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## Agenda Item 3:

Air Navigation Matters 3.6 Other Air Navigation issues

## SEAMLESS ATM SYSTEM

(Presented by the Secretariat)

### SUMMARY

This Working Paper presents ICAO background information on CNS/ATM systems planning and implementation considering the global aspect of international civil aviation. It also addresses the key activities currently in progress in the CAR region which will lead eventually to a seamless ATM system and the performance objectives which are now being used to direct regional work.

#### **References**:

- Second Amendment to the Global Air Navigation Plan for the CNS/ATM systems (Doc 9750).
- Report of the Fifth All Planning and Implementation Regional Group (ALLPIRG/5) Meeting (Montreal, Canada, 23-24 March, 2006).
- Summary of Discussions of the Regional North American/Caribbean (NAM/CAR) Air Traffic Management (ATM) Meeting (Santo Domingo, Dominican Republic, 19-21 April 2006).
- *Report of the ATM/CNS/SG/5 Meeting (Lima, Peru, 13-17 Nov. 2006).*

## 1. Introduction

1.1 The Second Amendment to the *Global Air Navigation Plan for CNS/ATM Systems* (Doc 9750), or Global Plan, which is now in the approval process, provides the basis of a roadmap for a seamless global air traffic management system which is aimed at bringing near and medium term benefits to the ATM community, taking advantage of currently available aircraft capabilities and ATC infrastructure and technology.

1.2 In light of the budgetary realities and the new ICAO business plan process, the Fifth Meeting of the ALLPIRG (ALLPIRG/5) held in Montreal, Canada, from 23 to 24 March 2006, supported that all the future work of the Planning and Implementation Regional Groups (PIRGs) should be justified and based on clearly established performance objectives that support the ICAO Strategic Objectives. In this context, the Meeting agreed that all the PIRGs terms of reference should be reviewed to ensure that the resources will be handled in an appropriate manner and that all the work, including the Secretariat's, will support the ICAO strategic plan. The informing methods to the Commission and to the Council on the PIRGS work are also being reviewed to ensure that the agreed performance objectives are complied and the progress of such work will be measure with time lines. Consequently, among others, the ALLPIRG/5 Meeting agreed the following Conclusion 5/2 (see WP/11) which supports review regional work programmes.

# 2. Analysis

2.1 The Strategic Vision identified in the Global Plan is "To foster implementation of a seamless, global air traffic management system that will enable aircraft operators to meet their planned times of departure and arrival and adhere to their preferred flight profiles with minimum constraints and without compromising agreed levels of safety."

2.2 This vision is further refined in the Mission of Implementation:

To develop a seamless, globally coordinated system of air navigation services that will cope with worldwide growth in air traffic demand while:

- Improving upon the present levels of safety;
- Improving upon the present levels of regularity;
- Improving upon the overall efficiency and capacity of airspace and airports;
- Improving operations allowing for capacity increase while minimizing fuel consumption and aircraft engine emissions;
- Increasing the availability of user-preferred flight schedules and profiles; and
- Minimizing differing equipment carriage requirements between regions.

2.3 The Global Plan describes a strategy aimed at achieving near and medium term ATM benefits on the basis of available and foreseen aircraft capabilities and ATM infrastructure. It contains guidance on ATM improvements necessary to support a uniform transition to the ATM system envisioned in the global ATM operational concept (Doc 9854). The operational concept presents the ICAO vision of an integrated, harmonized and globally interoperable ATM system. A global ATM system can be described as a worldwide system that, on a global basis, achieves interoperability and seamlessness across regions for all users during all phases of flight; meets agreed levels of safety; provides for optimum economic operations; is environmentally sustainable; and meets national security requirements.

2.4 The basis for developing a global ATM system is an agreed-to structure of homogeneous ATM areas and major traffic flows/routing areas. These areas and flows tie together the various elements of the worldwide aviation infrastructure into a global system.

2.5 A homogeneous ATM area is an airspace with a common ATM interest, based on similar characteristics of traffic density, complexity, air navigation system infrastructure requirements or other specified considerations wherein a common detailed plan will foster the implementation of interoperable ATM systems. Homogeneous ATM areas may extend over States, specific portions of States, or groupings of States. They may also extend over large oceanic and continental areas. They are considered areas of shared interest and requirements. The Caribbean Region has been declared by the GREPECAS

as a homogenous area. Likewise, the West Atlantic Route System (WATRS), which straddles the CAR/NAT boundary, can be considered a homogeneous area.

