AEEC

Together "We Set the Standard."

To	AEEC Members	**Date**	May 6, 2016
From	P. J. Prisaznuk AEEC Executive Secretary pjp@sae-itc.org 1-410-212-0913	**Reference**	16-067/AXX-198 lth

Subject **New AEEC Activities**
Approved at the AEEC General Session
April 25-28, 2016 - Atlanta, Georgia

Summary The AEEC Executive Committee initiated ten new projects in Atlanta as follows:

- **16-002 - ARINC Project Paper 6xx:** *Common Standards for Software Data Loading and Data Management*
- **16-003 - Supplement 7 to ARINC Characteristic 781:** *Mark 3 Aviation Satellite Communication System*
- **16-004 - Supplement 2 to ARINC Specification 842:** *Guidance for Usage of Digital Certificates*
- **16-005 - ARINC Specification 628:** *Cabin Equipment Interfaces* (multi-part update)
- **16-006 - Supplements to ARINC Characteristic 791 Part 1 and Part 2:** *Ku-Band and Ka-Band Satellite Communications System*
- **16-007 - Supplement 5 to ARINC Specification 622:** *ATS Data Link Applications over ACARS Air-Ground Network*
- **16-008 - Data Link Users Forum (3-year project extension)**
- **13-011A - Supplement 1 to ARINC Characteristic 771:** *Low-Earth Orbiting Aviation Satellite Communication System*
- **11-005B - Supplement 22 to ARINC Specification 424:** *Navigation System Database*
- **08-004C - Supplement 7 to ARINC Specification 661:** *Cockpit Display System Interfaces to User Systems* and **ARINC Project Paper 661 Part 2**

The statement of work for each of these projects is attached to this announcement. This letter informs the industry of AEEC's actions and serves as an invitation for interested parties to participate in ARINC Industry Activities. For additional information, feel free to contact the AEEC Executive Secretary or visit the AEEC website: *www.aviation-ia.com/aeec*

cc AGCS, CDS, CSS, DLK, DLUF, KSAT, NDB, NIS, SAI, SDL

Attachment 1

Attachment 1

ARINC Project Initiation/Modification (APIM)

1.0 Name of Proposed Project APIM 16-002

ARINC Project Paper 6xx: Common Standards for Aircraft Software Loading and Data Management

1.1 Name of Originator and/or Organization

Ted Patmore, Delta Air Lines

2.0 Subcommittee Assignment and Project Support

2.1 Suggested AEEC Group and Chairman

Software Data Loading (SDL) Subcommittee

Chairmen:

- Ted Patmore Delta Air Lines
- Rod Gates American Airlines

2.2 Support for the activity (as verified)

Airlines: (Identify each company by name.)

- American Airlines
- Delta Air Lines
- FedEx
- TAP Portugal
- United

Airframe Manufacturers:

- Airbus
- Boeing

Suppliers:

- Aero Instruments
- Auvation
- Cascade Engineering
- GE Aviation
- Honeywell International
- SAGEM
- Teledyne Controls
- TechSAT
- Others: TBD

2.3 Commitment for Drafting and Meeting Participation (as verified)

Airlines:

- Delta Air Lines
- American Air Lines

Airframe Manufacturers:

- Airbus
- Boeing

Suppliers:

- Aero Instruments
- Auvation
- Cascade Engineering

- Honeywell International
- SAGEM
- Teledyne Controls
- TechSAT
- Avionics Interface Technologies

Others: TBD

2.4 Recommended Coordination with other groups

AMC Field Loadable Software (FLS) WG

AEEC Network Infrastructure and Security (NIS) regarding security issues

3.0 **Project Scope** (why and when standard is needed)

Several standards related to aircraft software data loading and management use common terms and technical methods. Terms and methods are required to remain consistent for all related standards. Currently, many of these methods such as integrity validation (CRC, SHA-1), authenticity validation (digital signatures), software classifications, part number formats, terms of reference, and common acronyms and glossaries are specified and maintained within several of these standards.

There is a need to have one document that can be reference by other standards to avoid the creation, duplication, and maintenance of common specifications across multiple standards.

Doing this will also foster cross compatibility among the SDL family of standards and reduce the risk of future ambiguity issues that often arise when such document elements are addressed within the context of only one single standard.

This document is needed to effectively keep future supplements of SDL related standards in sync with each other in a manner that avoids divergence between related standards.

3.1 Description

Several software management standards require reference to common terms and various method specifications. These standards that are listed below, all have the need to reference a common source for terms and methods.

There is a strong need to avoid the replication of data across multiple standards that can generate a risk of having inconsistent specifications.

It is important to have clear common specifications that apply to all software data loading aspects, especially those related to software configuration management, software integrity, and aircraft information security.

Software Data Loading is the key subject of interest in regards to aircraft security management, therefore it is important for terms and methods to remain consistent across all related standards.

Table 1 – Software and Data Loading Standards

ARINC Standards	Supp	Document Title	Publish Date
ARINC Report 614		Standard Firmware Loader for Avionics Shops	September 30, 1989
ARINC Report 615-3	3	Airborne Computer High Speed Data Loader	August 15, 1992
ARINC Report 615-4	4	Airborne Computer High Speed Data Loader	May 6, 2002
ARINC Report 666		Electronic Distribution of Software	May 17, 2002
ARINC Report 665-4	3	Loadable Software Standards	TBD 2016
ARINC Report 615A-3	3	Software Data Loader Using Ethernet Interface	June 30, 2007
ARINC Report 827		Electronic Distribution of Software by Crate (EDS Crate)	September 15, 2010
ARINC Report 667-1	1	Guidance for the Management of Field Loadable Software	November 12, 2010
ARINC Report 835		Guidance for Security of Loadable Software Parts Using Digital Signatures	November 23, 2011
ARINC Report 826-1	1	Software Data Loader Using CAN Interface	December 20, 2013
* ARINC Report 835-1	1	Guidance for Security of Loadable Software Parts Using Digital Signatures	January 2, 2014
ARINC Specification 838		Loadable Software Part Definition Format	January 2, 2014
ARINC Specification 641		Logical Software Part Packaging for Transport	July 31, 2015
ARINC Specification 843		ARINC Specification 843: Aircraft Software Common Configuration Reporting	July 31, 2015
ARINC Specification 844 Part 1 & Part 2		Enhanced ARINC 429 Data Loading, and Target implementation considerations for ARINC 615-3 and ARINC 615-4 targets	TBD 2016
ARINC Report 849 (document in work)		Software Data Loading Specification Requirements for the Avionics Shop Environment.	TBD 2017

* This APIM stipulates that **ARINC Report 835:** *Guidance for Security of Loadable Software Parts Using Digital Signatures* will not change as a result of this APIM and the proposed ARINC Standard.

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: (aircraft & date)

Boeing: (aircraft: All existing and new. Standard would have immediate applicability to most Boeing aircraft as Boeing makes heavy use of existing standards which use these common terms and methods)

Other: (manufacturer, aircraft & date)

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 ☒

Specify (e.g., ARINC 429)

When is the ARINC Standard required? Feb 2018

What is driving this date? The need to avoid divergence in SDL standards

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

(Describe the major issues to be addressed.)

