

WHO

SYSCOM: NAVAIR

Sponsoring Program: NAVAIR PEO (A)

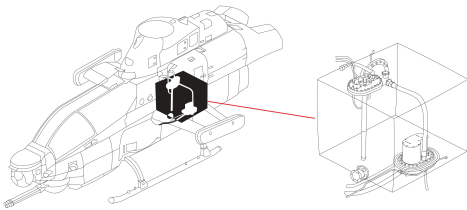
Transition Target: PMA-276

TPOC: (301) 342-9385

Other Transition Opportunities: Military platforms that would benefit from improved and/or secondary sources for fuel bladders include F/A-18 (PMA-265), Multi-Mission Helicopters (PMA-299), CH-47 Chinook Program Office, V-22 Joint Program Office (PMA-275, AFLCMC/WIV), USAF Helicopter Program Office (AFLCMC/WIH), SOF AT&L, Rotary Wing PEO, AFLCMC/WIU, AFLCMC/WIS, Joint Aircraft Survivability Program (JASP)

Notes: Current state of the art fuel bladder manufacturing is a handmade, artisan dependent process that can take up to 60 days to complete. This process is subject to human error, often requiring significant rework of the finished product, which results in expensive end products and long build time. This rework can include, but is not limited to, repairs such as patches, buffing, and fitting replacement.

Fuel bladders are utilized on a majority of Navy, Marine, Army, and Air Force aviation platforms, as well as throughout the commercial industry. This topic has the potential for interoperability, since the same material lay-up and manufacturing process can be utilized for fuel bladders across many military and commercial platforms.



THEM CAD rendition of durable fuel bladder (2024).

WHAT

Operational Need and Improvement: Quality fuel bladders are imperative for the safety of our warfighters. Any fuel leaks during operational flight lead to a risk of fire, which could result in the loss of aircraft and crew. On many platforms, the Navy's demand for fuel bladders is higher than the rate that the current fuel bladder manufacturer is able to supply. The US Navy seeks a self-sealing, crashworthy, low cost, lightweight, flexible fuel bladder for combat aircraft applications. To meet unmet Navy supply and demand, new bladders must be produced through a much faster and more repeatable manufacturing process.

Specifications Required: Proposed designs must be compatible with any fuel used by the Navy, including JP-5, commercial Jet A (with military additives) and a 50/50 blend of current jet fuel and bio-derived fuel. Proposed designs must also have self-sealing capability. A more consistent material and process will yield higher quality bladders and more efficient manufacturing process, which will help reduce the downtime of aircraft, thus improving the capability of the warfighter. MIL specifications that must be met include MIL-DTL-5578, 6396, and 27422F.

Technology Developed: Texas High Energy Materials, LLC (THEM) has developed a modern combat aircraft fuel bladder designed to meet MIL-DTL-27422F performance requirements.

A true innovation in manufacturing, our new bladder prototype is designed and developed "from the ground up", using zero legacy materials or manufacturing processes from the World War II era still in use today for current fuel bladder production. Gone are the seams, artisan "by hand" production methods, inconsistent natural rubber, months long production times, and short supply of legacy bladders. The DoD now has access to consistent, 100% synthetic, high-performance, high-quality fuel bladders that can be produced in hours, not months, for uninterrupted supply.

Warfighter Value: The ballistic tolerance of our fuel bladder technology prevents rupture, leaking and catastrophic release of fuel when struck by 50-caliber and 20mm Vulcan projectiles. Our physical self-sealing mechanism is instant and complete, even after tumbled 50-caliber bullets core-out and remove bladder material. Legacy bladders continue to use inconsistent natural rubber for self-sealing, which is highly susceptible to premature activation that renders the mechanism useless.

WHEN

Contract Number: N68335-23-C-0226

Ending on: Jan 08, 2025

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Fit test H1 left aft fuel bladder	Low	NAVAIR approval of proper fit and installation.	6	2nd QTR FY25
MIL-DTL-27422F testing	Medium	Self-sealing / Crashworthy performance tests completed.	6	2nd QTR FY25
Full Automation Manufacturing Process	Medium	Automated production line completed.	7	2nd QTR FY26
Platform Integration Demonstration	Medium	Class desk approval.	8	TBD

HOW

Projected Business Model: As a preferred U.S. Military partner, Texas High Energy Materials specializes in materials designed to endure the most extreme conditions while staying environmentally friendly. Our self-sealing fuel cells are versatile and easily adaptable to any geometry and platform. 80% of our build process is automatable and seamless minimizing variability and the need for rework. Our process is fast, efficient, and unparalleled; our fuel cell can be created in hours versus the months it takes for legacy cells. Texas High Energy Materials, LLC can partner with current DoD fuel bladder and fuel system suppliers to produce and integrate alternative bladders into aircraft systems. The company can also pursue organic growth of an affiliated company to produce and supply fuel bladders to primes and subcontracted component manufacturers.

Company Objectives: Texas High Energy Materials, LLC develops innovative materials in a practical, collaborative approach for government and private industry applications. We transition our technological breakthroughs into commercial, state-of-the-art products and champion their integration into government procurement and non-DoD industrial use. We seek meetings with those interested in our fuel bladder technology and manufacturing methods that deliver better fuel bladders, faster and at lower cost, as well as allowing mission-critical assets damaged in battle to remain in service without compromising safety or performance of the aircraft or aircrew.

Potential Commercial Applications: Other applications include Formula One (F1) racing; NASCAR; H1 Unlimited Hydroplane boat racing, and NHRA drag racing.

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