

Department of the Navy SBIR/STTR Transition Program

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MCSC-PRR-4452

Topic # N193-138
Lightweight Run-flat Tire/Wheel Assemblies for Marine Corps Wheeled Vehicles
Force Engineering, Inc.

WHO

SYSCOM: MCSC

Sponsoring Program: PEO LS, Amphibious Combat Vehicle (ACV)

Transition Target: Amphibious Combat Vehicle (ACV)

TPOC: sbir.admin@usmc.mil

Other Transition Opportunities: USMC Mine Resistant Ambush Protected (MRAP) vehicle, USMC and US Army Joint Light Tactical Vehicle (JLTV), US Army Stryker and Armored Security Vehicle (ASV), USMC and US Army High Mobility Multi-purpose Wheeled Vehicle (HMMWV), USMC and US Army Combat Support and Combat Service Support trucks.

Notes: Composite Run Flat Inserts (CRFI) adapts proven materials technology from aerospace and automotive markets to military tires and wheels. Composite materials are inherently corrosion resistant and ballistic and blast protective. Prototype CRFI's have already been fabricated, installed in ACV wheels, and static load tested to validate their structural integrity and weight savings. Force Engineering has presented this technology to vehicle prime contractors for vehicles using 16R20 wheels. We have also presented this technology to the Army PM Light Tactical Vehicles and are beginning work on a CRFI for the High Mobility Multipurpose Wheeled Vehicle (HMMWV). We have already submitted a patent application for CRFI technology.



<https://media.defense.gov/2018/Jun/20/2001933605/1-1/0/180619-M-ZZ999-1203.JPG>

WHAT

Operational Need and Improvement: The Marine Corps needs lightweight run-flat tire and wheel designs for military vehicles that increase the survivability and mobility of tactical and combat vehicles on/off paved roads and in water. CRFIs provide run-flat operational capability at less than one-half the weight of existing system. Novel CRFI materials and designs provide improved bead-lock traction and rigidity. Composite materials provide buoyancy even when tires are flat or damaged.

Specifications Required: Test Operations Procedure (TOP) 02-2-698 Run Flat Testing. Society of Automotive Engineering (SAE) J2014 Pneumatic Tire/Wheel/Run flat Assembly Qualifications for Military Tactical Wheeled Vehicles.

Technology Developed: Composite materials wheel and run flat insert technology that integrates the run flat function and the tire bead lock function into a single part. CRFI design maximizes the stiffness and spring properties of composite materials. Innovative one-step manufacturing technology creates a net-shape part with all features molded in using additive manufacturing tooling techniques.

Warfighter Value: Increased vehicle survivability and mobility expands capabilities. Reduced system weight extends range and payload capacity and reduces fuel consumption.

WHEN

Contract Number: M67854-21-C-6513

Ending on: Jul 01, 2023

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Demonstrate CRFI Concept	Medium	Meet Proof Test Load	4	4th QTR FY20
Fabricate Full-Size Part	Low	Fitted to ACV Wheel	5	2nd QTR FY21
Proof Load Prototype CRFI	Medium	Load Test on ACV Wheel	5	3rd QTR FY21
Create Preliminary Design	Low	Bolt Together on ACV Wheel	6	2nd QTR FY22
Full Wheel & Tire Proof Test	Low	Installed on ACV Wheel	6	4th QTR FY22
Roll Test Wheel/Tire	Medium	Contractual SOW/TOP 02-2-698 Run Flat Testing	7	1st QTR FY23
Ballistic Test	Medium	TOP 02-2-698 Run Flat Testing	7	1st QTR FY23
On-Vehicle Test	Medium	SAEJ2014/TOP 02-2-698 Run Flat Testing	8	3rd QTR FY23

HOW

Projected Business Model: Complete product development activities internally (design, first article production, test) and create a Technical Data Package (TDP) and Intellectual Property (IP) portfolio using our own resources. Build the first production tooling and productionize the CRFI fabrication process internally to augment IP portfolio and create a licensable product and technology. Conduct Low Rate Initial Production (LRIP) internally and sell CRFIs to DOD/primes to demonstrate production viability. License CRFI technology for full-rate production/co-production and license/partner for export sales to NATO partners to create business base that generates annual \$15MM EBITDA, then sell technology/product/company to Private Equity or IPO.

Company Objectives: The ultimate goal is to productionize this technology for product sales to prime contractors and DoD vehicle fleets. Our current objective is to complete CRFI design and testing and obtain First Article Test (FAT) approval and safety release or 16R20 wheels to enable product sales to DoD and prime contractors. FAT approval is a trigger to initiate marketing and sale and capital raise activities.

Potential Commercial Applications: Run flat tire insert for commercial automotive application for improved safety and weight reduction by eliminating spare tire.

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