Create separate common reference document for the family of SDL standards that includes:

- Define CRC and other integrity methods.
- Specify security authenticity signature methods (also referencing **ARINC Report 835:** *Guidance for Security of Loadable Software Parts Using Digital Signatures*)
- Common SDL Part number format
- Common SDL Terminology
    - Definitions (e.g., Target HW POS)
- Common Glossary of Terms for consistency
- Provide Guidance for usage of Software Load LRU Specific Attributes (User defined data that is digested by target LRU)

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 ❑

Identify: (company name)

4.2 Specific project benefits (Describe overall project benefits.)

4.2.1 Benefits for Airlines

Airlines will benefit tremendously by having a standard that defines common methods and data used across several ARINC and other industry standards. Each standard will be easier to maintain and the accuracy of specifications will be enhanced.

This document will provide common reference to ARINC software management documents regarding specific aspects of aircraft information security as well.

4.2.2 Benefits for Airframe Manufacturers

Airframe manufacturers can use this document to avoid confusion created by diverse and inconsistent information spread across several standards.

4.2.3 Benefits for Avionics Equipment Suppliers

Avionics Equipment Suppliers manufacturers can use this document to avoid confusion created by diverse and inconsistent information spread across several standards.

5.0 Documents to be Produced and Date of Expected Result

ARINC Project Paper xxx: Common Standards for Aircraft Software Loading and Data Management

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.

Product/Activity	Mtgs	Mtg-Days (Total)*	Expected Start Date	Expected Completion Date
ARINC Project Paper xxx	6	18	June 2016	Feb 2018

* This meeting plan will be augmented by monthly web conferences.

6.0 Comments

The SDL has two other projects (PP844 and PP849) on the agenda through 2016. The work on this APIM will be in parallel with these projects.

6.1 Expiration Date for this APIM

October 2018

Submit completed form to the AEEC Executive Secretary.

Attachment 2

Attachment 2

ARINC Project Initiation/Modification (APIM)

1.0 Name of Proposed Project APIM 16-003

Supplement 7 to **ARINC Characteristic 781:** *Mark 3 Aviation Satellite Communication Systems.*

a. Addition of a security overlay for SwiftBroadband (SBB) safety services

b. General maintenance of the document.

1.1 Name of Originator and/or Organization

Francois Aicardi, Airbus

Alan Schuster Bruce, Inmarsat

2.0 Subcommittee Assignment and Project Support

2.1 Suggested AEEC Group and Chairman

AGCS, Robert Holcomb, American Airlines

2.2 Support for the activity (as verified)

Airlines: American Airlines, United others TBD

Airframe Manufacturers: Airbus, Boeing, Bombardier

Suppliers: Cobham, L2, Rockwell Collins, Honeywell, Thales

Others: Inmarsat

2.3 Commitment for Drafting and Meeting Participation (as verified)

Airlines: American Airlines, others TBD

Airframe Manufacturers: Airbus, Boeing, Bombardier

Suppliers: Cobham, Rockwell Collins, Honeywell, Thales

Others: Inmarsat

2.4 Recommended Coordination with other groups

(List other AEEC subcommittees or other groups.)

DLK, KSAT, NIS

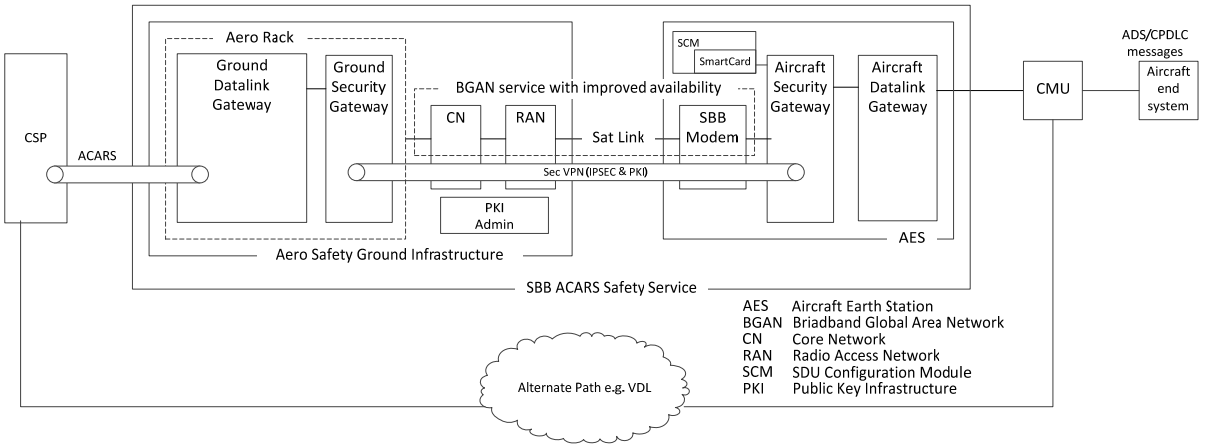
3.0 Project Scope (why and when standard is needed)

3.1 Description

Background

Inmarsat is completing development of the addition of a security overlay (VPN) based on IPSEC and PKI to support ACARS over SBB as shown below:

Proposed Security Overlay



The PKI certificate management will be based on ARINC 842 and ATA Spec 42.

In time it is expected that the security overlay will also support ATN/IPS services.

Note that corresponding changes to RTCA MASPS and MOPS were authorized in late 2014 (RTCA SC-222)

Scope of activity

Therefore, it is proposed to:

1. Include a security overlay (VPN) in ARINC 781 as an option for the ACARS service within the SDU.
2. Make additional changes to ARINC 781:
   - Update Attachment 8: Security Analysis. This will be based on ARINC 771 and results from Inmarsat development. The goal is to have a common set of security objectives for safety services that can be used by both Inmarsat SBB and Iridium Certus. Recommendations for partitioning the AISD from ACD BITE and data loading links will be addressed.
   - Add clarification on the use of the Join/Leave words in an SBB AES.
   - Fix a 12 dB error in the audio level specification.
   - Standardize the allocation of Ethernet ports on the SDU.
   - Other minor issues as they arise.

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 ☒

Boeing: TBD

Other: (manufacturer, aircraft & date)

Modification/retrofit requirement yes ☒ no ❑

Airbus: A320 family, A330, A350, A380 - 2018

Needed for airframe manufacturer or airline project yes ☒ no ❑

Airbus: A320 family, A330, A350, A380 - 2018

Mandate/regulatory requirement yes ❑ no ☒

Program and date: (program & date)

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

Specify (e.g., ARINC 429)

When is the ARINC Standard required?

