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Agenda Item 3: Air Navigation Matters
3.2 New version of the Global Air Navigation Plan (GANP), 7th Edition

AVIATION SYSTEM BLOCK UPGRADES (ASBU)

(Presented by the Secretariat)

EXECUTIVE SUMMARY	
The present working paper provides information on Aviation System Block Upgrades (ASBU) elements and how they can help define the CAR Regional priorities and regional objectives for the CAR Region and its operability with neighboring States.	
Action:	All ECAR/NTG, ECAR/RD and ECAR/CATG Groups are invited to analyse the information presented in this working paper and update their action plan according to the work proposed.
Strategic Objectives:	<ul style="list-style-type: none">• Safety• Air Navigation Capacity and Efficiency• Environmental Protection
References:	<ul style="list-style-type: none">• Resolutions of the 41st ICAO Assembly: https://www.icao.int/Meetings/a41/Documents/Resolutions/10184_en.pdf• Global Air Navigation Plan (GANP) Seventh Edition: https://www4.icao.int/ganpportal/ASBU• Second Meeting of Rapporteurs of the North American, Central American and Caribbean Working Group (NACC/WG/RAP/2), Mexico City, Mexico, 28 to 31 March 2023 https://www.icao.int/NACC/Pages/meetings-2023-wgrap02.aspx

1. Introduction

1.1 During the 41st ICAO Assembly held in October 2022, the Seventh edition of the Global Air Navigation Plan (GANP) was approved and the importance of global framework and the regional and national plans to support Strategic Objectives of ICAO were recognized.

1.2 GANP is the tool to develop and prioritize the technical and operational work of the ICAO Programme; it is necessary that States, International Organizations, Industry, and all Stakeholders utilize the GANP to plan and implement activities, establish priorities, targets and indicators consistent with globally harmonized objectives, taking into account operational needs.

1.3 The GANP drives the evolution of the global air navigation system to meet the ever-growing expectations of the aviation community. The purpose of the GANP is to equitably accommodate all airspace users operations in a safe, secure and cost-effective manner while reducing aviation environmental impact. To this end, the GANP provides a series of operational improvements to increase capacity, efficiency, predictability, flexibility while ensuring interoperability of systems and harmonization of procedures.

1.4 States must develop their National Air Navigation Plans (NANP) for their own navigation modernization, to coordinate with ICAO and align their plans to ensure regional harmonization and global compatibility and interoperability.

2. ICAO NACC Strategy to develop regional and national objectives using the GANP Seventh Edition

2.1 According to previous ECARs meetings, it is necessary to update the regional air navigation implementation status and base it in the four levels of the GANP. For this, the following is needed to be considered:



2.2 The Global Strategic level provides high-level strategic directions for decision-makers to drive the evolution of the global air navigation system towards a common agreed vision.

2.3 The Air Navigation - System Performance Assessment (AN-SPA) tool has the goal of promoting a performance-based approach for a cost-effective modernization of the air navigation system. This tool guides the aviation community in the application of a six-step performance management process and in the selection of relevant operational improvements within the ASBU framework.

2.4 The Global Technical level supports technical managers in planning implementation of basic services and new operational improvements in a cost-effective manner and according to specific needs, while ensuring interoperability of systems and harmonization of procedures. Two global technical frameworks:

- a) Basic Building Block (BBB): which outlines the foundation for a robust air navigation system by defining the essential air navigation services that shall be provided for international civil aviation; and
- b) an updated version of the Aviation System Block Upgrades (ASBU) framework for scalable implementation, which provides the aviation community with the performance benefits expected from the implementation of specific air navigation operational improvements.

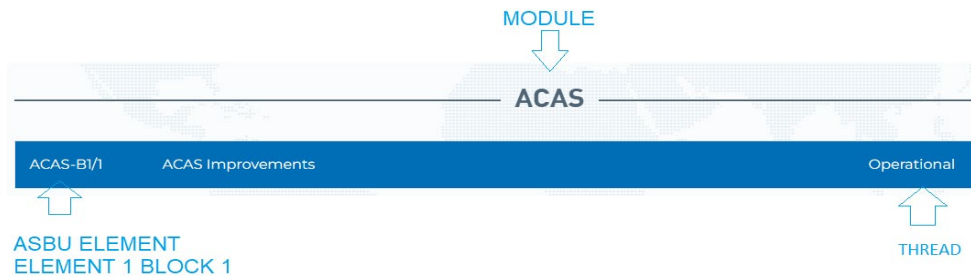
2.5 Electronic Regional Air Navigation Plan (eANP): The regional ANPs represent the bridge between, from one side, the global provisions in the ICAO Standards and Recommended Practices (SARPs) and the Global Air Navigation Plan (GANP), and from the other side, the States' national plans and current implementation. The ANPs have so far been developed to set forth, in detail, the facilities, services and procedures required for international air navigation within a specified region(s) and they contain planning and guidance material.

