

Department of the Navy SBIR/STTR Transition Program

DISTRIBUTION STATEMENT A. Approved for public release. Distribution is unlimited.

MCSC-PRR-2433

Topic # N153-124

BISCEP (Biomass Incinerating Stirling Cycle Energy Producer)

Midé Technology Corporation

WHO

SYSCOM: MARCOR

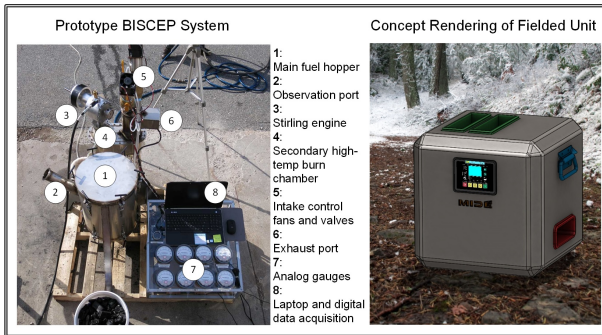
Sponsoring Program: MARCOR
SYSCOM / Expeditionary Power

Transition Target: P4M Logistics
Combat Element Systems (LCES), PM
Engineer Systems, Power Team

TPOC:

sbir.admin@usmc.mil

Other transition opportunities: Joint Deployable Waste to Energy (JDW2E) initiatives are working to convert waste to usable energy for base camps. Waste generated at bases is typically back hauled (very expensive) or burned, which is hazardous to the environment. An incinerating solution that converts waste to electrical energy will reduce pollution, make more effective use of land and manpower, and reduce the need of fuel shipments. The initiative is a joint effort by the Army, Air Force, and Navy and targets bases from 50-6,000 people with 1 to 5 tons of waste per day.



Mide, Copyright 2018

WHAT

Operational Need and Improvement:

Logistics resupply of power, both fuel and batteries, is a major burden on a Marine Company. There is a need for technology that can harvest energy in covered locations which would reduce this logistical burden. Wind and solar power solutions do not perform well near or under covered locations such as in forests or jungles. Other efforts have been looked at such as micro-hydro turbines, and hand crank generators: none of these systems meet size, weight, operational area limitation, or ease of deployment, making them unsuitable as a power source.

Specifications Required:

- Proposed concepts must meet the following operational requirements:
- operate in temperature ranges of -20°F to 125°F
 - operate in rain, dust, salt conditions and survive transit over rough terrain
 - must be compact, meeting 2-person lift (88 lbs)
 - scalable and have energy densities greater than 25W/ft² and 5W/lbs
 - minimal start up time (< 10 minutes for 2 people)
 - meet MIL-STD-1275F (nominal 24VDC output)
 - meet MIL-STD-1332B (120VAC output)

Technology Developed:

Midé's Biomass Incinerating Stirling Cycle Energy Provider (BISCEP) is able to burn wood, twigs, leaves, used packaging material (including for MRE's), waste building material, dunnage, and garbage.

Warfighter Value:

- reduces dependency on fuel
- meets SWaP requirements
- meets MIL-STD 1275F and 1332B
- system is scalable

WHEN

Contract Number: M67854-17-C-6505 **Ending on:** January 31, 2019

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Prototype Burner and Stirling demonstrated individually	Low	Achieved	4	3rd QTR FY17
Complete generator demonstrated	Low	Achieved	5	1st QTR FY18
System at desired performance level and deliver to MCSC for eval	Med	Prototype system is fully assembled and outputting ~400W of electrical power when powered by biomass	6	1st QTR FY19
System packaging and design are finalized	Low	Unit has been repackaged to meet the SWaP requirements.	7	3rd QTR FY19
Testing complete	Med	Qualified by passing MIL-STD 1275F and 1332B as well as MIL-STD-810F as required.	8	1st QTR FY20

HOW

Projected Business Model: Mide has the facilities and expertise to begin low rate production of a finalized system. For a more cost-effective solution, it may be more appropriate to license the technology to a company that manufactures complementary hardware such as conventional generators, alternative power systems, or base accessories.

Mide does not have a set business model and considers what is best for the product when the time comes. Mide is registered on GSA and currently sells products to government, Primes, industry, and the public.

Company Objectives:

For this technology, the first goal is identifying additional needs within the DoD for the technology. These needs can be for the existing system (~500 W) or a larger scale system that produces ~10 kW.

A secondary goal is identifying Primes or manufacturing partners for the product. Mide is able to manufacture the system in house, however, it may be more beneficial when offered with complementary systems such as power storage units, mobile base infrastructure, and other renewable energy solutions.

Potential Commercial Applications:

The proposed system is well suited to replace gasoline and diesel-powered generators. In many situations where a generator is required, it is often difficult to acquire liquid fuel. In natural disasters, power outages and demand spikes can limit the availability of fuel. In remote locations, the user must transport fuel with the generator, which is limited. The proposed BISCEP system can address these shortcomings since it is able to burn locally sourced biomass. In natural disasters, there is often an abundance of debris, trash, and branches that must be disposed of. When operating the generator in remote locations, the user doesn't have to transport fuel to the site and can instead locally source the fuel.

Contact: Dr Jeffrey Court, Senior Mechanical Engineer, Director Innovation
jcourt@mide.com (781) 306-0609