INTERNATIONAL CIVIL AVIATION ORGANIZATION

AFI PLANNING AND IMPLEMENTATION REGIONAL GROUP FIFTEENTH MEETING (APIRG/15)

(Nairobi, Kenya, 26 – 30 September 2005)

Agenda Item 6: Review of significant developments related to air navigation
6.1: Follow-up on the outcome of the Eleventh Air Navigation Conference

PROGRESS REPORT ON PROPOSED AMENDMENT TO THE *GLOBAL AIR NAVIGATION PLAN FOR CNS/ATM SYSTEMS* (DOC 9750)

(Presented by the Secretariat)

SUMMARY

On 13 March 1998, the Council reviewed and accepted the Global Air Navigation Plan for CNS/ATM Systems (Global Plan). The Council also agreed that future updates of the Global Plan should be accomplished by the Secretariat based on the ongoing work of ICAO at both the global and regional levels. This paper presents a progress report on the second amendment to the Global Plan which is being developed in follow-up to the Eleventh Air Navigation Conference and in line with recent developments within industry.

Action by APIRG is in paragraph 3.

1. INTRODUCTION

1.1 In order to progress implementation of Communications, Navigation, and Surveillance/Air Traffic Management (CNS/ATM) Systems, a plan of action was needed. The first effort toward developing such a plan was the *Global Coordinated Plan for Transition to ICAO Communications, Navigation, and Surveillance/Air Traffic Management Systems* (Global Coordinated Plan) which was included as an appendix in the *Report of the Fourth Meeting of the Special Committee for the Monitoring and Coordination of Development and Transition Planning for the Future Air Navigation System (FANS Phase II)* (Doc 9623). In 1996, the Council agreed that there was an established need for an updated plan which should constitute a "living" document comprising technical, economic, legal and institutional elements.

1.2 On 29 January 1998, the Commission reviewed a revised Global Coordinated Plan which was re-titled as the *Global Air Navigation Plan for CNS/ATM Systems* (Doc 9750) (Global Plan). On 13 March 1998, the Council accepted the revised Global Plan. Since the acceptance of the first edition of the revised Global Plan, a comprehensive proposal for amendment to several parts of the document was developed. In June 2001, the Council accepted the first amendment to the Global Plan and the second edition was published in 2002.

1.3 In follow-up to the Eleventh Air Navigation Conference (AN-Conf/11, Montreal, 22 September to 3 October 2003), recent developments within industry, and in association with the work of ICAO toward developing a Business Plan, a proposal to revise the Global Plan has been developed.

2. SECOND AMENDMENT OF THE GLOBAL PLAN

2.1 AN-Conf/11 (Doc 9828) discussed the role and function of the Global Plan under Agenda Item 1, and agreed that the Global Plan was a significant component in the development of regional and national plans and that, together with the global ATM operational concept, which was endorsed by the conference, it provided an effective architecture for future ATM systems. The conference also agreed on Recommendation 1/10: Status of the Global Air Navigation Plan for CNS/ATM Systems, and Recommendation 1/12: Amendment of Chapter 4 of the Global Plan. On 15 January 2004, the Commission approved Recommendations 1/10 and 1/12 of the conference. With respect to Recommendation 1/12, the Commission requested the Secretary General to take it into account when developing the next amendment to the Global Plan.

2.2 In follow-up to AN-Conf/11, the sixth meeting of the Air Navigation Commission Consultation with Industry, with the theme “Fostering the Implementation of the Recommendations of the Eleventh Air Navigation Conference”, was held in Montreal on 18 and 19 May 2004. Among the topics discussed was “Global ATM — From Concept to Reality”, which resulted in a conclusion encouraging industry partners to work together toward the development of a common roadmap/global action plan for presentation to the Commission and consideration for inclusion in the Global Plan . Subsequent to this, an ATM Implementation Roadmap (roadmap) was developed by a dedicated project team established by industry for this purpose. On 24 November 2004, the roadmap was presented to the Commission during an informal briefing.