2.6 A major traffic flow refers to a concentration of significant volumes of air traffic on the same or proximate flight trajectories. Major traffic flows may cross several homogeneous ATM areas with different characteristics. The north/south flow between the New York area and the Caribbean is a major traffic flow, as is the Eastern Caribbean/Miami flow.

2.7 A routing area encompasses one or more major traffic flows, defined for the purpose of developing a detailed plan for the implementation of ATM systems and procedures. A routing area may cross several homogeneous ATM areas with different characteristics. A routing area specifies common interests and requirements among underlying homogeneous areas, for which a detailed plan for the implementation of ATM systems and procedures either for airspace or aircraft will be specified. The route networks of the Caribbean and WATRS, taken together, is an example of a routing area with distinct flows, north/south and east/west wherein traffic is common to both networks, yet the underlying homogeneous area in the Eastern Caribbean has very different infrastructures, procedures and requirements.

2.8 With work underway to prepare for the 2007 Cricket World Cup and the WATRS redesign on the north, we have the opportunity to move toward the near term view of seamless international operations and the longer view of a seamless global ATM system.

2.9 Traffic enters the E/CAR from all directions, coming from areas with radar surveillance and VHF communications, and coming from areas with neither. The E/CAR, itself has varying levels of infrastructure in the TMAs and en route airspace. ATC facilities have diverse levels of automation support tools. Ground-to-ground communications quality and reliability varies depending on local infrastructures. ATC regulations are adopted nationally and are not always consistent from island to island. All of these characteristics are factors affecting air operations.

2.10 Several activities are currently underway in the CAR, SAM and NAT regions contributing to the near term goal of seamless international operations. These include implementation of performance-based navigation (RNAV and RNP); demand and capacity balancing or air traffic flow management (ATFM); interfacing and integration of ATM Automation systems including ATS Inter-Facility Data Communications (AIDC) and radar-data sharing; improvements to the telecommunications networks; civil/military coordination regarding Special use Airspace; and ATM contingency planning.

2.11 Performance-based navigation, both RNAV and RNP, is being addressed regionally for the en route environment and nationally for approach and terminal applications. The WATRS RNP 10 implementation is one of the regional activities. As the routes are re-aligned or new routes added, ATC providers will need to develop RNAV or RNP routes connecting to airports. Local traffic operating between E/CAR islands will have different requirements for RNAV or RNP routes based on their flight trajectories, which must also be addressed.

2.12 It has been recognized for some time that there are periods during which demand for access to airspace and/or airports has exceeded the capacity therein. This translates into delays for aircraft and passengers, reduced predictability for airlines and airport operations, increased fuel expenses and aircraft engine emissions. The North American and European regions have both actively pursued solutions within their areas of jurisdiction for many years. During the last two years they have worked together to deal with issues affecting North Atlantic traffic and to share best practices. The Caribbean region, jointly with North America and with South America has recently become engaged in demand and capacity balancing activities. Some of the issues affecting the CAR region are traffic departing

northbound into WATRS; excessive demand for access to airports during peak vacation periods; and most significantly, the 2007 Cricket World Cup which will be hosted primarily in the Eastern Caribbean.

2.13 The CAR/SAM ATM Automation Task Force held its first meeting August 29-31, 2006 in Mexico City. The primary purpose of the task force meeting was to complete the *Interface Control Document for the CAR and SAM Regions*. This document, has recently been approved by the ATM/CNS/SG/5 of GREPECAS, and provides guidance material for ATC units to exchange flight plan data and radar handovers using protocols harmonized with those in other regions. ATS providers will be able to configure their flight data processors to send, receive and process current flight plans (CPLs) and similar messages, reducing controller workload and improving accuracy and timeliness of the data being coordinated.

2.14 All inter-facility communications, whether data (e.g. AFTN, NADIN, radar-data, etc) or voice, are dependent on the telecommunications infrastructure. Improvements are being implemented within the Caribbean region. Reliability, quality and bandwidth are all improving with transition to the MEVA II satellite network for the Central Caribbean which includes stations located in San Juan and Miami connecting into the U.S. NADIN. The Eastern Caribbean is now investigating satellite options to replace the existing digital network which is subject to routine failures. These transitions provide opportunities to implement radar-data sharing to increase surveillance capabilities and reduce separation, AIDC for the exchange of flight plan data and eventually radar and/or ADS handovers, and to implement full demand and capacity balancing measures incorporating collaborative decision making with all ATM stakeholders.

