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CAR/SAM REGIONAL PLANNING AND IMPLEMENTATION GROUP (GREPECAS)
Sixth CNS Committee Meeting of the ATM/CNS Subgroup of GREPECAS (CNS/COMM/6)
Santo Domingo, Dominican Republic, 30 June to 4 July

Agenda Item 3: Surveillance Systems Development

REFERENCES ON SURVEILLANCE SARPS, PLANNING AND WORKS OF ASP PANEL

(Presented by the Secretariat)

Summary

This information paper provides a general reference to the current status of the SARPS and planning topics related to Surveillance Systems and an overview of the upcoming works in the ASP Panel.

1. SURVEILLANCE SARPs REFERENCE AND GUIDANCE MATERIAL

1.1 Following is a summary of the current status of SARPS and guidance material related to Surveillance Systems as reference and orientation for the implementation of these systems:

- Secondary Surveillance Radar (SSR) SARPS are described on Annex 10, Volume IV. SSR Guidance material are available on:
  - Doc. 9684 “Manual for Secondary Surveillance Radar Systems”, and
  - Doc. 9688 “Manual on Mode S Specific Services”
- Orientations for the use of Automatic Dependant Surveillance Contract (ADS-C) are available under Doc. 9705 “ATN Manual” and Doc. 9739 “Comprehensive ATN Manual” as well as in Doc. 9694 “ ATS Manual, Datalink Applications”.
- Annex 10, Volume IV provides the standards for the Automatic Dependant Surveillance Broadcast. ADS-B guidance material is available depending on the transmission media used:
  - Doc 9816 Manual on VDL Mode 4:
  - Doc. 9861 “Manual on UAT” and part of Amendment 82 to Annex 10,
  - Mode S extended Squitter (1090 ES):
    - Version 0 Amendment 77 to Annex 10
    - Version 1 Amendment 82 to Annex 10
      - Doc. 9871 “Mode S and Extended Squitter” (draft version)
- Doc 8071 “Manual on Testing of RadioNavaids”, Vol III,
- Doc. 9863 “AIRBORNE COLLISSION AVOIDANCE SYSTEM (ACAS) MANUAL”
- Circular 311 Assessment of ADS-B to Support Air Traffic Services and Guidelines for Implementation

2. SURVEILLANCE GLOBAL AND REGIONAL PLANNING

2.1 The Global Strategies are described on Doc 9750 Global Air Navigation Plan on its initiatives:

- GPI-09 Situational Awareness: promotes the operational implementation of data link surveillance, and the definition of the use of ADS-B and ADS-C.
- GPI-17 Data link Applications promotes the use of data link applications, and its harmonization for seamless and interoperable operations.

On the Appendix to this note are presented the mentioned GPIs.

2.2 Concerning the CAR/SAM Regional Implementation of Surveillance Systems: Doc. 8733 "CAR/SAM Regional Air Navigation Plan" CNS Table 4A describes this planning

2.3 Based on the Global and Regional Planning, GREPECAS 14 Meeting convened that the *Preliminary elements for a regional Surveillance Strategy* and the *Regional CAR/SAM Strategy for short, medium and long term ADS-C and ADS-B* use be integrated in an Unified Regional Strategy for the Implementation of Surveillance Systems. This task is to be performed by the CNS Committee through its Surveillance Task Force Group.

2.4 GREPECAS Conclusion13/87, aimed the States/Territories/ International Organizations that in collaboration with the airspace users, establish and execute a ADS-B Trial program, using the available services and technology, with the scope of improving the knowledge of ADS-B and evaluate the benefits for Air Traffic Management on the CAR/SAM Regions.

2.5 On GREPECAS/14 Meeting, the airspace users represented by IATA informed that airline members support ADS-B implementation.

3. AMENDMENTS TO SURVEILLANCE RELATED SARPs

3.1 Since November 22, 2007 Amendment 5 to PANS ATM Doc 444 is applicable. The amendment includes changes to facilitate implementation of new technology in relation to a variety of ATS data link application including ADS-C, ADS-B, AIDC and CPDLC. It also includes operational procedures and phraseology for the use of ADS-B. It was also identified that safety and efficiency World be enhanced by the inclusion of provisions that support using ADS-B functionality in a similar manner to traditional radar Technology.

