

# **ASBU ELEMENTS**

DAIM DATS FICE FRTO

☑ Functional Description

☑ Deployment Applicability ☑ Performance Impact Assessment

#### DAIM.

DAIM-B1/1

Provision of quality-assured aeronautical data and Information information

- ☐ Sixth edition of the GANP ②
- Main Purpose ? The main purpose of this element is to ensure that aeronautical data and information comply with quality standards in order to meet the needs of airspace users and support the safety of flight operations.
- New Capabilities Provision of high quality aeronautical data and information; consistent interpretation and timely exchange of aeronautical data and information; and, automatic management, processing, verification, usage and exchange of aeronautical data and information.
- This element ensures that processes, procedures and systems are improved to allow for an Description ? enhanced quality of aeronautical information products and services. This element includes:
  - 1. Full move into an automated data-centric environment so that the management, processing, verification, usage and exchange can be done in a structured, automatic manner and human intervention is reduced.
  - 2. Aeronautical data and information is of high quality if it is aggregated and provided by authoritative sources. This requires to properly control relationships along the whole data chain from the origination to the distribution to the next intended user (formal arrangements with data originators, neighbouring States, data and information service providers and others).

Maturity Level ? Standardization

**Human Factor** Considerations

- 1. Does it imply a change in task by a user or affected others? Yes
- 2. Does it imply processing of new information by the user? No
- 3. Does it imply the use of new equipment? Yes
- 4. Does it imply a change to levels of automation? Yes

PLANNING LAYERS ?

Strategical Pre-tactical

**OPERATIONS 2** 

Taxi-out Departure En-route Arrival Taxi-in

#### DEPENDENCIES AND RELATIONS 2

There are currently no dependencies.

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	Information exchange	Procedures for the provision of aeronautical information services in an AIM environment	ANSPs should define in an AIM Manual of operations the procedures to be followed for the provision of quality assured aeronautical information. Reference ICAO documents: Annex 15 - Aeronautical Information Services PANS – Aeronautical Information Management ICAO Doc 8126 - Aeronautical Information Services	ANSP	2018
Operational procedures	Quality	Procedures for the application of a quality management system to the AIM processes.	ANSPs should define in a Quality Manual the procedures to be followed to apply a quality management system to the AIM processes. Reference ICAO documents: Annex 15 - Aeronautical Information Services PANS – Aeronautical Information Management Doc 9839 - Manual on the Quality Management System for Aeronautical Information Services	ANSP	2018
Ground system infrastructur e	Information exchange	Automated aeronautical information management systems and infrastructure.	Automated systems and infrastructure to support the collection, processing, distribution and quality control of the aeronautical information products and services.	ANSP	2018
Training	-	Training requirements for the provision of quality-assured aeronautical data and information	Training for AIS/AIM personnel	ANSP	2018
Regulatory provisions	National regulatory framework	National framework for the provision of quality assured aeronautical data and information	Development of State Regulatory framework to support the provision of quality-assured aeronautical data and information. Reference ICAO documents: Annex 15 - Aeronautical Information Services PANS – Aeronautical Information Management	CAA	2018

Regulatory Formal Formal Formal Formal arrangements between ANSP and arrangements or the aeronautical data originators to ensure data quality. Reference ICAO documents:

Aeronautical Information Management,
Appendix 1)

CAA 2018

DAIM-B1/2 Provision of digital Aeronautical Information Information Publication (AIP) data sets ☐ Sixth edition of the GANP ② Main Purpose ? To make available digital AIP data and information in an interoperable manner and mutuallyunderstood manner. New Capabilities ? Provision of digital AIP data sets. This will facilitate the exchange of aeronautical information that becomes easy to be integrated and filtered, thus increasing cost effectiveness and efficiency. The need for interoperable exchange of AIP data and information requires providing them in digital Description ? form and complying with digital data exchange requirements. This element consists in the replacement of existing sections of the AIP by digital AIP data sets. Therefore, this element supports the migration to a data-centric environment where aeronautical data and information (AIP) will be provided in a structured and digital form through the use of information exchange models (e.g. AIXM). Ready for implementation Maturity Level ? **Human Factor** 1. Does it imply a change in task by a user or affected others? Yes Considerations 2. Does it imply processing of new information by the user? No 3. Does it imply the use of new equipment? Yes 4. Does it imply a change to levels of automation? Yes





# Type of Dependencies ASBU Element Relation-operational need DAIM-B1/1 - Provision of quality-assured aeronautical data and information

ENABLERS	
Enabler Enabler Type Enabler Name Description / References Stakehol	lers Year

Operational procedures	Information exchange	Procedures for the provision of digital AIP data set	Updated AIM Manual of operations to include information about the provisions of digital AIP data sets. Reference ICAO documents: Annex 15 - Aeronautical Information Services PANS - Aeronautical Information Management Doc 8126 - Aeronautical Information Services	ANSP	2018
Information exchange model	Aeronautical Information	Aeronautical Information Exchange Model (AIXM) v 5.1	The objective of the Aeronautical Information Exchange Model (AIXM) is to enable the provision in digital format of the aeronautical information that is in the scope of Aeronautical Information Services (AIS). Reference material: AIXM Confluence site/AIS Manual Volume 4	ANSP	2018
Ground system infrastructur e	Information exchange	Automated systems and infrastructure to support the provision of digital AIP data sets using AIXM	Automated systems and infrastructure to support the processing and distribution of the digital Aeronautical Information Publication (AIP) data sets.	ANSP	2018
Ground system infrastructur e	Information exchange	Airspace user systems to be updated to leverage the benefits of digital AIP data sets using AIXM.	Automated systems and infrastructure for the users to make use of the digital Aeronautical Information Publication (AIP) data sets.	Airspace user	2018
Training	-	Training requirements for the provision of digital AIP data sets	Training for AIS/AIM personnel, Airspace users	ANSP Airspace user	2018
Regulatory provisions	National regulatory framework	National framework for the provision of digital Aeronautical Information Publication (AIP) data sets	Development of State Regulatory framework to support the provision of digital Aeronautical Information Publication (AIP) data sets Reference ICAO documents: Annex 15 - Aeronautical Information Services PANS – Aeronautical Information Management Doc 8126 – Aeronautical Information Services	CAA	2018

Main Purpose To make available digital terrain data and information in an interoperable manner and mutually-understood manner.

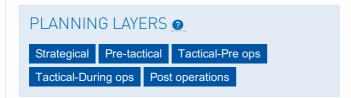
New Capabilities Provision of terrain data as digital data sets. This will facilitate the exchange of terrain data that becomes easy to integrate and easily filtered, thus increasing cost effectiveness and efficiency.

Description The need for interoperable exchange of terrain data requires providing the data in digital form and complying with digital data exchange requirements. This element consists in the replacement of existing terrain data by digital terrain data sets. Therefore, this element supports the migration to a data-centric environment where terrain data will be provided in a digital form and in a structured way.

Maturity Level Ready for implementation

Human Factor Considerations

- 1. Does it imply a change in task by a user or affected others? Yes
- 2. Does it imply processing of new information by the user? No
- 3. Does it imply the use of new equipment? Yes
- 4. Does it imply a change to levels of automation? Yes





# Type of Dependencies ASBU Element Relation-operational need DAIM-B1/1 - Provision of quality-assured aeronautical data and information

Enabler Category  Description / References  Stakeholders  Year  Operational procedures  Enabler Type Enabler Name  Description / References  Stakeholders  Year  Updated AIM Manual of operations to include information about the provisions of digital terrain data sets. ICAO reference documents: Annex 15 - Aeronautical Information Management Doc 8126 - Aeronautical Information Services	ENABLER	S				
procedures exchange the provision of digital terrain digital terrain data sets. ICAO reference data set documents: Annex 15 - Aeronautical Information Services PANS- Aeronautical Information Management Doc 8126 -		Enabler Type	Enabler Name	Description / References	Stakeholders	Year
	'		the provision of digital terrain	include information about the provisions of digital terrain data sets. ICAO reference documents: Annex 15 - Aeronautical Information Services PANS- Aeronautical Information Management Doc 8126 -	ANSP	2018

Ground system infrastructur e	Information exchange	Automated systems and infrastructure to support the provision of digital terrain data sets using AIXM	Automated systems and infrastructure to support the processing and distribution of the digital terrain data sets.	ANSP	2018
Ground system infrastructur e	Information exchange	Airspace user systems to be updated to leverage the benefits of digital terrain data sets using AIXM.	Automated systems and infrastructure for the users to make use of the digital terrain data sets.	Airspace user	2018
Training	-	Training requirements for the provision of digital terrain data sets	Training for AIS/AIM personnel, Airspace users	ANSP Airspace user	2018
Regulatory provisions	National regulatory framework	National framework for the provision of digital terrain data sets	Development of State Regulatory framework to support the provision of digital terrain data sets Reference ICAO documents: Annex 15 - Aeronautical Information Services PANS — Aeronautical Information Management Doc 8126 — Aeronautical Information Services	CAA	2018

DAIM-B1/4	Provision of digital obstacle data sets Information
☐ Sixth edition of the	e GANP ②
Main Purpose	To make available digital obstacle data in an interoperable and mutually-understood manner.
New Capabilities 2	Provision of obstacle data as digital data sets. This will facilitate the exchange of obstacle data that becomes easy to integrate and easily filtered, thus increasing cost effectiveness and efficiency.
Description 2	The need for interoperable exchange of obstacle data requires providing the data in digital form and complying with digital data exchange requirements. This element consists in the replacement of existing obstacle data by digital obstacle data sets. Therefore, this element supports the migration to a data centric environment where obstacle data will be provided in a structured and digital form through the use through the use of information exchange models (e.g. AIXM).
Maturity Level 2	Ready for implementation

# Human Factor Considerations

- 1. Does it imply a change in task by a user or affected others? Yes
- 2. Does it imply processing of new information by the user? No
- 3. Does it imply the use of new equipment? Yes
- 4. Does it imply a change to levels of automation? Yes





#### DEPENDENCIES AND RELATIONS

Type of Dependencies ASBU Element

Relation-operational need DAIM-B1/1 - Provision of quality-assured aeronautical data and information

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Information exchange model	Aeronautical Information	Aeronautical Information Exchange Model (AIXM) v 5.1	The objective of the Aeronautical Information Exchange Model (AIXM) is to enable the provision in digital format of the aeronautical information that is in the scope of Aeronautical Information Services (AIS). Reference material: AIXM Confluence site/AIS Manual Volume 4	ANSP	2018
Operational procedures	Information exchange	Procedures for the provision of digital obstacle data set	Updated AIM Manual of operations to include information about the provisions of digital obstacle data sets. Reference ICAO document: Annex 15 - Aeronautical Information Services PANS – Aeronautical Information Management Doc 8126 – Aeronautical Information Services	ANSP	2018
Ground system infrastructur e	Information exchange	Automated systems and infrastructure to support the provision of digital obstacle data sets using AIXM	Automated systems and infrastructure to support the processing and distribution of the digital obstacle data sets.	ANSP	2018

Ground system infrastructur e	Information exchange	Airspace user systems to be updated to leverage the benefits of digital obstacle data sets using AIXM.	Automated systems and infrastructure for the users to make use of the digital obstacle data sets.	Airspace user	2018
Training	-	Training requirements for the provision of digital obstacle data sets	Training for AIS/AIM personnel, Airspace users	ANSP Airspace user	2018
Regulatory provisions	National regulatory framework	National framework for the provision of digital obstacle data sets	Development of State Regulatory framework to support the provision of digital obstacles data sets Reference ICAO documents: Annex 15 - Aeronautical Information Services PANS – Aeronautical Information Management Doc 8126 – Aeronautical Information Services	CAA	2018

DAIM-B1/5	Provision of digital aerodrome mapping data sets Information
☐ Sixth edition of the	e GANP 2
Main Purpose 2	To make available digital aerodrome mapping data and information in an interoperable and mutually-understood manner.
New Capabilities 2	Provision of aerodrome mapping data as digital data sets. This will facilitate the exchange of aerodrome mapping data that becomes easy to integrate and easily filtered, thus increasing cost effectiveness and efficiency.
Description ?	The need for interoperable exchange of aerodrome mapping data requires providing the data in digital form and complying with digital data exchange requirements. This element consists in the replacement of existing aerodrome mapping data by digital aerodrome mapping data sets. Therefore, this element supports the migration to a data centric environment where aerodrome mapping data will be provided in a structured and digital form through the use through the use of information exchange models (e.g. AIXM).
Maturity Level	Ready for implementation
Human Factor	1. Does it imply a change in task by a user or affected others? Yes
Considerations	2. Does it imply processing of new information by the user? No
	3. Does it imply the use of new equipment? Yes
	4. Does it imply a change to levels of automation? Yes

# PLANNING LAYERS Strategical Pre-tactical Tactical-Pre ops Tactical-During ops Post operations

#### DEPENDENCIES AND RELATIONS **①**

Type of Dependencies ASBU Element

Relation-operational need DAIM-B1/1 - Provision of quality-assured aeronautical data and information

Enabler	Enable - Time	Enabler Name	Description / References	Stakeholders	Year
Category	Enabler Type	Enabler Name	Description / References	Stakenolders	rear
Information exchange model	Aeronautical Information	Aeronautical Information Exchange Model (AIXM) v 5.1	The objective of the Aeronautical Information Exchange Model (AIXM) is to enable the provision in digital format of the aeronautical information that is in the scope of Aeronautical Information Services (AIS). Reference material: AIXM Confluence site/AIS Manual Volume 4	ANSP	2018
Operational procedures	Information exchange	Procedures for the provision of digital aerodrome mapping data set	Updated AIM Manual of operations to include information about the provisions of digital aerodrome mapping data sets.  Reference ICAO documents: Annex 15 - Aeronautical Information Services PANS - Aeronautical Information Management  Doc 8126 - Aeronautical Information  Services	ANSP	2018
Ground system infrastructur e	Information exchange	Automated systems and infrastructure to support the provision of digital aerodrome mapping data sets using AIXM	Automated systems and infrastructure to support the processing and distribution of the digital aerodrome mapping data sets.	ANSP	2018
Ground system infrastructur e	Information exchange	Airspace user systems to be updated to leverage the benefits of digital aerodrome mapping data sets using AIXM.	Automated systems and infrastructure for the users to make use of the digital aerodrome mapping data sets.	Airspace user	2018

Training	-	Training requirements for the provision of digital aerodrome mapping data sets	Training for AIS/AIM personnel, Airspace users	ANSP Airspace user	2018
Regulatory provisions	National regulatory framework	National framework for the provision of digital aerodrome mapping data sets	Development of State Regulatory framework to support the provision of digital aerodrome mapping data sets Reference ICAO documents: Annex 15 - Aeronautical Information Services PANS – Aeronautical Information Management Doc 8126 – Aeronautical Information Services	CAA	2019

DAIM-B1/6	Provision of digital instrument flight procedure Information data sets
Sixth edition of the	e GANP ②
Main Purpose	To make available digital instrument flight procedure data in an interoperable and mutually-understood manner.
New Capabilities    Output  Description:	Provision of instrument flight procedure data as digital data sets; and, compliance with the navigation specifications, consistency in design, coding and operation of performance-based navigation (PBN) procedures to avoid differences in the aircraft behaviour in response to the coded path terminators by the use specific criteria for coding instrument flight procedures. This will facilitate the exchange of instrument flight procedure data that becomes easy to integrate and easily filtered, thus increasing cost effectiveness and efficiency.
Description 2	The need for interoperable exchange of instrument flight procedure data requires providing the data in digital form and complying with digital data exchange requirements. This element consists in the replacement of existing instrument flight procedure data by digital instrument flight procedure data sets. In addition, it includes consistent coding of procedures to match the procedure design intent and ensure more repeatable flight paths. Applying new rules for coding Instrument flight procedures will limit the number of allowable path terminators for PBN procedures in compliance with the PBN Navigation Specifications. Therefore, this element supports the migration to a data centric environment where instrument flight procedure data will be provided in a structured and digital form through the use of information exchange models (e.g. AIXM).
Maturity Level 2	Ready for implementation
Human Factor	1. Does it imply a change in task by a user or affected others? Yes
Considerations	2. Does it imply processing of new information by the user? No
	3. Does it imply the use of new equipment? Yes

4. Does it imply a change to levels of automation? Yes

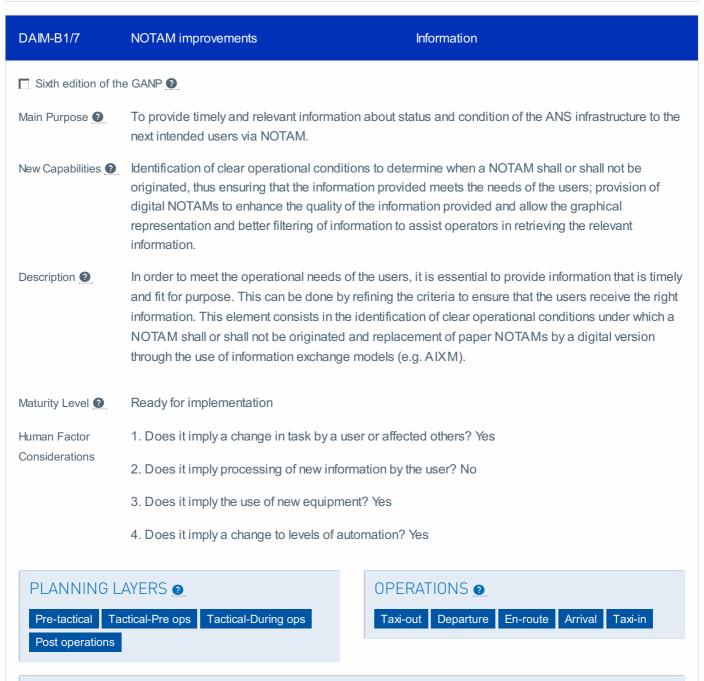
#### DEPENDENCIES AND RELATIONS 2

Type of Dependencies ASBU Element

Relation-operational need DAIM-B1/1 - Provision of quality-assured aeronautical data and information

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Information exchange model	Aeronautical Information	Aeronautical Information Exchange Model (AIXM) v 5.1	The objective of the Aeronautical Information Exchange Model (AIXM) is to enable the provision in digital format of the aeronautical information that is in the scope of Aeronautical Information Services (AIS). Reference material: AIXM Confluence site/AIS Manual Volume 4	ANSP	2018
Operational procedures	Information exchange	Procedures for the provision of digital instrument flight procedures data set	Updated AIM Manual of operations to include information about the provisions of digital instrument flight procedure data sets. Reference ICAO documents:  Annex 15 - Aeronautical Information  Services PANS – Aeronautical  Information Management Doc 8126 –  Aeronautical Information Services	ANSP	2018
Ground system infrastructur e	Information exchange	Automated systems and infrastructure to support the provision of digital instrument flight procedures data sets using AIXM	Automated systems and infrastructure to support the processing and distribution of the digital instrument flight procedures data sets.	ANSP	2018
Ground system infrastructur e	Information exchange	Airspace user systems to be updated to leverage the benefits of digital instrument flight procedure data sets using AIXM.	Automated systems and infrastructure for the users to make use of the digital instrument flight procedures data sets.	Airspace user	2018

