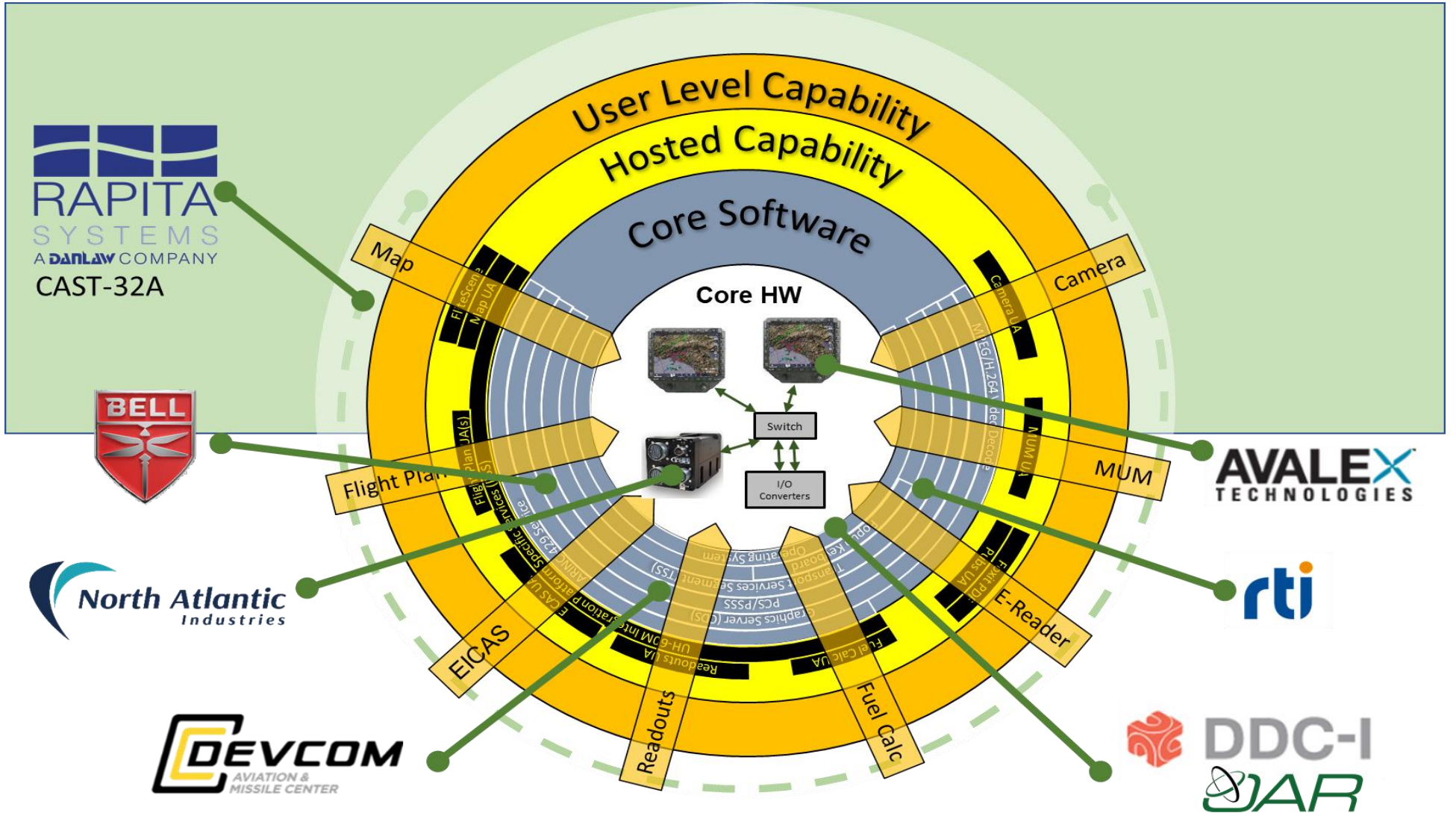
The Open Group FACE Consortium
&
TSOA-ID FACE TIM Demo
March 23 2021

