



International Civil Aviation Organization

**EIGHTEENTH MEETING OF THE COMMUNICATIONS/NAVIGATION  
AND SURVEILLANCE SUG-GROUP (CNS SG/18) OF APANPIRG**

Asia and Pacific Regional Sub-Office, Beijing, China  
(21 – 25 July 2014)

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**Agenda Item 9: Review and updates**

9.1) Air Navigation Reporting Forms and Seamless Reporting Form,  
Regional Performance Dashboard

**ANRF, SEAMLESS REPORTING AND  
MONITORING OF REGIONAL PROGRESS**

(Presented by the Secretariat)

**SUMMARY**

This paper presents an overview of the Seamless ATM planning and reporting required by States, and provides an update on the progress towards the performance-based monitoring regime being implemented during 2014.

This paper relates to –

**Strategic Objectives:**

*A: Safety – Enhance global civil aviation safety*

*B: Air Navigation Capacity and Efficiency – Increase Capacity and improve efficiency of the global civil aviation system*

*E: Environmental Protection – Minimize the adverse environmental effects of civil aviation activities*

**1. INTRODUCTION**

1.1 APANPIRG/24 noted that although the GANP has a global perspective, all ASBU modules may not be applicable to all States or Regions. Some of the modules are specialized packages that should be applied where specific operational requirements or corresponding benefits exist. Implementation priorities for Air Traffic Management enhancements will vary between regions as each has different operational environments, traffic volumes etc. Prioritization exercise could be done by individual states and regionally by APANPIRG. Guided by the Global Air Navigation Plan (GANP), APANPIRG/24 acknowledged that the regional planning process requires full involvement of States, service providers, airspace users and other stakeholders, thus ensuring commitment by all for implementation.

1.2 APANPIRG/24 further noted that the PIRG–RASG Global Coordination Meeting held on 19 March 2013 requested PIRGs to establish regional priorities and set targets and report to ICAO by May 2014. APANPIRG/24 also noted that the APAC Seamless ATM Plan spelt out the 6 regional ASBU priorities which are aligned to GANP (ASBU modules) and adopted Conclusion 24/2:

***Conclusion 24/2 — Establishing Regional Priorities and Targets***

*That, following the PIRG - RASG Global Coordination meeting held in March 2013 APANPIRG/24 invited the Chairpersons of ATM, RASMAG, CNS, and MET sub groups to establish regional priorities and targets for the APAC Region in alignment with the GANP and APAC Seamless ATM Plan by December 2013 in order to facilitate submission to ICAO by May 2014.*

1.3 In accordance with APANPIRG Conclusion 24/2, the Chairpersons of Sub-Groups (ATM, RASMAG, CNS and MET) and the Asia Pacific Seamless ATM Planning Group (APSAPG) were invited to consider the further development of Asia/Pacific Regional Priorities and Targets.

1.4 The Chairpersons of the Sub Groups agreed on the regional priorities and targets for the APAC Region which was based on the highest priority elements. In addition, all 42 Seamless ATM elements were assigned priorities.

1.5 Regional priorities and targets, along with the supporting Air Navigation Reporting Forms, will be proposed for endorsement at the APANPIRG/25.

1.6 As presented in Chapter 2, following the setting of these objectives, the APAC Region has now to progress the implementation of the 42 items. ANRF act as high level regional planning documents, while a web-based report process and graphical dashboard will allow to track the progress.

**2. DISCUSSION**

**AIR NAVIGATION REPORTING FORMS (ANRF)**

2.1 APANPIRG/23 noted the developments in revising the Global Air Navigation Plan and agreed to take the revised edition of the Global Plan into account in planning and implementation of regional and national air navigation systems. APANPIRG/23 also noted that as ICAO will be migrating to the ASBU framework, consequently the Performance Framework Form will be modified to the Air Navigation Report Form (ANRF) effective from 2013.

2.2 The Air Navigation Report Forms (ANRFs) have replaced the earlier Performance Framework Forms (PFF). 5 PFF in the case of the CNS Sub Group were maintained: ATN, ADS-B, AIDC, AMHS and SATCOM. The ANRF is intended to be a means of setting milestones, targets, and metrics for each of the key planning elements (at first, the seven priority elements). The ANRF also identifies the implementation challenges. A total of 18 ANRF corresponding to the 18 ASBU elements has to be developed at the regional level and presented to APANPIRG and its Sub-Groups as appropriate for review. It should be noted that States are not expected to fill ANRF for global or regional purposes; however they are a practical solution for planning the ANS improvements at the national level.

2.3 During the planning process which took place in 2012 and 2013 in the APAC Region and led to the adoption by APANPIRG/24 of the Seamless ATM Plan v1.0, all objectives and targets pertaining to ATM performance were discussed and planned accordingly.

### Endorsing bodies

2.4 Placed at **Appendix 1**, a draft matrix of responsibilities for APANPIRG bodies has been developed by the ICAO Regional Office to allocate the ASBU modules and corresponding seamless ATM elements to the different technical subgroups of APANPIRG for review by the meeting. The role of the endorsing body is to endorse the amendments to the ANRF, and review and discuss the progress of their implementation, using the monitoring tools for this purpose.

2.5 While the table presents the endorsing body, it is understood that other technical sub-groups would be consulted as necessary.

### ANRFs

2.6 The following ANRF have to be endorsed by the CNS SG:

Seamless ATM Reference	APAC Seamless ATM Specification title	ASBU Module	ASBU - Module title	Proposed Regional Priority
180	ATS Surveillance	B0-ASUR	Initial Capability for Ground Surveillance	1
220	ATS Inter-facility Data-link Communications (AIDC)	B0-FICE	Increased Interoperability Efficiency & Capacity through Ground-Ground Integration	1
270	ATS surveillance with data integrated	B0-ASUR	Initial Capability for Ground Surveillance	1
280	ADS-C and CPDLC	B0-TBO	Improved Safety and Efficiency through the initial application of Data Link En-Route	1
110	Performance-based Navigation (PBN) Approach	B0-APTA	Optimization of Approach Procedures including vertical guidance	1
120	Standard Instrument Departures/Standard Terminal Arrivals (SID/STAR)	B0-CCO B0-CDO	Optimization of Approach Procedures including vertical guidance	2
160	Safety Nets	B0-SNET	Increased effectiveness of ground-based safety nets	2
170	Airborne Safety Systems	B0-ACAS	Airborne Collision Avoidance Systems (ACAS) Improvements	2
-	Air Traffic Situational Awareness	B0-ASEP	Air Traffic Situational Awareness (ATSA)	2
40	Safety and Efficiency of Surface Operations	B0-SURF	Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)	3

2.7 The meeting is invited to review the draft ANRF (**Attachments 1 to 10**) developed and agree for submission to APANPIRG/25 in view of their adoption, recognizing that the main objectives and targets to meet for these two modules were already discussed and planned by the APAC States in the Seamless Plan V1.0.

### **Seamless ATM Implementation Guidance**

2.8 The Seamless ATM plan version 1.0 was endorsed by APANPIRG in June 2013 with the conclusion 24/54.

2.9 A Seamless ATM Implementation Guidance was developed from April to June 2013 and received different comments from States and ICAO since then. The latest version (version 4.3, May 2014) of seamless implementation guidance is placed at Attachment 11. It is also available here: <http://www.icao.int/APAC/Documents/edocs/Seamless%20ATM%20Implementation%20Guidance%20v4-3.pdf>

2.10 A comprehensive history of changes is available here: <http://www.icao.int/APAC/Documents/edocs/Seamless%20ATM%20Implementation%20Guidance%20-%20History%20of%20changes.pdf>.

2.11 The Seamless ATM Implementation Guidance provides a valuable guidance on expected impacts and on documents to be used when implementing any of the ASBU/Seamless elements.

2.12 It provides also a project-oriented approach to implement the different Seamless ATM plan elements that was for example used by the CRV Task Force for building the regional implementation planning and by the Interregional AIDC Task Force as a basis for the implementation guidance.

2.13 A traceability between ASBU modules and Seamless ATM items at **Attachment 11**.

### **Seamless ATM Reporting Forms**

2.14 Whilst guidance is provided for each and every action of the Seamless ATM Plan, only a very limited subset of actions needs a periodic implementation report from Asia/Pacific States at the regional level to keep all stakeholders coordinated. Through the Seamless ATM Reporting Form, available as a spreadsheet in Excel format (<http://www.icao.int/APAC/Documents/edocs/Regional%20Seamless%20ATM%20Reporting%20Form%20-%20v4.xlsx>) and soon as a web-based reporting form, States are invited to report their progress on implementation and issues encountered. In this way, potential delays may be anticipated and managed.

2.15 The Seamless ATM Reporting Form enables a formalised process for regional planning that can identify areas where greater support for States is required. In this regard, the scope of support and desired timeframe should be specified in the column “Remarks” of the Seamless ATM Reporting Form.

2.16 The Regional Seamless ATM Reporting Form is used for collecting and analysing data from States from a global perspective. This allows planning that supports the Global Air Navigation Plan, and reporting of the overall progress of Asia/Pacific Seamless ATM implementation to appropriate bodies.

2.17 APANPIRG/24 adopted the following Conclusion:

***Conclusion 24/55 on State Seamless ATM Planning:***

*That, given the urgency and priority of Seamless ATM planning for the Asia/Pacific as acknowledged by the 46th Conference of Directors General of Civil Aviation (DGCA, Osaka, Japan, 12-16 October 2009) and APANPIRG/22 (05-09 September 2011), States should be urged to:*

- a) review Version 1.0 of the Asia/Pacific Seamless ATM Plan and utilise the Plan to develop planning for State implementation of applicable Seamless ATM elements;*
- b) ensure relevant decision-makers are briefed on the Seamless ATM Plan;*
- c) submit the First Regional Seamless ATM Reporting Form to the ICAO Regional Office by 01 March 2014; and*
- d) where possible, participate and contribute to Seamless ATM system collaborative training and research initiatives.*

2.18 Since then, 12 States have submitted their first Seamless ATM reporting form. The remaining States/Administrations that had not reported were reminded to submit a Seamless ATM reporting form as soon as possible, using the attached reporting form, through ICAO State letter T 8/5.1 & T 3/10.1.2- AP101114 dated 1 July 2014.

2.19 The form may include more items in the future. For example, if the ANRF on B0-FICE is approved with its revision concerning AMHS and the migration of communications between States on the regional network, those two items would be added to the Reporting Form.

**Web-based Reporting Process**

2.20 The ICAO APAC Regional Office has developed a web-based tool in an effort to ease the submission of such reports in the future for States, and reap the benefits of data analysis for ICAO. This tool will be available on the ICAO APAC website using a secure webpage dedicated to the States/Administrations, and will provide the ability to submit up to four reports times a year, as well as exporting and archiving functions. It will be possible for users to prepare a report based on the previous submissions, which should minimize the input workload.

2.21 The testing process is currently ongoing, and showcasing will be proposed at different ICAO Sub Groups meetings including this meeting. Additionally, Snapshots of the application are placed at **Appendix 2**. A “How To” will be available online to describe how to use the tool.

2.22 The same ICAO State letter requested to nominate a point of contact and a substitute before 31 August 14 that will be in charge of preparing and submitting the form online at least once per year on behalf of their State/Administration.

2.23 Once the tool is online, States/Administrations will submit their Seamless ATM reporting forms through the web-based tool. The estimated date for the cut-over is September 2014. Points of contact will be informed by email.

### **Two levels of monitoring**

2.24 Two levels of monitoring are desirable:

- monitoring of the regional performance gains, through the regional performance dashboard, allowing global correlation of status and expectations and “customer oriented”; and
- monitoring of regional implementation progress through a regional picture, one level below, allowing corrective actions by APANPIRG on the implementation : “process oriented”. The monitoring would be done for the 42 seamless items.

2.25 In the discussions of the Chairpersons meetings, the added value of having two levels of monitoring (the high level regional performance dashboard and the process-orientated regional picture, focusing on the 42 Seamless ATM elements) to steer the air navigation improvements was shared and acknowledged. It was envisaged that the monitoring tools (regional picture and regional performance dashboard) could serve a more streamlined project-oriented process for the Asia/Pacific Region by identifying issues, challenges or risks and speeding up the decision-making process to take corrective actions and adapt plans.

### **Regional picture (project)**

2.26 Export functions including calculation are provided to the ICAO Regional Office staff members to analyse the inputs from States/Administrations and later on, feed a GIS-based regional picture that would present a regional picture, i.e. a regional map with the progress on each item for all States/Administrations. However this project is still in progress and the feasibility not fully guaranteed.

### **Regional performance dashboard**

2.27 The Performance Dashboards present up-to-date regional implementation results, highlighting what States and groups of States are achieving in collaboration with their respective Planning and Implementation Regional Groups (PIRGs) and Regional Aviation Safety Groups (RASGs). Their ultimate intention, besides ICAO’s basic measurement, accountability and transparency goals, is to help motivate aviation groups and stakeholders to continue to participate in and improve upon the applicable cooperative programmes being implemented at the regional level.

2.28 The dashboards are available here:  
<http://www.icao.int/safety/Pages/Regional-Targets.aspx>. This link will be provided in the dedicated State/Administration Web-based Reporting Process Home page as well.

2.29 The targets and metrics as per WP/05 draft conclusion will be recommended to ICAO/HQ for inclusion and use in the public ICAO APAC Performance Regional Dashboard until further update if such draft conclusion is endorsed. Some of the indicators will be calculated thanks to the data collection through the web-based Reporting Process.

## **3. ACTION BY THE MEETING**

3.1 The meeting is invited to:

In view of their submission to APANPIRG/25 for adoption, the meeting is invited to:

- a) note the information contained in this paper;
- b) review the draft ANRF accordingly and recommend their adoption to APANPIRG/25 through the following Draft Conclusion:

***Draft Conclusion 18/X - ANRFs and responsibility matrix***

*That, the ANRF on B0-ASUR, B0-FICE, B0-TBO, B0-APTA, B0-CCO, B0-CDO, B0-SNET, B0-ACAS, B0-ASEP and B0-SURF together with the matrix of responsibilities be adopted after their review by the other APANPIRG subgroups.*

- c) review the Seamless ATM Implementation Guidance v4.3 and recommend its adoption to APANPIRG/25 through the following Draft Conclusion:

***Draft Conclusion 18/X - Seamless ATM implementation guidance***

*That, the Seamless ATM implementation guidance version 4.3, May 2014 be adopted by APAC States/Administrations and maintained by the ICAO Regional Office.*

- d) note the information on the web-based Reporting process and urge the nomination of points of contact as requested by ICAO State letter;
- e) recommend to APANPIRG/25 the adoption of the following Draft Conclusion

***Draft Conclusion 18/X - Web-based reporting process***

*That, States/Administrations start reporting on their Seamless ATM implementation progress at least once a year through the ICAO online reporting process from October 2014 onwards.*

- f) Note that the targets and metrics as per WP/05 draft conclusion will be recommended to ICAO/HQ for inclusion and used in the public ICAO APAC Regional Performance Dashboard until further update if such draft conclusion is endorsed; and
- g) discuss any relevant matters as appropriate.

