Department of the Navy SBIR/STTR Transition Program

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Topic # N231-070
SOLAR-BLIND UVC AND VUV DETECTORS
Adroit Materials

WHO

SYSCOM: ONR

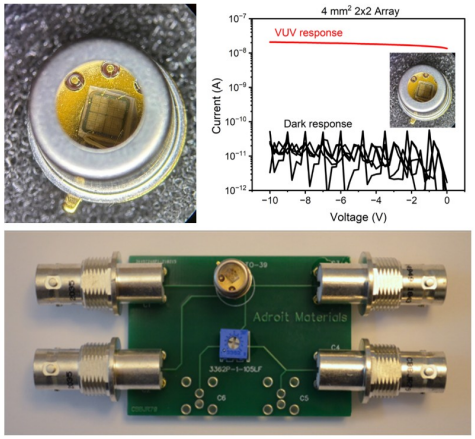
Sponsoring Program: TBD

Transition Target: TBD

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Other Transition Opportunities: TBD

Notes: The developed detectors allow for low noise, solar blind detection of VUV light while maintaining a smaller form factor and higher mechanical stability compared to competing technologies.



Adroit Materials has developed a highly sensitive semiconductor based VUV detector.

WHAT

Operational Need and Improvement: • Microsatellites and satellite constellations are increasingly used for ionosphere, thermosphere, and space weather monitoring
• Current FUV/VUV instruments rely on microchannel plate (MCP) and/or photomultiplier tube (PMT) detectors that require high operating voltages, exhibit limited quantum efficiency, are large, mechanically instable, and are susceptible to radiation damage.
• These limitations increase size, weight, power consumption, and mission risk while reducing detector lifetime and sensitivity.
• A compact, low-power, radiation-hard, solar-blind detector is needed to enable next-generation space sensing payloads and constellations.

Specifications Required: • Sensitive detection of FUV/VUV radiation in the 135–180 nm wavelength range
• High quantum efficiency and low dark current to enable detection of weak atmospheric emissions
• Solar-blind operation with strong visible-light rejection to eliminate background interference
• Radiation hardness suitable for long-duration space missions
• Low size, weight, and power (SWaP) compatible with microsatellite and CubeSat platforms
• Reliable operation over a wide temperature range and extended mission lifetimes

Technology Developed: • Developed solid-state AlGaN-based solar-blind VUV photodetectors for space applications
• Demonstrated packaged detectors with sensitivity extending to 120 nm and dark current below 1 pA
• Demonstrated low-voltage operation (10–50 V), high UV sensitivity, and visible-light rejection greater than 10^8
• Established large-area detectors (>4 mm²) and detector arrays compatible with microsatellite payloads

Warfighter Value: • Enables compact, low-power FUV/VUV sensing payloads for microsatellites and distributed satellite constellations, reducing size, weight, power, and cost
• Improves sensitivity, reliability, and mission lifetime through a radiation-hard, solar-blind solid-state detector architecture
• Supports critical space missions including space weather monitoring, ionospheric characterization, and space domain awareness

WHEN

Contract Number: N68335-24-C-0315 **Ending on:** Jul 31, 2026

Milestone	Risk Level	Measure of Success	Ending TRL	Date
4 mm2 detector	N/A	device size	6	4th QTR FY26
Lifetime	N/A	>10,000 hrs. liftime	6	4th QTR FY26

HOW

Projected Business Model: Adroit Materials will commercialize the technology through direct sales of packaged VUV detector components and integrated detector subsystems for government, research, and commercial space customers. Revenue will be generated through detector sales, custom detector development, and integration into satellite payloads and scientific instrumentation.

Company Objectives: Adroit Materials leverages a developed III-Nitride materials toolbox with the goal to demonstrate and commercialize next generation optoelectronic and power devices.

Potential Commercial Applications: • Space weather monitoring, ionospheric characterization, and space domain awareness missions.
• Missile plume, heat signature, and other ultraviolet-based threat detection systems
• UV sensing payloads for Earth observation, remote sensing, and environmental monitoring
• Heat and flame detection independent of IR radiation

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