink:
,DRCACK01050107063914LFPG,,KJFK,,AFR5556,,050107,,A380,,F-WWOW,
/4,100,0631,xxxx
```

Scenario 2

De-icing provider sends information on the anti-icing process. De-icing was not performed, but anti-icing the aircraft was conducted with 400 liters of fluid type 2 and a 75:25 fluid: hot water mixture.

However, this uplink is rejected due to missing mandatory data (de-icing/anti-icing performed indicators). Error is classified as non-fatal error, error type is syntax error.

After processing the error downlink, the de-icing service provider sends a revised DRCSUB message.

11.0 DE-ICING

ACARS Example:

```

DRCSUB01 uplink:
,DRCSUB01050311081212LFPG,,KJFK,,AFR5556,,050311,,A380,,F-WWOW,
/ABC,E4567,,,,,2,75,400,0801,0809,LT,xxxx

GERIND01 downlink:
,GERIND01050311081214LFPG,,KJFK,,AFR5556,,050311,,A380,,F-WWOW,
/,DRCSUB01,2,3,,1,xxxx

DRCSUB01 uplink:
,DRCSUB01050311081935LFPG,,KJFK,,AFR5556,,050311,,A380,,F-WWOW,
/ABC,E4567R,0,,,,,1,2,75,400,0801,0809,LT,xxxx

```

XML Example

See electronic document '633-2.zip' for details and examples of DRC service messages.

11.3 De-Icing Process Report Service

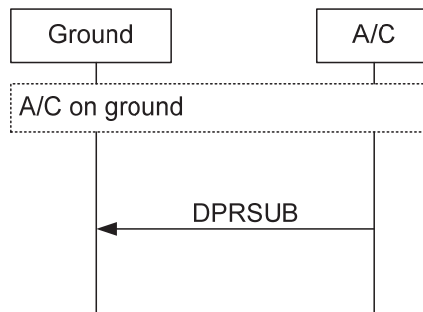


Figure 11.3-1 – De-Icing Process Report Service

The purpose of the De-Icing Process Report Service is to document anti-icing code as well as to monitor the de-icing provider performance.

The following subsections define version 1 of DPRREP service.

11.3.1 De-Icing Report Downlink

Element Name: **DPRREP**

The De-Icing process report element is used to downlink the anti-icing code and other data related to the de-icing process to the airline's ground host. Even if not a "third-party" message, it is included to enable application designers in providing a de-icing application covering all the airline's needs.

11.3.2 DPR ACARS format

The ACARS format may be used for air-ground and ground-ground messages.

When using the ACARS format, the supplementary header should be used.

ACARS Label used is "DI".

11.0 DE-ICING

Table 11.3.2-1 – DPRREP01 ACARS Definition

Parameter Name	Meaning	Field length (in char)	Contents		Option	Range	Resolution	Unit	Example
			Fixed text	Parameter Type					
De-IcingFluidTyp	Fluid type used for aircraft de-icing	1		Y	Yes	[1 to 4]			2
parameter separator		1	comma		No	" "			,
De-IcingFluidMix	De-Icing fluid percentage of the fluid-water mixture used for aircraft de-icing	2-3		(2-3)Y	Yes	[25 to 100]	1 percent		50
parameter separator		1	comma		No	" "			,
ActualDe-icingBeginTime	Time when the process of de-icing was started	4		timeMin	Yes				1753
parameter separator		1	comma		No	" "			,
ActualDe-icingEndTime	Time when the process of de-icing was finished	4		timeMin	Yes				1753
parameter separator		1	comma		No	" "			,
Anti-IcingFluidTyp	Fluid type used for aircraft anti-icing	1		Y	Yes	[1 to 4]			4
parameter separator		1	comma		No	" "			,
Anti-icingFluidMix	Anti-Icing fluid percentage of the fluid-water mixture used for aircraft anti-icing	2-3		(2-3)Y	Yes	[25 to 100]	1 percent		100
parameter separator		1	comma		No	" "			,
ActualAnti-icingBeginTime	Time when the process of anti-icing was started	4		timeMin	Yes				1753
parameter separator		1	comma		No	" "			,
ActualAnti-IcingEndTime	Time when the process of anti-icing was finished	4		timeMin	Yes				1753

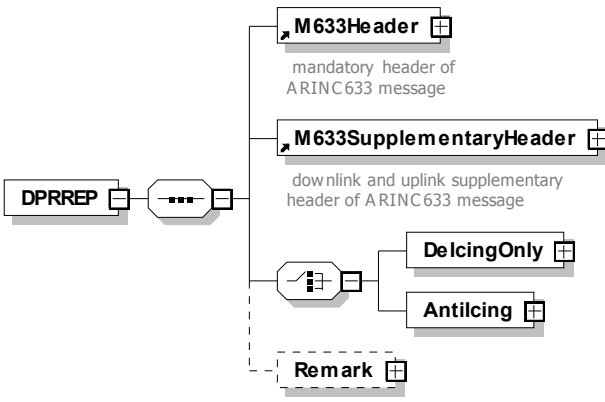
11.3.3 XML Schema

The IP/XML format may be used for air-ground and ground-ground messages.

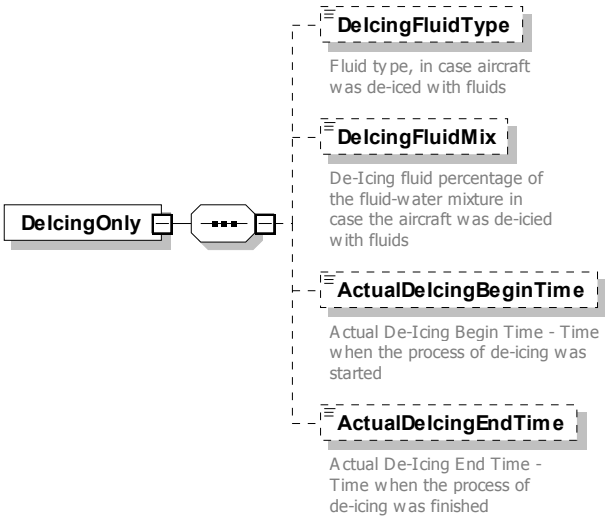
When using the IP/XML format, the supplementary header should be used.

11.0 DE-ICING

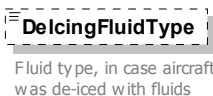
element DPRREP

diagram	
children	M633Header M633SupplementaryHeader DelcingOnly Antilcing Remark

element DPRREP/DelcingOnly

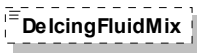
diagram	
children	DelcingFluidType DelcingFluidMix ActualDelcingBeginTime ActualDelcingEndTime

element DPRREP/DelcingOnly/DelcingFluidType

diagram	
type	restriction of <code>xs:positiveInteger</code>
facets	enumeration 1 enumeration 2 enumeration 3 enumeration 4
annotation	documentation Fluid type, in case aircraft was de-iced with fluids

11.0 DE-ICING

element **DPRREP/DelcingOnly/DelcingFluidMix**

diagram	 De-Icing fluid percentage of the fluid-water mixture in case the aircraft was de-iced with fluids
type	restriction of xs:nonNegativeInteger
annotation	documentation De-Icing fluid percentage of the fluid-water mixture in case the aircraft was de-iced with fluids

element **DPRREP/DelcingOnly/ActualDelcingBeginTime**

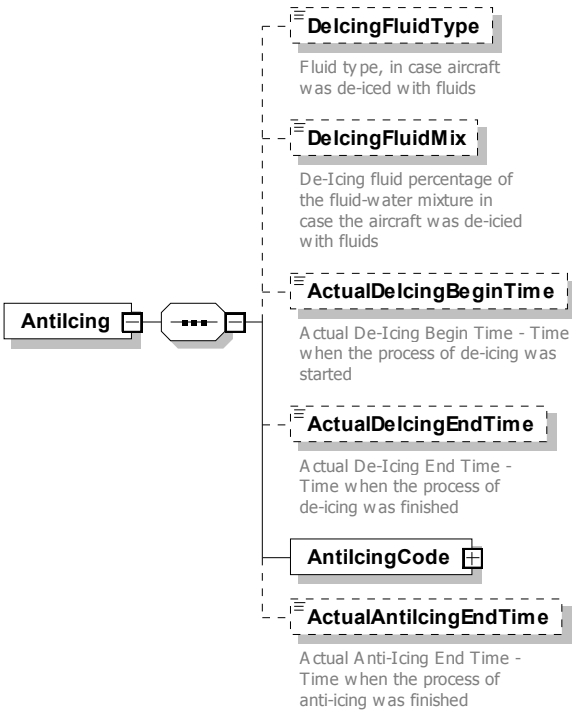
diagram	 Actual De-Icing Begin Time - Time when the process of de-icing was started
type	xs:dateTime
annotation	documentation Actual De-Icing Begin Time - Time when the process of de-icing was started

element **DPRREP/DelcingOnly/ActualDelcingEndTime**

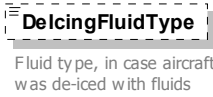
diagram	 Actual De-Icing End Time - Time when the process of de-icing was finished
type	xs:dateTime
annotation	documentation Actual De-Icing End Time - Time when the process of de-icing was finished

11.0 DE-ICING

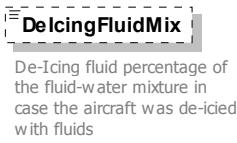
element **DPRREP/Antilcing**

diagram	 DelcingFluidType Fluid type, in case aircraft was de-iced with fluids DelcingFluidMix De-Icing fluid percentage of the fluid-water mixture in case the aircraft was de-iced with fluids ActualDelcingBeginTime Actual De-Icing Begin Time - Time when the process of de-icing was started ActualDelcingEndTime Actual De-Icing End Time - Time when the process of de-icing was finished AntilcingCode ActualAntilcingEndTime Actual Anti-Icing End Time - Time when the process of anti-icing was finished
children	DelcingFluidType DelcingFluidMix ActualDelcingBeginTime ActualDelcingEndTime AntilcingCode ActualAntilcingEndTime

element **DPRREP/Antilcing/DelcingFluidType**

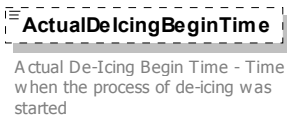
diagram	 DelcingFluidType Fluid type, in case aircraft was de-iced with fluids
type	restriction of xs:positiveInteger
facets	enumeration 1 enumeration 2 enumeration 3 enumeration 4
annotation	documentation Fluid type, in case aircraft was de-iced with fluids

element **DPRREP/Antilcing/DelcingFluidMix**

diagram	 DelcingFluidMix De-Icing fluid percentage of the fluid-water mixture in case the aircraft was de-iced with fluids
type	restriction of xs:nonNegativeInteger
annotation	documentation De-Icing fluid percentage of the fluid-water mixture in case the aircraft was de-iced with fluids

11.0 DE-ICING

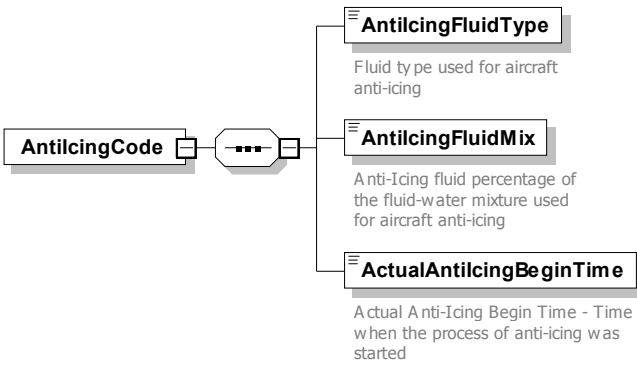
element **DPRREP/Antilcing/ActualDelcingBeginTime**

diagram	 ActualDelcingBeginTime Actual De-Icing Begin Time - Time when the process of de-icing was started
type	xs:dateTime
annotation	documentation Actual De-Icing Begin Time - Time when the process of de-icing was started

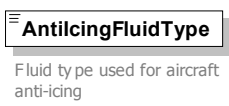
element **DPRREP/Antilcing/ActualDelcingEndTime**

diagram	 ActualDelcingEndTime Actual De-Icing End Time - Time when the process of de-icing was finished
type	xs:dateTime
annotation	documentation Actual De-Icing End Time - Time when the process of de-icing was finished

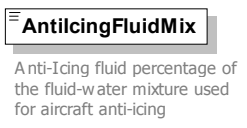
element **DPRREP/Antilcing/AntilcingCode**

diagram	 AntilcingCode is connected to AntilcingFluidType, AntilcingFluidMix, and ActualAntilcingBeginTime. AntilcingFluidType Fluid type used for aircraft anti-icing AntilcingFluidMix Anti-Icing fluid percentage of the fluid-water mixture used for aircraft anti-icing ActualAntilcingBeginTime Actual Anti-Icing Begin Time - Time when the process of anti-icing was started
children	AntilcingFluidType AntilcingFluidMix ActualAntilcingBeginTime

element **DPRREP/Antilcing/AntilcingCode/AntilcingFluidType**

diagram	 AntilcingFluidType Fluid type used for aircraft anti-icing
type	xs:positiveInteger
annotation	documentation Fluid type used for aircraft anti-icing

element **DPRREP/Antilcing/AntilcingCode/AntilcingFluidMix**

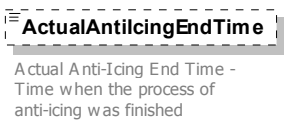
diagram	 AntilcingFluidMix Anti-Icing fluid percentage of the fluid-water mixture used for aircraft anti-icing
type	xs:positiveInteger
annotation	documentation Anti-Icing fluid percentage of the fluid-water mixture used for aircraft anti-icing

11.0 DE-ICING

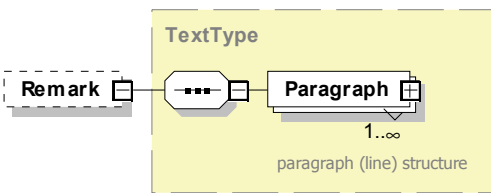
element **DPRREP/Antilcing/AntilcingCode/ActualAntilcingBeginTime**

diagram	 ActualAntilcingBeginTime Actual Anti-Icing Begin Time - Time when the process of anti-icing was started
type	xs:dateTime
annotation	documentation Actual Anti-Icing Begin Time - Time when the process of anti-icing was started

element **DPRREP/Antilcing/ActualAntilcingEndTime**

diagram	 ActualAntilcingEndTime Actual Anti-Icing End Time - Time when the process of anti-icing was finished
type	xs:dateTime
annotation	documentation Actual Anti-Icing End Time - Time when the process of anti-icing was finished

element **DPRREP/Remark**

diagram	 The diagram shows a Remark element (dashed box) containing a sequence of TextType (dashed box) and Paragraph (solid box) elements. The TextType element is followed by a Paragraph element, which is then followed by an ellipsis (...) indicating repetition. The Paragraph element is labeled with 1..∞ and paragraph (line) structure.
type	TextType
children	Paragraph

11.3.4 Dynamic Aspects

In contrast to many local procedures, all times included in the DPR service should be UTC times.