March 2017

What is driving this date? Development of Airbus Lightweight Cockpit Satcom

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

If NO please specify solution: AGCS believes one year is sufficient time

Are Patent(s) involved? yes ❑ no ☒

If YES please describe, identify patent holder: _____

3.3 Issues to be worked

- Agree upon overall security approach
- Align with FAA and EASA to take benefit of the overall security approach
- Define satcom security functionality

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 ❑

Identify: (company name)

4.2 Specific Project Benefits

4.2.1 Benefits for Airlines

Provide a state of the art security overlay for ACARS/SBB for airlines

4.2.2 Benefits for Airframe Manufacturers

Provide a secure end-to-end solution to the aircraft by providing isolation between subnetwork domains and by providing authentication of the most secure ground counterpart (Inmarsat Secure Aero Rack)

4.2.3 Benefits for Avionics Equipment Suppliers

More/continued sales, and provides more functionality from the satcom system.

5.0 Documents to be Produced and Date of Expected Result

ARINC 781 Supplement 7.

5.1 Meetings and Expected Document Completion

Product/Activity	Mtgs	Mtg-Days (Total)	Expected Start Date	Expected Completion Date
Supplement 7 to ARINC Characteristic 781	3	9*	April 2016	April 2017

* This activity will be carried out during AGCS Subcommittee meetings preparing ARINC 771 and ARINC 781 satcom standards and use approximately 3 hours per meeting. Web conferencing will be used where appropriate.

6.0 Comments

None

6.1 Expiration Date for this APIM

April 2017

Submit completed form to the AEEC Executive Secretary.

Attachment 3

Attachment 3

ARINC Project Initiation/Modification (APIM)

1.0 Name of Proposed Project APIM 16-004

Supplement 2 to ARINC Report 842, “Guidance for Usage of Digital Certificates”

1.1 Name of Originator and/or Organization

Network Infrastructure and Security (NIS) Subcommittee

2.0 Subcommittee Assignment and Project Support

2.1 Suggested AEEC Group and Chairman

Network Infrastructure and Security (NIS) Subcommittee
Chairman: Steve Arentz, United Airlines

2.2 Support for the activity (as verified)

Airlines: United Airlines, FedEx, Alaska, American, Delta

Airframe Manufacturers: Boeing, Airbus

Suppliers: Rockwell Collins, Honeywell, Panasonic, Teledyne, Zodiac Inflight Innovations

Others:

2.3 Commitment for Drafting and Meeting Participation (as verified)

Airlines: United Airlines, FedEx

Airframe Manufacturers: Boeing

Suppliers: Rockwell Collins, Honeywell, Panasonic, Teledyne, Zodiac Inflight Innovations

Others:

2.4 Recommended Coordination with other groups

CSS, IPS, SAI, SDL

Note: Informal coordination with ICAO and ATA

3.0 Project Scope (why and when standard is needed)

3.1 Description

ARINC Report 842 was originally published in 2012 with Supplement 1 released shortly following in 2013.

ARINC Report 842 was developed as a companion document to ATA Specification 42.

Spec 42 provides guidance on common processes, tools and practices for securely transmitting, storing and exchanging commercial aviation data.

- Considerations for protecting data from corruption or manipulation while at rest or during transmission between an airplane and back office systems.
- Methods of positively identifying a person or device electronically using digital security.

- Guidance on continuous operations from the perspective of both the airline operator and the system designer.

ARINC Report 842 provides additional information to a level not available in Spec 42. Specifically:

- Guidance detail from an airline perspective on implementation of certificate manage infrastructure
- Guidance to developers of other industry standards recommending that any external-entity-to-aircraft communications requiring security or message-sender authentication use existing industry standards.

Spec 42 has been revised twice since the last publish of ARINC Report 842. The most recent revision (2015.1) published by A4A includes:

- New guidance for non-PKI Electronic Signatures
- New guidance for selecting Certificate and Attribute Authorities
- Updated credential assurance strength recommendations
- Added typical use cases for Digital Signature in airline operations
- New guidance for use of PKI Card Management Systems
- New appendix for XML Digital Signature Profiles
- New appendices for non-PKI operational and credential provider policies
- Deprecated SHA1 in the ATA Reference Certificate Policy
- Reorganized the specification to provide more clarity, improve the flow, and better distinguish between PKI and non-PKI guidance.

In October 2015, US NIST released Special Publication (SP) 800-152, which provides general requirements/guidance for key management systems. This document expands upon the key management framework in NIST SP 800-130, which is referenced in ARINC Report 842. The general key management guidance within the new NIST document could be adapted to ARINC Report 842 with an aircraft approach.

3.2 Planned usage of the envisioned specification

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

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

Airbus: (aircraft & date)

Boeing: (aircraft & date)

Other: (manufacturer, aircraft & date)

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 ☐

Specify (e.g., ARINC 429)

When is the ARINC standard required? _____ (Feb 2018) _____

What is driving this date? _____ (state reason) _____

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

With the significant changes described above, it is necessary to update ARINC Report 842 to include:

- Updates to references to Spec 42
- Incorporate appropriate additions from Spec 42 (technology) from an airline perspective.
- Review NIST 800-152 to develop additional guidance
- Incorporate any technology/business model/business process updates
- Support IPS Subcommittee as needed
- Gather and incorporate lessons learned from new aircraft programs and experiences with key management implementation/deployment
- Review and incorporate current certificate management processes and real world application of digital certificates.

4.0 Benefits

4.1 Basic benefits

Operational enhancement 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 ☐

Identify: (company name)

4.2 Specific project benefits (Describe overall project benefits.)

4.2.1 Benefits for Airlines

Airlines have implemented procedures to support the use and maintenance of digital certificates in order to accommodate the directions that the airframe manufacturers are taking in new aircraft, and also to comply with current and evolving regulatory requirements that may mandate message authentication by digital signature for air-to-ground communication. Standardized guidance

concerning the installation, use, and life cycle maintenance of digital certificates in aircraft systems benefit airlines by facilitating airline security procedure development and reducing the risk of insecure procedures. Furthermore, this document ensures that consistent design practices used across multiple aircraft systems that use certificates, reducing costs for airlines and allowing uniform processes even across a heterogeneous fleet.

4.2.2 Benefits for Airframe Manufacturers

Airframe manufacturers are already implementing programs involving digital certificates on aircraft, and are providing significant push to implement more such programs. Standardized guidance concerning the contents and use of digital certificates in the aircraft environment will benefit airframe manufacturers by minimizing recurring design costs and ensuring consistent design practices across multiple aircraft systems that may be using certificates.

4.2.3 Benefits for Avionics Equipment Suppliers

System/equipment suppliers have implemented digital certificate capabilities to accommodate the directions that the airframe manufacturers are taking in aircraft system designs. Standardized guidance concerning the contents and use of digital certificates in the aircraft environment will benefit avionics suppliers by minimizing recurring design costs, as consistent design practices will ensure that requirements are similar across different aircraft systems that may be using certificates.

5.0 Documents to be Produced and Date of Expected Result

Supplement 2 to ARINC Report 842

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 842, Supp 2	6	6*	June 2016	Feb 2018

This meeting plan will be augmented by monthly web conferences.

6.0 Comments

* 6 in-person meetings with 1 day per meeting focused on ARINC 842. Should the NIS Subcommittee be tasked with the development of other standards, the actual meeting length may be extended.

6.1 Expiration Date for the APIM

April 2018

Completed forms should be submitted to the AEEC Executive Secretary.