Presented by

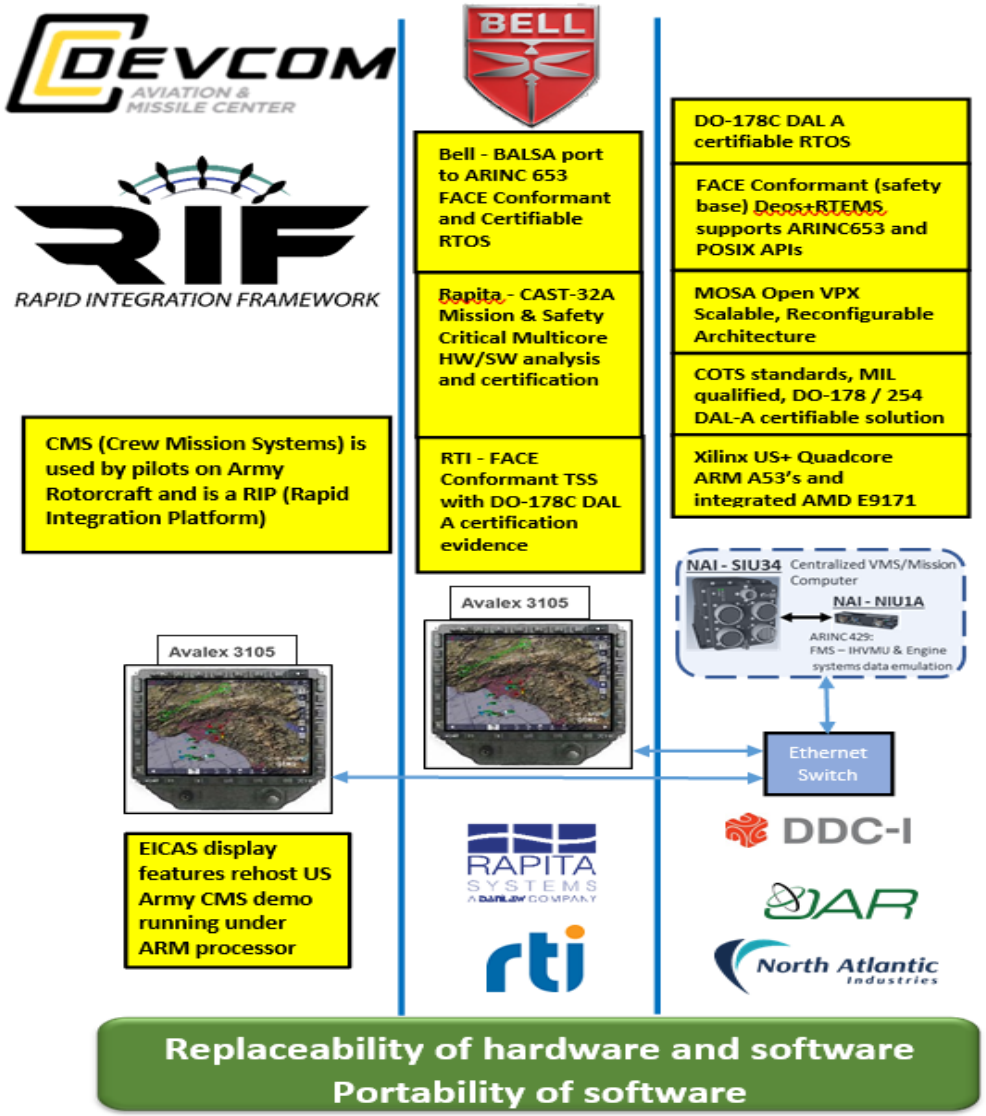
FACE Demo Team US Army Engagement Overview

