



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 6.3: Other surveillance related issues

INTER-REGIONAL ADS-C REPORTING INTERVAL TASK FORCE

(Presented by the Secretariat)

SUMMARY

This paper presents outcomes of Forty-Fifth Meeting of the North Atlantic Implementation Management Group (NAT IMG/45) held in Paris from 10 to 13 November 2014.

Action by meeting is provided in Section 3.

1. Introduction

1.1 The Forty-Fifth Meeting of the North Atlantic Implementation Management Group (NAT IMG/45) in November 2014, among other issues, reviewed the need for a study to determine the minimum ADS-C periodic report intervals.

1.2 As request from ICAO Paris Office, coordination with APANPIRG for establishment of an inter-regional APAC/NAT Inter-regional ADS-C Report Interval Task Force was proposed. ICAO Secretariat was requested to provide the proposal to respective States/Administrations through the APANPIRG Sub-group to seek their consent to the proposed way forward. The Terms of Reference of the Task Force agreed by the NAT IMG is provided in **Appendix A** to this paper

1.3 An initial teleconference of the Task Force was held on 7 July 2015 (No States/Administration from APAC participate the conference). The report of Teleconference/1 is provided at **Appendix B** to this paper for easy reference.

2. Discussion

2.1 The NAT IMG made Decision 45/11 to investigate existing FANS 1/A data link implementations to determine the technically feasible minimum ADS-C periodic reporting interval.

2.2 The NAT IMG recalled that NAT IMG/44 in reviewing the recommendation to task the NAT CNSG to conduct a study to determine the minimum ADS-C periodic report intervals, had agreed that before approving such a study, requiring involvement of stakeholders outside the NAT CNSG, clear answers regarding the need, the scope of data collected and for what purpose it would be used were required. In this respect, the NAT IMG agreed to task the NAT CNSG to develop a framework of the study clearly indicating its scope and expected output.

2.3 The NAT IMG noted that the FANS 1/A Interoperability Standard (RTCA DO 258A/EUROCAE ED 100A) specified a minimum ADS-C periodic reporting interval of 64 seconds for each of up to five possible ADS periodic contracts. However, early on, Airbus and Boeing certification testing had identified that system performance would significantly deteriorate, particularly if each ADS-C periodic contract specified such intervals. Any potential issues with using short (i.e. 64 seconds) ADS-C periodic reporting intervals could impact NAT planning and implementation initiatives as well as have global implications. Specifying a short ADS-C periodic reporting interval in one part of the world may affect system performance in other parts of the world.

2.4 The NAT IMG also noted that the ICAO Separation and Airspace Safety Panel (SASP) was developing new standards for applying separation minima based on ADS-C that were expected to specify minimum ADS-C periodic reporting intervals that are shorter (as short as 4 minutes) than the current 14 minute reporting interval specified for the application of a 55.5 km (30 NM) longitudinal separation minimum.

2.5 The NAT IMG was informed that a new global initiative had arisen out of the loss of MH370 (as well as the older AFR447 accident) addressing the perceived need to constantly track aircraft on a global basis for the purpose, inter alia, of reducing the size of the potential search area should an aircraft be lost. An international meeting convened by ICAO concluded that IATA, with support from ICAO, would investigate solutions to effectively implement global tracking of aircraft. Using ADS-C to report position at one minute (64 second) periodic intervals in abnormal circumstances was currently among the near-term options.

2.6 Taking into account the vast investment that was instigated by aircraft operators and ANSPs in FANS 1/A systems, the NAT IMG considered appropriate to investigate the performance capabilities of the end-to-end FANS 1/A system in order to be able to maximize the benefits that can be derived from the system.

2.7 Therefore, the NAT IMG agreed that an inter-regional task force with the terms of reference as provided at **Appendix A** to determine the technically feasible minimum reporting interval. Therefore, the following decision was agreed.

NAT IMG Decision 45/11 – Inter-regional ADS-C Reporting Interval Task Force

That, the ICAO Regional Director, Europe and North Atlantic, take appropriate measures to coordinate with the ICAO Asia and Pacific (APAC) Regional Office and Asia/Pacific Air Navigation Planning Group (APANPIRG) to establish an Inter-regional Automatic Dependent Surveillance – Contract (ADS-C) Reporting Interval Task Force to determine the technically feasible minimum ADS-C periodic reporting interval in accordance with the terms of reference as provided at Appendix N (*to NAT IMG/45 meeting report*).

