European and North Atlantic Office

TRANS-REGIONAL AIRSPACE AND SUPPORTING ATM SYSTEMS STEERING GROUP

FIRST MEETING

(Paris, 2-3 May 2007)

Agenda Item 2: Review of the requirements of the airspace user community for a rational, modern, and economically viable structure and ATM services

SEAMLESS ATM SYSTEM

(Presented by the ICAO North American, Central American and Caribbean Office)

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 NAM/CAR Regions 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).*

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 with and the progress of such work will be measured with time lines.

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 Polar area can be considered as a homogenous area, as it has several similar traffic flows, all in remote and oceanic areas, spanning several ICAO Regions.

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 North American/Asia flow via the Russian Far East (RFE).

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 North America, 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 has variations in infrastructures, procedures and requirements.

2.8 With work underway to redesign WATRS, implement ADS-B across much of U.S. and Canada and to analyze routes and flows in the Polar area, 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 northern North American airspace from all directions, coming from areas with surveillance and direct controller/pilot communications, and coming from areas with neither. Other Polar ATS Providers have varying levels of infrastructure in the 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 consistent from State to State. Atmospheric and environmental factors are extreme, placing extra stresses on the infrastructure and aircraft, alike. All of these characteristics are factors affecting air operations.

2.10 Several activities are currently underway in the NAM, CAR 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 domestically 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 couple years they have worked together to deal with issues affecting North Atlantic traffic and to share best practices. Traffic operating

on the North Pacific Organized Track System, the Russian Far East and Polar Routes have been subject to slot assignments for years in order to deal with the system limitations.

2.13 Under the auspices of the North American Aviation Trilateral (NAAT), the Canada, Mexico, United States (Can/Mex/USA) Automation Systems Interface (ASI) Task Force developed the *North American Common Coordination Interface Control Document*. This document provides guidance material for the three ATS Providers to exchange flight plan data and radar handovers using protocols harmonized as much as possible with those in other regions. The first phase of automation interfaces was implemented between the U.S. and Mexico and resulted in a reduction in controller workload and increase in flight data accuracy. These same benefits are being observed on the U.S./Canada boundary as interfaces are implemented.

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 globally and we can look forward to migration to the Aeronautical Message Handling System (AMHS). As reliability, quality and bandwidth are enhanced, we will have 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 North American 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 the 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 the ICAO Air Navigation Bureau to harmonize regional work processes 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 a Seamless ATM System agreed in the regional ATM NAM/CAR Meeting. 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 to GPIs. By using these performance objectives as the basis for organizing work, the TRASAS will ensure activities undertaken will be part of and harmonized with the larger NAT, NAM, EUR, PAC and Asia work programmes, leading to the goal of seamless global ATM.

2.20 To further progress work on the performance objectives, States 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 resources needed. This will also help in identifying annual needs and assistance in each ICAO Region.

3. Conclusion

3.1 The development of harmonized initiatives and operational procedures across States 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 WATRS redesign is a significant step in this direction enhancing safety, efficiency and increasing capacity. The Polar area needs to be given the same level of attention in order to obtain similar improvements. Taken separately, each enhancement we make 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 TRASAS/1 Meeting is invited to:

a) note the information contained in this Working Paper;

b) encourage States to develop action plans for prioritizing, monitoring and reporting implementation activities; and

c) support measures to reach the goal of a seamless ATM system.

