TOPIC NUMBER: N122-134 | **SBIR INVESTMENT:** $648,870 | **PHASE III FUNDING:** $495,697

DEPARTMENT OF THE NAVY

NAVY SBIR/STTR SUCCESS STORY

SEAM ENGINEERING: STITCHLESS SEAM TECHNOLOGY

Applying their stitchless seam technology and human centered design process, Propel LLC developed a one-piece Damage Control (Steam) Suit that is easier to don, is 42 percent lighter, and provides increased thermal protection, mobility, visibility and communications versus the in-service two-piece legacy ensemble.

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THE CHALLENGE

Using stitchless seaming and advanced design technologies, demonstrate improved technical performance, including a reduction in bulk and weight, better moisture management (breathability), wind/water resistance, durability, abrasion resistance, flexibility, and improved human factors and ergonomics versus the current in-service Damage Control (Steam) Suit. In conjunction with improved technical performance, demonstrate reductions to end item costs realized through manufacturing efficiencies.

THE TECHNOLOGY

Propel's stitchless seam engineering and revolutionary design technologies utilizing advanced textiles enable the Propel Steam Suit to better protect Sailors from steam and high heat encountered during casualty situations. Significantly lighter and less bulky, the suit enhances mobility and provides easy access to emergency air resupply.

THE TRANSITION

Upon receipt of an Urgent Universal Need Statement (UUNS) from PEO Subs for an improved Damage Control (Steam) Suit to provide increased protection and safety for personnel entering the engine room to locate and isolate steam leaks, the Director, In-Service Engineering, NAVSEA 05U7, working with Ms. Amy Brayshaw of NAVSUP's Navy Clothing and Textile Research Facility (NCTRF), identified a seamless potential stitching technology being developed by Propel under NAVSUP SBIR Phase I, Topic N122-134, as a solution. As a result, NAVSUP awarded a Phase III contract (N00189-15-P-G080) in 2015 to develop an improved suit. A prototype suit was successfully tested by the Navy in a controlled laboratory environment where test subjects donned both the existing suit and the Propel suit. The effort concluded in 2017 with delivery of 15 prototypes, which were forward deployed on three submarines for casualty response and other testing and feedback, provided to NAVSEA at the end of the deployments. On 25 September 2019, GSA—on behalf of NAVSEA—awarded a Phase III, $3 million, five-year IDIQ contract (47QFLA19D0013) to Propel. The first Delivery Order (47QFLA19F0222) for 44 steam suits was completed on 19 March 2020.

THE NAVAL BENEFIT

Increased Sailor safety. Improved casualty response time. Stitchless seaming of advanced personal protective textile materials creates a more comfortable suit with less bulk, lighter weight, and improved mobility, flexibility, dexterity, visibility, and communications. Air resupply no longer requires doffing the suit. In addition, stitchless seaming simplifies manufacturing methods and processes, enabling increased manufacturing efficiency and allowing for integration of a lower skilled workforce, lowering manufacturing and life-cycle costs.

THE FUTURE

NAVSEA is committed to rapid deployment of technology to our warfighters. The type commander will develop a fielding plan and order steam suits for submarine personnel based on that schedule. Propel's stitchless seam engineering, human-centered design processes, and revolutionary garment construction methods can be incorporated in the design and manufacture of all U.S. military clothing and textile based products—e.g., tactical vests, personal protective equipment (PPE), such as chemical biological protective uniforms, masks, and aprons, and non-garments, such as shelters—to increase user safety and comfort, durability and manufacturing efficiencies.

"USERS IDENTIFIED ISSUES WITH ACCESS TO THEIR EMERGENCY AIR SUPPLY, MANEUVERABILITY, DEXTERITY, VISIBILITY, COMMUNICATIONS, AND DURABILITY WITH THE CURRENT PROTECTIVE GARMENT. THE PROPEL STEAM SUIT CORRECTS ALL THE CONCERNS OF THE CURRENT SUIT AND GREATLY IMPROVES THE USER'S SAFETY AND CASUALTY RESPONSE TIME. ADVANCING TECHNOLOGIES IN TEXTILES AND CLOTHING MADE THE STEAM SUIT POSSIBLE. NEW TEXTILES AND CONSTRUCTION TECHNIQUES PROVIDE A SMALLER, LIGHTER SUIT THAT PROVIDES PROTECTION FOR SAILORS IN CASUALTY SITUATIONS AND GREATLY IMPROVES MANEUVERABILITY, DEXTERITY, VISIBILITY, COMMUNICATIONS, AND ACCESS TO EMERGENCY AIR SUPPLY."

Dean Putnam
SBIR Program Manager
Naval Sea Systems Command (NAVSEA)

Published: 2020