

Department of the Navy SBIR/STTR Transition Program

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NAVSEA #2021-0378

Topic # N151-022

Method for Removal of Airfield Paint Markings and Aircraft Tire Rubber Build-up from Installed AM2 Mat Surfaces

Atmospheric Plasma Solutions

WHO

SYSCOM: NAVSEA

Sponsoring Program: PMA-251

Transition Target: PEO Carriers, TEAM Subs, PEO Ships, SEA 04

TPOC:

Other transition opportunities:

Weapon system maintenance, Non Destructive Testing and Evaluation, Biofouling remediation

Notes: Pictured is the PlasmaBlast Atmospheric Plasma Coating Removal (APCR) system in operation for coating removal



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WHAT

Operational Need and Improvement: Atmospheric Plasma Coating Removal (APCR) addresses the immediate and growing need for a more environmentally friendly, operator-safe, cost-effective paint and coating removal solution for use on naval platforms and at naval facilities. This technology significantly reduces risks and hazards associated with media-based mechanical and chemical coating removal processes. The plasma coating removal technology has particular effectiveness where abrasive blasting is not easily deployed, specified or permitted. The plasma technology can be used to reduce costs for jobs including but not limited to Non-Destructive Inspections (NDI), weld prep, and spot coating removal.

Specifications Required: APCR has been demonstrated to be an effective alternative to media and wet abrasive blasting on a wide range of painted/coated surfaces, including steel and aluminum. The lightweight and intuitive system can be setup quickly and is easily operated by one user. The PlasmaBlast APCR system weighs less than 40 pounds and only requires compressed air and standard 240 or 480 volt power, making it a truly portable and easily-deployed system. The system can be safely used in confined or open spaces.

Technology Developed: The PlasmaBlast system uses electricity and compressed air to produce an air plasma beam. The power supply provides the electrical power to excite the air into the plasma state and the plasma pen forms and shapes the plasma beam. The APCR process converts a significant portion of the removed organic coating into water vapor and carbon dioxide, leaving behind less solid mass than was present in the original coating. The remaining solids are a dust which can be safely collected with a suitable vacuum filtration system. The plasma beam is scanned across a coated surface (manually or robotically) to remove the coating layer by layer, allowing for full or selective removal, in addition to cleaning and surface preparation.

Warfighter Value: This novel technology advances the Navy's goal of improving shipboard maintenance to increase the operational lifetime of ships and aircraft and other military assets. The implementation of the APCR technology will improve shipyard efficiency, lower maintenance costs, lower ship construction costs and shorten ship construction delivery timelines. During demonstrations and testing at Naval shipyards artists and technicians have found the system to be a benefit because of less vibrational impact and reduced PPE.

WHEN

Contract Number: N68335-20-C-0384 Ending on: May 1, 2022

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Based on field testing the system was improved ease of use, portability and ergonomics	Low	Significant changes well received based on positive feedback from users of the system	TRL-7	January 2017
Awarded Best New Technology 2019 US DOD Commercial Technologies for Maintenance Activities	Low	Presenation at Maintenance Innovation Challenge	TRL-8	June 2019
Robotic system designed, tested and acquired by Newport Newship yard for use in CVN construction	Low	Testing, data collection and analysis conducted on platform	TRL-8	April 2020
Systems acquired and implemented by US Army for amored vehicle maintenance	Med	Reduced repair time and risk of worker injury	TRL-9	June 2021
Systems acquired by PHNSY for NDT/NDI	Low	Improved ability to conduct inspection on critical welds	TRL-8	July 2021
Two sytems purchased by TRF Bangor in FY21 for training and process development	Low	Replace needle-guns, improves ability to inspect welds and plates	TRL-8	September 2020

HOW

Projected Business Model: The PlasmaBlast APCR systems are available now in the the single beam precision coating removal system PB-7000. There are three models - Mobile, Robotic and Bench. A SBIR project is underway to produce data and analysis to more fully qualify the technology and system on a broader range of coatings and substrates including the HY series of metals. An increasing number of use cases are being validated in field tests that prove out the value of deployment in the public shipyards, IMFs and with prime contractors.

Company Objectives: To introduce the world's first environmentally responsible, atmospheric plasma coating removal system based upon a patented PlasmaBlast APCR technology that quickly and safely removes protective coatings. The current product is ideal for removing coatings and sealants from intricate fittings and parts, for NDI applications, and significantly reducing or eliminating the need for additional surface preparation prior to recoating. Technology development programs are currently underway to achieve higher production rates and to enable technology integration into readily available coating removal platforms, including robotics. These advancements are intended to create cost-and time-effective solutions for large-scale projects

Potential Commercial Applications: The APCR technology is the next generation of surface preparation solution marine, aviation, oil and gas, transportation and most other commercial industries where protective coatings are used. The company has deployed the tool to Fortune 100 companies operating on around the world. The flagship product PB 7000 Precision Blasting is gaining qualification and acceptance as a repair and maintenance tool in both hand held and robotic implementations. The successful deployment into commercial applications is advancing the system for even more application inside the DoD.

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