

Department of the Navy SBIR/STTR Transition Program

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MCSC-PRR-2439

Topic # N153-126

High Voltage Antenna Protection for Hand-held and Man-pack Radios

QorTek, Inc.

WHO

SYSCOM: MARCOR

Sponsoring Program: Multiband Radio II

Transition Target: PRC117G

TPOC:
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Other transition opportunities: Army Ground Radios and Army WIN-T Army Hand Held and Vehicle Radio Applications

Notes: Expeditionary forces moving in urban environments will require communication forces to have high voltage protection from overhead wires when in operation.



<https://www.defense.gov/Photos/Photo-Gallery/igphoto/2001187118/>
U.S. Marine Corps Photo VRIN: 454080-L-GUL58-951.jpg

WHAT

Operational Need and Improvement: In an urban operational environment, dismounted Marines can encounter low-hanging wires such as high voltage lines which present the potential for an electric shock hazard. These lines are unpredictable in height and voltage. For efficient communications, dismounted Marines operate hand-held or man-pack radios with long collapsible monopoles. These antenna, for electrically efficient operation, can be long (8 ft.) which can present the possibility of an electrical shock hazard should direct contact be made with an overhead power line. While monopole antennas exhibit good size and weight characteristics for the performance they provide, they pose a shock hazard in these types of environments due to their length and all metal construction.

Specifications Required: The solution is intended to protect the warfighter from 20kV (35kV RMS objective) high voltage accidental contact. The device is intended to not interfere with the operation of the transceiver and to either provide equivalent or better radiation pattern omnidirectional gain as well as being difficult for enemy detection. The solution is to be applied to hand-held and man-pack radio equipment that operate in the HF and Very High Frequency (VHF) bands. The solution is desired to have minimal soldier impact with regards to weight and flexibility.

Technology Developed: QorTek has developed an advanced technology solution, called the eHalt, which provides a fast, mechanical breaker action in series with the radio antenna. The breaker acts to disconnect the antenna from high voltage contact rapidly such that electrocution hazards are eliminated. The eHalt device is inserted in series with the antenna and can be fit with radio connectors compatible with currently fielded US Marine transceivers.

Warfighter Value: The eHalt device can provide up to 35kVRMS protection for dismounted Marines with communication equipment. The device is an engineered solution (which will be more failsafe vs. a tactics, techniques, & procedures solution) to the problem. The solution is compact and enables a means to rapidly replace the device in the field if necessary. An advantage of our design in the device does not require power and therefore has no issues with shelf life as well as being a cost-effective solution utilizing cost effective materials. The eHalt device will allow for dismounted warfighters to continue operations in the field without concern for overhead hazards.

WHEN

Contract Number: M67854-17-C-6507 **Ending on:** March 27, 2019

Milestone	Risk Level	Measure of Success	Ending TRL	Date
20kV Static Withstand	Low	Threshold blocking capability	4	1st QTR FY18
Mechanical Disconnect Operation	Low	Developed and demonstrated mechanical disconnect	5	2nd QTR FY18
Integrated Capacitor Designed	Med	Supplies eHalt trigger power and provides additional protection layer	5	4th QTR FY18
Integrated System Complete - eHalt	Med	Complete system for demonstration in a relevant environment	6	1st QTR FY19

HOW

Projected Business Model: The Marine Corps Systems Command (MARCORSYSCOM) intends to procure many PRC117F/G hand held radios under the Multiband Radio II Program starting in 2020. Based on this projection, QorTek plans to manufacture sufficient eHalt Antenna Protection Devices to meet this production demand. QorTek plans to source all the individual components from qualified outside sources, perform detailed incoming inspection on the components, develop a binned Kanban system to enable lean and efficient sub-assembly and final assembly of the eHalt devices, including final inspection, in a dedicated manufacturing space at QorTek's headquarters in Williamsport, PA. As the potential volumes increases, QorTek will develop an outside source for the final integration while maintaining responsibility for the overall quality and shipping to the customer. This alternative integrator will provide dual source supply to address potential demand surges, flexibility in cost, as well as addressing Disaster Recovery Plan requirements.

Company Objectives: QorTek currently produces LRIP electronic components for both the Navy and commercial applications. Based on this experience, QorTek would like to supply this new safety equipment to the US Marine Corps, US Army, and potentially to NATO allies. Tying the commercialization of our previous DoD work into this new safety apparatus will allow the company to expand and grow as well as make new potential commercial avenues. We also aim to utilize this program to expand our manufacturing capability for future commercial endeavors.

Potential Commercial Applications: In addition to the target Marine applications, QorTek is investigating other DoD potential consumers for this safety device, including the US Army and other NATO Allies as well as potential, first responders in disaster areas and rural oil and gas exploratory fleets. The patented mechanism could also find use in other electrical applications that are lower in required voltage blocking but still necessary from a safety aspect.

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