



International Civil Aviation Organization

CAR/SAM REGIONAL PLANNING IMPLEMENTATION GROUP (GREPECAS)

**Fifth Meeting of the GREPECAS Aerodromes and Ground Aids /
Aerodrome Operational Planning Subgroup (AGA/AOP/SG/5)**

Montevideo, Uruguay, 20 to 24 November 2006

AGA/AOP/SG/5-WP/19

18/10/06

Agenda Item 6: Review of Other Technical Matters
6.1 The ICAO Global Air Navigation Plan (Global Plan)

THE ICAO GLOBAL AIR NAVIGATION PLAN (GLOBAL PLAN)

(Presented by the Secretariat)

SUMMARY

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. Efforts by ICAO toward achieving such a system are focused on the global ATM operational concept (operational concept) as the guiding vision and the Global Air Navigation Plan as the transition map. To accomplish this, the Global Plan has been restructured and revised and its second amendment is process, and will be supported by planning tools to assist States, regional planning groups and air navigation service providers in the planning process.

Referencias:

- Global Air Navigation Plan for CNS/ATM systems (Doc 9750)
- Proposal for Amendment Doc 9750 (State Letters AN 13/54-06/15 24 February 2006
- Air Navigation Commission, AN WP 8158, 05/10/06

1. Introduction

1.1 Evolution to Global Plan initiatives

ICAO has disseminated a draft of the amended Global Air Navigation Plan for CNS/ATM Systems (Doc 9750). One important change reflected in the revised edition of the document – first published in 1993 – is the incorporation of relevant material from an implementation “roadmap” developed by industry as a follow-up to the 11th ICAO Air Navigation Conference (Montreal 2003). The revised Global Plan describes a strategy aimed at achieving near and medium-term air traffic management (ATM) benefits on the basis of available and foreseen aircraft capabilities and ATM infrastructure.

2. General Considerations of the Global Plan

2.1 The Global Plan is focused on operational and technical improvements that provide benefits to the aircraft operators over the near and medium terms. The long term initiatives are needed for guidance to the evolution of a Global ATM System, such as the one foreseeable on the operational concept, which will be added to the Global Plan as soon as they are designed, planned, developed and approved.

2.2 The Global Plan focuses therefore, on efforts towards maintaining consistent global harmonization and improving implementation efficiencies by drawing on the existing capabilities of the infrastructure and successful regional implementation of CNS/ATM systems over the short and medium terms.

2.3 This 2nd amendment is supported by planning tools that take various formats; among these are software applications, planning documentation, web-based reporting forms, and project management tools. Regarding business planning the Global Plan initiatives were developed in unison with ICAO's business planning process, and as such reflect the key activities and critical tasks related to the organization's strategic objectives for the 2005-10 period.

2.4 Definitely, the 2nd amendment of the revised edition of the Global Plan will facilitate the planning and implementation of these developments through new and innovative methods. A set of Global Plan initiatives will ensure that the available near and medium-term opportunities are fully exploited, while planning tools will provide guidance on preparatory activities and serve as the basis for establishing performance objectives and implementation time lines.

2.5 The conceptual and development framework of the ICAO Global Air Navigation Plan is detailed in **Appendix A** to this Working Paper

3. Discussion

3.1 Considering the aforementioned statements, the management of each air side process has substantially varied, since each of the parties, either at a corporate or individual level, has responsibilities and decisions to visualize, analyze and make a decision from a systemic point of view. In fact, the USOAP practices are based on this vision.

3.2 The content of this working paper covers the issues that affect the global, regional and local aeronautical system; therefore, our Subgroup has to study each one of the details contained in the Global Plan and how the AGA issues are inserted in the dynamics of the Plan.

4. Suggested Action

4.1 The Meeting is invited to take note, review and discuss about this Working Paper.

APPENDIX A

1. Components of the Airside Air Traffic Management Operational Concept (ATM)

The ATM system, will be based on the provision of integrated and interdependent services. The separate components form one system. Figure 1.

