



International Civil Aviation Organization

**NINETEENTH MEETING OF THE COMMUNICATIONS/NAVIGATION
AND SURVEILLANCE SUB-GROUP (CNS SG/19) OF APANPIRG**

Bangkok, Thailand, 20 – 24 July 2015

Agenda Item 2.3: Report of meetings relevant to CNS

FIT-ASIA/4 AND RASMAG/20 OUTCOMES

(Presented by the Secretariat)

SUMMARY

This paper presents the outcomes of the FIT-Asia/4 and RASMAG/20 meetings.

1. INTRODUCTION

1.1 The Fourth Meeting of the Future Air Navigation Systems Interoperability Team-Asia (FIT-Asia/4) was held on 25 May 2015 at Bangkok, Thailand and the Twentieth Meeting of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/20) was held from 26-28 May 2015 at the same venue.

1.2 A total of 61 participants attended either or both the FIT-Asia/4 and RASMAG/20 meetings from Australia, Bangladesh, China, India, Indonesia, Japan, Lao PDR, Mongolia, Philippines, Republic of Korea, Singapore, Thailand, the United States, Viet Nam, IATA, and ICAO.

2. DISCUSSION

CRA Services

2.1 FIT-Asia/3 had been informed that there was a considerable lack of data-link problem reporting among FIT-Asia States and airspace users, and few FIT-Asia States had arrangements in place for the analysis of problem reports by a competent Central Reporting Agency (CRA). While the number of States making arrangements for the analysis of problem reports had improved, the FIT-Asia/4 noted that overall there had been little reporting of both problems and performance data.

2.2 The meeting was reminded that the FIT-Asia Terms of Reference (TOR) required *inter-alia*, that it conducted activities to support FIT-Asia participant States' compliance with ICAO Annex 11 – *Air Traffic Services* and Global Operational Data-Link Document (GOLD) requirements for data-link performance. Moreover, FIT-Asia/4 recalled that monitoring, reporting and analysis of data-link performance and problems was essential for the achievement and maintenance of system performance required for the application of RNP based separation standards.

2.3 FIT-Asia/4 was reminded that Conclusion24/24: *ADS/C and CPDLC Problem Reporting and Analysis* requested FIT-Asia States to register on the FIT-Asia website (<http://www.ispacg-cra.com>), and report their registration to the ICAO Asia/Pacific Regional Office by 31 December

2013 and report problems relating to Automatic Dependent Surveillance-Contract (ADS-C) and Controller Pilot Data-Link Communications (CPDLC) services to the CRA for analysis.

2.4 **Table 1** lists the FIT-Asia administrations that had either implemented ADS-C/CPDLC, or were expected to do so under the Asia/Pacific Seamless ATM Plan, and their FIT-Asia CRA registration status.

Administration	Data-Link (ADS-C/CPDLC) Service Status	Seamless ATM Expectation (Nov 2015)	FIT-Asia CRA Registration
China	Implemented	YES	YES
India	Implemented	YES	YES
Indonesia	Implemented	YES	YES
Malaysia		YES	YES
Myanmar	Implemented	YES	YES
Maldives	Implemented	YES	YES
Philippines		YES	SEASMA*
Singapore	Implemented	YES	SEASMA*
Sri Lanka	Implemented	YES	
Thailand			
Viet Nam	Implemented	YES	SEASMA* YES
* <i>The South East Asia Safety Monitoring Agency (SEASMA) provides CRA service for Philippines, Singapore and Viet Nam. Current SEAMA CRA arrangements expire September 2016.</i>			

Table 1: FIT-Asia ADS-C/CPDLC Implementation and CRA Registration Status.

2.5 Since FIT-Asia/3, only two administrations had submitted problem reports to FIT-Asia CRA. The FIT-Asia CRA website administrator had noted that several Problem Reports (PRs) could not be assessed, as the data link service provider only retained logs for 90 days. In addition, only three administrations had submitted performance data analysis to FIT-Asia/4.

