



CAPABILITY BRIEF

Unmanned Air Systems (UAS)

USING OPEN ARCHITECTURE TECHNOLOGIES TO ACCELERATE
UAS MISSION SYSTEMS DEPLOYMENT

HIGHLIGHTS

Proven technology with rapid insertion, maintainability and extensibility capabilities

Unparalleled Modular Open Systems Approach (MOSA) expertise

Ideal for UAS / UAV swarm and counter swarm connectivity frameworks

COTS RTCA DO-178C and EUROCAE ED-12C DAL A certification evidence

Robust safety, security, interoperability and resilience features with FACE and SAE AS-4UCS support

RTI works with the world's leading defense agencies, systems integrators and suppliers in their mission-critical DDS-based open architecture systems. Proven through hundreds of deployments, RTI Connex DDS improves performance and system affordability through rapid interoperability with other systems plus portability, loose coupling and real-time Quality of Service (QoS) capabilities.

CONNEX DDS IN UAS ENVIRONMENTS

As today's Unmanned Air Systems (UAS) grow in capabilities and utilization, they face challenges in achieving airworthiness while enabling the rapid insertion of new capabilities into deployed systems and operations.

Meeting these UAS operational demands requires three capabilities:

1. To develop, acquire, and consolidate unique UAS capabilities from a diverse pool of mission assets that integrate both required industry standards and proprietary solutions
2. To rapidly integrate and achieve airworthiness for both military and civilian airspace
3. To ensure security at all levels of UAS mission communications

RTI Connex[®] DDS is the commercial leader in real-time connectivity software that supports open architecture UAS systems. It provides fast, scalable, reliable and secure connectivity within and between land, sea, air and space-based systems. Based on the Object Management Group (OMG[®])

Data Distribution Standard (DDS[™]), Connex DDS integrates with Aerospace & Defense (A&D) industry standards, including the Open Group Future Airborne Capability Environment (FACE[™]). RTI offers the only certified conformant FACE Transport Service Segment (TSS) solution to enable rapid insertion of new FACE avionics applications. Through its support for open standards, Connex DDS modernizes UAS platforms for rapid integration of both new and legacy airborne mission assets, creating an open communications foundation for UAS swarm and counter swarm deployments.

Connex DDS conforms to the US DoD / SAE AS-4UCS Unmanned Systems (UxS) Control Segment (UCS) Architecture and data model. The UCS Open Architecture (OA) enables an open business model based on Service Oriented Architecture (SOA) principles. The UCS standard offers interoperability, which promotes innovation and competition for UAS capabilities and increases collaborative efforts resulting in reduced total lifecycle and ownership costs of UCS platforms.

Connex DDS offers commercial-off-the-shelf (COTS) RTCA DO-178C and EUROCAE ED-12C DAL A certification evidence containing over 5,000 hyperlinked files audited by a third party for rapid and reliable review.

COMPLIANCE WITH DDS SECURITY SPECIFICATIONS

Connex DDS is the first solution to comply with the new OMG DDS standard security specification. These security plug-ins provide authentication, access control, encryption, data tagging and event logging without modifying the existing DDS network infrastructure. Connex DDS ensures data confidentiality and integrity while protecting information across multiple security domains from unauthorized access and tampering.

Connex DDS includes a rich set of tools that accelerate module and system-level development, debugging, testing, integration and optimization. RTI tools provide users with the ability to visualize system modules, interconnectivity and health, as well as to introspect and inject data.

COMPLETING THE MISSION WITH MUM-T/SWARMING/ALE

Next generation unmanned systems will need to operate in concert with manned aviation and ground systems, in a technique known as Manned-Unmanned Teaming (MUM-T). This capability will expand the use of UAS in a wider range of missions, including Air Launched Effects (ALE) where UAS platforms can be launched from manned helicopters or other airborne platforms. There are other new requirements for modern warfare: Maximizing target saturation using a battlefield technique known as UAS Swarming, and similarly, UAS Counter-Swarming as a defensive technique to neutralize or repel attacks.

Every UAS mission requires a robust, proven, airworthiness-ready foundation for communication across disparate manned and unmanned aerial platforms, legacy and new sensor platforms, and proprietary software lines. Connex DDS, with its inherent loose coupling, auto-discovery, peer-to-peer architecture and security capabilities, enables the instantaneous scaling of swarm environments with real-time response with a proven Technology Readiness Level (TRL) 9 technology.

PROVEN IN MORE THAN 1,200 AEROSPACE & DEFENSE DESIGNS

Connex DDS is used in over 1,200 mission-critical aerospace & defense systems throughout the world, including:

General Atomics Aeronautical Systems, Inc.

General Atomics (GA) Advanced Cockpit Ground Control Stations deliver real-time data acquisition, analysis and response for unmanned aircraft systems. GA selected RTI Connex DDS to simplify application code and speed development. The solution was delivered in less than 14 months, significantly faster than in-house development or alternative software.

Aurora

Aurora Flight Sciences ALIAS (Aircrew Labor In-cockpit Automation System) is a minimally-invasive robotic copilot. It combines manipulation and machine vision to actuate aircraft controls and perceive aircraft instruments. RTI Connex DDS integrates advanced software and controls into an open, adaptable architecture.

Boeing

Boeing's AWACS provides airborne surveillance, command and control for battle management. The company used Connex DDS in the AWACS upgrade design, which is more open and supportable. Open and extensible connectivity software lowers maintenance costs.

US Army

The US Army Ground-Based Sense and Avoid (GBSAA) system enables UAS to safely operate in FAA-controlled U.S. National Air Space (NAS) with other commercial, private and military aircraft. Connex DDS is used to separate UAS flights from Instrument Flight Rules (IFR) and Visual Flight Rules (VFR) aircraft. The system is certified using RTI's RTCA DO-178C DAL A safety certification evidence for Connex DDS.

ABOUT RTI

Real-Time Innovations (RTI) is the largest software framework company for autonomous systems. RTI Connex® is the world's leading architecture for developing intelligent distributed systems. Uniquely, Connex shares data directly, connecting AI algorithms to real-time networks of devices to build autonomous systems.

RTI is the best in the world at ensuring our customers' success in deploying production systems. With over 1,500 designs, RTI software runs over 250 autonomous vehicle programs, controls the largest power plants in North America, coordinates combat management on U.S. Navy ships, drives a new generation of medical robotics, enables flying cars, and provides 24/7 intelligence for hospital and emergency medicine. RTI runs a smarter world.

RTI is the leading vendor of products compliant with the Object Management Group® (OMG®) Data Distribution Service™ (DDS) standard. RTI is privately held and headquartered in Sunnyvale, California with regional offices in Colorado, Spain and Singapore.

Download a free 30-day trial of the latest, fully-functional Connex DDS software today: <https://www.rti.com/downloads>.

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