ICAO GANP PORTAL

ASBU ELEMENTS

GADS NAVS NOPS OPFL

☑ Functional Description | ☑ Enablers | ☑ Deployment Applicability | ☑ Performance Impact Assessment

GADS

GADS-B1/1	Aircraft Tracking	Operational

☐ Sixth edition of the GANP

Main Purpose

To provide support to the ATSU Alerting Service in areas without ATS surveillance with an update rate of the aircraft position of at least once per 15 mins. The objective is to assist the relevant stakeholders in the timely identification and location of aircraft in distress, to reduce reliance on the procedural methods for determining aircraft position and helping to ensure the availability and sharing of aircraft position data.

New Capabilities

Aircraft operator will be able to track the aircraft, detect missing position reports, notify if necessary the relevant ATSUs and timely share relevant information including last known position(s).

Description

Aircraft tracking is one of the Global Aeronautical Distress and Safety System (GADSS) functions (ref, GADSS ConOPS V6). Aircraft tracking is a process, established by the operator, that maintains and updates, at standardised intervals, a groundbased record of the four dimensional position of individual aircraft in flight. (ICAO Annex 6)

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

If the aircraft operator is not already tracking its aircraft.

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

PLANNING LAYERS

Tactical-Pre ops | Tactical-During ops

OPERATIONS

En-route

DEPENDENCIES AND RELATIONS

Type of Dependencies	ASBU Element
Relation-operational need	GADS-B1/2 - Operational Control Directory

Relation-technology option	COMS-B0/2 - ADS-C (FANS 1/A) for procedural airspace
Relation-technology option	ASUR-B0/1 - Automatic Dependent Surveillance – Broadcast (ADS-B)
Relation-technology option	ASUR-B1/1 - Reception of aircraft ADS-B signals from space (SB ADS-B)
Relation-technology option	COMI-B0/5 - Satellite communications (SATCOM) Class C Data
Relation-technology option	COMI-B1/3 - SATCOM Class B Voice and Data
Relation-technology option	COMS-B1/2 - PBCS approved ADS-C (FANS 1/A+) for procedural airspace

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	Search and rescue	Procedures for aircraft tracking	Operator aircraft tracking policy, process and procedures. References: ICAO Annex 6 – Aircraft Tracking and ICAO Circular 347 - Aircraft Tracking Implementation Guidelines	Aircraft operator	2018
Airborne system capability	Search and rescue	Airborne aircraft tracking system	Airborne aircraft tracking capability. Note: copy table in the circular. Reference: ICAO Annex 6 – Aircraft Tracking and ICAO Circular 347 - Aircraft Tracking Implementation Guidelines.	Aircraft operator	2018
Ground system infrastructure	Search and rescue	Data link for aircraft tracking	Airborne aircraft tracking capability. Note: copy table in the circular. Reference: ICAO Annex 6 – Aircraft Tracking and ICAO Circular 347 - Aircraft Tracking Implementation Guidelines.	Aircraft operator	2018
Ground system infrastructure	Search and rescue	Ground aircraft tracking system	System with capability to process and monitor aircraft tracking data. Airborne aircraft tracking capability. Note: copy table in the circular. Reference: ICAO Annex 6 – Aircraft Tracking and ICAO Circular 347 - Aircraft Tracking Implementation Guidelines.	Aircraft operator	2018
Training	Search and rescue	Aircraft tracking training	Aircraft Operator procedures for detecting missing position reports and notifying ATSU's	Aircraft operator	2018

DEPLOYMENT APPLICABILITY

Operational conditions:

This element is only applicable in oceanic airspace lacking ATS surveillance with a position update rate of at least

once per 15 mins.

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)
Direct benefits	Earlier detection of aircraft in operational anomalies	ANSP, Aircraft operator
	Better position information of aircraft in distress	ANSP, Aircraft operator, RCC, SAR authority
	Improve situational awareness of aircraft operator	Aircraft operator

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI

GADS-B1/2 Operational Control Directory Operational

☐ Sixth edition of the GANP

Main Purpose To ensure that Point of Contact (PoC) information is available and can be accessed by Rescue Coordination Centres (RCCs), ATSUs and aircraft operators in support of emergency situations.

New Capabilities Access to point of contact information of ATSUs, Aircraft Operators and Rescue Coordination Centres.

Description Point of Contact repository is part of the Global Aeronautical Distress and Safety System (GADSS) and is used to enable timely contact between the persons relevant to an emergency situation involving an aircraft in a specified area.

Maturity Level Ready for implementation

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? No
3. Does it imply the use of new equipment? No
4. Does it imply a change to levels of automation? No

PLANNING LAYERS

Strategical, Tactical-Pre ops, Tactical-During ops, Post operations

OPERATIONS

En-route

DEPENDENCIES AND RELATIONS

There are currently no dependencies.

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	Search and rescue	Procedures for Operational Control Directory	Procedures for maintaining PoC information and making PoC updates available. Procedures for using PoC repository. Reference: Annex 11; Annex 12 and ICAO Circular 347 - Aircraft Tracking Implementation Guidelines	ANSP Aircraft operator RCC	2018

DEPLOYMENT APPLICABILITY

Operational conditions:

This element is applicable in emergency situations.

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)
Direct benefits	Faster and more effective response to emergency situations	ANSP, Aircraft operator, RCC, SAR authority
	Improve situational awareness of aircraft operator, ANSP and RCCs.	ANSP, Aircraft operator, RCC, SAR authority

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI

GADS-B2/1 Location of an aircraft in Distress Operational

☐ Sixth edition of the GANP

Main Purpose: To ensure tracking of aircraft in distress and timely and accurate location of end of flight position to accurately direct search and rescue (SAR) operations in an efficient and effective way.

New Capabilities: To be able to determine the position of an aircraft in distress at least once every minute. This capability is resilient to failures of the aircraft's electrical power, navigation and communication systems.

Description

The localisation of an aircraft in distress is one of the Global Aeronautical Distress and Safety System (GADSS) functions. This function uses on board systems to broadcast aircraft position (latitude and longitude), or distinctive distress signals from which the aircraft position and time can be derived. The aircraft position information will be transmitted, without the need for flight crew action, at least once every minute, when an aircraft is in a distress condition.

An aircraft is in a distress condition when it is in a state that, if the aircraft behaviour event is left uncorrected, may result in an accident. The operator is responsible for ensuring that this information is made available to the actors involved in the emergency.

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

PLANNING LAYERS

Tactical-During ops

OPERATIONS

Departure | En-route | Arrival

DEPENDENCIES AND RELATIONS

Type of Dependencies	ASBU Element
Relation-technology need	GADS-B1/2 - Operational Control Directory

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	Search and rescue	Procedures for location of aircraft in distress	References: ICAO Annex 6 – Location of an aircraft in distress and ICAO Doc 10054 Manual on Location of Aircraft in Distress and Flight Recorder Data Recovery	ANSP Aircraft operator RCC	2018
Airborne system capability	Search and rescue	Location of aircraft in distress	Applicable to new production aircraft from 2021. Reference: ICAO Annex 6 – Location of an aircraft in distress	Aircraft operator	2023
Ground system infrastructure	Search and rescue	Capability to receive a distress signal	Distress Tracking Repository. Reference: ICAO Annex 6 – Location of an aircraft in distress and ICAO Doc 10054 Manual on Location of Aircraft in Distress and Flight Recorder Data Recovery	Aircraft operator	2023

Training	Search and rescue	Training requirements for location of aircraft in distress	Aircraft Operator procedures for ADT	Aircraft operator	2023

DEPLOYMENT APPLICABILITY

Operational conditions:

This element is applicable in emergency situations.

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)
Direct benefits	Faster and more effective response to emergency situations	ANSP, Aircraft operator, RCC, SAR authority
	More reliable accident site location	ANSP, Aircraft operator, RCC, SAR authority

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI

GADS-B2/2	Distress tracking information management	Operational

☐ Sixth edition of the GANP

Main Purpose: To ensure distress tracking information is available and can be accessed by RCCs, ATSUs and aircraft operators in support of emergency procedures.

New Capabilities: Access to location of aircraft in distress data.

Description: Distress tracking information is of vital importance for efficient and effective handling of distress situations and SAR operations. Distress tracking information management provides a means to make the last known position of an aircraft in distress available to the relevant stakeholders in atimely manner.

Maturity Level: Ready for implementation

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? No
3. Does it imply the use of new equipment? No
4. Does it imply a change to levels of automation? No

PLANNING LAYERS

Tactical-During ops | Post operations

OPERATIONS

Departure | En-route | Arrival

DEPENDENCIES AND RELATIONS

Type of Dependencies	ASBU Element
Relation-operational option	SWIM-B2/1 - Information service provision
Relation-operational option	SWIM-B2/2 - Information service consumption

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	Search and rescue	Procedures for making available and accessing distress tracking information	Reference: ICAO Annex 6 – Location of an aircraft in distress/Flight Recorders and ICAO Doc 10054 Manual on Location of Aircraft in Distress and Flight Recorder Data Recovery.	ANSP Aircraft operator RCC	2021

DEPLOYMENT APPLICABILITY

Operational conditions:

This element is applicable in emergency situations.

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)
Direct benefits	Faster and more effective response to emergency situations	ANSP, Aircraft operator, RCC, SAR authority
	More reliable accident site location	ANSP, Aircraft operator, RCC, SAR authority
	Improve situational awareness of aircraft operator, ANSP and RCCs.	ANSP, Aircraft operator, RCC, SAR authority

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI

GADS-B2/3	Post Flight Localization	Operational

☐ Sixth edition of the GANP

Main Purpose: To enable efficient and effective SAR operations by providing accurate position information of the end of flight location following a crash.

New Capabilities: The capability to locate the end of flight with a level of accuracy required by SAR.

Description: Post Flight Localization is one of the GADSS functions. When an accident occurs there is a phase beginning immediately at the end of flight where the rescue of possible survivors has the immediate and highest priority. Accurate aircraft position information (1 NM or better) is provided through the Post Flight Localization function to guide SAR services on site.

Maturity Level: Standardization

Human Factor Considerations

PLANNING LAYERS

Post operations

OPERATIONS

Departure | En-route | Arrival

DEPENDENCIES AND RELATIONS

Type of Dependencies	ASBU Element
Relation-operational benefit	GADS-B2/1 - Location of an aircraft in Distress

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	Search and rescue	Procedures regarding the operation of the system intended for timely recovery of flight recorder data	Description of the operator capabilities. Reference: Annex 6 – Location of an aircraft in distress and ICAO Doc 10054 Manual on Location of Aircraft in Distress and Flight Recorder Data Recovery	Aircraft operator	2021

Airborne system capability	Search and rescue	ELT	Reference: ICAO Annex 6 – Location of an aircraft in distress and ICAO Doc 10054 Manual on Location of Aircraft in Distress and Flight Recorder Data Recovery	Aircraft operator RCC	2019
Airborne system capability	Search and rescue	ULD	Reference: ICAO Annex 6 – Location of an aircraft in distress and ICAO Doc 10054 Manual on Location of Aircraft in Distress and Flight Recorder Data Recovery	Aircraft operator RCC	2019

DEPLOYMENT APPLICABILITY

Operational conditions:

This element is applicable in emergency situations.

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)
Direct benefits	Faster and more effective response to emergency situations	Aircraft operator, RCC, SAR authority

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI

GADS-B2/4 Flight Data Recovery Operational

☐ Sixth edition of the GANP

Main Purpose To enable timely and efficiently recovery of information for accident investigation.

New Capabilities Timely recovery and availability of information relevant for accident investigation. Avoiding long and costly search operations to recover Flight Data Recorder.

Description To ensure accident investigation authorities obtain timely access to the flight recorder information, the aircraft will be equipped with a means, approved by the State of the aircraft operator, to recover the flight recorder data and make it available in a timely manner. The requirements for approving the means to make flight recorder data available in a timely manner are detailed in ICAO Annex 6.

Maturity Level Ready for implementation

Human Factor Considerations

PLANNING LAYERS

Post operations

OPERATIONS

Departure | En-route | Arrival

DEPENDENCIES AND RELATIONS

Type of Dependencies	ASBU Element
Relation-operational benefit	GADS-B2/1 - Location of an aircraft in Distress

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	Search and rescue	Procedures regarding the operation of the system intended for timely recovery of flight recorder data	Description of the operator capabilities. Reference: Annex 6 – Location of an aircraft in distress and ICAO Doc 10054 Manual on Location of Aircraft in Distress and Flight Recorder Data Recovery	Aircraft operator	2021
Airborne system capability	Search and rescue	System intended for timely recovery of flight recorder data	Reference: ICAO Annex 6 – Location of an aircraft in distress and ICAO Doc 10054 Manual on Location of Aircraft in Distress and Flight Recorder Data Recovery	Aircraft operator	2025
Ground system infrastructure	Search and rescue	C,N,S	No CNS needed for Automatic Deployable Flight Recorder. Satellite Link needed for flight recorder streaming before impact.	Aircraft operator	2025

DEPLOYMENT APPLICABILITY

Operational conditions:

This element is applicable in emergency situations.

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)
Direct benefits	Timely retrieval flight recorder data	Aircraft operator Accident Investigation Authority
	Improve AIA understanding of the flight environment pre the end of flight.	Accident Investigation Authority

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI

NAVS

NAVS-B0/1 Ground Based Augmentation Systems (GBAS) Technology

☐ Sixth edition of the GANP

Main Purpose

Support Precision Approach and landing operations at a specific airport (one system may support all runway ends). As an option, may support arrival and departure phases of flight.

New Capabilities

- Category I performance using GBAS Approach Service Type C (GAST-C).
- As an option, PBN in terminal area (RNAV 1 and RNP 1 operations) can be supported using GBAS positioning service.

Description

This element introduces improved accuracy, integrity and availability through a local airport based differential satellite navigation and monitoring system. A local network of reference receivers is deployed at or near an airport. Observations from these reference receivers are used to compute corrections for each satellite as well as to monitor for system integrity. The information is broadcast to users via a VHF Data Broadcast link (operating in the 108 to 118 MHz band).

Maturity Level

Ready for implementation

Human Factor Considerations

PLANNING LAYERS

Tactical-During ops

OPERATIONS

Departure Arrival

DEPENDENCIES AND RELATIONS

There are currently no dependencies.

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year

Operational procedures	Navigation	GBAS Cat I Instrument flight procedures	Instrument flight procedures validated and published. Reference: ICAO Doc 4444 PANS Air Traffic Management; ICAO Doc 8168 PANS Aircraft operations ; ICAO Doc 9849 Global Navigation Satellite System (GNSS) Manual; ICAO Doc 9365 Manual of All-Weather Operations; ICAO EUR Doc 013 European guidance material on All Weather Operations at Aerodromes and ICAO Doc 8071 Manual on Testing of Radio Navigation Aids.	ANSP Aircraft operator	2013
Airborne system capability	Navigation	GBAS receiver GAST C	GBAS receivers. Reference: ICAO Annex 10 Vol I technical requirements; RTCA/EUROCAE MOPS.	Aircraft manufacturer Aircraft operator	2013
Ground system infrastructure	Navigation	GBAS ground stations GAST C	GBAS ground stations. Reference: ICAO Annex 10 Vol I; provisions supporting system certification/approval by the designated authority; RTCA/EUROCAE MOPS.	Airport operator ANSP Ground systems supplier	2013
Training	Navigation	Training requirements for GBAS for CAT I	Adaptation of aircrews due to ILS look alike concept implementation and procedures designers. Reference: States/Regions regulations.	Airport operator ANSP Aircraft operator	2013
Space system infrastructure	Navigation	GNSS core constellation	Core constellation. Reference: documentation specific to each core constellation defining provisions supporting performance commitment.	Ground systems supplier Satellite provider	2013

NAVS-B0/2 Satellite Based Augmentation Systems (SBAS) Technology

☐ Sixth edition of the GANP

Main Purpose: Support PBN in all phases of flight with an increased accuracy, integrity and availability compared to ABAS. Increases accuracy and integrity for the vertical guidance.

New Capabilities: Support all PBN navigation specifications, with a deployment emphasis over RNP APCH down to LPV or LP minima at 250 ft (APV I performance) or 200 ft /550 m (Category I performance)

Description

This element introduces improvements in the availability, accuracy and integrity of satellite navigation through a wide area differential satellite navigation position and integrity monitoring system. A network of ground reference systems is deployed in a region and connected via a data-network. Observations from the reference systems are used to monitor satellite signals and produce correction and integrity information which is then broadcast over a geostationary satellite link to aircraft. The LPV service volume is mainly determined by the distribution of the monitoring network, depending on the implementation, a wider service volume may be achieved supporting RNP 0.3 and RNP 0.1 performance.

