



## **FIXM v4.0.0 Primer**

The **F**light **I**nformation **E**xchange **M**odel (FIXM) is an exchange model capturing Flight and Flow information that is globally standardised. The requirement for FIXM was identified by the International Civil Aviation Organisation (ICAO) Air Traffic Management Requirements and Performance Panel (ATMRPP) and endorsed at the 12th Air Navigation Conference as part of the Aviation System Block Upgrades (ASBU) and as described in Flight and Flow Information for a Collaborative Environment (FF-ICE).

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The FIXM Primer is the entry point to FIXM. It provides an introduction to FIXM, sets it into context, explains how the FIXM community is organised, and lists its components and supporting materials.

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The authoritative reference for FIXM is [www.FIXM.aero](http://www.FIXM.aero).

Details on Airservices Australia: <http://www.airservicesaustralia.com/>

Details on DSNA: <http://www.developpement-durable.gouv.fr/-Navigation-aerienne-.html>

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Details on NATS Limited: <http://www.nats.co.uk/>

Details on NAV CANADA: <http://www.navcanada.ca/>

Details on the SESAR JU and its members: <http://www.sesarju.eu/discover-sesar/partnering-smarter-aviation/members>

Details on the US FAA: <http://www.faa.gov/>

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## Introduction

The FIXM Primer is the entry point to FIXM. It provides an introduction to FIXM, sets it into context, explains how the FIXM community is organised, and lists its components and supporting materials.

The target audience for the FIXM Primer is:

- Experts in the Flight domain and ATM expert modellers having an interest in the global harmonisation of Flight information
- Developers of systems and information services that require interoperable exchange of Flight information
- More generally, any organisations or individuals working in the field of ATM that are interested in exchanging Flight information

## Introduction to FIXM

### What is FIXM?

The **F**light **I**nformation **E**xchange **M**odel (FIXM) is an exchange model capturing Flight and Flow information that is globally standardised.

FIXM is the equivalent, for the Flight domain, of AIXM (Aeronautical Information Exchange Model) and WXXM (Weather Information Exchange Model) both of which were developed in order to achieve global interoperability for, respectively, AIS and MET information exchange. FIXM is therefore part of a family of technology independent, harmonized and interoperable information exchange models designed to cover the information needs of Air Traffic Management. According to the ICAO SWIM concept [1], FIXM is one of the models that belong to the “Information Exchange Models” layer of the ICAO SWIM Global Interoperability framework.

FIXM contains flight information items that satisfy, and are traceable to, ICAO requirements for Flight information exchanges.

### Main FIXM drivers

The requirement for FIXM was identified by the ICAO Air Traffic Management Requirements and Performance Panel (ATMRPP) and endorsed at the 12th Air Navigation Conference as part of the Aviation System Block Upgrades (ASBU) and as described in Flight and Flow Information for a Collaborative Environment (FF-ICE) [2].

FIXM is developed as means of compliance to the ICAO FF-ICE concept.

The **FIXM Strategy** document details the strategic objectives for FIXM to guide the overall FIXM development.

### FIXM development and governance

The development of FIXM is **open** to any organisation or individual having a verifiable interest in FIXM. The collaborative group of FIXM Stakeholders forms the **FIXM Community of Interest (CoI)**.

FIXM is governed by the **FIXM Change Control Board (CCB)**. It is supported by the **FIXM CCB Secretariat (CCBS)** which provides the technical and human resources for the management of the FIXM Change Proposals, of the FIXM components and of the FIXM online resources.

The FIXM CCB, FIXM CCBS and FIXM CoI act under the provision of the **FIXM Change Management Charter**. This document clarifies the roles and responsibilities of each group and details the FIXM change management process.

Because FIXM is a means of compliance to the ICAO FF-ICE concept, the FIXM development is supervised by the **ICAO ATMRPP**.

## FIXM online resources

The development and release process of FIXM are supported by the following online resources:

- The **FIXM website** ([www.FIXM.aero](http://www.FIXM.aero)) serves as the authoritative reference for all FIXM materials. It stores the official FIXM releases and related materials endorsed by the FIXM CCB.
- The **FIXM JIRA repository** (<https://jira.wx.ll.mit.edu/secure/Dashboard.jspa>) stores the FIXM Change Requests issued by the FIXM Col and assessed by the FIXM CCB in support of the FIXM development.
- The **FIXM forum** ([fixm.forum@eurocontrol.int](mailto:fixm.forum@eurocontrol.int)) is the distribution list used by the FIXM Col during the FIXM development. Emails sent to this list will reach all registered FIXM participants.
- The **FIXM work area** ([http://im.eurocontrol.int/wiki/index.php/FIXM\\_Work\\_Area](http://im.eurocontrol.int/wiki/index.php/FIXM_Work_Area)) is a public wiki established as a complement to the FIXM website in order to support the collaborative development of FIXM. It is used to facilitate the download of working documents, for supporting the discussion about FIXM change proposals, and for sharing any other information deemed useful for the FIXM Col.