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**Appendix 1: proposed matrix of responsibilities for APANPIRG bodies**

ASBU Module	ASBU - Module title	Regional Priority	Seamless ATM Specification title	Seamless Reference	Endorsing body (Proposal)
B0-ACDM	Improved Airport Operations through Airport-CDM	2	Airport Collaborative Decision-Making (ACDM)	70	<b>AOP WG</b>
B0-NOPS	Improved Flow Performance through Planning based on a Network-Wide view	1	Air Traffic Flow Management/Collaborative Decision-Making (ATFM/CDM)	80	<b>ATFM SG</b>
B0-RSEQ	Improve Traffic flow through Sequencing (AMAN/DMAN)	2	Arrival Manager/Departure Management (AMAN/DMAN)	50	<b>ATFM SG</b>
B0-DATM	Service Improvement through Digital Aeronautical Information Management	1	Aeronautical Information Management	300	<b>ATM SG</b>
B0-FRTO	Improved Operations through Enhanced En-Route Trajectories	1	Civil Military use of SUA	360	<b>ATM SG</b>
B0-CDO	Improved Flexibility and Efficiency in Descent Profiles using Continuous Descent Operations (CDOs)	2	Continuous Descent Operations (CDO)	90	<b>ATM SG</b>
B0-CCO	Improved Flexibility and Efficiency Departure Profiles – Continuous Climb Operations (CCO)	2	Continuous Climb Operations (CCO)	100	<b>ATM SG</b>
B0-FRTO	Improved Operations through Enhanced En-Route Trajectories	2	Performance-based Navigation (PBN) Routes	140	<b>ATM SG</b>
B0-APTA	Optimization of Approach Procedures including vertical guidance	2	ATM systems enabling optimal PBN/ATC operations	250	<b>ATM SG</b>
B0-FRTO	Improved Safety and Efficiency through the initial application of Data Link En-Route	3	UPR and DARP	290	<b>ATM SG</b>
B0-WAKE	Improved Access to Optimum Flight Levels through Climb/Descent Procedures using ADS-B	3	Nil	-	<b>ATM SG</b>
B0-OPFL	Increased Runway Throughput through Optimized Wake Turbulence Separation	3	Nil	-	<b>ATM SG</b>
B0-APTA	Optimization of Approach Procedures including vertical guidance	1	Performance-based Navigation (PBN) Approach	110	<b>CNS SG</b>
B0-ASUR	Initial Capability for Ground Surveillance	1	ATS Surveillance	180	<b>CNS SG</b>
B0-FICE	Increased Interoperability Efficiency & Capacity through Ground-Ground Integration	1	ATS Inter-facility Data-link Communications (AIDC)	220	<b>CNS SG</b>



B0-ASUR	Initial Capability for Ground Surveillance	1	ATS surveillance with data integrated	270	<b>CNS SG</b>
B0-TBO	Improved Safety and Efficiency through the initial application of Data Link En-Route	1	ADS-C and CPDLC	280	<b>CNS SG</b>
B0-CCO B0-CDO	Optimization of Approach Procedures including vertical guidance	2	Standard Instrument Departures/Standard Terminal Arrivals (SID/STAR)	120	<b>CNS SG</b>
B0-SNET	Increased effectiveness of ground-based safety nets	2	Safety Nets	160	<b>CNS SG</b>
B0-ACAS	Airborne Collision Avoidance Systems (ACAS) Improvements	2	Airborne Safety Systems	170	<b>CNS SG</b>
B0-ASEP	Air Traffic Situational Awareness (ATSA)	2	Nil	-	<b>CNS SG</b>
B0-SURF	Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)	3	Safety and Efficiency of Surface Operations	40	<b>CNS SG</b>
B0-AMET	Meteorological information supporting enhanced operational efficiency and safety	2	Meteorological Information	310	<b>MET SG</b>

**Appendix II: Web-based Seamless ATM Reporting Process**

Home > RD\_APAC

### APAC Regional Seamless ATM Reporting Process

**My State/Administration**

Title	Number of FIR	Number of high density FIR	High Density International Aerodromes
Japan	1	1	2

**To report from a blank form, start here**

**How to**


URL  
 Seamless ATM plan  
 Seamless ATM guidance material  
 Monitoring the APAC implementation progress with the APAC Regional Picture  
 Monitoring the performance with the Regional Performance Dashboard

**My reporting forms**

<input type="checkbox"/>	Type	Name	Modified	Status	E dit	<input type="checkbox"/>	Modified By
<div style="background-color: #f2f2f2; padding: 2px;">                     State : Japan (4)                 </div>							
<div style="background-color: #f2f2f2; padding: 2px;">                     ReportYear : 2014 (3)                 </div>							
<input type="checkbox"/>		Japan-2014-1	11/06/2014 1:28 AM	Submitted		<input type="checkbox"/>	asisuser, oTest
<input type="checkbox"/>		Japan-2014-2	10/06/2014 10:03 PM	in preparation		<input type="checkbox"/>	asisuser, oTest
<input type="checkbox"/>		Japan-2014-4	10/06/2014 10:19 PM	in preparation		<input type="checkbox"/>	asisuser, oTest
<div style="background-color: #f2f2f2; padding: 2px;">                     ReportYear : 2013 (1)                 </div>							
<input type="checkbox"/>		Japan-2013-2	06/06/2014 5:36 PM	Submitted		<input type="checkbox"/>	asisuser, oTest

Add a State seamless implementation plan you want to share with ICAO

**Home page of a State/Administration user showing number of FIR/aerodromes, the starting point for reporting (“To report from a blank form”), useful links (“How to”) and archived reporting forms**  
*Note: content displayed is fictive*



## Regional Seamless Reporting Form

State/Administration:	Japan	Number of FIR:	1	General Comment (Optional): <div style="border: 1px solid black; height: 50px; width: 100%;"></div>
		Number of high density FIR:	1	
Date of Report:	11/06/2014			

Priority	Seamless Plan Reference	Applicable or not	Reaching the Objective Phase I		Reaching the Objective Phase II		Remarks (e.g. project scope, FIRs or routes concerned by implementation, etc.)	Issues Encountered/ Expected
			Date of Complete Implementation (Planned or Actual)	Progress	Date of Complete Implementation (Planned or Actual)	Progress		
3	Apron Management	Applicable <input type="text" value="v"/>	<input type="text" value=""/> <small>(Planned or Actual)</small>	70% <input type="text" value="v"/>				
3	ATM-Aerodrome Coordination	Applicable <input type="text" value="v"/>	26/06/2014 <input type="text" value=""/> <small>(Planned or Actual)</small>	80% <input type="text" value="v"/>			test	
3	Aerodrome capacity	Applicable <input type="text" value="v"/>	<input type="text" value=""/> <small>(Planned or Actual)</small>	60% <input type="text" value="v"/>	<input type="text" value=""/> <small>(Planned or Actual)</small>	60% <input type="text" value="v"/>		
3	Safety and Efficiency of Surface Operations	Not yet analysed <input type="text" value="v"/>	<input type="text" value=""/> <small>(Planned or Actual)</small>	Select... <input type="text" value="v"/>				

Online Reporting form (partial view) showing metadata, and the first 4 seamless items

1	ATS Inter-facility Data-link Communications (AIDC)	Not yet analysed Not applicable Applicable	17/07/2014	1 FIR		0 FIR		

**Different status shown for the column “Applicable or not”**

3	Safety and Efficiency of Surface Operations	Applicable						
2	Arrival Manager/Departure Management (AMAN/DMAN)	Not yet analysed		Select...		Select...		
2	ATC Sector Capacity	Applicable				Select...		

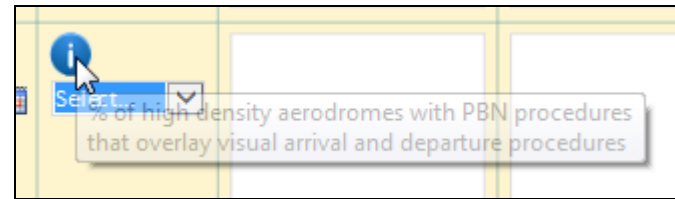
**Information tips by overflying a “i” with the mouse**

1	ATS Inter-facility Data-link Communications (AIDC)	Applicable	17/07/2014	1 FIR	February, 2015 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 Today is July 4, 2014	0 FIR	
2	Automated Transfer of Control in an ATSU	Not yet analysed		Select...		Select...	

**Example of selection of a date in the calendar**

3	Performance-based Navigation (PBN) Visual and Arrival Procedures	Applicable			31/12/2017	Select... 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%	
2	Performance-based Navigation (PBN) Routes	Not yet analysed		Select...			
	Performance-based	Not yet analysed		No data available			

**Example of selection of a percentage of implementation for PBN visual/arrival procedures**  
**The indicator can be overflowed to recall what is measured:**



2	Civil Military common training	Applicable		Yes			
2	Civil Military common procedures	Applicable		Yes			
2	Air traffic Situational awareness	Applicable			Yes		
3	Optimized wake turbulence separation	Applicable			80%		
3	In-trail procedures	Applicable			1 FIR		

Save    Submit    Exit without saving

**Choice of actions to perform after filling in the form  
 (Save/Submit/Exit without saving)**

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**AIR NAVIGATION REPORT FORM (ANRF)****APAC Regional Planning for ASBU Modules**

<b>REGIONAL/NATIONAL PERFORMANCE OBJECTIVE – B0-ACAS: ACAS Improvements</b>					
<b>Performance Improvement Area3: Optimum Capacity and Flexible Flights – Through Global Collaborative ATM</b>					
<b>ASBU B0-102: Impact on Main Key Performance Areas (KPA)</b>					
	<b>Access &amp; Equity</b>	<b>Capacity</b>	<b>Efficiency</b>	<b>Environment</b>	<b>Safety</b>
<b>Applicable</b>	N	N	Y	N	Y

<b>ASBU B0-101: Planning Targets and Implementation Progress</b>	
<b>5. Elements</b>	<b>6. Targets and Implementation Progress (Air Ground)</b>
1. ACAS II (TCAS Version 7.1)	<p><b>Nov. 15 (phase 1):</b> All Category R and S upper controlled airspace, and Category T airspace supporting high density aerodromes should require the carriage of ACAS and Terrain Awareness Warning Systems (TAWS), unless approved by ATC</p> <p><b>Nov. 18 (phase 2):</b> All Category R and S upper controlled airspace, and Category T airspace should, unless approved by the State, require the carriage of an operable ACAS and TAWS</p>

<b>ASBU B0-101: Implementation Roadblocks/Issues</b>				
<b>Elements</b>	<b>Implementation Area</b>			
	<b>Ground System Implementation</b>	<b>Avionics Implementation</b>	<b>Procedures Availability</b>	<b>Operational Approvals</b>
1. ACAS II (TCAS Version 7.1)	NIL	Lack of funding	NIL	NIL

<b>ASBU B0-101: Performance Monitoring and Measurement (Implementation)</b>	
<b>Elements</b>	<b>Performance Indicators/Supporting Metrics</b>
1. ACAS II (TCAS Version 7.1)	<p>Percentage of States/Administrations requiring the carriage of ACAS (with TCAS 7.1 evolution) and TAWS for all Category R and S upper controlled airspace, and Category T airspace supporting high density aerodromes</p> <p>Percentage of States/Administrations requiring the carriage of ACAS and TAWS for all Category T airspace</p>

<b>ASBU B0-101: Performance Monitoring and Measurement (Benefits)</b>	
<b>Key Performance Areas</b>	<b>Benefits</b>
Access & Equity	NA
Capacity	NA
Efficiency	ACAS improvement will reduce unnecessary resolution advisory (RA) and then reduce trajectory deviations
Environment	NA
Safety	ACAS increases safety in the case of loss of separation





## 1. AIR NAVIGATION REPORT FORM (ANRF)

### APAC Regional Planning for ASBU Modules

<b>2. REGIONAL/NATIONAL PERFORMANCE OBJECTIVE – Module PBN Terminal</b>					
<b>Performance Improvement Area 4: Efficient Flight Path – Through Trajectory-based Operations</b>					
<b>3. ASBU B0-TBO: Impact on Main Key Performance Areas (KPA)</b>					
	<b>Access &amp; Equity</b>	<b>Capacity</b>	<b>Efficiency</b>	<b>Environment</b>	<b>Safety</b>
<b>Applicable</b>	N	N	Y	Y	Y

<b>4. PBN Terminal: Planning Targets and Implementation Progress</b>	
<b>5. Elements</b>	<b>6. Targets and implementation progress (Ground and Air)</b>
CCO implementation <sup>1</sup>	November 2015 (Phase I): all high density international aerodromes implement CCO and CDO operations where States have assessed it applicable <sup>2</sup>
CDO implementation	
PBN SIDs implementation	November 2015 (Phase I): all international high density aerodromes should have RNAV 1 (ATS surveillance environment) or RNP 1 (ATS surveillance and non-ATS surveillance environments) SID/STAR
PBN STARs	

<b>7. PBN Terminal: Implementation Challenges</b>				
<b>Elements</b>	<b>Implementation Area</b>			
	<b>Ground System Implementation</b>	<b>Avionics Implementation</b>	<b>Procedures Availability</b>	<b>Operational Approvals</b>
CCO implementation	NIL	NIL	Airspace and procedure design enable optimized climb profile until cruising level	NIL
CDO implementation	NIL	NIL	Airspace and procedure design enable optimized profile descents (avoid stepped arrivals)	NIL

<sup>1</sup> CCO and CDO are flight operations procedures and only indirectly related to PBN procedures - SID/STAR, and APV. Whether this stays in this ANRF or not will depend entirely on finding a performance measurement that has some meaning. If we do not, then these items should be removed.

<sup>2</sup> The Seamless ATM Plan does not state that CCO/CDO is expected to be implemented in all high density aerodromes. It says that States should consider implementation. The target is to implement 100% of procedures that have been assessed as beneficial (i.e.: according to the States plan)



<b>7. PBN Terminal: Implementation Challenges</b>				
<b>Elements</b>	<b>Implementation Area</b>			
	<b>Ground System Implementation</b>	<b>Avionics Implementation</b>	<b>Procedures Availability</b>	<b>Operational Approvals</b>
PBN SIDs implementation	ATM systems enable PBN spec. and ATC separation standards (as per Seamless item 250)	NIL	NIL	NIL
PBN STARs	ATM systems enable PBN spec. and ATC separation standards (as per Seamless item 250)	NIL	NIL	NIL

<b>8. PBN Terminal: Performance Monitoring and Measurement</b>	
<b>8A. PBN Terminal: Implementation Monitoring</b>	
<b>Elements</b>	<b>Performance Indicators/Supporting Metrics</b>
CCO implementation	Indicators: Percentage of high density international aerodromes implementing CCO and CDO operations Supporting metric: Number of high density international aerodromes implementing CCO and CDO operations
CDO implementation	
PBN SIDs implementation	Indicators: percentage of international high density aerodromes implementing Standard Instrument Departures/Standard Terminal Arrivals (SID/STAR) Supporting metric: Number of international high density aerodromes implementing Standard Instrument Departures/Standard Terminal Arrivals (SID/STAR)
PBN STARs	
	Indicators: percentage of high density international aerodromes implementing ATM systems enabling optimal PBN operations Supporting metric: Number of high density international aerodromes implementing ATM systems enabling optimal PBN operations

<b>8. PBN Terminal: Performance Monitoring and Measurement</b>	
<b>8 B. PBN Terminal: Performance Monitoring</b>	
<b>Key Performance Areas</b>	<b>Metrics ( if not indicate qualitative Benefits)</b>
Access & Equity	NA
Capacity	NA
Efficiency	Benefit: Cost savings for aircraft operators through reduced fuel burn and efficient aircraft operating profiles.
Environment	Benefit: Environmental benefits through reduced emissions and noise reduction Authorization of operations where noise limitations would otherwise result in operations being curtailed or restricted.
Safety	Benefit: More consistent flight paths. Lower pilot and air traffic control workload



## 1. AIR NAVIGATION REPORT FORM (ANRF)

### APAC Regional planning for ASBU Modules

<b>2. REGIONAL PERFORMANCE OBJECTIVE – ASBU B0-ASEP: Air Traffic Situational Awareness</b>					
<b>Performance Improvement Area 3: Optimum Capacity and Flexible Flights</b>					
<b>3. ASBU B0-ASEP: Impact on Main Key Performance Areas</b>					
	<b>Access &amp; Equity</b>	<b>Capacity</b>	<b>Efficiency</b>	<b>Environment</b>	<b>Safety</b>
<b>Applicable</b>	N	Y	N	N	Y

<b>4. ASBU B0-ASEP: Planning Targets and Implementation Progress</b>	
<b>5. Elements</b>	<b>6. Targets and implementation progress (Ground and Air)</b>
Air Traffic Situational Awareness (ATSA)	Nil

<b>7. ASBU B0-ASEP: Implementation Challenges</b>				
<b>Elements</b>	<b>Implementation Area</b>			
	<b>Ground System Implementation</b>	<b>Avionics Implementation</b>	<b>Procedures Availability</b>	<b>Operational Approvals</b>
Air Traffic Situational Awareness (ATSA)	NIL	Upgrade of avionics	NIL	NIL

<b>8. ASBU B0-ASEP Performance Monitoring and Measurement</b>	
<b>8A. ASBU B0-ASEP: Implementation Monitoring</b>	
<b>Elements</b>	<b>Performance Indicators/Supporting Metrics</b>
Air Traffic Situational Awareness (ATSA)	Indicator: Percentage of States/Administrations implementing air traffic situational awareness  Supporting metric: Number of States/Administrations implementing air traffic situational awareness

<b>8. ASBU B0-ASEP. Performance Monitoring and Measurement</b>	
<b>8 B. ASBU B0-ASEP: Performance Monitoring</b>	
<b>Key Performance Areas</b>	<b>Metrics ( if not indicate qualitative Benefits)</b>
Access & Equity	-
Capacity	Provides crews with the means to achieve quicker visual acquisition of targets
Efficiency	-
Environment	-
Safety	Crew awareness is improved

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## 1. AIR NAVIGATION REPORT FORM (ANRF)

### APAC Regional planning for ASBU Modules

<b>2. REGIONAL PERFORMANCE OBJECTIVE – ASBU B0-ASUR: Initial capability for ground surveillance</b>					
<b>Performance Improvement Area 1: Airport Operations</b>					
<b>3. ASBU B0-ASUR: Impact on Main Key Performance Areas</b>					
	<b>Access &amp; Equity</b>	<b>Capacity</b>	<b>Efficiency</b>	<b>Environment</b>	<b>Safety</b>
<b>Applicable</b>	Y	Y	Y	Y	Y

<b>4. ASBU B0-ASUR: Planning Targets and Implementation Progress</b>	
<b>5. Elements</b>	<b>6. Targets and implementation progress (Ground and Air)</b>
Item 180- ATS surveillance	<p>November 2015 (Seamless ATM Plan Phase 1): All Category S upper controlled airspace and Category T airspace supporting high density aerodromes should be designated as non-exclusive or exclusive as appropriate ADS-B airspace requiring operation of ADS-B</p> <p>November 2018 (Seamless ATM Plan Phase 2): All Category S upper controlled airspace and Category T airspace should be designated as non-exclusive or exclusive as appropriate ADS-B airspace requiring operation of ADS-B using 1090ES with DO-260/260A and 260B capability. In areas where ADS-B based separation service is provided, the mandatory carriage of ADS-B OUT using 1090ES with DO260/60A and 260B should be prescribed</p>
Item 270- ATS surveillance with data integrated	November 2015 (Seamless ATM Plan Phase 1): ADS-B or MLAT or radar surveillance systems should be used to provide coverage of all Category S-capable airspace as far as practicable, with data integrated into operational ATC aircraft situation displays

<b>7. ASBU B0-ASUR: Implementation Challenges</b>				
<b>Elements</b>	<b>Implementation Area</b>			
	<b>Ground System Implementation</b>	<b>Avionics Implementation</b>	<b>Procedures Availability</b>	<b>Operational Approvals</b>
Item 180- ATS surveillance	Long transition time to ADS-B systems for SSR equipped providers Misuse of ADS-B messages of insufficient integrity	Ratio of fleet ADS-B equipped and approved, particularly in general aviation, and ageing commercial fleet	NIL	Dependent on States' development of approval standards.



