

## Raytheon Company - Patriot Missile Test Station

### RTX Customer Overview

Raytheon's Patriot Missile System, the foundation of the U.S. Army's integrated Air & Missile Defense architecture, is a long-range, all-altitude, all-weather system fielded to defeat advanced threats including aircraft, tactical ballistic missiles and cruise missiles. Originally designed in 1978, the system uses a complex test station to validate and verify the on-board guidance systems and aeronautical performance of the missiles. As these hardware-centric systems aged, their lack of serviceability and reliability mandated that Raytheon adopt new technologies that would allow for test station support long into the future. Raytheon chose RTX as the software solution that would meet the requirements of its client - The U.S. Army.

# Raytheon

### The Challenge

The test stations, which ensure that Patriot missiles are precise enough to hit targets moving at five times the speed of sound, were designed in the late 70's primarily with proprietary hardware, along with a proprietary software language called RATEL hosted on a DEC MicroVAX - a multi-user data-processing system that was retro-fitted for test equipment.

Over time, the hardware and software needed maintenance and support as parts wore out or failed and as the Army introduced new product requirements. Raytheon, experiencing increasing difficulty finding knowledgeable technicians to work on the equipment, faced the challenge of migrating to a less-costly system that would be supported by today's technology. On top of that, the U.S. Army required that the new system be supportable until 2032.

Raytheon found that migrating the test system to one that is software driven – with fewer moving parts and a more robust interface, rather than one that is hardware driven, would offer them more-simplified maintenance and the future compatibility needed to meet the

Army's needs. Since reliability was also critical, Raytheon knew that a Windows-based operating system, a commercial-off-the-shelf (COTS) product, would be most likely to offer them ongoing support and a large talent pool of technicians.

But unlike the hardware-based system, the Windows operating system introduced the problem of unpredictable interrupts. Raytheon then needed to control the timing of Windows interrupts to accommodate for fluctuations in processing speed to achieve optimum performance and accurate calibration of Patriot Missiles. In other words, it was challenged with the need to integrate deterministic, interrupt-driven processing into the Windows operating system of the test stations.

### The IntervalZero Solution

Upon researching technologies that could offer the needed control over Windows operating systems as well as mission-critical real-time determinism, Raytheon chose RTX.

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The reliability and unparalleled performance of RTX extension for Windows, along with the company's long history, stable growth, and training capabilities, made IntervalZero the obvious solution. RTX enabled Raytheon to develop within the familiar Windows environment and create a stable and controllable application with sub-microsecond latencies. Raytheon reduced its system cost by eliminating proprietary hardware and associated maintenance.

The Patriot Missile System is now the primary air-defense system deployed by nine nations worldwide. Raytheon's ongoing support for missile test stations is ensuring that this defense technology is upgradable and supportable for years to come. In addition, costly long-term hardware maintenance has been significantly reduced. Patriot is also part of a U.S. two-tiered defense against the escalating tactical ballistic missile threat.

### For More Information

To learn about IntervalZero's Embedded Products or to schedule a demo, please contact us at [sales@intervalzero.com](mailto:sales@intervalzero.com).

### About IntervalZero

IntervalZero Inc. – formerly Ardence, a Citrix Company – develops Embedded software products that deliver real-time capability and that meet the needs of the Embedded technology market.

IntervalZero simplifies the creation of Embedded systems by taking advantage of the Windows Win32 API development environment to deliver both real-time, deterministic hardware control and an excellent end-user experience.

Solutions that rely on IntervalZero's Embedded software are deployed world-wide – primarily in Industrial Automation, Military/Aerospace, Medical Device, and Test & Measurement.

IntervalZero's Embedded software products include RTX, ETS and Select. RTX delivers real-time capability for direct control of embedded hardware and relies on Microsoft Windows to deliver the world-class Windows user experience. ETS is the smallest-footprint, stand alone, real-time operating system (RTOS) that supports the Win32 API. Select enables multi-purpose device functionality on a single operating system as well as instant on/off capability that minimizes boot time and ends long shutdowns

Founded in 1980 as VenturCom, IntervalZero is headquartered in Waltham, MA, and operates across North America, Europe and Asia. More information can be found at [www.IntervalZero.com](http://www.IntervalZero.com).



**IntervalZero**

**Contact:**

**In US**

[sales@intervalzero.com](mailto:sales@intervalzero.com)

**In EMEA**

[Fabrice.Boisset@intervalzero.com](mailto:Fabrice.Boisset@intervalzero.com)

[IntervalZero.com](http://IntervalZero.com)