Maturity Level

Ready for implementation

Human Factor Considerations

PLANNING LAYERS

Tactical-During ops

OPERATIONS

Departure | En-route | Arrival

DEPENDENCIES AND RELATIONS

There are currently no dependencies.

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	Navigation	SBAS instrument flight procedures	Procedures validated and published. Reference material: ICAO Doc 4444 PANS Air Traffic Management; ICAO Doc 8168 PANS Aircraft operations or United States Standards for Terminal Instrument Procedures (TERPS); ICAO Doc 9849 Global Navigation Satellite System (GNSS) Manual; ICAO Doc 9613 Performance-based Navigation (PBN) Manual and ICAO Doc 8071 Manual on Testing of Radio Navigation Aids.	ANSP Aircraft manufacturer Aircraft operator	2013
Airborne system capability	Navigation	SBAS receiver	SBAS receivers integrated with aircraft navigation systems. Reference: ICAO Annex 10 Vol I technical requirements; RTCA/EUROCAE MOPS.	Aircraft manufacturer Aircraft operator	2013

Ground system infrastructure	Navigation	SBAS ground stations	Ground stations to provide a wide area monitoring network. No local airport infrastructure is required. However, a network of ground reference systems and a highly reliable data network with processing facilities and satellite signal generation capability is required. References: ICAO Annex 10 Vol I; document specific to each SBAS; provisions supporting system certification/approval by the designated authority and performance commitments.	SBAS service provider	2013
Training	Navigation	Training requirements for SBAS	Adaptation of aircrews due to ILS look alike concept implementation and procedures designers. Reference: ICAO Doc 9613 Performance-based Navigation (PBN) Manual and States/Regions regulations.	ANSP Aircraft manufacturer Aircraft operator	2013
Space system infrastructure	Navigation	GNSS core constellation	Core constellation. Reference: documentation specific to each core constellation defining provisions supporting performance commitment.	Ground systems supplier Satellite provider	2013
Space system infrastructure	Navigation	GNSS augmentation satellites	These satellites broadcast the SBAS messages to the different users. Reference: document specific to each SBAS provider	SBAS service provider	2013

NAVS-B0/3 Aircraft Based Augmentation Systems (ABAS) Technology

☐ Sixth edition of the GANP

Main Purpose Support non-precision (LNAV) and vertically guided (LNAV/VNAV) approaches with BaroVNAV and other terminal and enroute navigations.

New Capabilities ABAS supports all PBN navigation specifications with the exception of RNP APCH down to LPV/LP minima. Specific ABAS configurations are required to support RNP AR APCH.

Description This element supports non-precision and vertically guided approaches using GNSS lateral navigation and barometric vertical guidance.

Maturity Level Ready for implementation

Human Factor Considerations

PLANNING LAYERS

OPERATIONS

Tactical-During ops

Departure | En-route | Arrival

DEPENDENCIES AND RELATIONS

There are currently no dependencies.

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	Navigation	ABAS instrument flight procedures	ABAS instrument flight procedures validated and published. Reference: ICAO Doc 4444 PANS Air Traffic Management; ICAO Doc 8168 PANS Aircraft operations or United States Standard for Terminal Instrument Procedures (TERPS); ICAO Doc 9849 Global Navigation Satellite System (GNSS) Manual; ICAO Doc 9613 Performance-based Navigation (PBN) Manual and ICAO Doc 8071 Manual on Testing of Radio Navigation Aids.	ANSP Aircraft operator	2013
Airborne system capability	Navigation	ABAS avionics	ABAS without Baro-VNAV capability to support non-precision (LNAV) or with Baro-VNAV capability to support vertically guided (LNAV/VNAV) approaches. ABAS is capable of supporting other phase of flight such as oceanic, en-route and terminal operations. Reference: ICAO Annex 10 Volume I and ICAO Doc 9613 Performance-based Navigation (PBN) Manual for technical requirements; RTCA/EUROCAE MOPS.	Airport operator Aircraft manufacturer	2013
Space system infrastructure	Navigation	GNSS core constellation	Core constellation. Reference: documentation specific to each core constellation defining provisions supporting performance commitment.	Ground systems supplier Satellite provider	2013
Training	Navigation	Training requirements for ABAS	Pilot training requirements for RNP APCH and procedure designers. Specific training required for RNP AR APCH.	ANSP Aircraft operator	2013

NAVS-B0/4 Navigation Minimal Operating Networks (Nav. MON) Technology

☐ Sixth edition of the GANP

Main Purpose

- To adjust conventional navaids networks through the increased deployment of satellite based navigation systems and procedures to ensure the necessary levels of resilience for navigation.
- To provide a minimum level of capabilities to accommodate State aircraft operations where there is a mismatch in terms of aircraft equipage.
- To make a more efficient use of the frequency spectrum

New Capabilities: Provision of a navigation backup.

Description: This element allows the rationalization of the ground based conventional infrastructure through the definition of minimal networks of ground navaids. Consultations and agreements from airspace users and aircraft operators are required to define this element.

The MON should be revisited with the introduction of new navigation capabilities.

Maturity Level: Ready for implementation

Human Factor Considerations

PLANNING LAYERS

Tactical-During ops

OPERATIONS

Departure | En-route | Arrival

DEPENDENCIES AND RELATIONS

There are currently no dependencies.

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Other	Navigation	Plan for minimal operating networks (MON).	Airspace users consultation, dedicated studies and safety cases are required to mitigate the withdrawal of existing ground networks. References: ICAO Regional Air Navigation Plans	ANSP, CAA, Aircraft operator	2013

NAVS-B1/1 Extended GBAS Technology

☐ Sixth edition of the GANP

Main Purpose: To support precision approach and landing operations at a specific airport (one system may support all runway ends). As an option, may support arrival and departure phases of flight

New Capabilities

- CAT II operations utilizing GBAS Approach Service Type C (GAST C) in conjunction with enhanced ionospheric monitoring and airplane augmentations.
- Category II/III operations supported by GBAS Approach Service Type D (GAST D).
- Enhanced VHF Data Broadcast (VDB) airborne equipment performance to support interoperability of VDB, ILS and VOR in the 108 - 118 MHz band.

Description

This element introduces improved accuracy, integrity and availability through a local airport based differential satellite navigation and monitoring system. A local network of reference receivers is deployed at or near an airport. Observations from these reference receivers are used to compute corrections for each satellite as well as to monitor for system integrity. The information is broadcast to users via a VHF Data Broadcast link (operating in the 108 to 118 MHz band). This element extends the capability of Block 0 by adding improved ionospheric error monitoring and mitigation as well as enhanced VDB receiver performance to support interoperability and coexistence of ILS, VOR and VDB at any airport.

Maturity Level

Standardization

Human Factor Considerations

PLANNING LAYERS

Tactical-During ops

OPERATIONS

Departure | Arrival

DEPENDENCIES AND RELATIONS

There are currently no dependencies.

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Space system infrastructure	Navigation	GNSS core constellation	Core constellation. Reference: documentation specific to each core constellation defining provisions supporting performance commitment.	Ground systems supplier Satellite provider	2013
Airborne system capability	Navigation	GBAS receiver GAST D	GBAS receivers. Reference: ICAO Annex 10 Vol I technical requirements; RTCA/EUROCAE MOPS.	Aircraft manufacturer Aircraft operator	2019
Ground system infrastructure	Navigation	GBAS ground stations GAST D	GBAS ground stations. Reference: ICAO Annex 10 Vol I; provisions supporting system certification/approval by the designated authority; RTCA/EUROCAE MOPS.	Airport operator ANSP Ground systems supplier	2019

Operational procedures	Operations	GBAS Cat II/III Instrument flight procedures	Instrument flight procedures validated and published. Reference: ICAO Doc 4444 PANS Air Traffic Management; ICAO Doc 8168 PANS Aircraft operations ; ICAO Doc 9849 Global Navigation Satellite System (GNSS) Manual; ICAO Doc 9365 Manual of All-Weather Operations; ICAO EUR Doc 013 European guidance material on All Weather Operations at Aerodromes and ICAO Doc 8071 Manual on Testing of Radio Navigation Aids.	ANSP Aircraft operator	2019
Training	-	Training requirements for GBAS for CAT II/III	Adaptation of aircrews due to ILS look alike concept implementation and procedures designers. Reference: States/Regions regulations.	Airport operator ANSP Aircraft operator	2019

NAVS-B2/1 Dual Frequency Multi Constellation (DF MC) GBAS — Technology

☐ Sixth edition of the GANP

Main Purpose More robust and less vulnerable to atmospheric propagation perturbations, supports Cat I,II, III GBAS landing operations in all regions of the world.

New Capabilities GBAS provide dual frequency and multi constellation additional augmentation information.

Description This element builds upon the basic GBAS systems introduced within Block 1.

New core constellations and signals: (e.g. Beidou, Galileo) or dual frequencies such as GPS, GLONASS will enhance satellite based navigation services through GBAS.

DF MC GBAS will provide additional navigation augmentation information.

Maturity Level Validation

Human Factor Considerations

PLANNING LAYERS

Tactical-During ops

OPERATIONS

Departure | Arrival

DEPENDENCIES AND RELATIONS

Type of Dependencies	ASBU Element
Evolution	NAVS-B0/1 - Ground Based Augmentation Systems (GBAS)

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Space system infrastructure	Navigation	New core constellations	New satellite constellations (Beidou, Galileo) or dual frequencies such as GPS or GLONASS provide opportunities to enhance satellite based navigation services by increasing performance and robustness to failures.	Satellite provider	2019
Operational procedures	Navigation	DF MC GBAS Cat I, II, III Instrument flight procedures	New core constellations (Beidou, Galileo) and signals (GPS, GLONASS) will provide opportunities to enhance satellite based navigation services through GBAS. New signals/constellations are expected to support existing procedures with an increased performance/robustness, therefore, additional procedures might be validated and published. Reference: ICAO Doc 4444 PANS Air Traffic Management; ICAO Doc 8168 PANS Aircraft operations ; ICAO Doc 9849 Global Navigation Satellite System (GNSS) Manual; ICAO Doc 9365 Manual of All-Weather Operations; ICAO EUR Doc 013 European guidance material on All Weather Operations at Aerodromes and ICAO Doc 8071 Manual on Testing of Radio Navigation Aids.	ANSP Aircraft operator	2025
Airborne system capability	Navigation	DFMC GBAS receiver	New core constellations (Beidou, Galileo) and signals (GPS, GLONASS) will provide opportunities to enhance satellite based navigation services through GBAS. Dual Frequency multi constellation (DFMC) GBAS receivers. Reference: ICAO Annex 10 Vol I technical requirements; RTCA/EUROCAE MOPS.	Aircraft manufacturer Aircraft operator	2025
Ground system infrastructure	Navigation	DFMC GBAS ground stations	New core constellations (Beidou, Galileo) and signals (GPS, GLONASS) will provide opportunities to enhance satellite based navigation services through GBAS. DFMC GBAS ground stations at the airport are required. Reference: ICAO Annex 10 Vol I; provisions supporting system certification/approval by the designated authority; RTCA/EUROCAE MOPS.	Airport operator ANSP Ground systems supplier	2025

NAVS-B2/2	Dual Frequency Multi Constellation (DF MC) SBAS	Technology

☐ Sixth edition of the GANP

Main Purpose
- To increase availability and expand coverage.
- To reduce cost through the reduction of the need for ground stations.

New Capabilities: More robust and wider area landing services, including Cat I autoland, possibly Cat II (R&D on-going).

Description: This module builds upon the basic SBAS systems introduced within Block 0.

New core constellations and signals: (e.g. Beidou, Galileo) or dual frequencies such as GPS, GLONASS will enhance satellite based navigation services through SBAS.

DF MC SBAS provide dual frequency and multi constellation additional navigation signals.

Maturity Level: Validation

Human Factor Considerations

PLANNING LAYERS

Tactical-During ops

OPERATIONS

Departure | En-route | Arrival

DEPENDENCIES AND RELATIONS

Type of Dependencies	ASBU Element
Evolution	NAVS-B0/2 - Satellite Based Augmentation Systems (SBAS)

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year

Operational procedures	Navigation	Enhanced SBAS instrument flight procedures	New core constellations (Beidou, Galileo) and signals (GPS, GLONASS) will provide opportunities to enhance satellite based navigation services through SBAS. New signals/constellations are expected to support existing procedures with an increased performance/robustness, therefore, additional procedures might be validated and published. Reference material: ICAO Doc 4444 PANS Air Traffic Management; ICAO Doc 8168 PANS Aircraft operations or United States Standards for Terminal Instrument Procedures (TERPS); ICAO Doc 9849 Global Navigation Satellite System (GNSS) Manual; ICAO Doc 9613 Performance-based Navigation (PBN) Manual and ICAO Doc 8071 Manual on Testing of Radio Navigation Aids.	ANSP Aircraft manufacturer Aircraft operator	2025
Airborne system capability	Navigation	DFMC SBAS receiver	New core constellations (Beidou, Galileo) and signals (GPS, GLONASS) will provide opportunities to enhance satellite based navigation services through SBAS. Dual Frequency multi constellation (DFMC) SBAS receivers integrated with aircraft navigation systems. Reference: ICAO Annex 10 Vol I technical requirements; RTCA/EUROCAE MOPS.	Aircraft manufacturer Aircraft operator	2025
Ground system infrastructure	Navigation	DFMC SBAS ground stations	New core constellations (Beidou, Galileo) and signals (GPS, GLONASS) will provide opportunities to enhance satellite based navigation services through SBAS. Ground stations will provide a wide area monitoring network. No local airport infrastructure is required. However, a network of ground reference systems and a highly reliable data network with processing facilities and satellite signal generation capability is required. References: ICAO Annex 10 Vol I; document specific to each SBAS; provisions supporting system certification/approval by the designated authority and performance commitments.	SBAS service provider	2025
Space system infrastructure	Navigation	New core constellations	New satellite constellations (Beidou, Galileo) or dual frequencies such as GPS or GLONASS provide opportunities to enhance satellite based navigation services by increasing performance and robustness to failures.	Satellite provider	2019

Space system infrastructure	Navigation	GNSS DFMC augmentation satellites	These satellites broadcast the DFMC SBAS messages to the different users. Reference: document specific to each SBAS provider	SBAS service provider	2025

NAVS-B2/3 Dual Frequency Multi Constellation (DF MC) ABAS — Technology

☐ Sixth edition of the GANP

Main Purpose
More robust navigation services (in particular versus loss of a single frequency, or of a single constellation).

New Capabilities
ABAS algorithms use dual frequency and multi constellation additional signals. Only horizontal (2D) enhanced ABAS navigation services are expected within Block 2. Vertical (3D) enhanced ABAS navigation services will be introduced within Block 3.

Description
This element builds upon the basic ABAS systems introduced within Block 0.

New core constellations and signals: (e.g. Beidou, Galileo) or dual frequencies such as GPS, GLONASS will enhance satellite based navigation services through ABAS.

DF MC ABAS will use additional navigation signals and new integrity algorithmes (A-RAIM).

Maturity Level
Validation

Human Factor Considerations

PLANNING LAYERS

Tactical-During ops

OPERATIONS

Departure | En-route | Arrival

DEPENDENCIES AND RELATIONS

Type of Dependencies	ASBU Element
Evolution	NAVS-B0/3 - Aircraft Based Augmentation Systems (ABAS)

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year

Space system infrastructure	Navigation	New core constellations	New satellite constellations (Beidou, Galileo) or dual frequencies such as GPS or GLONASS provide opportunities to enhance satellite based navigation services by increasing performance and robustness to failures.	Satellite provider	2019
Training	Navigation	Training requirements for enhanced ABAS	In principle no additional training than for NAV-B0/3 will be required. Reference: Pilot training requirements for RNP APCH and procedure designers. Specific training required for RNP AR APCH.	ANSP Aircraft operator	2025
Operational procedures	Navigation	Enhanced ABAS instrument flight procedures	New core constellations (Beidou, Galileo) and signals (GPS, GLONASS) will provide opportunities to enhance satellite based navigation services through ABAS. New signals/constellations are expected to support existing procedures with an increased performance/robustness, therefore, additional procedures might be validated and published. Reference: ICAO Doc 4444 PANS Air Traffic Management; ICAO Doc 8168 PANS Aircraft operations or United States Standard for Terminal Instrument Procedures (TERPS); ICAO Doc 9849 Global Navigation Satellite System (GNSS) Manual; ICAO Doc 9613 Performance-based Navigation (PBN) Manual and ICAO Doc 8071 Manual on Testing of Radio Navigation Aids	ANSP Aircraft operator	2025
Airborne system capability	Navigation	DFMC ABAS receiver	DFMC ABAS receiver integrated with aircraft navigation systems. Reference: ICAO Annex 10 Volume I technical requirements; RTCA/EUROCAE MOPS.	Aircraft manufacturer Aircraft operator	2025

NOPS

NOPS-B0/1	Initial integration of collaborative airspace management with air traffic flow management	Operational

☐ Sixth edition of the GANP

Main Purpose: Introduce ASM/ATFM techniques, procedures and tools for the initial establishment of an integrated collaborative airspace management and air traffic flow and capacity management process applicable to the strategic through to the tactical phases of operations.