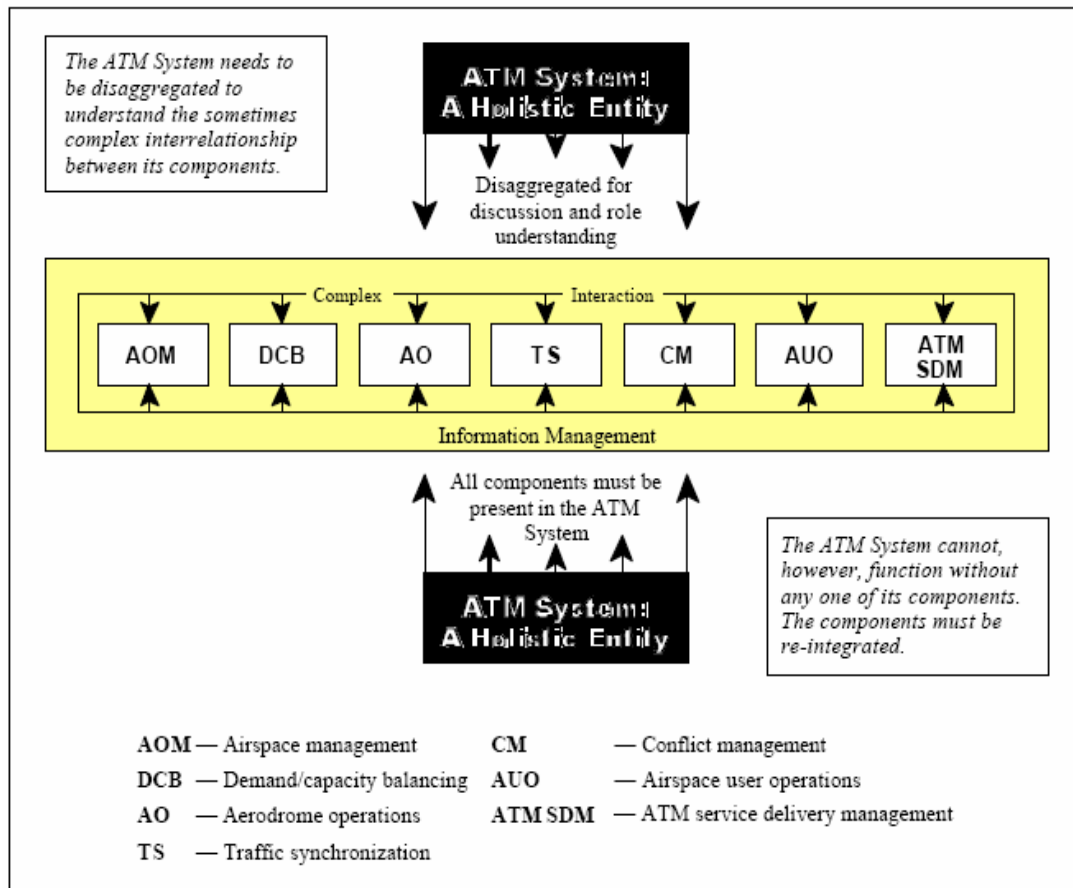


Figure 1 –Separate Components of the ATM System

Summary Description of separate Components

Aerodrome Operations (AO)

As an integral part of the ATM system, the aerodrome operator must provide the needed ground infrastructure including, inter alia, lighting, taxiways, runways and precise surface guidance to improve safety and maximize aerodrome capacity in all weather conditions.

Airspace organization and management (AOM)

Airspace organization will establish airspace structures in order to accommodate the different types of air activity, volume of traffic and differing levels of service. Airspace management is the process by which airspace options are selected and applied to meet the needs of the ATM community.

Demand and capacity balancing (DCB)

Demand and capacity balancing will strategically evaluate system-wide traffic flows and aerodrome capacities to allow airspace users to determine when, where and how they operate, while mitigating conflicting needs for airspace and aerodrome capacity.

Traffic Synchronization (TS)

Traffic synchronization refers to the tactical establishment and maintenance of a safe, orderly and efficient flow of air traffic.

Airspace user operations (AUO)

Airspace user operations refer to the ATM-related aspect of flight operations

Conflict Management (CM)

Conflict management will consist of three layers: strategic conflict management through airspace organization and management, demand and capacity balancing, and traffic synchronization; separation provision; and collision avoidance.