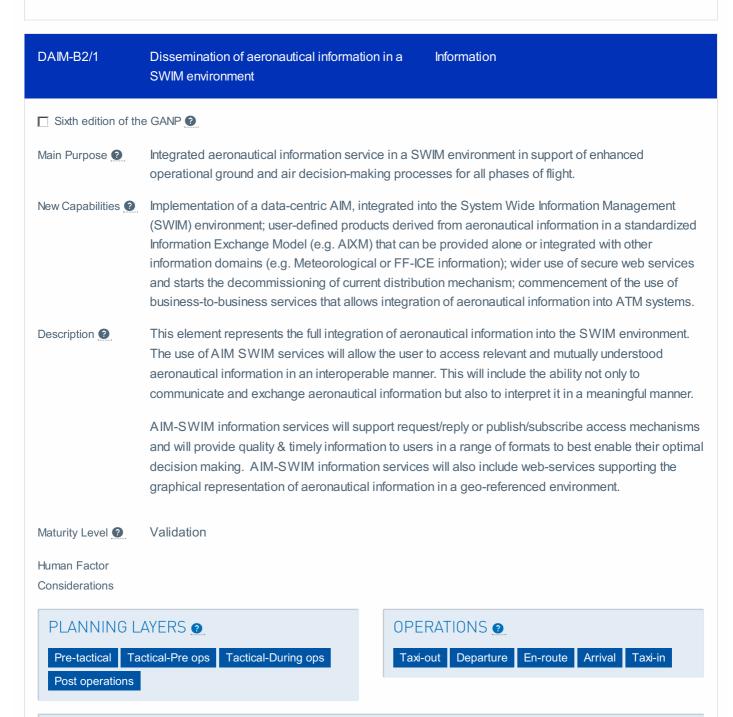
Training	-	Training requirements for the provision of digital instrument flight procedure data sets	Training for AIS/AIM personnel, Airspace users	ANSP Airspace user	2018
Regulatory provisions	National regulatory framework	National framework for the provision of digital instrument flight procedures sets	Development of State Regulatory framework to support the provision of digital instrument flight procedures data sets Reference ICAO documents: Annex 15 - Aeronautical Information Services PANS – Aeronautical Information Management Doc 8126 – Aeronautical Information Services	CAA	2018



Type of Dependencies	ASBU Element
Relation-operational need	DAIM-B1/1 - Provision of quality-assured aeronautical data and information
Relation-information need	DAIM-B1/2 - Provision of digital Aeronautical Information Publication (AIP) data sets
Relation-information need	DAIM-B1/4 - Provision of digital obstacle data sets
Relation-information need	DAIM-B1/5 - Provision of digital aerodrome mapping data sets
Relation-information need	DAIM-B1/6 - Provision of digital instrument flight procedure data sets
Relation-information benefit	SWIM-B2/1 - Information service provision
Relation-information need	SWIM-B2/2 - Information service consumption

ENABLER	S				
Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Information exchange model	Aeronautical Information	Aeronautical Information Exchange Model (AIXM) v 5.1	The objective of the Aeronautical Information Exchange Model (AIXM) is to enable the provision in digital format of the aeronautical information that is in the scope of Aeronautical Information Services (AIS). Reference material: AIXM Confluence site/AIS Manual Volume 4	ANSP	2018
Operational procedures	Information exchange	Procedures for the provision of an enhanced NOTAM service	Updated AIM Manual of Operations to include information about the provisions of NOTAM. Reference ICAO documents: Annex 15 - Aeronautical Information Services PANS – Aeronautical Information Management Doc 8126 – Aeronautical Information Services	ANSP	2019
Ground system infrastructur e	Information exchange	Automated systems and infrastructure to support the provision of NOTAM using AIXM.	Automated systems and infrastructure to support the processing and distribution of NOTAM	ANSP	2019
Ground system infrastructur e	Information exchange	Airspace user systems need to be updated to leverage the benefits of digital NOTAM using AIXM.	Automated systems and infrastructure for the users to make use of NOTAM	Airspace user	2019

Training	-	Training requirements for the provision of enhanced NOTAM	Training for AIS/AIM personnel, Airspace users	ANSP Airspace user	2019
Regulatory provisions	National regulatory framework	National framework for the provision of NOTAM	Development of State Regulatory framework to support the provision of NOTAM Reference ICAO documents: Annex 15 - Aeronautical Information Services PANS – Aeronautical Information Management Doc 8126 – Aeronautical Information Services	CAA	2018



Type of Dependencies	ASBU Element
Evolution	DAIM-B1/2 - Provision of digital Aeronautical Information Publication (AIP) data sets
Evolution	DAIM-B1/3 - Provision of digital terrain data sets
Evolution	DAIM-B1/4 - Provision of digital obstacle data sets
Evolution	DAIM-B1/5 - Provision of digital aerodrome mapping data sets
Evolution	DAIM-B1/6 - Provision of digital instrument flight procedure data sets
Relation-information need	DAIM-B2/3 - Aeronautical information to support higher airspace operations
Relation-information need	DAIM-B2/4 - Aeronautical information requirements tailored to UTM
Relation-operational need	SWIM-B2/1 - Information service provision
Relation-operational need	SWIM-B2/2 - Information service consumption
Relation-operational need	SWIM-B2/3 - SWIM registry
Relation-operational need	DAIM-B2/2 - Daily Airspace Management information to support flight and flow

ENABLER	S				
Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Information exchange model	Aeronautical Information	Aeronautical Information Exchange Model (AIXM) v 5.1	The objective of the Aeronautical Information Exchange Model (AIXM) is to enable the provision in digital format of the aeronautical information that is in the scope of Aeronautical Information Services (AIS). Reference material: AIXM Confluence site/AIS Manual Volume 4	ANSP	2018
Ground system infrastructur e	Information exchange	Automated systems and infrastructure to support the provision of aeronautical information over SWIM	Automated systems and infrastructure for the dissemination of aeronautical information in a SWIM environment.	ANSP	2025
Ground system infrastructur e	Information exchange	Airspace user systems to be updated to subscribe or access the aeronautical information services over SWIM	Automated systems and infrastructure for the users to subscribe or access the aeronautical information in a SWIM environment.	Airspace user	2025

Training	-	Training requirements for the provision of aeronautical information over SWIM	Training for AIS/AIM personnel	ANSP	2025
Information exchange model	Aeronautical Information	Aeronautical Information Exchange Model (AIXM) v 5.x	The objective of the Aeronautical Information Exchange Model (AIXM) is to enable the provision in digital format of the aeronautical information that is in the scope of Aeronautical Information Services (AIS). Reference material: AIXM Confluence site/AIS Manual Volume 4	ANSP	2025

DAIM-B2/2 Daily Airspace Management information to Information support flight and flow ☐ Sixth edition of the GANP ② To establish common practices and data formats for daily airspace management initiatives Main Purpose ? continuously updated as events take place for flight and flow planning and execution. New Capabilities Daily Airspace Management operational changes are packaged and made accessible for use in all local and regional flight and flow operations. Description ? Airspace Management, in daily operations, will continuously adjust airspace status, adjust airspace volumes (e.g. advanced flexible use of airspace) and add temporary airspace initiatives. This element mirrors the modernization efforts ongoing for scheduled AIP modifications with global best practices for packaging and making this information available for dissemination to improve local and regional flight planning in keeping with the flight and flow initiatives engendered in Block 2 FICE and NOPS. This best practice DAIM service enable by SWIM will ensure that information regarding status airspace configurations (Fixes, FIR Boundaries, static zones etc...) and information regarding airspace evolution (reroutings, sector configurations, airspace use plan and updated airspace use plan, airspace reservations, route restrictions and availability, dynamic zones etc.) will be available in formats that support NOPS and FICE automation. Maturity Level ? Validation Human Factor 1. Does it imply a change in task by a user or affected others? Yes Considerations 2. Does it imply processing of new information by the user? Yes

3. Does it imply the use of new equipment? No

4. Does it imply a change to levels of automation? Yes

Post operations

DEPENDENCIES AND RELA	TIONS 2
Type of Dependencies	ASBU Element
Relation-operational need	DAIM-B2/1 - Dissemination of aeronautical information in a SWIM environment
Relation-information need	FRTO-B0/1 - Direct routing (DCT)
Relation-information need	FRTO-B0/2 - Airspace planning and Flexible Use of Airspace (FUA)
Relation-information need	FRTO-B0/3 - Pre-validated and coordinated ATS routes to support flight and flow
Relation-information need	FRTO-B1/1 - Free Route Airspace (FRA)
Relation-information need	FRTO-B1/2 - Required Navigation Performance (RNP) routes
Relation-information need	FRTO-B1/3 - Advanced Flexible Use of Airspace (FUA) and management of real time airspace data
Relation-information need	FRTO-B1/4 - Dynamic sectorization
Relation-information need	FRTO-B2/1 - Local components of integrated ATFM and ATC Planning function (INAP)
Relation-information need	FRTO-B2/2 - Local components of Dynamic Airspace Configurations (DAC)
Relation-information need	FRTO-B2/3 - Large Scale Cross Border Free Route Airspace (FRA)

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	Information exchange	Operational procedures for aeronautical information requirements to support network operations	New procedures will be required to produce and distribute the new aeronautical information in support of network operations. Updated AIM Manual of operations to address the requirements for aeronautical information to support network operations. Reference ICAO documents: Annex 15 - Aeronautical Information Services PANS- Aeronautical Information Management Doc 8126 -	ATM network function	2025

Ground	Information	Automated	Update to the national aeronautical data	ATM network function	2025
system infrastructur e	exchange	systems and infrastructure to include aeronautical information requirements to support network operations	management system, including systems supporting data collection, verification and distribution. For instance, automated functions should be introduced to generate the airspace usage plan information service.		
Training	-	Training requirements for aeronautical information requirements regarding network operations	For personnel managing the ATM information and for their users if the interfaces and access conditions change.	ATM network function	2025
Information exchange model	Aeronautical Information	Aeronautical Information Exchange Model (AIXM) v 5.x	The objective of the Aeronautical Information Exchange Model (AIXM) is to enable the provision in digital format of the aeronautical information that is in the scope of Aeronautical Information Services (AIS). Reference material: AIXM Confluence site/AIS Manual Volume 4	ANSP	2025

DAIM-B2/3	Aeronautical information to support higher Information airspace operations
Sixth edition of the	e GANP ②
Main Purpose ?	To provide higher airspace management information in an airspace service that is complementary to standard AIS.
New Capabilities    Output  Description:	Higher airspace definitions and status are packaged and made accessible to operators flying in the airspace.
Description ?	Long endurance and near space tourism operators' space crafts are subject to all applicable AIS. In addition, there may be a need to manage operations in the airspace by changing the status of volumes of airspace solely related to these operators. Since this information is applicable only to these operators, there is limited value in including this as information in ATM airspace management. A complementary, separate service is desired.
Maturity Level ?	Validation

# Human Factor Considerations

- 1. Does it imply a change in task by a user or affected others? No
- 2. Does it imply processing of new information by the user? Yes
- 3. Does it imply the use of new equipment? No
- 4. Does it imply a change to levels of automation? No





# Type of Dependencies ASBU Element Relation-operational need DAIM-B1/2 - Provision of digital Aeronautical Information Publication (AIP) data sets

ENABLERS					
Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	Information exchange	Operational procedures to support higher airspace operations	Rules to describe higher airspace information. Updated AIM Manual of operations to include information about the requirements for aeronautical information in higher airspace. Standards and guidance material: ICAO Annex 15 - Aeronautical Information Services PANS-AIM ICAO Doc 7383 - Aeronautical Information Services Provided by States	ANSP	2025
Ground system infrastructur e	Information exchange	Automated systems and infrastructure to include aeronautical information requirements to support higher airspace operations	Update to the national aeronautical data management system, including data collection, verification and distribution.	ATM network function	2025
Training	-	Training requirements for aeronautical information requirements regarding higher airspace operations.	Training for AIS/AIM personnel	ANSP	2025

Information Aeronautical Aeronautical The objective of the Aeronautical **ANSP** 2025 exchange Information Information Information Exchange Model (AIXM) is to Exchange Model enable the provision in digital format of the model (AIXM) v 5.x aeronautical information that is in the scope of Aeronautical Information Services (AIS). Reference material: AIXM Confluence site/AIS Manual Volume

### **DAIM-B2/4** Aeronautical information requirements tailored to Information **UTM** ☐ Sixth edition of the GANP ② To provide low altitude airspace management information in a UAS Traffic Management (UTM) Main Purpose ? service that is complementary to standard AIS. New Capabilities UTM airspace definitions and status are packaged and made accessible to UAS operators flying in UTM. Description UAS flying in UTM are subject to all applicable AIS. In addition, UTM will manage UAS in the airspace by changing the status of volumes of airspace solely related to UAS operations. For example, the publishing of maps where UAS may operate near airports in class B, or locations where state operations are occurring for which UAS need to stay clear. Given the manner in which UAS operations occur it is likely that the operator must be in continuous contact with the network to access this information. Since the volume of such airspace management information would overwhelm ATM airspace management, a complementary, separate service is desired. Maturity Level ? Validation **Human Factor** 1. Does it imply a change in task by a user or affected others? No Considerations 2. Does it imply processing of new information by the user? Yes 3. Does it imply the use of new equipment? No 4. Does it imply a change to levels of automation? No





#### **DEPENDENCIES AND RELATIONS ?**

Type of Dependencies

**ASBU Element** 

ENABLER	S				
Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	Information exchange	Operational procedures for aeronautical information requirements to support UTM	New procedures will be required to produce and distribute the AIP data for UTM users. Updated AIM Manual of operations to address the requirements for aeronautical information in low-altitude. Standards and guidance material: ICAO Annex 15 - Aeronautical Information Services PANS-AIM ICAO Doc 7383 - Aeronautical Information Services Provided by States	ANSP	2025
Ground system infrastructur e	Information exchange	Automated systems and infrastructure to include aeronautical information requirements to support UTM	Automated systems and infrastructure to include aeronautical information requirements to support provision of digital AIM data for UTM users.	ANSP	2025
Airborne system capability	Information exchange	UAS logic to make use of the AIM information	Automated systems and infrastructure for UAS to make use of the AIM information.	Airspace user	2025
Training	-	Training requirements for aeronautical information requirements regarding UTM	Training for AIS/AIM personnel	ANSP	2025
Information exchange model	Aeronautical Information	Aeronautical Information Exchange Model (AIXM) v 5.x	The objective of the Aeronautical Information Exchange Model (AIXM) is to enable the provision in digital format of the aeronautical information that is in the scope of Aeronautical Information Services (AIS). Reference material: AIXM Confluence site/AIS Manual Volume 4	ANSP	2025

DAIM-B2/5	NOTAM replacement	Information
☐ Sixth edition of	f the GANP	

Main Purpose **1** To introduce a more efficient mechanism to exchange aeronautical information that is currently provided by the NOTAM system.

New Capabilities Airspace user will be allowed to tailor the AIM updates to their operational needs as well as subscribe to airspace constraint alerts so that changes to any constraint are immediately available.

This element consists in the establishment of an information service through SWIM that serves as a replacement for the information currently provided by NOTAMs. The replacement of the current NOTAM system by this information service is expected to solve identified deficiencies such as NOTAM proliferation or the operational irrelevance of the information provided.

Maturity Level Standardization

Human Factor Considerations

- 1. Does it imply a change in task by a user or affected others? Yes
- 2. Does it imply processing of new information by the user? Yes
- 3. Does it imply the use of new equipment? No
- 4. Does it imply a change to levels of automation? Yes





DEPENDENCIES AND RELATIONS				
Type of Dependencies	ASBU Element			
Evolution	DAIM-B1/7 - NOTAM improvements			
Relation-operational need	SWIM-B2/1 - Information service provision			
Relation-operational need	SWIM-B2/2 - Information service consumption			

ENABLERS						
Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year	
Operational procedures	Information exchange	Operational procedures to produce and distribute the new "NOTAM"	Updated AIM Manual of operations to include information about the new "NOTAM". Reference ICAO documents: Annex 15 - Aeronautical Information Services PANS – Aeronautical Information Management Doc 8126 – Aeronautical Information Services	ANSP	2025	

Information exchange	Automated systems and infrastructure to support the provision new "NOTAM"	Automated systems and infrastructure to support the provision of dynamic AIM updates including data collection, verification and distribution.	ANSP	2025
Information exchange	Airspace user systems need to be updated to take advantage of the new "NOTAM"	Automated systems and infrastructure for the users to make use of the new "NOTAM".	Airspace user	2025
-	Training requirements for the provision of new "NOTAM"	Training for AIS/AIM personnel	ANSP	2025
National regulatory framework	National framework for the provision of the new "NOTAM"	Development of State Regulatory framework to support the provision of the new "NOTAM" Reference ICAO documents: Annex 15 - Aeronautical Information Services PANS — Aeronautical Information Management Doc 8126 — Aeronautical Information Services	CAA	2025
	exchange  Information exchange  -  National regulatory	exchange systems and infrastructure to support the provision new "NOTAM"  Information exchange systems need to be updated to take advantage of the new "NOTAM"  Training requirements for the provision of new "NOTAM"  National regulatory framework for the provision of the provisi	exchange systems and infrastructure to support the provision new "NOTAM"  Information exchange systems need to be updated to take advantage of the new "NOTAM"  Training requirements for the provision of new "NOTAM"  National regulatory framework provision of the new "NOTAM"  National regulatory framework for the provision of the new "NOTAM"  Development of State Regulatory framework to support the provision of the new "NOTAM" Reference ICAO documents: Annex 15 - Aeronautical Information Management	exchange systems and infrastructure to support the provision of dynamic AIM updates including data collection, verification and distribution.  Information exchange Airspace user systems need to be updated to take advantage of the new "NOTAM"  Training requirements for the provision of new "NOTAM"  National regulatory framework for the new "NOTAM"

## DATS \_\_\_\_

DATS-B1/1	Remotely Operated Aerodrome Air Traffic Operational Services
Sixth edition of the	e GANP ②
Main Purpose    Output  Description:	To provide ATS at aerodromes not from a traditional on-site tower, but remotely from either a local or a distant location. The service provided may be a control service or flight information service as appropriate.
New Capabilities 2	Provision of an aerodrome ATS from a remote location using digital video or surveillance technologies, or non-surveillance procedures.
Description 2	This element represents the provision of Aerodrome Control or Aerodrome Flight Information Services (AFIS) at aerodromes from other than an on-site facility. This could be achieved by utilizing either video surveillance, digital surveillance, procedural processes, or a combination thereof, which is commensurate with the complexities and traffic demands at the aerodrome. A Remote Tower Centre (RTC) will be remotely connected to one or more aerodromes and consist of one or more Controller Working Positions (CWP), dependent on the requirements of the connected aerodrome(s).

