Showcase Directory

NCMS Technology Showcase

PUGET SOUND NAVAL SHIPYARD & INTERMEDIATE MAINTENANCE FACILITY

July 24-26, 2019

NATIONAL CENTER FOR MANUFACTURING SCIENCES

NATIONAL CENTER FOR MANUFACTURING SCIENCES

Technology Showcases
NCMS Technology Showcases are a tremendous opportunity for our industry partners and members to put their advanced technologies in the hands of maintainers and other key stakeholders within the DoD community.

NCMS' Commercial Technologies for Maintenance Activities (CTMA)
Our CTMA Program supports DoD's emphasis on the importance of warfighter and equipment readiness. CTMA provides collaboration and innovation between government and industry to fill technology needs within the maintenance and sustainment communities.

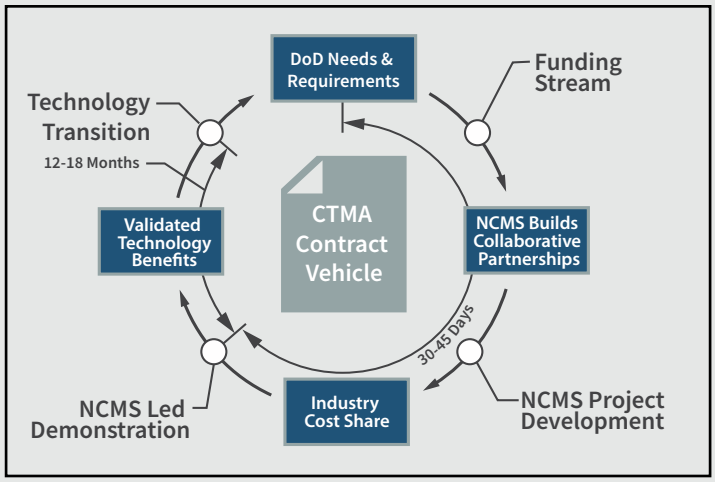
Technology Transition through Partnerships and Dedication
CTMA brings forward innovative technologies that assist with maintenance tasks and provides the required testing and evaluation processes to prove cost-effectiveness. Because these technologies are commercially available, the process is expedited and efficient; 30-45 days from cradle to execution.

CTMA PROVIDES A VENUE FOR INDUSTRY PARTNERS TO DEMONSTRATE TECHNOLOGIES FOR DOD EVALUATION PRIOR TO ACQUISITION.

An F/A-18F Super Hornet fuselage is placed in a special fixture for the replacement of the Center Barrel section of the aircraft at FRCSW. This was the first Super Hornet to undergo this procedure, originally pioneered by FRCSW on F/A-18 legacy Hornet aircraft. Photo by Chuck Arnold, courtesy of FRCSW.

CTMA ENABLING MAINTENANCE FOR THE NEXT 100 YEARS

The CTMA Workflow



By the Numbers:

420 Multi-Partner Projects

$8B Projected Cost Savings by 2023

$226M Service-Directed Funds Applied

$200M Industry Cost Share

92% Technology Transition

107 DoD Partners

Focus Areas

CTMA's focus is to drive down maintenance costs and help remove other obstacles. Current projects fall within the following areas:

- Advanced/Additive Manufacturing
- Autonomic Logistics
- Business Processes and Partnerships
- Coating and Corrosion Prevention
- Condition-Based Maintenance +
- Energy, Environmental, Health and Safety
- Enhanced Inspection
- Reliability Improvement (Hardware)
- Training/Misc.

About CTMA

The CTMA Program offers a unique contracting vehicle for industry, academia, and the DoD sustainment community to work in collaboration to promote the development, demonstration, and transition of new and innovative technologies which enhance warfighter readiness at best value and lowest risk.

For more information about CTMA, visit www.ncms.org/ctma or contact Debbie Lilu at debral@ncms.org.

About NCMS

NCMS is a cross-industry technology development consortium, dedicated to improving the competitiveness and strength of the U.S. industrial base. As a member-based organization, it leverages its network of industry, government, and academia to develop, demonstrate, and transition innovative technologies efficiently, with less risk and lower cost.

For more information about NCMS visit www.ncms.org.

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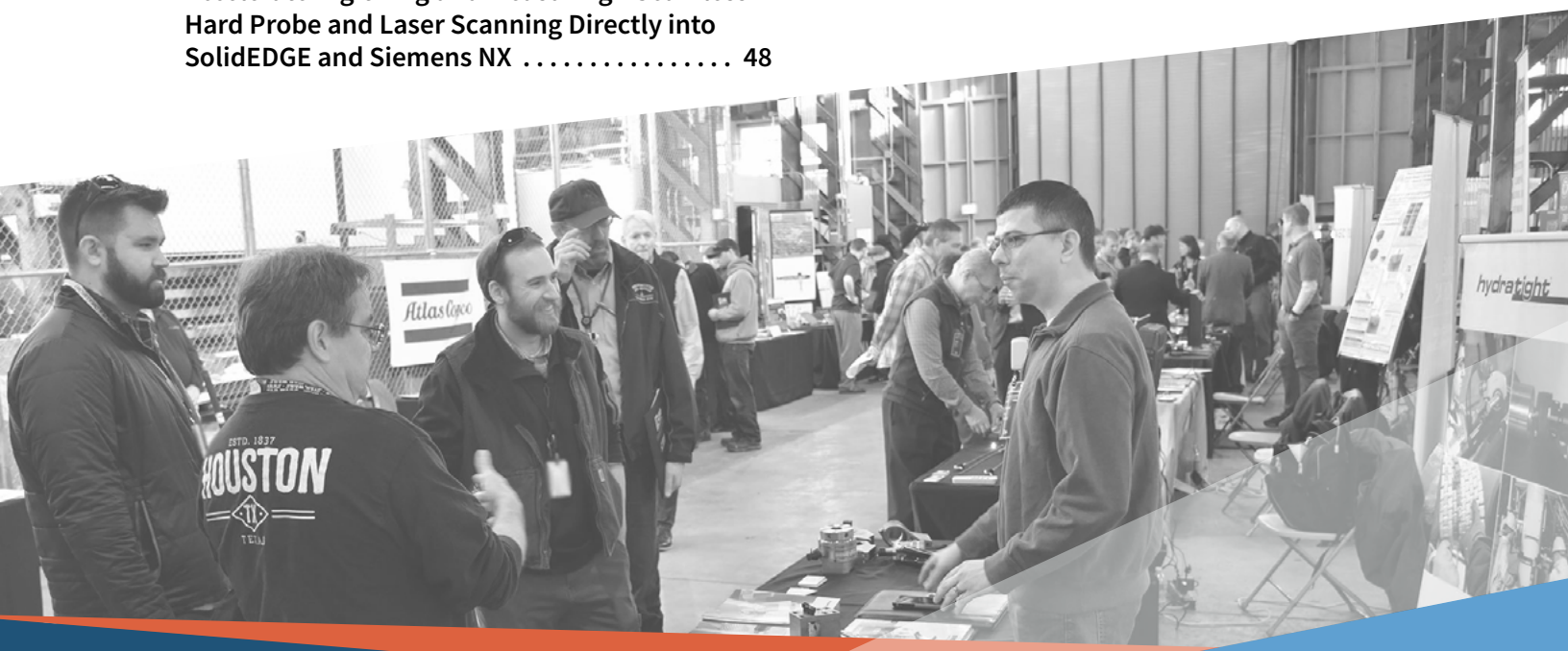
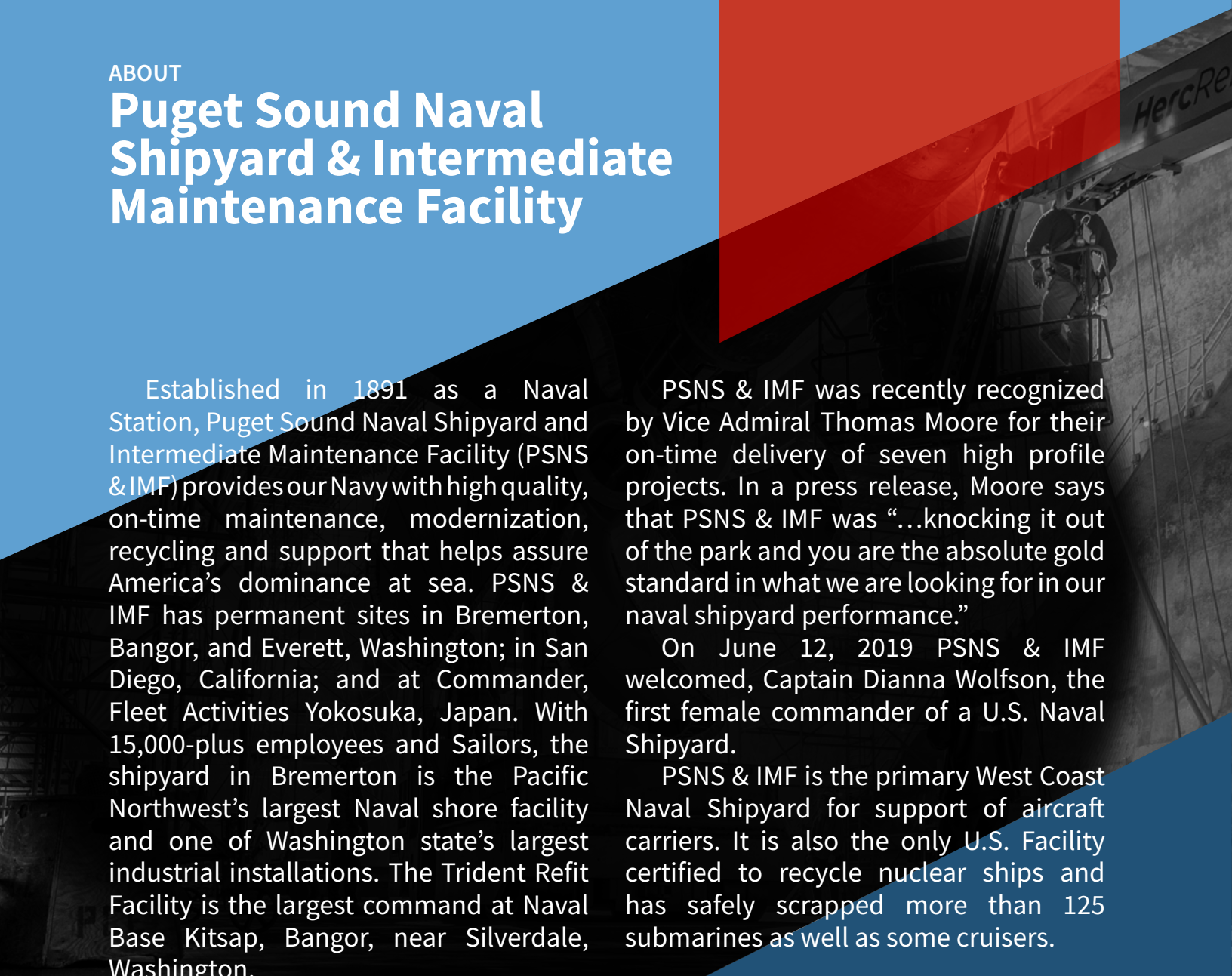


ABOUT

Puget Sound Naval Shipyard & Intermediate Maintenance Facility



Established in 1891 as a Naval Station, Puget Sound Naval Shipyard and Intermediate Maintenance Facility (PSNS & IMF) provides our Navy with high quality, on-time maintenance, modernization, recycling and support that helps assure America's dominance at sea. PSNS & IMF has permanent sites in Bremerton, Bangor, and Everett, Washington; in San Diego, California; and at Commander, Fleet Activities Yokosuka, Japan. With 15,000-plus employees and Sailors, the shipyard in Bremerton is the Pacific Northwest's largest Naval shore facility and one of Washington state's largest industrial installations. The Trident Refit Facility is the largest command at Naval Base Kitsap, Bangor, near Silverdale, Washington.

PSNS & IMF was recently recognized by Vice Admiral Thomas Moore for their on-time delivery of seven high profile projects. In a press release, Moore says that PSNS & IMF was "…knocking it out of the park and you are the absolute gold standard in what we are looking for in our naval shipyard performance."

On June 12, 2019 PSNS & IMF welcomed, Captain Dianna Wolfson, the first female commander of a U.S. Naval Shipyard.

PSNS & IMF is the primary West Coast Naval Shipyard for support of aircraft carriers. It is also the only U.S. Facility certified to recycle nuclear ships and has safely scrapped more than 125 submarines as well as some cruisers.

Puget Sound Technology Focus Areas

ADVANCED/ADDITIVE MANUFACTURING
- 3D printing
- 3D scanning
- Blockchain
- Thermal spray
- Prototyping

AUTONOMIC LOGISTICS
- Artificial intelligence
- Automation technologies
- Smart factory

BUSINESS PROCESSES AND PARTNERSHIPS
- Cybersecurity
- Lifecycle management
- Logistics
- Machine learning
- Product lifecycle management
- Software

COATINGS AND CORROSION PREVENTION
- Laser ablation
- Laser coating
- Shop painting
- Surface removal and preparation

CONDITION-BASED MAINTENANCE +
- Intercept packaging
- Oil, fuel, and fluid analysis instruments
- Structural health monitoring

ENERGY, ENVIRONMENTAL, HEALTH AND SAFETY
- Confined spaces monitoring system
- Ergonomic power tools
- HAZMAT logistics
- Human augmentation
- Industrial vacuum capture
- Radiation dose calculation software
- Radiation shielding and containment
- Recycling media

ENHANCED INSPECTION
- Circuit analysis test equipment
- Industrial augmented reality
- Inspection (tanks & voids)
- Radiological surveys
- Scanning and measuring tools
- System isolation and tagout
- Wiring

RELIABILITY IMPROVEMENT
- Collaborative robots for industrial applications
- Equipment & process modernization
- Maintenance and calibration services
- Tool repair

TRAINING/MISC.
- Augmented reality/virtual reality
- Cold cutting technologies
- Computer-based training
- Logistics information systems training
- Machining products
- Needle-gun scaler
- Plasma power supplies & delivery systems
- Portable machining tools
- Remote vision equipment
- Round cold cutting tools
- Switchable magnet technologies
- Training curriculum for maintenance
- Welding

Open Letter to All

A warm welcome to all the government and industry attendees to the Technology Showcase hosted at the Puget Sound Naval Shipyard and Intermediate Maintenance Facility (PSNS & IMF), Naval Sea Systems Command. This exciting event brings innovative maintenance and sustainment technologies directly to those who strive to keep our naval fleets at maximum readiness levels. The technologies gathered at this Showcase were custom chosen because they are commercially available, adaptable, and extremely pertinent to the important work that is performed at this shipyard. You are here because the technologies you offer directly affect our nation's readiness level.

NCMS' goal is to facilitate a vibrant exchange of knowledge, assist in filling unmet needs, and to promote and accelerate technology transition from U.S. manufacturers to the Armed Forces. Through our Commercial Technologies for Maintenance Activities (CTMA) Program, NCMS can thoughtfully bring together industry and government to realize this purpose. The result of which culminates in supporting the overall NAVSEA effort to design, build, deliver, overhaul, and maintain ships and systems on-time and within cost for the U.S. Navy.

The PSNS & IMF at Bremerton, Washington is the largest naval shore facility in the Pacific Northwest. It takes a leading role in submarine and surface vessel on-time overhaul and maintenance delivery. I am confident that this Technology Showcase introduces our talented maintenance and sustainment leaders and artisans from PSNS & IMF, as well as those from neighboring Service facilities, to technologies that will enhance and support the unified effort of maintaining a modern and lethal naval fleet.