EXAMPLES:

In the following scenario a CRJ7 has been de-iced and anti-iced. For de-icing purposes, fluid type 1 with a mixture of 50% fluid and 50% hot water were used. Anti-icing was started at 06:31 with fluid type 3 and mixture of 75:25. The de-icing service provider did not forward any other than these data. For de-icing provider monitoring purposes, flight crew therefore entered de-icing begin (06:20) and anti-icing end-time (06:39). Free text was added by the flight crew to inform the airline operation people about new fluid types available at the departure airport. Ground host appropriately handles the free text.

11.0 DE-ICING**ACARS Example:**

```
DPRREP01 downlink:  
,DPRREP01050107064155LFPG,,KJFK,,AFR5556,,050107,,A380,,F-WWOW,  
/1,50,0620,0631,3,75,0631,0639,/ACC.TO PROVIDER, TYPE 4 FLUID IS NOW  
AVBL IN EPWAxxxx
```

XML Example:

See electronic document '633-2.zip' for details and examples of DPR service messages. Examples are available in examples folder.

12.0 POTABLE WATER SYSTEM

12.0 POTABLE WATER SYSTEM

12.1 Introduction

The Potable Water System provides the aircraft's cabin systems like water faucets, toilets and galleys with potable water, which has to be filled in tanks on board before flight. In standard aircraft, a water quantity pre-selection function is available. That means, during water servicing, the water system controls the water level in the tanks and stops water filling when a certain quantity is reached. This quantity, named Pre-selected Water Quantity (PSWQ), can be formally set in a typical standard aircraft either by a flight attendant or by the ground service personnel.

On some aircraft, it will be additionally possible to set the PSWQ via ACARS from ground before the aircraft arrives at the gate. The potable water remote pre-selection application is used to support the aircraft's ground servicing processes and to optimize the take-off weight depending on the pax load. The following application has been defined:

Section	Application	SMI	Label	Description
12.2	Potable Water Remote Pre-selection	JWP	WP	Request Status of Pre-selection on ground; set PSWQ from ground

12.2 Potable Water Remote Pre-selection

The water quantity pre-selection function may be used to define in advance the water quantity to be refilled during the service procedure. To simplify the ground servicing task, the water quantity monitoring system may be controlled by ACARS messages.

This section specifies the messages to be supported for remote control of the potable water pre-selection.

The Potable Water Remote Pre-selection uses the following datalink services:

1. **WATER STATUS:** the ground operation center can request a Potable Water System (PWS) status report indicating current parameters of the system. This service is named 'WST' (Water STatus).
2. **WATER DATA SUBMISSION:** the ground operation center can provide the PWS with a new PSWQ before refilling. This service is named 'WDA' (Water DATA submission).
3. **ERRORS:** in case of failed operation, the ground operation center is informed. The General Error Service ('GER', refer to Section 5.2.1) is used to indicate errors.

These steps may require one or more of the following and any number of common elements to be sent. The following table shows the water elements defined in this section:

12.0 POTABLE WATER SYSTEM

Table 12.2-1 – Potable Water Remote Pre-selection Element Table

Element Name	ACARS Label	Service Version	DL/UL	Purpose
WSTREQ	WP	1	UL	Water-STatus-REQuest Requests a potable water status report downlink
WSTREP	WP	1	DL	Water-STatus-REPort Informs the ground about the aircraft PWS status
WDASUB	WP	1	UL	Water-DAta submission-SUBmit Submits PSWQ to an aircraft's PWS
WDAACK	WP	1	DL	Water-DAta submission-ACK A/C adapts submitted PSWQ and replies the value to the ground for confirmation
WDACOM	WP	1	UL	Water-DAta submission-COMmand Activates PSWQ received by ACK message
WDACON	WP	1	DL	Water-DAta submission-CONfirm Confirms that PSWQ has been set successfully

12.2.1 Water-Status

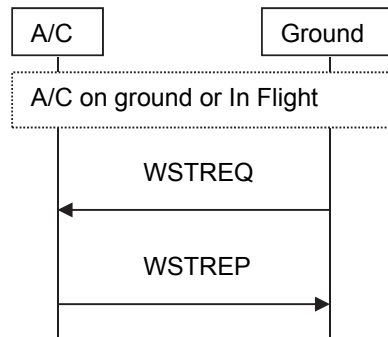


Figure 12.2.1-1 – Typical Water-Status Exchange

The Water-Status element is used to inform ground systems about the water situation onboard.

The following subsections define version 01 of WST service.

Operational parameter ranges and resolution in all messages will vary depending on aircraft type. Therefore, the airline and ground operator should ensure that only messages with ranges and resolutions fitting the aircraft type will be used.

12.2.1.1 Water-STatus-REQuest Uplink (WSTREQ)

Element Name: **WSTREQ**

The Water-status-request uplink should contain no parameters – and thus only contain the header.

The water status request uplink may contain one **or several** optional supplementary address(es) (as per ARINC Specification 620).

12.2.1.2 Water-STatus-REPort Downlink (WSTREP)

Element Name: **WSTREP**

The water status report downlink may contain one **or several** optional supplementary address(es) (as per ARINC Specification 620), which will be the copy of the supplementary address(es) (if present) in the associated WSTREQ.

12.0 POTABLE WATER SYSTEM

12.2.1.3 Dynamic Aspects

WSTREP01 should only be sent in response to WSTREQ01.

The airborne application should also perform the actions specified in the following table. The standard application state is “listening for ACARS messages” (called “listening mode”).

Table 12.2.1.3-1 – Airborne Processing of Non-nominal Conditions

A/C condition	Event	A/C action	Comment
Water system degraded mode or airborne application internal error	WSTREQ received	Send GERIND with appropriate error code and return to listening mode	
ANY	Erroneous WSTREQ received	Send GERIND with appropriate error code and return to listening mode	
ANY	WSTREQ received with a non supported version number	Send GERIND with appropriate error code 5 and supported version numbers and return to listening mode	

The ground application should also perform the actions specified in the following table.

Table 12.2.1.3-2 – Ground Processing of Non-nominal Conditions

Ground condition	Event	Ground action	Comment
WSTREQ was sent – wait for WSTREP	Receive GERIND with error code 5 (and list of supported versions)	Analyze list of supported versions – at user’s discretion – it is recommended that if one matches the versions supported by the ground, then re-send the message with good version number	
WSTREQ was sent – wait for WSTREP	Receive GERIND with error code 3 or 6 (message considered erroneous)	at ground user’s discretion – it is recommended that the message is corrected and re-sent	
WSTREQ was sent – wait for WSTREP	GERIND received with error code 0, 4, 8, 9, 10, 11	at ground user’s discretion – it is recommended that at least one retry is performed before giving up	
WSTREQ was sent – wait for WSTREP	More than 10 minutes (value at user’s discretion) waiting	at ground user’s discretion – it is recommended that at least one retry is performed before giving up – the ground application could check if WSTREQ was declared received by the aircraft (use of ARINC Message Assurance service)	
WSTREQ was sent – wait for WSTREP	WSTREP received containing invalid data	at ground user’s discretion – it is recommended that at least one retry is performed before giving up	

12.0 POTABLE WATER SYSTEM

12.2.1.4 ACARS Format

The message should only contain one element. No supplementary header should be used here.

Label used is “WP”.

WSTREQ01

No data field should be embedded in the WSTREQ01 message (only header and CRC information and optional supplementary addresses).

WSTREP01

The element parameters should be encoded in ACARS, as follows.

Table 12.2.1.4-1 – WSTREP01 ACARS Definition

Field name	Meaning	Field length (in Char)	Contents		Option	range	resolution	Unit	Example
			Fixed text	Parameter type					
Current Water Quantity	The current percentage of the filling quantity of the water tanks	1-4		Water quantity	NO	0 to 999	Percent	Percent	55
parameter separator		1	,	(comma)	NO				,
Current PSWQ	The current value in percent of the aircraft's pre-selected water quantity parameter. This value specifies the end quantity of the next aircraft water refilling process	1-3		Water quantity	NO	0 to 999	Percent	Percent	80
parameter separator		1	,	(comma)	NO				,
CurrentPSWQSource	Source that last changed PSWQ (0: None, 1: A/C Cabin, 2: A/C Body, 3: ACARS)	1		N	NO	0 to 9			1
parameter separator		1	,	(comma)	NO				,
PSWQReceiveDate	Date when PSWQ was set	6		date	NO				061006
parameter separator		1	,	(comma)	NO				,
PSWQReceiveTime	Time when PSWQ was set	4		timemin	NO				1318

Example: (example below includes ARINC 633 header information)

Uplink: ,WSTREQ01061006141536/,xxxx
 Downlink: ,WSTREP01061006141545/55,80,1,061006,1318,xxxx

Note: xxxx is the CRC.

12.0 POTABLE WATER SYSTEM

12.2.1.5 XML Format

To be added in a future supplement.

12.2.2 Water Data Submission Service

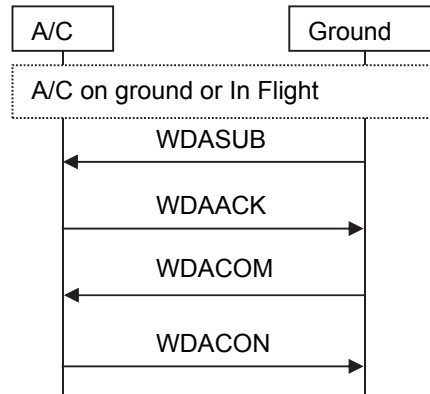


Figure 12.2.2-1 – Typical Water Data Submission Exchange

The elements defined here are needed to specify the data required to perform potable water remote pre-selection. Data uplinked to the aircraft “water system” is acknowledged by sending back a valid value derived from the uplinked value. A separate command uplink is needed for activation and a final confirmation downlink to indicate whether the value is set successfully in the A/C. Typically the four messages are sent in the order SUB, ACK, COM and CON. Typically the messages are used on the ground during preflight but may be exchanged at any time before, during or after the flight. Detailed use of these data by the water system is aircraft implementation dependent and is outside the scope of this document.

This section defines version 01 of Water data service.

Operational parameters’ ranges and resolution in all messages will vary depending on aircraft type. Therefore, the airline and ground operator should ensure that only messages with ranges and resolutions fitting the aircraft type will be used.

12.2.2.1 Water-DAta-SUBmit Uplink (WDASUB)

Element Name: **WDASUB**

The water data submit uplink may contain one, and a maximum of one optional supplementary address (as per ARINC Specification 620).

This element should contain the potable water pre-selection value set on ground.

12.2.2.2 Water-DAta-ACK Downlink (WDAACK)

Element Name: **WDAACK**

The water data Ack downlink may contain one optional supplementary address (as per ARINC Specification 620), which will be the copy of the supplementary address (if present) in the associated WDASUB.

This element should contain a valid value for the pre-selection derived from the value received in the WDASUB message. If the received value has been detected as invalid, the rounded up value is returned and the type of invalidity is set appropriately.

12.2.2.3 Water-DAta-COMmand Uplink (WDACOM)

Element Name: **WDACOM**

12.0 POTABLE WATER SYSTEM

The water data command uplink may contain one, and a maximum of one optional supplementary address (as per ARINC Specification 620).

This element should contain the information to set or to cancel the value received in WDAACK.