- 2018 – US Army, NAI, RTI, DDC-I & OAR Support US Army RIF FACE Demo Green Team
- 2020 - US Army Combat Capabilities Development Command (CCDC) Aviation & Missile Center (DEVCOM) and North Atlantic Industries sign a CRADA (ORTA #593) to achieve following goals:
  - Further research in prototyping products that improves aviation performance and affordability
  - Research, develop and demonstrate software on multiple hardware solutions and associated I/O modules
  - Demonstrations will use a FACE IOSS integration layer with an existing FACE Conformant ARINC 653 RTOS
- 2021 – US Army (DEVCOM), Bell Helicopters, NAI, RTI, DDC-I and Rapitia FACE Demonstrations supporting:
  - Bell Helicopters – Port of The Open Groups FACE Consortium Basic Avionics Lightweight Source Archetype (BALSA), to a FACE Conformant DAL-A Certifiable ARINC 653 multicore RTOS running under Xilinx US+ ARM and NXP Power Series T2080 multicore architectures
  - US Army DEVCOM 2018 Green Team Demo port to NAI 68GP2 Certifiable Xilinx US+ Quadcore ARM Processor

FACE Demo System Capability Overview



FACE Demo Capabilities Overview



DEVCOM AVIATION & MISSILE CENTER
BELL
North Atlantic Industries
DDC-I
JAR
rti
RAPITA SYSTEMS A DANLAW COMPANY