**7. ASBU B0-ASUR: Implementation Challenges**

Elements	Implementation Area			
	Ground System Implementation	Avionics Implementation	Procedures Availability	Operational Approvals
	Sharing of data surveillance	Faulty/ageing avionics		
Item 270- ATS surveillance with data integrated	Lack of any automation functionality. Quality control of integration of data into ATM automation systems.	NIL	NIL	NIL

**8. ASBU B0-ASUR Performance Monitoring and Measurement**

**8A. ASBU B0-ASUR: Implementation Monitoring**

Elements	Performance Indicators/Supporting Metrics
Item 180- ATS surveillance	Indicator: Percentage of FIRs with ATS surveillance using ADS-B or SSR or MLAT where ATS surveillance is possible  Supporting metric: Number of FIRs with ATS surveillance using ADS-B or SSR or MLAT where ATS surveillance is possible
Item 270- ATS surveillance with data integrated	Indicator: Percentage of ACCs with ATS Surveillance using ADS-B, MLAT or radar where ATS surveillance is possible and having data integrated into the ATC system situation display  Supporting metric: Number of ACCs with ATS Surveillance using ADS-B, MLAT or radar where ATS surveillance is possible and having data integrated into the ATC system situation display

**8. ASBU B0-ASUR. Performance Monitoring and Measurement**

**8 B. ASBU B0-ASUR: Performance Monitoring**

Key Performance Areas	Metrics ( if not indicate qualitative Benefits)
Access & Equity	Improved airspace capacity, separation standards and ATC situational awareness permit better opportunity for access to airspace by all users.
Capacity	Benefits: Typical surveillance-based horizontal separation minima are 3 NM or 5 NM enabling a significant increase in airspace capacity compared to procedural minima.
Efficiency	Benefits: Optimized air traffic flow sequencing and runway throughput rates enabled by typical surveillance separation minima.  Reduced ATC workload with implementation of surveillance separation minima and significantly reduced radiotelephony traffic



**8. ASBU B0-ASUR. Performance Monitoring and Measurement**

**8 B. ASBU B0-ASUR: Performance Monitoring**

Key Performance Areas	Metrics ( if not indicate qualitative Benefits)
	required for managing identified aircraft.
Environment	Benefits: Reduced carbon emissions resulting from increased airspace capacity and efficiency, which lead to greater opportunity for flight at optimal flight levels and reduction in airborne holding.
Safety	Benefits: Less likelihood of airspace and ATC overload due to increased airspace capacity and reduced controller workload. Reduced likelihood of breakdown-of-separation incidents. Support for search and rescue alerting response.

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## 1. AIR NAVIGATION REPORT FORM (ANRF)

### APAC Regional Planning for ASBU Modules

<b>2. REGIONAL/NATIONAL PERFORMANCE OBJECTIVE – B0-FICE:</b> <b>Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration</b>					
<b>Performance Improvement Area 2:</b> <b>Globally Interoperable Systems and Data – Through Globally Interoperable System Wide Information Management</b>					
<b>3. ASBU B0-FICE: Impact on Main Key Performance Areas (KPA)</b>					
	<b>Access &amp; Equity</b>	<b>Capacity</b>	<b>Efficiency</b>	<b>Environment</b>	<b>Safety</b>
<b>Applicable</b>	Y	Y	Y	Y	Y

<b>4. ASBU B0-FICE: Planning Targets and Implementation Progress</b>	
<b>5. Elements</b>	<b>6. Targets and implementation progress (Ground and Air)</b>
Item 220 - ATS Inter-facility Data-link Communications (AIDC)	November 2015 (Seamless ATM Plan Phase I): ATM systems should enable AIDC between ATC units where transfers of control are conducted. As far as practicable, the AIDC messages types ABI, EST, ACP, TOC, AOC should be implemented.  November 2018 (Seamless ATM Plan Phase II): Implement full AIDC messaging, or alternate communication standard.
<a href="#"><i>Complete the regional ATN/AMHS network in the whole APAC region (enabler)</i></a>	<a href="#"><i>November 2015: all States are interconnected in AMHS</i></a>
<a href="#"><i>Migrate communications between States on the regional network (AIDC, ATFM, SUR data, performance monitoring, SWIM, etc)<sup>1</sup>(enabler)</i></a>	<a href="#"><i>November 2018: all States have migrated their communications</i></a>

<b>7. ASBU B0-FICE: Implementation Challenges</b>				
<b>Elements</b>	<b>Implementation Area</b>			
	<b>Ground System Implementation</b>	<b>Avionics Implementation</b>	<b>Procedures Availability</b>	<b>Operational Approvals</b>

<sup>1</sup> [Valid only if the study requested by APANPIRG/24 concludes that such network should be implemented in the APAC region](#)



**7. ASBU B0-FICE: Implementation Challenges**

Elements	Implementation Area			
	Ground System Implementation	Avionics Implementation	Procedures Availability	Operational Approvals
1. ATM systems should enable AIDC between ATC units where transfers of control are conducted. As far as practicable, the AIDC messages types ABI, EST, ACP, TOC, AOC should be implemented.	ATM automation system capability and supporting data communications network.	NIL	ATC procedures for intervention and interaction with ATM automation system, and for operational improvements including reduced ATC manual coordination requirement where supported by appropriate airspace and ATS route design or redesign.	NIL
2. Implement full AIDC messaging, or alternate communication standard.	ATM automation system capability and supporting data communications network.	NIL	ATC procedures for intervention and interaction with ATM automation system, and for operational improvements including reduced ATC manual coordination requirement where supported by appropriate airspace and ATS route design or redesign.	
<a href="#"><u>3. Complete the regional ATN/AMHS network in the whole APAC region</u></a>	<a href="#"><u>Readiness of all States for double stack</u></a>	<a href="#"><u>NIL</u></a>	<a href="#"><u>NIL</u></a>	<a href="#"><u>NIL</u></a>
<a href="#"><u>4. Migrate communications between States on the regional network</u></a>	<a href="#"><u>Multinational agreement and Common Procurement</u></a>	<a href="#"><u>NIL</u></a>	<a href="#"><u>NIL</u></a>	<a href="#"><u>NIL</u></a>

**8. ASBU B0-FICE: Performance Monitoring and Measurement**

**8A. ASBU B0-FICE: Implementation**

Elements	Performance Indicators/Supporting Metrics
1. Implement AIDC at APAC States between ATC units where transfers of control are conducted (minimum set: ABI, EST, ACP, TOC, AOC)	% of FIRs within which all applicable ACCs have implemented at least one interface to use AIDC / OLDI with neighbouring ACCs





**8. ASBU B0-FICE: Performance Monitoring and Measurement**  
**8A. ASBU B0-FICE: Implementation**

Elements	Performance Indicators/Supporting Metrics
2. Implement AIDC compliant with PAN-Regional AIDC ICD, or alternate higher performance data communications between all ACCs and between ACCs and all associated terminal ATC units.	% of FIRs within which all applicable ACCs have implemented full AIDC messaging, or alternate communication standard
3. <u><a href="#">Complete the regional ATN/AMHS network in the whole APAC region (enabler)</a></u>	<u><a href="#">% of States interconnected in AMHS</a></u>
4. <u><a href="#">Migrate communications between States on the regional network (enabler)</a></u>	<u><a href="#">% of States with migration of applications terminated</a></u>

**8A. ASBU B0-FICE: Performance Monitoring and Measurement**  
**8 B. ASBU B0-FICE: Performance Monitoring**

Key Performance Areas	Metrics (if not indicate qualitative Benefits)
Access & Equity	Benefit: Greater access afforded by improvements in capacity and efficiency.
Capacity	Benefit: Increased capacity due to reduced controller workload associated with ATS coordination and transfers of control.
Efficiency	Benefit: Reduced voice coordination, improved timeliness of coordination, leading to better efficiencies in ATC workload and task prioritization
Environment	Benefit: Increased capacity due to reduction in ATC workload, leading to more aircraft operating at preferred flight levels on optimum trajectories.
Safety	Benefit: Reduction and early detection of human coordination errors, thus reducing large height deviation (LHD) events. Extension of safety net alerts to aircraft operating beyond FIR boundary when to or intending to transit the FIR.

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**AIR NAVIGATION REPORT FORM (ANRF)**

**APAC Regional Planning for ASBU Modules**

<b>REGIONAL/NATIONAL PERFORMANCE OBJECTIVE – B0-SNET: Increased Effectiveness of Ground-Based Safety Nets</b>					
<b>Performance Improvement Area3: Optimum Capacity and Flexible Flights – Through Global Collaborative ATM</b>					
<b>ASBU B0-SNET: Impact on Main Key Performance Areas (KPA)</b>					
	<b>Access &amp; Equity</b>	<b>Capacity</b>	<b>Efficiency</b>	<b>Environment</b>	<b>Safety</b>
<b>Applicable</b>	N	N	N	N	Y

<b>4. ASBU B0-SNET: Planning Targets and Implementation Progress</b>	
<b>5. Elements</b>	<b>6. Targets and Implementation Status (Air Ground)</b>
1. Short Term Conflict Alert (STCA) Area Proximity Warning (APW) Minimum Safe Altitude Warning (MSAW)	<b>Nov. 18 (Phase 2):</b> ATS surveillance systems should enable STCA, APW and MSAW

<b>7. ASBU B0-SNET: Implementation Challenges</b>				
<b>Elements</b>	<b>Implementation Area</b>			
	<b>Ground System Implementation</b>	<b>Avionics Implementation</b>	<b>Procedures Availability</b>	<b>Operational Approvals</b>
1. Short Term Conflict Alert (STCA) Area Proximity Warning (APW) Minimum Safe Altitude Warning (MSAW)	ATM Systems upgrade	NIL	ATC Manual update and approval	NIL

<b>8. ASBU B0-SNET: Performance Monitoring and Measurement (Implementation)</b>	
<b>8A. ASBU B0-SNET: Implementation Monitoring</b>	
<b>Elements</b>	<b>Performance Indicators/Supporting Metrics</b>
1. Short Term Conflict Alert (STCA) Area Proximity Warning (APW) Minimum Safe Altitude Warning (MSAW)	Indicator: Percentage of States/Administrations implementing ground-based safety-nets (STCA, APW, MSAW, etc.) Supporting Metric: Number of States/Administrations implementing ground-based safety-nets (STCA, APW, MSAW, etc.)

<b>ASBU B0-SNET: Performance Monitoring and Measurement (Benefits)</b>	
<b>8 B. ASBU B0-SNET: Performance Monitoring</b>	
<b>Key Performance Areas</b>	<b>Benefits</b>
Access & Equity	NA
Capacity	NA
Efficiency	NA
Environment	NA
Safety	Significant reduction of the number of major incidents

**AIR NAVIGATION REPORT FORM (ANRF)  
APAC Regional Planning for ASBU Modules**

<b>REGIONAL/NATIONAL PERFORMANCE OBJECTIVE – B0-SURF: Safety and Efficiency of Surface Operations ( A-SMGCS )</b>					
<b>Performance Improvement Area 1: Airport Operations</b>					
<b>ASBU B0-SURF: Impact on Main Key Performance Areas (KPA)</b>					
	<b>Access &amp; Equity</b>	<b>Capacity</b>	<b>Efficiency</b>	<b>Environment</b>	<b>Safety</b>
<b>Applicable</b>	Y	Y	Y	Y	Y
<b>ASBU B0-SURF: Planning Targets and Implementation Progress</b>					
<b>Elements</b>			<b>Targets and Implementation Progress (Ground and Air)</b>		
Safety and Efficiency of Surface Operations			November 2015 (Seamless ATM Phase I): All high density international aerodromes (100,000 scheduled movements per annum or more) should have provided electronic surface movement guidance and control.		
<b>ASBU B0-SURF: Implementation Challenges</b>					
<b>Elements</b>	<b>Implementation Area</b>				
	<b>Ground system Implementation</b>	<b>Avionics Implementation</b>	<b>Procedures Availability</b>	<b>Operational Approvals</b>	
Safety and Efficiency of Surface Operations	A-SMGCS system integrating sensors. Vehicles properly equipped (cooperative transponder systems)	Nil	Nil	Nil	

<b>ASBU B0-SURF: Performance Monitoring and Measurement (Implementation)</b>	
<b>Elements</b>	<b>Performance Indicators/Supporting Metrics</b>
Surveillance system for ground surface movement(PSR,SSR, ADS-B or Multilateration (aircraft vehicles)	Percentage of applicable international aerodromes having implemented A-SMGCS
<b>ASBU B0-SURF: Performance Monitoring and Measurement (Benefits)</b>	
<b>Key Performance Areas</b>	<b>Performance Metrics</b>
Access & Equity	Improves portions of the Manoeuvring area obscured from view of the control tower for vehicles and aircraft. Ensures equity in ATC handling of surface traffic regardless of the traffic's position on the international aerodrome
Capacity	Sustained level of aerodrome capacity during periods of reduced visibility
Efficiency	Reduced taxi times through diminished requirements for intermediate holdings based on reliance on visual surveillance only. Reduced fuel burn
Environment	Reduced emissions due to reduced fuel burn
Safety	Reduced runway incursions. Improved response to unsafe situations. Improved situational awareness leading to reduced ATC workload



# 1. AIR NAVIGATION REPORT FORM (ANRF)

## APAC Regional Planning for ASBU Modules

<b>2. REGIONAL/NATIONAL PERFORMANCE OBJECTIVE – Module B0-TBO: Improved Safety and Efficiency through the initial application of Data Link En-Route</b>					
<b>Performance Improvement Area 4: Efficient Flight Path – Through Trajectory-based Operations</b>					
<b>3. ASBU B0-TBO: Impact on Main Key Performance Areas (KPA)</b>					
	<b>Access &amp; Equity</b>	<b>Capacity</b>	<b>Efficiency</b>	<b>Environment</b>	<b>Safety</b>
<b>Applicable</b>	N	Y	Y	Y	Y

<b>4. ASBU B0-TBO: Planning Targets and Implementation Progress</b>	
<b>5. Elements</b>	<b>6. Targets and implementation progress (Ground and Air)</b>
ADS-C	November 2015 (Phase I): Within Category R airspace (remote en-route airspace within ATS communications and surveillance coverage dependent on a third-party CSP), ADS-C surveillance should be enabled to support PBN-based separations
CPDLC	November 2015 (Phase I): Within Category R airspace (remote en-route airspace within ATS communications and surveillance coverage dependent on a third-party CSP), CPDLC should be enabled to support PBN-based separations

<b>7. ASBU B0-TBO: Implementation Challenges</b>				
<b>Elements</b>	<b>Implementation Area</b>			
	<b>Ground System Implementation</b>	<b>Avionics Implementation</b>	<b>Procedures Availability</b>	<b>Operational Approvals</b>
ADS-C	RCP and RSP framework should ensure that the end to end performance is reached and maintained, including CSP performance	Implementation of ADS-C for general aviation	NIL	NIL
CPDLC	RCP and RSP framework should ensure that the end to end performance is reached and maintained, including CSP performance	Implementation of CPDLC for general aviation	NIL	NIL

<b>8. ASBU B0-TBO: Performance Monitoring and Measurement</b>	
<b>8A. ASBU B0-TBO: Implementation Monitoring</b>	
<b>Elements</b>	<b>Performance Indicators/Supporting Metrics</b>



<b>8. ASBU B0-TBO: Performance Monitoring and Measurement</b>	
<b>8A. ASBU B0-TBO: Implementation Monitoring</b>	
<b>Elements</b>	<b>Performance Indicators/Supporting Metrics</b>
ADS-C	Indicators: Percentage of FIRs utilising ADS-C to provide service within all category R airspace Supporting metric: Number of FIRs utilising ADS-C to provide service within all category R airspace
CPDLC	Indicators: Percentage of FIRs utilising CPDLC to provide service within all category R airspace Supporting metric: Number of FIRs utilising CPDLC to provide service within all category R airspace

<b>ASBU B0-TBO: Performance Monitoring and Measurement</b>	
<b>8 B. ASBU B0-TBO: Performance Monitoring</b>	
<b>Key Performance Areas</b>	<b>Metrics ( if not indicate qualitative Benefits)</b>
Access & Equity	NA
Capacity	Benefit: A better localization of traffic and reduced separation allow increased capacity. Reduced communication workload and better organization of controller tasks increase sector capacity.
Efficiency	Benefit: Routes/tracks and flights can be separated by reduced minima, allowing flexible routings and vertical profiles closer to the user-preferred ones. In association with AIDC, implementation of DARP procedures.
Environment	Benefit: Reduced emissions as a result of reduced fuel burn
Safety	Benefit: ADS-C based tools support cleared level adherence monitoring, route adherence monitoring, danger area infringement warning and improved search and rescue. Reduced occurrences of misunderstandings; solution to stuck microphone situations. Quicker responses to route deviation requests and emergencies.