12.2.2.4 Water-DAta-CONfirm Downlink (WDACON)

Element Name: **WDACON**

The water data command uplink may contain one, and a maximum of one optional supplementary address (as per ARINC Specification 620), which will be the copy of the supplementary address (if present) in the associated WDACOM.

12.2.2.5 Dynamic Aspects

- WDASUB, WDAACK, WDACOM and WDACON should always be sent in the order specified above.
- When a valid WDASUB message has been received, the airborne water pre-selection application should consider that a transaction has been 'opened'. A transaction should be considered 'closed' when the airborne application has received the WDACOM from ground and returned the WDACON or when a time out after transmission of WDAACK has elapsed without receiving any WDACOM.
- The aircraft should generate the WDAACK message within a delay following reception of WDASUB, compatible with the time out value used by the ground system.
- The ground should generate the WDACOM message within a delay following reception of WDAACK, compatible with the time-out value used by the airborne system. WDACOM should only be sent upon reception of WDAACK.
- The aircraft should generate the WDACON message within a delay following reception of WDACOM, compatible with the time-out value used by the ground system.

COMMENTARY

Ten minutes can be considered as a reasonable value for airborne and ground time-out delays.

COMMENTARY

The airborne application may only support one transaction at a time. If no supplementary addresses are embedded in the messages, consider that two ground applications are the same application.

- If multiple ground applications interact with the aircraft water system, supplementary addresses should be used to identify unambiguously the ground application.
- The airborne system is likely to clear received data at a point in the flight cycle as specified by the system supplier.

COMMENTARY

The time when the airborne system can clear the received data is implementation dependent and may be obtained from supplier documentation.

12.0 POTABLE WATER SYSTEM

The following tables define the required or recommended behavior (detailed in the tables) for the aircraft application and ground application for non-nominal conditions.

Table 12.2.2.5-1 – Airborne Processing of Non-nominal Conditions

Aircraft Condition	Event	Aircraft Action	Comment
ANY	Erroneous WDASUB or WDACOM received	Send GERIND with appropriate error code No change on on-going transaction if started	
No transaction opened or WDAACK not yet sent	WDACOM received	- Send GERIND with error code 2 - current transaction continues	
Transaction opened	WDASUB received	- Send GERIND with error code 21 - current transaction continues	
WDAACK was sent following reception of WDASUB	No WDACOM received after WDAACK transmission before airborne time out delay	Send GERIND with error code 1 Abort transaction	
ANY	WDASUB or WDACOM received with a non supported version number	-Send GERIND with error code 5 and list of supported versions of this service - current transaction continues (if any)	
Water system degraded mode or airborne application internal error	Message received	-Send GERIND with appropriate error code - Abort transaction if any	
No transaction opened	WDASUB with "Out of range" parameters	-Send WDAACK with valid value and invalid type -Transaction opened (wait for WDACOM)	

12.0 POTABLE WATER SYSTEM

Table 12.2.2.5-2 – Ground Processing of Non-nominal Conditions

Ground condition	Event	Ground action	Comment
ANY	GERIND received with error codes 0, 1, 2, 4, 7, 8, 9, 10, 11	At ground user's discretion – it is recommended that at least one retry appropriate to the error code is performed before giving up	
WDASUB transmitted to the aircraft	WDAACK not received by the ground before ground time out delay, following WDASUB transmission to the aircraft	At ground user's discretion – it is recommended that at least one retry is performed before giving up – the ground application should check if WDASUB was declared received by the aircraft (use of ARINC Message Assurance service)	
WDASUB transmitted to the aircraft	WDAACK received containing invalid data	Send WDACOM with cancel – at ground user's discretion to retry with WDASUB after received WDACON	
ANY	Receive GERIND with error code 5 (and list of supported versions)	Analyze list of supported versions – at user's discretion – it is recommended that if one matches the versions supported by the ground, then re-send the message with good version number	
after any message sending	Receive GERIND with error code 3 or 6 (message considered erroneous)	at ground user's discretion - it is recommended that the message is corrected and re-sent	
WDASUB transmitted to the aircraft	GERIND received with code 21	Wait for airborne time out delay before sending WSTREQ for checking new values then resubmitting the message if always needed, or check with other ground system that controls potable water remote pre-selection.	
WDACOM transmitted to the aircraft	WDACON not received by the ground before ground time out delay, following WDACOM transmission to the aircraft	At ground user's discretion – it is recommended that at least one retry is performed before giving up – the ground application should check if WDACOM was declared received by the aircraft (use of ARINC Message Assurance service)	

12.0 POTABLE WATER SYSTEM

12.2.2.6 ACARS Format

The message will only contain one element. No supplementary header should be used here.

Label used is “WP”.

Table 12.2.2.6-1 – WDASUB01 ACARS Definition

Field name	Meaning	Field length (in Char)	Contents		Option	range	resolution	Unit	Example
			Fixed text	Parameter type					
RemotePS WQ	RemotePre-selected Water Quantity	1-4		Waterquantity	NO	0 to 1000	Tenth of Percent	tenth of percent	800

Table 12.2.2.6-2 – WDAACK01 ACARS Definition

Field name	Meaning	Field length (in Char)	Contents		Option	range	resolution	Unit	Example
			Fixed text	Parameter Type					
InvalidType	Type of invalidity of received value	1		N	NO	0 to 9	1	-	0
parameter separator		1	,		NO				,
Revised PSWQ	Revised Pre-selected Water Quantity	1-4		waterquantity	NO	0 to 1000	Tenth of Percent	tenth of percent	800
parameter separator		1	,		NO				,
AckDate	Date when Submit was received and ACK was sent	6		date	YES				061006
parameter separator		1	,		NO				,
AckTime	Time when Submit was received and ACK was sent	4		timemin	YES				1318

Table 12.2.2.6-3 – WDACOM01 ACARS Definition

Field name	Meaning	Field length (in Char)	Contents		Option	range	resolution	Unit	Example
			Fixed text	Variable text					
Command	'1' = Command (WDAACK received correctly and confirmed by user), '0' or any other value means cancel.	1		B	NO	0 to 1			1

Table 12.2.2.6.4 – WDACON01 ACARS Definition

Field name	Meaning	Field length (in Char)	Contents		Option	range	resolution	Unit	Example
			Fixed text	Variable text					
PSWQ Setting Status	'1' = PSWQ Setting successful '0' or any other value means canceled	1		B	NO	0 to 1			1

12.0 POTABLE WATER SYSTEM

Examples:

In the first example a pre-selection of 80% is submitted and successfully set.

In the second example an invalid value is entered as pre-selection value and in the ACK message the next valid value is indicated, which is subsequent confirmed.

```

Uplink:      ,WDASUB01061009144432/80,xxxx
Downlink:    ,WDAACK01061009144452/0,80,061006,1318,xxxx
Uplink:      ,WDACOM01061009144517/1,xxxx
Downlink:    ,WDACON01061009144610/1,xxxx

Uplink:      ,WDASUB01061009154432/67,xxxx
Downlink:    ,WDAACK01061009154452/6,70,061006,1318,xxxx
Uplink:      ,WDACOM01061009154517/1,xxxx
Downlink:    ,WDACON01061009154610/1,xxxx

```

12.2.2.7 XML Format

To be added in a future supplement.

12.2.3 Errors

General Error Service to be used.

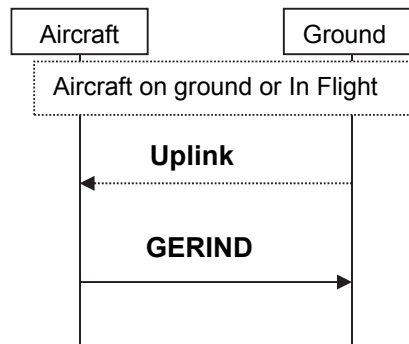


Figure 12.2.3-1 – Typical Error Exchange

The General Error Service ('GER', refer to Section 5.2.1) is used to report any error detected by the aircraft Water application to the Ground. The General Error Service contains one element named 'IND' (INDication)

Depending on the type of received uplink and on its content, various types of errors will be reported by the aircraft (see in Sections 12.2.1 and 12.2.2 and in table below for list of possible error codes).

GERIND uplinks are not used by the Potable Water System.

12.2.3.1 Water-Error-Indication Downlink (GERIND)

Element Name: **GERIND**

12.2.3.2 Dynamic Aspects

Refer to other sections for details.

12.2.3.3 ACARS Format

For the General Error Indication element structure refer to Section 5.2.1.1.

The General Error Indication downlink may contain one or several optional supplementary address (as per ARINC Specification 620), which will be the copy of the supplementary address(es) (if present) contained in last received uplink.

12.0 POTABLE WATER SYSTEM

Table 12.2.3.3-1 – Application Specific Error Types

Sender's Situation	Type Name	Type ID	Suggested text to user (e.g., flightcrew)	Comment
As defined in Section 5		0		
		1		
		2		
		3		
		4		
		5		
		6		
		7		
		8		
		9		
		10		
		11		
Aircraft water system is not able to process the uplink (i.e., Submit Water data process on going with another Ground system)	Busy	21		
Communication is broken with the avionics water system, datalink application is not able to send data to the water system – therefore, WDASUB is not available.	read-only	22		
ACARS transaction procedure overruled and aborted by source on A/C	Aborted	23		
Disabled on A/C due to e.g., servicing procedure	disabled	24		

Application Specific Use of Error Data

Contains supplier specific detailed information for troubleshooting (software status, source of the error, parameters values, etc.).

In case of error 5, should only list the supported versions of the service (NN separated by spaces).

12.2.3.4 XML Format

This format should be used for ground-ground message exchanges only.

**ATTACHMENT 1
AOC APPLICATION ELECTRONIC DOCUMENT**

ATTACHMENT 1 AOC APPLICATION ELECTRONIC DOCUMENT

1.1 Schema

As stated in Section 1.3.2, the electronic document has precedence over the text portion of this standard. The electronic document consists of multiple XML schemas. These schemas are provided to ensure application interoperability and to assist the software designer in proper coding of applications defined in this specification.

COMMENTARY

While the best intent and care has been taken in their construction, no assurances can be made that they are flawless. The reader should report any omissions or inconsistencies to the ARINC IA staff using the attached errata sheet.

The schemas are contained in a separate .zip file with a schema folder containing files with the XML extension of .xsd. The .zip file is available at the namespace www.aviation-ia.com/aeec/SupportFiles/633-2/.

The schemas are located within the ARINC Store and therefore access is limited. AEEC Member Organizations (AMO) and ARINC IA Corporate Sponsors are provided a password with their membership and may download this file at no additional charge. All others will be required to place an order through the ARINC store.

Those who download the schema file will also receive the associated XML schema example files. See Appendix E.

**APPENDIX A
GLOSSARY & ACRONYMS**

APPENDIX A GLOSSARY & ACRONYMS

The following table contains acronyms and definitions used in the document text.

For the definition of parameters used in actual messages, see Appendix D.

Abbreviation	Description	Note/Clarification
ACARS	Aircraft Communication Addressing and Reporting System	In the context of this document, the acronym ACARS is usually used for the ACARS air/ground link consisting of a protocol stack defined in the 1970s
AIP	Aeronautical Information Publication	
AOA	ACARS Over AVLK	A 1990s extension of the original ACARS protocol stack, allowing the use of classical ACARS messages over a modernized subnetwork called VDL Mode 2
AOC	Aeronautical Operational Control	A group or the entirety of applications used for communication of an aircraft with its airline or service partner pendants on the ground An “AOC” super-application could be hosted on a CMU or an EFB platform
ARINC	Aeronautical Radio Incorporated	
AMS	ACARS Message Security	
ATA	Air Transport Association	
ANSI	American National Standards Institute	
ATS	Air Traffic Service(s)	Group of applications used for communication of an aircraft with Air Traffic Control entities on the ground
CA	Certificate Authority	
CG	Center of Gravity	usually expressed in percent of MAC (Mean Aerodynamic Chord)
CMU	Communications Management Unit	Avionics system used as an intermediate system (communication router or gateway) or endsystem.
COTS	Commercial of-the-shelf	
CRC	Cyclic Redundancy Code	A method to assure integrity of messages against unattended corruption
CSMA/CD	Carrier Sense Multiple Access with Collision Detection	
DL	Downlink	message from aircraft to ground
DSP	Datalink communication Service Provider	e.g., SITA and ARINC
DTP	Document Type Definition	
ECAM	Electronic Centralized Monitoring System	
EFB	Electronic Flight Bag	An EFB is an airborne system capable of communicating with ground systems and providing an interface to the flight crew. The EFB is not part of the classical avionics systems. Note that other ARINC documents use the acronym NSS instead of EFB

**APPENDIX A
GLOSSARY & ACRONYMS**

Abbreviation	Description	Note/Clarification
EFD	eFF Downlink	
eFF or eFF system	Electronic Flight Folder	An application, typically hosted on an EFB, which enables pilots to access and manipulate briefing information during all flight phases.
eFF data package (eFF)		The data processed by the eFF application. Always related to one specific flight sector. A full eFF data package usually contains more than 100 kBytes of flight related data.