2.3 During its formal assessment of the roadmap on 18 January 2005, the Commission requested the Secretariat to develop a proposal for amendment of the Global Plan to incorporate relevant material from the industry roadmap and to present the proposed amendment to the Commission for review.

2.4 The proposed amendment of the Global Plan is being developed on the basis of the recommendations of AN-Conf/11 and the logical groupings of operational initiatives excerpted from the roadmap. The operational initiatives, as developed by industry, were consolidated by the Secretariat in close cooperation with industry to allow a smooth integration with the current planning framework of the Planning and Implementation Regional Groups (PIRGs) as well as with the current version of the Global Plan (descriptions of the near- and medium- term operational initiatives are contained in Appendix A). The proposed amendment also takes into account the global ATM operational concept and the long-term transition strategies being developed by the Air Traffic Management Requirements and Performance Panel (ATMRPP). It is expected that the transition strategies being developed by the ATMRPP will eventually be placed in the Global Plan, providing a more comprehensive roadmap for transition to the global ATM system envisioned in the operational concept.

2.5 It is proposed that the Global Plan be divided into three volumes for the following reasons. First, it is considered that much of the material in the present version of the Global Plan is valid and, subject to appropriate updates, could be retained to provide generic guidance material on areas largely outside the air navigation domain. Volume I would contain this material.

2.6 Volume II is proposed to contain comprehensive guidance material and detailed operational requirements and planning criteria for air navigation planning (i.e. air traffic management, communications, navigation, surveillance, aeronautical information service and meteorology, etc.) that

would lead to a more global and seamless ATM system. The intent is to have a Volume II that would serve as a guidance document for executives, policy-makers and planners, which would also contain global timelines for implementation of the operational initiatives (Appendix A refer). Appendix B depicts a sample of global timelines; however, it is envisaged that timelines would be subject to regional air navigation agreement.

2.7 Volume III is proposed to be comprised of an interactive planning and reporting tool aimed at facilitating planning for implementation of the envisaged global ATM system. It would include the operational initiatives related to the near- and medium- term planning periods and would track progress achieved by the PIRGs toward implementation of the operational initiatives. The intent is that as States in each region consider implementation of an operational initiative, they would use the common programme templates and reporting formats as the basis for establishing performance objectives and implementation time lines and also to define the work to be accomplished. It is envisaged that some parts of the programme templates would be the subject of regional air navigation agreement, managed by PIRGs and reviewed by the Secretariat on a regular basis. Summary reports may also be developed using the programme templates, for presentation to the Commission and Council.

2.8 The Secretariat would finalize the amendment to the Global Plan and present it to the Commission for its initial review during its October-December 2005 session. Subsequently, the Secretariat would be consulting States though established process as well as presenting the same proposed amendment to ALLPIRG/5 (5-7 December 2005) so as to seek their views and obtain full support for the revised Global Plan. Consequent to this coordination process and taking into account comments received from States and ALLPIRG, the amendment will be presented to the Commission for its final review during its January-March 2006 session followed by final acceptance by the Council in May-June 2006.

3. ACTION BY APIRG

3.1 The Meeting is invited to:

a) note the status of the proposed amendments to the *Global Air Navigation Plan for CNS/ATM Systems*;

b) note that the Secretary General has scheduled the ALLPIRG/5 meeting to be held from 5 to 7 December 2005, at which time the amendment to the Global Plan will be reviewed; and

c) note that the amended Global Plan, after its initial review by the ANC, later by States and ALLPIRG/5, will be presented to the Commission for its final review in January-March 2006 followed by final acceptance by the Council in May-June 2006.

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APPENDIX A

DESCRIPTION OF OPERATIONAL INITIATIVES EXTRACTED FROM THE INDUSTRY ROADMAP AND AMENDED BY THE SECRETARIAT

1. Flexible Use of Airspace

Overview Statement: The optimization and equitable balance in the use of airspace between civil and military users, facilitated through both strategic coordination and dynamic interaction.

