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APAC FF-ICE Ad hoc Group Workshop with TTX

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Flight and Flow Information for a Collaborative Environment (FF-ICE) Overview

Flight and Flow Information for a Collaborative Environment (FF-ICE) **Goals**

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- FF-ICE objective is to replace the current flight planning system/service with a more adaptable and digital information-based flight planning that supports diverse set of Airspace Users (AU). To move toward FF-ICE:

  - FF-ICE Release 1 applicability date is **November 2024**

  - Propose Flight Plan 2012 sunset date is target for **2034**

- Collaborative Decision Making (CDM) process is build into the FF-ICE services to enable the AU to query the Enhanced ATM Service Providers (eASP) systems for the operating picture and propose a flight plan to meet the AU's business objective.

  - The CDM processes that FF-ICE services facilitate are expected to be performed via computer-to-computer links within a SWIM-compatible environment.

  - The negotiation procedure between the AU and eASP system facilitates the determination of an optimal route and trajectory

FF-ICE **Goals** (cont'd)

- To ensure FF-ICE services are globally interoperable, adoption of global standards for data structure and information exchange.

    - FF-ICE services are expected to be highly automated.

    - The ability to exchange, between the AU and ASP, more flight and flow related information in a systematic manner which is both robust and expandable facilitating future requirements for both AU and ASP.

- Two phases: Pre-departure and Post departure

    - FF-ICE Release 1 comprised of pre-departure data and procedures

    - FF-ICE Release 2 comprise of post-departure data and procedures

FF-ICE **Goals** (cont'd)

Address limitations and constraints of the current flight planning mechanism

Long Term

Short Term

Enable transitioning to a fully collaborative environment where a flight trajectory is shared and optimized during all phases of a flight

FF-ICE **Release 1**

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- FF-ICE Release 1 comprised of pre-departure data and procedures

- Six services – 2 Mandatory and 4 Optional

- Applicability date – November 2024

FF-ICE Services

Planning Service (Optional)

Related Messages:

Preliminary Flight Plan Message
Flight Plan Update Message
Flight Cancellation Message
Submission Response Message
Planning Status Message

Filing Service (Mandatory)

Related Messages:

Filed Flight Plan Message
Flight Plan Update Message
Flight Cancellation Message
Submission Response Message
Filing Status Message

Trial Service (Optional)

Related Messages:

Trial Request Message
Submission Response Message
Trial Response Message

Flight Data Request Service (Mandatory)

Related Messages:

Flight Data Request Message
Submission Response Message
Flight Data Response Message

Publication Service (Optional)

Related Messages:

No specific messages defined. Information on flights that match a set of criteria are transmitted to registered subscribers in response to certain events or conditions. An eASP will indicate the events and/or criteria to which a subscriber can subscribe.

Notification Service (Optional)

Related Messages:

Flight Departure Message
Flight Arrival Message
Submission Response Message

ICAO FF-ICE **Release 2 Scope**

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- **FF-ICE/Release 2 allows for the post-departure negotiation between the eAU and relevant eASPs on changes to the flight's Agreed Trajectory.**

- **Post-departure negotiation must pertain to changes in the Agreed Trajectory which do not necessitate involvement of the ATCO in the negotiation.**

- **The Agreed Trajectory is shared and maintained (updated) across the planning actors of relevant eASPs.**

- **Clearances are provided to the flight in-time to ensure the aircraft will operate to the Agreed Trajectory**

Trial Request

Negotiation Horizon

Revision Request

Align Strategic and ATC

Trajectory Update

Re-evaluation

FF-ICE **Release 2 Status**

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- FF-ICE R2 status

  - Research and validation activities across Asia, Europe and North America

  - Environment is more challenging but provides greater benefits

  - Additional challenges in a mix mode environment

Trial Request

Negotiation Horizon

Revision Request

Align Strategic and ATC

Trajectory Update

Re-evaluation

FF-ICE **Release 2 Building Blocks**

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- FF-ICE R2 Building Blocks

  - Trial Request – optional in FF-ICE R1

  - Negotiation Horizon – A point in space or time, along the Agreed Trajectory that defines the end of a tactical ATC event and the beginning of strategic negotiations in the negotiation process