Standardization

Human Factor Considerations

- 1. Does it imply a change in task by a user or affected others? Yes
- 2. Does it imply processing of new information by the user? Yes
- 3. Does it imply the use of new equipment? Yes
- 4. Does it imply a change to levels of automation? Yes

#### PLANNING LAYERS ?

Tactical-Pre ops Tactical-During ops



Taxi-out Departure Arrival Taxi-in

DEPENDENCIES AND REL	ATIONS o
Type of Dependencies	ASBU Element
Relation-technology benefit	ASUR-B0/1 - Automatic Dependent Surveillance - Broadcast (ADS-B)
Relation-technology benefit	ASUR-B0/2 - Multilateration cooperative surveillance systems (MLAT)
Relation-technology benefit	ASUR-B0/3 - Cooperative Surveillance Radar Downlink of Aircraft Parameters (SSR-DAPS)
Relation-operational benefit	SURF-B0/1 - Basic ATCO tools to manage traffic during ground operations
Relation-information need	AMET-B1/1 - Meteorological observations information
Relation-information need	AMET-B1/2 - Meteorological forecast and warning information
Relation-information need	AMET-B1/4 - Dissemination of meteorological information

ENABLER	S				
Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Regulatory provisions	National regulatory framework	Amendment of the national regulatory framework for the provision of remote ATS at aerodromes	Depending on existing state regulations, new provisions on remotely operated ATS may be required, based on ICAO Annex 10, 11 and/or PANS-ATM.	CAA	2019
Operational procedures	Regular operations	Procedures for the provision of remote ATS at aerodromes	Procedures may be required for the operation depending on the capabilities of the implementation.	ANSP	2019
Operational procedures	Contingency operations	Procedures for the provision of remote ATS at aerodromes in contingency situations.	Contingency procedures in case of full or partial failure of the RTC based on ICAO PANS-ATM.	ANSP	2019

Training	-	Training requirements for the provision of remote ATS at aerodromes	ATCO Training in the RTC operational standards, limitations and procedures. ATSEP training on the RTC Equipment and Datalink Systems.	ANSP	2019
Ground system infrastructur e	Surveillance	Surveillance means at the remote tower centre	At the remote facility: Visual reproduction of the out-of-the window view on data/monitor screens, projectors or similar technical solutions or Procedural Systems. References:	ANSP	2019
Ground system infrastructur e	Surveillance	Surveillance means at the aerodrome where remote ATS are provided	At the aerodrome where ATS are provided: visual surveillance cameras, surface movement radar, surveillance radar, multilateration or other positioning and surveillance implementations as required.	ANSP	2019
Ground system infrastructur e	Communicati	Communication means between the remote tower centre and the aerodrome where remote ATS are provided	Suitable communication and data transfer capabilities between the airports and the RTC including suitable redundancies for technical infrastructure at the aerodrome, remote facility and data links.	ANSP	2019
Regulatory provisions	Operational Approval	Operational approval required for remote tower centre	Operational Approval required for Remote Tower Facility and associated equipment and system components linking the RTC to the aerodrome.	ANSP	2019
Regulatory provisions	Certification	ATS Unit Certification to include level of service to be provided by the RTC.	ATS Unit Certification to include level of service to be provided by the RTC.	ANSP	2019

#### **DEPLOYMENT APPLICABILITY**

#### **Operational conditions:**

Provide ATS for an aerodrome which due to its location has limited support living facilities for staff and results in increased overall operational costs to build and maintain a conventional on-site tower. Provide a contingency ATC Tower Facility from a remote tower in the event the regular on-site tower is unavailable. A remote facility may be sited at a location which is ideally located to provide better living conditions for operational staff. Providing a remote facility may enable substantial cost savings in construction. The deployment may enable provision of ATS at aerodromes where it would otherwise be uneconomical or unsustainable. Provide an ATC Tower Facility from a remote tower located on the aerodrome or within close proximity to the aerodrome as the main facility which may enable a more cost effective and efficient service compared to that of a conventional tower.

#### Main intended benefits:

Туре	Operational description	Benefitting stakeholder(s)
	Enabling options for an ATS Facility to be constructed at a cost efficient, easily accessible location particularly when the aerodrome is situated in a remote region.	ANSP
	Facility construction, equipage and maintenance cost benefits. Minimise cost to Aerodromes for provision of ATS Services at a low traffic density aerodromes Staffing benefits.	ANSP
Direct benefits	Service Improvement through use of digital cameras and systems to provide an improved level of surveillance as compared to a conventional tower with basically only direct out of the window surveillance and possible limitations to viewing all relevant parts of an aerodrome or its associated circuit or airspace.	ANSP
	Minimise cost to Aerodromes for provision of ATS Services at low traffic density aerodromes. Reduced ATS and Maintenance staff requirements.	ANSP
	Enabling options to combine multiple aerodromes ATS from one ATS facility.	ANSP
	Enabling ATS provision at new locations which were previously uneconomical or unsustainable.	Airspace user
	Improve situational awareness of ATCO	ANSP
Indirect benefits	Staffing and Human Resources benefits through options for ATS Facility being located in easily assessable areas with better access to facilities such as schools, shops and hospitals.	ANSP

### INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

КРА	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Cost effectiveness		Reduce costs in the Air Navigation System	++	
Flexibility		Improve flexibility of the Air Navigation System	++	

КРА	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Safety		Maintain or improve safety during surface movement	++	KPI20: Number of aircraft accidents
Safety		Maintain or improve safety on the runway	++	KPI20: Number of aircraft accidents

#### FICE \_\_\_\_

FICE-B0/1 Automated basic interfacility data exchange Information (AIDC) ☐ Sixth edition of the GANP ② To improve the efficiency of coordination and tranfer of control between ATS units. Main Purpose ? New Capabilities Replacement of voice communication between ATS units by automatic message exchange. Description ? This element represents a first automation step in the evolution of the coordination and transfer of control between neighbouring ATS units to guarantee that all related and necessary flight information will be available to the other unit as per agreement. Maturity Level ? Ready for implementation **Human Factor** 1. Does it imply a change in task by a user or affected others? No Considerations 2. Does it imply processing of new information by the user? Yes 3. Does it imply the use of new equipment? Yes 4. Does it imply a change to levels of automation? Yes PLANNING LAYERS ② **OPERATIONS 3** 

Tactical-Pre ops Tactical-During ops

Departure En-route Arrival

#### DEPENDENCIES AND RELATIONS 3

Type of Dependencies ASBU Element

Relation-technology benefit COMI-B0/7 - ATS Message Handling System (AMHS)

#### **ENABLERS**

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Regulatory provisions	SMS	Apply SMS	Apply Safety Management System in accordance with the national requirements and guidance.	ANSP	2013
Ground system infrastructur e	Flight and Flow information	HMI and FDPS	Upgrade the ground system to support the composition, exchange and processing of messages.	ANSP	2013
Operational procedures	Flight and flow information	Procedures for AIDC	Procedures for message composition and exchange. References: PANS-ATM ICAO Doc 4444 - Procedures for Air Navigation Services and regional interface control (ICD) documents.	ANSP	2013
Ground system infrastructure	Flight and Flow information	Interconnectivity	Connectivity between ATSU systems through IP, AMHS, etc.	ANSP	2013
Training	Flight and Flow information	Training requirements for AIDC	Training for ATCO and CNS staff regarding AIDC.	ANSP	2013
Regulatory provisions	National regulatory framework	National regulatory framework amendment for the use of AIDC	If applicable, CAA may need to amend the national regulatory provisions on the use of AIDC. References: PANS-ATM (ICAO Doc 4444) and Regional Interface Control (ICD) documents.	CAA	2013

FICE-B2/1	Planning Service Information	
☐ Sixth edition of the	ne GANP 3	
Main Purpose	To allow aircraft operator to obtain constraint feedback while informing the relevant service provious of their intentions.	ders
New Capabilities 2	Ability to determine relevant constraints applicable to a flight and feed them back to the operator, this way, service providers will benefit from the availability of preliminary flight plans for resource planning (e.g. ATFM).	. In
	A service provider that supports Preliminary Flight Plans and provides feedback should also pro a "re-evaluation" capability, i.e. updates to the feedback that reflect changes to constraints after the initial feedback is provided.	

Description ?

The FF-ICE Planning Service permits an operator to submit a Preliminary Flight plan prior to filing an ATS Flight plan (Filed Flight Plan) for evaluation by the service provider. The flight plan represents the intention of the operator and is used by the service provider for resource planning. Service providers indicate the acceptability of the flight plan to the operator, and provide feedback regarding constraints that will be applicable to the flight. It allows for a collaborative, iterative planning process to optimize the plan and reduce any surprises after a filed flight plan is submitted.

Maturity Level ?

Validation

**Human Factor** Considerations

- 1. Does it imply a change in task by a user or affected others? Yes
- 2. Does it imply processing of new information by the user? Yes It is a new method and people have to learn the new method.
- 3. Does it imply the use of new equipment? No
- 4. Does it imply a change to levels of automation? Yes

#### PLANNING LAYERS ?

Pre-tactical Tactical-Pre ops

OPERATIONS ?

Type of Dependencies	ASBU Element
Relation-benefit	AMET-B2/1 - Meteorological observations information
Relation-operational need	SWIM-B2/1 - Information service provision
Relation-operational need	SWIM-B2/2 - Information service consumption
Relation-operational need	SWIM-B2/3 - SWIM registry
Relation-information need	AMET-B2/2 - Meteorological forecast and warning information
Relation-benefit	AMET-B2/4 - Meteorological information service in SWIM
Relation-information benefit	DAIM-B1/1 - Provision of quality-assured aeronautical data and information
Relation-information need	DAIM-B1/2 - Provision of digital Aeronautical Information Publication (AIP) data sets
Relation-information need	DAIM-B1/3 - Provision of digital terrain data sets
Relation-information need	DAIM-B1/4 - Provision of digital obstacle data sets
Relation-information need	DAIM-B1/5 - Provision of digital aerodrome mapping data sets
Relation-information need	DAIM-B1/6 - Provision of digital instrument flight procedure data sets
Relation-information need	DAIM-B1/7 - NOTAM improvements
Relation-information need	DAIM-B2/1 - Dissemination of aeronautical information in a SWIM environment
Relation-information need	DAIM-B2/2 - Daily Airspace Management information to support flight and flow

ENABLER:	S				
Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	Flight and flow information	Procedures for the provision and use of FF-ICE Planning Service	Procedures for FF-ICE flight data exchange, preliminary flight plan, flight plan update, flight plan revaluation, flight cancellation and flight data request.  References: PANS-ATM ICAO Doc 4444 - Procedures for Air Navigation Services and ICAO Doc 9965 - Manual on Flight and Flow Information for a Collaborative Environment (FF-ICE) 1st Edition	ANSP Airspace user	2022
Information exchange model	Flight and flow information	Flight Information Exchange Model (FIXM) Version 4.2.0	References: PANS-ATM ICAO Doc 4444 - Procedures for Air Navigation Services and ICAO Doc 9965- FF-ICE Manual 1st Edition.	ANSP ATM network function	2020
Ground system infrastructure	Flight and Flow information	Capability to process FFICE data exchange	Upgrade the ground system to process FF-ICE data exchange using FIXM and including assignment/recognition of GUFI. References: PANS-ATM ICAO Doc 4444 - Procedures for Air Navigation Services and ICAO Doc 9965- FF-ICE Manual 1st Edition.	ANSP Airspace user	2024
Ground system infrastructur e	Flight and Flow information	Capability to obtain and use necessary information for FF-ICE Services	Upgrade the ground system to use AMET and DAIM information obtained via SWIM services to determine constraints applicable to a flight. References: ICAO Doc 4444 - PANS-ATM, ICAO Doc 9965 - FF-ICE Manual 1st Edition, Annex 3 - Meteorological Service for International Air Navigation, ICAO Doc 10066 - PANS-AIM, ICAO Doc (xxxxx) - PANS-IM and Annex 15 - Aeronautical Information Services.	ANSP	2024
Training	Flight and Flow information	Training requirements for FICE Planning service.	Training for flight data staff, dispatch, ATFM staff on FICE Planning service.	ANSP Airspace user	2024
Regulatory provisions	SMS	Apply SMS	Apply Safety Management System in accordance with the national requirements and guidance.	ANSP	2013

Ground system infrastructure	Flight and Flow information	Capability to provide and use FF-ICE Planning Service	Upgrade the ground system to provide and use FF-ICE Planning Service (e.g. send and process flight plans and constraints). References: PANS-ATM ICAO Doc 4444 - Procedures for Air Navigation Services and ICAO Doc 9965 - FF-ICE Manual 2nd Edition.	ANSP Airspace user	2024
Regulatory provisions	National regulatory framework	National regulatory framework amendment for the provision and use of FF-ICE Planning Service	If applicable, the national regulatory framework may need to be amended to allow the provision and use of FF-ICE Planning Service. References: PANS-ATM (Doc 4444) and FF-ICE Manual (ICAO Doc 9965, 2nd Edition).	CAA	2022

FICE-B2/2	Filing Service Information
Sixth edition of the	e GANP ②
Main Purpose 🕜	To enhance ATS flight plan processing including constraints evaluation and enhanced flight information sharing.
New Capabilities 2	Ability to accept Filed Flight Plans provided by the aircraft operator in FIXM format and to take advantage of the more advanced content permitted in them, for example:
	<ul> <li>Climb and descent performance data to allow more accurate and consistent calculation of 4D</li> <li>Trajectories by the service provider.</li> </ul>
	<ul> <li>Operator-calculated 4D-Trajectory to allow understanding by the service provider of the operator expectations.</li> </ul>
Description	FF-ICE will permit submission of a filed flight plan using FIXM in lieu of the teletype-format FPL used today. FF-ICE also provides feedback to the operator regarding whether the flight plan was successfully processed, the flight plan status and where necessary any constraints with which the flight plan does not comply.
Maturity Level 2	Validation
Human Factor	1. Does it imply a change in task by a user or affected others? Yes
Considerations	2. Does it imply processing of new information by the user? Yes
	It is a new method and people have to learn the new method.
	3. Does it imply the use of new equipment? No
	4. Does it imply a change to levels of automation? Yes

DEPENDENCIES AND RELA	TIONS O
Type of Dependencies	ASBU Element
Relation-operational need	SWIM-B2/1 - Information service provision
Relation-operational need	SWIM-B2/2 - Information service consumption
Relation-operational need	SWIM-B2/3 - SWIM registry
Relation-operational need	FICE-B2/1 - Planning Service
Relation-benefit	AMET-B2/1 - Meteorological observations information
Relation-information need	AMET-B2/2 - Meteorological forecast and warning information
Relation-benefit	AMET-B2/4 - Meteorological information service in SWIM
Relation-information benefit	DAIM-B1/1 - Provision of quality-assured aeronautical data and information
Relation-information need	DAIM-B1/2 - Provision of digital Aeronautical Information Publication (AIP) data sets
Relation-information need	DAIM-B1/3 - Provision of digital terrain data sets
Relation-information need	DAIM-B1/4 - Provision of digital obstacle data sets
Relation-information need	DAIM-B1/5 - Provision of digital aerodrome mapping data sets
Relation-information need	DAIM-B1/6 - Provision of digital instrument flight procedure data sets
Relation-information need	DAIM-B1/7 - NOTAM improvements
Relation-information need	DAIM-B2/1 - Dissemination of aeronautical information in a SWIM environment
Relation-information need	DAIM-B2/2 - Daily Airspace Management information to support flight and flow
Relation-information need	DAIM-B2/5 - NOTAM replacement

ENABLERS	5				
Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Information exchange model	Flight and flow information	Flight Information Exchange Model (FIXM) Version 4.2.0	References: PANS-ATM ICAO Doc 4444 - Procedures for Air Navigation Services and ICAO Doc 9965- FF-ICE Manual 1st Edition.	ATM network function	2020
Ground system infrastructure	Flight and Flow information	Capability to process FFICE data exchange	Upgrade the ground system to process FF-ICE data exchange using FIXM and including assignment/recognition of GUFI. References: PANS-ATM ICAO Doc 4444 - Procedures for Air Navigation Services and ICAO Doc 9965- FF-ICE Manual 1st Edition.	ANSP Airspace user	2024

Ground system infrastructur e	Flight and Flow information	Capability to obtain and use necessary information for FF-ICE Services	Upgrade the ground system to use AMET and DAIM information obtained via SWIM services to determine constraints applicable to a flight. References: ICAO Doc 4444 - PANS-ATM, ICAO Doc 9965 - FF-ICE Manual 1st Edition, Annex 3 - Meteorological Service for International Air Navigation, ICAO Doc 10066 - PANS-AIM, ICAO Doc (xxxxx) - PANS-IM and Annex 15 - Aeronautical Information Services.	ANSP	2024
Regulatory provisions	SMS	Apply SMS	Apply Safety Management System in accordance with the national requirements and guidance.	ANSP	2013
Operational procedures	Flight and flow information	Procedures for provision and use of FF-ICE Filing Service	Procedures for FF-ICE flight data exchange, filed flight plan, flight plan update, flight plan re-evaluation, flight plan cancellation and flight data request/Reference: PANS-ATM (Doc 4444) and FF-ICE Manual (Doc 9965, 2nd Edition).	ANSP Airspace user	2022
Training	Flight and Flow information	Training requirements for the filing service	Flight data staff, Dispatch, ATCOs, Flight Crew, AIS staff, ATM/ASM staff	ANSP Airspace user	2022
Ground system infrastructure	Flight and Flow information	Capability to provide and use FF-ICE Filing Service	Upgrade to the ground system to provide and use FF-ICE Filing Service (e.g. send and process FF-ICE filed flight plans and constraints). Reference: PANS-ATM (Doc 4444) and FF-ICE Manual (Doc 9965, 2nd Edition).	ANSP Airspace user	2024
Regulatory provisions	National regulatory framework	National regulatory framework amendment for the provision and use of FF-ICE Filing Service	If applicable, CAA may need to amend the national regulatory provisions to allow the provision and use of FF-ICE Filing Service/Reference: PANS-ATM (Doc 4444) and FF-ICE Manual (Doc 9965, 2nd Edition).	CAA	2022

FICE-B2/3	Trial Service	Information
☐ Sixth edition of th	e GANP	
Main Purpose 2	To provide the aircraft operator with the ability to dimpacting the flight plan currently being used by the	
New Capabilities ?	Allows an aircraft operator to assess the impact of Plan before committing to the change.	f a potential change to a Filed or Preliminary Flight

Description ?

The aircraft operator submits a potential change to a Filed or Preliminary Flight Plan, then, the service provider analyses the proposed change and provides the flight plan acceptability and constraints expected to affect the flight. The service provider does not retain any information about trial requests. A trial request does not indicate intent and therefore is not used by the service provider. If the aircraft operator is satisfied with the solution they will submit a Flight Plan update.

Maturity Level ?