Goal: The aim is for all States to evolve toward complete dynamic integration of civil and military air traffic services including real-time civil/military controller-to-controller co-ordination to the required level through adequate system support, improved operational procedures and enhanced information on civilian traffic position and intentions.

2. Alignment of Upper Airspace Classifications

Overview Statement: The harmonization of Upper Airspace and associated traffic handling in each State to ensure application of a common ICAO ATS Airspace Class above a globally agreed division level.

Goal: The aim is to achieve a continuum of airspace, free from operational discontinuities, inconsistencies and disparate rules and procedures, so that transition from one segment to another is seamless to both airspace users and ATM providers. Over the long term, the ICAO classification scheme should be simplified to accommodate implementation of the Global ATM Operational Concept.

3. Collaborative Airspace Design

Overview Statement: The organization of airspace, in cooperation and coordination with the ATM service provider and airspace users, so that the airspace can be flexibly and dynamically managed to accommodate the preferred trajectories of the users.

Goal: The aim is for uniform airspace organization and management principles applicable on a global basis, leading to a more flexible airspace design to accommodate traffic flows dynamically, initially on a sub-regional basis leading to harmonized management and allocation of airspace and route structures regionally rather than on a national basis.

4. Capability Based Horizontal Navigation

Overview Statement: The implementation of the concept of required navigation performance (RNP) so that horizontal separation can be reduced and benefits achieved by aircraft operators that equip to meet RNP requirements.

Goal: Incorporate advanced aircraft navigation capabilities as part of the air navigation system infrastructure, bringing additional efficiency benefits to the airspace users.

5. **Dynamic and Flexible Route Management**

Overview Statement: The establishment of structured but flexible route systems, on the basis of RNAV and RNP capability, aimed at accommodating preferred flight trajectories.

Goal: Implementation of ATS route structures that avoid concentrations of aircraft over congested points and, eventually, implementation of a free routing environment that meets the needs of the airspace users to operate along preferred and dynamic flight trajectories.

6. **Enhance Terminal Operations**

Overview Statement: The implementation of optimized standard instrument departures (SIDs), standard instrument arrivals (STARs), instrument flight procedures, holding, approach and associated procedures, taking into account improved aircraft capabilities, along with ATM decision support systems.

Goal: The aim is to optimize TMA capacity and efficiency and provide for more fuel efficient aircraft operations. Aircraft will gradually take on traffic synchronization activities.

7. **Enhance Traffic and Capacity Management**

Overview Statement: The implementation of air traffic flow management (ATFM) measures on a strategic and regional basis, along with reduced vertical separation minimum (RVSM) and RNP, to enhance airspace capacity and improve in operating efficiency.

Goal: The overall objective is implementation of the strategic aspects of the global ATM operational concept (i.e., airspace organization and management, demand/capacity balancing, conflict management) including collaborative decision-making techniques, making use of decision support tools. Restrictions would then be largely centred on entry/exit times while tactical separation will revert to the aircraft.

8. **Enhance Aerodrome Capacity**

Overview Statement: The ATM system should know the position and intent of all vehicles and aircraft operating on the manoeuvring area so that capacity can be maintained in all weather conditions. Over the long term, aircraft design should allow enhanced ability to slow and vacate the runway.

Goal: The reduction of runway occupancy times through improved runway geometry, lighting, markings and procedures, including the application of reduced runway separation minima, and improvement the ability of aircraft to manoeuvre on the aerodrome surface in all weather conditions.

9. **Implement Reduced Vertical Separation**

Overview Statement: Increase capacity through optimized use of airspace.

Goal: Implement RVSM in all airspace. Over the long term, develop and implement new vertical separation minima.

10. **Harmonize Level Systems**

Overview Statement: Increase capacity and improve safety through implementation of a globally harmonized and seamless airspace.