2.15 Work is on-going between ATC providers and military organisations throughout the region to improve coordination of and access through Special Use Airspace. Airspace is a joint resource with demands placed on it by both military and civil users. Access should not be denied to either user group except as necessary to protect flight operations.

2.16 The Y2K event provided the global ATM community an opportunity to focus on contingency planning. The goal was to provide a safe, orderly operation during a potential crisis. Operators and ATC providers alike, needed to have confidence the system would continue to function with a certain level of predictability. While Y2K is far behind us now, the need to provide continuity and predictability of service has not abated. Whether a natural disaster or human event is the cause of a crisis, the global ATM community demands that service be provided, albeit at a lower capacity, without adversely affecting safety levels. Following a requirement of ICAO Council, the NACC Regional Office is developing a regional catalogue of ATM contingency plans which are being developed bilaterally between States, Territories and International Organizations throughout the regions, including related Points of Contact to facilitate regional coordination.

2.17 Each of the above activities contributes to enhanced ATM system performance. The ATM community places expectations on the performance of the system and measures that performance from several perspectives. These general expectations are relative to the effective operation of the ATM system and include *safety, security, environment, efficiency, cost-effectiveness, capacity, access and equity, flexibility, predictability, global interoperability and participation* by the entire ATM community.

2.18 During the last year the NACC Office has carried out close coordination with ICAO ANB to harmonize regional work process with the global planning initiatives (GPIs) of the Global Plan and has worked with States, Territories and International Organizations in various regional meetings to align the work programmes into specific ATM performance objectives in support of the strategic objectives of ICAO. The goal is to focus attention on regional implementation activities and to ensure that resources are efficiently utilized and work is not duplicated. The new work process and methods

should also ensure that performance objectives can be measured against timelines and to facilitate reporting of progress achieved to the ICAO Council and Air Navigation Commission.

2.19 The **Appendix** to this Working Paper contains performance objectives for Seamless ATM system agreed in the ATM NAM/CAR and ATM/CNS/SG/5 Meetings. Each performance objective describes benefits expected and their connection to ICAO strategic objectives, tasks designated in accordance with ICAO Doc 9854 together with regional work programme activities to be completed in the near and medium term and including a description of strategic tasks and their relationship with GPIs. By using these performance objectives as the basis for organizing work, the E/CAR will ensure activities undertaken will be part of and harmonized with the larger NAT, NAM, CAR and SAM work programmes, leading to the goal of seamless global ATM.

2.20 To further progress work on the performance objectives, States and Territories should develop their own implementation strategies or action plans that reflect their work programmes, timelines, individual parties responsible and work status so as to monitor progress and to report advances on those activities, as required. Additionally, they should consider recording detailed information on activities required to complete implementation, and a means to provide feedback on progress of work through an annual reporting process which will help Civil Aviation Administrations to prioritize activities and provide the support needed. This will also help in identifying annual needs and assistance in each ICAO Region.

## 3. Conclusion

3.1 A significant implementation work has been developed in the E/CAR, nevertheless, in order to harmonized the implementation of the regional works, it is necessary to increase efforts. In this context, the E/CAR future work programmes should also consider the harmonization of the ATM operational safety systems implementation, the planning and training of human resources and the environmental protection during aircraft operations.

3.2 The development of harmonized initiatives and operational procedures across States/Territories and regions will lead to the successful and cost effective implementation of a seamless global ATM system. The work being done in preparation for the 2007 Cricket World Cup and the WATRS redesign and harmonization are significant steps in this direction enhancing safety, efficiency and increasing capacity. Taken separately, each enhancement benefits the system to an extent; if they are worked together, a seamless ATM system will be possible much sooner.

## 4. Suggested action

4.1 The E/CAR DCA/20 Meeting is invited to:

- a) note the information contained in this Working Paper;
- b) encourage States and Territories to develop action plans for prioritizing, monitoring and reporting implementation activities; and
- c) support measures to reach the goal of a seamless ATM system.

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## APPENDIX

## SEAMLESS ATM SYSTEM

### **REGIONAL PLANNING PROCESS**

The regional planning process should be conducted in accordance with the global plan initiatives (GPIs) of the Global Plan (Doc 9750) and the ICAO vision for an integrated ATM system, harmonized and interoperable, as established in the Global ATM Operational Concept (Doc 9854).