A very special thanks to the PSNS & IMF team who made this event possible through their significant efforts and teamwork, especially to Captain Dianna Wolfson, Mitch Van Epps, Cahn Tran, and Jeffrey Brimhall. Creating an exciting and worthwhile Technology Showcase, such as this, is one great example of what we can achieve working together.

Sincerely,

Lisa Strama
NCMS President and CEO

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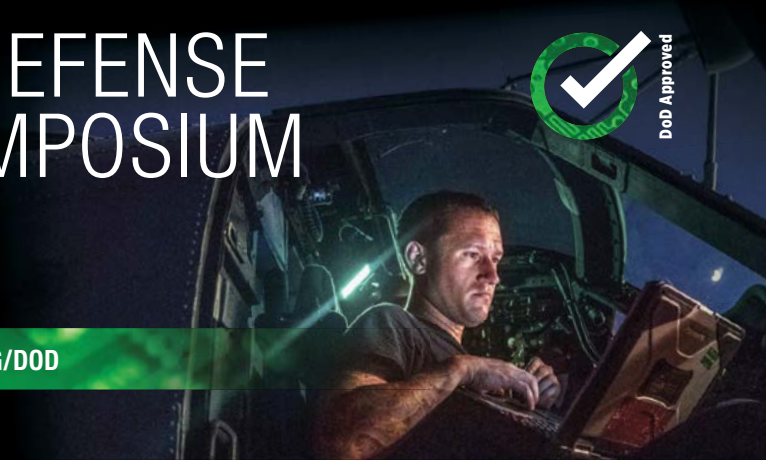
Technology Showcase Agenda

Wednesday July 24	
1000 - 1100	ON BASE- CTMA Tutorial for Base Management Greg Kilchenstein, ODASD-MR Debbie Lilu, NCMS
1300 - 1330	Welcome Industry PSNS & IMF Lisa Strama, NCMS
1330 - 1500	Tour of Puget Sound Navy Museum
1500 - 1700	Exhibitor Setup at Kitsap Conference Center
1700 - 1900	No Host Social Bremerton Bar and Grill 190 Pacific Avenue, Bremerton, WA 98337 360-627-8081 www.bremertonbarandgrill.com
Thursday July 25	
0800 - 1830	Technology Showcase
1230 - 1330	Working Lunch
Friday July 26	
0800 - 1500	Technology Showcase
1100 - 1200	Working Lunch

DEPARTMENT OF DEFENSE MAINTENANCE SYMPOSIUM

READY SYSTEMS @ THE SPEED OF RELEVANCE

DoD Approved



DECEMBER 9–12, 2019 | SPOKANE, WASHINGTON | SAE.ORG/DOD

MAINTENANCE INNOVATION CHALLENGE

CALL FOR INNOVATIONS

The Deputy Assistant Secretary of Defense for Materiel Readiness, is challenging you to submit your maintenance related innovations.

Revolutionary or Evolutionary; showcase your discoveries to the maintenance community at the 2019 Department of Defense Maintenance Symposium and shape the future of the industry.

This is your opportunity to demonstrate how to keep maintenance ahead of the curve in: processes | testing validation | finance products methodology services | work flows.

Abstracts must meet the following criteria in order to be considered for the maintenance innovation challenge:

1. Must be an original contribution to the state of the art
2. Technically accurate—focused on current or potential maintenance operations or management—and strictly avoid commercialism
3. Must be feasible or practical
4. Abstract must be submitted using the template provided (abstract 300–500 words only)
5. Include a powerpoint quad chart (template details and requirements below) Entries from previous years will not be accepted
6. All submissions must be cleared for public release

All abstracts that meet the minimum criteria listed above will be posted on a public website and included in a Maintenance Innovation Challenge summary booklet, distributed at the Symposium. From the eligible abstracts, an evaluation board comprised of maintenance subject matter experts will select six finalists to present at the 2019 DoD Maintenance Symposium. Each presenter will be allocated exactly 15 minutes, including audience Q&A. The winner will be selected by the Maintenance Executive Steering Committee and Joint Group on Depot Maintenance Senior Leaders, and recognized at a Symposium Plenary Session.

Individuals representing the six Maintenance Innovation Challenge finalists are responsible for registering for the symposium and any associated fees, if not attending in another capacity.

If you have any questions or need further information regarding the 2019 Maintenance Innovation Challenge please contact Kristie Saber of SAE International at kristie.saber@sae.org.

Administrative support provided by SAE International under contract with the U.S. Department of Defense

P19384366

ALPHASTAR CORPORATION

GENOA SHM - Digital Twin Zero Maintenance

Dr. Rashid Miraj | 562-961-7827 | rmiraj@alphastarcorp.com | www.alphastarcorp.com

GENOA SHM Digital Twin zero maintenance technology continuously assesses the health of a structure to enable a model-based systems engineering approach for inspection and maintenance relative to survivability, combat readiness and aging. The approach includes customizable Digital Twin sensing and computing architecture for real-time analysis, feedback, readiness, estimation of remaining useful life and cost savings.

Current technology readiness level (TRL) is 5 and the strategy going forward is to establish proof of technology/system adequacy in a laboratory/field test environment using subcomponents/components. Technology captures precursors using multi-physics non-destructive evaluation by integrated modeling framework to automatically update computer models with sensor data and compute remaining useful life.

The strategy includes (1) laboratory qualification and validation with real part; (2) protected evaluation with maintenance/depot support; (3) real world field test bed for real-time feedback and active environment conditioning; (4) pursue, in-parallel, next-level miniaturization and ruggedization of hardware as well next level security of software and data transmissions; (5) deliver product as a retro-fit package for existing platforms; (6) work with end user/business partner (Boeing, General Atomics, etc.) to integrate technology into new systems; (7) work with leading commercial software vendors to bundle technology and make available to industrial sectors such as energy, infrastructure, automotive, etc.

Headquartered in Long Beach, CA, AlphaSTAR Corporation is a leading engineering services and software developer that provides innovative physics-based simulation technologies for structural health monitoring, metal, polymer and ceramic additive manufacturing, material modeling and analysis of advanced composite structures in the aerospace, automotive, defense, and energy industries worldwide.

PROBLEM

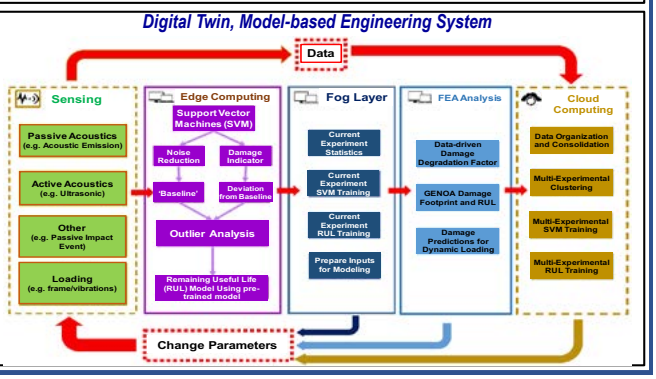
Lack of NDE Sensor data integration into a modeling framework that allows precursor measurement to be used to make a remaining useful life prediction and continuously assess health state of structure to enable a model-based systems engineering approach to inspection and maintenance to address survivability, combat readiness and fleet aging.

BENEFITS

- Real-time technology for Structural Health Monitoring (SHM), zero-maintenance, fleet readiness and sustainment
- Data fusion of multiple data sources
- Edge computing for denoising and damage identification at hardware level
- Fog-cloud computing for machine learning/data processing
- Physics-based simulations driven by sensor data
- Probabilistic models coupled with physics-based simulations and sensor data

TECHNOLOGY SOLUTION

Diagnostic Approach - Use of Acoustic Emission (AE) in Multi-scale and Multi-physics Damage Monitoring: (1) Multi-scale mechanical testing coupled with NDE, (2) Cross-validation of AE with full field surface strain measurements and microstructure, (3) Identification of multi-physics trends related to damage precursors and (4) Validation of NDE measurements using data-driven physics-based modeling.
Prognostic Approach - Integrated-Multi-scale-Multi-physics Modeling for Remaining Useful Life (RUL) Predictions: (1) Multi-scale/multi-physics progressive failure analysis and (2) Damage Tracking by Progressive failure dynamic analysis (PFDA)



AMERICAN CERAMIC TECHNOLOGY INC.

Non-Hazardous Radiation Shielding Manufacturer

Richard Culbertson | 619-992-3104 | cubculbertson@cs.com | www.silflexshielding.com

American Ceramic Technology (ACT) Inc. Is the manufacture of Silflex® shielding, the industry's most innovative and award-winning radiation shielding material. ACT Inc. has always been a materials-based company, and worked in many different industries. In 2005 Silflex was developed, and after 14 months of testing Silflex was certified by Entergy for us in the nuclear industry. Since receiving this certification in 2007 Silflex has revolutionized the way the industry thinks about shielding. Silflex is a light weight, non-toxic customizable shielding system that has enabled the shielding of the impossible, reducing dose and improving the safety issues with handling and installing shielding. Continuing its industry leading innovation and investment in technology, Silflex introduced the exclusive neutron materials and products in 2008 rapidly becoming the leader in shielding the dry fuel storage process. Additionally, Silflex introduced its exclusive premium magnetic technology (patented) significantly reducing installation time and therefore reducing dose. The premium magnetic technology was certified by EPRI and Duke Energy after extensive seismic testing for installation without secondary attachment techniques. Additionally, Silflex is rated as a low or exempt material for purposes of the new NFPA 805 fire procedures. No other non-toxic, light weight shielding has the pedigree of Silflex and with over 750 tons used worldwide no other competitive copy has the experience or proven results of Silflex.

PROBLEM

- ANO Nuclear Plant was looking for a new and innovative radiation shielding
- Needed to be just as effective as lead shielding
- Needed a quicker application than lead shielding
- Need to be a safer environment for workers to install shielding

BENEFITS

- Saved ANO Nuclear of $319,000.00 in total saving for one project
- Tungsten weighs 25-50% less than lead and twice as effective
- Less toxicity hazard and mixed waste processing costs
- Tungsten is more effective than lead at reducing Gamma Rays
- Workers avoid exposure to Lead Shielding when wearing the vest by 39% through the use of Tungsten Vests.
- The total exposure avoided was 642 person-mRem.

TECHNOLOGY SOLUTION

The project consisted of two parts. First part was shielding the source. Installation of tungsten shielding blankets with imbedded magnetics that form fit with ease. They were 25-50% lighter than lead which was easier to install and also twice as effective than the previously used lead shielding. Second part was shielding the person. "If you can't shield the source, shield the person." ANO founded the fabricated tungsten vest to eliminate concerns that are associated with lead shielding exposure to humans and the environment.

ANALATOM INCORPORATED

In Situ Corrosion Rate and Environmental Condition Monitoring Supporting Structural Health Assessment

Dr. Bernard Laskowski | 408-980-9516 | bernard.laskowski@analatom.com | www.analatom.com

Located in Silicon Valley, Analatom Incorporated designs, develops, and manufactures hardware and software solutions to meet Structural Health Monitoring/Condition-Based Monitoring (SHM/CBM) demands. Analatom technology is fielded in several key commercial and military arenas, such as Aerospace (fixed wing and rotary wing), Petrochemical (pipelines), and Civil Engineering (bridges and buildings) customers in U.S. and international markets. An Air Force example illustrates the cost, maintenance efficiency, safety, and mission readiness benefits of monitoring corrosion with onboard sensing. With the help of the sensors, the maintenance team at Patrick AFB, Florida, has the ability to calculate where and when corrosion is likely to start, enabling the base's corrosion prevention to be taken to a higher level. Sensors are proving to be a tool that allows measuring not just effectiveness, but also maintenance shortcomings. For maritime applications, Analatom technology improves vessel system sustainment by monitoring concealed corrosion in inaccessible areas where visual inspections are labor intensive. The monitoring system, based on Micro Linear Polarization Resistance (µLPR) corrosion rate sensors, provides the capability of operating in remote areas without any interaction or support with advanced detection and prognostic capabilities. Data is downloaded and evaluated during vessel inspections to assist maintenance and design personnel identify the state of the vessel to improve depot-level maintenance. The Analatom system not only does measure corrosivity of the environment, allowing calculation of estimates of structural corrosion; but the thin sensors when installed beneath protective coatings give direct measurements of actual corrosion rates occurring, as well as indicating coating degradation.

PROBLEM

- Annual corrosion related costs for DoD facilities, infrastructure, and equipment are $20 billion.
- Aerospace examples: Approximately 25% ($5 billion) occurs at depot-level maintenance for Air Force aircraft and missiles. Navy and Marine Corps aviation annual corrosion cost is $2.6 billion; 26.1% of total maintenance costs (FY 2008-2009).
- For maritime applications, existing/emerging corrosion sensing, logging, and monitoring technologies are not applied as a comprehensive, strategic, integrated solution for corrosion management, maintenance, and mitigation.

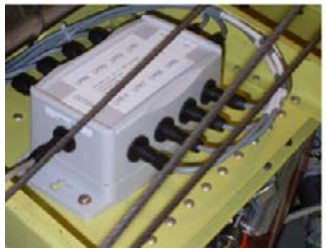
BENEFITS

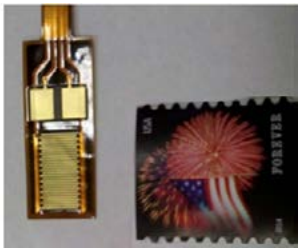
- **Heightened military capability** by ensuring maintenance is condition-based, resulting in shortened procedures & reduced depot times.
- **Accelerated military development** when domain experts/engineers can identify areas frequently maintained to improve structural & material designs.
- **Reduced costs and increased ROI** by identifying failure modalities in critical components. CBM+ compatible condition monitoring reduces life cycle costs associated with unnecessary maintenance, particularly for inaccessible critical components.

TECHNOLOGY SOLUTION

- Analatom monitoring/assessment system incorporates in situ corrosion rate and environmental conditions micro-sensors providing continuous data for advanced modeling assessment and prediction of protective coating & CPC condition.
- Assessing/predicting coating degradation and corrosion onset through advanced sensor data management, analytics software, and hybrid coating condition/corrosion modeling establishes the framework for sustainment groups' real-time corrosion assessment of in-service platforms to substantially enhance CBM+ programs.

Corrosion Monitoring System Typical Installation and Corrosion Rate Sensor with Postage Stamp





APTIMA, INC.

Remote Monitoring of Workers in Confined Spaces

John Feeney | 937-490-8000 | jfeeney@aptima.com | www.aptima.com

Aptima, Inc. offers a Confined Space Monitoring System (CSMS) that will enable real-time sensing and assessment of maintenance workers and their surrounding environments as they operate in confined spaces and other potentially hazardous areas. The CSMS will support prevention, detection, and intervention of health and safety hazards while greatly reducing the time, costs, and manpower required by current confined space monitoring practices. Benefits include the ability to remotely monitor several critical areas: the environmental conditions of each confined space, the status of the workers in these confined spaces, the location of workers and the spaces they are working in as well as the ability to establish and maintain communication between a remote monitoring center and the workers in the confined spaces. The ability to measure environmental conditions in the confined space requires sensors that can monitor attributes of the space such as temperature and humidity; a wide range of potentially hazardous gases in the atmosphere including: O_2, CO, CO_2, H_2S; as well as gas-free Lower Explosive Limits (%LELs) and Volatile Organic Compounds (VOCs). Likewise, multiple sensors will accurately assess the health status of confined space workers. Sensors can include physiological measures such as heart rate, respiration, and sweat concentration as well as other measures such as motion, posture and positions. These assessments not only identify workers that are trending towards threatening conditions but also deliver timely interventions to prevent and/or respond to health and safety problems. Through the identification of these threat conditions the CSMS can provide improved response times for when interventions are needed and appropriate.