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Comments on Implementation Guidance

Ref.	State or Administration	Document	Para, Table or Figure	Comment	Suggested modification (mandatory)	ICAO proposed modification	Document taking the comment into account
1	China	Seamless ATM Implementation Guidance v4 0	Element 60 ATC Sector Capacity	In the line of Element 60 ATC Sector Capacity, the corresponding PARS and PASL is 7.50 and 7.44, and I think they both belong to Phase II, but in the table 7.50 is listed in Phase I column.	they both belong to Phase II	List para 7.50 in Phase II column instead of Phase I column	Seamless ATM Implementation Guidance v4 1
2	China	Seamless ATM Implementation Guidance v4 0	Element 300	The element 300 is called Aeronautical Meteorology, and the corresponding PARS and PARL is 7.38 and 7.51 which are both related to AIM. Please confirm that element 300 is not Aeronautical Information	Element 300 is not Aeronautical Information	Rename element 300 as "Digital Aeronautical Information Management"	Seamless ATM Implementation Guidance v4 1
3	China	Seamless ATM Implementation Guidance v4 0	Para 7.31	I did not find PARS and PASL 7.31 in the table		Agreed that 7.31 para is not in the table, but no modification proposed as this para 7.31 is about implementing the regional items themselves, the outcome of which will be monitored through the performance regional dashboard. ("The efficacy, continuity and availability of ATM services should be supported by adherence with regional planning and guidance material regarding ATM automation and ATM contingency systems")	
4	ICAO	Seamless ATM Implementation Guidance v4 0	Table 1	Table 1 should introduce phase1 and 2, and para referred to, to have a global view		Table 1 to introduce phase1 and 2, and para referred to, to have a global view	Seamless ATM Implementation Guidance v4 1
5	ICAO	Seamless ATM Implementation Guidance v4 1	Table 1			Rename items of column Specification title after Meeting Summary of discussion of Chairperson's meeting, Hong Kong China, 16-17 Jan. 2014.	Seamless ATM Implementation Guidance v4 2
6	ICAO	Seamless ATM Implementation Guidance v4 1	Section "Preparing the projects" and Table 2			Reduce the number of key milestone to only one: Implement and Monitor, in order to alleviate the State reporting work load	Seamless ATM Implementation Guidance v4 2
7	ICAO	Seamless ATM Implementation Guidance v4 1	Table 3			Updated guidance material. Updated also Specification title after Meeting Summary of discussion of Chairperson's meeting, Hong Kong China, 16-17 Jan. 2014.	Seamless ATM Implementation Guidance v4 2
8	ICAO	Seamless ATM Implementation Guidance v4 1	Table 4			Updated Reporting form after reporting form version 3, produced after review by Chairperson's meeting, Hong Kong China, 16-17 Jan. 2014.	Seamless ATM Implementation Guidance v4 2
9	ICAO	Seamless ATM Implementation Guidance v4 2	Table 4			Deletion, replacement by a URL to the Seamless reporting form	Seamless ATM Implementation Guidance v4 3
10	ICAO	Seamless ATM Implementation Guidance v4 2	Table 3, Element 220 AIDC			Added reference to the PAN AIDC ICD to be endorsed by APANPIRG	Seamless ATM Implementation Guidance v4 3
11	Japan	Seamless ATM Implementation Guidance v4 2	Table 3, Element 220 AIDC	AIDC Element does not mention phase 2 objective	Add phase 2 objective for AIDC element	Added phase 2 objective for AIDC element	Seamless ATM Implementation Guidance v4 3
12							
13							
14							

## INTERNATIONAL CIVIL AVIATION ORGANIZATION



# Seamless ATM Implementation Guidance

Version 4.3, May 2014

Related to the Asia/Pacific Seamless ATM Plan, Version 1.0



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## Introduction

1.1 The Seamless ATM plan plans a number of regional planning items. **Table 1** indicates the reference code used to track the large number of separate planning elements, whether the elements affect the aerodrome, terminal or en-route phases (or a combination of these), the cross reference to the Aviation System Block Upgrade (ASBU) module, if any, and in which phase its implementation is expected in the Asia-Pacific Region.

Seamless ATM Plan reference, paragraph	Aerodrome	Terminal	En-route	Specification title	ASBU module	Phase 1 (12 Nov. 2015)	Phase 2 (08 Nov. 2018)
10 (7.1)	✓			Apron Management	Regional	✓	
20 (7.1)	✓	✓		ATM-Aerodrome Coordination	Regional	✓	
30 (7.1, 13)	✓			Aerodrome capacity	Regional	✓	✓
40 (7.1)	✓			Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)	B0-SURF	✓	
50 (7.25, 45)	✓	✓		Arrival Manager/Departure Management (AMAN/DMAN)	B0-RSEQ	✓	✓
60 (7.44, 50)		✓	✓	ATC Sector Capacity	Regional		✓
70 (7.2)	✓			Airport Collaborative Decision-Making (ACDM)	B0-ACDM	✓	
80 (7.27, 47)		✓	✓	Air Traffic Flow Management/Collaborative Decision-Making (ATFM/CDM)	B0-NOPS	✓	✓
90 (7.3)		✓		Continuous Descent Operations (CDO)	B0-CDO	✓	
100 (7.3)		✓		Continuous Climb Operations (CCO)	B0-CCO	✓	
110 (7.5, 14, 16)		✓		Performance-based Navigation (PBN) Approach	B0-APTA	✓	✓
120 (7.4, 15)		✓		Standard Instrument Departures/Standard Terminal Arrivals (SID/STAR)	B0-CCO	✓	✓
130 (7.19)		✓		Performance-based Navigation (PBN) Visual Departure and Arrival Procedures	Regional		✓
140 (7.9, 22)			✓	Performance-based Navigation (PBN) Routes	B0-FRTO	✓	✓
150 (7.8)			✓	Performance-based Navigation (PBN) Airspace	Regional	✓	
160 (7.52, 54)		✓	✓	Safety Nets	B0-SNET		✓
170 (7.7, 21)		✓	✓	Airborne Safety Systems	B0-ACAS	✓	✓
180 (7.6, 23, 24)		✓	✓	Ground-based surveillance	B0-ASUR	✓	✓
190 (7.28)			✓	Airspace classification	Regional	✓	

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Seamless ATM Plan reference, paragraph	Aerodrome	Terminal	En-route	Specification title	ASBU module	Phase 1 (12 Nov. 2015)	Phase 2 (08 Nov. 2018)
200 (7.10)			✓	Flight Level Orientation Scheme (FLOS)	Regional	✓	
210 (7.36, 40)			✓	Flight Level Allocation Schemes (FLAS)	Regional	✓	
220 (7.35, 49)		✓	✓	ATS Inter-facility Data-link Communications (AIDC)	B0-FICE	✓	✓
230 (7.29,46)	✓	✓	✓	Automated Transfer of Control	Regional	✓	✓
240 (7.34,48)		✓	✓	ATS Surveillance data sharing	Regional	✓	✓
250 (7.37, 43, 53)	✓	✓	✓	ATM systems enabling optimal PBN/ATC operations	B0-APTA	✓	✓
260 (7.30)	✓	✓	✓	ATC Horizontal separation	Regional	✓	
270 (7.32)	✓	✓	✓	Situation display integrating surveillance data	B0-ASUR	✓	
280 (7.33)		✓	✓	ADS-C, CPDLC	B0-TBO	✓	
290 (7.33)	✓	✓	✓	UPR and DARP	B0-FRTO	✓	
300 (7.38, 51)	✓	✓	✓	Aeronautical Information Management	B0-DATM	✓	✓
310 (7.26, 39)	✓	✓	✓	Meteorological Information	B0-AMET	✓	
320 (7.41, 55)	✓	✓	✓	ATM Managers' Performance	Regional	✓	✓
330 (7.41)	✓	✓	✓	ATC simulators performance	Regional	✓	
340 (7.41)	✓	✓	✓	Safety assessment of changes	Regional	✓	
350 (7.41)	✓	✓	✓	ATM Operators' performance	Regional	✓	
360 (7.11)		✓	✓	Civil Military use of SUA	B0-FRTO	✓	
370 (7.42)		✓	✓	Strategic Civil Military coordination	Regional	✓	
380 (7.42)		✓	✓	Tactical Civil Military coordination	Regional	✓	
390 (7.42)	✓	✓	✓	Civil Military system integration	Regional	✓	
400 (7.42)	✓	✓	✓	Civil Military navaids joint provision	Regional	✓	
410 (7.42)	✓	✓	✓	Civil Military common training	Regional	✓	
420 (7.42)	✓	✓	✓	Civil Military common procedures	Regional	✓	

**Table 1: List of Seamless ATM Plan specifications**

## Preparing the projects

1.2 At the State level, the implementation of each element should be structured as a project, divided into a number of stages and major tasks/actions, and coordinated with the other projects at the regional level when needed. **Appendix A** provides full traceability to the ASBU framework for ease of reference.

1.3 In order to share a common vocabulary and give some related regional guidelines, it is considered necessary to utilise a formal step by step planning system.

1.4 The table at the bottom left of **Figure A** provides a simple way of indicating the ‘customised’ actions that may be necessary for each project to be implemented effectively. Note that there are several blank spaces, which have in this case have been recommended as unnecessary for this particular element. This should not preclude a State from adding extra steps if this is deemed necessary.

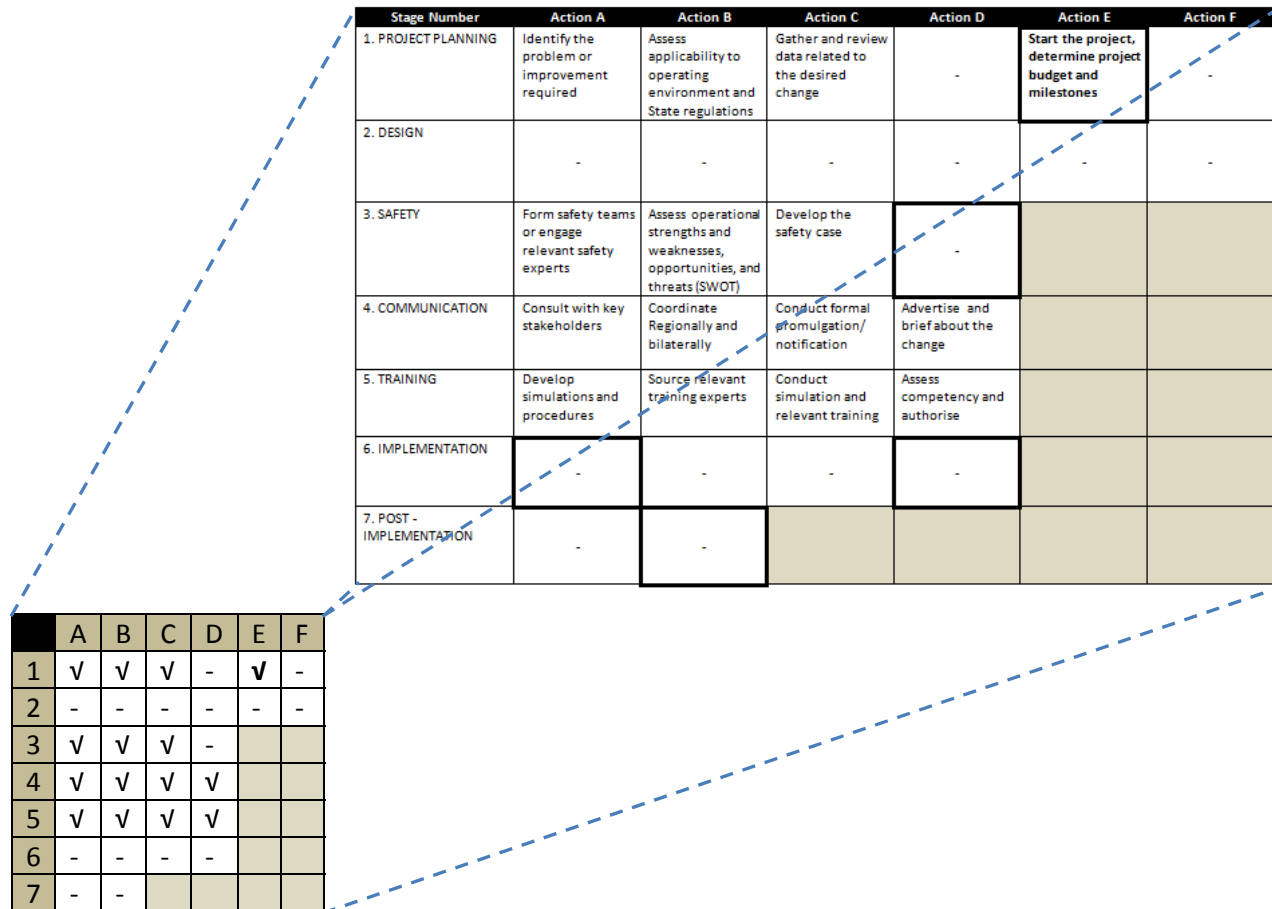


Figure A: Mapping between a Planning Grid and the Implementation Guidance Matrix

1.5 **Figure B** provides the meaning of the signs used in the Implementation Guidance Matrix, to indicate if the considered action item is applicable or not, and if it is related to a key milestone or not.

	A	B	C	D	E	F		<b>Value</b>	<b>Meaning</b>
1	√	√	√	-	√	-		√	applicable, Key milestone
2	-	-	-	-	-	-		√	applicable
3	√	√	-	-				-	not applicable for the considered item
4	√	√	√	-				■	never applicable
5	√	-	-	-					
6	-	-	√	√					
7	-	-							

*Figure B: Meaning of the signs used in an implementation matrix*

1.6 Most importantly, States need to ensure they have the right preliminary assessment to determine if any particular elements are applicable to them. For many States, there will be cost or other resource implications, so there may need to be a degree of economic evaluation before deciding to go ahead with any particular implementation.

1.7 None of the project steps were compulsory for any particular element, but should be taken as a guide to optimal implementation change management. The steps may also be taken in any particular order or done concurrently (i.e.: at the same time) if necessary. States need to determine the best change management fit for their individual circumstances. In this regard, the implementation guidance is provided as a starting resource for those States that find this beneficial, but is not intended to replace change management processes already in place if these are appropriate and robust. States should refer to the Safety Management Manual (Doc 9859) for an overview of optimal change management processes.

1.8 One action, *Action 6D- Implement and monitor*, as outlined in in solid red border in **Table 2**, is a key milestone. It is considered to be essential for reporting in terms of the Regional Seamless ATM Reporting Form.

1.9 The Regional Seamless ATM Reporting Form needs a consistent approach from States, as the implementation data needs to be comparable between States, and it is also part of a larger global reporting system.

1.10 **Table 2** provides the complete Implementation Guidance Matrix. An example of an implementation process might be Seamless ATM element 60: ATC sector Capacity, which might require only 1(a, b, c, e), 3(a, b, c), 4(a, b, c, d), and 5(a, b, c, d), while 1(e) was a key milestone.

1.11 **Table 3** entitled ‘Recommended Implementation Actions and Guidance’ are provided as early planning assistance for States.

1.12 A State Seamless ATM Implementation Plan Template is provided (<http://www.icao.int/ layouts/download.aspx?SourceUrl=/APAC/Documents/edocs/State Seamless ATM Implementation Plan Template v3.0.doc>) . The State Seamless ATM Implementation Plan is primarily intended for internal use within the State concerned, to aid its own planning. However the document may be useful on occasions for regional planning, although the Regional Seamless ATM Reporting Form is the primary source of information for ICAO.