ATM service delivery management (ATMSDM)

ATM service delivery management will operate seamlessly from gate to gate for all phases of flight and across all service providers.

2. DEVELOPMENT

2.1 *Planning Process*

The basis for developing a global ATM system in enroute airspace 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. 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.

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.

2.2 *Work Programme*

After identifying the homogeneous ATM areas and major traffic flows, which all regions have already progressed substantially, planners should conduct a survey of the current and foreseen aircraft population and its capabilities, predicted traffic figures, and also the ATM infrastructure, including human resource availability and requirements, among other things. An analysis of the data gathered should lead to the identification of “gaps” in performance. The Global Plan initiatives would then be evaluated against these gaps to identify those that would most appropriately provide the operational improvements necessary to meet performance objective (s).

This planning process would continue with development of scenarios for implementation of initiatives, cost-benefit analyses of the various scenarios and preliminary development of infrastructure support requirements. Additional steps would include development of implementation plans and funding profiles, further review of human resource requirements to support the identified initiatives, followed by further cost-benefit analyses. Finally, national and regional implementation plans would be developed or amended based on the selected initiatives. The planning tools will assist planners in carrying out the above steps.

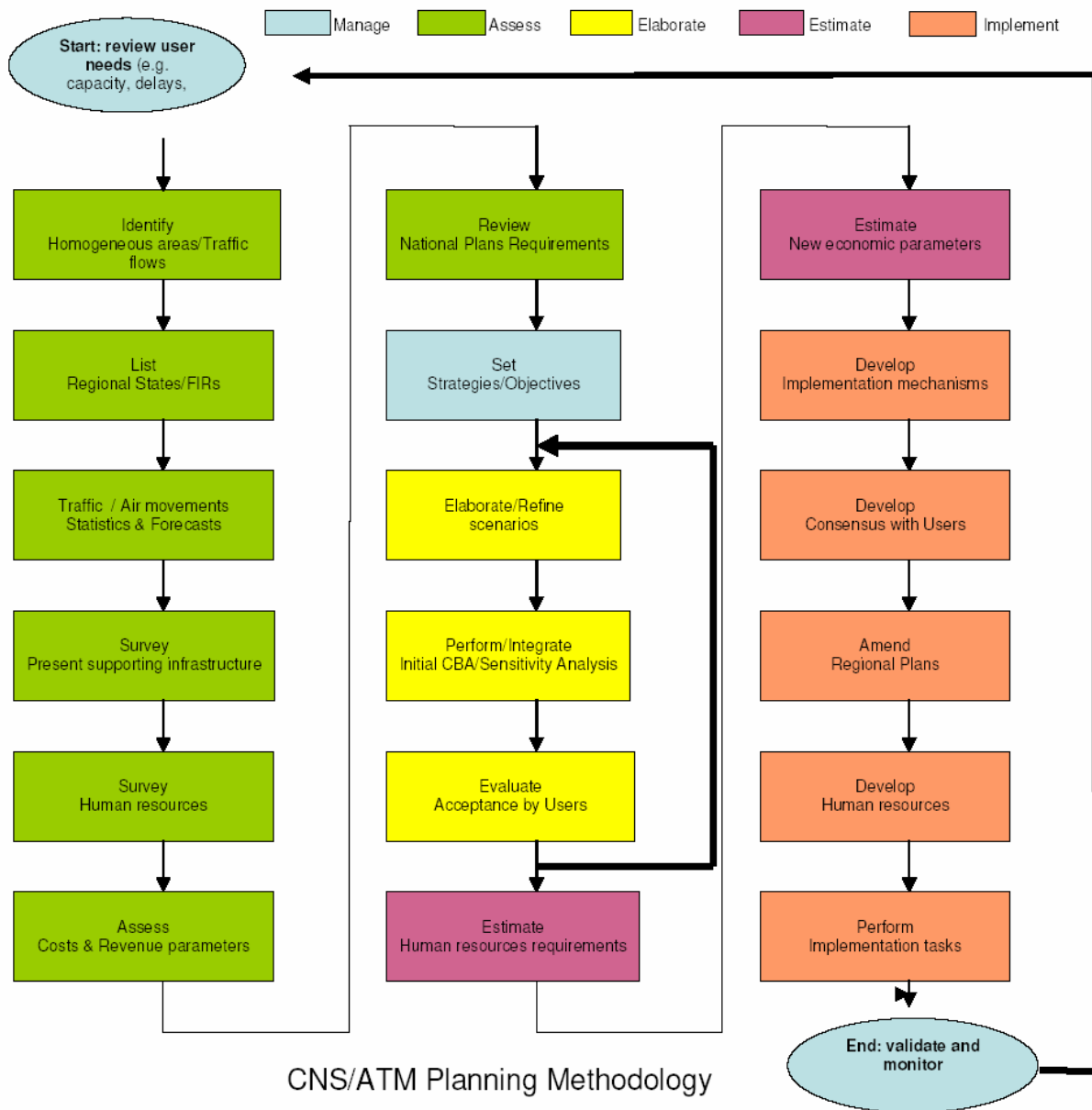


Figure 2. Planning flow chart

2.2.1 The planning process described in this volume of the Global Plan has been developed on the basis of the planning model container in the previous version of the Global Plan which served as a step in the evolution toward a global ATM system.

2.3 *Global Plan Initiatives (GPI)*

For each initiative, the ATM objective and the implementation strategy are described in the paragraphs below. The strategies related to each initiative, are provided in State Letter AN 13/54-06/15 dated 24 February 2006. Only the aerodromes initiatives will be described in the current Working Paper.

2.3.1 *Integration of Initiatives*