3. Aviation System Block Upgrades (ASBU)

3.1 The ICAO GANP ASBU methodology is a programmatic and flexible global approach that allows all Member States to advance their Air Navigation capacities based on their specific operational requirements.

3.2 ASBU works according to the following structure:

- a) ASBU Thread: three different categories, operational, information and technology.
- b) ASBU Module: is the group of elements from a thread that, according to the enablers' roadmap, will be available for implementation within the defined deadline established by the ASBU Block.
- c) ASBU Block: this implies, that the element and all the enablers associated to it, need to be available for implementation by the ASBU block year.
- d) ASBU Element: this module is the group of elements from a thread that, according to the enablers' roadmap, will be available for implementation within the defined deadline established by the ASBU Block.



<https://www4.icao.int/ganpportal/ASBU>

1.3 The ASBU Elements have different levels of maturity:

- a) Ready for implementation: this maturity level focuses on the end of system development and the initial operational capacity at the global level.
- b) Standardization: this maturity level focuses on the definition of the provision necessary for the interoperability of system and the harmonization of the procedures.
- c) Validation: this maturity level focuses on industrial research and validation and includes the proof of concept validation, standalone prototype implementation and test, testing and prototyping in representative environment, and the full engineering feasibility demonstration in actual system application.
- d) Concept: this maturity level focuses on exploratory research and include scientific research, investigation of basic principles observed and reported and definition of the concept.

3.4 **Appendix A** contains information of the different ASBU elements according to their level of maturity.

3.5 Every ASBU element contains information on its functional description, enablers, deployment applicability and performance impact assessment. States must understand that ASBU elements are addressed to satisfy an operational need or solve a deficiency, increase efficient and safety.

3.6 It is necessary to work doing an assessment to find the “ready for implementation” Air Navigation level of implementation through the ASBU elements. See further details in **Appendix B**.

2. Assessment of ASBU elements

4.1 It is necessary for the region to make an analysis of the implementation status of each ASBU element, which elements are currently operating, with their level of implementation and the operationalization of each of their enablers. This analysis must be done for each ASBU element.

4.2 It is necessary to collect the data and results of the analysis in order to contribute to the regional analysis of the implementation of air navigation. The ASBU elements together with the BBB elements will provide the data needed to define the status of the region in terms of air navigation.

4.3 Finally, with this result the weak areas will be identified, the projects that should be prioritized and the identification of short, medium, and long-term goals.

3. Suggested actions:

5.1 The Meeting is invited to:

- a) analyze the information provided in this working paper;
- b) every Task Force must integrate the evaluation of the ASBU elements according to the ASBU thread; and
- c) other action that may apply.