1.13 The State Seamless ATM Implementation Plan Template format is not mandatory and States may choose to use their own planning documents instead of the template. Similar to the Recommended Implementation Actions and Guidance in Table 3, States may choose to add or delete elements, or steps of any element's implementation plan to suit their own needs.

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Stage Number	Action A	Action B	Action C	Action D	Action E	Action F
1. PROJECT PLANNING	Identify the problem or improvement required	Assess applicability to operating environment and State regulations	Gather and review data related to the desired change	Assess economic feasibility and cost/benefit	Start the project, determine project budget and milestones	Plan tendering and maintenance contract process
2. DESIGN	Determine initial design of the desired change, including alternatives	Determine Key Performance Indicators and/or success criteria	Design backup and transition procedures/ steps, including reversion	Determine maintenance considerations	Refine and agree on final design	Define system validation and verification (FAT, SAT)
3. SAFETY	Form safety teams or engage relevant safety experts	Assess operational strengths and weaknesses, opportunities, and threats (SWOT)	Develop the safety case	Prepare and apply for regulatory approval or certification		
4. COMMUNICATION	Consult with key stakeholders	Coordinate Regionally and bilaterally	Conduct formal promulgation/ notification	Advertise and brief about the change		
5. TRAINING	Develop simulations and procedures	Source relevant training experts	Conduct simulation and relevant training	Assess competency and authorise		
6. IMPLEMENTATION	Conduct operational trials and testing	Assess stability and performance	Make a Go/No-Go decision	<b>Implement and monitor</b>		
7. POST - IMPLEMENTATION	Develop review -Lessons learnt -KPI achievement -Report	Monitor medium and long term performance and safety				

**Table 2: Implementation Guidance Matrix**

## Recommended Implementation Actions and Guidance

No	Element	Phase I (expected implementation by 12 November 2015)	Phase II (expected implementation by 08 November 2018)	Implementation actions (Refers to Table 2, implementation matrix)							Main impacts / Main requirements and guidance references
				A	B	C	D	E	F		
10	Apron Management REGIONAL	7.1.a All high density aerodromes should provide an appropriate apron management service in order to regulate entry of aircraft into and coordinate exit of aircraft from the apron									<b>Main impacts</b> <ul style="list-style-type: none"> <li>People: Airport development and maintenance planners, Airport Operators, ANSP Capacity and safety Managers and procedure designers</li> </ul>
				1	√	√	√	√	√	√	
				2	√	√	√	√	√	√	
				3	√	√	√	√			
				4	√	√	√	√			
				5	√	√	√	√			
				6	√	√	√	√			
20	ATM- Aerodrome Coordination - REGIONAL	7.1.b All high density should have appropriate ATM coordination (including meetings and agreements) related to: <ul style="list-style-type: none"> <li>airport development and maintenance planning;</li> <li>coordination with local authorities regarding environmental, noise abatement, and obstacles;</li> <li>ATM/PBN procedures affecting the aerodrome</li> </ul>									<b>Main impacts</b> <ul style="list-style-type: none"> <li>People: Airport development and maintenance planners, Airport Operators, ANSP Capacity and safety Managers and procedure designers, Airspace users</li> </ul>
				1	√	√	√	-	√	-	
				2	√	√	-	-	-	-	
				3	√	√	-	-			
				4	√	√	√	√			
				5	√	-	-	-			
				6	-	-	√	√			
30	Aerodrome capacity - REGIONAL	7.1.c All high density aerodromes (100,000 scheduled movements per annum or more) should conduct regular airport capacity analysis, which includes a detailed assessment of passenger, airport gate, apron, taxiway and runway capacity	7.13 All high density aerodromes should have a declared airport terminal and runway capacity based on a capacity and efficiency analysis, to ensure the maximum possible efficiency of aircraft and passenger movement.								<b>Main impacts</b> <p>People: Airport development and maintenance planners, Airport Operators, ANSP Capacity and safety Managers and procedure designers, Airspace users</p>
				1	√	√	√	-	√	-	
				2	-	-	-	-	-	-	
				3	√	√	-	-			
				4	√	√	√	-			
				5	√	-	-	-			
				6	-	-	√	√			
7	-	-									