In fact, integration is a sought after goal of a global ATM system. An example would be the achievement of full integration of arrival, departure and surface traffic management which would improve aerodrome throughput the sequencing and metering provided by the integration of arrival, departure and surface management functions. Benefits are achieved through the creation of an optimized traffic flow from the top of climb. This could effectively eliminate ground and airborne holding, leading to a more optimum use of the airspace, the runway system and ground facilities. Achievement of the above, would require implementation of several initiatives, or various parts of different initiatives, including decision support systems, performance based navigation, collaborative airspace design and management, terminal area design and management and aerodrome design and management.

2.3.2 Global Plan Initiatives and their relationship to the major Groupings are shown in Table 1.

Table 1 – Global Plan Initiatives and their relationships to the major Groupings

#.	GPI	En route	Terminal Area	Aerodrome	Supporting Infrastructure	Related Operational Concept Components
GPI-1	Flexible use of airspace	X	X			AOM, AOU
GPI-2	Reduced vertical separation minima	X				AOM, CM
GPI-3	Harmonize level systems	X				AOM, CM, AOU
GPI-4	Align upper airspace classification	X				AOM, CM, AOU
GPI-5	RNAV and RNP (Performance Basic Navigation)	X	X	X		AOM, AO, TS, CM, AOU
GPI-6	Air Traffic Flow Management	X	X	X		AOM, AO, DCB, TS, CM, AOU
GPI-7	Dynamic and flexible ATS route management	X	X			AOM, AOU
GPI-8	Collaborative airspace design and management	X	X			AOM, AOU
GPI-9	Situational awareness	X	X	X	X	AO, TS, CM, AOU
GPI-10	Terminal area design and management		X			AOM, AO, TS, CM, AOU
GPI-11	RNP and RNAV SIDs and Stars		X			AOM, AO, TS, CM, AOU
GPI-12	Functional Integration of Ground Systems with airborne systems		X		X	AOM, AO, TS, CM, AOU
GPI-13	Aerodrome Design and Management			X		AO, CM, AOU
GPI-14	Runway operations			X		AO, TS, CM, AOU
GPI-15	Match IMC and VMC operating capacity		X	X	X	AO, CM, AOU
GPI-16	Decision support systems and alerting systems	X	X	X	X	DCB; TS, CM, AOU
GPI-17	Implementation of data link applications	X	X	X	X	DCB, AO, TS, CM, AOU, ATMSDM
GPI-18	Aeronautical Information	X	X	X	X	AOM, DCB, AO, TS, CM, AOU, ATMSDM
GPI-19	Meteorological systems	X	X	X	X	AOM, DCB, AO, AOU,
GPI-20	WGS-84	X	X	X	X	AO, CM, AOU
GPI-21	Navigation Systems	X	X	X	X	AO, TS, CM, AOU
GPI-22	Communication infrastructure	X	X	X	X	AO, TS, CM, AOU
GPI-23	Aeronautical radio spectrum	X	X	X	X	AO, TS, CM, AOU, ATMSDM

