RTI CUSTOMER SNAPSHOT

Lockheed Martin UK

ROTARY AND MISSION SYSTEMS

HIGHLIGHTS

Lockheed Martin UK's Rotary and Mission Systems (RMS) group uses RTI Connext® to develop and integrate a visual simulation environment with VR headsets at multiple levels of fidelity for AFV training

RTI Connext is used to manage third-party plugins, including Unity® and Epic Games® Unreal Engine® gaming engines, and delivers real-time simulation data from edge systems up to the cloud over RTI's Real-Time WAN Transport

Working with RTI Connext helped RMS to create immersive, DDS-based training environments with accurate representations of military vehicles from multiple user viewpoints

> ❝
> RTI Connext is what you want to make things work. We know we've got the right set of tools for the journey as we continue to develop and expand our training system architecture."
>
> — **Nigel Jones**
> Chief Training System Architect,
> Rotary and Mission Systems
> Lockheed Martin UK

ABOUT LOCKHEED MARTIN

Lockheed Martin UK Limited (LMUK) is a global aerospace and defense company with a long history in the design, development and manufacturing of aircraft, satellites and other advanced technologies in military systems. At present, the Rotary and Mission Systems group in the UK is focused on developing and delivering a virtual training system architecture, primarily focused on the use of lifelike simulations for training across land, sea and air.

CHALLENGE

To enable multi-fidelity armoured fighting vehicle (AFV) training, a system must accurately simulate a tank driving on the battlefield in real time, which soldiers then experience and interact within milliseconds through virtual reality (VR) headsets. Any latency or jitter in the flow of data is therefore unacceptable.

Taking a cue from the private sector, many system developers in the military began experimenting with new plug-ins, including powerful 3D creation tools that are used for immersive experiences in the worlds of both computer gaming and Hollywood film CGI. How do they fare in military applications? Very well indeed, but with one important caveat — for military use, a training system cannot simply be designed around sets of data. Instead, it must be built around the flow of real-time data in motion. Creating the basic training environment is therefore only half the battle — the goal is to then integrate the real-time sharing of simulation data at all times and at all levels. This always-evolving influx of data can encompass visual cues, equipment performance, troop movement, system state, land sea and air conditions, and many other critical life-and-death factors.

In the end, the challenge RMS sought to address was primarily one of device and network integration. Many in the industry are now favoring the use of the Data Distribution Service (DDS™) standard to support Generic Vehicle Architecture (GVA)-based

military ground vehicles, as it is a critical component for moving real-time data into the cloud. DDS is a data-centric standard that is able to work across disparate transport protocols to unify all data communication using a Publish/Subscribe model, ensuring that data is continuously available systemwide and that it goes only when and where it is needed. To help solve the data connectivity and integration challenges involved, RMS chose RTI Connext, which is built on the DDS standard.

SOLUTION

RTI Connext enabled RMS to send DDS-based data to a gateway in a cloud environment and then use that gateway in the cloud to build a repository of analyzable data on simulation. RTI Connext is also able to manage real-time data with fine-grained configurable Quality of Service (QoS), ensuring the integrity and reliability of data in motion.

By initially contracting RTI Connext to support low-latency data transport, RMS was able to provide an architecture that was used to implement the UK AJAX crew turret trainer system, which is a deployed training system that is still actively in use by the UK MoD.

Moving quickly from research to production has long been a dominant theme at LMUK. This fast-paced approach to simulation design was initially achieved by widening the scope of how DDS was being used for vehicle simulators. Crucially, the building of simulators can now be done in a more streamlined, reusable way, creating a sustainable model that makes sense from both a technology and a business perspective.

Fast-forward to today, and the RMS group is using custom plug-ins through RTI Connext for virtually every demanding visual simulation environment being created, including those utilizing the latest Unity and Unreal Engine plug-ins, which need access to real-time data on demand to perform as designed. In turn, this data-centric approach leverages the benefit of being able to successfully provision cloud-based simulators for augmented reality and VR training, while neatly avoiding performance and latency issues.

RESULTS

RMS is now uniquely able to develop and field a new modular simulation architecture that can be successfully moved up to the cloud, bringing an innovative, Service-Oriented Architecture (SOA) approach to multi-fidelity AFV training. This approach utilizes all the benefits of being able to send data up to the cloud through wide-area network (WAN) transport, while solving potential latency issues at the source. The cloud-based delivery of virtual training in turn remains instantly adaptable and responsive to external stimuli, based on the principles of data centricity. RTI Connext enables the management of all data in motion as DDS Topics, while RTI Tools give RMS the ability to set precise and strategic rules for the handling of real-time data.

Creating a simulation environment that can become the 'gold standard' for soldier training remains the ultimate objective. Within the simulation, integrating the gunner view with the commander view and the driver view — all from a moving vehicle — requires that all data is continuously in lockstep. Outside the simulation, the system architecture needs to work with Linux servers in the cloud, Windows on the ground platforms, and be flexible enough to integrate the latest technologies, such as HoloLens, Android, and more.

What's the glue that ties it all together? "In my opinion, the right implementation of DDS," says Jones. "A lot of the work that we did with RTI Connext was to understand just how far we could go in terms of processing time to actually maintain speed visually. RTI Tools help do the job by providing a great deal of visibility on what is going on with any DDS-based system, which open-source DDS doesn't do."

ABOUT RTI

Real-Time Innovations (RTI) is the infrastructure software company for smart-world systems. Across industries, RTI Connext® 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.

Your systems.
Working as one.

CORPORATE HEADQUARTERS

232 E. Java Drive, Sunnyvale, CA 94089
Telephone: +1 (408) 990-7400
info@rti.com

rti.com
rti_software
rtisoftware

company/rti
rti.com/blog
connextpodcast