2.6 IATA had contracted Boeing on behalf of Airports Authority of India to provide CRA services for Indian and South Asian Flight Information Regions (FIRs). IATA was in the process of renewing the CRA service contract with Boeing until 31 December 2016, and expected to continue this arrangement to at least 2018 or until AAI indicated a wish to take over the CRA service. The service covered the airspace of India, Maldives, Myanmar and Sri Lanka, and would also cover Bangladesh when data link services were implemented there.

CRA Problem Reports Analysis

2.7 The Boeing CRA presented an analysis of data link problem reports analysed since FIT-Asia/3. States were urged to access the CRA website and enter PRs immediately, to allow for timely data retrieval and analysis of data. The meeting noted that there were occasional difficulties in logging on to the CRA website. Boeing CRA was requested to provide further information on the CRA workflow, and more clarity on how to use the website.

2.8 It was also noted that most of the problems reported related to fundamental errors, indicating a lack of familiarity with GOLD procedures and guidance. While States should be familiar with GOLD, it was recognized that it would be beneficial to provide a short video presentation of known problem areas, particularly CPDLC hand-off processes.

2.9 Boeing CRA informed the meeting that any new ATS unit coming on line or making automation system changes could contact Boeing CRA to arrange data link functional and performance testing using their test-bed facilities.

Data Link Performance Reports

2.10 China provided data link performance data for the period October 2014 to March 2015, for the L888 route. The performance data was measured against CPDLC Actual Communications Performance (ACP) for messages sent within three centres (Chengdu, Lanzhou and Urumqi per media type media type (Satellite, Very High Frequency - VHF and High Frequency - HF) was measured against the 95% 320 second and 99.9% 370 second Required Communication Performance (RCP) 400 specification. The ADS-C downlink latency of HF failed to meet the 95% target, due to the long latency of the messages from some HF stations. In discussing the HF latency, it was agreed that China would provide information on which aircraft types were reverting to HF, and Boeing CRA would then endeavour to determine why.

2.11 Singapore presented data link performance for the Singapore FIR for the period May 2014 to April 2015. The performance data was measured against GOLD RCP and RSP requirements. Data link performance in the Singapore FIR generally met the RCP 240 and RSP 180 performance requirements, either meeting or just falling below the 99.9% performance targets and meeting the 95% targets.

2.12 India provided the FIT-Asia/4 meeting with analysis of the observed performance of the ADS/CPDLC data link within the Chennai Flight Information Region during a twelve month period from January 2014 to December 2014 by the Bay of Bengal Arabian Sea Indian Ocean Safety Monitoring Agency (BOBASMA). The GOLD Performance Analysis Tool (GPAT) tool version 3 was used for monitoring Chennai FIR data link performance. All operators satisfied RCP-240 criteria of 95 percent of transactions within 180 seconds, but only a few operators met the criteria of 99.9 percentage transitions within 210 seconds. The ATM automation systems at Mumbai, Delhi and Kolkata were being upgraded so as to enable collection of ADS and CPDLC data for performance monitoring of the ground systems. India also advised the meeting that approximately 62% of the traffic within the Chennai FIR were data link equipped.

2.13 Indonesia presented information on planned integration of ADS-C/CPDLC with the Jakarta Air Traffic Services Centre (JATSC). An operational trial had been running in the Jakarta FIR, and operational implementation was expected in September 2015. Data link services had been provided in the Ujung Pandang FIR since 23 September 2010.

Revised Data Link Performance Reporting Template and Guidance

2.14 The Asia/Pacific Region Data Link Performance Reporting Template, developed by FIT-Asia/2, was found to be in need of further editorial and structural amendment. There was also a need for some brief guidance for the use of the template. The FIT-Asia/4 considered an updated template and guidance, which mainly consisted of error removal, and restructuring of content and format.

