

Topic: N093-187

GVD Corporation

Innovative Environmental Protection for Airborne Platforms

System designers avoid conformal coatings as a method to protect RF devices due to the coating's impact on signal performance. GVD's coating technology provides environmental protection that achieves parity or exceeds conventional coatings' reliability and can be applied directly over RF circuits without significant impact to RF parameters. Coated test articles are to be subjected to harsh environments that represent expected performance on a maritime airborne radar system. GVD Corporation provides vapor deposited coating services for a variety of industries and seeks opportunities to commercialize this innovative technology for high reliability electronics.

Technology Category Alignment:

Electronics Integration

RF Components for sensing, transmission and communication

Sensors, Electronics and Photonics

Manufacturing Technology for Affordability

Radio Frequency (RF) (non-EW)

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SYSCOM: NAVAIR

Contract: N68335-16-C-0272

 Corporate Brochure: https://navystp.com/vtm/open_file?type=brochure&id=N68335-16-C-0272

Department of the Navy SBIR/STTR Transition Program

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NAVAIR 2017-978

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WHO

SYSCOM: NAVAIR

Sponsoring Program: PEO IWS

Transition Target: Protective thin film coating for avionic electronic devices

TPOC:
(301)757-3284

Other transition opportunities: Radar systems, electronic warfare systems, maritime electronic systems, avionic electronic systems, non-hermetic packaged devices

Notes: GVD scientist unloading a production-scale coating system.



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WHAT

Operational Need and Improvement: RF circuit cards and antennas exhibit performance issues using conventional conformal coating techniques. The GVD process seeks to minimize RF performance issues while improving environmental reliability of electronic assemblies.

Specifications Required: These systems have an anticipated 20-year service life and the solution must show no degradation of electrical performance (gain, current consumption, input/output impedance, s-parameters) and maintain environmental, temperature, and moisture ingress/absorption protection.

Technology Developed: The technology developed will improve the reliability of electronic assemblies with minimal impact on RF performance. Initial proof of concept has been achieved by testing coated prototype devices and test articles for changes in RF performance and survivability in harsh environments. Additional validation will demonstrate this technology's ability to protect RF-frequency systems and to be a high-reliability alternative to conventional conformal coatings.

Warfighter Value: Systems designers can further improve the performance and reliability of digital or RF electronics assemblies being used in harsh operating environments. Future evaluation looks to demonstrate a reduction in total-cost-of-ownership of coated devices by reducing field failures due to environmental exposure as compared to conventional conformal coatings.

WHEN

Contract Number: N68335-16-C-0272 **Ending on:** December 22, 2017

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Demonstrate improved application process	Med	Meets industry standard environmental protection of electronics	5	August 2016
Coating application and test on prototype assembly	Med	Demonstrated acceptable RF performance after coating application	6	February 2017
Design production-scale system	Med	Complete system design	6	December 2017
Generate maintenance and upkeep plans	N/A	Complete document drafts	6	December 2017

HOW

Projected Business Model: GVD has a two-tier approach to provide the coating. For low volume and prototyping, GVD will provide coating services from our Cambridge, MA facility. If the outlook for throughput requirements cannot be met, a system based on the design completed in this project will be manufactured and located in close proximity to the customer's manufacturing location. GVD is open to a variety of business models, such as opening a nearby facility to provide coating services or bringing a system in-house for the customer to use, including license of the technology and a service to support and maintain the system.

Company Objectives: GVD looks to proliferate this coating technology across defense-industry electronics systems, making it a viable environmental protection solution for RF, microwave, and digital systems developed for DoD platforms. Replacing hermetic packaging as an environmental protection solution provides the largest value proposition; however, additional validation is needed to demonstrate acceptable reliability without hermeticity. GVD's coating process has numerous benefits over conventional conformal coatings such as parylene, urethane, and acrylic, including improved reliability and easier rework. GVD will target commercial and DoD opportunities to provide alternatives to conventional coatings and hermetic packaging.

Potential Commercial Applications: Commercial applications that see the most value from our coating technology have the same qualities as the defense industry applications: high frequency RF or microwave devices that operate in harsh environments. Automotive radar requires low-cost alternatives to meet the demanding cost requirements of the automotive industry; reliability of these systems is critical as automated driving is adopted and further developed. Chip manufacturers can benefit by providing additional reliability for their non-hermetically packaged products.

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