Virtual Laboratory on Ship Demonstrates the Capabilities of Virtualized Systems at Sea

The VLOS, located in USS Lassen's sonar equipment room throughout the 2019 exercise, consists of five commercial off the shelf workstations and two processors. APPLIED RESEARCH LABORATORY – UNIVERSITY OF TEXAS

WASHINGTON –

Sailors aboard Arleigh Burke-class destroyer USS Lassen (DDG 82), in partnership with Program Executive Office Integrated Warfare Systems (PEO IWS) 5.0, Undersea Systems, successfully tested the Virtual Laboratory on Ship (VLOS), a virtualized Undersea Warfare Combat System (AN/SQQ-89 A(V)15), during a recent weeklong underway period, the PEO announced in a June 26 release. VLOS represents another important step forward in the U.S. Navy's efforts to speed combat system element development and software upgrades.

During the past year, IWS 5.0 developed VLOS in close collaboration with Applied Research Laboratory – University of Texas (ARL-UT) and Naval Undersea Warfare Center (NUWC) Division Newport to meet the Department of the Navy's demand to speed the development of cutting-edge weapon systems with industry's advancements in software virtualization and virtual machine applications. VLOS is a virtualized

sonar sensor subset of the tactical AN/SQQ-89A(V)15 system and operates alongside the ship's AN/SQQ-89 system via passive receipt of acoustic and navigation data from the tactical system. For rapid installation and removal purposes, VLOS is packaged and installed as a roll-on/roll-off temporary change to the ship it is installed aboard and incorporates the Naval Sea Systems Command flexible technology demonstration processes.

The VLOS was installed on board USS Lassen alongside the existing AN/SQQ-89A(V)15 tactical system to evaluate new advanced sensor capabilities in an operationally relevant environment against live submarine targets and weapons. During the weeklong underway period, PEO IWS 5.0, ARL-UT and NUWC engineers demonstrated the ability to transmit a software fix from a shore site to a ship at sea using VLOS. The successful transmission of software supports the Navy's initiatives to speed the delivery of new software capabilities to combat systems at sea via the existing networks ships use to send and receive data.

Additionally, VLOS operated the latest Advanced Capability Build (ACB) software, ACB 15, while the ship's AN/SQQ-89A(V)15 system operated its older certified software build, ACB 9. The ship's Sailors performed the undersea warfare exercise with

ACB 9 while the VLOS engineers were utilizing ACB 15, which allowed Sailors to see what additional combat capability exists within ACB 15 while performing high-end undersea warfare events.

“This progression of virtualizing the SQQ-89 system represents the team’s efforts to rapidly plan and execute demonstrations to take advantage of existing industry technology and align it with Navy technology,” said PEO IWS 5.0 Major Program Manager Capt. Jill Cesari. “These efforts will make a real difference in our ability to deliver more capability faster.”

In 2018, PEO IWS 5.0 tested VLOS on USS Nitze (DDG 94). During the Nitze trials, VLOS was tested pier side and at sea over a two-week period. The test results demonstrated satisfactory performance of a virtualized version of the tactical AN/SQQ-89A(V)15 advanced capability build software, operating in a relevant at-sea environment, and supported the decision to proceed with the most recent underway period on USS Lassen.

The VLOS test results will be used to evaluate advanced AN/SQQ-89A(V)15 sensor capabilities prior to fielding, demonstrate the feasibility of transmitting large and complex software upgrades and fixes for ships at sea, and support future efforts to virtualize the tactical AN/SQQ-89A(V)15 system.

Additionally, VLOS efforts have assisted the progression of virtualized training systems at the Fleet Anti-Submarine Warfare Training Center in San Diego, where the majority of training occurs for shipboard officers and Sailors operating and maintaining the AN/SQQ-89(A)V15 sonar suite.