



International Civil Aviation Organization

**Third Meeting of the Bay of Bengal Reduced Horizontal Separation
Implementation Task Force (BOB-RHS/TF/3)**

Singapore, 18 – 21 May 2010

Agenda Item 2: Review Outcomes of Related Meetings

SUMMARY OF OUTCOMES OF THE BOB-RHS/TF/2 MEETING

(Presented by the Secretariat)

SUMMARY

The purpose of this working paper is to provide the meeting with a summary of the work accomplished at the FITBOB/12 and BOB-RHS/TF/2, which were held at the ICAO Regional Office in Bangkok on 22 – 26 February 2010.

1. INTRODUCTION

1.1 Two separate meetings were held during the period 22 to 26 February 2010. The FITBOB/12 meeting was held between 22 to 23 February and followed by the BOB-RHS/TF/2 meeting.

2. DISCUSSION

Review of FITBOB/12

Review of the Data Link Seminar in 2009

2.1 The meeting recalled that a Data Link Seminar was held at ICAO Asia and Pacific Office, Bangkok, Thailand on 24 and 25 August 2009 in conjunction with FIT-BOB/11.

2.2 The Seminar clarified the role of ADS-C, CPDLC and Data Link services with SITA providing a presentation on the Service Performance review and the Service Provision

Data Link Operations in the Chennai, Kolkata and Mumbai Flight Information Regions (FIRs)

2.3 India informed the seminar that there were many weather deviations during the monsoon period from June to September each year over the Arabian Sea and the Bay of Bengal. It was noted that the data link systems are capable of deviation contracts.

2.4 Approximately 400 flights operate per day in the oceanic airspace of the Mumbai FIR. About 160 of those flights were data link capable.

2.5 Approximately 230 flights operate per day in the oceanic airspace of the Chennai FIR with around 120 of those flights being data link capable. Nevertheless, for reasons unknown, an average about 10% of the flights did not log on to the ADS/CPDLC system.

2.6 Approximately 248 flights operate per day in the oceanic airspace of the Kolkata FIR, with 148 of those flights being data link capable and provided with data link services.

Roles and Functions of the Data Link Central Reporting Agency

2.7 Boeing informed the seminar that the FITs were required to provide the oversight on the system performance by monitoring actual system performance and comparing against requirements – latency and availability. CRAs are supposed to investigate the Problem Reports (PRs) and make recommendations to the various regional FITs. Airbus and Boeing have the expensive equipment, e.g. test benches, simulators, etc. which are already funded by other programs.

2.8 Operators (preferably right off the airplane) and air traffic service units were encouraged to submit PR. Monthly monitoring performance data is also essential so as to manage the “global network resource”.

Review of the First Satellite Data Link Operational Continuity Meeting

2.9 The meeting noted the outcomes of the First Satellite Data-link Operational Continuity Meeting (SOCM/1, August 2009) held in Bangkok and the Conclusions adopted by the 20th meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/20, September 2009) based on the recommendations made by SOCM/1.

2.10 SOCM/1 was presented the status of development of Global Operational Data Link Document (GOLD). SOCM/1 expressed full support for the Global Operational Data Link Document (GOLD) and recommended a Conclusion to distribute form(s) for submission of information by States and international organizations for adoption by APANPIRG.

Central Reporting Agency (CRA)

2.11 The meeting reviewed the TOR of BOB-CRA as follows:

Objective

1) *The objective of the Bay of Bengal Central Reporting Agency (BOB-CRA) operated by BOEING is to assist the members of the FANS Implementation Team for the Bay of Bengal (FIT-BOB) to plan and implement FANS I/A based ADS and CPDLC systems in the Indonesian, Bay of Bengal and Arabian Sea FIRs (including ASIOACG member States) in accordance with the TOR of FIT-BOB.*

Terms of Reference

2) *To meet the above objective the BOB-CRA shall:*

- a) share technical and operational information with the FIT-BOB members on the planning and implementation of ADS and CPDLC systems;
- b) process the ADS/CPDLC problem reports (PR) received from the FIT-BOB members in the manner prescribed in the *FANS I/A Operations Manual (FOM)* and the *Guidance Material for End-to-*

End Safety and Performance of ATS Data Link Systems in the Asia and Pacific Region;

- c) disseminate de-identified information on individual problem reports to the FIT-BOB members to enable airborne and ground system enhancement/ remediation; and
- d) prepare periodic reports for the FIT-BOB and RASMAG.

