# ARINC Project Initiation/Modification (APIM)

## 1. Name of Proposed Project **APIM 08-004C**

**This APIM proposes development of Supplement 7 to ARINC Specification 661.**

**Supplement 7 to ARINC Specification 661 Part 1:** *Cockpit Display System Interfaces to User Systems:* Avionics Interfaces, Basic Symbology, and Behavior

**ARINC Project Paper 661 Part 2:** *Cockpit Display System Interfaces to User Systems:* User Interface Markup Language (UIML) for Graphical User Interfaces

Software specification only yes ☑ no ☐

## 2. Suggested Subcommittee Assignment (who acts)

### 2.1 Identify AEEC group

CDS Subcommittee (active since 2000)

### 2.2. Support for the activity

Organizations: Airbus, Boeing, Dassault, Esterel Technologies, Flexible Software Solutions, GE Aviation, Honeywell, Presagis, Rockwell Collins, Thales [others TBI]

### 2.3. Commitment for resources (directly from participant)

Organizations: Airbus, Boeing, Dassault, Esterel Technologies, Flexible Software Solutions, GE Aviation, Honeywell, Presagis, Rockwell Collins, Thales [others TBI]

### 2.4. Recommended Coordination with other groups

The following AEEC Subcommittee activities are relevant to this topic:

- SAI Subcommittee

## 3. Project Scope

Develop and maintain ARINC 661 flight deck display interface standards for new airplane development programs and for retrofit programs, including Airbus A380, A350, A400M, Boeing B787, B737 Max, B777X, KC-46A, COMAC C919, Regional Aircraft, General Aviation (GA) and rotorcraft. Ensure growth for CNS/ATM applications that provide advanced operational concepts that will increase aviation safety, capacity, and efficiency.

ARINC 661 defines the basic building blocks through which a Graphical User Interface (GUI) to display systems can be developed. ARINC 661 is being expanded to meet OEM requirements for new airplane programs. ARINC 661 will enable flight crews to interact with the CDS using a cursor control device or touchscreen technology.

Part 1 will be updated through the preparation of Supplement 7 topics identified in Section 3.3, the material needed to describe Part 1 and Part 2, and the relation between the two parts.

ARINC Project Paper 661 Part 2 will define the User Interface Markup Language which will allow developers to specify the interface and the look and behavior of any graphical user interface, in particular ARINC 661 building blocks.

## 3.1 Description

## 3.2. Planned usage of the envisioned specification

New aircraft developments planned to use this specification yes ☑ no ☐

New avionics equipment for major retrofit programs yes ☑ no ☐

Mandate/regulatory requirement yes ☐ no ☑
Please specify program and date: N/A

Modification/retrofit requirement yes☐ no ☑
Please specify: TBD

Airframer and/or airline projects to use this specification yes ☑ no ☐

Is the infrastructure standard for the aircraft defined? yes ☑ no ☐
When is the ARINC standard required?

- Supplement **7** to ARINC 661 is expected by April 201**8**.
- ARINC Project Paper 661 Part 2 **will be rescheduled to mature simultaneously with Supplement 7 to Part 1 in April 2018.**

Are 18 months (min) available for standardization work? yes ☑ no☐
If 'No' please specify solution:
Patent(s) involved? yes ☐ no ☑
If 'Yes' please describe:

## 3.3. Issues to be worked

Start with ARINC 661-**6** Gray Cover and update the document to include:

- **Widget Structure Meta Definition**
- **Three dimensional projection**
- **Super Layer clarifications and new material (Appendix H)**
- **Custom Data Elements (Look Modeling)**
- **Coupling and alignment of Part 1 and Part 2**
- **Relocation of Look and Feel related sections of Part 1 to Part 2**
- **Any necessary clarifications**

ARINC Project Paper 661 Part 2 will include the following:

- User Interface Markup Language Syntax
- Principle of coupling Part 1 and Part 2 material of ARINC 661

- Definition of a first set of primitives and first set of basic components
- Execution model
- Widget samples using the UIML

## 4. Benefits envisioned

### 4.1. Basic benefits

New aircraft flight deck concepts are enabled by “interactive” features of ARINC 661. Projects benefiting from this effort would be future production aircraft and major retrofit programs that could utilize common equipment for the creation, modification and expansion of CDS features and aircraft operating capabilities.

