COCKPIT DISPLAY SYSTEM (CDS) SUBCOMMITTEE

CO-CHAIRS:

Part 1 – Brian Gilbert, Boeing

Part 2 – Sofyan Su, Airbus

SECRETARY:

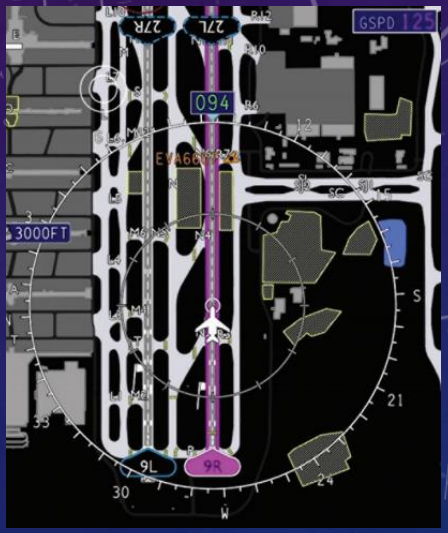
Larry Hesterberg

AEEC General Session
May 14, 2020
UPDATED FOR SAI SUBCOMMITTEE
June 25, 2020

ARINC SPECIFICATION 661 PART 1

Cockpit Display System Interfaces to User Systems, Part 1, Avionics Interfaces, Basic Symbology, and Behavior

- Current version: Supplement 7, published June 17, 2019
- Cockpit Display System (CDS) interface
  - Defines data structures independent of physical bus
  - Defines Graphical User Interface (GUI) objects
- New aircraft flight deck concepts are enabled by “interactive” features of ARINC 661
  - Expands display capability for flight crew
  - Allows use of common equipment
- Widely used across industry
  - Airbus: A380, A350, and A400M; Boeing: 787, 777X, 737 MAX, KC-46A; COMAC: C919
  - Regional and Business aviation (Embraer, Dassault, Bombardier)
  - Required by Future Airborne Capability Environment (FACE) Consortium



- Development performed under APIM 19-010
  - Extension of previously authorized APIM 08-004 by 1 year
  - Synchronized release of Part 2 with Part 1 Supplement 8
- APIM 19-010A is drafted and proposed to define future activities
  - Both Part 1 and Part 2 will be revised

ARINC 661 PART 1 - WAY FORWARD

DRAFT APIM 19-010A prepared to initiate the development of Supplement 9 to ARINC 661 Part 1

- Metadata for runtime protocol
- Document reorganization
- Super layer formalization and concept of “window”
- Formalize Extended Block header
- Definition File header extensions
- Layer-level priority/indication of criticality
- Handling of terrain in 3D maps, ExternalSource3D widget
- Dimming (layer/widget level)
- Enforcement of parent/child relationships across multiple layers of nesting
- Support for copy and paste
- Deferred action items and metadata issues
- Rules for widget events
- Metadata naming conventions
- New widgets and extensions (TBD – as proposed by members)
- Doc gen tool improvements

ARINC 661 PART 2 SCOPE

- Part 2 : User interface (UI) Markup Language
  - **Bring better User Experience (UX)**

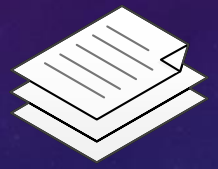
Specialized User Interface

Intuitive design

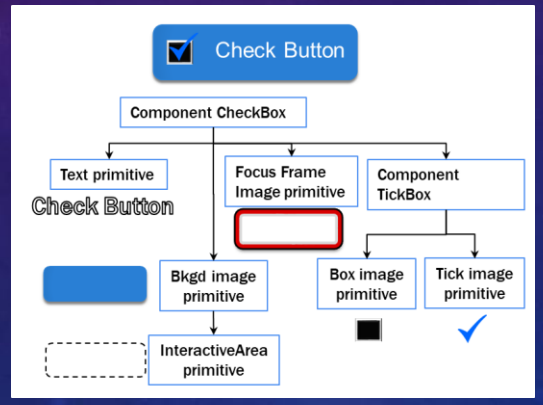
Reduce Pilot Workload

ARINC 661 PART 2 SCOPE

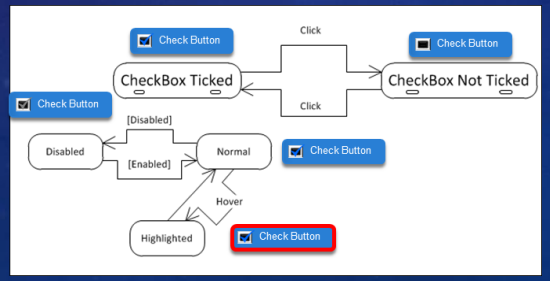
- Part 2 : User interface (UI) Markup Language
  - **Bring better User Experience (UX)**
  - **Formalized language** to define the Look and Behavior of UI Objects
  - **Model** based definition of "**modern**" and "**intuitive**" UI Objects



Textual definition of
User Interface



Model based definition



Faster Time to Market of products

Reduce Product costs

Add to cart

ARINC 661 PART 2 - WAY FORWARD

DRAFT APIM 19-010A prepared to initiate the development of Supplement 1 to ARINC 661 Part 2

- ARINC 661 Part 1 & Part 2 coupling
- Scripting Language definition
- Addition of features (Map symbols, Complex text, etc.)
- Time Schedule 2023

