



'Attaboy' for Joint Tactical Terminal Software Test Automation

ABERDEEN PROVING GROUND, Md. –



In combat on land, at sea, in the air and even in cyberspace, joint force warfighters rely on real-time data on threats and friendly forces to make split-second, potentially life-and-death decisions. Contrast that with the software development environment, where testing new programs and patches is crucial but often manual, laborious and time-consuming.

With lives at stake, there's no resting on laurels. So when a high-priority software issue threatened a critical intelligence platform, the U.S. Army Communications-Electronics Command Software Engineering Center channeled the urgency of the battlefield to automate its testing and deliver the fix faster.

Terminal Velocity

Automated software testing offers numerous advantages over its manual counterpart, including improved quality, fewer errors and increased test frequency. In 2018, after a thorough technical assessment of multiple test automation tools, the SEC identified Eggplant as its test platform and began to roll out automation across the organization.

While automation is not one size fits all, the SEC Intelligence Support Division also identified the Joint Tactical Terminal as a project that could benefit. The JTT is a family of software-programmable radios that provide commanders with situational awareness from intelligence, surveillance and reconnaissance sensors via the Integrated Broadcast Service. The JTT is often integrated into larger, more complex systems, such as the U.S. Navy's Aegis Combat System that can track and guide weapons to destroy enemy targets.

In 2018, the Navy identified a high-priority problem within the JTT quad diversity antenna, whose algorithm combines signals from multiple antennas. Under certain circumstances the manufacturer hadn't accounted for, the signal would degrade over time. The problem could be due to numerous variables,



such as atmospheric conditions or the antenna line of sight over the earth's curvature. So the JTT team rolled up its sleeves and went to work.

The team was able to address the issue in the software, but that was only half the battle. Thorough testing to validate the solution required at least 10 test runs under different conditions and scenarios. What's more, each test event took 10 hours and required the tester to enter inputs manually.

"Given the volume of testing required and the technical complexity, we realized we needed an automated solution," said Bennett Dunn, JTT project lead. "And with Eggplant, we had one available."

Not Garden-Variety Testing

Using Eggplant, the team was able to replicate the tests for different scenarios required. It could then execute the tests during off-hours to complete multiple test runs without a tester being present. Eggplant enabled the team to move from completing a 10-hour test event every three days to running a 24-hour test event every day.

"Testing with Eggplant really freed up our resources and manpower and allowed the team to focus on multiple other pressing priorities," Dunn said.

Ultimately, the JTT team ran approximately 90 hours of tests on off-hours. Using automation, it also uncovered additional problems inherent in the software, which enabled the developers to create solutions. It's now keeping the Eggplant scripts to use in future regression tests.

The team included the fix in the latest release for the JTT-Senior, fielded in April 2019. Two weeks after delivery, the SEC received an email from the Naval Information Warfare Center Pacific stating, "Navy sends a big 'Attaboy!' your way, thanks for all the hard work and long hours, and congrats on a great product!"

