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.