EFU	eFF Uplink	
EICAS	Engine Indication and Crew Alerting System	
FMS	Flight Management System	Avionics system used by the flight crew for navigation and other flight related tasks. A FMS can be the airborne endsystem of air-/ground messages
FOB	Fuel On Board	Amount of fuel mass contained in aircraft fuel tanks
FQMS	Fuel Quantity Management System	Avionics system managing fuel related tasks, e.g., distribution of fuel in multiple aircraft tanks
FCA	Fuel CG Advisory	
FCAIND	Fuel CG Advisory Indication	
FDA	Fuel Data	
FDAACK	Fuel Data Acknowledge	
FDACOM	Fuel Data Submit Command	
FDASUB	Fuel Data Submit	
FEN	Automatic Refuel End	
FENIND	Automatic Refuel End Indication	
FERIND	Fuel Error Indication	
FO	Fuel Order	
FORACK	Fuel Order Acknowledge	
FORSUB	Fuel Order Submit	
FPR	Fuel Process	
FPRACK	Fuel Process Acknowledge	
FPRREP	Fuel Process Report	
FQMS	Fuel Quantity Management System	
FR	Fuel Receipt	
FRCACK	Fuel Receipt Acknowledge	
FRCSUB	Fuel Receipt Submit	
FST	Fuel Status	
FSTREP	Fuel Status Report	
FSTREQ	Fuel Status Request	
FTB	Fuel auto ground Transfer Begins	
FTBIND	Fuel Transfer Begin Indication	
FTE	Fuel auto ground Transfer End	
FTEIND	Fuel auto ground Transfer End Indication	
FTI	Fuel auto ground Transfer Interrupted	
FTIIND	Fuel auto ground Transfer Interrupted Indication	
GER	General Error Service	
HF	High Frequency	

**APPENDIX A
GLOSSARY & ACRONYMS**

Abbreviation	Description	Note/Clarification
HFDL	High Frequency Data Link	
HTTP	Hypertext Transfer Protocol	
ICAO	International Civil Aviation Organization	
IEC	International Electrotechnical Committee	
IEEE	Institute of Electrical and Electronic Engineers	
IETF		
IP	Internet Protocol	
ISO	International Organization of Standards	
IT	Information Technology	
LLC	Limited Liability Corporation	
LTS	Load Trim Sheet	A document or information package containing data about the aircraft's weights and weights distribution
MFI	Message Function Identifier	
N/A	Not Applicable	
OS	Operating System	
PFQ	Pre-selected Fuel Quantity	
PKI	Public Key Infrastructure	
PSWQ	Pre-selected Water Quantity	
RFC	Request for Comment	
SATCOM	Satellite Communication	
SMI	Standard Message Identifier	
TCP	Transmission control Protocol	
TOCG	Take Off Center of Gravity	
UDP	User Datagram Protocol	
UL	Uplink	message from ground to aircraft
VHF	Very High Frequency	
WBA	Weight and Balance Application	
WDA	Water DAta Status	
WERIND	Weight and Balance Error Indication	
WIFSUB	Weight and Balance Initialize (Full) Submit	
WIISUB	Weight and Balance Initialize (Intermediate) Submit	
WIMSUB	Weight and Balance Initialize (Minimum) Submit	
WIRREP	Weight-balance-Init-eRror-Report Service	
WISUB	Weight and Balance Initialization Submit	
WR1REP	Weight and Balance Report	
WR2REP	Weight and Balance Report	
WST	Water SStatus	
W3C	Worl Wide Web Consortium	
XML	Extensible Markup Language	
ZFW	Zero Fuel Weight	

APPENDIX B
TUTORIAL ON TRANSPORTATION OF 633 MESSAGES OVER ACARS

APPENDIX B TUTORIAL ON TRANSPORTATION OF ARINC 633 MESSAGES OVER ACARS

This appendix explains how ARINC 633, 618 and 620 interact, gives examples and references for message structure for each of these protocols.

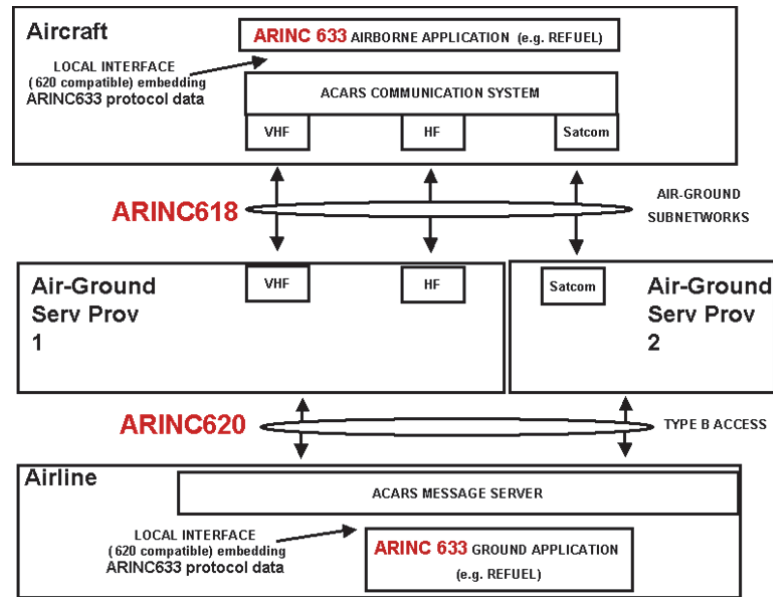


Figure B-1 – Location and Interaction Between ARINC ACARS Protocols

DOWNLINKS

1- Airborne application generates an Application message, e.g. ARINC633 format and sends the request to the router

2- The airborne ACARS router

- chooses the air-ground subnetwork
- formats the message to ARINC618 (message is segmented to fit ARINC618 block size of the selected subnetwork)
- sends the various ARINC618 blocks of the message over the selected subnetwork

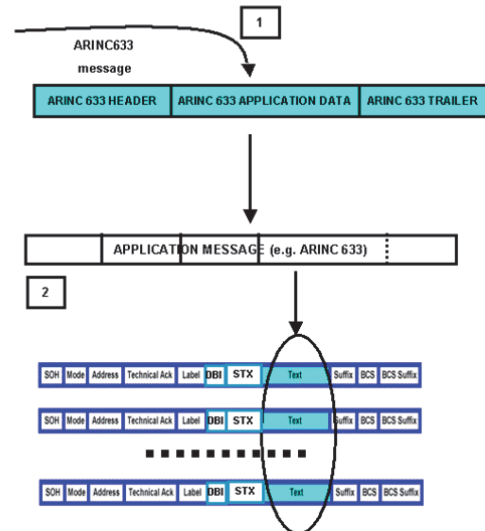


Figure B-2 – Protocol Interactions for ARINC 633 Downlinks

APPENDIX B
TUTORIAL ON TRANSPORTATION OF 633 MESSAGES OVER ACARS

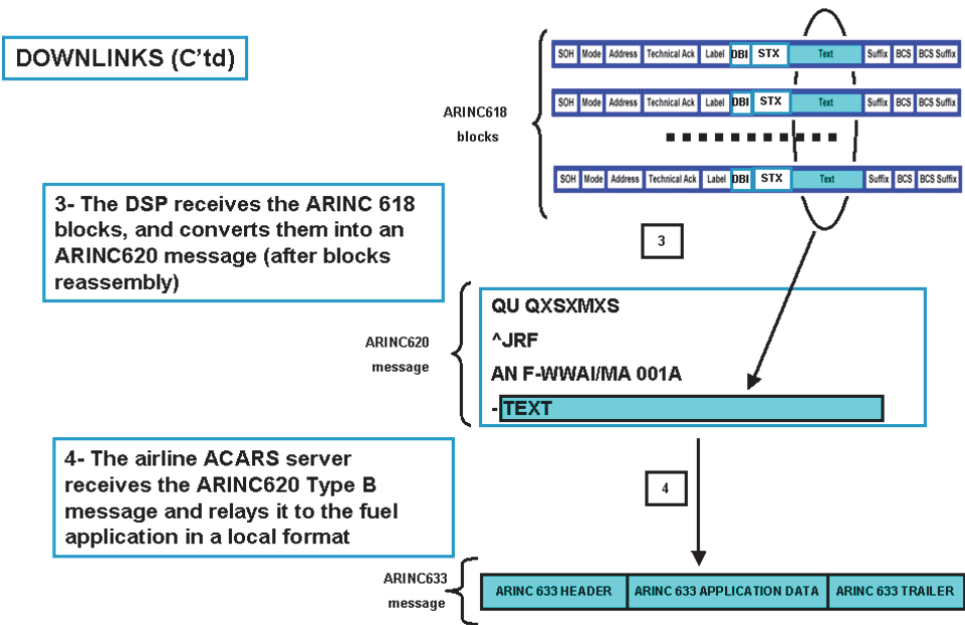


Figure B-3 – Protocol Interactions for ARINC 633 Downlinks (continued)

DOWNLINKS (C'td)

6- The ground application checks the header, and trailer, before processing the data

UPLINKS TRANSMISSION PROCESS IS SYMETRIC

Figure B-4 – Protocol Interactions for ARINC 633 Downlinks (continued)

APPENDIX B

TUTORIAL ON TRANSPORTATION OF 633 MESSAGES OVER ACARS

4.4.2.2 ACARS Message Envelope Structure

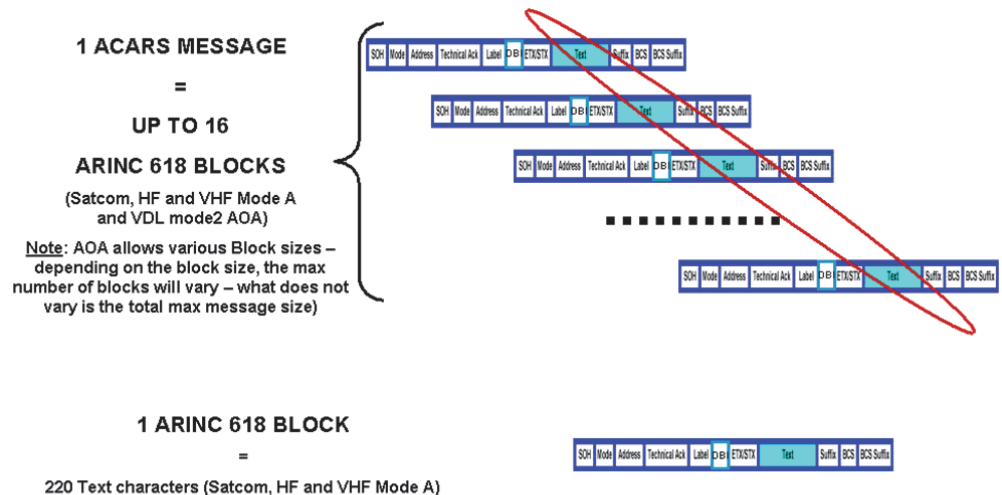
Table 4.4.2.2.1: ACARS Message Envelope

Char	Parameter Name	Format	Example	Option
0-n1	Protection Identifier	(0-n)I or (0-n)J	(empty)	see note
1	delimiter	" "	,	No
3	ServiceIdentifier	3char	FDA	No
3	MessageIdentifier	3char	SUB	No
2	VersionNumber	NN	01	No
12	HeaderTimestamp	datetime	050125131605	No
0-n2	Supplementary Downlink Header Element	see table below	(empty)	Yes
1	ContentElementStartCharacter	"f"	/	No
0-n3	Message Content Element		„230000,0	Yes
1	Parameter Delimiter	" " (comma)	,	No
1	FreeTextStartCharacter	"f"	(empty)	see note
0-n4	FreeText	(0-n)I	(empty)	Yes
4	Application CRC (16 bit)	JJJJ	xxxx	No

EXAMPLE ARINC 633 FDASUB REFUEL MESSAGE IS THUS:

« „FDASUB01050125131605/,„230000,0,xxxx »

Figure B-5 – ARINC 633 Message Structure



NOTE: THIS IS AN EXAMPLE FOR DOWNLINK MESSAGES

Figure B-6 – ARINC 618 Message Structure in Blocks

APPENDIX B TUTORIAL ON TRANSPORTATION OF 633 MESSAGES OVER ACARS

HEREAFTER IS THE FORMAT OF AN ARINC 618 BLOCK

SAME FORMAT IS APPLICABLE TO ALL SUBNETWORKS, EXCEPT FOR VDL MODE 2 – AOA

for some DSPs only WHERE THE ONLY DIFFERENCE IS THE BLOCK MAX TEXT SIZE, THAT CAN BE BIGGER (1008 instead of 220 for some implementations, can go up to 2032 bytes)

NAME OF FIELD	FIELD LENGTH (CHARACTERS)
Start of Header	1
Mode	1
Address	7
Technical Acknowledgment	1
Label	2
Uplink/Downlink Block Identifier	1
Start of Text	1
Text	0 to 220 max (except for VDL2 AOA: 220 or 1008 depending on the DSP) Note: AOA text size= (N1 value (in bits)/8) – 31 Default N1 value=8312b → 1008 characters for SITA Min value for AOA= 2008b → 220 characters for ARINC Max value of N1=16504b → 2032 characters
Suffix	1
Block Check Sequence	2
BCS Suffix	1

Figure B-7 – ARINC 618 Block Structure

UPLINK TO A LOCAL APPLICATION

NAME	SOH	MODE	address	TAK	LABEL	UBI	STX (if text)	APPL TEXT (option)	SUFFIX	BCS	BCS Suffix (<DEL>)
SIZE	1	1	7	1	2	1	1	0 - 220	1	2	1
example	<SOH>	2	.N123XX	3	10	A	<STX>		<ETX> or <ETB> for last block of msg		<DEL>

UPLINK TO A REMOTE APPLICATION (ARINC 619 USER)

NAME	<SOH>	MODE	address	TAK	LABEL	UBI	<STX>	“.”	<SP> (space char)	“#”	SUB LABEL	APPL TEXT (option)	SUFFIX	BCS	BCS Suffix (<DEL>)
SIZE	1	1	7	1	2	1	1	1	1	1	2	0-215	1	2	1
EXAMP LE	<SOH>	2	.N123XX	3	H1	A	<STX>	“.”	<SP>	“#”	MD		<ETB> or <ETX>		<DEL>

Uplink supplementary address(es):

Some uplink messages permit the inclusion of a supplementary address field. The supplementary address field of the uplink message, if present, will contain the address of the source (End system) that is providing the uplink message. In the case of ATS messages, the Supplementary address will typically be that of the ATC facility that is responsible for the airspace in which the aircraft is located, or into which the aircraft is expected to travel. The information in the supplementary address field is used to address the response, to the message, if any. The supplementary address field may contain additional addresses, designating secondary recipients of any subsequent downlink generated by the aircraft avionics in response to the uplink message. First supplementary address can be the message MFI (2 characters only).