Attachment 4

Attachment 4

ARINC Project Initiation/Modification (APIM)

1.0 Name of Proposed Project APIM 16-005

Define Cabin System Interfaces as follows:

- HD Landscape Camera
- USB 3.1 Power Outlets
- Update Network System Components
- 4K Ultra High Definition Video Standards

1.1 Name of Originator and/or Organization

Cabin Systems Subcommittee (CSS)
Delta Air Lines, Chairman

2.0 Subcommittee Assignment and Project Support

2.1 Suggested AEEC Group and Chairman

Cabin System Subcommittee (CSS)
Dale Freeman, Delta Air Lines

2.2 Support for the activity (as verified)

Airlines: Delta

Airframe Manufacturers: Airbus, Boeing

Suppliers: KID, VT Miltope, LH-Technik, Thales, Panasonic, Rockwell-Collins, Lumexis, Zodiac ZII, Zodiac Seats France, Astronics, Amphenol, TE Connectivity, Esterline Souriau, ITT Cannon, W. L. Gore, Molex, Latecoere

Others:

2.3 Commitment for Drafting and Meeting Participation (as verified)

Airlines: Delta

Airframe Manufacturers: Airbus, Boeing

Suppliers: KID, VT Miltope, LH-Technik, Thales, Panasonic, Rockwell-Collins, Lumexis, Zodiac ZII, Zodiac Seats France, Astronics, Amphenol, TE Connectivity, Esterline Souriau, ITT Cannon, W. L. Gore, Molex, Latecoere

Others:

2.4 Recommended Coordination with other groups

N/A

3.0 Project Scope (why and when standard is needed)

3.1 Description

New and retrofit aircraft will use the documents developed under this standardization program. The documents will define cost effective and valuable network infrastructures for interface standards between inter-cabin and cabin-to-aircraft equipment and communications standards.

The objective is to help the airlines cope with the rapid and evolving IFE industry by providing them with the freedom of choice in the installation and modular expansion of cabin equipment. This is necessary since passenger entertainment and infotainment systems are subject to frequent aircraft upgrades. Generating cabin interface protocols, administering and resolving seat integration issues, cabin communications, and connector standardization are also significant parts of the activities.

Specifically, this APIM authorizes the following activities for Cabin Standards:

- Include the following changes in Supplement 8 to ARINC 628 Part 1, which is open per APIM 15-006:
  (1) Provide interfaces for a High-Definition (HD) Landscape Camera. The interface definition will include new video encoding formats, video resolution, and bandwidth requirements.
  (2) Provide specifications for UHD Video streams (4K), video encoding requirements and video screen resolutions.
- Update applicable interfaces for USB 3.1 outlets in passenger seats in Supplement 9 to ARINC 628 Part 2, Supplement 4 to ARINC 809, and Supplement 2 to ARINC 832.
- Supplement 4 to ARINC 628 Part 9 – to replace references to legacy network system components that are no longer in use or have been replaced (e.g., CNSU) to be in line with current systems, e.g., ARINC 628 Part 1 802.11n wireless access points.

3.2 Planned usage of the envisioned specification

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

Airbus: A320Neo, Airplane retrofit and forward fit programs

Boeing: 737 Max, 777X, and airplane retrofit programs forward fit programs

Modification/retrofit requirement yes ☒ no ☐

Specify: Airlines are retrofitting cabin systems into their existing fleets.

Needed for airframe manufacturer or airline project yes ☒ no ☐

Specify: driven by the need to provide common definitions for the airplane programs and retrofit programs

Mandate/regulatory requirement yes ☐ no ☒

Program and date: No mandate

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

Specify:

When is the ARINC Standard required? Per aircraft program

What is driving this date? Aircraft Development Schedules

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

If NO, please specify solution: Not applicable

Are Patent(s) involved? yes ☐ no ☒

If YES please describe, identify patent holder: Not applicable

3.3 Issues to be worked

- Definition of standard cabin interfaces for the technologies indicated

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 ☒

Product offered by more than one supplier yes ☒ no ☐

Identify:

4.2 Specific project benefits (Describe overall project benefits.)

Cabin systems provide entertainment and other services to the passenger. To satisfy the airline's desire for improved services to its passengers, cabin systems are becoming more sophisticated and complex. Home entertainment and office type computing systems and peripherals are finding applications in the cabin to facilitate data handling and communication to the ground. The growing complexity of cabin equipment has resulted in the need to update Cabin Standards in multiple parts. New standards are being added to provide guidance to developers of next generation systems and networks. The benefits of the cabin standards are numerous. They provide the airlines freedom of choice, unit price reduction through increased volume, interchangeable spares, more upgradeable options, and creation of more sub- markets for integrators and software/hardware suppliers. These benefits are being realized on all new aircraft programs, eventually regional and business jets, and retrofit aircraft programs.

4.2.1 Benefits for Airlines

- Equipment interchangeability between suppliers
- Reduction in development cost, improved reliability, and therefore reduced cost for the airlines

4.2.2 Benefits for Airframe Manufacturers

- Equipment interchangeability between suppliers
- Flexibility and reduced costs by working from the same set of guidelines
- Reduction of time and cost for new developments due to reuse of proven solutions

4.2.3 Benefits for Avionics Equipment Suppliers

- Eliminates the need to design custom provisions for each installation

- Reduction of time and cost for new developments due to reuse of proven solutions

5.0 Documents to be Produced and Date of Expected Result

- Supplement 8 to ARINC 628P1
- Supplement 9 to ARINC 628 Part 2
- Supplement 4 to ARINC 809
- Supplement 2 to ARINC 832
- Supplement 4 to ARINC 628 Part 9

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
Supplement 8 to ARINC 628P1	3	9	5/16	3/17
Supplement 2 to ARINC 832	2	6	5/16	3/17
Supplement 4 to ARINC 809	3	9	5/16	3/17
Supplement 9 to ARINC 628 Part 2	3	9	5/16	3/17
Supplement 4 to ARINC 628 Part 9	5	15	5/16	9/17
Allocated Resources (max)	**5**	**15**	**May 2016**	**September 2017**

* Meeting days reflect CSS meetings responsible for multiple ARINC Standards. In addition to the in-person meetings identified above, web conferences will be called to support specific project goals.

6.0 Comments

This APIM opens the following three standards.

- ARINC Specification 628 Part 2
- ARINC Specification 628 Part 9
- ARINC Specification 809
- ARINC Specification 832

The following documents are already being supplemented under existing APIMs:

- ARINC Specification 628 Part 1 (APIM 15-006)

6.1 Expiration Date for this APIM

October 2017

Completed forms should be submitted to the AEEC Executive Secretary.