3.2 Similarly, amendment 82 to Annex 10 is applicable since November 2007, which introduces some relevant concerns to Surveillance:

- Update to texts concerning SSR Mode S, extended squitter and ACAS.
- SARPS for the Universal Access transceptor (UAT)
- Update to the SARPS and technical specifications for supporting the new version of the extended squitter message (Version 1 based on DO 260A)

4. ICAO SURVEILLANCE PANEL

4.1 ICAO Aeronautical Surveillance System Expert Panel (ASP) formally denoted Surveillance and Conflict Resolution Systems Panel (SCRSP) procures the revision and update of the SARPs and guidance material for the implementation of improvements and future surveillance systems through its different working groups. Currently the following topics are be consider in their next Meeting:

a) Draft high level SARPs for Multilateration systems (MLAT);
b) New provisions on required surveillance performance (RSP) and airborne surveillance applications (relating to use of ADS-B reports onboard aircraft);
c) Report on RF pollution study relating to 1030/1090 MHz in light of increases traffic and new systems (for ex. MLAT);
d) Consolidation of guidance material on surveillance in a new aeronautical manual; and
e) Update to existing ICAO provisions on surveillance and collision avoidance systems in light of operational experience

5. Action suggested

The Meeting is invited to take note of the information included in this paper.

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APPENDIX

(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

Description of strategy

1.51 The further implementation of enhanced surveillance techniques (ADS-C or ADS-B) will allow reductions in separation minima and an enhancement of safety, increase in capacity, and improved flight efficiency, all on a cost-effective basis. These benefits may be achieved by bringing surveillance to areas where there is no primary or secondary radar, when cost-benefit models warrant it. In airspaces where radar is used, enhanced surveillance can bring further reductions in aircraft separation minima and improve, in high traffic density areas, the quality of surveillance information both on the ground and in the air, thereby increasing safety levels. The implementation of sets of quality- assured electronic terrain and obstacle data necessary to support the ground proximity warning systems with forward- looking terrain avoidance function as well as a minimum safe altitude warning (MSAW) system will benefit safety substantially.

1.52 Implementation of surveillance systems for surface movement at aerodromes where weather conditions and capacity warrant will also enhance safety and efficiency while implementation of cockpit display of traffic information and associated procedures will enable pilot participation in the ATM system and improve safety through greater situational awareness.

1.53 In remote and oceanic airspace where ADS-C is used, FANS capabilities exist on many air transport aircraft and could be added to business aircraft. ADS-B can be used to enhance traffic surveillance in domestic airspace. In this respect, it should be noted that the 1090 extended squitter is available and should be accepted as the global choice for the ADS-B data link.

1.54 At terminal areas and at aerodromes surrounded by significant terrain and obstacles, the availability of quality-assured terrain and obstacle databases containing digital sets of data representing terrain surface in the form of continuous elevation values and digital sets of obstacle data of features, having vertical significance in relation to adjacent and surrounding features considered hazardous to air navigation, will improve situational awareness and contribute to the overall reduction of the number of controlled flight into terrain related accidents.

(GPI-17) DATA LINK APPLICATIONS

Scope: Increase the use of data link applications.

Related Operational Concept Components: DCB, AO, TS, CM, AUO, ATMSDM

Description of strategy

1.79 The implementation of less complex data link services (e.g. pre-departure clearance, oceanic clearance, D-ATIS, automatic position reporting) can bring immediate efficiency benefits to the provision of ATS. Transition to the use of data link communications for more complex safety-related uses that take advantage of a wide variety of CPDLC messages, including ATC clearances, is already being successfully implemented.

1.80 Use of CPDLC and implementation of other data link applications can bring significant advantages over voice communication for both pilots and controllers in terms of workload and safety. In particular, they can provide efficient linkages between ground and airborne systems, improved handling and transfer of data, reduced channel congestion, reduced communication errors, interoperable communication media and reduced workload. The reduction of workload per flight translates into capacity increases and enhanced safety.

1.81 Communication data link and data link surveillance technologies and applications should be selected and harmonized for seamless and interoperable global operations. ADS-C, ADS-B and CPDLC are in service in various regions of the world but lack global harmonization. Current regional initiatives, including utilizing unique message subsets and CPDLC procedures, hinder efficient development and acceptance for global aircraft operations. Existing and emerging technologies should be implemented in a harmonized global manner in the near term to support long-term goals. Harmonization will define global equipage requirements and therefore minimize user investment.

1.82 FANS-1/A and aeronautical telecommunication network (ATN) applications support similar functionality, but with different avionics requirements. Many internationally-operated aircraft are equipped with FANS-1/A avionics initially to take advantage of data link services offered in certain oceanic and remote regions. FANS-1/A equipage on international business aviation aircraft is underway and is expected to increase.

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