PROBLEM

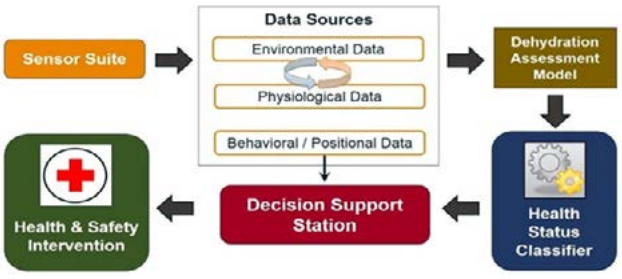
Confined space areas with their limited or restricted means for entry and exit may contain adverse atmospheric and other conditions that impose risks to workers in those spaces. OSHA regulations and guidance help ensure safe conditions exist prior to entry and through the duration of the work performed inside confined spaces. However, maintaining these safe working conditions is resource intensive which impacts cost and productivity of work performed.

BENEFITS

- Enhanced and continuous health monitoring with physiological sensors
- Enhanced and continuous of monitoring confined space environments including atmospheric sensors
- Increased safety for workers in confined spaces
- Improved workflow and worker efficiencies

TECHNOLOGY SOLUTION

The CSMS will enable real-time sensing and assessment of workers and their surrounding environments as they operate in confined spaces and other potentially hazardous areas. The CSMS will support prevention, detection, and intervention of health and safety hazards while greatly reducing the time, costs, and manpower required by current confined space monitoring practices.



ATLAS COPCO POWER TOOLS

Ergonomic Power Tools for Material Removal and Bolting Solutions

Joe Rarick | 346-267-6612 | joe.rarick@atlascopco.com | www.atlascopco.com

At our global R&D centers, we develop a wide range of products, from compressors, air treatment and vacuum solutions to power tools and industrial assembly systems. The technologies touch upon various areas of expertise, such as mechanics, electronics, software, materials technology and hydraulics. With advanced system, quality assurance and process software, and high-tech tools and assembly systems, our range offers solutions for durability, high-quality and sustainable productivity. We lead the world for advanced process control and quality assurance software supporting the operation of high-tech operator-friendly tools. We currently have more than 4,000 tools in our range and our dynamic product development program generates a large number of new solutions every year. Our high performance, hand-operated and fixtured assembly tools, advanced system, quality assurance and process software and extensive know-how make a major contribution to lean production. Productivity starts with people and we continue to lead the field for ergonomically-designed tools that help minimize operator fatigue and increase individual productivity. At Atlas Copco we do everything we can to ensure reliable, sustainable results with responsible use of resources: human, natural and capital. Our focus on sustainability is driven by our core values, in which we take pride, and this is clearly reflected in our innovative portfolio. We continuously develop new system and process software solutions that assure quality and raise productivity, along with energy efficient tooling offering lowest cost of ownership. Safeguarding health and boosting productivity in your operation through better ergonomics have long been part of our business philosophy.

PROBLEM	BENEFITS
▪ Productivity issues ▪ Quality / Re-work costs ▪ Ergonomic tooling problems ▪ Reliability concerns ▪ High cycle times	▪ Less noise and vibration ▪ Less trigger time exposure to the operator ▪ Improved productivity and quality ▪ Data collection ▪ Lubrication free motors
TECHNOLOGY SOLUTION	
▪ Hydraulic nuts vs. supper nuts ▪ Data collection for torqueing bolts vs. second operation inspection ▪ Speed governor for continues power ▪ Scatter damping for less vibration ▪ High power-to-weight ratio ▪ Auto balancer to minimize vibration	

ATMOSPHERIC PLASMA SOLUTIONS

Atmospheric Plasma Coating Removal

Glenn Astolfi | 919-341-8325 | gastolfi@apsplasma.com | apsplasma.com

Atmospheric Plasma Coating Removal (APCR) is an innovative technology that uses no media, requires no containment and does no damage to the substrate. Using only air and electricity you can now remove coatings significantly faster and cheaper AND it's safer for the worker and the environment. Using a "cool" plasma beam paints, sealants and epoxies are vaporized. The word "Atmospheric" in atmospheric plasma refers to the air pressure at which the plasma forms. In this case it refers to atmospheric pressure, or the air pressure that we, as humans, live and breathe every day. Therefore "atmospheric plasma" is simply a plasma that operates in open air without the need of any special chambers or containment. The APCR process uses a low pressure (70- 100 psi) compressed air source and electricity (208-440 volt) to produce a special form of atmospheric pressure air plasma. This atmospheric air plasma is highly chemically activated and oxidizes any organic components in paints and other coating materials. The APCR process converts a significant portion of the removed organic coating into water vapor and carbon dioxide, leaving behind a lower volume of solids of mostly inorganic pigments and fillers that can be safely collected with a suitable HEPA vacuum virtually eliminating the need for containment. APCR is the next generation of coating removal and surface preparation technology that represents a step forward in developing more environmentally responsible methods for coating removal. Tested in U.S. government trials, APCR was found to be a safe and effective alternative to dry media blasting and wet abrasive blasting.

PROBLEM

There is a need for cleaner, environmentally safe and cost effective coating removal solutions. Today removing coatings is a costly, multi-step, time and labor consuming process. Many coating removal methods can cause substrate damage. Where grit and water blasting can't be used, manual labor is often the only solution.

BENEFITS

- Safer for the operator and environmentally friendly
- Significantly reduces job costs
- Reveals substrate without change to profile
- Rugged, lightweight and portable for use in yards and depots
- Media and chemical free, minimal clean up
- Fast training, simple to operate and quick to mobilize

TECHNOLOGY SOLUTION

Atmospheric Plasma Coating Removal is a breakthrough depainting technology that uses no media, requires no containment and does no damage to the substrate. Using only air and electricity the PlasmaBlast® system converts organic components of most paints, sealants and protective coatings into carbon dioxide and water vapor. Inorganic constituents of the coatings, such as pigments are recovered as a fine dust.

BECHTEL NATIONAL

Bechtel Innovation

Tina Banks | 571-352-4529 | tbanks1@bechtel.com | www.bechtel.com

Bechtel has led advances in safety, quality, design, construction, execution, and project management for more than 120 years. The explosive growth of technologies has created a unique opportunity for significant advances across industry sectors. To tackle today's challenges with tomorrow's solutions, Bechtel is implementing technologies like 5D modeling, high-res drone photography with laser accuracy, and human augmentation applications to advance production and decrease project schedule. Bechtel uses Digital Twin 4-5D modeling software to optimize site logistics and project schedule. This advanced modeling assists our customers in improving lifecycle management and enhancing project coordination and logistics, resulting in increased site efficiencies and decreased project schedule. At Bechtel, innovation does not stop at the engineering and procurement stages. In the field, we are delivering effective solutions that increase productivity and advance the safety and quality of any project. With mobile field carts, project managers can optimize their time in the field coordinating contractor sequencing, reviewing site plans, and collaborating with our customer. The observation deck constructed over the carts provides a safe, mobile workstation equipped with all the capabilities of the office. With a dedicated innovation team, Bechtel is investing more than ever in concept-to-completion innovation. Bechtel has the knowledge and resources to deliver real innovative solutions that meet the needs of today's progressive customers.

PROBLEM

To deliver a faster, leaner, safer, and cost effective maintenance and construction infrastructure solution to the United States Navy through the advancement of engineering, procurement, and construction technology and innovation

BENEFITS

- An innovative partner who delivers global mega-project lifecycle management capabilities
- Optimization of project and maintenance schedules through enhanced project collaboration and logistics
- Advanced data collection from project conception to completion through integrated technology

TECHNOLOGY SOLUTION

- Human augmentation
- Automation technology integration
- Optimization of safety, quality, and productivity resulting in decreased project schedule
- Integrated 4D+ digital twin modeling
- Mobile interactive field solutions
- Concept-to-completion software for machine learning and data mining

Digital twin model benefiting managers through project concept to completion

CAPTURE 3D

ATOS Optical and Laser Metrology Systems

Staton Apple | 206-641-4423 | staton.apple@capture3d.com | www.capture3d.com

3D metrology plays a tremendous role in product design, manufacturing, production, and maintenance. It helps us decipher what the naked eye cannot and allows us to monitor trends to predict future issues. Metrology is the process that validates the parts, and the parts that create the parts, to ensure all are within tolerance and meet design intent. Capture 3D, headquartered in Santa Ana, California was founded in 1997 as the North American partner for GOM Optical Measuring Systems in Germany. Capture 3D has offices throughout the United States including an Automated Metrology Solutions Center in Farmington Hills, Michigan. As an industry leader in 3D optical non-contact measurement solutions we will help you gain more knowledge about your engineering processes, so you can quantify what is actually going on to solve engineering issues, prevent future problems, optimize workflows, eliminate wasteful costs/rework, and improve product quality while accelerating return on investment.

PROBLEM

- Lagging quality inspection processes bottlenecking manufacturing process
- Slow development time and low quality part production
- Wasted time due to rework
- High rate of scrap parts
- Existing tooling has no associated CADD

BENEFITS

Accuracy - High quality metrology systems tested for accuracy, repeatability, and reproducibility.
Speed - Capture millions of accurate X-Y-Z points as fast as 0.2 seconds.
Versatility - Solutions can be quickly configured to measure small to extra-large parts and/or assemblies (i.e. grooves of a human finger to a full size aircraft). Compact and advanced design to suit your engineering needs. There are various configurations available.
Complete Solution - Innovative turnkey solution with intelligent software and ruggedized hardware engineered to operate in industrial conditions and prolonged operational hours.

TECHNOLOGY SOLUTION

The ATOS systems are optical, non-contact, blue light 3D metrology scanning systems used for various applications such as Reverse Engineering, Additive Manufacturing, CNC Machining, and Quality Control.

Aerospace certified, and shop-floor proven, the ATOS systems are designed to be both robust and compact for a high accuracy, mobile, and versatile solution. Interchangeable and scalable measuring volumes ensure entire feature capture with rapid scan times. User friendly software interface for data visualization, GD&T inspection, and reporting to provide a complete, all-in-one, HW and SW solution.

CIMTEC AUTOMATION

Collaborative Robot Application

John Lajoie | 804-338-0532 | jlajoie@cimtec.com | www.cimtecautomation.com

Since first establishing our business in 1987, CIMTEC has become one of the industry's largest, most progressive, responsive and trusted providers of automation solutions. Our work ranges from fully vetting and supplying automation products to designing and implementing complete, state-of-the-art automation systems. Headquartered in Charlotte, North Carolina, CIMTEC has offices in strategic locations throughout North Carolina, South Carolina and Virginia.

CIMTEC specializes in Collaborative Robotics. But what is a collaborative robot? A collaborative robot places control of the automation task into the hands of operators. They are: Easy to set up, easy to program, easy to re-deploy, and safe to work side-by-side with humans. The Harvard Business Review (HBR) calls them "smarter, smaller, safer robots." In an HBR interview, the head of innovation management technical planning at BMW said of the 20 adaptive robots at its plant in Spartanburg, South Carolina that: 1) Robots have become safer and this makes people happier with them. 2) Robots speed-up thankless tasks. 3) Robots greatly reduce idle time. 4) Workers want to work with the new robots. "…huge gains will come when the new machines are paired with high performers…"

PROBLEM

1.) Many repetitive tasks are dull, dirty, and dangerous. For those whose job is to complete repetitive tasks, there is constant threat of injury, boredom and human error. Hiring and retaining skilled employees for repetitive tasks, no matter how critical, is difficult.

2.) Precise object distance measurement and human detection around dangerous equipment presents a SAFETY risk.

BENEFITS

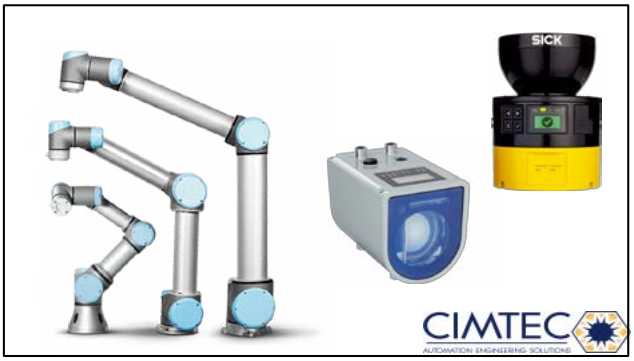
1.) Safety, Repeatability, Precision, easily deployed

2.) Precision, Ease of use, Rugged, Safety

TECHNOLOGY SOLUTION

1.) Collaborative Robots… a new approach with force limiting technology to minimize danger and simplify the programming and deployment.

2.) Industrial Lasers… Application specific lasers used for safety monitoring to prevent human injury as well as precise object location.



CM TECHNOLOGIES CORPORATION

Wiring

Greg Allan | 412-262-0725 | greg.allan@ecadusa.com | www.ecadusa.com

CM Technologies Corporation provides cable/wiring test technology and services for characterizing installed electrical systems and equipment in nuclear power plants, submarines, military and commercial aircraft, and other facilities. We offer COTS and custom-engineered solutions for simple or complex projects with applications ranging from routine troubleshooting to implementing aging management programs for critical wiring/cable infrastructures. The core technology offered by CM Technologies emerged from the aftermath of the 1979 accident at the Three Mile Island Nuclear Power Plant. The DoE scientists needed a reliable test method for conducting condition assessments of the installed instrumentation and control circuits from a remote location. A new test technique was commercialized, known as ECAD®, which could "look through" connectors, electrical penetrations and into the areas near the damaged reactor without subjecting the operator to any radiation exposure. Since 1985, our test systems and instruments have been successfully integrated into cable condition monitoring programs and predictive maintenance programs for a variety of applications. Our customers include NASA, the U.S. military, the commercial nuclear utility industry, and various DoD/DoE sites where the performance of wiring, cables and circuits is considered critical.CM Technologies' technology includes: Portable and rugged ECAD® Test Systems for collecting resistance, complex impedance, insulation resistance, and Time Domain Reflectometry (TDR) data from installed circuits, wiring harness On-site Cable/Circuit Testing. CM Technologies can provide on-site testing services for troubleshooting, condition monitoring, or aging management. These services have been performed on-board submarines, flight lines, NASA launch pads, and in operating nuclear power plants. Our handheld TDR instrumentation is a high-resolution TDR packaged in a commercial rugged or MIL-qualified computer. Custom software is also available to aid in the interpretation of the signatures or integrating platform installation information to create a "TDR map".

PROBLEM

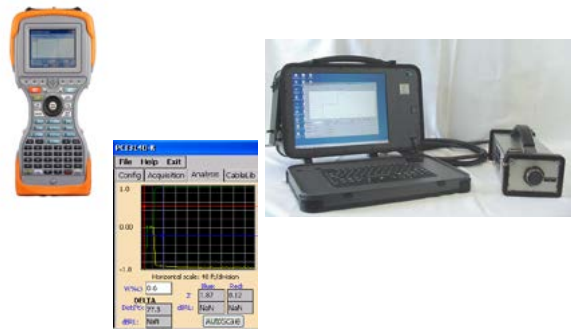
Installed electrical circuits have many components, including wiring/cables, connectors, and circuit load, and usually offer access at a single-end. If a maintainer is going to effectively characterize or troubleshoot an installed circuit, he/she needs a single-ended test technique cable of identifying the contribution of each circuit element without having to disconnect the LRU circuit load.