2.8 From APAC Secretariat perspective, the meeting is invited to note the following points when discussing this proposal:

- Separation standards lower than 30NM in the Asia/Pacific may have very rare application, and are unlikely to be endorsed for regional use unless there is a global standard (experience has shown that even 30NM is used infrequently);
- In the future, higher density organized track systems such as the NOPAC (North Pacific) may occasionally need a lesser separation (however it should be noted that wake turbulence and the difficulty of managing smaller separations between conflict pairs over long distances means it is unlikely to be applied on anything but the rarest of circumstances);
- The cost of the increased reporting rate must be considered in terms of the deliverable of this work which would be part of the study by the Task Force as CSP (communication service provider) would also be involved;
- ICAO HQ advised that although the Separation and Airspace Safety Panel (SASP) would be interested in this work from a theoretical standpoint, this is not a priority task for SASP at this time; and
- In terms of the SAR deliverables, the Global Aeronautical Distress and Safety System (GADSS) concept has already conducted some trials through the Normal Tracking Implementation Initiative (NATII) to determine that the communication system can manage an increased ADS-C reporting rate much less than 14 minutes for a single aircraft. However it unlikely that this is the case if a large number of aircraft also have a rapid reporting rate.

2.9 States/Administrations with operational experience and in a position to do are encouraged to participate in the work of Task Force to provide input and contributions from APAC perspective.

3. Action by the Meeting

3.1 The meeting is invited to note the information provided in this paper;

3.2 Review the Terms of Reference in Appendix A and make appropriate recommendation for consideration by APANPIRG;

3.3 States/Administrations in a position to do so, be urged to participate in the study and provide input and contribution to the study.

APPENDIX A

TERMS OF REFERENCE OF THE INTER-REGIONAL ADS-C REPORTING INTERVAL TASK FORCE

(paragraph 7.21 refers of NAT IMG meeting report)

Reporting structure

The Task Force would report jointly to the executive bodies of the NAT SPG and APANPIRG.

Purpose

This study will investigate existing FANS 1/A data link implementations to determine the technically feasible minimum ADS-C periodic reporting interval. The study will:

- a) Gain a better understanding of the sensitivities to system loading based on ADS-C reporting intervals that are used;
- a) Determine minimum ADC C periodic reporting interval that would be technically feasible under specified conditions and without significantly impacting operational performance;
- b) Determine benefit to the regions in their planning and implementation of future ATM concepts of operation (e.g. NAT Service Development Roadmap and future 2025 concept of operations);
- c) Support validation of future standards for applying separation minima based on ADS-C, such as 37 km (20 NM) longitudinal separation minimum, currently under development by the Separation and Airspace Safety Panel (SASP); and

The primary intent of convening an inter-regional task force is to prepare a report that would support regional planning and implementation initiatives, the development of ICAO manuals, such as *Global Operational Data Link Document* (Doc [GOLD]), and proposed amendments to Annexes and *Procedures for Air Navigation Services* (PANS).

Scope of Work:

The study may include analysis, testing and operational trials and address the following elements:

- a) The avionics (up to and including the communications components);
- b) The VHF sub-network (the RGS capacity aspect);
- c) The ground/ground sub-network (including the ATSU connections);
- d) The inter-networking connection;
- e) The satellite sub-network (the per satellite/GES aspect);
- f) ATS automation systems; and
- g) Interaction between intervals and latency, including impact on communication performance.

The issue of "minimum technically feasible report interval" has at least three dimensions that will be considered:

- a) Single ground-recipient (and thus single contract), single aircraft;
- b) Multiple ground-recipients (up to five contracts), single aircraft; and
- c) Multiple ground-recipients (up to five contracts with each aircraft), multiple aircraft.

Composition

The Task Force is composed of multidisciplinary experts with relevant knowledge from contributory groups of the NAT SPG, APANPIRG and ICAO Secretariat; OPLINKP, SASP, communications service providers, satellite companies, aircraft manufacturers and aircraft operators. The TF may consult with outside experts, as required.

Conduct of the work and schedule

It is anticipated that the Task Force will conduct its work primarily by teleconferences and other electronic means of communications. The Task Force would only hold any direct meetings as deemed necessary and as agreed by its members.

The tentative completion date for this task would be early 2016 to support regional coordination and provide the final report at NAT SPG/52 and APANPIRG/27.

Deliverables

The Task Force will produce the following:

- a) a report on the sensitivities and effects of specifying short ADS-C periodic reporting intervals on system capability and performance;
- b) a statement on the economic aspects; and
- c) other material, as determined necessary, such as analysis/test plans and results to substantiate the conclusions and any proposed changes Doc [GOLD], or other manuals and regional documents.