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

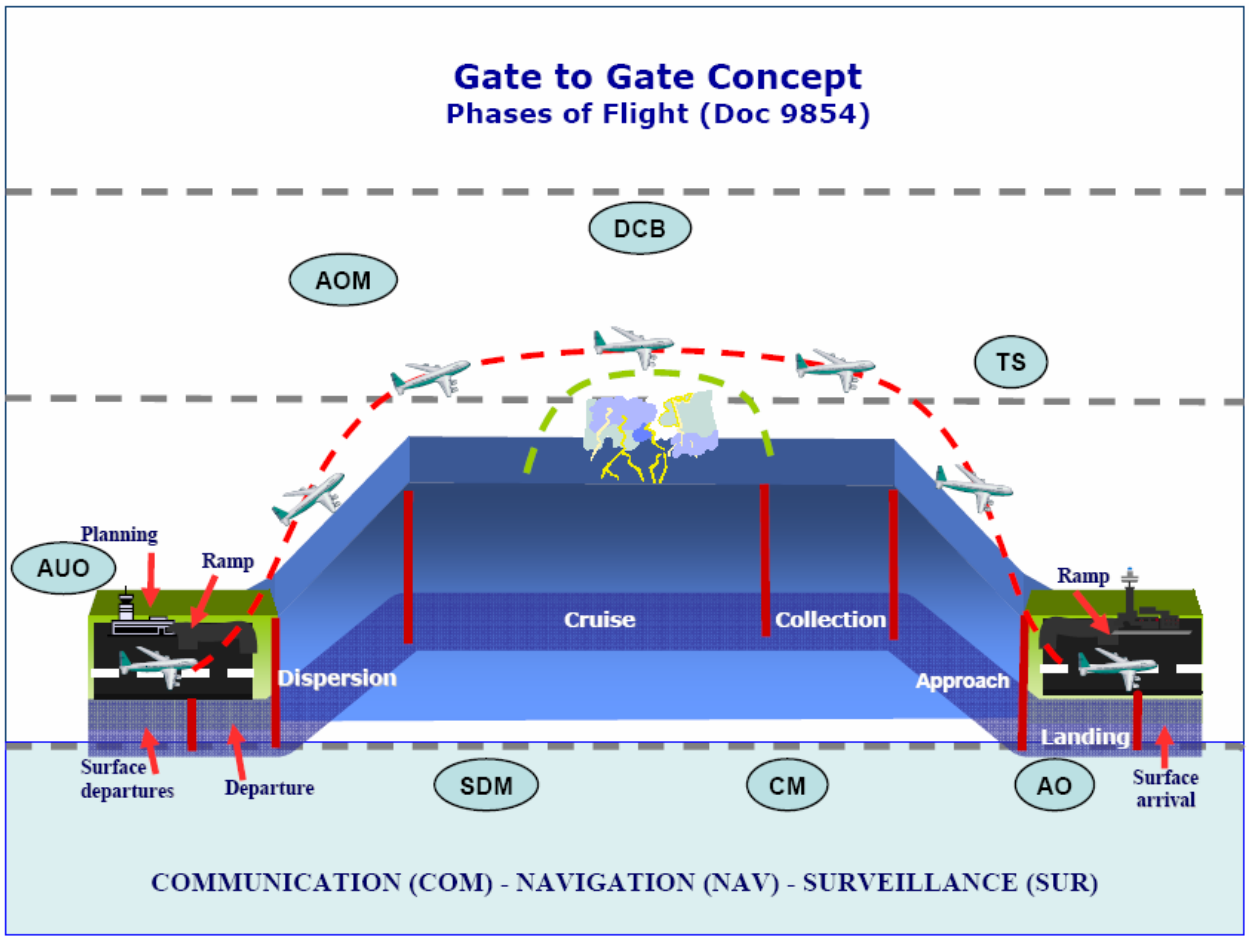
Each strategy or set of activities should be identified with associated components of the ATM system when describing the tasks. According to the Doc 9854, the designators for ATM components are as follows:

- **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

<table>
<tr><th colspan="4">OPTIMIZE THE ATS ROUTE STRUCTURE IN BOTH
TERMINAL AND EN-ROUTE AIRSPACE</th></tr>
<tr><td colspan="4">Benefits</td></tr>
<tr><td>Environment
Efficiency</td><td colspan="3">• reductions in fuel consumption;
• ability of aircraft to conduct flight more closely to preferred trajectories;
• increase in airspace capacity;
• facilitate utilization of advanced technologies (e.g., FMS based arrivals) and ATC decision support tools (e.g., metering and sequencing), thereby increasing efficiency.</td></tr>
<tr><td colspan="4">Strategy
Short term (2010)
Medium term (2011 - 20015)</td></tr>
<tr><td>TASK</td><td>DESCRIPTION</td><td>START-END</td><td>STATUS</td></tr>
<tr><td>AOM</td><td>En-route airspace
• analyze the en-route ATS route structure and implement all identifiable improvements;
• implement all remaining regional requirements (e.g. RNP 10 routes); and
• finalize implementation of WGS-84
• monitor implementation progress
• 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;
In terminal airspace
• 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
• monitor implementation progress</td><td>2005-2008

2008-2011</td><td></td></tr>
<tr><td>References</td><td colspan="3">GPI/5: performance-based navigation, GPI/7: dynamic and flexible ATS route management, GPI/8: collaborative airspace design and management, GPI/10: terminal area design and management, GPI/11: RNP and RNAV SIDs and STARs and GPI/12: FMS-based arrival procedures.</td></tr>
</table>

IMPLEMENT RNP APPROACHES			
Benefits			
Efficiency **Safety**	• Improvements in capacity and efficiency at aerodromes. • Improvements in safety at aerodromes.		
Strategy **(2008-2015)**			
TASK	**DESCRIPTION**	**START-END**	**STATUS**
AOM	• 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: **Stage 1** – Evaluate existing procedures, determine compatibility of use with RNAV overlay routes **Stage 2** – Carry out cost benefit analysis and safety assessments of RNAV procedures **Stage 3** – Use existing radar vectoring patterns as the basis for RNAV departure and arrival tracks **Stage 4** – Evaluation and simulation of procedures **Stage 5** – Design stand-alone RNAV procedures **Stage 6** – Training phase **Stage 7** – Publish new procedures and introduce into new service, meet AIRAC dates **Stage 8** – Operational review **Stage 9** – Removal of conventional procedures • monitor implementation progress		
References	GPI/5: performance-based navigation, GPI/7: dynamic and flexible ATS route management, GPI/8: collaborative airspace design and management, GPI/10: terminal area design and management, GPI/11: RNP and RNAV SIDs and STARs and GPI/12: FMS-based arrival procedures.		