BENEFITS

- Non-destructive, single-ended test technique; LRU loads can be left connected
- Software designed by NAVSEA submarine technicians for maintaining towed arrays and transducers
- TDR instrumentation is a replacement for the obsolete Tektronix 1502 TDR
- Results are stored in a database to enable trending and comparisons between circuits.
- MIL-qualified configurations (MIL-STD-810 and MIL-STD-461) are available

TECHNOLOGY SOLUTION

Our ECAD® testers provide a complete characterization of an installed circuit. Measurements include: DC resistance, complex impedance (capacitance, inductance, dissipation factor, insulation resistance, and TDR). Our testers can also be configuration with a variety of wide-bandwidth switching modules to automate the testing of multiple channels/circuits. CM Technologies also offers a variety of handheld TDR instrumentation and custom instrument design for systems using both metallic and optical circuits.



COMPUTER AIDED TECHNOLOGY (CATI)

Desktop Metal Printing Technology and Creaform Handheld Scanning/Measuring Technology

Matt Krell | 503-828-1589 | matt.krell@cati.com | www.cati.com

CATI is a team of engineering and manufacturing experts helping our clients expand their capabilities and improve productivity through innovative technology. By understanding your challenges, we find solutions for your business' success. With the help of our powerful portfolio of software, 3D printing, 3D scanning and metrology, PDM and PLM, design automation, and implementation solutions, we help you reinvent your business, so you can stay ahead of the competition. No matter who you are, we are here to support you and your business.

We are the nation's leading solutions provider for SOLIDWORKS, Dassault Systemes, Stratasys, Creaform, Desktop Metal, and Roland. Our corporate office is in Buffalo Grove, Illinois, with 21 offices across the country that offer local training and support to our customers 12 hours a day. Our expert certified engineers are the best you can find anywhere, delivering unmatched technical support, training, and implementation services.

PROBLEM

- Lead time to end use Metal Part
- Amount of waste material with standard manufacturing processes
- Design limitations based on standard manufacturing processes

BENEFITS

- **Reduction in lead times to Part**
  Additive manufacturing is a faster transition from the design stage to the production of the final part. Most time saved is due to instrumentation matter.
- **Cost advantages through the reduction of material waste**
  In metal 3D printing, raw material is added and formed layer by layer, rather than subtracted or cut out of a bulk solid figure.
- **New approach to design**
  3D printing technologies allow for the production of unique and complex structures. Complexity of the part does not generate additional costs.

TECHNOLOGY SOLUTION

Metal printing technologies from Desktop Metal allow to manufacture parts from metal rods and powder, which are as good, if not better, than those made with conventional techniques. In most of the cases 3D printing allows to save in time and costs, when compared to traditional methods.

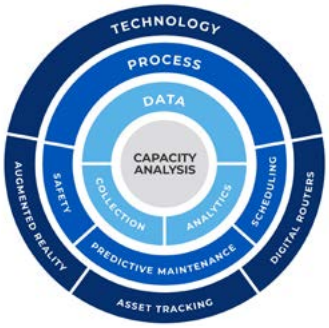
- 316L
- 4140
- 17-4PH
- Inconel 625
- Copper

CREAN INNOVATIONS

Smart Factory, Asset Tracking and Augmented Reality as well as Capacity Improvements

Cris Frusina | 737-932-0310 | cfrusina@creanassociates.com | www.creaninnovations.com

Crean Innovations delivers innovative solutions that improve the capacity and economic performance of engineered-to-order and configured-to-order complex manufacturing environments. Our integrated process and technology solutions accelerate output delivery, increase operational visibility, and lower overall factory stress. Crean Innovations is the smart factory technology solutions business of Crean Associates, a leading technology and engineering advisory firm to aerospace and government entities for nearly two decades. Crean Innovations was engaged by a contractor to the U.S. Navy to help their supplier eliminate late deliveries. The result: a 50% increase in capacity, a 39% reduction of cycle-time, and increased product quality. Recently, Crean Innovations designed a new manufacturing/test facility for an Aerospace & Defense client with optimized product flow resulting in increased capacity by 40%, cycle time reductions of 65% and increased delivery rate by 60%. With over 8,000 years of manufacturing optimization expertise, our subject matter experts are able to dissect complex environments and deliver IT and process improvement solutions faster than our competitors. Learn how Crean Innovations can help you at www.CreanInnovations.com.

PROBLEM	BENEFITS
How to ensure a safe work environment How to increase manufacturing productivity & output How to increase manufacturing operational visibility	Safer work environment Improved operational visibility Increased productivity and worker skillsets Greater manufacturing capacity and output
TECHNOLOGY SOLUTION Smart Factory OS for data collection/analysis Asset tracking (RFID, GPS) & Smart Rack for increased operational visibility and worker safety Augmented reality for worker training and remote expert assistance	

CS UNITEC, INC.

Ergonomic Needle Scalers

Scott Saunders | 800-700-5919 | ssaunders@csunitec.com | www.csunitec.com

CS Unitec's line of Genuine Trelawny™ surface preparation equipment includes descaling tools for the marine and shipyard industries. These tools offer safe working levels of vibrations, making them the preferred option for companies seeking high performance. Trelawny Vibro-Lo™ VL Series is designed to quickly and efficiently remove coatings and corrosion and clean other accumulated materials. The VL Series offers 8x less vibration than traditional needle scalers. The internal air pressure is used to absorb the recoil and impact from the anvil and needles. The lower vibration reduces operator fatigue, increases efficiency and helps to prevent injury. An optional dust shroud helps to maintain a clean working environment when the tool is attached to a vacuum. The VL needle scalers are lightweight, easy-to-handle pneumatic units that provide up to 3,000 blows per minute. They are ideal for irregular surfaces that are otherwise difficult to prepare. Other applications include cleaning and stress relieving weld seams and steel joints. The tools can be converted to chisel scalers quickly and easily with an optional quick-change chisel holder. The Vibro-Lo VL Series includes both pistol grip and inline handle designs. The VL203 and VL303 are designed with a pistol grip handle and have 19 and 28 needles, respectively. Model VL223 has an inline handle and is equipped with 19 needles. Changing needles is quick and easy, requiring no additional tools. Needle variations include chisel or flat tips for light surface marking and pointed tips for very hard scale removal. Non-sparking Copper Beryllium needles are available for use in potentially hazardous environments. Stainless steel needles are offered for applications where corrosion or humidity presents a problem. The scalers operate at only 5.5 CFM of air consumption with vibration levels up to 2.75 m/s2. CS Unitec also offers a line of pneumatic, hydraulic and electric power tools and non-sparking, non-magnetic safety hand tools for construction and industry.

PROBLEM

Preparing marine vessels for coating/recoating exposes workers to excessive vibration when using tools to remove rust, paint and other surface effects. The excessive vibration causes work related injuries, downtime and a drop in productivity. Workers need a more user-friendly alternative to the standard high-vibration surface preparation tools being used in most shipyards.

BENEFITS

- Pistol and inline models
- Unique Vibro-Lo™ vibration reduction system produces 8x less vibration than standard models
- Optional dust shroud
- Tool-free changeover between needle to chisel attachments
- Innovative design requires less air consumption
- Higher worker productivity and profitability
- Lower risk of vibration-related injuries

TECHNOLOGY SOLUTION

A line of pistol and inline low-vibration air-powered needle and chisel scalers offer 8x less vibration than standard, currently used models. Vibration damping components offset the hammer vibration when tool impacts the workpiece. Lower tool vibration contributes to a safer work environment, making workers more comfortable and helping to protect them from vibration-related injuries. This results in higher production. The low-vibration technology also considerably reduces air consumption.

DIT-MCO

DIT-MCO HT-128 Handheld Wiring Analyzer

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DIT-MCO testers detect faults in wire harnesses and control assemblies using both low-voltage and high-voltage/high current, providing the highest level of fault detection. The testers find open circuits, shorts, leakage between wires, faulty components and other faults. The DT-128 handheld wiring analyzer operate in a variety of environments from manufacturing to maintenance depots. DIT-MCO test systems are used extensively in the aerospace and military product industry and they set the standard for wire integrity testing. DIT-MCO's handheld HT-128 is a distributed cable test system that allows maintenance technicians to connect individual testers to each harness branch connector instead of using a single, centralized tester and multiple return adapter cables or loopback plugs. This approach allows the use of small, battery-powered testers that wirelessly link together to achieve the desired wire harness test coverage. The HT-128 performs continuity and resistance tests on each wire in the harness. Opens, shorts, crossed wires and high-resistances are reported within seconds. Test results for each harness can be saved for proof-of-testing documentation.

PROBLEM	BENEFITS
How to quickly find and identify Continuity faults (Opens, Push Back Pins, Crossed Wires, etc.) in existing installed wiring harnesses.	▪ Easy to use – limited operator training required ▪ Compact, lightweight, portable ▪ Test installed cables without loopback plugs or long adapter cables ▪ Quickly catch opens, shorts, mis-wires, high resistance errors ▪ Measure resistors, verify proper polarity of diodes ▪ Saves test reports for documented test results ▪ Rugged, handheld, durable ▪ Battery operated for true portability
TECHNOLOGY SOLUTION DIT-MCO is the long-time leader in providing wiring harness and interconnect test systems to the Military, Aerospace and Defense industries. DIT-MCO testers detect wiring faults using both low-voltage and high- voltage/high current, providing the highest level of fault detection. Find open circuits, shorts, leakage between wires, faulty components and other faults. The systems operate in a variety of environments from manufacturing to maintenance depots.	

ECLYPSE INTERNATIONAL CORPORATION

DoD Rugged and Deployable Automatic Wire Test Set (AWTS)

Matt Lucas | 951-371-8008 x102 | mlucas@verizon.net | www.eclypse.org

For 30 years Eclypse International has been providing customers with state-of-the-art circuit analysis test equipment and turn-key test solutions. These solutions combine test equipment, test consulting, product support, software integration, and software programming. Eclypse is actively engaged in direct current, broadband impedance, partial discharge analysis (PDA) and standing wave reflectometry (SWR) technologies that are on the forefront of test equipment development. The capabilities of the Eclypse product line have made us a favorite in industries that utilize extremely complex wiring systems. Most of our customers realize a return on investment (ROI) of one year or less. In some situations, customers have realized ROI in a matter of weeks or even days. The Automatic Wire Test Set (AWTS) product line can fulfill all levels of electrical system testing and troubleshooting within a controlled environment and as well to deployable locations in the field. Our equipment tests AC/DC Hipot, wire harness and wire system maintenance (to include relays, data busses, indicators, etc.) with up to 30,000 test points, and component assemblies and complex wire systems, and they can be tested in place to reduce your overall maintenance costs. AWTS can perform electrical and electronic system diagnostics reliably and repeatedly in a fraction of the time it takes technicians to perform tests with manual equipment. AWTS quickly identifies and reports faulty conditions (both static and intermittent) to the maintenance technician saving time, cost, and increasing overall system reliability. Our systems are fully programmable and replaces the need for multiple single purpose test sets, which reduces your footprint of required equipment. Eclypse AWTS design has become the DoD standard for over 10 years. Come to our table to learn about the latest advances in testing procedures known as Certification Test Protocol (CTP) that are leading the future of test.

PROBLEM

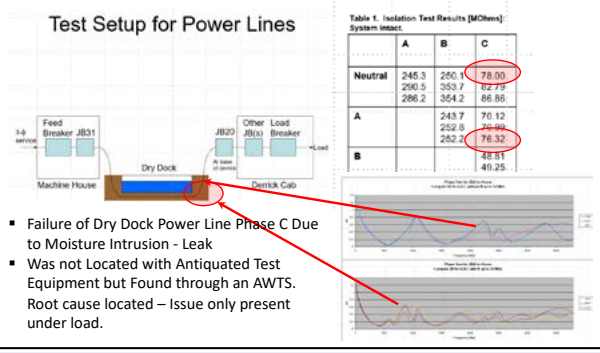
- The DoD Needs a Consistent and Accurate Way to Find Both Hard and Soft Faults in Complex Electrical Wiring Distribution Systems.
- Need Solution to No Fault Found or Intermittent Symptoms to Operators/Users
- Existing Obsolete Test Equipment Needs to Be Replaced
- Billions of Dollars are Wasted by Neglecting to Electrically Test Wiring or Not Testing/Inspecting Effectively

BENEFITS

- Root Cause Failures Identified and Repairs are Validated and Certified
- Automated, Easy Setup, Accurate, and Repeatable
- Reduces Troubleshooting of Electrical Systems from Days to Minutes
- Full XML Data Collection Output for Analysis/Trending

TECHNOLOGY SOLUTION

- Full Electrical Wiring Interconnection System (EWIS) Testing
- Fault Location Provided Within Inches
- Replaces Old Obsolete Test Sets and Methods
- Usable at Any Level of Maintenance
- AWTS is a DoD Standard for Electrical Testing



- Failure of Dry Dock Power Line Phase C Due to Moisture Intrusion - Leak
- Was not Located with Antiquated Test Equipment but Found through an AWTS. Root cause located – Issue only present under load.

ELEVATE SYSTEMS

Reverse Engineering to Create Required Technical Data

Scott Gray | 210-807-9981 x1 | scott.gray@elevatesystems.com | www.elevatesystems.com

Although we are not a manufacturer, we develop the data that manufacturers need to produce assets we have designed and provide rapid prototyping to prove the designs prior to working with manufacturers for first article and build to print efforts. We also integrate additive manufacturing into our designs and have the ability to "print" prototypes in our lab in San Antonio, Texas.

Once the prototypes have been validated, we outsource the production printing to one of several trusted sources. In addition to our engineering design capabilities, we have an extraordinary knowledge of blockchain technology that allows us to integrate into our processes for validation, security and provenance of the assets and systems we are supporting.

Weapon systems supported include the C-5 Cargo Aircraft, the C-141 Starlifter (no longer in inventory), the B-52 Stratofortress, the F-15 and F-16, the A-10 Warthog, the HH-60H Seahawk Special Ops Helicopter, WC-135 support, UH-60 Blackhawk and the AH-64 Apache, MQ-8B Drone and numerous other platforms and ground support equipment. Support primarily has centered on obsolescence and diminishing sources of supply as well as reverse and re-engineering services in addition to new design, finite element analysis, product improvement, vendor identification and source qualification.

Our capabilities include engineering design services, reverse engineering services, finite element analysis, simulation services, metrology services utilizing handheld devices as well as a portable coordinate measuring machine (CMM), technical data package creation/modification/update, 3D solid modeling, technical order creation and updating, SOLIDWORKS, use of additive manufacturing and 3D Printing services; we have 3D printers in our office for prototyping and light production efforts.