Validation

Human Factor Considerations

- 1. Does it imply a change in task by a user or affected others? Yes
- 2. Does it imply processing of new information by the user? Yes It is a new method and people have to learn the new method.
- 3. Does it imply the use of new equipment? No
- 4. Does it imply a change to levels of automation? Yes

#### PLANNING LAYERS ②

Pre-tactical Tactical-Pre ops

**OPERATIONS ?** 

Type of Dependencies	
	ASBU Element
Relation-benefit	FICE-B2/1 - Planning Service
Relation-operational need	FICE-B2/2 - Filing Service
Relation-benefit	AMET-B2/1 - Meteorological observations information
Relation-information need	AMET-B2/2 - Meteorological forecast and warning information
Relation-benefit	AMET-B2/4 - Meteorological information service in SWIM
Relation-operational need	SWIM-B2/1 - Information service provision
Relation-operational need	SWIM-B2/2 - Information service consumption
Relation-operational need	SWIM-B2/3 - SWIM registry
Relation-information need	DAIM-B1/1 - Provision of quality-assured aeronautical data and informatio
Relation-information need	DAIM-B1/2 - Provision of digital Aeronautical Information Publication (AIP) data sets
Relation-information need	DAIM-B1/3 - Provision of digital terrain data sets
Relation-information need	DAIM-B1/4 - Provision of digital obstacle data sets
Relation-information need	DAIM-B1/5 - Provision of digital aerodrome mapping data sets
Relation-information need	DAIM-B1/6 - Provision of digital instrument flight procedure data sets
Relation-information need	DAIM-B1/7 - NOTAM improvements
Relation-information need	DAIM-B2/1 - Dissemination of aeronautical information in a SWIM environment

Relation-information need	DAIM-B2/2 - Daily Airspace Management information to support flight and flow
Relation-information need	DAIM-B2/5 - NOTAM replacement

Enabler	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Category	Litable: Type	Endoror Harro	Decomption / Notice charge	Ola Konolido I o	Tour
Information Flight a exchange information model	_	Flight Information	References: PANS-ATM ICAO Doc 4444	ANSP	2020
	information	Exchange Model (FIXM) Version 4.2.0	- Procedures for Air Navigation Services and ICAO Doc 9965- FF-ICE Manual 1st Edition.	ATM network function	
Ground F	Flight and	Capability to	Upgrade the ground system to process	ANSP	2024
system infrastructure	Flow information	process FFICE data exchange	FF-ICE data exchange using FIXM and including assignment/recognition of GUFI. References: PANS-ATM ICAO Doc 4444 - Procedures for Air Navigation Services and ICAO Doc 9965- FF-ICE Manual 1st Edition.	Airspace user	
Ground system infrastructur e	Flight and Flow information	Capability to obtain and use necessary information for FF-ICE Services	Upgrade the ground system to use AMET and DAIM information obtained via SWIM services to determine constraints applicable to a flight. References: ICAO Doc 4444 - PANS-ATM, ICAO Doc 9965 - FF-ICE Manual 1st Edition, Annex 3 - Meteorological Service for International Air Navigation, ICAO Doc 10066 - PANS-AIM, ICAO Doc (xxxxx) - PANS-IM and Annex 15 - Aeronautical Information Services.	ANSP	2024
Regulatory	SMS	Apply SMS	Apply Safety Management System in accordance with the national requirements and guidance.	ANSP	2013
Operational procedures	Flight and flow information	Procedures for provision and use of FF-ICE Trial Service	Procedures for submission and processing of trial requests/Reference: PANS-ATM (Doc 4444) and FF-ICE Manual (Doc 9965, 2nd Edition).	ANSP Airspace user	2022
Ground system infrastructure	Flight and Flow information	Capability to provide and use FF-ICE Trial Service	Upgrade to the ground system to provide and use FF-ICE Trial Service (send and process trial requests and constraints). Reference: PANS-ATM (Doc 4444) and FF-ICE Manual (Doc 9965, 2nd Edition).	ANSP Airspace user	2024
Training	Flight and Flow information	Training requirements for	Training for flight data staff, Dispatch, ATCOs, Flight Crew, AlS staff, ATM/ASM	ANSP Airspace user	2024

Regulatory National National If applicable, CAA may need to amend the CAA 2022 national regulatory provisions to allow the provisions regulatory regulatory framework framework provision and use of FF-ICE Trial Service. amendment for Reference PANS-ATM (Doc 4444) and the provision and (Doc 9965, 2nd Edition). use of FF-ICE Trial Service

FICE-B2/4	Flight Data Request Service	Information				
☐ Sixth edition of the GANP ②						
Main Purpose ?	To make available a query and reply service allowing an operator or authorized stakeholders to query the service providers for information on one of its flights - allows an operator to verify the status of a flight previously submitted.					
New Capabilities    O	To allow a service provider or operator to request a Filed or Preliminary Flight Plan, supplementary information (SAR data), or Flight status information. In addition, a service provider will be able to request an aircraft operator to resend a previously submitted flight plan.					
Description ?	PANS-ATM Chapter 11 describes the use of the RQP and RQS messages for an ATS Unit to request a flight plan or specific information about a flight. This element will permit a service provider to make available a query and reply service allowing an operator to query information about its flights, for example a flight plan previously submitted, search and rescue data, or status of a flight.					
Maturity Level 2	Validation					
Human Factor Considerations	1. Does it imply a change in task by a user or affected others? Yes					
	2. Does it imply processing of new information by the user? Yes					
	It is a new method and people have to learn the new method.					
	3. Does it imply the use of new equipment? No					
	4. Does it imply a change to levels of automation? Yes					
PLANNING L	AYERS 7	OPERATIONS <u>o</u>				



DEPENDENCIES AND RELATIONS @		
Type of Dependencies	ASBU Element	
Relation-operational need	SWIM-B2/3 - SWIM registry	
Relation-operational need	SWIM-B2/1 - Information service provision	
Relation-operational need	SWIM-B2/2 - Information service consumption	
Relation-operational need	FICE-B2/2 - Filing Service	

ENABLER	S				
Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Information exchange model	Flight and flow information	Flight Information Exchange Model (FIXM) Version 4.2.0	References: PANS-ATM ICAO Doc 4444 - Procedures for Air Navigation Services and ICAO Doc 9965- FF-ICE Manual 1st Edition.	ANSP ATM network function	2020
Ground system infrastructure	Flight and Flow information	Capability to process FFICE data exchange	Upgrade the ground system to process FF-ICE data exchange using FIXM and including assignment/recognition of GUFI. References: PANS-ATM ICAO Doc 4444 - Procedures for Air Navigation Services and ICAO Doc 9965- FF-ICE Manual 1st Edition.	ANSP Airspace user	2024
Regulatory provisions	SMS	Apply SMS	Apply Safety Management System in accordance with the national requirements and guidance.	ANSP	2013
Operational procedures	Flight and flow information	Procedures for FF-ICE Flight Data Request Service	Procedures for submission and processing of flight data requests.  Reference: PANS-ATM (Doc 4444) and FF-ICE Manual (Doc 9965, 2nd Edition).	ANSP Airspace user	2022
Ground system infrastructure	Flight and Flow information	Capability to provide and use FF-ICE Flight Data Request Service	Upgrade to the ground system to provide and use FF-ICE Flight Data Request Service (query flight information and provide flight plan in response).  Reference: PANS-ATM (Doc 4444) and FF-ICE Manual (Doc 9965, 2nd Edition).	ANSP Airspace user	2024
Training	Flight and Flow information	Training requirements for flight data request service	Training for flight data staff and dispatch regarding flight data request service.	ANSP Airspace user	2024
Regulatory provisions	National regulatory framework	National regulatory framework amendment for the provision and use of FF-ICE Flight Data Request Service	If applicable, CAA may need to amend the national regulatory provisions to allow the provision and use of FF-ICE Flight Data Request Service. Reference PANS-ATM (Doc 4444) and (Doc 9965, 2nd Edition).	CAA	2022

FICE-B2/5 Notification Service Information

☐ Sixth edition of the GANP ☐

Main Purpose ☐ To allow a service provider or operator to notify other parties of the departure or arrival of a flight.

New Capabilities ☐ Allow the complete transition of the existing ATS messages to FIXM.

Description ☐ The service provider or operator sends a message to other parties upon departure or arrival of a flight based on local agreement.

Maturity Level ☐ Validation

1. Does it imply a change in task by a user or affected others? Yes

Considerations

- 2. Does it imply processing of new information by the user? Yes It is a new method and people have to learn the new method.
- 3. Does it imply the use of new equipment? No
- 4. Does it imply a change to levels of automation? Yes



Tactical-During ops



DEPENDENCIES AND RELATIONS		
Type of Dependencies	ASBU Element	
Relation-operational need	SWIM-B2/1 - Information service provision	
Relation-operational need	SWIM-B2/2 - Information service consumption	
Relation-operational need	SWIM-B2/3 - SWIM registry	
Relation-operational need	FICE-B2/2 - Filing Service	

ENABLER:	5				
Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Information exchange model	Flight and flow information	Flight Information Exchange Model (FIXM) Version 4.2.0	References: PANS-ATM ICAO Doc 4444 - Procedures for Air Navigation Services and ICAO Doc 9965- FF-ICE Manual 1st Edition.	ANSP ATM network function	2020
Ground system infrastructure	Flight and Flow information	Capability to process FFICE data exchange	Upgrade the ground system to process FF-ICE data exchange using FIXM and including assignment/recognition of GUFI. References: PANS-ATM ICAO Doc 4444 - Procedures for Air Navigation Services and ICAO Doc 9965- FF-ICE Manual 1st Edition.	ANSP Airspace user	2024

Regulatory provisions	SMS	Apply SMS	Apply Safety Management System in accordance with the national requirements and guidance.	ANSP	2013
Operational procedures	Flight and flow information	Procedures for FF-ICE Notification Service	Procedures for provision of FF-ICE Notification Service.	ANSP	2024
Training	Flight and Flow information	Training requirements for notification service	Training requirements for flight data staff and dispatch regarding the notification service.	Airport operator  ANSP  Airspace user	2024
Regulatory provisions	National regulatory framework	National regulatory framework amendment for the provision and use of FF-ICE Notification Service	If applicable, CAA may need to amend the national regulatory provisions to allow the provision and use of FF-ICE Notification Service. Reference PANS-ATM (Doc 4444) and (Doc 9965, 2nd Edition).	CAA	2022

FICE-B2/6	Publication Service	Information				
☐ Sixth edition of the	e GANP 🕜					
Main Purpose	To ensure consistent flight information and da be used to improve ATM decision-making pro	ta is available to all stakeholders. This information can occesses.				
New Capabilities 2	Allow the sharing of FF-ICE with the ATM con	nmunity via FIXM.				
Description <a>O</a>	General publication of information about flights being handled by the ASP to authorized subscribers via a SWIM information service.					
Maturity Level	Validation					
Human Factor	1. Does it imply a change in task by a user or	affected others? Yes				
Considerations	2. Does it imply processing of new information by the user? Yes					
	It is a new method and people have to learn the	ne new method.				
	3. Does it imply the use of new equipment? N	0				
	4. Does it imply a change to levels of automa	tion? Yes				
PLANNING L		PERATIONS 2				
Pre-tactical Ta	ctical-Pre ops Tactical-During ops					

Type of Dependencies	ASBU Element
Relation-operational need	FICE-B2/2 - Filing Service
Relation-operational need	SWIM-B2/1 - Information service provision
Relation-operational need	SWIM-B2/2 - Information service consumption
Relation-operational need	SWIM-B2/3 - SWIM registry
Relation-operational benefit	SWIM-B2/4 - Air/Ground SWIM for non-safety critical information

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Information exchange model	Flight and flow information	Flight Information Exchange Model (FIXM) Version 4.2.0	References: PANS-ATM ICAO Doc 4444 - Procedures for Air Navigation Services and ICAO Doc 9965- FF-ICE Manual 1st Edition.	ANSP ATM network function	2020
Ground system infrastructure	Flight and Flow information	Capability to process FFICE data exchange	Upgrade the ground system to process FF-ICE data exchange using FIXM and including assignment/recognition of GUFI. References: PANS-ATM ICAO Doc 4444 - Procedures for Air Navigation Services and ICAO Doc 9965- FF-ICE Manual 1st Edition.	ANSP Airspace user	2024
Regulatory provisions	SMS	Apply SMS	Apply Safety Management System in accordance with the national requirements and guidance.	ANSP	2013
Operational procedures	Flight and flow information	Procedures for FF-ICE Publication Service	Procedures to provide FF-ICE Publication Service	ANSP	2022
Training	Flight and Flow information	Training requirements for publication service	Training requirements for flight data staff and dispatch regarding publication service.	ANSP	2024
Regulatory provisions	National regulatory framework	National regulatory framework amendment for the provision and use of FF-ICE Publication Service	If applicable, CAA may need to amend the national regulatory provisions to allow the provision and use of Publication Service.  Reference PANS-ATM (Doc 4444) and (Doc 9965, 2nd Edition).	CAA	2022

☐ Sixth edition of the GANP ②

Main Purpose 2

Higher airspace operations will have a different multi-national flavour worldwide. The FF-ICE capabilities support a strategic collaborative flight planning environment.

- New Capabilities ? Trajectory operations based on the flight business/mission needs
  - · High level of accuracy in the strategic planning of flight business/mission intent
  - · Based on community flight planning rules, an operator will generate business trajectory and publically share via SWIM.
  - · Updates of the intended trajectory will be provided if intended trajectory deviates from the agreed trajectory

Description ?

A joint multi-national capability to support operations at these altitudes provides for strategic separation based on shared intent. Vehicles at these altitudes exhibit the widest range of operational conditions. They share in common the ability to provide long-term precise intent which allows for flight planning that support strategic conflict management. This ability to share long term intent as well as the lower number of participants allows this operational capability to be a shared as opposed to a centralized command and control state or regional based function.

Maturity Level ?

Validation

**Human Factor** Considerations

- 1. Does it imply a change in task by a user or affected others? Yes
- 2. Does it imply processing of new information by the user? Yes
- 3. Does it imply the use of new equipment? Yes
- 4. Does it imply a change to levels of automation? Yes

# PLANNING LAYERS ?

Strategical Pre-tactical Tactical-Pre ops

Tactical-During ops

**OPERATIONS 2** Departure En-route Arrival

# **DEPENDENCIES AND RELATIONS 3**

Type of Dependencies	ASBU Element
Relation-operational need	SWIM-B2/3 - SWIM registry
Relation-operational need	SWIM-B2/1 - Information service provision
Relation-operational need	SWIM-B2/2 - Information service consumption
Relation-information need	DAIM-B2/3 - Aeronautical information to support higher airspace operations

### **FNABLERS**

Category

**Enabler Enabler Type** Enabler Name **Description / References** 

**Stakeholders** 

Regulatory provisions	SMS	Apply SMS	Apply Safety Management System in accordance with the national requirements and guidance.	ANSP	2013
Operational procedures	Flight and flow information	Procedures for message composition and exchange	PANS-ATM ICAO Doc 4444 - Procedures for Air Navigation Services	ANSP	2018
Ground system infrastructur e	Flight and Flow information	Capability to support the assignment/recognition of GUFI	ICAO Doc 4444 - PANS-ATM and ICAO Doc 9965 - FF-ICE Manual 2nd edition.	ANSP Airspace user	2024
Ground system infrastructur e	Flight and Flow information	FDP system that accesses AMET and DAIM information via SWIM services.	ICAO Doc 4444 - PANS-ATM, Annex 3 - Meteorological Service for International Air Navigation, ICAO Doc 10066 - PANS-AIM, ICAO Doc (xxxxx) PANS-IM, and Annex 15 – Aeronautical Information Services.	ANSP Airspace user	2018
Ground system infrastructur e	Flight and Flow information	FDP System that exposes the flight information to global community via SWIM services.	PANS-ATM ICAO Doc 4444 - Procedures for Air Navigation Services	ANSP	2018
Ground system infrastructure	Flight and Flow information	Capability to provide and use FF-ICE Filing Service	Upgrade to the ground system to provide and use FF-ICE Filing Service (e.g. send and process FF-ICE filed flight plans and constraints). Reference: PANS-ATM (Doc 4444) and FF-ICE Manual (Doc 9965, 2nd Edition).	ANSP Airspace user	2024
Training	Flight and Flow information	Training requirements for flight management service for higher airspace operations	Training for flight data staff and dispatch regarding the flight management service of higher airspace operations.	ANSP	2018
Information exchange model	Flight and flow information	Flight Information Exchange Model (FIXM) Version x.x.x	Reference: PANS-ATM (Doc 4444) and FF-ICE Manual (Doc 9965).	ANSP ATM network function	2024
Ground system infrastructur e	Flight and Flow information	FDP system able to process FIXM Version x.x.x	ICAO Doc 4444 - PANS-ATM and ICAO Doc 9965 - FF-ICE Manual 2nd Edition.	ANSP	2024

Main Purpose ?

Operators at the lowest altitudes, outside of manned flight terminal operations, have unique shared operating environment to support beyond visual line of sight operations.

- New Capabilities Operators provide intent before operating
  - UTM flight trajectory requirements and exchanges (Block 1)
  - A community network of intent sharing is in place to improve safe operations

Description ?

The large number of operations occurring in what has been traditionally a visual flight regime extends well beyond the capability from a CNS, automation and controllers to manage as a traditional IFR environment. From a flight planning management perspective these operations require the operators to share intent before flying so that they strategically de-conflict, provides for the exchange models to support these operations, and a flight management system that complements this shared environment.

Maturity Level ?

Validation

**Human Factor** Considerations

- 1. Does it imply a change in task by a user or affected others? Yes
- 2. Does it imply processing of new information by the user? Yes
- 3. Does it imply the use of new equipment? Yes
- 4. Does it imply a change to levels of automation? Yes

# PLANNING LAYERS ②

Pre-tactical Tactical-Pre ops Tactical-During ops

OPERATIONS ?

Departure En-route Arrival

### DEPENDENCIES AND RELATIONS @

BEI ENBENOIES / IN B REEL (	
Type of Dependencies	ASBU Element
Relation-operational need	SWIM-B2/3 - SWIM registry
Relation-operational need	SWIM-B2/1 - Information service provision
Relation-operational need	SWIM-B2/2 - Information service consumption
Relation-information need	DAIM-B2/4 - Aeronautical information requirements tailored to UTM

# **ENABLERS**

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Information	Flight and flow	Flight Information	References: PANS-ATM ICAO Doc 4444	ANSP	2020
exchange	information	Exchange Model	- Procedures for Air Navigation Services	ATM network	
model		(FIXM) Version	and ICAO Doc 9965- FF-ICE Manual 1st	function	
		4.2.0	Edition.		

