SUPPORTING THE NAVY'S ADDITIVE MANUFACTURING ADVANCEMENTS

In October 2022, APL engineers, in partnership with the Naval Surface Force Atlantic and Naval Sea Systems Command (NAVSEA) Technology Office, installed the first hybrid metal 3-D printer onboard a Navy ship, the USS Bataan *(LHD 5). About a year later, with support from the NAVSEA Technology Office and APL, sailors onboard the* Bataan *used the printer to fabricate a stainless steel sprayer plate that was installed to repair one of the ship's de-ballasting air compressors, and they did it in fewer than five days. APL is also supporting the Navy in its quest to develop and field additive manufacturing systems to supplement traditional casting methods and accelerate submarine production. In July 2023, APL hosted a working group to discuss the current state of in situ monitoring in additive manufacturing, identify opportunities for advancement, and develop a path forward for future Navy implementation of such technology.*

From top left clockwise:

APL staff members Hunter Turco, Jason Reese, Ben Miller, Sarah Bostwick, Alan Huang, and Deepu David stand in front of a 3-D printer system in the Laboratory's machining shop. APL installed an identical machine on board the amphibious assault ship USS *Bataan* (LHD 5) in October 2022. (Credit: APL/Craig Weiman)

Hunter Turco, a senior mechanical fabrication technician, adjusts parts on a 3-D printer in one of APL's fabrication facilities. (Credit: APL/Ed Whitman)

The USS *Bataan* sails in the Arabian Gulf on April 23, 2020. A 3-D-printed sprayer plate was used to repair the ship's ballasting system, which provides critical stability while the vessel is underway. (Credit: U.S. Navy/Mass Communication Specialist Seaman Apprentice Darren Newell)

Machinery Repairman 1st Class Cory Hover demonstrates the software used to design the sprayer plate used to cool, lubricate, and maintain oil pressure for one of the *Bataan*'s de-ballasting air compressors. The sprayer plate was completely designed and fabricated aboard the ship using the newly installed additive manufacturing hybrid CNC machine. (Credit: U.S. Navy/Mass Communication Specialist 2nd Class Bradley Rickard)

APL staff members Drew Seker, Bryan Kessel, and Hunter Turco were part of the team that helped Navy sailors fabricate the stainless steel sprayer plate at sea. Kessel is holding an identical replica of the sprayer plate that was fabricated at APL. A close-up of the sprayer plate is shown in the middle image. (Credit: APL/Ed Whitman)

The In Situ Monitoring Working Group gathered at APL for a two-day event in July 2023 that brought together industry and government partners to identify tools and methods to improve the Navy's reliance on additive manufacturing. (Credit: APL/Ed Chapman)