

APIM – Mark 3 Aviation Satellite Communication System, Aircraft Installation Provisions

ARINC IA Project Initiation/Modification (APIM)

Name of proposed project

APIM #: 04-001A

Mark 3 Aviation Satellite Communication System, Aircraft Installation Provisions

Suggested Subcommittee assignment

It is recommended that the AGCS Subcommittee work this project and that a Rapporteur be used to advance the aggressive schedule noted below. (See Meetings, below).

Project Scope

The responsibility of this project is to ultimately provide SATCOM avionics and antenna equipment that is small enough & cost effective for use in aerospace from Air Transport category aircraft through to the Business & Regional Jets. Attachment 1 covers recommended design goals. This includes standardization of the avionics and antenna subsystems interfaces (mounting and electrical) to the aircraft.

Project Benefit

This project will establish a smaller, lighter, and cost effective form factor for a new technology that will allow airlines to use the same form factors for regional to wide body aircraft and allow interchangeability of suppliers' equipment. This project also combines comprehensive ATC and broadband voice and data requirements allowing for global (excluding polar) coverage. This project intends to make a dual SATCOM installation more practical.

Background Information

Initial installation and recurring service costs for satellite equipment has been cost prohibitive for many air transport operators. This has led most commercial air transport operators to install a SATCOM system only where required by regulatory agencies. These SATCOM systems are used sparingly as a least preferred (from a cost effective standpoint) means of communications.

The myriad of form factors and wiring differences between avionics architectures has resulted in costly charges for equipment and wiring provisions. In some instances airlines have had to support two SATCOM architectures because ARINC 741 equipment was too big for their small aircraft fleet.

Airlines supporting effort

British Airways
Japan Airlines
United Parcel Service (UPS)
Federal Express (FEDEX)

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Suppliers and Service Providers supporting effort

Airbus
ARINC Incorporated
Aviation Data Systems (Australia) Pty Ltd
Aviation Management Inc. LLC (AMI)
Boeing Commercial Airplanes
Chelton SATCOM
CMC Electronics
EMS SATCOM
Honeywell
Inmarsat
ITS Electronics Inc.
MAS Corp
Rockwell/Collins
SITA
Telenor
Tenzing Communications
Thales Communications
Thrane & Thrane
USAF (HAF/XORM-GANS)
Universal Weather and Aviation
Victron Technology (for ITS Electronics)

Issues to be worked

See Attachment 1 for a starting point for the list.

Recommended Coordination with other groups

CEI (Cabin Equipment Interfaces) Subcommittee, File Server Working Group, and DLK (Datalink) Systems Subcommittee as needed.

Projects/programs supported by work

Boeing has a desire to implement this project on the 7E7 due for delivery in 2008. In order to support this schedule, Boeing requires red label parts by 2006.

Timetable for projects/programs

July 30th 2004: Begin Strawman for functional, form factor and pin-out definitions.
December 31st 2004 Conclude form factor size and major pin-out definitions
December 31st 2005: Publish initial ARINC Characteristic 781

Documents to be produced and date of expected result

ARINC Characteristic 781: “Mark 3 Aviation Satellite Communication System, Aircraft Installation Provisions”

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Meetings

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

Activity	Mtgs	Mtg-Days
<i>Core Characteristic Definition</i>	<i>4 per year</i>	<i>1-2 day(s) per meeting (Managed by Rapporteur in concert with Inmarsat BGAN meetings)</i>
	<i>2 per year</i>	<i>1 day per meeting (Oversight by AGCS Subcommittee)</i>

For IA staff use

Date Received 3/5/04 IA staff assigned: Mike Rockwell

Potential impact: C

(A. Safety B. Regulatory C. New aircraft/system D. Other)

Forward to committee(s) (AEEC, AMC, FSEMC): AEEC Date Forward: 4/1/04

Committee resolution: 1

(0. Withdrawn 1. Authorized 2. Deferred 3. More detail needed 4. Rejected)

