



**WORKING PAPER**

**HIGH-LEVEL CONFERENCE ON AVIATION SECURITY (HLCAS)**

**Montréal, 12 to 14 September 2012**

**Agenda Item 8: Driving technology developments and innovation**

**SECURITY MATTERS RELATING TO AIR NAVIGATION**

(Presented by the Secretariat)

**SUMMARY**

The Twelfth Air Navigation Conference (AN-Conf/12), a once in a decade event, will be held in Montréal, Canada from 19 to 30 November 2012. Under the concept of “One-Sky” for international civil aviation, AN-Conf/12 will deliver capacity and efficiency outcomes over a rolling 15 year planning horizon that enable a digital information environment, integrate aerodromes within end-to-end flight strategies, and take far greater advantage of satellite capabilities to facilitate trajectory based flight operations and their supporting air traffic management services.

Recognizing that security matters have an important influence on the overall air navigation system, the Air Navigation Commission (ANC) of ICAO made provision in the Agenda of AN-Conf/12 to address security matters in the air navigation context. To provide safe, sustainable and efficient air navigation services, the future air navigation system will require increasing certainty in regard to the physical security of air navigation infrastructure, the predictability and punctuality of airport operations, the security of communications and the protection of space-based services.

The Secretariat, together with the ANC, has taken the opportunity presented by the High-level Conference on Aviation Security to bring to the attention of, and seek support from, the aviation security community on these matters which have an important influence on the overall air navigation system and clear interdependencies with aviation security.

**Action:** The High-level Conference on Aviation Security is invited to endorse the conclusions and recommendations in paragraph 3.

**1. INTRODUCTION**

1.1 During the preparation of AN-Conf/12, the Secretariat, together with the Air Navigation Commission (ANC) of ICAO, identified the need to bring security matters, as they relate to air navigation, to the attention of the High-level Conference on Aviation Security (HLCAS).

1.2 The ANC provides technical input from a global perspective to the Council of ICAO on matters relating to all air navigation fields including, inter alia, air traffic management, flight operations, airworthiness, communication, navigation, surveillance and meteorology services, aviation accident and incident investigation and the management of aeronautical information.

1.3 ICAO estimates that US\$120 billion will be spent on the transformation of air transportation systems in the next ten to fifteen years. This transformation will bring significant benefits for safety, efficiency and the environment. Stakeholders, including service providers, regulators, airspace users and manufacturers, will face increased levels of interaction as new, modernized air traffic management (ATM) operations are implemented. Working together will be essential for achieving the potential for global harmonization and interoperability in air navigation. Security issues related to the transformation of the aviation system are coming into view, issues that will require closer collaboration among experts in safety and security disciplines. Accordingly, the agenda sent to States and international organizations for the Twelfth Air Navigation Conference requested that security matters be considered in the system changes that lie ahead.

1.4 The agenda for AN-Conf/12 was prepared by the ANC and transmitted to States and international organizations in December 2011 (refer ICAO State letter 13/1-11/71: <http://www.icao.int/Meetings/anconf12/Documents/071e%5b1%5d.pdf>). Within the larger air navigation picture, the narratives accompanying the agenda call for “*High level impediments to implementation such as cyber security to be identified and considered.....*” and “*...predictability and punctuality, including aspects related to the transit of security and border control points as these are significant contributors/limiters to efficient surface operations, will be reviewed*”. Additionally, the ANC has long advocated that ICAO provisions relating to the physical security of air navigation infrastructure (e.g. air traffic control centres, as well as surveillance, communication and navigation aid equipment) should be developed to assure sustainability in the delivery of air navigation services.

1.5 It is anticipated that States and international organizations will submit papers to the High-level Conference on Aviation Security under Agenda Item 8, “Driving technology developments and innovation” and to the AN-Conf/12 to support discussions on these subjects.

## 2. DISCUSSION

2.1 Trajectory predictability and punctuality, efficient protection of information exchanges and space-based services as well as air navigation facilities will have increasing importance in the future. The following issues of air navigation have been identified by the ANC as having clear interdependencies with aviation security. The on-going involvement of aviation security expertise in relation to these aspects is considered essential in order to mitigate vulnerabilities, support the long-term planning and deployment of the future aviation system and therefore would make a valuable contribution to the AN-Conf/12.