ENHANCE CIVIL/MILITARY COORDINATION AND CO-OPERATION			
Benefits			
Efficiency	• increase airspace capacity;		
Continuity	• allow a more efficient ATS route structure • ensure safe and efficient action in the event of unlawful interference; • make available military restricted airspace more hours of the day so that aircraft can fly on their preferred trajectories; and • improve search and rescue services.		
Strategy (2008-2012)			
TASK	**DESCRIPTION**	**START-END**	**STATUS**
AOM	• develop guidance material on civil/military coordination and co-operation to be used by States/Territories to develop national policies, procedures and rules; • establish civil/military coordination bodies; • arrange for permanent liaison and close cooperation between civil ATS units and appropriate air defense units; • conduct a regional review of special use airspace; • 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 • monitor implementation progress		
References	GPI/1: flexible use of airspace.		

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

IMPROVE DEMAND AND CAPACITY BALANCING			
Benefits			
Environment	• reduction in weather- and traffic-induced holding, leading to reduced fuel consumption and emissions;		
Efficiency	• improved and smoother traffic flows; • improved predictability; • improved management of excess demand for service in ATC sectors and aerodromes; • improved operational efficiency; • enhanced airport capacity; • enhanced airspace capacity; and		
Safety	• improved safety management.		
Strategy ***Near term (2008)***			
TASK	**DESCRIPTION**	**START-END**	**STATUS**
DCB	• 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; • identify and analyse traffic flow problems and develop methods for improving efficiencies on a gradual basis, as needed, through enhancements in current: o airspace organization and management (AOM) and ATS routes structure (unidirectional routes) and SID and STARS, o communication, navigation and surveillance systems, o aerodrome capacity, o ATS capacity, o training for pilots and Controllers; and o ATS letters of agreement; • define common elements of situational awareness between FMUs; o common traffic displays, o common weather displays (Internet), o communications (teleconferences, web), and o daily teleconference/messages methodology advisories; • develop methods to establish demand/capacity forecasting; • develop a regional strategy and work programme for harmonized implementation of ATFM service; and,		

Medium term (2010)			
	• develop a regional strategy for the implementation of flexible use of airspace (FUA); o assess use of airspace management processes; o improve current national airspace management to adjust dynamic changes in tactical stage to traffic flows; o introduce improvements in ground support systems and associated procedures for the extension of FUA with dynamic airspace management processes; o 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; • define common electronic information and minimum databases required for decision support and alerting systems for interoperable situational awareness between Centralized ATFM units; • develop regional procedures for efficient and optimum use of aerodrome and runway capacity; • develop a regional ATFM procedural manual to manage demand/capacity balancing; • develop a regional strategy and framework for the implementation of a Centralized ATFM unit; • develop operational agreements between Centralized ATFM units for interregional demand/capacity balancing; and, • monitor implementation progress.		
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.		

IMPROVE ATM SITUATIONAL AWARENESS			
Benefits			
Efficiency **Safety**	• enhanced traffic surveillance; • enhanced collaboration between flight crew and the ATM system; • improved collaborative decision-making through sharing electronic aeronautical data information; • reduced of workload for both pilots and controllers; • improved operational efficiency; • enhanced airspace capacity; • improved implementation on a cost-effective basis; • improved available electronic terrain and obstacle data in the cockpit; • reduced of the number of controlled flight into terrain related accidents; and • improved safety management.		
Strategy ***Near term (2010)***			
TASK	**DESCRIPTION**	**START-END**	**STATUS**
SDM	• identify parties concerned • identify the automation level required according to the ATM service provided in airspace and international aerodromes, assessing o operational architecture design, o characteristics and attributes for interoperability, o data bases and software, and o technical requirements; • improve ATS interfacility communication • implement flight plan data processing system and electronic transmission tools • implement radar data sharing programs where benefits can be obtained • develop situational awareness training programmes for pilots and controllers • implement ATM surveillance systems for situational traffic information and associated procedures • implement ATS automated message exchanges, as required o FPL, CPL, CNL, DLA, etc. • implement automated radar handovers, where able; • implement ground and air electronic warnings, as needed o Conflict prediction o Terrain proximity o MSAW o DAIW o Surveillance system for surface movement • implement data link surveillance technologies and applications: ADS, CPDLC, AIDC, as required.		

Medium term (2015)			
	• implement additional/advanced automation support tools to increase sharing of aeronautical information o ETMS or similar o MET information o AIS/NOTAM dissemination o Surveillance tools to identify airspace sector constraints o A-SMGC in specific aerodromes, as required • implement teleconferences with ATM stakeholders • monitor implementation progress		
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.		

– END –