Area of Responsibility

- 3) *The area of responsibility of the BOB CRA is defined as follows:*

The BOB CRA will provide CRA services for the international oceanic airspace of the FIT-BOB member States, where implementation of ADS/CPDLC technologies is undertaken to enhance surveillance and communications capability, leading to significant benefits for operational efficiency and regularity of flights.

Review Bay of Bengal ADS/CPDLC Operations

2.12 Malaysia advised the meeting on trials of their ADS/CPDLC systems which had been operating during a limited timeframe between 1500-1900 UTC since July 2008 on seven oceanic ATS routes, i.e. P628, L510, L645, L627, N571, B466 and P574 within the Kuala Lumpur FIR. Software upgrades are in the process of being installed and are expected to be completed by May 2010.

ADS/CPDLC Trial Progress in the Male FIR

2.13 Maldives informed the meeting that they commenced implementation of ADS-C and CPDLC data link services in the Male' FIR in 2009. In early September 2009, training for controllers was conducted and trials commenced in October 2009 on oceanic routes between Mumbai, Maldives and Australia with Emirates Airline aircraft.

2.14 At the outset the system performance was satisfactory. However, after a month the downlink performance was poor and the trials had to be discontinued after experiencing some equipment problem. The equipment supplier had been contacted and was expected to fix the problem by end of February 2010. If all goes well, the trials could commence again in March 2010.

Data Link Environment of the Arabian Sea and the Bay of Bengal

2.15 Emirates Airline reported a summary of data for the period of 14 days, 3 – 16 January 2010 for the data link environment of the Arabian Sea and the Bay of Bengal.

2.16 The summary indicated an overall improvement in Data Link capability and procedures with ACCs involved, however further improvement is still required. It was further noted that, from the Emirates data, occurrences of the unstable connections or unusable functionality had increased since the last survey.

Report on ADS-C/CPDLC Bench Testing with Chennai and Mumbai Centres

2.17 Boeing informed the meeting that the avionics suite or “bench” simulates full aircraft systems capabilities from an ADS and CPDLC standpoint. Once connected to either ARINC or SITA's ACARS network, the bench can logon to any FANS ground automation system around the world. Once connected, test bench aircraft appear just like any other flight operating in that airspace.

Overview of Testing Conducted and of the CPDLC Connection Transfer Process

2.18 Since January 2010, three bench tests had been conducted by Boeing with both Chennai and Mumbai FIRs. The first phase of testing was focused on automatic connection transfers between Chennai and Mumbai centres. Future auto-handoff tests will be conducted with neighbouring FIRs. Boeing provided a details methodology of the connection transfer process, also explaining that ADS connections are managed by the FIRs themselves and the GOLD document provides detailed guidelines on ADS connection etiquette. The results of ADS/CPDLC Bench Testing with Chennai and Mumbai Centres was also provided and explained.

ADS/CPDLC Problem Reports (PRs) in the Bay of Bengal

2.19 88 PRs were received by Boeing and actioned. It was recommended that ATSU automate the connection sequence. If the connections must be managed manually, ATSU are encouraged to develop and document local procedures to help ensure the connection handoff steps are followed correctly.

Global Operational Data Link Document

2.20 The current status on the GOLD was presented and the meeting began planning and implementation for its use. The latest GOLD information is maintained and available for download on the FAA and the Airways New Zealand public websites.

2.21 The meeting noted that GOLD was to facilitate global harmonization of existing data link operations and resolve regional and/or State differences impacting seamless operations. A description of the status of the GOLD in other ICAO regions was given to the meeting.

Update FIT-BOB Task List

2.22 The meeting reviewed and updated the Task List for the FIT-BOB, incorporating information provided during the meeting.

3. REVIEW OF BOB-RHS/TF/2 MEETING**Operational Issues**Letters of Agreement on 50NM Longitudinal Separation

3.1 It was noted that part of the planning and implementation process will involve letters of agreement (LOAs) being developed between ACCs regarding the use of 50NM longitudinal separation along the designated ATS routes where the use of CPDLC is required. The first phase of the project will concentrate on two or possibly three RNAV routes i.e. N571, P628 and perhaps P762, these LOAs may also be the model for other RNAV routes when the second phase of the project is considered. The LOA could also be part of present LOAs already agreed to by ACCs concerned. The decision to use either option rests with the ACCs concerned.

3.2 All LOAs should take into account a section dealing with Gross Navigation Errors (GNEs) which will be required to be produced for the Enroute Monitoring Agency (EMA).

India's progress towards implementation of 50 NM separation using CPDLC

3.3 It was observed that the data link services are provided on 12 international routes over the Bay of Bengal within Chennai FIR i.e. routes N877, L510, P628, L759, N571, N563, P762, P574, L896, N564, P761 & L645.