  - Revision Request

  - Align Strategic and ATC – reconcile the cleared and agreed trajectory

  - Trajectory Update

  - Re-evaluation – a process introduced in FF-ICE R1

FF-ICE Release 1 and Release 2 **Integration**

Multiple FIRs

Revise Agreed Trajectory
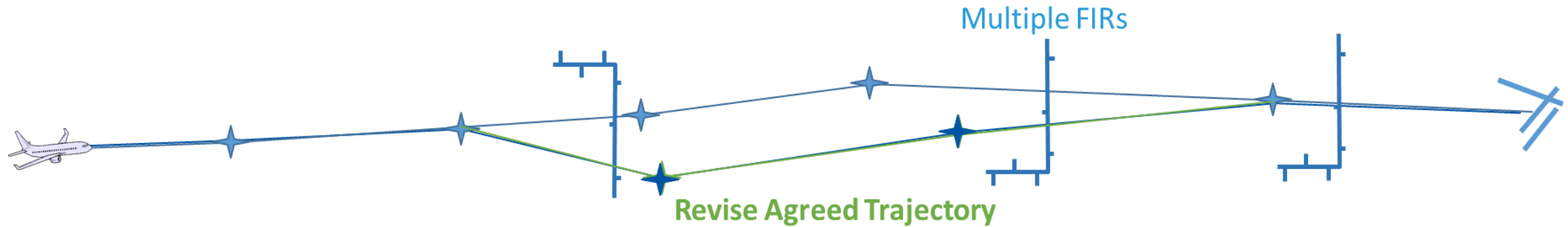
① Agreed Trajectory obtained using FF-ICE/R1
② Route clearance matches Agreed Trajectory on departure
③ While in flight, AU can revise the Agreed Trajectory
   Downstream – outside of ATC involvement
   Negotiate with a planning actor
④ ATC provides new route clearance

This is Release 2

Flight Plan 2012

- At the Fourteenth Air Navigation Conference (26 August – 6 September 2024)

- Agenda Item 3: Air Navigation System Performance Improvement

  - 3.2: Phasing Out Legacy System

    - Working Paper 11 - Cessation of ICAO 2012 Flight Plan by 2034

- Resources

  - ATS messages (Doc 9965 Volume II Implementation Guidance – Section 12)

  - FF-ICE Implementation Strategy (Doc 9965 Volume II Implementation Guidance – Appendix I)

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Flight and Flow Information for a Collaborative Environment (FF-ICE) Enablers

FF-ICE Enablers – **SWIM (1)**

- System Wide Information Management – to support sharing of ATM information with stakeholders in a standardized format to support operations.

- SWIM and FF-ICE

  - SWIM Registry – allows the information producers to publicized the FF-ICE services and the consumers to discover the services for use.

    - Information Service Overview - A set of information service metadata intended to promote service discovery and an initial evaluation of the information service characteristics.

  - Consumers can discover when FF-ICE services will be available in the information service Overview.

  - Producers of FF-ICE services can specify the geographical region coverage in the FF-ICE information service Overview.

FF-ICE Enablers – **SWIM (2)**

- What additional information on SWIM?

  - ATFM data/constraints/measures can be made available on SWIM

  - Airspace data/constraints can be made available on SWIM

- Global SWIM Implementation/supporting materials

  - ICAO Applicability Date – November 2024

  - ICAO SWIM Provision – PANS-IM (Doc 10199)

  - ICAO SWIM Implementation Guidance (Doc 10203)

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FF-ICE **FIXM**

- Flight Information Exchange Model (FIXM) - is an information exchange model capturing Flight and Flow information that is globally standardized.

- FIXM Core – provides a harmonized structure for flight data and FF-ICE messages
  - Filing services may accept flight plan in FIXM format.

- FIXM extension – implementation of extension to meet the specific needs of a particular region implementation of FF-ICE services.
  - APAC FIXM extension

- FF-ICE Implementation Guidance Appendix B Model and Data - important section for the technical/engineers.

