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# Chip Downing

Senior Market Development Director  
Aerospace & Defense

✉ [chip@rti.com](mailto:chip@rti.com)



# Accelerating Deployments with Quality COTS Partner Solutions



## How Does One Increase Value with a Standards-based Product?

- Industry-leading customer support and training
- Brilliant Professional Services team
- Product features above the standard that increase capabilities
- Tools that enable accelerated development and deployment
- Quality documentation that accelerates product deployment
- Partner Ecosystem that reduces integration risk

# How Does One Define Software Quality?

- Define software requirements judiciously
- Develop software according to proven processes
- Test software thoroughly
- Control software releases
- Conduct independent audits and tests
- More



# RTCA DO-178C and EUROCAE ED-12C Standard

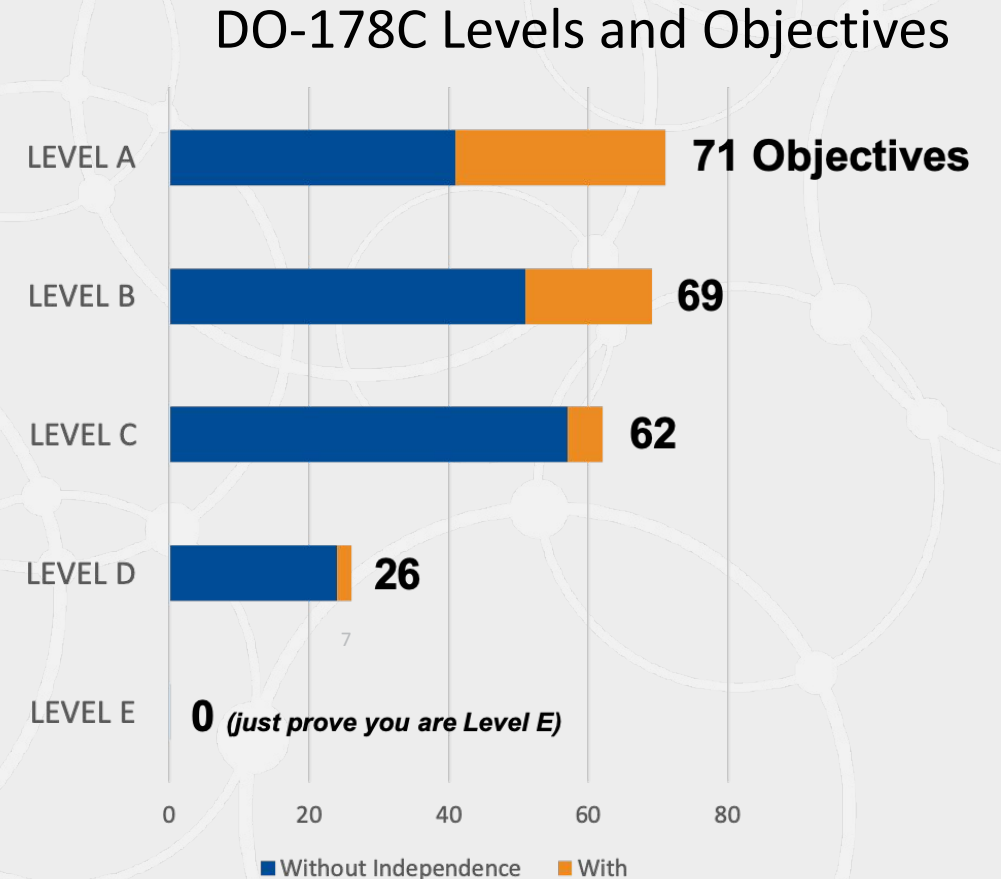
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The RTCA logo consists of the letters "RTCA" in a blue, sans-serif font. Below the letters is a small graphic of three orange dots arranged in a triangular pattern.