3.4 Data-link services are also provided on 15 international routes over Arabian Sea and Indian Ocean i.e. routes M638, P518, L301, N571, P574, N563, M300, P570, R456, G465, A451, A474, A214, B459, G450, and G424.

Data collection and analysis

3.5 Efforts are being made to establish a mechanism as well as procedures for automatic data collection by including the ATFMU address (VTBBZDZX) for all the appropriate flight plan and estimate messages. A graphical description of data collected by India was given to the meeting.

Implementation of 50 NM on ATS route N571 with level band restriction

3.6 The meeting was advised that, if a specific level band is provided for exclusive ADS/CPDLC operations on N571 route, operations on RNAV (RNP 10) routes P762, N877 and P761 can be made possible below and above the specified level band. The specific level band will also make it possible for the operations of non ADS/CPDLC equipped aircraft on N571.

3.7 These suggestions and other issues in regard to No PDC departures out of Colombo on P762 eastbound were of significance and would be considered at the next meeting of the task force.

Boeing assistance to India on Bench-testing of ADS/CPDLC equipage

3.8 Three tests were conducted earlier for the Mumbai System by Boeing from the test bench of B787 and one test was conducted for Chennai system by the Airbus Company from their test bench of A380 equipment. The message exchange was satisfactory. Subsequently, as a pre requisite for the implementation of 50 NM longitudinal separation over Bay of Bengal and Arabian Sea, Chennai and Mumbai Oceanic Control Centres participated in the Bench test conducted on 3rd, 10th and 17th, February, 2010 by Boeing Company, Seattle.

3.9 The exchange of CPDLC messages and functioning of ADS contracts of both ACC systems was satisfactory. Some minor issues were identified and are being addressed. A problem in each system has been in the data link hand offs. This issue is being addressed. It is expected that more such tests will be conducted after the issues have been corrected. The CRA Report of Boeing/IATA on analysis of the ADS/CPDLC data is still awaited although FANS-1A problem reports are regularly being sent by India.

Problems identified on ADS/CPDLC ground system during ATS Interoperability Test by Boeing

Chennai ground system

3.10 Transfer of control with Mumbai ATS unit on data link for aircraft call sign with 7 characters was not successful. The default setting for lateral and vertical deviation did not trigger any event change and the values incorporated in the ground system is not being acknowledged by the aircraft in the event contract.

Mumbai ground system

3.11 The meeting noted that when End Service message (no.161) is uplinked, the error message (no.159) is also automatically uplinked. The Mumbai system engineers are working to resolve this problem.

Summary

3.12 Finally, from an overall efficiency point of view, it was recommended that Boeing be kindly requested to consider similar ADS/CPDLC interoperability test procedures with Chennai, Colombo, and Kuala-Lumpur ATC centres to enable seamless surveillance & datalink communication on ADS/CPDLC.

Direct Controller & Pilot Communication (DCPC) in Indian FIRS

3.13 The selected exchange of data link messages between Chennai, Mumbai and the virtual aircraft during the bench test was found to be satisfactory. The time element taken to receive replies from two or more aircraft was generally within 2 minutes.

3.14 RCAG VHF 126.15 MHz is working satisfactorily as a primary back up frequency for CPDLC on routes P762 between LULDA and BIKEN, N571, between LAGOG and BIKEN, P628 between IGREX and VATLA and N877 between LAGOG and ORARA over Bay of Bengal within Chennai FIR.

Data collection to provide a business case supporting reduced horizontal separation decisions

3.15 The meeting was advised that traffic demand through the airspace involved in this project would be the key criteria in providing a business case supporting a reduced horizontal separation implementation timeline. Based on traffic demand, possible simulation could be performed on how various horizontal separation standards would affect traffic demand involved.

3.16 It was noted that ongoing RVSM safety monitoring data collection sampling of December traffic data sent to RMAs such as MAAR may appear to fit the definition of traffic demand information necessary for providing business case.

3.17 It was noted that another potential source of traffic demand data could be as simple as flight plans. Since it is required that flight plans include estimated elapsed time when crossing FIR boundary and planned routing, it is possible to construct a list of FIR boundary crossings of a particular flight simply by processing flight plan information. This crossing information would then form a basis of traffic demand useful for reduced horizontal separation implementation decisions.

3.18 In this respect, AEROTHAI stated that it was willing to perform offline post-processing of flight plans into traffic demand for further analysis and simulations.