Email distribution lists are created in support of the FIXM CCB and CCBS activities. The FIXM CCB can be reached at [FIXM.CCB@eurocontrol.int](mailto:FIXM.CCB@eurocontrol.int). The FIXM CCB Secretariat can be reached at [fixm.secretariat@eurocontrol.int](mailto:fixm.secretariat@eurocontrol.int)

*Note: FIXM online resources are provided or hosted by different members of the FIXM Col. This does not imply any specific ownership of related content and structures by these members.*

## Downloading and using FIXM

Appendix A – List of FIXM v4.0.0 materials provides the links to all official - and latest - FIXM components and supporting documents, including guidance for implementing and using FIXM.

Commercial uses of FIXM are permitted as stated in the license agreement on page 2.

## Becoming a member of the FIXM Col or FIXM CCB

Becoming a registered member of the FIXM Col is achieved by registering to the FIXM forum. The **FIXM work area** provides guidance for completing this registration and for accessing and using the FIXM online resources.

The **FIXM Change Management Charter** defines the FIXM CCB membership rules. FIXM CCB membership requests shall be addressed directly to the FIXM CCB.

## **FIXM v4.0.0 overview**

### **FIXM v4.0.0 scope**

FIXM v4.0.0 supports the content of the individual ATS message fields described in ICAO Doc 4444 [3] and the new flight data items identified by ICAO ATMRPP as part of the requirements for FF-ICE Block 1. The main reference for the new FF-ICE Block 1 content of FIXM v4.0.0 is ATMRPP working paper ref. *ATMRPP-WG/31-WP/713 “Manual on FF-ICE Implementation Guidance”* [4].

### **FIXM v4.0.0 components**

Appendix A – List of FIXM v4.0.0 materials provides the list of the FIXM v4.0.0 components and corresponding URLs.

### **Main changes**

FIXM v4.0.0:

- Retains only the pieces of flight information that are traceable to ICAO requirements (Doc 4444 and draft FF-ICE Block 1 requirements). This implies that some capabilities previously enabled by FIXM v3.0.1 are no longer supported.
- Incorporates a new messaging package for enabling the creation of the FF-ICE Block 1 messages as described by ICAO ATMRPP.
- Implements improved route and 4DT structures in line with FF-ICE Block 1 requirements.
- Achieves greater alignment with ISO standards (e.g. ISO 19103) and AIXM 5.1.

FIXM v4.0.0 is not backward compatible with FIXM v3.0.1.

### **Plans for future FIXM versions**

The **FIXM Release Plan** describing the intended scope and publication date of the future FIXM versions is under development as of the publication of FIXM v4.0.0, and is not yet available publicly. However, FIXM is expected to evolve over the period 2016-2018 in order to ensure full alignment with the ICAO requirements for FF-ICE Block 1. This should include, among others, the rationalisation of the “dangerous goods” package of FIXM as prescribed by ICAO ATMRPP, and any further adaptations possibly triggered by the ongoing clarification of the “core vs extensions” criteria for FIXM. Requirements from other ICAO panels may also be included in FIXM, as appropriate.

### **Main FIXM References**

- [1] Manual On System Wide Information Management (SWIM) Concept, (Advanced Edition – 2015), ICAO Doc 10039
- [2] Manual on Flight and Flow Information for a Collaborative Environment (First Edition – 2012), ICAO Doc 9965
- [3] Procedures for Air Navigation Services: Air Traffic Management, ICAO Doc 4444, 15th Ed
- [4] ATMRPP-WG/31-WP/713 “Manual on FF-ICE Implementation Guidance”

## Appendix A – List of FIXM v4.0.0 materials

### FIXM Strategy & Governance

<b>FIXM Strategy</b>	Details the strategic objectives for FIXM.	<a href="https://www.fixm.aero/documents/FIXM%20Strategy%20v1.0.pdf">https://www.fixm.aero/documents/FIXM%20Strategy%20v1.0.pdf</a> <i>Note: as of August 2016, Version 1.1 of the FIXM Strategy is being developed by the FIXM CCB.</i>
<b>FIXM Change Management Charter</b>	Clarifies the roles and responsibilities of the FIXM CCB, CCBS & Col and details the FIXM change management process.	<a href="https://www.fixm.aero/documents/FIXM%20Change%20Management%20Charter%20v1.0.pdf">https://www.fixm.aero/documents/FIXM%20Change%20Management%20Charter%20v1.0.pdf</a> <i>Note: as of August 2016, Version 1.1 of the FIXM Change Management Charter is being developed by the FIXM CCB.</i>
<b>FIXM Release Plan</b>	Provides the scope / content of future FIXM versions.	N/A <i>Note: under development as of the publication of FIXM v4.0.0, and not yet available publicly.</i>

