

Department of the Navy SBIR/STTR Transition Program

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ONR Approval #43-3252-17

Topic # N14A-T018

Compact Megavolt Switch Utilizing Novel Switching Mediums

ASR Corporation

WHO

SYSCOM: ONR

Sponsoring Program: Code 35

Transition Target: High voltage switching for directed energy applications

TPOC:

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Other transition opportunities: Dielectric mediums that can help reduce the use of Sulfur Hexafluoride (SF6) throughout the electric power utility industry.



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WHAT

Operational Need and Improvement: Many Department of Defense (DoD) directed energy systems and electric power utilities use SF6 in critical subsystems. The EPA has identified SF6 as a significant cause of climate change and has proposed onerous cost increases and maintenance requirements to reduce its use. This regulatory environment combined with the inherent need for smaller directed energy systems in DoD applications have led to the need for new dielectric mediums to replace SF6.

Specifications Required:

- 1 MV to 10 MV switch voltage
- 750 ns or less switch time
- < 300 ns pulse lengths
- 20 to 200 ns charge times
- 100 Hz to 1 kHz pulse repetition frequency
- Volume of 150 in³

Technology Developed: Compact, high voltage systems are increasingly being developed by the military for a variety of ground and airborne applications. As with any military system, there is a continual need to make existing systems smaller and lighter. One of the most critical support systems is a high voltage "switch" that controls the voltage and current within a high voltage system. ASR is developing extremely compact high voltage switch technologies to be applied in both current and future high voltage systems.

Warfighter Value: Cost effective and more compact directed energy systems that can be placed on military platforms to better protect the warfighter in directed energy conflicts.

WHEN

Contract Number: N00014-16-C-1038 **Ending on:** July 7, 2017

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Identification of a dielectric medium	Low	Breakdown strength. Environmentally friendly	TRL 6	October 2017
Development of 500 kV switch	Med	500 kV capable switch	TRL 6	October 2017
Development of a 1 MV switch	Med	1 MV capable switch	TRL 6	TBD

HOW

Projected Business Model: Develop compact high voltage switches and dielectric mediums that can be licensed to organizations for implementation as needed in commercial applications.

Company Objectives: Development of a high voltage switch that utilizes an environmentally friendly dielectric switching mediums. Develop licensable technologies that may help reduce the usage of SF6 in DoD directed energy systems and electric power utilities.

Potential Commercial Applications: High voltage switches are utilized in a variety of commercial applications including laser sources, electromagnetic pulse simulators, and directed energy weapons. Dielectric gasses are utilized extensively in the power industry. The results of this effort may lead to reduced SF6 usage and cost in many power electric utilities.

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