Department of the Navy SBIR/STTR Transition Program

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NAVAIR 2020-830

Topic # N182-121
Low-Density, Low-Volume Explosion Suppression Material for Aircraft Fuel Tanks
Response Technologies, LLC

WHO

SYSCOM: NAVAIR

Sponsoring Program: PEO (A)

Transition Target: PMA 261 CH-53 Heavy Lift Helicopter

TPOC:
(301)342-6070

Other transition opportunities:
All land, sea, and air vehicles that utilize crash foam

Developing Safer Fuel Tanks & Saving Weight

Photo Courtsey of USMC

Notes:
IP: U.S. Patent Application No.: 16/510,465. Title: PROCESS OF MANUFACTURING RETICULATED FOAM PRODUCTS, USING ALTERNATIVE MATERIALS. Filing Date: July 12, 2019

WHAT

Operational Need and Improvement: The Navy has two Fuel Tank Explosion Suppression (FTES) methods for air vehicles: On Board Inert Gas Generating System (OBIGGS) and Explosion Suppression Foam (ESF).
- OBIGGS protects the fuel tanks internally by constantly generating inert (nitrogen) gas and supplying it to the fuel tank ullage space to maintain an oxygen depleted environment.
- ESF (urethane foam) protects by filling the fuel tank with reticulated foam and keeps a ballistically-induced or electrical failure-induced flame front and explosion from propagating throughout the fuel tank.

Currently, the Navy seeks to develop a lightweight fuel tank explosion suppressant that fits within a wide range of aircraft fuel tank geometries and is easily installed and removed

Specifications Required: An innovative FTES material to replace ESF, while meeting the explosion suppression performance properties, is needed.
- FTES material must not displace more than one percent fuel volume,
- must not retain more than one percent fuel volume in any given fuel tank
- new FTES material must have a uniform nominal density not to exceed 0.9 pounds per cubic foot
- should perform with JP-4, JP-5, JP-8, and commercial Jet A fuels
- No toxicity hazard to personnel who maintain or come in contact with the FTES material can occur
- should be a 10-year maintenance requirement to check and remove
- Material color should be uniform throughout and cannot be blue, orange, yellow, or red

Technology Developed: RT's proof of concept materials is additively manufactured polymeric matrices. Phase I SBIR efforts demonstrated that the material can be manufactured at scale and showed very promising physical characteristics compared to the two controls.

Warfighter Value: - Lowers the weight of the foam and retained fuel by over 20%
- Reduces the amount of displaced fuel (e.g., lost fuel capacity) by over 50%.
- Delivers a 20% procurement cost reduction
- Doubles operating life due to fuel blend compatibility
- Improves the ease of installation and removal from aircraft fuel tanks

WHEN

Contract Number: N68335-20-C-0137 **Ending on:** January 21, 2022

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Protoypes	N/A	MIL-PRF-87260 B	4	April 2019
Improved Prototypes and DT&E	Low	MIL-PRF-87260 B	5	December 2020
Internal DT&E of Final Design	Med	MIL-PRF-87260 B	5	August 2021
Qualification	Med	MIL-PRF-87260 B	6	December 2021
OT&E	Med	MIL-PRF-87260 B	7	June 2022
Source Approval	Med	MIL-PRF-87260 B	8	December 2022

HOW

Projected Business Model:

RT seeks to manufacture and directly distribute FAUXM, our proprietary solution, by leveraging existing fuel cell relationships within the DOD, Primes and the Commercial Market. We expect to sell FAUXM via direct contracts, Purchase Orders (POs), and online ecommerce to commercial markets (B2B).

Company Objectives:

Potential Commercial Applications:
DOD: DLA, NAVAIR, USAF, Army CCDC, and ARL connections from existing work with A-10, H-60, H1, CH-53, FVL. FARA, and NGCV.
Primes: Sikorsky and Bell legacy, commercial and future aircraft.
Commercial Market: Automotive racing circuits

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