

## **INTERNATIONAL CIVIL AVIATION ORGANIZATION**



### **REPORT OF THE COMBINED SIXTH MEETING OF THE FANS IMPLEMENTATION TEAM, BAY OF BENGAL (FIT-BOB/6) AND THIRD MEETING OF THE FANS IMPLEMENTATION TEAM, SOUTH-EAST ASIA (FIT-SEA/3)**

BANGKOK, THAILAND, 22 – 25 NOVEMBER 2005

The views expressed in this Report should be taken as those of the  
Meeting and not of the Organization.

Approved by the Meeting  
and Published by the ICAO Asia and Pacific Office

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## **PART I – HISTORY OF THE MEETING**

### **1. Introduction**

1.1 The combined Sixth Meeting of the FANS Implementation Team for the Bay of Bengal (FIT-BOB/6) and Third Meeting of the FANS Implementation Team for South-East Asia (FIT-SEA/3) was held from 22 to 25 November 2005 at the Kotaite Wing of the ICAO Asia/Pacific Office.

### **2. Attendance**

2.1 The meeting was attended by 39 participants from Bangladesh, India, Indonesia, Japan, Lao PDR, Malaysia, Myanmar, Nepal, Philippines, Singapore, Thailand, Viet Nam and IATA. A list of participants is at **Appendix A** to this report.

### **3. Officers & Regional Office**

3.1 Mr. Andrew Tiede, Regional Officer ATM from the ICAO Asia and Pacific Regional Office, acted as the Moderator and Secretary for the meeting.

### **4. Opening of the Meeting**

4.1 The meeting was opened by Mr. Andrew Tiede on behalf of Mr. Lalit Shah, Regional Director of the Asia/Pacific Regional Office. In opening the meeting, he welcomed all participants to the Regional Office and recalled that the last meeting of the two FITs was also held as a combined meeting in April this year, in conjunction with a two day ADS/CPDLC seminar. Feedback in regard to the seminar had been complimentary, as the presentations provided by experts from Japan and Australia and supported by presentations from IFALPA, India, the FAA and ICAO had covered a number of subjects of relevance to data link operations. Mr. Tiede thanked the presenters and their administrations that had been involved with the seminar and reminded the meeting that copies of the seminar presentations were available from the Regional Office.

4.2 Mr. Tiede remarked that this meeting had a number of matters to consider, including an update of the ADS/CPDLC operational trial in the Bay of Bengal and progress towards the implementation of an operational trial in the Arabian Sea. He was hopeful that the remaining issues in regard to funding of the Bay of Bengal CRA could be quickly overcome in order to allow CRA services to be made available by Boeing in both the Bay of Bengal and the Arabian Sea.

4.3 Mr. Tiede recalled the generous offer by CRA Japan to provide initial CRA services for the South China Sea that had been accepted as a result of the last meeting and urged this meeting to complete the work on the terms of reference, reporting procedures and task list in support of the CRA Japan.

4.4 Noting that the ADS/CPDLC implementation by some States had now fallen-behind their own timelines in many areas, Mr. Tiede wished all participants a successful meeting.

5. **Language and Documentation**

5.1. All discussions were conducted in English. Documentation was issued in English. A total of 10 Working Papers, 5 Information Papers and 4 Flimsies were considered by the meeting. A list of the meeting papers considered is at **Appendix B**.

## PART II - REPORT ON AGENDA ITEMS

### **Agenda Item 1: Adoption of Agenda**

1.1 The meeting reviewed the provisional agenda that had been proposed by the Regional Office and adopted it as the agenda for the meeting:

Agenda Item 1: Adoption of Agenda

Agenda Item 2: Review Bay of Bengal ADS/CPDLC Operational Trial

Agenda Item 3: Review ADS/CPDLC Implementation Bay of Bengal and South-East Asia

Agenda Item 4: Central Reporting Agency – Bay of Bengal

Agenda Item 5: Central Reporting Agency – South East Asia

Agenda Item 6: Data link monitoring requirements

Agenda Item 7: Update Task Lists

Agenda Item 8: Any other business

Agenda Item 9: Date and venue of the next meeting

### **Agenda Item 2: Review Bay of Bengal ADS/CPDLC Operational Trial**

#### **India – Review of Bay of Bengal Operational Trial**

2.1 India updated the meeting in relation to the status of the ADS/CPDLC Operational Trial that had commenced in the Bay of Bengal on 19 February 2004, in relation to operations in the Chennai and Kolkata FIRs. Details of the presentation have been included as **Appendix C**.

2.2 India had started its ATS automation project in 1991-92 as a joint venture between equipment supplier Electronic Corporation of India Ltd (ECIL) and the Airports Authority of India (AAI), with initial operations at Chennai and Kolkatta in 2002 preceding the commencement of the operational trial in February 2004. The system was subsequently upgraded to provide a total FDPS solution for all ATS units at Chennai and Kolkatta, and at four other major Area Control Centres viz. Trivandrum, Varanasi, Ahamadabad and Nagpur.

2.3 The trial activities served 13 routes in the Bay of Bengal portions of the Chennai and Kolkata FIRs, including P574, N571, N563, P762, L645, P628, N877, L759, M770, L507, L301, N895 and P646. ADS services were originally available H24 in the Kolkata FIR and from 0200 to 2030 UTC in the Chennai FIR, but since 12 September 2005 services had been made available H24 in Chennai as well. As agreed during the earlier FIT-BOB meetings, India is changing the AFN Logon address of Chennai from VOMM to VOMF and Kolkata from VECF to VECC, with effect from 24<sup>th</sup> November 2005. India has adopted the FANS 1/A Operations Manual (FOM) as the operational procedures applicable to the trial.

2.4 Chennai had recently participated in the CPDLC trials conducted by Airbus Company, France from the test bench of A380 equipment based in Toulouse, France. The message exchange during testing was satisfactory in all respects, demonstrating compatibility with the Chennai equipment.

2.5 In respect of operations in the Kolkata and Chennai FIRs, sampling during September/October 2005 had indicated that the daily number of uplink/downlink messages at Chennai had varied from 500 to 2100 per day and 500 to 1000 at Kolkata during the period. The sampling window included periods when the ground equipment had been temporarily removed from service, resulting in large variations in data link message numbers. CPDLC messages averaged about 200 per day, as no position report on CPDLC or HF was required once an ADS contract had been established.

2.6 India reported that the total number of problem reports had reduced considerably, but they would very much appreciate assistance from a CRA in order to analyze and correct the problem reports received so far during the trial. Five reports had been logged from April 2005 to September 2005 at Chennai and similar number at Kolkata. The problem reports were generally classified as:

- related to ground system problems;
- related to an inability to receive downlink or send uplink even though the link-Status was normal;
- related to avionics;
- taking long time to log on some occasions; and
- SITA LINK failure (Frequent and unplanned)

2.7 Other problem reports were categorized as miscellaneous and include error code received in contact advisory, unsuccessful connection, no message exchange in spite of CPDLC contact etc. In accordance with arrangements agreed with Boeing CRA during earlier meetings to support the eventual commencement of CRA services by Boeing, all problem reports had been being forwarded to Boeing CRA ([bradley.d.cornell@boeing.com](mailto:bradley.d.cornell@boeing.com)) for record and analysis. However, as legal arrangements had not been finalized, Boeing had been unable to undertake any significant work in this respect.

2.8 From 28 September until 10 October 2005, the system at Chennai faced a peculiar problem due to the dual log-on instructions and addresses. Information was received that both log-on VOMM and VOMF would remain valid for one month, but aircraft were generally unable to log-on as VOMF. Some aircraft were able to log-on but could not continue their connectivity. In consultation with data service provider SITA, it was decided to continue with VOMM until AIRAC 24<sup>th</sup> November 2005, at which time the switch would be made to VOMF.

2.9 During October 2005, following completion of a software upgrade of ground systems at Chennai, problems reports suddenly increased significantly and the system was withdrawn by NOTAM on 31 October whilst the problems were investigated. Although it was originally expected that some aspect of the software upgrade was responsible, with cooperation from SITA the main difficulty was traced to problems with the insertion or deletion of additional "padding" zeros in the flight identifiers (i.e. flight 035 compared with flight 35) contained in MAS messages. SITA had made a routing change and difficulties were introduced in terms of the inconsistency of message parameters between SITA and ARINC systems. A temporary compensating modification was made to the Chennai ground equipment and the system was returned to service on 11 November 2005.

2.10 India noted that the modification of the ground system to solve a network related problem was a temporary one, implemented while coordination continues with SITA in regard to a long term rectification of this problem. India raised concerns that protocols should be established to ensure that the usage of different data service providers or changing between service providers should in no way affect the delivery of messages.

2.11 India reported that Kolkata was experiencing difficulties in effecting transfer of control of data link to the Yangon system. The meeting recognized that Myanmar was not participating in the trial and their ADS/CPDLC systems were not always available, and this would account for the lack of CPDLC response from their end. The meeting encouraged Myanmar to reactivate its ADS/CPDLC equipment as soon as possible in order to join the Bay of Bengal operational trial.

2.12 The meeting was informed that the Letter of Agreement (LOA) between Yangon and Kolkata did not include provision for the transfer of control of data link between the two centres. The meeting supported India's suggestion that during revision of LOAs between neighbouring ACCs/FICs, provision for ADS/CPDLC transfers should also be incorporated.

2.13 In summary, India reported that the trials in Chennai and Kolkata FIRs were proceeding positively, with confidence increasing amongst pilots and controllers. The ground system had already reached a level of stability where failures were now very infrequent. An enhancement planned for the system will enable the automatic relay of MET data contained in ADS reports directly to the MET department via an automatic message switching system.

2.14 Unfortunately, although the system has capacity to accommodate additional traffic, the number of participating airlines has not increased significantly, only recently moving from 16 to 19 participating airlines (**Appendix D** refers).

2.15 Even though the trial was proceeding well, India reported that they were not yet ready to consider the introduction of reduced separation provisions. India considered that a simultaneous coordinated implementation of reduced separation applications by all participating ATS service providers in the Bay of Bengal was likely to be the best implementation strategy. The Regional Office supported this position.

2.16 India was planning to introduce ADS/CPDLC trial operations in the Arabian Sea portions of the Mumbai and Delhi FIRs, commencing in early 2006. Mumbai and Delhi automation systems were now being armed with ADS/CPDLC components to handle ADS/CPDLC services over the Arabian Sea. Installation was complete and the system would be ready for trial operations commencing from January 2006. In support of this initiative, India advised that they would prefer to work strictly with one CRA for both the Bay of Bengal and the Arabian Sea.

### **Impediments to Implementation**

2.17 The meeting noted that although the ADS/CPDLC operational trial in the Bay of Bengal had commenced in February 2004, there were still no CRA services available more than 18 months after commencement of the trial. The lack of CRA services meant that complex problem reports had been unable to be analyzed and the technical parameters of the data link operations had been unable to be verified. Consequently, no progress could be made beyond the current trial operations.

2.18 The meeting considered that this situation was extremely regrettable as the many benefits available from data link operations were not yet able to be realized. The meeting recalled that the safety management provisions of Annex 11 (Section 2.26) required that States implement systematic and appropriate ATS safety management programmes to ensure that safety was maintained in the provision of ATS. The PANS ATM (Section 2.6) required the conduct of safety assessments in a number of circumstances, including the implementation of new communications, surveillance or other safety significant systems and equipment, including those providing new functionality and capabilities.

2.19 The meeting recognized that the CRA analysis would comprise a significant and critical component of the safety assessment in the context of implementing ADS/CPDLC. As the CRA analysis and ongoing CRA monitoring capability was not available to the Bay of Bengal trial, the safety assessment could not be completed and, consequently, the implementation of either CPDLC or ADS could not be authorized.

2.20 The Secretariat briefed the meeting that concerns of this nature had been recognized by APANPIRG/16 (August 2005) in relation to RVSM and reduced horizontal separation minima implementations, and that the ICAO safety assessment and ongoing monitoring provisions were equally applicable in the implementation of new communications and surveillance systems like ADS and CPDLC. In order to highlight their significant concerns in this regard, APANPIRG/16 had formulated the following Conclusion:

***Conclusion 16/5 – No implementation of reduced separation unless compliant with Annex 11***

*That, recognizing that some States had not adequately complied with safety management provisions, the Regional Office advise States of the Asia/Pacific Region that further regional implementation of reduced separation minima should only proceed in circumstances where implementing States can demonstrate an ability to comply with Annex 11, Chapter 2, safety management provisions for the continuous monitoring and regular assessment of the safety level achieved.*

2.21 As such, it was evident to the meeting that the significant investment in ground based data link capability made by States of the sub-region, particularly India, could not be utilized until the data link technical parameters had been appropriately demonstrated and ongoing monitoring and remediation arrangements were in place. Accordingly, the meeting urged all parties to take all actions to ensure the commencement of CRA services for the Bay of Bengal as soon as possible, in order to enable India and the FIT-BOB to progress the safety assessment for implementation. Once a suitable safety analysis had been completed in accordance with ICAO provisions, implementation of CPDLC and/or ADS could be considered.

**Agenda Item 3: Review ADS/CPDLC Implementation Bay of Bengal and South East Asia**

3.1 The meeting recalled that APANPIRG/15 had noted that planning and implementation of some elements of the “Asia/Pacific Regional Plan for the New CNS/ATM Systems” such as the ADS-C, ATN, AIDC, automated AIS systems, GNSS and ADS-B were progressing slowly. States were urged to give appropriate priority to progressing their implementation planning, in particular in the area of data link communications and ATM automated systems.

3.2 APANPIRG/15 also noted that the Air Navigation Commission recognised that work related to air navigation systems and, in particular, development and implementation continue to rank amongst the highest priority items on ICAO’s work programme. During its ongoing review of global and regional developments in the modernisation of air navigation system, the Commission noted that although good progress had been made with implementation of certain elements of CNS/ATM systems, the overall pace of implementation was slower than originally expected. The Commission requested the Secretary General to invite PIRGs and States to enhance their activities in the area of planning and implementation of CNS/ATM systems.

3.3 The need for data link services to enhance ATM to improve efficiency, airspace capacity and utilization, and enhance safety was a long standing requirement and a core element in the ICAO Regional CNS/ATM plan. Also, environmental concerns have placed a higher priority and urgency on maximizing fuel savings and the use of ADS and CPDLC would make a significant contribution. The Secretariat suggested that there needed to be a renewed effort on the part of States and ICAO to address the timely implementation of the regional CNS/ATM plan and give suitable priority to providing the data link services. Accordingly, the Secretariat urged States to accelerate their efforts to recover the delays in the implementation of regional planning milestones, including those related to ADS and CPDLC.

3.4 Japan raised concerns that insufficient information had been presented that would enable the meeting to assess the situation in respect of the delays. The Regional Office would prepare suitable papers for the next meeting to present regional planning material that would allow an accurate assessment in respect of regional implementation timelines for ADS and CPDLC.

Tables of ADS/CPDLC Equipage and ATS Status

3.5 The meeting reviewed and updated the Tables of ADS/CPDLC Equipage and ATS Status for the Indian Ocean/Bay of Bengal (**Appendix E**) and the South China Sea/South-East Asia (**Appendix F**). The meeting requested that the Regional Office expand the tables to include each FIR affected as an individual entity, rather than including all the FIRs of a State under one heading.

3.6 A number of States, including Indonesia and India, agreed to provide updated information for the tables via email to the Regional Office during the next few weeks. The Secretariat, noting that up to date information was important in the planning and conduct of operational trials, urged all participants to thoroughly review the information in the tables and update the Regional Office accordingly.

Whole of Indian Ocean

3.7 The Secretariat advised that Australia was presently working with African States through the Informal Indian Ocean ATS Coordination Group (IIOACG) to implement ADS and CPLDC in the Southern Indian Ocean area. The FIT-BOB/4 meeting (September 2004) had considered the establishment of a Whole of the India Ocean meeting to harmonize ADS/CPDLC implementation across the region. This was endorsed by BBACG/16 (February 2005) who recommended that the Regional Office bring this to the attention of APANPIRG/16 to be held on 22-26 August 2005. This would allow for integration of all the various coordinating groups and implementation plans into a consolidated approach.

3.8 Unfortunately the reduced ATM staffing circumstances at the Regional Office had resulted in an inability to further pursue this matter and it was unclear when further progress would be made. However, the Secretariat urged the meeting to consider the efficiencies to be gained by working with other States towards simultaneous implementations in contiguous airspaces.

Indonesia

3.9 Indonesia was not in a position to formally update the meeting in regard to their progress towards ADS/CPDLC implementation, but undertook to follow up and provide a comprehensive update to the next meeting.

Malaysia

3.10 Malaysia informed that they had experienced significant delays as a result of government reorganization and associated institutional delays. They were finalizing the tender documentation for the acquisition of new ADS/CPDLC equipment and tenders were expected to be let shortly.

3.11 Malaysia did not anticipate being involved in the South China Sea trials but expected to join the Bay of Bengal trial in due course.

Myanmar

3.12 Myanmar confirmed that they had recently moved into the new ACC facilities in Yangon, but at this stage there was no clear indication as to when they would join the trial.

Philippines

3.13 The meeting noted that the three principal ATS providers for the non-radar airspace over the South China Sea where ADS/CPDLC was needed were the Philippines, Singapore and Viet Nam. The Philippines advised that there had been unavoidable delays in obtaining ADS and CDPLC equipment and the implementation date had slipped. However, ground work had commenced and it was anticipated that stand alone equipment would be commissioned during 2007, but that an integrated arrangement would not be possible until 2011.

Singapore

3.14 Singapore confirmed that their ADS/CPDLC systems were operational and that they could join other States in an operational trial. CRA Japan had commenced coordination with Singapore in respect of providing CRA services as agreed during FIT-SEA/2.

3.15 Singapore was currently participating in a series of ADS/CPDLC tests with Airbus, which were expected to be completed by the end of 2005.

Sri Lanka

3.16 The meeting recalled that Sri Lanka had advised FIT-BOB/5 that they had installed ADS/CPDLC equipment in early 2001 and commenced trial operations on 15 June 2001 within Colombo FIR. With limited airlines willing to (and capable of) logon, the trials were conducted on a voluntary basis as stated in AIC A02/02. Since then, the trials were conducted until mid 2003. Though the related AIC continued to be current, due to reduced staffing situations a local instruction had been issued in late 2003, to restrict the services as per the daily staff situation. Although the system was not operational due to an equipment malfunction, Sri Lanka anticipated rejoining the trial after May 2005 when the equipment would be operational. Unfortunately no notification had been received by the Regional Office in respect of the resumption of the trial and, as Sri Lanka was not represented at this meeting, no further update was available.

Thailand

3.17 Thailand reported that they had experienced some operational difficulties recently and would defer participation in the Bay of Bengal trial. However, Thailand supported the implementation of both FIT-BOB and FIT-SEA programs. The present ADS/CPDLC system would be operated on individual requirement basis. With the mentioned difficulties, AEROTHAI would further study on the various requirements e.g. operational requirement/concept of operation, airspace organization, system and network support, user requirements for continental/high-density application etc. Thailand expected to

provide a more comprehensive report next meeting, by which time the operational requirements planning for the new Bangkok ACC would have been completed.

Viet Nam

3.18 Viet Nam informed the meeting that installation of their new systems at Ho Chi Minh ACC was proceeding well. Preliminary tests of CPDLC connections with aircraft had been conducted, with positive results. The new systems would be connected to a data link service provider network in June 2006, and Viet Nam expected to be ready for a operational trial in the Ho Chi Minh FIR during late 2006.

3.19 Viet Nam recognized that there were a significant number of tasks which would need to be completed and coordinated with service providers, operators and adjacent States before conducting trials, such as training for ATC and pilots, publication of aeronautical information by AIC and AIP, confirmation of airlines participation, and arrangements for the amendments to operational LOAs. These arrangements would be assisted by the FIT-SEA and the Regional Office, and the FIT-SEA CRA also offered assistance to Viet Nam in preparation of the processes for setting trials.

Phased Implementation – Singapore and Viet Nam

3.20 The meeting recalled that FIT-SEA/1 (May 2004) had agreed that the South China Sea area ADS/CPDLC operational trial would be carried out by the Philippines, Singapore and Viet Nam. Indonesia would also participate in this trial for the eastern part of the Jakarta FIR.

3.21 In noting the delay to implementation in the Philippines and the uncertainty in regard to the preparedness of Indonesia, the meeting suggested that a phased approach should be adopted in relation to the implementation of ADS and CPDLC in the South China Sea area, with implementations occurring as soon State's operational capability became available. Singapore and Viet Nam agreed to work together towards implementing an operational trial as soon as Viet Nam's equipment was commissioned, assisted by the Regional Office, the FIT-SEA and the FIT-SEA CRA. It was anticipated that a trial of this nature could be coordinated to commence in the latter part of 2006.

**Agenda Item 4: Central Reporting Agency – Bay of Bengal**

4.1 The meeting noted with disappointment that the matters in relation to the funding of CRA services for the Bay of Bengal operational trial had still not been resolved and, as such, CRA services were not available to the trial.

4.2 The BBACG and FIT-BOB had previously recognized that the establishment and funding of a CRA was critical to enabling States to meet the Annex 11 safety monitoring provisions required to implement operational ADS and CPDLC systems. Without appropriate CRA analysis of the implementation and ongoing technical performance of data link systems, appropriate safety assessments could not be completed in accordance with ICAO provisions and implementation of data link systems could not proceed. These matters have been previous discussed at paragraphs 2.17 to 2.21.

4.3 As a CRA was part of the safety requirements for the implementation and ongoing operation of ADS and CPDLC services, BBACG/13 recognized that the responsibility for the setting up and operation of a CRA for the Bay of Bengal area should be borne by the States or ATS service providers providing the ADS and CPDLC services. In this regard, recovery of these costs could be met through user charges.

4.4 In recognition of the complexity involved in any one State or group of States attempting to collect a small amount of funds from a large number of airlines for immediate dispersal to the CRA

provider, IATA had informed previous related meetings that although this was a State responsibility, IATA was prepared to assist States in this regard by collecting a levy directly from the airlines to fund the CRA services. Accordingly, a modified version of a Joint Financing arrangement was agreed which provided for IATA to collect a levy on the airspace users and to include provision for contributions to be made from other sources. IATA would then make payments to the CRA service provider on behalf of the States involved.

4.5 The combined BBACG/14 and FIT-BOB/3 meeting (February 2004) studied and endorsed the recommendations that had been proposed. In addition, FIT-BOB/3 accepted an offer by the Boeing Company to provide CRA services for the Bay of Bengal operational trial, recognizing the wide experience of Boeing and that there was no other offer, and noting that Boeing would not be able to commence the CRA operation until a suitable contract was in place. 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. 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.

4.6 IATA provided FIT-BOB/5 (April 2005) with details of the 18 months initial contract with Boeing and how the funding mechanism would work. A maximum cost of USD500 000 had been estimated by Boeing for the initial 18 month duration of the contract and this was accepted as a cap amount that would not be exceeded. IATA would be a principal contracting partner, Boeing would be paid in arrears and it should be possible to commence CRA services as soon as the contract was signed. States would not bear any expense in this process and would not be required to participate in the invoicing and collection of charges other than providing the data and publishing their AIP Supplements enabling IATA to collect the charges on behalf of States.

4.7 IATA reported that to bring the CRA into operation, it would be necessary for IATA to also enter into formal arrangements with the States concerned to ensure provision of the necessary data and to enable IATA to collect charges from the users of the data link services. In order to further progress the arrangements, the Special ATS Coordination Meeting on Funding of a Central Reporting Agency for the Bay of Bengal ADS/CPDLC Operational Trial (SCM BOB CRA) was held in June 2005.

4.8 The SCM BOB CRA considered a draft legal agreement between IATA and relevant States, which comprised the legal arrangements necessary to enable and facilitate the collection by IATA of a specific 'CRA Charge' from operators for the purposes of funding CRA services in relevant areas. In recognition that India and Sri Lanka would be the two States initially involved in supporting the provision of data to IATA, the SCM BOB CRA drafted separate agreements between IATA and India, and IATA and Sri Lanka. In the case of India, the legal agreement was expanded to include provision for CRA services in the Arabian Sea, in anticipation of the operational trial commencing in January 2006.

4.9 The SCM BOB CRA took into account that IATA would be entering into a separate legal agreement with Boeing in respect of the operation of the CRA and that the arrangements in this respect would therefore not be included in the agreements between States and IATA. IATA advised that the arrangements with Boeing had been finalized to the point that, once agreement was reached in regard to the arrangements between IATA and States, the contract with Boeing could be implemented and Boeing could commence providing CRA services.

4.10 India and IATA undertook to continue close coordination with a view to finalizing the agreement as soon as possible. The SCM BOB CRA recognized that although India and Sri Lanka would be the two States involved in providing data to IATA for charging purposes, the remaining States surrounding the Bay of Bengal should also be alerted to the imminent commencement of CRA services and requested that the Regional Office provide suitable advice to Thailand, Malaysia, Indonesia and Myanmar in this respect. The SCM BOB CRA drafted a generic AIP Supplement in this regard.

4.11 In order to ensure that the work toward implementation of CRA services continued at best speed, the SCM BOB CRA agreed to the following steps:

- 1) IATA to complete the fine detail and editorial work to the Agreements and provide 'execution' copies of the agreement documents to India and Sri Lanka as soon as possible;
- 2) IATA to coordinate with Sri Lanka in respect of progressing the Agreement to signature through State approval processes;
- 3) Airports Authority of India (AAI) to present the Agreement to the Board of AAI as soon as possible;
- 4) Subject to AAI Board approval, AAI to present the Agreement to the Government of India as soon as possible;
- 5) AAI to advise IATA immediately when Board and Government approval had been granted; and
- 6) AAI to coordinate with IATA to conduct formal signing of the Agreement.
- 7) Regional Office to coordinate with surrounding States in respect of the issuance of suitable AIP SUP notifying the implementation of CRA services.

4.12 The Regional Office noted that despite the positive work completed by the SCM BOB CRA in June 2005, contracts for the provision of CRA services had not yet been signed. India advised that good progress had been made, however the Board of the Airports Authority of India had requested additional information in relation to the costs involved, particularly how the USD 500,000 cap estimated by Boeing for the initial 18 months contract had been derived.

4.13 The meeting recognized that there was no cost to India, as the proposed arrangements involved IATA collecting (on behalf of India) a CRA charge from airlines and then paying Boeing CRA. However, in order to address questions raised by the Board of the Airports Authority of India during their consideration of the proposals, the meeting sought additional information from Boeing in regard to the costs involved in the provision of CRA services.