New Capabilities

Collaborative airspace planning process is extended by harmonizing the ASM/ATFM rules and procedures for the establishment, allocation and use of airspace structures in response to ATFM requirements.

Description

This element represents the initial step to enhancing the common situational awareness supporting optimum availability of airspace and ATC capacity to meet air traffic demands. It will result in a dynamic/rolling process supporting the enhancement of network operations. It will improve the cross border operations and optimise network operations based on the richest and more accurate information. It requires the implementation of new tools/systems and processes notably:

- ASM/ATFM process for the provision of the airspace use plan;
- Improved ASM/ATFM process for the provision of updated airspace use plan;
- System/tools for provision of airspace plan to ATM network function;
- Improved notification process for the ASM/ATFM purposes;
- Improved accuracy of airspace booking;
- Interoperability between local ASM and ATFM systems.

Maturity Level

Ready for implementation

Human Factor Considerations

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

Coordination between different airspace planning actors is more efficient and the need for paper/phone coordination is minimised.

2. Does it imply processing of new information by the user? Yes

Integrated airspace planning implies an utilisation of new data stream.

3. Does it imply the use of new equipment? Yes

ASM tool.

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

The manual process of airspace notification is semi-automated.

PLANNING LAYERS

Strategical | Pre-tactical | Tactical-Pre ops | Tactical-During ops

OPERATIONS

Departure | En-route | Arrival

DEPENDENCIES AND RELATIONS

Type of Dependencies	ASBU Element
Relation-information need	AMET-B0/1 - Meteorological observations products
Relation-operational need	FRTO-B0/2 - Airspace planning and Flexible Use of Airspace (FUA)

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year

Operational procedures	-	Procedures for dynamic co-operative management of the airspace	Develop the ASM/ATFM procedures related to dynamic co-operative management of the airspace (improved ASM/ATFM process via e.g. Airspace Use Plan/Updated airspace Use Plan). Reference: ICAO Doc 9971 Manual on Collaborative ATFM.	ANSP ATM network function	2013
Operational procedures	-	Procedures for improved notification process	Improved ASM/ATFM notification process. References: ICAO Doc 9971 Manual on Collaborative ATFM	ANSP ATM network function	2013
Operational procedures	-	Procedures for released of reserved airspace	Develop the ASM/ATFM procedures to identify and release previously reserved airspace. References: Doc 9971 Manual on Collaborative ATFM	ANSP ATM network function	2013
Operational procedures	-	Procedures for promulgation and notification of receipt	Develop the ASM/ATFM procedure for promulgation and notification of receipt of ASM data- Doc 9971 Manual on Collaborative ATFM	ANSP ATM network function	2013
Ground system infrastructure	ATM systems	Distribution of planned airspace usage information	Enhance the Airspace Management System and ATFM systems to distribute planned airspace usage information.	ANSP ATM network function	2013
Ground system infrastructure	ATM systems	Integrated airspace planning process	Upgrade the Airspace Management System and ATFM system to support an integrated airspace planning process	ANSP ATM network function	2013
Ground system infrastructure	ATM systems	Pre-tactical scenario management	Enhancements of Scenario management sub-system equipped with function to support pre-tactical CDM	ANSP ATM network function	2013
Ground system infrastructure	ATM systems	Airspace status information	Upgrade the Airspace Management Systems to provide airspace status information	ANSP ATM network function Aircraft operator	2013
Ground system infrastructure	ATM systems	ATFM systems interoperability with ASM system	Interoperability of ATFM systems for ASM zone shapes and timing with local ASM tools	ANSP ATM network function	2013
Ground system infrastructure	ATM systems	Reception of planned and actual airspace status	Enhance to ASM/ATFCM tools to receive information on planned and actual airspace status and support decision-making based on this information	Aircraft operator	2013

Training	-	Training requirements for initial integration of collaborative ASM with ATFM	Collaborative Airspace management training. Training on new procedures and tools.	ANSP ATM network function Aircraft operator	2013

DEPLOYMENT APPLICABILITY

Operational conditions:

This element should be undertaken by all ANSPs, AUs and the ATM Network function affecting both en-route and TMA operations.

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)
Direct benefits	Capacity. Flight delays will be reduced through better utilization of airspace resources within and across airspace boundaries.	ANSP, Airspace user, ATM network function
	Flight efficiency increased through the chance to plan more optimum routes/trajectories allowing lower fuel burn.	Airspace user
	Improve situational awareness of network manager	ATM network function
Indirect benefits	Safety. Better knowledge of traffic environment, common situational awareness, and some enhancement through reduction in controller workload.	ANSP, Airspace user, ATM network function

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Efficiency	Flight time & distance	Facilitate tactical decisions leading to a shorter actual route than in the FPL	++	KPI05: Actual en-route 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
Efficiency	Flight time & distance	Reduce need for tactical ATFM rerouting to circumnavigate airspace closed at short notice	++	KPI05: Actual en-route extension

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Efficiency	Vertical flight efficiency	Reduce altitude restrictions during climb introduced to avoid airspace above	++	KPI17: Level-off during climb
Efficiency	Vertical flight efficiency	Reduce altitude restrictions during cruise introduced to avoid airspace above	++	KPI18: Level capping during cruise
Efficiency	Vertical flight efficiency	Reduce altitude restrictions during descent to avoid Special Use Airspace	++	KPI19: Level-off during descent

NOPS-B0/2 Collaborative Network Flight Updates Operational

☐ Sixth edition of the GANP

Main Purpose

Improve ATFM situation awareness in order to facilitate re-routings and coordinated application of ATFM measures.

New Capabilities

Seamless exchange and processing of correlated position information, flight activation status and up to date flight plan information for airborne flights. Such data are required within the Area of Responsibility (AOR) of the ATFM unit, but also within the Area of Interest (AOI) of the ATFM unit for all flights entering the ATFM area.

Description

This element will ensure:

- Effective interface between ATC and ATFM with regard to deviations from the current flight plan.
- Enhanced tactical flow management service based on real-time aircraft position data and flight activation information resulting to more accurate ATFM measures and thus better use of scarce airspace resources.

It will require implementation ATFM/ATC systems related to provision, processing and presentation of ATFM messages.

Maturity Level

Ready for implementation

Human Factor Considerations

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

Manual notification disappeared.

2. Does it imply processing of new information by the user? Yes

ATFM message, CPRs and flight plan proposals are new items that were not previously exchanged.

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

4. Does it imply a change to levels of automation? No

PLANNING LAYERS

Tactical-During ops

OPERATIONS

Departure | En-route | Arrival

DEPENDENCIES AND RELATIONS

Type of Dependencies	ASBU Element
Relation-information need	AMET-B0/2 - Meteorological forecast and warning products

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	-	Network Planning procedures	Develop the ATFM procedures to incorporate information received from multiple sources into the Network Planning.- Doc 9971 Manual on Collaborative ATFM	ATM network function	2008
Operational procedures	-	Procedures for updated flight plan information	Develop the ATFM/ATC procedures for provision of updated flight plan information.- Doc 9971 Manual on Collaborative ATFM	ANSP ATM network function	2008
Ground system infrastructure	ATM systems	Correlated Position Reports	Upgrade of ATFM/ATC system related to the provision and reception of correlated position reports for airborne flights.	ANSP ATM network function	2008
Ground system infrastructure	ATM systems	ATFM message exchanges	Enhancement of ATFM/ATC system related to the provision and processing of ATFM messages.	ANSP ATM network function	2008
Ground system infrastructure	ATM systems	Flight activation messages	Upgrade of ATFM/ATC system related to the flight activation.	ANSP ATM network function	2008
Ground system infrastructure	ATM systems	Updated flight plan info	Upgrade the ATFM/ATC system for handling of flight plan info for airborne flights.	ANSP ATM network function	2008

DEPLOYMENT APPLICABILITY

Operational conditions:

This element will involve all ANSPs, AUs and the ATM Network Function for the collaborative updates of the flight status within an ATFM area. This will enhance predictability and better utilisation of available capacity.

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)

Type	Operational description	Benefitting stakeholder(s)
Direct benefits	Capacity. Better use of the available network capacity hence reducing delays.	ANSP ATM network function
	Predictability	ANSP Airspace user ATM network function
	Improve situational awareness of network manager.	ATM network function
Indirect benefits	Safety. Prevention of ATCO overload.	ANSP

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Capacity	Capacity shortfall & associated delay	Ensure that the measures applied are absolutely necessary and that unnecessary measures are avoided	++	
Capacity	Capacity shortfall & associated delay	Establish/improve the capability to use opportunities to mitigate disturbances, originating from: More precise surveillance data	++	

NOPS-B0/3 Network Operation Planning basic features Operational

☐ Sixth edition of the GANP

Main Purpose: The Network Operation Planning provides an overview of the situation from strategic planning through real time operations with ever increasing accuracy up to and including the day of operations by a common situational awareness for all ATFM actors within and adjacent to the ATFM area and allowing network wide demand and capacity balancing.

New Capabilities: A Network Operations Plan will be accessible online by stakeholders for consultation and update as needed.

Description: Network Operation Planning is based on enhanced participation in a dynamically updated collaborative planning process. This requires the sharing of the latest flight status and intentions; airport and airspace component, associated demand and capacity balancing measures in a frequently updated plan which is aimed to be realised as target by all actors. The elements and formats of the plan need to be established and harmonized, taking into account the requirements of the users of these plans. It will be possible for them to access and extract data for selected areas to support their operation and, if required, to create their specific operations plan.

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

PLANNING LAYERS

Strategical | Pre-tactical | Tactical-Pre ops | Tactical-During ops

OPERATIONS

Departure | En-route | Arrival

DEPENDENCIES AND RELATIONS

Type of Dependencies	ASBU Element
Relation-information need	AMET-B0/2 - Meteorological forecast and warning products
Relation-information need	AMET-B0/3 - Climatological and historical meteorological products

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	-	Tactical changes procedures	Develop the ATFM procedures to modify the Network operations planning in real-time in response to tactical changes to trajectories and airport/airspace capacities..- References: ICAO Doc 9971 Manual on Collaborative ATFM	ATM network function	2012
Operational procedures	-	Capacity balancing procedures	Develop the ATFM procedures for systematically incorporating changes to capacity balance as revised information enables the updating of the Network operations plan. References: ICAO Doc 9971 Manual on Collaborative ATFM	Airport operator ANSP ATM network function Aircraft operator	2012
Operational procedures	-	Coordination procedures	Develop the ATFM procedures for coordinating refined plans between ANSP, Airspace Users and Airport Operators.	Airport operator ANSP ATM network function Aircraft operator	2012
Operational procedures	-	Network Operation Planning procedures	Develop the ATFM procedures for on-line collaborative determination access/update to the Network Operation Planning and notification of updates.	Airport operator ANSP ATM network function Aircraft operator	2013

Operational procedures	-	Predefined scenario management	Develop the ATFM procedures for identifying the appropriate scenario from the catalogue of scenarios through collaborative decision making and initiating its implementation. References: ICAO Doc 9971 Manual on Collaborative ATFM	ATM network function	2013
Operational procedures	-	Dynamic sectorization procedures	Develop the ATFM procedures for initiating dynamic sectorization responses in collaboration with the ANSPs. References: ICAO Doc 9971 Manual on Collaborative ATFM	ATM network function	2013
Ground system infrastructure	ATM systems	Exchange of ATFM related data	Tool for exchange, presentation, visualization and update of ATFM related data.	Airport operator ANSP ATM network function Aircraft operator	2013
Ground system infrastructure	ATM systems	Capacity planning	Upgrade the capacity planning and scenario management with sector management tool to assist ANSPs in defining sector configurations.	ATM network function	2013
Training	-	Training requirements for network operation planning basic features	Network Operation Planning (basic features) training. Training on new procedures and tools	Airport operator ANSP ATM network function Aircraft operator	2013

DEPLOYMENT APPLICABILITY

Operational conditions:

The Network Operation Planning will involve all the operational stakeholders providing an overview of the situation from strategic planning to real time operations with ever increasing accuracy optimising the efficiency of the ATM system while balancing demand with capacity.

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)
Direct benefits	Capacity.	Airport operator ANSP Airspace user ATM network function
	Predictability.	Airport operator ANSP Airspace user ATM network function
	Improve situational awareness of stakeholders.	Airport operator ANSP Airspace user ATM network function

Type	Operational description	Benefitting stakeholder(s)
Indirect benefits	Safety by planning scarce resources in the most optimum way.	ANSP

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI

NOPS-B0/4 Initial Airport/ATFM slots and A-CDM Network Interface — Operational

☐ Sixth edition of the GANP

Main Purpose

Initial integration of airports into the ATM network function.

New Capabilities

Stakeholders will be able to share relevant airport and flight turnaround information with ATM network function resulting in better predictability and better use of existing capacity whilst considering user preferences and requirements.

Description

The first objective is the A-CDM (Airport Collaborative Decision Making) integration with ATFM via exchanges of specific messages. The second objective is to ensure ATFM slot adherence and limited ATFM slot swapping in order to meet airline demands in line with capacity declarations.

Convergence is ensured between airport slots, and flight plans, together with airport slot monitoring processes in order to improve consistency. That will require the deployment of new systems and processes for A-CDM and ATFM slot swapping:

- ATFM and airports system modules related to data exchanges for A-CDM
- Tools for airport and ATFM slot monitoring post-ops

Maturity Level

Ready for implementation

Human Factor Considerations

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

Phone coordination is reduced.

2. Does it imply processing of new information by the user? Yes

ATFM data presentation and scenario management are new data streams.

3. Does it imply the use of new equipment? Yes

Network Operation planning is a new tool, it might require specialised equipment for data access.

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

Manual process is semi-automated.

PLANNING LAYERS

OPERATIONS

Tactical-Pre ops | Tactical-During ops

Departure | Arrival | Turn-around

DEPENDENCIES AND RELATIONS

Type of Dependencies	ASBU Element
Relation-operational need	ACDM-B0/1 - Airport CDM Information Sharing (ACIS)
Relation-operational need	ACDM-B0/2 - Integration with ATM Network function

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	-	Airport slot procedure	Develop procedures for the collection of the Airport slots. References: ICAO Doc 9971 Manual on Collaborative ATFM	ATM network function Aircraft operator	2013
Operational procedures	-	ATFM A-CDM procedure	Develop the ATFM Collaborative procedures for improving Airport Operations in Adverse Conditions. References: ICAO Doc 9971 Manual on Collaborative ATFM	Airport operator ANSP ATM network function Aircraft operator	2012
Ground system infrastructure	ATM systems	Airport Slot Monitoring Tool	Tools supporting Airport Slot Monitoring post ops.	Airport operator ATM network function Aircraft operator	2012
Ground system infrastructure	ATM systems	Departure planning estimate	Enhance the ATFM system for provision of planned departure information. Enhance the ATC and airport systems for reception and processing of planned departure information.	Airport operator ANSP ATM network function	2010
Ground system infrastructure	ATM systems	Flight data for airborne flights	Enhance the ATFM system for provision of real time flight data for airborne flights. Enhance the ATC and airport systems for reception and processing of real time flight data for airborne flights	Airport operator ANSP ATM network function	2010

DEPLOYMENT APPLICABILITY

Operational conditions:

It concerns airports which have implemented A-CDM. The integration of airport planning with ATFM will involve all respective stakeholders in a collaborative decision facilitating slot adherence and some AUs preferences (limited slot swapping).