The objective is to achieve the maximum level of inter-operability and harmonization among sub-systems for a seamless and interoperable regional ATM system for all users during all phases of flight, complying with agreed levels of safety, providing optimum economic operations, to be environmentally sustainable and to fulfil national aviation security requirements.

The planning should be developed based on clearly defined performance objectives. The planning horizon should be focused on the strategies of development, activities or main tasks for two periods – that of less than 5 years (short-term) and 6 to 10 years (medium-term). Some already identified tasks to be analyzed beyond this period may be included if they conform to ICAO ATM requirements.

### ATM PERFORMANCE OBJECTIVES

The performance objectives for regional ATM work programmes should be developed using an approach that best reflects the necessary activities needed to support regional ATM system implementation.

During its life cycle, the performance objectives may change in a dynamic manner depending on the ATM system's evolution; therefore, these should be coordinated with and available to all interested parties within the ATM Community in order to achieve timely communication throughout the implementation process. The establishment of collaborative decision making processes (CDM) ensures that all stakeholders are involved in and concur with the requirements, tasks and timelines.

The following sections describe aspects pertaining to the performance objectives and required changes, and how these changes foster harmonized improvements throughout the regional ATM system.

#### Benefits

The ATM implementation strategies should provide a group of common benefits for all stakeholders and be achieved through the operational and technical activities planned in each performance objective. These benefits should be in accordance with the ICAO strategic objectives.

#### Identification of work

Each strategy or set of activities should be identified with associated components of the ATM system when describing the tasks. According to the Doc 9854, the designators for ATM components are as follows:

• AOM	— Airspace organization and management
• DCB	— Demand and capacity balancing
• AO	— Aerodrome operations
• TS	— Traffic synchronization
• CM	— Conflict management
• AUO	— Airspace user operations
• ATM SDM	— ATM service delivery management

Each ATM system component pertains to tasks and activities related to phases of air operations (en-route, terminal and airport), capacity management, airspace management including its flexible use and aeronautical information management.

The infrastructure includes the ground technical systems and capacity required to support operations such as communications, navigation and surveillance, data processing, inter-operability of systems, information management system and spectrum management, including both civil and military systems.

The following diagram shows the ATM components in relation to the phases of flight:



## Work Programmes

ATM evolution requires a clearly defined progressive strategy including tasks and activities which best represent the national and regional planning processes in accordance with the global planning framework. The goal is to obtain a harmonized regional implementation evolving toward a seamless global ATM system.

For this reason, it is necessary to develop short and medium term work programmes, focusing on the necessary changes to the system in which a clear work commitment will be carried out by the parties involved.

The regional work programmes should define additional tasks and activities, maintaining a direct relation with ATM system components such as airspace organization, civil-military coordination, human factors, aeronautical regulations, operational safety systems management and environmental protection, among others.

The referenced framework for regional activities should also include the coordination of activities with military authorities who play an important role in helping to ensure that the best use is made of the available airspace resources by all airspace users while still safeguarding national security.

The following principles should be considered when developing work programmes:

- The work should be organized using project management techniques and performance-based objectives in alignment with the strategic objectives of ICAO. The work programmes should be in accordance with the progress, characteristics and regional implementation needs.
- All activities involved in accomplishing the performance objectives should be designed following strategies, concepts, action plans and roadmaps which can be shared among States to align the regional work with the fundamental objective of achieving interoperability and seamlessness to the highest level.
- The planning of activities should include optimizing human resources, as well as encouraging dynamic use of electronic communication between States such as the Internet, videoconferences, teleconferences, e-mail, telephone and facsimile. Additionally, it should be ensured that resources will be efficiently used, avoiding any duplication or unnecessary work.
- The new work process and methods should ensure that performance objectives can be measured against timelines and the regional progress achieved can be easily reported to the Air Navigation Commission and to the ICAO Council.

## Status

The status is mainly focused on monitoring the progress of the implementation activity as it progresses toward a specific completion date. The status of the activity is defined as follows:

■Valid	the feasibility and benefits of an activity has been confirmed, work has been initiated but the activity itself has not been finalized.
■Completed	implementation of the activity has been finalized by the involved parties.

