

AEEC Project Initiation/Modification (APIM)

- 1.0 Name of Proposed Project** **APIM #: 10-007A**
SwiftBroadband Safety Services Provisions, ATCt Interference Management, Extended L Band Operation, and legacy HF, VHF, and satcom standards as needed.
- 1.1 Name of Originator & Organization**
Air Ground Communications Systems (AGCS) Subcommittee
- 2.0 Subcommittee Assignment and Project Support**
- 2.1 Suggested AEEC Group**
Air Ground Communications Systems (AGCS) Subcommittee
- 2.2 Support for the activity (as verified)**
Airlines: Continental **American** Airlines, others TBD
Airframe Manufacturers: Airbus, Boeing, Bombardier
Suppliers: Honeywell, Rockwell/Collins, Thales
CMC Electronics, Cobham, COM DEV, Thrane and Thrane
Others: Inmarsat, SITA, ARINC, Vizada, Stratos, LightSquared
- 2.3 Commitment for Drafting and Meeting Participation (as verified)**
Airlines: **American** (Chairman)
Airframe Manufacturers: Manufacturers: Airbus, Boeing, **Bombardier**
Suppliers: Honeywell, Rockwell/Collins, Thales
CMC Electronics, Cobham, COM DEV, **Thrane and Thrane**
Others: Inmarsat, SITA, ARINC, LightSquared
- 2.4 Recommended Coordination with other groups**
Manager of Air/Ground Interface Communications (MAGIC), Network Infrastructure and Security (NIS) Subcommittee, Data Link (DLK) Systems Subcommittee, Data Link Users Forum (DLUF), Media Independent Aircraft Messaging (MIAM), RTCA SC-222 Inmarsat AMS(R)S, ICAO Working Group M and/or F.

3.0 Project Scope (why and when standard is needed)

3.1 Description

3.1.1 SwiftBroadband (SBB) Safety Services

Update ARINC 781 to define equipment capable of supporting SwiftBroadband safety services on the Inmarsat I4 satellite constellation. This is a continuation of APIM 04-001A Phase 2. **Two form factors of equipment will be considered: (1) Based on the current form factors defined in ARINC 781 - which typically is multiple channel and has Classic Aero fall back and (2) A smaller and lighter single channel SBB only system known by Inmarsat as SB-200 – this is currently expected to be a 2MCU SDU, an integrated HPA/ DLNA and an antenna similar in footprint to a VHF blade. Changes will be included in ARINC 781, Satellite Data Unit (SDU) functional definition, and then applied to ARINC 741 and ARINC 761, by specific reference to ARINC 781.**

3.1.1.1 Design for existing aircraft (both form factors):

- A. ARINC 429 Interface to Satellite Data Unit (SDU) - Gateway function in SDU to redirect data link traffic over background class SBB channel.
- B. Analog Flight Deck safety voice over SBB using existing audio systems

3.1.1.2 Design for future aircraft (both form factors):

- A. ARINC 664 Part 7 Ethernet interface between SDU and ACARS/CMU
- B. Option for digital audio interface for flight deck voice

3.1.1.3 Installation Issues (SB-200 only)

- A. Define aircraft system architecture
- B. Define installation provisions (LRU size, form factor, connectors & pinout, aircraft wiring, cooling)

3.1.2 Management of Ancillary Terrestrial Component (ATCt) Interference to Inmarsat Aeronautical Services

Background to ATCt

Ancillary Terrestrial Component (ATCt) is a wireless terrestrial service designed to operate in an integrated fashion with mobile satellite services (MSS). LightSquared, headquartered in Reston, Virginia, is a United States MSS provider with a license to operate ATCt in the United States and Canada. ATCt reuses spectrum utilized for MSS by LightSquared and Inmarsat, creating the potential for interference to some Inmarsat aeronautical services in North America. The deployment of ATCt is contingent upon LightSquared securing strategic partnerships and capital investment and the timeline for that is not firmly defined at this time,

It is noted that RTCA SC-222 has, in November 2009, provisionally concluded that ATCt will not interfere with Classic Aero safety service, since the Classic Aero safety service is provided to aircraft that are at significant distances from the proposed location of ATCt base stations. Equipment changes may be needed