- FIXM.AERO website for latest FIXM update

FF-ICE FIXM **Example**

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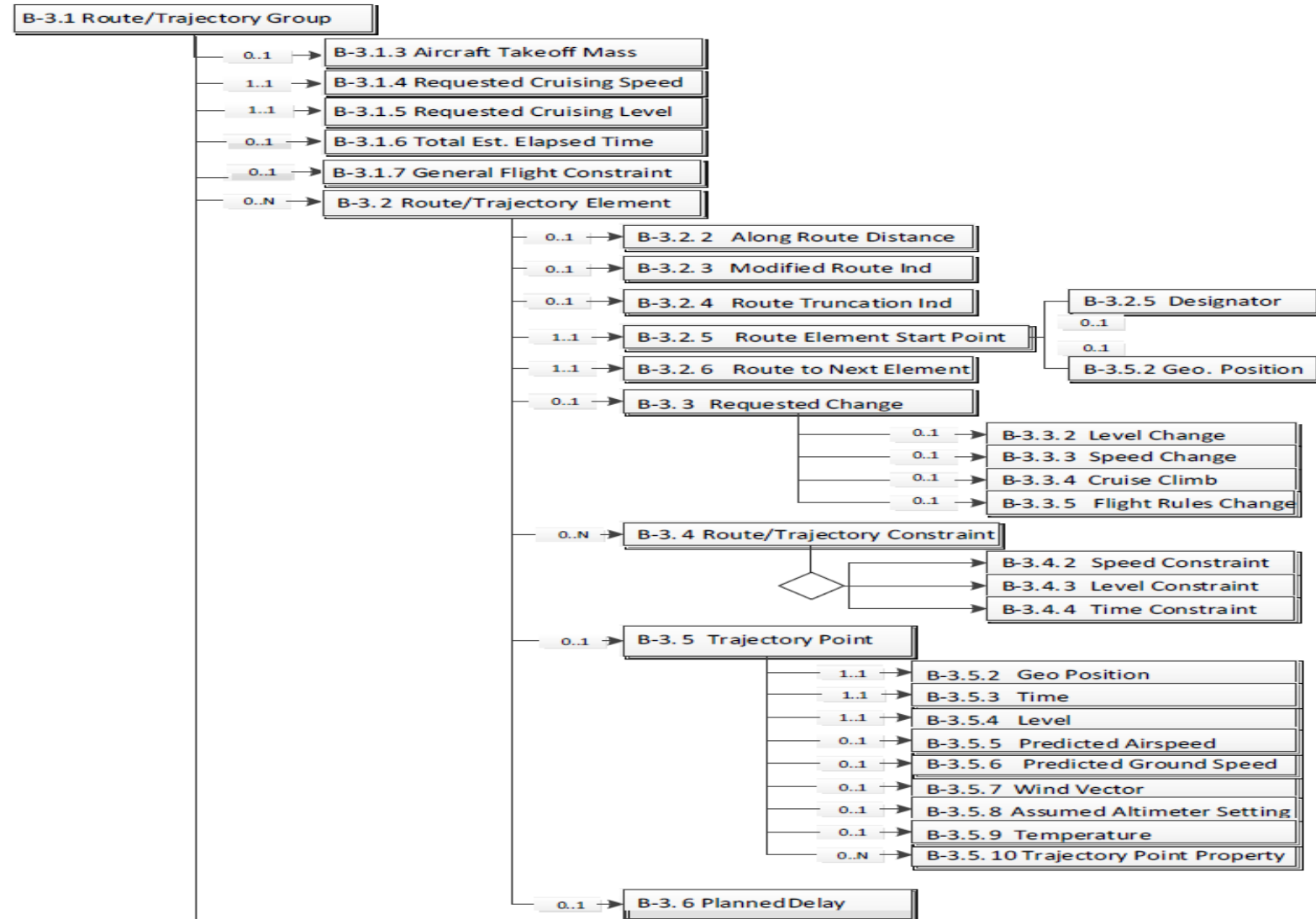
FF-ICE **GUFI**

- Globally Unique Flight Identifier (GUFI) : provide a unique reference to a specific flight. Its purpose is to assist in associating a message to the correct flight.

- GUFI format is intended for computer/system consumption. The GUFI requirements are as followed*:
    - GUFI shall consist of a Version 4 Universally Unique Identifier (UUID) as described in IETF RFC 4122.

    - The GUFI should rely on proven algorithms published in standard libraries referring to UUID Version 4.

    - The GUFI should include a namespace identifier providing an indication of the GUFI generator.

    - The GUFI should include the creation timestamp to further decrease the chances of a GUFI collision.