2.15 The FIT-Asia/4 meeting agreed that a common January - December data link performance reporting period each year should be used by FIT-Asia States. It was also suggested that reporting of outages should also be provided for in the template; thus the meeting agreed to a Draft Decision. The following Draft Conclusion was endorsed by RASMAG/20, for consideration by APANPIRG/26:

Draft Conclusion RASMAG/20-1: Data Link Performance Reporting Template and Guidance

That, the revised Data Link Performance Reporting Template and Guidance at **Appendix D to the Report** replaces the Data Link Performance Reporting Template on the ICAO Asia/Pacific Regional Office website.

Operational Significance of 99.9% Performance Criteria

2.16 FIT-Asia TF/4 discussed the operational significance of the 99.9% data link performance criteria, and what could be done in cases of ACP, Actual Communication Technical Performance (ACTP) and ADS-C downlink latency ‘just’ failing to meet the standard. GOLD Appendix D paragraph D 2.4.7.5 was reviewed. To support the performance objectives of the Seamless ATM Plan, and to ensure consistency of performance monitoring, analysis and reporting and CRA problem reporting among FIT-Asia States, a Draft Conclusion was developed. The following Draft Conclusion was endorsed by RASMAG/20, for consideration by the APANPIRG/26:

Draft Conclusion RASMAG/20-2: Data Link Performance Guidelines

That, FIT-Asia States are urged to:

- a) Monitor data link performance against the RCP240 and RSP180 criteria specified in Appendix B of the Global Operational Data Link Document (GOLD); and
- b) apply the guidelines specified in the GOLD Appendix D to determine whether fleet performance (the aggregate fleet of all data link aircraft operating in the airspace concerned, except only where it related to analysis of individual operator performance) either:
 - i. meets the 99.9% performance level; or
 - ii. requires submission of CRA problem reports and/or investigation that will attempt to determine the cause of the degradation.

Note: Gold Version 2.0 Appendix D Paragraph D.2.4.7.5.2 refers.

Air Navigation Service Deficiencies

2.17 Regarding the lack of response to Conclusion24/24: *ADS/C and CPDLC Problem Reporting and Analysis*, the FIT-Asia/4 meeting agreed to a Draft Conclusion. The following Draft Conclusion was endorsed by RASMAG/20, for consideration by APANPIRG/26:

Draft Conclusion RASMAG/20-3: ANS Deficiencies Relating to Data Link Performance Monitoring and Analysis

That, an Air Navigation Deficiency should be raised against non-implementation of the provisions of Annex 11 Paragraph 2.27.5 when any FIT-Asia administration has implemented operational ADS-C/CPDLC services and:

- a) has not made arrangements for the reporting and analysis of data link problems to a competent CRA as identified by the Regional Airspace Safety Monitoring Advisory Group (RASMAG); or
- b) does not report data link problems to the CRA; or
- c) does not provide data link problem analysis reports to a recognized FANS Interoperability/Implementation Team (FIT); or
- d) does not provide data-link performance analysis reports to a recognized FIT.

2.18 The FIT-Asia/4 and RASMAG/20 meetings agreed to the additions to the Deficiency List at **Appendix A**.

MAAR Safety Report

2.19 The Monitoring Agency for the Asian Region (MAAR) provided the results of the airspace safety oversight for the RVSM operation in the Bay of Bengal (BOB), Western Pacific/South China Sea (WPAC/SCS), and Mongolian airspace for 2014 to RASMAG/20.

2.20 The BOB RVSM airspace overall risk was estimated to be **18.73 x 10⁻⁹**, which did not meet the TLS by a substantial margin. This represented a major increase in apparent risk, which was probably caused by improved reporting. The MAAR stated that the Transfer of Control (TOC) points between the Chennai and Kuala Lumpur FIRs remained the most prominent hot spots in the region. They noted that there had been a series of ATS Inter-Facility Data Link Communications (AIDC) trials between Chennai and Kuala Lumpur FIRs, but it was unclear when this technology would become operational.

