



Europe A-CDM FIXM Extension v1.0

Primer

The Flight Information Exchange Model (FIXM) is an exchange model capturing Flight and Flow information that is globally standardised. It supports, like AIXM and WXXM, a “core + extension” mechanism: the core part contains the pieces of flight information that are globally recognised and which are endorsed by the FIXM CCB, while extensions supplement the core FIXM model in order to support additional requirements from particular communities of interest. *[adapted from the [FIXM Strategy v1.0](#)]*

This document serves as an introduction to the **Europe A-CDM FIXM Extension v1.0** developed by EUROCONTROL. It describes at high level the content of the extension, provides a brief overview of the Airport Collaborative Decision Making (A-CDM) concept that served as operational driver for the content of the extension and details the triggering activity for its development.

The **Europe A-CDM FIXM Extension v1.0** is still a **research extension** which **shall not be used for any operational purposes**. It is delivered officially to the FIXM CCB and made publicly available on www.FIXM.aero, so that its content can be considered for inclusion in future core FIXM versions, in accordance with the rules for governing the FIXM content described in the FIXM CCB Charter v1.0.

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2014

Version: 1.0

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Document History

| Version | Version Type | Author | Description of Changes |
|---------|--------------|----------------------------|-------------------------------|
| 1.0 | Final | Carlos Fornas, EUROCONTROL | First version of the document |

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Introduction

Purpose of the document

This document serves as an introduction to the **Europe A-CDM FIXM Extension v1.0** developed by EUROCONTROL. It describes at high level the content of the extension, provides a brief overview of the Airport Collaborative Decision Making (A-CDM) concept that served as operational driver for the content of the extension and details the triggering activity for its development.

Intended Readership

The target audience for the document is:

- Any FIXM Stakeholders having an interest in the Airport CDM business, including those interested in using the extension and/or assessing its proposed content;
- In general, any FIXM stakeholders willing to get an overview of this A-CDM-related FIXM work performed by EUROCONTROL;
- The FIXM CCB, who may ultimately decide to promote the content of this extension, or a subset of it, to future Core FIXM versions.

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Important notice

The Europe A-CDM FIXM Extension v1.0 is a research extension which shall not be used for any operational purposes.

Content of the A-CDM Extension

The **Europe A-CDM FIXM Extension v1.0** is an extension of the **FIXM Core v2.0** that covers the A-CDM concepts as stated in the A-CDM Implementation Manual [1] written by EUROCONTROL, ACI and IATA. In addition to that, it also covers the concept of **Airport Transit View** elaborated within the SESAR programme and which is complementary to A-CDM.

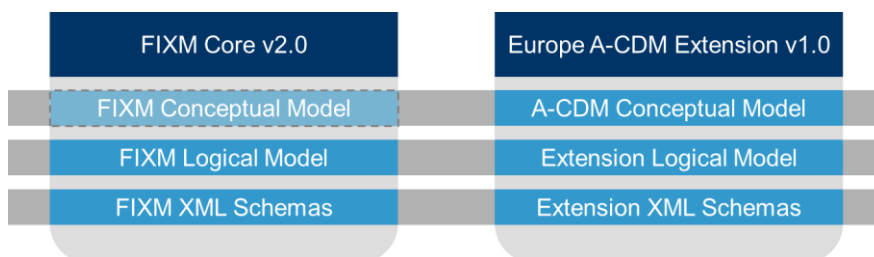


Figure 1 Europe A-CDM Extension v1.0 layers linked to the FIXM Core layers

As figure1 illustrates, this extension has been designed in order to cover the three main components of FIXM described in chapter 2.2 of the FIXM Strategy v1.0 [2]. These layers are the following:

1. The **Conceptual Model [6]** of the extension captures the operational language used to describe the operational driver for the extension and its foreseen A-CDM information exchanges. It provides the operational context needed to understand the data elements that are further captured in the Logical Model. The Conceptual Model strives to describe the main A-CDM concepts including their definitions and interrelations using simple diagrams; its design is intentionally uncluttered so that it does not require any strong UML skills to be used and understood.
Note: Since core FIXM v2.0 has no conceptual model (such a Core Conceptual Model is only foreseen for FIXM v4.0 onwards), the Conceptual Model of this extension covers the complete A-CDM scope.
2. The **Logical Model [7]** of the extension adds new properties to the FIXM Core Logical Model that are needed for exchanges between systems and/or services. The development of the logical model was according to the “FIXM v2.0 Modelling Best Practices” [3]. The data elements defined in it are traced to the Conceptual Model of the extension.
3. The **XML Schemas [8]** of the extensions are derived from the Logical Model; they extend the core FIXM v2.0 XML schemas and add the properties modelled in the Logical model of the extension.

This extension also includes the following artefacts in addition to these three main components described above:

4. **Primer [9]**: a primer document (this document) serving as high-level introduction to the extension;
5. Two dictionaries generated programmatically from the Conceptual and Logical Models of the extension:
 - o **Dictionary for Operational People [10]**: the dictionary generated from the Conceptual Model provides the list of terms that together build the A-CDM operational language relevant to the extension;
 - o **Data Dictionary for Technical People [11]**: the data dictionary generated from the Logical Model provides a textual representation of the structures / data elements that can be exchanged between systems and/or services;
6. Two model reference materials with the content extracted from the Conceptual and Logical Models of the extension:
 - o **Conceptual Model - Reference Material [13]**: the reference material extracted from the Conceptual Model provides all diagrams, organised in sections according the model packages;
 - o **Logical Model - Reference Material [12]**: the reference material extracted from the Logical Model provides the entities and properties definitions in addition to the diagrams, organised in sections according the model packages.

