

Company Overview

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Presented by:



Rob Hrabe
Co-Founder & CEO



Aaron Nardi
CTO & CSAT Advisory Board Member



Our History

*In 2007, Rob Hrabe retired from the Air Force after 22 years of service and started HF Webster Engineering Services to commercialize promising metal deposition and repair technologies from the **South Dakota School of Mines and Technology (SDSM&T)** now South Dakota Mines (SDM).*

*In 2010, Rob helped recruit Dr. Christian Widener to take over the director position of the Arbogast Materials Processing and Joining Laboratory at **SDSM&T**, and together they began investigating repair technologies for the Department of Defense... **cold spray**...*

*In 2011, working with the **Army Research Laboratory (ARL)**, they began developing a hand-held high-pressure cold spray system.*

*In 2012, **ARL** applied for a patent through **SDSM&T**. Both Widener and Hrabe participated in the development of the patent under funding from **ARL**, with collaborators Victor Champagne and Dennis Helfritch.*

*In 2013, **VRC Metal Systems** was founded after obtaining an exclusive license for the commercialization of the patent pending cold spray technology. **VRC** licensed the patent after a joint ownership agreement between the **SDSM&T** and **ARL** was completed.*





VRC is a FULL SERVICE Cold Spray

Provider

R&D

Engineering

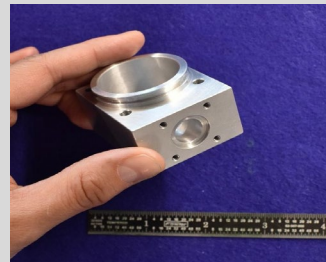
Process Development

Fee for Service Repair / Manufacturing

Equipment Manufacturing

Automation / Robotics

*Operations Support*³



VRC Headquarters

Next to Ellsworth AFB, South Dakota



- 55,000 Square Feet
- 10 Acres
- Designed for Cold Spray Ops
- High Bay Manufacturing
- Engineering/Lab
- 80,000 sq ft expansion option



VRC Satellite Facilities



Webster, MA



Kostas Research Institute
Burlington, MA

- 15,000 Square Feet
- High Bay Manufacturing
- Engineering/
Lab/ R&D

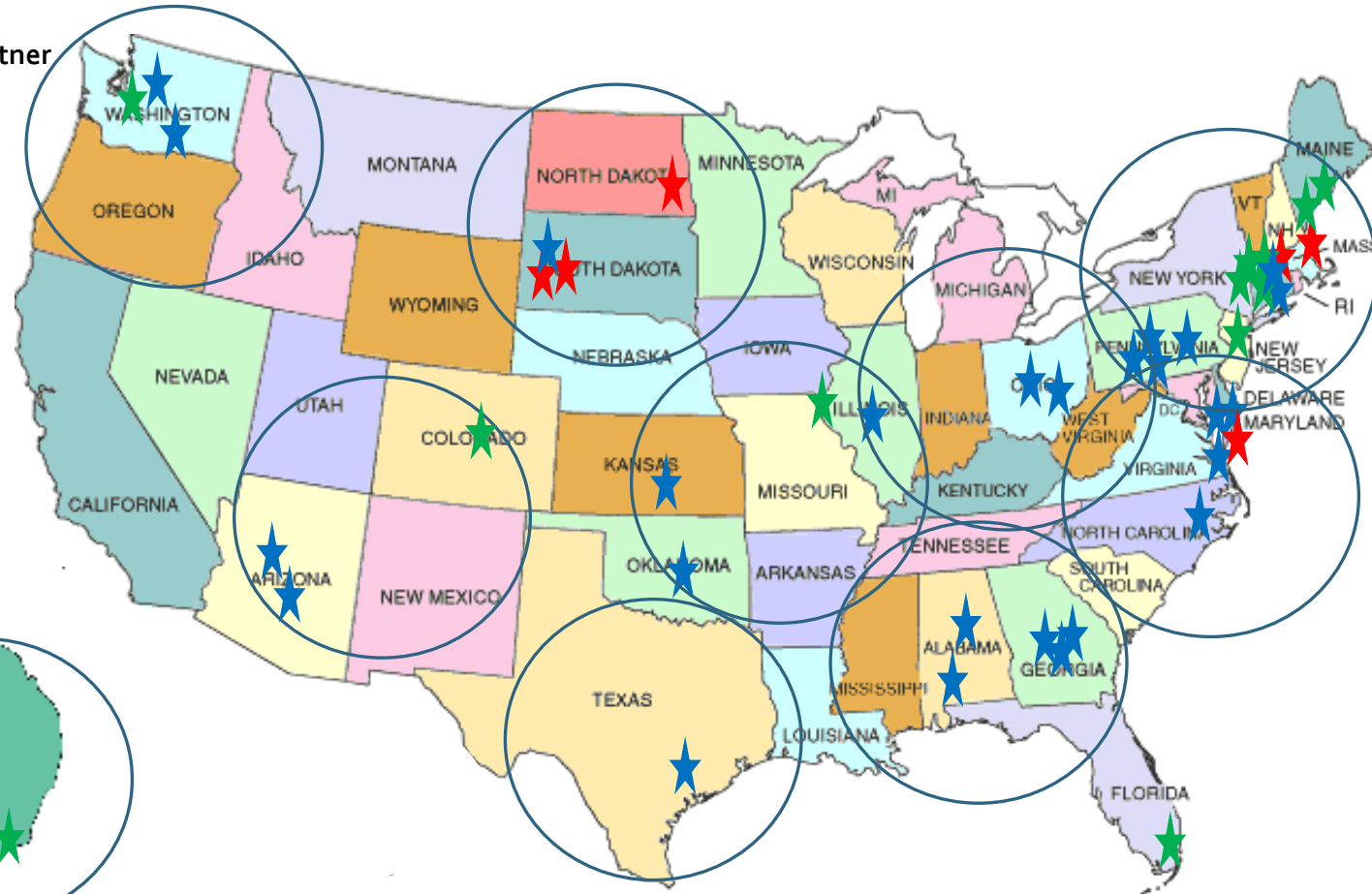
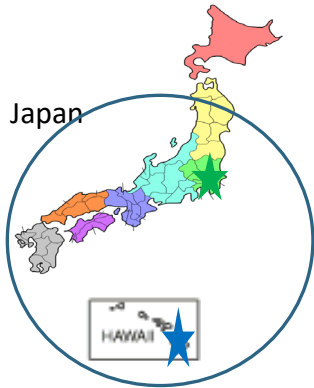


