

Department of the Navy SBIR/STTR Transition Program

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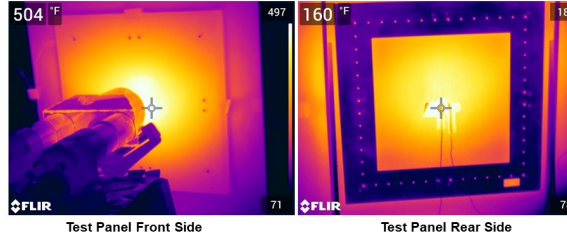
ONR Approval #43-8692-21

Topic # N18A-T024

Hybrid Ceramic Matrix Composite/Polymer Matrix Composite (CMC-PMC) Skin Materials
TRITON SYSTEMS, INC.

WHO

SYSCOM: ONR
Sponsoring Program: PMA-261
Transition Target: CH53-K
TPOC:
Dr. Anisur Rahman
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Other transition opportunities:



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WHAT

Operational Need and Improvement: Ability to maintain PMC skin integrity under thermal load with minimal parasitic thickness and weight increase.

Specifications Required: Keep the backside of the PMC at 250°F or below with a weight savings compared to a metallic heat shield system in approximately the same volume (~0.25").

Technology Developed: Multi-functional composite designed to avoid hot spots and isolate load carrying PMC from over temperature conditions.

- Thermal, chemical, and abrasion resistant outer layer.
- Robust, thermal isolation transition layer to accommodate CTE mismatch and reduce Z-axis thermal transfer
- Bolt on solution allows attachment and removal without damage to underlying aircraft skin
- Lightweight solution

Warfighter Value: - Hybrid composite skin enables greater operating temperature without replacement and requalification of the original CFRP composite.

- Hybrid composite skin increases operational life, thus reducing maintenance cost and down time.
- Hybrid composite skin allows integration of additional functionality to increase air vehicle survivability.
- Solution based on COTS materials that can be applied in the depot, in the field or on a manufacturing floor during production.

WHEN

Contract Number: N68335-19-C-0335 **Ending on:** July 20, 2023

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Thermal test demonstrating that the shield keeps backside of CFRP front skin below 250°F with 500°F impingement	Low	1	2	3rd QTR FY21
Mechanical tolerance of heat shield demonstrated - Impact and loads	Low	8 ftlb drop impact test and 300 psi flatwise tensile performance	4	3rd QTR FY21
Demonstrate ability to fabricate curved heat shield	Low	Visual	4	3rd QTR FY21
Scale-up fabrication of flat panel heat shield to 2'x2' and pass thermal testing	Low	6	4	3rd QTR FY21
Chemical resistance of heat shield demonstrated	Med	MIL STD 810F	5	4th QTR FY22
Successful vibration testing of heat shield	Med	MIL STD 810F with modifications	5	4th QTR FY23

HOW

Projected Business Model: We plan to fabricate the heat shields working with a toll manufacturing partner. Manufacturing plan is currently in development.

Company Objectives: We would like to identify further DoD applications for light weight, durable, heat shields for thermal protection at 700°F or lower. Triton Systems' goal is to supply light weight heat shields for DoD applications. These may include rotary or fixed wing aircraft (manned or unmanned), space vehicles, and weapon systems.

Potential Commercial Applications: Light weight heat thermal protection is of utility in commercial vehicles. Reduction of weight and metallic usage can result in cost saving and performance enhancements.

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