Note: These documents differ from the Data Dictionaries in so far as they do not propose an alphabetical list of definitions, but views of the two UML models organised according to model structures. These documents are primarily intended for

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people willing to discover the content of the UML models without having to open the UML files.

The table below summarises the content of the extension:

| Component of the extension | Format |
|--|--|
| Conceptual Model (see 14) [6] Logical Model (see 122) [7] | .eap file (UML model) - <i>Europe A-CDM Extension v1.0</i> The two models are intentionally stored in the same *.eap file in so far as a tracing between the two models is implemented. <i>Note: A free .eap file reader can be downloaded at this link.</i> |
| XML schemas (see 33) [8] | XSD files archived in a zip file - <i>Europe A-CDM Extension v1.0 XML_schemas</i> |
| Primer (see 44) [9] | PDF File |
| Dictionary for Operational People (see 55) [10] | PDF File |
| Data Dictionary for Technical People (see 55) [11] | PDF File |
| Logical Model - Reference material (see 66) [12] | PDF File |
| Conceptual Model - Reference material (see 66) [13] | PDF File |

What is A-CDM?

A-CDM (**Airport Collaborative Decision Making**) is “the concept which aims at improving Air Traffic Flow and Capacity Management (ATFCM) at airports by reducing delays, improving the predictability of events and optimising the utilisation of resources” [1].

A-CDM assumes the existence of airport operations optimisation systems eg. DMAN, SMAN. These systems interact with the different stakeholders relevant for the flight, here called A-CDM Partners. The A-CDM Partners provide their best estimation of when the aircraft will be ready to start movement from the gate to departure. All these estimations require access to the most updated information, therefore providing Common Situational Awareness, eg. information regarding the estimation of the arrival of the aircraft.

This results in a Collaborative Decision Making process that ensures optimised pre-departure planning which better satisfies A-CDM Partners needs while improving the airport resources utilisation, such as the runway or the gates.

The trigger for the A-CDM extension: SESAR A-CDM Services

This A-CDM extension has been initially developed in order to support a SESAR SWIM service activity related to the definition and design of harmonised A-CDM services (Fast Track 10). These services, essential to A-CDM, support the automation of the A-CDM process at a CDM Airport in order to enable information sharing; they are expected to enable common situational awareness and improve traffic event predictability. A particularly significant

benefit is the availability of information related to the transit of an aircraft in a CDM airport such that the corresponding A-CDM Partners can better achieve their operational goals by sharing a common situational awareness to significantly complement their individually planned operational flows.

The A-CDM services are the result of the joint collaboration between SESAR Fast Track 10 and the Airport Council International (ACI) World Working Group called ACRIS (Airport Community Recommended Information Services) which deals with the definition of Web Service standards that can support several aspects of B2B-integration between airports and their partners (e.g. airlines, ATC).

Both FIXM and AIDX [4] were recognised as natural candidates for encoding the payload of the A-CDM services implementation instances. During the assessment of the suitability of FIXM for these A-CDM Services, some gaps were found between the information to be exchanged through the A-CDM services and the information elements provided by the FIXM v2.0 Core. The A-CDM extension was originally drafted in order to close these gaps.

A different technical solution was ultimately chosen within SESAR for implementing the payload of the A-CDM services. Despite this decision, EUROCONTROL further completed this A-CDM extension (e.g. inclusion of the Conceptual Model layer) with the objective to deliver it officially to the FIXM CCB as a research extension, so that its content can be considered for inclusion in future core FIXM versions, in accordance with the rules for governing the FIXM content described in the FIXM CCB Charter v1.0 [5].

References

- [1] [A-CDM Implementation Manual](#), EUROCONTROL, IATA and ACI
- [2] [FIXM Strategy v1.0](#), FIXM Change Control Board
- [3] [FIXM v2.0 Modelling Best Practices](#), FIXM Technical Team
- [4] [Aviation Information Data Exchange \("AIDX"\)](#), IATA,ATA, ACI
- [5] FIXM Change Management Charter v1.0, FIXM Change Control Board
- [6] *Europe A-CDM Extension v1.0 Conceptual Model*. EUROCONTROL.
- [7] *Europe A-CDM Extension v1.0 Logical Model*. EUROCONTROL.
- [8] *Europe A-CDM Extension v1.0 XML schemas*. EUROCONTROL.
- [9] *Europe A-CDM Extension v1.0 Primer*. EUROCONTROL.
- [10] *Europe A-CDM Extension v1.0 Dictionary for Operational People*. EUROCONTROL.
- [11] *Europe A-CDM Extension v1.0 Data Dictionary for Technical People*. EUROCONTROL.
- [12] *Europe A-CDM Extension v1.0 Logical Model - Reference material*. EUROCONTROL.
- [13] *Europe A-CDM Extension v1.0 Conceptual Model - Reference material*. EUROCONTROL.

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