

## **IBAC Technical Report Summary**

**Subject: NAT Operations and Air Traffic Management**

**Meeting: North Atlantic (NAT) Technology and Interoperability Group 2<sup>nd</sup> (TIG/2)**

**IBAC File:**

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*Summary:* The Second Meeting of the ICAO NAT Technology and Interoperability Group (NAT TIG/2) was held from 17 to 21 October 2016 at the Irish Aviation Authority in Dublin, Ireland.

The meeting was chaired by Mr. Bjarni Stefansson (Iceland), Rapporteur of NAT TIG. Mr. Elkhan Nahmadov (ICAO EUR/NAT) was the secretary.

The meeting agenda included review of latest developments, data link performance monitoring and analyses, reports by states, industry and Data Link Monitoring Agency (DLMA), and planning/implementation.

The group reviewed the initial work programme and follow up action list as approved by NAT IMG.

Concerning the action to “Review information provided in CNSG/13 IP/28 and investigate ways to optimise data link performance, including the provision of very high frequency (VHF) data link coverage data/maps”, SITA has provided the data requested and it is being used by ANSPs to identify possible optimisations.

ARINC has also provided coverage maps but the maps did not include VHF station coordinates and theoretical coverage areas. ARINC was invited by the group to provide this information.

The Group was presented with the results of a study undertaken by Portugal in the Santa Maria FIR, from Jan – Jun 2016, to identify areas of data link performance degradation occurring due to SAT/VHF media transitions. The study concluded that most of these delays could be eliminated if the aircraft were on SAT all the time.

The Group discussed the merits of such an action to require FANS 1/A aircraft to disable their VHF data link capability to stay on SAT whenever operating in the NAT DLM airspace and noted that one operator had switched to SATCOM only effective from June 2016.

The Group concluded that a short-term trial to investigate the operational and economic impact of SAT only operation in the NAT would be needed. It was agreed that the United Kingdom would coordinate with the NAT ANSPs, IATA and IBAC to evaluate setting the trial up and report to the next meeting.

The Group noted NAT IMG Decision 48/08 and NAT SPG Conclusion 52/06 related to the NAT Data Link Mandate (DLM) Phase 2b implementation (FL350-FL390 (inclusive) throughout the ICAO NAT Region, 7 December 2017), its impact on Shanwick Oceanic South East Corner Tango routes operations and the establishment of the NAT IMG South East Corner Routes Project Team (SCRPT).

In response to a SCRPT/NAT TIG action to assess availability of dual-stack FANS 1/A - Aeronautical Telecommunications Network (ATN) avionics equipment for the most frequent aircraft types (Boeing and Airbus) operating on Shanwick southeast corner Tango routes, the Group reviewed a table presented by the SCRPT listing the dual stack capability provided by the aircraft manufacturers for the respective aircraft types.

Concerning NAT SOG Decision 14/07 inviting NAT IMG to assess which technical solutions, including Space-Based ADS-B, ground-based ADS-B and radar, can be utilized to support Selected Flight Level – Cleared Flight Level (SFL-CFL) Conformance Checking, the Group noted from the NAT Procedures and Operations Group (NAT POG)/2 report that some ANSPs were already using or planning to use this functionality.

The Group invited manufacturers to provide information on ADS-B transponders capability to provide SFL information. The preliminary information at the meeting indicated that SFL would be available only from DO260B compliant transponders. It was noted that EU Implementing Rule No 1207/2011 (as amended by 1028/2014) specifies MCP/FCU selected altitude as a mandatory data item to be transmitted by transponders.

In reviewing the NAT POG/2 report, the Group agreed to recommend that NAT IMG approve the first version of the NAT CPDLC route clearance uplinks implementation plan, addressing in Task 3a use of route clearances within oceanic airspace and in Task 3b use of route clearances prior to the oceanic boundary.

The Group was provided with an update on the work of the Asia Pacific/North Atlantic (APAC/NAT) Automatic Dependent Surveillance - Contract (ADS-C) Reporting Interval Task Force (RITF). It was noted that the work

is almost done and remaining actions to provide inputs into the global documents will be dealt with within the ICAO global contributory bodies supported by inputs from the NAT members of those groups.

The Group was provided the final report of the North Atlantic Performance-based Communication and Surveillance Project Team (NAT PBCS PT). The report provided a summary of the work of the NAT PBCS PT since NAT IMG/48 (May 2016). It recommended a proposal for amendment (PfA) to NAT SUPPs (Doc 7030/5) for NAT IMG approval, and further coordination for NAT SOG approval and endorsement by NAT SPG.

NAT PBCS PT assumed it will be disbanded at the end of 2016 and, therefore, it is recommending that the NAT IMG and NAT SOG transfer any remaining work to NAT SPG contributory groups. Some regional documentation, such as the North Atlantic Operations and Airspace Manual (Doc 007), and common language for State documents, such as the Aeronautical Information Circulars (AIC) and Aeronautical Information Publication (AIP), can be completed by NAT TIG and/or NAT POG after the approval of the NAT SUPPs.