Attachment 5

Attachment 5

ARINC Project Initiation/Modification (APIM)

1.0 Name of Proposed Project APIM 16-006

Broadband Satellite System Installation and Equipment Interfaces

1.1 Name of Originator and/or Organization

Ku/Ka Band Satellite Communications (KSAT) Subcommittee

2.0 Subcommittee Assignment and Project Support

2.1 Suggested AEEC Group and Chairman

Ku/Ka Band Satellite Communications (KSAT) Subcommittee
Peter Lemme, Totaport

2.2 Support for the activity (as verified)

Airlines: Delta
Airframe Manufacturers: Boeing (TBC), Airbus (TBC), Bombardier
Service Providers:
Suppliers:
Others:

2.3 Commitment for Drafting and Meeting Participation (as verified)

Airlines: Delta
Airframe Manufacturers: Boeing (TBC), Airbus (TBC), Bombardier
Service Providers:
Suppliers:
Others:

2.4 Recommended Coordination with other groups

Air/Ground Communications Systems (AGCS) Subcommittee
Cabin Systems Subcommittee (CSS)
Network Infrastructure and Security (NIS) Subcommittee
Systems Architecture and Interfaces (SAI) Subcommittee

3.0 Project Scope (why and when standard is needed)

3.1 Description

ARINC 791, Part 1 and ARINC 791, Part 2 define Ku-Band and Ka-Band satellite communication (satcom) equipment, installation and necessary interfaces to aircraft systems. Airlines, aircraft manufacturers, avionics suppliers, IFE suppliers, cabin communication suppliers and service providers with an interest in providing this equipment and services have participated in these activities.

It is recommended that the following work be performed to maintain these standards:

Supplement 3 to ARINC Characteristic 791 Part 1, including the following:

- Revise fittings to address installation issues identified during installation

programs and to accommodate a broader range of antenna options.

- Revise antenna location and blockage maps for selected single aisle configurations
- Clarify labeling of bulkhead penetrations
- Revise form factor length dimension for the KRFU and KANDU enclosures
- Revise and correct RTCA DO-160 section and category references, including updates for DO-160G
- Provide guidance on minimum agility to track satellites in taxi, in approach/departure, and enroute
- Provide guidance for waveguide installation

Supplement 2 to ARINC Characteristic 791 Part 2, including the following:

- Modify the network interface definition to correct port labeling and VLAN trunk definition.
- Revise aircraft geometry/blockage data section to include asymmetric blockage cases
- Update the management information base (MIB) for Ku-band and Ka-band satcom systems

3.2 Planned usage of the envisioned specification

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

Airbus: Airplane retrofit and forward fit programs

Boeing: 737 Max, 777X, and airplane retrofit programs

Modification/retrofit requirement yes ☒ no ☐

Specify: Airlines are retrofitting connectivity systems into their existing fleets.

Needed for airframe manufacturer or airline project yes ☒ no ☐

Specify: driven by the need to provide common definitions for the airplane programs and retrofit programs

Mandate/regulatory requirement yes ☐ no ☒

Program and date: No mandate

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

Specify:

When is the ARINC Standard required? Per aircraft program

What is driving this date? Aircraft Development Schedules

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

If NO, please specify solution: Not applicable

Are Patent(s) involved? yes ☐ no ☒

If YES please describe, identify patent holder: Not applicable

3.3 Issues to be worked

- Take advantage of improvements or corrections identified in the development of ARINC Project Paper 792
- Incorporate items identified in service implementation of ARINC 791 by the suppliers, service providers, airlines, and airframe manufacturers

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 ☒

Product offered by more than one supplier yes ☒ no ☐

Identify:

4.2 Specific project benefits (Describe overall project benefits.)

Simplify and lower the cost of installation and interconnection of these Ku band and Ka band satellite communication systems in new and retrofit airplanes.

4.2.1 Benefits for Airlines

Lowers acquisition cost of these systems for new and retrofit airplanes. Standardized equipment will also lower maintenance and spares costs across the airlines multiple airplane models.

4.2.2 Benefits for Airframe Manufacturers

Simplifies the design for installation of these systems, lowering the cost of installation and interconnection which ultimately lowers the acquisition cost.

4.2.3 Benefits for Avionics Equipment Suppliers

Avionics suppliers are able to design standard equipment applicable to multiple airplane manufacturers and models decreasing their design effort and cost.

5.0 Documents to be Produced and Date of Expected Result

Supplement 3 to ARINC 791 Part 1 and Supplement 2 to ARINC 791 Part 2

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
Supplement 3 to ARINC 791 Part 1 Supplement 2 to ARINC 791 Part 2	3	9	July 2016	Oct 2017

Reflects necessary Ku-Band and Ka-Band Satcom Subcommittee meetings. In addition to the proposed meetings identified above, the Subcommittee will have approximately 10 virtual meetings per year to support specific develop goals.

6.0 Comments

None.

6.1 Expiration Date for the APIM

Oct 2017

Completed forms should be submitted to the AEEC Executive Secretary.

Attachment 6

Attachment 6

ARINC Project Initiation/Modification (APIM)

1.0 Name of Proposed Project APIM 16-007

Air Traffic Services (ATS) Wind Service Implementation

1.1 Name of Originator and/or Organization

Boeing and Airbus

2.0 Subcommittee Assignment and Project Support

2.1 Suggested AEEC Group and Chairman

Group: Data Link Systems Subcommittee

Note: If possible, we would prefer to handle review and discussion of items via teleconference.

Chairman: Bob Slaughter, AA

2.2 Support for the activity

Airlines: American, United, UPS, Alaska,

Airframe Manufacturers: Boeing, Airbus

Suppliers: GE Aviation, Honeywell, Rockwell Collins, Thales

Others: FAA

2.3 Commitment for Drafting and Meeting Participation

Airlines: N/A

Airframe Manufacturers: Boeing, Airbus

Suppliers: GE Aviation, Honeywell, Rockwell Collins, Thales

Others: FAA

2.4 Recommended Coordination with other groups

RTCA SC-214

3.0 Project Scope

3.1 Description

Air Traffic Service Wind Service would allow for the transmission of wind and temperature gradient information to aircraft by an Air Traffic Control Center (ATCC). It is designed to support Interval Management and 4-D trajectory functions.

In order to provide the ATS wind service with minimal impact to the airborne equipment, the implementation described in the joint Boeing and Airbus paper was created.

In the proposed implementation, the existing Airline Operational Communication (AOC) (ARINC 702A) message format would be utilized for transmitting ATS winds. The main addition is the use of the ACARS supplemental address to identify the Originator (i.e. ATC).

This implementation would utilize existing air/ground message formats described in ARINC Specification 620.

3.2 Planned usage of the envisioned specification

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

Specify: TBD

Modification/retrofit requirement yes ☐ no ☒

Specify: If airlines want to take advantage of ATS winds services, then they must retrofit the capability via enabling the existing AOC communication feature within the Flight Management Computer/Function (FMC/FMF).

Needed for airframe manufacturer or airline project yes ☒ no ☐

Specify:

Mandate/regulatory requirement yes ☐ no ☒

Program and date: No mandate

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

Specify:

When is the ARINC Standard required? 2018

What is driving this date?

Standard development is required to support ATN baseline 2 implementation. Development of ATS wind service standards is also required to facilitate development of standards for the FIM function.

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

If NO, please specify solution: Not applicable

Are Patent(s) involved? yes ☐ no ☒

If YES please describe, identify patent holder: Not applicable

3.3 Issues to be worked

The work to be done consists of two tasks as follows:

1) Prepare Supplement 5 to ARINC 622 to include the proposed ATS winds

functionality.