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)

Type	Operational description	Benefitting stakeholder(s)
Direct benefits	Capacity.	Airport operator, ANSP, Airspace user, ATM network function
	Predictability.	Airport operator, ANSP, Airspace user, ATM network function
	Improve situational awareness of network manager.	ATM network function
Indirect benefits	Airspace users specific preferences /efficiency criteria of operations.	Airspace user

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Capacity	Capacity shortfall & associated delay	For a given airspace entry slot: let airspace users swap the slot to another flight (slot substitution or UDPP – User Driven Prioritisation Process)	++	

NOPS-B0/5 Dynamic ATFM slot allocation Operational

☐ Sixth edition of the GANP

Main Purpose Provision of dynamic departure ATFM slot allocation including Calculated Take-off Time (CTOT) for regulated flights to avoid ATFM congestions.

New Capabilities ATM network function to provide the departure ATFM slots, including CTOT for regulated flight to all concerned operational stakeholders. ANSPs/ Airport/ AU to be capable to receive and process CTOT and update Estimated Take-off Time (EOBT) in accordance with the agreed operational procedures.

Description The CTOT is defined as a time at which the aircraft shall take-off. CTOT is sent to AU / ATS when a flight becomes regulated (e.g. new flight entering the system, new period of regulation in the system, change of runway in use) at a system parameter time before the last received EOBT.
AU/ATS/Airport need to adhere with the CTOT. The calculation of take-off times takes into account the off-block times and an average taxiing time for the runway in use at the airfield concerned.

Maturity Level Ready for implementation

Human Factor Considerations

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

Constrains need to be handled.

2. Does it imply processing of new information by the user? Yes

CTOT and DPI are new items.

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

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

Instead being active user, only monitoring of data exchange and reacting in abnormal situations.

PLANNING LAYERS

Tactical-Pre ops

OPERATIONS

Departure

DEPENDENCIES AND RELATIONS

There are currently no dependencies.

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	-	Slot revision procedures	Develop the ATFM procedures for slot revision. References: ICAO Doc 9971 Manual on Collaborative ATFM	Airport operator, ANSP, ATM network function, Aircraft operator	2000
Ground system infrastructure	ATM systems	CTOT	System upgrade for provision, exchange and processing of CTOT	Airport operator, ANSP, ATM network function, Aircraft operator	2000

DEPLOYMENT APPLICABILITY

Operational conditions:

It concerns airports integrated in ATFM. All operational stakeholders participate in smoothing traffic flows facilitating ATFM slot adherence.

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)
	Predictability.	Airport operator, ANSP, Airspace user, ATM network function
	Fuel consumption.	Airspace user

Direct benefits Type	Operational description	Benefitting stakeholder(s)
	ATFM delays.	Airport operator ANSP Airspace user ATM network function

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Capacity	Capacity shortfall & associated delay	Implement TMIs to delay take-off times	++	KPI07: En-route ATFM delay
Capacity	Capacity shortfall & associated delay	Use ATFM oriented flow management: delay push-back of inbound traffic	++	

NOPS-B1/1 Short Term ATFM measures Operational

☐ Sixth edition of the GANP

Main Purpose: Short Term ATFM Measures (STAM) intends to smooth sector workloads by reducing traffic peaks through short-term applications of minor ground delays, appropriate flight level capping, timing and modalities of ATC re-sectorisation These measures are capable of reducing the traffic complexity for ATC with minimum curtailing impact on the airspace users.

New Capabilities: Stakeholders can optimize capacity throughput by adopting and improving the tactical capacity management procedures with the use of STAM.

Description

The rigid application of ATFM measures based on standard capacity thresholds as the pre-dominant tactical capacity measure needs to be replaced by a close working relationship between ANSP, AU and ATM Network function, which monitors both the real demand and the effective capacity of sectors having taken into account the complexity of expected traffic situation.

In order to close the gap between ATC and ATFM, new tools and local operational procedures need to be developed. The aim is to improve the efficiency of the system using flow management techniques close to the real time operations with direct impact on tactical capacity management and tactical action on traffic.

The target of the Short Term ATFM Measures is to replace en-route measures for situations where the capacity is nominal. These measures are capable of reducing the traffic complexity for ATC with minimum constraints for the airspace users. STAM tools and procedures are based on accurate short-term occupancy counts. The tactical capacity management procedures can be supported by the ATFM Tools (system based STAM with the hot-spot detections in the network view, the “what-if” function and capabilities of promulgation and implementation of STAM measures, including CDM). This will require the introduction of:

- Pre-tactical and Tactical Demand Capacity Balancing (DCB) evaluation tools;
- DCB tool based on occupancy counts;
- Enhanced monitoring techniques;
- DCB Coordination tools;
- DCB What-if function;
- DCB Network impact assessment;
- ATFM procedures to enable application of flow management closer to real time.

Maturity Level

Standardization

Human Factor Considerations

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

New task for all ATFM actors.

2. Does it imply processing of new information by the user? Yes

STAM measures are new items.

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

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

Reduced need for late and tactical interventions.

PLANNING LAYERS

Tactical-Pre ops

OPERATIONS

En-route | Arrival

DEPENDENCIES AND RELATIONS

Type of Dependencies	ASBU Element
Evolution	NOPS-B0/3 - Network Operation Planning basic features

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year

Operational procedures	-	DCB change procedure	Develop the ATFM procedures to respond to change of demand/ capacity balance. References: ICAO Doc 9971 Manual on Collaborative ATFM	ANSP ATM network function Aircraft operator	2014
Operational procedures	-	DCB optimisation procedure	Develop the ATFM procedures for demand/ capacity balance optimization. References: ICAO Doc 9971 Manual on Collaborative ATFM	ATM network function	2014
Operational procedures	-	STAM procedures	Develop the ATFM procedures to enable application of flow management techniques on traffic streams closer to real-time. References: ICAO Doc 9971 Manual on Collaborative ATFM	ANSP ATM network function Aircraft operator	2019
Ground system infrastructure	ATM systems	Strategic DCB tools	Strategic and pre-tactical demand-capacity balancing evaluation, simulation and display tools.	ATM network function	2014
Ground system infrastructure	ATM systems	Routings and Flow changes	Upgrade the Capacity planning and scenario management with tools to identify the most beneficial routings and flows changes implemented within the Collaborative Decision Making processes.	ANSP ATM network function Aircraft operator	2014
Ground system infrastructure	ATM systems	Basic STAM tool	Demand capacity balancing tool base on occupancy counts.	ANSP ATM network function	2014
Ground system infrastructure	ATM systems	Sector configuration integration	Integration of ANSPs sector configuration into ATFM Systems	ANSP ATM network function	2014
Ground system infrastructure	ATM systems	Enhanced STAM tool	Enhanced STAM tool (Coordination, what-if, network impact assessment).	ATM network function	2019
Ground system infrastructure	ATM systems	Local STAM tool	Local tool and interface with ATFM tools	ANSP	2019
Training	-	Training requirements for STAM	Staff training	ANSP ATM network function Aircraft operator	2014

DEPLOYMENT APPLICABILITY

Operational conditions:

It is applicable in areas where significant ATFM measures are required. This element will involve ANSPs as well AUs and the ATM Network function as required in a collaborative manner, during tactical planning in applying demand and capacity balancing actions for a limited time and affecting selected flights.

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)
Direct benefits	Capacity. Effective capacity is globally optimized thanks to the application of certain techniques affecting only selected flights.	ANSP Airspace user ATM network function
Indirect benefits	Safety. Small enhancement through the resolution of some conflicts through STAM measures, Predictability	ANSP Airspace user ATM network function

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Capacity	Capacity shortfall & associated delay	Establish/improve the capability to use opportunities to mitigate disturbances	++	
Capacity	Capacity shortfall & associated delay	TMI-based optimisation (only impacts traffic when a TMI or restriction is manually activated for one or more constraint satisfaction points)	++	

NOPS-B1/10 Collaborative Trajectory Options Program (CTOP) Operational

☐ Sixth edition of the GANP

Main Purpose: Collaborative Trajectory Options Programs are Traffic Management Initiatives (TMI) that allow ATFM to choose the best possible balance between ATFM dalay and rerouting by using airspace user provided Trajectory Option Sets (TOS) to mitigate the operational impact of weather or traffic demand airspace constraints.

New Capabilities

ATFM has the capability to receive and process Trajectory Option Sets (TOS) provided by airspace users. These are ranked trajectories that represent the operator's preference for the trade-off between receiving ATFM delay and routing around airspace constraints.

When there is an airspace constraint, ATFM has the flexibility to use the trajectory options provided by all participating operators to optimize the choice between accepting a subset of the flights to use the available airspace capacity, applying ATFM delay to others, and rerouting the remaining traffic around the constraint.

Finally, ATFM has the capability to electronically notify the participating airspace users of the chosen trajectory that they are expected to fly.

Description

CTOP works as follows:

1. ATFM creates an airspace boundary and establishes flow control on any air traffic that crosses that boundary.
2. 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.
3. CTOP uses the preferred options to automatically assign delays or reroutes to flights in order to dynamically manage the demand as conditions change.

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

Pre-tactical | Tactical-Pre ops

OPERATIONS

En-route

DEPENDENCIES AND RELATIONS

Type of Dependencies	ASBU Element
Relation-operational need	FRTO-B1/7 - Trajectory Options Set (TOS)

ENABLERS

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 infrastructure	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 CTOP	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:

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Capacity	Capacity shortfall & associated delay	For a given flight: at flight plan filing time airspace users provide network management with a range of trajectory options and associated trade-off criteria, from which one solution is chosen (CTOP – Collaborative Trajectory Options Program)	++	KPI04: Filed flight plan en-route extension KPI07: En-route ATFM delay KPI18: Level capping during cruise

NOPS-B1/2 Enhanced Network Operations Planning Operational

☐ Sixth edition of the GANP

Main Purpose: The Network Operations Planning needs to be enhanced to achieve collaborative planning with the support of services which can be automated (B2B interfaces/SWIM services).

New Capabilities: Tools and procedures to be deployed to enhance Network Operations planning.

Description

The Network Operations Planning process will be enhanced to continuously provide up-to-date situational information on all components of the network. Furthermore, it will provide access to initial network performance objectives and support to network performance assessment in post-operations.

The required technological platform will use the state-of-the-art technologies for creation of a virtual operations room for the physically distributed network operations, in support of collaborative Network Operations Planning. These interfaces will support the network collaborative dynamic/rolling processes from strategic to real-time operations, including capabilities for online performance monitoring integrated and feeding back into the collaborative network planning.

The information and dialogue tools shall be accessed via different interfaces. Access to information is done in a secure way, tailored according to stakeholders needs and subject to access control rules, so that only those who have an operational need to access particular information are able to do so. A common interface to all stakeholders needs to be developed to enable the collaborative decision-making processes used to build and execute the Network Operations Planning.

The following new features will be introduced:

- Enhanced Network Operations Planning interfaces (B2B/SWIM based);
- Initial steps related to the Network Operations Planning extended functions (crisis management and network disruption);
- Tools for on-line performance monitoring;
- Tools for network impact assessments.

Maturity Level

Standardization

Human Factor Considerations

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

New role and responsibilities for some ATFM actor.

2. Does it imply processing of new information by the user? Yes

New info stream are handled as impact assessment and crisis management.

3. Does it imply the use of new equipment? Yes

New platform and interfaces are needed.

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

New function were added , those that did not exist before.

PLANNING LAYERS

Strategical | Pre-tactical | Tactical-Pre ops

OPERATIONS

Departure | En-route | Arrival

DEPENDENCIES AND RELATIONS

Type of Dependencies	ASBU Element
Evolution	NOPS-B0/3 - Network Operation Planning basic features
Relation-information need	AMET-B1/3 - Climatological and historical meteorological information
Relation-information benefit	FICE-B2/4 - Flight Data Request Service
Relation-operational benefit	SWIM-B2/1 - Information service provision

Relation-operational benefit	SWIM-B2/2 - Information service consumption

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	-	Enhanced NOP dissemination procedure	Develop the ATFM procedures for communicating refined Network plans to ANSP, Airspace Users and Airport Operators...- Doc 9971 Manual on Collaborative ATFM	Airport operator ANSP ATM network function Aircraft operator	2019
Operational procedures	-	Enhanced NOP notification procedure	Develop the ATFM procedures for on-line access/update to the Network Plan and notification of updates. References: ICAO Doc 9971 Manual on Collaborative ATFM	Airport operator ANSP ATM network function Aircraft operator	2019
Operational procedures	-	Critical event procedure	Develop the ATFM procedures for handling of a critical event.	ATM network function	2019
Operational procedures	-	Airspace availability procedure	Develop the ATFM procedures to ensure that Network is constantly updated to reflect all changes to the airspace availability and airspace users requests. References: ICAO Doc 9971 Manual on Collaborative ATFM	Airport operator ANSP ATM network function Aircraft operator	2019
Operational procedures	-	B2B/SWIM services procedure	Real-time technical support procedures for B2B(2019)/SWIM(2020) services. References: ICAO Doc 9971 Manual on Collaborative ATFM	Aircraft operator	2019
Ground system infrastructure	-	Enhanced NOP platform	Enhance the ATFM technical platform.	ATM network function	2019
Ground system infrastructure	ATM systems	Enhanced NOP functions	Upgrade the ATFM system with extended function (crisis management, impact assessment, performance monitoring).	ATM network function	2019
Ground system infrastructure	ATM systems	Enhanced NOP interfaces	B2B (2019)/ SWIM (2020) Network system interfaces with concerned stakeholders.	Airport operator ANSP ATM network function Aircraft operator	2019

Training	-	Training requirements for enhanced network operations planning	Training in new operational procedures and ground systems.	Airport operator ANSP ATM network function Aircraft operator	2019

DEPLOYMENT APPLICABILITY

Operational conditions:

An enhanced common platform is available to all Stakeholders needs enabling the collaborative decision making processes used to maintain and execute the Network Operations Planning.

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)
Direct benefits	Capacity Enhanced planning will ensure better use of available capacity and reduce delays.	Airport operator, ANSP, Airspace user, ATM network function
	Cost Efficiency Enhanced planning will allow better use of human resources.	Airport operator, ANSP, Airspace user, ATM network function
	Improve situational awareness of network manager	ATM network function
Indirect benefits	Safety Enhanced by improved sharing of the network situation awareness.	Airport operator, ANSP, Airspace user, ATM network function

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Capacity	Capacity shortfall & associated delay	Establish/update the crisis management capabilities and plans (to cope with the risk of large scale disruptions)	++	

NOPS-B1/3 Enhanced integration of Airport operations planning with network operations planning — Operational

☐ Sixth edition of the GANP

Main Purpose — Integrate the airport operations planning into the network operations planning.

New Capabilities

The airport operations plan will be a single common and collaborative agreed dynamic/rolling plan available to all airport stakeholders. This plan will be integrated with the enhanced network operations planning.

Description

The airport operations plan will contain all data and information related to the different status of planning phases and will be a dynamic/rolling plan, which naturally evolves over time. The integration of airport operations planning within the network operations planning provides a dynamic/rolling picture of the network situation to be used by all operational stakeholders to prepare their plans and their inputs to the network CDM processes.

The data exchanges are based on the subset of B2B/SWIM services that are most widely available to all stakeholders, communicating with local airport A-CDM systems to exchange relevant operational information.

This element is a step prior to the full integration of the airport operations planning to the network operations planning.

Maturity Level

Standardization

Human Factor Considerations

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

Yes, manual coordination is automated.

2. Does it imply processing of new information by the user? Yes

AOP/NOP interfaces contain a full set of new data exchange items.

3. Does it imply the use of new equipment? Yes

In some cases. New modules and interfaces.

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

Reduced need for phone coordination.

