

SUCCESS STORY

TOPIC NUMBER:
N01-161, N05-095, N04-255

SBIR INVESTMENT:
\$1,993,991

PHASE III FUNDING:
\$6,990,591.51



HEARING PROTECTION HELMET (HPH)

Creare LLC developed and manufactures a hearing protection helmet (HPH), the HGU-99/P, providing hearing and impact protection, and better communication for Sailors and Marines on aircraft carrier flight decks.

Creare LLC

POC: Jed Wilbur
603-643-3800
Hanover, New Hampshire
03755

<https://www.creare.com/>

THE CHALLENGE

Aircraft carrier flight decks are a dangerous, dynamic, and very loud environment. Legacy hearing protection helmets (HPH) for flight deck personnel provide limited hearing and impact protection. The three-piece cranial helmet currently in use entered service in the 1960s. While there have been upgrades over the years to improve its effectiveness, the technology has reached its limits in preventing hearing loss from exposure to increased noise levels produced by next-generation aircraft.

THE TECHNOLOGY

Creare's HPH uses three layers of passive hearing protection, improving the limitations of legacy systems. In addition to traditional earplugs and ear cups, the HPH adds a noise-isolating helmet shell that also provides acute impact protection. To preserve auditory situational awareness and face-to-face communications, HPH includes electronic "hear-through" technology that recreates the ambient soundscape at the user's ears while ensuring the sound remains at safe levels. HPH interfaces with flight deck radios, the ship's sound powered phone (SPP) system, and aircraft intercommunications systems (ICS). As a result, the HPH allows the crew to maintain situational awareness while simultaneously protecting their hearing. HPH was developed for Sailors on aircraft carrier flight decks and F/A-18 and F-35 squadron maintainers in the Navy and Marine Corps.

THE TRANSITION

Creare initiated its hearing protection program in 2004, leveraged by three Navy SBIR topics: N01-161, N04-255, and N05-095; in addition to a parallel Air Force research grant. The initial research focused on investigating the limits of air-conducted, head-conducted and body-conducted noise, which subsequently led to the development of a hearing protection helmet.

From 2008 to 2011, the helmet underwent further enhancements, including adding head impact protection and external communication capabilities. Addressing feedback related to auditory situational awareness, Creare added "hear-through" technology in 2018. To manufacture the helmets, officially designated as the HGU-99/P, Creare collaborated with subcontractors: OTTO in Carpentersville, Illinois, and Composite Materials Research Development LLC (CMR-D) in Salem, Oregon. Fleet assessments were conducted aboard the U.S.S. Ford in 2020 and the U.S.S. Eisenhower in December 2022. In 2022, Creare was awarded SBIR Phase III contract N00421-22-C-0018 for "Hearing Protection Helmet Low-Rate Production."

THE NAVAL BENEFIT

The HGU-99/P helmet offers both near- and long-term hearing protection for Marines and Sailors. By reducing exposure to high noise levels on the flight deck, crew members experience improved well-being and a decreased likelihood of developing hearing loss and tinnitus. This, in turn, enhances the overall quality of life for veterans, as it mitigates the risk of hearing related injuries over time. Moreover, the hearing protection provided by the HGU-99/P helmet allows Marines and Sailors to hear communications better, resulting in increased mission effectiveness. Additionally, the HGU-99/P's impact protection feature provides acute safety by reducing the risk of head injuries.

THE FUTURE

Creare has secured a production contract with the Navy and is scheduled to deliver HGU-99/P helmets to the fleet starting in the summer of 2023. Furthermore, Creare is currently in negotiations for follow-on contracts to sustain production of the HGU-99/P. Apart from serving the Navy, Creare's HPH helmets are also available for commercial use and are in active service by oil and gas operations in the North Sea.