

WHO

SYSCOM: NAVAIR

Sponsoring Program: PMA 272 within PEO (T):
Advanced Aircraft Protection Systems

Transition Target: Subcomponent of a decoy device.

TPOC: (812) 854-6631

Other Transition Opportunities: Army and Air Force
Decoy Flares; Cartridge-actuated Device/Propellant-
actuated Device (CAD/PAD)

Notes: The image shows the decomposition rate of a Magnesium/Teflon/Viton (MTV) igniter composition (red) compared to two moisture stable igniter formulations (green and blue) developed by TDA Research, Inc. (TDA). The decomposition rate is determined by the amount of decomposition byproduct formed upon prolonged exposure to 75% relative humidity (RH) at 80 C. TDA's igniter formulations ignite after 50 days of aging under these conditions, while MTV fails to ignite after 14 days of aging. TDA's moisture stability is based on a novel, hydrophobic fuel that can be utilized generally in composite energetic formulations.

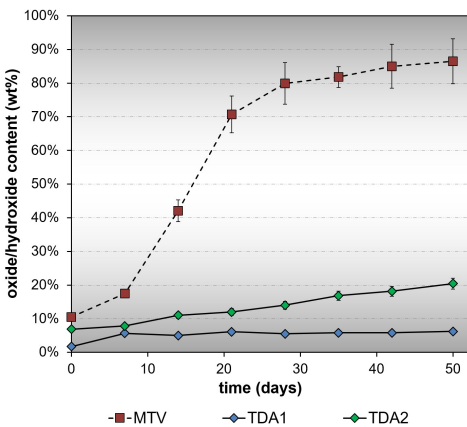


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WHAT

Operational Need and Improvement: Airborne Expendable Infrared Countermeasures (AEIRCMs) are deployed to decoy infrared guided missiles away from a targeted aircraft. AEIRCMs are ignited by an ignition pellet as the flare is being ejected from the aircraft. The ignition pellet currently consists of a composition based on MTV. Magnesium degrades when exposed to moisture, which can increase ignition times, or worse, non-ignitions. Another consequence of degradation is the evolution of hydrogen gas, which poses an ignition hazard. The Navy is seeking an ignition composition that is moisture stable and can be used as a drop-in replacement for MTV.

Specifications Required: A novel ignition composition that can replace MTV should be pelletized and sympathetically ignitable for operation in current Navy hardware (i.e., a pellet in a Safe-and-Arm (S&A) type igniter). The MTV-replacement should be stable to moisture degradation and long term storage, be reliably ignitable by an impulse cartridge, provide rapid ignition transfer to the primary pyrotechnic, and should be safe to handle and process. The operational conditions range from -65 degrees F to 160 degrees F.

Technology Developed: TDA has developed new igniter compositions that are less susceptible to moisture degradation than MTV. The moisture stability of these formulations, tested after 7 weeks of highly accelerated aging at 75% relative humidity (RH) and 80 °C, showed only 7-20% degradation, while MTV degraded by >85%; thus, TDA's igniter compositions are 70-90% more stable to moisture than MTV. TDA's moisture stable igniter compositions can be easily pressed into pellets, are safe to handle, and can be used as a drop-in replacement for MTV pellets.

Warfighter Value: TDA's moisture stable igniter formulation will increase reliability and safety of AEIRCMs by eliminating igniter formulations that can decompose upon storage and form flammable byproducts. TDA's igniter will not sacrifice performance and will be cost-competitive with current igniters.

WHEN

Contract Number: N68335-22-C-0152

Ending on: Mar 21, 2024

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Complete Phase II project	N/A	Development and demonstration of moisture stability and ignition properties	5	2nd QTR FY22
Begin Phase II.5 optimization and qualification	Medium	Igniter composition qualified for use in Navy countermeasure hardware	6	2nd QTR FY22
Navy Qualification of igniter formulation	Medium	Full qualification	6	2nd QTR FY24
Phase III: TDA manufacture and supply to Navy	Low	Sales of igniter to Navy or other DoD agency	6	2nd QTR FY25

HOW

Projected Business Model: The technology being developed in this project is a novel countermeasure flare igniter formulation. The igniter is used in very small amounts in each flare manufactured, and thus, a kilogram of this material can supply igniters for >5000 flares. This production level is well within TDA's capabilities to produce and supply to the Navy. This is likely to be a very small business, but could grow modestly if other military applications require moisture stable igniter formulations. TDA currently maintains and operates chemical production facilities capable of producing 100-ton quantities of inorganic chemicals and catalysts.

Company Objectives: TDA's moisture stable igniter formulations have the potential to be used by the Military in any application that employs igniter compositions, including countermeasure applications. Thus, we believe that other DoD agencies would also be potential investors in this technology, such as the Army and Air Force. TDA's goal is to grow this business to supply the Military with moisture stable igniter compositions for a variety of applications across many energetic materials and device platforms. There are several countermeasure flare manufacturers for the Military, including Chemring Kilgore and Armtect™, to name a few. Depending on the number of applications identified for our igniter, we could license technology to a major manufacturer to meet production demands and integrate our igniter formulations into other energetic materials platforms.

Potential Commercial Applications: Our moisture stable igniter formulation potentially has applications in any composite energetic system in which a fuel and an oxidizer are used. Potential commercial applications include the fireworks and pyrotechnics industry, as well as novel ignition materials for automobile air-bag applications.