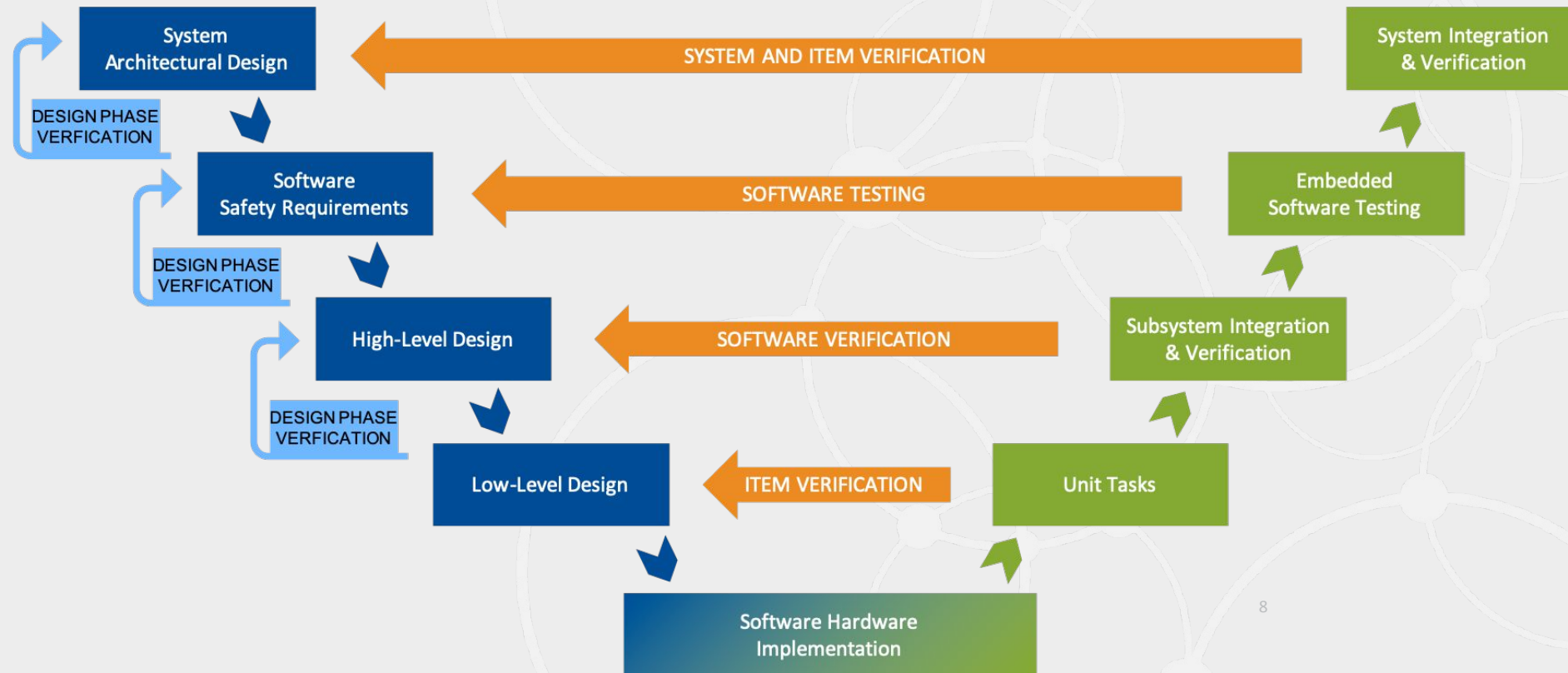
- Developed jointly by RTCA and EUROCAE
- Is an assurance standard, not a development standard
- Development outcomes need to satisfy the assurance criteria of DO-178C in the areas of planning, requirements definition, design and coding, integration, verification, configuration management, and quality assurance
- Regulatory compliance for software can be shown by conforming to the guidelines described in RTCA DO-178C

# Design Assurance Level Determines Rigor Needed for Compliance

- DO-178C mandates Design Assurance Level (DAL) be identified for each avionics system corresponding to hazard classifications derived from the safety assessment
- DAL Level defines the rigor (number of objectives) necessary to demonstrate compliance
- Level A assigned to software with catastrophic failure conditions, whereas Level E is assigned to software with no safety-related failure effects
- The FAA and EASA require a minimum of Level D compliance for any aircraft takeoff-required avionics software (e.g. flight data recorder software)
  - Ex. of Level A – Primary flight control systems
  - Ex. of Level E -- Passenger entertainment software



# Traceability in DO-178C



Mandates documented connection between the certification artifacts to ensure completeness  
Ensures that a Low Level Requirement (LLR) traces up to a High Level Requirement (HLR)  
Ensures each line of source code has a purpose and is connected to a requirement

# Challenges of Creating RTCA DO-178C Evidence

- Large program costs and risks
- High up-front engineering costs
- Difficulty with hiring engineers with certification experience
- High engineering expenditures for platform-specific certification
- Expensive migration to new processor and RTOS platforms
- Inexperienced team to defend certification evidence with certification authorities
- High Total Cost of Operations (TCO) – high costs for ensuring long term maintenance and expert support