**Tentative** the feasibility and benefits of an activity is being investigated or developed.

A tentative status indicates a potential activity; normally this activity will not be included in the regional planning documents unless it is an ICAO defined requirement.

## **Relationship between Performance Objectives and Global Plan Initiatives**

The 23 GPIs provide a global strategic framework and are designed to contribute to achieving the regional performance objectives and to support the logical progression of regional implementation work programmes.

Each performance objective should be referenced to the pertinent GPIs. The goal is to ensure that the evolutionary work process will be integrated into the global planning framework

## NATIONAL ACTION PLANS

States should develop their own national action plans reflecting the specific activities or tasks along with the expected benefits to be obtained and the date by which each should be completed according to its own needs and based on the regionally-agreed performance objectives.

The activities should include the necessary detailed actions to successfully achieve the national performance objectives, relating these activities with the short and medium term regionally-agreed performance objectives.

National plans should identify the individual parties responsible for achieving the objectives as well as a means for monitoring and eventually reporting progress on the actions to ICAO. The responsibilities and time-tables should be clearly defined so that the involved parties are aware of their commitments throughout the planning process.

Additionally, national action plans should include adequate means to provide information on implementation progress achieved such as through a periodic reporting process. This facilitates senior management levels' efforts to prioritize the actions and resources required. The same information provided to ICAO will allow feedback and assistance to be provided specific for each Region as they work to achieve a Global ATM system.

# ATM PERFORMANCE OBJECTIVES

OPTIMIZE THE ATS ROUTE STRUCTURE IN BOTH TERMINAL AND EN-ROUTE AIRSPACE			
Benefits			
Environment Efficiency	<ul> <li>reductions in fuel consumption;</li> <li>ability of aircraft to conduct flight more closely to preferred trajectorincrease in airspace capacity;</li> <li>facilitate utilization of advanced technologies (e.g., FMS based a support tools (e.g., metering and sequencing), thereby increasing effective of the sequence of the seque</li></ul>	pries; rrivals) and A ficiency.	TC decision
Strategy Short term (2010)			
TASK	Medium term (2011 - 20015) DESCRIPTION	START- END	STATUS
АОМ	<ul> <li>En-route airspace</li> <li>analyze the en-route ATS route structure and implement all identifiable improvements;</li> <li>implement all remaining regional requirements (e.g. RNP 10 routes); and</li> <li>finalize implementation of WGS-84</li> <li>monitor implementation progress</li> <li>develop a strategy and work programme to design and implement a trunk route network, connecting major city pairs in the upper airspace and for transit to/from aerodromes, on the basis of PBN and, in particular, RNAV/5, taking into account interregional harmonization;</li> <li>In terminal airspace</li> <li>develop a regional strategy and work programme for implementation of optimized standard instrument departures (SIDs), standard instrument arrivals (STARs), instrument flight procedures, holding, approach and associated procedures, on the basis of PBN and in particular RNAV/1 and 2; and</li> </ul>	2005-2008 2008-2011	
References	<ul> <li>monitor implementation progress</li> <li>GPI/5: performance-based navigation, GPI/7: dynamic and flexible GPI/8: collaborative airspace design and management, GPI/10: management, GPI/11: RNP and RNAV SIDs and STARs and C procedures.</li> </ul>	e ATS route r terminal area GPI/12: FMS-t	nanagement, design and based arrival

	IMPLEMENT RNP APPROACHES		
	Benefits		
Efficiency Safety	<ul><li>Improvements in capacity and efficiency at aerodromes.</li><li>Improvements in safety at aerodromes.</li></ul>		
	<i>Strategy</i> (2008-2015)		
TASK	DESCRIPTION	START- END	STATUS
AOM	<ul> <li>development of a regional strategy and work programme for implementation of RNP approaches at aerodromes where aircraft weighing 5700 kg or more are operated, on the basis of the transition plan as follows:</li> <li>Stage 1 – Evaluate existing procedures, determine compatibility of use with RNAV overlay routes</li> <li>Stage 2 – Carry out cost benefit analysis and safety assessments of RNAV procedures</li> <li>Stage 3 – Use existing radar vectoring patterns as the basis for RNAV departure and arrival tracks</li> <li>Stage 5 – Design stand-alone RNAV procedures</li> <li>Stage 6 – Training phase</li> <li>Stage 7 – Publish new procedures and introduce into new service, meet AIRAC dates</li> <li>Stage 9 – Removal of conventional procedures</li> </ul>		
References	GPI/5: performance-based navigation, GPI/7: dynamic and flexible GPI/8: collaborative airspace design and management, GPI/10: management, GPI/11: RNP and RNAV SIDs and STARs and C procedures.	le ATS route r terminal area GPI/12: FMS-t	nanagement, design and based arrival