Figure B-8 – ARINC 618 Block Structure for Uplink

APPENDIX B
TUTORIAL ON TRANSPORTATION OF 633 MESSAGES OVER ACARS

DOWNLINK FROM A LOCAL APPLICATION

NAME	SOH	MODE	A/C Address	TAK	LABEL	DBI	STX (if text)	MS N	Flight ID	APPL TEXT (option)	SUFFIX	BCS	BCS Suffix (<DEL>)
SIZE	1	1	7	1	2	1	1	4	6	0 - 210	1	2	1
example	<SOH>	2	N123XX	3	10	B	<STX>				<ETX> or <ETB>		<DEL>

DOWNLINK FROM A REMOTE APPLICATION (ARINC 619 USER)

NAME	<SOH>	mode	A/C address	TAK	label	DBI	<STX>	MSN	Flight ID	#	SUB LABEL + 'B'	APPL TEXT	suffix	BCS	BCS Suffix
SIZE	1	1	7	1	2	1	1	4	6	1	3	0-208	1	2	1
EXAMPLE	<SOH>	2	N123XX	3	H1	A	<STX>	S02A	AP1234	#	MDB		ETX		

Downlink supplementary address(es):

For some downlink message types it is possible to include Supplementary Addresses in the message text. The DSP will determine the ground address(es) of the downlink message and will add the addresses included in the Supplementary Address field to line 1 of the ground/ground message.

When Supplementary Addresses are included in the downlink, the Supplementary Address field begins with 'I' and is immediately followed by the first character of the first address. Subsequent addresses in the Supplementary Address field are separated by a space character. The last address in the list is followed by a period character. The maximum number of Supplementary Addresses is 16.

A Supplementary Address is normally either 7, 4 or 3 letters in length. All other Supplemental addresses in a single message must be of the same length. First supplementary address can be the message MFI (2 characters only).

Figure B-9 – ARINC 618 Block Structure for Downlink

REFER TO ARINC 620 SECTION 3.2.2

Title	Format	example
Destination address line	QU (priority) Destination address (airline host)	"QU XYTGK7X" (normal priority + to airline host)
Signature line	.. Source address Date and time	".QXSXMXS 251318" (from DSP on the 25 th of current month at 13h18mn)
SMI line	<01h> SMI value	"^CFD" (CMS message)
Text Element line	TEI + values list separated by 'I' In general: Flight identifier value and Aircraft number value	"FI AP0001/AN F-WWAI"
Communication service line	'DT' DSP RGS or VGS or GES or HFDL ground station Id Date and time MSN	"DT QXS FRA2 251318 C01A"
Free text line	Dash Space Application Data	"- data" where 'data' is application data
Free text line with supplementary addresses	Dash Space Slash Supplementary address #1 Space Supplementary address #2 ...list of addresses separated by spaces Supplementary address #16 Period Application Data	"- /XYTGL7X XYTGK7X data" where 'data' is application data

Figure B-10 – ARINC 620 Block Structure for Downlink

APPENDIX B
TUTORIAL ON TRANSPORTATION OF 633 MESSAGES OVER ACARS

REFER TO ARINC 620 SECTION 3.2.3

Title	Format	Example
Destination address line	QU (priority) Destination address (airline host)	"QU QXSXMXS" (normal priority + to airline host)
Signature line <i>(in general, not used for uplinks)</i>	Source address Date and time	"XYTGK7X 251318" (from airline on the 25 th of current month at 13h18mn)
SMI line	<01h> SMI value	"^CFD" (CMS message)
Text Element line <i>(in general, AN or FI exclusives)</i>	TEI + values list separated by '/' In general: Flight identifier value and/or Aircraft number value and possibly MAS element The airline host may also specify a transmission path (TP) to force transmission on a given subnetwork	"AN F-VWAI/MA 007A/TP SAT »" (to aircraft number F-VWAI, message number 7, MAS requested, routed only by Satcom allowed)
Free text line	Dash Space Depends on message	"- data" where 'data' is application data
Free text line with supplementary addresses	Dash Space Depends on message	"- xxxxxxxx" where xxxxxxxx is application data

Figure B-11 – ARINC 620 Block Structure for Uplink

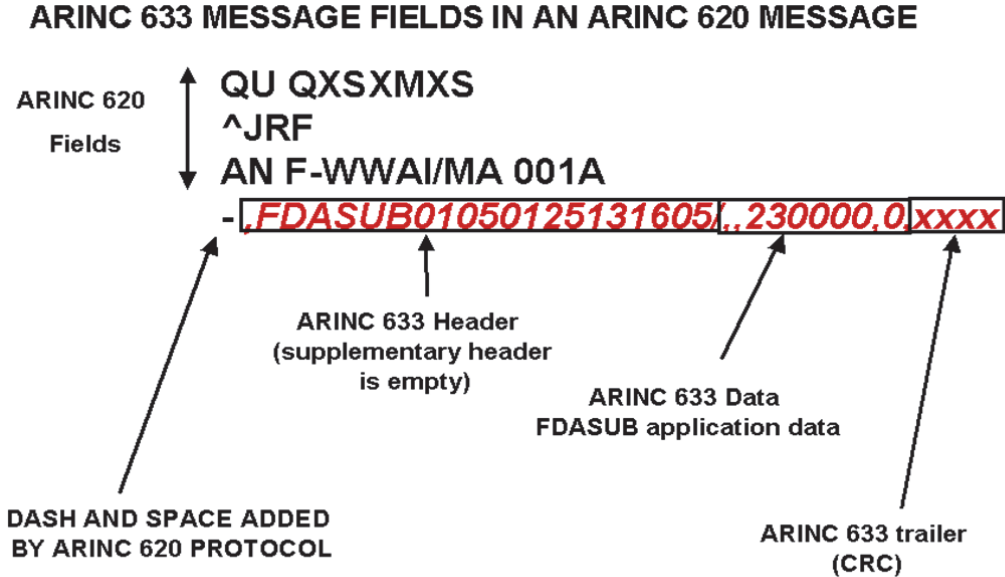


Figure B-12 – Example of an ARINC 633 Message Decoded at ARINC 620 Level

APPENDIX B
TUTORIAL ON TRANSPORTATION OF 633 MESSAGES OVER ACARS

1. GND sends fuel data submit uplink (FDASUB) (with Message Assurance required, code A aircraft ack requested)

```
QU QXSXMXS
^JRF
AN F-WWAI/MA 001A
- ,FDASUB01050125131605/,230000,0,xxxx
```

(where xxxx is the CRC computed on the free text)
 (ARINC633 fuel message is in red and italic)

2. Reception of MAS (acknowledgement) of uplink (MA 001S: S=Success, F=fail)(optional)

```
QU QXSXMXS
^MAS
AN F-WWAI/FI AP0001/MA 001S
DT QXS FRA2 251317 S10A
```

3. Fuel Data submit ACK is sent by the aircraft

```
QU XYTGK7X
.QXSXMXS 251318
^JRF
FI AP0001/AN F-WWAI
DT QXS FRA2 251318 U01A
- ,FDAACK01050125131701/,230000,0,xxxx
```

(where xxxx is the CRC computed on the free text)
 (ARINC633 fuel message is in red and italic)

Figure B-13 – Example of Fuel Exchanges at ARINC 620 Level

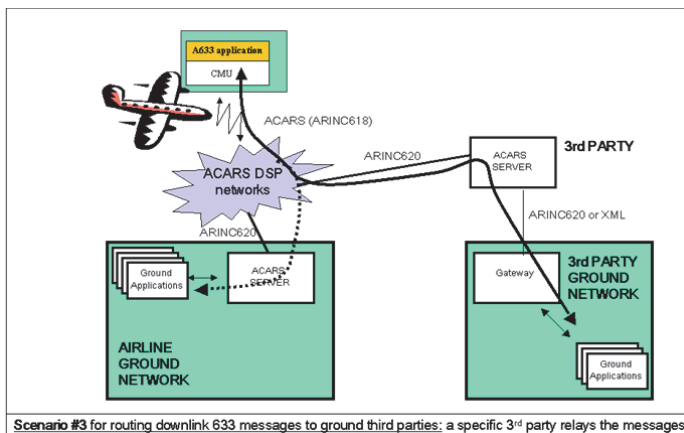
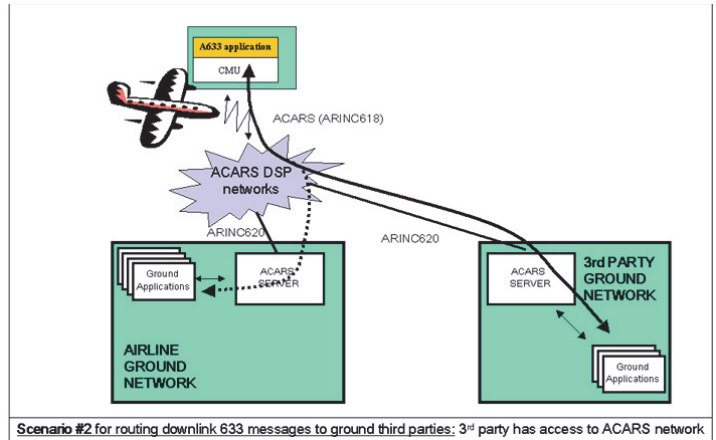
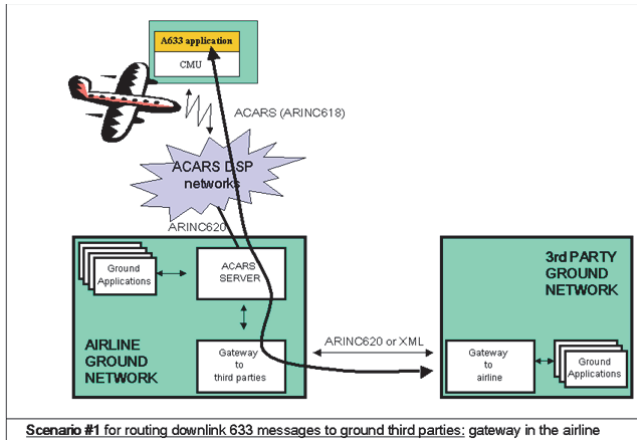
APPENDIX C POSSIBLE SCENARIOS FOR ROUTING ACARS MESSAGES TO MULTIPLE PARTIES

APPENDIX C POSSIBLE SCENARIOS FOR ROUTING ACARS MESSAGES TO MULTIPLE PARTIES

This appendix gives some examples of implementation of routing of downlink messages to multiple ground parties.

3 main scenarios are identified:

1. Centralized at airline
2. Decentralized: all parties have access to the ACARS network and DSP routes downlink messages to all interested parties (identified either statically or via supplementary addresses)
3. Centralized at a third party: maybe the DSP or any other party



**APPENDIX D
PARAMETER TABLE**

APPENDIX D PARAMETER TABLE

The following table lists parameters that may be available to typical Datalink installations and could be used in ARINC 633 message definition.

In a given aircraft installation, only a subset of these parameters may be available. Parameters that appear in standardized messages have been added to this list.

