



WORKING PAPER

**SECOND HIGH-LEVEL SAFETY CONFERENCE 2015 (HLSC 2015)
PLANNING FOR GLOBAL AVIATION SAFETY IMPROVEMENT**

Montréal, 2 to 5 February 2015

Theme 1: Reviewing the current situation

Topic 1.2: Emerging safety issues

GADSS CONCEPT DOCUMENT

(Presented by Canada)

SUMMARY

This working paper presents suggested adjustments to the *Concept of Operations for the Global Aeronautical Distress and Safety System* presented in HLSC/15-WP/2.

Action: The conference is invited to:

- a) consider the proposed adjustments and agree that the GADSS concept document should be amended as suggested in the appendix to this paper; and
- b) consider adjusting the timeframe foreseen for implementation of the GADSS repository.

1. INTRODUCTION

1.1 HLSC/15-WP/2 invites the conference to provide input to the *Concept of Operations for the Global Aeronautical Distress and Safety System* (GADSS concept). The GADSS concept was developed by an ad hoc working group convened by the Director of the Air Navigation Bureau to address a recommendation made by the Multi-disciplinary Special Meeting on Global Flight Tracking (Montréal, 12-13 May 2014). The draft concept underwent review and revision prior to being presented to this conference, where it is presented for general comment for the first time.

1.2 As highlighted in HLSC/15-WP/2, the purpose of the GADSS concept is to provide a clear definition of the objectives of flight tracking. The GADSS concept presents an outline of the flow of information between the various stakeholders with roles and responsibilities during and after an aircraft incident or accident. The GADSS concept does not provide specific technical solutions, but will provide the overarching framework for the future development of Standard and Recommended Practices (SARPs), Procedures for Air Navigation Services (PANS) and guidance.

2. DISCUSSION

2.1 The GADSS concept is meant to support future work, and was drafted based on the current understanding of current procedures and processes and current and emerging capabilities. The following suggestions are provided to expand upon the assumptions and understanding available to the experts who drafted and reviewed the GADSS concept as presented in HLSC/15-WP/2 and to provide consistency within the document and with other ICAO documents.

2.2 The appendix to this paper details specific suggestions to address the following:

- a) the term “emergency and abnormal situation” is used in Annex 6 – *Operation of Aircraft* to refer to situations “caused by engine, airframe or systems malfunctions, fire or other abnormalities”; it is suggested that “situation” rather than “event” be used in the GADSS concept document to ensure alignment between documents;
- b) dependence between ATS and aircraft systems is not a function of whether or not the air traffic service (ATS) systems are ground-based and primary radar is the only ATS surveillance system that is fully independent;
- c) further context could be provided through the inclusion of pertinent information about the evolution toward space-based communications, navigation and surveillance/air traffic management (CNS/ATM);
- d) there should be a clear differentiation between automatic dependent surveillance – broadcast (ADS-B) and automatic dependent surveillance – contract (ADS-C); and
- e) as notified in the Topic 1.2 working paper submitted by Canada ‘Enabling Global ATS Surveillance’, there will be a global free public service to provide flight tracking information for SAR purposes in relation to ADS-B equipped aircraft.

2.3 The GADSS concept appears to be advancing system-wide information management (SWIM) implementation by assuming that a GADSS repository, points of contact and areas of jurisdiction will be set up within the Block 0 time frame (2013 - 2018) (GADSS 4.4.4 - 4.4.10 and 5.0.2, SWIM and Information Repositories Services). Systematic access and sharing of information within the SWIM concept is not foreseen until Block 3 (B3-FICE); prior to this, only limited data sharing capabilities are foreseen.

3. CONCLUSION

3.1 The GADSS Concept of Operations will be used as the basis for developing technology and procedures to ensure coordinated and interoperable solutions for providing accurate and timely information about flights requiring alerting or search and rescue services. The suggested adjustments to the document will provide for technical clarity and completeness to support this further work.

APPENDIX

Detailed explanation of suggested changes

As per ICAO's practice, suggested additions are shown in grey highlight (suggested new text) and suggested deletions are shown in strikethrough (suggested for deletion).

1.3 Definitions

Abnormal event situation. An event situation during flight which may trigger lead to an emergency phase.

2.0 Improvement Areas in Current Operating Environment:

2.0.3 Most of the current operational environment is dependent on the correct operation of the related system on the aircraft while others, such as flight planning and surveillance (primary radar), are operate independently of aircraft systems. Much of the current ANS relies upon ground-based infrastructure, although increasing use is being made of GNSS, SATCOM data link and SATVOICE capabilities for navigation and communications. Space-based ATS surveillance will be enabled through satellite reception of ADS-B signals in the 2017 time-frame.

2.1 Aircraft Systems

2.1.1 The main areas for potential improvement identified are:

| | Improvement Areas | Analysis |
|------|--|--|
| 2.1i | Increase aircraft equipage for transmitting their 4D position and identity. | Not all aircraft overflying remote or oceanic airspace are equipped for continuous transmission of 4D position, although any aircraft that has a transponder can be equipped with ADS-B. Current ADS-C avionics and supporting communication infrastructure are not capable of supporting continuous transmission of 4D position. Not all aircraft are compatible with ADS-C installation. |
| 2.1j | Increase the use of aircraft capability to transmit their 4D position and identity for aircraft tracking purposes. | Aircraft operators are not using ADS-C capability to the degree possible. Current ADS-C avionics and supporting communication infrastructure are not capable of supporting continuous transmission of 4D position. Not all aircraft are compatible with ADS-C installation. |

| | | |
|------|--|--|
| 2.1k | Expansion of space- and ground- based infrastructure to achieve global coverage during all phases of flight. | The ADS-B ground infrastructure is not complete enough could be supplemented with space-based ADS-B to provide adequate global tracking capability. Spaced based ADS-B is not yet will be available in 2017. Existing Non-Geostationary satellite systems tend to have incomplete coverage of the Globe, a particularly benefit for polar route operations. |
| 2.11 | Reduce reliance on HF as sole means of communications over remote and oceanic areas. | The unreliable nature of HF communications leads to relatively frequent occurrences of situations warranting the declaration of the uncertainty phase. The frequency of such occurrences may lead to complacency which can result in a delayed SAR response to a genuine emergency (e.g. AF447). Carriage of satellite communications equipment as a secondary means to HF will assist to confirm the safety of an aircraft, or otherwise. CPDLC and SATVOICE are potential options. |

2.2 Air Traffic Services (ATS)

2.2.1 The main areas of potential improvement identified are:

| | Improvement Areas | Analysis |
|------|--|--|
| 2.2a | Improvement in existing ATS capabilities where voice is the only means to ensure the timely identification of abnormal events situations experienced by aircraft, where voice is the only means of position reporting. | Outside ATS surveillance airspace, the absence of position reports for a set period is the only indication of an abnormal event situation. Regular communication problems and related complacency may even extend this period in practice. Other than ADS-C, there is no airborne and/or ground automation to detect an abnormal event situation based on defined and measurable triggers; however, not all aircraft are compatible with ADS-C installation. |

2.3 The Search and Rescue (SAR) System

2.3.1 The main areas of potential improvement identified are:

| | Improvement Areas | Analysis |
|------|---|---|
| 2.3h | Lack of global availability of accurate aircraft position information for SAR and emergency response. | A free public service to provide this information with respect to ADS-B equipped aircraft will be available in late 2017. |