ARINC Project Initiation/Modification (APIM)

1.0 Name of Proposed Project

ARINC Project Paper 793: Multibeam Ku/Ka Satcom System with Fiber Optic Interfaces

1.1 Name of Originator and/or Organization

Mark Sorensen, Delta Air Lines

2.0 Subcommittee Assignment and Project Support

2.1 Suggested AEEC Group and Co-Chairs

Ku/Ka Satcom Subcommittee,

Chris Schaupmann, Airbus
Ryan Torgerson, The Boeing Company

2.2 Support for the Activity (as verified)

Airlines: Delta Air Lines, FedEx, Lufthansa, TAP Portugal, United Airlines

Airframe Manufacturers: The Boeing Company, Airbus,

Suppliers: Viasat, Amphenol (TBC), Astronics, Collins Aerospace, Intelsat, Panasonic Avionics, Honeywell, Gilat, Hughes, Smiths Interconnect, ThinKom, Satixfy (TBC), Safran (TBC)

Others: Inmarsat, COTSWORKS, Gore TBC), SCI Technology, Glenair (TBC), iDirect, Space X (TBC), Wavestream, TE, Amazon,

2.3 Commitment for Drafting and Meeting Participation (as verified)

Airlines: Delta Air Lines, United Airlines

Airframe Manufacturers: The Boeing Company, Airbus,

Suppliers: Viasat, Carlisle, Astronics, Collins Aerospace, Intelsat, Panasonic Avionics, Honeywell, Gilat, Hughes, Smiths Interconnect, ThinKom, Satisfy (TBC), Safran (TBC)

Others: COTSWORKS, Gore (TBC), SCI Technology, iDirect, Space X (TBC), Glenair (TBC), TE, Wavestream

2.4 Recommended Coordination with other groups

Cabin Systems Subcommittee (CSS)

Fiber Optic Subcommittee

DIFI (Non-ARINC IA Subcommittee or Work Group)
Seamless Air Alliance

3.0 Project Scope

Define a new Ku/Ka satcom system interwiring standard using fiber optic cabling for both radio channel and Ethernet interconnections.

The standard will leverage ARINC 792 equipment architecture and form factors and will change connector inserts.

3.1 Description

Emerging Electronically Steerable Antenna (ESA) has the capability to support multiple simultaneous beams, each with unique, selectable waveforms. These features are critical to support Non-Geostationary (NGSO) Satellite Networks, including Low Earth Orbit (LEO) and Medium Earth Orbit (MEO). Existing coaxial interconnections require difficult measures for this mode of operation.

ESA and Modem interfaces are moving towards a digital baseband interface instead of Intermediate Frequency. This technology allows the flexibility in positioning the modem, specifically to be inside the Outside Antenna Equipment. Furthermore, these measures are ideally suited for software defined modems.

Fiber optic bundles are lighter, can scale to support multiple beams, and can be easily adapted to installations that use both very short and very long bundle runs.

Fiber Optic distribution of Reference Frequencies.

Fiber Optic communication of GNSS RF signal.

3.2 Planned usage of the ARINC Standard

New aircraft developments planned to use this specification yes ☒ no ☐

Boeing plans on using this specification on future aircraft.

Modification/retrofit requirement yes ☐ no ☒

Specify: (aircraft & date)

Needed for airframe manufacturer or airline project yes ☐ no ☒

Specify: (aircraft & date)

Mandate/regulatory requirement yes ☐ no ☒

Program and date: (program & date)

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

Adding ARINC 600 (shell size 1 fiber insert)

When is the ARINC standard required? May 2026

What is driving this date? ESA and NGSO networks are coming into service by 2024.

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

If NO please specify solution: _____

Are Patent(s) involved? yes ☐ no ☒

If YES please describe, identify patent holder: _____

3.3 Issues to be Worked

- Modman Connector
- Pressure Bulkhead Interface
- Transmit and Receive Link Budget
- Reference Frequency distribution
- Number of channels to support
- Simplex/Duplex Ethernet fiber interface
- Baseband (I/Q) signal characteristics

- Maintainability
- Software Selectable waveform
- GNSS signal distribution

3.4 Security Scope

Is Cyber Security Impacted (if yes, check box(es) below)	yes ☒ no ☐
Aircraft Control Domain	yes ☐ no ☒
Airline Information Services Domain	yes ☒ no ☐
PAX Information and Entertainment Systems	yes ☒ no ☐
Other _____	yes ☐ no ☐

(Discuss the level of cyber security guidance needed, the specific topics to be covered, and whether these topics are covered elsewhere by reference, e.g., ICAO Documents, RTCA/EUROCAE Standards, existing ARINC Standards, or if they need to be defined by a new or revised ARINC Standard.)

4.0 Benefits

4.1 Basic Benefits

Operational enhancements	yes ☒ no ☐
For equipment standards:	
a) Is this a hardware characteristic?	yes ☒ no ☐
b) Is this a software characteristic?	yes ☐ no ☒
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: _____	
Product offered by more than one supplier	yes ☒ no ☐

4.2 Specific Project Benefits

Simple, scalable, lighter installation.

Support for NGSO networks.
Support for multiple, simultaneous beams.
Support for Software Selectable Waveforms
Avoids coaxial cable challenges
More freedom for locating equipment
Reduced EMI, Lightning and Bonding challenges

4.2.1 Benefits for Airlines

Weight saving
Improved access to NGSO satellite networks

4.2.2 Benefits for Airframe Manufacturers

Simple, scalable, lighter installation.

Support for NGSO networks.
Support for multiple, simultaneous beams.
Support for Software Selectable Waveforms
Avoids coaxial cable challenges
More freedom for locating equipment
Reduced EMI, Lightning and Bonding challenges

4.2.3 Benefits for Avionics Equipment Suppliers

Digital baseband modem/antenna interface
Reduced EMI, Lightning and Bonding challenges
Support for multiple, simultaneous beams.
Support for Software Selectable Waveforms
Support for NGSO networks.

5.0 Documents to be Produced and Date of Expected Result

New ARINC Project Paper 793, May 2026

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 PP 793**	*12 to 18*	*18*	*October 2024*	*May 2026*
Web Conferences	*Monthly*			

*concurrent with other KSAT projects/Subcommittee meetings

6.0 Comments

ARINC 792 specifies the use of coaxial interwiring. A new characteristic will differentiate the fiber/digital interwiring from the legacy coaxial interwiring. Any given installation will operate with either fiber or coaxial interwiring, but not both.

6.1 Expiration Date for the APIM

October 2026

Completed forms should be submitted to (*aeec@sae-itc.org*)