APPENDIX B

ADS C REPORTING INTERVAL TASK FORCE (TELECONFERENCE/1) (NAT IMG Decision 45/11 refers) 07/07/2015 (15:00-17:00 CEST)

1. Attended:

Marine GLIMOIS - AIRBUS
Noel DWYER - Canada
Bjarni STEFANSSON . - Iceland
Steve PINKERTON - United States
Tom KRAFT - United States
Adam KOCSE – United States
Gary COLLEDGE – INMARSAT
Andrew IVES. – INMARSAT
Elkhan NAHMADOV – ICAO EUR/NAT

2. Nominated members:

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3. Observers:

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4. Discussions

4.1. Reporting structure. It was noted that the task force was intended to be inter-Regional and reporting both to NAT SPG and APANPIRG. In this respect, the ICAO EUR/NAT Office is coordinating further steps with the ICAO APAC Office. At this point in time, it is not clear whether the APAC Region would join this activity, whether within its full or reduced scope. It was noted that there were APANPIRG sub-group meetings planned in July 2015, followed by the APANPIRG meeting in September. The outcome of these meetings may provide a clearer picture as to what extent the APAC Region intends to contribute.

4.2. The task force noted that the purpose of the study was described as to investigate existing FANS 1/A data link implementations to determine the technically feasible minimum ADS C periodic reporting interval. To that end , the study will:

- a) Gain a better understanding of the sensitivities to system loading based on ADS-C reporting intervals that are used;
- b) Determine minimum ADC C periodic reporting interval that would be technically feasible under specified conditions and without significantly impacting operational performance;
- c) Determine benefit to the regions in their planning and implementation of future ATM concepts of operation (e.g. NAT Service Development Roadmap and future 2025 concept of operations);

- d) Support validation of future standards for applying separation minima based on ADS C, such as 37 km (20 NM) longitudinal separation minimum, currently under development by the Separation and Airspace Safety Panel (SASP).

4.3. In this respect, the task force confirmed that there was strong support among NAT ANSPs to initiate and complete the tasks as outlined in the ToR. In the ensuing discussion, the task force debated whether the direction of the study would be first to describe applicable future operational scenarios/environment, then determine necessary requirements for ADS-C and then whether the end-to-end FANS 1/A performance could be impacted. It was noted that the ToR as endorsed by the IMG foresaw to determine the minimum technically feasible periodic ADS-C report intervals without tying this in with the supported operational scenario. INMARSAT thought that of the two approaches, the former would be preferable to them. The ICAO EUR/NAT noted that if this approach is accepted, this would mean a change to the ToR that would need to be coordinated with the NAT IMG.

4.4. The task force agreed that for the time being the scope of work shall remain as described in the ToR. The task force would start its work drawing on the expertise and nominations received from the NAT. Members from other Regions, namely APAC, could join at a later stage, if decided so by appropriate bodies in the APAC.

4.5. The task force agreed that to advance the work, it would be necessary to draft a strawman paper that would outline the actions that need to be undertaken. One of such actions would be to review the technical design parameters that could affect the minimum technically feasible ADS-C reporting intervals at the level of SSPs, CSPs, avionics manufacturers and ATC ground systems. Availability of this information would allow determining next steps. Another action would be for ANSPs to conduct a lab simulation to assess the impact of using various ADS-C reporting intervals on the overall FANS resilience/robustness, using the current monthly traffic activity data and current operational environment, e.g separation.

4.6. Therefore, the following actions were agreed:

4.6.1. The task force members review the technical design parameters of their systems and provide feedback;

4.6.2. Having noted that there was no one from ARINC and SITA on the task force, and that their participation is critical to the work of the task force, the ICAO EUR/NAT would specifically request ARINC and SITA support;

4.6.3. The United States would investigate whether a lab test could be carried out using the current operational scenario with a monthly sample traffic activity data to assess impact of various reduced ADS-C reporting intervals on the FANS 1/A end-to-end performance;

4.6.4. INMARSAT prepare a strawman paper to outline the actions and information that they would need to make available and completed in order to support the task force work.

4.6.5. The task force members were invited to discuss and propose a rapporteur for the task force to lead and coordinate the work with the support of the ICAO EUR/NAT.

4.6.6. All actions above to be completed by 31 August 2015.

4.6.7. Another teleconference to be held end of August-beginning of September to discuss next steps. The aim is to the some draft material for further discussions within the CNSG.
