NAVY Transition Assistance Program

NAVAIR Public Release 2012-245
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N091-014 - Acree Technologies Incorporated

Advanced Canopy and Window Materials for Improved Helicopter and Aircrew Survivability

NEED & CUSTOMER REQUIREMENT

Need: The Navy has an ongoing interest in improving the resistance of helicopter and aircraft canopies and windows to electromagnetic interference (EMI) radiation and reducing solar thermal heating and hazards from laser energy. Shielding technology improvements are sought that maintain or improve other aspects of system functionality, such as scratch and abrasion resistance and ballistic fragment protection. It is desirable to have aircraft windows last longer, reducing maintenance costs

Value to the Warfighter: Helicopter/rotorcraft occupants will be protected from eye damage from some lasers, microwave energy, and EMI radiation increasing aircrew and aircraft survivability. Aircraft windows will last longer, reducing maintenance costs.

Operational Gap: Multifunctional coatings are currently not commonly used to provide aircraft EMI protection and reduce solar heat and hazard laser exposure. Gold-based coatings for EMI/RF tend to be visibly dark and typical Indium Tin Oxide (ITO) coatings do not provide heat reduction or laser eye protection.

Customer Specifications: * Reduce heat transfer to the cabin and hazard from some lasers.
* Significant EMI attenuation surpassing today's off-the-shelf (OTS) coatings.
* Better than ten times (10x) improvement in abrasion resistance compared to OTS top coats.
* No impact on ballistic performance of window material.
* Keep number of coating layers to a minimum to increase manufacturability.

Technology Description: An advanced multifunctional coating and application process is being developed to coat helicopter and aircraft windows and canopies. The coating protects against EMI, reduces solar thermal heating and the hazard from some laser energy, and offers increased resistance to abrasion, scratching, and ballistic fragment impact resulting in lower maintenance costs, improved visibility and survivability.

SPONSORSHIP of original SBIR/STTR Topic

SYSCOM: NAVAIR

Transition Target: Rotorcraft and multi-mission aircraft

Original Sponsoring Program:
PMA 276, United States Marine Corps

TPOC Phone Number:
760-939-6150

Note:
Acree is advancing plasma technology in the fields of material science, innovative coating applications, and specialized plasma sources. We provide coating services for a wide variety of applications and research and development (R&D) services to develop unique coatings to solve specific customer needs.

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TECHNOLOGY DEVELOPMENT MILESTONES (SBIR/STTR)

Milestone	TRL	Risk	Measure of Success	TRL Date
Demonstrate IR and EMI shielding attenuation	3	Low	IR reduction, -50 db attenuation	March 2010
Demonstrate abrasion resistance	4	Low	>10x better than OTS hardcoat	May 2010
Coat 2' x 2' window panel to demonstrate coating large objects	5	Low	Coating with uniformity of less than 3%	October 2010
Coat actual aircraft window for testing on helicopter platform TBD	6	Moderate	Window performs to design specifications of: > 50 db attenuation, Sharp cutoff in IR, >10x better abrasion resistance	June 2012
Install coated window in actual aircraft and test performance under flight conditions	7	Moderate	Window does not limit aircraft performance by altering pilot visual acuity, causing glare or distortions. Window has better abrasion resistance and requires less maintenance and repair.	July 2012

Open contract: N68936-10-C-0103 ending August 31, 2012

TECHNOLOGY TRANSITION OPPORTUNITIES (PHASE III)

Other Potential Applications: The coating is applicable to helicopter, rotorcraft, or multi-mission aircraft within the Department of Defense (DoD). In addition, the coating is applicable to ship windows and ground transportation vehicles. The coating also has the added benefit of reducing thermal heating in the aircraft cockpit or cabin and reduces the hazard from some laser energy.

Business Model: Acree has existing coatings available for purchase and provides these to customers on a service basis. Acree also provides R&D services for the development of thin film coatings tailored to a customer's particular needs including corrosion, wear and erosion resistance, optical, medical, electrical coatings to name a few. Acree will continue to develop the coatings in this project through the Phase-II funding and will seek to develop relationships with appropriate window and helicopter manufacturers to explore licensing opportunities. Acree will also provide coating services on windows to primes for smaller scale orders.

Objective: Acree is seeking opportunities for licensing the coating to prime contractors involved in original equipment manufacturing or helicopters and applicable component parts such as windows. Example firms include but are not limited to TexStars, Bell Helicopter, Sikorsky, Boeing Rotorcraft Systems, and GKN Aerospace.

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