Department of the Navy SBIR/STTR Transition Program

Topic # N211-026
Reactive Boron Fuel for Energetic Applications
TDA Research, Inc.

WHO

SYSCOM: NAVAIR

Sponsoring Program: PEO (U&W)

Transition Target: PMA-201 Precision Strike Weapons, additive/subcomponent of Navy missile propulsion systems.

TPOC: (760) 939-8064

Other Transition Opportunities: Air Force and Army missiles and other rocket propelled munitions. AFRL research and development. Additives to rocket motors, energetic materials and pyrotechnics.

Higher, Faster, Farther Performing Missiles …

https://www.navair.navy.mil/news/AMRAAM-Completes-Two-Free-Flight-Test-Shots/Thu-05132021-1510

Notes: TDA Research Inc. (TDA), located near Denver Colorado, is actively developing novel high-performance propellant, explosives and pyrotechnic ingredients that improve rocket and missile performance. Currently, there are no Boron-based fuels or fuel additives used in solid or liquid propellants in the DoD. TDA's technology will fill this gap with more energetic boron-containing materials that can be integrated as a drop-in additive to solid and liquid propellant formulations. TDA's boron additives will provide a simple means to boost the performance of missiles and rocket propulsion.
TDA has 20+ years of experience working on energetic materials projects for the DoD, and TDA has all the capabilities to both work with and characterize energetic materials while safely performing this work.

WHAT

Operational Need and Improvement: New means to increase the performances of rockets and missiles are required to increase their effective range and enhance performance. New stable, safe, high-boron content energetic materials will facilitate the use of these energy-enhancing combustible additives in both liquid fuels and solid propellants for Navy propulsion applications. The Navy seeks to use the energy of boron-based fuel additives to increase the range of missiles and rocket propelled munitions with increases of up to 10% in operational range and/or speed are anticipated.

Specifications Required: The boron-based additives need to be compatible with current solid and liquid fuel ingredients. Compatibility criteria include solubility in liquid fuels, and miscibility with solid fuel ingredients. Implementing boron in energetic materials in a solid matrix for use in solid rocket motors and in hydrocarbon fuels is a requirement. Materials compatibility for use in an afterburner or rotating detonation engine is also sought.

Technology Developed: TDA Research is developing novel energetic molecular boron materials for use as combustion-enhancing additives to solid and liquid fuel formulations that are critical to Navy propulsion applications. The element boron has high energetic potential to enhance the performance of propellants, but it is otherwise difficult to fully realize this potential. Our technology allows boron to be used in current solid and liquid propellant fuel ingredients in a form that has not been previously achieved.

Warfighter Value: TDA's fuel additives will increase the performance and range of missiles such as AMRAAM, LRASM, Sidewinder and other applications including rotating detonation engines. The technology allows boron to be used in rocket fuels to enhance propellant energy and make Navy and DoD missile systems more effective with increased weapon range and lethality.

WHEN

Contract Number: N68936-22-C-0051 **Ending on:** Sep 26, 2025

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Complete Phase II Option	N/A	Development and demonstration of energy enhancement	4	2nd QTR FY26
Begin Phase II.5 optimization and qualification	Medium	Demonstrate additive in small-scale rocket motor testing	5	3rd QTR FY26
Navy qualification	High	Full qualification	6	3rd QTR FY27
Phase III: TDA manufacture	Low	Sales of boron additive to Navy or Prime Contractor	6	4th QTR FY27

HOW

Projected Business Model: We will collaborate with a major industry partner to transition the technology being developed in this project and pursue qualification of the product by the Navy. We will demonstrate our materials in a in a system level test-bed (or operation in a real system) with insertion planning into a Navy system. We expect to support the prime/system integrator with expertise on the production and use of our materials. TDA has the ability to produce intermediates and products at the kg scale and above, but at some point it is likely that the entire production process will be taken over by a major propellant manufacturer (with the partner ultimately selected by the Navy).

Company Objectives: TDA is motivated to supply the Navy with performance-enhancing boron-based additives for solid and liquid propulsion. We expect to lead the market for boron-based additives, and open new markets in both solid and liquid propulsion for the DoD. TDA's other efforts in materials development for propellants, explosives and pyrotechnics are likely to also benefit from new boron additives. Transitioning new military technologies is an important part of the company's growth strategy.

Potential Commercial Applications: Missile propulsion and rocket motor ingredients for the DoD are the primary targets for technology transition. Besides the US Navy applications, the new energetic boron materials developed in this project will benefit applications in the commercial space-launch and transport industries, including heavy lift craft.

Contact: Dr. Girish Srinivas, Chief Executive Officer
gsrinivas@tda.com (303) 940-2321