PLANNING LAYERS

ATM planning | Strategical | Pre-tactical | Tactical-Pre ops

OPERATIONS

Taxi-out | Departure | Arrival | Taxi-in | Turn-around

DEPENDENCIES AND RELATIONS

Type of Dependencies	ASBU Element
Evolution	NOPS-B0/4 - Initial Airport/ATFM slots and A-CDM Network Interface
Relation-operational need	ACDM-B2/1 - Airport Operations Plan (AOP)
Relation-operational need	NOPS-B1/2 - Enhanced Network Operations Planning
Relation-operational benefit	SWIM-B2/1 - Information service provision
Relation-operational benefit	SWIM-B2/2 - Information service consumption

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	-	AOP/NOP procedure	Develop the ATFM/Airport procedures for AOP/Network Operation Planning integration. References: ICAO Doc 9971 Manual on Collaborative ATFM	Airport operator ATM network function	2019
Ground system infrastructure	Airport systems	AOP	Develop the Airport Operations Plan module	Airport operator	2019
Ground system infrastructure	ATM systems	AOP/NOP interface	Develop the Airport Operations/ /Network Operations Planning interfaces	Airport operator ATM network function	2019

DEPLOYMENT APPLICABILITY

Operational conditions:

It concerns airports which have already implemented AOP. This element will involve Airports and the ATM Network function. Airport planning will be integrated in the Network operations planning. The integration of Airport operations planning within the Network operations planning.

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)
Direct benefits	Capacity. An integrated planning will facilitate better utilization of available airspace and airport capacities and will reduce delays. Support optimal use of facilities and services, better use of airport and ATFM slots. Predictability Efficiency Decrease in fuel burn through better timed operations.	Airport operator ANSP Airspace user ATM network function
	Improve situational awareness of stakeholders	Airport operator ANSP Airspace user ATM network function

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI

NOPS-B1/4 Dynamic Traffic Complexity Management Operational

☐ Sixth edition of the GANP

Main Purpose Enhanced traffic complexity assessment by automation.

New Capabilities

The predicted complexity coupled with traffic demand enables the ATM Network function to take timely action to better address demand and capacity balancing, or request the trajectory changes in coordination with ATC and Airspace Users.

Description

The rigid application of ATFM measures based on standard capacity thresholds as the pre-dominant tactical capacity measure needs to be replaced by a close working relationship between ANSPs and ATM Network function, which would monitor both the real demand and the effective capacity of sectors having taken into account the complexity of expected traffic situation. The local traffic complexity assessment continuously monitors sector demand and evaluate traffic complexity (by applying predefined complexity metrics) according to a predetermined qualitative scale. It provides support in the determination of solutions in order to plan airspace, sectors and staff to handle the predicted traffic. The local complexity assessment would benefit by receiving processing and integrating the ATM Network function information in order to supplement the local traffic counts with the relevant flight plan data. This will improve the quality of the planned trajectory and further enhance the traffic complexity management.

Maturity Level

Standardization

Human Factor Considerations

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

New task to manage traffic complexity.

2. Does it imply processing of new information by the user? Yes

New stream of data.

3. Does it imply the use of new equipment? Yes

It could be module of existing system or separate system.

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

Mental activates are automated, complexity tool provides additional data to facilitate the traffic de-confliction well in advance.

PLANNING LAYERS

Tactical-During ops

OPERATIONS

En-route

DEPENDENCIES AND RELATIONS

There are currently no dependencies.

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	-	Complexity management procedure	Complexity management procedures. References: ICAO Doc 9971 Manual on Collaborative ATFM.	ANSP ATM network function	2018
Ground system infrastructure	ATM systems	Local Traffic load	Local Traffic Load Management tool.	ANSP	2014

Ground system infrastructure	ATM systems	Local Traffic complexity	Local Traffic Complexity tools	ANSP	2016
Ground system infrastructure	ATM systems	ATFM Planned Trajectory (basic feature)	Provision and integration of ATFM Planned Trajectory.	ANSP ATM network function	2016
Ground system infrastructure	ATM systems	ATFM Planned Trajectory (enhanced feature)	Upgrade the ATFM systems with the Planned Trajectory improvements	ATM network function	2018
Ground system infrastructure	ATM systems	Network traffic complexity	Enhancements related to ATFM Traffic complexity assessment.	ATM network function	2019

DEPLOYMENT APPLICABILITY

Operational conditions:

It is applicable only in areas with dense and complex traffic. This element needs to be addressed by the ANSPs and the ATM Network function in their endeavour to find optimum solutions to accommodate the traffic demand.

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)
Direct benefits	Capacity	ANSP, ATM network function
	Cost-Efficiency	ANSP
	Improve situational awareness of network manager	ATM network function
Indirect benefits	Safety	ANSP

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Capacity	Capacity, throughput & utilization	Overcome operational ATC service delivery limitations if these are the blocking factor	++	KPI06: En-route airspace capacity

NOPS-B1/5	Full integration of airspace management with air traffic flow management	Operational

☐ Sixth edition of the GANP

Main Purpose: Ensure a continuous, seamless and iterative airspace management and air traffic flow management approach.

New Capabilities: Fully dynamic/rolling ASM/ ATFM integration process supporting information collection, processing and sharing with all concerned stakeholders.

Description: The full dynamic/rolling ASM/ATFM process focuses on improving airspace planning. It will ensure a continuous, seamless and iterative airspace planning and management/allocation based on airspace requests at any time period within strategic, pre-tactical and tactical ASM levels. It will result in a rolling process, supporting the enhancement of dynamic Network Operations Planning. The real time ASM data exchanges relates to the automated exchange services of ASM data during the tactical phase continuously in real time. ASM information (real-time Airspace Reservation status) is shared between different systems and Stakeholders and communicated to ATFM in the tactical phase.

Several new improvements are introduced as:

- Process/system modules supporting a full rolling ASM/ATFM and dynamic ASM/ATFM process allowing data sharing to all operational stakeholders,
- Process/System changes for initial Collaborative Decision Making (CDM) between ATFM function and the local designated authorities and between neighboring ASM actors.
- ASM information sharing addresses requirements aiming to improve the notification to airspace users based on automated data exchange processes
- Procedural and system modules for exchange of real time airspace status data;
- The Flexible Use of Airspace (FUA) process is improved with more dynamic airspace management enabling dynamic responses to airspace requests (or very short term changes)
- Real-time ASM coordination is further enhanced through "what-if" functionalities and automated support to airspace booking and airspace management.
- Real-time ASM data are exchanged between ASM support systems and ATC system
- Integration and management of ASM real-time data into ANSPs' ATM systems and into AUs flight planning systems;

The full dynamic/rolling ASM/ATFM process will be supported by the sharing of civil-military airspace data and by continuously updating Airspace Reservation information with other demand information among the authorized operational stakeholders in order to enhance the coordination of Cross-Border Operations, and to optimise the whole network operations based on the most timely and correct information. The process is enhanced with “what-if” functionalities enabling a better use of available capacity. ASM real-time data exchanges consisting of pre-notification of activation, notification of activation, de-activation, modification and release of airspace are collected, saved and processed in order to be exchanged between stakeholders and be made available to ATM actors, including Airspace Users (AUs). ATM systems need to be upgraded to exchange real-time ASM data messages containing real time activation status of predefined airspace structures with local ASM support systems and to display airspace status data at the Controller Working Position (CWP).

Maturity Level: Standardization

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

Real time ASM data is new data stream.

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

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

Automation increased compared with B0.

PLANNING LAYERS

Strategical | Pre-tactical | Tactical-Pre ops

OPERATIONS

Departure | En-route | Arrival

DEPENDENCIES AND RELATIONS

Type of Dependencies	ASBU Element
Evolution	NOPS-B0/1 - Initial integration of collaborative airspace management with air traffic flow management
Relation-operational need	FRTO-B1/1 - Free Route Airspace (FRA)
Relation-operational need	FRTO-B1/2 - Required Navigation Performance (RNP) routes
Relation-operational need	FRTO-B1/3 - Advanced Flexible Use of Airspace (FUA) and management of real time airspace data
Relation-operational need	FRTO-B1/4 - Dynamic sectorization

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	-	Rolling ASM/ATFM procedure	Develop the Procedures and processes for a dynamic/rolling ASM/ATFM process. References: ICAO Doc 9971 Manual on Collaborative ATFM	ANSP, ATM network function	2019
Operational procedures	-	ASM data sharing procedure	Develop the Procedures in support of ASM data sharing. References: ICAO Doc 9971 Manual on Collaborative ATFM	ATM network function, Aircraft operator	2019
Operational procedures	-	ASM real time exchanges procedure	Develop the Procedures related to real-time ASM data exchanges. References: ICAO Doc 9971 Manual on Collaborative ATFM	ANSP, ATM network function	2019
Operational procedures	-	Advanced FUA procedure	Develop the to advanced FUA procedure. References: ICAO Doc 9971 Manual on Collaborative ATFM	ANSP	2019

Operational procedures	-	Airspace changes procedure	Procedures to respond to changes submitted by Airspace users resulting from changes in airspace availability. References: ICAO Doc 9971 Manual on Collaborative ATFM	ANSP ATM network function	2019
Ground system infrastructure	ATM systems	Rolling ASM/ATFM	Adapt ASM/ATFM/AUs systems to support a rolling ASM/ATFM process	ANSP ATM network function Aircraft operator	2019
Ground system infrastructure	ATM systems	ASM notification process	Upgrade the ATFM System modules for improved ASM notification process	ATM network function	2019
Ground system infrastructure	ATM systems	ASM real time exchanges-ATC part	Upgrade the ATC systems for real-time ASM data exchanges	ATM network function	2019
Ground system infrastructure	ATM systems	ASM real time exchanges-ASM and ATFM part	Adapt ASM system, ATFM and AU systems for real-time ASM data exchanges	ANSP ATM network function Aircraft operator	2019
Training	-	Training requirements for full integration of ASM with ATFM	Rolling ASM/ATFCM process training. Training in new operational procedures and ground system changes	ANSP ATM network function Aircraft operator	2019

DEPLOYMENT APPLICABILITY

Operational conditions:

This element is an evolution of element NOPS-B0/1 and should be undertaken by all ANSPs, AUs and the ATM Network function affecting both en-route and TMA operations.

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)
Direct benefits	Capacity Flight delays will be reduced through better utilisation of airspace resources within and across airspace boundaries.	ANSP Airspace user ATM network function
	Flight efficiency Increased through the chance to plan more optimum routes/trajectories allowing lower fuel burn.	Airspace user

Type	Operational description	Benefitting stakeholder(s)
	Improve situational awareness of network manager and airspace manager	ANSP ATM network function
Indirect benefits	Safety Better knowledge of traffic environment, common situational awareness, and some enhancement through reduction in controller workload.	ANSP Airspace user ATM network function

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Efficiency	Flight time & distance	Facilitate tactical decisions leading to a shorter actual route than in the FPL	++	KPI05: Actual en-route 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
Efficiency	Flight time & distance	Reduce need for tactical ATFM rerouting to circumnavigate airspace closed at short notice	++	KPI05: Actual en-route extension
Efficiency	Vertical flight efficiency	Reduce altitude restrictions during climb introduced to avoid airspace above	++	KPI17: Level-off during climb
Efficiency	Vertical flight efficiency	Reduce altitude restrictions during cruise introduced to avoid airspace above	++	KPI18: Level capping during cruise
Efficiency	Vertical flight efficiency	Reduce altitude restrictions during descent to avoid Special Use Airspace	++	KPI19: Level-off during descent

NOPS-B1/6 Initial Dynamic Airspace configurations Operational

☐ Sixth edition of the GANP

Main Purpose: ASM solutions and initial dynamic airspace configurations for ATFM planning, synchronisation of traffic flows and demand/capacity balancing

New Capabilities: Availability of optimised Airspace solutions/Initial Dynamic Airspace configurations based on traffic demand and dynamic sectors management taken into account for ATFM purposes.

Description

This element addresses the following ASM/ATFM improvements:

- Airspace solutions
- Pre-defined airspace configurations
- ANSPs/ ATM Network function data exchanges pertinent to pre-defined airspace configurations

The ASM solutions process is aimed at delivering ASM options/solutions that can help reducing or even alleviate the ATFM measures and address capacity issues identified in any particular area as well as to improve flight efficiency assessing impact on capacity and ensuring the synchronised availability of optimized airspace structures based on traffic demand and dynamic sectors management.

The Airspace configurations are pre-defined and coordinated airspace structures and ATC dynamic sectorisation, to meet the ATFM and airspace needs in terms of capacity and/or flight efficiency. The implementation of pre-defined airspace configuration exchange covers the improvements of ATFM systems, to allow exchange of predefined airspace configurations information.

The decisions required for dynamic sectorisation could benefit from real time exchanges with ATM Network function for ATFM planning, synchronisation of traffic flows and demand/capacity balancing. The notification of Airspace Configurations will be based on automatic flows of information between the different stakeholders supported by the ATM Network function. The airspace configurations and flexible sector configurations are already used when the flows and constraints can be predicted well in advance (e.g. weekend routes or seasonal flows of traffic).

A more efficient and dynamic process involving the ATM Network function, ATC would require new functionalities and procedures and well defined collaborative decision making processes at pre-tactical level. The ANSPs systems needs to support the dynamic sectorisation by dynamic resizing and change of sector shapes and volumes based on pre-defined airspace configurations.

Maturity Level

Standardization

Human Factor Considerations

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

Utilisation of pre-defined airspace configuration.

2. Does it imply processing of new information by the user? Yes

Airspace structure and ATC sectorisation are new data information.

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

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

Manual Task are semi-automated.

PLANNING LAYERS

Strategical | Pre-tactical

OPERATIONS

Departure | En-route | Arrival

DEPENDENCIES AND RELATIONS

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-operational need	FRTO-B0/3 - Pre-validated and coordinated ATS routes to support flight and flow
Relation-operational need	FRTO-B1/1 - Free Route Airspace (FRA)
Relation-operational need	FRTO-B1/2 - Required Navigation Performance (RNP) routes
Relation-operational need	FRTO-B1/3 - Advanced Flexible Use of Airspace (FUA) and management of real time airspace data
Relation-operational need	FRTO-B1/4 - Dynamic sectorization

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	-	Airspace solution procedure	Develop the ASM/ATFM procedures for airspace solution. References: ICAO Doc 9971 Manual on Collaborative ATFM	ANSP ATM network function	2016
Operational procedures	-	Predefined airspace configuration procedure	Develop the ASM/ATFM procedures for pre-defined airspace configurations. References: ICAO Doc 9971 Manual on Collaborative ATFM	ANSP ATM network function	2018
Operational procedures	-	Constrain management procedure	Develop the ASM/ATFM procedures for dynamic sectorization and constrain management. References: ICAO Doc 9971 Manual on Collaborative ATFM	ANSP	2019
Ground system infrastructure	ATM systems	Airspace solution	Upgrade the ATFM system modules related to the airspace solution	ATM network function	2016
Ground system infrastructure	ATM systems	Predefined airspace configuration	Upgrade the ATFM system modules related to the pre-defined airspace configurations	ATM network function	2018
Ground system infrastructure	ATM systems	Dynamic sectorization	Enhance the ATC system capabilities with dynamic sectorization and constraint management.	ANSP	2019
Ground system infrastructure	ATM systems	Airspace configuration data exchanges (basic feature)	SWIM data exchanges for pre-defined airspace configurations	ANSP ATM network function	2019

DEPLOYMENT APPLICABILITY

Operational conditions:

This element will be addressed by ANSPs and the ATM Network function as required ensuring a synchronised availability of optimised airspace structures supported by dynamic sectors management to better address traffic demand.

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)
Direct benefits	Capacity	ANSP, ATM network function

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	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)	++	

NOPS-B1/7 Enhanced ATFM slot swapping Operational

☐ Sixth edition of the GANP

Main Purpose: Improve the Airspace Users driven ATFM slot swapping process

New Capabilities: The swapping of ATFM measure impacted flights within the same ATFM measure will be extended to all ATFM measure impacted flights.

Description: ATFM slot swapping allows Airspace Users (AU) to request a rearrangement of their own flights subject to an ATFM measure in order to better suit their needs. The enhanced ATFM Slot Swapping improves the slot swapping currently used by Airspace Users (AU), by allowing the function to be extended gradually to all airspace users, by re-prioritizing their flights during the pre-departure part of operations. The Enhanced Slot swapping increases flexibility for Airspace Users; and provides a wider range of possibilities, by facilitating the identification of possible swaps for an ATFM Measure impacted flight (through B2B/SWIM-based Network Operations Planning interfaces) and by reducing the rate of rejection of swap requests by refining current processes. The AUs requests for these changes in flight priority will be introduced at the initiative of the AUs themselves, airport authorities or the ATM Network function.

Maturity Level: Standardization

Human Factor Considerations	1. Does it imply a change in task by a user or affected others? Yes Change of tasks for many ATFM actors. 2. Does it imply processing of new information by the user? Yes New data stream for slot swapping and airport slot monitoring. 3. Does it imply the use of new equipment? Yes Change of system and interfaces. 4. Does it imply a change to levels of automation? Yes Coordination is semi-automated.