2) Review document for any minor editorial changes needed since its last publication (e.g., document references, etc.)

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: Not applicable	
Is this a software interface and protocol standard?	yes ☒ no ☐
Specify:	
Product offered by more than one supplier	yes ☒ no ☐
Identify: TBD	

4.2 Specific project benefits (Describe overall project benefits.)

4.2.1 Benefits for Airlines

The benefit for Airlines is expected to come from enhanced airspace capability using existing aircraft technology. There will be minimal impact to Avionics resulting in minimal cost to the operator. Additionally, since the technology being utilized has been in service for a long time, it is a mature technology which is already available on most older model aircraft. This will reduce the impact on retrofit aircraft.

This enables FIM development without major changes to the aircraft to support ATS wind uplinks.

4.2.2 Benefits for Airframe Manufacturers

The benefit to the airframe manufacturer will be the capability to use existing standards and capability to offer ATS wind service enhancement. By using existing capability, there will be minor impact to production and retrofit aircraft models. Only required change would be to enable AOC wind feature within the current FMC/FMF if not already enabled.

4.2.3 Benefits for Avionics Equipment Suppliers

Avionics equipment supplier benefits will be similar to the airframe manufacturer benefits. Due to the minimal impact to existing Avionics equipment, there will be minimal impact to the suppliers.

5.0 Documents to be Produced and Date of Expected Result

Supplement 5 to ARINC Specification 622 to include Air Traffic Services Wind Service information.

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
Addition of ATS Wind Services section to ARINC 622	3	3	Feb 2016	Dec 2016

These are intended to be virtual meetings with the interested parties.

6.0 Comments

None

6.1 Expiration Date for the APIM

April 2017

Attachment 7

Attachment 7

ARINC Project Initiation/Modification (APIM)

1.0 Name of Proposed Project APIM 16-008

Data Link Users Forum (DLUF)

1.1 Name of Originator and/or Organization

Victor Nagowski, DLUF Secretary

2.0 Subcommittee Assignment and Project Support

2.1 Suggested AEEC Group and Chairman

This APIM proposes the continuation of the DLUF activity for three years.

Co-Chairmen: Colin Gallant, British Airways; Brian Gleason, Southwest Airlines

2.2 Support for the activity (as verified)

Airlines: American, Air Canada, Air France, United, British Airways, Southwest, FedEx, UPS, KLM, TAP, Alaska, SAS, DLH, Hawaiian, ANA, JAL, Delta and others.

Airframe Manufacturers: Airbus, Boeing, Gulfstream

Suppliers: Cobham, AVICOM, Airtel ATN, Gables Engineering, GE Aviation, Honeywell, Inmarsat, Harris, SATCOM Direct, SITA, Rockwell Collins, ALTYS Technologies, Rockwell Collins IMS, Hewlett Packard, Spectralux, Iridium, SITA OnAir, Avionica, L2 Consulting, Teledyne Controls, Panasonic Avionics, Thales, and others.

Others: FAA, JRANSA, UK NATS, Nav Canada, IATA, Eurocontrol, MITRE, NWS, and others.

2.3 Commitment for Drafting and Meeting Participation (as verified)

Airlines: United, British Airways, and Southwest (To be confirmed).

Airframe Manufacturers: Airbus and Boeing (To be confirmed).

Suppliers: Airtel ATN, AVICOM, GE Aviation, Harris, Honeywell, Inmarsat, Iridium, Rockwell Collins Avionics, Rockwell Collins IMS and SITA.

Others: FAA, UK NATS, Nav Canada, IATA, and Eurocontrol.

2.4 Recommended Coordination with other groups

- SAI
- DLK Systems Subcommittee
- AOC
- AGCS
- AeroMACS
- KSAT

3.0 Project Scope (why and when standard is needed)

3.1 Description

The goal of the DLUF is to assist aircraft operators improve the system performance and maximize the operational and economic benefits of air/ground data link communication services through the exchange of technical and operational information. The DLUF is a coordinating activity among airlines and cargo carriers, aircraft manufacturers, avionics manufacturers, civil aviation authorities (CAA), Air Navigation Service Providers (ANSP), and data link service providers (DSP) on technical issues of mutual interest leading to the identification and resolution of common problems. The DLUF also provides an opportunity for coordination among airlines, civil aviation authorities, and Air Traffic Service (ATS) providers on the direction, equipment requirements and schedule of new ATS data link programs.

3.2 Planned usage of the envisioned specification

Not applicable

3.3 Issues to be worked

An objective of the DLK Users Forum is to establish and maintain interoperability between airborne users and ground communication service providers while ensuring the efficient use of the limited frequency spectrum allocated for use by the air transport industry.

The DLUF will evaluate a rational progression from the legacy air-ground communications systems to more capable air-ground communication systems as they are identified to support Aeronautical Operational Control (AOC) and ATS applications. The DLUF affords airspace users (i.e., airlines, air cargo carriers and other operators) and ATS service providers an opportunity to coordinate datalink applications. This coordination can be in the form of exchanging operational experience, harmonization of procedures, identification of problems or opportunities that enhance system performance. The DLUF will establish and promote consistency among the services offered by ATS providers.

4.0 Benefits

4.1 Basic benefits

4.2 Specific project benefits (Describe overall project benefits.)

The DLK Users Forum provides benefits to the aviation community by:

- Identifying and resolving operational issues
- Improving system reliability while reducing costs
- Identifying system enhancements and future air-ground communication systems

- Promoting interoperability among various AOC and ATS service providers
- Coordinating ATS applications and procedures for worldwide operations

4.2.1 Benefits for Airlines

- Enable airlines to influence datalink product evolution to suit their operational needs, leading to greater commonality across fleets
- Provide a venue for airlines to have input in forming regulations that govern data link usage
- Common processes and applications for data link usage worldwide
- Prepare for mandates from civil authorities
- Cost reduction in airline data link programs

4.2.2 Benefits for Airframe Manufacturers

- Airframe manufacturers will benefit from being able to offer new aircraft models with data link provisions that meet the broadest needs of their customers, and satisfies CAA mandates
- Airframe manufacturers can rely on equipment suppliers and choose not to develop products themselves

4.2.3 Benefits for Avionics Equipment Suppliers

- Avionics suppliers will benefit from being able to offer new data link provisions that meet the broadest needs of their customers
- Open market opportunities for data link suppliers to provide desired equipment.
- Will simplify supplier effort to equip different aircraft types
- Easier to certify and to get operational approval due to commonality and familiarity

4.2.4 Benefits for Data Link Service Providers

Open market opportunities for data link service providers to provide airline desired data link applications and introduce new services.

5.0 Documents to be Produced and Date of Expected Result

Reports will be provided for each meeting.

5.1 Meetings and Expected Document Completion

The DLK Users Forum meets twice per year for 2.5 days. One meeting is scheduled in the United States in the February timeframe, the other is scheduled in Europe in the September timeframe. The DLUF holds a two-day meeting, followed by a one half day airline only meeting to review the results of the last meeting and identify topics for future meetings.