2.21 **Figure 1** presents collision risk estimate trends during 2014.

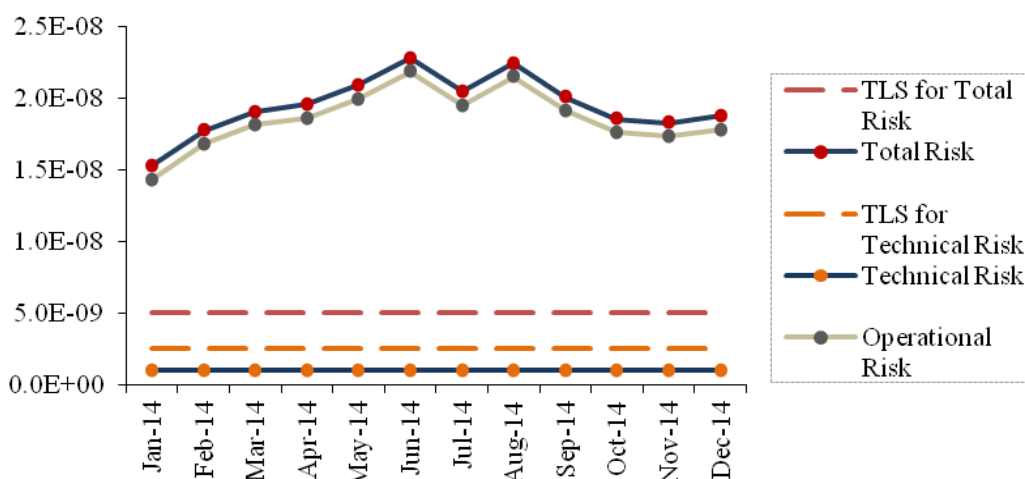


Figure 1: BOB Airspace RVSM Risk Estimate Trends

2.22 In relation to some of the other hotspots identified in the report, the RASMAG Chairman referred to GADER and sought information of what had changed to reduce the numbers of LHDs so significantly. ICAO advised that it probably had been influenced by the new Flight Level Allocation Scheme (FLAS) that has been introduced in Iranian airspace. This resulted in a significant change as controller workload has been reduced and as a result coordination errors had reduced. India advised that in an effort to resolve the hotspots to the east of the airspace, an AIDC trial will start between India and Malaysia in the near future and that an ADS-B data sharing agreement had been signed with Myanmar which should help reduce LHDs.

2.23 The WPAC/SCS RVSM airspace total risk was estimated to be **4.14 x 10⁻⁹**, which met the TLS. The meeting recognised that this was an improvement in safety performance since 2013.

2.24 Regarding the WPAC/SCS airspace, NOMAN and SABNO TOC points along the Hong Kong - Manila FIR boundary were the main hot spots. The number of occurrences at DOTMI on the Guangzhou/Hong Kong FIR boundary (all incorrect transfers occurred from China) and OSANU on the Manila/Kota Kinabalu FIR interface (most from flights being transferred from the Philippines) were relatively high. However the LHD durations were low since the accepting ATS units had radar surveillance, but this increased controller workload and still entailed unnecessary risk.

2.25 Even though the overall risk was below the TLS, the meeting recognised that the Philippines, Hong Kong, and Malaysia should still prioritize AIDC implementations between Hong Kong – Manila FIRs and Kota Kinabalu – Manila FIRs.

2.26 The Mongolian RVSM airspace total risk was estimated at 2.98×10^{-9} , which met the TLS and represented a major advance on 2013's results. RASMAG/20 recalled the positive effect of ATS surveillance in reducing risk within the Ulaanbaatar FIR by allowing rapid intervention, allowing less exposure to risk-bearing events. Due to the high number of LHD occurrences near NIXAL and INTIK, Mongolia had extended Secondary Surveillance Radar (SSR) coverage by about 30NM beyond its FIR boundary since December 2014.