ENHANCE CIVIL/MILITARY COORDINATION AND CO-OPERATION			
	Benefits		
Efficiency	• increase airspace capacity;		
Continuity	<ul> <li>allow a more efficient ATS route structure</li> <li>ensure safe and efficient action in the event of unlawful interference</li> <li>make available military restricted airspace more hours of the day their preferred trajectories; and</li> <li>improve search and rescue services.</li> </ul>	e; so that aircrat	ft can fly on
Strategy (2008-2012)			
TASK	DESCRIPTION	START- END	STATUS
AOM	<ul> <li>develop guidance material on civil/military coordination and cooperation to be used by States/Territories to develop national policies, procedures and rules;</li> <li>establish civil/military coordination bodies;</li> <li>arrange for permanent liaison and close cooperation between civil ATS units and appropriate air defense units;</li> <li>conduct a regional review of special use airspace;</li> <li>develop a regional strategy and work programme for implementation of flexible use of airspace in a phased approach beginning with more dynamic sharing of restricted airspace while working towards full integration of civil and military aviation activities by 2012; and</li> <li>monitor implementation progress</li> </ul>		
References	GPI/1: flexible use of airspace.		

ALIGN UPPER AIRSPACE CLASSIFICATION			
	Benefits		
Efficiency Continuity	<ul> <li>better utilization of data link communication;</li> <li>optimize use of flight plan data processing systems;</li> <li>enhance airspace management coordination, message exchange cap flexible and dynamic airspace management techniques;</li> <li>harmonization of interregional coordination processes;</li> <li>improvement of airspace interoperability and seamlessness; and</li> <li>ensure the provision of positive air traffic control services to all aircommunication.</li> </ul>	pabilities and craft operation	utilization of s.
	Strategy (True (2008)		
TASK	DESCRIPTION	START- END	STATUS
AOM	<ul> <li>Develop a regional implementation strategy and work programme for the implementation of ICAO Annex 11 airspace Class A above FL 195.</li> <li>identify key stakeholders, ATCOs, pilots, and relevant international organisations for coordination and cooperation on changes for new airspace organization, using a CDM process;</li> <li>develop new national airspace organization in accordance with ICAO provisions, as needed;</li> <li>Coordinate changes for regional and national documents;</li> <li>Doc 8733, CAR/SAM ANP;</li> <li>AIP; and,</li> <li>ATS letters of agreement</li> <li>carry out improvements in ground systems to support new airspace organization configurations, as necessary;</li> <li>publish national regulatory material for implementation of new rules and procedures to reflect airspace organizational changes;</li> <li>train ATCOs and pilots in new procedures, including all civil and military airspace users, as required;</li> <li>monitor implementation progress.</li> </ul>	END	
References	GPI/4: align upper airspace classification.		

	IMPROVE DEMAND AND CAPACITY BALANCIN	NG	
	Benefits		
Environment	<ul> <li>reduction in weather- and traffic-induced holding, leading to reduce missions;</li> </ul>	iced fuel const	umption and
Efficiency Safety	<ul> <li>improved and smoother traffic flows;</li> <li>improved predictability;</li> <li>improved management of excess demand for service in ATC sector</li> <li>improved operational efficiency;</li> <li>enhanced airport capacity;</li> <li>enhanced airspace capacity; and</li> <li>improved safety management.</li> </ul>	s and aerodron	nes;
	Strategy Near term (2008)		
TASK	DESCRIPTION	START- END	STATUS
DCB	<ul> <li>identify key stakeholders (ATC service providers and users, military authorities, airport authorities, aircraft operators and relevant international organisations) for purposes of coordination and cooperation, using a CDM process;</li> <li>identify and analyse traffic flow problems and develop methods for improving efficiencies on a gradual basis, as needed, through enhancements in current:         <ul> <li>airspace organization and management (AOM) and ATS routes structure (unidirectional routes) and SID and STARS,</li> <li>communication, navigation and surveillance systems,</li> <li>aerodrome capacity,</li> <li>ATS capacity,</li> <li>training for pilots and Controllers; and</li> <li>ATS letters of agreement;</li> </ul> </li> <li>define common traffic displays,</li> <ul> <li>common traffic displays (Internet),</li> <li>communications (teleconferences, web), and</li> <li>daily teleconference/messages methodology advisories;</li> </ul> <li>develop methods to establish demand/capacity forecasting;</li> <li>develop a regional strategy and work programme for harmonized implementation of ATFM service; and,</li> </ul>		

