

CAPABILITY BRIEF (UK & NATO)

GVA/NGVA-based Military Ground Vehicles

USING OPEN ARCHITECTURE TECHNOLOGIES TO ACCELERATE
MOBILE GROUND SYSTEMS DEPLOYMENT

HIGHLIGHTS

Data-centric Zero-Trust software connectivity framework

Support for UK Ground Vehicle Architecture (GVA), NATO GVA (NGVA), AUTOSAR Adaptive and ROS 2 / ROS-M standards

Multi-domain data-in-motion capabilities in shared network environments

Robust TRL-9 safety, security, interoperability and resilient network solution

Rapid technology insertion, maintainability and extensibility capabilities

Commercial ISO 26262 ASIL D certification evidence

Supports the requirements of the Modular Open Systems Approach (MOSA)

CONNECTIVITY FOR NEXT-GENERATION MILITARY GROUND VEHICLES

Next-generation military and first responder ground vehicle designs are evolving into software-defined platforms that require optimized flow of mission and vehicle data. These vehicles run on low-latency, high-reliability networks that connect and control the performance, efficiency and safety of vehicle and mission systems in real-time. At the same time, system capabilities need to rapidly scale across manned and autonomous vehicles, and across both legacy and new platforms.

To meet these intelligent data-centric requirements, military ground vehicles must be able to:

- Provide support for open UK GVA and NATO GVA (NGVA) standards, as well as other vehicular standards
- Enable consolidation of a competitive set of vehicle capabilities while increasing mission readiness and reducing operational costs
- Offer secure, reliable and efficient vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communications for optionally-autonomous mission operations

RTI Connex[®] delivers military-grade connectivity for open standards-based GVA, NGVA, and other software-defined vehicle designs. It provides fast, scalable, reliable and secure connectivity between manned and autonomous platforms. Through its integration to vehicular software standards, RTI Connex enables rapid system updates and mission-readiness, while driving down costs.

Connex, based on the Data Distribution Service (DDS[™]) standard, supports open architecture military ground systems by providing fast, scalable, reliable and secure connectivity between manned and autonomous platforms. Connex delivers a software foundation that works seamlessly with such existing vehicular software standards as GVA, NGVA, AUTOSAR Adaptive, ROS 2 and ROS-M.

Connex offers proven compatibility with all iterations of the GVA Data Model (derived from the Land Data Model) as used in the UK GVA standard (UK Defence Standard 23-009). It has also been successfully integrated with systems using the related NATO GVA standard (STANAG 4754). The GVA Data Model not only supports all the features of DDS that are required by the latest versions of the relevant Data Models and standards, but also offers a path to future iterations of GVA and NGVA which may require support for new technical features such as Time-Sensitive Networking (TSN).

When integrated with GVA or NGVA, Connex enables rapid integration and mission-readiness while increasing the maintainability of both new and legacy vehicle assets, offering a smooth transition to a modern vehicle architecture.

Connex includes a rich set of tools that accelerate module- and system-level development, debugging, testing, integration and

optimization. RTI tools provide the ability to visualize system modules and view interconnectivity and system health, as well as record, replay, introspect and inject data into military ground vehicle systems.

STANDARDS-BASED SECURITY FOR DATA-IN-MOTION

RTI Connex[®] Security Extensions enable systems integrators to design military vehicle components that facilitate security, without compromising the ability of the crew and systems to collaborate. This is accomplished by creating data-centric “Zero-Trust” security networks that can apply fine-grained authentication and encryption to individual data elements, enabling the sharing of network resources across multiple security domains.

Connex Security Extensions provide participant authentication, role-based access control per topic of data, encryption, data tagging and event logging, all without modifying the existing DDS network infrastructure. Connex Security Extensions ensure data confidentiality and integrity, while protecting data-in-motion information across multiple security domains from unauthorized access and tampering.

DETERMINISTIC NETWORKING USING TSN

Determinism, together with fine control, are becoming increasingly important in modern systems. The combination of the DDS standard and TSN brings those goals significantly closer.

DDS is a communications framework that operates at the higher levels of the network stack, while TSN works with lower-level network technology to provide deterministic networking over standard Ethernet. Both of these standards-based options are a natural fit in terms of providing deterministic communications for distributed systems. When used together, they improve system performance by preventing non-real-time traffic from interfering with deterministic real-time data flows on the same network.

STANDARDS-BASED SAFETY CERTIFICATION

When systems demand certification for predefined standards, RTI Connex[®] Cert, based on the DDS standard, enables system architects to build open and modular safety critical and real-time systems.

RTI Connex Cert reduces the time, cost and risk of system-level certification and provides a baseline for functional safety standards such as IEC 61508 and ISO 26262.

POWERFUL TOOLS AND INFRASTRUCTURE SERVICES

The Connex Product Suite includes a unique set of powerful development, analysis and monitoring tools to ease the entire development cycle from design to production. At the centre of this tool set is Administration Console, an essential tool for data visualization directly from your system as well as troubleshooting and monitoring all Connex infrastructure services.

The Connex Product Suite also offers a set of infrastructure service features including:

- **Routing Service** – enabling a layered architecture or connectivity to legacy protocols or technologies
- **Persistence Service** – saves DDS data samples to transient or persistent storage enabling more resilient systems
- **Recording and Replay Services** – used to record DDS data over time that can be used later for analysis, debugging or simulation purposes

PROVEN TECHNOLOGY WITH RAPID TECHNOLOGY INTEGRATION AND MAINTENANCE CAPABILITIES

Connex is built upon a loosely-coupled, publish-subscribe architecture, enabling robust application domain partitioning and accelerated update of critical technologies with minimal system impact and re-testing. Connex is a peer-to-peer data connectivity framework designed as a safety-critical, cyber-physical network architecture.



We are giving our customers a complete solution of armoured vehicles with integrated systems and subsystems, all based on the NATO Generic Vehicle Architecture (NGVA) and smart vehicles. We see RTI Connex as an integral part of every solution that we are implementing within the next generation armored vehicles.”

Military Vehicle Protection Developer
RTI Customer

ABOUT RTI

Real-Time Innovations (RTI) is the infrastructure software company for smart-world systems. Across industries, RTI Connex[®] is the leading software framework for intelligent distributed systems. RTI runs a smarter world.

RTI is the market leader in products compliant with the Data Distribution Service (DDS[™]) standard. RTI is privately held and headquartered in Silicon Valley with regional offices in Colorado, Spain, and Singapore.

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