Regional Safety Monitoring Assessment (WP24)

2.27 ICAO presented an overview of safety assessment results from a regional perspective. **Figure 5** indicated the status as reported to RASMAG/20.

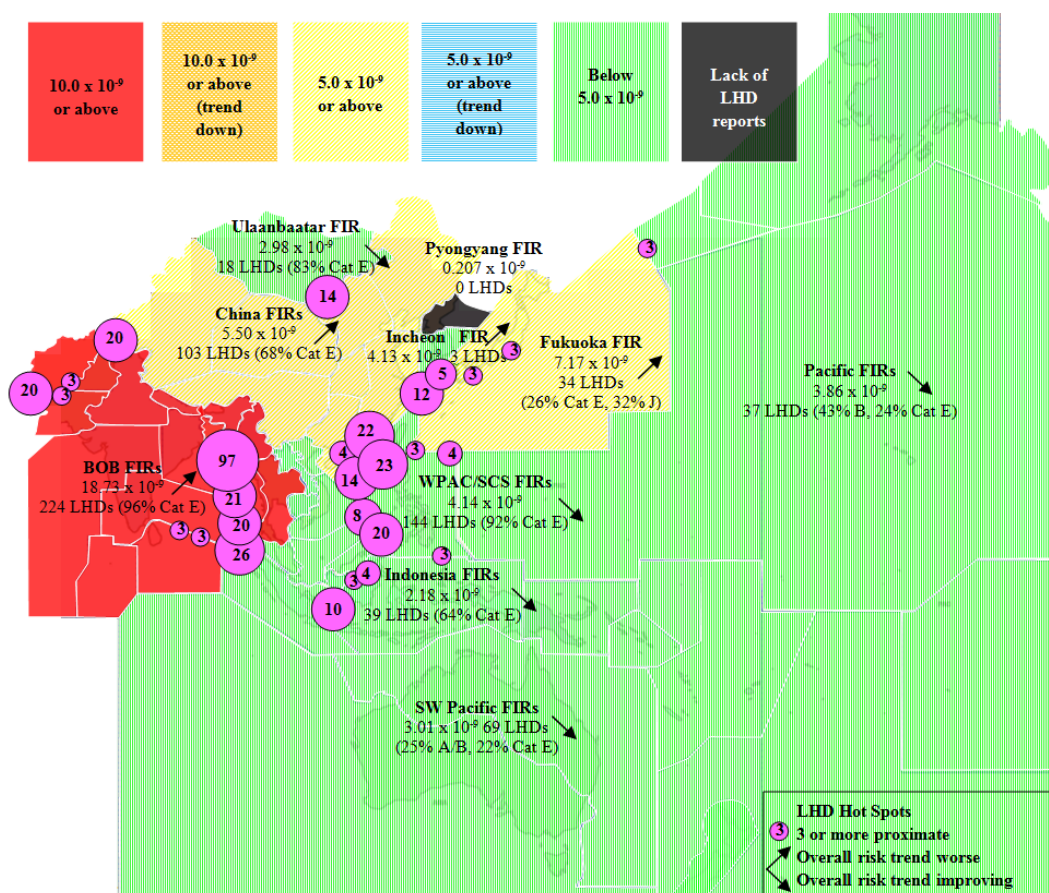


Figure 2: Asia/Pacific TLS compliance reported to RASMAG/20

2.28 **Figure 2** indicated the following sub-regional regional trends.

- **South Asia:** the improved reporting by India has resulted in a further significant degradation in the Bay of Bengal (BOB) safety risk assessment to reflect the true safety performance that had been hidden – one that greatly exceeded the TLS and remained the Asia/Pacific's highest risk area. However, the States concerned were taking a number of ATM improvement actions that were expected to substantially reduce risk during 2015 and 2016 when the new systems were implemented (however, there was no confirmation as to when the new communications and surveillance systems on Great Nicobar Island would be operational).