SMS Flight and flow	Apply SMS	Apply Safety Management System in accordance with the national requirements and guidance.	ANSP	2013
Flight and flow				
information	Procedures for message composition and exchange	PANS-ATM ICAO Doc 4444 - Procedures for Air Navigation Services	ANSP	2018
Flight and Flow information	Capability to support the assignment/reco gnition of GUFI	ICAO Doc 4444 - PANS-ATM and ICAO Doc 9965 - FF-ICE Manual 2nd edition.	ANSP Airspace user	2024
Flight and Flow information	FDP system that accesses AMET and DAIM information via SWIM services.	ICAO Doc 4444 - PANS-ATM, Annex 3 - Meteorological Service for International Air Navigation, ICAO Doc 10066 - PANS-AIM, ICAO Doc (xxxxx) PANS-IM, and Annex 15 – Aeronautical Information Services.	ANSP Airspace user	2018
Flight and Flow information	FDP System that exposes the flight information to global community via SWIM services.	PANS-ATM ICAO Doc 4444 - Procedures for Air Navigation Services	ANSP	2018
Flight and Flow information	Training requirements for low-altitude unmanned aircraft operations	Training for flight data staff and dispatch regarding the flight management service low-altitude unmanned aircraft operations.	ANSP	2018
Flight and Flow information	FDP system able to process FIXM Version x.x.x	ICAO Doc 4444 - PANS-ATM and ICAO Doc 9965 - FF-ICE Manual 2nd Edition.	ANSP	2024
	Flow information  Flight and Flow information  Flight and Flow information  Flight and Flow information	Flight and FDP System that exposes the flight information information information information information information information to global community via SWIM services.  Flight and Flow exposes the flight information to global community via SWIM services.  Flight and Flow requirements for information low-altitude unmanned aircraft operations  Flight and FDP system able flow to process FIXM	Flight and Flow information  Flight and Flow information  Flight and Flow information  Flight and Flow information  FIIght and Flow information  FDP system that accesses AMET and DAIM information via SWIM services.  Flight and Flow information  FDP System that accesses AMET and DAIM information via SWIM services.  Flight and Flow information  FDP System that exposes the flight information to global community via SWIM services.  Flight and Flow information  Flight and Flow inf	Flight and Flow information information information information  Flight and Flow support the assignment/reco gnition of GUFI  Flight and Flow information information information information  FIDP system that accesses AMET and DAIM information via SWIM services.  Flight and Flow exposes the flight information  FIIght and Flow exposes the flight information bearing information information information information information information information information  Flight and Flow erequirements for information information  Flight and Flow information to global community via SWIM services.  Flight and Flow information  Flight and Flow information  Flow information to global community via SWIM services.  Flight and Flow information to global community via SWIM services.  Flight and Flow operations  Flight and Flow information to perations  Flight and Flow operations  Flight and Flow information to perations  Flight and Flow operations  ICAO Doc 4444 - PANS-ATM and ICAO ANSP  ICAO Doc 9965 - FF-ICE Manual 2nd Edition.

# FICE-B2/9 Flight information management support for inflight Information re-planning Sixth edition of the GANP Main Purpose To enable aircraft operators and service providers (ATFM functions) to coordinate the reoptimization of flights based upon changing circumstances. Trajectory changes are limited to those occurring beyond an operationally-appropriate horizon. Service providers (ATFM functions) provide full constraint evaluation on proposed changes.

- New Capabilities 
   Collaborative planning via flight information exchange applications available between traffic management and airspace users.
  - Synchronization process to align trajectories for shared planning.
  - · Information standards and protocols for sharing network operations objectives and information exchanges supporting collaborative in-flight re-planning. Information models allow for consistent, integrated flight, flow and constraint information.
  - Operator constraints that the ATM service provider can consider when re-planning.

Description ?

Globally consistent processes and information exchanges are applied to support collaborative inflight re-planning between the AU and ASPs, integrating applicable RSEQ and NOPS planning processes. Information exchange models (e.g., MET, Aeronautical, Flow and Flight) support the application of consistent methods for evaluation of expected impacts on flows and individual flights as circumstances change. Automated applications employ these methods in support of in-flight replanning. The flight is cleared to the new flight plan by ATC as appropriate.

Maturity Level ?

Validation

**Human Factor** Considerations

- 1. Does it imply a change in task by a user or affected others? Yes
- 2. Does it imply processing of new information by the user? Yes
- 3. Does it imply the use of new equipment? Yes
- 4. Does it imply a change to levels of automation? Yes

# PLANNING LAYERS ?

Tactical-During ops



DEPENDENCIES AND RELA	DEPENDENCIES AND RELATIONS 2		
Type of Dependencies	ASBU Element		
Relation-operational need	FICE-B0/1 - Automated basic inter facility data exchange (AIDC)		
Relation-operational need	FICE-B2/1 - Planning Service		
Relation-operational need	FICE-B2/2 - Filing Service		
Relation-operational need	FICE-B2/3 - Trial Service		
Relation-operational need	FICE-B2/4 - Flight Data Request Service		
Relation-operational need	FICE-B2/5 - Notification Service		
Relation-operational need	FICE-B2/6 - Publication Service		
Relation-benefit	AMET-B2/1 - Meteorological observations information		
Relation-information need	AMET-B2/2 - Meteorological forecast and warning information		
Relation-benefit	AMET-B2/4 - Meteorological information service in SWIM		
Relation-operational need	SWIM-B2/1 - Information service provision		
Relation-operational need	SWIM-B2/2 - Information service consumption		

Relation-operational need	SWIM-B2/3 - SWIM registry
Relation-information benefit	SWIM-B2/4 - Air/Ground SWIM for non-safety critical information
Relation-information need	DAIM-B2/1 - Dissemination of aeronautical information in a SWIM environment
Relation-information need	DAIM-B2/2 - Daily Airspace Management information to support flight and flow
Relation-information need	DAIM-B2/5 - NOTAM replacement

Enables	Enables Time	Enabler Name	Description / References	Stakeholders	Voor
Enabler Category	Enabler Type	Enabler Name	Description / References	Stakenoiders	Year
Regulatory provisions	SMS	Apply SMS	Apply Safety Management System in accordance with the national requirements and guidance.	ANSP	2013
Operational procedures	Flight and flow information	Procedures to coordinate re- optimization of flight	Procedures for flight plan evaluation, submission and clearance delivery while in-flight. Reference: PANS-ATM (Doc 4444) and FF-ICE Manual (Doc 9965, 3rd Edition)	ANSP	2025
Airborne system capability	Flight and Flow information	Flight deck communication capability	Upgrade the ground system to allow the participation of the flight deck in replanning (e.g., A/G with FOC or A/G SWIM as applicable). References: TBD	Airspace user	2025
Ground system infrastructur e	Flight and Flow information	Automated capability to coordinate re-optimization of flights	Upgrade the ground system to provide applicable constraints and operational acceptability of a proposed change to a flight plan for an active flight. References: TBD	ANSP	2025
Ground system infrastructur e	Flight and Flow information	Synchronization of trajectory information	Upgrade of the gorund system to enable the synchronization of trajectory information suitable for RSEQ and NOPS planning. References: TBD	ANSP	2025
Ground system infrastructure	Flight and Flow information	Provision of updated plan to ATCO position	Upgrade of the ground system to enable the provision of updated flight plan to ATCO position for clearance delivery. References: TBD	ANSP	2025
Training	Flight and Flow information	Training requirements for inflight replanning	Training for flight data staff, dispatch, ATCOs, flight crew, AIS staff and ATM/ASM staff regarding inflight replanning.	ANSP Airspace user	2025
Ground system infrastructure	Flight and Flow information	Enhance flight planning capability	Upgrade of the ground systems to allow the update and exchange flight plans and process constraints received. References: TBD	Airspace user	2025

Information exchange model

information

Exchange Model FF-ICE Manual (Doc 9965). (FIXM) Version

X.X.X

Flight and flow Flight Information Reference: PANS-ATM (Doc 4444) and

ATM network function

2024

**ANSP** 

FICE-B3/1 Flight information management services for enhanced trajectory operations

Information

☐ Sixth edition of the GANP ②

Main Purpose ?

To provide automatic exchanges of up-to-date flight trajectories tailored to the individual flight operation in support of post-departure coordination and trajectory sharing.

New Capabilities ?

- . Mechanisms are in place to support exchange and synchronization of individual trajectory intent/projections (FDP/FMS/DST) for use across planning and tactical operations
- · Enhancement of automated coordination between ATS facilities supporting seamless delivery of Agreed trajectory
- · Support for flight-specific, dynamic constraint and separation application considering operator constraints, preferences and capabilities

Description ?

Mechanisms are in place to support exchange of intent allowing for advanced applications which can synchronize and share a common trajectory intent agreed to facilitate TBO in execution. The use of synchronized trajectories by automation and for ATC Coordination support a wider range of operational techniques within and across ANSP boundaries. Constraints are applied only where and when necessary and tailored to flight-specific capabilities.

Concept Maturity Level ?

**Human Factor** Considerations

- 1. Does it imply a change in task by a user or affected others? Yes
- 2. Does it imply processing of new information by the user? Yes
- 3. Does it imply the use of new equipment? Yes
- 4. Does it imply a change to levels of automation? Yes

# PLANNING LAYERS ?

Tactical-During ops

OPERATIONS ?

Departure En-route Arrival

# DEPENDENCIES AND RELATIONS @

Type of Dependencies	ASBU Element
Relation-operational need	SWIM-B2/1 - Information service provision
Relation-operational need	SWIM-B2/2 - Information service consumption
Relation-operational need	SWIM-B2/3 - SWIM registry
Relation-operational need	SWIM-B2/5 - Global SWIM processes

Relation-operational need	SWIM-B3/1 - Air/Ground SWIM for safety critical information
Relation-benefit	AMET-B3/1 - Meteorological observations information
Relation-benefit	AMET-B3/2 - Meteorological forecast and warning information
Relation-benefit	AMET-B3/4 - Meteorological information service in SWIM
Relation-information need	FICE-B2/7 - Flight information management service for higher airspace operations
Relation-information need	FICE-B2/9 - Flight information management support for inflight re-planning
Relation-information need	DAIM-B2/1 - Dissemination of aeronautical information in a SWIM environment
Relation-information need	DAIM-B2/2 - Daily Airspace Management information to support flight and flow
Relation-information need	DAIM-B2/5 - NOTAM replacement

	_				
ENABLER!					
Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Regulatory provisions	SMS	Apply SMS	Apply Safety Management System in accordance with the national requirements and guidance.	ANSP	2013
Operational procedures	Flight and flow information	Procedures for enhanced automated coordination	Procedures for enhanced automated coordination between ATS units. References: TBD	ANSP	2031
Airborne system capability	Flight and Flow information	Provision of aircraft-derived information	Update of the ground systems to allow the provision of aircraft-derived information supporting trajectory synchronization.  References: TBD	Airspace user	2031
Ground system infrastructure	Flight and Flow information	Trajectory synchronization	Update of the ground system to allow trajectory synchronisation across ground automation and using aircraft-derived information, including both the sharing and use of trajectory information. References: TBD	ANSP	2031
Ground system infrastructure	Flight and Flow information	ATCO awareness and flight-specific application	Update of the ground systems for enhanced HMI supporting ATCO awareness and flight-specific constraint application. References: TBD	ANSP	2031
Ground system infrastructur e	Flight and Flow information	Trajectory-based automated coordination between ATS facilities.	Update of the ground system to allow trajectory-based automated coordination between ATS units. References: TBD	ANSP	2031

Training Flight and Flow requirements for information enhanced trajectory operations.

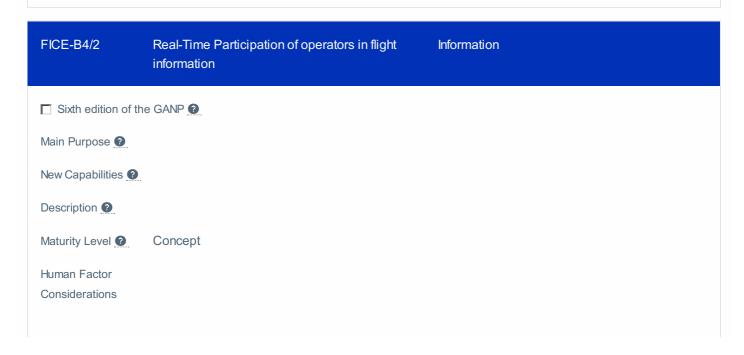
Flow requirements for enhanced trajectory operations.

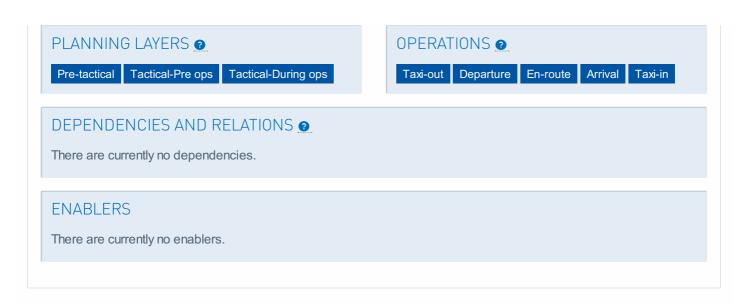
Training for flight data staff, ATCOs, flight crew and ATM/ASM staff regarding enhanced trajectory operations.

ANSP

Airspace user

FICE-B4/1 Integrated flight information management system Information for end-to-end global flight planning ☐ Sixth edition of the GANP ② Main Purpose ? New Capabilities ? Description 2 Maturity Level ? Concept **Human Factor** Considerations PLANNING LAYERS ② **OPERATIONS 3** Pre-tactical Tactical-Pre ops Tactical-During ops Taxi-out Departure En-route Arrival Taxi-in **DEPENDENCIES AND RELATIONS 3** There are currently no dependencies. **ENABLERS** There are currently no enablers.





FRTO-B0/1	Direct routing (DCT)	Operational
☐ Sixth edition of th	e GANP ?	
Main Purpose 2	Direct routings are established with the aim of proroute options on a larger scale across FIRs such to comparison with the fixed route network.	oviding airspace users with additional flight planning that overall planned leg distances are reduced in
New Capabilities 2	Direct routings (DCTs) are established at national planning (with published conditions of use). DCTs Free Route Airspace (FRA) concept. Direct routing flight and fuel planning.	should be considered as an early iteration of the

\_\_\_\_ FRT0 \_

### Description ?

DCTs could be implemented in a limited way e.g.:

- time constraint (fixed or depending on traffic/availability);
- traffic constraint (based on flow and/or level of traffic);
- flight level;
- lateral constraints:
- entry/exit conditions.

The extension of direct routings within and across the FIR boundaries also requires Network and ANSPs ground system upgrades for airspace management and flight data processing.

The following procedures and process might need to be considered:

- identify the direct routing airspace volume (lateral and vertical) and applicable time;
- · direct routings may co-exists with ATS route structure;
- · identify direct routing entry and exit points;
- · adapt airspace design and ensure direct routing horizontal and vertical connectivity;
- ATFM direct routing procedures;
- · adapt the LoA with adjacent ATS units;
- publish relevant data for direct routing in AIP;
- airspace management procedure for the implementation of direct routings;
- ATC procedures to cover direct routing co-ordination and transfer of control, trajectory change in direct routing; environment, conflict detection.

The ATM system upgrades of FDP and CWP, if required, are related to:

- upgrade of network flight planning and ASM/ATFM system for DCTs;
- · direct routing clearances;
- rerouting capabilities in cases the direct routing traversed the military airspace; differentiation between different traffic type airspaces;
- · direct route beyond AoR;
- calculation of 4D trajectory with Aol;
- editing function for 4D trajectories.

# Maturity Level ?

Ready for implementation

Human Factor Considerations

- 1. Does it imply a change in task by a user or affected others? Yes
- 2. Does it imply processing of new information by the user? Yes
- 3. Does it imply the use of new equipment? Yes
- 4. Does it imply a change to levels of automation? Yes

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# **DEPENDENCIES AND RELATIONS 3**

Type of Dependencies

Type of Dependencies	ASBO Element
Relation-operational need	NOPS-B0/1 - Initial integration of collaborative airspace management with air traffic flow management

Relation-operational need	FRTO-B0/2 - Airspace planning and Flexible Use of Airspace (FUA)
Relation-operational need	FRTO-B0/4 - Basic conflict detection and conformance monitoring
Relation-information need	FICE-B0/1 - Automated basic interfacility data exchange (AIDC)

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ENABLER	S				
Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	Design and operations	DCT Procedures	Design and use of operational procedures for direct routes. Reference: EUROCONTROL European Route Network Improvement Plan (ERNIP) - Part 1: European Airspace Design Methodology - Guidelines - Edition December 2018 (https://www.eurocontrol.int/publications/european-route-network-improvement-planernip-part-1-european-airspace-design)	ATM network function  Aircraft operator	2013
Ground system infrastructur e	ATC systems	ATC system upgrades for monitoring aids functions	ATC systems to be upgraded for DCT clearances, notification and co-ordination data exchanges and management of relevant airspace data. Reference: EUROCONTROL specification for the online Data exchanges (OLDI) https://eurocontrol.int/sites/default/files/publication/files/EUROCONTROL%20Specification%20OLDI%204.3.pdf	ANSP	2013
Ground system infrastructur e	CFSP systems	Upgrade of AOs Flight Planning Systems for DCTs	AO-CFSPS systems to be upgraded to enable flight planning of DCTs Reference: EUROCONTROL NM Flight Planning Requirements document December 2018 https://www.eurocontrol.int/publications/nm-flight-planning-requirements-guidelines	Aircraft operator	2013
Training	-	Training requirements for direct routing	ATCO Training, AO Training, ATM Network Training Training for DCT Provide training to staff prior to implementation	ATM network function  Aircraft operator	2013
Ground system infrastructur e	ATM systems	ATFM system for FUA	Upgrade ATFM/flight planning systems to support FUA Reference: EUROCONTROL NM Flight Planning Requirements document December 2018 (https://www.eurocontrol.int/publications/nm-flight-planning-requirements-guidelines)	ATM network function	2013

### **Operational conditions:**

This element will bring benefits in en-route airspace with low, medium and high complexity traffic.

### Main intended benefits:

Type Operational description Benefitting stakeholder(s)

# INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

КРА	Focus Areas	Most specific performance objective(s) supported	KPI Impact	КРІ
Efficiency	Flight time & distance	Overcome route selection inefficiencies associated with route network design	++	KPI04: Filed flight plan en-route extension

FRTO-B0/2 Airspace planning and Flexible Use of Airspace Operational (FUA)

☐ Sixth edition of the GANP ②

Main Purpose Establish the Flexible Use of Airspace (FUA) process and improve data exchange between civil and military stakeholders by automation to enable a more efficient use of airspace based on transparency and due regard to national security needs.

New Capabilities Deployment of automated airspace management (ASM) support systems to manage the airspace reservations based on the airspace user needs and resulting from civil-military collaborative decision-making process and more flexibly according to the airspace user needs.

This element addresses strategic/long term airspace management, pre-tactical planning and tactical operations. Automated ASM support systems improve airspace management processes and flexible airspace planning including time horizon specifications in all flight phases (strategic, pre-tactical and tactical time horizon) by providing mutual visibility on civil and military requirements. They also support flexible airspace planning according to civil and military ANSPs and airspace user requirements, including permit cross border and use of segregated areas operations regardless of national boundaries.