PLANNING LAYERS

Tactical-Pre ops

OPERATIONS

Departure

DEPENDENCIES AND RELATIONS

Type of Dependencies	ASBU Element
Evolution	NOPS-B0/4 - Initial Airport/ATFM slots and A-CDM Network Interface
Relation-operational need	NOPS-B1/2 - Enhanced Network Operations Planning
Relation-operational benefit	SWIM-B2/1 - Information service provision
Relation-operational benefit	SWIM-B2/2 - Information service consumption

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	-	Slot swapping procedure	Develop the Procedures for ATFM slot swapping. References: ICAO Doc 9971 Manual on Collaborative ATFM	ATM network function Aircraft operator	2019
Ground system infrastructure	ATM systems	FOC interface to slot swapping module	Upgrade the The Flight Operations Centre (FOC) system modules with interfaces, automation, and decision-support for ATFM slot swapping	Aircraft operator	2019
Ground system infrastructure	ATM systems	ATFM slot swapping module	Enhance the ATFM systems with ATFM slot swapping capabilities supporting as well the Airport Slot Monitoring in real time	ATM network function	2019
Training	-	Training requirements for slot swapping	Slot swapping training. Train Flight Operation Centre personnel	ATM network function Aircraft operator	2019

DEPLOYMENT APPLICABILITY

Operational conditions:

This element will support AUs businesses by reprioritizing their flights during the pre-tactical part of operations if and as requested by them. The ATM Network function will keep all impacted stakeholders in the loop in the context of the Collaborative Decision Making processes.

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)
Indirect benefits	Efficiency of airlines operations. Airlines cost savings related to each slot swap that is executed.	Airspace user

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Capacity	Capacity shortfall & associated delay	For a given airspace entry slot: let airspace users swap the slot to another flight (slot substitution or UDPP – User Driven Prioritisation Process)	++	

NOPS-B1/8 Extended Arrival Management supported by the ATM Network function — Operational

☐ Sixth edition of the GANP

Main Purpose: ATM Network function contributions to extended Arrival Management.

New Capabilities: Extended Arrival Management information is taken on board by the Network ATM function to improve the quality of the ATFM service.

Description: The ATM Network function involvement in extended Arrival Management process is addressed by this element. It does include the following elements:

- Enhancements of ATFM Planned Trajectory about the accuracy/predictability of estimates to meet the extended arrival management operational requirements;
- Provision of ATFM Planned Trajectory to ANSPs;
- Reception and processing of ANSPs extended Arrival Management info by ATM Network function;
- ATFM assessment tool for extended Arrival Management.

Bilateral agreements need be established between the sectors involved that can be in different ATC units and also in different countries, including the ATM Network function for the notification purposes. The ATFM procedures need to be revised for the management of the extended Arrival Management information.

Maturity Level	Standardization
Human Factor Considerations	1. Does it imply a change in task by a user or affected others? Yes Propagation of delay further en-route will increase the task for some ATFM actors. 2. Does it imply processing of new information by the user? Yes AMAN delay is propagated further en-route and the Network function is notified. 3. Does it imply the use of new equipment? No 4. Does it imply a change to levels of automation? Yes Some ATFM actors got new tasks for the optimisation of arrival traffic flows.

PLANNING LAYERS

Tactical-Pre ops | Tactical-During ops

OPERATIONS

En-route | Arrival

DEPENDENCIES AND RELATIONS

Type of Dependencies	ASBU Element
Relation-operational need	RSEQ-B1/1 - Extended arrival metering

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	-	Extended AMAN LoA	Define the data exchanges and operational procedures with ANSP. References: ICAO Doc 9971 Manual on Collaborative ATFM	ANSP ATM network function	2017
Operational procedures	-	ATFM procedure for Extended AMAN	Develop the ATFM procedures for management of extended Arrival Management information. References: ICAO Doc 9971 Manual on Collaborative ATFM	ATM network function	2017
Ground system infrastructure	ATM systems	ATFM extended AMAN module	Upgrade the ATFM system modules to support extended Arrival Management	ATM network function	2017

DEPLOYMENT APPLICABILITY

Operational conditions:

It is applicable in areas where extended AMAN tools and procedures are implemented. This element will be addressed by the ANSPs at high density TMAs, if and as required, in improving arrival management. The ATM Network function will ensure that all impacted stakeholders (different ATC units also maybe in different countries) are properly involved and appropriate ATFM actions are undertaken.

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)
Direct benefits	Capacity Operational Efficiency: Improved arrival flow.	ANSP, Airspace user, ATM network function
	Improve situational awareness of network managers and ANSPs	ANSP, ATM network function

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI

NOPS-B1/9 Target Times for ATFM purposes Operational

☐ Sixth edition of the GANP

Main Purpose
Use of Target Times for ATFM purposes including an initial level of arrival sequencing in case of an arrival ATFM measure.

New Capabilities
Calculation and provision of Target Times by the ATM Network function in addition to CTOT, for the most penalised measure.

Description
In order to improve the flight predictability at the entry of the congested area, a target time of entry at the congested area (most penalised measure) will be provided by ATM Network function. At this stage, the target times will be applied for ATFM purpose only, including an initial level of arrival sequencing in case of an arrival ATFM measure. The ATM Network function will provide the calculated Target Time (TT) at the most penalising measure reference point in addition to Calculated Take-Off Time (CTOT) to all concerned users. TT will be distributed by data exchanges with the concerned Stakeholders. Stakeholders using TTs should be able to receive, extract and present the target times delivered by ATM Network function. ANSPs have access to the relevant information on flights that are subject to a Target Time to manage these flights as required in accordance with local procedures that need to be developed. The Flight Operating centres should provide Target Times to pilots prior to departure; pilots should endeavour to adhere to the Target Times to the extent possible.

Maturity Level
Standardization

Human Factor Considerations

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

Target time adherence by AUs and ANSPs.

2. Does it imply processing of new information by the user? Yes

Target time to be presented to affected users.

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

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

AUs and ANSPs to process and comply with target times.

PLANNING LAYERS

Tactical-Pre ops

OPERATIONS

En-route | Arrival

DEPENDENCIES AND RELATIONS

Type of Dependencies	ASBU Element
Relation-operational need	RSEQ-B1/1 - Extended arrival metering

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	-	Target Time procedure	Develop the ATFM Target Times procedures and processes. References: ICAO Doc 9971 Manual on Collaborative ATFM	ANSP, ATM network function, Aircraft operator	2018
Ground system infrastructure	ATM systems	Target time module	Upgrade the ATFM Systems to support Target Time processing and sharing	ATM network function	2019
Ground system infrastructure	CFSP systems	Target time interface	AUs Operation Centre systems to extract and distribute Target Times	Aircraft operator	2019
Training	-	Training requirements for Target Times	Target Time training. Target Time training	ANSP, Aircraft operator	2019

DEPLOYMENT APPLICABILITY

Operational conditions:

This element will involve ANSPs, Airspace Users and the ATM Network function in their endeavour to improve predictability of operations through the sharing and use of Target Times (Target Times Over/Target Times of Arrival).

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)
Direct benefits	Predictability. Capacity	ANSP, Airspace user, ATM network function
	Improve situational awareness of ANSPs and flight crew	ANSP, Aircraft operator

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Capacity	Capacity shortfall & associated delay	TMI-based optimisation (only impacts traffic when a TMI or restriction is manually activated for one or more constraint satisfaction points)	++	

NOPS-B2/1	Optimised ATM Network Services in the initial TBO context	Operational

☐ Sixth edition of the GANP

Main Purpose: Optimised Air Traffic Flow and Capacity Management stemming from enhanced Trajectory prediction and further integration of ATC with ATFM.

New Capabilities: Availability of “BIG” data and enhanced statistical approaches will improve Trajectory forecast and provide more accurate and consistent end to end 4D trajectories which will in turn optimise the provision of Flow and Capacity Management Services also in the context of the global ATFM concept. New systems, tools and procedures supporting the ATFM/ATC integration (e.g. advanced STAM, TT exchanges) will be introduced.

Description

Computation and sharing of more accurate and consistent end to end 4D trajectories will constitute the basis for forecasting traffic complexity for the relevant look-ahead time horizons, improved ATFM scenario management and the provision of an enhanced common network view as a key enabler to optimise collaborative network management. Interactions between trajectory management and for instance, ATFM / STAM processes and Dynamic Airspace Configuration will be further enhanced.

Tools and systems are required for improved network prediction and performances such as:

- Tools that provide functionality for simulating, evaluating the balance between demand and capacity taking into account the data from different stakeholders;
- ATFM scenario management;
- Assessment of performance of network operations with stakeholders able to evaluate the impact of their intentions and decisions on capacity and other performance indicators;
- Automated tool supporting ATFM/ATC planning environment to manage traffic complexity in order to alleviate traffic complexity, density and traffic flow problems by planning individual trajectories using advanced planning tools;
- The management of Hotspot resolution and more frequent STAM Measures in the planning and execution phase is supported by advanced capabilities (preparation, implementation, monitoring).
- The Target-Time Management: to manage the hotspot resolution, DCB actors can constrain the Time of Entry of flights into the hotspot with TTO (Target Time Over the congested en-route point) and TTA (target Time of Arrival at congested Airport) in order to smooth the traffic.

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

Additional data are exchanged.

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

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

STAM measure coordination is automated.

PLANNING LAYERS

Tactical-Pre ops | Tactical-During ops

OPERATIONS

Departure | En-route | Arrival

DEPENDENCIES AND RELATIONS

Type of Dependencies	ASBU Element
Evolution	NOPS-B1/1 - Short Term ATFM measures
Evolution	NOPS-B1/4 - Dynamic Traffic Complexity Management
Evolution	NOPS-B1/8 - Extended Arrival Management supported by the ATM Network function
Evolution	NOPS-B1/9 - Target Times for ATFM purposes
Relation-operational need	NOPS-B2/3 - Collaborative Network Operation Planning

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	-	Scenario management procedure	Develop the ATFM the Scenario Management procedures. References: ICAO Doc 9971 Manual on Collaborative ATFM	ATM network function	2022
Operational procedures	-	Network Performance Assessment procedure	Develop the ATFM procedures for the Network performance assessments. References: ICAO Doc 9971 Manual on Collaborative ATFM	Airport operator ANSP ATM network function Aircraft operator	2022
Operational procedures	-	Hotspot resolution procedure	ATFM procedures for Hotspot resolution and more frequent STAM measures. References: ICAO Doc 9971 Manual on Collaborative ATFM	Airport operator ANSP ATM network function Aircraft operator	2022
Operational procedures	-	Target Time reconciliation procedure	ATFM/ATC/Airport procedures for TT management. References: ICAO Doc 9971 Manual on Collaborative ATFM	Airport operator ANSP ATM network function Aircraft operator	2022
Ground system infrastructure	ATM systems	Further traffic complexity enhancements	Further enhancement of ATC/ATFCM traffic complexity tools	ANSP ATM network function	2024
Ground system infrastructure	ATM systems	Scenario management module	Upgrade the ATFM systems with the Scenario Management module	ATM network function	2024
Ground system infrastructure	ATM systems	Network Performance Assessment module	Upgrade the ATFM systems with the Network Performance Assessment module	Airport operator ANSP ATM network function Aircraft operator	2024
Ground system infrastructure	ATM systems	Trajectory forecast module	Develop the Trajectory forecast modules	Airport operator ANSP Airspace user ATM network function	2025

Ground system infrastructure	ATM systems	Further enhancements of STAM tool	Upgrade the ATFM system to support the management of Hotspot resolution and more frequent STAM Measures in the planning and execution phase (preparation, implementation, monitoring)	ATM network function	2024
Ground system infrastructure	ATM systems	Target Time reconciliation module	Target Time management tools for the reconciliation of extended AMAN and AOP	Airport operator ANSP ATM network function Aircraft operator	2022

DEPLOYMENT APPLICABILITY

Operational conditions:

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Capacity	Capacity shortfall & associated delay	Address demand/capacity imbalance handled at the tactical ATFM stage (on the day of operations)	++	

NOPS-B2/2 Enhanced dynamic airspace configuration Operational

☐ Sixth edition of the GANP

Main Purpose: Improve the management of airspace including restricted / reserved areas and if possible dynamic mobile areas and fully integrate ASM with ATFM.

New Capabilities: Airspace configurations modified more dynamically based on evolutions anticipated in the forecast of traffic will be introduced. Airspace configurations will better match scarce resources with anticipated Demand and Capacity imbalances thus minimising the need for ATFM measures. The Air Traffic Flow Management and the Airspace Management will be further integrated.

Description

New concepts, systems and procedures will allow full dynamicity of airspace volumes management and sector configurations. DACs integration in ATFM will provide additional means regarding the collaborative optimisation of traffic flows (strategic, pre-tactical, tactical) making best use of available scarce resources. Airspace volumes that satisfy specific operational requirements are progressively introduced to facilitate the ATM network optimization and minimize the impact on the expected traffic flows.

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

Data related to dynamic airspace configurations.

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

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

The automation of DAC process is increased.

PLANNING LAYERS

Strategical | Pre-tactical | Tactical-Pre ops

OPERATIONS

Departure | En-route | Arrival

DEPENDENCIES AND RELATIONS

Type of Dependencies	ASBU Element
Evolution	NOPS-B1/6 - Initial Dynamic Airspace configurations
Evolution	NOPS-B1/5 - Full integration of airspace management with air traffic flow management

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	-	DAC procedure	Develop the ASM/ATFM procedures for DAC. References: ICAO Doc 9971 Manual on Collaborative ATFM.	ANSP, ATM network function	2024
Operational procedures	-	Airspace volume procedures	Develop the ASM/ATFM procedures for Dynamic Airspace Volumes. References: ICAO Doc 9971 Manual on Collaborative ATFM	ANSP, ATM network function	2024
Ground system infrastructure	ATM systems	DAC/DMA integration	Enhancement of ATFM system modules related to the DAC/DMA integration	ATM network function	2024

Ground system infrastructure	ATM systems	DAC/DMA interfaces	Development of data exchange interfaces for DAC/DMA	ANSP ATM network function	2024

DEPLOYMENT APPLICABILITY

Operational conditions:

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Capacity	Capacity shortfall & associated delay	Mitigate demand/capacity imbalance in en-route airspace	++	
Capacity	Capacity, throughput & utilization	Optimise en-route airspace capacity	++	

NOPS-B2/3 Collaborative Network Operation Planning Operational

☐ Sixth edition of the GANP

Main Purpose: Enhance Network Operation Planning to support the Collaborative Network Management in the context of more dynamic /rolling planning processes and the initial Trajectory Based Operations (TBO).

New Capabilities: System and procedures for the variety of collaborative mechanisms. It includes the tools, roles, responsibilities, rules and procedures concerning the ATFM initiation, delegation, coordination, implementation and monitoring.

Description: The Collaborative Network Operation Planning provides all the information to the ATFM actors/functions to support network and local demand capacity balancing activities as:

- Conciliating multiple constraint resolution strategies from all the stakeholders in order to identify the best measure given nature, scope and time horizon;
- The provision of network consolidated imbalances figures;
- The provision of enhanced “what-if” functionalities;
- The provision of what-else capabilities to propose alternate solution;
- The provision of Network information;
- Monitoring Network performance;
- Drawing latest information shared via SWIM.

Maturity Level: Validation

Human Factor Considerations

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

Integration of ATC and ATFM roles.

2. Does it imply processing of new information by the user? Yes

New data are handled and needs to presented to ATFM and ATC planning actors.

3. Does it imply the use of new equipment? Yes

In some cases. It could be handled via modules and interfaces or separate sub-systems.

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

User task for extended planning horizon are automated.