ASBU ELEMENTS				
Ready for implementation:				
Standardization:				
Validation:				
Concept:				
No define:				
ACAS (Airborne Collision Avoidance System)				
B0	B1	B2	B3	B4
	ACAS-B1/1 ACAS Improvements Operational	ACAS-B2/1 New collision avoidance system Operational		
		ACAS-B2/2 New collision avoidance capability as part of an overall detect and avoid system for RPAS Operational		
ACDM (Airport Collaborative Decision Making)				
B0	B1	B2	B3	B4
ACDM-B0/1 Airport CDM Information Sharing (ACIS) Operational		ACDM-B2/1 Airport Operations Plan (AOP) Operational	ACDM-B3/1 Full integration of ACDM and TAM in TBO Operational	
ACDM-B0/2 Integration with ATM Network function Operational		ACDM-B2/2 Airport Operations Centre (APOC) Operational		
		ACDM-B2/3 Total Airport Management (TAM) Operational		
AMET (Advanced Meteorological Information)				
B0	B1	B2	B3	B4
AMET-B0/1 Meteorological observations products Information	AMET-B1/1 Meteorological observations information Information	AMET-B2/1 Meteorological observations information Information	AMET-B3/1 Meteorological observations information Information	AMET-B4/1 Meteorological observations information Information
AMET-B0/2 Meteorological forecast and warning products Information	AMET-B1/2 Meteorological forecast and warning information Information	AMET-B2/2 Meteorological forecast and warning information Information	AMET-B3/2 Meteorological forecast and warning information Information	AMET-B4/2 Meteorological forecast and warning information Information
AMET-B0/3 Climatological and historical meteorological products Information	AMET-B1/3 Climatological and historical meteorological information Information	AMET-B2/3 Climatological and historical meteorological information Information	AMET-B3/3 Climatological and historical meteorological information Information	AMET-B4/3 Climatological and historical meteorological information Information
AMET-B0/4 Dissemination of meteorological products Information	AMET-B1/4 Dissemination of meteorological information Information	AMET-B2/4 Meteorological information service in SWIM Information	AMET-B3/4 Meteorological information service in SWIM Information	AMET-B4/4 Meteorological information service in SWIM Information
APTA (Airport Accessibility)				
B0	B1	B2	B3	B4
APTA-B0/1 PBN Approaches (with basic capabilities) Operational	APTA-B1/1 PBN Approaches (with advanced capabilities) Operational	APTA-B2/1 GBAS CAT II/III precision approach procedures Operational	APTA-B3/1 Parallel approaches without vertical guidance	
APTA-B0/2 PBN SID and STAR procedures (with basic capabilities) Operational	APTA-B1/2 PBN SID and STAR procedures (with advanced capabilities) Operational	APTA-B2/2 Simultaneous operations to parallel runways Operational	APTA-B3/2 Implementation of A-RNP to support non-complex simultaneous independent parallel approaches Operational	
APTA-B0/3 SBAS/GBAS CAT I precision approach procedures Operational		APTA-B2/3 PBN Helicopter Steep Approach Operations Operational		
APTA-B0/4 CDO (Basic) Operational	APTA-B1/4 CDO (Advanced) Operational	APTA-B2/4 Performance based aerodrome operating minima – Advanced aircraft with SVGS Operational		

ASBU ELEMENTS				
Ready for implementation:				
Standardization:				
Validation:				
Concept:				
No define:				
APTA (Airport Accessibility)				
B0	B1	B2	B3	B4
APTA-B0/5 CCO (Basic) Operational	APTA-B1/5 CCO (Advanced) Operational			
APTA-B0/6 PBN Helicopter Point in Space (PinS) Operations Operational				
APTA-B0/7 Performance based aerodrome operating minima – Advanced aircraft Operational				
APTA-B0/8 Performance based aerodrome operating minima – Basic aircraft				
ASUR (Alternative Surveillance)				
B0	B1	B2	B3	B4
ASUR-B0/1 Automatic Dependent Surveillance – Broadcast (ADS-B) Technology	ASUR-B1/1 Reception of aircraft ADS-B signals from space (SB ADS-B) Technology	ASUR-B2/1 Evolution of ADS-B and Mode S Technology	ASUR-B3/1 New non-cooperative surveillance system for airborne aircraft (medium altitudes) Technology	ASUR-B4/1 Further evolution of ADS-B and MLAT Technology
ASUR-B0/2 Multilateration cooperative surveillance systems (MLAT) Technology		ASUR-B2/2 New community based surveillance system for airborne aircraft (low and higher airspace) Technology		
ASUR-B0/3 Cooperative Surveillance Radar Downlink of Aircraft Parameters (SSR- DAPS) Technology				
COMI (Communication infrastructure)				
B0	B1	B2	B3	B4
COMI-B0/1 Aircraft Communication Addressing and Reporting System (ACARS) Technology		COMI-B2/1 Air-Ground ATN/IPS Technology	COMI-B3/1 VHF Data Link (VDL) Mode-2 Connectionless	
COMI-B0/2 Aeronautical Telecommunication Network/Open System Interconnection (ATN/OSI) Technology	COMI-B1/2 VHF Data Link (VDL) Mode 2 Multi- Frequency Technology	COMI-B2/2 Aeronautical Mobile Airport Communication System (AeroMACS) aircraft mobile connection Technology	COMI-B3/2 SATCOM Class A voice and data Technology	
COMI-B0/3 VHF Data Link (VDL) Mode 0/A Technology	COMI-B1/3 SATCOM Class B Voice and Data Technology	COMI-B2/3 Links meeting requirements for non- safety critical communication Technology	COMI-B3/3 L-band Digital Aeronautical Communication System (LDACS) Technology	
COMI-B0/4 VHF Data Link (VDL) Mode 2 Basic Technology	COMI-B1/4 Aeronautical Mobile Airport Communication System (AeroMACS) Ground-Ground Technology		COMI-B3/4 Links meeting requirements for safety critical communication Technology	
COMI-B0/5 Aeronautical Mobile Airport Communication System (AeroMACS) Class C Data Technology				
COMI-B0/6 High Frequency Data Link (HFDL) Technology				
COMI-B0/7 ATS Message Handling System (AMHS) Technology				