# RTI Connex Cert FAA RTCA DO-178C and EUROCAE ED-12C DAL A Certification Evidence

- **Plan for Software Aspects of Certification (PSAC)**
- Software Quality Assurance Plan
- Software Configuration Management Plan (SCMP)
- Software Development Plan (SDP)
  - Software requirements standards
  - Software design standards
  - Software coding standards
- Software Verification Plan (SVP)
- Software Requirements Specification (SRS)
- Software Design Document (SDD)
- **Certified platform production binary**
- Software Life Cycle Environment Configuration Index (SECI)
- Traceability Matrix
- Software Development Folder
  - Design reviews
  - Code reviews
  - Test reviews
  - Functional tests
  - Coverage results (object level)
- Tools Qualification Documents (TQD)
- Software Vulnerability Analysis
- **Software Accomplishment Summary (SAS)**

***RTI has over 5,000 hyperlinked files – in COTS packaging***

# **RTI Connex Certification Evidence**

- Proven certification evidence
- Lower up-front costs
- Yearly subscription model
- Standard and consistent pricing model
- Over 9 safety RTOS and 6 processor families supported

# Taming Certification Risk

How to reduce risk in aircraft certification programs?

- Establish supply chain controls
- Simplify software and hardware
- Use proven technologies

# Avionics Solution Stacks

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**Avionics  
Innovation**

**Avionics  
Innovation**

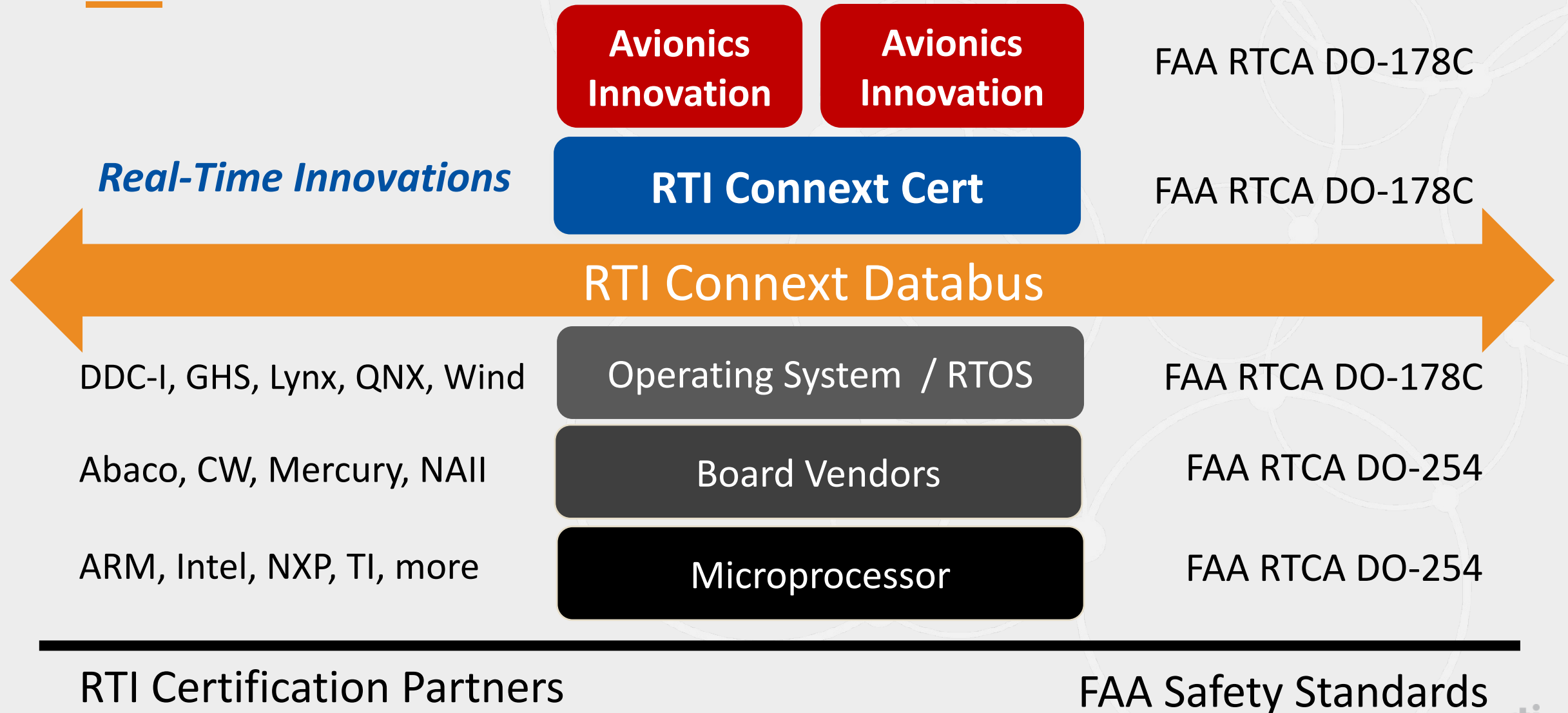
Connectivity / Transport

Operating System / RTOS

Board Vendors

Microprocessor

# RTI Certification Partner Ecosystem Solution Stack





# RTI Certification Partners

- **AdaCore** [ Ada Solutions ]
- **Abaco** [ Boards ]
- **AFuzion** [ Training ]
- **Ansys** [ Design Tools ]
- **CoreAVI** [ Graphics Drivers ]
- **Curtiss-Wright** [ Boards ]
- **DDC-I** [ RTOS ]
- **Disti:** [ Graphics ]
- **Ensco:** [ Graphics ]
- **Green Hills Software** [ RTOS ]
- **Intel** [ Processors ]
- **LDRA** [ Test Tools ]
- **Lynx Software** [ RTOS ]
- **Mercury Systems** [ Boards ]
- **North Atlantic Industries** [ Boards ]
- **Rapita Systems** [ Test Tools ]