Parameter Name	Def	Meaning	Example
A/THREngaged			
A623Connected			
AcrStatus			
Airborne			
AircraftConfiguration			
AircraftFleetIdentification			
AircraftType			
AircraftMassUnitDisplay			
AirlineIdentification			
AirportDestinationAlternate			
Altitude			
AltitudeCabinCurrent			
AltitudeCabinTarget			
APEngaged			
APEngagedMessageOnFMA			
APUAirIntake			
APUAvailable			
APUFaultPresent			
APUFuelLowPressure			
APURequired			
APUShutDown			
APUBleedValveClosed			
APUEGT			
APUFuelFlow			
APULowOilPressure			
APUOilPressure			
APUOilQuantity			
APUOilTemperature			
APUOperatingHours			
APURPMOutput			
APURunning			
APUStart			
APUStartCycles			
AverageWheelSpeed			
BaroAltitude			
Citypair			
CommandType			
CompanyRoute			
ComputedAirspeed			
CurrentDate			
CurrentFOB			

APPENDIX D
PARAMETER TABLE

Parameter Name	Def	Meaning	Example
CurrentPFQ			
CurrentPFQDate			
CurrentPFQSource			
CurrentPFQTime			
CurrentTime			
CurrentTTF			
CurrentZFCG			
CurrentZFCGDate			
CurrentZFCGSource			
CurrentZFCGTime			
CurrentZFW			
CurrentZFWDate			
CurrentZFWSource			
CurrentZFWTime			
DesiredTrack			
DestinationLatitude			
DestinationLongitude			
DistanceToDestination			
DistanceToWaypoint			
DoorCargo1Closed			
DoorCargo2Closed			
DoorCargo3Closed			
DoorCargo4Closed			
DoorEbayClosed			
DoorEntry1Closed			
DoorEntry2Closed			
DoorEntry3Closed			
DoorEntry4Closed			
DoorEntry5Closed			
DoorEntry6Closed			
DoorEntry7Closed			
DoorEntry8Closed			
DoorFlightDeckClosed			
DoorMainFwdClosed			
DoorsAllCabinClosed			
DoorsAllClosed			
DoorServiceClosed			
DriftAngle			
ECSPack1On			
ECSPack2On			
ECSPack3On			
Eng1BleedValveClosed			
Eng1EGT			
Eng1EPR			
Eng1FuelCutoff			
Eng1FuelFlow			
Eng1InletTurbineTemp			
Eng1LowOilPressure			
Eng1Mode			
Eng1N1			

**APPENDIX D
PARAMETER TABLE**

Parameter Name	Def	Meaning	Example
Eng1N2			
Eng1OilPressure			
Eng1OilQuantity			
Eng1OilTemperature			
Eng1Running			
Eng1TargetN1			
Eng1VibHP			
Eng1VibLP			
Engine identification			
Engine type			
ETAToDestination			
ETAToWaypoint			
FD engagement status			
FlapPosition			
Flight Phase FWC			
FlightIdentifier			
FlightNumber			
FMA modes engaged			
FMSActiveRoute			
FMSDate			
FMSDestinationAirport			
FMSDestinationRunway			
FMSFlightID			
FMSFlightPhase			
FMSOriginAirport			
FMSTime			
FOB			
FOBAccuracyState			
FQMS Fault			
FuelCenterTank			
FuelFlow			
FuelOnBoard-Unit			
FuelQuantity-Unit			
FuelDensity			
FuelOnBoard			
FuelQtyTank1			
FuelQtyTank2			
FuelQtyTank3			
FuelTemperature			
GearLeverDown			
Grossweight			
GroundSpeed			
GWCG			
GWCGAccuracyState			
ICAOAircraftAddrXPDR			
IndicatedAirspeed			
Jettison fault			
LandingCenterGear			
LandingGearOnGround			
LandingGearRetractionFault			

APPENDIX D
PARAMETER TABLE

Parameter Name	Def	Meaning	Example
LandingGearStatusFailures			
LandingGearSystemFault			
LandingGearSystemInControl			
LandingGearDown			
Mach			
MagneticHeading			
MagneticVariation			
MinimumAirspeed			
NavDatabase-Active			
OOOI1InDiscrete			
OOOI2InDiscrete			
OOOI3InDiscrete			
OOOI4InDiscrete			
OOOI5InDiscrete			
OOOI6InDiscrete			
OOOI7InDiscrete			
OOOI8InDiscrete			
OOOIOnOffInDiscrete			
OutsideAirTemperature			
PackValve1CmdOpen			
PackValve2CmdOpen			
ParkingBrakeSet			
PitchAngle			
PresentPositionLatitude			
PresentPositionLatLon			
PresentPositionLongitude			
PressureAltitude			
RadioHeightC			
RadioHeightL			
RadioHeightR			
ReceivedDatalinkPFQ			
ReceivedDatalinkPFQOutOfRange			
ReceivedDatalinkZFCG			
ReceivedDatalinkZFCGOutOfRange			
ReceivedDatalinkZFW			
ReceivedDatalinkZFWOutOfRange			
Refuel Panel Status			
Refuel Progress Parameter			
RegistrationNumber			
RollAngle			
RotatingBeaconOn			
SCI-ApplicationStatus			
SCI-Status			
SDUInstalled			
SelectedAirspeed			
SelectedAltitude			
SlideStatus			
StaticAirTemperature			
SubmittedPFQ			
SubmittedZFCG			

**APPENDIX D
PARAMETER TABLE**

Parameter Name	Def	Meaning	Example
SubmittedZFW			
ThrottleLeverAngle1			
ThrottleLeverAngle2			
ThrottleLeverAngle3			
ThrottleLeverAngle4			
TimeToDestination			
TimeToTopOfClimb			
TimeToTopOfDescent			
TimeToWaypoint			
TotalAirTemperature			
TrackAngleTrueValue			
TrackAngle			
TrimTankFuelQuantity			
TrueAirspeed			
TrueHeading			
TTF			
TTFAccuracyState			
Waypoint sequenced			
Weight-GWReinitRequest			
Weight-GW-ZFWUnit			
Weight-ZFW(used for performance computation)			
Weight-ZFWReinitRequest			
WeightOnWheels			
WindDirection			
WindSpeed			
WingAntilceSwOn			
ZeroFuelWeight			

Parameter Name	Def.	Meaning	Example
acMod	acType	Aircraft Equipment subtype according to ICAO 4444	A346
aircraftMassUnitDisplay	AA	Unit used for pilot display, e.g., FMS or ECAM/EICAS	KG
applicationID	Char3Type	Identification of the airborne application	JRE
ATO		Actual Time Over a Waypoint	
commandType	boolean	1 = Confirm, 0 or any other value means cancel	1
departureTime	time	Estimate of the time the aircraft leaves its parking stand	
departureDate	date	Estimate of the date the aircraft leaves its parking stand	
ETA	time	Estimate of the time the aircraft touches down	
ETimeOff	time	Estimate of the time the aircraft takes off	
ETimeIn	time	Estimate of the time the aircraft reaches parking stand	
FOB	mass-kg	The current metric value of the aircraft's Fuel On Board parameter	98100

APPENDIX D
PARAMETER TABLE

Parameter Name	Def.	Meaning	Example
TTK	mass-kg	The current metric value of the aircraft's Trim Tank Fuel parameter	7500
currentPFQ	mass-kg	The current metric value of the aircraft's Preselected Fuel Quantity parameter. This value specifies the end-quantity of the next aircraft refueling process	230000
PFQ	mass-kg	Amount of fuel that is wished to be in the aircraft after refueling. After fueling is finished PFQ should equal FOB	230000
PFQEntryDate	date	date when PFQ was last changed	050124, 061224
currentPFQSource	A	source that changed PFQ	F (for FMS)
currentPFQTime	time	time when PFQ was last changed	2329
currentZFCG	center-of-gravity	The current value of the aircraft's Zero Fuel Center-of-Gravity parameter.	385
ZFCGEntryDate	date	date when ZFCG was last changed	050124
currentZFCGSource	A	source that changed ZFCG	'A' (for ACARS)
ZFCGEntryTime	time	time when ZFCG was last changed	2359
currentZFW	mass-kg	The current metric value of the aircraft's Zero Fuel Weight (Mass) parameter.	320500
ZFWEntryDate	date	date when ZFW was last changed	050125
currentZFWSource	A	source that changed ZFW	'F' (for FMS)
ZFWEntryTime	time	time when ZFW was last changed	000055
dep	airport		LFPG
dest	airport		KJFK
flightDate	String	Flight date (YYMMDD)	051231
FOB	mass-kg	The current metric value of the aircraft's Fuel On Board parameter. Amount of fuel mass contained in aircraft fuel tanks	230100
FOBAccuracyState	boolean	1 = Normal, 0 = Degraded	0
GW	mass-kg	Total aircraft mass. GW includes taxi fuel and therefore GW is higher than TOW	56700
GWCG	center-of-gravity	The current value of the aircraft's Gross Weight Center-of-Gravity parameter	397
GWCGAccuracyState	boolean	1 = Normal, 0 = Degraded	1
messageID	Char3Type		SUB
receivedDatalinkPFQ	mass-kg	Contains the metric Preselected Fuel Quantity value to which the aircraft's refuel panel is to be set. This value specifies the end-quantity of the next aircraft refueling process	230000
receivedDatalinkPFQOutOfRange	mass-kg	same parameter, but received value out of range	

**APPENDIX D
PARAMETER TABLE**

Parameter Name	Def.	Meaning	Example
receivedDatalinkZFCG	center-of-gravity	Contains the Zero Fuel Weight Center-of-Gravity value. An A380 needs this value to distribute the fuel correctly	
receivedDatalinkZFCGOutOfRange	center-of-gravity	same parameter, but received value out of range	585
receivedDatalinkZFW	mass-kg	Contains the Zero Fuel Weight value. An A380 needs this value to distribute the fuel correctly.	320500
receivedDatalinkZFWOutOfRange	mass-kg	same parameter, but received value out of range	
serviceID	Char3Type		FPR
submittedPFQ	mass-kg	Contains the metric Preselected Fuel Quantity value to which the aircraft's refuel panel is to be set. This value specifies the end-quantity of the next aircraft refueling process	230000
submittedZFCG	center-of-gravity	Contains the Zero Fuel Weight Center-of-Gravity value. An A380 needs this value to distribute the fuel correctly.	385
submittedZFW	mass-kg	Contains the Zero Fuel Weight value. An A380 needs this value to distribute the fuel correctly.	320500
TimeOut	time	Actual time the aircraft leaves its parking stand	
TimeIn	time	Actual time the aircraft reaches parking stand	
TimeOff	time	Actual time the aircraft takes off	
TOCG	center-of-gravity	Take-off Center of Gravity	350
TTF	mass-kg	The current value of the aircraft's Trim Tank Fuel quantity	4200
TTFAccuracyState	boolean	1 = Normal, 0 = Degraded	1
TTK	mass-kg	Amount of Fuel in Trim Tank. While aircraft fuel tanks are usually in the wings and the airframe between the wings, the trim tank is usually in the aft of the aircraft, e.g., the stabilizer. Therefore filling or emptying the trim tank strongly effects the aircraft's CG	4500
versionNb	Int	Version Number	1
ZFW	mass-kg	Zero Fuel Weight. Mass of a fully loaded aircraft, except for the fuel	
ZFWCG	center-of-gravity	Zero Fuel Weight Center of Gravity	390

**APPENDIX D
PARAMETER TABLE**

Generic Avionics Parameter Table

Note: Parameter definitions per ARINC Characteristic 763-3.

Parameter Name	Def.	Meaning	Example
WhoAml			
AirlineID	IATA 767, 1-999		
AircraftID	ICAO, 1-7 char		
AircraftType	ICAO, 4 char		
AircraftTailNumber	alpha, 1-7 char		
FlightNumber	alpha, 1-6 char		
WhereAml			
Latitude	degrees ±180		
Longitude	degrees ±180		
BaroCorrectedAltitude	feet (0-131072)		
ComputedAirspeed	knots ±1024		
TrueAirspeed	knots ± 2048		
Mach	0 – 4.096		
TrueHeading	degrees ±180		
StaticAirTemp	degreesC, ±180		
VerticalSpeed	FPM, ±32768		
Origin	alpha, 4 chars		
Destination	alpha, 4 chars		
DistanceToDestination	NM, 0-32768		
TimeToDestination	Minutes, 0-8192		
WindSpeed	knots, 0-256		
WindDirection	degree, ±180		
TrueTrack	degree, ±180		
OOOI	packed discrete	as per ARINC 758	
WhenAml			
TimeUTC	alpha, HH:MM:SS.SS		
Date	DD:MM:YY		
WeightOnWheels	0 = ground		
FlightPhase	{Gate, Taxi, TakeOff, Climb, Cruise, Descent}		

COMMENTARY

All mass parameters in this specification have been named as weights, because the term weight is more commonly used than the term mass.

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SUPPLEMENT 1
TO
ARINC SPECIFICATION 633
AOC AIR-GROUND DATA AND MESSAGE EXCHANGE FORMAT

Published: March 12, 2010

Prepared by the AEEC

Adopted by the AEEC Executive Committee:

October 28, 2009

A. PURPOSE OF THIS DOCUMENT

This Supplement provides corrections or updates to the structure of the XML applications, particularly the electronic Flight Folder (eFF). Within the eFF, more changes were applicable to the headers and FlightPlan. The reader should be aware that the changes to the parameter nomenclature have rendered these schema versions not to be backward compatible with the original ARINC 633 schema.

B. ORGANIZATION OF THIS SUPPLEMENT

In this document **blue bold** text is used to indicate those areas of text changed by the current Supplement only.

C. CHANGES TO ARINC SPECIFICATION 633-1 INTRODUCED BY THIS SUPPLEMENT

This section presents a complete listing of the changes to the document introduced by this Supplement. Each change is identified by the section number and the title as it will appear in the complete document. Where necessary, a brief description of the change is included.

