International Civil Aviation Organization

The Twelfth Meeting of the FANS Implementation Team, Bay of Bengal (FIT-BOB/12) and the Second Meeting of the Bay of Bengal Reduced Horizontal Separation Implementation Task Force (BOB-RHS/TF/2)

Bangkok, Thailand, 22 − 26 February 2010

Agenda Item 2: Review of Data Link Seminar 2009

REVIEW OF THE DATA LINK SEMINAR IN 2009

(Presented by the Secretariat)

SUMMARY

The Eleventh Meeting of the FANS Implementation Team, Bay of Bengal and the Data Link Seminar (FIT-BOB/11 & Seminar, August 2009) was held at ICAO Asia and Pacific Office, Bangkok, Thailand. This paper presents a summary of presentations at the Data Link Seminar in 2009.

1. INTRODUCTION

1.1 The Eleventh Meeting of the FANS Implementation Team, Bay of Bengal and the Data Link Seminar (FIT-BOB/11 & Seminar) was held at ICAO Asia and Pacific Office, Bangkok, Thailand from 24 to 25 August 2009.

2. DISCUSSION

What Is ADS-C, What Is CPDLC, What Is Data Link

2.1 The Secretariat provided the seminar with broad presentation on what are ADS-C, CPDLC and data link. CPDLC is a means of text-based communications between controllers and pilots that replaces or enhances voice communications (HF and VHF) and is delivered by a data link (VHF, SATCOM and HF). ADS-C is a means of dependent surveillance operating over a data link that is generated by FANS aircraft equipment.

2.2 CPDLC is direct communications between controller and pilot to enable a reduced time involved in most operations/requests compared with using third-party HF. Clearances can be loaded directly into the flight management system by pilot and many uplink messages can arm avionics to send reports. Text message is available to pilot for reference, whose standardisation leads to unambiguous exchanges. Many downlink messages can automatically update ground flight data processing (FDP) system. CPDLC can be used in domestic airspace if it is better than voice, e.g. providing route clearances.

2.3 ADS-C provides positional information on controller's screen, thus replacing position reports and updates display automatically. ADS-C greatly reduces pilot and controller reporting workload. Event contracts provide vertical and lateral clearance monitoring. Emergency information is displayed on controller's screen.

International Harmonization of Procedures - GOLD

2.4 United States presented the progress of the *Global Operational Data Link Documents* (GOLD) development and the Version 5.0 of the document was presented to the seminar. The seminar appreciated the efforts made by the Ad-Hoc Working Group in completing the harmonized global FANS operational documents.

2.5 United States confirmed that the document would be maintained as a regional document after the Planning and Implementation Regional Group (PIRG) has endorsed the initial release of the GOLD, in coordination with other participating PIRGs. Each PIRG will establish a mechanism for submitting and administering change proposals.

2.6 Any stakeholder will be able to submit a change proposal to an ICAO regional office. The ICAO regional office will coordinate the change proposal within its own region, other regions and ICAO Headquarters to determine the acceptability of the change proposal. Once coordination has been completed and the change proposal is accepted, the change will be concluded by the PIRG.

2.7 The seminar expressed its strong support for the GOLD, noting the beneficial developments based on the *FANS Operations Manual* (FOM), the *North Atlantic Guidance Material* (NAT GM) *for ATS Data Link service,* and additional guidance and informational material on both old and new subjects that had been included in the GOLD. The Seminar encouraged all participants to undertake a review of the GOLD and provide comments related to accuracy, completeness and usability by sending completed comment form by 30 September 2009 to the focal contact point of GOLD.

Data Network System Provision and Architecture

2.8 SITA provide presentations on the following items:

a) Service Performance Review;

b) Service Provision;

i) VHF Network Update;

- Deployment Update; and
- VHF Network Optimization Project Update.

ii) Satellite Network Update; and

iii) AIRCOM Central Systems Infrastructure.

Data Link Operations in the Chennai and the Mumbai FIRs

2.9 India updated the Seminar on data link in the oceanic airspace of three Indian flight information regions (FIRs) viz. Chennai, Kolkata and Mumbai over the Arabian Sea, the Bay of Bengal and the Indian Ocean. Significant operational benefits had been achieved through implementation of ADS/CPDLC in the oceanic airspace. Improved surveillance through ADS facilitates timely detection of conflicts and aids conflict resolution.

2.10 HF communications especially in the Arabian Sea, the Bay of Bengal and the Indian Ocean airspace suffer inherent operational limitations due to ionospheric effects in the equatorial region. CPDLC had proved to be an effective tool for two way communications between controllers

and pilots, enabling quick and timely response for level change and authorization of route changes, deviation, etc.

2.11 There are many weather deviations necessary during the monsoon period from June to September each year over the Arabian Sea and the Bay of Bengal. The data link systems are capable of deviation contracts. The deviations can be tracked and better assistance can be extended to these flights.

2.12 Approximately 400 flights operate per day in the oceanic airspace of the Mumbai FIR. About 160 of these flights are data link capable. Thus about 40 % of the flights operating in the Mumbai FIR were provided with data link services.

2.13 Approximately 230 flights operate per day in the oceanic airspace of the Chennai FIR. About 120 of these flights are data link capable, but on an average about 10% of these flights do not log on to the ADS/CPDLC system. Thus about 50 % of the flights operating in the Chennai FIR were provided with data link services. Sampling during June 2009 indicated the number of uplink/downlink messages in Chennai varied from 2430 to 2700 per day. CPDLC messages averaged around 850 per day.

