

Department of the Navy SBIR/STTR Transition Program

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MCSC-PRR-2437

Topic # N153-126

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

METSS Corporation

WHO

SYSCOM: MARCOR

Sponsoring Program: Multiband Ground Radio / PM Communications Systems (CS) / PM Electronic Warfare

Transition Target: Multiband Radio II (MBR II) Program

TPOC:

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Other transition opportunities:

- Combine with intumescent material to prevent electrical fires in buildings and automobiles

- Laser wave guides / fiber optics / sensors (as the dielectric medium)

Notes:

Communication on the modern battlefield across long distances is critical. Linking units requires handheld or man-pack radios using either an 8 to 10-foot whip antenna or a 3 to 4-foot blade antenna. Long antenna lengths reduce radio power requirements and preserve the radio's battery life, but pose potential shock hazards to Marines using them on the ground or in vehicle turrets. When the antenna comes in contact with low-hanging power distribution lines fatal amounts of electricity can be conducted by the antenna through the radio as well as the operator.



http://photoblog.nbcnews.com/_news/2011/12/14/9424341-iraqi-voices-patchwork-electrical-grid-a-symbol-of-countrys-disconnects

WHAT

Operational Need and Improvement:

- Current antenna electrical protection is not acceptable against low overhead power lines
- Today's HF radio systems do not include enough high voltage protection
- Protective sheathing (used today) is a temporary solution (cumbersome, not easily stowed, poor fit)

High Need: Mission and Safety Critical

Specifications Required:

- Must integrate with existing antennas
- Provide high-voltage protection to 20 kV RMS (35 kV RMS objective)
- Achieve equivalent or better radiation pattern omnidirectional gain
- Must have low coefficient of friction
- Rugged, lightweight, easy to install, with a long service life

Technology Developed:

METSS has created a protective antenna cover technology using advanced, high-dielectric strength, commercially-available materials

Warfighter Value:

- Saves lives, prevents electrocution
- Solution does not interfere with radio's primary function
- Easy to use and install in field environment

WHEN

Contract Number: M67854-17-C-6508 **Ending on:** March 25, 2019

Milestone	Risk Level	Measure of Success	Ending TRL	Date
High-performance base materials identified	Low	Applied dielectric breakdown voltage (DBV) \geq 35 kV RMS	4	1st QTR FY17
Whip antenna joint design (eliminated gaps/channels)	Med	Objectives met	4	1st QTR FY17
Blade antenna living hinge design and aging	Low	DBVs ranged between 30 kV – 35 kV after aging for 2 weeks at 160 °F & 98% RH + 2 weeks at -40 °F, and after 10,000 bends	4	4th QTR FY17
Prototype Testing	Low	No loss in radio communications	5	1st QTR FY19
Prototype kit/how-to video delivery	Med	Successful Field User Evaluation (FUE) or Limited User Assessment (LUA)	7	2nd QTR FY19

HOW

Projected Business Model:

METSS is structured and staffed to provide the best mix of technical talents:

- to conduct successful R&D programs
- to rapidly develop new products and processes for DoD and industrial application
- to keep the focus of the company on technical innovation
- to transition technologies and intellectual property developed by METSS

METSS will manufacture the high voltage antenna protection kits internally

Company Objectives:

- become a material supplier to SINCGARS radio manufacturer (HARRIS Corp)
- leverage existing supply channels to support future technology insertions
- fill any supply chain voids or acquisition needs

Potential Commercial Applications:

- Antenna shielding for fighting and support vehicles
- Electrical wiring sheathes for chemical and fume hoods
- Ruggedized power distribution line covers
- Chemically, electrically, and abrasion resistant clean room plumbing and wire sheaths
- Electrical insulating materials for potentially explosive/flammable environments

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