Goal: Make a sustained political effort to encourage all States to adopt the ICAO Flight Level Scheme based on feet as contained in Appendix 2 to Annex 2 — *Rules of the Air*.

11. **Implement Decision Support Systems**

Overview Statement: Make optimum use of currently available automation functions (e.g., automated FDPS, MSAW, STCA, URET, CTAS, MAESTRO and on-line data interchange systems) in the near and medium terms.

Goal: To implement decision support tools to assist the air traffic controller and pilot with conflict detection and resolution and traffic smoothing, making optimum use of aircraft derived data.

12. **Implement Data Link Applications**

Overview Statement: Make maximum use of data link capabilities (VDL2, FANS, HF).

Goal: To implement ACARS and VDL-Mode 2 based data link services for pre-departure clearance, oceanic clearance, D-ATIS and other flight information and routine messages in the near term, as well as automatic position reporting on the part of the aircraft. Over the medium term, more complex safety related information can be exchanged, including ATC clearances. The long term use of data link will include down linking of aircraft flight parameters for use by the ATM system, and uplink of traffic data for improved situational awareness in the cockpit. Implement Data links (VDL2, FANS, HF).

13. **Improve Surveillance Capabilities**

Overview Statement: To improve surveillance in the terminal and en route environment through the implementation of ADS-A or ADS-B wherever there is presently no ATC surveillance system.

Goal: Implementation of elementary and enhanced Mode S/ADS/ADS-B on a region-wide basis. Implement available surveillance systems for surface movement at airports where weather conditions and capacity warrant.

14. **Improve Information Exchange**

Overview Statement: Standardize aeronautical information data exchange format and implement distributed electronic data services. Ultimately, aeronautical information management should provide quality assured information to users in real-time.

Goal: In the near and medium terms, States should strive to deliver aeronautical information in conformance with the Integrated Aeronautical Information Package. Over the long term, ICAO should develop and implement an international aeronautical information exchange data model that supports a

global collaborative decision-making environment, facilitating the implementation of a global, seamless ATM system. A global database of quality assured aeronautical information should also be an ICAO long-term objective.

15. Implement WGS-84

Overview Statement: The geographical coordinates used across various States in the world to determine the position of runways, obstacles, airports, navigation aids and ATS routes are based on a wide variety of local geodetic reference systems. With the introduction of area navigation (RNAV), the problem of having geographical coordinates referenced to local geodetic datums is more evident and has clearly shown the need for a universal geodetic reference system. ICAO, to address this issue, adopted in 1994 the World Geodetic System – 1984 (WGS-84) as a common horizontal geodetic reference system for air navigation with an applicability date of 1 January 1998.

Goal: To work toward implementation of WGS-84 by all States.

16. GNSS Implementation

Overview Statement: The global navigation satellite systems (GNSS), comprising satellite constellations in conjunction with appropriate augmentation systems should evolve into sole means of navigation for oceanic/remote areas, en-route continental, non-precision approach and for precision approach and landing operations.

Goal: To migrate from terrestrial navigation to satellite navigation through a cooperative and cost-effective approach.

17. Enhancement of Meteorological Systems (WAFS, IAVW and Automatic Air-Reporting) to support ATM

Overview: To improve the availability of meteorological information in support of a seamless global ATM system.

Goal: Enhancement of WAFS in view of producing automated turbulence, icing and thunderstorm forecasts in the grid-point format, and wind and temperature forecasts with improved spatial and temporal resolution to assist ATM in tactical decision-making for aircraft surveillance, air traffic flow management and updating flight plans for flexible/dynamic aircraft routing. Enhancement of the IAVW to improve the forecast accuracy in view of the optimization of the use of airspace and to reduce the time needed for volcanic ash advisories and SIGMET to reach area control centres and aircraft-in-flight. Enhancement of automatic downlink of MET information included in ADS messages to provide accurate upper wind fields and real-time wind profiles to assist in the automatic sequencing of aircraft on approach to maximize runway capacity.