PROBLEM

Air Force had no data or drawings for this necessary (MICAP) asset

BENEFITS

- New sources of supply for assets
- Use of Additive Manufacturing
- Government owned and controlled technical data
- Lower acquisition costs over remaining life of system

TECHNOLOGY SOLUTION

Elevate Systems reverse engineered the assets and utilized additive manufacturing for the impeller increasing performance and reducing sustainment costs

EXTREME INDUSTRIAL COATINGS

Weldless Repair of Cast Iron, Bearing, and Seal Surfaces

Jon Osborne | 509-991-1773 | jjono@extremecoatings.com | www.extremecoatings.com

Extreme Industrial Coatings, LLC, (EIC)'s many years of experience repairing cast iron, bearing, and seal surfaces without welding give maintenance professionals the high confidence they need to tackle critical component repairs. Highly stressed bearing and seal surfaces can degrade over time due to several failure mechanisms, including abrasion, corrosion, and micro-fretting that can occur between shaft bearing surfaces and inner bearing races. Weld repairs to damaged shafts can weaken, embrittle, and distort the shaft, resulting in overstressed bearings and seals and catastrophic shaft failure. Repairs of cast iron surfaces via welding can be particularly thorny, as cast iron tends to become brittle and crack when welded. Any non-weld repairs of these surfaces will need to not only resist abrasion, corrosion, and micro-fretting, but also exhibit very high bond strength and toughness, while not compromising the base material. Clearly, maintenance pros need high-quality, proven options for repairing critical cast iron, bearing, and seal surfaces without welding. EIC has specialized in thermal spray repairs and enhancements of machine components for mining, hydroelectric, and industrial applications since 2003. We have developed proprietary, non-welding application processes that we have successfully used on critical components for hundreds of mining machines—including some of the largest mining trucks in the world. Additionally, we have provided critical repair services on over 100 hydroelectric dam components throughout the Pacific Northwest and beyond. Many of these components could not be repaired using conventional welding techniques. EIC is actively seeking opportunities to employ these repair processes on maritime machinery components. We welcome your inquiries and look forward to earning your confidence.

PROBLEM

Highly-stressed bearing and seal surfaces can degrade over time due to several failure mechanisms, including abrasion, corrosion, and the micro-fretting that can occur between shaft bearing surfaces and inner bearing races.

Traditional weld repairs to damaged shafts can weaken, embrittle, and distort the base material, leading to bearing or shaft failure and costly downtime. Weld repairs of cast iron surfaces can be particularly thorny, as cast iron tends to become brittle and crack when welded.

BENEFITS

- Allows high-quality, metallic repairs of large areas of damaged cast iron and steel
- Does not distort and weaken the base metal
- Very resistant to abrasion, corrosion, cavitation, and erosion
- Very tough and well-bonded; will not spall or flake off
- Extremely good compatibility with journal and roller bearing materials
- Very machinable
- Many years of successful applications; references available

TECHNOLOGY SOLUTION

EIC has specialized in non-welding repairs of machine components for mining, hydroelectric, and industrial applications since 2003. Using our proprietary thermal spray processes, we have successfully repaired over 100 critical components for 20 hydroelectric dams that could not be repaired using conventional welding techniques.

Additionally, we have repaired, again without welding, wheel group components for hundreds of mining machines including some of the largest mining trucks in the world.

FARO TECHNOLOGIES

FaroArm®/FARO VantageS6 Laser Tracker™

Michael Russo | 206-743-7223 | michael.russo@faro.com | www.faro.com

FARO® is the world's most trusted source for 3D measurement, imaging and realization technology. The company develops and manufactures leading edge solutions that enable high-precision 3D capture, measurement and analysis across a variety of industries including manufacturing, construction, engineering and public safety. Faro's global headquarters are located in Lake Mary, Florida. The company also has a technology center and manufacturing facility consisting of approximately 90,400 square feet located in Exton, Pennsylvania containing research and development, manufacturing and service operations of our FARO laser tracker™ and FARO cobalt array 3D imager product lines. We create unique value and support operational excellence for our customers by: enabling faster, more accurate, compelling and useable 3D documentation, accelerating execution timelines, minimizing in field 3D documentation and measurement times, shrinking margin impacting scrap and rework costs, and reducing development risk.

PROBLEM	BENEFITS
Improve the speed and efficiency of acquiring highly accurate measurement data for inspection, alignment and reverse engineering applications.	▪ Portable Metrology ▪ High Accuracy Inspection ▪ Trusted Faro company ▪ World Class Support

TECHNOLOGY SOLUTION
▪ Faro Arm
  ▪ Quantum Series
  ▪ ISO10360-12 certified
▪ Faro VantageS 6P
  ▪ Long range measurement
  ▪ Full 6 DoF
	

GE INSPECTION ROBOTICS

Ultra Mobile Industrial Inspection Robots

Jim Disser | 281-217-6324 | james.disser@inspection-robotics.com | www.inspection-robotics.com

As a leader in the robotic inspection field, GE Inspection Robotics is built on engineering, innovation, and technology. Established in 2006, the GE Inspection Robotics develops autonomous inspection robots for power plants, chemical/ petrochemical facilities, and the maritime industry. Thanks to the latest robotic and measurement technology, many service and maintenance tasks can be carried out by inspection robots. These devices are extremely robust and reliable, operating autonomously and to the highest degree of precision even in adverse environments. GE Inspection Robotics provides operators and inspection companies of large-scale technical facilities with tailor-made systems enabling them to improve inspections by minimizing outages and maintenance times and enhancing environmental and workplace safety.

PROBLEM	BENEFITS
Traditional tank inspection is performed by putting an inspector in the tank (Confined Space Entry). This presents significant challenges and safety issues for the asset owner.	Use of robots can reduce or eliminate Confined Space Entries (CSE), which in turn can ▪ Reduce costs and time during turnarounds / outages ▪ Increase asset uptime / availability ▪ Produce consistent, repeatable inspections ▪ Reduce / eliminate risk of CSE
TECHNOLOGY SOLUTION	BIKE Platform – Ultra Mobile Inspection Robot
Utilize highly mobile inspection robots to perform these internal tank inspections. Equipped with magnetic wheels for extreme maneuverability, these robots can carry a wide array of testing technologies, including high resolution visual cameras, UT, EC, and other sensors.	

GUIDEHOUSE

Strategy Consulting; Process, People, Infrastructure

Ryan McKeon | 727-743-7926 | rtmckeon@guidehouse.com | guidehouse.com

Guidehouse (formerly PricewaterhouseCoopers Public Sector) is one of the top three consultancies to the federal government. We help the Navy's shipyards with capabilities necessary to support a successful shipyard optimization strategy. We provide the right skill set and expertise, and the right level of effort to advise the Navy's shipyards on effective optimization strategies in support of improved ship availabilities. The Navy's shipyards can benefit from Guidehouse's expertise.

NAVSEA 04 Experience: "Shipyard of the Future" roadmaps and videos, and PMS 555's Phase II Area Development Plans, and hosting NAVSEA's Joint Robotics Summit.

Enterprise Risk Management (ERM): We co-authored the worldwide standard for ERM, as well as the deployment strategy for the Navy.

Cybersecurity: We are a leader in Navy cybersecurity, and helped rewrite NAVSEA's cybersecurity guidance.

Auditability/Material Accountability: We authored the DoD's Financial Improvement Audit Readiness (FIAR) guidance, and have been a primary provider of FIAR support to the Navy including NAVSEA.

Financial Analysis and Cost Reduction: We provide PPBE support associated with POM development at the OPNAV echelon I level, and are experienced delivering independent cost assessments and life cycle cost estimates.

Business Process Re-engineering (BPR) and Lean Six Sigma: We bring a renowned human-centered design (HCD) change management methodology, and significant experience executing BPR across the Navy.

Real Property Advisory Services: We support the DoD and DON through capital planning, project portfolio analysis, and prioritization.

PROBLEM

The U.S. Navy's aging shipyards require optimization and recapitalization to keep up with current maintenance demands in order to improve the reliability and efficiency of current depot availabilities and prepare for the increased workload associated with the larger fleet being constructed. Detailed, integrated shipyard requirement and planning is required as soon as possible to obtain near and long term budgetary resources and initiate the execution of projects as quickly as possible.

BENEFITS

The Navy's shipyards benefit from expert consulting services through:

- Reduced time and risk for ship availabilities
- Reduced costs
- Improved cybersecurity
- Improved auditability
- Improved communications and business processes

TECHNOLOGY SOLUTION

Guidehouse (formerly PricewaterhouseCoopers Public Sector) is a top three consultancy to the Federal Government. As it relates to the Navy's shipyards, Guidehouse brings:

- Process improvements
- Technology implementations
- Enterprise risk management
- Cybersecurity
- Auditability
- Shipyard of the Future strategy and road mapping

Guidehouse®

HAWK RIDGE SYSTEMS/MARKFORGED

3D Design, Manufacturing, and 3D Printing Solutions

Thomas Leach | 952-994-5640 | thomasl@hawkridgesys.com | hawkridgesys.com
Tony Higgins | 240-401-4971 | tony.higgins@markforged.com | markforged.com

Hawk Ridge Systems is a leading provider of 3D design, manufacturing, and 3D printing solutions to help clients exceed their business objectives. Their solutions include Markforged metal and composite printing technologies, Artec 3D scanners and the full portfolio of Dassault Systèmes offerings, including SOLIDWORKS, and CAMWorks manufacturing software. Hawk Ridge Systems is the largest provider of Markforged additive manufacturing solutions in North America. Hawk Ridge Systems has been awarded the top Markforged reseller in North America 2018 and the top SOLIDWORKS reseller award many times since its inception in 1996. The company also offers worldwide training through the Hawk Ridge Systems store. Based in Silicon Valley, Hawk Ridge Systems has 22 offices in the United States and Canada, providing coast-to-coast coverage in North America.

PROBLEM

- Time waiting for metal parts and logistics for ordering parts can be critical to your mission.
- Having to transport all the spare parts you may need to the field.
- Increased cost for replacement parts
- Replacing end of life parts & parts that are not easily sourced

BENEFITS

- Markforged 3D printers offer the ability to print metal and Strong parts at the point of need.
- Installing Markforged technology on ships to create spare parts for the ship and other needs
- The military is able to transport the technology and raw materials, rather than every conceivable spare part or weapon.
- speed up the supply chain, reduce costs, and help make them more productive and battle-ready
- 3D printing will reducing your budgets and procurement times

TECHNOLOGY SOLUTION

Hawk Ridge Systems & Markforged has everything you need to go from design to fully functional metal and composite parts – The Markforged Metal X 3D printer system is end to end manufacturing solution.

The Markforged X7 is the composite printer that has the ability to print Onyx (nylon mixed with chopped carbon fiber and continues carbon fiber, Kevlar, fiberglass making extremely strong parts.

HEXAGON MANUFACTURING INTELLIGENCE

Romer Portable Coordinate Measuring Arm—Leica Laser Tracker

Ryan Myers | 248-500-9858 | ryan.myers@hexagon.com | hexagonmi.com

Both Hexagon technologies address the need for collection and analysis of measurement data with high-tech scanning and measuring tools.

Romer Arm:

The unique modular wrist of the Absolute Arm has been specifically designed to make measurement flexible, fast and secure.

Quickly switch between laser scanning and touch probing without interrupting the measurement process.

Pistol grips available in three different sizes–choose the most comfortable fit for the user.

Remove the grip completely to measure hard-to-reach areas such as holes and cavities.

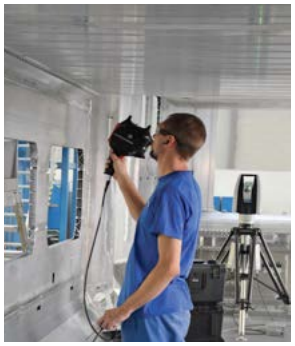
For measurement in the tightest areas even the RS5 Laser Scanner can be removed, and as with all Hexagon probes and scanners, quickly replaced later with no need for recalibration. Whatever the use case, the flexible modular design of the Absolute Arm makes it instantly adaptable and always ready to measure.

Leica Laser Tracker:

The first fully portable six degrees of freedom (6DoF) laser measurement system, the Leica Absolute Tracker AT960 delivers the technology necessary to serve as the global referencing system for a high-end 3D laser scanner.

The high-speed dynamic measurement functionality of the AT960 can accurately locate a Hexagon laser scanner up to 30 meters away with a maximum distance uncertainty of just 10 microns.

The unmatched speed, accuracy and portability of the Leica Absolute Tracker AT960 is based on a foundation of innovative technologies that make it the pinnacle of high-performance metrology on the move.

PROBLEM	BENEFITS
The need for rapid and accurate data capture for reverse engineering and inspection to CAD or best fit analysis.	▪ Enhanced laser scanning and reverse engineering capabilities ▪ Portable systems designed to be used in harsh environments ▪ State of the Art Technology that connects the shipyard to the digital thread!
TECHNOLOGY SOLUTION ▪ Romer Absolute Arm for measurement volumes smaller than 15 cubic feet ▪ Leica AT960 LR Laser Tracker with T-probe & T-Scan for measurement volumes larger than 15 cubic feet	 

HYDRATIGHT/ENERPAC

Portable Machining and Bolting Equipment

Tony Kamps | 651-212-0384 | anthony.kamps@hydratight.com | www.hydratight.com

Pipe Cutting and Beveling Machines (Clamshells)

The Hydratight series of clamshells are highly portable split frame lathes ideally suited for machining applications within new construction, decommissioning, component replacement, fabrication and refurbishment industries.

Shaft Machining (MS-JTL)

The MS-JTL combines the best features from our patented Midsize (MS) Clamshell and the field-proven and patented journal turning lathe (JTL) to give a precision machining tool that performs accurate and consistent machining of bearing journals and other round surfaces. This hybrid portable lathe machine can be powered by hydraulic, pneumatic or electric power and comes complete with everything you'll need to turn shafts for almost any OD turning application.

Hydraulic Torque Wrench

Hydratight's lightweight hydraulic torque wrenches (formerly known as Hydratight's RSL Series) have been designed to tighten and loosen nuts and bolts for professional applications across the oil & gas, powergen and industrial markets. The hydraulic torque tool has only three moving parts in the ratchet mechanism.

Tensioners

The family of tensioners from Hydratight represents a giant leap in the specialist field of bolt tensioning technology. Unique, groundbreaking and world class, the accuracy and efficiency provided by a tensioner for bolting applications, cannot be matched by any other current technology.

Flange Facing Machines

Mirage flange facing machines utilize our patented power feed tool posts, and demonstrate innovative design with the latest linear and ball screw technology. These flange facer machines are available in internal and external mounting options.

PROBLEM	BENEFITS
▪ Cut and bevel pipe ▪ Shaft refurbishment ▪ Tighten and loosen nuts and bolts ▪ Flange Facing	Each Hydratight machine, wrench or tool is engineered to operate safely and accurately even in the most demanding environments and critical applications

TECHNOLOGY SOLUTION

- The Hydratight series of clamshells are highly portable split frame lathes engineered to cut and bevel all pipe and tubing ranging from 0.84" to 177".
- The MS-JTL is a precision machining tool that performs accurate and consistent machining of bearing journals and other round surfaces. Designed for larger diameter shaft refurbishment (4" to 36.5").
- Hydratight's lightweight hydraulic torque wrenches have been designed to tighten and loosen nuts and bolts for all professional applications.
- Our Mirage flange facing machines are available in internal and external mounting options. They utilize our patented power feed tool posts and demonstrate innovative design with the latest linear and ball screw technology.