ASBU ELEMENTS				
Ready for implementation:				
Standardization:				
Validation:				
Concept:				
No define:				
COMS (ATS Communication service)				
B0	B1	B2	B3	B4
COMS-B0/1 CPDLC (FANS 1/A & ATN B1) for domestic and procedural airspace Technology	COMS-B1/1 PBCS approved CPDLC (FANS 1/A+) for domestic and procedural airspace Technology	COMS-B2/1 PBCS approved CPDLC (B2) for domestic and procedural airspace Technology	COMS-B3/1 Extended CPDLC (B2 incl. Adv-IM and dynamic RNP) for dense and complex airspace Technology	
COMS-B0/2 ADS-C (FANS 1/A) for procedural airspace Technology	COMS-B1/2 PBCS approved ADS-C (FANS 1/A+) for procedural airspace Technology	COMS-B2/2 PBCS Approved ADS-C (B2) for domestic and procedural airspace Technology	COMS-B3/2 Extended ADS-C (B2 incl. Adv-IM and dynamic RNP) for dense and complex airspace Technology	
	COMS-B1/3 SATVOICE (incl. routine communications) for procedural airspace Technology	COMS-B2/3 PBCS approved SATVOICE (incl. routine communications) for procedural airspace Technology		
CSEP (Cooperative Separation)				
B0	B1	B2	B3	B4
	CSEP-B1/1 Basic airborne situational awareness during flight operations (AIRB) Operational	CSEP-B2/1 Interval Management (IM) Procedure Operational	CSEP-B3/1 Interval Management (IM) Procedure with complex geometries Operational	CSEP-B4/1 Airborne separation Operational
	CSEP-B1/2 Visual Separation on Approach (VSA) Operational	CSEP-B2/2 Cooperative separation at low altitudes Operational	CSEP-B3/2 Remain Well Clear (RWC) functionality for UAS/RPAS Operational	
	CSEP-B1/3 Performance Based Longitudinal Separation Minima Operational	CSEP-B2/3 Cooperative separation at higher airspace Operational		
	CSEP-B1/4 Performance Based Lateral Separation Minima Operational			
DAIM (Digital Aeronautical Information Management)				
B0	B1	B2	B3	B4
		DAIM-B2/1 Dissemination of aeronautical information in a SWIM environment Information		
	DAIM-B1/2 Provision of digital Aeronautical Information Publication (AIP) data sets Information	DAIM-B2/2 Daily Airspace Management information to support flight and flow Information		
	DAIM-B1/3 Provision of digital terrain data sets Information	DAIM-B2/3 Aeronautical information to support higher airspace operations Information		
	DAIM-B1/4 Provision of digital obstacle data sets Information	DAIM-B2/4 Aeronautical information requirements tailored to UTM Information		
	DAIM-B1/5 Provision of digital aerodrome mapping data sets Information	DAIM-B2/5 NOTAM replacement Information		
	DAIM-B1/6 Provision of digital instrument flight procedure data sets Information			
	DAIM-B1/7 NOTAM improvements Information			

ASBU ELEMENTS				
Ready for implementation:				
Standardization:				
Validation:				
Concept:				
No define:				
DATS (Digital Aerodrome Air Traffic Services)				
B0	B1	B2	B3	B4
	DATS-B1/1 Remotely Operated Aerodrome Air Traffic Services Operational			
FICE (Flight and Flow Information for a Collaborative Environment (FF-ICE))				
B0	B1	B2	B3	B4
FICE-B0/1 Automated basic inter facility data exchange (AIDC) Information		FICE-B2/1 Planning Service Information	FICE-B3/1 Flight information management services for enhanced trajectory operations Information	FICE-B4/1 Integrated flight information management system for end-to-end global flight planning Information
		FICE-B2/2 Filing Service Information		
		FICE-B2/3 Trial Service Information		
		FICE-B2/4 Flight Data Request Service Information		
		FICE-B2/5 Notification Service Information		
		FICE-B2/6 Publication Service Information		
		FICE-B2/7 Flight information management service for higher airspace operations Information		
		FICE-B2/8 Flight information management service for low-altitude operations Information		
		FICE-B2/9 Flight information management support for inflight re-planning Information		
FRTO (Improved operations through enhanced en-route trajectories)				
B0	B1	B2	B3	B4
FRTO-B0/1 Direct routing (DCT) Operational	FRTO-B1/1 Free Route Airspace (FRA) Operational	FRTO-B2/1 Local components of integrated ATFM and ATC Planning function (INAP) Operational		
FRTO-B0/2 Airspace planning and Flexible Use of Airspace (FUA) Operational	FRTO-B1/2 Required Navigation Performance (RNP) routes Operational	FRTO-B2/2 Local components of Dynamic Airspace Configurations (DAC) Operational		
FRTO-B0/3 Pre-validated and coordinated ATS routes to support flight and flow Operational	FRTO-B1/3 Advanced Flexible Use of Airspace (FUA) and management of real time airspace data Operational	FRTO-B2/3 Large Scale Cross Border Free Route Airspace (FRA) Operational		
FRTO-B0/4 Basic conflict detection and conformance monitoring Operational	FRTO-B1/4 Dynamic sectorization Operational	FRTO-B2/4 Enhanced Conflict Resolution Tools Operational		

