ARINC Project Initiation/Modification (APIM)

1.0   **Name of Proposed Project**   **APIM: 23-XXX**

This APIM proposes development of the following document:

Supplement 2 to ARINC Report 645: Common Terminology and Functions for Software Distribution and Loading (Section 5.0 Security Standards).

1.1   **Name of Originator and /or Organization**

Ted Patmore, Delta Airlines

2.0   **Subcommittee Assignment and Project Support**

2.1   **Suggested AEEC Group and Chairman**

Software Distribution and Loading (SDL) Subcommittee
Co-Chairman: Chris Kuske, Teledyne Controls
Co-Chairman: Ted Patmore, Delta Air Lines

2.2   **Support for the Activity (as verified)**

(Blue verification request sent)

Airlines: Delta, KLM, FedEx, American Airlines, NetJets. Air Canada, United Airlines, UPS, Lufthansa

Airframe Manufacturers: Airbus, Boeing

Suppliers: Honeywell, TechSAT, Teledyne Controls, MBS Electronics, Collins Aerospace, Safran, Aero Instruments & Avionics, GE Aerospace, Aviage, Carillion Information Security, North American Tech Sat, AIT/Teradyne, Panasonic Aero, Thales

Others:

2.3   **Commitment for Drafting and Meeting Participation (as verified)**

(Blue verification request sent)

Airlines: Delta, KLM, FedEx, American Airlines, NetJets, Air Canada, United Airlines, UPS, Lufthansa

Airframe Manufacturers: Airbus, Boeing

Suppliers: Honeywell, TechSAT, Safran, Teledyne Controls, MBS Electronics, Collins Aerospace, Aero Instruments & Avionics, GE Aerospace, Aviage, Carillion Information Security, North American Tech Sat, AIT/Teradyne, Panasonic Aero, Thales

Others:

2.4   **Recommended Coordination with other Groups**

(List other AEEC Subcommittees or other industry groups)

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

Supplement 1 to ARINC 645 added Section 5: *Security Standards* which define characteristics and feature requirements to support cyber security during distribution of software to and from Portable Data Loaders (PDLs) and STC ADLs.

This project proposes Supplement 2 which will add additional guidance to Section 5 for users of ARINC 645 Section 5 compliant PDLs and ADLs which will add a checklist of items required to substantiate loader compliance.

3.1   Description

When PDLs are acquired from the supplier, the user or operator should be able to verify the integrity and completeness of all required security features. A minimal checklist of items required to substantiate loader compliance should be used. The list should include the following:

- Certificate of conformance to ARINC 645 Section 5: *Security Standards*
- Demonstrate rejection of software distributions that have incorrect digital signatures or expired certificates e.g. fail integrity and authenticity checks.
- Adequate indication by loader to the operator when distributions are rejected due to failed signature check.
- The rejected software distribution must not be stored on the data loader.
- Indicate signature check status of software immediately before loading process begins. Software loader indicates abort if signature check fails.
- A list of rejected software distributions should be recorded and available for display.
- Clear user interface features that support all ARINC 645 compliance elements.
    - Electronic access control
    - Signature rejection
    - Network access

3.2   Planned usage of the ARINC Standard

Note: New airplane programs must be confirmed by the aircraft 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: It is expected that this standard would be used for operators to comply with AC 43-216. It is expected that regulators may require use of this standard in future rulings.

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

  Specify   (e.g., ARINC 429)

When is the ARINC standard required?   May 2024

What is driving this date?   AC 43-216 and AIA SW security use case

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

1. Device hardening requirements and potential impact to existing loaders

2. Regulatory involvement to ensure solution meets in work security rulings

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 ☐

Security design requirements were specified by Supplement 1 to ARINC 645. Supplement 2 will provide quality assurance guidance and human interface design requirements of PDLs and ADLs. This standard will use ARINC 835 digital signature security protocols and support DO-355A / ED-204A information security guidance for continuing airworthiness.

4.0   Benefits

4.1   Basic Benefits

Operation 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: All existing PDL and STC ADL suppliers are expected to be compatible with updated security requirements

4.2   Specific Project Benefits

Provides standard user interface characteristics of PDLs and ADLs. Provides guidance for quality assurance and completeness of an end-to-end software tamper protection solution where the airplane OEMs do not provide a built-in secure loader.

4.2.1   Benefits for Airlines

Defines method for airlines to audit the presence and integrity of PDL and ADL security features.

Provides usage guidance for an end-to-end solution that is less reliant on a variety of storage, network, and handling processes. Provides a good means to comply with AC 43-216.

4.2.2   Benefits for Airframe Manufacturers

Provide common usage and performance standard requirements for secure PDLs and ADLs

4.2.3   Benefits for Avionics Equipment Suppliers

(Describe any benefits unique to the equipment supplier's point of view.)

Define customer expectations for secure PDLs and ADLs.

5.0   Documents to be Produced and Date of Expected Result

Supplement 2 to ARINC Report 645 adding Software Loader Security Guidance

5.1   Meetings an Expected Document Completion

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

Activity	Virtual Mtgs	F2F Mtgs (Total)	Expected Start Date	Expected Completion Date
Supp 2 to ARINC Report 645	*22*	*4 (12)*	*May 2023*	*May 2025*

Please note the number of in-person meetings and the number of meeting days to be supported by the ARINC IA Staff.

Please add a statement describing the frequency of web conferences.

6.0   Comments

The SDL Subcommittee has other APIMs in-work. Work on all projects is done concurrently.

The SDL has monthly web conferences to discuss and modify their assigned projects.

6.1   Expiration Date for the APIM

April/October 2026