4.14 Boeing had advised that from previous experience in other regions, including approximately 10 years with the North Pacific and South Pacific FIT groups, and based on the standard cost of services, tools and equipment time that they would be required to provide, the amount had been estimated at not more than USD 500 000 in the first contract period of 18 months. This was a capped amount and the actual cost could be rather less than this, depending on the number and type of problem reports that needed assessment by the CRA. If the cap was reached prior to the expiry of the 18 month initial period, it was likely that this would be as a result of serious problems with the ground equipments in use that would need to be fully addressed before continuing with the trial

4.15 Boeing noted that there was expected to be wide disparity in the type of work needed to investigate and resolve the variety and number of problem reports, some of which might require simulators, laboratory services and in-house software tools to trouble shoot the system from end-to-end and resolve problems. Some problems would necessarily cost more in terms of time and effort, perhaps involving travel to inspect the ground installation, while some might be relatively simple. Therefore, it was extremely difficult to itemize the costs in advance.

4.16 In noting that suitable guidance in relation to the functions of a CRA were contained in the FANS 1/A Operations Manual (FOM) and the *Guidance Material for End-to-End Safety and Performance Monitoring of Air Traffic Service (ATS) Data Link Systems in the Asia/Pacific Region* (see appendix P) that had recently been endorsed by APANPIRG/16 as regional guidance material, Boeing provided additional guidance in respect of the general duties that would be undertaken by the CRA, as follows:

CRA Task	Resource Requirement
<ul style="list-style-type: none"> <li>Manage data confidentiality agreement with all FIT members who provide problem reports</li> </ul>	Legal services, technical expertise
<ul style="list-style-type: none"> <li>Develop and administer problem report process</li> <li>De-identify all reports</li> <li>Enter de-identified reports into a data base</li> <li>Keep the identified reports for processing</li> <li>Request audit data from data link service providers</li> <li>Assign responsibility for problem resolution where possible</li> <li>Analyze the data</li> <li>Identify trends</li> </ul>	Problem reporting data base, ATS audit decode capability, airborne test benches as a minimum, simulators highly recommended, ATS workstation simulation capability (CPDLC and ADS)
<ul style="list-style-type: none"> <li>Schedule, coordinate FANS procedures testing</li> </ul>	Airborne test benches as a minimum, simulator capability highly recommended, ATS simulation capability (CPDLC and ADS), ATS audit decode and report capability, technical expertise, operational expertise
<ul style="list-style-type: none"> <li>Administer and monitor an informal end-to-end configuration process.</li> </ul>	Technical expertise and associated knowledge of avionic and ground systems
<ul style="list-style-type: none"> <li>Develop (as recommendations) new end-to-end system performance requirements.</li> </ul>	Technical expertise, operational expertise
<ul style="list-style-type: none"> <li>Receive, decode, and process monthly status reports from the air traffic service providers</li> </ul>	Database tools, technical expertise
<ul style="list-style-type: none"> <li>Coordinate and test the implementation of proposed benefit enhancing procedures resulting from ATS data link systems for a given region (i.e. Dynamic Airborne Route Planning and or User Preferred Routes)</li> </ul>	Technical expertise, operational expertise

4.17 India requested any additional information or guidance that was available in respect of understanding the costs involved. Based on their long experience in the Pacific, it may be possible for Boeing to give some general guidance in terms of average number of problem reports, average number of hours labour and so forth.

4.18 IATA agreed to undertake further liaison with Boeing in order to obtain any further details in respect of costing that Boeing may be able to provide. However, as noted above, the costs were extremely difficult to itemize further and resorting to very broad assumptions may simply serve to introduce erroneous understandings. It was also important to note that as Boeing was a commercial company it was probable that some of this information would be considered as “commercial-in-confidence” and may necessitate dedicated arrangements to facilitate discussions between the Board of

the Airports Authority of India and Boeing. IATA would undertake coordination between Boeing and India in this regard.

#### **Draft Terms of Reference BOB CRA**

4.19 In commencing preparatory work for the establishment of the BOB CRA, the Regional Office had requested that Boeing CRA provide a step-by-step checklist or similar guidance to the States involved in order that the CRA requirements could be readily understood and complied with. The Boeing CRA had provided initial guidance by way of the CRA Terms of Reference and supporting guidance material included in **Appendix G**.

4.20 The meeting thanked Boeing for preparing the draft documentation. In reviewing the draft terms of reference, the meeting noted the similarities between the Boeing proposal and the material contained in the *Guidance Material for End-to-End Safety and Performance Monitoring of Air Traffic Service (ATS) Data Link Systems in the Asia/Pacific Region* (see appendix P) that had been adopted by APANPIRG/16 during August 2005 as regional guidance material. The meeting considered that Boeing may not have been aware of the development of this guidance material and that there was now an opportunity to simplify the Boeing proposal by removing the duplicated material.

4.21 Accordingly, the meeting requested that the Regional Office make Boeing aware of the situation and request that Boeing consider submitting a simplified proposal to the next meeting.

#### **Agenda Item 5: Central Reporting Agency – South East Asia**

##### **Establishment of FIT-SEA CRA**

5.1 In considering the establishment of a CRA for the FIT-SEA, the meeting recalled that the generous offer by CRA Japan to provide CRA services to the FIT-SEA for operations in the South China Sea area was accepted by the participating States present during the FIT-SEA/2 meeting (April 2005), including the Philippines and Singapore, and was strongly supported by the Regional Office as well as IATA and IFALPA. Subsequently Indonesia and Viet Nam, who were not present at FIT-SEA/2, were advised by letter from the Regional Office in this regard (ref: ATM 0248 & 0249) and had also accepted the offer from CRA Japan.

5.2 The meeting noted that services to be provided by the CRA Japan would be on a voluntary and temporary basis until a formal CRA was established, and adopted the terminology FIT-SEA CRA for the services provided by CRA Japan for the South China Sea area.

5.3 CRA Japan advised that the objectives of the FIT-SEA CRA were to assist the FIT-SEA members in planning and implementing ADS/CPDLC systems by sharing the technical and operational information, processing FANS 1/A Problem Reports (PR), disseminating the de-identified problem report information, and submitting reports to the FIT-SEA and relevant bodies. In addition, the FIT-SEA CRA would also share the technical and operational information with the respective ATSUs for the purpose of improving ADS/CPDLC systems.

5.4 In order to progress the work of the FIT-SEA CRA, in particular the commencement of an ADS/CPDLC operational trial involving the Philippines, Singapore and Viet Nam, the meeting considered the following matters:

- a) FIT-SEA members and their roles (definition and listing of members);
- b) Area of FIT-SEA CRA services;

- c) Terms of Reference (TOR) of FIT-SEA CRA;
- d) List of tasks of FIT-SEA CRA;
- e) Arrangements of data confidentiality agreement between State, Airlines, Data Link Service Providers (DSPs) and the FIT-SEA CRA; and
- f) Arrangements for submission of problem reports (PRs) to the FIT-SEA CRA.

**FIT-SEA Members and Work Plan**

5.5 The meeting reconfirmed the membership, Terms of Reference and Work Plan (**Appendices H and I** refer) for the FIT-SEA as agreed during the FIT-SEA/1 meeting (May 2004) and noted the membership as follows.

5.6 Membership of FIT-SEA would be open to all interested parties, including:

- a) South-East Asia States with CNS/ATM work stations;
- b) Data Link Service Providers (DSPs) (including ARINC, SITA & INMARSAT);
- c) Aircraft manufactures (Boeing & Airbus);
- d) ICAO;
- e) IATA, IFALPA, IFATCA and interested International Organizations, and
- f) Representatives of participating airlines.

5.7 The meeting also reconfirmed that it would be necessary to obtain the involvement and cooperation of the aircraft manufacturers and data link service providers as had been discussed during FIT-SEA/2. In this regard the meeting again requested that the Secretariat confirm their participation at future FIT-SEA meetings.

**Area of FIT-SEA CRA services**

5.8 The meeting agreed that the geographical area of FIT-SEA CRA services (**Appendix J** refers) shall be defined as follows:

the FIT-SEA CRA will provide CRA services for the airspace within the Ho Chi Minh, Manila and Singapore FIRs, where implementation of ADS/CPDLC technologies is considered to enhance surveillance and communications capability, leading to significant benefits for operational efficiency and regularity of flights in the South China Sea area.

5.9 Specific route segments where an ADS/CPDLC trial could be planned would be determined by respective States in due course and would be advised to FIT-SEA and the FIT-SEA CRA. In addition, the meeting recognized that procedural separation had been applied on ATS routes in the Sanya AOR and consequently any reduction of separation may not be possible in its adjacent FIRs utilizing ADS/CPDLC in the future. In this regard, it was considered crucial for FIT-SEA to have China involved in the future development of the ADS/CPDLC trial in the South China Sea area. The Regional Office agreed to alert China to this fact and seek their involvement in future FIT-SEA meetings.

**Terms of Reference (TOR) of FIT-SEA CRA;**

5.10 The meeting reviewed and updated the draft terms of reference proposed by the CRA Japan for the FIT-SEA CRA and adopted final terms of reference as described in **Appendix K**.

List of tasks of FIT-SEA CRA

5.11 The meeting reviewed and updated the draft task list proposed by the CRA Japan for the FIT-SEA CRA and adopted a suitable task list as described in **Appendix L**.

Arrangement of data confidentiality agreements

5.12 The meeting considered arrangements for data confidentiality agreement between States, Airlines, Data Link Service Providers (DSPs) and the FIT-SEA CRA. The meeting recognized that in order for the CRA-Japan to act as the FIT-SEA CRA under the authorization of the FIT-SEA, it was essential that the three primary States concerned, namely the Philippines, Singapore and Viet Nam, establish data confidentiality agreements with airlines who will operate in their respective FIRs and participate in the operational trial, so that problem reports from airlines could be collected by the States and submitted to the FIT-SEA CRA. It would be equally important that the three primary States establish data confidentiality agreements with their data service providers. In addition, the CRA-Japan would need to arrange data confidentiality agreements directly with the States concerned in order to provide services as the FIT-SEA CRA.

5.13 The meeting also understood that the FIT-SEA CRA would be responsible for analysis of problem reports, dissemination of de-identified information on problem reports and preparation of consolidated data periodic reports from information provided by States in accordance with the TOR agreed by the FIT-SEA only in so far as problem reports were provided by States under the terms of signed data confidentiality agreements with airlines, data service providers and the CRA-Japan.

5.14 A model data confidentiality agreement between States and FIT-SEA CRA has been reproduced as **Appendix M**, and would be circulated by the FIT-SEA CRA to the Philippines, Singapore, and Viet Nam for their consideration and action.

Arrangements for submission of problem reports to the FIT-SEA CRA.

5.15 The meeting understood that problem reports (PRs) should be submitted first to the States from ATS providers, airlines and data service providers in accordance with their data confidentiality agreement. The submitted PRs (**Appendix N** refers) would then be forwarded to the FIT-SEA CRA as raw data without any processing of the PRs by the States concerned. It was stressed that the submission of PRs to the FIT-SEA CRA from States should be completed as soon as possible on each occasion in order that the CRA could initiate required actions in a timely manner.

5.16 In recognizing the importance of quick and efficient communications between the parties involved in investigating a problem report, the meeting agreed that a list of contact persons should be created and kept up to date. The meeting agreed that the list of contact officers contained in the respective Tables of ADS/CPDLC equipage and ATS Status (see appendices E and F) were suitable in the first instance but should be kept up to date.

**Report of CRA Japan**

5.17 In providing the report of CRA Japan, Japan advised the meeting that Air Traffic Control Association Japan (ATCA-Japan) had taken the role of Central Reporting Agency (CRA) activities for Tokyo FIR under the Informal Pacific ATC Coordinating Group FANS Interoperability Team (IPACG FIT) since 2001. The total number of Problem Reports (PRs) received from IPACG FIT members was 380 as of October 2005.

5.18 The meeting noted that the CRA had also produced the monthly Periodic Status Reports on the end-to-end system performance of ATS data link operations in Tokyo FIR. The meeting also noted the information concerning the identified trend of problems and the end-to-end system performance, as a result of analysis of the problem reports received for the 6-month period from January to June 2005. The presentation by CRA Japan is attached as **Appendix O** to this Report.

5.19 When the 46 problems reported during the six months were classified in functions, 35% were related to the message delivery problems, 30% were CPDLC related and 13% were ADS related. When classified in causal factors, 32% were avionics related, 26% related to air/ground communication issues and 15% resulted from operational issues. The lessons learnt from these problems were as follows:

- a) too rapid operation of log-on after log-off (cockpit operation);
- b) confusion with the wrong tail number filed in the flight plan (dispatcher);
- c) delayed response to pilot request by the controller causing timer to run out, leading to unrecognized Message Reference Number (controller).

5.20 Japan reported details of the monthly system performance on ATS data link operations resulting from analysis of data recorded at Tokyo Area Control Center during the same 6-month period. It was confirmed that all analyzed values met the criteria specified in the FANS 1/A Operations Manual.

#### **Agenda Item 6: Data link monitoring requirements**

##### **Guidance Material for the End-to-End Monitoring of Data Link Systems**

6.1 The meeting was informed that APANPIRG/16 (August 2005) had reviewed the *Guidance Material for End-to-End Safety and Performance Monitoring of Air Traffic Service (ATS) Data Link Systems in the Asia/Pacific Region* that had been prepared by RASMAG. 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 FANS-1/A Interoperability/Implementation Team (FIT) and Central Reporting Agency (CRA).

6.2 After reviewing the guidance material and noting the history of its development under the auspices of RASMAG, including the reviews that had been undertaken by the specialist FIT Groups (including IPACG, ISPACG, FIT-BOB and FIT-SEA) and ATM/AIS/SAR/SG/15, APANPIRG/16 adopted the following Conclusion:

***Conclusion 16/20 – Guidance Material for End-to-End Safety and Performance Monitoring of Air Traffic Service (ATS) Data Link Systems in the Asia/Pacific Region***

*That the Guidance Material for End-to-End Safety and Performance Monitoring of Air Traffic Service (ATS) Data Link Systems in the Asia/Pacific Region, as shown in Appendix B to the [APANPIRG/16] Report on Agenda Item 2.1, be circulated as regional guidance material by the Regional Office, in accordance with established procedures.*

6.3 The Secretariat informed the meeting that the Guidance Material (**Appendix P** refers) would now be forwarded to ICAO Headquarters for final review in accordance with established procedures. Subject to final review, the material would then be circulated by Regional Office State Letter

for application as regional guidance material. In the event that the ICAO Headquarters review proposed major amendments, the guidance material would be re-circulated to RASMAG and the FIT groups for further consideration.

### **FANS 1/A Operations Manual (FOM)**

6.4 The meeting recalled that APANPIRG/15 (August 2004) had agreed that States should take all relevant ICAO provisions on data link into account when establishing their operating requirements and procedures. Further, APANPIRG/15 had agreed that the FANS 1/A Operations Manual (FOM) provided the necessary procedures for ATS providers and should be used as a basis to operate ADS and CPDLC with aircraft equipped with the FANS-1/A systems, adopting the following Conclusion:

#### ***Conclusion 15/7 – FANS 1/A Operations Manual (FOM)***

*That, the FANS 1/A Operations Manual (FOM) be used by States and users in the Asia and Pacific Regions as a basis for operating automatic dependent surveillance (ADS) and controller pilot data link communications (CPDLC) in conjunction with Annex 10 – Aeronautical Telecommunications Volume II – Communications Procedures including those with PANS status, the Procedures for Air Navigation Services – Air Traffic Management (PANS/ATM Doc 4444) and the Guidance Material on CNS/ATM Operations in the Asia and Pacific Region.*

6.5 In regard to further development of the regional Guidance Material and the FOM, and harmonizing with ICAO provisions, APANPIRG/15 recognized that additional work was required to more closely align the material of the documents concerned. In this regard, APANPIRG/15 appreciated that ICAO Headquarters was willing to undertake the lead to progress this work 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 to achieving this goal.

### **International ATS Data Link Operations Manual (IDLM)**

6.6 In considering the need for harmonized global FANS 1/A operating procedures, ICAO Headquarters had supported proposals raised during the North Atlantic FANS Interoperability Group Eleventh meeting (NAT-FIG/11, October 2004). NAT-FIG/11 agreed that amalgamation of the Pacific FANS Operations Manual (FOM) and the NAT Guidance Material was a desirable goal. It was recognised that there were practical and operational reasons why some elements of FANS implementation must differ from region to region. Many differences however, could be successfully reconciled across regions and result in overall international harmonization of data link services.

6.7 Work had commenced under the auspices of the ICAO EUR/NAT Office in order to produce a joint document which consolidated elements of FANS operations that are common across all participating regions, whilst identifying operationally necessary differences among regional service providers for specification in region-specific sections. A preliminary draft copy of the "International ATS Data Link Operations Manual (IDLM)" has been released for review and comment, a copy of the draft IDLM has been included on the CD-ROM for this meeting.

6.8 The meeting noted the fundamental parameters had been adopted for the initial stages of this work. The overriding philosophy was to ensure that what pilots and controllers do in the context of data link operations should be consistent across FIR boundaries to the maximum extent possible. In addition, the following methodology had been adopted in compiling the initial draft of the IDLM:

- a) "FANS" was dropped from the title because there are other operational data link applications for which the NAT has procedures -- and more are likely throughout the world in the years to come;
- b) "Operation" was retained in the title to continue the emphasis that the IDLM document is designed to be a living useful tool for the Datalink community rather than a collection of suggestions, or policies, or guidance for optional behavior;
- c) The only truly "merged" data from the FOM and NAT are administrative information (e.g. participating entities, change request forms) and common list data (e.g. data link message descriptions, acronyms);
- d) For all other data the NAT and FOM documents have been "combined" rather than merged;
- e) Some information that should perhaps be merged hasn't been yet (e.g. the Request for Change form) and this is just a matter of timing. With respect to the RFC form in particular, IPACG and ISPACG have already agreed that the two forms from the Pacific and Atlantic should be completely re-done to a single common form. This would be done editorially in due course;
- f) There are in this draft, and there will necessarily be in any final document, some FIR-specific chapters or sections. That is true of the FOM and NAT materials today; and
- g) Most importantly, there has been a conscious effort made to avoid any change to the words of any operational section from either document. In some cases that even creates what would appear to be needless duplication. This is essential in order that users of both FOM and NAT manuals be assured that this combination/merger will not alter in any way anything they now do. Only after formal adoption of a finalized document would substantive changes be considered and this would be undertaken via the proper Request for Change process.

#### **Agenda Item 7: Update Task Lists**

7.1 The meeting reviewed and updated the Task Lists for the FIT-BOB (**Appendix Q**) and the FIT -SEA (**Appendix R**), noting that although India had completed many of the tasks on the FIT-BOB Task List, the items needed to be retained in order to serve as guidance for new States joining the operational trial. This would also be the case in terms of the FIT-SEA Task List as it was probable that States would join the operational trial at different times as their equipment was commissioned.

#### **Agenda Item 8: Any other business**

##### **ICAO OPLINK Panel Draft CPDLC Guidance Material**

8.1 During the last seven years or so, a number of States and airlines have implemented CPDLC systems for communication in areas outside normal direct voice communications, as well as areas within VHF coverage as a supplement to voice. Initially, there was little in the way of CPDLC knowledge or any existing procedures that could be adapted to assist the early implementers of CPDLC.

8.2 Over the years there have been many lessons learned in the use of CPDLC. These lessons relate to ATC procedures, pilot procedures, technical specifications as well as the human machine interface (HMI) for constructing and displaying CPDLC messages. A lot has also been learned about the human factors associated with the *reading* of a text message as opposed to *hearing* it. It is important that this information is made widely available to any future CPDLC-users.

8.3 In response to reports of widespread misunderstanding of the use of CPDLC by pilots and air traffic controllers, the Secretary of the ICAO Operational Data Link Panel (OPLINKP) requested that the panel develop a document containing guidance material for the use of CPDLC.

8.4 The CPDLC guidance material provides a compendium of various procedures, guidance on individual CPDLC message element use, anecdotes and lessons learned, as well as other information that may be useful when implementing or utilizing CPDLC. It is a non-technical document, aimed primarily at pilots and air traffic controllers, although there is also information that may be of interest to other parties, e.g. avionics and ground system manufacturers.

8.5 The CPDLC guidance material consists of two parts:

- a) Part 1 contains general guidance, procedures, training and automation issues; and
- b) Part 2 contains guidance on specific CPDLC messages.

8.6 It is anticipated that the CPDLC guidance material has the potential to reduce error rates, as well as standardizing procedures over a number of regions. The material also includes concepts that may be beneficial if incorporated into future CPDLC systems. Accordingly, the first full meeting of the OPLINK Panel (OPLINKP/1) in September 2005 recommended that ICAO publish the guidance document as a matter of urgency. A copy of the draft CPDLC guidance material has been included on the CD-ROM for this meeting.

#### **Draft ICAO Safety Management Manual (SMM, Doc 9859)**

8.7 Although safety management provisions had been introduced into Annex 11 some years ago, ICAO experienced some delays in publishing an appropriate Manual of Safety Management for ATS. A draft ATS Manual was eventually presented to the 11<sup>th</sup> Air Navigation Conference (22 September – 3 October 2003) and was circulated electronically as a final draft document.

8.8 Subsequently, in light of the expansion of provisions for safety management systems in other areas in addition to ATS, in particular Annex 14 – *Aerodromes* and Annex 6 – *Operation of Aircraft*, ICAO pursued the philosophy of a combined safety management manual, rather than a series of separate manuals addressing separate ICAO Annexes.

8.9 The meeting was advised that, with effect from mid October 2005, the draft *ICAO Safety Management Manual* (SMM, Doc 9859-AN/460), containing combined safety management provisions, had been placed on the internal ICAO web and was authorized for release to State civil aviation administrations as a final draft document, subject to a disclaimer noting that the document was still a “work in progress”. A reproduction of the Table of Contents of the SMM has been included as **Appendix S** and electronic copies of the draft Manual would be available from the Regional Office on request. A copy of the draft SMM had also been included on the CD-ROM for this meeting. The meeting noted that the combined SMM superseded the existing Manual of Safety Management for ATS which would no longer be circulated.

### Required Communication Performance (RCP) Concepts

8.10 To meet the demands on airspace capacity and operational efficiency, operational communication capability is increasingly playing an essential role in air traffic management using a mixture of data and voice communication. For example, data link can provide for integration of air traffic management functional capabilities on the aircraft and at the ATS units, direct controller-pilot communications enabling user-preferred and dynamic rerouting and intervention capabilities in reduced separation environments where alternative communications are more cumbersome.

8.11 The Required Communication Performance (RCP) concept provides a means to ensure the acceptable performance of communications within a complete ATM system and also assesses the need for objective operational criteria, in the form of an RCP type, encompassing operational communication transactions taking into account human interactions, procedures, and environmental characteristics.

8.12 The development of SARPs, procedures and guidance material relating to the use of RCP is being progressed under the auspices of the ICAO Operational Data Link Panel (OPLINK). Currently the OPLINK Panel is considering arrangements under which the RCP type is specified by the value for the communication transaction time (in seconds) associated with the ATM function e.g. RCP400. Each RCP type denotes values for the maximum time for the completion of the operational communication transaction, continuity, availability, and integrity applicable to the most stringent operational communication transaction supporting an ATM function.

8.13 The following are examples of RCP types under consideration:.

- RCP 10 would be used for controller intervention capability supporting separation assurance in a 5 nm radius environment.
- RCP60 - In combination with the RCP 10 in a 5 nm radius environment, RCP 60 may be applied to routine communications on a data link system to offload the voice communication system.
- RCP 120 would be used for controller intervention capability supporting separation assurance in a 15 nm radius separation environment.
- RCP 240 would be used for controller intervention capability supporting separation assurance in a 30/30 separation environment.
- RCP 400 would be used for controller intervention capability supporting separation assurance in current environments where separations are greater than 30/30 and alternative technologies are planned for providing normal means of communication, e.g., Iridium voice or HF data link in lieu of HF voice.

8.14 The OPLINK Panel has finalized its work on the *ICAO Manual on Required Communication Performance* and has recommended that the Manual be published as a matter of urgency. A copy of the draft RCP Manual has been included on the CD-ROM for this meeting.

8.15 The meeting was alerted to the conceptual similarities between RNP and RCP, noting ICAO's philosophy of pursuing Required Total Systems Performance (RTSP) via RNP, RCP and Required Surveillance Performance (RSP) methodologies. The meeting agreed that these issues were best dealt with by the relevant expert ICAO Panel and would await further information in due course

### **Update of the activities of the Air Traffic Flow Management Task Force**

8.16 The Secretariat briefed the meeting in regard to the activities of the Air Traffic Flow Management Task Force (ATFM/TF), which had been convened under the auspices of the Bay of Bengal ATS Coordination Group (BBACG) in February 2005. In order to meet the objectives described in the terms of reference established by BBACG, the ATFM/TF had adopted a programme for the phased implementation of air traffic flow management in accordance with the following:

**Phase One:** Flights planning to transit the Kabul FIR

**Phase Two:** Other international flights crossing the Bay of Bengal and/or South and South East Asia areas

**Phase Three:** Future planning for increased traffic within the Bay of Bengal and South and South East Asia areas

8.17 The Fourth Meeting of the Air Traffic Flow Management Task Force (ATFM/T/F/4) was held in Bangkok, Thailand during 7 – 11 November 2005. Two days of the meeting (9 and 10 November 2005) were devoted to a Workshop in relation to the Bay of Bengal Cooperative ATFM Advisory System (BOBCAT) under development by Thailand.

8.18 ATFM/TF/4 noted that APANPIRG/16 (August 2005) had included item 11 “*States to consider and implement aspects of air traffic flow management (ATFM)*” on the APANPIRG List of Key Priorities.

8.19 The task force had requested that Thailand develop their automated flow system (BOBCAT) to the stage of an operational ATFM trial. ATFM/TF/4 recognized that BOBCAT, or any other flow management system, was not an ATC separation tool and the work of the ATFM/TF should focus very clearly on addressing the Phase One implementation issues only, as consideration of Phase 2 & 3 issues would be dealt with by the task force in due course

8.20 In order to demonstrate the capabilities of BOBCAT, the task force had organized two paper trial simulations using traffic sample data from 5-7 October and 19 October 2005. In noting the results of the paper trials, the ATFM/TF/4 meeting agreed that further paper trials utilizing the data collection for traffic during 15 to 21 December 2005 would be of assistance in substantiating the capabilities of BOBCAT and providing some training to affected airlines. The outcomes of the trial would be made available to ATFM/TF/5 in January 2006 for review.

8.21 ATFM/TF/4 agreed that the proposed 22 December 2005 date for implementation of the operational trial be deferred until AIRAC 16 March 2006, with shadow operations commencing on 9 March, one week prior to live operations. The commencement of the operational trial would be subject to the decision of the ATFM/TF Core Team and a Special ATS Coordination Meeting of Core Team members in respect of the Go/No Go decision was scheduled for the 20<sup>th</sup> & 21<sup>st</sup> February 2006.

