

ARINC Project Initiation/Modification (APIM)

1.0 Name of Proposed Project

APIM 19-012

ARINC Specification 653: Avionics Application Software Standard Interface, Part 0, Overview Of ARINC 653, and Avionics Application Software Standard Interface, Part 3A and 3B, Conformity Test Specifications for Multi-Core Processor Operating Systems

1.1 Name of Originator and/or Organization

APEX Software Subcommittee

2.0 Subcommittee Assignment and Project Support

2.1 Suggested AEEC Group and Chairman

APEX Software Subcommittee

Pierre Gabrilot, Airbus and Gordon Putsche, Boeing

2.2 Support for the activity (as verified)

Airlines: TBD

Airframe Manufacturers: Airbus, Boeing

Suppliers: Collins Aerospace, Garmin, Honeywell, Thales, GE Aviation, Green Hills Software, Wind River Systems, DDC-I, Verocel, GMV, Sysgo, Lynx Software, Universal Avionics, Mannarino

Others: TUBITAK

2.3 Commitment for Drafting and Meeting Participation (as verified)

Airlines: TBD

Airframe Manufacturers: Airbus, Boeing

Suppliers: Collins Aerospace, Garmin, Honeywell, Thales, GE Aviation, Green Hills Software, Wind River Systems, DDC-I, Verocel, GMV, Sysgo, Lynx Software, Universal Avionics, Mannarino

Others: TUBITAK

2.4 Recommended Coordination with other groups

SAI Subcommittee, Future Airborne Capability Environment (FACE)

3.0 Project Scope (why and when standard is needed)

3.1 Description

Maintain an application software interface definition for avionics real-time computing systems performing the most flight-critical applications on the airplane.

This APIM will:

1. For Part 0: Make corrections to the Glossary and include information from the new Supplements to Parts 3A and 3B.
2. Add multicore processor conformity test specifications in Parts 3A & 3B.

3.2 Planned usage of the envisioned specification

Develop and maintain ARINC 653 software interface standards for new airplane development programs and for retrofit programs, including the Boeing 777X.

ARINC 653 (APEX) defines an interface between Application software and Executive software. ARINC 653 is being expanded to meet OEM requirements and avionics supplier requirements for new airplanes and to support in-service software updates.

New aircraft developments planned to use this specification yes no

Airbus: New potential programs
Boeing: Future new models, 2021 and on
Other: (manufacturer, aircraft & date)

Modification/retrofit requirement yes no

Specify: Multiple Airbus & Boeing programs

Needed for airframe manufacturer or airline project yes no

Specify: (aircraft & date)

Mandate/regulatory requirement yes no

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

Specify ARINC 653

When is the ARINC standard required? October 2021

What is driving this date? Implementation of multi-core solutions by several avionics suppliers.

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

- Prepare Supplement 3 to ARINC Specification 653, Part 0, Overview Of ARINC 653
- Review multicore services in ARINC 653 Parts 1 & 2 and prepare the necessary conformity test specifications
- Prepare Supplement 2 to ARINC Specification 653, Part 3A, Conformity Test Specification for ARINC 653 Required Services (Part 1, Supplement 5 2019 version)
- Prepare Supplement 1 to ARINC Specification 653, Part 3B, Conformity Test Specification for ARINC 653 Extended Services (Part 2, Supplement 4 2019 version).

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: Wind River, Green Hills, DDC-I, Thales, Honeywell, GE Aviation, Lynx Software, Sysgo.

4.2 Specific project benefits (Describe overall project benefits.)

4.2.1 Benefits for Airlines

This standard will provide several benefits to the airlines:

- Enables airlines to consider operational upgrades to specific software to support new ATC capabilities, e.g., CNS/ATM.
- Reduction of avionics weight and volume by using IMA architecture
- The benefit of multi-core is twofold:
 - 1) more computing throughput as new functions require.
 - 2) Reduction of the number of modules for the same computing throughput.

4.2.2 Benefits for Airframe Manufacturers

This standard will provide several benefits to airframe manufacturers:

- The airframe manufacturers can specify a common interface for all aircraft implementations.
- Provides flexibility to add new capabilities by adding to existing platforms or plugging in appropriate components.
- Enables use of competitive O/S products that are commercially available (COTS).
- Increased maturity in products as a result of using well-defined interfaces, and reusability
- With multi-core, the OEM has the option of using hi-performance avionics based on the latest edition of the ARINC 653 standard.

4.2.3 Benefits for Avionics Equipment Suppliers

This standard will provide several benefits to avionics suppliers:

- Enables concurrent design of application software programs
- Maintaining the open door for software re-use
- Reduces time-to-market
- As an indirect benefit, the avionics manufacturer stays competitive once standardized multi-core is mastered.

5.0 Documents to be Produced and Date of Expected Result

ARINC 653 Part 0, Supplement 3	September 2020
ARINC 653 Part 3A, Supplement 2	September 2020
ARINC 653 Part 3B, Supplement 1	April 2021

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
Parts 0, 3A & 3B	2	6	Oct 2019	April 2021

NOTE: Web conferences will be scheduled as needed. It is anticipated that at least one every quarter will be held.

6.0 Comments

6.1 Expiration Date for the APIM

October 2021

Completed forms should be submitted to Paul Prisaznuk, AEEC Executive Secretary and Program Director (pjp@sae-itc.org).