3.19 Taking into consideration the usefulness of business case data, it was agreed that flight plans and related ATS messages transiting the Bay of Bengal and/or the Oceanic Mumbai FIR would be forwarded to the Bangkok ATFMU at its AFTN Address, VTBBZDZX. In this respect, AEROTHAI would coordinate follow up actions with States and airlines involved regarding this issue.

Impact of reduced longitudinal separation in the Kabul FIR

3.20 It was noted that Afghanistan was willing to address reduced longitudinal separation and would review requirements for implementation of 50 NM longitudinal separation in the Kabul FIR.

3.21 It was noted that major international routes traversing the Kabul FIR from South and Southeast Asia are RNP compliant, although at the present time, RNP longitudinal separation of 50 NM is not applied.

3.22 The Kabul ACC is still a procedural control facility without RADAR support. While the standard longitudinal separation currently used is 80 NM, the Kabul ACC has accomplished with the assistance of the ATFM/BOBCAT initiative, unparalleled growth.

3.23 Due to this high level of military operations, the Kabul ACC is sometimes forced to restrict total availability of particular air traffic routes transiting the Kabul FIR. Nevertheless, with the cooperative activity between Afghanistan and neighbouring States, these situations are causing minimal restrictions for most of the users.

3.24 Radar and a combination of Multi-Lat/ADSB are being discussed for the Kabul FIR. The goal is to introduce full surveillance coverage of the Kabul FIR. Any new procedures will also take into account the safety of aircraft operating within the Kabul FIR.

En-route Monitoring Agency (EMA) Handbook

3.25 It was recalled that, recognizing the need for a common set of principles and practices for safety assessment and ongoing safety monitoring, RASMAG prepared a regional En-Route Monitoring Agency Handbook in connection with operational usage of reduced horizontal-plane separation minima based on the application of PBN. The handbook is expected to also help to promote an interchange of information among Asia/Pacific States in support of achieving common operational horizontal monitoring procedures, as well as supporting the acquisition and sharing of data resulting from the application of those procedures.

3.26 The **En-route Monitoring Agency (EMA) Handbook** is available on the ICAO website for States' information <http://www.bangkok.icao.int/edocs/index.html>

Airline participation in data collection

3.27 As part of the safety assessment for the area under consideration, periodic data collection and analysis would be required. Notwithstanding that this data will be from nominated FIRs, it was agreed that there may also be a need for aircraft to contribute to this data collection process by cooperating with ACCs in the sending and receiving of CPDLC messages prior to implementation of Phase 1.

3.28 Therefore, where necessary to do so, airlines were requested to cooperate with necessary data when required by the EMA.

Future Direction and Arrangements

Route proposals for Phase 1 of the project

3.29 It was agreed to include 2 additional RNAV routes in Phase 1 of the project. In addition to N571, the agreed RNAV route for Phase 1 were P628 and P762. P762 would be subject to Yangon FIR having satisfactory CPDLC capability by the scheduled commencement of Phase 1. The purpose of this increase was to give a wider spread of issues which may be encountered prior to all routes being considered.

Additional routes to be considered entering the Indian Ocean

3.30 Discussions took place regarding additional routes which leave the Bay of Bengal and extend into the Indian Ocean, especially the routes used by aircraft operating to/from South Africa.

3.31 Although traffic is comparably light, P627 is a popular route for aircraft operating from Hong Kong to South African destinations depending on forecast winds. P627 originates in Phuket (Bangkok FIR) and then traverses Kuala Lumpur, Jakarta, Colombo and Melbourne FIRs before entering Johannesburg Oceanic FIR. It was noted that Jakarta does not presently have DCPC capability for their airspace West of Sumatra to the Colombo FIR. Nevertheless, action is in hand to increase the range of their VHF coverage as well as introducing ADS/CPDLC into the Jakarta ACC. The concept of RNP 50 NM separation was agreed to awaiting further advice from Indonesia on this matter. The necessary coordination requirements between Jakarta, Colombo and Melbourne FIRs would then take place including AIP requirements.

Upgrading ATS routes to RNAV routes in the India Ocean

3.32 It was further suggested that other ATS routes leaving Malaysia, Singapore and Indonesia into the Indian Ocean should be upgraded to RNAV routes as soon as possible. It would be preferable if the complete section of these routes within the Asia/Pacific region be jointly coordinated with all FIRs involved so that a common date for change to RNAV RNP 10 was agreed to. Where possible to do so, this action would be commenced so as to have all of these routes concurrently upgraded to RNAV RNP 10 capability.