HYTORC

Batter, Hydraulic and Pneumatic Torque Tooling

Ty Babb | 201-953-9920 | tbabb@hytorc.com | hytorc.com

HYTORC makes industrial bolting safer and simpler. With 50 years of experience focused entirely on developing the highest quality industrial bolting systems, HYTORC is the most trusted name in the industry. From steel mills and mining equipment to refineries, power plants, and wind turbines; we have developed solutions for every bolting application imaginable. For custom projects, our highly experienced engineering team is at your service to design the most efficient solution for your job with simple operation and economical pricing in mind. We are consistently improving upon existing products, and developing new tools, based on feedback from the people that use our tools every day. Our latest product line features patented industry-firsts like hands-free operation to keep tool operators at a safe distance from the application, on board documentation systems to provide job accountability and assurance, and industry-leading bolt load accuracy to reduce nut loosening and joint failure. With authorized repair facilities located all over the world, fast and professional service is always available. All our products are covered by our worldwide one-year no-questions-asked warranty, which includes free parts and labor. Our latest bolting systems are guaranteed to stop leaks on pressurized vessels and eliminate unwanted nut loosening. Our mission is to make our customers' jobs as safe and hassle-free as possible. Contact HYTORC today to find out how we can optimize your bolting.

PROBLEM

- Productivity issues
- Quality / Re-work costs
- Ergonomic tooling problems
- Reliability concerns
- High cycle times
- Inaccurate impact tooling
- Injury to workers

BENEFITS

- Tooling can be configured for multiple applications based upon reaction fixtures
- Less trigger time exposure to the operator
- Improved productivity and quality
- Data collection
- Global support via service centers or drop shipping
- Tooling accepted within Navy community

TECHNOLOGY SOLUTION

- Hytorc washers and nuts vs. super nuts, conventional nuts
- Data collection for torqueing bolts vs. second operation inspection
- Exact torque value set on tooling
- Ability to remove reaction points all together
- On-site calibration ability via Hytorc van
- NSN numbers for some products
- Kitting available
- Torque and angle, torque check and snug modes available on battery tooling

www.hytorc.com

ID INTEGRATION INC.

Locate & Track Assets On-Demand with RFID Location Tracking

Gary Moe | 425-438-2533 | gmoe@id-integration.com | www.id-integration.com

Transform production efficiency with improved workflow, fewer errors, and less downtime. Save time and money searching for critical tools and equipment. Breeze through audits and keep tabs on inventory. It's all possible with today's RFID Smart Manufacturing technology. Now is the time for manufacturers and companies to begin pilot and proof-of-concept projects for RFID asset and work order tracking projects. This is where the emerging technology is heading and if manufacturers want to be competitive and relevant in the future, they need to begin using these technologies. We have the answers for RFID applications for any industry: from government and aerospace to industrial manufacturing, to healthcare (hospitals & medical clinics) and pharmaceutical, to construction and landscaping, to chemical and farming, to car lot and dockside, and more.

With our unlimited RFID technology, you now have unlimited ways to utilize this technology: Reduce operator time spent searching for orders, tools, parts & more, gain valuable insight throughout the work order process to identify bottlenecks & updated ETAs, increase accuracy of data by eliminating manual entry errors, and analytics to alert stakeholders to issues of concern and improve efficiency. At ID Integration, we bring to the table more than 20 years of experience navigating compliance standards in the defense and aerospace industries. "One-size-fits-all" solutions don't work. We create tailor-made solutions to fit your needs, whether you're facing an audit, or you need to automate your entire work order process, our systems integration experts have you covered.

PROBLEM

Downtime searching for critical tools and equipment is costly in terms of expense, potential fines, lost tooling, and failed audits. Decreased efficiency, workflow bottlenecks, and user error also negatively impact the overall production and accuracy.

Some applications may also require capability to bridge the gap between different RFID technologies (active, GPS, IoT, hybrid, & traditional) without dealing with disparate data.

BENEFITS

- RFID Location Tracking technology enables manufacturers and companies to reduce time spent searching for orders, tools, parts, & more.
- Provides insight to the work order process identifying bottlenecks and ETAs.
- Increases data accuracy by eliminating manual data entry errors.
- Provides analytics that alert stakeholders to issues and means to increase overall efficiency.

TECHNOLOGY SOLUTION

- V-Tag™ Active RFID: V-Tag GPS™ RFID tags "talk" with each other to create an ad hoc, decentralized network.
- V-Tag GPS™ RFID: Rugged RFID tags designed to withstand the rigors of wide temperature and humidity fluctuations found in outdoor environments. They're equipped with beepers that sound off at 75 decibels to pinpoint exact locations of assets.
- Active, IoT, & Hybrid RFID: Track assets with smart manufacturing capabilities. Combination solutions maximize processes & data collection capabilities.
- Traditional RFID: Some applications include a combination of traditional RFID with modern technology.

IMPACTO PROTECTIVE PRODUCTS INC.

Personal Protective Equipment

Debra Bradley | 702-858-1806 | debra@impacto.ca | www.impacto.ca

Impacto specializes in improving worker safety and comfort by providing ergonomically designed personal protective equipment to reduce impact, vibration and repetitive motion in any work environment.

IMPACTO strives to provide high-quality products which help to protect workers. A safe workforce helps reduce compensation claims while adding to overall employee wellness. Our stakeholders include safety groups, engineering staff, medical personnel, unions, management and most importantly frontline workers. By interacting with these groups, we are able to provide a solution that incorporates ergonomic work design, protective clothing and employee training. Impacto line of industrial products include the anti-vibration air glove, anti-impact gloves, wrist supports for prevention of repetitive strain injuries RSI, a wide range of knee pads, body pads and cushions, air belt lumbar supports, anti-fatigue and puncture resistant insoles, steel toe cap overshoes and ice traction overshoes. For more details visit our website www.impacto.ca or call us toll free 888-232-3031.

PROBLEM	BENEFITS
Injuries caused by impact and vibrating tools as well as cumulative trauma and repetitive strain injuries. Examples are repetitive strain by overuse of the wrist experienced by cashiers, machine operators, sewers and assembly line workers.	Our high-performance dedicated laser scanners provide industry-leading millimeter accuracy for the highest level of confidence, while our innovative integrated scanners provide the utmost versatility. Add this to powerful software, experienced support and efficient workflows, and you have a complete solution.
TECHNOLOGY SOLUTION The using Personal Protection Safety Products (PPE) helps to prevent injuries, provide support to prevent lesions and repetitive cumulative traumas. For example, using steel or composite cap Turbotoe overshoes help prevent impact injuries to the toe area.	

INTERTEST, INC.

Focused on the Visual Solutions of Tomorrow

Tom Daly | 908-496-8008 | tfdaly@intertest.com | www.intertest.com

InterTest® Inc. provides remote visual inspection (RVI) tools and non-destructive testing (NDT) equipment to customers around the world. With our extensive experience in inventing and innovating industrial inspection and testing methods, we are proud to offer an armory of unparalleled products and solutions for virtually any industry and environmental application. From aircraft engines to the car racing track, hot and harsh manufacturing plants to cold outdoor environments, and bright welding torches to low-light applications, our team promises to meet and exceed your expectations. At InterTest, we are RVI and NDT experts. Our superb engineering and talented manufacturing staff boasts over a century of collective, invaluable industry experience. Likewise, our attentive sales and customer support teams are driven to deliver a value-added experience for every order. Above all, we remain focused on the visual solutions of tomorrow!

PROBLEM

InterTest® is a leading supplier of specialized vision products, remote visual inspection (RVI) tools, and non-destructive testing (NDT) equipment. Manufacturing RVI solutions under the iShot® Imaging brand, InterTest® excels at providing solutions to allow for viewing and accessing areas previously out of reach. In addition, we represent other industry leading RVI and NDT manufacturers to complement our offering.
From standard off-the-shelf products ready to ship same day, to custom solutions engineered specifically for your application, we have the knowledge and experience to deliver premier visual solutions.

BENEFITS

- Visibility and accessibility solutions
- Industrial inspection and testing
- Inspection system integrations
- Custom engineering and innovation
- Harsh environmental application solutions
- Remote Vision application support
- Equipment sourcing experts
- Video technology experts
- Prototype services
- Resellers

TECHNOLOGY SOLUTION

- (RVI) Remote-Visual Inspection Tools
- (NDT) Non-Destructive Testing Equipment
- Custom Engineered Solutions
- Sony-Authorized System Integrator
- Engineering, Manufacturing and Quality Experts
- Worldwide Solutions Provider
- ISO 90001:2008

WeldWatch EDU Tutoring Station EM13248

Vistascope EM13364

LANCS INDUSTRIES

Radiation Shielding & Containment

Lewis Byrd | 425-823-6634 | lbyrd@lancsindustries.com | www.lancsindustries.com

Founded in 1974, Lancs Industries is North America's largest supplier of radiation shielding and containment products. Lancs' products increase safety and reduce risk to workers in hazardous radioactive environments by reducing exposure to radiation and minimizing the spread of contamination. These products include lead, tungsten, bismuth and iron shielding, containments such as glovebags, tents; protective clothing and various packaging for the storage of radioactive waste. Lancs has manufactured over 80% of the lead shielding used by U.S. naval shipyards (including PSNSY) and nuclear power facilities. Lancs' customers include all United States nuclear navy shipyards, companies that manufacture and renovate nuclear powered ships, companies and agencies in the nuclear power generating industry, and nuclear waste and remediation clean-up sites. All Lancs products are manufactured in our 18,000 sq. ft. facility in Kirkland, Washington just north of Seattle. Lancs also provides expert advisory services and training in the installation, use and removal of shielding and containments for our customers to improve radiologic work practices. A selected list of Lancs nuclear and radiological protection equipment customers include Puget Sound Naval Shipyard, Norfolk Naval Shipyard, Pearl Harbor Naval Shipyard, Portsmouth Naval Shipyard, General Dynamics-Electric Boat, Huntington Ingalls Industries-Newport News Shipbuilding, U.S. Naval Inventory Control Point – Naval Supply Systems Command (Mechanicsburg), Pacific Northwest NL Battelle, Savannah River Nuclear Solutions, and Washington River Protection Solutions.

PROBLEM

- Risk of radiation exposure to workers
- Need to temporarily store or permanently dispose of radioactive material

BENEFITS

- Reduction of worker exposure to radiation
- Workers are able to perform work in a safe environment without restriction or impediment due to bulky or non-fitting protective clothing

TECHNOLOGY SOLUTION

- A variety of cost effective shielding and containment products

LIFE CYCLE ENGINEERING

Mixed Reality Training

Russ Kuntz | 360-227-9336 | rkuntz@lce.com | www.lce.com

Since 1976, Life Cycle Engineering (LCE) has provided engineering solutions that deliver lasting results for private industry, public entities, government organizations, and the military. LCE has now partnered with Taqtile, uniting the knowledge and expertise of LCE's subject matter experts (SMEs) with Taqtile's Manifest software. Together, we are combining the knowledge gained by the LCE SMEs over their many years of experience developing procedures and training with Manifest to deliver a digital transformation to frontline workers at the job site or in the classroom. This process allows the technician to perform pre-job preparation or equipment familiarization in the classroom, office, or boardroom by reviewing the same procedures upon a digital twin or actual on-the-job assistance at the worksite. Technicians have just-in-time access to the procedures they need, when and where they need them. Procedures can be performed online or offline, with complete access to the steps and associated notes and content. Manifest allows SMEs (authors) to intuitively create stored step-by-step procedures with minimal training. Manifest does not require specialized knowledge of 3D, CAD publishing tools, or coding to create guided content. The partnership of LCE's SMEs and Taqtile Manifest provides the opportunity for everyone to be an expert.

PROBLEM

There is a shortage of skilled blue-collar workers in the United States. This shortage is having an impact on staffing levels as well as skilled workers to support USN Ship repair. As the majority of the current ship repair workforce reaches retirement age, it is critical to have the capability to pass on that knowledge to the next generation of ship repair workers, while still getting the work completed on time and with zero defects.

BENEFITS

- Procedures are saved to location of customers choice and can be recalled upon the same equipment, another instance of the equipment elsewhere, or on a virtual representation of the equipment in a classroom or boardroom.
- Unfamiliar equipment, and/or infrequently executed operations can be pre-visualized over real-world equipment or digital twins.
- Trainees and new recruits can contact SMEs in a live engagement to better understand how to perform a difficult task or overcome obstacles.

TECHNOLOGY SOLUTION

Using Taqtile Manifest software and experience of LCE's Subject Mater Experts (SME), step-by-step instructions for equipment operations, configuration, repair and maintenance using the HoloLens, Magic Leap, Tablet and/or PC+web browser to overlay steps on real-world equipment and in-situ capture audio, video, text, bookmarked documents, and more to best describe the task at hand.

LOCKHEED MARTIN & UNIVERSAL SYNAPTICS

Intermittent Fault Detection & Isolation System 2.0 (IFDIS 2.0™) and Intermittent Fault Detector (IFD-128™, IFD-256™, IFD-512™)

Nate Johnson | 801-710-1618 | nate.johnson@usynaptics.com | www.usynaptics.com

DoD is seeking ways to increase materiel readiness to 80% for all weapon systems, with focus on F-35, F/A-18, F-16, and F-22. OSD calculated the negative impact of No Fault Found (NFF) on mission capable rates and cost ($3B annually), with intermittent faults cited as the primary cause. For many DoD weapon system components that cause operational failures, 50% have the actual root cause problem identified and repaired, the other half test NFF. Conventional automatic test equipment (ATE) is not designed to detect intermittent failures that cause NFF. ATE's inability to detect intermittent faults led to the development of IFDIS 2.0™, specifically designed to detect and isolate intermittent faults in avionics components. LRU/WRA testing has more than tripled operational reliability and realized $70M+ in maintenance cost savings. IFDIS 2.0 diagnostic capability is now portable and can be applied rapidly at O- and I-levels of maintenance for Electrical Wiring Interconnect Systems (EWIS) to include harness bundles and cables. Like IFDIS 2.0, IFD™ is MIL-PRF 32516 compliant. VIFD has detected and isolated intermittent faults in 99% of tested systems. These capabilities can be applied to the complete spectrum of avionics components/wiring. Increasing mission capability to 80% for weapon systems is possible with IFDIS 2.0 and the portable IFD.

PROBLEM

NFF test results are primarily driven by intermittent faults, a life-cycle cost driver and DoD materiel readiness degrader. Conventional ATE was not designed to detect intermittent faults and is incapable of detecting and isolating momentary intermittent faults that cause NFF, leaving them unrepaired.

BENEFITS

- Improve Materiel Readiness
- Achieve SecDef 80% availability in 2019
- Eradicate No Fault Found (NFF) occurrences
- Reduction of MICAPs
- Decrease maintenance cost
- Increase operational availability
- Cost-effective readiness
- Reduction in repair cycle-time

TECHNOLOGY SOLUTION

IFDIS 2.0™ and IFD™ are specifically designed and purpose built to detect and isolate intermittent faults, enabling them to be repaired. By identifying and correcting the root causes of random, intermittent failures, reliability increases on the diagnosed systems and sub-systems.