- **Presagis** [ Graphics ]
- **QNX** [ RTOS ]
- **Sysgo** [ RTOS ]
- **The Mathworks** [ Design Tools ]
- **Vector** [ Test Tools ]
- **Verocel** [ Cert Tools ]
- **Wind River** [ RTOS ]
- **WolfSSL** [ Security ]

# RTCA DO-330 and EUROCAE ED-215 Qualified Tools

- RTCA DO-330 and EUROCAE ED-215 standards provide tool qualification guidance for building airborne and ground-based software that are achieving safety certification using RTCA DO-178C, DO-254, and DO-278 safety certification guidance.
- DO-330 describes five Tool Qualification Levels (TQL) categories, TQL-1 to TQL-5, and the required tool qualification objectives that must be satisfied. TQL-5 is the least rigorous, TQL-1 is the most rigorous, and accelerates and/or eliminates the highest number of DO-178C objectives.
- DO-330 tool qualification criteria may also be applied in other industry safety domains such as automotive/autonomous, space systems, electronic systems, and other environments requiring rigorous safety processes.

# RTI RTCA DO-330 Certification Tool Partners

- **AdaCore** [ Ada Solutions ]
- **Ansys** [ Design Tools ]
- **DDC-I** [ RTOS ]
- **LDRA** [ Test Tools ]
- **Presagis** [ Graphics ]
- **Rapita Systems** [ Test Tools ]
- **The Mathworks** [ Design Tools ]
- **Vector** [ Test Tools ]
- **Verocel** [ Cert Tools ]
- **Wind River** [ RTOS ]
- **WolfSSL** [ Security ]

# RTI A&D Partner Ecosystem

- [AdaCore](#)
- [Ametek/Abaco](#)
- [AFuzion](#)
- [Aitech](#)
- [AMD](#)
- [Ansys](#)
- [Concurrent Real-Time](#)
- [Concurrent Technology UK](#)
- [CoreAVI](#)
- [Curtiss-Wright](#)
- [Dassault / MagicDraw](#)
- [DDC-I](#)
- [Disti](#)
- [Ensco](#)
- [Epic Games \(Unreal\)](#)
- [Green Hills Software](#)
- [IBM Rhapsody](#)
- [Intel](#)
- [Kutleng](#)
- [LDRA](#)
- [Lynx Software](#)
- [Mercury Systems](#)
- [Mocana](#)
- [NAII](#)
- [NVIDIA](#)
- [NXP](#)
- [Presagis](#)
- [QNX](#)
- [Rapita Systems](#)
- [Simblocks.io](#)
- [SimFront](#)
- [Sysgo](#)
- [Texas Instruments \(TI\)](#)
- [The Mathworks](#)
- [TES-SAVi](#)
- [UEI](#)
- [Unity](#)
- [Vector](#)
- [Verocel](#)
- [Wind River](#)
- [WolfSSL](#)