The Group noted that to support the latest amendments to SARPs and PANS concerning CPDLC, ADS-C and PBCS, ICAO had posted unedited versions of the Performance-based Communication and Surveillance (PBCS) Manual (Doc 9869), 2<sup>nd</sup> Edition, and the Global Operational Data Link (GOLD) Manual (Doc 10037), 1<sup>st</sup> Edition, on the ICAO-NET. The OPLINKP had derived these documents from the inter-regional Global Operational Data Link Document (GOLD), 2<sup>nd</sup> Edition, dated 26 April 2013.

The PBCS Manual (Doc 9869) contains the material that was formerly in the inter-regional GOLD, 2<sup>nd</sup> Edition, Appendices B, C and D, and includes other material from regional documentation and the former Manual on RCP (Doc 9869), 1<sup>st</sup> Edition. The Group noted that after their expected publication by the end of 2016, these global documents would supersede the current inter-regional GOLD, 2<sup>nd</sup> Edition.

The group noted the controller pilot data link communications (CPDLC) and automatic dependent surveillance (ADS-C) performance reports by the NAT ANSPs. All reports agreed that aggregated 95% criterion of the ADS-C Required Surveillance Performance (RSP) 180 and CPDLC Required Communication Performance (RCP) 240 requirement was met. Some reports included a pilot operational response time (PORT) filter value of 12 seconds, which will be used on an individual basis but not as part of the common reporting template.

The DLMA presented an analysis of 89 PRs that occurred in the NAT Region between 1 Sep 2015 and 31 Aug 2016. Of the 89 total PRs: 66% (59) were due to avionics issues; 7% (6) were due to flight crew errors; 19% (17) were due to ground automation issues; 2% (2) were due to controller errors; 1% (1) were due to dispatcher errors; 4% (4) were due to ACARS network or subnetwork issues.

The Group agreed to develop a regional data link problems resolution tracking system maintained by the NAT DLMA and populated with inputs from manufacturers and ANSPs. Of particular interest were the issues for which avionics fixes were available but implementation of those fixes was dependent on aircraft operators.

The Group noted that in order to support the implementation of the NAT RLatSM plan, it could be required that the implementation of some of these fixes would be prerequisite for obtaining necessary PBCS authorisations in order to be eligible for reduced separation operations. The Group agreed that this potential regional requirement could be promulgated to NAT operators using the NAT SUPPs (Doc 7030) and NAT Doc 007.

Regarding PR2236 (Aircraft lost datalink connections several times, resulting in loss of separation with another aircraft), the Group invited ANSPs to study the possibility of repeating messages when Message Assurance (MAS) failed message was received. It was noted that there were indications, in implementations outside the NAT, that in about 75% of situations this measure would resolve the problem.

With regards to PR2259 and 2263, it was noted that the issues were attributed to the Iridium system as the two aircraft lost communications via Iridium close together in terms of both time and position. This problem could be potentially due to the recent unavailability of one of the Iridium satellites which has created a moving "hole" in the Iridium system coverage.

Informal indication that was received suggested that this coverage situation would likely continue until the Iridium NEXT system launch. The Group invited Iridium to provide more detailed information to the NAT ANSPs and NAT TIG about the coverage gap and information provided to Iridium customers.

The Group was presented with information on the usage of 30NM and 50NM reduced longitudinal separation minima and the effect of data link connection issues as experienced in New York flight information region (FIR). At the present time, these separation standards are not used extensively within KZNY-E. But usage will increase when aircraft are capable of being transferred to adjacent FIRs implementing the same separation standards.

During Jan - Aug 2016, there were 105 cases observed where a message presented to the controller indicated that an aircraft designated as eligible for 30nm separation experienced a connection issue. These include flights

using 30nm longitudinal separation both in-trail and for climbs and descents. For the 116 in-trail aircraft pairs with 30nm longitudinal separation, there were 3 cases where 30nm separation had to be discontinued.

The Group noted that ADS-C disconnects throughout the NAT continue to be a problem for air traffic controllers. Aircraft types can contribute to the problems encountered and some resolution must be considered in order for FANS related initiatives and separations to continue. The Group agreed that Canada and United Kingdom would submit DLMA problem reports on recent occurrences to assist with investigation.

The Group was provided with equipage filing and usage statistics that indicated continuing growth in the FANS 1/A CPDLC/ADS-C equipage that achieved about 97% on OTS and about 82% throughout the NAT. Similarly, the ADS-B and RNP 4 equipage was about 80% in the NAT.

The Group recalled that the original intent of this data collection was to support NAT implementation programmes with information on current equipage levels and differences between FPL filed FANS 1/A equipage and actual usage. In this regard, it was agreed that the actual usage should be based on AFN log on taking place.

Canada provided an update on the investigation into failures of address forwarding procedures. During Mar - Aug 2016, 3% of all datalink flights experienced a failure of the address forwarding procedure. With separations on the NAT relying on FANS performance, successful connection transfer is critical.

The Message Latency project team has identified a number of challenges to implementation of latency timers, either in the avionics or ground systems. It was recalled that the proposal to implement latency timers by the CSPs was not supported in the past. Avionics upgrade would be a long term and costly exercise. Nevertheless, it was agreed that the project team should finish its work and provide the final report to the next meeting.

