



CAPABILITY
BRIEF

Modeling, Simulation and Training (MS&T)

ADVANCING OPEN ARCHITECTURE TECHNOLOGIES TO POWER TRANSFORMATIONAL MS&T SYSTEMS

Training for today's military threats requires secure, simulated environments that can be quickly integrated, assembled and reconfigured from a diverse set of proprietary and open solutions. RTI Connex[®] provides a proven platform that brings distributed simulation assets together in a secure and scalable high-performance network environment. Connex has the required security and interoperability capabilities for cross-vendor, cross-branch and cross-ally simulations.

HIGHLIGHTS

- » Rapid simulation integration using open architecture technologies
- » Integrates HLA, DIS and TENA simulation standards, along with Unity[®] and Unreal Engine[®] gaming engines
- » Integration of live, real-time data with hardware-in-the-loop (HIL) simulation systems, digital twins, and deployed systems
- » Standards-based architecture supporting multiple security domains
- » Efficient technology insertion, maintainability and extensibility capabilities
- » Robust safety, security, interoperability, scalability and resiliency

Developing Next Generation MS&T Systems

Next-generation Modeling, Simulation and Training (MS&T) systems require real-time access to authenticated, secured data from both training assets and live real-time operational data to enable multi-national participation. Meeting these vital operational demands for MS&T requires three core capabilities:

1. Develop, acquire and consolidate unique MS&T functions from a diverse pool of assets, integrating both industry standards and proprietary solutions according to specific training mission requirements.
2. Continually improve simulation value by integrating and evolving simulation, gaming and actual deployed systems to increase fidelity and effectiveness.
3. Enable global participation in implementing sensitive assets with appropriate levels of authentication and encryption for situational awareness data, in order to protect simulation intellectual property and mission confidentiality, while enabling the highest fidelity in MS&T scenarios.

Above all, today's MS&T systems require a next-generation data connectivity platform in order to prepare warfighters for future missions with live real-time data from the field of operations. These systems must protect against cybersecurity threats, while optimizing the flow of multi-domain data in real-time with millisecond precision to support high-fidelity simulations.

A Secure, Scalable and Highly-Reliable MS&T Platform

Connex supports open architecture MS&T systems by providing fast, scalable, reliable and secure connectivity within and between all forms of real and simulated land, sea, air, space and cyber systems. Based on the Data Distribution Service (DDS[™]) standard, Connex is the first solution to comply with the DDS Security (DDS-SECURITY[™]) Specification. Its security plug-ins provide authentication, access control, encryption, data tagging and event logging, without modifying the existing DDS network infrastructure. This ensures data confidentiality and integrity, while protecting information across multiple security domains from unauthorized access and tampering.

Connex integrates with key MS&T and A&D industry standards, including:

- High-Level Architecture (HLA)
- Distributed Interactive Simulation (DIS)
- Robot Operating System 2 (ROS 2)
- The Open Group Future Airborne Capability Environment (FACE™)
- The Open Group Sensor Open Systems Architecture (SOSA™)
- U.S. DoD / SAE AS-4UCS Unmanned Systems (UxS) Control Segment (UCS) Architecture and data model

The Multi-Supplier MS&T Integration Challenge

The optimal way to prove interoperability is through the actual integration of disparate MS&T assets built on multiple standards. Over the years at I/ITSEC, RTI has demonstrated integrations with Epic Games® Unreal Engine®, Kratos training platforms, L3Harris™ cockpit displays, MAK aircraft simulators, Microsoft Flight Simulator, National Instruments, and Unity gaming engine using Connex. These demonstrations created an integration of multiple simulation standards, including HLA and DIS simulation platforms containing different data formats. These were then integrated with a FACE Technical Standard avionics platform using actual avionics hardware. Additional components were the Microsoft Flight Simulator for hands-on interaction, the L3Harris FliteScene® and the SimBlocks.io One World SDK for Unity gaming platform.

This demonstration proved that military training scenarios can be rapidly assembled and reconfigured in an agile, ad hoc manner from ready-made, commercial-off-the-shelf (COTS) components. Systems based upon the Connex connectivity framework can integrate a wide range of real-time simulation environments to efficiently deliver Live, Virtual and Constructive (LVC) training. These integrated multi-vendor training and simulation systems reduce risk and drive down costs, and vastly improve training fidelity using proven methodologies and components.

Proven in Unique Designs

RTI is the market leader in DDS technology, with systems deployed in simulation environments such as:

Kratos

The Reconfigurable Virtual Collective Training System (RVCTS) incorporates the latest mixed reality technology to deliver the highest immersive fidelity of any collective training system. By leveraging Connex in their RVCTS, Kratos can ensure reliable backend communication among hardware and software realtime systems. It has subsequently been deployed under realworld conditions as the UH-IMP-AVET Mixed Reality trainer.

CAE Sim XXI Full-Flight Simulator

Pilots around the world consider CAE's Sim XXI full-flight simulator as the closest simulation of the true experience of flight. It delivers breakthrough visual realism, precise cockpit replication, high-fidelity avionics simulation, and flight and ground-handling characteristics indistinguishable from the aircraft. Connex helps to achieve this level of full-flight simulation, which involves a variety of complex subsystems sharing and processing data in real-time.

U.S. Navy HiPer-D

The Naval Sea Systems Command (NAVSEA) Dahlgren Division needed to investigate how to apply advanced technologies and concepts to the Naval Surface Ship AntiAir Warfare (AAW) problem domain. Connex was used by the U.S. Navy High Performance Distributed Computing Project (HiPer-D) to create test bed demonstrations based fully on COTS technology. This enabled NAVSEA to investigate technologies supporting real-time, distributed, scalable, fault-tolerant, heterogeneous computing systems to be used in combat systems.

ABOUT RTI

RTI is the software framework company for physical AI systems, with a mission to run a smarter world. RTI Connex® provides the data architecture for over 2,000 designs, running in more than \$1T of total deployed systems worldwide.

RTI, Real-Time Innovations and the phrases "RTI Runs a Smarter World" and "Your systems. Working as one," are registered trademarks or trademarks of Real-Time Innovations, Inc. All other trademarks used in this document are the property of their respective owners. ©2025 RTI. All rights reserved. CB-005 V4 0825

2 • rti.com