



International Civil Aviation Organization

**The Second Meeting of the Regional Airspace Safety Monitoring Advisory Group
(RASMAG/2)**

Bangkok, Thailand, 4 – 8 October 2004

**Agenda Item 5: Review regional and global airspace planning and implementation
developments and provision of airspace safety monitoring services**

**UPDATE OF PROGRESS ON THE DATA LINK OPERATIONAL TRIAL FOR THE BAY OF
BENGAL AREA AS REPORTED BY THE FOURTH MEETING OF THE FANS
IMPLEMENTATION TEAM FOR THE BAY OF BENGAL AREA**

(Presented by the Secretariat)

SUMMARY

This paper presents a summary of the report of the Fourth Meeting of the FANS Implementation Team for the Bay of Bengal Area (FIT-BOB/4) concerning the data link operational trial which commenced on 19 February 2004. Information is also provided on the expansion of the trial to include the entire Indian Ocean non-radar airspace.

1 INTRODUCTION

1.1 The FIT-BOB/4 meeting was held in conjunction with the Fifteenth Meeting of the Bay of Bengal ATS Coordination Group (BBACG/15) at the Asia/Pacific Regional Office on 13-17 September 2004. The meeting updated progress on the operational trial, which commenced on 19 February 2004 for the implementation of ADS and CPDLC in the Bay of Bengal area.

2 DISCUSSION

Establishment of the Central Reporting Agency (CRA)

2.1 At the FIT-BOB/3 meeting (February 2004), it was agreed to accept Boeing's offer to provide CRA services for the Bay of Bengal ADS/CPDLC operational trial. Accordingly, IATA and Boeing were requested to pursue the establishment of a contract on behalf of the FIT-BOB States participating in the operational trial for Boeing to set up and operate the CRA. IATA agreed to the arrangements and would work with Boeing to evaluate the costs of operating the CRA, arrange for a contract with Boeing, and collect the funds from the airspace users concerned.

2.2 IATA was pleased to inform the FIT-BOB/4 meeting that it had completed the required airline arrangements to provide funding with a first year cap of not more than US\$500 thousand and was in the process of completing the legal documentation with Boeing. IATA requested the assistance of States in providing traffic data to assist with the collection of payments from participating airlines. In order to avoid the double/triple billing of flights that passed through a number of FIRs, IATA would work with States to log the identities, times of day, routes used and ACCs involved for airspace users in the trial area.

2.3 Boeing CRA confirmed that satisfactory arrangements had been made and that finalization of legal aspects was imminent. Boeing advised that the CRA should be able to commence work related to the Bay of Bengal operational trial from October 2004. Participating States were urged to provide appropriate data, contact persons, etc for use by the CRA.

2.4 In order for the CRA to effectively perform its tasks, it was critical that participants at FIT-BOB meetings involved in CRA discussions should have sufficient technical and operational knowledge to genuinely assist in problem rectification. Accordingly, FIT-BOB/4 identified the need for future FIT-BOB meetings to include airline representation from the operators flying in the trial airspace, and ATSU representation that included technical/engineering and air traffic controller personnel associated with the trial operations.

2.5 Boeing CRA informed the meeting that it was essential that States understood and followed the requirements in the FANS-1/A Operations Manual (FOM). In particular, Boeing CRA stressed the need for quick action in obtaining message logs, etc regarding problem reports, as experience had shown that, if the material was not collected within about one week, the effectiveness of the fault finding processes was diminished. Although there was substantial information and experience from the Pacific ADS/CPDLC implementations to draw upon, the Bay of Bengal area was likely to experience a number of problems specific to that area.

2.6 FIT-BOB/4 stressed that it was important that States concerned provided the required technical performance data and problem reports to the CRA promptly so that effective follow-up action could be taken.

Data Link monitoring requirements

FANS 1/A Operations Manual (FOM)

2.7 It was recalled that FIT-BOB/3 had adopted the Pacific Operations Manual (POM) as the basis for the ADS and CPDLC operational trial in the Bay of Bengal. The POM contained the FANS-1/A operating procedures and requirements being applied by States in the Pacific Region in the provision of data link services. The title of POM was changed by IPACG and ISPACG to FANS-1/A Operations Manual (FOM) at the request of the Regional Office to facilitate wider applicability of the document.

2.8 In considering implementation of data link systems, APANPIRG/15 (August 2004) agreed that States should take all relevant ICAO provisions on data link into account when establishing their operating requirements and procedures. Further, under Conclusion 15/7, APANPIRG/15 agreed that the FOM be used by States and users as a basis for operating ADS and CPDLC in conjunction with relevant ICAO provisions and regional guidance material.

2.9 APANPIRG/15 recognized that additional work was required to more closely align the material of the documents concerned. This work would be taken up by ICAO in coordination with the Regional Office and the States responsible for the FOM. APANPIRG/15 reiterated the importance of common data link operating procedures for global applicability and urged States to continue to support ICAO's efforts towards achieving this goal.