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40	<p><b>Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2) (B0-SURF)</b></p>	<p>7.1.d All high density aerodromes (100,000 scheduled movements per annum or more) should provide electronic surface movement guidance and control.</p>		<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>2</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>3</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>√</td> <td>√</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	D	E	F	1	√	√	√	√	√	√	2	√	√	√	√	√	√	3	√	√	√	√			4	√	√	√	√			5	√	√	√	√			6	√	√	√	√			7	√	√					<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>• People: ATCO, ATSEP</li> <li>• Procedures: ANSP (configuration and use of A-SMGCS), Airport Operators</li> <li>• Systems: Avionics, Vehicles, ANSP Ground System</li> </ul> <p><b>Main requirements/guidance</b></p> <ul style="list-style-type: none"> <li>• ICAO Annex 14, Volume I, Chapter 9</li> <li>• ICAO Annex 11</li> <li>• ICAO Doc 4444</li> <li>• ICAO Doc 9476 SMGCS Manual</li> <li>• ICAO Doc 9830 A-SMGCS Manual</li> <li>• Eurocae ED-87B MASPS for SMGCS</li> <li>• Eurocae ED-116 MOPS for Surface Movement Radar Sensor Systems for Use in A-SMGCS</li> <li>• Eurocae ED-117 MOPS for Mode S Multilateration Systems for Use in A-SMGCS</li> <li>• Eurocae ED-128 Guidelines for Surveillance Data Fusion in Advanced Surface Movement Guidance and Control Systems (A-SMGCS) Levels 1 and 2</li> </ul> <p>Note: The provision of A-SMGCS should be subject to economic analysis</p>
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50	<p><b>Arrival Manager/ Departure Management (AMAN/DMAN) (B0-RSEQ)</b></p>	<p>7.25 All high density aerodromes should have AMAN/DMAN facilities.</p>	<p>7.45 All AMAN systems should take into account airport gates for runway selection and other aircraft departures from adjacent gates that may affect arriving aircraft</p>	<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>2</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>3</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>√</td> <td>-</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>√</td> <td>√</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	D	E	F	1	√	√	√	√	√	√	2	√	√	√	√	√	√	3	√	√	√	√			4	√	-	√	√			5	√	√	√	√			6	√	√	√	√			7	√	√					<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>• People: ATCO, ATSEP</li> <li>• Procedures: ANSP (configuration and use of AMAN/DMAN)</li> <li>• Systems: ANSP Ground System, Avionics</li> </ul> <p><b>Main requirements/guidance</b></p> <ul style="list-style-type: none"> <li>• ICAO Annex 10, Volume II</li> <li>• ICAO Doc 9705</li> </ul> <p>Note: Refer to Airport CDM and: Coordination of ANSP ground systems for extension of AMAN horizon</p>
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60	<b>ATC Sector Capacity - REGIONAL</b>		7.44 All terminal ATC Sectors should have a nominal aircraft capacity figure based on a scientific capacity study and safety assessment, to ensure safe and efficient aircraft operations. 7.50 To ensure the safety and efficiency of aircraft operations, a nominal aircraft capacity figure based on a scientific capacity study and safety assessment should be available for all enroute ATC sectors	<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>√</td> <td>√</td> <td>√</td> <td>-</td> <td>√</td> <td>-</td> </tr> <tr> <td>2</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>3</td> <td>√</td> <td>√</td> <td>√</td> <td>-</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>-</td> <td>-</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	D	E	F	1	√	√	√	-	√	-	2	-	-	-	-	-	-	3	√	√	√	-			4	√	√	√	√			5	√	√	√	√			6	-	-	-	-			7	-	-					<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>• People: ANSP Capacity and safety Managers</li> </ul>
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70	<b>Airport Collaborative Decision-Making (ACDM) (B0-ACDM)</b>	7.2 All high density aerodromes should operate an A-CDM system serving the MTF and busiest city pairs, with priority implementation for the busiest Asia/Pacific aerodromes (ASBU Priority 2).		<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>2</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>3</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>√</td> <td>√</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	D	E	F	1	√	√	√	√	√	√	2	√	√	√	√	√	√	3	√	√	√	√			4	√	√	√	√			5	√	√	√	√			6	√	√	√	√			7	√	√					<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>• People: ANSP and airport managers (as part of CDM), airport designers, ATCO, Flight crew</li> <li>• Procedures: ANSP, Airport Operators, Airspace users</li> <li>• Systems: Avionics, ANSP and Airport Ground Systems, Vehicles</li> </ul> <p><b>Main requirements/guidance</b></p> <ul style="list-style-type: none"> <li>• ICAO Doc 4444</li> <li>• ICAO CDM Manual</li> <li>• ICAO Doc 9868 (PANS training)</li> <li>• US TBFM and EUROCONTROL A-CDM</li> <li>• Eurocae ED-141 Minimum technical specifications for airport collaborative decision making (airport-CDM) systems</li> </ul>
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80	<b>Air Traffic Flow Management / Collaborative Decision-Making (ATFM/CDM) (B0-NOPS)</b>	7.27 High density FIRs supporting the busiest Asia/Pacific traffic flows and high density aerodromes should implement ATFM incorporating CDM to enhance capacity, using bi-lateral and multi-lateral agreements.	7.47 All FIRs supporting Major Traffic Flows should implement ATFM incorporating CDM to enhance capacity, using bi-lateral and multi-lateral agreements.	<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>2</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>3</td> <td>√</td> <td>-</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>√</td> <td>√</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	D	E	F	1	√	√	√	√	√	√	2	√	√	√	√	√	√	3	√	-	√	√			4	√	√	√	√			5	√	√	√	√			6	√	√	√	√			7	√	√					<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>• People: Flow Managers, ATCO, Dispatchers</li> <li>• Procedures: ANSP</li> <li>• Systems: ANSP Ground Systems</li> </ul> <p><b>Main requirements/guidance</b></p> <ul style="list-style-type: none"> <li>• ICAO Manual on ATFM available in draft version.</li> <li>• US/Europe experience enough to help initiate applications in other regions</li> <li>• New procedures required to link much closer ATFM with ATS in case of using miles-in-trail or AMAN or DMAN</li> </ul>
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90	<b>Continuous Descent Operations (B0-CDO)</b>	7.3 CDO operations should be considered for implementation at all high density international aerodromes after analysis, based on a performance-based approach.		<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>-</td> </tr> <tr> <td>2</td> <td>√</td> <td>√</td> <td>√</td> <td>-</td> <td>√</td> <td>-</td> </tr> <tr> <td>3</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>√</td> <td>√</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	D	E	F	1	√	√	√	√	√	-	2	√	√	√	-	√	-	3	√	√	√	√			4	√	√	√	√			5	√	√	√	√			6	√	√	√	√			7	√	√					<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>• People: Airspace designers, ANSP procedures designers, Flight Procedures designers, Flight crew, ATCO</li> <li>• Procedures: ANSP, Airspace users</li> <li>• Systems: Avionics, Ground Systems, Navaid infrastructure</li> </ul> <p><b>Main requirements/guidance</b></p> <ul style="list-style-type: none"> <li>• ICAO Continuous Descent Operations (CDO) Manual (Doc 9931)</li> <li>• ICAO Performance Based Navigation Manual (ICAO Doc 9613)</li> <li>• ICAO PBN operational approval guidance material</li> <li>• ICAO Doc 9868 (PANS training)</li> </ul> <p>Note: Since RNP AR Approaches require significant training, ANSPs should work closely with airspace users to determine where RNP AR approaches are to be implemented.</p>
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110	<p><b>Performance-based Navigation (PBN) Approach (B0-APTA)</b></p>	7.5 Where practicable, all high density aerodromes with instrument runways serving aeroplanes should have approaches with vertical guidance (APV). should have:	7.14 RNP 0.3 arrival/departure, approach and/or en-route transiting procedures should be considered at high density aerodromes with rotary wing operations.								<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>• People: Airspace designers, ANSP procedures designers, Flight Procedures designers, Flight crew, ATCO</li> <li>• Procedures: ANSP, Airspace users</li> <li>• Systems: Avionics, ANSP Ground Systems, SBAS and GBAS infrastructure</li> </ul> <p><b>Main requirements/guidance</b></p> <ul style="list-style-type: none"> <li>• ICAO Annex 11</li> <li>• ICAO Annex 10</li> <li>• ICAO PANS-OPS Volume 1</li> <li>• ICAO PBN Manual</li> <li>• ICAO GNSS Manual</li> <li>• ICAO Manual on Testing of Radio Navigation Aids (Doc 8071), Volume II</li> <li>• ICAO Quality Assurance Manual for Flight Procedure Design (Doc 9906)</li> <li>• ICAO Doc 9868 (PANS training)</li> </ul> <p>Notes:</p> <ul style="list-style-type: none"> <li>• the APAC PBN Plan Version 3 required RNP APCH (with Baro-VNAV) for 30% of instrument runways by 2010 and 50% by 2012 (priority should be given to airports with operational benefits); and RNP APCH with Baro-VNAV or APV in 100% of instrument runways by 2016.</li> <li>• For avionics consider Basic IFR Avionics (TSO C129 with RAIM), Basic IFR GNSS receivers with Baro VNAV, SBAS avionics (TSO C145/146), GBAS receivers (TSO C161/162)</li> </ul>	
		a) precision approaches; or										
		b) approaches with vertical guidance (APV), either RNP APCH with Barometric Vertical Navigation (Baro-VNAV) or augmented GNSS (SBAS or GBAS; or										
		c) when an APV was not practical, straight-in RNP APCH with Lateral Navigation (LNAV)										
			a) precision approaches; or									
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120	<p><b>Standard Instrument Departures/ Standard Terminal Arrivals (SID/STAR) (B0-CCO)</b></p>	<p>7.4 All international high density aerodromes should have RNAV 1 (ATS surveillance environment) or RNP 1 (ATS surveillance and non-ATS surveillance environments) SID/STAR.</p>	<p>7.15 All international aerodromes should have RNAV 1 (ATS surveillance environment) or RNP 1 (ATS surveillance and non-ATS surveillance environments) SID/STAR.</p>	<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>√</td> <td>√</td> <td>√</td> <td>-</td> <td>√</td> <td>-</td> </tr> <tr> <td>2</td> <td>√</td> <td>√</td> <td>√</td> <td>-</td> <td>√</td> <td>-</td> </tr> <tr> <td>3</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>√</td> <td>-</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	D	E	F	1	√	√	√	-	√	-	2	√	√	√	-	√	-	3	√	√	√	√			4	√	√	√	√			5	√	√	√	√			6	√	√	√	√			7	√	-					<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>• People: Airspace designers, ANSP procedures designers, Flight Procedures designers, Flight crew, ATCO</li> <li>• Procedures: ANSP, Airspace users</li> <li>• Systems: Avionics, ANSP Ground Systems, SBAS and GBAS infrastructure</li> </ul> <p><b>Main requirements/guidance</b></p> <ul style="list-style-type: none"> <li>• ICAO Annex 11</li> <li>• ICAO Annex 10</li> <li>• ICAO PANS-OPS Volume 1</li> <li>• ICAO PBN Manual</li> <li>• ICAO GNSS Manual</li> <li>• ICAO Manual on Testing of Radio Navigation Aids (Doc 8071), Volume II</li> <li>• ICAO Quality Assurance Manual for Flight Procedure Design (Doc 9906)</li> <li>• ICAO Doc 9868 (PANS training)</li> </ul> <p>Note: the Asia/Pacific PBN Plan Version 3 required RNAV 1 SID/STAR for 50% of international airports by 2010 and 75% by 2012 (priority should be given to airports with RNP Approach); and RNAV 1 or RNP 1 SID/STAR for 100% of international airports and 70% of busy domestic airports where there are operational benefits by 2016.</p>
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130	<p><b>Performance-based Navigation (PBN) Visual Departure and Arrival Procedures - REGIONAL</b></p>		<p>7.19 PBN procedures that overlay visual arrival and departure procedures should be established where this provided an operational advantage.</p>	<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>-</td> </tr> <tr> <td>2</td> <td>√</td> <td>√</td> <td>√</td> <td>-</td> <td>√</td> <td>-</td> </tr> <tr> <td>3</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>√</td> <td>-</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	D	E	F	1	√	√	√	√	√	-	2	√	√	√	-	√	-	3	√	√	√	√			4	√	√	√	√			5	√	√	√	√			6	√	√	√	√			7	√	-					<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>• People: Airspace designers, ANSP procedures designers, Flight Procedures designers, Flight crew, ATCO</li> <li>• Procedures: ANSP, Airspace users</li> <li>• Systems: Avionics, ANSP Ground Systems, SBAS and GBAS infrastructure</li> </ul> <p><b>Main requirements/guidance</b></p> <ul style="list-style-type: none"> <li>• ICAO Annex 11</li> <li>• ICAO Annex 10</li> <li>• ICAO PANS-OPS Volume 1</li> <li>• ICAO PBN Manual</li> <li>• ICAO GNSS Manual</li> <li>• ICAO Manual on Testing of Radio Navigation Aids (Doc 8071), Volume II</li> <li>• ICAO Quality Assurance Manual for Flight Procedure Design (Doc 9906)</li> <li>• ICAO Doc 9868 (PANS training)</li> </ul>
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140	<p><b>Performance-based Navigation (PBN) Routes (B0-FRTO)</b></p>	<p>7.9 All ATS routes should be designated with a navigation performance specification to define the CNS/ATM operational environment. The ATS route navigation performance specification selected should be the least stringent needed to support the intended operation. When obstacle clearance or ATC separation requirements demand, a more stringent navigation specification may be selected. ATS routes should be established in accordance with the following PBN specifications:</p> <ul style="list-style-type: none"> <li>Category R airspace – RNP 4, RNP 10 (RNAV 10) (other acceptable navigation specifications – RNP 2 oceanic); and</li> <li>Category S airspace – RNP 2 or RNAV 2 (other acceptable navigation specifications – RNAV 5).</li> </ul>	<p>7.22 All en-route controlled airspace should be designated as being exclusive PBN airspace with mandatory carriage of GNSS utilising RNP navigation specifications, except for State aircraft. Such implementation mandates should be harmonised with adjacent airspace. ATS routes should be established in accordance with the following PBN specification:</p> <ul style="list-style-type: none"> <li>Category R and S airspace – RNP 2</li> </ul>	<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>-</td> </tr> <tr> <td>2</td> <td>√</td> <td>-</td> <td>√</td> <td>-</td> <td>√</td> <td>-</td> </tr> <tr> <td>3</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>√</td> <td>-</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	D	E	F	1	√	√	√	√	√	-	2	√	-	√	-	√	-	3	√	√	√	√			4	√	√	√	√			5	√	√	√	√			6	√	√	√	√			7	√	-					<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>People: Flight crew, ATCO, Airspace Planners, Airspace users</li> <li>Procedures: ANSP (letters of agreement, airspace, AIP/AIC), Airspace users</li> <li>Systems: Avionics (Flight following/monitoring), ANSP Ground Systems (support of Flexible Routing)</li> </ul> <p><b>Main requirements/guidance</b></p> <ul style="list-style-type: none"> <li>ICAO Annex 11</li> <li>ICAO Annex 10</li> <li>ICAO PANS-OPS Volume 1</li> <li>ICAO PBN Manual</li> <li>ICAO GNSS Manual</li> <li>ICAO Manual on Testing of Radio Navigation Aids (Doc 8071), Volume II</li> <li>ICAO Quality Assurance Manual for Flight Procedure Design (Doc 9906)</li> <li>ICAO Doc 9868 (PANS training)</li> </ul> <p>Note: The possibility of a regional mandate of PBN should be considered</p>
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150	<p><b>Performance-based Navigation (PBN) airspace - REGIONAL</b></p>	<p>7.8 All Category R and S upper controlled airspace, and Category T airspace supporting high density aerodromes should be designated as non-exclusive or exclusive PBN airspace as appropriate. This is to allow operational priority for PBN approved aircraft, harmonised specifications and to take into account off-track events such as weather deviations, with priority implementation for high density FIRs.</p>		<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>-</td> </tr> <tr> <td>2</td> <td>√</td> <td>√</td> <td>√</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>3</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>-</td> <td>-</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>√</td> <td>-</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>√</td> <td>-</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	D	E	F	1	√	√	√	√	√	-	2	√	√	√	-	-	-	3	√	√	√	√			4	√	√	√	√			5	-	-	√	√			6	√	-	√	√			7	√	-					<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>People: Flight crew, Airspace users, Civil aviation authorities, ANSP</li> <li>Procedures: ANSP</li> <li>Systems: Avionics, ANSP Ground Systems</li> </ul> <p><b>Main requirements/guidance</b></p> <ul style="list-style-type: none"> <li>ICAO Annex 11</li> <li>ICAO Annex 2</li> </ul>
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160	<p><b>Safety Nets (B0-SNET)</b></p>		<p>7.54 ATS surveillance systems should enable STCA, APW and MSAW. Route Adherence Monitoring (RAM) should be utilised when monitoring PBN route separations. Cleared Level Adherence Monitoring (CLAM) should be utilised to monitor RVSM airspace</p> <p>7.52 ATM systems providing services within Category R airspace should enable appropriate ATC capabilities including CPAR, which is a key enabler for UPR and DARP operations.</p>	<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>2</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>3</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>√</td> <td>√</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	D	E	F	1	√	√	√	√	√	√	2	√	√	√	√	√	√	3	√	√	√	√			4	√	√	√	√			5	√	√	√	√			6	√	√	√	√			7	√	√					<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>People: ATCO, ATSEP</li> <li>Procedures: ANSP (configuration and use of safety nets/monitoring aids, recovery techniques)</li> <li>Systems: Avionics (support of cooperative surveillance using Mode C/S transponder or ADS-B OUT), ANSP Ground Systems</li> </ul> <p><b>Main requirements/guidance</b></p> <ul style="list-style-type: none"> <li>ICAO Doc 4444</li> <li>Gold Edition 1 and draft Edition 2 documents For RAM and CLAM, UPR and DARP in CPDLC/ADS-C/WPR serviced airspaces</li> </ul>
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170	<b>Airborne Safety Systems</b> - <b>B0-ACAS</b>	7.7 All Category R and S upper controlled airspace, and Category T airspace supporting high density aerodromes should require the mandatory carriage of an operable mode S transponder within airspace where Mode S radar services are provided, ACAS and Terrain Awareness Warning Systems (TAWS), unless approved by ATC.	7.21 All Category R and S upper controlled airspace, and Category T airspace should require the mandatory carriage of an operable mode S transponder within airspace where Mode S radar services are provided, ACAS and Terrain Awareness Warning Systems (TAWS), unless approved by ATC.		A	B	C	D	E	F	<b>Main impacts</b> <ul style="list-style-type: none"> <li>• People: Flight crew, Airspace users, Civil aviation authorities</li> <li>• Procedures: Airspace users</li> <li>• Systems: Avionics</li> </ul> <b>Main requirements/guidance</b> <ul style="list-style-type: none"> <li>• ICAO Annex 11</li> <li>• ICAO Annex 10</li> <li>• ICAO Doc 9863 Airborne Collision Avoidance System (ACAS) Manual</li> <li>• Eurocae ED-143 Change 1</li> </ul>
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180	Ground-based surveillance (B0-ASUR)	7.6 All Category S upper controlled airspace and Category T airspace supporting high density aerodromes should be designated as non-exclusive or exclusive as appropriate ADS-B airspace requiring operation of ADS-B using 1090ES with DO-260/260A and 260B capability, with priority implementation for the following high density FIRs	7.23 All Category S upper controlled airspace and Category T airspace should be designated as non-exclusive or exclusive as appropriate ADS-B airspace requiring operation of ADS-B using 1090ES with DO-260/260A and 260B capability.  7.24 In areas where ADS-B based separation service was provided, the mandatory carriage of ADS-B OUT using 1090ES with DO260/60A and 260B should be prescribed.		A	B	C	D	E	F	<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>• People: ATCO, ATSEP, Flight crew</li> <li>• Procedures: ANSP (configuration and use of ADS-B traffic display and separation standards)</li> <li>• Systems: Avionics (ADS-B OUT), ANSP Ground Systems (Implementation of ADS-B and integration with ATC automation) and infrastructure</li> </ul> <p><b>Main requirements/guidance:</b></p> <ul style="list-style-type: none"> <li>• ICAO Annex 11</li> <li>• ICAO Annex 10</li> <li>• ICAO Annex 2</li> <li>• ICAO Cir 326 Assessment of ADS-B and MLAT services to supports ATS</li> <li>• ICAO Doc 4444</li> <li>• ICAO Doc 9871 Technical Provisions for Mode S Services and Extended Squitter</li> <li>• ICAO ADS-B Implementation and Operations Guidance Document Ed. 6</li> <li>• ICAO Guidance Material on Building Safety Case for ADS-B separation V1</li> <li>• AMC2024, RTCA/ Eurocae DO-260A/DO-260B -ED102A</li> <li>• Eurocae ED-126/RTCA DO-303 SPI ADS-B-NRA Application</li> </ul> <p>Eurocae ED-161/RTCA DO-318 SPI ADS-B-RAD Application</p> <ul style="list-style-type: none"> <li>• Particular attention should be given to the training of General Aviation Flight crews regarding appropriate use of AIRB &amp; VAS application</li> <li>• Approval Plans: Operational Approval Guidance/Criteria may be needed based on regional application for ATSA</li> <li>• Procedure for use of ADS-B traffic display being proposed for inclusion in PAN-OPS (Doc 8168) for applicability in Nov. 2013</li> </ul>
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190	<p><b>Airspace classification</b> - <b>REGIONAL</b></p>	<p>7.28 Harmonization of upper airspace classification should be as follows: a) Category R controlled airspace– Class A; and b) Category S controlled airspace– Class A, or if there are high level general aviation or military VFR operations: Class B or C.</p>		<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>√</td> <td>√</td> <td>√</td> <td>-</td> <td>√</td> <td>-</td> </tr> <tr> <td>2</td> <td>√</td> <td>-</td> <td>-</td> <td>-</td> <td>√</td> <td>-</td> </tr> <tr> <td>3</td> <td>√</td> <td>-</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>-</td> <td>-</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>-</td> <td>-</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>√</td> <td>-</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	D	E	F	1	√	√	√	-	√	-	2	√	-	-	-	√	-	3	√	-	√	√			4	√	√	√	√			5	-	-	√	√			6	-	-	√	√			7	√	-					<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>• People: Flight crew, Airspace users, Civil aviation authorities, ANSP</li> <li>• Procedures: ANSP</li> <li>• Systems: Avionics, ANSP Ground Systems</li> </ul> <p><b>Main requirements/guidance</b></p> <ul style="list-style-type: none"> <li>• ICAO Annex 11</li> <li>• ICAO Annex 2</li> </ul>
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200	<p><b>Flight Level Orientation Schemes (FLOS)</b> - <b>REGIONAL</b></p>	<p>7.10 The ICAO Table of Cruising Levels based on feet as contained in Appendix 3a to Annex 2 should be used.</p>		<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>-</td> </tr> <tr> <td>2</td> <td>√</td> <td>√</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>3</td> <td>√</td> <td>√</td> <td>√</td> <td>-</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>-</td> <td>-</td> <td>√</td> <td>-</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>-</td> <td>-</td> <td>√</td> <td>-</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>√</td> <td>-</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	D	E	F	1	√	√	√	√	√	-	2	√	√	-	-	-	-	3	√	√	√	-			4	√	√	√	√			5	-	-	√	-			6	-	-	√	-			7	√	-					<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>• People: Flight crew, Airspace users, Civil aviation authorities, ANSP</li> <li>• Procedures: ANSP</li> <li>• Systems: Avionics, ANSP Ground Systems</li> </ul> <p><b>Main requirements/guidance</b></p> <ul style="list-style-type: none"> <li>• ICAO Annex 11</li> <li>• ICAO Annex 2</li> </ul>
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210	<p><b>Flight Level Allocation Schemes (FLAS)</b> - <b>REGIONAL</b></p>	<p>7.36 Priority for FLAS level allocations should be given to higher density ATS routes over lower density ATS routes. FLAS should comply with Annex 2, Appendix 3a unless part of an OTS. FLAS other than OTS should only be utilised for safety and efficiency reasons within R and S airspace.</p> <p>7.40 Where a minimum aircraft equipage is specified, any aircraft that does not meet specified equipage requirements should receive a lower priority, except as prescribed (such as for State aircraft). States should require State aircraft to comply with equipage requirements as far as practicable.</p>		<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>-</td> </tr> <tr> <td>2</td> <td>√</td> <td>√</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>3</td> <td>√</td> <td>√</td> <td>√</td> <td>-</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>-</td> <td>-</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>√</td> <td>√</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	D	E	F	1	√	√	√	√	√	-	2	√	√	-	-	-	-	3	√	√	√	-			4	√	√	√	√			5	√	√	√	√			6	-	-	√	√			7	√	√					<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>• People: Flight crew, Airspace users, Civil aviation authorities, ANSP</li> <li>• Procedures: ANSP</li> <li>• Systems: Avionics, ANSP Ground Systems</li> </ul> <p><b>Main requirements/guidance</b></p> <ul style="list-style-type: none"> <li>• ICAO Annex 11</li> <li>• ICAO Annex 2, Appendix 3a</li> </ul>
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220	<p><b>ATS Inter-facility Data-link Communications (AIDC) (B0-FICE)</b></p>	<p>7.35 ATM systems should enable AIDC (version 3 or later) between ATC units where transfers of control are conducted (ASBU Priority 1). As a minimum, the following AIDC messages types should be implemented:</p> <ul style="list-style-type: none"> <li>Advanced Boundary Information (ABI);</li> <li>Coordinate Estimate (EST);</li> <li>Acceptance (ACP);</li> <li>TOC; and</li> <li>Assumption of Control (AOC)</li> </ul>	<p>7.49 ATM systems should enable AIDC, or an alternative process that achieves at least the same level of performance as AIDC, between en-route ATC units and terminal ATC units where transfers of control are conducted (ASBU Priority 1).</p>	<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>2</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>3</td> <td>✓</td> <td>-</td> <td>✓</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>✓</td> <td>-</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	D	E	F	1	✓	✓	✓	✓	✓	✓	2	✓	✓	✓	✓	✓	✓	3	✓	-	✓	✓			4	✓	✓	✓	✓			5	✓	✓	✓	✓			6	✓	✓	✓	✓			7	✓	-					<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>People: ATCO, ATSEP</li> <li>Procedures: ANSP (configuration and use of automatic coordinations)</li> <li>Systems: ANSP Ground Systems, ground/ground communications infrastructure</li> </ul> <p><b>Main requirements/guidance</b></p> <ul style="list-style-type: none"> <li>ICAO Annex 10</li> <li>ICAO Doc 4444</li> <li>APAC AIDC ICD</li> <li>When endorsed by APANPIRG: PAN AIDC ICD</li> </ul>
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230	<p><b>Automated Transfer of Control - REGIONAL</b></p>	<p>7.29 Where practicable, all ATC Sectors within the same ATC unit with ATS surveillance capability should have automated hand-off procedures that allow the transfer of control of aircraft without the necessity for voice communications, unless an aircraft requires special handling.</p>	<p>7.46 Where practicable, all ATC Sectors with adjacent ATC Centres using ATS surveillance capability should have automated hand-off procedures that allow the transfer of control of aircraft without the necessity for voice communications, unless an aircraft requires special handling.</p>	<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>2</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>3</td> <td>✓</td> <td>-</td> <td>✓</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>✓</td> <td>-</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	D	E	F	1	✓	✓	✓	✓	✓	✓	2	✓	✓	✓	✓	✓	✓	3	✓	-	✓	✓			4	✓	✓	✓	✓			5	✓	✓	✓	✓			6	✓	✓	✓	✓			7	✓	-					<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>People: ATCO, ATSEP</li> <li>Procedures: ANSP (configuration and use of automatic coordinations)</li> <li>Systems: ANSP Ground Systems, ground/ground communications infrastructure</li> </ul> <p><b>Main requirements/guidance</b></p> <ul style="list-style-type: none"> <li>ICAO Annex 11</li> <li>ICAO Annex 10</li> <li>ICAO Doc 4444</li> </ul>
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240	<p><b>ATS Surveillance data sharing - REGIONAL</b></p>	<p>7.34 Subject to appropriate filtering, ATS surveillance data, particularly from ADS-B, should be shared with neighbouring ATC units within high density FIRs. Direct speech circuits and appropriate handoff procedures should be implemented between controllers providing ATS surveillance in adjacent airspace.</p>	<p>7.48 Subject to appropriate filtering, ATS surveillance data, particularly from ADS-B, should be shared with all neighbouring ATC units.</p>	<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>2</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>3</td> <td>✓</td> <td>-</td> <td>✓</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>✓</td> <td>-</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	D	E	F	1	✓	✓	✓	✓	✓	✓	2	✓	✓	✓	✓	✓	✓	3	✓	-	✓	✓			4	✓	✓	✓	✓			5	✓	✓	✓	✓			6	✓	✓	✓	✓			7	✓	-					<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>People: ATSEP</li> <li>Procedures: ANSP</li> <li>Systems: ANSP Ground Systems, ground/ground communications infrastructure</li> </ul> <p><b>Main requirements/guidance</b></p> <ul style="list-style-type: none"> <li>ICAO Annex 10</li> <li>ICAO ADS-B Implementation Guidance Document (AIGD) Ed.6</li> </ul>
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250	<b>ATM systems enabling optimal PBN/ATC operations (B0-APTA)</b>	7.37 ATM systems, including communication and ATS surveillance systems and the performance of those systems, should support the capabilities of PBN navigation specifications and ATC separation standards applicable within the airspace concerned .	7.43 ATM system design (including ATS surveillance, ATS communication systems, ATC separation minimum, aircraft speed control and ATC training) should be planned and implemented to support optimal aerodrome capacity expectations for the runway(s) concerned.  7.53 Electronic flight progress strips should be utilised wherever practicable.		<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>• People: ATCO, ANSP system engineers and industry stakeholders</li> <li>• Procedures: ANSP (design and maintenance of ATS systems)</li> <li>• Systems: ANSP Ground Systems</li> </ul> <p><b>Main requirements/guidance</b></p> <ul style="list-style-type: none"> <li>• guidance on the performance of datalink communication and surveillance systems</li> <li>• guidance on the performance of ATS communication and surveillance systems is available in the Global Operational Data-link Document Ed.2</li> <li>• Eurocae ED-109A for Software Integrity Assurance Considerations for CNS/ATM Systems</li> <li>• Eurocae ED-153: Guidelines for ANS Software Safety Assurance</li> </ul> <p>Notes:</p> <ul style="list-style-type: none"> <li>• The efficacy, continuity and availability of ATM services should be supported by adherence with regional planning and guidance material regarding ATM automation and ATM contingency systems.</li> <li>• The ATM systems should deal particularly with: <ul style="list-style-type: none"> <li>○ Flight plan provisions related to PBN,</li> <li>○ Support of free routes (FDPS, conflict detection algorithm, and degraded cases)</li> <li>○ Coordination and transfer on non-published points</li> <li>○ Electronic dialogue</li> <li>○ Level of safety assurance to be met by the system</li> </ul> </li> </ul>
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260	<p align="center"><b>ATC Horizontal separation - REGIONAL</b></p>	<p>7.30 The delivery of CNS/ATM services should be based primarily on the CNS/ATM capability. All ATC units should authorise the use of the horizontal separation minima stated in ICAO Doc 4444 (PANS ATM), or as close to the separation minima as practicable, taking into account such factors as:</p> <p>a) the automation of the ATM system;</p> <p>b) the capability of the ATC communications system;</p> <p>c) the performance of the ATS surveillance system, including data-sharing or overlapping coverage at TOC points; and</p> <p>d) ensuring the competency of air traffic controllers to apply the full tactical capability of ATS surveillance systems.</p>		<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>√</td> <td>√</td> <td>√</td> <td>-</td> <td>√</td> <td>-</td> </tr> <tr> <td>2</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>3</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>√</td> <td>√</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	D	E	F	1	√	√	√	-	√	-	2	√	√	√	√	√	√	3	√	√	√	√			4	√	√	√	√			5	√	√	√	√			6	√	√	√	√			7	√	√					<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>• People: ANSP: ATCO, ATSEP, and Flight crew</li> <li>• Procedures: ANSP, CAA</li> <li>• Systems: Avionics, ANSP Ground Systems (FDPS, conflict detection algorithm, and degraded cases)</li> </ul> <p><b>Main requirements/guidance</b></p> <ul style="list-style-type: none"> <li>• ICAO Annex 11</li> <li>• ICAO Annex 2</li> <li>• ICAO PANS-ATM (Doc 4444)</li> </ul>
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270	<p align="center"><b>Situation display integrating surveillance data (B0-ASUR)</b></p>	<p>7.32 ADS-B (using 1090ES) or MLAT or radar surveillance systems should be used to provide coverage of all Category S-capable airspace as far as practicable. Data from ATS surveillance systems should be integrated into operational ATC aircraft situation displays (standalone displays of ATS surveillance data should not be used operationally).</p>		<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>2</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>3</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>√</td> <td>-</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	D	E	F	1	√	√	√	√	√	√	2	√	√	√	√	√	√	3	√	√	√	√			4	√	√	√	√			5	√	√	√	√			6	√	√	√	√			7	√	-					<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>• People: Flight crew, ATCO (separation provisions, information service, SAR based on ADS-B/MLAT/WAM), ATSEP</li> <li>• Procedures: Avionics, ANSP (ADS-B to ADS-B and ADS-B to radar separation and fused targets)</li> <li>• Systems: Avionics (ADS-B OUT), ANSP Ground Systems (fusion and display of MLAT/ADS-B data) and infrastructure</li> </ul> <p><b>Main requirements/guidance</b></p> <ul style="list-style-type: none"> <li>• ICAO PANS-ATM (Doc 4444)</li> <li>• ICAO Doc 9924_Aeronautical Surveillance Manual</li> <li>• ICAO Doc 9871 Technical Provisions for Mode S Services and Extended Squitter</li> <li>• ICAO Doc 9868 (PANS training)</li> <li>• WAM: Eurocae ED-142</li> </ul>
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280	ADS-C, CPDLC (B0-TBO)	7.33 Within Category R airspace, ADS-C surveillance and CPDLC should be enabled to support PBN-based separations.			A	B	C	D	E	F	<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>• People: ATCO, ATSEP</li> <li>• Procedures: ANSP</li> <li>• Systems: Avionics, ANSP Ground Systems</li> </ul> <p><b>Main requirements/guidance</b></p> <ul style="list-style-type: none"> <li>• ICAO Doc 4444</li> <li>• ICAO Manual of Air Traffic Services Data Link Applications (Doc 9694)</li> <li>• ICAO Manual on datalink performance</li> <li>• APAC communication and surveillance strategy</li> <li>• ICAO Doc 9925 - Manual on the Aeronautical Mobile Satellite (Route) Service Edition 1</li> <li>• Global Operational Data Link Document (GOLD) Edition 2</li> <li>• RTCA DO-258A/Eurocae ED-100A, RTCA DO-306/Eurocae ED-122</li> </ul> <p>Notes:</p> <ul style="list-style-type: none"> <li>• Provisions regarding Performance Based Communications and Surveillance including Post-Monitoring Analysis are to be found in GOLD Ed. 2</li> <li>• Regarding regulatory requirements, it should be noted that new ICAO OPLINK and SASP Ops documentation is under development</li> </ul>
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290	<b>UPR and DARP (B0-FRTO)</b>	7.33 Within Category R airspace, UPR and DARP should be enabled to support PBN-based separations		<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>2</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>3</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>√</td> <td>√</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	D	E	F	1	√	√	√	√	√	√	2	√	√	√	√	√	√	3	√	√	√	√			4	√	√	√	√			5	√	√	√	√			6	√	√	√	√			7	√	√					<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>• People: ATCO, ATSEP</li> <li>• Procedures: ANSP</li> <li>• Systems: Avionics, ANSP Ground Systems</li> </ul> <p><b>Main requirements/guidance</b></p> <ul style="list-style-type: none"> <li>• ICAO Doc 4444</li> <li>• ICAO Manual of Air Traffic Services Data Link Applications (Doc 9694)</li> <li>• ICAO Manual on datalink performance</li> <li>• APAC communication and surveillance strategy</li> <li>• Global Operational Data Link Document (GOLD) Edition 2</li> <li>• RTCA DO-258A/Eurocae ED-100A, RTCA DO-306/Eurocae ED-122</li> </ul> <p>Notes:</p> <ul style="list-style-type: none"> <li>• Provisions regarding Performance Based Communications and Surveillance including Post-Monitoring Analysis are to be found in GOLD Ed. 2</li> <li>• regarding regulatory requirements, it should be noted that new ICAO OPLINK and SASP Ops documentation is under development</li> </ul>
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300	<b>Aeronautical Information Management (B0-DATM)</b>	7.38 ATM systems should be supported by digitally-based AIM systems (using Aeronautical Information Exchange Model version 5.1 or later) through implementation of Phase 1 and 2 of the AIS-AIM Roadmap in adherence with ICAO and regional AIM planning and guidance material	7.51 ATM systems should be supported by complete implementation of AIM Phase 3.	<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>2</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>3</td> <td>√</td> <td>-</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>√</td> <td>-</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	D	E	F	1	√	√	√	√	√	√	2	√	√	√	√	√	√	3	√	-	√	√			4	√	√	√	√			5	√	√	√	√			6	√	√	√	√			7	√	-					<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>• People: AIS/AIM personnel, ATCO, ATSEP</li> <li>• Procedures: ANSP (data users to retrieve information digitally), Airspace users (Electronic Flight Bag)</li> <li>• Systems: ANSP Ground Systems (Automation of national XML aeronautical data, NOTAM and MET) and infrastructure</li> </ul> <p><b>Main requirements/guidance</b></p> <ul style="list-style-type: none"> <li>•</li> </ul>
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310	<p><b>Meteorological Information (B0-AMET)</b></p>	<p>7.26 All high density aerodromes should provide meteorological forecasts, aerodrome warnings and alerts that support efficient terminal operations.</p>									<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>• People: Airport operators, airspace users, meteorological authorities, MET services</li> <li>• Procedures: ANSP, MET services, airspace users</li> <li>• Systems: ANSP Ground Systems (including future integration of SWIM)</li> </ul> <p><b>Main requirements/guidance</b></p> <ul style="list-style-type: none"> <li>• ICAO Annex 3, including Amendment 76</li> <li>• Asia and Pacific regions air navigation plan</li> <li>• ICAO Manual of Aeronautical Meteorological Practices (Doc 8896)</li> <li>• ICAO Manual on Coordination between Air Traffic Services, Aeronautical Information Services &amp; Aeronautical Meteorological Services (Doc 9377)</li> <li>• Handbook on the International Airways Volcano Watch – Operational Procedures and Contact List (Doc 9766)</li> <li>• Manual on Low Level Wind Shear (Doc 9817)</li> <li>• Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds (Doc 9691)</li> <li>• Regional guidance material including the Regional SIGMET Guide, ROBEX Handbook and OPMET Data Banks Interface Control Document.</li> <li>• Amendment 76 to Annex 3 applicable on 14 Nov. 2013</li> <li>• Draft manual on the Digital Exchange of Aeronautical Meteorological Information <a href="http://www.icao.int/safety/meteorology/MARIE-PT/Documents/Forms/AllItems.aspx">http://www.icao.int/safety/meteorology/MARIE-PT/Documents/Forms/AllItems.aspx</a></li> <li>• Airspace users may use AOC data-link to send information to aircraft</li> </ul>
		<p>7.39 ATM systems should be supported by implementation of appropriate meteorological information reporting systems, providing, inter-alia, observations, forecasts, warnings and alerts, and also provide for information to meteorological authorities or offices where required.</p>									