### FIXM v4.0.0 – Main components

<b>FIXM Logical Model v4.0.0</b>	Captures in UML all the constructs that are required for system-to-system exchange of flight information, as required by ICAO.	<a href="https://fixm.aero/releases/FIXM-4.0.0/FIXM_Core_v4_0_0_Logical_Model.eap">https://fixm.aero/releases/FIXM-4.0.0/FIXM_Core_v4_0_0_Logical_Model.eap</a>
<b>FIXM XML Schemas v4.0.0</b>	A realisation of the FIXM Logical Model expressed as a XML Schema Definition (XSD).	<a href="https://fixm.aero/releases/FIXM-4.0.0/FIXM_Core_v4_0_0_Schemas.zip">https://fixm.aero/releases/FIXM-4.0.0/FIXM_Core_v4_0_0_Schemas.zip</a>

### FIXM v4.0.0 – Supporting materials

<b>FIXM v4.0.0 Primer</b> <i>(this document)</i>	The entry point to FIXM.	<a href="https://fixm.aero/releases/FIXM-4.0.0/FIXM_Core_v4_0_0_Primer_20161031.pdf">https://fixm.aero/releases/FIXM-4.0.0/FIXM_Core_v4_0_0_Primer_20161031.pdf</a>
<b>FIXM v4.0.0 HTML Documentation</b>	An online HTML description of the FIXM content derived programmatically from the main FIXM components.	<a href="https://fixm.aero/releases/FIXM-4.0.0/doc/schema_documentation/index.html">https://fixm.aero/releases/FIXM-4.0.0/doc/schema_documentation/index.html</a>

<b>FIXM v4.0.0 Operational Data Description</b>	<p>Lists the main data items captured in FIXM v4.0.0 with their operational definitions, a list of acceptable synonyms and abbreviations etc.</p>	<p><a href="https://fixm.aero/releases/FIXM-4.0.0/FIXM_Core_v4_0_0_Operational_Data_Description_20161031.pdf">https://fixm.aero/releases/FIXM-4.0.0/FIXM_Core_v4_0_0_Operational_Data_Description_20161031.pdf</a></p> <p><i>Note: a revision of this document is planned for October 2016 in order to include a formal traceability to the ICAO requirements and the paths to the corresponding constructs in the main FIXM components.</i></p>
<b>FIXM v4.0.0 Implementation Guidance</b> comprising <ul style="list-style-type: none"> <li>• <b>ATS Message Content to FIXM Logical Model Map</b></li> <li>• <b>(Draft) FIXM 4.0.0 Implementation Guidance</b></li> <li>• <b>(Draft) FF-ICE 1 Realization Through FIXM-Based Services</b></li> <li>• <b>(Draft) XML Examples</b></li> </ul>	<p>Provides non-prescriptive guidance and clarifications about the use of the main FIXM components.</p> <p>Provides a mapping between the FIXM Logical Model and ICAO Air Traffic Services messages as defined in ICAO Doc 4444.</p> <p>Provides guidance and recommendations on how to best implement FIXM in support of the flight information exchanges described in the FF-ICE Implementation Manual.</p> <p>A set of FIXM-Based example services that enable the information exchanges defined in ICAO FF-ICE Implementation Guidance.</p> <p>XML examples in valid FIXM v4.0.0 format representing sample ICAO flight information exchanges and 4DT data.</p>	<p><a href="https://fixm.aero/documents/DRAFT%20-%20FIXM%20Implementation%20Guidance.zip">https://fixm.aero/documents/DRAFT%20-%20FIXM%20Implementation%20Guidance.zip</a></p> <p><a href="https://fixm.aero/documents/ATS%20Message%20Content%20to%20FIXM%20Logical%20Model%20Map_v4_0.pdf">https://fixm.aero/documents/ATS%20Message%20Content%20to%20FIXM%20Logical%20Model%20Map_v4_0.pdf</a></p>
<b>FIXM Modelling Best Practices</b>	<p>Provides principles, rules and recommendations for developing and maintaining the FIXM Logical Model, and for creating extensions.</p>	<p><a href="https://fixm.aero/releases/FIXM-4.0.0/FIXM_Core_v4_0_0_Modelling_Best_Practices.pdf">https://fixm.aero/releases/FIXM-4.0.0/FIXM_Core_v4_0_0_Modelling_Best_Practices.pdf</a></p>



<b>FIXM Development Guidelines</b>	Provide guidelines for the construction of the main FIXM components so that interoperability with existing standards and legacy systems is ensured during the period of transition to FF-ICE.	<a href="https://fixm.aero/documents/FIXM%20Development%20Guidelines_v2.pdf">https://fixm.aero/documents/FIXM%20Development%20Guidelines_v2.pdf</a>
<b>FIXM Modelling Workbench</b>	A tool for developing, evaluating, and releasing all artefacts of the FIXM data modelling, including XSD Generation Service for extensions.	<a href="https://www.fixm.aero/tools.pl#">https://www.fixm.aero/tools.pl#</a> <i>Note: this tool is subject to a different disclaimer.</i>