Maturity Level Ready for implementation

Human Factor Considerations

Description ?

- 1. Does it imply a change in task by a user or affected others? Yes
- 2. Does it imply processing of new information by the user? Yes
- 3. Does it imply the use of new equipment? Yes
- 4. Does it imply a change to levels of automation? Yes

DEPENDENCIES AND RELA	TIONS 💁
Type of Dependencies	ASBU Element
Relation-operational need	FRTO-B0/1 - Direct routing (DCT)
Relation-operational need	NOPS-B0/1 - Initial integration of collaborative airspace management with air traffic flow management

ENABLER	S				
Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Regulatory provisions	Operational Approval	Operational approval to provide FUA	Follow regulations for regulatory approval Reference: ICAO Circular 330 Civil/Military Coordination European Union Regulation (EC) No 2150/2005 of 23 December 2005 laying down common rules for the flexible use of airspace. https://www.eurocontrol.int/articles/flexible-use-airspace-fua-mandate	CAA ICAO	2013
Operational procedures	Design and operations	FUA Procedures for Dynamic Airspace Management	Design and use of operational procedures Reference: EUROCONTROL European Route Network Improvement Plan (ERNIP) - Part 1: European Airspace Design Methodology - Guidelines - Edition December 2018 https://www.eurocontrol.int/publications/european-route-network-improvement-planemip-part-1-european-airspace-design EUROCONTROL European Route Network Improvement Plan (ERNIP) - Part 3: Airspace Management Handbook - Edition December 2018 https://www.eurocontrol.int/sites/default/file s/publication/files/ernip-part-3-asm-handbook-edition-5-v5-5.pdf	Aircraft operator	2013

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Ground system infrastructur e	ATM systems	Tools and System to support FUA	Tools to be implemented and existing systems upgraded to conduct FUA operations. Reference European Route Network Improvement Plan (ERNIP) - Part 3: Airspace Management Handbook - Annex 12 Edition December 2018 (https://www.eurocontrol.int/sites/default/fil es/publication/files/ernip-part-3-asm-handbook-edition-5-v5-5.pdf) EUROCONTROL Local And sub-Regional Airspace Management support system (https://www.eurocontrol.int/services/local-and-sub-regional-airspace-management-support-system-lara)	ANSP	2013
Training	-	Training requirements for FUA	Training for FUA Provide training to staff prior to implementation	ANSP Aircraft operator	2013
Ground system infrastructur e	ATM systems	ATFM system for FUA	Upgrade ATFM/flight planning systems to support FUA Reference: EUROCONTROL NM Flight Planning Requirements document December 2018 (https://www.eurocontrol.int/publications/nm-flight-planning-requirements-guidelines)	ATM network function	2013

# **Operational conditions:**

This element will bring benefits in en-route airspace with low, medium and high complexity traffic.

# Main intended benefits:

Туре	Operational description	Benefitting stakeholder(s)
Direct benefits	Ensure that the right airspace is available at the right time for the mission	ANSP ATM network function  Aircraft operator

# INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

КРА	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Access and equity		Improve airspace reservation management	++	
Efficiency	Flight time & distance	Facilitate direct routing of portions of the flight (if this does not cause network problems)	++	KPI05: Actual enroute extension

КРА	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Efficiency	Flight time & distance	Overcome route selection inefficiencies associated with route & airspace availability as known at the flight planning stage	++	KPI04: Filed flight plan en-route extension
Efficiency	Flight time & distance	Reduce need for tactical ATFM rerouting to circumnavigate airspace closed at short notice	++	KPI05: Actual enroute extension
Efficiency	Flight time & distance	Reduce need to avoid airspace because of lack of confirmation that it will be open	++	KPI04: Filed flight plan en-route extension
Efficiency	Vertical flight efficiency	Reduce altitude restrictions during climb to avoid Special Use Airspace	++	KPI17: Level-off during climb
Efficiency	Vertical flight efficiency	Reduce altitude restrictions during cruise to avoid Special Use Airspace	++	KPI18: Level capping during cruise
Efficiency	Vertical flight efficiency	Reduce altitude restrictions during descent to avoid Special Use Airspace	++	KPI19: Level-off during descent

FRTO-B0/3 Pre-validated and coordinated ATS routes to Operational support flight and flow

☐ Sixth edition of the GANP ②

Main Purpose A collection of routes that have been pre-validated and coordinated with impacted air route traffic control centers and airspace users.

New Capabilities There are three main options for the flexible routings:

- Preferred Routes
- Playbook Routes
- Coded Departure Routes (CDR)

Description ?

There are many instances when ATC needs to move air traffic away from, or into, a particular area of airspace. When this happens, traffic managers will typically implement reroutes – a common route, or set of routes, that they want aircraft to use in a particular area. These routes are predetermined and applied to the certain sector/airport accordingly. Routes are available through ANSP database and are published for the airspace users.

Preferred routes are the normal, everyday routes that ATC would like operators to file. These routes were developed to increase system efficiency and capacity by having balanced traffic flows among high-density airports, as well as de-conflicting traffic flows where possible. Preferred routes are those that operators will most commonly file.

Playbook routes are a set of standard routes that ATC can utilize to fit a particular set of circumstances, when the preferred routes are not available. These routes were created to allow for rapid implementation as needed.

CDRs are a combination of coded air traffic routings and refined coordination procedures, designed to reduce the amount of information that needs to be exchanged between ATC and flight crews.

Maturity Level ?

Ready for implementation

Human Factor
Considerations

- 1. Does it imply a change in task by a user or affected others? Yes
- 2. Does it imply processing of new information by the user? Yes
- 3. Does it imply the use of new equipment? No
- 4. Does it imply a change to levels of automation? No

# PLANNING LAYERS ②

Pre-tactical Tactical-Pre ops Tactical-During ops

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Departure En-route Arrival

**OPERATIONS 2** 

# DEPENDENCIES AND RELATIONS 2

Type of Dependencies	ASBU Element
Relation-operational need	FRTO-B0/1 - Direct routing (DCT)
Relation-operational need	FRTO-B0/2 - Airspace planning and Flexible Use of Airspace (FUA)
Relation-information need	AMET-B0/1 - Meteorological observations products
Relation-information need	AMET-B0/2 - Meteorological forecast and warning products
Relation-information need	AMET-B0/4 - Dissemination of meteorological products

# **ENABLERS**

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational	Design and	Procedures on	Design and operational procedures for	ANSP	2013
procedures	operations	flexible routing tools	ANSPs and AOs on how to use flexible routing tools.	Aircraft operator	

Ground system infrastructur e	ATM systems	Tools and system to support Flexible routing	ANSP implemented tools to support preferred, playbook, and CDR routes. Reference: https://www.fly.faa.gov/Products/products.j	ANSP	2013
Ground system infrastructur e	CFSP systems	Upgrade of AOs Flight Planning Systems for Flexible routings (optional)	AO-CFSPS systems to be upgraded to enable flight planning of flexible routings. Although AOs can just look up these routes on the weblink, they can also integrate these data into their flight planning system and have it in their tool. Reference: https://www.fly.faa.gov/Products/products.j sp	Aircraft operator	2013
Training	-	Training requirements for flexible routings	Training provided to TMC, ATCO, FOC on how to use flexible routing	ANSP Aircraft operator	2013

# **Operational conditions:**

This element will bring benefits in en-route airspace with low, medium and high complexity traffic.

# Main intended benefits:

Type Operational description Benefitting stakeholder(s)

# INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

КРА	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Capacity	Capacity shortfall & associated delay	Establish/update/publish the catalogue of strategic ATFM measures designed to respond to a variety of possible/typical/recurring events degrading the airspace system (e.g. predefined action plans)	++	
Flexibility		Improve flexibility of the Air Navigation System	++	

FRTO-B0/4 Basic conflict detection and conformance Operational monitoring

Sixth edition of the GANP 3

Main Purpose Reduction of ATCO's workload via early and systematic conflict detection and conformance monitoring.

New Capabilities **2** Deployment of basic conflict detection tools (Medium Term Conflict Detection Tool- MTCD) and conformance monitoring warnings.

Description MTCD assists the controller in conflict identification and planning tasks by providing automated early detection of potential conflicts; facilitating identification of flexible routing/conflict free trajectories; identifying aircraft constraining the resolution of a conflict or occupying a flight level requested by another aircraft.

The monitoring aids (MONA) function provides the controller with warnings if aircraft deviate from a clearance or planned trajectories and reminders related to the ATCO instructions to be issued. MONA might include the flight progress monitoring as well as the lateral, longitudinal, vertical and Cleared Flight Level (CFL) deviations.

Maturity Level Ready for implementation

Human Factor Considerations

- 1. Does it imply a change in task by a user or affected others? Yes
- 2. Does it imply processing of new information by the user? Yes
- 3. Does it imply the use of new equipment? Yes
- 4. Does it imply a change to levels of automation? Yes



Tactical-During ops

OPERATIONS 2

Departure En-route Arrival

# DEPENDENCIES AND RELATIONS 2

Type of Dependencies ASBU Element

Relation-operational need FRTO-B0/1 - Direct routing (DCT)

### **FNARI FRS**

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Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	Design and operations	ATC Procedures for Medium Term Conflict Detection (MTCD) and Monitoring Aids (MONA)	Design and use of operational procedures	ANSP	2013

Ground A system infrastructur e	ATC systems	ATM system Upgrades for MTCD and MONA functions	ATC systems to be upgraded to ensure conformance monitoring of flights and conflict detection for ATC planning purposes. Reference: EUROCONTROL Monitoring Aids (MONA) specification 3 March 2017. This document provides system requirements for Monitoring Aids (MONA).https://www.eurocontrol.int/standa rds?page= Reference: EUROCONTROL Medium-Term Conflict Detection (MTCD) specification 3 March 2017. This document provides system requirements for Medium-Term Conflict Detection (MTCD). https://www.eurocontrol.int/standards? page=4 EUROCONTROL Trajectory Prediction Specification Edition 2.0 March 2017 (https://www.eurocontrol.int/publications/trajectory-prediction-specification)	ANSP	2013
Training -		Training requirements for MTCD and MONA	ATCO Training Provide training to staff prior to implementation	ANSP	2013

# **Operational conditions:**

This element will bring benefits in en-route airspace with low, medium and high complexity traffic.

# Main intended benefits:

Туре	Operational description	Benefitting stakeholder(s)
Direct benefits	Improve situational awareness of ATCO	ANSP

# INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	КРІ
Capacity	Capacity, throughput & utilization	Reduce ATCO workload (enroute)	++	KPI06: En-route airspace capacity
Safety		Avoid vertical & lateral navigation errors during flight (cases of non-conformance with clearance)	++	KPI20: Number of aircraft accidents

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Safety		Improve early detection of conflicting ATC Clearances (CATC) (en-route / departure / approach)	++	KPI20: Number of aircraft accidents KPI23: Number of airprox/TCAS alert/loss of separation/near midair collisions/midair collisions (MAC)
Safety		Improve separation provision (at a planning horizon > 2 minutes)	++	KPI20: Number of aircraft accidents KPI23: Number of airprox/TCAS alert/loss of separation/near midair collisions/midair collisions (MAC)

FRTO-B1/1	Free Route Airspace (FRA)  Operational
☐ Sixth edition of th	ne GANP ②
Main Purpose ?	The Free Route Airspace (FRA) concept brings significant flight efficiency benefits and a choice of user preferred routes to airspace users.
	As a step to full trajectory-based operations, the FRA concept brings increased flight predictability, reduced uncertainty for the ATM network function, which in turn can lead to potential capacity increases for ATM, which will also benefit the user.
New Capabilities   O	FRA is a specified volume of airspace within which users may freely plan a route between a defined entry point and a defined exit point, with the possibility to route via intermediate (published or unpublished) waypoints, without reference to the ATS route network, subject to airspace availability. Within this airspace, flights remain subject to air traffic control.
	FRA enables airspace users to fly as close as possible to what they consider the optimal trajectory without the constraints of a fixed route network structure.

### Description ?

FRA implementation can be customized for instance:

- · laterally and vertically;
- during specific periods;
- with a set of entry/exit conditions;
- · with initial system upgrades.

The extension of FRA within and across the FIR boundaries also requires upgrades of the ATM network function system and the ANSPs ground system for airspace management and flight data processing.

The following procedures and process might need to be considered:

- FRA airspace volume (lateral and vertical) and applicable time (not necessary H24 7/7);
- · FRA entry and exit points, arrival transition point and departure transition point, and intermediate
- adapt airspace design and ensure FRA horizontal and vertical connectivity;
- ATFM FRA procedures;
- · adapt the LoA with adjacent -and military- ATS units;
- publish relevant data for FRA in AIP;
- charts for FRA operations;
- airspace management procedure for the implementation of free routes operation;
- · ATC procedures to cover free route co-ordination and transfer of control, trajectory change in a free route environment, conflict detection.

The upgrades of ATM systems for flight data processing and controller working postition, if required, are related to:

- ATC clearances beyond AoR;
- differentiation between different traffic type airspaces;
- calculation of 4D trajectory with Aol;
- editing function for 4D trajectories;
- · coordination point management for FRA;
- · coordination with military agencies;
- enhance conflict management and controller HMI functions to support conflict detection and resolution.

### Maturity Level ?

Standardization

**Human Factor** Considerations

- 1. Does it imply a change in task by a user or affected others? Yes
- 2. Does it imply processing of new information by the user? Yes
- 3. Does it imply the use of new equipment? Yes
- 4. Does it imply a change to levels of automation? Yes

# PLANNING LAYERS ? Strategical Pre-tactical ATM planning

Tactical-Pre ops Tactical-During ops

**OPERATIONS 2** 

Departure En-route Arrival

Type of Dependencies	ASBU Element
Relation-operational need	NOPS-B1/5 - Full integration of airspace management with air traffic flow management
Relation-operational need	FRTO-B1/4 - Dynamic sectorization
Relation-operational need	FRTO-B1/3 - Advanced Flexible Use of Airspace (FUA) and management of real time airspace data
Relation-information need	FICE-B0/1 - Automated basic inter facility data exchange (AIDC)
Relation-operational need	FRTO-B1/5 - Enhanced Conflict Detection Tools and Conformance Monitoring
Relation-information need	DAIM-B2/2 - Daily Airspace Management information to support flight and flow
Evolution	FRTO-B0/1 - Direct routing (DCT)

ENABLER	S				
Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational	Design and	Procedures for	Design and use of operational	ANSP	2019
procedures	operations	FRA Airspace Design	procedures. Reference: EUROCONTROL European Route Network Improvement Plan (ERNIP) - Part 1: European Airspace Design Methodology - Guidelines - Edition December 2018 https://www.eurocontrol.int/publications/eur opean-route-network-improvement-plan- ernip-part-1-european-airspace-design	ATM network function	

Ground system infrastructur e	ATM systems	ATC System Upgrade for FRA	AATM system upgrades for MTCD and MONA functions. ATC systems to be upgraded to ensure conformance monitoring of flights and conflict detection for ATC planning purposes Reference: EUROCONTROL Monitoring Aids (MONA) specification 3 March 2017. This document provides system requirements for Monitoring Aids (MONA).https://www.eurocontrol.int/standa rds?page= Reference: EUROCONTROL Medium-Term Conflict Detection (MTCD) specification 3 March 2017. This document provides system requirements for Medium-Term Conflict Detection (MTCD). https://www.eurocontrol.int/standards? page=4 EUROCONTROL Trajectory Prediction Specification Edition 2.0 March 2017 https://www.eurocontrol.int/publications/trajectory-prediction-specification	ANSP	2019
Ground system infrastructur e	CFSP systems	Upgrade of AOs flight planning systems for FRA	AO-CFSPS systems to be upgraded to enable flight planning of FRA operations. Reference: EUROCONTROL NM Flight Planning Requirements document December 2018 https://www.eurocontrol.int/publications/nm -flight-planning-requirements-guidelines	Aircraft operator	2019
Training		Training requirements for FRA	ATCO Training: FRA Training Provide training to staff prior to implementation Reference: EUROCONTROL European Free Route Airspace Developments 2016 https://www.eurocontrol.int/sites/default/file s/publication/files/free-route-airspace-brochure-20161216.pdf AO and ATM Network Function Training: FRA Training Provide training to staff prior to implementation Reference: EUROCONTROL European Free Route Airspace Developments 2016 https://www.eurocontrol.int/sites/default/file s/publication/files/free-route-airspace-brochure-20161216.pdf	ANSP ATM network function Aircraft operator	2019
Ground system infrastructur e	ATM systems	ATFM system for FRA	Upgrade ATFM/flight planning systems to support FRA	ATM network function	2019

### **Operational conditions:**

This element will bring benefits in en-route airspace with low, medium and high complexity traffic.

### Main intended benefits:

Type Operational description Benefitting stakeholder(s)

### INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

КРА	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Efficiency	Flight time & distance	Overcome route selection inefficiencies associated with route network design	++	KPI04: Filed flight plan en-route extension

FRTO-B1/2	Required Navigation Performance (RNP) routes	Operational
FR10-01/2	Reduited Navidation Fellonnance (RNF) Toutes	Operational

☐ Sixth edition of the GANP ②

Main Purpose RNP routes should be deployed within en-route airspace where Free Route Airspace (FRA) is not planned or if FRA is deployed the RNP routes should ensure the connectivity between FRA and TMAs.

The objective is to provide consistent navigation using the most appropriate PBN type, infrastructure and navigation applications.

New Capabilities Performance-based navigation (PBN) specifications allow aircraft to fly a specific path between two 3D-defined points in space. The new capability refers to the Implementation of PBN/RNP routes within en-route airspace.

Description With the introduction of a RNP navigation specification, the advantages gained from RNAV will be further enhanced by on-board performance monitoring and alerting and the execution of more predictable aircraft behavior.

Design of optimized routes which may include closely spaced parallel routes, Fixed Radius Transition (FRT) and Tactical Parallel Offset (TPO) functionality in en-route, supported by infrastructure and system improvements to support PBN routes.

The adequate navigation infrastructure is required. GNSS or DME ground infrastructure needs to be optimised to support RNP operations and main reversionary capability in case of GNSS outages.

PBN requires a full digital chain, to critical data quality levels, for aeronautical data provided to the airborne systems. The system improvements for controller support tools which might be required are covered by other FRTO elements (MTCD, monitoring aids) or other threads (Safety Nets).