ASBU ELEMENTS				
Ready for implementation:				
Standardization:				
Validation:				
Concept:				
No define:				
FRTO (Improved operations through enhanced en-route trajectories)				
B0	B1	B2	B3	B4
	FRTO-B1/5 Enhanced Conflict Detection Tools and Conformance Monitoring Operational			
	FRTO-B1/6 Multi-Sector Planning Operational			
	FRTO-B1/7 Trajectory Options Set (TOS) Operational			
GADS (Global Aeronautical Distress and Safety System (GADSS))				
B0	B1	B2	B3	B4
	GADS-B1/1 Aircraft Tracking Operational	GADS-B2/1 Location of an aircraft in Distress Operational		
	GADS-B1/2 Operational Control Directory Operational	GADS-B2/2 Distress tracking information management Operational		
		GADS-B2/4 Flight Data Recovery Operational		
NAVS (Navigation systems)				
B0	B1	B2	B3	B4
NAVS-B0/1 Ground Based Augmentation Systems (GBAS) Technology	NAVS-B1/1 Extended GBAS Technology	NAVS-B2/1 Dual Frequency Multi Constellation (DF MC) GBAS Technology		
NAVS-B0/2 Satellite Based Augmentation Systems (SBAS) Technology		NAVS-B2/2 Dual Frequency Multi Constellation (DF MC) SBAS Technology		
NAVS-B0/3 Aircraft Based Augmentation Systems (ABAS) Technology		NAVS-B2/3 Dual Frequency Multi Constellation (DF MC) ABAS Technology		
NAVS-B0/4 Navigation Minimal Operating Networks (Nav. MON) Technology				
NOPS (Network Operations)				
B0	B1	B2	B3	B4
NOPS-B0/1 Initial integration of collaborative airspace management with air traffic flow management Operational	NOPS-B1/1 Short Term ATFM measures Operational	NOPS-B2/1 Optimised ATM Network Services in the initial TBO context Operational		
NOPS-B0/2 Collaborative Network Flight Updates Operational	NOPS-B1/2 Enhanced Network Operations Planning Operational	NOPS-B2/2 Enhanced dynamic airspace configuration Operational		
NOPS-B0/3 Network Operation Planning basic features Operational	NOPS-B1/3 Enhanced integration of Airport operations planning with network operations planning Operational	NOPS-B2/3 Collaborative Network Operation Planning Operational		

ASBU ELEMENTS				
Ready for implementation:				
Standardization:				
Validation:				
Concept:				
No define:				
NOPS (Network Operations)				
B0	B1	B2	B3	B4
NOPS-B0/4 Initial Airport/ATFM slots and A-CDM Network Interface Operational	NOPS-B1/4 Dynamic Traffic Complexity Management Operational	NOPS-B2/4 Multi ATFM slot swapping and Airspace Users priorities Operational	NOPS-B3/1 ATM Network Services in full TBO context Operational	
NOPS-B0/5 Dynamic ATFM slot allocation Operational	NOPS-B1/5 Full integration of airspace management with air traffic flow management Operational	NOPS-B2/5 Further airport integration within Network Operation Planning Operational	NOPS-B3/2 Cooperative Network Operations Planning Operational	
	NOPS-B1/6 Initial Dynamic Airspace configurations Operational	NOPS-B2/6 ATFM adapted for cross-border Free Route Airspace (FRA) Operational	NOPS-B3/3 Innovative airspace architecture Operational	
	NOPS-B1/7 Enhanced ATFM slot swapping Operational	NOPS-B2/7 UTM Network operations Operational		
	NOPS-B1/8 Extended Arrival Management supported by the ATM Network function Operational	NOPS-B2/8 High upper airspace network operations Operational		
	NOPS-B1/9 Target Times for ATFM purposes Operational			
	NOPS-B1/10 Collaborative Trajectory Options Program (CTOP) Operational			
OPFL (Improved access to optimum flight levels in oceanic and remote airspace)				
B0	B1	B2	B3	B4
OPFL-B0/1 In Trail Procedure (ITP) Operational	OPFL-B1/1 Climb and Descend Procedure (CDP) Operational	OPFL-B2/1 Separation minima using ATS surveillance systems where VHF voice communications are not available Operational	OPFL-B3/1 Helicopter RNP 0.3 Terminal and En-Route Operations Operational	
			OPFL-B3/2 Expansion of upper limit of the Reduced Vertical Separation Minima (RVSM) band of flight levels Operational	
			OPFL-B3/3 Target-to-target separations using Space-based ADS-B data Operational	