Operational enhancements (reduction in DOC?) yes ☑ no ☐

Form, Fit, Function, (FFF) standard (HW and/or SW):

a. ARINC 600 form (only HW) yes ☐ no ☑

b. Interchangeable fit (plug, mount, SW loading interface, etc.) yes ☐ no ☑

c. Interchangeable function yes ☑ no ☐

If not fully interchangeable, please explain:

Interface and protocol standard (for aircraft defined in section 3 scope) yes ☑ no ☐

Please specify: Aircraft installation interface may use any suitable protocol for data delivery, including ARINC 664 Ethernet

Product offerable from more than one supplier (competitive environment) yes ☑ no ☐

Please identify: Aircraft manufacturers, CDS application developers

### 4.2 Specific Project Benefits

Supplement 7 to ARINC Specification 661 Part 1 will define a common CDS interface data formats, graphical user interface (GUI). The idea is to support the widest possibilities of airplane types, for both forward fit and retrofit using common data interface. This document will enable benefits to be realized at lower costs to the airlines and with less risk to the suppliers.

ARINC Project Paper 661 Part 2 will define a language (UIML) that can be used by any airframe manufacturer on any kind of aircraft to specify graphical user interface look and behavior. This document will enable benefits to be realized at lower costs to the airlines and with less risk to the suppliers.

### 4.3 Project Benefit for Airlines

This standard will provide several benefits to Airlines as stated in ARINC 661:

Minimize the cost of acquiring new avionic systems to the extent it is driven by the cost of CDS development

Minimize the cost of adding new display function to the cockpit during the life of an aircraft

Minimize the cost of managing hardware obsolescence in an area of rapidly

evolving technology

Introduce interactivity to the cockpit, thus providing a basis for airframe manufacturers to standardize the Human Machine Interface (HMI) in the cockpit

Enables airlines to consider operational upgrades to CDS to support new ATC capabilities, e.g., CNS/ATM.

## 4.4 Project Benefit for Airframe Manufacturers

This standard will provide several benefits to Airframe manufacturers:

The airframe manufacturers can define a common CDS interface for all aircraft implementations.

Flexibility to add new CDS capabilities by adding to existing platforms.

The airframe manufacturers can use a common language, from CDS mockups and prototyping, to maintenance and training, graphical user interfaces.

Reduce the cost of development and management of the graphical user interface specification.

Ability to specify modern user interface (data fusion, multi-touch, animation, 3D, Post WIMP interface)

## 4.5 Project Benefit for Avionics Equipment Suppliers

This standard will provide several benefits to Avionics Suppliers:

Reduces CDS cost of development compared to non-standard platforms

Allows for an open market place for manufacturers to supply interoperable equipment.

## 4.6 Project Benefit for CDS Development Tool Suppliers

This standard will provide several benefits to Tool Suppliers:

Enables tools to be developed that are recognized and accepted by a wide market.

## 5. Documents to be Produced and Date of Expected Result

**Supplement 7 to ARINC Specification 661 Part 1:** *Cockpit Display System Interfaces to User Systems:* Avionics Interfaces, Basic Symbology, and Behavior. A mature document is expected in **April 2018**.

**ARINC Project Paper 661 Part 2:** *Cockpit Display System Interfaces to User Systems:* User Interface Markup Language (UIML) for Graphical User Interfaces. The document is **scheduled for completion simultaneously with Supplement 7 to Part 1 in April 2018.**

## 6. Meetings/Expected Document Completion

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

This activity to be completed within the approved work program and meeting schedule for the CDS Subcommittee:

| Activity | Mtgs | Mtg-Days 2016 | Mtg-Days 2017 | Mtg-Days 2018 |
|---|---|---|---|---|
| ARINC 661 Part 1 Supplement 7 | 5 | 2 (5-day)<br>3+2<br>10 days max | 2 (5-day)<br>3+2<br>10 days max | 1 (5-day)<br>3+2<br>5 days max |
| ARINC Project Paper 661 Part 2 | | | | |

**Mature drafts of both documents are expected in April 2018.**

The APIM expiration date is **May 31, 2018.**

## 7. Comments