1.1 Purpose of Document

A new (second) COMMENTARY was added at the end of the section.

1.3.2 “Electronic” Document

The web site address was updated to reflect the current location of the associated files.

The description of sequential schema naming was expanded, indicating that the filename for A633 Supplement 1 is ARINC633-1_AOC.zip.

3.0 ACARS MESSAGE SECURITY AND COMPRESSION

The introduction was expanded by the addition of an advisory in a box declaring that ARINC Specification 823 has precedence. Security guidance in this document (ARINC 633) is provided as general guidance.

3.1 Airline Operations Considerations

A new COMMENTARY was added after paragraph 2.

3.2 ACARS Message Security

New text was added to introduce and reference ARINC 823 (Parts 1 and 2). The definitions of Data Integrity and Message Authentication were tightened.

4.2.2 Parameter Type Definitions

A new parameter type, `waterquantityType`, was added to Table 4.2.2-2: Specific ACARS Parameter Type Definition Table.

4.4.4 M633Headers

A new section and its sub-sections (4.4.4.1 – 4.4.4.2) were added.

5.0 Common Elements

Fully-documented common elements and attributes were added.

5.2.1.2 General ERRor INDication XML Format

Fully-documented common elements and attributes were added.

5.4 Operational Flight Plan

FAR 121.639 and FAR 91.167 are cited as requirements documents that drive the definition of flight plan applications. Fully-documented common elements and attributes were added.

5.16 Airport Information

Fully-documented common elements and attributes were added.

5.17 Security Information

This section was deleted by Supplement 1.

5.18 Airline Defined

This section was deleted by Supplement 1.

5.19 Upper Air Data

Fully-documented common elements and attributes were added.

5.20 Airspace Data

Fully-documented common elements and attributes were added.

6.2.2.6 XML Format

Fully-documented common elements and attributes were added.

6.2.3.4 XML Format

Fully-documented common elements and attributes were added.

6.2.4.4 XML Format

Fully-documented common elements and attributes were added.

6.2.5.4 XML Format

Fully-documented common elements and attributes were added.

6.2.6.4 XML Format

Fully-documented common elements and attributes were added.

6.2.7.4 XML Format

Fully-documented common elements and attributes were added.

6.3.1.5 XML Format

Fully-documented common elements and attributes were added.

6.3.2.4 XML Format

Fully-documented common elements and attributes were added.

6.3.3.3 XML Format

Fully-documented common elements and attributes were added.

6.3.4.3 XML Format

Fully-documented common elements and attributes were added.

9.1.2 XML Format

Fully-documented common elements and attributes were added.

9.2.1.1.2 XML format

Fully-documented common elements and attributes were added.

9.2.2.1.2 XML format

Fully-documented common elements and attributes were added.

9.2.3.1.2 XML format

Fully-documented common elements and attributes were added.

9.4.1.2 XML format

Fully-documented common elements and attributes were added.

10.2.5 Topic concept

Fully-documented common elements and attributes were added.

- 10.2.6 Subfolders Properties**
Fully-documented common elements and attributes were added.
- 10.2.7 Subfolder Associations**
Fully-documented common elements and attributes were added.
- 10.2.8 Documents Properties**
Fully-documented common elements and attributes were added.
- 10.2.9 Document Associations**
Fully-documented common elements and attributes were added.
- 10.2.11 eFF Schema**
Fully-documented common elements and attributes were added.
- 10.4.1.4 XML Format**
Fully-documented common elements and attributes were added.
- 10.4.2.3 XML Format**
Fully-documented common elements and attributes were added.
- 10.4.3.3 XML Format**
Fully-documented common elements and attributes were added.
- 11.1.5 DOR XML Schema**
Fully-documented common elements and attributes were added.
- 11.2.4 XML Schema**
Fully-documented common elements and attributes were added.
- 11.3.3 XML Schema**
Fully-documented common elements and attributes were added.
- 12.0 Potable Water System**
New section added.

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SUPPLEMENT 2
TO
ARINC 2 SPECIFICATION 633
AOC AIR-GROUND DATA AND MESSAGE EXCHANGE FORMAT

Published: November 28, 2012

Prepared by the AEEC

Adopted by the AEEC Executive Committee:

October 4, 2012

A. PURPOSE OF THIS DOCUMENT

This Supplement thoroughly updates ARINC Specification 633. XML schemas are added and existing schemas are modified (extensive FlightPlan revision). XML examples are included (e.g., AirportData, AirportWxr, ATS ICAO FlightPlan, CrewList and PaxList, NOTAM, Pirep, UpperAirData Hazard Advisory, etc.).

B. ORGANIZATION OF THIS SUPPLEMENT

In this document **blue bold** text is used to indicate those areas of text changed by the current Supplement only.

C. CHANGES TO ARINC SPECIFICATION 633 INTRODUCED BY THIS SUPPLEMENT

This section presents a complete listing of the changes to the document introduced by this Supplement. Each change is identified by the section number and the title as it will appear in the complete document. Where necessary, a brief description of the change is included.

1.1 Purpose of Document

References to ARINC 633-2 were added.

1.3.1 “Text” Document

The following statements were deleted: “It should be noted that XML schemas are not defined in this document” and “The XML schemas are located in the electronic portion of this specification, See Section 1.3.2.”

1.3.2 “Electronic” Document

This section was expanded. References to ARINC 633-1 were changed to ARINC 633-2. The link to the standard’s XML supporting files web site was revised. Examples that were previously contained in A633-1.zip are now in the newly created A633-2_examples.zip file.

4.4.4.1 M633Header

This section was revised to reflect that schema versionNumber 1 corresponds to ARINC 633, versionNumber 2 corresponds to ARINC 633-1, and versionNumber 3 corresponds to ARINC 633-2.

The element M633Header message structure was revised. The properties row was deleted. AirportWeather, ATIS, Crew List and EFFTtype elements were added to the used by row. ARINC 633-2 versionNumber annotation was added to the attributes row.

The order of the versionNumber and timestamp message structures was swapped.

The attribute M633Header/@versionNumber message structure was revised. The properties and facets rows were deleted. The annotation row was modified adding 3 as the version number for ARINC 633-2.

The attribute M633Header/@timestamp message structure was revised by deleting the properties row.

4.4.4.2 M633SupplementaryHeader

M633SupplementaryHeader and M633SupplementaryHeader/Flight message structures were revised; all other existing structures were deleted.

M633SupplementaryHeader message structure: the properties row was deleted. AirportWeather, ATIS, Crew List and EFFTtype elements were added to the used by row.

M633SupplementaryHeader/Flight message structure: the properties row was deleted. AirportWeather, ATIS, Crew List and EFFTye elements were added to the used by row.

M633SupplementaryHeader/Aircraft Message structure was added.

5.0 Common Elements

This section was thoroughly modified. Existing XML data sets which define how the eFF and EFB applications are structured and encoded were revised.

The Weather data set was renamed to AirportWeather data set.

A statement was added noting that attribute waypointId is optional but recommended.

The following XML data set message structures were added:

AircraftType
AircraftRegistration Type
AirportType
AltitudeType
CloudsType
ConnectionInfoType
ContactInfoType
CostIndexType
FlightIdentificationType
FlightNumberType
FlightType
GeographyType
ObservationType
AirportWeatherType
PersonalInfoType
PressureType
RemarksType
SurfaceWind Type
TemperatureType
TextType
TravelDoumentType
VisibilityAndWeatherType
VolumeType
WeatherChangeType
WeatherType
WeightType
brakingActionType
FuelAdjustmentType
ICAOCodeType
WaypointFunctionType
GroupforecastType.

The following diagrams were added:

AirportFunction enumerations

Multiple ETOPS Areas

Terrain Clearance Check and Consideration of Escape Airports.

5.2.1.2 General Error INDication XML Format

The properties row was deleted from the Element GerIND and Element GerIND/Error message structures.

The properties and facets rows were deleted from, and an annotation row added to the following message structures:

Attribute GeneralError/@erroneousSMI
 attribute GeneralErrorType /@erroneous/Service
 attribute GeneralErrorType/@erroneousElement
 attribute GeneralErrorType/@tryAgain

The properties row was deleted from, and an annotation row added to the following message structures:

attribute GeneralErrorType/@erroneousVersion
 attribute GeneralErrorType /@errorClass
 attribute GeneralErrorType/@errorType

The used by row was added to the complexType GeneralErrorType message structure.

5.4 Operational Flight Plan

A note was added. Additional text and element message structures were revised or deleted.

The properties row was deleted from the following message structures:

element FlightPlan
 attribute FlightPlan/@ComputedTime
 attribute FlightPlan/@category
 element FlightInfo
 attribute FlightInfo/@captain
 attribute element FlightInfo.

The properties and facets rows were deleted from the following message structures:

attribute FlightPlan/@flightPlanId
 attribute FlightPlan/@cancelled
 attribute FlightPlan/@linkedFlightPlan
 element FlightPlan/Remarks
 attribute FlightInfo/@captain.

5.4.1 FlightPlanHeader

This section was added, it contains revised text and message structures.

MEL/CDL items were introduced under FlightPlanHeader.

The properties row was deleted from the FlightPlanHeader and RouteInformation message structures. Weight, Altitude and CruiseProcedures Adjustments were added.

The properties rows were deleted from the FuelHeader message structures.

Transport Coefficient information was added.

Reserve Fuel message structure was added.

5.4.2 FuelHeader

This section was added. It contains revised text and message structures.

A statement noting that additional fuel required as a result of the terrain clearance calculation should be treated as a mandatory fuel type.

Adjustment examples were added, Transport Coefficient element information is provided.

Message structures' properties row was deleted throughout.

5.4.3 WeightHeader

This section was added, it contains revised text and message structures.

Message structures' properties row was deleted throughout.

5.4.4 Waypoints

This section was added; it contains revised text and message structures.
Message structures' properties row was deleted throughout.

5.4.5 FlightPlanSummary

This section was added; it contains revised text and message structures.
Message structures' properties row was deleted throughout.

5.4.6 NonStandardFlightPlanningType

This section was added; it contains revised text and message structures.
The following statement was added: "The use of the element /NonStandardFlightPlanningType/NoAlternate is required when the flight plan does not require an Arrival Alternate airport (e.g., island destination scenario). In this case all provided Arrival Alternate Airports are for information only".
Message structures' properties row was deleted throughout.

5.4.7 ETOPS Summary

This section was added, it contains revised text and message structures.
Message structures' properties row was deleted throughout.

5.4.8 AlternateRoutes

This section was added, it contains revised text and message structures.
The following statement was added: "This Structure has to be used also for providing data for the route from Departure Airport to Departure Alternate. The use of @airportFunction is required".
Message structures' properties row was deleted throughout.

5.4.9 AirportDataList

This section was added. It contains revised text and message structures.
Message structures' properties row was deleted throughout.

5.4.10 ContingencySavingsHeader

This section was added. It contains revised text and message structures.
Message structures' properties row was deleted throughout.

5.4.11 FuelStatics

This section was added. It contains revised text and message structures.
Message structures' properties row was deleted throughout.

5.4.12 TankeringInfo

This section was added. It contains revised text and message structures.
Message structures' properties row was deleted throughout.

5.5 ATC Flight Plan

This section was added, it contains revised text and message structures. The properties row was deleted throughout.

The following statements were added: "ICAO has introduced changes to the ICAO model flight plan form and ATS Messages in Amendment 1 to 15th Edition of PANS ATM Doc 4444 which will become applicable as of 15 Nov 2012. Due to this, a number of changes were introduced in the FlightPlanAtclcao structure and definition as well".

The following Note was added: “In order to keep the correct relationship between different files where the @flightPlanId is used, they have to be the same (e.g., FlightPlanAtclcao/@flightPlanId has to be the same as the one used in FlightPlan/@flightPlanId (only for FlightPlan/@category=”normal”), NOTAMBriefing/@flightPlanId etc.)”.

AtcMessageDetail and ItemListType message structures were modified.

5.6 Airport Weather

This previously reserved section was added.

5.7 SIGMET, AIRMET, AIREP, Convective SIGMET

This section was added. It was previously reserved for SIGMET.

5.8 Weather Charts

The following statement was added to this previously reserved section: “A structure and format definition of digital UAD data for a future supplement, most likely referring to BUFR data format, will be provided in a future supplement.”

5.9 NOTAM

This previously reserved section was added.

5.12 Crew List

This previously reserved section was added.

5.13 Pax List

This previously reserved section was added.

5.16 Airport Information

This section was revised. The following statements were added: “Currently the structure and definition of AirportData data is not to be used as a single source for Takeoff and Landing Performance applications. This may be revisited in a future supplement”.

Message structures’ Properties row deleted throughout.

5.19 Upper Air Data

This section was revised. The following statements were added: “The UpperAirData schema is to be used for upper air data along the planned flight route.

The number of waypoints provided with this structure can differ from the number of waypoints provided with the FlightPlan/Waypoints structure.