While the increased reporting at Indian FIR boundary TOC points was laudable, it appeared unlikely that there could be no LHDs as reported within Indian continental airspace; thus further work was necessary to sensitise ATC to an appropriate reporting culture.

There were a number of hot spots evident on the Kabul FIR boundary, most notably at position GADER (between the Tehran and Kabul FIRs); however since late 2014 these LHDs had markedly reduced after intervention by MAAR in coordination with the ICAO Middle East (MID) Region.

- **Southeast Asia** reflected an overall improvement in safety risk, even with an increase in reported LHDs. The Philippines airspace remained a major concern, with numerous LHDs evident at all points along the Manila FIR boundary. The greater use of AIDC and ATS surveillance in the South China Sea, and an ATM system upgrade for the Manila FIR continued to require a priority focus.
- **East Asia:** China recorded a dramatic increase in reported LHDs, resulting in its airspace being well over TLS. This reflected a much improved reporting culture, fostered by the efforts of the China RMA. Other than the known hot spots between Pakistan and Chinese airspace near PURPA and between Mongolia and China near NIXAL, new hot spots were revealed between Shanghai/Taipei, Guangzhou/Hong Kong and Sanya/Hong Kong FIRs. China had made significant progress in addressing the PURPA hot spot by improving the communication and surveillance capabilities in this area.

Attention to the other hot spots in the congested airspace of Eastern China was also required, particularly as these were mainly operational ATC errors in general that could be improved with the use of AIDC and more robust procedures (note: the volume of occurrences between Hong Kong and the Sanya/ Guangzhou FIRs may require an urgent focus on such matters as airspace dimensions, ATS route structures, Flight Level Allocation Scheme (FLAS), ATS coordination procedures and the management of the aerodromes within the Pearl River Delta using a 'metroplex' planning methodology).

Mongolian airspace observed a downward trend in risk, despite a doubling of the reported LHDs – mainly due to the improved intervention capability using ATS surveillance (note: there were several LHDs reported in MAAR's analysis of the Ulaanbaatar/Beijing FIR boundary at NIXAL and INTIK which do not appear to have been reported to the China RMA; thus the work on improving the reporting culture within China should continue)

The Pyongyang FIR continued to record no LHDs, which was statistically possible, given the low estimated flight hours. However, no LHDs had been reported for many years; thus it was likely that there was a lack of reporting culture within this airspace, despite China's past efforts to sensitise DPRK ATC.

Japanese airspace had shown a marked upward (worsening) risk trend; despite the number of LHDs reducing (this was assumed to be due to the longer duration of the LHDs). The significant number of ATC interface errors with the Incheon FIR was concerning, as this was related to the 'AKARA' corridor. The corridor was, a complex airspace serving very high density traffic between China and Japan, and the ROK and the Taipei FIR that used a FLAS, with multiple frequencies and control authorities in the same area. It would appear to be necessary for the involved administrations to urgently review this airspace and its associated procedures (note: AIDC was being used between the ROK and Japan).

- **Southwest Pacific:** all FIRs showed a downward trend, with significant improvement in the performance of Indonesian airspace. However some caution was necessary, as there had still been major interface issues between the Jakarta and Ujung Pandang FIRs, and reporting had been a problem in the past in this airspace. In summary, the result indicated a positive safety result from the efforts of the AAMA, regulators and ANSPs in the FIRs concerned, although Indonesia needed continued focus on its internal improvement programme (note: there were several LHDs reported in MAAR's analysis of the Kota Kinabalu/Jakarta FIR boundary which do not appear to have been reported to AAMA).
- **Pacific:** the Pacific showed a significant risk improvement, even though the number of LHDs more than doubled (mainly occurring in the high density North Pacific Organised Track System (NOPAC) and Hawaiian route system).

