



International Civil Aviation Organization

The Combined Sixth Meeting of the FANS Implementation Team, Bay of Bengal (FIT-BOB/6) and the Third Meeting of the FANS Implementation Team, South-East Asia (FIT-SEA/3)

Bangkok, Thailand, 22 – 25 November 2005

Agenda Item 4: Central Reporting Agency – Bay of Bengal

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

(Presented by the Secretariat on behalf of Boeing)

SUMMARY

This paper proposes draft Terms of Reference and supporting guidance in respect of the responsibilities of the Central Reporting Agency (CRA) in support of the FANS Interoperability Team for the Bay Of Bengal (FIT – BOB). It also describes the process and procedures used by operators and ATSUs involved with FIT – BOB to report problems and monitor network system performance.

1 INTRODUCTION

1.1 In establishing the ADS/CPDLC Operational Trial for the Bay of Bengal, FIT-BOB/3 (February 2004) had accepted an offer by the Boeing Company to provide CRA services for the operational trial, noting that Boeing would not be able to commence the CRA operation until a contract was in place, and agreed that the operational trial could commence as planned on AIRAC date 19 February 2004. Accordingly, IATA and Boeing were requested to pursue the establishment of a contract on behalf of the FIT-BOB States participating in the operational trial for Boeing to set up and operate the CRA. IATA agreed to the arrangements and would work with Boeing to evaluate the costs of operating the CRA, arrange for a contract with Boeing, and collect the funds from the airspace users concerned.

1.2 The Regional Office undertook to continue coordination with Boeing in respect of CRA implementation activities. Although many of the CRA requirements were already contained in FANS 1/A Operations Manual, it was likely that further coordination between the States and the CRA in respect of CRA requirements would be necessary prior to commencing CRA services. For example, States would be expected to sign a confidentiality agreement with the CRA in respect of the provision of traffic movement and other data to the CRA.

2 DISCUSSION

2.1 The Regional Office had requested that the 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. In the mean time, India and Sri Lanka were encouraged to continue reporting problems in accordance with the existing arrangements as described in the FANS 1/A Operations Manual.

2.2 The Boeing CRA had provided initial guidance by way of the CRA Terms of Reference and supporting guidance material included in the **Attachment** to this paper.

3 ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) Review and discuss the draft Terms of Reference and supporting guidance for the BOB CRA contained in this paper,
- b) Update the draft Terms of Reference and supporting guidance based on the results of discussions at the meeting, and
- c) Provide feedback to the Boeing CRA in respect of the updated Terms of Reference and supporting guidance.

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**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.

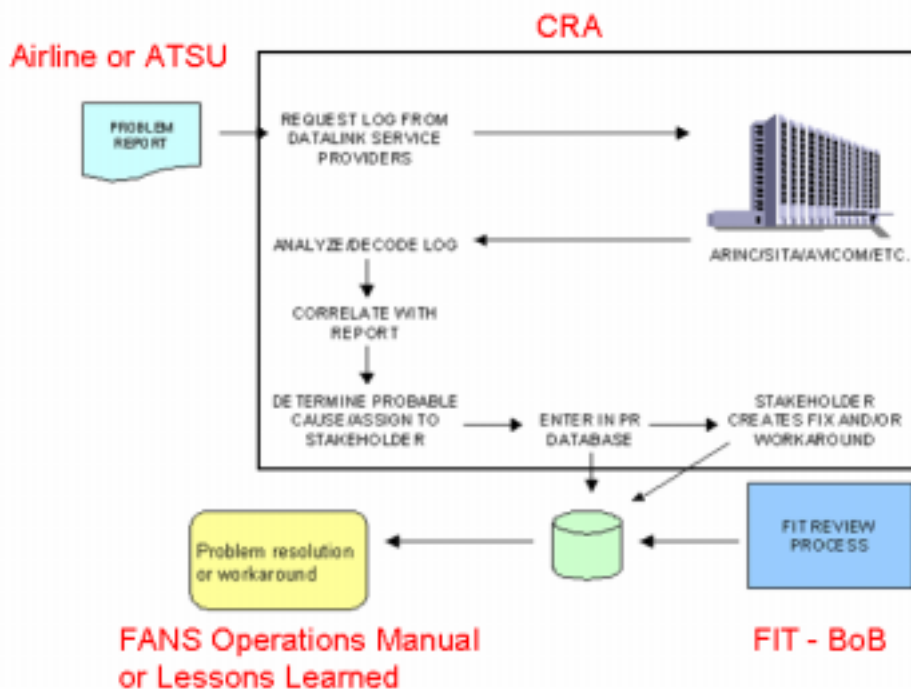
Tool requirements are as follows. The CRA must be able to simulate an ATS ground station to the extent of exercising all combinations and ranges of controller-pilot data link communications (CPDLC) uplinks and automatic dependent surveillance (ADS) reports. The CRA must also have access to airborne equipment. 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.

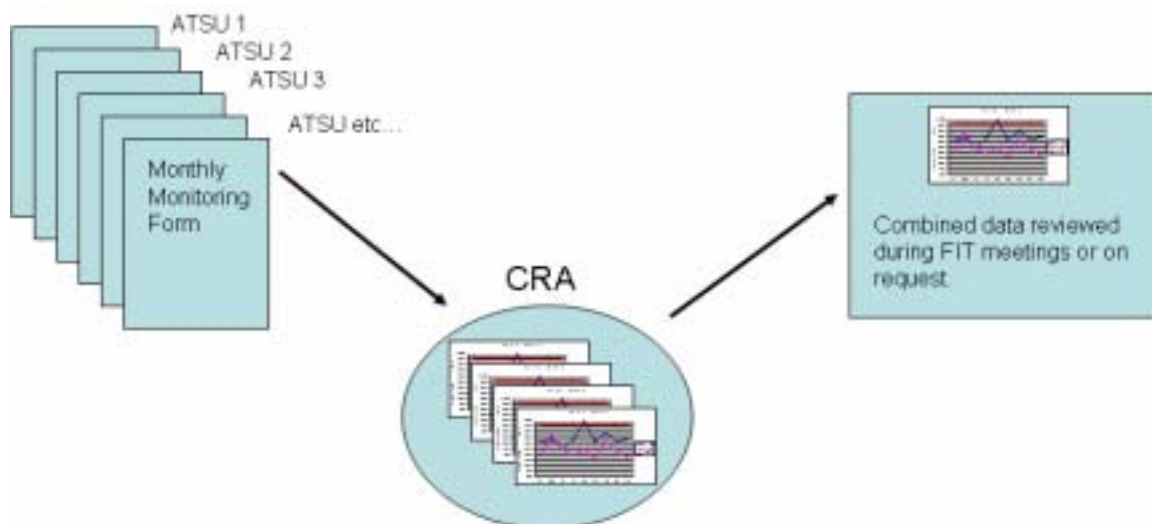
1.3 Monthly Status Report Process Description

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