2.14 Approximately 248 flights operate per day in the oceanic airspace of the Kolkata FIR. About 148 of these flights are data link capable and are provided with data link services. Thus about 60 % percent of the flights were provided with data link services.

Roles and Functions of the Data Link Central Reporting Agency

2.15 Boeing made the presentation on the purpose of the FIT and the central reporting agency (CRA). Firstly, the FIT carries out problem identification and resolution by specifically:

a) Reviewing de-identified problem reports (PRs) provided by the CRA;
b) Recommending interim operational procedures; and
c) Reviewing summaries of problems encountered.

2.16 Secondly, the FIT provides the oversight on the system performance by monitoring actual system performance and comparing against requirements – latency and availability.

2.17 On the other hand, CRA investigates PRs and making recommendations to the various regional FIT. There are several companies/organizations within the industry that could provide the CRA services. Airbus and/or Boeing have the expensive equipment, e.g. test benches, simulators, etc., which are already funded by other programs. They can basically “rent” the benches or simulators to checkout procedures and problems or to develop new capabilities.

2.18 FIT are “working level” meetings consisting of flight crew who routinely fly though airspace, controllers who use the automation systems, dispatchers and technical automation specialists. Boeing emphasised the importance of the submission of PR for the success of the FIT. Operators (preferably right off the airplane) and air traffic service units are encouraged to submit the PR. Monthly monitoring performance data is also absolutely essential which are required to manage the “global network resource”.

Required Communication Performance Specifications

2.19 United States provided an overview of performance specifications for communication and surveillance capabilities, and how they are used to support operational initiatives for improving air traffic management. This included RCP 240/D and RCP 400/D specifications applicable for CPDLC, RCP 400 applicable for “non-traditional voice etc. and surveillance performance

specification e.g. type 180 and type 400 for ADS-C and AFMC WPR, etc. The Seminar noted that relevant RCP specifications and surveillance performance specification have been included into GOLD as Appendices B and C. States were encouraged to take the specifications into consideration when taking planning and implementation initiatives in specific airspace.

Problem Report and System Performance Analysis

2.20 Monitoring in the Auckland FIR showed that the FANS-1/A system was capable of meeting the RCP 240 and ADS-C latency requirements of the Oceanic SPR. All aircraft earth stations (AES) using high-gain antennas have the option to enable the 10.5 kilobits per second channels for both ground-to-air calls over the P-channel and air-to-ground calls over the R- and T-channels. A number of fleets had been identified as still using the low speed 600/1200 bits per second channels and these operators should be encouraged to switch to the high speed channels. In addition to minimizing the resource required, significant performance benefits accrue with the use of the high speed channels.

2.21 During the development of ADS latency monitoring in 2008, the performance of the B777 fleets were observed to be considerably below what was expected. An assessment of all delayed reports greater than 90 seconds demonstrated that there was a significant correlation between the downlink delays and areas of transition from VHF to SATCOM RGS for B777 aircraft. A fix has been prepared and would be released to the B777 fleets with the AIMS Block Point 14 upgrade which was undergoing certification with SIA during the week of 24-28 August 2009.

Oceanic SPR – Safety Requirements

2.22 Information was provided on the DO-306/ED-122 Oceanic SPR standard which listed 27 safety requirements for the application of data link services in oceanic airspace. Twenty-four requirements are applicable to ATS providers' ground systems.

2.23 Of the 24 safety requirements in the Oceanic SPR applicable to ground systems, the New Zealand Oceanic Control System was compliant with 22, partially complaint with one and not complaint with one when the SPR was published. Following some work, New Zealand was now compliant with 23 of the safety requirements and not compliant with one.

2.24 States should undertake a compliance review against the safety requirements expressed in the Oceanic SPR – as shown in Appendix B of the GOLD – and documents the outcomes for review during FIT-BOB/12 in February 2010. The Secretariat highlighted that the Safety Requirements Register on the Informal South Pacific ATS Coordination Group website provided a convenient method to undertake and record the outcomes, and encouraged States to make use of this tool. An item was added to the task list in this respect. GOLD Appendix D covers obtaining the required data points from the FANS 1/A ACARS messages, and the calculation of actual communication performance (ACP), actual communication technical performance (ACTP), pilot operational response time (PORT) and surveillance latency.

Post Implementation Monitoring

2.25 The data points were recommended for CPDLC analysis as the minimum set that should be extracted from air navigation service provider (ANSP) data link system recordings to enable RCP analysis and provide sufficient information for problem analysis.

2.26 Similarly, data points were recommended for ADS analysis as the minimum set that should be extracted from ANSP data link system recordings to enable an analysis of ADS-C performance and provide sufficient information for problem analysis.

2.27 It is recommended that regions implement monthly performance reporting to obtain system performance metrics. These reports will provide data on observed availability, ADS-C latency and CPDLC communications performance as described herein. ANSPs should report on communication service providers notified system outages and on detected outages that have not been notified. Only outages greater than 10 minutes are reported.

2.28 ANSP should report observed ACP and ACTP for RCP 240 and RCP 400 for different media paths using all transactions involving a WILCO response. A tabular reporting format can be used to capture the observed performance at the 95% and 99.9% RCP 240/400 times.

2.29 ANSPs should report observed ADS-C latency for RSP 180 and RSP 400 for different media paths. A tabular reporting format can be used to capture the observed performance at the 95% and 99.9% RSP 180/400 times.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper, and

b) undertake a compliance review by States against the safety requirements expressed in the Oceanic SPR in Appendix B of the GOLD and document the outcomes for review, as required in paragraph 2.24 above.

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