- Refine Segregation and Security Principles for each domain (Aircraft Control Domain (ACD), Airline Information Services Domain (AISD), Passenger Information Entertainment Services Domain (PIESD))
- Identify Functional and Non-Functional Requirements to be met
- Ensure Ground/Air Communication Management
- Ensure End-to-End Interoperability
- Ensure interoperability with other applicable ARINC standards
- Identify certification considerations
- **SB-200 aircraft architectural drivers including: LRU functional split, antenna requirements, cooling, aircraft wiring, interchangeability.**

3.3.2 Update equipment standards to manage ATCt/Inmarsat spectrum sharing.

- Determine in which airspace Inmarsat Aeronautical Terminals need to operate in terms of 'closeness' to ATCt base stations, and determine RF specification for DLNA. This work is expected to be carried out in conjunction with RTCA SC-222.
- Ensure Inmarsat Aeronautical Terminals can operate, when required, in the presence of ATCt interference in North American Airspace
- Ensure Inmarsat Aeronautical Terminals can operate using ATCt frequency bands when outside North American Airspace
- Determine issues and identify solutions to instruct the DLNA to change filter characteristics for both forward fit and retrofit aircraft.

3.3.3 Update equipment standards to support Extended L Band.

- Determine additional services beyond running existing services over the extended band.
- Determine and investigate technical driving issues which include protection of radio astronomy band (1660-1670MHz) and intermodulation products.
- Update equipment standards for SDU, HPA, DLNA, Antenna.

4.0 Benefits

4.1 Basic benefits

Operational enhancements yes no

For equipment standards:

a. Is this a hardware characteristic? yes no

SwiftBroadband safety services **based on existing form factor** are not expected to impact hardware. **SwiftBroadband safety services based on smaller form factor requires new hardware.**

ATCt rollout and Extended L band would probably impact hardware.

b. Is this a software characteristic? yes no

SwiftBroadband safety services will impact software.

ATCt rollout and Extended L Band would probably impact software.

c. Interchangeable interface definition? yes no

d. Interchangeable function definition? yes no

If not fully interchangeable, please explain: _____

Is this a software interface and protocol standard? yes no

Specify: The satellite data unit software will need to be designed to be compatible with priority and preemption definitions in the I4 satellite constellation.

Product offered by more than one supplier yes no

Identify: (See company list above)

4.2 Specific project benefits (Describe overall project benefits.)

Provide robust satellite based Air Traffic Control communication for the purpose of increased efficiency in oceanic airspace. Increase throughput, reduce latency, and improve overall reliability by providing a second independent safety service from Classic Aero. Meet Required Communication Performance (RCP) for 30 nautical mile separation of aircraft.

4.2.1 Benefits for Airlines

Shorter flight routes in oceanic airspace resulting in reduced fuel consumption and reduced flight time. Ensure ATC system has capacity to support capacity and direct flight routing.

4.2.2 Benefits for Airframe Manufacturers

Ensure ATC system capacity is not a limiting factor in number of aircraft purchased by airlines.

4.2.3 Benefits for Avionics Equipment Suppliers

Additional sales of new equipment.

5.0 Documents to be Produced and Date of Expected Result

5.1 Meetings and Expected Document Completion

The following table identifies the number of meetings and proposed meeting days needed to produce the documents described above.

Activity	Mtgs	Mtg-Days (Total)	Expected Start Date	Expected Completion Date
ARINC 781 Supplement 5	4	12 days total (some of which include RTCA SC-222)	06/2010	09/2012
ARINC 741 Supplement 14			06/2010	09/2012
ARINC 761 Supplement 5			06/2010	09/2012

January 2012 meeting plus Mid-2012 meeting planned. Boeing has offered to host teleconferences and web conferences to further development of draft material between official AGCS Subcommittee meetings.

6.0 Comments

This APIM supercedes Phase 2 of APIM # 04-001A, providing an update of the planned work for SwiftBroadband safety services and identifying new work required as a result of potential ATCt rollout.

6.1 Expiration Date for the APIM

October 2012

For AEEC Secretary use	
Date Received: September 8, 2011	Assigned: <u>Mike Rockwell</u>
Potential impact: _____	
(A. Safety B. Regulatory C. New aircraft/system D. Other)	
Resolution: _____	
<i>Authorized, Deferred, Withdrawn, More Detail Needed, Rejected</i>	
Assigned to SC/WG: _____	