Assigned Priority: A Date of Resolution: 4/26/04

A. – High (execute first) B. – Normal (may be deferred for A.)

Assigned to SC/WG Air/Ground Communications Systems Subcommittee

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Attachment 1

Design Goals

1. **Architecture:** *There should be only one avionics form factor definition in the proposed standard.*
2. **Targeted Systems:** *Inmarsat BGAN satellite communication systems.*
3. **Size & weight:** *Form factor sizes for the proposed Characteristic should be a maximum of [6MCU] for forward fit avionics. This is the total aggregate size performing the traditional SDU/HPA/RFU and HSD (High Speed Data including Swift-64 & BGAN) functions. The antenna subsystem should also be constrained to the following: A maximum weight of [30lbs] for the antenna (excluding mounting plate) subsystem (performing the functions of antenna, DLNA, BSU/ACU). The BSU/ACU should **not** be a separate LRU. Candidate antenna subsystems are low profile top mount (not greater than 3 inches in height) and tail mounted antennas.*
4. **Cost Effective:** *SATCOM system acquisition and installation should be cost effective.*
5. **Backwards Compatibility:** *The new avionics should accommodate existing ARINC 741 Antenna Subsystems.*

Phase 1: APIM Core Characteristic (Air Transport, Business & Regional)

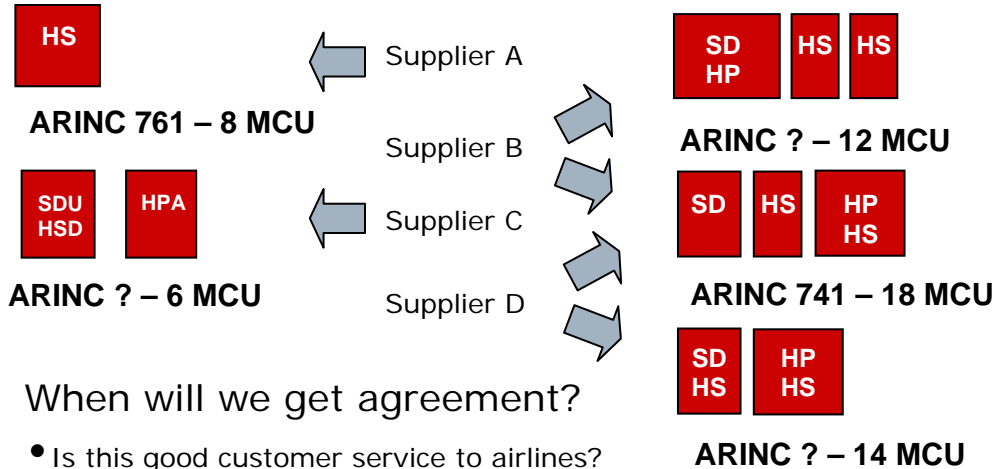
Define a characteristic with the above design goals applied. This work involves agreement on form factor, pin out definitions and high level functionality. ATC communications in this phase would leverage off of existing AMS(R)S (Aero-H+/I ARINC 741/761) services, but all of these functions would still be contained in the proposed small form factors.

Phase 2: Use of Broadband (L-Band Spectrum) for ATC communication

Define & investigate requirements for the migration of AMS(R)S ATC services (voice and data) into a native IP based environment within the L-Band spectrum. The technical drive towards this migration is an expected reduction in datalink message transit delay. A voice service under an IP environment also provides an alternative to (but not strictly a replacement of) the current public telephony based ATC voice services. Under a satellite based party line voice implementation, there is no need for flight crews to wait for ATC to “pick up the phone”. Another advantage is that other aircraft will have awareness of the communications being conducted within the same FIR.

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Today's SATCOM Outlook Swift-64 and BGAN - ARINC 741/761



When will we get agreement?

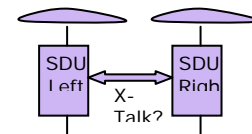
- Is this good customer service to airlines?
- Where are the benefits to this plan?
- Cost Effective, Harmony?

In an Ideal World – A Fresh Start APIM Proposal

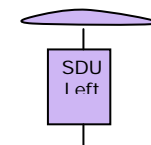
One Design for all!

- Dual SATCOM more cost effective

Supplier A
Supplier B
Supplier C
Supplier D



Wide Body Installation – LRCS
Dual Independent Installation



Narrow Body Installation
Single “e-enabled” Installation

- We have the technology.
- We have the resolve
- We have the support
- To ensure value & success to operators!!