If necessary, the DLUF will schedule a workshop in conjunction with a DLUF meeting on a specific subject matter. The intent is to help educate the airlines on a specific product, an air/ground protocol improvement, new service provision, etc.

6.0 Comments

6.1 Expiration Date for the APIM

December 2019

Completed forms should be submitted to the AEEC Executive Secretary.

Attachment 8

Attachment 8

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 ☐

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 ☐

Identify: (company name)

4.2 Specific project benefits (Describe overall project benefits.)

4.2.1 Benefits for Airlines

Airlines will have interchangeability between the solutions offered by the Suppliers of Iridium NEXT satcom systems.

4.2.2 Benefits for Airframe Manufacturers

Aircraft Manufacturers will have to define one installation on-board the aircraft, whatever the Supplier of the Iridium NEXT satcom system.

4.2.3 Benefits for Avionics Equipment Suppliers

Avionics Equipment Suppliers will be able to propose to the Airframe Manufacturers and to the Airlines, an Iridium NEXT solution compatible with the aircraft capabilities, and will not require specific installation features.

5.0 Documents to be Produced and Date of Expected Result

Prepare ARINC Project Paper 771 to define aircraft installation provisions and equipment capable of supporting:

- Stand-alone Iridium NEXT
- Multi-service satcom capable of SBB and Iridium NEXT

The content of pertinent ARINC Standards may be included and/or referenced in Project Paper 7xx as needed. For example, ARINC 761 defines provisions for a Multi-Bearer System (MBS)/ Complementary Satcom System (CSS) for data link service (see ARINC 761 Att 1-4 Note 60, and Att 2), with references to such a service included in ARINC 758 CMU, ARINC 429 Part 3 Att 11A, ARINC 619 Att 3 Table 3-1, ARINC 758 Section 5.3.3.3 and Att 6 Table 6-15, and ARINC 620 Section 5.3.51.

The effort to define a multi-service satcom installation (e.g., SBB and Iridium NEXT) will take existing satcom definitions into consideration. Even though MBS/CSS provisions may have yet to be implemented, the definitions found in ARINC 761 should be considered.

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.

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.

Attachment 9

Attachment 9

ARINC Project Initiation/Modification (APIM)

1.0 Name of Proposed Project — APIM 11-005B

Navigation Data Base (NDB) / ARINC 424

This APIM updated by NDB Subcommittee on February 25, 2016.

It proposes the development of Supplement 22 to ARINC Specification 424: *Navigation System Database,* defining a navigation database standard including both traditional ASCII encoding and Extensible Markup Language (XML) encoding of data.

It also recommends that the proposed ARINC Project Paper 424A, a dedicated UML document, be cancelled (formerly APIM 11-005A).

1.1 Name of Originator & Organization

NDB Subcommittee

2.0 Subcommittee Assignment and Project Support

2.1 Suggested AEEC Group and Chairman

NDB Subcommittee

Choung Phung, FedEx

2.2 Support for the activity (as verified)

Airlines: Delta, FedEx, Lufthansa, United,

Airframe Manufacturers: Airbus, Boeing

Suppliers: Jeppesen, LIDO, Navtech, Rockwell Collins, Honeywell, Universal, GE Aviation, Garmin, NGA, MITRE

Others: TBD

2.3 Commitment for Drafting and Meeting Participation (as verified)

Airlines:

Airframe Manufacturers:

Suppliers: Honeywell, Jeppesen, LIDO, Navtech, NGA

Others: TBD

2.4 Recommended Coordination with other groups

SAI Subcommittee, AMDB Subcommittee

3.0 Project Scope

The project will identify, evaluate, and document the recommended standards for the preparation of airborne navigation system reference data for use in the air transport industry. This data is intended for merging with existing airborne navigation computer operational software to produce a navigation data base for use onboard the aircraft. This scope recommends **Supplement 22** to ARINC Specification 424 to support new navigation procedures.

This activity will model the ARINC 424 content using the Unified Modeling Language (UML) enabling an object-oriented definition of ARINC 424 and the creation of a standard XML Schema Definition (XSD) file for inclusion in ARINC 424 Supplement 22.

3.1 Description

The NDB Subcommittee will expand the current ARINC 424 interchange format of 132 characters to include an XML format that is easy to extend and has no size constraints.

3.2 Planned usage of the envisioned specification

Use the following symbol to check yes or no below. ☒

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

- Airbus: (aircraft & date)
- Boeing: (aircraft & date)
- Other: (manufacturer, aircraft & date)

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☒

- Specify (e.g., ARINC 429)

When is the ARINC standard required?

- The NDB Standard is a dynamic document and will need to be continually updated to maintain interoperability between new and older ATS procedures and FMS cockpit implementations.

What is driving this date? _____ (state reason) _____

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

- If NO please specify solution: The Subcommittee will need to meet once a year to continue work on the developing standard.

Are Patent(s) involved? yes ❑

- If YES please describe, identify patent holder: _____

3.3 Issues to be worked

See item 3.1

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 ❑

Identify: (company name)

4.2 Specific project benefits (Describe overall project benefits.)

4.2.1 Benefits for Airlines

There is universal support among airlines, manufacturers, and regulatory authorities for the preparation of regular updates to ARINC Specification 424. One of the key benefits of this project is the continued interoperability between new and older ATS procedures and FMS procedures. Significant additional benefits are expected from the reduced separation standards and the increased availability of user-preferred routing that will result from the development of RNP RNAV procedures.

Other avionics systems on the aircraft, in addition to FMS, use ARINC 424.

4.2.2 Benefits for Airframe Manufacturers

See item 4.2.1

4.2.3 Benefits for Avionics Equipment Suppliers

See item 4.2.1

5.0 Documents to be Produced and Date of Expected Result

ARINC Specification 424 is a dynamic document that requires frequent update. The most current version of the document is ARINC 424-21. Supplement 22 will include the UML model and standard XSD file(s).

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
Supplement 22 to ARINC 424	3	9	April 2016	Date TBD

6.0 Comments

1 meeting per year

6.1 Expiration Date for this APIM

April 2019

Attachment 10

Attachment 10

ARINC Project Initiation/Modification (APIM)

1. Name of Proposed Project **APIM 08-004C**

This APIM proposes development of Supplement 7 to ARINC Specification 661.

Supplement 7 to ARINC Specification 661 Part 1: *Cockpit Display System Interfaces to User Systems:* Avionics Interfaces, Basic Symbology, and Behavior

ARINC Project Paper 661 Part 2: *Cockpit Display System Interfaces to User Systems:* User Interface Markup Language (UIML) for Graphical User Interfaces

Software specification only yes ☑ no ☐

2. Suggested Subcommittee Assignment (who acts)

2.1 Identify AEEC group

CDS Subcommittee (active since 2000)

2.2. Support for the activity

Organizations: Airbus, Boeing, Dassault, Esterel Technologies, Flexible Software Solutions, GE Aviation, Honeywell, Presagis, Rockwell Collins, Thales [others TBI]

2.3. Commitment for resources (directly from participant)

Organizations: Airbus, Boeing, Dassault, Esterel Technologies, Flexible Software Solutions, GE Aviation, Honeywell, Presagis, Rockwell Collins, Thales [others TBI]

2.4. Recommended Coordination with other groups

The following AEEC Subcommittee activities are relevant to this topic:

- SAI Subcommittee

3. Project Scope

Develop and maintain ARINC 661 flight deck display interface standards for new airplane development programs and for retrofit programs, including Airbus A380, A350, A400M, Boeing B787, B737 Max, B777X, KC-46A, COMAC C919, Regional Aircraft, General Aviation (GA) and rotorcraft. Ensure growth for CNS/ATM applications that provide advanced operational concepts that will increase aviation safety, capacity, and efficiency.

