

Department of the Navy SBIR/STTR Transition Program

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NAVSEA #17-547

Topic # N123-157

Efficient, Cost-Effective, Low-Emissions Method to Cutting Nuclear Submarine and Aircraft Carrier Hulls

EnergYnTech/N.A.Tech. Inc.

WHO

SYSCOM: NAVSEA

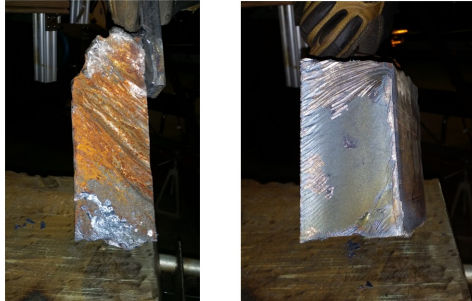
Sponsoring Program: Puget Sound Naval Shipyard

Transition Target: Submarine and Aircraft Carrier Hulls

TPOC:
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Other transition opportunities: Hull cutting for machinery removal, production cutting for shipbuilding, other heavy fabrication (e.g., Army, Marines, Air Force), and commercial use. Induction combined with an arc plasma, or with plasma and oxygen, cuts metal at four to ten times the speed of plasma or oxyfuel alone, to speed up shipbreaking and production cutting of all thicknesses, it also dramatically reduces or completely eliminates all fumes from coated metal cutting a key factor for submarine hull recycling -- but also useful for all U.S. and European shipbreaking.

Notes: All systems can operate outdoors in all shipyards and in other heavy fabrication facilities and field locations. Tested on 1/4" plate and capable of cutting thicknesses up to many inches. Cuts steel faster than any other existing commercial process, it can be used with induction and plasma only on other metals as well, such as aluminum and titanium.



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WHAT

Operational Need and Improvement: For cutting hulls for decommissioned Nuclear Submarines and Aircraft Carriers - the iCut System meets all operational needs:

1) Able to cut high-tensile steel; 2) Portability: machine sized to be brought into a drydock; 3) Electronic control at the cutter, man drivable, does not require programming for each cut; 4) Flexible cutting path capable of cutting non-flat plate with a variable radius of curvature; 5) Cut kerf (width) is required to be 1/2" minimum 3/4-1" preferred. Depth of cut from 1/2" to 4"; 6) Cutter should not require access to both sides of panel; 7) Cutter should be designed for dry or very minimal coolant/lubrication; 8) Cutter system must be suitable for use in year-round, open-weather, salt waterfront environment; 9) Resultant fume opacity below the limit set by Puget Sound Clean Air Act (PSCAA) and also lower than the norm of oxy-propane torch cutting; 10) Cutter to cut large sheets of plate at high speed within OSHA noise limits; 11) Cutter must have reduced or eliminated repetitive motion and fatigue injuries

Specifications Required: Primary: While cutting Submarine and Aircraft Carrier hulls, resultant fume opacity below the limit set by Puget Sound Clean Air Act (PSCAA) and also lower than the norm of oxy-propane torch cutting. Secondary: Must equal or exceed current cutting speeds.

Technology Developed: iCut™ – Induction plus arc plasma plus oxygen, cuts steel at 4X - 8X the speed for shipbreaking and production cutting. Eliminates fumes due to overheated coatings for shipbreaking, including submarine hulls. System is robotic/automated and portable - can operate outdoors. Three configurations, initially: 1) simple gantry on stanchions which rests on the hull; 2) gantry on an 80' boom heavy lift manlift with enclosed cab and touchscreen controls for the operator; 3) magnetic crawler (like a miniature bulldozer with magnetic treads) that can operate in all positions for Aircraft Carrier hull and deck cutting.

Near zero fume due to ultra high speed so heat does not spread and over heat coating on surrounding metal.

WHEN

Contract Number: N00024-16-C-4004 **Ending on:** December 15, 2017

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Cut with low fume emission	Med	laboratory testing proven	4	
Cut speed well above production need	Med	laboratory testing proven	4	

HOW

Projected Business Model: Build and deliver cutting/welding systems to US Navy Shipyards, Commercial Shipbuilders and Shipbreakers.

Company Objectives: Commercialize/license technology, process, and support equipment across the shipbuilder/shipbreaker industry.

Potential Commercial Applications: Scrapyards in the Great Lakes and Gulf Coast of Texas need the capability to cut thick metal with minimum emissions. Industrial operations with excessive carbon footprint in need of clean cutting vs smoke capture technologies. Automotive manufacturing plants.

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