ASBU ELEMENTS				
Ready for implementation:				
Standardization:				
Validation:				
Concept:				
No define:				
RSEQ (Improved traffic flow through runway sequencing)				
B0	B1	B2	B3	B4
RSEQ-B0/1 Arrival Management Operational	RSEQ-B1/1 Extended arrival metering Operational	RSEQ-B2/1 Integration of arrival and departure management Operational		RSEQ-B4/1 Departure management in terminal airspace from multiple airports Operational
RSEQ-B0/2 Departure Management Operational			RSEQ-B3/2 Arrival management in terminal airspace with multiple airports Operational	RSEQ-B4/2 Extended arrival management supporting overlapping operations into multiple airports Operational
RSEQ-B0/3 Point merge Operational			RSEQ-B3/3 Increased utilization of runway capacity by improved real-time runway scheduling Operational	
			RSEQ-B3/4 Improved operator fleet management in runway sequencing Operational	
SNET (Ground-based Safety Nets)				
B0	B1	B2	B3	B4
SNET-B0/1 Short Term Conflict Alert (STCA) Operational	SNET-B1/1 Enhanced STCA with aircraft parameters Operational			
SNET-B0/2 Minimum Safe Altitude Warning (MSAW) Operational	SNET-B1/2 Enhanced STCA in complex TMAs Operational			
SNET-B0/3 Area Proximity Warning (APW) Operational				
SNET-B0/4 Approach Path Monitoring (APM) Operational				
SURF (Surface operations)				
B0	B1	B2	B3	B4
SURF-B0/1 Basic ATCO tools to manage traffic during ground operations Operational	SURF-B1/1 Advanced features using visual aids to support traffic management during ground operations Operational	URF-B2/1 Enhanced surface guidance for pilots and vehicle drivers Operational	SURF-B3/1 Optimization of surface traffic management in complex situations Operational	
SURF-B0/2 Comprehensive situational awareness of surface operations Operational	SURF-B1/2 Comprehensive pilot situational awareness on the airport surface Operational	URF-B2/2 Comprehensive vehicle driver situational awareness on the airport surface Operational		
SURF-B0/3 Initial ATCO alerting service for surface operations Operational	SURF-B1/3 Enhanced ATCO alerting service for surface operations Operational	SURF-B2/3 Conflict alerting for pilots for runway operations Operational		
	SURF-B1/4 Routing service to support ATCO surface operations management Operational			
	SURF-B1/5 Enhanced vision systems for taxi operations Operational			

ASBU ELEMENTS				
Ready for implementation:				
Standardization:				
Validation:				
Concept:				
No define:				
SWIM (System Wide Information Management)				
B0	B1	B2	B3	B4
		SWIM-B2/1 Information service provision Information	SWIM-B3/1 Air/Ground SWIM for safety critical information Information	
		SWIM-B2/2 Information service consumption Information		
		SWIM-B2/3 SWIM registry Information		
		SWIM-B2/4 Air/Ground SWIM for non-safety critical information Information		
		SWIM-B2/5 Global SWIM processes Information		
TBO (Trajectory-based operations)				
B0	B1	B2	B3	B4
TBO-B0/1 Introduction of time-based management within a flow centric approach. Operational	TBO-B1/1 Initial Integration of time-based decision making processes Operational	TBO-B2/1 Pre-departure trajectory synchronization within a flight centric and network performance approach Operational	TBO-B3/1 Network based on-demand synchronization of trajectory based operations Operational	TBO-B4/1 Total airspace management performance system Operational
		TBO-B2/2 Extended time-based management across multiple FIRs for active flight synchronization Operational		
WAKE (Wake Turbulence Separation)				
B0	B1	B2	B3	B4
		WAKE-B2/1 Wake turbulence separation minima based on 7 aircraft groups Operational	WAKE-B3/1 Dependent parallel approaches Operational	WAKE-B4/1 En-route Wake Encounter Ground based Prediction Operational
		WAKE-B2/2 Time based wake separation minima for final approach Operational	WAKE-B3/2 Independent segregated parallel operations Operational	WAKE-B4/2 En-Route Wake Encounter on-board flight management/mitigation Operational
			WAKE-B3/3 Wake turbulence separation minima based on leader/follower static pairs- wise Operational	
			WAKE-B3/4 Enhanced dependent parallel approaches Operational	
			WAKE-B3/5 Enhanced independent segregated parallel operations Operational	
			WAKE-B3/6 Time based wake separation minima for departure based on leader/follower static pair-wise Operational	
			WAKE-B3/7 Time based dependent parallel approaches Operational	
			WAKE-B3/8 Time based independent segregated parallel operations Operational	