8.22 ATFM/TF/4 reviewed the current draft of the ATFM Handbook, recognizing that the final draft of the Handbook should be made available for review and adoption during the ATFM/TF/5 meeting, to enable wide circulation prior to the commencement of the operational trial on 16 March 2006. The meeting agreed that after the initial issue, the Handbook would be maintained by the ATFMU and made available only in electronic copy via the ATFMU/BOBCAT website.

8.23 The meeting reviewed and updated the draft BOBCAT Hazard Log, prepared as a result of the hazard identification activities commenced during ATFM/TF/3 in order to consider safety aspects in relation to the implementation of BOBCAT during the operational trial. The meeting noted that a safety statement must be finalised during ATFM/TF/5 to record the safety issues identified by the task force.

8.24 The BOBCAT domain name registration process had commenced with application being lodged for URL <http://www.bobcat.aero/>. The ATFMU had been allocated an AFTN address of VTBBZDZX.

8.25 The meeting recognized that in order to ensure that a suitable AIP Supplement was prepared and distributed in time to meet the 19 January AIRAC date for the operational trial on 16 March 2006, all information for the AIP supplement would need to be available by late December 2005. The meeting gratefully accepted the offer from Singapore to use the services of the AIS section of CAAS to finalize the formatting of the AIP Supplement once the drafting was complete.

#### **Frequency Management at intersection of Yangon, Kolkata and Dhaka FIRs**

8.26 IATA briefed the meeting in respect of frequency management problems being experienced by flights enroute between Dhaka FIR and Yangon FIR which transited a small portion of the south east corner of the Kolkata FIR which lies between the Dhaka and Yangon FIRs.

8.27 Dhaka FIR is surrounded by Kolkata FIR, except for a short segment in the west which shares a common boundary with Yangon FIR for about 75 nautical miles. Four international routes traverse the Dhaka FIR, namely L507, B465/A599, G463 and A201, aligned generally in an east-west direction. Consequently, except for G463, flights on the other routes through Dhaka FIR have to pass through Kolkata FIR twice.

8.28 Two of the routes (B465 and A599) briefly re-enter Kolkata FIR to the east of Dhaka FIR for a distance of less than 30 nautical miles, i.e. about 4 minutes of flying time, before entering Yangon FIR. The other two routes (A201 and L507), re-enter Kolkata FIR to the east of Dhaka FIR and remain in Kolkata FIR for 125 and 98 nautical miles respectively, before entering Yangon FIR. In the worst case scenario, an aircraft could fly through 4 FIRs within 27 minutes, or 215 nautical miles.

#### Pilot and ATC Operational procedures

8.29 The Jeppesen charts for the area include a note for waypoint CHILA (in Kolkata FIR) indicating that “*W-bound aircraft have to contact Kolkata ATC at Lashio VORDME/NDB and Dhaka ATC 10 minutes prior ETA Chila Int. Eastbound aircraft have to contact Kolkata and Yangon ATC or Mandalay APP 10 minutes before entering Yangon FIR*”.

8.30 The Bangladesh AIP states that for A599 “*all aircraft are to make simultaneous broadcast east of Lashio position to Kolkata and Yangon*”.

8.31 However, the Indian AIP states for A599 that “*in Indian airspace eastbound flights must report position Chila and westbound flights position Lashio to Kolkata and Dhaka*”.

8.32 Additionally, the PANS ATM (Doc 4444) Para 10.4.2.4.1 requires that “*where non-radar separation minima are being applied, the transfer of air-ground communications of an aircraft from the transferring to the accepting ATC unit shall be made five minutes before the time at which the aircraft is estimated to reach the common control area boundary, unless otherwise agreed between the two ATC units concerned.*”

8.33 As a consequence of the above provisions, IATA noted that if the requirement by ATS was for pilots to contact the ACC for the FIR it is intending to enter 10 minutes before entry, a pilot operating an westbound flight on A599 could potentially have to be in contact with Yangon, and be in contact with Kolkata and Dhaka at the same time, as the flying time in Kolkata FIR would only be 4 minutes at most. Conversely, an eastbound flight on the same route would be required to be in contact with Dhaka, Kolkata and Yangon ACC simultaneously in order to fulfill such a requirement.

8.34 IATA informed the meeting that attempting to ensure frequency management as described above was complex for flight crew in respect of the number of radios available and cockpit workload. The situation was exacerbated because air/ground and ground/ground communications were often patchy in this area and difficulties had regularly been experienced by flight crews in establishing contact with even one ground agency. The additional need to manage transition requirements from CVSM to RVSM levels and vice versa between Lashio and Linso resulted in situations where cockpit workload was extremely high.

8.35 IATA requested that the current procedures and practices be reviewed and streamlined, in order to address the cockpit workload issues. To assist with the discussions, IATA submitted the following proposal to the meeting for consideration:

	<b>Procedure</b>	<b>Action</b>	
1	<b>Westbound aircraft on A599</b>	<p>Transfer of control Point for Westbound aircraft from Yangon ACC to Dhaka ACC at CHILA.</p> <p>Aircraft calls only Yangon while in Yangon FIR and Dhaka at CHILA.</p> <p>No requirement to call Kolkata</p>	<p>India delegates ATC responsibility for that segment to Dhaka.</p> <p>Yangon ACC coordinates only with Dhaka.</p> <p>Dhaka passes ETA and ATO CHILA to Kolkata.</p> <p>LOA amendments</p>
2	<b>Eastbound aircraft on A599</b>	<p>Transfer of control point for Eastbound aircraft from Dhaka ACC to Yangon ACC at CHILA.</p> <p>Aircraft calls Dhaka while in Dhaka FIR and Yangon ACC at CHILA.</p> <p>No requirement to call Kolkatta</p>	<p>Dhaka ACC to pass estimate and transfer to Yangon ACC only.</p> <p>Dhaka ACC to pass ETA and ATO CHILA to Kolkata</p> <p>LOA amendments</p>
3	<b>Westbound aircraft on L507</b>	Kolkatta to pass ETA and ATO ESDOT to Dhaka	
4	<b>Eastbound aircraft on L507</b>	Kolkatta to pass ETA and ATO AVPOP to Dhaka	

8.36 In considering the issues and IATA's proposal for solution, the meeting identified that there were a number of historical difficulties in ground/ground communications between ACCs that led to delays in coordination between the ACCs involved.

8.37 Delegates from Bangladesh, India, Myanmar and IATA discussed the issues at length, assisted by the Regional Officers for ATM and CNS. It was noted that the recent commissioning of satellite links between Myanmar and Bangladesh had resulted in good quality and efficient communications between the Dhaka and Yangon ACCs and it was agreed that there were no remaining technical difficulties with communications between the two ACCs.

8.38 In respect of communications between Dhaka and Kolkata ACCs, although improvements had been made with the installation of an IDD hotline, communications difficulties were still being experienced by Dhaka in Kolkata not answering calls, or the calls being answered but being told to standby while the call was relayed to the Kolkata East or West sector. Similarly, Kolkata had been experiencing problems with calls to Dhaka either not answered at all or answered only after a long delay. It was apparent to the meeting that the difficulties in ground/ground communication needed to be overcome before improvements could be made to flight crew procedures.

8.39 In discussions with the Regional Officer CNS, it was noted that the switching equipment to the East or West sector in Kolkata was very quick and the transfer of the call from Dhaka should take only a period of seconds. Also, the 64 kbit IDD line between the two ACCs had been identified as having extra capacity and work was being progressed to add additional voice channels to the existing line, now that the Bangladesh Regulator had agreed that the line could be used for voice as well as data transmission. Although no implementation date was available, these improvements would increase the technical communication capabilities, as an interim arrangement prior to reaching the ICAO standard of VSAT communications.

8.40 In acknowledging the improvements that were proposed, the meeting noted that the present level of technical equipage was adequate and could not understand why delays in communication were occurring, apparently as a result of technical difficulties. In the absence of technical difficulty, it was probable that a 'human error' of some kind was likely. In an effort to clearly establish what the problems were, the meeting agreed that more information on the number and type of problems was required.

8.41 Accordingly, Bangladesh and India agreed that a two week sampling, testing and recording period should be conducted, commencing from the 1<sup>st</sup> of December 2005. During the 14 day period, logs would be kept in the Dhaka and Kolkata ACCs that recorded all relevant data in relation to difficulties with ground/ground communications. As much detail as possible should be recorded including time of day, type of difficulty, time taken to answer calls, calls misdirected or not answered etc. A daily report would be passed by each ACC to the other ACC to enable investigation of the day's events and at the end of the 14 day period the outcomes of the testing period would be collated.

8.42 It was anticipated that this material would be useful in identifying the type and cause of the problems and subsequently technical or procedural solutions could be identified and implemented. In order to assist with the 14 day testing period and facilitate the exchange of daily reports, suitable contact arrangements between the two ACCs were established as follows:

Kolkata ACC

Mr. Chandan Sen, Deputy General Manager ATM  
Tel: 001 91 2511 0707  
Email: chandansen4@rediffmail.com, and

Watch Supervisory Officer (WSO) Kolkatta

Tel: 001 91 33 25119520  
AFTN : VECCYDYX (Kolkata ACC)  
Attention Watch Supervisory Officer (WSO) and Mr. Sen

Dhaka ACC

Mr. Tapan Kanti Ghose  
Station Air Traffic Officer (SATO)  
Zia International Airport, Dhaka  
Tel: 88 02 894870-74 ext 3412, and

Duty Air Traffic Controller  
Tel 88 02 8960001, 88 02 894810-17, ext 3465, or ACC 3410  
AFTN: VGZRZQZX  
Attention Mr. Ghose.

8.43 It was apparent to the meeting that the difficulties in ground/ground communication needed to be overcome before meaningful changes could be made to the flight crew procedures in accordance with IATA's request. Accordingly, the meeting agreed that the results of the 14 days test/sample/recording period would be reported to the BBACG/17 meeting scheduled 18-20 January 2006.

8.44 The delegates from Bangladesh, Myanmar and India that had been involved in the discussions expressed that the opportunity to sit and discuss the issues had been very valuable and a number of incidental matters had also been discussed. The Secretariat briefed the group about the advantages that would result from a programme of mutual familiarization visits, under which representatives from each ACC would periodically visit the other ACC in order to meet duty staff.

8.45 This would enable the discussion and solution of problems, and increase the understanding of the restrictions and difficulties routinely experienced by operational staff in the respective ACCs. The Secretariat encouraged the commencement of such a programme as it was evident that mutual benefit would accrue to the parties involved. Bangladesh and India agreed to explore this possibility further and would commence discussion with the ATS General Managers in Dhaka and Kolkata.

**Agenda Item 9: Date and venue for the next meeting**

9.1 The meeting recognized the benefits that had been achieved by holding a combined meeting of the FIT-BOB and FIT-SEA, and agreed that a combined meeting should also be held on the next occasion.

9.2 In setting the date for the next combined FIT meeting, the meeting considering the conduct of the existing ADS/CPDLC operational trial in the Bay of Bengal, the proposed commencement of the Arabian Sea ADS/CPDLC operational trial (Mumbai and Delhi FIRs) in January 2006 and the potential for Colombo FIR to join the Bay of Bengal trial in the near term. In addition, the meeting considered the progress that had been made in the South China Sea area and the potential commencement of an ADS/CPDLC operational trial involving Singapore and Viet Nam during the second half of 2006. It was also likely that the remaining issues in regard to Bay of Bengal CRA funding would be addressed in early 2006, enabling Boeing to commence CRA services for the FIT-BOB by mid 2006.

9.3 Consequently, a combined meeting of the FIT-BOB and the FIT-SEA was scheduled over four days from 25 to 28 July 2006, at the ICAO premises in Bangkok. The Regional Office would make arrangements accordingly.

**10. Closing of the meeting**

10.1 Mr. Tiede thanked all participants for their active involvement in the meeting. Good progress had been made towards the operating parameters for the FIT-SEA CRA and the FIT-SEA looked forward to the commencement of an ADS/CPDLC operational trial involving Singapore and Vietnam in the late stages of 2006.

10.2 The reporting from India in relation to the Bay of Bengal trial had been informative and Mr Tiede hoped that a clearer understanding in relation to the funding complexities of the Bay of Bengal CRA had been achieved, which would enable a quick resolution of the few remaining difficulties and enable Boeing to commence CRA services. This would also serve to accelerate progress in the Arabian Sea trials scheduled for January 2006.

10.3 Good progress had also been made during the week by the side meetings between States in respect of particular issues and Mr. Tiede encouraged States to continue to engage in bi-lateral and tri-lateral discussions to quickly resolve difficulties in respect of civil aviation matters.

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**LIST OF PARTICIPANTS**

STATE/NAME	DESIGNATION/ADDRESS	CONTACT DETAILS
<b>BANGLADESH</b>		
Mr. Jibesh Chandra Mukherjee	Assistant Director (ATS/AERO) ATS/AERO Division Civil Aviation Authority of Bangladesh Kurmitola, Dhaka 1229 Bangladesh	Tel: 880-2-8914870-74 ext 3369,3488 Fax: 880-2-8914705
Mr. Ratan Kumar Saha	Deputy Station Air Traffic Officer Civil Aviation Authority of Bangladesh O.C. Building Zia International Airport Dhaka 1229 Bangladesh	Tel: 880-2-896001, 880-2-8914810-17 ext 3452
<b>INDIA</b>		
Mr. Srikrishan	Executive Director (ATM) Airports Authority of India Rajiv Gandhi Bhavan New Delhi India	Tel: +91 11 2463 1684 Fax: +91 11 2461 1078 E-mail: edatmchqnad@aai.aero
Mr. S.V. Satish	Deputy General Manager (ATM) Airports Authority of India ATS Complex, Chennai Airport Chennai – 600027 India	Tel: +91 44 22561539 Fax: +91 44 22560700 E-mail: svsatish@aai.aero
Mr. M.K. Nelli	Asstt. General Manager (ATM) Airports Authority of India ATS Complex, CSI Airport Sahar Rd. P.O., Mumbai – 99 India	Tel: +91 22 26828015 Fax: +91 22 26828066 E-mail: mknelli21@gmail.com
<b>INDONESIA</b>		
Mr. Sigit Djumatno, SSI	Directorate Aviation Safety Officer Directorate General of Air Communication Gedung Karya, Lt. 23 Jl. Medan Merdeka No. 8 Jakarta 10110, Indonesia	Tel: +62-21-3507569 Fax: +62-21-3507569 E-mail: sigit_dj@plasa.com
<b>JAPAN</b>		
Mr. Hiroshi Inoguchi	Special Assistant to the Director ATS Systems Planning Division ATS Department, JCAB, MLIT 2-1-3 Kasumigaseki, Chiyoda-ku Tokyo 100-8918, Japan	Tel: +81-3-5253-8111 ext 51128 Fax: +81-3-5253-1663 E-mail: inoguchi-h2hh@mlit.go.jp
Mr. Yoshiro Nakatsuji	Director, ATCA Japan Air Traffic Control Association Japan 1-6-6, Haneda Airport, Ota-ku Tokyo 104-0041 Japan	Tel: +81-3-3747-1231 Fax: +81-3-3747-0856 E-mail: naka@atcaj.or.jp

<b>STATE/NAME</b>	<b>DESIGNATION/ADDRESS</b>	<b>CONTACT DETAILS</b>
Ms. Hiromi Suzuki	Expert (Technical) Air Traffic Control Association Japan 1-6-6, Haneda Airport, Ota-ku Tokyo 104-0041 Japan	Tel: +81-3-3747 1231 Fax: +81-3-3747 1231 E-mail: crasa@cra-japan.org
<b>LAO PDR</b>		
Mr. Inthanousone Sisanonh	Deputy Director Lao Airports Authority Wattay International Airport P. O. Box 3175, Vientiane Lao People's Democratic Republic	Tel: 856-21-512008 Fax: 856-21-512216 E-mail: inthanousorn@yahoo.com
<b>MALAYSIA</b>		
Mr. Omran Zakaria	Deputy Director Air Traffic Services Division Department of Civil Aviation 4th Floor Podium Block B Lot 4G4 Precinct 4 Federal Govt Admin Centre 62570 Putrajaya Malaysia	Tel: 603-8871 4000 Fax: 603-8871 4290 E-mail: omran@dca.gov.my
Mr. Mohd Rodzi Salleh	Air Traffic Controller Department of Civil Aviation Block B, Air Traffic Control Centre Sultan Abdul Aziz Shah Airport 47200 Subang, Selangor Malaysia	Tel: 603-7847 3573 Fax: 603-7847 3572 E-mail: rodzi_atc@yahoo.com
Mr. Loh Yew Khang	Air Traffic Control Officer Air Traffic Control Centre Department of Civil Aviation Jalan Kepayan 88618 Kota Kinabalu Malaysia	Tel: 603-088-224911, 224404 Fax: 603-088-219198 E-mail: dcasabah@streamyx.com
<b>MYANMAR</b>		
Mr. Nyunt Win	ATC/AIS Officer Department of Civil Aviation Yangon International Airport Yangon 11021 Myanmar	Tel: +951 663814 Fax: +951 665124 E-mail: ats@dca.gov.mm
Mr. Aung Zaw Thein	Air Traffic Control Officer Department of Civil Aviation Yangon International Airport Yangon 11021 Myanmar	Tel: +951 663814 Fax: +951 665124 E-mail: ats@dca.gov.mm

<b>STATE/NAME</b>	<b>DESIGNATION/ADDRESS</b>	<b>CONTACT DETAILS</b>
<b>NEPAL</b>		
Mr. Purushottam Shakya	ATS Manager Civil Aviation Authority of Nepal Flight Operation Dept Air Traffic Control Div TIACAO Kathmandu, Nepal	Tel: 977-1-447 1411 Res: 977-1-427 4599 Fax: 977-1-447 1411 E-mail: puru.shakya59@yahoo.com
Mr. Narendra Muni Bajracharya	Senior Officer Aero-com Division Civil Aviation Authority of Nepal TIACAO Kathmandu, Nepal	Tel: 977-1-447 1411 Res: 977-1-436 0796 Fax: 977-1-447 1411 E-mail: nmbajracharya@yahoo.com
<b>PHILIPPINES</b>		
Mr. Salvador G. Rafael	Chief, ATC Division Air Transportation Office NAIA Road, Pasay City Metro Manila Philippines	Tel: 632-8799160 Fax: 632-8799160 E-mail: raffy_thunder92@yahoo.com
Mr. Valeriano B. Lepasana	Supervising Air Navigation Systems Specialist Air Transportation Office NAIA Road, Pasay City Metro Manila, Philippines	Tel: 8799 258 Fax: 8799165 E-mail: vblepasana@yahoo.com
<b>SINGAPORE</b>		
Mr. Lim Kim Chuan Sebastian	Senior Air Traffic Control Manager (Airspace) Civil Aviation Authority of Singapore Singapore Changi Airport P.O. Box 1 Singapore 918141	Tel: 65 6541 2401 Fax: 65 6545 6516 E-mail: sebastian_lim@caas.gov.sg
Mr. Kathirvelu s/o Krishnan	Air Traffic Control Officer Singapore Air Traffic Control Centre Civil Aviation Authority of Singapore 60 Biggin Hill Road Singapore 509950	Tel: 65 6541 2668 Fax: 65 6545 6252
<b>THAILAND</b>		
Mr. Kamol Pulperm	Senior Air Transport Technical Officer Airport Standards and Air Navigation Facilitating Division 71 Soi Ngarmduplee, Rama IV Road Bangkok 10120, Thailand	Tel: 66-2-286 8159 Fax: 66-2-286 8159 E-mail: kamol_pulperm@yahoo.com
Plt.Off. Choochart Mainoy	Air Traffic Services Specialist Airport Standards and Air Navigation Facilitating Division 71 Soi Ngarmduplee, Rama IV Road Bangkok 10120, Thailand	Tel: 66-2-286 8159 Fax: 66-2-286 8159 E-mail: cmainoy@hotmail.com

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<b>STATE/NAME</b>	<b>DESIGNATION/ADDRESS</b>	<b>CONTACT DETAILS</b>
Mr. Choosit Kuptaviwat	Director, Air Traffic Services Engineering Planning and Standards Department Aeronautical Radio of Thailand Ltd. 102 Ngamduplee Tungmahamek, Sathorn Bangkok 10120, Thailand	Tel: 66-2-285 9457 Fax: 66-2-285 9538 E-mail: choosit.ku@aerothai.co.th
Mr. Tinnagorn Choowong	Air Traffic Control Manager En-route Air Traffic Management Department Aeronautical Radio of Thailand Ltd. 102 Ngamduplee Tungmahamek, Sathorn Bangkok 10120, Thailand	Tel: 66-2-285 9975 Mobile: 66-09-816 6486 Fax: 66-2-285 9077 E-mail: tinnagorn.ch@aerothai.co.th
Mr. Jirasak Netiprawat	Air Traffic Control Manager Aeronautical Radio of Thailand Ltd. 102 Ngamduplee Thungmahamek Bangkok 10120, Thailand	Tel: 66-2-285 9496 Fax: 66-2-285 9490 E-mail: jirasak.ne@aerothai.co.th
Ms. Saifon Obromsook	Systems Engineer Aeronautical Radio of Thailand Ltd. 102 Ngamduplee Tungmahamek, Sathorn Bangkok 10120, Thailand	Tel: 66-2-287 8291 Fax: 66-2-285 9617 E-mail: fon@aerothai.co.th
Capt. Werasak Wiroonpetch	Manager, International Aviation Affairs and Development Department Thai Airways International Limited 89 Vibhavadee Rangsit Road, Chatuchak, Bangkok 10900 Thailand	Tel: 66-2-545-2666 Fax: 66-2-545 3849 E-mail: werasak.w@thaiairways.com
Mr. Surasak Lurvisawakul	Aircraft Engineer, Avionics Systems Group Technical Department, Engineering (TE-E) Thai Airways International Limited Bangkok International Airport Bangkok 10210, Thailand	Tel: 66-2-563 8733 Fax: 66-2-504 3360 E-mail: surasak.l@thaiairways.com
Mr. Manoch Suesat	Senior Flight Operations Officer Thai Airways International Limited BKKOP 4 <sup>th</sup> Floor Central Block Bangkok International Airport Thailand	Tel: 66-2-535 2450 Fax: 66-2-504 3812 E-mail: manoch.s@thaiairways.com
Mr. Pairat Wonganan	Manager Flight Operations Control, Dispatch Bangkok Airways Co., Ltd. Domestic Terminal Don Muang Bangkok 10210, Thailand	Tel: 66-2-535 2499 ext 346 Fax: 66-2-504 3981 E-mail: pairat@bangkokair.com
Ms. Wipawinee Preelers	Chief of Dispatch Bangkok Airways Co., Ltd. Domestic Terminal Don Muang Bangkok 10210, Thailand	Tel: 66-2-535 2499 ext 302 Fax: 66-2-504 3981 E-mail: wipawine@bangkokair.com

STATE/NAME	DESIGNATION/ADDRESS	CONTACT DETAILS
<b>VIET NAM</b>		
Mr. Nguyen Van Hoang	Deputy Approach Control Unit Southern Air Traffic Services Center Vietnam Air Traffic Management 58 Truong Son Road Tan Son Nhat Airport Tan Bin District Ho Chi Minh, Viet Nam	Tel: 090-3-952 166 E-mail: nvhoang59@yahoo.com
Mr. Cu Van Sinh	CNS Executive of CNS Department Vietnam Air Traffic Management (VATM) Gialam Airport Long Bien District Hanoi, Viet Nam	Tel: 0912866275 E-mail: cuvansinh@yahoo.com
Mr. Phan Dinh Tuan	ATS Officer Air Navigation Department Civil Aviation Administration of Vietnam Hanoi, Viet Nam	Tel: 8329829
<b>IATA</b>		
Mr. Soon Boon Hai	Assistant Director – Safety, Operations & Infrastructure – Asia/Pacific International Air Transport Association 77 Robinson Road #05-00 SIA Building Singapore 068896	Tel: 65-62397267 Fax: 65-65366267 E-mail: soonbh@iata.org
Capt. Coty Mao	Senior Training Supervisor EVA Airways 9 <sup>th</sup> Fl., 376 Sec. 1 Hsin-Nan Road, Luchu Taoyuan, Taiwan 338 Taiwan	Tel: +886-3-351 5832 Fax: +886-3-351 0015 E-mail: cotymao@seed.net.tw
Mr. Chen Ching-Nien	Professional Engineer EVA Airways 9 <sup>th</sup> Fl., 376 Sec. 1 Hsin-Nan Road, Luchu Taoyuan, Taiwan 338 Taiwan	Tel: +886-3-351 5898 Fax: +886-3-351 0015 E-mail: ericchen@evaair.com
Mr. Mohamed Hassan Howswai	Sr. Manager Navigation Services/a Saudi Arabian Airlines P.O. Box 620 CC929 Jeddah 21231 Saudi Arabia	Mobile: +966-5463 0884 E-mail: mhowswai@saudiairlines.com.sa
<b>ICAO</b>		
Mr. Andrew Tiede	Regional Officer ATM ICAO Asia and Pacific Office 252/1 Vibhavadi Rangsit Rd Chatuchak, Bangkok 10900 Thailand	Tel: 66-2-5378189 Fax: 66-2-5378199 AFTN: VTBBICOX E-mail: atiede@bangkok.icao.int icao_apac@bangkok.icao.int

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STATE/NAME	DESIGNATION/ADDRESS	CONTACT DETAILS
Mr. Kyotaro Harano	Regional Officer ATM ICAO Asia and Pacific Office 252/1 Vibhavadi Rangsit Rd Chatuchak, Bangkok 10900 Thailand	Tel: 66-2-5378189 Fax: 66-2-5378199 AFTN: VTBBICOX E-mail: kharano@bangkok.icao.int icao_apac@bangkok.icao.int
Mr. Polawat Chootai	Regional Officer ATM ICAO Asia and Pacific Office 252/1 Vibhavadi Rangsit Rd Chatuchak, Bangkok 10900 Thailand	Tel: 66-2-5378189 Fax: 66-2-5378199 AFTN: VTBBICOX E-mail: pchootai@bangkok.icao.int icao_apac@bangkok.icao.int

**LIST OF WORKING PAPERS, INFORMATION PAPERS AND FLIMSYES**

**WORKING PAPERS**

WP/No.	Agenda Item	Title	Presented by
1	1	Provisional Agenda	Secretariat
2	8	Report of CRA Japan	Japan
3	4	Draft TORs for a Central Reporting Agency in support of a FANS Interoperability Team for the Bay of Bengal	Secretariat on behalf of Boeing
4	3	ADS/CPDLC equipage and participation of States in operational trials of ADS/CPDLC	Secretariat
5	7	Update FIT-BOB Work Plan	Secretariat
6	7	Update FIT-SEA Work Plan	Secretariat
7	6	FANS 1/A Operations Manual (FOM)	Secretariat
8	4	Review of the Special ATS Coordination Meeting on Funding of a CRA for the BOB ADS/CPDLC Operational Trial	Secretariat
9	2	Update of ADS/CPDLC Operational Trials	India
10	5	Terms of Reference, Task List and Problem Reporting Procedures for FIT-SEA CRA	Secretariat

**INFORMATION PAPERS**

IP/No.	Agenda Item	Title	Presented by
1	1	List of Working and Information Papers	Secretariat
2	8	Draft Document 9859 – ICAO Safety Management Manual	Secretariat
3	8	Required Communication Performance (RCP) Concepts – An Introduction	Secretariat
4	6	ICAO OPLINK Panel (OPLINKP) CPDLC Guidance Material	Secretariat
5	8	Update of Air Traffic Flow Management Task Force Activities	Secretariat

**FLIMSIIES**

<b>Flimsy No.</b>	<b>Agenda Item</b>	<b>Title</b>	<b>Presented by</b>
1	8	Dhaka FIR	IATA
2	4	CRA Costing	IATA
3	5	FIT-SEA CRA	Japan
4	5	FIT-SEA side-meeting	Japan



# UPDATE ON ADS/CPDLC OPERATIONAL TRIALS

Airports Authority Of India

## FIT-BOB/6 & FIT-SEA/3 Appendix C to the Report

### Presentation on ADS/CPDLC Operational Trials within Indian FIRs





# UPDATE ON ADS/CPDLC OPERATIONAL TRIALS

**Airports Authority Of India**

- Current Status
- Problem Reports
- Problem Analysis
- Problem Resolution
- Future System Enhancements
- Conclusion
- Action by the Meeting



# UPDATE ON ADS/CPDLC OPERATIONAL TRIALS

**Airports Authority Of India**

## ■ Current Status

- Operational Trials from 19<sup>th</sup> February 2004
  - Within Chennai & Kolkatta FIRs
  - No. of airlines logging increased from 16 to 19
- H24 both in Kolkatta and Chennai FIRs
  - Serving 13 ATS routes
- Uplink/Downlink Messages
  - Chennai –varied from 500-2100
  - Kolkatta – Varied from 500-1000
  - Average CPDLC messages 200 per day



# UPDATE ON ADS/CPDLC OPERATIONAL TRIALS

**Airports Authority Of India**

## ■ Current Status

- AFN Log On address being changed to
  - "VOMF" and "VECF" from "VOMM" & "VECC".
  - Effective Date 24<sup>th</sup> November 2005.
- India adopting FANS 1 A operations Manual
- Chennai participated in ADS/CPDLC trials of A380.
- Mumbai & Delhi FIRs will be joining trial operations early 2006.



