

ARINC Project Initiation/Modification (APIM)

1.0 Name of Proposed Project **APIM 13-011A**

Supplement 1 to ARINC 771 - Iridium NEXT Standardization

1.1 Name of Originator and/or Organization

AGCS Subcommittee

2.0 Subcommittee Assignment and Project Support

2.1 Suggested AEEC Group and Chairman

AGCS (Air/Ground Communication System Subcommittee)

Robert Holcomb, American Airlines, Chairman

2.2 Support for the activity (as verified)

Airlines: AAL, **ASA**, DLH, HAL, TAP, UAL, others TBD

Airframe Manufacturers: Airbus, Boeing, Bombardier

Suppliers: Avionica, Cobham, **CMC**, FLYHT, Honeywell, Iridium,- L3 Com, Panasonic, Rockwell Collins, Thales, others TBD

Others: **L2**

2.3 Commitment for Drafting / Meeting Participation (as verified)

Airlines: AAL

Airframe Manufacturers: Airbus, Boeing, **Bombardier**

Suppliers: Avionica, Cobham, FLYHT, Honeywell, Iridium, L2, L3 Com, Panasonic, Rockwell Collins, Thales

Others:

2.4 Recommended Coordination with other groups

AEEC Subcommittees: EFB, KSAT, NIS and SAI

3.0 Project Scope

The objective of this ARINC activity is to define Supplement 1 to ARINC Characteristic 771 for the Iridium NEXT satcom system.

Iridium states: "Anticipated to begin launching in 2015, Iridium NEXT will recreate the existing Iridium constellation architecture of 66 cross-linked low-Earth orbiting (LEO) satellites covering 100 percent of the globe. Iridium NEXT will substantially enhance and extend Iridium mobile communications services, delivering:

- **The initial release defined Low Gain and Active Low Gain Antenna (LGA and ALGA)**
- **Supplement 1 will define Higher Gain Antenna that support higher data speeds**
- Powerful new services and device capabilities
- The advantages of innovative IP technology
- Backward compatibility with current handsets, devices and applications."

It is expected that the Iridium NEXT constellation will be fully deployed by 2017.

ARINC Characteristic 761: *Second Generation Aviation Satellite Communication System, Aircraft Installation Provisions* defines the characteristics for Inmarsat-I and Iridium satcom systems. The baseline of that document is Inmarsat-I and there are special characteristics that pertain to Iridium. Several implementations of Iridium avionics on-board aircraft have been realized, however, most do not follow ARINC 761.

ARINC Project Paper 771 defines the characteristics of Iridium NEXT installation on-board the aircraft:

- Functions supported: voice and data, both safety and non-safety services.
- Interface of Iridium NEXT to avionics systems, identical to the one of Inmarsat satcom system where applicable.
- Antenna: characteristics and footprint for single element antenna.
- Antenna: characteristics and footprint for a dual element antenna, considering Sensor Systems, Aero Antenna, others as applicable.
- Satellite Data Unit (SDU): Main functions, Interface to avionics and EFB.
- Form/factor: 2 MCU considering ARINC 781 connector arrangement.
- Option for RF module installation close to the antenna to minimize cable losses (not sure HPA and DLNA can be separated from RF module).
- Intermediate Gain Amplifier (IGA).
- Ethernet interface: ARINC 781 Attachment 5 defines the interface of Iridium NEXT with EFB, which all EFBs will need to meet, to use Iridium NEXT data communications. This interface will also be applied to connect EFBs to Inmarsat satcom. The EFB/satcom interface will be defined in cooperation with EFB SC.
- Define a Satellite Data Unit Configuration Module (SCM) similar to that defined by ARINC 781.
- Define how a single satcom supplier might build a dual cooperative satcom system with one Inmarsat and one Iridium satcom system capable of managing resources for both satcom systems in order to provide increased availability and protection from loss of function due to a single satcom provider's network outage **or in the case of polar routes where only Iridium is functional**.
- Work in parallel with the RTCA MOPS to define allowable insertion losses as a result of the required GPS notch filter and the common use of a combiner/splitter in the SDU so that two voice channels can be provided utilizing a single antenna element.
- Provide guidance on GLONASS equipped aircraft. GLONASS and Iridium may need to be mutually exclusive, but explore whether options exist for both technologies to possibly exist on the same aircraft in light of mandates for GLONASS on Russian registered aircraft.
- **Supplement 1 will define SDU Crosstalk functionality**

ARINC Project Paper 771 will also address data security issues that may be associated with the use of Iridium NEXT. The guidance provided in ARINC 781 and ARINC 791 may be applicable.

The Iridium NEXT standard, when applied by the industry, will enable the following Iridium NEXT solutions:

- Interchangeable at aircraft level.

- Interoperable with avionics system, such as Inmarsat satcom, with ability for suppliers to manufacture a single SDU capable of operating over Inmarsat or Iridium networks.
- Interoperable with EFBs compliant with the Iridium standard, with the same interface applicable for an Inmarsat satcom.

3.1 Description

3.2 Planned usage of the envisioned specification

Note: New airplane programs must be confirmed by manufacturer prior to completing this section.

Use the following symbol to check yes or no below.

New aircraft developments planned to use this specification yes no

Airbus: SA and LR/A350/A380 TBD

Boeing: (TBA)

Other: (TBA)

Modification/retrofit requirement yes no

Specify: (TBA)

Needed for airframe manufacturer or airline project yes no

Specify: (TBA)

Mandate/regulatory requirement yes no

Program and date: (N/A)

Is the activity defining/changing an infrastructure standard? yes no

Specify

When is the ARINC Standard required? **Supplement 1 - April 2017**

What is driving this date? Readiness to develop systems and install them on aircraft when Iridium NEXT constellation becomes operational.

Are 18 months (min) available for standardization work? yes no

If NO please specify solution: Revision should only take 3-6 months.

Are Patent(s) involved? yes

If YES please describe, identify patent holder: Not that we are aware of.

3.3 Issues to be worked

- Agreement from the different suppliers on the ARINC characteristics, considering the solution they have already for the current Iridium constellation.
- Commitment from the Suppliers to follow the ARINC standard

In addition, the following items might be considered for investigation:

- Iridium NEXT SDU interchangeable with an Inmarsat SDU
- A SDU capable both of Iridium NEXT and Inmarsat

4.0 Benefits

4.1 Basic benefits

Operational enhancements yes no

Iridium NEXT	Mtgs	Mtg-Days (Total)	Expected Start Date	Expected Completion Date
2013	1	3	October 2013	
2014	3	9		
2015	3	9		October 2015
2016	2	6	May 2016	
2017	2	6		April 2017

Notes: Additional web conferences will be organized on an “as needed” basis.

6.0 Comments

Status reports and discussion may take place in SAI.

6.1 Expiration Date for this APIM

October 2017

Submit completed form to the AEEC Executive Secretary.