ASBU ELEMENTS ELEMENTS READY FOR IMPLEMENTATION

ACAS (Airborne Collision Avoidance System)

B0	B1	B2
	ACAS-B1/1 ACAS Improvements Operational	

ACDM (Airport Collaborative Decision Making)

B0	B1	B2
ACDM-B0/1 Airport CDM Information Sharing (ACIS) Operational		
ACDM-B0/2 Integration with ATM Network function Operational		

AMET (Advanced Meteorological Information)

B0	B1	B2
AMET-B0/1 Meteorological observations products Information		
AMET-B0/2 Meteorological forecast and warning products Information		
AMET-B0/3 Climatological and historical meteorological products Information		
AMET-B0/4 Dissemination of meteorological products Information		

APTA (Airport Accessibility)

B0	B1	B2
APTA-B0/1 PBN Approaches (with basic capabilities) Operational		
APTA-B0/2 PBN SID and STAR procedures (with basic capabilities) Operational		
B0	B1	B2
APTA-B0/3 SBAS/GBAS CAT I precision approach procedures Operational		
APTA-B0/4 CDO (Basic) Operational		
APTA-B0/5 CCO (Basic) Operational		

Appendix B

ASBU ELEMENTS
ELEMENTS READY FOR IMPLEMENTATION

B0	B1	B2
APTA-B0/6 PBN Helicopter Point in Space (PinS) Operations Operational		
APTA-B0/7 Performance based aerodrome operating minima – Advanced aircraft Operational		
APTA-B0/8 Performance based aerodrome operating minima – Basic aircraft		

ASUR (Alternative Surveillance)

B0	B1	B2
ASUR-B0/1 Automatic Dependent Surveillance – Broadcast (ADS-B) Technology	ASUR-B1/1 Reception of aircraft ADS-B signals from space (SB ADS-B) Technology	
ASUR-B0/2 Multilateration cooperative surveillance systems (MLAT) Technology		
ASUR-B0/3 Cooperative Surveillance Radar Downlink of Aircraft Parameters (SSR-DAPS) Technology		

COMI (Communication infrastructure)

B0	B1	B2
COMI-B0/1 Aircraft Communication Addressing and Reporting System (ACARS) Technology		
COMI-B0/2 Aeronautical Telecommunication Network/Open System Interconnection (ATN/OSI) Technology	COMI-B1/2 VHF Data Link (VDL) Mode 2 Multi- Frequency Technology	
COMI-B0/3 VHF Data Link (VDL) Mode 0/A Technology	COMI-B1/3 SATCOM Class B Voice and Data Technology	
COMI-B0/4 VHF Data Link (VDL) Mode 2 Basic Technology	COMI-B1/4 Aeronautical Mobile Airport Communication System (AeroMACS) Ground-Ground Technology	
B0	B1	B2

ASBU ELEMENTS ELEMENTS READY FOR IMPLEMENTATION

COMI-B0/5 Satellite communications (SATCOM) Class C Data Technology		
COMI-B0/6 High Frequency Data Link (HF DL) Technology		
COMI-B0/7 ATS Message Handling System (AMHS) Technology		

COMS (ATS Communication service)

B0	B1	B2
COMS-B0/1 CPDLC (FANS 1/A & ATN B1) for domestic and procedural airspace Technology	COMS-B1/1 PBCS approved CPDLC (FANS 1/A+) for domestic and procedural airspace Technology	
COMS-B0/2 ADS-C (FANS 1/A) for procedural airspace Technology	COMS-B1/2 PBCS approved ADS-C (FANS 1/A+) for procedural airspace Technology	
	COMS-B1/3 SATVOICE (incl. routine communications) for procedural airspace Technology	

CSEP (Cooperative Separation)

B0	B1	B2
	CSEP-B1/1 Basic airborne situational awareness during flight operations (AIRB) Operational	
	CSEP-B1/2 Visual Separation on Approach (VSA) Operational	