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Medium term (2010)	
	<ul> <li>develop a regional strategy for the implementation of flexible use of airspace (FUA); <ul> <li>assess use of airspace management processes;</li> <li>improve current national airspace management to adjust dynamic changes in tactical stage to traffic flows;</li> <li>introduce improvements in ground support systems and associated procedures for the extension of FUA with dynamic airspace management processes;</li> <li>implement dynamic ATC sectorization in order to provide the best balance between demand and capacity to respond in real-time to changing situations in traffic flows, and to accommodate in short-term the preferred routes of users;</li> <li>define common electronic information and minimum databases required for decision support and alerting systems for interoperable situational awareness between Centralized ATFM units;</li> <li>develop regional procedures for efficient and optimum use of aerodrome and runway capacity;</li> <li>develop a regional ATFM procedural manual to manage demand/capacity balancing;</li> <li>develop a regional strategy and framework for the implementation of a Centralized ATFM unit;</li> <li>develop operational agreements between Centralized ATFM units for interregional demand/capacity balancing; and,</li> <li>monitor implementation progress.</li> </ul></li></ul>
References	GPI/1: flexible use of airspace; GPI/6: air traffic flow management; GPI/7: dynamic and flexible ATS route management; GPI/9: Situational awareness; GPI/13: aerodrome design and management; GPI/14: runway operations; and GPI/16: decision support and alerting systems.

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IMPROVE ATM SITUATIONAL AWARENESS			
Benefits			
Efficiency Safety	<ul> <li>enhanced traffic surveillance;</li> <li>enhanced collaboration between flight crew and the ATM system;</li> <li>improved collaborative decision-making through sharing election information;</li> <li>reduced of workload for both pilots and controllers;</li> <li>improved operational efficiency;</li> <li>enhanced airspace capacity;</li> <li>improved implementation on a cost-effective basis;</li> <li>improved available electronic terrain and obstacle data in the cockp</li> <li>reduced of the number of controlled flight into terrain related accide</li> <li>improved safety management.</li> </ul>	ctronic aeron it; ents; and	autical data
	Strategy		
TASK	DESCRIPTION	START- END	STATUS
SDM	<ul> <li>identify parties concerned</li> <li>identify the automation level required according to the ATM service provided in airspace and international aerodromes, assessing         <ul> <li>operational architecture design,</li> <li>characteristics and attributes for interoperability,</li> <li>data bases and software, and</li> <li>technical requirements;</li> </ul> </li> <li>improve ATS interfacility communication</li> <li>implement flight plan data processing system and electronic transmission tools</li> <li>implement radar data sharing programs where benefits can be obtained</li> <li>develop situational awareness training programmes for pilots and controllers</li> <li>implement ATM surveillance systems for situational traffic information and associated procedures</li> <li>implement ground and air electronic warnings, as needed             <ul> <li>Conflict prediction</li> <li>Terrain proximity</li> <li>MSAW</li> <li>DAIW</li> <li>Surveillance system for surface movement</li> </ul> </li> </ul>		

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Medium term (2015)		
	<ul> <li>implement additional/advanced automation support tools to increase sharing of aeronautical information         <ul> <li>ETMS or similar</li> <li>MET information</li> <li>AIS/NOTAM dissemination</li> <li>Surveillance tools to identify airspace sector constraints</li> <li>A-SMGC in specific aerodromes, as required</li> </ul> </li> <li>implement teleconferences with ATM stakeholders</li> <li>monitor implementation progress</li> </ul>	
References	GPI/1: flexible use of airspace; GPI/6: air traffic flow management; and GPI/7: dynamic and flexible ATS route management; GPI/9: Situational awareness; GPI/13: aerodrome design and management; GPI/14: runway operations; and GPI/16: decision support and alerting systems; GPI/17: implementation of data link applications; GPI/18: aeronautical Information; GPI/19: meteorological systems.	

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