An update was provided by Inmarsat on the evaluation of FANS-1/A over SBB (using SB-Safety technology) and the Classic Aero System. For Swift Broadband-Safety, Inmarsat provided an update on the introduction of the service and the FANS Evaluation trials underway at PARC. It was noted that Actual Surveillance Performance is lower in the Oakland FIR than in other FIRs. A PARC Tiger Team is investigating.

Inmarsat gave an extensive presentation on the recent Classic Aero service and capacity upgrades both globally and those specifically enhancing NAT operations. A roadmap timeline for both Classic and SB-Safety service life was presented with an overview of the current I-3 to I-4 migration options and two new Inmarsat 6 satellites.

NAT ANSPs provided updates on the implementation of UM137/DM40 in the NAT, all showing success rates about 70-80% whereas the target for automation was 90%. NAT ANSPs are contacting those aircraft operators that show incorrect responses to inform and educate in relation to the UM137 message.

It was agreed that a short (1-2 weeks) trial would be organized with Canada, Iceland and United Kingdom in December 2016 to test automated application of UM137/DM40. The results would be shared at the next meeting.

The Group was provided with information on the use of CONFIRM ASSIGNED ROUTE (UM137) / ASSIGNED ROUTE (DM40) by International General Aviation Aircraft. It was noted that the majority of IGA aircraft flying routes in the NAT have Flight Management System (FMS) capability to correctly send an ASSIGNED ROUTE (DM40) downlink report in response to a CONFIRM ASSIGNED ROUTE (UM137) uplink.

For these aircraft, flight crews should respond with the ASSIGNED ROUTE downlink report without free text or voice communications. There are some IGA aircraft which do not have the capability for an ASSIGNED ROUTE (DM40) downlink report. For these aircraft, flight crews should respond with a free text message, as defined in the applicable AIC, without voice communications.

Recently it became apparent that some avionics developed for the NAT Data Link Mandate may not support the entire message set described in EUROCAE ED-100A/RTCA DO-258A. This causes problems as some CPDLC messages deemed essential to NAT operations, such as DM40, may not be supported by these systems.

The Group noted that NAT DLM provisions in Doc 7030 refer to ED-100A/DO258A as means of compliance. Therefore, to be qualified for NAT DLM, all functionalities of ED-100A/DO258A would need to be implemented.

As the Group was not ready to develop a comprehensive checklist of all ED-100A/DO258A functionalities at this time, an Excel sheet was developed with a reduced list of some most critical FANS 1/A CPDLC / ADS-C functions, including automation of uplink messages UM79, UM80 and UM83 and downlink messages DM24, DM40 and DM59 and deviations in implementations from the specifications.

The intention was that aircraft manufacturers would enter the capabilities of each Aircraft Type/FANS 1/A avionics pair. Airbus, Boeing and IBAC agreed to do their best to populate the list before the next meeting.

The next meeting is scheduled on 3-7 April 2017 in Paris, France. The following meeting will be on 11-15 September 2016 in Canada at to be decided location.

**Implication for Business Aviation:**

**Note.** Aircraft operators with capable avionics may want to consider reconfiguring the avionics to continuously use SATCOM in those areas of the world with intermittent VHF coverage. Use of VHF in those areas may degrade data link performance.

**Note.** A short-term trial to investigate the operational and economic impact of SATCOM only operation in the NAT is planned. The trial will be coordinated by the United Kingdom with the NAT ANSPs, IATA and IBAC.

**Note.** The United Kingdom, Canada, and Iceland are using CPDLC Confirm Assigned Route (UM137) / Assigned Route (DM40) for route conformance monitoring to increase safety in the NAT. Additional information may be found in the respective Aeronautical Information Circulars (AIC).

**Note.** For those systems that support an Assigned Route (DM40) downlink report which provides the active route from the FMS, flight crews should respond to an uplink Confirm Assigned Route (UM137) message with an Assigned Route (DM40) downlink. CPDLC free text or HF voice should not be used as this negates automatic conformance monitoring and increases controller workload.

**Note.** Some International General Aviation aircraft may not support DM40. For these aircraft, flight crews should respond with a free text message, as defined in the applicable AIC, without voice communications.

**Note.** A short (1-2 weeks) trial is planned by Canada, Iceland and United Kingdom in December 2016 to test automated application of CPDLC Confirm Assigned Route (UM137) / Assigned Route (DM40).

**Note.** Due to the recent unavailability of one of the Iridium satellites, a moving gap may exist in the Iridium system coverage. Additional information is available from Iridium.

**Note.** Aircraft Operators should ensure that the ICAO filed flight plan contains the correct notation for CPDLC, ADS-C, ADS-B, and RNP equipage.

**Note.** Gander and Shanwick no longer initiate data link connection with those flights that do not indicate data link capability in the flight plan.

**Note.** Operators are encouraged to complete available aircraft upgrades as soon as possible to improve data link performance.

**Decisions Required:**

To make decisions on the timely acquisition of equipment, degree of training and certification required to meet the requirements to efficiently continue accessing airspace.

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