Maturity Level Standardization

# Human Factor Considerations

- 1. Does it imply a change in task by a user or affected others? Yes
- 2. Does it imply processing of new information by the user? Yes
- 3. Does it imply the use of new equipment? Yes
- 4. Does it imply a change to levels of automation? Yes

# PLANNING LAYERS ②

Pre-tactical Tactical-Pre ops Tactical-During ops



En-route

# DEPENDENCIES AND RELATIONS 2

Type of Dependencies	ASBU Element
Relation-operational need	APTA-B0/1 - PBN Approaches (with basic capabilities)
Relation-operational need	APTA-B1/1 - PBN Approaches (with advanced capabilities)
Relation-operational need	SNET-B0/1 - Short Term Conflict Alert (STCA)

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ENABLER	5				
Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Regulatory provisions	Operational Approval	Operational approval to provide RNP Routes	Provide appropriate terrestrial navigation infrastructure to support RNP operations - ground based stations Reference: ICAO Docs, 9613 (Ed 5 – when it is released), Airspace Design – 9992, Operation Approval – 9997. Annexes 6, 11 and 15 (for the data) and the PANS, 4444, 8168 and the new PANS AIM	CAA ICAO	2019
Operational procedures	Design and operations	Procedures to design the RNP routes	Design and use of operational procedures Reference: EUROCONTROL European Route Network Improvement Plan (ERNIP) - Part 1: European Airspace Design Methodology - Guidelines - Edition December 2018 https://www.eurocontrol.int/publications/eur opean-route-network-improvement-plan- ernip-part-1-european-airspace-design European Airspace Concept Handbook for PBN Implementation Edition 3.0 2013 https://www.eurocontrol.int/sites/default/file s/publication/files/handbook-pbn- implement-2013-ed-3a.pdf	ANSP	2019
Airborne system capability	Aircraft system	Install appropriate RNP equipment	Equip aircraft eligible for RNP operations as defined in ICAO DOC 9613	Aircraft manufacturer Aircraft operator	2019

Ground system infrastructur e	ATC systems	Adapt ATC ground system HMI for RNP routes	Upgrade HMI to provide presentation of PBN equipage to ATC	ANSP	2019
Training	-	Training requirements for RNP routes	Flight Crew Training: Train flight crews in RNP Provide training to staff prior to implementation ATCO Training: Train ATCOs in RNP Provide training to staff prior to implementation	ANSP Aircraft operator	2019

# **Operational conditions:**

The element will bring benefit in an en-route medium to high complexity traffic environment.

### Main intended benefits:

Type Operational description Benefitting stakeholder(s)

# INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

КРА	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Capacity	Capacity, throughput & utilization	Overcome capacity limitations attributable to route network design	++	KPI06: En-route airspace capacity
Capacity	Capacity, throughput & utilization	Take advantage of increased navigation precision (airspace with PBN operations) to implement route networks and airspace structures with smaller lateral and vertical safety buffers	++	KPI06: En-route airspace capacity

FRTO-B1/3

Advanced Flexible Use of Airspace (FUA) and management of real time airspace data

Sixth edition of the GANP 

Main Purpose 

FUA and airspace mangement (ASM) need to be enhanced with collaborative airspace data sharing between all ATM actors, negotiation procedures, system support and real time ASM data integration.

New Capabilities FUA procedures are enhanced by ASM data sharing between the ATM network function, ASM actors, airspace users and ATC. ASM data regarding the planning and tactical management of airspace reservations are continuously exchanged and integrated in real time between the ATM systems. Continuous exchange of ASM data between civil and military national actors will be enhanced.

Description ?

Automated ASM systems to ensure uninterrupted data flow between ATM Network functions and the neighbouring ASM systems from the pre-tactical planning to the real time airspace status.

ASM is enhanced by automated data exchange services during the pre-tactical and tactical execution phases continuously in real time. ASM information is shared between ASM systems and ATS units/systems, and communicated to the ATM network function in the tactical and execution phases. These data, consisting of pre-notification of activation, notification of activation, deactivation, modification and release are collected, saved and processed. Furthermore, these data need to be exchanged between ASM stakeholders and made available to other actors and relevant airspace users not involved in ASM processed.

Maturity Level ?

Standardization

**Human Factor** Considerations

- 1. Does it imply a change in task by a user or affected others? Yes
- 2. Does it imply processing of new information by the user? Yes
- 3. Does it imply the use of new equipment? Yes
- 4. Does it imply a change to levels of automation? Yes





DEPENDENCIES AND RELATIONS 2				
Type of Dependencies ASBU Element				
Evolution	FRTO-B0/2 - Airspace planning and Flexible Use of Airspace (FUA)			
Relation-operational need	FRTO-B1/1 - Free Route Airspace (FRA)			
Relation-operational need	NOPS-B1/5 - Full integration of airspace management with air traffic flow management			

ENABLEF	RS			
Enabler	Enabler Type	Enabler Name	Description / References	Stakeholders Year
Category				

Regulatory provisions	Operational Approval	Operational approval to provide Advanced FUA	Follow regulations for regulatory approval Reference: ICAO Circular 330 Civil/Military Coordination European Union Regulation (EC) No 2150/2005 of 23 December 2005 laying down common rules for the flexible use of airspace. https://www.eurocontrol.int/articles/flexible-use-airspace-fua-mandate	CAA ICAO	2019
Operational	Design and	Procedures for	Design and use of operational	ANSP	2019
procedures	operations	Exchange of Real Time	procedures. Reference: EUROCONTROL Centralised Advanced Flexible Use of	ATM network function	
		Airspace Data	Airspace Support Service Concept of Operations (CONOPS) Edition 2.1	Aircraft operator	
			October 2014 EUROCONTROL		
			European Route Network Improvement Plan (ERNIP) - Part 3: Airspace		
			Management Handbook - Edition		
			December 2018 https://www.eurocontrol.int/sites/default/file		
			s/publication/files/ernip-part-3-asm-		
			handbook-edition-5-v5-5.pdf ICAO Guidance for Civil/Military Cooperation		
			Reference: 10088 ICAO Doc Civil Military co-operation		
Ground	ATM systems	•	Upgrade systems for partners to	ANSP	2019
system infrastructur		Upgrades for Exchange of	exchange real time data Reference: EUROCONTROL European Route	ATM network function	
е		Real Time Airspace Data	Network Improvement Plan (ERNIP) - Part 3: Airspace Management Handbook -		
		, mopaco Bata	Annex 12 Edition December 2018		
			https://www.eurocontrol.int/sites/default/file		
			s/publication/files/ernip-part-3-asm-		
			s/publication/files/ernip-part-3-asm- handbook-edition-5-v5-5.pdf		
Ground system	ATC systems	Integration and Management of	handbook-edition-5-v5-5.pdf  Upgrade systems to handle real time data in ATM systems and AU flight planning	ANSP	2019
	ATC systems	_	handbook-edition-5-v5-5.pdf  Upgrade systems to handle real time data	ANSP	2019
system infrastructur	ATC systems	Management of ASM real-time	handbook-edition-5-v5-5.pdf  Upgrade systems to handle real time data in ATM systems and AU flight planning systems Reference: EUROCONTROL European Route Network Improvement Plan (ERNIP) - Part 3: Airspace	ANSP	2019
system infrastructur	ATC systems	Management of ASM real-time	handbook-edition-5-v5-5.pdf  Upgrade systems to handle real time data in ATM systems and AU flight planning systems Reference: EUROCONTROL European Route Network Improvement	ANSP	2019
system infrastructur	ATC systems	Management of ASM real-time	handbook-edition-5-v5-5.pdf  Upgrade systems to handle real time data in ATM systems and AU flight planning systems Reference: EUROCONTROL European Route Network Improvement Plan (ERNIP) - Part 3: Airspace Management Handbook - Annex 12 Edition December 2018 https://www.eurocontrol.int/sites/default/file	ANSP	2019
system infrastructur	ATC systems	Management of ASM real-time	handbook-edition-5-v5-5.pdf  Upgrade systems to handle real time data in ATM systems and AU flight planning systems Reference: EUROCONTROL European Route Network Improvement Plan (ERNIP) - Part 3: Airspace Management Handbook - Annex 12 Edition December 2018 https://www.eurocontrol.int/sites/default/file s/publication/files/ernip-part-3-asm-handbook-edition-5-v5-5.pdf	ANSP	2019
system infrastructur	ATC systems	Management of ASM real-time	handbook-edition-5-v5-5.pdf  Upgrade systems to handle real time data in ATM systems and AU flight planning systems Reference: EUROCONTROL European Route Network Improvement Plan (ERNIP) - Part 3: Airspace Management Handbook - Annex 12 Edition December 2018 https://www.eurocontrol.int/sites/default/file s/publication/files/ernip-part-3-asm-	ANSP	2019
system infrastructur	ATC systems	Management of ASM real-time	handbook-edition-5-v5-5.pdf  Upgrade systems to handle real time data in ATM systems and AU flight planning systems Reference: EUROCONTROL European Route Network Improvement Plan (ERNIP) - Part 3: Airspace Management Handbook - Annex 12 Edition December 2018 https://www.eurocontrol.int/sites/default/file s/publication/files/ernip-part-3-asm-handbook-edition-5-v5-5.pdf EUROCONTROL Local And sub-Regional	ANSP	2019

Training	-	Training requirements for Advanced FUA	Training for the real time ASM data exchanges Provide training to staff prior to implementation	ATM network function	2019
			·	Aircraft operator	
Ground system infrastructur e	CFSP systems	Upgrade of AOs flight planning systems for FUA	Upgrade systems to handle real time data in AU flight planning systems Reference: EUROCONTROL European Route Network Improvement Plan (ERNIP) - Part 3: Airspace Management Handbook - Annex 12 Edition December 2018 https://www.eurocontrol.int/sites/default/file s/publication/files/ernip-part-3-asm- handbook-edition-5-v5-5.pdf	Aircraft operator	2019

# **Operational conditions:**

The element will bring benefit in an en-route medium to high complexity traffic environment.

# Main intended benefits:

Туре	Operational description	Benefitting stakeholder(s)
Direct benefits	Improve sitautional awareness of network managers, aircraft operators, ANSPs, flight crew, ATCO and airspace managers.	ANSP ATM network function  Aircraft operator
	Ensure that the right airspace is available at the right time for the mission	ANSP ATM network function  Aircraft operator

# INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

КРА	Focus Areas	Most specific performance objective(s) supported	KPI Impact	КРІ
Access and equity		Improve airspace reservation management	++	
Efficiency	Flight time & distance	Facilitate direct routing of portions of the flight (if this does not cause network problems)	++	KPI05: Actual enroute extension
Efficiency	Flight time & distance	Overcome route selection inefficiencies associated with route & airspace availability as known at the flight planning stage	++	KPI04: Filed flight plan en-route extension

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Efficiency	Flight time & distance	Reduce need for tactical ATFM rerouting to circumnavigate airspace closed at short notice	++	KPI05: Actual enroute extension
Efficiency	Flight time & distance	Reduce need to avoid airspace because of lack of confirmation that it will be open	++	KPI04: Filed flight plan en-route extension
Efficiency	Vertical flight efficiency	Reduce altitude restrictions during climb to avoid Special Use Airspace	++	KPI17: Level-off during climb
Efficiency	Vertical flight efficiency	Reduce altitude restrictions during cruise to avoid Special Use Airspace	++	KPI18: Level capping during cruise
Efficiency	Vertical flight efficiency	Reduce altitude restrictions during descent to avoid Special Use Airspace	++	KPI19: Level-off during descent

FRTO-B1/4	Dynamic sectorization Operational							
☐ Sixth edition of the	☐ Sixth edition of the GANP ②							
Main Purpose 2	Dynamically adapt ATC sectorization to respond to traffic demand without increasing the number of controllers working position in use.							
New Capabilities    Output  Description:	This tool will provide real-time support to the operations room supervisor to select the most appropriate sector configuration according to the traffic demand and complexity, taking into account predefined sector configuration as well as the change of the ATC sector shapes by adding/removing the elementary sectors.							
Description    O	The sectorization tool enables the dynamic management of a large number of possible sector configurations. Based on the volume of pre-defined ATC sector configurations, the automated system continuously evaluates traffic demand and complexity in the future and proposes optimum sectorization solutions.							
	This tool supports real-time shaping of the airspace volumes allocated to the physical controller working position by adding/removing elementary sectors in order to respond to the predicted traffic demand and complexity.							
Maturity Level 🕜	Standardization							

# Human Factor Considerations

- 1. Does it imply a change in task by a user or affected others? Yes
- 2. Does it imply processing of new information by the user? Yes
- 3. Does it imply the use of new equipment? Yes
- 4. Does it imply a change to levels of automation? Yes





DEPENDENCIES AND RELATIONS 2				
Type of Dependencies	ASBU Element			
Relation-operational need	NOPS-B1/6 - Initial Dynamic Airspace configurations			
Relation-operational need	FRTO-B1/2 - Required Navigation Performance (RNP) routes			
Relation-operational need	NOPS-B1/4 - Dynamic Traffic Complexity Management			

ENABLER	S				
Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	Design and operations	ATC Operational Supervisor Procedures for Dynamic Sectorization	Design and use of operational procedures	ANSP	2019
Ground system infrastructur e	ATC systems	ATC System Tools for Support of Dynamic Sectorization	ATC system Upgrade relevant to dynamic handling of airspace volumes	ANSP	2019
Training	-	Training requirements for dynamic sectorization	ATCO/Operational Supervisor Training for Dynamic Sectorization Provide training to staff prior to implementation	ANSP	2019

# **DEPLOYMENT APPLICABILITY**

# **Operational conditions:**

The element will bring benefit in an en-route medium to high complexity traffic environment.

### Main intended benefits:

Туре	Operational description	Benefitting stakeholder(s)

#### INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS **KPI** Most specific performance **KPA Focus Areas KPI** objective(s) supported **Impact** Capacity, throughput & Improve flexibility of sector Capacity ++ utilization configuration management Improve flexibility to modify Capacity, throughput & sector configuration at short Capacity ++ utilization notice to cope with traffic pattern variations

FRTO-B1/5	Enhanced Conflict Detection Tools and Operational				
11110 2 110	Conformance Monitoring				
☐ Sixth edition of th	Sixth edition of the GANP 3				
Main Purpose 🕜	Enhancements of basic mid-term conflict detection (MTCD)/ monitoring alert (MONA) functions and thus further improving the ATCO productivity and reducing the workload.				
New Capabilities 2	Conflict Detection Tools (CDT) will include enhancements to MTCD (up to 20 minutes planning horizon) function, plus tactical functions based on a shorter look-ahead time, typically from 10 to 2 minutes ahead. MTCD will be complemented by basic a conflict resolution advisor and a what if function.				
	Monitoring aids (MONA) provide controllers with reminders and warnings and are enhanced via the integration of Aircraft Derived Data (ADD). The provision of a trajectory warning with respect to downlinked parameters, as well as the additional reminders for change of frequency and manual coordination enhance support provided to controllers.				
Description ?	CDT provides real-time assistance to the en-route controllers (both planning and tactical) in conflict detection and resolution. It is based on new approaches that enhance and refine the existing tools yielding more efficient and usable services.				
	MTCD aids the planning ATCO by showing only the most probable conflicts within the predefined look-ahead time, discarding detected conflicts with lower probabilities. The MTCD includes the what if probe function showing the problems that would occur if the given clearances is applied and identify the contextual traffic that may impair the manual identified conflict resolution.				
	The tactical tool is based on the tactical trajectories and identifies the conflicts within the sectors, including the what-if capabilities.				

MONA provides the en-route controller with warnings if aircraft deviate from the calculated ground

system trajectory or the ATCOs tactical clearances (e.g. heading, vertical rate).

Maturity Level ?

Standardization

### Human Factor Considerations

- 1. Does it imply a change in task by a user or affected others? Yes
- 2. Does it imply processing of new information by the user? Yes
- 3. Does it imply the use of new equipment? Yes
- 4. Does it imply a change to levels of automation? Yes

# PLANNING LAYERS ?

Tactical-During ops



DEPENDENCIES AND RELATIONS 2			
Type of Dependencies ASBU Element			
Evolution	FRTO-B0/4 - Basic conflict detection and conformance monitoring		
Relation-operational need	FRTO-B1/1 - Free Route Airspace (FRA)		
Relation-operational need	FRTO-B1/6 - Multi-Sector Planning		

ENABLER	S				
Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	Design and operations	ATC procedures for enhanced CDT and MONA	Design and use of operational	ANSP	2019
Ground system infrastructur e	ATC systems	ATC system upgrades for enhanced CDT and MONA functions	Upgrade ATC systems to provide enhanced monitoring capabilities as well as detection of planned/tactical conflicts Reference: EUROCONTROL Monitoring Aids (MONA) specification 3 March 2017. This document provides system requirements for Monitoring Aids (MONA).https://www.eurocontrol.int/standards?page= Reference: EUROCONTROL Medium-Term Conflict Detection (MTCD) specification 3 March 2017.This document provides system requirements for Medium-Term Conflict Detection (MTCD). https://www.eurocontrol.int/standards? page=4 EUROCONTROL Trajectory Prediction Specification Edition 2.0 March 2017 https://www.eurocontrol.int/publications/trajectory-prediction-specification	ANSP	2019
Training	-	Training requirements for enhanced CDT and MONA	ATCO Training for CDT and MONA Provide training to staff prior to implementation	ANSP	2019

# **DEPLOYMENT APPLICABILITY**

## **Operational conditions:**

The element will bring benefit in an en-route medium to high complexity traffic environment.

### Main intended benefits:

Туре	Operational description	Benefitting stakeholder(s)
Direct benefits	Improve situational awareness of ATCO	ANSP

KPA Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
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FRTO-B1/6	Multi-Sector Planning	Operational
☐ Sixth edition of the	the GANP ②	
Main Purpose 2	This element is applicable only to en-route sectors t and tactical).	hat are currently staffed by two ATCOs (planning
	The multi-sector planning (MSP) function defines a operating procedures to enable the planning control controllers operating in different adjacent sectors.	. ,
	This function might reduce the ATCO workload rela workload conversion to potential capacity gains mig configurations.	
New Capabilities 2	New tools and operating procedures are needed fo several tactical controllers operating in different sec ensures suitable coordination agreements between the tactical controllers.	tors. The Multi Sector Planning (MSP) controller
Description 2	The ATM system functions are enhanced to allow a sector tactical roles and the planner and tactical role. The multi-sector planner needs to have an access to and tools for the airspace of several ATC sectors all	es to be combined on a controller work position. o flight data, system tracks, trajectory, warnings
	The multi-sector planner needs to provide an extend to this role, including the coordination function.	ded planner functions within the sectors allocated
Maturity Level 2	Standardization	

### Human Factor Considerations

- 1. Does it imply a change in task by a user or affected others? Yes
- 2. Does it imply processing of new information by the user? Yes
- 3. Does it imply the use of new equipment? Yes
- 4. Does it imply a change to levels of automation? Yes

# PLANNING LAYERS 2

Tactical-During ops



En-route

DEPENDENCIES AND RELATIONS 2				
Type of Dependencies	ASBU Element			
Relation-operational need	FRTO-B1/3 - Advanced Flexible Use of Airspace (FUA) and management of real time airspace data			
Relation-operational need	FRTO-B1/5 - Enhanced Conflict Detection Tools and Conformance Monitoring			

ENABLER	S				
Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	Design and operations	ATC procedures for MSP	Design and use of operational procedures	ANSP	2019
Ground system infrastructur e	ATC systems	ATC system Upgrade for Support of MSP Role	Upgrade ATC systems with the capabilities to support the planning controller taking the responsibility of more than one sector. The tactical responsibilities are distributed to several tactical controllers. Reference:  EUROCONTROL Medium-Term Conflict Detection (MTCD) specification 3 March 2017. This document provides system requirements for Medium-Term Conflict Detection (MTCD).  https://www.eurocontrol.int/standards? page=4 EUROCONTROL Trajectory Prediction Specification Edition 2.0 March 2017  https://www.eurocontrol.int/publications/trajectory-prediction-specification	ANSP	2019
Training	-	Training requirements for MSP	ATCO Training Provide training to staff prior to implementation	ANSP	2019

## **DEPLOYMENT APPLICABILITY**

### **Operational conditions:**

The element will bring benefit in an en-route medium to high complexity traffic environment.

