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ASSEMBLY — 37TH SESSION

TECHNICAL COMMISSION

Agenda Item 41: Support of the ICAO policy on radio frequency spectrum matters

RADIO TRANSMISSION OF FLIGHT DATA FROM AIRCRAFT AND RADIO SPECTRUM REQUIREMENTS

(Presented by Canada)

REVISION NO. 1

EXECUTIVE SUMMARY

This paper introduces the requirement to globally coordinate the allocation of radio spectrum in order to support the transmission of flight data from aircraft. Following the Air France 447 accident there have been significant international activities related to the transmission of data, including the ICAO Flight Recorder Panel recommended amendment to Annex 6. The transmission of data from an aircraft will require the availability of radio spectrum that is globally harmonized and available in allocations protected in accordance with ITU Radio Regulations.

Action: The Assembly is invited to:

a) consider and endorse the requirement for flight data transmission from aircraft;
b) consider and endorse a strategy to support the technical work necessary to have access to globally harmonized spectrum to support flight data transmission; and
c) support the work of appropriate ICAO operational and technical panels to achieve this.

Strategic Objectives:	This working paper relates to Strategic Objectives A, D and E on safety, efficiency and continuity.
Financial implications:	Resources for the activities referred to in this paper are included in the proposed budget for 2011 to 2013.
References:	http://aviation-safety.net/database/record.php?id=20090601-0

1. INTRODUCTION

1.1 Considerable work has been underway in the Flight Recorder Panel (FLIRECP) on a variety of tasks. These tasks include items such as consideration of independent power supplies, video image recording, in-flight downloading of video and enhanced reliability of data recorders. The panel has discussed the transmission of flight data from the aircraft, on a periodic or triggered basis, for the purpose of locating an aircraft following an accident.

1.2 The technology exists today to achieve transmission of flight data from an aircraft. Depending on established requirements, the data transmission could include certain aircraft parameters such as heading, altitude, pitch, roll and yaw, lat/long, airspeed, to mention a few. Currently, there are a number of companies offering flight data transmission services for maintenance and tracking purposes, such as FLYHT. From a technical perspective, there is no limit to the type of parameters which could also include compressed format video and voice.

1.3 Following the unfortunate accident of Air France 447, significant international activities related to flight data transmission have taken place. This work will continue to harmonize the requirements and criteria necessary to support flight data transmission from an aircraft. At this point, no work has been undertaken to study the frequency spectrum requirements to support flight data transmission.

1.4 Subsequent to this accident, the Bureau d'Enquêtes et d'Analyses (BEA) made safety recommendations to the European Aviation Safety Agency (EASA) and ICAO that included the following (please see the reference in the executive summary):

a) extend as rapidly as possible to 90 days the regulatory transmission time for ULB's installed on flight recorders on airplanes performing public transport flights over maritime areas;

b) make it mandatory, as rapidly as possible, for airplanes performing public transport flights over maritime areas to be equipped with an additional ULB capable of transmitting on a frequency and for a duration adapted to the pre-localization of wreckage; and

c) study the possibility of making it mandatory for airplanes performing public transport flights to regularly transmit basic flight parameters (for example position, altitude, speed, heading).

1.5 Frequency spectrum is a very limited resource that is difficult to have access to. While demand for it increases from many services, we are seeing increasing shortages. Therefore, it is imperative that technical studies on the spectrum needs and requirements to adequately support data transmission from aircraft are undertaken at the earliest practical time.

2. SPECTRUM REQUIREMENTS

2.1 Considering the operational requirements outlined above and in order to support transmission of flight data from an aircraft, whether periodically, by trigger or other established event mechanisms, it will require availability of suitable radio spectrum. It is assumed at this point that any radio frequencies used for this purpose would need to be globally harmonized and available in frequency allocations appropriately protected by ITU Radio Regulations.

2.2 Radio spectrum is a very limited resource, whereby its availability for use by any service is likely to be under conditions of constraint due to sharing the resource with other services. Spectral efficiency is necessary where practical, such as using the latest technological advancements or developments. In the aeronautical domain, it is critically important to have access to frequencies that are free from harmful interference.

2.3 In the general sense, two scenarios need to be considered for the transmission of flight data from an aircraft to an appropriate monitoring point:

a) line-of-sight scenario where terrestrial communications could be used for data transmission; and

b) non line of sight scenario where satellite communications would be required for data transmission.

2.4 The different scenarios by concept, essentially consider trans-oceanic, trans-continental and even trans-polar where the communications requirements for each regime of flight operation would need to be considered. At this preliminary stage, it is not anticipated that flight data transmission from an aircraft would be continuous, moreover it would consist of short data bursts that could be transmitted in a manner to be as spectrally efficient as practical. It is not expected that data transmission of this nature would require a high degree of bandwidth. In reality, it is anticipated to be limited in bandwidth requirement.

2.5 With the ongoing development of air traffic management (ATM) concepts and the future deployment of digital technologies onboard aircraft, there will be additional spectrum needs to meet the growth in the aviation industry. The spectrum needs and requirements for flight data transmission will need to be considered as early as possible.

3. CONCLUSION

3.1 The Assembly is invited to consider the information in this working paper on radio spectrum required to support flight data transmission from aircrafts, to endorse in an Assembly recommendation: the concept of flight data transmission from aircraft, and to recognize the overall safety benefits in the aviation industry; to recognize the study work necessary within an appropriate technical panel to identify radio spectrum to support flight data transmission; and to consider the required tasking of a technical panel for this work to begin in the earliest practical timeframe.

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