MAGLOGIX

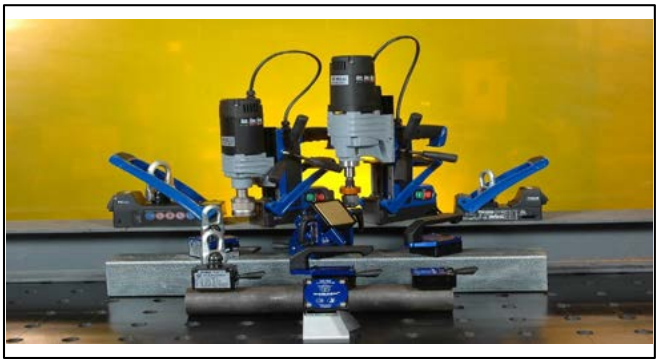
Switchable Magnets

Jim Michael | 303-257-7888 | jmichael@maglogix.com | www.maglogix.com

Maglogix® has developed next-generation magnetic technology that allows for nearly unlimited applications in steel fabrication, repair and welding. Utilizing patented Multi-Pole technology Maglogix has created the world's most powerful magnetic devices achieving full holding power starting on the thinnest steel. Our magnetic field is extremely compact and focused. Safety and ergonomics are paramount for our magnets, all magnets are safe and easy to turn on, even repetitively and when used on very thin steel. Our range of products include hand lifters that can eliminate cuts and crush injuries. Lifting magnets, from 220-2,200 lbs. of safe working load are so light and powerful that they are designed to be taken off the hook and used for all aspects of fabrication, plate leveling and work-holding. Magnetic drill presses that are the lightest on the market, will operate safely on even 1/8" steel and will not fall off when the power goes out. Maglogix base magnets range from 150-7,500 lbs. gripping force and are designed for easy integration and attachment into custom applications.

Maglogix magnets can replace temporary welds and scarring by over 80% and can be used in place of Dogs and Pins and Pad eyes allowing for rapid project completion, fewer inspections and fewer labor hours required. Maglogix, 2018 winner of the NCMS/CTMA Technology Competition award, develops patents in Denver, Colorado with manufacturing in Germany and the USA.

The newly released MagnaSense magnet utilizes patented technology to tell the operator or inspector exactly how much holding force is available on that particular location. Knowing the actual attractive force can save the user from breakaway or holding failures caused by rust, paint, thin steel and other surface conditions.

PROBLEM	BENEFITS
Steel work requires lengthy Fit-Up, Alignment, Levelling and Positioning typically involving a large number of Temporary Welds resulting in Scarring, and wasted Time.	▪ Eliminates crush injuries ▪ Dramatically reduces temporary welds and scarring ▪ Enhances readiness and acts as a force multiplier ▪ Extremely versatile and customizable
TECHNOLOGY SOLUTION	
Maglogix® is allowing the fabricator to utilize incredibly powerful magnets to align, hold, position, pull and pry against replacing the need for tack welds and time consuming labor.	

NATIONAL CENTER FOR MANUFACTURING SCIENCES

Technology Development Consortium

Rebecca Taylor | 202-822-5025 | rebeccat@ncms.org | www.ncms.org

The National Center for Manufacturing Sciences (NCMS) fosters a continuously growing network of technologies, entrepreneurs, investors and experts in industry, government, and academia to expedite development, demonstration, and delivery of cutting-edge technology capabilities in support of manufacturing competitiveness. NCMS engages across the entire innovation ecosystem to ensure access to the best available technologies based on requirement.

NCMS enables world-class, innovative companies, through our network and beyond, to work effectively with other organizations and academia on new opportunities. This model brings together highly capable and respected companies with providers and end-users who need these innovations and technology solutions. NCMS members and other collaborative companies benefit from an accelerated progression of idea creation through execution.

- Connections with highly qualified, sophisticated, like-minded companies
- Vehicles for government contracts which remove barriers and streamline expensive, complex accounting compliance requirements
- Credibility with federal agencies with diverse industrial applications

PROBLEM

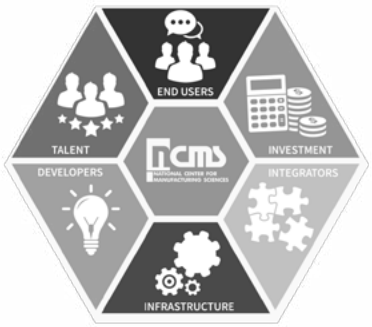
US industry and academia develop ground-breaking and innovative technologies that could enhance the nation's defense and manufacturing sectors. Yet there is no pipeline that connects those advances to government and the manufacturing industrial base. Technologies that could fill critical needs remain undetected, thereby wasting time, effort, resources, and opportunity.

BENEFITS

- Streamlines contracting and cost accounting
- Focuses on advanced technologies expanding military capabilities
- Offers outstanding opportunities to develop and transfer mutually-beneficial technologies
- Reduces costs of R&D through leveraging and sharing
- Allows testing and evaluation of technology before transition
- Supports increased lethality and a more viable industrial base

SOLUTION

NCMS engages across the entire innovation ecosystem to ensure access to the best available technologies based on requirements for economic and national security. Our more than 30 years of experience working in a collaborative environment provides us with insights into technology innovation and a deep understanding on how the partners can best access specialized communities. This alignment provides strengthened business opportunities, technology transitions, and an environment where cutting-edge innovations can make a significant impact.



NPO

Radiation Shielding

Mike Davis | 331-201-8081 | mdavis@eichrom.com | eichrom.com/npo

NPO designs and manufactures radiation shielding and contamination control products: applying our engineering and radiation protection expertise to minimize radiation exposure in commercial nuclear power, nuclear medicine and industrial radiography. NPO's three main product lines include Lead Wool Blankets, T-Flex, and Specialized Shielding solutions.

PROBLEM	BENEFITS
A particular source of radiation, be it a pipe, valve, or other components, is causing an elevated amount of dose taken to personnel in and around the area.	The shielding provided reduces dose rates to all personnel
TECHNOLOGY SOLUTION	
Radiation shielding in the form of lead wool blankets, T-Flex polymer sheets, tiles, or pipe shielding, or customer engineered solution utilizing a combination of steel, lead, and T-Flex blocks the component that has been identified as the source of radiation. This reduction is determined by the thickness of the material and whatever weight limitation may exist.	

PENTEK

Corner-Cutter® Needle-gun Scaler, VAC-PAC® HEPA Vacuum, ROTO-PEEN Scaler, ECAD Tester and TDR Instrumentation

Greg Allan | 412-262-0725 | greg.allan@pentekusa.com | www.pentekusa.com

Pentek, Inc. is the industry leader in manufacturing, engineering and designing specialty surface decontamination technologies and processes for commercial, industrial and nuclear applications. We offer turnkey solutions for simple or complex decontamination projects with our technology being used by contractors, government agencies, and utilities around the world. Pentek started during the aftermath of the 1979 accident at the Three Mile Island Nuclear Power Plant when the industry realized there was a lack of nuclear-grade decontamination technologies that could be effectively applied during the recovery effort. As a result, Pentek designed and engineered what has become a complete line of innovative surface decontamination and waste packaging technologies. Since 1981, our products have successfully been used for critical work scopes within the nuclear weapons industry, commercial nuclear utility industry, and at various DoD/DoE sites where strict environmental controls are a prerequisite.

PROBLEM

Removing coatings, radioactive contamination and other hazardous materials from steel and concrete surface needs to be conducted in a manner that is safe for the workers and also safe for work environment. Dust, debris and airborne contaminates should be captured immediately at the point where a needle-gun scaler contacts the surface.

BENEFITS

- Removes radioactivity, lead paint, rust, corrosion, epoxy coatings
- When used with a Pentek vacuum, the Corner-Cutter mitigates the need for the respiratory protection of the operator from airborne radiological and toxic particulates.
- Light-weight and low reaction force helps to reduce operator fatigue
- Shrouds permit the tool to conform to inside corners, outside corners and flat surfaces
- High production rate

TECHNOLOGY SOLUTION

Pentek's Corner-Cutter® is a pneumatically operated needle scaler. Specially hardened needles operate within an evacuated stainless steel enclosure to prevent dust, debris and airborne contamination from being released into the workplace environment. The Corner-Cutter® is a mature design, commercially available for 30+ years and is extremely well-suited for a shipyard environment.

PTC

Shipyard Modernization Solutions

Ian Boulton | 520-749-6633 | iboulton@ptc.com | www.ptc.com

PTC's market leading and award-winning Industrial Internet of Things (IIoT) platform, ThingWorx and ThingWorx Analytics will allow the Navy to modernize their shipyards. The capabilities allow users to source, contextualize, synthesize, orchestrate, and engage with data from their connected products, operations, and disparate systems. This broad set of capabilities enables companies to wrap and extend existing decision support tools, such as databases or systems, analyze them, implement applications and create unique user interfaces to manage this information all on a secure and scalable architecture. These solutions coupled with our Vuforia augmented reality suite, present a whole new way to interact with digital information that delivers information through visual processing that is much easier to comprehend.

PROBLEM

Maintenance activities do not possess the capabilities to remotely access data from industrial machines, test equipment or storage locations. Lack of visibility results in machines operating in insolated environments without remotely monitored alerts, performance data or quality indicators. Additionally, workforce doesn't always have the skills to complete tasks safely, quickly and with quality. Lengthy training pipelines and increasingly complex machines, coupled with dwindling skilled workforce requires a new approach to learning, maintenance and operations.

BENEFITS

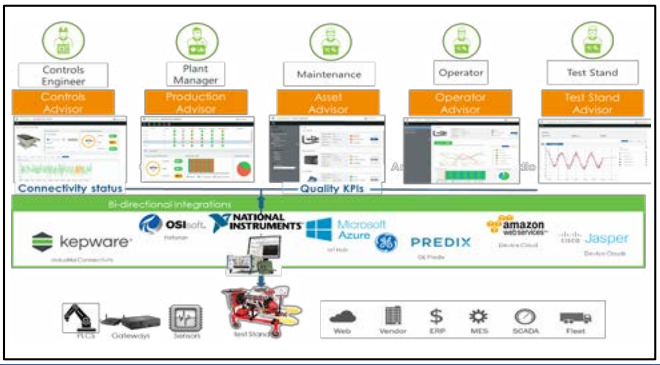
- Reduce manual data entry and human decisions
- Provide visibility to part and order status
- Optimize machine performance
- Access and analyses to stranded test stand data
- Improve test scheduling and throughput
- Increase response time and issue resolution
- Improve access to data for engineering analysis
- Reduce job completion time and error rates

Improve personnel and fleet readiness

TECHNOLOGY SOLUTION

ThingWorx: #1 Industrial Internet of Things (IoT) software platform allowing users to source, contextualize, synthesize, orchestrate, and engage with data from their connected products, operations, and software.

Vuforia: Augmented Reality platform with more than 62% market share that provides the ability for users to experience digital information in the context of a physical product: in the field, on the shop floor, on the showroom floor, or on the cab of a machine. It can also bring the machine or the shop floor to the user wherever they might be.



PYROTEK

Marine Acoustic and Thermal Solutions

David Wolf | 509-991-8548 | davwol@pyrotek.com | www.pyroteknc.com

Pyrotek products are designed for extreme marine conditions. Aesthetic and environmental factors have been allowed for in the product construction, offering products that meet or exceed the requirements of safety of life at sea (SOLAS) and the International Maritime Organization (IMO) regulations. Many of these solutions will also protect your asset from structural duress, metal fatigue and ensure longevity and structural soundness for years to come. Selecting the right solutions will substantially reduce noise levels on commercial, cruiseliner, luxury, defense and military vessels, improving boating pleasure and safety.

DECIDAMP SP150

Decidamp SP150 is a fast drying, water-based vibration damping compound. The exceptional vibration damping properties are complemented by ease of use, low volatile organic compounds (VOCs) and low combustibility. It can be easily applied by spray gun, brush, roller or trowel. Once dry the cured film is UV, water and abrasion resistant.

ULTIMATE – U Sea Protect

ULTIMATE combines peak performance in fire protection and thermal insulation with an extremely lightweight, flexible product. It provides additional acoustic insulation while being faster and more efficient to install than traditional methods. It is marine certified for use on steel, aluminum and composite/glass constructions.

PROBLEM

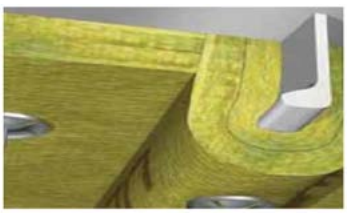
- Heavy, difficult to install Structural Fire Protection (SFP)
- Heavy and labor intense insulation materials
- Structural vibration
- Airborne Noise
  - Transfer of noise and vibration
  - Personnel safety and fatigue
  - Structural fatigue
- Condensation
- Solution Compliance

BENEFITS

- Light weight fire protection and thermal insulations
- Reduce noise and vibration
- Improve safety and personnel environment conditions
- Eliminate condensation
- Design for economy and performance

TECHNOLOGY SOLUTION

- U-Sea-Protect Structural Fire Protection and Thermal solutions
- Spray on damping coatings, Damping tiles, custom designed damping and acoustic products
- Design solutions combining acoustic and thermal systems
- Labor saving application of materials
- Light weight - high performance materials



(Left) DECIDAMP SP150
(Above) ULTIMATE – U Sea Protect

RADIATION SAFETY & CONTROL SERVICES, INC. (RSCS)

SIM-Teq™ Radiation Training Equipment

Steve Nester | 800-525-8339 x242 | sdnester@radsafety.com | radsafety.com

SIM-Teq™ is a portable wireless training network of simulated dosimeters, survey meters, and gamma radiation sources. The network-based system allows the instructor to combine simulated instrument auto-response with manual, remote control capability. The SIM-Teq system enables trainers to create a training environment which includes high fidelity simulated instruments and "live" detectable sources to instill the experience, self-assurance and real understanding they want trainees to achieve - safely. The instructor is free to teach, observe and assess the trainee, with the ability to remotely manage or control any SIM-Teq device at any time. The system includes many options to train responders using radiation detection instruments. In the simplest training scenario, a powered "live" source can be deployed, and a trainee handed a training instrument to locate a boundary line, complete a survey or locate the source. A classroom of trainees can each experience the features and functions of their instrument, all controlled by a single instructor. Response teams participating at a multi-organizational drill can all safely experience an interactive large-scale radiological event, where one or more Exercise Controllers can easily observe and manage the hazardous environment. The system is designed to meet the variety of training organization needs to provide frequent, realistic training to provide Responders with the skills necessary to successfully coordinate together in an actual incident. From learning the basic principles of radiation and operation of instruments, to working in complex radiological scenarios, SIM-Teq provides the flexibility to suit the needs of radiation training programs and achieve the desired results.

PROBLEM

Users of radiation detection equipment are limited in training options to acquire the understanding and skills desired at the individual and organizational level. Safety concerns limit the use of real radioactive sources and simulated hazardous environments and devices are often unrealistic and ineffective. A safe, portable and realistic solution which combines high fidelity simulated instruments, auto-response to "live" simulated sources and manual instructor control of all devices would enable students to hone their skills by practicing independently and together, in the classroom and in the field.

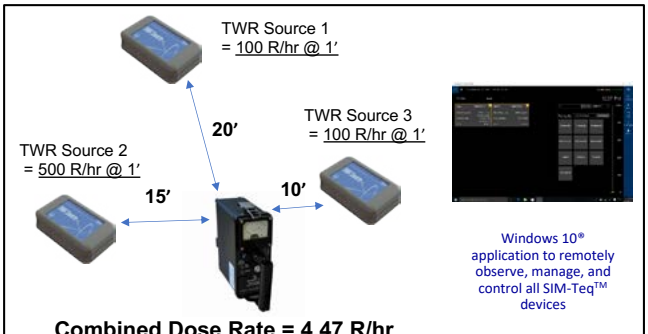
BENEFITS

Run Seamless Training Exercises to Train Workers Safely on the use of Radiation Detection Equipment:

- Seconds to deploy simulated "live" sources of radiation and training instruments.
- Dynamic auto-response between up to 16 simulated instruments with 10 TWR sources.
- Configure and control all instrument specific features, anytime.
- Dynamic dose and rate displayed on instrument and remote instructor display.
- Remote activation of alarms and fault conditions.
- Control groups of up to 32 devices simultaneously.