# UPDATE ON ADS/CPDLC OPERATIONAL TRIALS

**Airports Authority Of India**

## ■ Problem Reports

- CRA to analyse and correct the problem reports received so far during the trial.
  
- Issue of authorizing IATA to collect a nominal charge from the airlines as operating cost for CRA.
  - IATA to give the break up of charges in order to obtain approval from Government of India.



# UPDATE ON ADS/CPDLC OPERATIONAL TRIALS

**Airports Authority Of India**

## ■ Problem Reports

- A Few reports between April to September 2005 both from Chennai and Kolkatta.
- In October/November 2005 at Chennai problem reports increased due to:
  - Software Up-gradation process.
  - Receipt of messages from SITA with different Flight Identifiers within MAS messages.
- Transfer of Control for CPDLC between Yangon and Kolkata not taking place



# UPDATE ON ADS/CPDLC OPERATIONAL TRIALS

## Airports Authority Of India

- Problem Analysis
- Problems reports classified as:
  - Related to ground system problems- 30%
  - Related to an inability to receive downlink or send uplink even though the link-Status was normal- 53%
  - Related to avionics -10%
  - Taking long time to log on some occasions-7%
  - SITA LINK failure (Frequent and unplanned) observed by Kolkatta system



# UPDATE ON ADS/CPDLC OPERATIONAL TRIALS

**Airports Authority Of India**

- Problem Analysis
- Problems reports sent to:
  - [bradley.d.cornell@boeing.com](mailto:bradley.d.cornell@boeing.com)
- Dual AFN Log on instructions has caused problems. Chennai reverted to "VOMM" until 24<sup>th</sup> Nov 05.
- Problems due to messages received with and without padding zero's in Flight Identifier



# UPDATE ON ADS/CPDLC OPERATIONAL TRIALS

**Airports Authority Of India**

## ■ Problem Resolution

- New AFN Log from 24<sup>th</sup> November at Chennai & Kolkatta
- System was withdrawn from 31<sup>st</sup> Oct to 11<sup>th</sup> Nov 05 at Chennai to resolve acceptance of both types of messages (padded and unpadded Flight Identifier)
- While revising Letter of agreements between ACCs/OCCs/ FICs provision for ADS/CPDLC transfers should also be incorporated.



# UPDATE ON ADS/CPDLC OPERATIONAL TRIALS

**Airports Authority Of India**

- Future system Enhancements
  - Automatic relay of MET data contained in ADS reports directly to the MET
  - Installation of Mumbai and Delhi ADS/CPDLC is complete and system will be ready for trial operations from January 2006.



# UPDATE ON ADS/CPDLC OPERATIONAL TRIALS

**Airports Authority Of India**

- Conclusion
- Trials have been proceeding positively.
- Simultaneous implementation of reduced separation applications over BOB by all participating ANSP service providers.
- India would prefer to work strictly with one CRA for both the Bay of Bengal and the Arabian Sea.
- Need to be assured that introduction of different service providers should in no way affect the delivery of messages.



# UPDATE ON ADS/CPDLC OPERATIONAL TRIALS

**Airports Authority Of India**

- The meeting is invited to:
- Review the outcomes of the operational trials and agree upon a common date for issue of AIP supplement pending formation of CRA.
- look into the network service related problems.



# UPDATE ON ADS/CPDLC OPERATIONAL TRIALS

Airports Authority Of India

# Thank You

FIT-BOB

BAY OF BENGAL ADS/CPDLC OPERATIONAL TRIAL

Participating Airlines (September/October 2005)

SI No.	AIRLINE
1	<b>AIR FRANCE</b>
2	<b>AUSTRIAN</b>
3	<b>CATHAY PACIFIC</b>
4	<b>CHINA AIRLINES</b>
5	<b>EMIRATES</b>
6	<b>ETIHAD</b>
7	<b>LUFTHANSA</b>
8	<b>MALAYSIAN AIRLINES</b>
9	<b>QATARI</b>
10	<b>QANTAS</b>
11	<b>SAUDIA</b>
12	<b>SINCARGO</b>
13	<b>SINGAPORE AIRLINES</b>
14	<b>SOUTH AFRICAN AIRLINES</b>
15	<b>SPEED BIRD (British Airways)</b>
16	<b>SRILANKAN AIRWAYS</b>
17	<b>THAI AIRLINES</b>
18	<b>UNITED PARCEL SERVICE</b>
19	<b>YEMINI</b>

*Note: data provided by the Airports Authority of India.*

**Indian Ocean, Bay of Bengal - ADS/CPDLC equipage and ATS Status**

STATE/ ORGANIZATION	FIR	LOGON CODE	Ground Station Manuf- acturer	DSP	ADS	CPDLC	AIDC	FDP	Test, Ops Trial or Operational	Procedures Published	BOB TRIAL	CONTACTS	REMARKS
AUSTRALIA Airservices Australia	Melbourne	YMMM	Thales	SITA	YES	YES	YES	YES	Operational	YES	NO	Geoff Whitley, Operations Manager Melbourne Centre, Tel 61 3 9235 7378, Fax 61 3 9235 2471, E-mail: geoff.whitley@airservicesaustralia.com	Integrated System, ADS - B in 2005/06
	Brisbane	YBBB	Thales	SITA	YES	YES	YES	YES	Operational	YES	NO	Warren Beeston, Operations Manager Brisbane Centre, Tel, Fax, E-mail: warren.beeston@airservicesaustralia.com	Integrated System, ADS - B in 2005/06
INDIA Airport Authority of India	Chennai	VOMF	ECIL	SITA	YES	YES	NO	YES	Ops Trial	A1783/03, NOTAM A0700/03 A1177/03 A1796/05	YES	Mr. S.V. Satish Deputy General Manager (ATM) Airports Authority of India Tel: +91 44 22561539 Fax: +91 44 22560700 E-mail: svsatish@aaai.aero	ADS-C Integrated with DPS, work in progress to integrate with RDPS
	Kolkata	VECF	ECIL	SITA	YES	YES	NO	YES	Ops Trial	A1278/00 NOTAM A0700/03 A1177/03 A1276/05	YES	Mr. S.V. Satish Deputy General Manager (ATM) Airports Authority of India Tel: +91 44 22561539 Fax: +91 44 22560700 E-mail: svsatish@aaai.aero	ADS-C Integrated with DPS, work in progress to integrate with RDPS
	Mumbai	VABF	Raytheon	SITA	YES	YES	NO	YES	Ops Trial Early 2006		Arabian Sea Trial YES	Mr. M.K. Nelli Deputy General Manager (ATM) Airports Authority of India Tel: +91 22 26828015 Fax: +91 22 26828066 E-mail: mknelli21@gmail.com	India will commence Ops Trial in Arabian Sea portion of Mumbai FIR from Jan 2006

FIT-BOB/6 & FIT-SEA/3  
Appendix E to the Report

STATE/ ORGANIZATION	FIR	LOGON CODE	Ground Station Manuf- acturer	DSP	ADS	CPDLC	AIDC	FDP	Test, Ops Trial or Operational	Procedures Published	BOB TRIAL	CONTACTS	REMARKS
	Delhi	VIDF	Raytheon	SITA	YES	YES	NO	YES	Ops Trial Early 2006		Arabian Sea Trial YES	Mr. M.K. Nelli Deputy General Manager (ATM) Airports Authority of India Tel: +91 22 26828015 Fax: +91 22 26828066 E-mail: mknelli21@gmail.com	India will commence Ops Trial in Arabian Sea portion of Delhi FIR from Jan 2006
INDONESIA Directorate General of Air Communications		WIIZ	ARINC	ARINC	YES	YES	NO (Sep 04)	YES	Ops Trial	AIP Sup Nr:03/01 17May01	YES	Mr. Nanang S. Taruf Deputy Director System & Procedure Air Navigation Directorate of Aviation Safety E-mail: cns-atm@telkom.net Wi Yono Tel: 6221 5506178 E-mail: dss97@centrin.net.id	
MALAYSIA Department of Civil Aviation	Kuala Lumpur	WMFC		ARINC			NO	YES	In early 2006 Malaysia will issue tender documentation for new installation.	NO	Mr. Harizan Mohammad Yatim Director ATS		
	Kota Kinabalu	WBKK		ARINC			NO	YES		NO	Tel: 603-78465233 Fax: 603-78472997 E-mail: accwmfc@tm.net.my harizan@atsdca.gov.my		
MALDIVES	Male		NO	NO	NO	NO	NO	NO	NO	NO			
MYANMAR Department of Civil Aviation	Yangon	VYYF	Thales	SITA	YES	YES	NO	NO	Ops Trial	AIC A1/99 (10.1.99)	NO	U Yoa Shu Director of ATS, DCA Myanmar Tel: 95 1 663838 Fax: 95 1 665124 mail ats@dca.gov.mm	Stand alone. Moving to new facilities, consider trial after mid 2006
SINGAPORE Civil Aviation Authority of Singapore	Singapore	WSJC	Thales	SITA	YES	YES	NO	YES	Operational	YES	NO	<a href="mailto:yeo_cheng_nam@caas.gov.sg">yeo_cheng_nam@caas.gov.sg</a>	Ops Trial completed 1999, integrated system

FIT-BOB/6 & FIT-SEA/3  
Appendix E to the Report

STATE/ ORGANIZATION	FIR	LOGON CODE	Ground Station Manuf- acturer	DSP	ADS	CPDLC	AIDC	FDP	Test, Ops Trial or Operational	Procedures Published	BOB TRIAL	CONTACTS	REMARKS
SRI LANKA Airport & Aviation Services (AASL) Ltd	Colombo	VCCC	Thales	SITA	YES	YES	NO	YES	Ops Trial	AIC-A020F-2001	NO	Mr. Ajith Nandana Wickremarachchi Senior Air Traffic Controller Airport & Aviation Services (Sri Lanka) Limited Bandaranaike International Airport, Colombo, Katunayake Sri Lanka Tel: 94 777344338 Fax: 94 11 2635105 E-mail: wickram1@yahoo.com	Stand alone
THAILAND AEROTHAI	Bangkok	VTBB	ARINC	ARINC	YES	YES	YES	YES	Ops Trial	3 monthly NOTAM	DEFER	Mr. Tinnagorn Choowong Tel: 66-2-285 9975 Mobile: 66-09-816 6486 Fax: 66-2-285 9077 E-mail: tinnagorn.ch@aerothai.co.th	
ARINC											YES	Mr. Sarawut Assawachaichit Program Manager, Globalink Asia Tel: 66 2 2859435-6 Fax: 66 2 2859437 E-mail: sassawac@arinc.com	
CENTRAL REPORTING AGENCY (CRA)											YES	Mr. Bradley Cornell Boeing Tel: 1 425 2946520 E-mail: bradley.d.cornell@boeing.com	
IATA											YES	Soon Boon Hai Assistant Director Safety Operations & Infrastructure Tel: 65 62397267 Fax: 65 65366267 E-mail: soonbhd@iata.org	

FIT-BOB/6 & FIT-SEA/3  
Appendix E to the Report

STATE/ ORGANIZATION	FIR	LOGON CODE	Ground Station Manuf- acturer	DSP	ADS	CPDLC	AIDC	FDP	Test, Ops Trial or Operational	Procedures Published	BOB TRIAL	CONTACTS	REMARKS
IFALPA											YES	Capt. Toby Gursanscky Regional Vice President South Pacific Tel: 61 2 99487532 E-mail: gursanscky@bigpond.com	
SITA											YES	Mr. David Fung SITA Regional Manager, Asia AIRCOM CNS Services Room 1201, 12/F Centre Point 181-185 Gloucester Road Wanchai Hong Kong, China Tel: 852-9400 7979 E-mail: david.fung@sita.aero	
ICAO											YES	Mr. Andrew Tiede Regional Officer ATM Tel: 66 2 5378189, ext. 152 Fax: 66 2 537 8199 E-mail: atiede@bangkok.icao.int icao_apac@bangkok.icao.int	

**South China Sea/South-East Asia - ADS/CPDLC equipage and ATS Status**

STATE/ ORGANIZATION	FIR	LOGON CODE	Ground Station Manuf- acturer	DSP (e.g. SITA, ARINC)	ADS	CPDLC	AIDC	FDP	Test, Ops Trial or Operational	Procedures Published	ADS/CPDLC TRIAL	CONTACTS	REMARKS
CHINA	Sanya AOR												State to provide information for FIT-SEA/4
HONG KONG, CHINA CAD - Civil Aviation Department	Hong Kong												State to provide information for FIT-SEA/4
INDONESIA Directorate General of Air Communications	Jakarta	WIIIZ	ARINC	ARINC	YES	YES	NO (Sep 04)	YES	Ops Trial	AIP Sup Nr:03/01 17May01	NO	Mr. Nanang S. Taruf Deputy Director System & Procedure Air Navigation Directorate of Aviation Safety E-mail: cns-atm@telkom.net Wi Yono Tel: 6221 5506178 E-mail: dss97@centrin.net.id	
	Ujung Pandung		ARINC	ARINC	YES	YES	NO (Sep 04)	YES	Ops Trial	AIP Sup Nr:03/01 17May01	NO	Mr. Nanang S. Taruf Deputy Director System & Procedure Air Navigation Directorate of Aviation Safety E-mail: cns-atm@telkom.net Wi Yono Tel: 6221 5506178 E-mail: dss97@centrin.net.id	

FIT-BOB/6 & FIT-SEA/3  
Appendix F to the Report

STATE/ ORGANIZATION	FIR	LOGON CODE	Ground Station Manuf- acturer	DSP (e.g. SITA, ARINC)	ADS	CPDLC	AIDC	FDP	Test, Ops Trial or Operational	Procedures Published	ADS/CPDLC TRIAL	CONTACTS	REMARKS
JAPAN JCAB - Civil Aviation Bureau of Japan	Fukuoka	RJJJ										Mr. Hiroshi Inoguchi Special Assistant to the Director, JCAB ATS Systems Planning Division, Tel: +81-3-5253-8111 ext 51128 Fax: +81-3-5253-1663 E-mail: inoguchi-h2hh@mlit.go.jp	Tokyo FIR Oceanic participating in the IPACG FIT State to provide information for FIT-SEA/4
MALAYSIA Department of Civil Aviation	Kuala Lumpur	WMFC		ARINC			NO	YES	In early 2006 Malaysia will issue tender documentation for new installation.	NO	Mr. Harizan Mohammad Yatim Director ATS Tel: 603-78465233 Fax: 603-78472997		
	Kota Kinabalu	WBKK		ARINC			NO	YES		NO	E-mail: accwmfc@tm.net.my harizan@atsdca.gov.my		
PHILIPPINES	Manila									NO	Mr. Salvador G. Rafael Chief, ATC Division Tel: 632-8799160 Fax: 632-8799160 E-mail: raffy_thunder92@yahoo.com	State to provide information for FIT-SEA/4	
SINGAPORE Civil Aviation Authority of Singapore	Singapore	WSJC	Thales	SITA	YES	YES	NO	YES	Operational	YES	YES	<a href="mailto:yeo_cheng_nam@caas.gov.sg">yeo_cheng_nam@caas.gov.sg</a>	Expects to join Viet Nam in operational trial commencing late 2006
THAILAND AEROTHAI	Bangkok	VTBB	ARINC	ARINC	YES	YES	YES	YES	Ops Trial	3 monthly NOTAM	NO	Mr. Tinnagorn Choowong Tel: 66-2-285 9975 Mobile: 66-09-816 6486 Fax: 66-2-285 9077 E-mail: tinnagorn.ch@aerothai.co.th	

FIT-BOB/6 & FIT-SEA/3  
Appendix F to the Report

STATE/ ORGANIZATION	FIR	LOGON CODE	Ground Station Manuf- acturer	DSP (e.g. SITA, ARINC)	ADS	CPDLC	AIDC	FDP	Test, Ops Trial or Operational	Procedures Published	ADS/CPDLC TRIAL	CONTACTS	REMARKS
VIETNAM	Ho Chi Minh										YES	Mr. Cu Van Sinh CNS Department VATM Gialam Airport Hanoi, Tel: 0912866275 E-mail: cuvansinh@yahoo.com	Equipment installation progressing, expect to be ready for operational trial in late 2006.State to provide information for FIT-SEA/4
	Hanoi										NO	Mr. Cu Van Sinh CNS Department VATM Gialam Airport Hanoi, Tel: 0912866275 E-mail: cuvansinh@yahoo.com	
ARINC												Mr. Sarawut Assawachaichit Program Manager, Globalink Asia Tel: 66 2 2859435-6 Fax: 66 2 2859437 E-mail: sassawac@arinc.com	
CENTRAL REPORTING AGENCY (CRA)											YES	Mr. Yoshiro NAKATSUJI K-1 Building, 3rd floor 1-6-6, Haneda Airport. Ota-ku, Tokyo 144-0041, Japan Telephone: +81-3-3747-1231 Fax: + +81-3-3747-1231 E-mail: crasa@cra-japan.org OR naka@atcaj.or.jp	FIT-SEA CRA, operated by CRA Japan.
IATA											YES	Soon Boon Hai Assistant Director Safety Operations & Infrastructure Tel: 65 62397267 Fax: 65 65366267 E-mail: soonbhd@iata.org	

FIT-BOB/6 & FIT-SEA/3  
Appendix F to the Report

STATE/ ORGANIZATION	FIR	LOGON CODE	Ground Station Manuf- acturer	DSP (e.g. SITA, ARINC)	ADS	CPDLC	AIDC	FDP	Test, Ops Trial or Operational	Procedures Published	ADS/CPDLC TRIAL	CONTACTS	REMARKS
IFALPA											YES	Capt. Suresh Menon Regional Vice President ASIA/East Tel: 61 2 99487532 Fax:(65) 6584 8869 E-mail: menon@pacific.net.sg	
SITA											YES	Mr. David Fung SITA Regional Manager, Asia AIRCOM CNS Services Room 1201, 12/F Centre Point 181-185 Gloucester Road Wanchai Hong Kong, China Tel: 852-9400 7979 E-mail: david.fung@sita.aero	
ICAO											YES	Mr. Andrew Tiede Regional Officer ATM Tel: 66 2 5378189, ext. 152 Fax: 66 2 537 8199 E-mail: atiede@bangkok.icao.int icao_apac@bangkok.icao.int	

**DRAFT TERMS OF REFERENCE  
FOR A CENTRAL REPORTING AGENCY IN SUPPORT OF  
A FANS INTEROPERABILITY TEAM FOR THE BAY OF BENGAL**

## **1. Central Reporting Agency**

In order for the FANS INTEROPERABILITY TEAM (FIT) to achieve its important goals of problem resolution, system performance assurance, and planning and testing of operations that will enable benefits, work must be done on a daily basis. To address these concerns a dedicated sub-team, called the Central Reporting Agency (CRA), is required to do the daily monitoring, coordination, testing, and problem research tasks outlined by the terms of reference for the FIT.

### **1.1 Central Reporting Agency resource requirements**

To be effective, the CRA must have two main components: dedicated staff and adequate tools. Staffing requirements will vary depending on the complexity of the region being monitored. There are several factors that affect regional complexity from an ATS monitoring standpoint such as amount of airspace, the amount of variety in operating procedures, number of airlines, number of different airborne equipment variants, number of air traffic service providers, number of different ground equipment variants and number of network service providers.

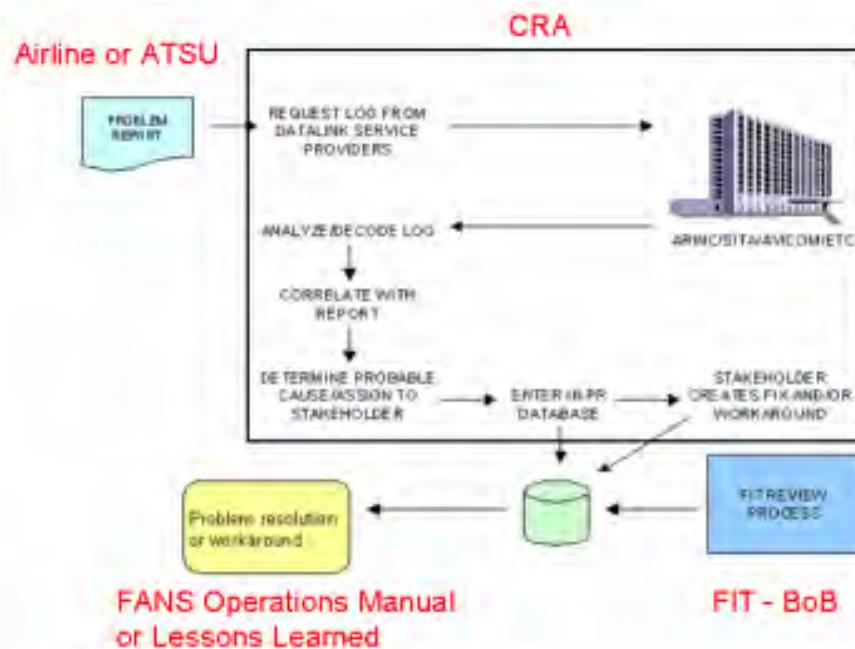
Tool requirements are as follows. The CRA must be able to simulate an ATS ground station to the extent of exercising all combinations and ranges of controller-pilot data link communications (CPDLC) uplinks and automatic dependent surveillance (ADS) reports. The CRA must also have access to airborne equipment. For the airborne side, test benches capable of being connected to data link service provider networks are adequate; however, engineering simulators offer additional capability.

In support of the problem report audit analysis task, the CRA must have software that can decode data link service provider audit report data and produce usable reports. Without these tools it is virtually impossible for a CRA to resolve problems identified by the FIT.

Coordination is also a big part of the CRA's job. In the pursuit of problem resolution, action item resolution, monitoring, and testing, many issues arise which require coordination among many FIT stakeholders. The CRA has the primary responsibility to provide this coordination function as delegated by the FIT.

### **1.2 Problem Report Identification and Resolution Process Description**

The problem identification and resolution process as it applies to an individual problem consists of a data collection phase, followed by problem analysis and coordination with affected parties to secure a resolution, and interim procedures to mitigate the problem in some instances. This is shown in the diagram below.



The problem identification task begins with the CRA receiving a problem report from a stakeholder, usually an operator, ATS provider. **Problem reports must contain the required information listed on the FANS Operations Manual (FOM) problem reporting form listed in Appendix A.** If problem reports are received without required information such as, flight number, tail number, time / date, aircraft type, audit data cannot be requested and the problem cannot be adequately investigated.

The data collection phase consists of obtaining message logs from the appropriate parties (which will depend on which service providers were being used and operator service contracts). Today, this usually means the CRA will order logs for the appropriate period of time from ARINC and SITA (and occasionally other service providers, such as AVICOM and AEROTHAI will be involved). Usually, a log for a few hours before and after the event that was reported will suffice, but once the analysis has begun, the CRA will sometimes request additional data (sometimes for several days prior to the event if the problem appears to be an on-going one).

Additionally, some airplane specific recording may be available that may assist in the data analysis task. The CRA does not always request this type of information (doing so would be an unacceptable imposition on the operators), but when the nature of the problem has been clarified enough to indicate that an additional level of investigation would be helpful. These additional records include:

- Airplane maintenance system logs
- BITE data dumps for some airplane systems
- SATCOM activity logs

Logs and printouts from the flight crew and recordings/logs from the ATC Center(s) involved in the problem may also be necessary. It is important that the body collecting data for the analysis task is in a position to obtain all this data in a timely matter, as much of it is subject to limited retention.

Once the data has been collected, the analysis can begin. For this, it is necessary to be able to decode all the message types involved. Obviously, a tool that can decode all the ATS datalink messages of the type used in that region is necessary. These tools would include:

- AFN (per ARINC 622), ADS and CPDLC (both per RTCA DO-258/EUROCAE ED-100) in a FANS-1/A region
- Context Management, ADS and CPDLC applications (all per ICAO Doc 9705 and RTCA DO-280/ED-110) in an ATN region
- FIS or ARINC 623 messages used in the region

Once the messages have been decoded, the analysis requires a thorough understanding of the complete message traffic, including:

- Media management messages
- Relationship of ground-ground and air-ground traffic
- Message envelope schemes used by the particular datalink technology (ACARS , ATN, etc.)

It is also important for the analyst to have a good grounding in how the airplane systems operate (and interact) to provide the ATS datalink functions, as many of the reported problems are airplane system problems.