FACE Demo Software Configuration Overview

Future Airborne Capability Environment

DEVCOM AVIATION & MISSILE CENTER

DDC-I

JAR

RapiTest

RapiTime

CAST32A

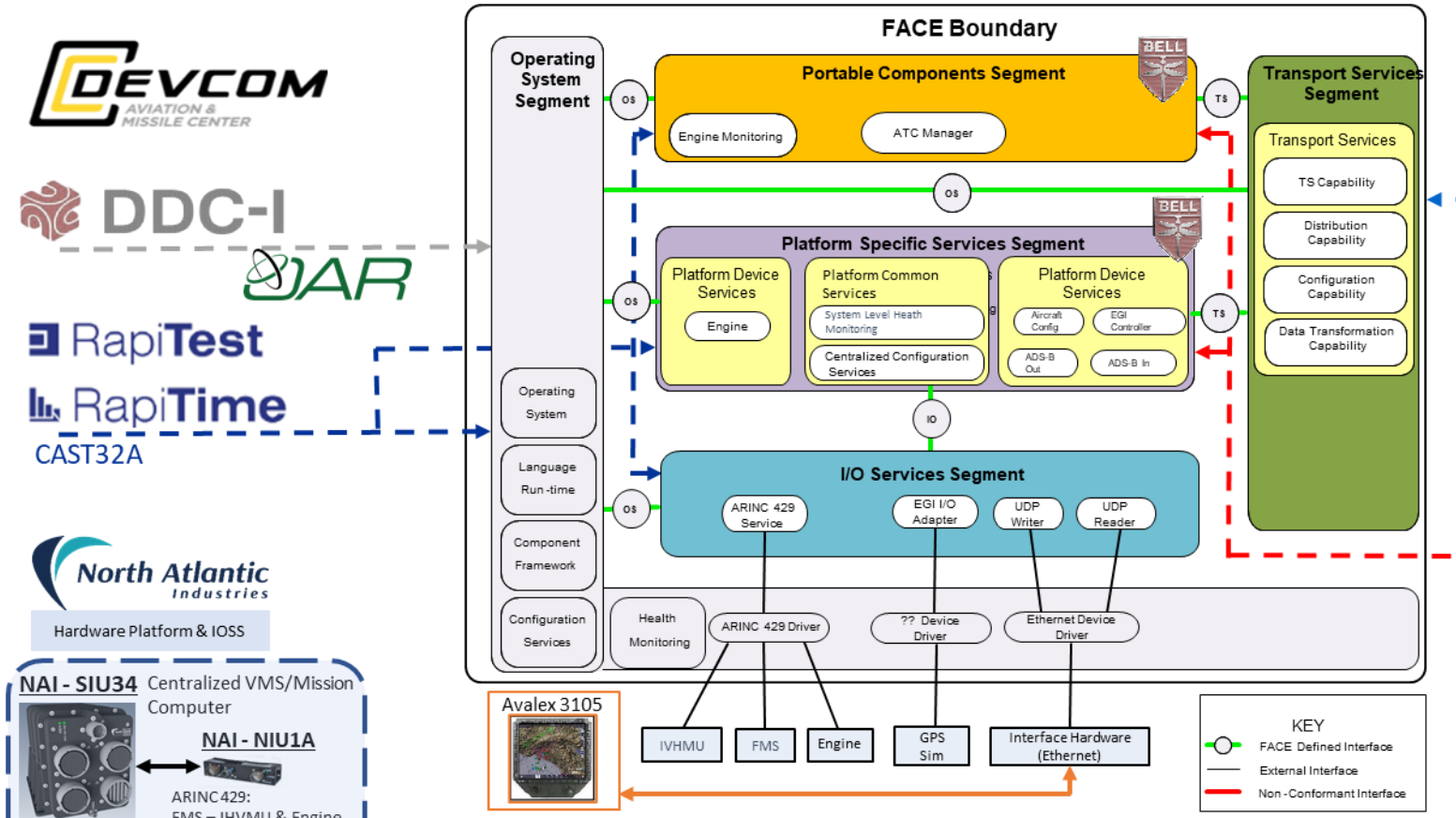
North Atlantic Industries

Hardware Platform & IOSS

NAI - SIU34 Centralized VMS/Mission Computer

NAI - NIU1A

ARINC 429:
FMS – IHVMU & Engine systems data emulation



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

BELL

rti

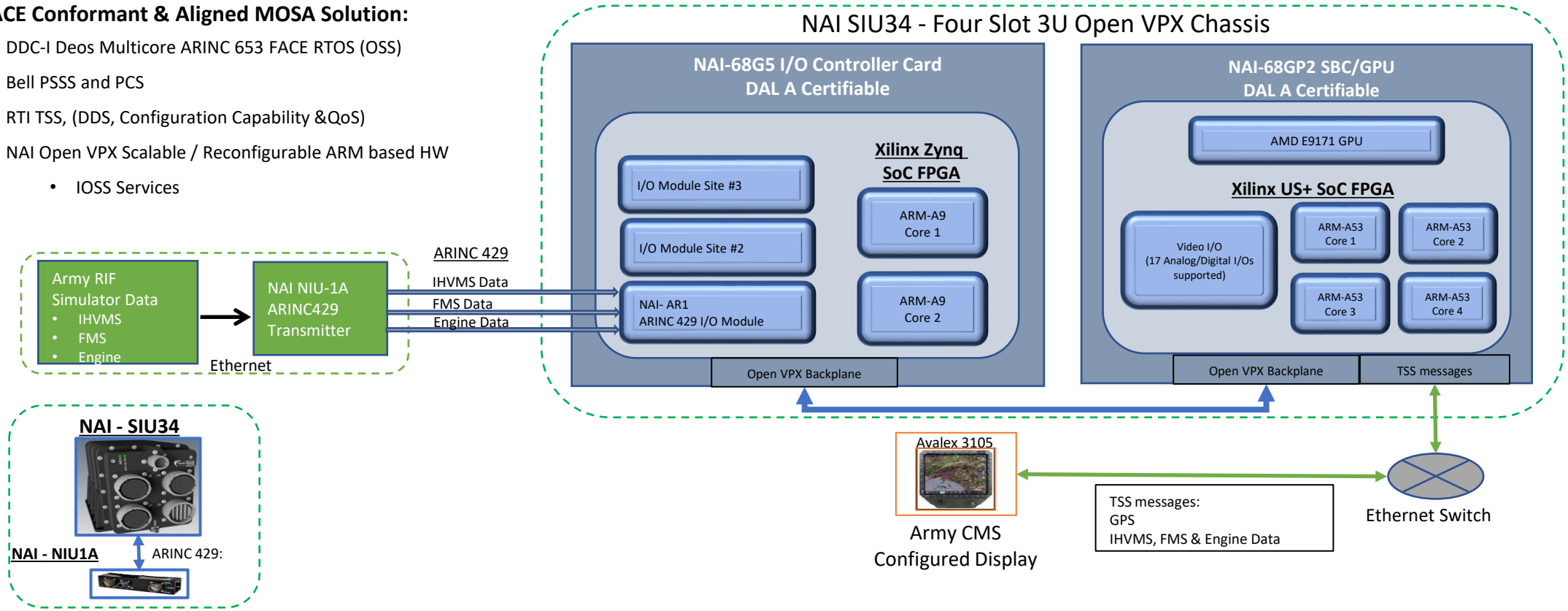
RAPITA SYSTEMS
A DANLAW COMPANY

FACE Demo Hardware Configuration Overview

Centralized Processor and I/O Converter

FACE Conformant & Aligned MOSA Solution:

- DDC-I Deos Multicore ARINC 653 FACE RTOS (OSS)
- Bell PSSS and PCS
- RTI TSS, (DDS, Configuration Capability &QoS)
- NAI Open VPX Scalable / Reconfigurable ARM based HW
    - IOSS Services



FACE TIM Demo March 2021

- US Army CCDC/AvMC CMS FACE Team providing CMS
- Bell PSSSs and PSCs to utilize the above
- DDC-I FACE 3.x conforming, DO-178C DAL A multicore Operating System
- Rapita CAST32A multicore interference analysis
- RTI FACE 3.1 TSS conforming, with DO-178C DAL A certification evidence
- NAI FACE 3.x IOSS
- NAI hardware (Xilinx US+ ARM A53 Quad Core and I/O)

Joint Bell, US Army DEVCOM AvMC, DDC-I, NAII, Rapita, and RTI FACE Demo Demonstration

"The Bell 360 Invictus offers great improvements in capability for soldiers and our team has designed this aircraft to mitigate technical risk and improve survivability at an affordable cost. These modular DCUs work well with Bell's intent to deliver a versatile weapon system that emphasizes operational availability, sustainability, and maintainability for attack and reconnaissance missions." www.bellflight.com

The U.S. Army Combat Capabilities Development Command Aviation & Missile Center (CCDC AvMC), part of the U.S. Army CCDC which is a major subordinate command of the U.S. Army Futures Command (AFC), is leveraging UHPO's Crew Mission System (CMS) engine-indicating and crew-alerting system (EICAS) and fuel monitoring capability that are aligned to FACE Technical Standard 2.1 to drive a separate user interface (UI) display window. avmc.army.mil

DDC-I is demonstrating Deos™, its RTCA DO-178C DAL A certified FACE 3.0 conformant operating system which supports ARINC 653, POSIX, and Rate Monotonic APIs across PowerPC, Intel and ARM processors. Deos is the only operating system built specifically from Day 1 for certified avionics systems. Deos differentiators include patented cache partitioning, DAL A linking/loader to minimize change impact, RMA, and slack scheduling. Deos was first certified to DO-178 DAL A in 1998, and our SafeMC™ Multicore Technology supports concurrent DAL A execution across cores. DDC-I. www.ddci.com

NAI is a leading independent supplier of embedded computing, Input/Output, communications, measurement, simulation, power and systems products for commercial, industrial and military applications built on a Configurable Open System Architecture (COSA™). COSA offers the greatest modularity, flexibility, adaptability and configurability in the industry that accelerates our customers' time-to-mission. COSA supports a Modular Open Systems Approach (MOSA) that delivers the best of both worlds: custom solutions from COTS components with No NRE. For information on NAI products go to: www.naii.com

Major defense suppliers like Bell have embraced the Modular Open System Approach to enable quick, cost-effective, technology integration. This video explains how Rapita works with customers like Bell and other ecosystem suppliers like DDC-I and Wind River to identify and analyze the impact of multicore interference on software timing behavior. We produce the evidence that meets the objectives of CAST-32A through our automated framework and facilitate compliance with the Future Airborne Capability Environment (FACE) technical standard.. www.rapita.com

Real-Time Innovations (RTI) ,the largest software connectivity framework provider for autonomous platforms and critical systems. is demonstrating its FACE certified conformant Connext® TSS which provides application and systems interoperability at the FACE Transport Services Segment (TSS) level. RTI Connext TSS is the first certified conformant FACE TSS and is layered on top of RTI Connext DDS. RTI also offers COTS RTCA DO-178C DAL A safety certification evidence for both Connext TSS and Connext DDS; this evidence supports over 9 OS/RTOS and 6 processor families. www.rti.com