

Topic: N153-126

## METSS Corporation

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

The Marine Corps Systems Command requires an integrated protective solution for radio antennas used by dismounted USMC Radio Operators. Long radio antennas are mission critical assets; however, if contacted with low-hanging power distribution lines (common in war-torn regions), lethal amounts of electricity can be imparted to the operator and radio. METSS intends to provide high-voltage antenna protection of 35KV RMS, while providing equivalent radiation pattern omnidirectional gain across frequencies between 2 and 88 MHz. Solutions will enable retrofit to existing antennas in the field or while in depot. The added protection will not cue enemies, snag, or fail in harsh conditions. METSS's solution will be light, easy-to-use, and support whip and blade antennas for the Single Channel Ground and Airborne Radio System (SINCGARS).

### Technology Category Alignment:

Advanced Electronics

Energy & Power Technologies

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**SYSCOM:** MARCOR

**Contract:** M67854-17-C-6508

 Corporate Brochure: [https://navystp.com/vtm/open\\_file?type=brochure&id=M67854-17-C-6508](https://navystp.com/vtm/open_file?type=brochure&id=M67854-17-C-6508)

Department of the Navy SBIR/STTR Transition Program

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WHO

**SYSCOM:** MARCOR

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

**Transition Target:** Multiband Radio II (MBR II) Program

**TPOC:**

[sbir.admin@usmc.mil](mailto:sbir.admin@usmc.mil)

**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](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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