All this information will enable the analyst to determine a probable cause by working back from the area where the problem was noticed to where it began. In some cases, this may entail manual decoding of parts of messages based on the appropriate standard to identify particular encoding errors. It may also require lab testing using the airborne equipment (and sometimes the ground networks) to reliably assign the problem to a particular cause.

Once the problem has been identified, then the task of coordination with affected parties begins. The stakeholder who is assigned responsibility for fixing the problem must be contacted, and a corrective action plan agreed.

This information (the problem description, the results of the analysis, and the plan for corrective action) is then entered in a database covering datalink problems, both in a complete form to allow continued analysis and monitoring of the corrective action, as well as in a de-identified form for the information of other stakeholders. These de-identified summaries are reported at the appropriate regional management forum.

The Datalink Monitoring Agency's responsibility does not end with determining the cause of the problem and identifying a fix. As part of that activity, procedural work-arounds to mitigate the problem may have to be developed while the fix is being fielded (and software updates to a fleet may take several years before all aircraft have the fix), and the Central Reporting Agency will also attempt to identify any trends in problems that are reported.

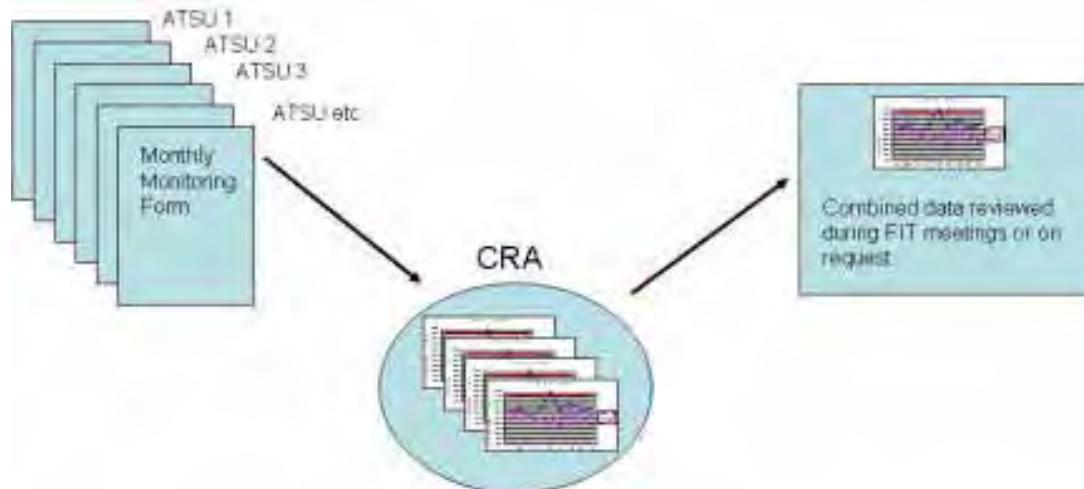
### 1.3 Monthly Status Report Process Description

Network system performance is a key element that can affect the operational acceptability of CPDLC and ADS services. ATSUs are in the best position to help monitor network performance since they are an end system and have access to both uplink and downlink message delivery times. For downlinks from aircraft the time the message was sent can be compared with the time the message was received at the ATSU. For uplinks the time the message was sent by the controller can be compared with the time uplink message assurance downlink was received. This performance data is then sent to the CRA each month. The CRA will compare the incoming monthly report received from each ATSU against identified performance requirements and against the aggregate monthly trend data. If any datum of the incoming report is outside required values or is radically different from the aggregate trend, then the FIT will investigate the cause and may create a new Problem Report.

The CRA will add the incoming monthly report received from each ATSU and DSP to the aggregate trend data. The CRA will release the de-identified aggregate monthly trend data to FIT members during FIT meetings or upon request.

The monthly network performance monitoring form is provided in attachment B.

A graphic showing the data flow for monthly monitoring reports is shown in the diagram below.



During development and implementation of the original FANS problem reporting and monthly monitoring system operators and ATSUs identified the need to protect problem reports, audit log data, and monthly monitoring data from distribution outside the CRA unless that data was de-identified by the CRA. A data confidentiality agreement was developed which says the CRA will not release any data to outside parties unless that data was de-identified. The data confidentiality agreement is provided by the CRA to each participating ATSU and operator providing problem reports and or monthly monitoring data.

The data confidentiality agreement form is provided in Appendix C.

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Appendix A  
Problem Reporting form

Appendix B  
ATSU Monthly Monitoring Form

Appendix C  
Data Confidentiality Agreement

**FANS IMPLEMENTATION TEAM (FIT-SEA)  
FOR THE SOUTH CHINA SEA**

**TERMS OF REFERENCE**

**Composition of FANS Implementation Team (FIT)**

The FANS Implementation Team (FIT) will consist of representatives from aircraft and ancillary equipment manufacturers, airlines, data communication service providers (DSP), ATS providers, IATA, ICAO, IFALPA, and IFATCA.

**FIT-SEA Terms of Reference (TORs)**

The FANS Implementation Team for the South East Asia region (FIT-SEA) shall be responsible for system configuration and oversee the end-to-end monitoring process to ensure the FANS 1/A systems are implemented and continue to meet their performance, safety, and interoperability requirements.

FIT-SEA shall:

- a) Determine the common operational architecture to support CPDLC and ADS;
- b) Support the implementation and operational benefits of CPDLC and ADS;
- c) Authorize and coordinate system testing and operational trials;
- d) Develop interim operational procedures to mitigate the effects of problems until such time as they are resolved;
- e) Review de-identified problem reports and determine appropriate resolution;
- f) Monitor the progress of problem resolution; and
- g) Assess system performance based on information in Central Reporting Agency periodic reports.

**Preparation of Reports**

The Central Reporting Agency (CRA) will report, as required, to FIT-SEA. FIT-SEA will report to the South East Asia ATS Co-coordinating Group (SEACG). ICAO will submit reports to appropriate sub-groups of APANPIRG.

## **FIT-SEA WORK PLAN**

1. Develop and sign a data confidentiality agreement between South East Asia States, airlines using FANS 1/A in the South East Asia region, Data Link Service Providers (DSPs) and the CRA. This agreement ensures that team members can submit identified problem reports to the CRA to facilitate problem resolution and that all problem reports will be de-identified before dissemination to the entire FIT-SEA team.

**Action:** **CRA/States/Airlines/DSPs coordinate with CRA to sign data confidentiality agreement**

2. Adopt the FANS 1/A Operations Manual (FOM) and ICAO regional *Guidance Material on CNS/ATM Operation in the Asia/Pacific Region* to establish operating and reporting procedures in the South East Asia region.

**Action:** **FIT-SEA members make appropriate arrangements to incorporate technical, training and documentation aligned with the FOM and ICAO Guidance Material.**

3. States/ATSU Providers to ensure controllers are trained to operate their respective FANS 1/A workstations using the FOM and ICAO *Guidance Material on CNS/ATM Operations in the Asia/Pacific Region* as a basis for developing training.

**Action:** **FIT-SEA ATSUs adopt training requirements.**

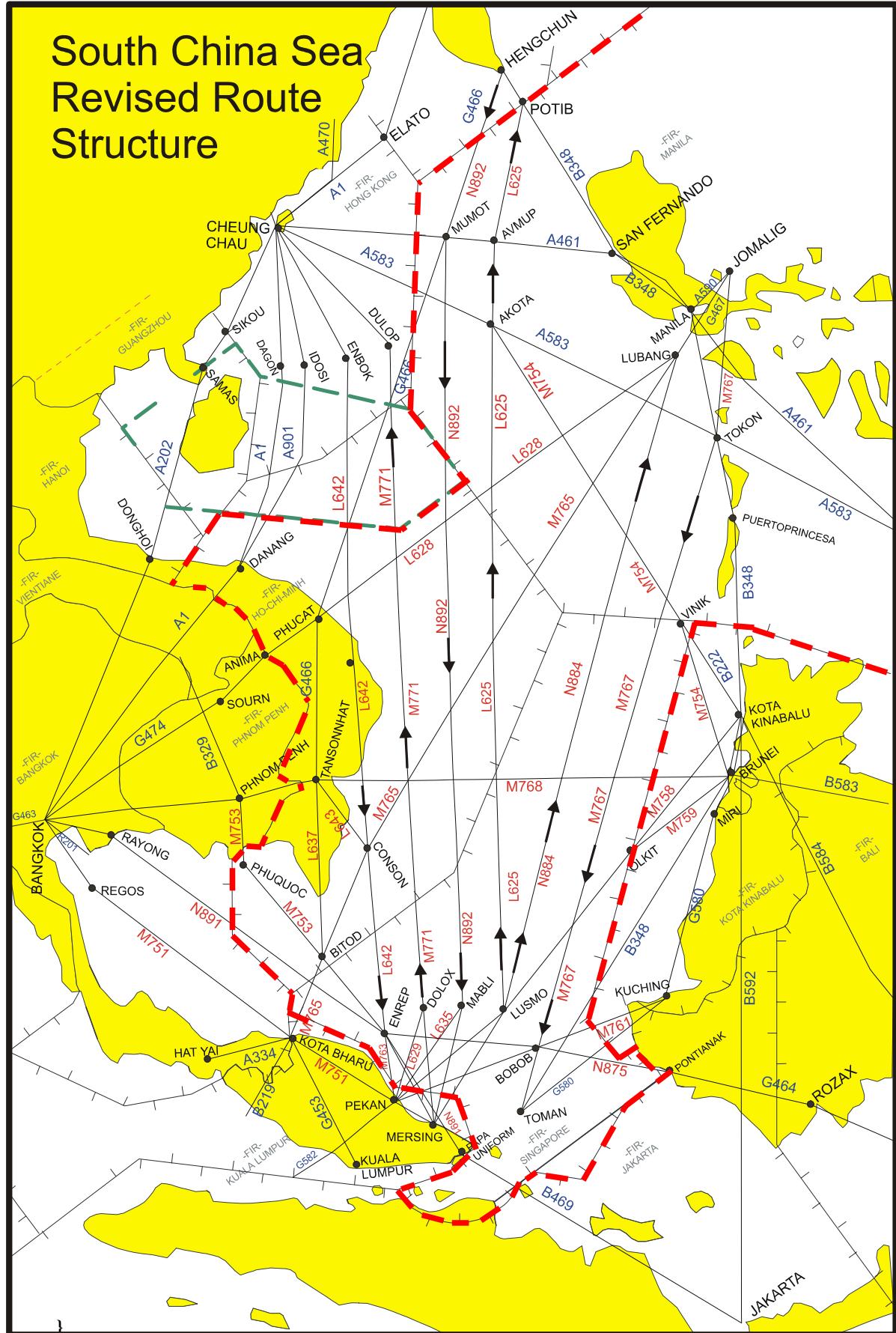
4. Participating operators to ensure flight crews are trained to operate their respective FANS 1/A systems using the FOM and ICAO regional *Guidance Material on CNS/ATM Operations in the Asia/Pacific Region* as a basis for developing training. To obtain operational approval for FANS 1/A from their regulatory authorities as required, operators should take into account appropriate technical material such as: FAA documents “*Controller-To-Pilot Data Link Communication Operational Approval Information Package*” dated 25 February 1999 and FAA AC 120-70.

**Action:** **Operators to implement training requirements as designated by appropriate regulatory authorities.**

5. Co-ordinate with all FANS 1/A equipped operators prior to the start of ADS/CPDLC operational trials and urge them to participate.

**Action:** **States/ATSUs to coordinate with operators and IATA for FANS 1/A trial participation.**

# South China Sea Revised Route Structure



**TERMS OF REFERENCE (TORs)**  
**FANS IMPLEMENTATION TEAM, SOUTH-EAST ASIA**  
**CENTRAL REPORTING AGENCY**  
**(FIT-SEA CRA)**

- 1) The objective of the FIT-SEA CRA operated by the CRA Japan is to assist the FIT-SEA members to plan and implement ADS and CPDLC systems, which are based on FANS 1/A, in the South China Sea area in accordance with the TOR of FIT-SEA.
- 2) To meet the above objective the FIT-SEA CRA shall:
  - a) share the technical and operational information with the FIT-SEA members on the planning and implementation of ADS and CPDLC systems;
  - b) process the problem reports (PR) received from the FIT-SEA members in the manner prescribed in the FANS 1/A Operations Manual (FOM);
  - c) disseminate the de-identified information on individual PR to the FIT-SEA members by means of access to the CRA Japan website; and
  - d) prepare periodic reports for the FIT-SEA and RASMAG.
- 3) The area of responsibility of the FIT-SEA CRA is defined as follows:

the FIT-SEA CRA will provide CRA services for the airspace within the Ho Chi Minh, Manila and Singapore FIRs, where implementation of ADS/CPDLC technologies is considered to enhance surveillance and communications capability, leading to significant benefits for operational efficiency and regularity of flights in the South China Sea area.”
- 4) The services of the FIT-SEA CRA operated by the CRA Japan are on a voluntary and temporary basis until a formal CRA is established by the FIT-SEA.

## **FIT-SEA CRA**

### **TASK LIST**

The tasks of the FIT-SEA CRA concern information sharing with the FIT-SEA members on technical and operational information to support the planning and implementation of ADS/CPDLC systems, the process of problem reports (PRs), and preparation of periodic reports for the FIT-SEA.

<b>Tasks</b>	<b>Remarks</b>
<b>1. Information Sharing through FIT-SEA/RASMAG</b> <ul style="list-style-type: none"> <li>a. Suggestion on planning and implementation of ground systems.</li> <li>b. Advice on development of ADS/CPDLC operational procedures.</li> </ul>	
<b>2. Collection and processing of Problem Reports (PRs)</b> <ul style="list-style-type: none"> <li>a. Collection of PRs from ATSU and aircraft operators</li> <li>b. Processing the PRs with:           <ul style="list-style-type: none"> <li>* data analysis;</li> <li>* reconstruction of the event;</li> <li>* identification of causes/factors in cooperation with appropriate parties; and</li> <li>* monitoring of rectification progress.</li> </ul> </li> </ul>	<p>Via e-mail, postal mail and fax</p> <p>Engineers analyse the logs of ground systems</p> <p>Consultation/cooperation with appropriate parties</p>
<b>3 Dissemination of information</b> <ul style="list-style-type: none"> <li>a. Report on the summary of PRs to the FIT-SEA.</li> <li>b. Website           <ul style="list-style-type: none"> <li>* List of PRs;</li> <li>* System performance analysis data of the Tokyo FIR; and</li> <li>* Documents.</li> </ul> </li> </ul>	<p>Report to the FIT-SEA and RASMAG</p> <p>All information including PRs is de-identified</p> <p>FANS 1/A Operations Manual (FOM) &amp; other documents</p> <p>Periodic reports and meeting summaries.</p>

**FIT-SEA Central Reporting Agency  
Responsibility Agreement  
(Model document)**

What follows is a detailed process setting forth the manner by which the Air Traffic Control Association Japan (ATCA-J), as the Central Reporting Agency (CRA) of the FANS Implementation Team for South-East Asia (FIT-SEA) under the authorization of the FIT-SEA, will handle data received from the FIT-SEA members.

The ATCA-J agrees to fulfill its functions as defined in the process described in the attachment herewith. The ATCA-J's use of both the Protected Data and the Released Data will be for purpose of advancing, in the defined area of services, the use of ATS data link with FANS capability only and will not be used for any marketing purpose or ATCAJ-instituted litigation. It should be understood, however, that the ATCA-J is legally obligated to respond to subpoenas and, in the event the ATCA-J receives a subpoena for the Protected Data, it will provide notice to the owning FIT-SEA member prior to production under the subpoena.

This agreement will become effective on (agreed date) for a period of three years or until the termination of ATCA-J's role for the FIT-SEA CRA, whichever comes first.

Please evidence your concurrence to ATCA-J's use of the Protected Data by signature in the space provided below and return to the undersigned.

Respectfully,

Signature

Printed Name  
Managing Director  
Air Traffic Control Association Japan

State Civil Aviation Authority Concurrence

Name: \_\_\_\_\_ Signature: \_\_\_\_\_

Title: \_\_\_\_\_ Organization: \_\_\_\_\_

Address: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

E-mail: \_\_\_\_\_ Date (day/month/year): \_\_\_\_\_

Attachment

## 1. DEFINITIONS

ATSU: Air Traffic Service Unit. An organization responsible for the provision of air traffic service in the airspace concerned.

CRA: Central Reporting Agency. An organization tasked with the regular dissemination of de-identified system performance data based on monthly Periodic Status Reports that are provided by ATSUs through respective State Civil Aviation Authority. CRA will also track problem reports and publish de-identified information for dissemination to FIT-SEA members. Problem resolution will be the responsibility of appropriate FIT-SEA members.

FIT-SEA: FANS Implementation Team for South-East Asia. Establishment of this team was agreed by the South-East Asia ATS Co-ordination Group (SEACG) at its eleventh meeting held at ICAO Asia and Pacific Regional Office, Bangkok, Thailand from 24 to 28 May 2004. Terms of Reference (TOR) and Work Plan of the FIT-SEA were also agreed at this meeting (Appendices A and B of the meeting report refer). FIT-SEA members include:

- a) South-East Asia States with CNS/ATM work stations;
- b) Data Link Service Providers (DSPs) (including ARINC, SITA & INMARSAT);
- c) Aircraft manufacturers (Boeing & Airbus);
- d) ICAO;
- e) IATA, IFALPA, IFATCA and other International Organizations; and
- f) Representatives of participating airlines.

Protected Data: Information, which is held by the FIT-SEA CRA for a limited time for the purpose of executing CRA responsibilities. This information is available only to those FIT members directly involved in the problem.

Released Data: Information, derived from Protected Data, which has been de-identified as to its source (including, but not limited to the aircraft operator, ATSU, DSP and aircraft manufacturer). This information will be stored for an indefinite period and will be available to all FIT members.

## 2. PERIODIC STATUS REPORT

Monthly statistic analyses data in regard to ATS data link system performance are submitted to the FIT-SEA CRA from the ATSUs. The methodologies for the performance analyses are prescribed in FANS 1/A Operations Manual. If any datum of these reports does not meet the criteria prescribed in FANS 1/A Operation Manual, the FIT will take any action to identify the cause. These data will be summed and averaged by the FIT-SEA CRA to be an aggregated form, and will be reported to the FIT-SEA.

### 3. PROBLEM REPORT

#### 3.1 Protected Problem Report Data

Reference FANS 1/A Operations Manual for the problem report form.

All raw data used for the process of problem reports are to be protected, and, will be destroyed as soon as possible after the investigation completed.

#### 3.2 Released Data will include:

- a) Description of event without reference to actual time or affected parties;
- b) Analysis and cause(s) of the problem;
- c) Recommended resolution; and
- d) Status of progress in reaction by the party.

#### 3.3 Processing of Problem Report Data

- a) The FIT-SEA CRA will receive a new problem report from the FIT-SEA member through the FIT-SEA member State.
- b) All incoming information will be stored in the Protected Problem Report. The information will be kept in a separate server not to be able to be accessed from outside.
- c) The FIT-SEA CRA may need to request additional information regarding the problem from the originator and/or other FIT members. All of this additional information will be kept in the Protected Problem Report.
- d) When the FIT-SEA determines an appropriate resolution to the problem, a de-identified version of the resolution will be added to the Release Data.
- e) The FIT-SEA CRA will publish the Release Problem Report Data for access by all FIT-SEA members.

\*\*\*\*\*

## **PROBLEM REPORTING PROCEDURES OF THE FIT-SEA CRA**

### **1. Contact Point**

Manager: Mr. Yoshiro NAKATSUJI  
Address: K-1 Building, 3<sup>rd</sup> floor  
1-6-6, Haneda Airport, Ota-ku, Tokyo 144-0041, Japan  
Telephone: +81-3-3747-1231  
Fax: +81-3-3747-1231  
E-mail: [crasa@cra-japan.org](mailto:crasa@cra-japan.org) OR [naka@atcaj.or.jp](mailto:naka@atcaj.or.jp)

### **2. Address to send FANS 1/A Problem Reports (PRs)**

FANS 1/A PRs should be sent to “CRA Japan” via any means of e-mail, postal mail or facsimile.

E-mail address: [crasa@cra-japan.org](mailto:crasa@cra-japan.org) OR [naka@atcaj.or.jp](mailto:naka@atcaj.or.jp)

Postal mail address:

CRASA, K-1, 1-6-6, Haneda Airport, Ota-ku, Tokyo 144-0041, Japan

Facsimile: +81-3-3747-1231

### **3. FANS 1/A PR Form**

The FIT-SEA members are requested to send PRs to the CRA Japan with the items prescribed in the paragraph 3.10, FANS 1/A Operations Manual (FOM).

It is recommended to use the FANS 1/A PR Form attached to this paper. When other form is used, all items required by the FOM should be included.

### **4. Website address**

<http://www.crasa.cra-japan.org>

<b>FANS 1/A PROBLEM REPORT</b>				Number
Date UTC		Time UTC		
Registration		Flight Number		
Sector				
Originator		Aircraft Type		
Organization				
Active Center		Next Center		
Position				
Description				