Draft Guidance Material for End-to-end Safety and Performance Monitoring of Air Traffic Service Data Link Systems in the Asia/Pacific Region

2.10 The FIT-BOB/4 meeting noted that at RASMAG/1 (26-30 April 2004) draft *Guidance Material for End-to-end Safety and Performance Monitoring of Air Traffic Service Data Link Systems* in the Asia/Pacific Region was adopted and would be developed further as required. The guidance material was intended to provide a set of working principles for ATS data link system performance monitoring that would be applied by all States implementing these systems, as well as providing detailed guidance on the requirements for establishing and operating a FIT and CRA. It was intended that this guidance material would help promote a standardized approach for monitoring the performance of ATS data link systems within the Region. The guidance material is provided in the **Appendix** to this paper.

2.11 FIT-BOB/4 agreed that the guidance material would be used to set up and operate the data link monitoring services under the CRA for the Bay of Bengal area. The meeting also noted that the role of RASMAG included reviewing and coordinating airspace safety monitoring activities in the Asia/Pacific Region, and that the CRA would be required to report on its activities to RASMAG.

Problem Reports and System Performance Review

ADS/CPDLC operational trial - Chennai and Kolkata FIRs

2.12 India reported that the default periodic reporting period was increased from 5 minutes (304 seconds) to 27 minutes (1620 seconds) in May 2004, based on airline feedback provided through IATA. IATA thanked India for acting on the feedback, but noted that they were still seeing examples of one minute reporting periods and sought the assistance of India in further investigating the matter.

2.13 India was using the FOM as the basis for operational procedures, with supplementary requirements being managed by NOTAM.

2.14 India updated the meeting with regard to problems experienced in the Chennai and Kolkata FIRs during the ADS/CPDLC operational trial, since the trial commenced on 19 February 2004.

Major Problems

2.15 Since the commencement of the operational trial on 19 February 2004, a total of 62 problems were observed at Chennai and more than 200 at Kolkata. The following major problems were observed:

Problems related to ground systems

- a) data link messages were received from the aircraft but the ground system did not produce the expected result on the controller's display;
- b) in some cases there was a mis-match between the flight level displayed and actual level maintained by the aircraft;
- c) the majority of the Kolkata problem reports related difficulties in effecting transfer of control to the Yangon system;

(Myanmar was not participating in the trial and their ADS/CPDLC systems were not always available, which account for the lack of CPDLC response from their end)

Problems related to data link

- d) there were a number of instances where the data link was indicating operational but up-link messages were not reaching the aircraft, and in the reverse case, wherein data link messages were received continuously while the AFN window showed that connectivity was still in progress;
- e) the data link provided by SITA failed on several occasions at both Chennai and Kolkata;

Problems related to avionics

- f) many occasions were reported where ADS/CPDLC was connected but no responses were received from the aircraft either on CPDLC or ADS (experienced more by some airlines);

Human factors

- g) a number of instances involving a mismatch between the flight identifier in the CPDLC messages and that contained in the flight plan, e.g. AUS2 was indicated as AUS0002. These problems could be attributed to human factors.

Summary of Problems

2.16 In general, it was observed that problems were mainly related to:

- a) inability to exchange messages in spite of AFN window indicating connected;
- b) inability to disconnect ADS/CPDLC when end of service is sent;
- c) inability to effect transfer of control to the next data authority (NDA) (Yangon), by Kolkata;
- d) an ADS connection was established but not CPDLC;
- e) delays in receipt of ADS Reports; and
- f) inability to uplink in spite of receiving repeated downlink messages.

2.17 In light of the problems experienced so far, India advised that they were not pursuing a reduction in separation standards based on ADS/CPDLC. In addition, route conformance monitoring and distance-based conflict alerts were yet to be incorporated into the ground system. India welcomed the establishment of the CRA and looked forward to the assistance that would be provided by the CRA.

2.18 Singapore reported that they had experienced some of the same problems described by India and had undertaken follow up within CAAS and at their regular airline/ATC meetings. Singapore agreed to present a suitable paper to the FIT-BOB/5 meeting to codify the problems being experienced by Singapore.

Delayed ADS-C reports in Australian airspace

2.19 FIT-BOB/4 was informed of problems observed by Australia relating to the occasional delayed receipt of ADS-C reports and/or CPDLC downlinks from aircraft in Australian airspace. Australia had conducted an analysis of ADS-C reports received by Brisbane and Melbourne ACCs over a 6 month period (late 2003/early 2004) in order to:

- a) gain an indication of the relative frequency of these 'delayed' ADS-C reports;
- b) identify any problem locations (if any) where delayed reports were more prevalent; and
- c) identify whether the problem was possibly related to a specific airline or aircraft type.

