DEPARTMENT OF THE NAVY

NAVY SBIR/STTR SUCCESS STORY

TOOLS FOR RAPID INSERTION OR ADAPTATION OF COMBAT SYSTEM CAPABILITIES

Automated Test and Re-Test (ATRT) provides for the rapid and comprehensive testing, analysis and certification of combat and weapons systems.

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THE CHALLENGE

The Navy's combat and weapons systems today are largely software-driven and growing in complexity with the time between software updates measured in years. New enterprise technologies and practices are required to dramatically accelerate the rate at which software based capabilities can be integrated, tested, certified, and deployed.

THE TECHNOLOGY

ATRT is a scalable digital ecosystem enabling secure cloud-based continuous integration, test, and deployment to virtual/digital twins with near real-time feedback from advanced edge analytics. ATRT uniquely utilizes Model- Based System Engineering to describe expected system behavior and performance combined with automated test and analysis technologies. Enterprise features allow for a fully collaborative environment enabling distributed teams to effectively plan, execute, and report results. Use of the technology does not require any changes to existing systems, can be utilized incrementally, and is designed to support both individual systems and system of systems integration, test and deployment.

THE TRANSITION

The Navy has leveraged the capabilities provided by ATRT across more than 125 projects in support of NAVSEA, NAVAIR, NAVWAR, and ONR. One innovation developed under the ATRT SBIR initiative was the combination of combat system virtualization with near real-time automated mission test and analysis. In 2019, this was demonstrated with the delivery of the AEGIS Virtual Twin and a successful live-fire event on a Arleigh Burke class destroyer. In addition, the Navy's Digital Integrated Support Cell Program (DISC) is incorporating and extending ATRT capabilities to support the Navy's digital transformation objectives. The technologies have been and continue to be used and extended by multiple program offices to support the integration, test, and certification of combat and weapons system software including the development and deployment of virtual/digital twins.

THE NAVAL BENEFIT

ATRT provides the ability for the Navy to deliver certified combat and weapons system software updates at scale across the Fleet on-demand. The consistent, comprehensive and continuous access to objective quality evidence provided by ATRT also reduces the risk and cost of software updates. In addition, the real-time analytics on the edge provide continuous feedback and recommendations to optimize system and crew performance once on deployment. ATRT is an enabler for the Navy to deliver software-based warfighting capability at the speed of relevance, with higher confidence, and lower costs.

THE FUTURE

ATRT capabilities in the near-term are being expanded to support the rapid, dynamic, and comprehensive integration, test and assessment of the systems and capabilities required for Distributed Maritime Operations. Future advancements include the increased use of artificial intelligence in the conduct of system testing and real- time system assessment along with maximizing warfighting performance once deployed. ATRT provides the ecosystem to collect the data at scale necessary for artificial intelligence to effectively be applied, combined with highly automated processes to assess the resulting performance impacts.

> "ATRT CONTINUES TO PROVIDE THE U.S. NAVY THE CAPABILITY TO INSERT SOFTWARE UPDATES TO COMBAT AND COMBAT WEAPONS PLATFORMS AT AN UNPRECEDENTED RATE. NOT ONLY DOES ATRT SIGNIFICANTLY REDUCE OUR DEVELOPMENT RISK AND COST, IT PUTS THE NAVY ON A PATH TOWARDS RAPID CAPABILITY DELIVERY TO OUTPACE ANY ADVERSARY"
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> Scott Bewley
> Program Manager
> Navy Digital Integration Support Cell (DISC) Program