ARINC Project Initiation/Modification (APIM)

# Name of Proposed ProjectAPIM 21-007

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

## Name of Originator and/or Organization

Gordon Putsche, Boeing

Pierre Gabrilot, Airbus

# Subcommittee Assignment and Project Support

## Suggested AEEC Group and Chairman

APEX Software Subcommittee

Pierre Gabrilot, Airbus and Gordon Putsche, Boeing

## 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

## 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

## Recommended Coordination with other groups

SAI Subcommittee

# Project Scope (why and when standard is needed)

## 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.

## 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 [x]  no [ ]

 Airbus: Supports new airplane product development

 Boeing: Supports new airplane product development

 Other: (manufacturer, aircraft & date)

Modification/retrofit requirement yes [ ]  no [x]

 Specify: (aircraft & date)

Needed for airframe manufacturer or airline project yes [ ]  no [ ]

 Specify: (aircraft & date)

Mandate/regulatory requirement yes [ ]  no [x]

 Program and date: (program & date)

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

 Specify (e.g., ARINC 429)

When is the ARINC standard required? \_\_\_\_\_\_(month/year)\_\_\_\_\_\_\_\_\_\_

What is driving this date? \_\_\_\_\_\_\_(state reason)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Are 18 months (min) available for standardization work? yes [x]  no [ ]

 If NO please specify solution: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Are Patent(s) involved? yes [ ]  no [x]

 If YES please describe, identify patent holder: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

## Issues to be Worked

* Prepare Supplement 3 to ARINC 653 Part 0
* Prepare Supplement 6 to ARINC 653 Part 1
* Prepare Supplement 5 to ARINC 653 Part 2
* Prepare Supplement 2 to ARINC 653 Part 3A. Note that a revision to ARINC 653 Part 3A is only needed if the modifications to Parts 1 and 2 impact the content of that document. This is not anticipated, but it is listed here as a contingency
* Note that ARINC 653 Part 3B work is pending commitment from participants.

## Security Scope

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

 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.)*

# Benefits

## Basic Benefits

Operational enhancements yes [x]  no [ ]

For equipment standards:

* + - * 1. Is this a hardware characteristic? yes [ ]  no [x]
				2. Is this a software characteristic? yes [x]  no [ ]
				3. Interchangeable interface definition? yes [x]  no [ ]
				4. Interchangeable function definition? yes [x]  no [ ]

 If not fully interchangeable, please explain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Is this a software interface and protocol standard? yes [x]  no [ ]

 Specify: ARINC 653\_\_\_\_\_\_\_\_\_\_\_\_

Product offered by more than one supplier yes [x]  no [ ]

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

## 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.

### 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.

### Benefits for Airframe Manufacturers

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

### Benefits for Avionics Equipment Suppliers

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

# Documents to be Produced and Date of Expected Result

* ARINC 653 Part 0, Supplement 3 October 2023
* ARINC 653 Part 1, Supplement 6 April 2023
* ARINC 653 Part 2, Supplement 5 April 2023
* ARINC 653 Part 3A, Supplement 2 October 2023
* ARINC 653 Part 3B (TBV) (TBD)
* Note that a revision to ARINC 653 Part 3A is only needed if the modifications to Parts 1 and 2 impact the content of that document. This is not anticipated, but it is listed here as a contingency
* Note that ARINC 653 Part 3B work is pending commitment from participants.

## 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 653 Part 0 | 2 | 6 | Jan 2022 | April 2023 |
|  |  |  |
| ARINC 653 Part 1 | Jan 2022 | April 2023 |
|  |  |  |
| ARINC 653 Part 2 | Jan 2022 | April 2023 |
|  |  |  |
| ARINC 653 Part 3A(if needed) |  | October 2023 |
| ARINC 653 Part 3B |  |  |  | TBD |

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

Web conferences will be conducted approximately quarterly.

# Comments

None.

## Expiration Date for the APIM

October 2023

***Completed forms should be submitted to Paul Prisaznuk (pjp@sae-itc.org)***

***AEEC Executive Secretary & Program Director***