2.20 Australia had reported that it appeared that the problem was related to the transition of the aircraft from one satellite 'spot beam' to another. This problem caused the avionics to "buffer" data link downlink messages (ADS-C and CPDLC), and to transmit the contents of the buffer at a later time. It was noted that data link uplink messages appeared to be unaffected by this problem.

2.21 FIT and CRA analysis determined that there was certain equipment (Satellite Data Unit) from a specific avionics manufacturer that was common to the aircraft types suffering these problems. The manufacturer had been advised of the findings, however the time frame to implement a fix was unknown.

ADS/CPDLC Seminar

2.22 In reviewing the operational problems so far identified by the trial and in acknowledging the remarks from the Boeing CRA regarding the complex technical nature of ADS/CPDLC, FIT-BOB/4 agreed to hold a two day seminar in conjunction with the FIT-BOB/5 meeting that as an effective way to educate ATS providers and operators in the region about ADS/CPDLC operations.

Expansion of the operational trial for the Indian Ocean airspace

2.22 India, Indonesia and Thailand were the only States participating in the operational trial, and at the FIT-BOB/3 meeting it had been noted that all States responsible for the Bay of Bengal area and adjacent oceanic airspaces should be part of the operational trial.

2.23 In considering the expansion of the operational trial to the remainder of the India Ocean airspace, FIT-BOB/4 noted progress made by India, Malaysia, Myanmar and Sri Lanka to further develop their data link systems. In this regard, the following information was noted:

- a) India intended to introduce ADS/CPDLC operations into the Mumbai FIR but would wait until operations in the Chennai and Kolkata FIRs were well bedded in;
- b) Malaysia had experienced some delays due to institutional issues involving privatisation. Trials were expected to commence by the middle of 2005 when ADS/CPDLC systems utilising off-the-shelf equipment became operational. Provision had been made in the specifications to integrate these systems at a later stage. Using a stand alone configuration initially would save time;

- c) Myanmar was making significant progress to upgrade a number of their facilities. The ADS/CPDLC, stand alone workstation was planned to move into the new ACC facilities prior to January 2005. Following this move, the situation would be reassessed regarding controller training and participation in the trial; and
- d) Sri Lanka was experiencing problems with software and controller staffing levels, and only 6 controllers had been trained to operate ADS/CPDLC. Training would be arranged with India when possible.

2.24 As the Bay of Bengal area comprised only one portion of the Indian Ocean, the Secretariat encouraged States to commence planning towards the implementation of ADS/CPDLC operations throughout the entire Indian Ocean airspace. This would necessarily involve coordination with Australia, island States in the Indian Ocean and East African States, in addition to the member States of the BBACG.

2.25 The Secretariat considered that there were a number of advantages in bringing the greater Indian Ocean area under the oversight of one body. This was particularly relevant in the context of the introduction of ADS/CPDLC operations to the area. A greater level of standardisation would be achieved and operational implementations would be more readily coordinated in order to avoid patchy implementation. The ADS/CPDLC experience of Australia and the BBACG States involved in the current operational trial would be available to the group. Boeing had indicated that they expected to be in a position to expand the services provided by the BOB CRA to cover the entire Indian Ocean if required. Similarly, RASMAG already had oversight responsibility for the Bay of Bengal and would be able to address the expanded role.

2.26 IATA supported the proposal in regard to the ability to facilitate simultaneous implementations in contiguous airspaces and considered that a group of this nature would assist in accelerating the implementation process. The meeting was invited to consider this proposal and provide feedback at the next BBACG meeting.

Data link equipment specifications

2.26.1 FIT-BOB/4 recognized that States needed more guidance on the technical requirements necessary to ensure that the equipment procured was suitable for the implementation of ADS/CPDLC and application of reduced separation minima. In the absence of ICAO SARPs for the FANS-1/A aircraft data link, and the performance parameters to be achieved for the provision of ATC services using ADS and CPDLC, especially for the reduction of separation, the reference data would have to be derived from appropriate safety assessments and collision risk models. Also, the separation criteria in PANS-ATM (Doc 4444) would need to be taken into account. It would be helpful for States to obtain information from those States who had already procured and were operating these systems. There was also some technical information available in the FOM regarding equipment performance requirements.

2.26.2 FIT-BOB/4 further recognized that the intent of CNS/ATM was to increase airspace capacity by allowing the safe implementation of reduced separation requirements. In this regard, ADS/CPDLC equipment purchased by States should be able to facilitate reduced lateral and longitudinal separation of 30 NM in the future.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the outcomes of the FIT-BOB/4 meeting on ADS/CPDLC implementation progress and in particular the setting up of the CRA;
- b) consider issues arising and any appropriate follow up action by RASMAG; and
- c) review and revise the draft *Guidance Material for End-to-end Safety and Performance Monitoring of Air Traffic Service Data Link Systems in the Asia/Pacific Region* (Appendix refers) as appropriate.