**FIT-BOB/6 & FIT-SEA/3**  
**Appendix O to the Report**

# **Report of CRA Japan**

## **- Lessons Learnt from Problem Reports in IPACG FIT -**

**Hiromi Suzuki**

**Central Reporting Agency**

**Japan**

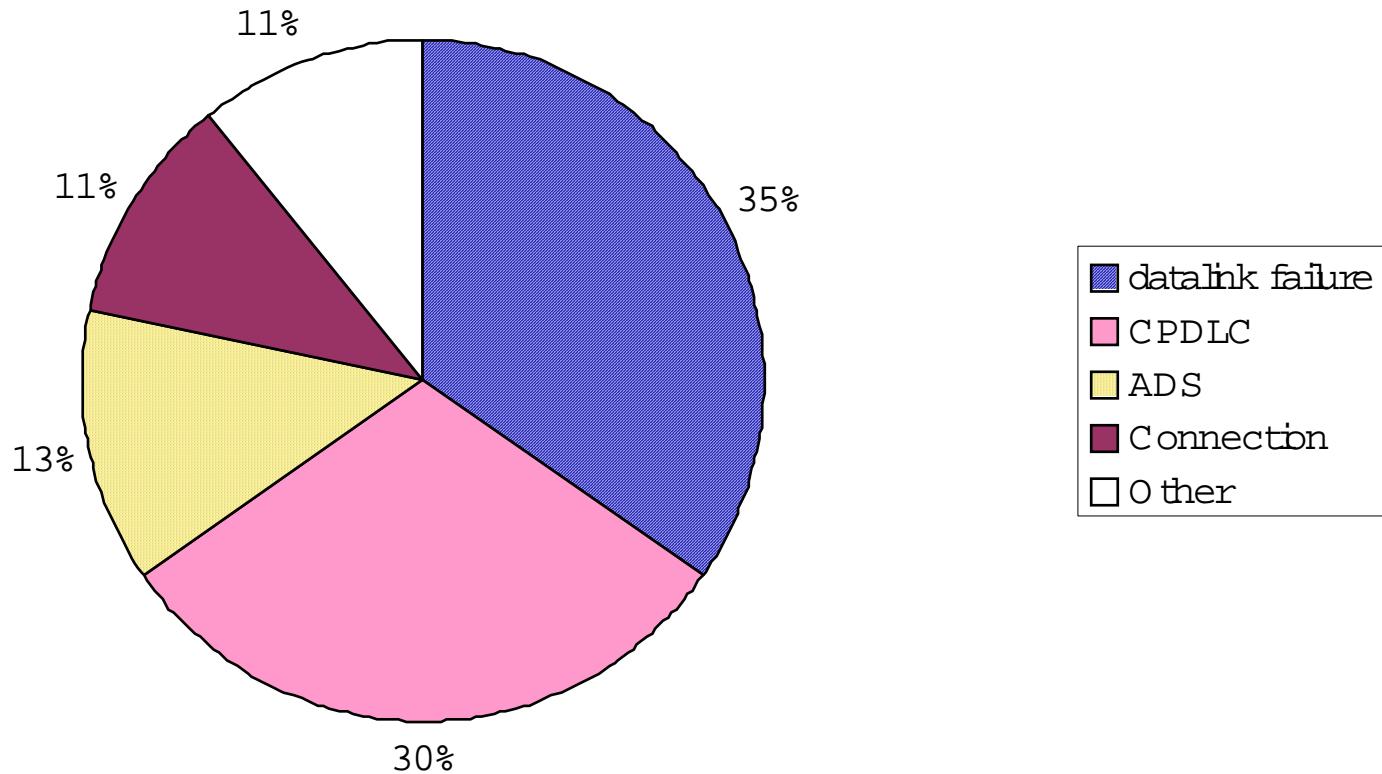
**IPACG FANS Interoperability Team**

# Trend of Problem Reports

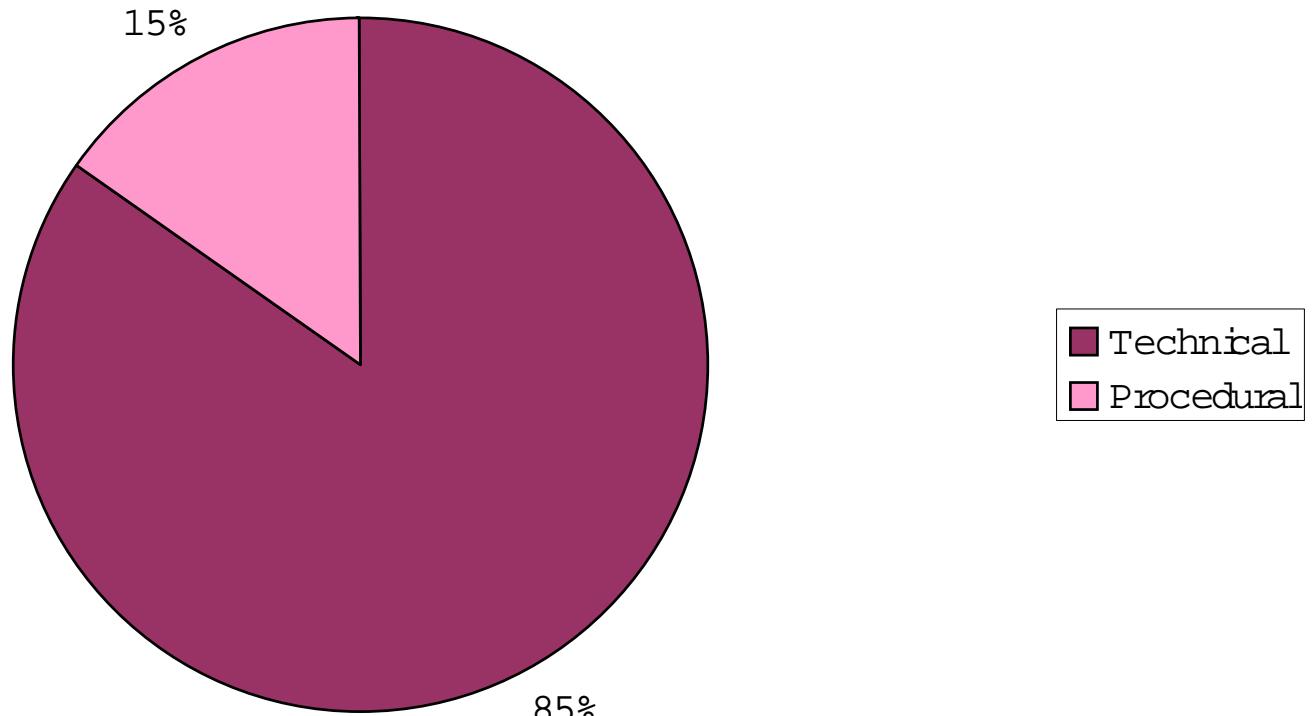
**January – June, 2005**

**CRA Japan received  
46 Problem Reports**

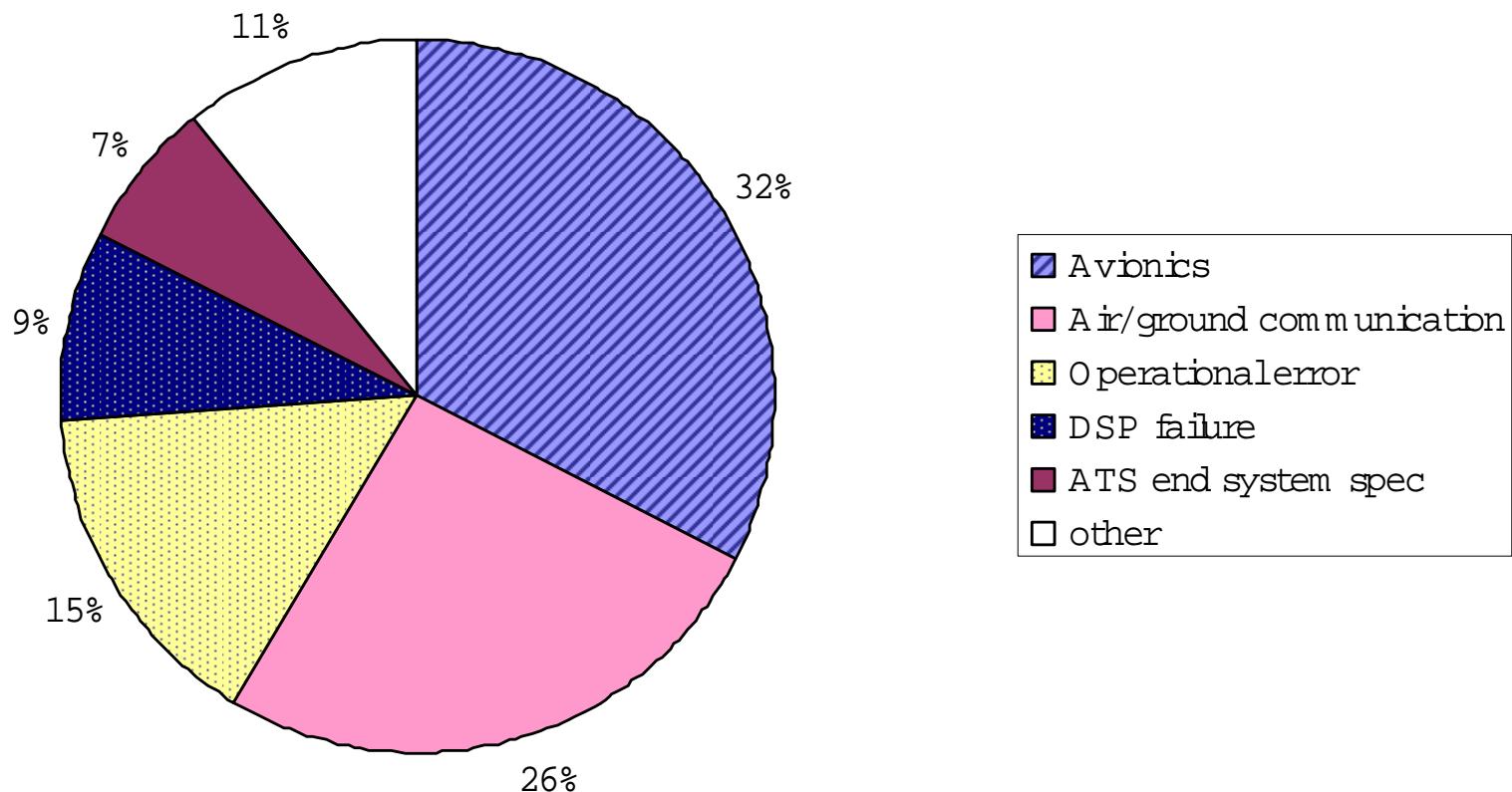
# Classified in Functions



# Type of Problem Reports



# Classified in Causal Factors





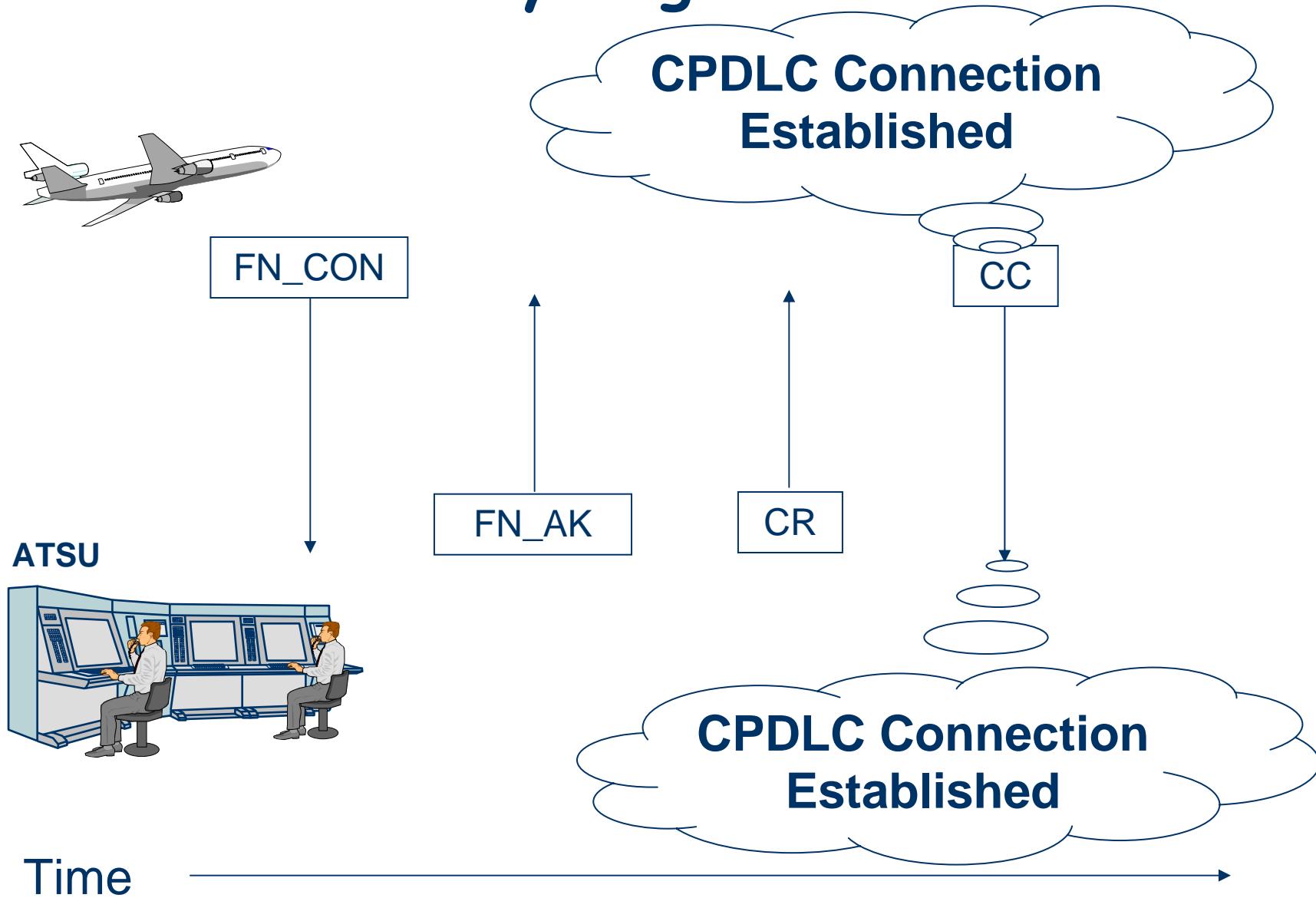
# Problem Reports

# **CPDLC Connection Failure**

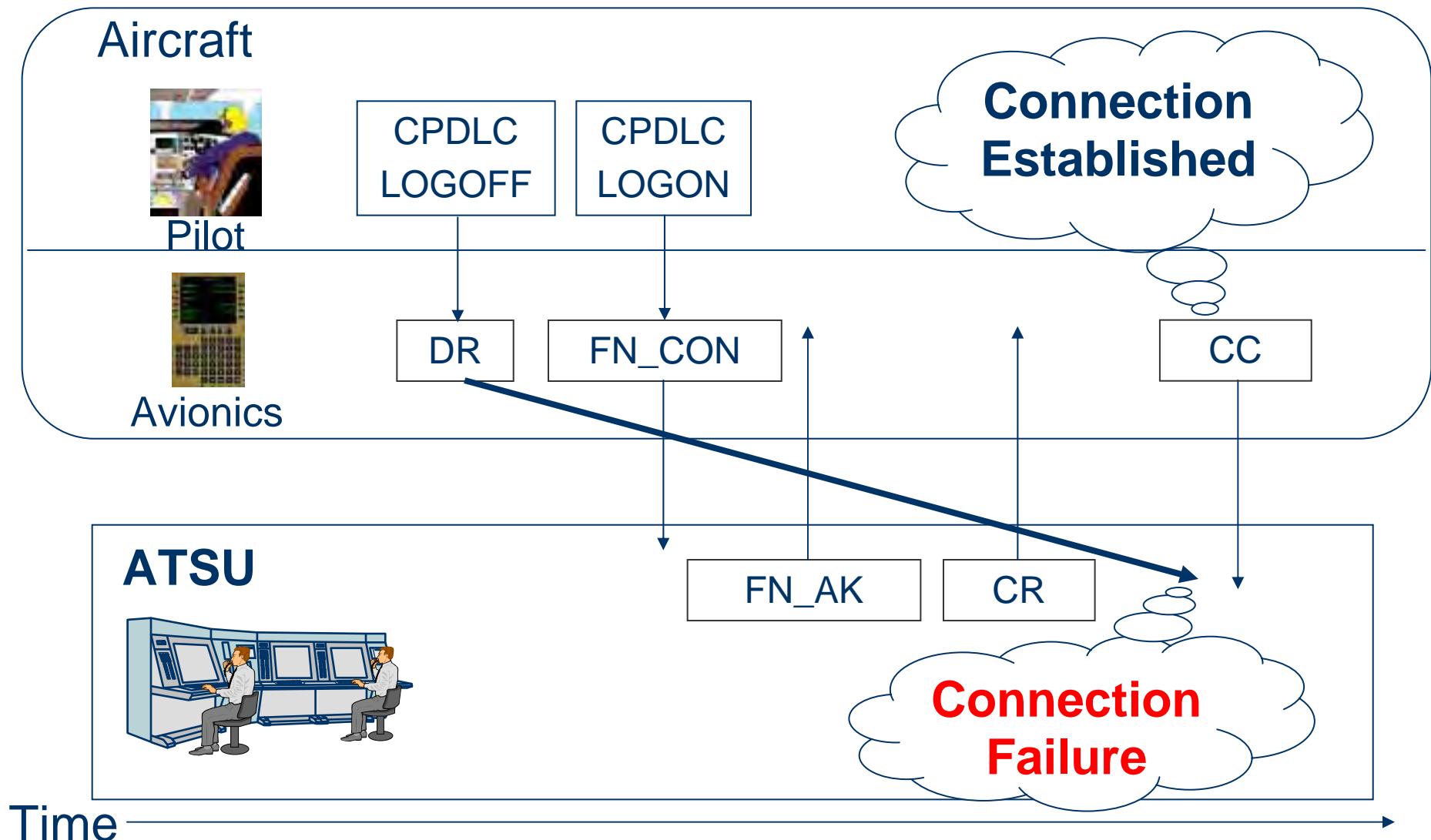
---

- While the downlink messages from the aircraft successfully reached an ATSU, uplink from the ATSU was unsuccessful.
- With no response from the ATSU, the pilot disconnected and tried to re-connect CPDLC in a moment. This caused a sequence error of messages to reach ATSU.
- Then, the CPDLC connection was disconnected at the ATSU, though the connection being established at airborne side.
- It was learnt that pilots should wait a certain pause before attempting re-connection after disconnection of CPDLC.

**Normally it goes like this:**



# What happened in this case;

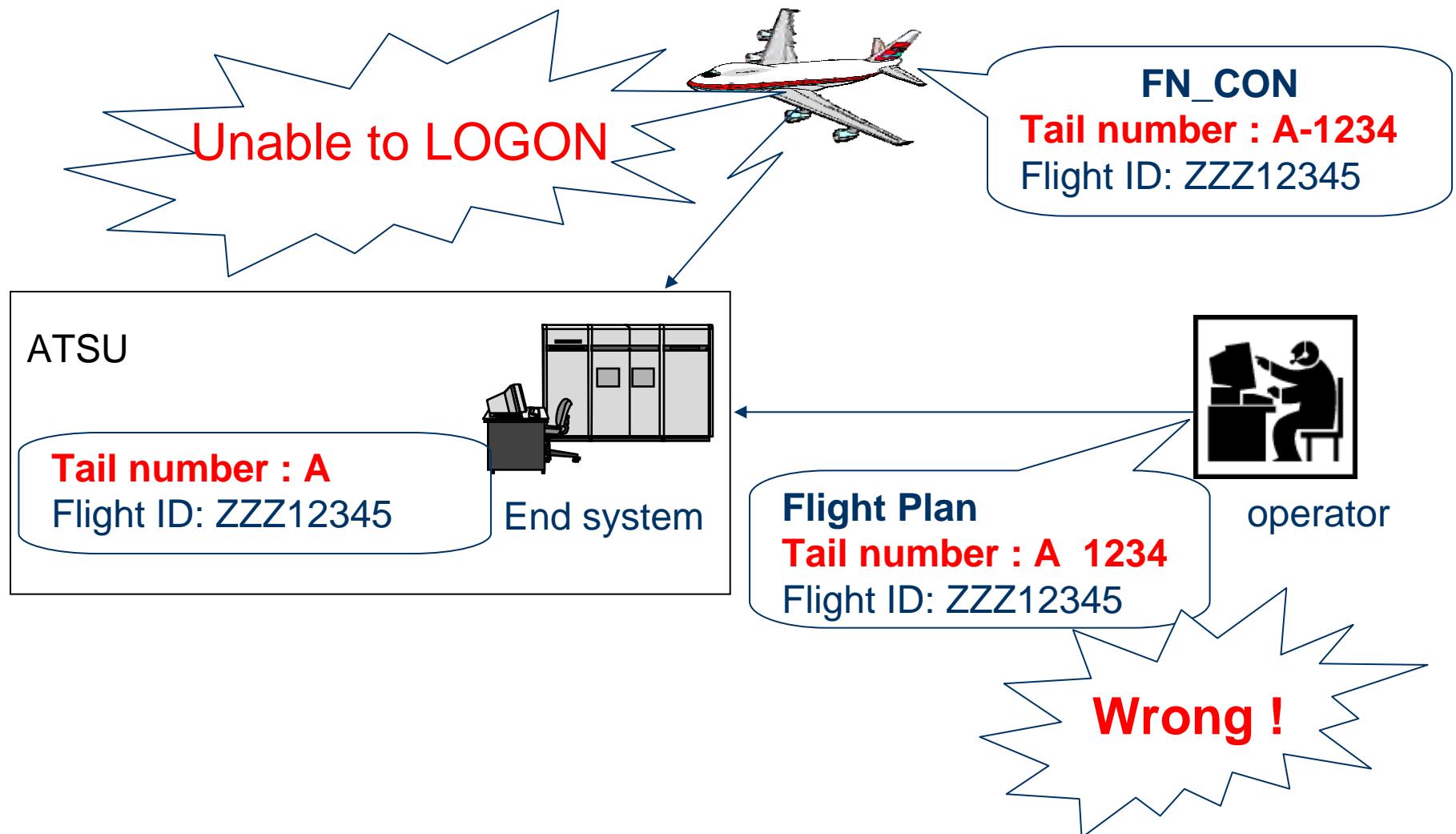


## ***Incorrect Tail Number in Flight Plan***

---

- An aircraft failed in attempting a CPDLC connection.
- Tail Number in the FN\_CON did not match to the tail Number filled in the flight plan.
- In this case, the cause of the connection failure resulted from the incorrect tail number written in the flight plan.
- Wrong tail number could trigger a serious situation such as connection with wrong aircraft.
- Wrong flight ID will also bring about the same situation.

# Unable to LOGON

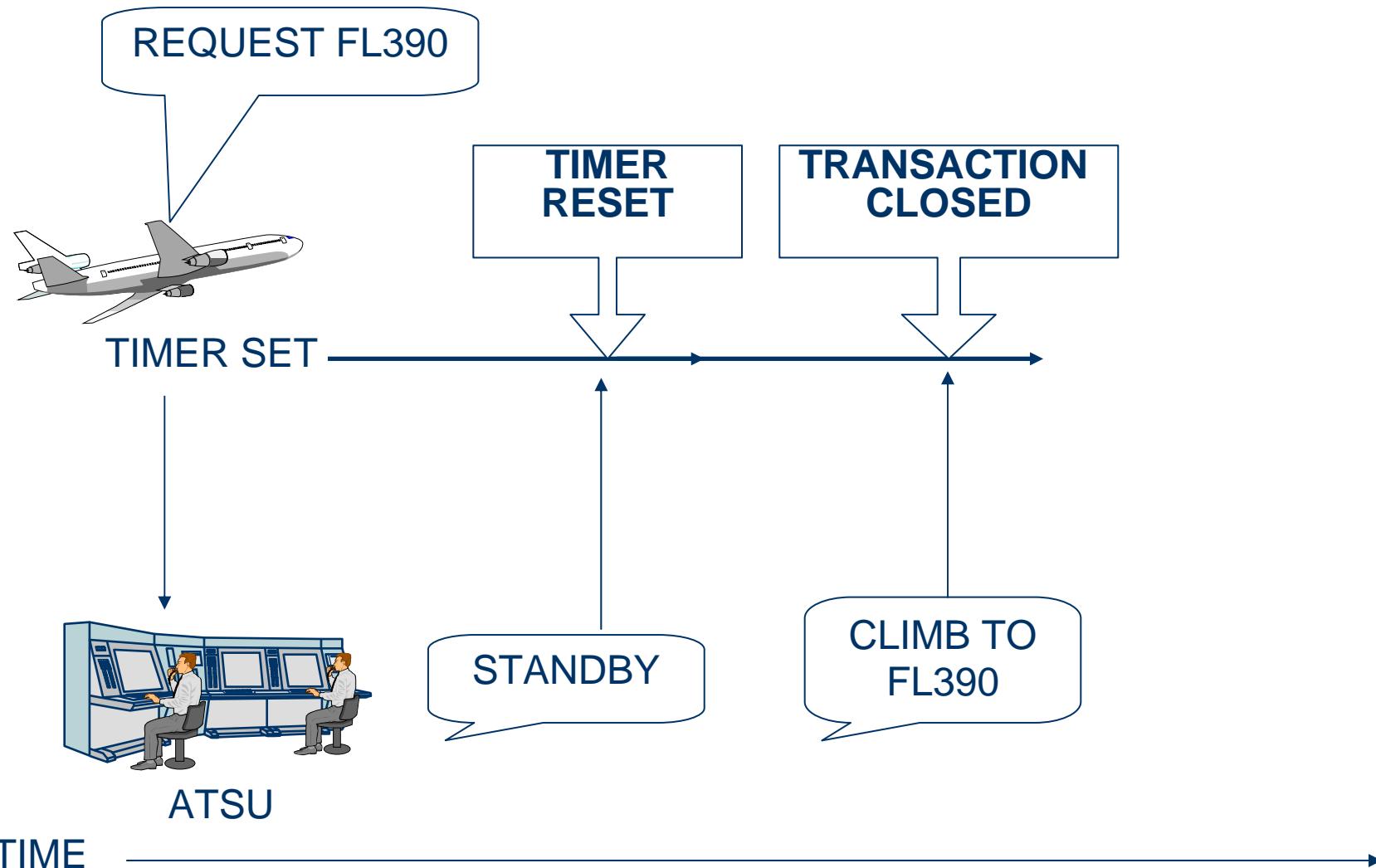


## *Error Response to ATC Clearance*

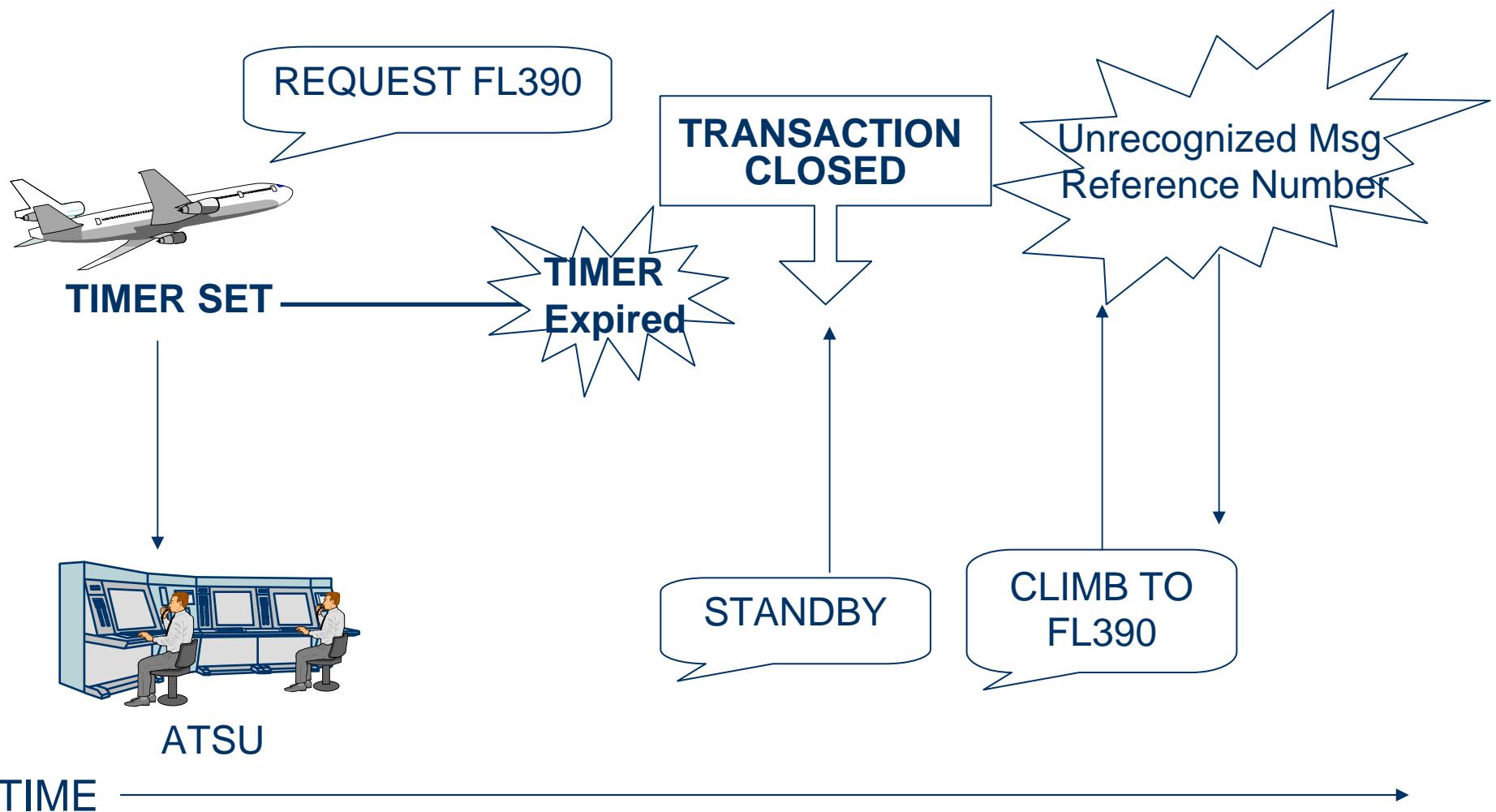
---

- Avionics downlinked “REQUEST FL390” and set a timer for waiting the clearance.
- ATSU uplinked “STANDBY” 8 minutes later, when the timer had already expired.
- The clearance uplinked from ATSU was also invalidated.
- Controllers should be aware that aircraft set a timer waiting for the response. After the timer expires, uplinked clearance or response will be ignored, and an error message will be sent from the aircraft.