ARINC 661 defines the basic building blocks through which a Graphical User Interface (GUI) to display systems can be developed. ARINC 661 is being expanded to meet OEM requirements for new airplane programs. ARINC 661 will enable flight crews to interact with the CDS using a cursor control device or touchscreen technology.

Part 1 will be updated through the preparation of Supplement 7 topics identified in Section 3.3, the material needed to describe Part 1 and Part 2, and the relation between the two parts.

ARINC Project Paper 661 Part 2 will define the User Interface Markup Language which will allow developers to specify the interface and the look and behavior of any graphical user interface, in particular ARINC 661 building blocks.

3.1 Description

3.2. Planned usage of the envisioned specification

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

New avionics equipment for major retrofit programs yes ☑ no ☐

Mandate/regulatory requirement yes ☐ no ☑
Please specify program and date: N/A

Modification/retrofit requirement yes☐ no ☑
Please specify: TBD

Airframer and/or airline projects to use this specification yes ☑ no ☐

Is the infrastructure standard for the aircraft defined? yes ☑ no ☐
When is the ARINC standard required?

- Supplement **7** to ARINC 661 is expected by April 201**8**.
- ARINC Project Paper 661 Part 2 **will be rescheduled to mature simultaneously with Supplement 7 to Part 1 in April 2018.**

Are 18 months (min) available for standardization work? yes ☑ no☐
If 'No' please specify solution:
Patent(s) involved? yes ☐ no ☑
If 'Yes' please describe:

3.3. Issues to be worked

Start with ARINC 661-**6** Gray Cover and update the document to include:

- **Widget Structure Meta Definition**
- **Three dimensional projection**
- **Super Layer clarifications and new material (Appendix H)**
- **Custom Data Elements (Look Modeling)**
- **Coupling and alignment of Part 1 and Part 2**
- **Relocation of Look and Feel related sections of Part 1 to Part 2**
- **Any necessary clarifications**

ARINC Project Paper 661 Part 2 will include the following:

- User Interface Markup Language Syntax
- Principle of coupling Part 1 and Part 2 material of ARINC 661

- Definition of a first set of primitives and first set of basic components
- Execution model
- Widget samples using the UIML

4. Benefits envisioned

4.1. Basic benefits

New aircraft flight deck concepts are enabled by “interactive” features of ARINC 661. Projects benefiting from this effort would be future production aircraft and major retrofit programs that could utilize common equipment for the creation, modification and expansion of CDS features and aircraft operating capabilities.

Operational enhancements (reduction in DOC?) yes ☑ no ☐

Form, Fit, Function, (FFF) standard (HW and/or SW):

a. ARINC 600 form (only HW) yes ☐ no ☑

b. Interchangeable fit (plug, mount, SW loading interface, etc.) yes ☐ no ☑

c. Interchangeable function yes ☑ no ☐

If not fully interchangeable, please explain:

Interface and protocol standard (for aircraft defined in section 3 scope) yes ☑ no ☐

Please specify: Aircraft installation interface may use any suitable protocol for data delivery, including ARINC 664 Ethernet

Product offerable from more than one supplier (competitive environment) yes ☑ no ☐

Please identify: Aircraft manufacturers, CDS application developers

4.2 Specific Project Benefits

Supplement 7 to ARINC Specification 661 Part 1 will define a common CDS interface data formats, graphical user interface (GUI). The idea is to support the widest possibilities of airplane types, for both forward fit and retrofit using common data interface. This document will enable benefits to be realized at lower costs to the airlines and with less risk to the suppliers.

ARINC Project Paper 661 Part 2 will define a language (UIML) that can be used by any airframe manufacturer on any kind of aircraft to specify graphical user interface look and behavior. This document will enable benefits to be realized at lower costs to the airlines and with less risk to the suppliers.

4.3 Project Benefit for Airlines

This standard will provide several benefits to Airlines as stated in ARINC 661:

Minimize the cost of acquiring new avionic systems to the extent it is driven by the cost of CDS development

Minimize the cost of adding new display function to the cockpit during the life of an aircraft

Minimize the cost of managing hardware obsolescence in an area of rapidly

evolving technology

Introduce interactivity to the cockpit, thus providing a basis for airframe manufacturers to standardize the Human Machine Interface (HMI) in the cockpit

Enables airlines to consider operational upgrades to CDS to support new ATC capabilities, e.g., CNS/ATM.

4.4 Project Benefit for Airframe Manufacturers

This standard will provide several benefits to Airframe manufacturers:

The airframe manufacturers can define a common CDS interface for all aircraft implementations.

Flexibility to add new CDS capabilities by adding to existing platforms.

The airframe manufacturers can use a common language, from CDS mockups and prototyping, to maintenance and training, graphical user interfaces.

Reduce the cost of development and management of the graphical user interface specification.

Ability to specify modern user interface (data fusion, multi-touch, animation, 3D, Post WIMP interface)

4.5 Project Benefit for Avionics Equipment Suppliers

This standard will provide several benefits to Avionics Suppliers:

Reduces CDS cost of development compared to non-standard platforms

Allows for an open market place for manufacturers to supply interoperable equipment.

4.6 Project Benefit for CDS Development Tool Suppliers

This standard will provide several benefits to Tool Suppliers:

Enables tools to be developed that are recognized and accepted by a wide market.

5. Documents to be Produced and Date of Expected Result

Supplement 7 to ARINC Specification 661 Part 1: *Cockpit Display System Interfaces to User Systems:* Avionics Interfaces, Basic Symbology, and Behavior. A mature document is expected in **April 2018**.

ARINC Project Paper 661 Part 2: *Cockpit Display System Interfaces to User Systems:* User Interface Markup Language (UIML) for Graphical User Interfaces. The document is **scheduled for completion simultaneously with Supplement 7 to Part 1 in April 2018.**

6. Meetings/Expected Document Completion

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

This activity to be completed within the approved work program and meeting schedule for the CDS Subcommittee:

Activity	Mtgs	Mtg-Days 2016	Mtg-Days 2017	Mtg-Days 2018
ARINC 661 Part 1 Supplement 7	5	2 (5-day) 3+2 10 days max	2 (5-day) 3+2 10 days max	1 (5-day) 3+2 5 days max
ARINC Project Paper 661 Part 2				

Mature drafts of both documents are expected in April 2018.

The APIM expiration date is **May 31, 2018.**

7. Comments