2.29 The Regional analysis of 'hot spots' indicated a number of priority high risk areas where APANPIRG needed to take specific action, in order to reduce risk to an acceptable level. Notwithstanding the establishment of the Asia/Pacific ATS Inter-facility Data Link Communication Implementation Task Force (APA TF/1) and on-going ATM improvement programmes designed to enhance the capability of ATC, RASMAG/20 agreed to the following Draft Conclusion related to Special Coordination Meetings (SCM) in order of assumed risk (as presented to RASMAG) to ensure an urgent reduction of risk for consideration by APANPIRG/26:

Draft Conclusion RASMAG/20-4: Asia/Pacific LHD Hot Spot Action Plans

That, the following Regional Monitoring Agencies (RMAs), States and ATC units should take urgent action* to establish a scrutiny group or an alternate means to address the following Large Height Deviation (LHD) hot spot areas and present Action Plans and details of progress made to the ICAO Regional Office, prior to 01 January 2016:

- a) MAAR, India, Myanmar and Malaysia – Kolkata/Chennai FIRs interface with Yangon/Kuala Lumpur FIRs;
- b) PARMO, China RMA, JASMA, MAAR, China, Japan, Republic of Korea and Taipei Area Control Centre (ACC) – Incheon FIR AKARA Corridor interface with Shanghai/Fukuoka/Taipei FIRs;
- c) China RMA, MAAR, China and Hong Kong China— Hong Kong FIR interface with Guangzhou/Sanya FIRs;
- d) MAAR, AAMA, JASMA, Hong Kong China, Indonesia, Japan and the Philippines – Manila FIR interface with Fukuoka/Hong Kong China/Singapore/Ujung Pandang FIRs; and
- e) China RMA, MAAR, China and Pakistan – Urumqi FIR interface with Lahore FIR.

**Action should be taken as soon as practicable, even prior to APANPIRG/26 if possible.*

Note: the RMAs in bold were expected to take the lead in organising the scrutiny groups or alternative means to address the issues.

Pakistan - China ATC Coordination Errors Update

2.30 In RASMAG/18, China RMA reported there were communication issues between China Urumqi ACC and the Lahore ACC (Pakistan), and the increasing number of LHDs due to ATC coordination errors. China RMA had a side meeting with the Pakistan delegation during CNS SG/18 meeting in July 2014. China planned to establish Very Small Aperture Terminal (VSAT) stations near the borders to improve the communication and surveillance capability between China and Pakistan. A China – Pakistan Communication Coordination meeting was held in Beijing in May 2015 to discuss the VSAT station project requirement.

ADS-B Out Data Height Reference for Monitoring

2.31 The United States noted that RASMAG, MAWG and RMACG had previously discussed the difficulty in using ADS-B Out data for estimating aircraft height-keeping performance. A determination of the aircraft reference height was possible in some regions, but in some areas it is not possible to determine whether Height Above Ellipsoid (HAE) or Mean Sea Level (MSL) was used as the reference frame.

2.32 One of the key data fields in ADS-B Out messages used to estimate aircraft ASE was the ‘Geometric Height Difference from Barometric’ subfield. Both the FAA and EUROCONTROL have certification guidance for ADS-B Out installations that guaranteed HAE was used in accordance with guidance in RTCA DO-260A and RTCA DO-260B. The ICAO Aeronautical Surveillance Panel (ASP) Technical Subgroup (TSG) were proposing changes to ICAO Doc 9871 and RTCA DO-260B to facilitate the use of HAE only.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the information contained in this paper;
- b) note paragraph 2.15 (Draft Conclusion RASMAG/20-1: Data Link Performance Reporting Template and Guidance);
- c) note paragraph 2.16 Draft Conclusion RASMAG/20-2: Data Link Performance Guidelines;
- d) note paragraph 2.17 Draft Conclusion RASMAG/20-3: ANS Deficiencies Relating to Data Link Performance Monitoring and Analysis;
- e) note paragraph 2.68 Draft Conclusion RASMAG/20-4: Asia/Pacific LHD Hot Spot Action Plans; and
- f) discuss any relevant matters as appropriate.