### *Physical security of air navigation infrastructure*

2.2 In general, the protection of air navigation infrastructure from security threats is crucial to sustaining safe aircraft operations. Specifically, the level of protection of remote installations may have to be reinforced due to the increasing use of generic technologies for aviation (e.g. information networks, satellite data transmission) that can be used with unlawful purpose. In this regard, the ANC notes and supports the development of an *Air Traffic Management Security Manual*.

### *Trajectory predictability and punctuality of airport operations*

2.3 Trajectory predictability and punctuality as well as the increasingly accurate time and trajectory management of flights will play a key role in the future. The aim of the future air navigation system is to increase user flexibility and maximize operating efficiencies and associated environmental benefits while increasing system capacity and improving safety levels. The optimization of individual aircraft trajectories, traffic flows and the effective use of airspace and airport movement areas will require

collaboration of all stakeholders. Efficiency gains will be measured in terms of minutes saved, calculated on an end-to-end basis per flight with, in some cases, a saving of as little as one minute per flight serving as a goal to be pursued.

2.4 Airport security plays a major role in the predictability and punctuality of airport operations by the facilitation of passenger throughput. For example, a flight delayed at the gate may have an adverse impact on the efficient flow of air traffic with a domino effect to multiple airports.

2.5 Close collaboration and cooperation between the air navigation and security communities within individual States will serve to minimize such delays and facilitate efficient flight operations.

2.6 The future aviation system relies on each aircraft being able to adhere strictly to its time based trajectory and several security matters at airports are influential in assuring that the arrival and departure times are accurate, predictable and punctual.

#### *Security of communications*

2.7 The future aviation system will be based on the extensive, real-time exchange of high volumes of accurate data. Internet Protocol (IP) will form the basis for ATM operational information exchange, using open architecture networks. Ultimately, aircraft in flight will be able to communicate actual and intent information to ATC automation.

2.8 The security of all communications, particularly ‘Safety of Life’ services, remains paramount. The seriousness with which this kind of activity is viewed by the international community is reflected in the September 2010 Beijing Convention (*Convention on the Suppression of Unlawful Acts Relating to International Civil Aviation*), which obligates parties to criminalize conduct by any person that “*unlawfully and intentionally...damages air navigation facilities or interferes with their operation, if any such act is likely to endanger the safety of aircraft in flight.*” The Beijing Convention defines, in Article 2 (C), air navigation facilities to include “*signals ... necessary for the navigation of the aircraft*”.

#### *Protection of space-based services*

2.9 The gradual implementation of the global navigation satellite system (GNSS) has taken place around the world. GNSS is today a cornerstone of the air navigation system.

2.10 Satellite-based solutions are supporting the global improvement of many different aspects of air navigation services worldwide. The recent occurrences of unlawful interference events, as well as the recognized vulnerability of GNSS signals (refer AN-Conf/12-WP/21: [http://www.icao.int/Meetings/anconf12/Document Library/ANConfWP21.6.1.EN.pdf](http://www.icao.int/Meetings/anconf12/Document%20Library/ANConfWP21.6.1.EN.pdf)), highlight the need to, *inter alia*, prevent activities such as spoofing and jamming. Additionally, the readily available flight information that allows identification of aircraft increases the opportunity for unlawful actions on specific flights.

### **3. CONCLUSIONS AND RECOMMENDATIONS**

3.1 To provide safe, sustainable and efficient air navigation services, the future air navigation system requires certainty of the physical security of air navigation infrastructure, the predictability and punctuality of airport operations, the security of communications and the protection of space based services. The High-Level Conference on Aviation Security is invited to:

- a) recognize the interdependencies that exist between aviation security and air navigation, including the physical security of air navigation infrastructure;
- b) encourage States to strengthen internal coordination between aviation security and air navigation organizations;
- c) acknowledge airport surface operations as an integral component of future air navigation capacity and efficiency, and recognize that predictability and punctuality in airport operations are very significant contributors to, or limiters of, overall air navigation efficiency;
- d) acknowledge vulnerabilities of global navigation satellite system (GNSS) and associated potential threats of harmful interference;
- e) note the information in, and intention of, the Convention on the Suppression of Unlawful Acts Relating to International Civil Aviation, particularly in respect to the protection of signals for the navigation of aircraft; and
- f) request that ICAO direct the Aviation Security Panel (AVSECP) to regularly address “Air Navigation Matters” in close collaboration with the Air Navigation Commission.

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