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SBIR INVESTMENT: \$1,523,497

PHASE III FUNDING: \$10,322,469

DEPARTMENT OF THE NAVY

NAVY SBIR/STTR SUCCESS STORY



A COMPACT SWAGING MACHINE FOR AIRCRAFT CARRIER PURCHASE CABLE TERMINALS

Creare's Compact Swaging Machine (CSM) enables expeditious sustainment of arresting-gear purchase cable terminals on U.S. Navy aircraft carriers

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THE CHALLENGE

To safely recover fixed-wing aircraft, landing forces are absorbed by the aircraft carrier's arresting-gear engines to slow and stop the aircraft. A flexible steel cross deck pendant wire that the tailhook catches during landing is connected to two purchase cables and transfers the forces from the aircraft's tailhook to the arresting gear engine. Currently, replacing a purchase cable's connection socket is labor intensive and hazardous. The process requires three Sailors to operate a small furnace to smelt molten zinc in a confined space. The zinc fumes are toxic and handling molten metal in rough seas adds to the hazard. The molten zinc is poured into a socket and takes up to eight hours to cool before the connection can be tested for quality assurance (QA). If QA test fails, the Sailors must cut off the new socket and start over. The purchase cable terminal is a safety-critical item.

THE TECHNOLOGY

Creare's CSM is an advanced hydraulic system that applies 800-tons of force in an automated process to swage the purchase cable swaged terminal onto the cable which is installed in spool-like fashion onboard the ship. This CSM makes installing terminals safer and reduces the number of man-hours required from 4-6 sailors, 8-12 hours to 1 sailor, 1 hour.

THE TRANSITION

Phase III funding for CSM was provided by the Aircraft Launch and Recovery Equipment Program Office (PMA-251); the CSM team is composed of Creare and PMA-251. The Navy has installed six CSMs on three aircraft carriers to date. The USS Nimitz (CVN 68) was the first carrier to install the CSM and conduct flight operations on swaged purchase cables. The CSM is also installed aboard USS Carl Vinson (CVN 70) and USS George H.W. Bush (CVN 77). Ultimately, the Navy will install CSM on every carrier across both the Nimitz and Ford classes. The new CSMs' logistics footprint is smaller than that required for pouring sockets, simplifies and shortens the QA process, and greatly decreases the likelihood of producing sockets that fail those QA inspections.

THE NAVAL BENEFIT

The new CSM requires only one Sailor one hour to complete a cable termination, saving an average of 928 man-hours per deployment with an average of 32 terminations per deployment. Horizontal and rotational hydraulic actuators in the CSM automate the swaging process, enabling a sailor with no swaging experience to operate the machine solely by pressing buttons. Additionally, it improves operational availability of U.S. Navy aircraft carrier arresting-gear engines by reducing the time required to get an engine back on-line by seven hours as compared to the old method of pouring molten zinc into the sockets that connect the cross deck pendant to the purchase cable.

THE FUTURE

As prime contractor, Creare is the sole source provider of CSM sustainment, including spare parts, and training. Under an indefinite delivery/indefinite quantity (IDIQ) contract with Creare, the Navy will procure CSMs to install on all U.S. Navy aircraft carriers (11 active carriers in 2020).

"I AM ELATED TO SEE THE CSM'S INTEGRATION INTO THE FLEET GETTING UNDERWAY", SAID PAULA PARSONS, MK-7 AND CSM TEAM LEAD. "THE BENEFIT IT BRINGS TO BOTH SAILORS' QUALITY OF LIFE AND OPERATIONAL READINESS IS SIGNIFICANT."

Paula Parsons

Mk 7 Arresting Gear Team Lead

PMA 251 Aircraft Launch and Recovery Equipment