DAIM (Digital Aeronautical Information Management)

B0	B1	B2
	DAIM-B1/2 Provision of digital Aeronautical Information Publication (AIP) data sets Information	
	DAIM-B1/3 Provision of digital terrain data sets Information	
B0	B1	B2
	DAIM-B1/4 Provision of digital obstacle data sets Information	

ASBU ELEMENTS ELEMENTS READY FOR IMPLEMENTATION

	DAIM-B1/5 Provision of digital aerodrome mapping data sets Information	
	DAIM-B1/6 Provision of digital instrument flight procedure data sets Information	
	DAIM-B1/7 NOTAM improvements Information	

DATS (Digital Aerodrome Air Traffic Services)

B0	B1	B2

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

B0	B1	B2
FICE-B0/1 Automated basic inter facility data exchange (AIDC) Information		

FRTO (Improved operations through enhanced en-route trajectories)

B0	B1	B2
FRTO-B0/1 Direct routing (DCT) Operational		
FRTO-B0/2 Airspace planning and Flexible Use of Airspace (FUA) Operational		
B0	B1	B2
FRTO-B0/3 Pre-validated and coordinated ATS routes to support flight and flow Operational		
FRTO-B0/4 Basic conflict detection and conformance monitoring Operational		

GADS (Global Aeronautical Distress and Safety System (GADSS))

B0	B1	B2
	GADS-B1/1 Aircraft Tracking Operational	GADS-B2/1 Location of an aircraft in Distress Operational

ASBU ELEMENTS ELEMENTS READY FOR IMPLEMENTATION

	GADS-B1/2 Operational Control Directory Operational	GADS-B2/2 Distress tracking information management Operational
		GADS-B2/4 Flight Data Recovery Operational

NAVS (Navigation systems)

B0	B1	B2
NAVS-B0/1 Ground Based Augmentation Systems (GBAS) Technology		
NAVS-B0/2 Satellite Based Augmentation Systems (SBAS) Technology		
NAVS-B0/3 Aircraft Based Augmentation Systems (ABAS) Technology		
NAVS-B0/4 Navigation Minimal Operating Networks (Nav. MON) Technology		

NOPS (Network Operations)

B0	B1	B2
NOPS-B0/1 Initial integration of collaborative airspace management with air traffic flow management Operational		
NOPS-B0/2 Collaborative Network Flight Updates Operational		
NOPS-B0/3 Network Operation Planning basic features Operational		
NOPS-B0/4 Initial Airport/ATFM slots and A-CDM Network Interface Operational		
NOPS-B0/5 Dynamic ATFM slot allocation Operational		

OPFL (Improved access to optimum flight levels in oceanic and remote airspace)

B0	B1	B2
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ASBU ELEMENTS ELEMENTS READY FOR IMPLEMENTATION

OPFL-B0/1 In Trail Procedure (ITP) Operational		OPFL-B2/1 Separation minima using ATS surveillance systems where VHF voice communications are not available Operational
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RSEQ (Improved traffic flow through runway sequencing)

B0	B1	B2
RSEQ-B0/1 Arrival Management Operational		
RSEQ-B0/2 Departure Management Operational		
RSEQ-B0/3 Point merge Operational		

SNET (Ground-based Safety Nets)

B0	B1	B2
SNET-B0/1 Short Term Conflict Alert (STCA) Operational	SNET-B1/1 Enhanced STCA with aircraft parameters Operational	
SNET-B0/2 Minimum Safe Altitude Warning (MSAW) Operational	SNET-B1/2 Enhanced STCA in complex TMAs Operational	
SNET-B0/3 Area Proximity Warning (APW) Operational		
SNET-B0/4 Approach Path Monitoring (APM) Operational		

SURF (Surface operations)

B0	B1	B2
SURF-B0/1 Basic ATCO tools to manage traffic during ground operations Operational		
SURF-B0/2 Comprehensive situational awareness of surface operations Operational	SURF-B1/2 Comprehensive pilot situational awareness on the airport surface Operational	
B0	B1	B2

ASBU ELEMENTS ELEMENTS READY FOR IMPLEMENTATION

SURF-B0/3 Initial ATCO alerting service for surface operations Operational		
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SWIM (System Wide Information Management)

B0	B1	B2
		SWIM-B2/3 SWIM registry Information

TBO (Trajectory-based operations)

B0	B1	B2
TBO-B0/1 Introduction of time-based management within a flow centric approach. Operational		

WAKE (Wake Turbulence Separation)

B0	B1	B2