

ARINC Project Initiation/Modification (APIM)

1.0 Name of Proposed Project **APIM 21-007**

Update **ARINC Specification 653: Avionics Application Software Standard Interface, multi-part document (Section 5 of this APIM identifies each part)**

1.1 Name of Originator and/or Organization

Gordon Putsche, Boeing
Pierre Gabrilot, Airbus

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: Honeywell Aerospace, Green Hills, Wind River, DDC-I, Mannarino Systems, General Electric, GMV, Universal Avionics, Verocel, Collins, Thales, SYSGO
Others: TUBITAK, SAAB

2.3 Commitment for Drafting and Meeting Participation (as verified)

Airlines: TBD
Airframe Manufacturers: Airbus, Boeing
Suppliers: Wind River, Green Hills, DDC-I, Verocel, GMV, Universal Avionics
Others: TUBITAK

2.4 Recommended Coordination with other groups

SAI Subcommittee

3.0 Project Scope (why and when standard is needed)

3.1 Description

The ARINC 653 standard suite needs updating to provide clarifications and corrections resulting from use of the standard. In addition, new capabilities need to be added to accommodate and expand user base as well as account for technological improvements. New capabilities include the addition of a C++ programming language interface specification.

3.2 Planned usage of the ARINC Standard

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: Supports new airplane product development
 Boeing: Supports new airplane product development
 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: ARINC Specification 653

When is the ARINC standard required? October 2023
 What is driving this date? New product development

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 4 to ARINC 653 Part 0
- Prepare Supplement 6 to ARINC 653 Part 1
- Prepare Supplement 5 to ARINC 653 Part 2
- Prepare Supplement 3 to ARINC 653 Part 3A
 - Note that a revision to ARINC 653 Part 3A is only needed if the modifications to Parts 1 impacts the content of that document. The updates to the test specification will be clear when Part 1 is complete.

3.4 Security Scope

Is Cyber Security Impacted (if yes, check box(es) below) yes no

Aircraft Control Domain yes no

Airline Information Services Domain yes no

Pax Information and Entertainment Systems yes no

Other _____ yes no

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

4.0 Benefits

4.1 Basic Benefits

Operational enhancements yes no

For equipment standards:

(a) Is this a hardware characteristic? yes no

(b) Is this a software characteristic? yes no

(c) Interchangeable interface definition? yes no

(d) Interchangeable function definition? yes no

If not fully interchangeable, please explain:

Is this a software interface and protocol standard? yes no

Specify: ARINC Specification 653

Product offered by more than one supplier yes no

Identify: DDC-I, Green Hills, Wind River, SYSGO

4.2 Specific Project Benefits

Use of the ARINC 653 standard has broadened significantly. Updates and maintenance of the standard are increasingly important to ensure consistent interpretation (portability), and improved capability to support increasing demands for modern aircraft functionality.

4.2.1 Benefits for Airlines

This standard will provide several benefits to the airlines:

- Enables airlines to consider operational upgrades to specific software
- 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

Portability allows for increased freedom of choice with respect to computing equipment and tools.

4.2.3 Benefits for Avionics Equipment Suppliers

The standard software environment facilitates common developer knowledgebase, which should improve quality of software.

5.0 Documents to be Produced and Date of Expected Result

- ARINC 653 Part 0, Supplement 4 October 2023
- ARINC 653 Part 1, Supplement 6 April 2023
- ARINC 653 Part 2, Supplement 5 April 2023
- ARINC 653 Part 3A, Supplement 3 October 2023 - TBC
 - Note that a revision to ARINC 653 Part 3A is only needed if the modifications to Parts 1 impacts the content of that document. The updates to the test specification will be clear when Part 1 is complete. Any updates are likely to be small and easily accomplished by the WG members.

- Note that a revision to ARINC 653 Part 3B is under discussion and if deemed necessary, this APIM will be updated.

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 |
|--------------------------------------|-------------|-------------------------|----------------------------|---------------------------------|
| <i>ARINC 653 Part 0</i> | 2 | 6 | <i>Jan 2022</i> | <i>April 2023</i> |
| | | | | |
| <i>ARINC 653 Part 1</i> | | | <i>Jan 2022</i> | <i>April 2023</i> |
| | | | | |
| <i>ARINC 653 Part 2</i> | | | <i>Jan 2022</i> | <i>April 2023</i> |
| | | | | |
| <i>ARINC 653 Part 3A (if needed)</i> | | | | <i>October 2023</i> |

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

Web conferences will be conducted approximately quarterly.

6.0 Comments

None.

6.1 Expiration Date for the APIM

October 2023

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