# When controller's response sent in time



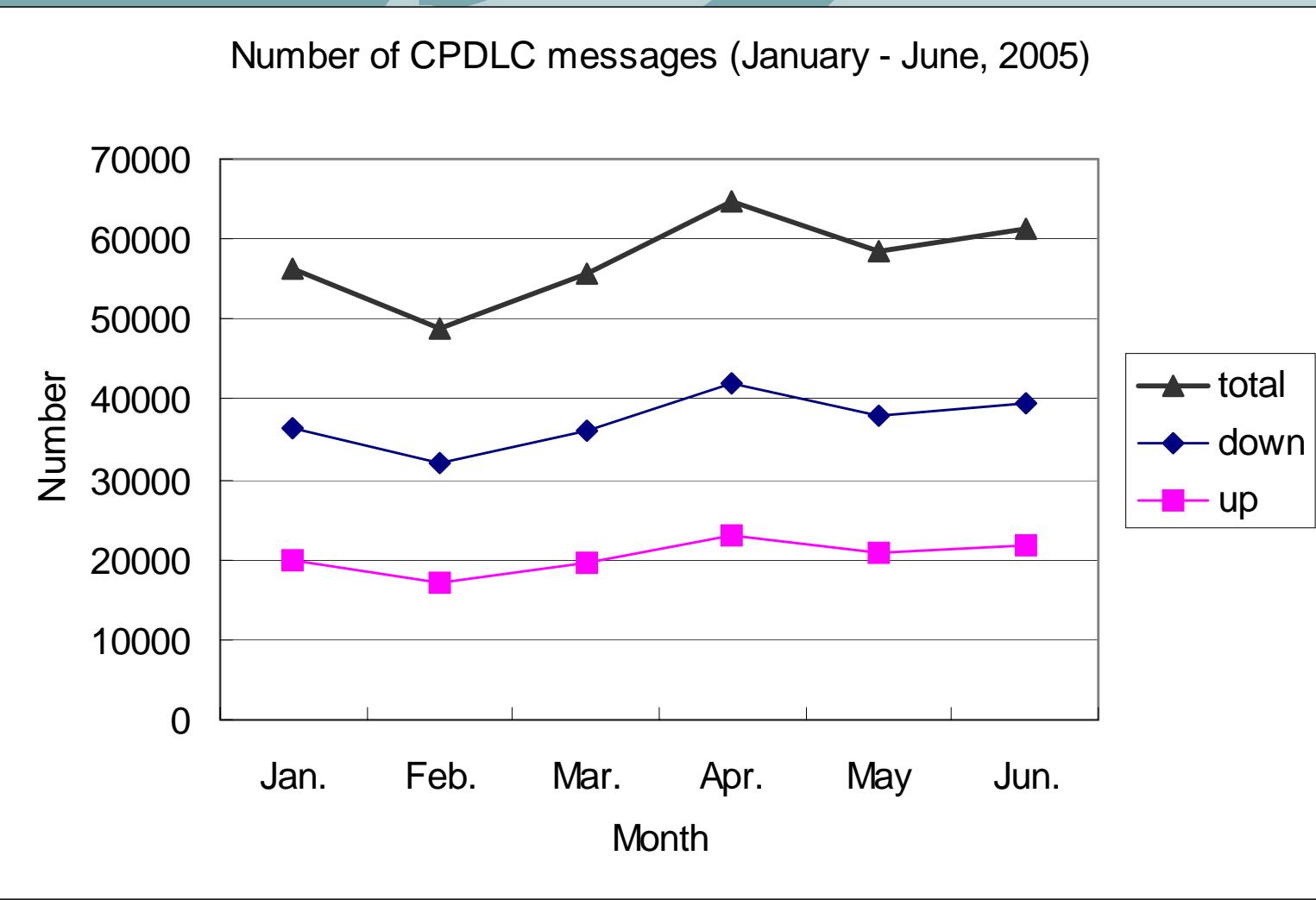
# After timeout, the clearance was ineffective



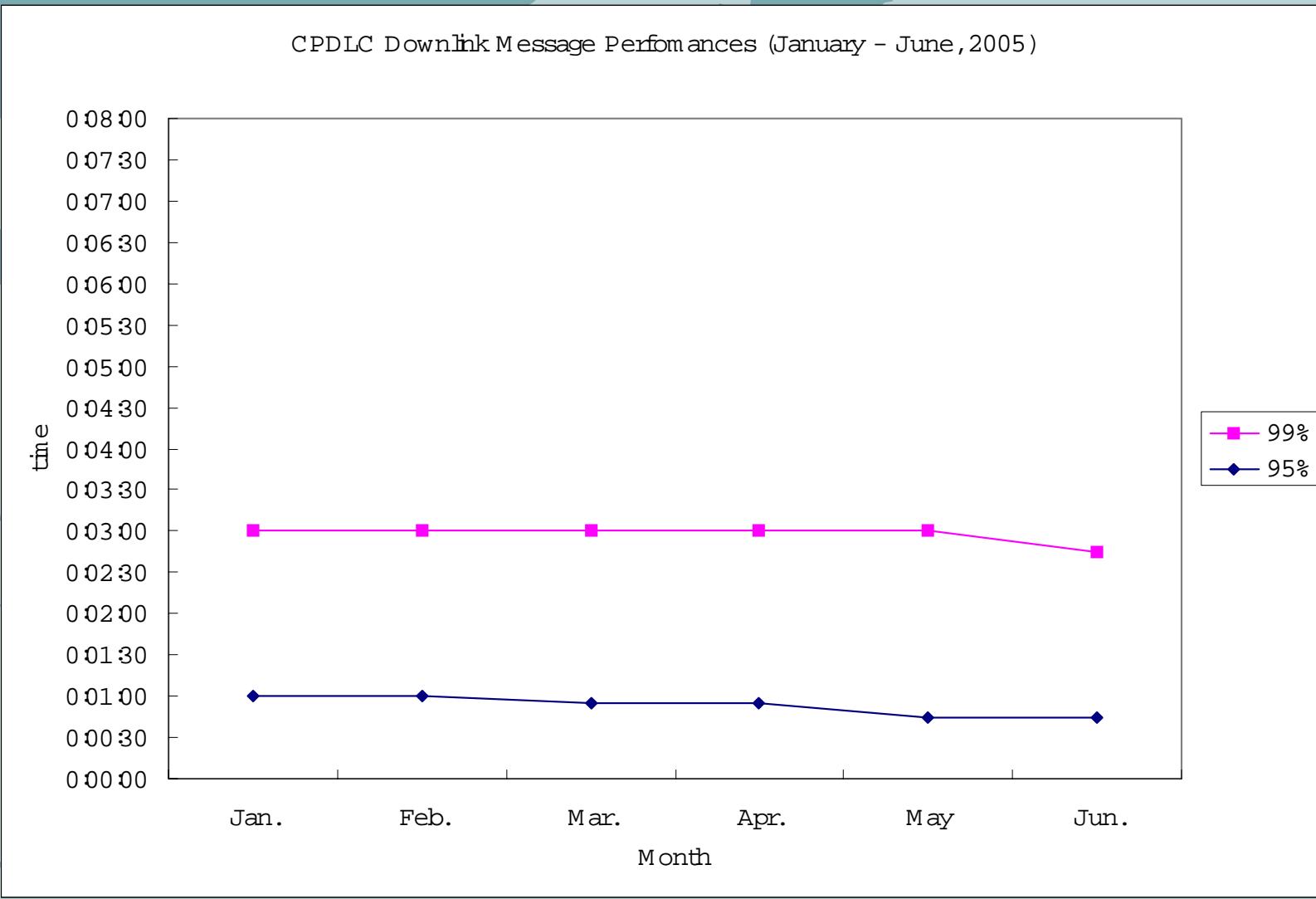


# Periodic Status Report

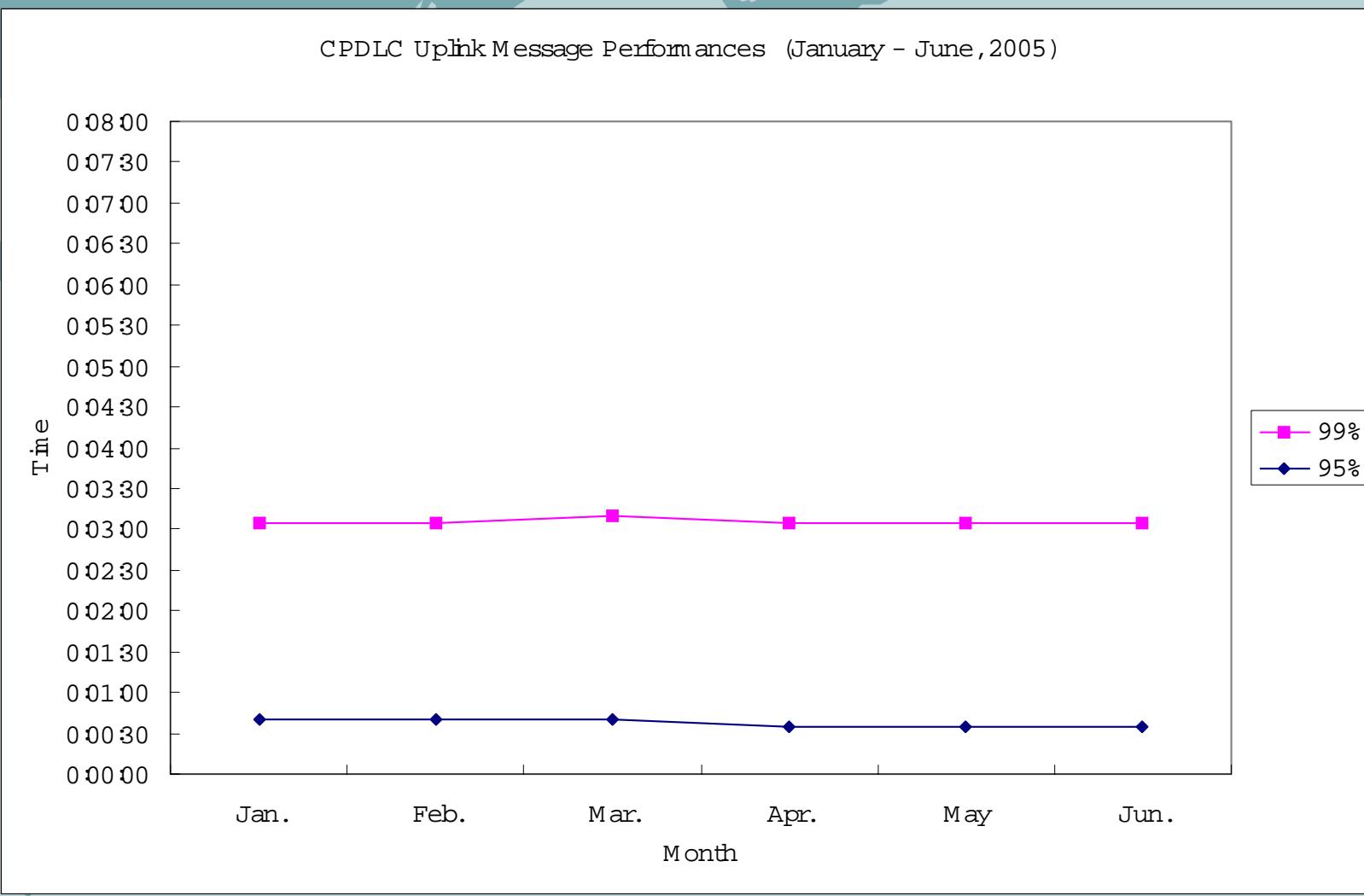
# Number of CPDLC messages



# CPDLC Downlink Message Performance



# CPDLC Uplink Message Performance



## Conclusion

**FIT CRA activities  
work for the safer and more stable  
ADS and CPDLC operations  
in the Asia/Pacific airspace.**



# **Thank You Very Much**

**Address of CRA Japan**

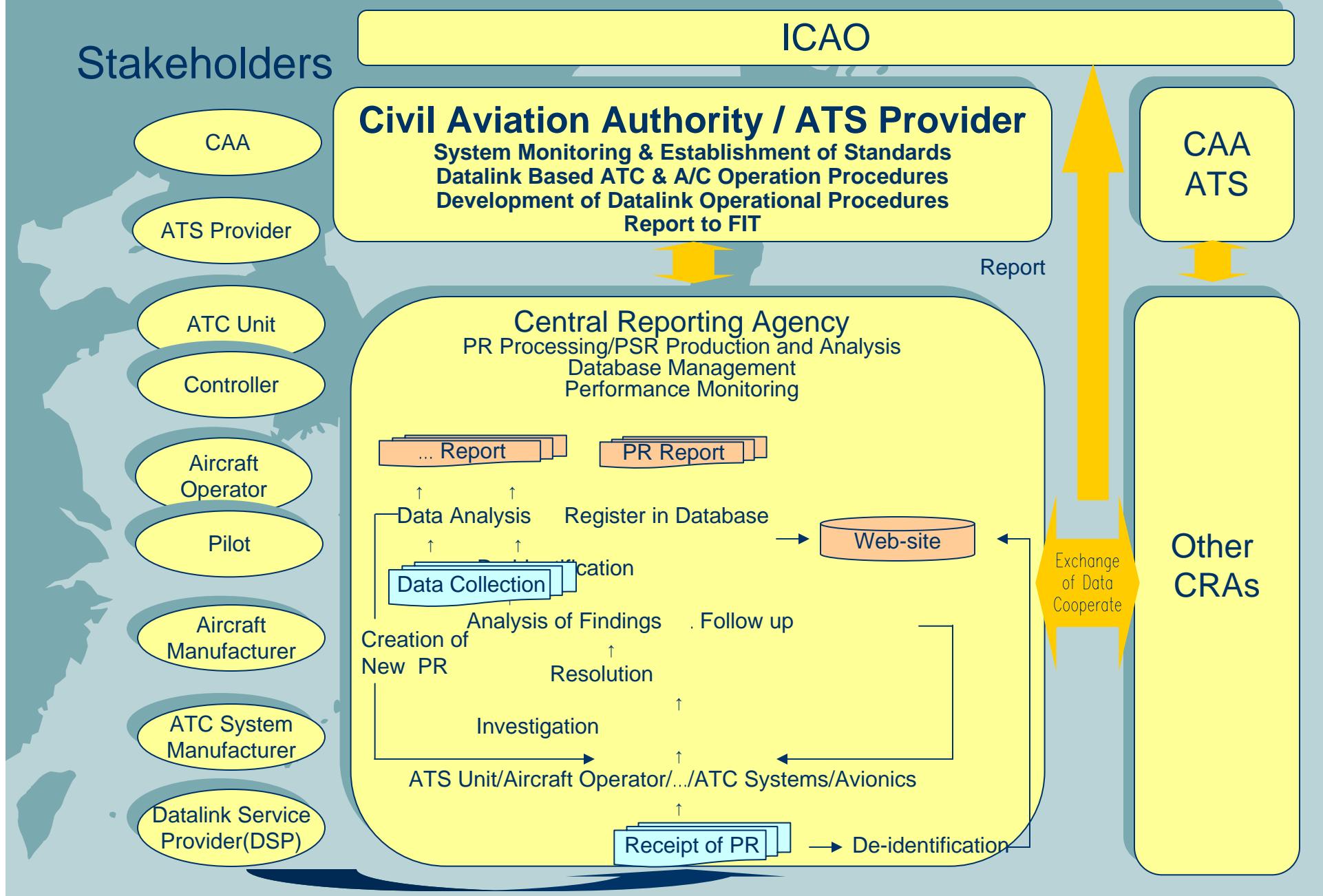
**crasa@cra-japan.org**

**Website**

**<http://www.crasa.cra-japan.org>**

**To be accessible to Problem Reports or  
Performance data, you are requested to sign  
Confidentiality Agreement**

# ATS Datalink Monitoring Structure and PRs & PSRs Process



**DRAFT GUIDANCE MATERIAL FOR  
END-TO-END SAFETY AND PERFORMANCE MONITORING OF  
AIR TRAFFIC SERVICE (ATS) DATALINK SYSTEMS  
IN THE ASIA/PACIFIC REGION**

## **1 Background**

1.1 The Asia Pacific Airspace Safety Monitoring (APASM) Task Force established by the Asia Pacific Air Navigation Planning Implementation Regional Group (APANPIRG) noted that requirements for monitoring aircraft height-keeping performance and the safety of reduced vertical separation minimum (RVSM) operations had been more comprehensively developed than for other Air Traffic Management (ATM) services, such as reduced horizontal separation based on required navigation performance (RNP), and monitoring of Air Traffic Services (ATS) datalink systems. For RVSM, a handbook with detailed guidance on the requirements for establishing and operating Regional Monitoring Agencies (RMA) was at an advanced stage of development by the ICAO Separation and Airspace Safety Panel (SASP). (The RMA Handbook has since been completed and is expected to be adopted by ICAO in 2005). There was no comparable document under development by ICAO for ATS datalink applications and so the APASM Task Force developed draft guidance material for the Asia/Pacific Region covering safety and performance monitoring for ATS datalink applications.

1.2 The experience gained by the Informal Pacific ATC Coordinating Group (IPACG) and the Informal South Pacific ATS Coordinating Group (ISPACG) FANS Interoperability Teams (FITs) and the supporting Central Reporting Agency (CRA) to monitor automatic dependent surveillance (ADS) and controller pilot datalink communication (CPDLC) performance for both aircraft and ground systems was used as a resource on which to develop monitoring guidance material.

1.3 The APASM Task Force was succeeded by the Regional Airspace Safety Monitoring Advisory Group (RASMAG) of APANPIRG, which decided to adopt this APASM material and further develop it to become the standard guidance material for end-to-end safety and performance monitoring of ATS datalink systems in the Asia Pacific region.

1.4 Within the remainder of the Asia Pacific Region, the Bay of Bengal and South East Asia Coordinating Groups are mirroring what has been done by IPACG and ISPACG and have created implementation teams and CRAs to accomplish this activity. These implementation teams also perform the interoperability activities which will continue after the implementation is complete. This guidance material focuses on interoperability issues, both prior to and following implementation.

## **2 Requirements for Safety and Performance Monitoring**

2.1 Annex 11, at 2.26.5, states:

“Any significant safety-related change to the ATC system, including the implementation of a reduced separation minimum or a new procedure, shall only be effected after a safety assessment has demonstrated that an acceptable level of safety will be met and users have been consulted. When appropriate, the responsible authority shall ensure that adequate provision is made for post-implementation monitoring to verify that the defined level of safety continues to be met.”

2.2 ATS datalink applications, such as ADS, CPDLC and ATS interfacility data communication (AIDC), are increasingly being used in support of separation and particularly of reduced separation minima. Accordingly, it is necessary to provide the monitoring required by Annex 11 to those

datalink services. Datalink services comprise both a technical and an operational element. These guidelines, which apply only to the technical element, propose a structure and methodology for monitoring the technical end-to-end safety performance of air-ground and ground-air datalink services. The operational aspects of datalink monitoring are carried out by the appropriate Safety Monitoring Agency (SMA).

2.3 Ground-ground datalink systems supporting applications such as AIDC are essentially simpler and more direct than air-ground systems, and monitoring can be achieved directly between the concerned ATS providers. However, it should be noted that States have a responsibility to ensure that monitoring of ground-ground datalink systems is carried out in support of the implementation of reduced separation minima. Monitoring of ground-ground datalink performance is outlined in Appendix A.

2.4 The requirement for on-going monitoring after implementation is based on several factors, including both degradation of performance with time and changes to equipment which may occur, either through modification or under renewal programmes. The use of ADS-B to support separation and the introduction of the Aeronautical Telecommunication Network (ATN) will bring significant changes to the system that will require monitoring programmes.

### **3 Purpose of Guidance Material**

3.1 The purpose of this guidance material is to:

- a) Provide a set of working principles common to all States implementing ATS datalink systems.
- b) Provide detailed guidance on the requirements for establishing and operating an interoperability team.
- c) Provide detailed guidance on the requirements for establishing and operating a Central Reporting Agency.
- d) Promote a standardized approach for implementation and monitoring within the Region.
- e) Promote interchange of information among different Regions to support common operational monitoring procedures.

### **4 Establishment and Operation of an Interoperability Team and CRA**

4.1 Recognizing the safety oversight responsibilities necessary to support the implementation and continued safe use of ATS datalink systems, the following standards apply to any organization intending to fill the role of an interoperability team:

- a) The organization must receive authority to act as an interoperability team as the result of a decision by a State, a group of States or a regional planning group, or by regional agreement.
- b) States should appoint a CRA that has the required tools and personnel with the technical skills and experience to carry out the CRA functions.
- c) States should ensure that the CRA is adequately funded to carry out its required functions.

## 5 Interoperability Teams

5.1 The technologies adopted to provide ATS datalink functionality exist in several different domains (e.g. aircraft, satellite, ground network, air traffic service units and human factors) and these elements must be successfully integrated across all domains. Airborne and ground equipment from many different vendors, as well as the sub-systems of several different communication networks, must inter-operate successfully to provide the required end-to-end system performance. In addition, standardised procedures must be coordinated among many different airlines and States to provide the desired operational performance. Technical and operational elements must then coalesce to allow the various applications to demonstrate mature and stable performance. Only then can essential benefits be realized.

5.2 A team approach to interoperability is essential to the success of any ATS datalink implementation, an important lesson learned by the ISPACG, whose members were the first to implement CNS/ATM applications using FANS 1/A systems. Stakeholders had worked closely together during the initial development and subsequent certification of FANS-1/A, but even though a problem-reporting system was in place when FANS-1/A operations commenced, many problems went unresolved and it was not possible in the short term to adopt the new operational procedures that would provide the expected benefits of higher traffic capacity and more economic routes. Therefore, an interoperability team was formed to address both technical and operational issues and help to ensure that benefits would result. However, the ISPACG also realized that a traditional industry team approach would not be effective. Daily attention and sometimes significant research would be required if the many issues were to be adequately resolved. To address these concerns, the interoperability team created a dedicated sub-team, the CRA, to perform the daily monitoring, coordination, testing, and problem research tasks outlined by the team. This approach is similar to that taken for RVSM implementations where supporting groups provide aircraft height keeping monitoring services.

5.3 Although the monitoring process described above was developed for FANS-1/A based CPDLC and ADS applications, it applies equally to ATN-based ATS applications. This was validated during the Preliminary EUROCONTROL Test of Air/ground data Link (PETAL) implementation of ATN-based ATS datalink services in Maastricht Area Control Centre.

### 5.4 Role of the Interoperability Team

5.4.1 The role of the interoperability team is to address technical and operational problems affecting the transit of datalink aircraft through international airspace. To do this, the interoperability team must oversee the end-to-end monitoring process to ensure the datalink system meets, and continues to meet, its performance, safety, and interoperability requirements and that operations and procedures are working as specified.

5.4.2 The specific tasks of an interoperability team are:

- a) Initiate and oversee problem reporting and problem resolution processes.
- b) Initiate and oversee end-to-end system performance monitoring processes.
- c) Oversee the implementation of new procedures.
- d) Report to the appropriate State regulatory authorities and to the appropriate ATS coordinating group.

5.4.3 Terms of reference for an interoperability team are shown at Appendix B.

## 5.5 Interoperability Team Members

5.5.1 The principal members of an interoperability team are the major stakeholders of the sub-systems that must interoperate to achieve the desired system performance and end-to-end operation. In the case of ATS datalink systems, the major stakeholders are aircraft operators, ATS providers, and communication service providers. Other stakeholders such as international organizations, and airframe and avionics manufacturers also play an important role and should be invited by the major stakeholders to contribute their expertise.

## 6 Central Reporting Agencies

6.1 Work must be done on a daily basis for an interoperability team to achieve its important goals of problem resolution, system performance assurance, and planning and testing of operations that will enable benefits. A dedicated sub-team, the CRA, is required to do the daily monitoring, coordination, testing and problem research tasks for the interoperability team. Appendix C shows a table of CRA tasks and the associated resource requirements.

6.2 A CRA should be established in order to determine the safety performance of the datalink systems before the implementation of reduced separation minima in a particular area, and it should remain active throughout the early stages of implementation. However, as the performance of the systems stabilises to a satisfactory level, it should be possible to reduce the number of CRAs in the region by combining responsibility for different areas.

6.3 The functions of a CRA are:

- a) To develop and administer problem report processes.
- b) To maintain a database of problem reports.
- c) To process monthly end-to-end system performance reports from air traffic service providers.
- d) To coordinate and test the implementation of new procedures resulting from ATS datalink systems for a given region.
- e) To administer and monitor an informal end-to-end configuration process.
- f) To manage data confidentiality agreements as required.
- g) To identify trends.
- h) To provide regular reports to the interoperability team.

## 6.4 CRA Resource Requirements

6.4.1 To be effective, the CRA must have dedicated staff and adequate tools. Staffing requirements will depend on the complexity of the region being monitored. There are several factors that affect regional complexity from an ATS monitoring standpoint such as dimensions of the airspace, variety in operating procedures, number of airlines, number of airborne equipment variants, number of air traffic service providers, number of ground equipment variants and number of communication service providers.

6.4.2 The CRA must be able to simulate an ATS ground station operational capability to the extent of exercising all combinations and ranges of CPDLC uplinks and ADS reports. The CRA must also have access to airborne equipment: a test bench is adequate, though engineering simulators that can be connected to either the ARINC or SITA communication network can offer additional capability for problem solving. In support of the datalink audit analysis task, the CRA must have software that can decode communication service provider audit data and produce usable reports. Without these tools it is virtually impossible for a CRA to resolve problems or monitor system performance.

6.4.3 Coordination is an important part of the CRA's job. In the pursuit of problem resolution, action item resolution, monitoring and testing, many issues arise that require coordination among the various stakeholders. The CRA has a primary responsibility to provide this coordination function as delegated by the interoperability team. Coordination between CRAs is also important, particularly to expand the information database on problems and trends; there may be a need for CRA coordination within the region and with CRAs in other regions. An incident may appear to be an isolated case, but the collation of similar reports by a CRA or the CRA coordinating group might indicate an area that needs more detailed examination

## 7 Working Principles for Central Reporting Agencies

7.1 The working principles in this guidance material result from the combined experience of the North Atlantic FANS Implementation Group, ISPACG FANS Interoperability Team, IPACG FANS Interoperability Team, and the ATN implementation in Maastricht ACC.

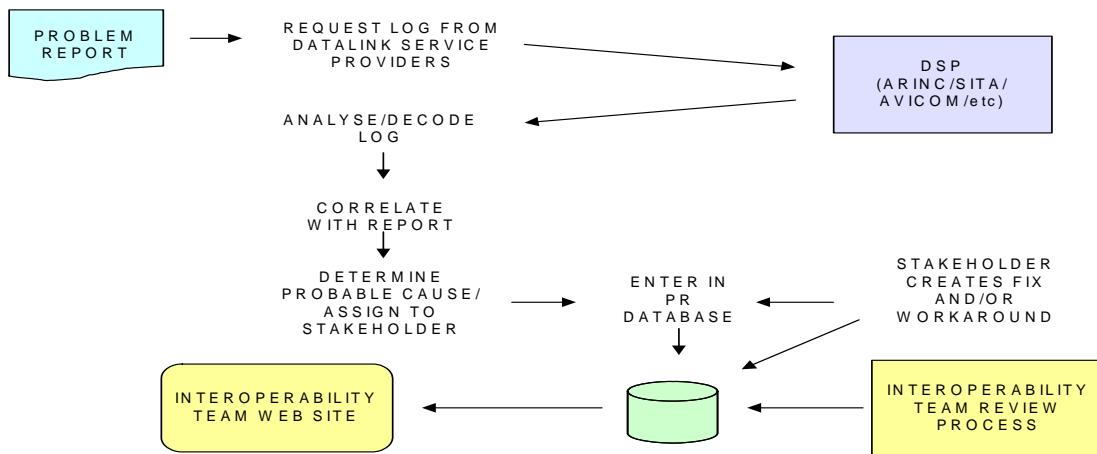
### 7.2 Confidentiality Agreements

7.2.1 Confidentiality of information is an established principle for problem reporting, and so reports must be de-identified before being made accessible to other agencies. However, it is necessary for the CRA to retain the identity of the original reports so that problem resolution and follow-up action can be taken.

7.2.2 The CRA must initiate and maintain confidentiality agreements with each entity providing problem reports.

### 7.3 Problem Identification and Resolution

7.3.1 The problem identification and resolution process, as it applies to an individual problem, consists of a data collection phase, followed by problem analysis and coordination with affected parties to secure a resolution, and recommendation of interim procedures to mitigate the problem in some instances. This is shown in the diagram below.