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320	<p align="center"><b>ATM Managers’ Performance - REGIONAL</b></p>	<p>7.41 The following should be established to support human performance in the delivery of a Seamless ATM service. The systems should consider all the elements of the SHEL Model (Software, Hardware, Environment and Liveware – humans), in accordance with the ICAO Human Factors DigestNo. 1 and related reference material: a) human performance training for all ANSP managers, including: human performance training for all ANSP managers, including:</p> <ul style="list-style-type: none"> <li>assessment and management of risks related to human capabilities and limitations;</li> <li>effective participation in a team and team management</li> <li>effective safety reporting systems;</li> <li>human factors in air safety investigation; fatigue management approaches;ms comprising multidisciplinary operational staff and managers which review safety performance and assess significant proposals for change to ATM syst</li> </ul>	<p>Prevention of fatigue systems should be established to support human performance in the delivery of a Seamless ATM service. The systems should be consistent with guidance within ICAO Doc 9966 <i>FRMS – Fatigue Risk Management System</i>.</p>	<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>√</td> <td>-</td> <td>-</td> <td>-</td> <td>√</td> <td>-</td> </tr> <tr> <td>2</td> <td>√</td> <td>√</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>3</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>-</td> <td>-</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>√</td> <td>√</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	D	E	F	1	√	-	-	-	√	-	2	√	√	-	-	-	-	3	√	√	√	√			4	√	√	√	√			5	√	√	√	√			6	-	-	√	√			7	√	√					<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>People: all ANSP staff, particularly: managers, operators, safety managers and teams</li> <li>Procedures: ANSP (initial/continuous training on human performance, reporting, operational team management)</li> <li>Systems: tool for safety reporting</li> </ul> <p><b>Main requirements/guidance</b></p> <ul style="list-style-type: none"> <li>ICAO Annex 1 <i>Personnel Licensing</i></li> <li>ICAO Circular 214 <i>Fundamentals on Human Factors</i></li> <li>ICAO Circular 227 <i>Training of Operational Personnel on Human Factors</i></li> <li>ICAO Circular 241 <i>Human Factors in ATC</i></li> <li>ICAO Circular 249 <i>Human Factors in CNS and ATM Systems</i></li> <li>ICAO Circular 302 <i>Cross-cultural factors in aviation safety</i></li> <li>ICAO Circular 318 <i>Language Testing Criteria for Global Harmonization</i></li> <li>Circular 323 <i>Guidelines for Aviation English Training Programmes</i></li> <li>ICAO Doc 9835 <i>Manual on the Implementation of ICAO Language Proficiency Requirements</i></li> <li>ICAO Doc 9966 <i>Fatigue Risk Management Systems</i></li> <li>ICAO <i>Human Factors Digest No. 1</i></li> <li>For recording of data (for history and analysis purposes): ED-111 Functional specifications for CNS/ATM Recording</li> </ul>
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330	<p align="center"><b>ATC simulators performance - REGIONAL</b></p>	<p>7.41 The following should be established to support human performance in the delivery of a Seamless ATM service. The systems should consider all the elements of the SHEL Model (Software, Hardware, Environment and Liveware – humans), in accordance with the ICAO Human Factors DigestNo. 1 and related reference material: b) enhancement and improved application of ATC simulators;</p>		<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>2</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>3</td> <td>√</td> <td>-</td> <td>-</td> <td>-</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>-</td> <td>-</td> <td>-</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>-</td> <td>-</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	D	E	F	1	√	√	√	√	√	√	2	√	√	√	√	√	√	3	√	-	-	-			4	-	-	-	-			5	√	√	√	√			6	-	-	-	√			7	-	-					<p><b>Refer to item 320</b></p>
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340	<p><b>Safety assessment of changes</b> - <b>REGIONAL</b></p>	<p>7.41 The following should be established to support human performance in the delivery of a Seamless ATM service. The systems should consider all the elements of the SHEL Model (Software, Hardware, Environment and Liveware – humans), in accordance with the ICAO Human Factors Digest No. 1 and related reference material: c) safety teams comprising multidisciplinary operational staff and managers which review safety performance and assess significant proposals for change to ATM systems;</p>		<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>2</td> <td>-</td> <td>-</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>3</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>-</td> <td>-</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>√</td> <td>√</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	D	E	F	1	√	√	√	√	√	√	2	-	-	√	√	√	√	3	√	√	√	√			4	√	√	√	√			5	√	√	√	√			6	-	-	√	√			7	√	√					<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>• People: all ANSP staff, particularly: managers, operators, safety managers and teams</li> <li>• Procedures: ANSP (initial/continuous training on human performance, reporting, operational team management)</li> <li>• Systems: tool for safety reporting</li> </ul> <p><b>Main requirements/guidance</b></p> <ul style="list-style-type: none"> <li>• ICAO Annex 19 Safety management</li> <li>• ICAO Doc 9859 Safety Management Manual (SMM)</li> </ul>
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350	<p><b>ATM Operators' performance</b> - <b>REGIONAL</b></p>	<p>7.41 The following should be established to support human performance in the delivery of a Seamless ATM service. The systems should consider all the elements of the SHEL Model (Software, Hardware, Environment and Liveware – humans), in accordance with the ICAO Human Factors Digest No. 1 and related reference material: d) human performance-based training and procedures for staff providing ATS, including:</p> <ul style="list-style-type: none"> <li>• the application of tactical, surveillance-based ATC separation;</li> <li>• control techniques near minimum ATC separation;</li> <li>• responses to ATM contingency operations and safety net alerts; and</li> <li>• the importance of an effective safety reporting culture.</li> </ul>		<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>2</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> </tr> <tr> <td>3</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>√</td> <td>√</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	D	E	F	1	√	√	√	√	√	√	2	√	√	√	√	√	√	3	√	√	√	√			4	√	√	√	√			5	√	√	√	√			6	√	√	√	√			7	√	√					<p><b>Refer to item 320</b></p>
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360	<p><b>Civil Military Use of SUA (B0-FRTO)</b></p>	<p>7.11 SUA should only be established after due consideration of its effect on civil air traffic by the appropriate Airspace Authority to ensure it will be used for the purpose that it is established;</p> <ul style="list-style-type: none"> <li>used regularly;</li> <li>as small as possible, including any internal buffers, required to contain the activity therein;</li> <li>if applicable, operated in accordance with FUA principles; and</li> <li>activated only when it is being utilised:</li> </ul> <p>SUA should be regularly reviewed to ensure the activities that affect the airspace, and size and timing of such activity are accurately reflected by the SUA type, dimensions, activation notice and duration of activation.</p>		<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>-</td> </tr> <tr> <td>2</td> <td>√</td> <td>√</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>3</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>√</td> <td>-</td> <td>-</td> <td>-</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>-</td> <td>-</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>√</td> <td>√</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	D	E	F	1	√	√	√	√	√	-	2	√	√	-	-	-	-	3	√	√	√	√			4	√	√	√	√			5	√	-	-	-			6	-	-	√	√			7	√	√					<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>People: Airspace planners</li> <li>Procedures: ANSP (Airspace Planning, letters of agreement) and MIL</li> <li>Systems: ANSP ground systems, MIL ground systems</li> </ul> <p><b>Main requirements/guidance material</b></p> <ul style="list-style-type: none"> <li>ICAO Circular 330 AN/189 Civil/Military Cooperation in ATM offers guidance &amp; examples of civil/military cooperation</li> </ul>
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370	<p><b>Strategic Civil Military coordination (Regional)</b></p>	<p>7.42 a) a national civil/military body should be formed to coordinate strategic civil-military activities (military training should be conducted in locations and/or at times that do not adversely affect civilian operations, particularly those associated with major aerodromes);</p>		<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>-</td> </tr> <tr> <td>2</td> <td>√</td> <td>√</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>3</td> <td>√</td> <td>√</td> <td>-</td> <td>-</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>√</td> <td>-</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>√</td> <td>√</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	D	E	F	1	√	√	√	√	√	-	2	√	√	-	-	-	-	3	√	√	-	-			4	√	√	√	√			5	√	√	√	√			6	√	-	√	√			7	√	√					<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>People: Airspace planners</li> <li>Procedures: ANSP (Airspace Planning, letters of agreement) and MIL</li> </ul> <p><b>Main requirements/guidance material</b></p> <ul style="list-style-type: none"> <li>ICAO Circular 330 AN/189 Civil/Military Cooperation in ATM offers guidance &amp; examples of civil/military cooperation</li> </ul>
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380	<p><b>Tactical Civil Military coordination (Regional)</b></p>	<p>Formal civil-military liaison should take place for tactical responses by encouraging military participation at civil ATM meetings and within ATC Centres.</p>		<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td>-</td> </tr> <tr> <td>2</td> <td>√</td> <td>√</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>3</td> <td>√</td> <td>√</td> <td>-</td> <td>-</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>√</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>√</td> <td>-</td> <td>√</td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>√</td> <td>√</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	D	E	F	1	√	√	√	√	√	-	2	√	√	-	-	-	-	3	√	√	-	-			4	√	√	√	√			5	√	√	√	√			6	√	-	√	√			7	√	√					<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>People: Airspace planners</li> <li>Procedures: ANSP (Airspace Planning, letters of agreement) and MIL</li> <li>Systems: ANSP ground systems, MIL ground systems</li> </ul> <p><b>Main requirements/guidance material</b></p> <ul style="list-style-type: none"> <li>ICAO Circular 330 AN/189 Civil/Military Cooperation in ATM offers guidance &amp; examples of civil/military cooperation</li> </ul>
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390	<b>Civil Military system integration (Regional)</b>	Integration of civil and military ATM systems using joint procurement, and sharing of ATS surveillance data (especially from ADS-B systems) should be provided as far as practicable		<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>2</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>3</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>✓</td> <td>✓</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	D	E	F	1	✓	✓	✓	✓	✓	✓	2	✓	✓	✓	✓	✓	✓	3	✓	✓	✓	✓			4	✓	✓	✓	✓			5	✓	✓	✓	✓			6	✓	✓	✓	✓			7	✓	✓					<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>• People: Airspace planners</li> <li>• Procedures: ANSP (Airspace Planning, letters of agreement) and MIL</li> <li>• Systems: ANSP ground systems, MIL ground systems</li> </ul> <p><b>Main requirements/guidance material</b> ICAO Circular 330 AN/189 Civil/Military Cooperation in ATM offers guidance &amp; examples of civil/military cooperation</p>
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410	<b>Civil Military common training (Regional)</b>	Common training should be conducted between civil and military ATM units in areas of common interest	<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>2</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>3</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>5</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>6</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>7</td> <td>✓</td> <td>✓</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	D	E	F	1	✓	✓	✓	✓	✓	✓	2	✓	✓	✓	✓	✓	✓	3	✓	✓	✓	✓			4	✓	✓	✓	✓			5	✓	✓	✓	✓			6	✓	✓	✓	✓			7	✓	✓					<p><b>Main impacts</b></p> <ul style="list-style-type: none"> <li>• People: Airspace planners</li> <li>• Procedures: ANSP (Airspace Planning, letters of agreement) and MIL</li> <li>• Systems: ANSP ground systems, MIL ground systems</li> </ul> <p><b>Main requirements/guidance material</b> ICAO Circular 330 AN/189 Civil/Military Cooperation in ATM offers guidance &amp; examples of civil/military cooperation</p>	
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420	<b>Civil Military common procedures (Regional)</b>	Civil and military ATM units should utilize common procedures as far as practicable			<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>Main impacts</b> <ul style="list-style-type: none"> <li>• People: Airspace planners</li> <li>• Procedures: ANSP (Airspace Planning, letters of agreement) and MIL</li> <li>• Systems: ANSP ground systems, MIL ground systems</li> </ul> <b>Main requirements/guidance material</b> ICAO Circular 330 AN/189 Civil/Military Cooperation in ATM offers guidance & examples of civil/military cooperation
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**Table 3:** Implementation Actions and Guidance