# FACE

## FACE Portable Components Segment (PCS)

Common Services and Portable Components reside here

## FACE Transport Services Segment (TSS)

All communication, including inter-Up communication, is achieved through message-based transport middleware which reside in this segment

## FACE Platform-Specific Services Segment (PSSS)

Standardized Up-level data products and indirect hardware access are provided by this segment

## FACE I/O Services Segment (IOSS)

Standardized, but indirect hardware access is provided in this segment

## FACE Operating Systems Segment (OSS)

Language  
Run-time

Graphics  
Drivers

Hardware  
Device Drivers

Hardware, Microprocessors, Devices, Boards



# FACE Multi-Supplier Demonstration



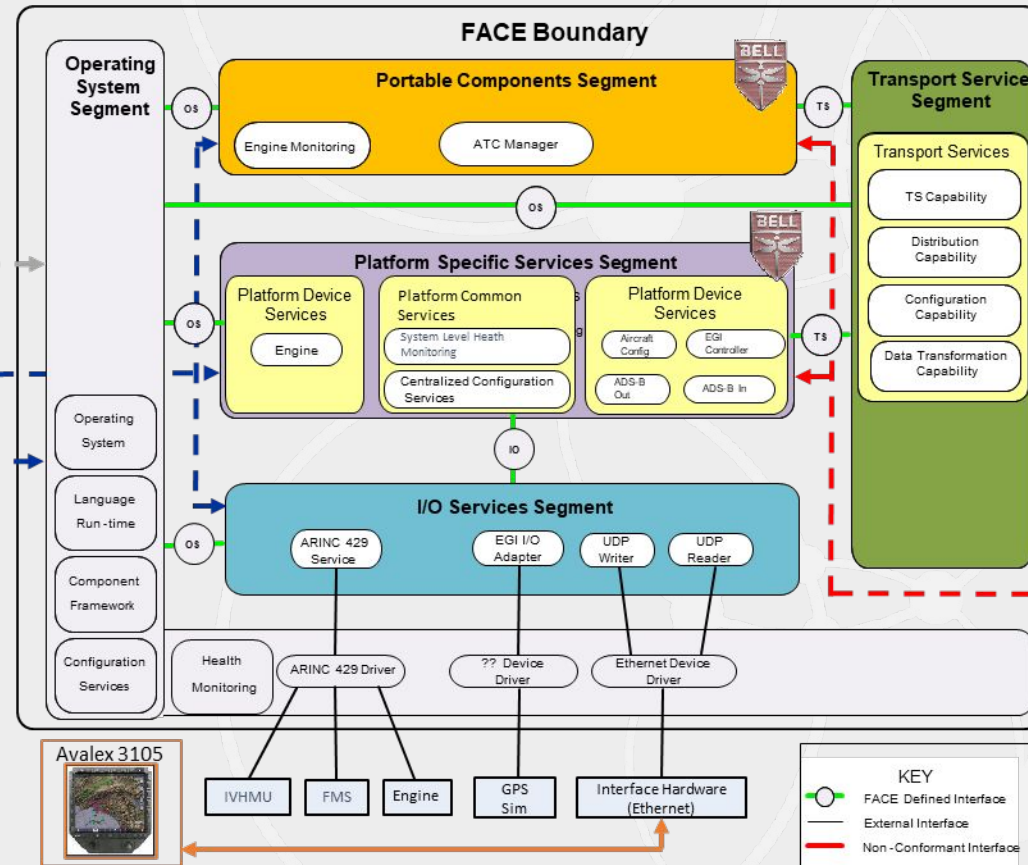
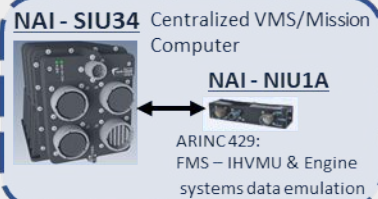
Future Airborne Capability Environment



US Army Logo  
Here



Hardware Platform & IOSS



BALSA Port  
to ARINC 653  
FACE Conformant  
DAL-A Certifiable RTOS





# RTI Commitment to Customers

- *RTI strives to always drive increasing value in its products and services*
- *RTI safety certification products and partner ecosystem accelerate our customers critical projects while reducing program risk*

# Questions?



***Thank you!***





# Try a full version of Connex DDS for 30 days

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you up and running fast

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