

Topic: N122-134

Propel LLC

Seam Engineering: Stitchless Seam Technology

Propel LLC, a human-centered textile technologies design company, has applied stitchless seaming technology in order to enhance the performance of DOD clothing, personal protective equipment, and other textile items. Successful testing of stitchless seam garments in relevant field environments validated laboratory test data. Manufacturing assessments indicate that the transition from low rate to full rate production in sufficient quantities to meet Navy requirements is highly feasible. The completion of a Phase III contract to design and prototype a new Navy Damage Control (Steam) Suit confirms the technology's value and transition capability. Integration of Propel's stitchless seam technology into suitable new and existing clothing items and textile systems will enhance their form, fit, and function and reduce item weight.

Technology Category Alignment:

Protection, Sustainment, and Warfighter Performance

Materials & Manufacturing Processes

Readiness

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SYSKOM: NAVSUP

Contract: N00189-15-C-Z087

 Corporate Brochure: https://navystp.com/vtm/open_file?type=brochure&id=N00189-15-C-Z087

Department of the Navy SBIR/STTR Transition Program

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WHO

SYSCOM: NAVSUP

Sponsoring Program: NCTRF

Transition Target: NEXCOM
Uniform Program Management
Office

TPOC:
(508)233-1321

Other transition opportunities:
Clothing and Personal Protective
Equipment for
> NAVAIR
> US Army PM-SPIE and PM-SCIE
e.g US Army's Cold Temperature
and Arctic Protection System
(CTAPS)
> MARCORSYSCOM PM-Infantry
Combat Equipment (ICE)
> JPEO Chemical and Biological
Defense



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WHAT

Operational Need and Improvement: Need for 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. Need for rapid prototyping of test quantities of garments using the selected stitchless technologies to support developmental garment programs versus current cost-prohibitive approaches.

Specifications Required: Reduced weight, bulk and stiffness of seams. Reduced manufacturing costs with material and other cost savings. Reduce manufacturing complexity, e.g. reduction in number of different machines for different stitch types as well as simplification of garment manufacturing flow. Reduction of labor intensive mechanical stitch processes.

Technology Developed: Propel developed a stitchless technology tool set and an optimized stitchless technology design engineering process to deliver best form, fit and function with high manufacturing readiness and rapid prototyping capability. Propel's innovations optimize the performance of garments and other textile end items by replacing sewing with needle and thread with stitchless technologies.

Warfighter Value: Prototype Phase II field tested Stitchless Jacket is 30% lighter than the Navy's incumbent in-service garment. Stitchless seam technology results in lower bulk and a reduced packing cube. Improved flexibility and lower weight of Stitchless technologies result in better ergonomics. Stitchless seam garments have low water weight gain and improved surface integrity, and are quieter in field use. A new 1-piece US Navy Steam (Damage Control) Suit was designed and prototyped under a follow-on Phase III RD&E contract, and is 42% lighter and with a donning time that is 50% less than for the in-service incumbent 2-piece ensemble.

WHEN

Contract Number: N00189-15-C-Z087 **Ending on:** December 31, 2017

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Field Trial of 10 Prototype Stitchless Jackets	Med	Garments meet the needs of the users as measured by user surveys, focus groups and evaluation of tested garments	7	December 2017
Manufacturing Feasibility Study	Med	Stitchless garment is ready for transition to low rate manufacturing	7	December 2017
Production of 300 Prototype Stitchless Jackets (Phase II Option)	Low	Garments pass end item testing protocols for performance	7	September 2018
Navy administered Operational Field-Test of 300 Stitchless Jackets	Med	Garments meet Navy's improvement goals	7	May 2019

HOW

Projected Business Model: Propel's business model is to apply the Stitchless technology tool set together with the optimized Stitchless technology design engineering process, via RDT&E contracts, in order to improve existing military clothing, gear and textile end items as well as for new items using the Stitchless technologies. Propel will hold any follow-on acquisition contracts, teaming with highly qualified military contractors for manufacturing. At this time scale-up to full rate manufacturing is limited by the equipment on hand, which is only sufficient for prototype quantities. Needed equipment is readily available for purchase, but additional capital investment will be required to close this technology transition gap.

Company Objectives: Propel's objective is to connect with Navy and other DOD program offices for whom current clothing systems and textile end items could be significantly enhanced by application of the Stitchless technologies. The Stitchless technologies lend themselves to rapid prototyping of better solutions for user protection - engineering the design of the Stitchless garment or textile end-item to a specific need rather than the one garment fits all needs approach that is more typical of current approaches. Propel's advanced technologies can be implemented to improve protection as well as form, fit, function for the user, together with the potential for cost savings from assembly automation and materials reduction.

Potential Commercial Applications: Industrial Workwear, protective and safety gear. Other Militaries (e.g. NATO).

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