2.4 Global Plan Initiatives (GPI) AGA Field

2.4.1 GPI- 5 RNAV and RNP (Performance – Based Navigation)

Scope: The incorporation of advanced aircraft navigation capabilities into the air navigation system infrastructure.

Related Operational Concept Components: AOM, AO, TS, CM, AUO.

2.4.2 GPI -6 Air Traffic Flow Management

Scope: The Implementation of strategic, tactical and pre-tactical measures aimed at organizing and handling traffic flows in such a way that the totality of the traffic handled at any given time or in any given airspace or aerodrome is compatible with the capacity of the ATM system.

Related Operational Concept Components: AOM, AO, DCB, TS, CM, AUO.

2.4.3 GPI-9 Situational Awareness

Scope: Operational Implementation of data link-based surveillance. The implementation of equipment to allow traffic information to be displayed in aircraft supporting implementation of conflict prediction and collaboration between flight crew and the ATM system. Improve situational awareness in the cockpit by making available electronic terrain and obstacle data of required quality.

Related Operational Concept Components: AO, TS, CM, AUO.

2.4.4 GPI-13 Aerodrome Design and Management

Scope: The implementation of management and design strategies to improve movement area utilization.

Related Operational Concept Components: AO, CM, AUO.

2.4.5 GPI-14 Runway Operations

Scope: Maximize runway capacity.

Related Operational Concept Components: AO; TS, CM, AUO.

2.4.6 GPI-15 Match IMC and VMC Operating Capacity

Scope: Improve the ability of aircraft to manoeuvre on the aerodrome surface in adverse weather conditions.

Related Operational Concept Components: AO; CM; AUO.

2.4.7 GPI-16 Decision Support and alerting systems

Scope: Implement decision support tools to assist air traffic controllers and pilots in detecting and resolving air traffic conflicts and in improving traffic flow

Related Operational Concept Components: DCB, TS, CM, AUO.

- 2.4.8** ***GPI-17 Implementation of data link applications***
Scope: Increase the use of data link applications.
Related Operational Concept Components: DCB, AO, TS, CM, AUO, ATMSDM.
- 2.4.9.** ***GPI-18 Aeronautical Information***
Scope: To make available in real-time, quality assured electronic information (aeronautical, terrain and obstacle).
Related Operational Concept Components: AOM, DCB, AO, TS, CM, AUO, ATMSDM.
- 2.4.10** ***GPI-19 Meteorological Systems***
Objective: To improve the availability of meteorological information in support of a seamless global ATM system.
Related Operational Concept Components: AOM; DCB, AO, AUO.
- 2.4.11** ***GPI-20WGS-84***
Objective: The implementation of WGS-84 by all States.
Related Operational Concept Components: AO, CM, AUO.
- 2.4.12** ***GPI-21 Navigation Systems***
Scope: Enable the introduction and evolution of performance-based navigation supported by a robust navigation infrastructure providing an accurate, reliable and seamless global positioning capability.
Related Operational Concept Components: AO, TS, CM, AUO.
- 2.4.13** ***GPI-22 Communication Network Infrastructure***
Scope: To evolve the aeronautical mobile and fixed communication infrastructure, supporting both voice and data communications, accommodating new functions as well as providing the adequate capacity and quality of service to support ATM requirements.
Related Operational Concept Components: AO; TS, CM, AUO.
- 2.4.14** ***GPI-23 Aeronautical Spectrum***
Scope: Timely and continuing availability of adequate radio spectrum, on a global basis, to provide viable air navigation services (communication, navigation and surveillance).
Related Operational Concept Components: AO; TS, CM, AUO, ATMSDM.