* Implementation Guidance – Appendix G – GUFI Construction

FIXM v4.3.0 – **GUFI Format**

The Globally Unique Flight Identifier (GUFI) was updated based on latest ATMRPP guidance

- Includes a UUID + namespace (domain & identifier) + timestamp to enhance uniqueness and traceability[1]
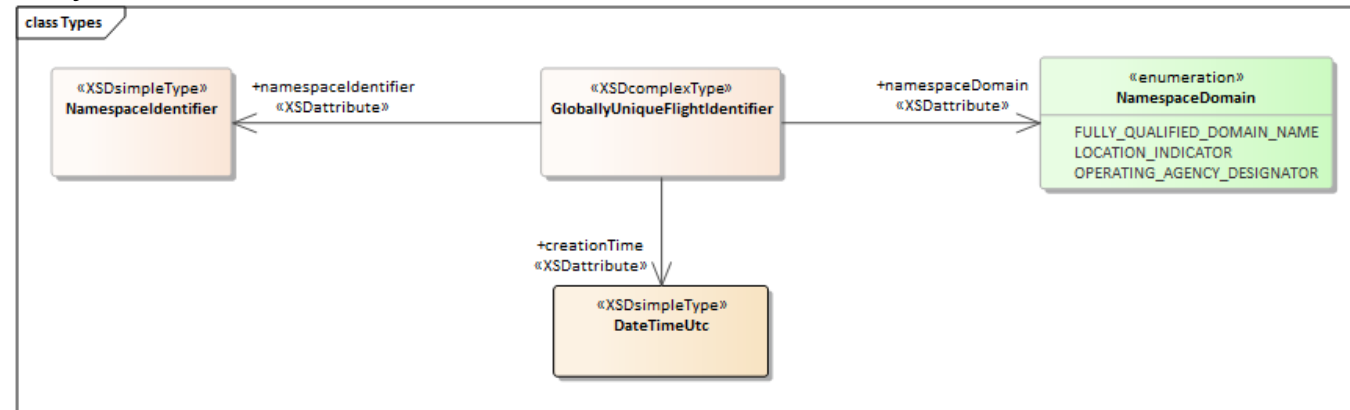
- A legacy version of the GUFI (UUID only) is retained in the model to support backwards compatibility when translating older messages to v4.3.0[2]
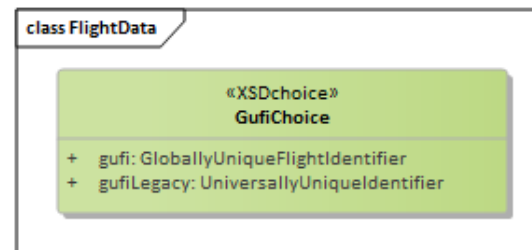
[1] https://docs.fixm.aero/#/general-guidance/flight_identification?id=encoding-a-gufi-in-fixm-core-430
[2] https://docs.fixm.aero/#/general-guidance/flight_identification?id=compatibility-with-fixm-core-420

FIXM v4.3.0 – **GUFI Example**

```xml
<!-- xmlns:fx="http://www.fixm.aero/flight/4.3" -->
<fx:flight>
        <fx:flightIdentification>
                <fx:gufi codeSpace="urn:uuid" creationTime="2022-12-01T12:18:36Z"
                        namespaceDomain="OPERATING_AGENCY_DESIGNATOR"
                        namespaceIdentifier="AIB">
                        dd056de9-0ba9-4d55-82cf7b976b0b6d29</fx:gufi>
```

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Thank You

FF-ICE Acronym List

Acronym	Description
ASP	ATM Service Provider
ATC	Air Traffic Control
ATCO	Air Traffic Controller
ATMRPP	Air Traffic Management Requirements and Performance Panel
ATS	Air Traffic Services
AU	Airspace Users
CDM	Collaborative Decision Making
eASP	enhanced ATM Service Providers
FF-ICE	Flight and Flow-Information for a Collaborative Environment

Acronym	Description
FIXM	Flight Information Exchange Model
GUFI	Globally Unique Flight Indentifier
ICAO	International Civil Aviation Organization
IETF RFC	Internet Engineering Task Force Request for Comment
R1	Release 1
R2	Release 2
SWIM	System Wide Information Management
UUID	Universal Unique Identifier

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