A structure and definition of digital UpperAirDataArea data independent of the planned route, most likely referring to GRIB2 data format, will be provided in a future supplement.”

Message structures’ Properties row deleted throughout.

5.20 Airspace Data

This section was revised. The following statement was added: “This AirspaceData schema is to be used for providing data related to the airspace areas along the planned flight route which is provided with the FlightPlan schema”.

Message structures’ Properties row deleted throughout.

5.21 ATIS

This section was added.

5.22 Pilot Report

This section was added.

5.23 Hazard Briefing

This section was added.

6.2.1.5 XML Format

The structures in this section were revised. Properties row deleted throughout.

6.2.2.6 XML Format

The structures in this section were revised. Properties row deleted throughout.

6.2.3.4 XML Format

The structures in this section were revised. Properties row deleted throughout.

6.2.5.4 XML Format

The structures in this section were revised. Property's row deleted throughout.

6.2.6.4 XML Format

The structures in this section were revised. Property's row deleted throughout.

6.2.7.4 XML Format

The structures in this section were revised. Properties row deleted throughout.

6.3.1.5 XML Format

The structures in this section were revised. Properties row deleted throughout.

6.3.2.4 XML Format

The structures in this section were revised. Properties row deleted throughout.

6.3.3.3 XML Format

The structures in this section were revised. Properties row deleted throughout.

6.3.4.3 XML Format

The structures in this section were revised. Properties row deleted throughout.

9.1.2 XML Format

The structures in this section were revised. The following statement was added:
“Due to limitations of the current WBA schema, an update is planned for a future supplement”.

Properties row deleted throughout.

9.2.1.1.2 XML Format

The structures in this section were revised. Properties row deleted throughout.

9.2.2.1.2 XML Format

The properties row was deleted from the WIFSUB structure.

9.2.3.1.2 XML Format

The properties row was deleted from the WIFSUB structure.

9.4.1.2 XML Format

The properties row was deleted from the element WI_Error structure.
 The properties and facets rows were deleted from the element WI_Error Message structure.

10.1 Introduction

The Section title was changed from General to Introduction.

The following statements were added at the beginning of the section: “The electronic flight folder consists of a set of information related to an individual segment (origin/destination) of flight. The set of information is bound within an eFF data package (known as ‘eFF’) which is composed of a set of documents (organized by Topics and optionally by folders/subfolders), provided by one or more ground systems and packaged into one or more *.eff files (see 10.3.1 EFF Packaging)”.

10.2.2 Document Storable in the eFF

An MME extension type table and a note were added at the end of the section.

10.2.3 Document / Operational Flight Plan Documents

All Documents bullet was added to types of XML Structure file.

10.2.5 Topic Concepts

The section was expanded.

The namespace row was removed from the ComplexType TopicType structure.

The properties row was removed from the ComplexType TopicType structure.

Table 10.2.5.1 – Recommended Topic Name Values table:

ATIS, Hazard, Weather/Airport, Weather/Regional, NOTAM and Pirep topics were added.

Weather/Test entries: these have been deprecated and will be deleted in future supplements.

NOTAM/ATC and NOTAM/Company: these have been deprecated and will be deleted in future supplements.

10.2.6 Subfolders Properties

Annotations were added or modified in the element SubFolderType/Document structure.

10.2.7 Subfolder Association

The section was expanded.

The properties, facets and annotation rows were removed from the attribute ApplicationType@name structure.

The properties row was removed from the following structures:

attribute ApplicationType@callable

element SubFolder.Template.Grp/StageOfFlight

element SubFolder.Template.Grp/Application

element SubFolder.Template.Grp/Topic

10.2.8 Document Properties

The section was expanded.

The structures in this section were revised.

The properties row was removed from the attribute complexType DocumentType structure. Annotations were modified.

10.2.9 Document Associations

The structures in this section were revised.

The properties and facets row were removed from the following structures:

- attribute ParameterFileType/@file
- attribute ParameterFileType/@name
- attribute ParameterFileType/@value
- attribute SimpleSignType/@userID
- element SimpleSignType/@Digest
- element LegalSignType/@Digest
- element SimpleSignType/@Cert

Properties row deleted from the following structures:

- ParameterFileType/@timestamp
- ParameterFileType/@timetype
- ParameterFileType/@Sign
- attribute SignatureType/@timestamp
- attribute SignatureType/@type
- attribute SignatureType/@LegalSign
- element SignatureType/@SimpleSign
- singleType CertType
- element DocumentType/CommentDocument

The simpleType DocumentMimeType table was added.

10.2.11 eFF Schema

The structures in this section were revised.

Properties and facet row were deleted from the element EFFTtype/templateReference structure.

The properties row was deleted from the following structures:

- element EFFTtype/previousTimestamp
- element EFFTtype/full package
- element EFFTtype/state
- element EFFTtype/SubFolder

The element DocumentType/CommentDocument and SubFolderType structures were added.

10.3.1 eFF Packaging

This section was expanded. Flat Structure and naming conventions were specified.

10.3.4 Updating eFF

This section, and its subsections, was added.

10.4.1.3 XML Format

Message structure properties row deleted from element EFUSUB structure.

10.4.2.3 XML Format

Message structure properties row deleted from element EFDREP structure.

10.4.3.3 XML Format

Message structure properties row deleted throughout.

11.1.5 DOR XML Schema

The properties row was deleted from the following structures:

- element DORSUB
- attribute DORSUB@deicingRequiredIndicator

element DORSUB@ServiceFlight
 element DORIND
 attribute DORIND@deicingOpsindicator
 element DORIND@DeicingPlace
 attribute DORIND@DeicingPlace@deicingPlaceType
 element DORIND@EstimatedDe-IcingBeginTime
 element DORIND@EstimatedDe-IcingEndTime
 element DORIND/DeicingSequenceNumber
 element DORIND/Remark

The properties and facets rows were deleted from the following structures:

attribute DORSUB@acknowledgeRequired
 element DORSUB@ServiceAirport
 element DORSUB@DeicingProviderID

11.2.4 XML Format

The properties row was deleted from the following structures:

element DRCACK/AnticingCode
 element DRCACK/AnticingCode/AntilcingFluidType
 element DRCACK/AnticingCode/AntilcingFluidMix
 element DRCACK/AnticingCode/ActualAntilcingBeginTime
 element DRCSUB
 element DRCSUB/DelcingOnly/ActualAntilcingBeginTime
 element DRCSUB/DelcingOnly/ActualAntilcingEndTime
 element DRCSUB/DelcingOnly/DelcingFluidVolume
 attribute DRCSUB/DelcingOnly/DelcingFluidVolume/@input
 element DRCSUB/Antilcing
 element DRCSUB/Antilcing/DelcingFluidType
 element DRCSUB/Antilcing/ActualAntilcingBeginTime
 element DRCSUB/Antilcing/ActualAntilcingEndTime
 element DRCSUB/Antilcing/DelcingFluidVolume
 element DRCSUB/Antilcing/DelcingFluidVolume/@unit
 element DRCSUB/Antilcing/AntilcingCode
 element DRCSUB/Antilcing/AntilcingCode/AntilcingFluidType
 element DRCSUB/Antilcing/AntilcingCode/AntilcingFluidMix
 element DRCSUB/Antilcing/ActualCode/ActualAntilcingBeginTime
 element DRCSUB/Antilcing/ActualAntilcingEndTime
 element DRCSUB/Antilcing/AntilcingFluidVolume
 attribute DRCSUB/Antilcing/AntilcingFluidVolume/@unit

The properties and facets rows were deleted from the following structure:

element DRCSUB/DelcingOnly/AntilcingFluidMix
 element DRCSUB/Antilcing/DelcingFluidMix

11.3.3 XML Format

The properties row was deleted from all structures.

The properties and facets row was deleted from the following structures:

element DPREP/DelcingOnly/DelcingFuidMix
 element DPREP/Antilcing/DelcingFuidMix

Appendix A – Glossary & Acronyms

New Acronyms were added.

ARINC Standard – Errata Report

1. Document Title

(Insert the number, supplement level, date of publication, and title of the document with the error)

2. Reference

Page Number: _____ Section Number: _____ Date of Submission: _____

3. Error

(Reproduce the material in error, as it appears in the standard.)

4. Recommended Correction

(Reproduce the correction as it would appear in the corrected version of the material.)

5. Reason for Correction (Optional)

(State why the correction is necessary.)

6. Submitter (Optional)

(Name, organization, contact information, e.g., phone, email address.)

Please return comments to fax +1 410-266-2047 or standards@arinc.com

Note: Items 2-5 may be repeated for additional errata. All recommendations will be evaluated by the staff. Any substantive changes will require submission to the relevant subcommittee for incorporation into a subsequent Supplement.

[To be completed by IA Staff]

Errata Report Identifier: _____ **Engineer Assigned:** _____

Review Status: _____

ARINC Project Initiation/Modification (APIM)

1.0 Name of Proposed Project **APIM #:** _____

(Insert name of proposed project.)

1.1 Name of Originator and/or Organization

(Insert name of individual and/or the organization that initiated the APIM)

2.0 Subcommittee Assignment and Project Support

2.1 Suggested AEEC Group and Chairman

(Identify an existing or new AEEC group.)

2.2 Support for the activity (as verified)

Airlines: (Identify each company by name.)

Airframe Manufacturers:

Suppliers:

Others:

2.3 Commitment for Drafting and Meeting Participation (as verified)

Airlines:

Airframe Manufacturers:

Suppliers:

Others:

2.4 Recommended Coordination with other groups

(List other AEEC subcommittees or other groups.)

3.0 Project Scope (why and when standard is needed)

3.1 Description

(Insert description of the scope of the project.)

3.2 Planned usage of the envisioned specification

Note: New airplane programs must be confirmed by manufacturer prior to completing this section.

New aircraft developments planned to use this specification yes ☐ no ☐

Airbus: (aircraft & date)

Boeing: (aircraft & date)

Other: (manufacturer, aircraft & date)

Modification/retrofit requirement yes ☐ no ☐

Specify: (aircraft & date)

Needed for airframe manufacturer or airline project yes ☐ no ☐

Specify: (aircraft & date)

Mandate/regulatory requirement yes ☐ no ☐
 Program and date: (program & date)
 Is the activity defining/changing an infrastructure standard? yes ☐ no ☐
 Specify (e.g., ARINC 429)
 When is the ARINC standard required?
 _____(month/year)_____
 What is driving this date? _____(state reason)_____
 Are 18 months (min) available for standardization work? yes ☐ no ☐
 If NO please specify solution: _____
 Are Patent(s) involved? yes ☐ no ☐
 If YES please describe, identify patent holder: _____

3.3 **Issues to be worked**

(Describe the major issues to be addressed.)

4.0 **Benefits**

4.1 **Basic benefits**

Operational enhancements yes ☐ no ☐
 For equipment standards:
 (a) Is this a hardware characteristic? yes ☐ no ☐
 (b) Is this a software characteristic? yes ☐ no ☐
 (c) Interchangeable interface definition? yes ☐ no ☐
 (d) Interchangeable function definition? yes ☐ no ☐
 If not fully interchangeable, please explain: _____
 Is this a software interface and protocol standard? yes ☐ no ☐
 Specify: _____
 Product offered by more than one supplier yes ☐ no ☐
 Identify: (company name)

4.2 **Specific project benefits (Describe overall project benefits.)**

4.2.1 **Benefits for Airlines**

(Describe any benefits unique to the airline point of view.)

4.2.2 **Benefits for Airframe Manufacturers**

(Describe any benefits unique to the airframe manufacturer's point of view.)

4.2.3 **Benefits for Avionics Equipment Suppliers**

(Describe any benefits unique to the equipment supplier's point of view.)

5.0 **Documents to be Produced and Date of Expected Result**

Identify Project Papers expected to be completed per the table in the following section.

5.1 Meetings and Expected Document Completion

The following table identifies the number of meetings and proposed meeting days needed to produce the documents described above.

Activity	Mtgs	Mtg-Days (Total)	Expected Start Date	Expected Completion Date
<i>Document a</i>	<i># of mtgs</i>	<i># of mtg days</i>	<i>mm/yyyy</i>	<i>mm/yyyy</i>
<i>Document b</i>	<i># of mtgs</i>	<i># of mtg days</i>	<i>mm/yyyy</i>	<i>mm/yyyy</i>

Please note the number of meetings, the number of meeting days, and the frequency of web conferences to be supported by the IA Staff.

6.0 Comments

(Insert any other information deemed useful to the committee for managing this work.)

6.1 Expiration Date for the APIM

April/October 20XX

For IA staff use only

Date Received: : [Click here to enter a date.](#)

IA staff : _____

Potential impact: _____

(A. Safety

B. Regulatory

C. New aircraft/system D. Other)

Resolution: _____

Authorized, Deferred, Withdrawn, More Detail Needed, Rejected)

Assigned to SC/WG: _____

Completed forms should be submitted to the AEEC Executive Secretary.