PLANNING LAYERS

Strategical | Pre-tactical | Tactical-Pre ops

OPERATIONS

Departure | En-route | Arrival

DEPENDENCIES AND RELATIONS

Type of Dependencies	ASBU Element
Evolution	NOPS-B1/2 - Enhanced Network Operations Planning
Evolution	NOPS-B1/1 - Short Term ATFM measures

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	-	Collaborative NOP procedure	Develop the ATFM procedures for the collaborative access and update of the Network Operation Planning. References: ICAO Doc 9971 Manual on Collaborative ATFM	Airport operator, ANSP, ATM network function, Aircraft operator	2025
Ground system infrastructure	ATM systems	Collaborative NOP platform	Develop the Collaborative Network Operation Planning platform	ATM network function	2025
Ground system infrastructure	ATM systems	Extended ATFM functions	Upgrade the ATFM system with extended functions (consolidation of imbalances, ECDM modules “what-if” and “what-else” functions, monitoring of network performances).	ANSP, ATM network function, Aircraft operator	2025
Ground system infrastructure	ATM systems	Collaborative NOP SWIM interfaces	SWIM Network system interfaces with concerned Stakeholders.	Airport operator, ANSP, ATM network function, Aircraft operator	2025

DEPLOYMENT APPLICABILITY

Operational conditions:

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)
Direct benefits	Improve situational awareness of stakeholders	

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI

NOPS-B2/4 Multi ATFM slot swapping and Airspace Users priorities — Operational

☐ Sixth edition of the GANP

Main Purpose: Introduce s Airspace Users preferences and priorities based on their business models to select flights for ATFM measures

New Capabilities: Capabilities to accommodate Airspace Users priorities are introduced enabling AUs to recommend a priority order for flights affected by delays on departure, arrival and en-route, and to share preferences with other ATM stakeholders in capacity-constrained situations. The swapping of ATFM regulated flights will be extended/enhanced (different AUs, multi-swapping, substitution on cancelations, etc.).

Description: The multi ATFM slot swapping is supported by a tool that:

- Identification of viable swaps;
- Perform multi-swap (e.g. weather deterioration);
- Slot substitution on Cancellation: capability to substitute the ATFM slot of a cancelled flight for another flight.

The systems and tools for Airspace Users priorities include:

- AU decision making tool can interface with Airport CDM system to propose flight reordering;
- Interface with the departure sequencing tool;
- Interface with the ATM network function related to the swapped flights and actions to be undertaken (e.g. new CTOT)

Maturity Level: Validation

Human Factor Considerations	1. Does it imply a change in task by a user or affected others? Yes Change of tasks for many ATFM actors. 2. Does it imply processing of new information by the user? Yes New data stream for UDPP data. 3. Does it imply the use of new equipment? Yes Change of system and interfaces. 4. Does it imply a change to levels of automation? Yes Airspace Users preferences are fully taken into account.

PLANNING LAYERS

Tactical-Pre ops

OPERATIONS

Departure

DEPENDENCIES AND RELATIONS

Type of Dependencies	ASBU Element
Evolution	NOPS-B1/7 - Enhanced ATFM slot swapping
Evolution	NOPS-B1/2 - Enhanced Network Operations Planning
Evolution	NOPS-B0/4 - Initial Airport/ATFM slots and A-CDM Network Interface
Evolution	NOPS-B0/2 - Collaborative Network Flight Updates

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	-	Multi-swap procedures	Develop the procedures for multi ATFM slot swapping and AUs priorities. References: ICAO Doc 9971 Manual on Collaborative ATFM	ATM network function Aircraft operator	2025
Ground system infrastructure	CFSP systems	Multi Swap /UDPP interfaces	The Flight Operations Centre (FOC) system modules with tools and interfaces for multi ATFM slot swapping and UDPP	Aircraft operator	2025
Ground system infrastructure	Airport systems	Airport modules for AUs priority	Upgrade the Airport system adapted to accommodate AUs priorities	Airport operator	2025
Ground system infrastructure	ATM systems	Multi Swap /UDPP modules	Develop the ATFM Tool for ATFM multi-swap and AUs priorities	ATM network function	2025

Training	-	Training requirements for multi slot swapping	Multi Swap /UDPP training. Train Flight Operation Centre personnel	Airport operator ATM network function Aircraft operator	2025

DEPLOYMENT APPLICABILITY

Operational conditions:

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Capacity	Capacity shortfall & associated delay	For a given airspace entry slot: let airspace users swap the slot to another flight (slot substitution or UDPP – User Driven Prioritisation Process)	++	

NOPS-B2/5 Further airport integration within Network Operation Planning — Operational

☐ Sixth edition of the GANP

Main Purpose: Integrated Network planning with additional Airport Operation Planning (AOP) components into the Network Operation Planning.

New Capabilities: Additional AOP components (airport performance data, airport constrains, landside part) will be integrated with the enhanced Network operations planning.

Description: The integration of additional AOP data within the Network operations planning provides an enhanced dynamic/rolling picture of the network situation to be used by all operational stakeholders to prepare their plans and their inputs to the network CDM processes. The data exchanges are based on the subset of SWIM services that are most widely available to all stakeholders, communicating with local airport A-CDM systems to exchange relevant operational information.

The concept aims to improve integration of departure planning data from medium/small size airports when serving a complex airspace with dense traffic through improved availability of aircraft pre-departure information to the ATM Network function by specific TWR tools providing accurate electronic pre-departure information.

Maturity Level: Validation

Human Factor Considerations

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

Manual coordination is automated.

2. Does it imply processing of new information by the user? Yes

Extended AOP/NOP interfaces contain an additional set of data items.

3. Does it imply the use of new equipment? Yes

In some cases. New modules and interfaces.

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

Reduced need for phone coordination.

PLANNING LAYERS

Strategical | Pre-tactical | Tactical-Pre ops

OPERATIONS

Taxi-out | Departure | Arrival | Taxi-in | Turn-around

DEPENDENCIES AND RELATIONS

Type of Dependencies	ASBU Element
Evolution	NOPS-B0/4 - Initial Airport/ATFM slots and A-CDM Network Interface
Evolution	ACDM-B2/1 - Airport Operations Plan (AOP)
Evolution	NOPS-B1/3 - Enhanced integration of Airport operations planning with network operations planning
Relation-operational need	NOPS-B2/2 - Enhanced dynamic airspace configuration

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	-	Enhanced AOP/NOP procedure	Develop the ATFM/Airport procedures for additional AOP components/Network Operation Planning integration. References: ICAO Doc 9971 Manual on Collaborative ATFM	Airport operator, ATM network function	2025
Ground system infrastructure	Airport systems	Enhanced AOP	Enhance the Airport Operations Plan (AOP) with additional components	Airport operator	2025
Ground system infrastructure	ATM systems	Enhanced AOP/NOP interface	Develop the Advanced AOP/Network Operations Planning interfaces	Airport operator, ATM network function	2025
Ground system infrastructure	ATC systems	ATC DPI	Enhance the TWR systems for provision of ATC departure planning data	ANSP	2016
Ground system infrastructure	ATM systems	ATC DPI integration	Departure planning data interface and integration	ANSP, ATM network function	2016

DEPLOYMENT APPLICABILITY

Operational conditions:

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)
Direct benefits	Improve situational awareness of network manager, airport operator, aircraft operator and ATCOs.	Airport operator, ANSP, ATM network function, Aircraft operator

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI

NOPS-B2/6	ATFM adapted for cross-border Free Route Airspace (FRA)	Operational

☐ Sixth edition of the GANP

Main Purpose: Adapt ATFM to accommodate cross border Free Route operations.

New Capabilities: The ATFM system tools and procedures are adapted to support the complexity management, demand capacity balancing and ATFM/ATC integration for large cross border FRA deployments.

Description: Large cross-border FRA will require the modification of existing ATFM tools and processes as:

- Demand Prediction Uncertainty in FRA environment;
- Complexity methodologies in FRA environment;
- STAM measures managed in FRA environment;
- ATFM/ATC integration in FRA environment.

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

Additional and more complex data are exchanged (hotspot resolution, prediction uncertainty).

3. Does it imply the use of new equipment? Yes

In some cases. It could be considered as upgrade of existing tool via new modules and interfaces, or development of new tool with SWIM interfaces.

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

The level of automation compared with B0 and B1 elements is increased.

PLANNING LAYERS

Strategical | Pre-tactical | Tactical-Pre ops

OPERATIONS

En-route

DEPENDENCIES AND RELATIONS

Type of Dependencies	ASBU Element
Evolution	NOPS-B1/1 - Short Term ATFM measures
Evolution	NOPS-B1/4 - Dynamic Traffic Complexity Management
Evolution	FRTO-B1/2 - Required Navigation Performance (RNP) routes
Relation-operational need	NOPS-B2/3 - Collaborative Network Operation Planning

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	-	Cross-border FRA procedure	Develop the ATFM/ ATC procedures for the large cross border FRA. References: ICAO Doc 9971 Manual on Collaborative ATFM	ANSP, ATM network function	2016
Ground system infrastructure	ATM systems	Integration of ATFM/ATC planning function	Develop the tools supporting the integration of ATFM/ATC planning function	ANSP, ATM network function	2025
Ground system infrastructure	ATM systems	Advanced STAM tool	Upgrade the ATFM system to support the management of Hotspot resolution and more frequent STAM Measures in the planning and execution phase (preparation, implementation, monitoring)	ATM network function	2024
Ground system infrastructure	ATM systems	Traffic Complexity enhancements	Further enhancement of ATC/ATFCM traffic complexity tools	ANSP, ATM network function	2024
Ground system infrastructure	ATM systems	Traffic prediction module	Develop the Demand Prediction Uncertainty tools	ATM network function	2025

DEPLOYMENT APPLICABILITY

Operational conditions:

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)

Type	Operational description	Benefitting stakeholder(s)
Direct benefits	Improve situational awareness of network manager	ATM network function

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Capacity	Capacity shortfall & associated delay	Mitigate demand/capacity imbalance in en-route airspace	++	
Capacity	Capacity, throughput & utilization	Optimise en-route airspace capacity	++	

NOPS-B2/7 UTM Network operations Operational

☐ Sixth edition of the GANP

Main Purpose

New Capabilities

Description

Maturity Level -

Human Factor Considerations

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

New role and responsibilities.

2. Does it imply processing of new information by the user? Yes

New data stream for UTM traffic.

3. Does it imply the use of new equipment? Yes

Flight planning modules for drone operators.

4. Does it imply a change to levels of automation? No

PLANNING LAYERS

Strategical | Pre-tactical | Tactical-Pre ops

OPERATIONS

DEPENDENCIES AND RELATIONS

There are currently no dependencies.

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	Operations	UTM Network procedure	Develop the Network procedures to manage UTM traffic concerning the airspace reservation and constraint management. Additional item as trajectory management and ATFM measure might be included if relevant.	ANSP ATM network function UAS operator	2025
Ground system infrastructure	ATM systems	UTM Network system upgrades	Upgrade of ATFM and flight planning function to manage UTM.	ANSP ATM network function UAS operator	2025
Training	-	Training requirements for UTM Network operations	Training of ATM Network function personnel, Drone operators and ATCOs concerning the UTM operations	ANSP ATM network function UAS operator	2025

DEPLOYMENT APPLICABILITY

Operational conditions:

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Safety		Maintain or improve safety of very low-level operations	++	

NOPS-B2/8 High upper airspace network operations Operational

☐ Sixth edition of the GANP

Main Purpose

New Capabilities

Description

Maturity Level -

Human Factor Considerations

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

New role and responsibilities.

2. Does it imply processing of new information by the user? Yes

New data stream for the higher altitude operation.

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

4. Does it imply a change to levels of automation? No

PLANNING LAYERS

Strategical | Pre-tactical | Tactical-Pre ops

OPERATIONS

DEPENDENCIES AND RELATIONS

There are currently no dependencies.

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Operational procedures	Operations	Higher airspace Network procedure	Develop the Network procedures to manage higher airspace traffic concerning the airspace reservation and constraint management.	ANSP, ATM network function, UAS operator	2025
Ground system infrastructure	ATM systems	Higher airspace operation Network system upgrades	Upgrade ATFCM and flight planning functions to coordinate any flow /trajectory constraints due to unforeseen weather phenomena, transition operations or airspace restrictions.	ANSP, ATM network function, UAS operator	2025
Training	-	Training requirements for higher airspace network operations	Training of ATM Network function personnel, higher altitude vehicle operators and ATCO.	ANSP, ATM network function, UAS operator	2025

DEPLOYMENT APPLICABILITY

Operational conditions:

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI

KPA	Focus Areas	Most specific performance objective(s) supported	KPI ++ Impact	KPI

NOPS-B3/1 ATM Network Services in full TBO context Operational

☐ Sixth edition of the GANP

Main Purpose: Air Traffic Flow and Capacity Management in the TBO environment

New Capabilities: Improved trajectory predictions will permit capacity buffers to be reduced. Trajectory clustering will allow Flow-centric operations for Demand and Capacity Balancing.

Description: Automated network management using AI and machine leaning for DCB decision support tools and hotspot resolution.

Dynamic Airspace Configurations (DAC) and Demand and Capacity Balance will be fully integrated. In this context conflict free routes will be automatically allocated and the most optimal division FL structure for specific periods of time will be calculated and flexibly implemented. Finer ATFCM measures (Smart Trajectory Adjustment Measures), taken in a timeframe particularly close to the time of occurrence of a complex situation, will be implemented in a cooperative manner.

Maturity Level: -

Human Factor Considerations

PLANNING LAYERS

Tactical-Pre ops | Tactical-During ops

OPERATIONS

Departure | En-route | Arrival

DEPENDENCIES AND RELATIONS

There are currently no dependencies.

ENABLERS

There are currently no enablers.

DEPLOYMENT APPLICABILITY

Operational conditions:

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Capacity	Capacity shortfall & associated delay	Address demand/capacity imbalance handled at the tactical ATFM stage (on the day of operations)	++	
Flexibility		Improve flexibility of the Air Navigation System	++	

NOPS-B3/2 Cooperative Network Operations Planning Operational

☐ Sixth edition of the GANP

Main Purpose: Network planning will transit from collaborative to cooperative in support of performance steering in the TBO environment.

New Capabilities: Network planning will accommodate the needs of all actors identifying all possible constraints and striving for the “Absolute Priority” unifying flight priorities and specificities.

Description: High level of automation enabling the reconciliation of multiple flight and flow centric measures and scenarios with minimum adverse impact on performance. It will allow connecting SBT reconciliation with RBT synchronisation mechanism. The Network Operations Planning will cover the global/inter-regional coordination process in all phases including post-ops analysis focusing on performance impact.

Maturity Level: -

Human Factor Considerations

PLANNING LAYERS

Strategical | Pre-tactical | Tactical-Pre ops | Tactical-During ops | Post operations

OPERATIONS

Departure | En-route | Arrival

DEPENDENCIES AND RELATIONS

Type of Dependencies	ASBU Element
Evolution	NOPS-B2/3 - Collaborative Network Operation Planning

ENABLERS

There are currently no enablers.

DEPLOYMENT APPLICABILITY

Operational conditions:

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Capacity	Capacity shortfall & associated delay	Mitigate demand/capacity imbalance at airports and/or associated terminal airspace	++	
Capacity	Capacity shortfall & associated delay	Mitigate demand/capacity imbalance in en-route airspace	++	

NOPS-B3/3 Innovative airspace architecture Operational

☐ Sixth edition of the GANP

Main Purpose: Service oriented airspace architecture/concept/design/management to fulfil the needs of all kind of users/actors.

New Capabilities: New airspace concept with associated management/institutional structures in place to incorporate all actors and operations including very low and sub-orbital commercial space.

Description: A holistic airspace/architecture including design and management/institutional structures envisaged to protect a “flight” along its path. Specific operational characteristics/type of operations for each actor/user will be accommodated. Different taxonomy/procedures management functions will be in place. Required infrastructure and its performance will be relevant to the need including regional centralised systems, contingency and emergency cases. Dynamic management of moving areas will be in place (e.g. management of areas that are potentially unsafe due to weather phenomena that can evolve in 4D) and Variable Profile Areas will be integrated in DAC.

Maturity Level: -

Human Factor Considerations

PLANNING LAYERS

Strategical | Pre-tactical | Tactical-Pre ops | Tactical-During ops

OPERATIONS

Departure | En-route | Arrival

DEPENDENCIES AND RELATIONS

Type of Dependencies	ASBU Element

Evolution	NOPS-B2/2 - Enhanced dynamic airspace configuration

ENABLERS

There are currently no enablers.

DEPLOYMENT APPLICABILITY

Operational conditions:

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Access and equity		Improve access and equity	++	

OPFL

OPFL-B0/1	In Trail Procedure (ITP)	Operational

☐ Sixth edition of the GANP

Main Purpose: To enable aircraft to reach a more satisfactory flight level for flight efficiency or to avoid turbulence for safety.