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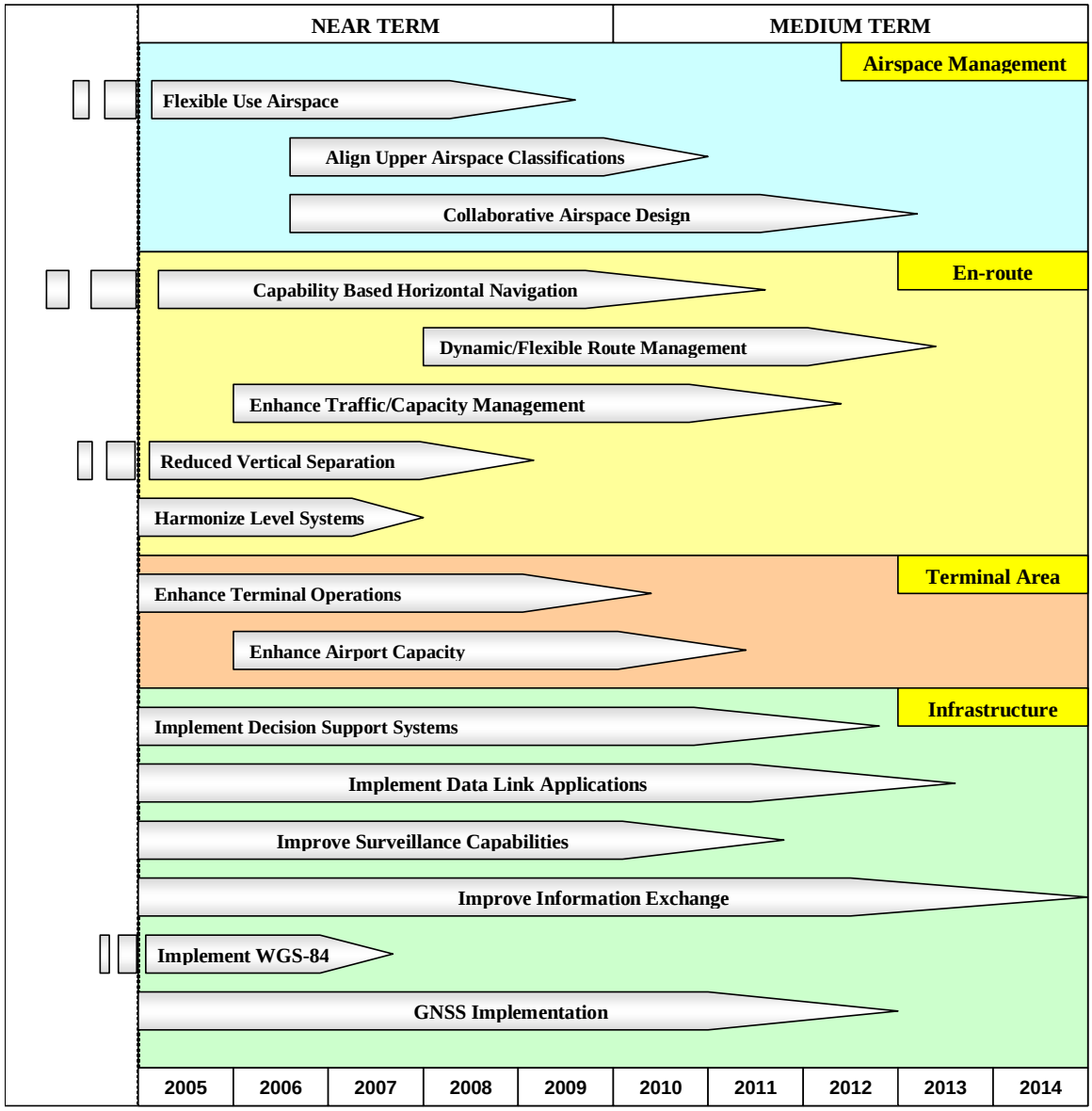
APPENDIX B

GLOBAL TIMELINES



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