Coordination with the Arabian Sea, Indian Ocean ATS Coordination Group (ASIOACG) for changes to the Indian Ocean route structure.

3.33 The good work achieved by ASIOACG in the Indian Ocean area, especially with regard to the routes between the Gulf area and Australia was noted by the meeting. It was further observed that this group was also looking at extending the Flex tracks or User Preferred Route (UPRs) concept northwards from the already established use within the Melbourne FIR.

3.34 It was agreed that proposals to change any of the present routes in the Indian ocean would be coordinated with ASIOACG prior to implementation.

Background to timetable for implementation of RNP 10 50 NM longitudinal separation in the Bay of Bengal and Mumbai Oceanic

3.35 It was finally agreed that, based on this timetable for implementation for Bay of Bengal and Mumbai Oceanic areas, and taking into consideration that Malaysia will be testing their updated CPDLC equipment in May 2010, the following programme for Phase 1 of the project was decided:

- a) Kuala Lumpur ACC is scheduled to resume trialing CPDLC within the KL FIR in May 2010 between 1500-1900UTC and is scheduled to have CPDLC available H24 in October 2010b)
- b) FIT-BOB is again expected to convene in October to study and approve the data supplied by all FIRs concerned in Phase 1 of this project They are KL FIR, Chennai FIR, Kolkata FIR, Mumbai FIR. It may also be possible to receive data from Colombo and Yangon ACCs;
- c) FIT-BOB/BOB-RHS/TF/4 – GO-No Go meeting is programmed to convene in October;
- d) Phase 1 of the project involving N571, P628 and possibly P762 would commence on AIRAC Date 13 January (or 10 February) 2011

- e) BOB-RHS/TF/5 Post Implementation Meeting in April 2011 together with Go/No Go for Phase 2 of the project
- f) Stage 2 of the Project involving all other BOB and Mumbai Oceanic FIR routes, including Indian Ocean routes crossing Male FIR commence on AIRAC Date 28 July or 25 August 2011

Note: *P627 and other Indian Ocean routes to be described could be included subject to coordination with neighboring FIRs and safety criteria requirements.*

3.36 Malaysia also advised that for information on the progress of their implementation programme for CPDLC, they have established a website <http://int.dca.gov.my/cpdlc> which gives a summary of the data of aircraft utilising CPDLC.

Uni-directional Crossing Routes

3.37 It was noted that as well as the primary traffic flow was between South East Asia and India, there were also crossing tracks serving traffic between Asia and Africa. While not as heavily loaded, allowance still needed to be made with the allocation of flight levels, notwithstanding that this may cause some limitations on the capacity of the primary routes.

3.38 To overcome of these limitations, it was suggested that, by establishing uni-directional routes for the crossing traffic, these aircraft could be allocated the same levels, which thereby effectively sustains the capacity on the primary routes.

Establishment of an India EMA

3.39 With respect to the establishment of the India EMA, it was noted that there were several paths that were available to India to effect a timely establishment of this facility.

3.40 RASMAG approval would be required before the India EMA could proceed with their responsibilities. Unfortunately, there would only be one RASMG meeting in 2010, scheduled to take place on 4-8 October where information should be presented by India to RASMAG to fulfil their EMA approval requirements. It was noted that ongoing coordination is continuing between Airports Authority of India (AAI) and SEASMA (CAAS) and in addition, it is proposed that AAI staff will visit SEASMA for more in-depth EMA discussions shortly. It was suggested that, to avoid any delay in the implementation process of Phase 1 of the project, AAI would continue to work closely and expeditiously with SEASMA in Singapore to overcome any difficulties in the initial stage of India's efforts to establish an EMA.

3.41 A sample of an Operational Letter of Agreement (LOA) between Air Traffic Service (ATS) authorities for Monitoring of Aircraft Navigation Errors in the South China Sea Area was presented.

3.42 It was suggested that the task force should study this sample and if agreed, use a similar document for use in the Bay of Bengal and Mumbai Oceanic area and be available to States concerned

BOBCAT Data Collection Analysis

3.43 The meeting was given a detailed analysis and overview of operational data by Thailand on westbound flights operating into the Kabul FIR from the commencement of full ATFM operations in July 2007 to December 2009.

4. ACTION BY THE MEETING

4.1 The meeting is invited to:

- a) Note the work achieved at the 2nd Meeting of the BOB-RHS Task Force;
- b) Follow-up on appropriate items pertaining to the TF/2 Report; and,
- c) Continue to work towards the agreed timelines for implementation of Phase 1 and Phase 2 of the work programme.

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