DRAFT APIM 19-010A
ARINC 661 PART 1 AND PART 2

- Scope – Prepare two documents:
  - Supplement 9 to ARINC Specification 661: *Cockpit Display System Interfaces to User Systems, Part 1, Avionics Interfaces, Basic Symbology, and Behavior*
  - Supplement 1 to ARINC Specification 661: *Cockpit Display System Interfaces to User Systems, Part 2, User Interface Markup Language (UIML) for Graphical User Interfaces*.
- Benefits
  - Part 1 allows the CDS graphical user interface and data formats to support a wide number of airplane types, using a common data interface
  - Part 2 will enable UIML data structures to be used to specify graphical user interface look and behavior, which allows new display features to be added at lower costs to the airlines.
- Timeline – Mature documents expected May 2023

DISCUSSION AND COMMENT

BACKUP SLIDES

(PRESENTED MAY 14, 2020 AEEC GENERAL SESSION)

APPROVAL OF ARINC 661 PART 1 AND ARINC 661 PART 2

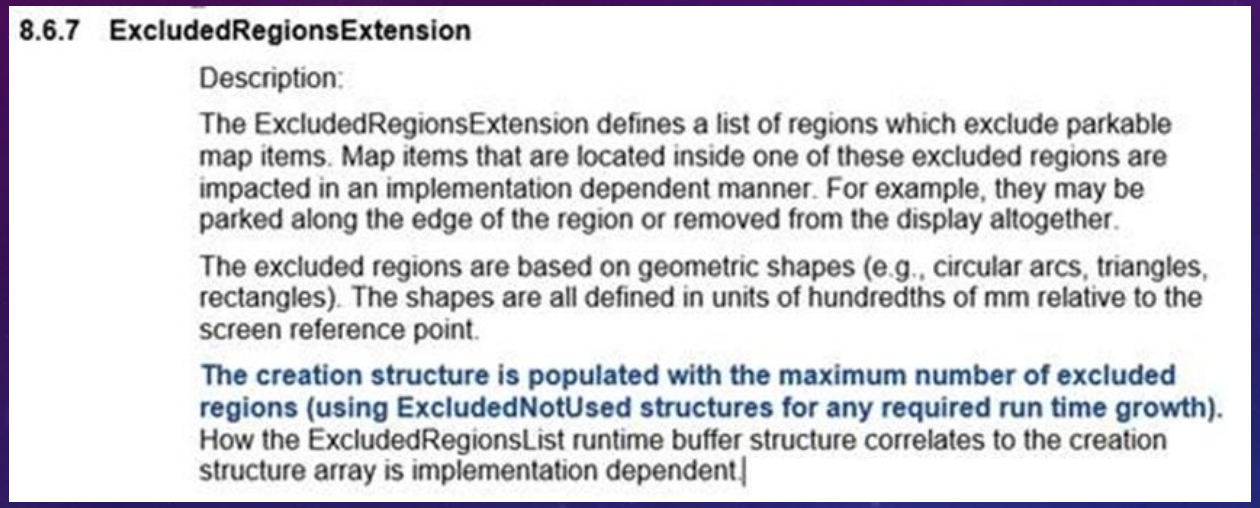
- Part 1 development of Supplement 8 was initiated in June 2019
  - 11 new widgets – all related to 3D Maps
  - 7 new widget extensions
  - Created metadata definitions (XML) for all widgets, extensions, events, symbols, and associated data types (simple and complex)
  - Created tools to generate schema files and validate metadata
  - Created tools to autogenerate document content such as parameter, creation structure, event, and runtime tables, keyword and enumeration tables, and summary/relationship tables
    - Most tables re-ordered/re-formatted as a result
  - General clean-up, error corrections, harmonization, and clarification

- Part 2 development was initiated in February 2016, supported by 10 face to face meetings

- Draft 1 of ARINC 661 Part 1 and Draft 2 of ARINC Project Paper 661 Part 2 circulated on April 15, 2020
  - Documents circulated for 29 days
  - Editorial and technical comments received

APPROVAL OF ARINC 661 - PINK PAGE COMMENT

- Part 1 Pink Page Comments: BOEING
  - Part 1 Technical



8.6.7 ExcludedRegionsExtension

Description:

The ExcludedRegionsExtension defines a list of regions which exclude parkable map items. Map items that are located inside one of these excluded regions are impacted in an implementation dependent manner. For example, they may be parked along the edge of the region or removed from the display altogether.

The excluded regions are based on geometric shapes (e.g., circular arcs, triangles, rectangles). The shapes are all defined in units of hundredths of mm relative to the screen reference point.

The creation structure is populated with the maximum number of excluded regions (using ExcludedNotUsed structures for any required run time growth). How the ExcludedRegionsList runtime buffer structure correlates to the creation structure array is implementation dependent.

  - Part 1 also will have misc editorial changes, cross-reference corrections, etc.

- Part 2 is clean, subject to the usual AEEC staff clean-up during publication

- Draft 1 of ARINC 661 Part 1 with Pink Page and Draft 2 of ARINC Project Paper 661 Part 2

Executive Committee Consideration please

2019-2020 ACTIVITY AND ACCOMPLISHMENTS

- Completed final drafts of ARINC 661 Part 1 Supp 8 to and Project Paper ARINC 661 Part 2
  - Ready for Executive Committee consideration today
- Created GitHub repository and documentation for collaborative development and use of metadata and associated tools
- Completed metadata definitions
  - Included with PDF as electronic support files
- Completed schema generation, validation, and document generation tools
  - Kept within committee (not part of electronic support files included with the standard)
- Three face-to-face meetings
- Monthly WebEx meetings (more towards the end)
- Participation of major airframers, avionics equipment suppliers, and modelling tool vendors