- 4,000 Square Feet
- Engineering/Lab/R&D

FACILITIES WITH VRC CAPABILITY



- ★ VRC
- ★ Govt /Commercial Partner
- ★ Projected



CHESAPEAKE, VA REGIONAL CENTER

- 5 miles from Norfolk Naval Shipyard
- 9,800 sq ft industrial space



GIG HARBOR, WA REGIONAL CENTER





**Equipment, Process Development, R&D, Automation, Systems Integration,
Training, On-Site Support, Fee for Service Repair and Manufacturing**

Key Markets

DOD/Govt



**Commercial
Aerospace**

**Energy
Storage**

Industrial

- Energy
- Ag
- Field Services





DRAGONFLY (Portable system)
Developed under a Navy RIF program



GEN III (First system)
Developed in conjunction with ARL & SDSM&T



BROLGA (Trailerized system)
Developed under a Navy SBIR program



RAPTOR (Ruggedized system)
Developed under a Navy SBIR program

TURN-KEY/END TO END SOLUTIONS

Gen III Portable High Pressure Cold Spray System



- Both the heater and the powder feeder can be removed from the cart for operation 50ft or more away from the main unit

VRC Cold Spray System with Integrated Robotics and Support Equipment



- VRC Cold Spray System integrates the Gen III design with a customizable acoustical booth to meet each customer's needs
- Dust collection system installed for a clean work environment, a turntable for component handling and a robotic system is integrated to make it a fully automated system

VRC Integrated Process Engineering Robot with Helium Recovery System



- Designed to capture undeposited metal powders by means of a wet dust collector which can exhaust nitrogen gas through the roof of the building, or when using helium, return it to the room for recycling by the QuantumPure™ helium recovery system that is connected to the booth from outside the building

TURN-KEY/END TO END SOLUTIONS

**OSD Mantech Phase I Reconfigurable
Cold Spray Repair Center**



- Custom automation system (example)
- 6-Axis gantry system that offers a part scanning capability prior to repair of the part to get the initial dimensions
- Provides light duty fabrication prior to repair, cold sprays the part and then rescans for any necessary remanufacturing

**OSD Mantech Phase II Helium
Recovery Cold Spray Repair Cell**



- Integrated Gen III Cold Spray System with robotic automation and a CNC machine for pre and post machining of candidate parts
- Uses a Helium recovery system to recycle helium to reduce costs

**VRC Paladin™ Cold Spray
Manufacturing Center**



- Incorporated automated tool selection options with a touch probe for part restoration
- Integrated system pallet changer moves a part between the Gen III Cold Spray System for adding material and then returns it to the machine tool for post-process machining, creating a true hybrid additive and subtractive manufacturing system

Installation and Support

- Full Installation of system components and Integration
- On-site training and ongoing support



Cold Spray Training

- Cold Spray Operator Training Program and Cold Spray Operations and Management
 - Includes a custom curriculum with hands-on instruction
 - Transition part repair process to customers



- Manufacturing at the Point of Need
- Augmented In-Field Repair Capability
- Improved Cold Spray Additive Manufacturing Capability



POINTS OF CONTACT

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