## Regional Reporting

- 2.1 Whilst guidance is provided for each and every action of the Seamless ATM Plan, only a very limited subset of actions needs a periodic implementation report from Asia/Pacific States at the regional level to keep all stakeholders coordinated. Through the Seamless ATM Reporting Form, available as a spreadsheet in Excel format (<http://www.icao.int/APAC/Documents/edocs/Regional%20Seamless%20ATM%20Reporting%20Form%20-%20v4.xlsx>) and soon as a web-based reporting form, States are invited to report their progress on implementation and issues encountered. In this way, potential delays may be anticipated and managed.
- 2.2 The Seamless ATM Reporting Form enables a formalised process for regional planning that can identify areas where greater support for States is required. In this regard, the scope of support and desired timeframe should be specified in the column “Remarks” of the Seamless ATM Reporting Form.
- 2.3 The Regional Seamless ATM Reporting Form is used for collecting and analysing data from States from a global perspective. This allows planning that supports the Global Air Navigation Plan, and reporting of the overall progress of Asia/Pacific Seamless ATM implementation to appropriate bodies.

ATM Seamless Plan		Performance Improvement Area				ATM seamless plan				ASBU traceability			
Reference	Regional/ASBU	1- Airport Operations	2- Globally Interoperable Systems & Data	3- Optimum Capacity and Flexible Flights	4- Efficient Flight Path	Aerodrome	Terminal	En-route	Specification title	Module	ASBU - Module title	Regional Priority	Comment
10	Regional	✓				✓			Apron Management	-		1	Regional operational need
20	Regional	✓				✓	✓		ATM-Aerodrome Coordination	-		1	Regional operational need
30	Regional	✓				✓			Aerodrome capacity	-		1	Regional operational need
40	ASBU	✓				✓			Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)	B0-SURF	Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)	3	
50	ASBU	✓				✓	✓		Arrival Manager/Departure Management (AMAN/DMAN)	B0-RSEQ	Improve Traffic flow through Sequencing (AMAN/DMAN)	2	
60	Regional			✓			✓	✓	ATC Sector Capacity	-		1	Regional operational need
70	ASBU	✓				✓			Airport Collaborative Decision-Making (ACDM)	B0-ACDM	Improved Airport Operations through Airport-CDM	2	
-	ASBU	✓				✓	✓		-	B0-WAKE	Increased Runway Throughput through Optimized Wake Turbulence Separation	3	Not retained by APAC - No standard available
80	ASBU						✓	✓	Air Traffic Flow Management/Collaborative Decision-Making (ATFM/CDM)	B0-NOPS	Improved Flow Performance through Planning based on a Network-Wide view	1	
90	ASBU				✓		✓		Continuous Descent Operations (CDO)	B0-CDO	Improved Flexibility and Efficiency in Descent Profiles using Continuous Descent Operations (CDOs)	2	
100	ASBU				✓		✓		Continuous Climb Operations (CCO)	B0-CCO	Improved Flexibility and Efficiency Departure Profiles – Continuous Climb Operations (CCO)	2	
110	ASBU	✓					✓		Performance-based Navigation (PBN) Approach	B0-APTA	Optimization of Approach Procedures including vertical guidance	2	
120	ASBU	✓					✓		Standard Instrument Departures/Standard Terminal Arrivals (SID/STAR)	B0-APTA	Optimization of Approach Procedures including vertical guidance	2	
130	Regional				✓		✓		Performance-based Navigation (PBN) Visual and Arrival Procedures	-		1	Regional operational need
140	ASBU				✓			✓	Performance-based Navigation (PBN) Routes	B0-FRTO	Improved Operations through Enhanced En-Route Trajectories	1	
150	Regional				✓			✓	Performance-based Navigation (PBN) Airspace	-		1	Regional operational need
160	ASBU			✓			✓	✓	Safety Nets	B0-SNET	Increased effectiveness of ground-based safety nets	2	
170	ASBU			✓			✓	✓	Airborne Safety Systems	B0-ACAS	Airborne Collision Avoidance Systems (ACAS) Improvements	2	
-	ASBU			✓				✓	-	B0-OPFL	Improved Access to Optimum Flight Levels through Climb/Descent Procedures using ADS-B	3	Not retained by APAC - Limited value in airspace already using RNP4 standards
180	ASBU			✓			✓	✓	ATS Surveillance	B0-ASUR	Initial Capability for Ground Surveillance	1	
-	ASBU			✓				✓	-	B0-ASEP	Air Traffic Situational Awareness (ATSA)	2	Mainly an aircraft/crew related module: cockpit-based applications which do not require any support from the ground hence they can be used by any suitably equipped aircraft
190	Regional			✓				✓	Airspace classification	-		1	Regional operational need
200	Regional			✓				✓	Flight Level Orientation Scheme (FLOS)	-		1	Regional operational need
210	Regional			✓				✓	Flight Level Allocation Schemes (FLAS)	-		1	Regional operational need
220	ASBU		✓					✓	ATS Inter-facility Data-link Communications (AIDC)	B0-FICE	Increased Interoperability Efficiency & Capacity through Ground-Ground Integration	1	
230	Regional			✓		✓	✓	✓	Automated Transfer of Control in an ATSU	-		1	Regional operational need
240	Regional			✓			✓	✓	ATS Surveillance data sharing	-		1	Regional operational need
250	ASBU			✓		✓	✓	✓	ATM systems enabling optimal PBN/ATC operations	B0-APTA	Optimization of Approach Procedures including vertical guidance	2	
260	Regional			✓		✓	✓	✓	ATC Horizontal separation	-		1	Regional operational need
270	ASBU			✓		✓	✓	✓	Multi-sensor integrated surveillance (ADS-B, MLAT, radar)	B0-ASUR	Initial Capability for Ground Surveillance	1	
280	ASBU				✓		✓	✓	ADS-C, CPDLC	B0-TBO	Improved Safety and Efficiency through the initial application of Data Link En-Route	1	
290	ASBU				✓	✓	✓	✓	UPR and DARP	B0-TBO	Improved Safety and Efficiency through the initial application of Data Link En-Route	1	
300	ASBU		✓			✓	✓	✓	Aeronautical Meteorology	B0-DATM	Service Improvement through Digital Aeronautical Information Management	1	
310	ASBU		✓			✓	✓	✓	Meteorological Information	B0-AMET	Meteorological information supporting enhanced operational efficiency and safety	2	
320	Regional			✓		✓	✓	✓	ATM Managers' Performance	-		1	Regional operational need
330	ASBU			✓		✓	✓	✓	ATC simulators performance	B0-FRTO	Improved Operations through Enhanced En-Route Trajectories	1	
340	ASBU			✓		✓	✓	✓	Safety assessment of changes	B0-FRTO	Improved Operations through Enhanced En-Route Trajectories	1	
350	ASBU			✓		✓	✓	✓	ATM Operators' performance	B0-FRTO	Improved Operations through Enhanced En-Route Trajectories	1	
360	ASBU			✓			✓	✓	Civil Military use of SUA	B0-FRTO	Improved Operations through Enhanced En-Route Trajectories	1	
370	ASBU			✓			✓	✓	Strategic Civil Military coordination	B0-FRTO	Improved Operations through Enhanced En-Route Trajectories	1	

380	ASBU			✓		✓	✓	Tactical Civil Military coordination	B0-FRTO	Improved Operations through Enhanced En-Route Trajectories	1	
390	ASBU			✓		✓	✓	Civil Military system integration	B0-FRTO	Improved Operations through Enhanced En-Route Trajectories	1	
400	ASBU			✓		✓	✓	Civil Military Nav aids joint provision	B0-FRTO	Improved Operations through Enhanced En-Route Trajectories	1	
410	ASBU			✓		✓	✓	Civil Military common training	B0-FRTO	Improved Operations through Enhanced En-Route Trajectories	1	
420	ASBU			✓		✓	✓	Civil Military common procedures	B0-FRTO	Improved Operations through Enhanced En-Route Trajectories	1	
-	ASBU	✓				✓			B1-APTA	Optimised Airport Accessibility	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU	✓				✓			B1-WAKE	Increased Runway Throughput through Dynamic Wake Turbulence Separation	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU	✓				✓			B1-RSEQ	Improved Airport operations through Departure, Surface and Arrival Management	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU	✓				✓			B1-SURF	Enhanced Safety and Efficiency of Surface Operations – SURF, SURF-IA and Enhanced Vision Systems (EVS)	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU	✓				✓			B1-ACDM	Optimized Airport Operations through A-CDM Total Airport Management	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU	✓				✓			B1-RATS	Remotely Operated Aerodrome Control	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU		✓			✓			B1-FICE	Increased Interoperability, Efficiency and Capacity through Flight and Flow Information for a Collaborative Environment Step-1 (FF-ICE/1) application before Departure	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU		✓			✓	✓		B1-DATM	Service Improvement through Integration of all Digital ATM Information	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU		✓			✓	✓		B1-SWIM	Performance Improvement through the application of System-Wide Information Management (SWIM)	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU		✓			✓	✓		B1-AMET	Enhanced Operational Decisions through Integrated Meteorological Information (Planning and Near-term Service)	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU			✓			✓		B1-FRTO	Improved Operations through Optimized ATS Routing	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU			✓		✓	✓		B1-NOPS	Enhanced Flow Performance through Network Operational Planning	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU			✓		✓	✓		B1-ASEP	Increased Capacity and Efficiency through Interval Management	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU			✓			✓		B1-SNET	Ground-based Safety Nets on Approach	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU				✓				B1-CDO	Improved Flexibility and Efficiency in Descent Profiles (CDO) using VNAV	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU				✓				B1-TBO	Improved Traffic synchronization and Initial Trajectory-Based Operation	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU				✓				B1-RPAS	Initial Integration of Remotely Piloted Aircraft (RPA) into Non-Segregated Airspace	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU	✓				✓	✓		B2-WAKE	Advanced Wake Turbulence Separation (Time-based)	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU	✓				✓	✓		B2-RSEQ	Linked Arrival Management and Departure Management (AMAN/DMAN)	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU	✓							B2-SURF	Optimized Surface Routing and Safety Benefits (A-SMGCS Level 3-4 and SVS)	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU		✓			✓	✓		B2-FICE	Improved Coordination through Multicenter Ground-Ground Integration (FF-ICE/1 & Flight Object, SWIM)	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU		✓			✓	✓		B2-SWIM	Enabling Airborne Participation in collaborative ATM through SWIM	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan

-	ASBU			√				√		B3-FRTO	Traffic Complexity Management	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU			√		√	√	√		B2-NOPS	Increased user involvement in the dynamic utilization of the network	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU			√				√		B2-ASEP	Airborne Separation (ASEP)	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU			√				√		B2-ACAS	New Collision Avoidance System	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU				√		√			B2-CDO	Improved Flexibility and Efficiency in Descent Profiles (CDOs) using VNAV, required speed and time at arrival	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU				√					B2-RPAS	Remotely Piloted Aircraft (RPA) Integration in Traffic	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU	√				√	√	√		B3-RSEQ	Integration AMAN/DMAN/SMAN	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU		√			√	√	√		B3-FICE	Improved Operational Performance through the introduction of Full FF-ICE	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU		√			√	√	√		B3-AMET	Enhanced Operational Decisions through Integrated Meteorological Information (Near-term and Immediate Service)	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU			√		√	√	√		B3-NOPS	Traffic Complexity Management	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU			√				√		B3-ATSA	Airborne Self-Separation (SSEP)	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU				√	√	√	√		B3-TBO	Full 4D Trajectory-based Operations	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan
-	ASBU				√	√	√	√		B3-RPAS	Remotely Piloted Aircraft (RPA) Transparent Management	Not yet assessed	Will be assessed through a regional gap analysis in a future revision of the ATM seamless plan