New Capabilities: The procedure couples the capability of the controller to receive the current position and intent from a pair(s) of aircraft with the ability of the trailing aircraft to space itself accurately from the preceding aircraft(s) to allow for the safe issuance of the ITP clearance.

Description: ITP is primarily intended to help facilitate access to optimum flight levels for aircraft operating in airspace where no ATS surveillance service is available. The ITP aircraft must acquire and process position broadcast (ADS-B) data from up to two non-manoeuvring aircraft. Aircraft identification, altitude, position and ground speed of reference aircraft would be assessed by the ITP aircraft's on-board equipment (on-board decision support system) to determine whether an ITP climb or descent is possible. Based on the processed broadcast data from the reference aircraft(s), a pilot can make an ITP climb or descent request to air traffic control (ATC). Pilots are responsible for using the on-board equipment to evaluate the situation and provide the required information to the controller.

Maturity Level: Ready for implementation

Human Factor Considerations

PLANNING LAYERS

Tactical-During ops

OPERATIONS

En-route

DEPENDENCIES AND RELATIONS

There are currently no dependencies.

ENABLERS

There are currently no enablers.

DEPLOYMENT APPLICABILITY

Operational conditions:

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)
Direct benefits	Improve situational awareness of flight crew and ATCO	ANSP, Aircraft operator

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Efficiency	Vertical flight efficiency	Increase acceptance of pilot requests for higher cruise level	++	KPI18: Level capping during cruise
Efficiency	Vertical flight efficiency	Reduce level restrictions during cruise issued by ATCOs for conflict resolution purposes	++	KPI18: Level capping during cruise

OPFL-B1/1 Climb and Descend Procedure (CDP) Operational

☐ Sixth edition of the GANP

Main Purpose: The CDP was designed to improve service to appropriately equipped aircraft by providing an air traffic controller with another option for initiating an altitude change when existing separation minima do not allow an aircraft to climb or descend through the altitude of a blocking aircraft.

New Capabilities: The capability for the controller to request current position and intent from pair(s) (ADS-C capability) aircraft provides the situational awareness to allow the controller to use the simultaneous reporting of position to support the procedure at less than the nominal separation.

Description

The CDP utilizes existing ADS-C aircraft equipage and air traffic control (ATC) capabilities to allow more flights to achieve their preferred vertical profiles. Integral to the CDP is the use of advanced communication and surveillance capabilities (i.e. ADS-C and CPDLC). The CDP is conceptually modelled after existing in-trail distance measuring equipment (DME) rules set forth in the Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM, Doc 4444), paragraph 5.4.2.3.4. Aircraft pair distance verification is performed by the ground automation system using simultaneous ADS-C demand contract reports.

Maturity Level

Standardization

Human Factor Considerations

PLANNING LAYERS

Tactical-During ops

OPERATIONS

En-route

DEPENDENCIES AND RELATIONS

There are currently no dependencies.

ENABLERS

There are currently no enablers.

DEPLOYMENT APPLICABILITY

Operational conditions:

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)
Direct benefits	Improve situational awareness of flight crew and ATCO	ANSP, Aircraft operator

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Efficiency	Vertical flight efficiency	Increase acceptance of pilot requests for higher cruise level	++	KPI18: Level capping during cruise
Efficiency	Vertical flight efficiency	Reduce level restrictions during cruise issued by ATCOs for conflict resolution purposes	++	KPI18: Level capping during cruise

OPFL-B2/1	Separation minima using ATS surveillance systems where VHF voice communications are not available	Operational

☐ Sixth edition of the GANP

Main Purpose

With the advent of Space-based ADS-B data in oceanic and remote continental areas, there are projected Capacity, Efficiency and Environmental advantages in SADS-B derived separation minima.

ICAO has published reduced lateral and longitudinal separation minima that capitalize on the increased frequency of position information update, while retaining the procedural foundation of requiring aircraft to remain on tracks to ensure separation, thereby making accessible such capacity, efficiency and environmental advantages.

New Capabilities

Implementation of the new lateral and longitudinal separation minima will provide alleviation from level congestion, and a consequent increase in access to optimal flight levels.

Description

The availability of additional usable flight levels will increase airspace efficiency while decreasing congestion at lower flight levels. This will result in reduced fuel burn and consequently reduce greenhouse gas emissions.

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

PLANNING LAYERS

Tactical-During ops

OPERATIONS

En-route

DEPENDENCIES AND RELATIONS

There are currently no dependencies.

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Regulatory provisions	National regulatory framework	National framework amendment for new separation standard	National regulation amendment for new separation standard. References: DOC. 4444 – Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM)	CAA	2020

Operational procedures	Separation	Procedures for separation.	Defined in PANS-ATM.	ANSP	2020
Airborne system capability	Navigation	RNP4/RNP2	Aircraft should be equipped with RNP4/RNP2. Reference: Doc 9613 (PBN Manual)	Aircraft manufacturer Aircraft operator	2020
Airborne system capability	Communication service	RCP 240	Aircraft should be equipped with RCP 240. Reference: ICAO Doc 10037 Edition 1 Global Operational Datalink Manual (GOLD)	Aircraft manufacturer Aircraft operator	2020
Airborne system capability	Surveillance	Surveillance capability for the new separation minima.	Surveillance capability such as ADS-B OUT transponder. Reference: Annex 10 Vol IV.	Aircraft manufacturer Aircraft operator	2020
Ground system infrastructure	Surveillance	Surveillance system for the new separation minima.	To support the separation application. Reference: Annex 10 Vol IV.	ANSP	2020
Ground system infrastructure	ATC systems	ATC tool for separation minima	Ground tools/capabilities that assist the air traffic controller in providing separation.	ANSP	2020
Training	-	Training requirements for separation minima using ATS surveillance systems where VHF voice communications are not available	For Air traffic controllers. References: Annex 1, PANS-ATM. And for crew for awareness.	ANSP Aircraft operator	2020

DEPLOYMENT APPLICABILITY

Operational conditions:

Oceanic and continental en-route environments. To increase capacity and to allow a more optimum flight level.

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)
Direct benefits	Efficiency	Aircraft operator
	Capacity	ANSP, Aircraft operator
	Access	Aircraft operator
Indirect benefits	Environment	General citizen

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Efficiency	Flight time & distance	Improve route selection after the flight planning stage	++	KPI05: Actual en-route extension
Efficiency	Flight time & distance	Improve route selection at the flight planning stage	++	KPI04: Filed flight plan en-route extension
Efficiency	Fuel burn	Reduce fuel burn impact of impeded conditions	+	KPI16: Additional fuel burn
Efficiency	Vertical flight efficiency	Reduce vertical flight inefficiency during the cruise phase	++	KPI18: Level capping during cruise

OPFL-B3/1 Helicopter RNP 0.3 Terminal and En-Route Operations — Operational

☐ Sixth edition of the GANP

Main Purpose

Existing PBN track separation guidance for fixed wing airplane routes does not fully serve the helicopter IFR mission profiles which may require routes to be established at low altitude in mountainous and obstacle-rich environments or over densely populated regions with approaches to Points-In-Space (PINS) or helipads/heliports in airspace not typically used for fixed wing operations.

Unlike fixed wing aircraft, helicopter normal operating capability, i.e. en-route cruising speed and manoeuvring ability is suited to RNP 0.3 for en-route as well as the terminal environment. Studies have shown that increasing the availability of IFR service to helicopter operations has the potential to decrease the risk of accidents for helicopter operations in marginal weather conditions.

New Capabilities

Facilitating arrivals and departures, and en-route IFR Helicopter operations in terrain rich environments.

Description

Evolution of lateral track separation for parallel helicopter RNP 0.3 routes to facilitate safe and efficient IFR helicopter operations in all phases of flight.

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? No

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

PLANNING LAYERS

Tactical-During ops

OPERATIONS

Departure | En-route | Arrival

DEPENDENCIES AND RELATIONS

There are currently no dependencies.

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Regulatory provisions	National regulatory framework	National framework amendment for performance-based separation provisions for helicopter specific navigation capability	National regulation amendment for performance-based separation provisions for helicopter specific navigation capability. References: DOC. 4444 – Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM)	CAA	2028
Operational procedures	Design	PBN procedures design and use	These operational procedures should be designed and used as specified in Doc 8168 (PANS-OPS Vol II and I) or equivalent.	ANSP	2028
Operational procedures	Design	PBN procedure validation, approval and publication	A flight inspection and/or validation of the procedures might be required before publication. The publication of the procedures should follow Annex 4. References: ICAO Doc 9906 (Quality Assurance Manual for Flight Procedure Design).	ANSP CAA	2028
Operational procedures	Operations	Procedures for the crew to follow to fly a PBN approach.	Defined in the Ops Manual. Reference: Doc 9613 (PBN Manual)	Aircraft operator	2028
Operational procedures	Separation	Procedures for separation	Defined in the Ops Manual. Reference: PANS-ATM	ANSP	2028
Operational Authorization	-	Operational Authorization for PBN specification	Aircraft operator flying a PBN procedure should have an operational authorization related to the specified performance of the procedure, as described in Doc 9997 (PBN Ops Approval Manual).	CAA Aircraft operator	2022

Airborne system capability	Navigation	Helicopter capability RNP 0.3	Helicopters should be equipped with RNP 0.3. Reference: Doc 9613 (PBN Manual)	Aircraft manufacturer Aircraft operator	2021
Training	-	Training requirements for Helicopter RNP 0.3 Terminal and En-Route Operations	Crew trained to fly the procedure. References: As defined in Doc 9613 (PBN Manual). For Air traffic controllers. References: PANS-ATM. References: PANS-OPS Vol II and Doc 9992 Manual on the Use of Performance-Based Navigation (PBN) in Airspace Design	ANSP Aircraft operator	2028

DEPLOYMENT APPLICABILITY

Operational conditions:

For operations of helicopters in terminal and en-Route in complex urban environment or areas with abrupt terrain. Preserving safety and providing access to helicopters for emergency purposes for example.

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)
Direct benefits	Safety	Aircraft operator, General citizen
	Access	Aircraft operator, General citizen
Indirect benefits	Environment	General citizen

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Capacity	Capacity, throughput & utilization	Increase planned capacity (the maximum configuration capacity established as part of [multi-year] ATM planning)	+	KPI06: En-route airspace capacity
Efficiency	Flight time & distance	Optimise horizontal flight efficiency in the en-route phase	+	
Safety		Avoid controlled flight into terrain (CFIT) and obstacle collision risk	++	KPI20: Number of aircraft accidents

OPFL-B3/2	Expansion of upper limit of the Reduced Vertical Separation Minima (RVSM) band of flight levels	Operational

☐ Sixth edition of the GANP

Main Purpose

The demand for flights in the existing RVSM band of flight levels (FL290- FL410) has increased to the point where, at certain altitudes, it is generating congestion similar to that which prevailed before the implementation of RVSM.

The introduction of RVSM added six flight levels, the immediate impact and benefit of which were mostly observed in the FL 330 to FL 370 band of flight levels as this is where the majority of civil flights operated. Initially the upper levels of RVSM airspace were sparsely occupied. With the proliferation of modern civil aircraft capable of efficient operations at higher flight levels, occupation of FL 400 and FL 410 has increased with routing options becoming limited as a result of congestion, with consequent inefficiency and fuel burn/emissions affected adversely. Expansion of the upper bound of the RVSM band of flight levels will provide alleviation from level congestion.

New Capabilities

Expansion of the upper bound of the RVSM band of flight levels will provide alleviation from level congestion, and a consequent increase in access to optimal flight levels.

Description

The availability of additional usable flight levels will increase airspace efficiency while decreasing congestion at lower flight levels. This will result in reduced fuel burn and consequently reduce greenhouse gas emissions.

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

There are currently no dependencies.

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Regulatory provisions	National regulatory framework	National framework amendment for allowing qualified aircraft to operate at the additional RVSM levels	National regulation amendment for allowing qualified aircraft to operate at the additional RVSM levels. References: Annex 2, Annex 11; Annex 6; DOC. 4444 – Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM)	CAA	2028

Operational procedures	Design and operations	Procedures for the use of additional RVSM levels	Design and use of additional flight levels. Reference: Annex 2	ANSP	2028
Operational Authorization	-	Operational Authorization for extended RVSM	Aircraft operator flying an additional RVSM level should have an authorization as per Doc 9760.	CAA Aircraft operator	2028
Airborne system capability	Altimeter	Height keeping capability	Aircraft should be equipped with appropriate height keeping capability. Reference: Doc 9937.	Aircraft manufacturer Aircraft operator	2028
Training	-	Training requirements for the expansion of upper limit of the Reduced Vertical Separation Minima (RVSM) band of flight levels	Crew trained to fly the procedure. References: Annex 6. For Air traffic controllers. References: PANS-ATM.	ANSP Aircraft operator	2028

DEPLOYMENT APPLICABILITY

Operational conditions:

Oceanic and continental en-route environments. To increase capacity and to allow a more optimum flight level.

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)
Direct benefits	Efficiency	Aircraft operator
	Capacity	ANSP, Aircraft operator
	Access	Aircraft operator
Indirect benefits	Environment	General citizen

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Capacity	Capacity, throughput & utilization	Increase planned capacity (the maximum configuration capacity established as part of [multi-year] ATM planning)	++	KPI06: En-route airspace capacity
Efficiency	Fuel burn	Reduce fuel burn impact of impeded conditions	+	KPI16: Additional fuel burn

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Efficiency	Vertical flight efficiency	Reduce cruise level inefficiency attributable to altitude constraints imposed by ATM	++	KPI18: Level capping during cruise

OPFL-B3/3 Target-to-target separations using Space-based ADS-B data — Operational

☐ Sixth edition of the GANP

Main Purpose

With the advent of Space-based ADS-B data in oceanic and remote continental areas, there are projected Capacity, Efficiency and Environmental advantages in SADS-B derived separation minima.

A “radar-like” target-to-target separation minima that capitalizes on the increased frequency of position information updates but makes use of datalink communications capability (for circumstances where VHF communications do not exist) will offer increased flexibility and free aircraft form needing to adhere to specific tracks.

New Capabilities

Implementation of the target-to-target separation minima will provide alleviation track adherence requirements associated with procedural separation minima. And offer a consequent increase in access to optimal flight levels.

Description

The availability of the flexibility offered by target-to-target separation will increase airspace efficiency, resulting in reduced fuel burn and consequently reduced greenhouse gas emissions.

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

There are currently no dependencies.

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Regulatory provisions	National regulatory framework	National framework amendment for target-to-target separation	National regulation amendment for target-to-target separation. References: DOC. 4444 – Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM)	CAA	2024
Operational procedures	Separation	Target to target separation	Procedures for target-to-target separation. Defined in PANS-ATM.	ANSP	2024
Airborne system capability	Communication service	RCP 240 .	Aircraft should be equipped with RCP 240. Reference: ICAO Doc 10037 Edition 1 Global Operational Datalink Manual (GOLD)	Aircraft manufacturer Aircraft operator	2024
Airborne system capability	Surveillance	Surveillance capability for the new target-to-target separation minima.	Surveillance capability such as ADS-B OUT transponder. Reference: Annex 10 Vol IV.	Aircraft manufacturer Aircraft operator	2024
Ground system infrastructure	Surveillance	Surveillance system for the new target-to-target separation minima.	To support the separation application. Reference: Annex 10 Vol IV.	ANSP	2024
Ground system infrastructure	ATC systems	ATC tool for target to target separation	Ground tools/capabilities that assist the air traffic controller in providing target to target separation.	ANSP	2024
Training	-	Training requirements for target-to-target separation	For Air traffic controllers. References: Annex 1, PANS-ATM. And for crew for awareness.	ANSP Aircraft operator	2024

DEPLOYMENT APPLICABILITY

Operational conditions:

Oceanic and continental en-route environments. To increase capacity and to allow a more optimum flight level.

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)
Direct benefits	Efficiency	Aircraft operator
	Capacity	ANSP, Aircraft operator
	Access	Aircraft operator
Indirect benefits	Environment	General citizen

INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Efficiency	Flight time & distance	Improve route selection after the flight planning stage	++	KPI05: Actual en-route extension
Efficiency	Flight time & distance	Improve route selection at the flight planning stage	++	KPI04: Filed flight plan en-route extension
Efficiency	Fuel burn	Reduce fuel burn impact of impeded conditions	+	KPI16: Additional fuel burn
Efficiency	Vertical flight efficiency	Reduce vertical flight inefficiency during the cruise phase	++	KPI18: Level capping during cruise