

# Department of the Navy SBIR/STTR Transition Program

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MCSC-PRR-3628

Topic # N172-103

Electro-Magnetic Interference Composite Rigid Wall Shelter (EMI CRWS)

Conductive Composites Company

## WHO

**SYSCOM:** MARCOR

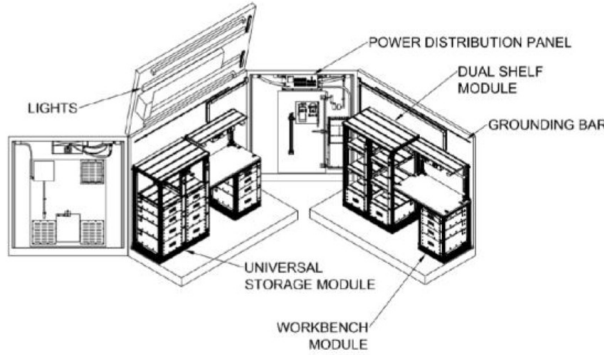
**Sponsoring Program:** Marine Corps Systems Command (MCSC)

**Transition Target:** Rigid Wall Shelters (RWS)

**TPOC:**

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**Other transition opportunities:** In addition to the Marines, we are developing hardened truck mounted shelters for Air Force specific applications. First Responders, containerized data centers and Army's Shelters of the Future program are also viable transition opportunities.



Technical Manual 09272B 141 Shelter, Non-Expandable 10 ft. EMI

**Notes:** EMI-CRWS is being developed from proven composite shelter fabrication methods and builds on previous Phase I and Phase II efforts. This design leverages the experience our partner manufacturer whose all-composite shelters pass all Container Safety Certification (CSC) testing and 9-high stacking requirements. Conductive Composites has previously designed, fabricated and tested a ridged wall truck mounted shelter for the Air Force with extreme shielding requirements including isolation from ionizing radiation. The lessons learned from these efforts will greatly reduce the technical risk with delivering the EMI-CRWS.

## WHAT

**Operational Need and Improvement:** Marine Corps Systems Command (MCSC) has expressed the desire to reduce corrosion in existing Rigid-Wall Shelters (RWS), provide increased multi-threat protection, reduce weight, lower shipping costs, and reduce life cycle costs. This emerging need is not unique to the Marine Corps and is anticipated to be prevalent within the larger Navy organization, Army, and Air Force. Our EMI-CRWS is a light-weight, high strength, highly insulating, corrosion resistant and broadly protective mobile shelter that can support many operational needs from maintenance and repair operations to command posts and medical operations. Corrosion resistance and low weight inherent with composites will be the primary benefits to reduce costs and extend the useful life of the shelters.

**Specifications Required:** Objectives for material improvements over traditional RWS are a weight reduction of 30%, 40% improvement in thermal insulation and an 80db EMI-shielding effectiveness. Testing and validation for specifications of International Organization for Standardization (ISO) and CSC standards to provide nine-high stacking of freight containers will be completed. The EMI-CRWS will also meet ISO, DoD, and DoN requirements for 10 ft. RWS to include but not limited to: exterior dimensions, lifting, doors, power service, grounding, heating, cooling, lighting, exterior/interior finish, mounting and transportability.

**Technology Developed:** Conductive Composites has developed the composite material technology that enables fabrication of the lightweight composite structures that will be delivered under this effort. We have a laboratory dedicated to composite fabrication and testing where our technology is incorporated into test coupons and prototypes by various composites manufacturing methods and then validated through testing.

**Warfighter Value:** The EMI-CRWS by Conductive Composites brings new materials technology to replace the legacy system of rigid wall structures. EMI-CRWS will offer more comfortable environmental conditions inside, more durability and corrosion resistance outside and will contribute to a more efficient, lighter weight and effective fighting force.

## WHEN

Contract Number: M67854-19-C-6508

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Critical Design Review	Low	Meets all requirements	5	4th QTR FY20
EMI-CRWS Fabrication	Low	Fabrication Completed	5	3rd QTR FY21
Integration	Low	All components fully integrated maintaining EMI-shielding	6	3rd QTR FY21
Test and Certification	Med	Meets all requirements	7	4th QTR FY21
Final Report and Prototype Delivery	Med	Delivery of EMI-CRWS	7	4th QTR FY21

## HOW

**Projected Business Model:** For this effort, the first objective is to deliver a non-expandable 10 ft. container to serve as a baseline, utilizing existing tooling from partner manufacturers. All features will be present such as doors, environmental controls and power service, all maintaining shielding effectiveness. Designs for shelter variants such as single and double-sided expandable shelters will be investigated. As part of these design efforts we will build a prototype concept of seam construction methods suitable for expandable shelters. Tooling will be focused on Design for Manufacturability and Assembly (DFMA). The DFMA will be used to identify opportunities for part count reduction and time-saving assembly steps. These findings will be identified and incorporated into the final manufacturing process and design to ensure scalability for future commercialization.

**Company Objectives:** Conductive Composites has 36 years' experience developing and delivering conductivity-based polymer and composite solutions that provide conductivity and shielding performance in lightweight materials systems. Our objective is to deliver an integrated, completely shielded, and cost-effective 10 ft. shelter to the MCSC that exceeds existing RWS requirements. Ultimately, we desire to make our EMI-CRWS shelters and its variants available to all U.S. forces as a replacement for legacy rigid wall shelters.

**Potential Commercial Applications:** Applications for First Responders as command and communications shelters and applications for the private sector as modular containerized data centers have been identified. Conductive Composites will pursue potential commercial applications and markets both directly, through channel partners and relationships with shelter providers such as Kratos Gichner, AAR Mobility, and others.

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