**7.3.2** The problem identification task begins with receipt of a report from a stakeholder, usually an operator, ATS provider or communication service provider. If the person reporting the problem has used the problem reporting form provided in the appropriate regional manual, then data collection can begin. If not, additional data may have to be requested from the person reporting the problem.

**7.3.3** The data collection phase consists of obtaining message logs from the appropriate parties (which will depend on which service providers were being used and operator service contracts). Today, this usually means obtaining logs for the appropriate period of time from the communication service providers involved. (In the future, with ATN development, additional providers will become involved and airborne recordings as per EUROCAE ED-112 should become available.) Usually, a log for a few hours before and after the event that was reported will suffice, but once the analysis has begun, it is sometimes necessary to request additional data, (perhaps for several days prior to the event if the problem appears to be an on-going one).

**7.3.4** Additionally, some airplane-specific recordings may be available that may assist in the data analysis task. These are not always requested initially as doing so would be an unacceptable imposition on the operators, but may occur when the nature of the problem has been clarified enough to indicate the line of investigation that needs to be pursued. These additional records include:

- Aircraft maintenance system logs.
- Built-In Test Equipment data dumps for some airplane systems.
- SATCOM activity logs.

**7.3.5** Logs and printouts from the flight crew and recordings/logs from the ATS provider(s) involved in the problem may also be necessary. It is important that the organization collecting data for the analysis task requests all this data in a timely manner, as much of it is subject to limited retention.

7.3.6 Once the data has been collected, the analysis can begin. For this, it is necessary to be able to decode all the messages involved, and a tool that can decode every ATS datalink message type used in the region is essential. These messages include:

- AFN (ARINC 622), ADS and CPDLC (RTCA DO-258/EUROCAE ED-100) in a region operating FANS-1/A.
- Context Management, ADS and CPDLC applications ICAO Doc 9705 and RTCA DO-280/ED-110) in a region using ATN.
- FIS or ARINC 623 messages used in the region.

7.3.7 The analysis of the decoded messages requires a thorough understanding of the complete message traffic, including:

- Media management messages.
- Relationship of ground-ground and air-ground traffic.
- Message envelope schemes used by the particular datalink technology (ACARS, ATN, etc).

7.3.8 The analyst must also have a good understanding of how the aircraft systems operate and interact to provide the ATS datalink functions, as many of the reported problems are airplane system problems.

7.3.9 This information will enable the analyst to determine a probable cause by working back from the area where the problem was noticed to where it began. In some cases, this may entail manual decoding of parts of messages based on the appropriate standard to identify particular encoding errors. It may also require lab testing using the airborne equipment (and sometimes the ground networks) to reliably assign the problem to a particular cause.

7.3.10 Once the problem has been identified, then the task of coordination with affected parties begins. The stakeholder who is assigned responsibility for fixing the problem must be contacted and a corrective action plan agreed.

7.3.11 This information (the problem description, the results of the analysis and the plan for corrective action) is then entered into a database covering datalink problems, both in a complete form to allow continued analysis and monitoring of the corrective action and in a de-identified form for the information of other stakeholders. These de-identified summaries are reported at the appropriate regional management forum.

#### 7.4 Mitigating Procedures

7.4.1 The CRA's responsibility does not end with determining the cause of the problem and identifying a fix. As part of that activity, and because a considerable period may elapse while software updates are applied to all aircraft in a fleet, procedural methods to mitigate the problem may have to be developed while the solution is being coordinated. The CRA should identify the need for such procedures and develop recommendations for implementation by the service providers and operators involved.

#### 7.5 Routine Datalink Performance Reporting

7.5.1 An important part of datalink safety performance is the measurement of the end-to-end performance. This should, of course, be carried out prior to implementation of new separation minima, but should continue on a regular basis to give assurance that the safety requirements continue to be met. Datalink performance assessment is based on round-trip time,

availability, integrity, reliability and continuity, and ATS providers should provide the CRA with regular measurements of these parameters.

7.5.2 The CRA will use the information supplied by ATS providers to produce a performance assessment against the established datalink requirements for the region. These requirements are set according to the separation minima being applied, and so may differ within different areas according to usage.

7.5.3 The CRA performance assessment should be made available to the RMA and SMA for their calculation of system performance against the minimum values defined in the FANS 1/A Operations Manual. The system performance criteria are at Appendix D.

7.5.4 ADS round-trip times are normally measured as the time between sending a contract request and receiving the associated Acknowledgement (ACK) or Message Assurance (MAS) message. CPDLC round-trip times are normally determined from the ATSU end-system time stamps for transmission of the uplink message and reception of the associated MAS.

7.5.5 ADS and CPDLC downlink one-way times are defined by the difference between the aircraft time stamp and the ASTU end-system reception time stamp.

7.5.6 ADS and CPDLC success rates are only available for uplink messages. The success rate is expressed as the percentage of messages that receive a successful ACK or MAS within a specified time.

7.5.7 AIDC round trip times may be obtained from the difference between message transmission and reception of the Logical Acknowledgement Message (LAM). The success rate is expressed as the percentage of messages that are successfully delivered to the destination ATSU.

## 7.6 Configuration Monitoring

7.6.1 A variety of technical systems are involved in the datalink process and changes, particularly to software and hardware parameters, are not infrequent; any change may have an impact on the overall performance of the datalink. It is therefore important that the CRA is kept informed of each change of configuration of each system. With this information it is often possible to identify changes that lead to improvements or deteriorations in the datalink performance or that may be associated with particular problems.

7.6.2 All ATS providers, communication service providers, aircraft operators and avionics suppliers should therefore report all system configuration changes to the CRA. The CRA will then maintain a database of configuration changes for each system or sub-system. It is not necessary for the CRA to know the details of changes, but where a change is expected to affect performance, information on the likely effect should be provided.

## 7.7 New Procedures and Improved Performance Requirements

7.7.1 The CRA may recommend new end-to-end datalink system performance requirements, either to accommodate new operational procedures or to take account of recognised problems.

7.7.2 The CRA may recommend the testing and implementation of new procedures.

## APPENDIX A

### METHODOLOGY FOR MONITORING AIDC

#### **1 Introduction**

1.1 AIDC plays an important role in ATC coordination, and may become a significant element of ATC in the support of reduced separation minima. The performance of AIDC operations should therefore be monitored as part of the required monitoring process prior to the implementation of reduced separation minima.

1.2 AIDC operates essentially over fixed networks and generally has only two or three involved parties: the ATS providers and network providers. It is therefore generally unnecessary to develop a FIT-type approach to safety monitoring; instead such monitoring and problem identification and resolution can be carried out directly by the concerned parties.

1.3 Because, in general, fixed networks are used for AIDC, continuous performance monitoring after implementation of reduced separation minima is not generally necessary, though annual performance and availability checks are recommended. Monitoring should also take place after any changes to the network or the end-user equipment. This will be particularly important during the implementation of the ATN.

#### **2 AIDC Technical Performance**

2.1 Two major criteria for monitoring AIDC technical performance are the achievement of acceptable delivery times and the reliability of message delivery. Delivery times can best be measured in terms of the end-to-end round trip time. Reliability is measured as the AIDC message delivery success rate.

#### **3 End-to-end Round-Trip Time**

3.1 The end-to-end round trip message time may be measured as the time difference between the transmission of an AIDC message and the reception of the corresponding Logical Acknowledgement Message (LAM) or Logical Rejection Message (LRM). If the originating AIDC system receives neither a LAM nor an LRM from the receiving system within a specified time limit (a variable system parameter, typically 5 minutes), it will declare a time-out, and the time parameter must be used as the round-trip time.

3.2 Any AIDC message requiring a LAM response may be used; CPL messages are perhaps the most used and therefore the most convenient.

3.3 A large number of measurements of round-trip times should be averaged for performance reporting.

#### **4 Message Delivery Success Rate**

4.1 The Message Delivery Success Rate may be expressed as the percentage of messages successfully delivered to the destination ATSU.

4.2 Unsuccessful delivery is indicated by either the reception of an LRM or a time-out due to non-reception of a LAM within a specified time.

4.3 Case-1: LRM Received

4.3.1 When an AIDC system detects an error in a received message, it responds with a Logical Reject Message (LRM) to the originating system. Receipt of the LRM indicates that the original message was not successfully delivered.

#### 4.4 Case-2: Time out

4.4.1 The time-out indicates non-delivery of the message (and initiates various actions within the AIDC system).

$$\text{Message Delivery Success Rate} = \frac{1 - (\text{LRM} + \text{TO})}{\text{TOT}}$$

Where:

LRM = number of received LRMs

TO = number of Time Outs

TOT = total number of messages

4.5 A large number of measurements of delivery success rates should be averaged for performance reporting.

## 5 Reporting

5.1 ATS providers should report the results of AIDC performance monitoring to RASMAC.

## 6 Caution

6.1 It is known that there are incompatibilities between some ATS end-systems leading to a situation in which a satisfactorily received message may not be able to be properly processed. In at least one case, the receiving system has been programmed to send neither LAM nor LRM in response to such messages.

6.2 This will result in a distortion of the true round-trip time and success rate for the originating end-system.

6.3 It is recommended that ATS providers ensure that all involved parties are aware of such situations so that affected messages may be excluded from the performance measurement data.

APPENDIX B

TERMS OF REFERENCE FOR AN INTEROPERABILITY TEAM

**Reporting and problem resolution processes**

- To establish a problem reporting system.
- To review de-identified problem reports and determine appropriate resolution.
- To identify trends.
- To develop interim operational procedures to mitigate the effects of problems until such time as they are resolved.
- To monitor the progress of problem resolution.
- To prepare summaries of problems encountered and their operational implications.

**System performance and monitoring processes**

- To determine and validate system performance requirements.
- To establish a performance monitoring system.
- To assess system performance based on information from the CRA.
- To authorise and coordinate system testing.
- To identify accountability for each element of the end-to-end system.
- To develop, document and implement a quality assurance plan that will provide a path to a more stable system.
- To identify configurations of the end-to-end system that provide acceptable datalink performance, and to ensure that such configurations are maintained by all stakeholders.

**New procedures**

- To coordinate testing in support of implementation of enhanced operational procedures

**Reporting**

- To report safety-related issues to the appropriate State or regulatory authorities for action
  - To provide reports to each meeting of the implementation team or ATS coordinating group, as appropriate.
  - To provide reports to RASMAG.
-

APPENDIX C

CRA TASKS AND RESOURCE REQUIREMENTS

**NOTE: CHANGE ORDER TO MATCH PARA 6.3**

<b>CRA Task</b>	<b>Resource Requirement</b>
Manage data confidentiality agreements as required	Legal services Technical expertise
Develop and administer problem report process: <ul style="list-style-type: none"><li>• de-identify all reports</li><li>• enter de-identified reports into a database</li><li>• keep the identified reports for processing</li><li>• request audit data from communication service providers</li><li>• assign responsibility for problem resolution where possible</li><li>• analyse the data</li></ul>	Problem reporting data base ATS audit decode capability Airborne test bench as a minimum, simulator highly recommended ATS simulation capability (CPDLC and ADS)
Identify trends	
<b>Coordinate and test the implementation of new procedures</b>	Airborne test bench as a minimum, simulator capability highly recommended ATS simulation capability (CPDLC and ADS) ATS audit decode and report capability Technical expertise Operational expertise
Administer and monitor an informal end-to-end configuration process.	Technical expertise
Report to the interoperability team	Technical expertise

APPENDIX D

FANS 1/A OPERATION MANUAL  
SYSTEM PERFORMANCE CRITERIA

The table below defines the minimum values to be met and verified. This does not prevent ATS service providers from negotiating more constraining contractual requirements with their communication service providers if it is thought necessary.

Criteria	Definition	Values
Performance	End to end round trip time for uplinks. (sending and reception of MAS)	Round trip time of 2 minutes, 95% of messages. Round trip time of 6 minutes, 99% of messages.
	End to end one way time for downlinks. (comparison of message time stamp and receipt time)	One way time of 1 minute, 95% of messages. One way time of 3 minutes, 99% of messages
	Uplink messages only: Undelivered messages will be determined by: <ul style="list-style-type: none"> <li>• Message assurance failure is received. After trying VHF and, SATCOM Depending on reason code received, the message might, in fact, have reached the aircraft.</li> <li>• No message assurance or flight crew response is received by ATSU after 900 seconds</li> </ul>	Less than 1% of all attempted messages undelivered
Availability	The ability of the network data link service to perform a required function under given conditions at a given time:  The maximum allowed time of continuous unavailability or downtime should be declared MTTR (Mean Time To Repair) *	99.9%  TBD
Reliability	The ability of a data link application/system to perform a required function under given conditions for a given time interval: it can be expressed in MTBF (Mean Time Between failure) *	TBD
Integrity	The probability of an undetected failure, event or occurrence within a given time interval.	$10^{-6}$ /hour

\* Availability = MTBF x 100/(MTBF+MTTR)

*Note: RTCA SC189/EUROCAE WG 53 defines the performance requirements for specific operational environments.*

— END —

## FIT- BOB TASK LIST

(last updated November 2005)

	<b>ACTION ITEM</b>	<b>TIME FRAME</b>	<b>RESPONSIBLE PARTY</b>	<b>Status</b>	<b>REMARKS</b>
1.	ATS providers to adopt the FOM and to review and update their ATSU operating procedures to align with the FOM.	Ongoing activity as additional States join the operational trial.	All States	Ongoing	<p>Important all ATSU adopt common operating procedures.</p> <p>APANPIRG/15 (August 2004) agreed that the FANS1/A Operations Manual (FOM) be used as the basis for ADS and CPDLC operations in conjunction with Annex 10, PANS/ATM and regional guidance material.</p>
2.	ATS providers to coordinate with adjacent ACCs to review and update letters of agreement for introduction of ADS/CPDLC services on a trial basis.	Ongoing activity as additional States join the operational trial.	All States	Ongoing	Ensure common ATC procedures applied.
3.	Issue NOTAM on the commencement of the operational trial in line with the model NOTAM provided by FIT-BOB/3.	Ongoing activity as additional States join the operational trial.	All States	Ongoing	<p>Some States have already issued NOTAM on their operational trial.</p> <p><u>India to revise NOTAM</u></p> <p><u>Sri Lanka to issue new AIC for recommencement of trial</u></p>

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	ACTION ITEM	TIME FRAME	RESPONSIBLE PARTY	Status	REMARKS
4.	Coordinate with BOB States <b>not present at FIT-BOB/4</b> on implementation of the operational trial..	Ongoing activity as additional States join the operational trial.	ICAO, Malaysia, Sri Lanka, Myanmar, Bangladesh	Ongoing	Determine status on trial participation  <b>Sri Lanka planning to recommence trial in June/July 2005</b>
5.	Coordinate with Indian Ocean States on harmonizing implementation of operational trial.	As soon as practicable	ICAO APAC BOB and Indian Ocean States	Ongoing	Operational trial underway in BOB since February 2004 .
6.	Coordinate with Middle East and East African Regional Offices on implementation of operational trial in the Arabian Sea and Indian Ocean.	As soon as practicable	ICAO APAC	Ongoing	To harmonize inter-regional implementation of ADS/CPDLC and to ensure common operating procedures established.  <b>APANPIRG/16 to be advised of expansion of implementation plan to whole of the Indian Ocean and formation of coordination group</b>  <b>APANPIRG/16 not advised because expansion on hold due limitations in Regional Office ATM Resources</b>  <b>Secretariat to inform Middle East and East African offices of Arabian Sea trial from January 2006.</b>
7.	Collecting of ADS/CPDLC problem reports and submit to CRA.	Immediate	States, operators	Ongoing	To be submitted as soon as practicable to facilitate analyzing the reports.  <b>BOB CRA (Boeing) planned operation TBA from May/June 2005.</b>

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	<b>ACTION ITEM</b>	<b>TIME FRAME</b>	<b>RESPONSIBLE PARTY</b>	<b>Status</b>	<b>REMARKS</b>
8.	Establish provision of monthly monitoring date ADS/CPDLC system performance data to be submitted to the CRA.	Monthly	States	Ongoing	Essential for evaluating overall system performance within the trial airspace.  BOB CRA (Boeing) planned operation TBA from May/June 2005.
9.	Compile data on aircraft ADS/CPDLC equipped in the trial airspace.	6 monthly	States, IATA	Ongoing	To keep record of aircraft participating in the trial and determine overall benefits derived by population of aircraft operating in the trial airspace.
10.	Training of controllers and technical staff on ADS/CPDLC operational procedures based on the FOM.	Ongoing activity as additional States join the operational trial.	States	Ongoing	
11.	Nominate contact person (ATS and technical) and keep details updated.	As soon as practicable	States, operators	Ongoing	Important that CRA has contact with engineering personnel to analyze problem reports and performance data.  Contact person included in table of ADS/CPDLC and ATS status retained by FIT-BOB  BOB CRA (Boeing) planned operation TBA from May/June 2005.

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	ACTION ITEM	TIME FRAME	RESPONSIBLE PARTY	Status	REMARKS
12.	Establish data confidentiality agreements with States and operators participating in the trial airspace.	Immediate	CRA, States and operators	As required	Necessary to establish agreement with data providers for release of data and to de-identify reports.
13.	Include on aeronautical charts logon address of ATSU's providing ADS/CPDLC services using the FIR code.	As soon as practicable	ICAO	Ongoing  Closed	Annex 4 amendment to be considered  Annex 15 amendment being progressed by ICAO HQ, effective November 2007. Amendment requires States to include in AIP list of log on codes for what services and where.
14.	Update ICAO Guidance material on CNS/ATM Operations in APAC Region.	As soon as practicable	ICAO	Ongoing	Part III harmonized with FOM.  ICAO Headquarters continuing the review/harmonisation of Guidance Material.
15.	Coordinate with FOM editorial group on request for change to the FOM.	As required	BOB FOM editor	Ongoing	BOB FOM editor to be nominated  FOM includes Request for Change (RFC) processes. Send all FOM RFCs to the Regional Office.

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	ACTION ITEM	TIME FRAME	RESPONSIBLE PARTY	Status	REMARKS
16.	Establish CRA.	As soon as practicable	States/IATA/ Boeing	Ongoing	<p>SCM regarding CRA funding held December 2003. Boeing &amp; IATA coordinating funding arrangements for CRA and process expected to be completed April 2005.</p> <p>Additional SCM BOB CRA held June 2005.</p> <p>BOB CRA (Boeing) planned operation TBA from May/June 2005.</p>
17.	Provide authorization for IATA to invoice and collect user charges to fund the CRA, and States to enter into agreement with IATA to provide required data.	As soon as practicable	BOB States/ IATA	Ongoing	<p>In coordination with IATA States to issue AIP SUP notifying users of charging for CRA services for operators using ADS/CPDLC in BOB data link service area</p> <p>BOB CRA (Boeing) planned operation TBA from May/June 2005.</p>

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**FIT- SEA TASK LIST**

(last updated November 2005)

	<b>ACTION ITEM</b>	<b>TIME FRAME</b>	<b>RESPONSIBLE PARTY</b>	<b>Status</b>	<b>REMARKS</b>
1.	ATS providers to adopt the FOM and to review and update their ATSU operating procedures to align with the FOM.	Ongoing activity as additional States join the operational trial.	All States	Ongoing	Important all ATSU adopt common operating procedures.  APANPIRG/15 (August 2004) agreed that the FANS1/A Operations Manual (FOM) be used as the basis for ADS and CPDLC operations in conjunction with Annex 10, PANS/ATM and regional guidance material.
2.	ATS providers to coordinate with adjacent ACCs to review and update letters of agreement for introduction of ADS/CPDLC services on a trial basis.	Ongoing activity as additional States join the operational trial.	All States	Ongoing	Ensure common ATC procedures applied.
3.	Issue NOTAM on the commencement of the operational trial in line with the model NOTAM provided by FIT-BOB/3.	Ongoing activity as additional States join the operational trial.	All States	Ongoing	Singapore has issued NOTAM on availability of ADS/CPDLC services in the Singapore FIR
4.	Coordinate with SEA States on implementation of the operational trial..	Ongoing activity as additional States join the operational trial.	All States	Ongoing	Determine status on trial participation  Tables of ADS/CPDLC equipage and ATS Status prepared and retained by FIT-SEA

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	<b>ACTION ITEM</b>	<b>TIME FRAME</b>	<b>RESPONSIBLE PARTY</b>	<b>Status</b>	<b>REMARKS</b>
5.	As States join the operational trial collect ADS/CPDLC problem reports and submit to CRA.	Immediate	States, operators	Ongoing	<p>To be submitted as soon as practicable to facilitate analyzing the reports.</p> <p>FIT-SEA CRA operated by CRA Japan expected to undertake CRA services from late 2005.</p> <p>Singapore to provide data to CRA Japan FIT-SEA CRA.</p>
6.	Establish provision of monthly monitoring date ADS/CPDLC system performance data to be submitted to the CRA.	Monthly	States	Ongoing	<p>Essential for evaluating overall system performance within the trial airspace.</p> <p>FIT-SEA CRA operated by CRA Japan expected to undertake CRA services from late 2005.</p> <p>.</p>
7.	Compile data on aircraft ADS/CPDLC equipped in the trial airspace.	6 monthly	States, IATA	Ongoing	To keep record of aircraft participating in the trial and determine overall benefits derived by population of aircraft operating in the trial airspace.
8.	Training of controllers and technical staff on ADS/CPDLC operational procedures based on the FOM.	Ongoing activity as additional States join the operational trial.	States	Ongoing	

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	<b>ACTION ITEM</b>	<b>TIME FRAME</b>	<b>RESPONSIBLE PARTY</b>	<b>Status</b>	<b>REMARKS</b>
9.	Nominate contact person (ATS and technical) and keep details updated.	As soon as practicable	States, operators	Ongoing	<p>Important that CRA has contact with engineering personnel to analyze problem reports and performance data.</p> <p>Contact person included in table of ADS/CPDLC and ATS status retained by FIT-SEA</p> <p><b>FIT-SEA CRA operated by CRA Japan</b> expected to undertake CRA services from late 2005.</p>
10.	Establish data confidentiality agreements with States and operators participating in the trial airspace.	Prior to commencement of operational trial	CRA, States and operators	As required	To establish agreement with States , operators and data providers for release of data and to de-identify reports.
11.	Include on aeronautical charts logon address of ATSUs providing ADS/CPDLC services using the FIR code.	As soon as practicable	States/ ICAO	Ongoing Closed	Annex 4 amendment to be considered Annex 15 amendment being progressed by ICAO HQ, effective November 2007. Amendment requires States to include in AIP list of log on codes for what services and where.
12.	Update ICAO Guidance material on CNS/ATM Operations in APAC Region.	As soon as practicable	ICAO	Ongoing	<p>Part III harmonized with FOM.</p> <p>ICAO Headquarters continuing the review/harmonisation of Guidance Material.</p>

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	<b>ACTION ITEM</b>	<b>TIME FRAME</b>	<b>RESPONSIBLE PARTY</b>	<b>Status</b>	<b>REMARKS</b>
13.	Coordinate with FOM editorial group on request for change to the FOM.	As required	SEA FOM editor	Ongoing	SEA FOM editor to be nominated.  FOM includes Request for Change (RFC) processes. Send all FOM RFCs to the Regional Office.
14.	Establish CRA	As soon as practicable	ICAO APAC/States/ CRA Japan	Ongoing Closed	Regional Office to confirm with States not present at FIT-SEA/2 on acceptance of CRA Japan as the SEA CRA.  Regional Office transmitted letters (ATM 0248 & 0249) to Viet Nam and Indonesia on 3 June 2005, including TOR and Task List.  <b>FIT-SEA CRA operated by CRA Japan to undertake CRA services from late 2005.</b>
15.	Provide details of processes necessary to set up and operate the SEA CRA	FIT-SEA/3	SEA States/ CRA Japan/ participating industry partners	Ongoing	CRA Japan to provide information at FIT-SEA/3  <b>FIT-SEA/3 endorsed terms of reference, task list and problem reporting arrangements for FIT-SEA CRA operated by CRA Japan.</b>

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2005

**International Civil Aviation Organization**

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- The FDA team
- Off-the-shelf packages

**LINE OPERATIONS SAFETY AUDIT (LOSA) PROGRAMME****Introduction****ICAO's role****Terminology**

- Threats
- Errors
- Threat and error management
- Systemic countermeasures

**Defining Characteristics of LOSA****Safety Change Process****Implementing LOSA****CABIN SAFETY PROGRAMME****General****ICAO Requirements****Managing Cabin Safety**

- Commitment
- Positive safety culture
- SOP's checklists and briefings
- Hazard and Incident reporting
- Training for Cabin Safety
- Safety oversight

**Appendices**

1. Sample company policy on non-punitive hazard reporting
2. Examples of items to be reported in an airline occurrence reporting system
3. Sample Memorandum Of Understanding between an airline and a pilots association for the operation of a flight data analysis (FDA) programme
4. Human Factors Affecting Cabin Safety
5. Safety Reporting for Flight Attendants

**Chapter 17 – AIR TRAFFIC SERVICES OPERATIONS****ATS Safety**

- General
- ICAO requirements
- Functions of the ATS Safety Regulatory Authority
- Safety Manager

**ATS Safety Management Systems**

- Safety Performance Indicator And Safety Targets
- Effective Direction
- Safety Organization
- Risk Management
- Incident Reporting Systems
- Emergency Response
- Safety Investigations
- Safety Oversight
- Managing Change

**Changing ATS Procedures****Threat and Error Management****Normal Operations Safety Surveys (NOSS)****Appendices:**

1. Human Factors in Air Traffic Services
2. Risk Assessment of ATS Procedures
3. Threat and Error Management in ATS

**Chapter 18 - AERODROME OPERATIONS****Airport Safety - General****Regulatory Framework**

- ICAO Requirement for Safety Management
- State Responsibilities
- Approaches to Discharge of Regulatory Responsibilities

**Aerodrome Safety Management**

- Airport Operator Safety Management System
- Scope for Airport Safety Management
- Coherent direction
- SM and safety committee(s)
- Safety Occurrence Reporting
- Safety oversight
- Safety Audits

**Airport Emergency Response Planning**

- Coordinated response
- Airport emergency response exercises

**Airport Ramp Safety**

- Ramp work environment
- Causes of ramp accidents
- Safety management on the ramp
- Vehicle operations

**Role of Airline Safety Manager in Ground Safety****Chapter 19 – Aircraft Maintenance****Maintenance Safety — General****Managing Safety in Maintenance**

- Corporate approach to safety
  - Organizing for safety
  - Documentation and records management
  - Resource allocations
  - Safety culture
- Principal tools for safety management in maintenance
- Safety oversight and programme evaluation

**Managing Procedural Deviations in Maintenance**

- Maintenance Error Decision Aid (MEDA)

**Safety Manager's Concerns****Appendix**

1. Maintenance Working Conditions
  2. Précis on the Maintenance Error Decision Aid (MEDA)
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