INTERNATIONAL CIVIL AVIATION ORGANIZATION

Fourth Meeting of the APIRG Communications, Navigation and Surveillance Sub-group (Dakar, Senegal, 25-29 July 2011)

Agenda Item 6: Aeronautical Radionavigation Service

Planning and implementation guidelines

(Presented by the Secretariat)

SUMMARY

This information paper provides the CNS/SG/4 Meeting with the strategies for the implementation of the ICAO Global Plan Initiatives for navigation systems, for consideration when establishing regional planning and implementation guidelines.

Action by the meeting is at **paragraph 3.**

REFERENCE:

-ICAO Global Air Navigation Plan, Doc 9750

Related Strategic Objectives: **A** and **C.**

1. INTRODUCTION

1.1. The *Global Air Navigation Plan* was developed on the basis of an industry roadmap in an effort to facilitate implementation of the Recommendations of the 11TH Air Navigation Conference and ensure that focused efforts would lead to near- and medium-term benefits. The Global Plan, therefore, contains near- and medium-term guidance on air navigation system improvements necessary to support a uniform transition to the ATM system envisioned in the operational concept.

2. DISCUSSION

2.1. In accordance with the Global Plan, planning will be focused on specific performance objectives, supported by a set of "Global Plan Initiatives" ("initiatives"). These initiatives are options for air navigation system improvements that when implemented result in direct performance enhancements. States and regions will choose initiatives that meet performance objectives, identified through an analytical process, specific to the particular needs of a State, region, homogeneous ATM area or major traffic flow. A set of interactive planning tools will assist with the analytical process.

Description of strategies for the implementation of the Global Plan initiatives on Navigation Systems (GPI-21) and World Geodetic System – 1984 (GPI-20)

NAVIGATION SYSTEMS (GPI-21)

2.2. Airspace users need a globally interoperable navigational infrastructure that delivers benefits in safety, efficiency and capacity. Aircraft navigation should be straightforward and conducted to the highest level of accuracy supported by the infrastructure.

2.3. To meet those needs, the progressive introduction of performance-based navigation must be supported by an appropriate navigation infrastructure consisting of an appropriate combination of global navigation satellite systems (GNSS), self-contained navigation systems (inertial navigation system) and conventional ground-based navigation aids.

2.4. GNSS provides standardized positioning information to the aircraft systems to support precise navigation globally. One global navigation system will help support a standardization of procedures and cockpit displays coupled with a minimum set of avionics, maintenance and training requirements. Thus, the ultimate goal is a transition to GNSS that would eliminate the requirement for ground-based aids, although the vulnerability of GNSS to interference may require the retention of some ground aids in specific areas.

2.5. GNSS-centered performance-based navigation enables a seamless, harmonized and cost-effective navigational service from departure to final approach that will provide benefits in safety, efficiency and capacity.

2.6. GNSS implementation will be carried out in an evolutionary manner, allowing gradual system improvements to be introduced. Near-term applications of GNSS are intended to enable the early introduction of satellite-based area navigation without any infrastructure investment, using the core satellite constellations and integrated multisensory airborne systems. The use of these systems already allows for increased reliability of non-precision approach operations at some airports.

2.7. Medium/longer-term applications will make use of existing and future satellite navigation systems with some type of augmentation or combination of augmentations required for operation in a particular phase of flight.

WORLD GEODETIC SYSTEM – 1984 (GPI-20)

2.8. The geographical coordinates used across various States in the world to determine the position of runways, obstacles, aerodromes, navigation aids and ATS routes are based on a wide variety of local geodetic reference systems. With the introduction of 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.

2.9. Fundamental to the implementation of GNSS is the use of a common geographical reference system. ICAO adopted the WGS-84 Geodetic Reference System as that datum, and many States have implemented or are implementing the system. Failure to implement, or a decision to use an alternative reference system, will create a seam in ATM service and will delay the full realization of GNSS benefits. Completion of the implementation of the WGS-84 Geodetic Reference System is a prerequisite for a number of ATM enhancements, including GNSS.

3. CONCLUSION

3.1. The meeting is invited to endorse the strategy for the implementation of the Global Plan Initiatives for systems as described in this working paper, as part of regional planning and implementation guidelines for aeronautical radio navigation service.

— END —