### Main intended benefits:

Type Operational description Benefitting stakeholder(s)

КРА	Focus Areas	Most specific performance objective(s) supported	KPI Impact	КРІ
Cost effectiveness		Reduce costs in the Air Navigation System	++	

FRTO-B1/7	Trajectory Options Set (TOS) Operational
☐ Sixth edition of the	e GANP ②
Main Purpose    O	To give airspace users greater flexibility and control over their trajectory with respect to airspace constraints.
New Capabilities 2	Airspace users have the capability to develop and file a set of desired reroute options (called a Trajectory Options Set or TOS) that is the operator's preference for routing around airspace constraints.
	From these options, ATFM will choose the one that the operator is expected to fly. Operators have te capability to receive and process these notifications.
Description 3	Trajectory Options Sets (TOS) are used when airspace users are participating in Collaborative Option Programs (CTOP). These work as follows:
	<ol> <li>ATFM creates an airspace boundary and establishes flow control on any air traffic that crosses that boundary. (This is a NOPS action).</li> <li>Airspace Users based on the notice of the airspace constraint develop and submit in advance of the issuance of the program, a set of desired reroute options (called a Trajectory Options Set or TOS) that is the operator's preference for routing around the constraint.</li> <li>CTOP uses the preferred options to automatically assign delays or reroutes to flights in order to dynamically manage the demand as conditions change.</li> </ol>
Maturity Level 2	Standardization
Human Factor	1. Does it imply a change in task by a user or affected others? Yes
Considerations	2. Does it imply processing of new information by the user? Yes
	3. Does it imply the use of new equipment? Yes
	4. Does it imply a change to levels of automation? Yes

Strategical Pre-tactical Tactical-Pre ops



Departure En-route Arrival

DEPENDENCIES AND RELATIONS 2				
Type of Dependencies	ASBU Element			
Relation-operational benefit	FRTO-B1/1 - Free Route Airspace (FRA)			
Relation-operational benefit	FRTO-B1/2 - Required Navigation Performance (RNP) routes			
Relation-operational benefit	FRTO-B1/3 - Advanced Flexible Use of Airspace (FUA) and management of real time airspace data			
Evolution	FRTO-B0/3 - Pre-validated and coordinated ATS routes to support flight and flow			

ENABLER	S				
Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Regulatory provisions	Advisory circular	CTOP advisory circular	Guidance to customers how to manage flights in the constrained area Reference: FAA AC 90-115	CAA	2019
Operational procedures	Operations	Operational procedures for the use of CTOP	Operational guidelines on CTOP usage	ANSP Aircraft operator	2019
Ground system infrastructur e	ATM systems	Tools and system to support CTOP	Tools and systems in place at ANSP to support CTOP operations Reference: https://cdm.fly.faa.gov/?page_id=983	ANSP	2019
Ground system infrastructure	CFSP systems	CSFP to support	Tools and systems in place at AOs to support CTOP operations Reference: https://cdm.fly.faa.gov/?page_id=983	Aircraft operator	2019
Training	-	Training requirements for CTOP	ATM Training, Flight Dispatcher training Training is provided on how to use CTOP system to increase flight operation efficiency	ANSP Aircraft operator	2019

# DEPLOYMENT APPLICABILITY

### **Operational conditions:**

The element will bring benefit in an en-route medium to high complexity traffic environment.

### Main intended benefits:

Туре	Operational description	Benefitting stakeholder(s)
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INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS					
КРА	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI	

FRTO-B2/1

Local components of integrated ATFM and ATC Operational Planning function (INAP)

☐ Sixth edition of the GANP ②

Main Purpose ?

Bridge the planning gap between local ATFM and ATC processes and facilitate layered ATM planning in the execution phase.

- New Capabilities 2 1. Transparency and exchange of information between local ATFM and ATC in respect of necessary action the execution phase.
  - 2. Relevant and shared information on the predicted complexity of the operation with workload impact in short and medium term up to 45 minutes.
  - 3. Informed decision making via integration with local resource management (scheduling tools)
  - 4. Full use of DAC system capabilities.
  - 5. Use of the information in the local ATFM and ATC decision support tools in a harmonised and integrated manner.

Description ?

In the ATM layered planning the gap between the ATFM planning and ATC planning is being closed. On one side ATFM planning traditionally dealing in pre-departure is being extended into the execution phase). On the other side ATC planning, due better precision of the Trajectory Prediction and thus ATC support tools, is pushed further than the traditional sector entry and exist planning with the horizon of 8 to 15 minutes to extended ATC planning with the horizon up to 45 minutes, especially with further progression of the concept like MSP and Flight Centric Operations. Basis for this integration is the use and exchange of predicted workload information based on complexity assessment as a best approximation for ATCO workload.

The enhanced tool will take into account all available information combine them and deliver resolutions for overload situations with the less disruption and most performant network effect. The tool is the main enabler for optimization of the two main resources of the ATM - the airspace and the ATCOs. It is designed in such a way to keep the airspace and ATCO workload related constrains always at the optimal level in the real time. Therefore, what was considered as a planning gap is becoming an overlap requiring integration and harmonization of Local ATFM and ATC operations. This integration will eventually result in complete transformation and disappearance of the "sector defensive" traditional ATC planning into seamless ATM planning process.

Maturity Level ?

Validation

**Human Factor** Considerations

- 1. Does it imply a change in task by a user or affected others? Yes
- 2. Does it imply processing of new information by the user? Yes
- 3. Does it imply the use of new equipment? Yes
- 4. Does it imply a change to levels of automation? Yes

# PLANNING LAYERS ?

Tactical-During ops

OPERATIONS ?

En-route

DEPENDENCIES AND RELATIONS 2				
Type of Dependencies	ASBU Element			
Evolution	FRTO-B1/6 - Multi-Sector Planning			
Evolution	NOPS-B1/4 - Dynamic Traffic Complexity Management			
Relation-operational need	NOPS-B2/1 - Optimised ATM Network Services in the initial TBO context			
Relation-operational need	NOPS-B2/6 - ATFM adapted for cross-border Free Route Airspace (FRA)			

ENABLER	S				
Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	Design and operations	Operational procedures for INAP	Design and use of operational procedures for Dynamic Capacity Balancing - DCB and Extended ATC planning (INAP)	ANSP ATM network function	2025
Ground system infrastructur e	ATM systems	ATC/ATFM system upgrade for support of INAP	Upgrade the ATC/ATFM system to support the integration of ATFM and ATC planning function	ATM network function	2025
Training	-	Training requirements for INAP	ATCO Training for INAP FMP training for INAP Provide training to staff prior to implementation	ANSP	2025

## **DEPLOYMENT APPLICABILITY**

## **Operational conditions:**

The element will bring benefit in an en-route medium to high complexity traffic environment.

### Main intended benefits:

Туре	Operational description	Benefitting stakeholder(s)

КРА	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Capacity	Capacity, throughput & utilization	Optimise actual capacity (capacity monitoring values and sector configurations actually used on the day of operation)	++	

FRTO-B2/2

# Local components of Dynamic Airspace Configurations (DAC)

### Operational

☐ Sixth edition of the GANP ②

Main Purpose To provide optimum use of the airspace, with minimum impact on the AU business needs

New Capabilities Re-organisation and re-structuring of the airspace in the execution phase and in real time including transition from between different type of airspace configurations and related ATC operations

In order to satisfy stakeholders business needs, it will be required that the airspace configuration changes and transfer from one type of ATC operation to another happens more dynamically. This is enabled by automation and existence of large number of airspace configuration scenarios adapted for different traffic flow or complexity situations.

It is clear the efficient forms of configurations supporting Free-route or concepts like Fight Centric Operations become impracticable when certain level of complexity is reached. Dynamic Airspace Configurations using local tools and procedures in short term are supposed to optimize these transitions and make them possible in real time.

Dynamic mobile areas introduction will allow for restricted/reserved areas to be either planned along a trajectory or a protective area that will accompany the user during the whole or part of the trajectory to ensure the safety of all airspace users.

Maturity Level Validation

Human Factor
Considerations

- 1. Does it imply a change in task by a user or affected others? Yes
- 2. Does it imply processing of new information by the user? Yes
- 3. Does it imply the use of new equipment? Yes
- 4. Does it imply a change to levels of automation? Yes

### PLANNING LAYERS ②

Tactical-Pre ops Tactical-During ops

OPERATIONS **①** 

Departure En-route Arrival

## DEPENDENCIES AND RELATIONS @

ASBU Element
NOPS-B1/6 - Initial Dynamic Airspace configurations
NOPS-B2/1 - Optimised ATM Network Services in the initial TBO context
FRTO-B2/1 - Local components of integrated ATFM and ATC Planning function (INAP)

### **FNABLERS**

Enabler Type Enabler Name Description / References Stakeholders Year Category

Regulatory provisions	Operational Approval	Operational approval for DAC	Follow regulations for approval Adapt present airspace classification. Define responsibility and liability in DAC environment	CAA ICAO	2025
Operational	Design and	Operational	Design and use of operational	ANSP	2025
procedures	ures operations procedures for procedures: Transitional procedures for DAC different ATC operations in DAC	ATM network function			
			situations. Procedures for instantaneous airspace delegation. Procedures for dynamic change of mode of ATC operations in a portion of an airspace.		
Ground	ATM systems	ATM system	Upgrade ATC/ATFM system with	ANSP	2025
system infrastructur		Upgrade Provide upgrade to	automated tools capable of predicting traffic and complexity evolution and	ATM network function	
е		support of DAC	applying low-altitude DAC based resolution scenarios.		
Training -	-	requirements for DAC	ATC, Local Airspace Mangers,	ANSP	2025
			supervisors, Network function staff and FMP training Provide training to staff prior to implementation	ATM network function	

### **DEPLOYMENT APPLICABILITY**

### **Operational conditions:**

The element will bring benefit in an en-route medium to high complexity traffic environment.

### Main intended benefits:

Type Operational description Benefitting stakeholder(s)

### INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

КРА	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Capacity	Capacity, throughput & utilization	Improve flexibility of sector configuration management	++	
Capacity	Capacity, throughput & utilization	Optimise actual capacity (capacity monitoring values and sector configurations actually used on the day of operation)	++	

FRTO-B2/3 Large Scale Cross Border Free Route Airspace Operational (FRA)

Main Purpose ?

The Free Route Airspace (FRA) concept brings significant flight efficiency benefits and a choice of user preferred routes to airspace users. Large -scale operations based on regional implementation can provide even greater freedom and benefits to AUs to fly according to their own business models leading to full trajectory based operations. Large scale FRA will continue to provide increased flight predictability, reduced uncertainty for the ATM Network function, which in turn can lead to potential capacity increases for ATM, which will also benefit the user.

New Capabilities ?

FRA is specified airspace within which users may freely plan a route between a defined entry point and a defined exit point, with the possibility to route via intermediate (published or unpublished) waypoints, without reference to the ATS route network, subject to airspace availability. Within this airspace, flights remain subject to air traffic control. In large scale operations the concept is applied across a large scale geographical area typically changing from State implementation to regional implementation.

Description ?

The initial implementation of FRA comes with certain limitations e.g. FL, dimensions, timing, functions and tools, Lat/Long use as a significant point etc. Large scale operations of FRA will ensure that these limitation are solved and no longer required leading to seamless operations in a large volume of airspace crossing State borders.

Maturity Level ?

Validation

**Human Factor** Considerations

- 1. Does it imply a change in task by a user or affected others? Yes
- 2. Does it imply processing of new information by the user? Yes
- 3. Does it imply the use of new equipment? Yes
- 4. Does it imply a change to levels of automation? Yes

### PLANNING LAYERS ?

Tactical-Pre ops Tactical-During ops

**OPERATIONS 2** 

En-route

DEPENDENCIES AND RELA	TIONS o
Type of Dependencies	ASBU Element
Evolution	FRTO-B1/1 - Free Route Airspace (FRA)
Relation-operational need	FRTO-B1/3 - Advanced Flexible Use of Airspace (FUA) and management of real time airspace data
Relation-operational need	FRTO-B1/6 - Multi-Sector Planning
Relation-operational need	FRTO-B1/5 - Enhanced Conflict Detection Tools and Conformance Monitoring
Relation-operational need	NOPS-B1/4 - Dynamic Traffic Complexity Management
Relation-operational need	NOPS-B2/6 - ATFM adapted for cross-border Free Route Airspace (FRA)
Relation-operational need	FRTO-B2/4 - Enhanced Conflict Resolution Tools
Relation-operational need	FRTO-B2/1 - Local components of integrated ATFM and ATC Planning function (INAP)

ENABLER	S				
Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	Design and operations	Cross border FRA Airspace Design			2025
Ground	ATM systems	Upgrade ATM	ATM system upgraded for cross-border	ANSP	2025
system infrastructur e		systems for improvements for cross-border FRA	FRA clearances, notification and coordination data exchanges relevant for cross—border FRA and management of relevant cross-border FRA airspace data. Reference: EUROCONTROL Monitoring Aids (MONA) specification 3 March 2017. This document provides system requirements for Monitoring Aids (MONA).https://www.eurocontrol.int/standards?page= Reference: EUROCONTROL Medium-Term Conflict Detection (MTCD) specification 3 March 2017.This document provides system requirements for Medium-Term Conflict Detection (MTCD). https://www.eurocontrol.int/standards? page=4 EUROCONTROL Trajectory Prediction Specification Edition 2.0 March 2017 https://www.eurocontrol.int/publications/trajectory-prediction-specification EUROCONTROL specification for the online Data exchanges (OLDI) https://eurocontrol.int/sites/default/files/publication/files/EUROCONTROL %20Specifi	ATM network function	
Ground system infrastructur e	CFSP systems	Upgrade of AOs Flight Planning Systems for cross-border FRA	cation%20OLDI%204.3.pdf  Upgrade of AOs flight planning systems Reference: EUROCONTROL NM Flight Planning Requirements document 10 December 2018 https://www.eurocontrol.int/publications/nm -flight-planning-requirements-guidelines	Aircraft operator	2025
Training	-	Training requirements for cross-border FRA	ATCO, AO and ATM Network Function Training Training for Cross-Border FRA Provide training to staff prior to implementation	ANSP ATM network function Aircraft operator	2025

ATM network function

n 2025

Ground ATM systems ATFM system for system cross border infrastructur FRA

Upgrade ATFM/flight planning systems to support cross border FRA. Reference: EUROCONTROL NM Flight Planning Requirements document December 2018 https://www.eurocontrol.int/publications/nm-flight-planning-requirements-guidelines

### **DEPLOYMENT APPLICABILITY**

### **Operational conditions:**

The element will bring benefit in an en-route medium to high complexity traffic environment.

### Main intended benefits:

Type Operational description Benefitting stakeholder(s)

### INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

КРА	Focus Areas	Most specific performance objective(s) supported	KPI Impact	КРІ
Efficiency	Flight time & distance	Overcome route selection inefficiencies associated with route network design	++	KPI04: Filed flight plan en-route extension

# FRTO-B2/4 **Enhanced Conflict Resolution Tools** Operational ☐ Sixth edition of the GANP ② Main Purpose Providing conflict resolution support for ATCOs considering elements of ATM layered planning and overall network effect. New Capabilities ? 1. Taking into account additional INAP and network effect elements when providing conflict resolutions. 2. Harmonisation and integration with the ATFM support tools resulting in informed decision making 3. Integration of foreseen conflict resolution options for workload assessment and prediction Description ? Basic conflict resolution tools are designed to provide resolution solutions for immanent conflict taking into account certain time horizon for which the resolution trajectory has to be conflict free. In the new planning environment with extended panning horizons and integration between local ATFM and ATC processes this feature is insufficient. In order to provide informed decision on conflict resolution, which will have no negative network effect, enhanced resolution tools are to be designed. They will exploit the SWIM enabled capability to exchange and probe possible conflict resolutions taking into account the network effect to some extend (compatibility with Target Times, CTA and CTO) and the effect on the workload on other ATCOs on a longer planning scale. This approach induces substantial changes in the ATCO's working methods but on other side should provide for the flexibility and required level of freedom for safe separation in human centric environment.

Maturity Level ? Validation

Human Factor Considerations

- 1. Does it imply a change in task by a user or affected others? Yes
- 2. Does it imply processing of new information by the user? Yes
- 3. Does it imply the use of new equipment? Yes
- 4. Does it imply a change to levels of automation? Yes

## PLANNING LAYERS ②

Tactical-During ops



Departure En-route Arrival

DEPENDENCIES AND RELATIONS 2					
Type of Dependencies ASBU Element					
Evolution	FRTO-B1/5 - Enhanced Conflict Detection Tools and Conformance Monitoring				
Relation-operational need	FRTO-B2/3 - Large Scale Cross Border Free Route Airspace (FRA)				

ENABLERS							
Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year		
Regulatory provisions	Operational Approval	Operational Approval for enhanced conflict resolution tools	Obtain Regulatory Approval Provisions for limited delegation of Responsibility and Liability to the automation will be required	CAA	2025		
Operational procedures	-	Operational procedures for enhanced conflict resolution tools	Adaptation of Manuals Design and use of operational Procedures	ANSP	2025		
Airborne system capability	Aircraft system	Capability	Downlink of airborne calculation of the Trajectory and other aircraft derived data for improvement of TP	Airspace user Aircraft manufacturer	2025		
Ground system infrastructure	ATC systems	Integrate enhanced Conflict Resolution Tools	Upgrade ATC system with advance conflict resolution capabilities	ANSP	2025		
Training	-	Training requirements for enhanced conflict resolution tools	Training for the use of the function Provide training to staff prior to implementation	ANSP	2025		

## **DEPLOYMENT APPLICABILITY**

**Operational conditions:** 

The element will bring benefit in an en-route medium to high complexity traffic environment.

### Main intended benefits:

Type Operational description Benefitting stakeholder(s)

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI	
Safety		Avoid vertical & lateral navigation errors during flight (cases of non-conformance with clearance)	++	KPI20: Number of aircraft accidents	
Safety		Improve early detection of conflicting ATC Clearances (CATC) (en-route / departure / approach)	++	KPI20: Number of aircraft accidents KPI23: Number of airprox/TCAS alert/loss of separation/near midair collisions/midair collisions (MAC)	