TECHNOLOGY SOLUTION

The SIM-Teq™ System is a wireless training network of simulated dosimeters, survey meters, and TWR Sources managed and controlled by the Simulation Control Center (SCC) application. The system combines auto-response and manual control of devices, complete portability and ease of use. Simulated instruments incorporate Original Equipment Manufacturer (OEM) hardware for realistic look, feel and operation.



REVERSEENGINEERING.COM

Accelerate Digitizing and Measuring—Seamless Hard Probe and Laser Scanning Directly into SolidEDGE and Siemens NX

Christiann Moore | 858-488-5231 | christiann@reverseengineering.com | reverseengineering.com

The costs associated with having a laser scanning provider scan patterns and provide cloud or polygonal mesh data is expensive. With ReverseEngineering.com software and a laser scanner we can create our own cloud data at no cost other than our own labor and the initial capital expenditure. It is easy to use and is integrated with all CAD software and allows collection and processing of 3D cloud data into a manageable size that can easily be manipulated. You can also take point probe data directly into the CAD software. ReverseEngineering.com is the only company that takes point data directly into the CAD software to process the cloud data into polygonal mesh data and export as an STL file. ReverseEngineering.com software has less steps from art to part.

Historic patterns, new inventions, prototypes, all for which no patterns or detailed engineering data exists, can use ReverseEngineering.com's technology to recreate 3D digital cloud and point data and seamlessly translate into full parametric 3D models.

PROBLEM

- Inability to maximize reverse engineering and inspection scanning software and hardware bundles, to create a manufacturable part.
- The need to save time and simplify the process of using 3D design software, currently used by shop floor engineers, with scanned data (Scan to CAD).

BENEFITS

- 3D scanning software integrates portable CMMs (Faro Scan arm and Hexagon Romer Scan arms) directly into CAD (Solidworks, Inventor, SolidEDGE , NX, CREO, SpaceClaim and AutoCAD) as native, editable entities for model creation.
- Saves time by scanning 3D molds, models or parts direct in CAD. Inspect or create drawings, complex surfaces and solids.
- Supports manufacturable data output and AR (augmented reality) models from complex CAD parts.

TECHNOLOGY SOLUTION

- ReverseEngineering.com's proprietary software solves the problem of post processing massive 3D point clouds direct to Solidworks, SolidEDGE, Inventor, Siemens NX , PTC Creo, AutoCad SpaceClaim and MasterCAM .
- Use scanning and digitizing hardware (hard probe or point cloud scans) bundled with ReverseEngineering.com software, to re-create manufacturable molds, models or parts direct in your shop floor CAD.
- Custom classes teach the process of scanning direct to CAD in real-time and with real parts in your shop.

SIEMENS GOVERNMENT TECHNOLOGIES

Lifecycle Management for Depot Maintenance

Matt Brennan | 484-919-8251 | matt.brennan@siemens.com | new.siemens.com

Teamcenter® digital lifecycle management, enables global enterprises to engage every facet of requirements development to retirement of systems and platforms. Integrated idea capture and data management, real-time conferencing, conflict resolution, supplier and program management tools are combined with an industry-leading open design and development solution in a single, shared source of system and platform knowledge. The NX™ suite enables a holistic approach to system and platform development that stresses collaborative knowledge capture and re-use in a managed environment ensuring quality as well as performance. Mentor Graphics provides electronic design automation software and hardware solutions to design, analyze, and test electro-mechanical systems, electronic hardware, and embedded systems software worldwide. Tecnomatix® combines knowledge management with process improvement in a virtual environment that lets you optimize the quality, process, facilities, resource and simulation aspects of your logistics and production operations. Simcenter™ uniquely combines system simulation, 3D CAE and test to help predict performance across all critical attributes earlier and throughout the entire product lifecycle. By combining physics- based simulations with insights gained from data analytics, Simcenter helps optimize design and deliver innovations faster and with greater confidence.

PROBLEM

- Per GAO audit, Naval Shipyard facility conditions are contributing to lost operational days when ships could be at sea.
- Pearl Harbor Naval Shipyard was established in 1908 with majority of its current facilities being constructed during WWII and the Cold War
- Most facilities have exceeded their 67 year life expectancy and are costly to maintain.
- Current facilities are sub-optimally configured/positioned to support current repair mission of Naval Shipyards and are driving inefficiencies and excess travel

BENEFITS

- Optimize equipment and processes to increase efficiencies
- Determine, prioritize and validate which capital investments are needed and will have the greatest ROI
- Provide assurance that investments will yield results sought.
- Maximize workforce allocation
- Reduce costs and waste

Impact on Warfighter:

- Increased operational days at sea
- Improved ship readiness

TECHNOLOGY SOLUTION

Employing simulation software to create a baseline digital model to simulate the "As-Is" condition of facilities, equipment, personnel, and maintenance and sustainment work processes. "As-Is" model is referred to as a digital twin.

Once created, the user can then make and test changes to the digital twin to optimize the shipyard maintenance and sustainment processes by digitally changing infrastructure, equipment lines and/or processes to test and challenge scenarios in a closed environment, creating the optimal shipyard plant layout and configuration.

Optimization run: Shops 56/57 moved to DD3. Distance travelled during availability decreased from 9M ft to 4.5M ft.

SILVER FIR SOFTWARE

Attila Radiation Transport Software

Connor Trepton | 253-432-6847 | connor.trepton@silverfirsoftware.com | silverfirsoftware.com

The Attila Software Suite takes a graphical user interface (GUI) based approach for radiation transport calculation. Users create, or modify, a computer-aided design (CAD) model in the software package of their choosing, then pull that model in the Attila suite using the Parasolid or ACIS formats. A contiguous mesh is generated within the Attila suite and material properties are created and assigned. After assigning materials, the user defines the source region/regions and Attila deterministically solves the Boltzmann Transport Equation to obtain flux and dose everywhere in the model. The dose is then viewed in a CAD-based visualization tool. If your organization would benefit from a faster analysis turnaround, we may be able to help. If your bottleneck is building geometry, Attila offers best-of-class geometry creation/cleanup through SpaceClaim®. Attila also includes state-of-the-art solution visualization through Tecplot® 360, providing intuitive solution field insight and the tools to easily and attractively present results to non-technical audiences. Organizations may also benefit from independent dose solution verification. For this reason, the Attila Software Suite also comes with Attila4MC. Attila4MC uses a stochastic approach to obtain the dose at points of interest, or everywhere in the model. This solution can be obtained using the same CAD model and contiguous mesh that users prepared for the deterministic run, further enhancing productivity. When dose calculation accuracy is critical, the Attila Software Suite provides a streamlined process to obtain up to two independent solutions and can present the findings in a manner that is easy to understand.

PROBLEM

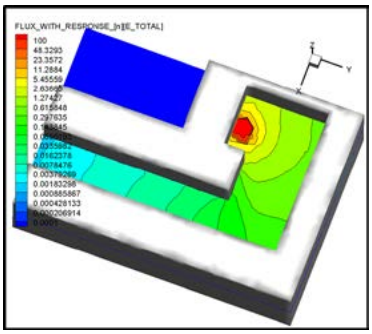
Inaccurate dose calculations can lead to personnel overexposure and delays in workflow execution. Engineers and technicians who are responsible for determining dose need tools that are easy to use and provide accurate results that can be verified and easily presented to management.

BENEFITS

- Allows user to precisely capture the geometry of the work area
- GUI-based problem setup
- Able to model Neutron and Gamma radiation
- High solution accuracy
- Independent solution verification
- Dose field mapping
- Easy to present solution

TECHNOLOGY SOLUTION

The Attila Software Suite provides users with state-of-the-art CAD tools for geometry creation/cleanup, a GUI-based approach to calculation setup, two completely independent solution methods, and easy to use solution visualization software.



SURCLEAN, INC.

Laser Ablation Surface Cleaning

Susan Sprentall | 248-797-9352 | slsprentall@surclean.com | www.surclean.com

Coated surfaces need to be repainted after some period because aging and environmental conditions impact the surfaces' performance. Laser methods remove more paint per unit time, have few consumables, produce minimal waste (a volume smaller than that of the paint itself), produce no hazardous waste, use no water, and do not expose operators to hazardous chemicals.

SurClean, Inc. has developed a real-time, closed-loop laser process controller (LPC). The LPC analyzes the material being ablated in real time and based on this analysis decides what laser power level is best suited for aggressive coating removal. The LPC modulates the laser power such that high energy is emitted when paint needs to be removed and low (or no) energy is emitted when passing over the primer and/or substrate.

The LPC proven attributes allow it to be used for a broad range of coating removal applications since sensing methods are not color dependent, thus the system can be tuned to remove a wide variety of coatings, such as anodizing and oxide removal.

SurClean has demonstrated it discriminates 5 of the 7 stealth coating layers.

The control panel integrates with other sensors i.e., thermal detection providing numerous means to detect the differences between the coating to be removed and the material to be protected providing optimum protection.

SurClean's HyperScan™ Optic provides a continual delivery of laser light utilizing 95-99% of the laser output power.

The 8kW Mobile Cleaning System is the first totally self-contained handheld laser ablation unit for forward deployment and for standalone use in a fabrication shop. The handheld is ergonomic, lightweight, and designed for easy replacement.

PROBLEM

- Unplanned maintenance due to corrosion and coating adhesion issues impacts the DoD asset availability and threatens the security of our country.
- Utilizing traditional methods –chemical, abrasive, grit and water blast:
- Generates hazardous waste
- Time consuming
- Greater risk of asset damage –uncontrollable
- Are not composite compatible
- Harmful to human capital and the environment

BENEFITS

Generates a small volume of ash particulate
•Non-hazardous particulate in most cases
•Generates less air particulate than OSHA standard
•No substrate damage under a variety of conditions
•Does not change metallurgical properties
•Does not damage composites (must be same resign across asset)
•Ability to strip topcoat without removing primer
•Not dependent on paint color to discriminate layers
•Normal ROI less than 2 years confirmed by third parties
•Automation available for 90% applications providing repeatability

TECHNOLOGY SOLUTION

LASER IS SAFE. PRECISE. CLEAN., Laser ablation removes more paint per unit time, Produces minimal waste (a volume smaller than that of the paint itself),

- No hazardous waste, water to capture or air particulate
- SurClean addresses two primary concerns:
  - COTS Use of off the shelf laser sources from 500 W to 15kW, chillers, fibers, exhaust systems, robotics.
  - Lack of precision –removing more paint than desired, impacting profile and damage to structure and substrate SurClean Laser Process Control provides layer by layer removal, protecting substrate.
- Ergonomic and safety concerns addressed with design, weight of unit and offering robotic interactions, total automation or flexible systems.

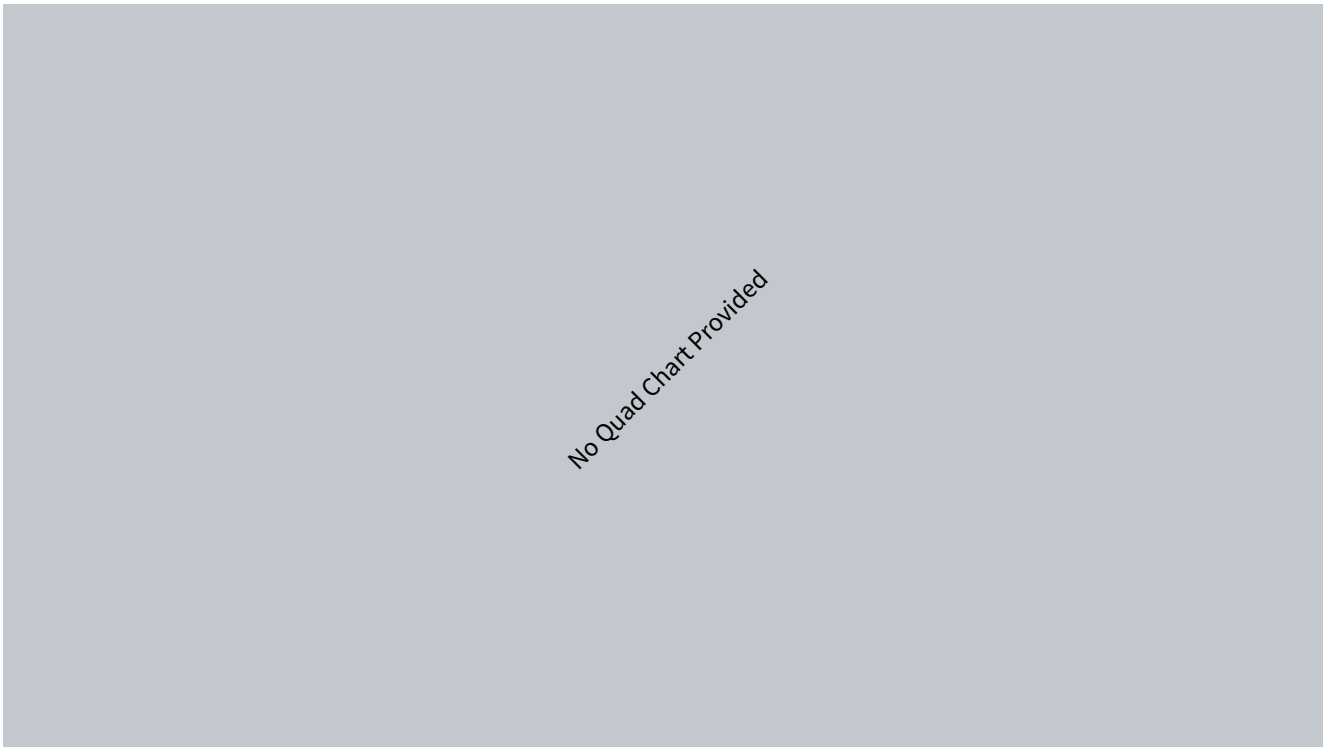
TRAINING/MISC.

SWAGELOK NORTHWEST (US)

Orbital Welding, Fluid System Components, Services and Training

Matt Kline | 360-303-7075 | matthew.kline@swagelok.com | nwus.swagelok.com

Swagelok Northwest (US) is your exclusive local sales and service center for the Pacific Northwest. Our end-to-end quality system and knowledgeable team of associates have helped serve communities and transform countless fluid systems. With unparalleled quality, performance, and safety, Swagelok Northwest (US) is the provider you can trust. We're your source for first-rate fluid system products, solutions, and training.



TEMPLE ALLEN INDUSTRIES

Stand-Up Abrading Machine

Cele Bryan | 240-888-6931 | cbryan@templeallen.com | templeallen.com

The Temple Allen SAM™ (Stand-up Abrading Machine) is configured with a random orbital 5” pad as an alternative for those applications requiring moderately-aggressive scuffing, sanding and removal of paint. While not as aggressive as its paint stripping counterpart, this SAM is an ideal tool for moderate levels of surface preparation.

The true benefit of this technology is in its ergonomic application of our vibration-reducing technology. This tool is designed to best position the artisan and the sander(s) for a given application.

The Temple Allen SAM Deck Scaler takes the already-proven Aurand MP6, mounts it on an ergonomic and vibration-dampening control handle to enable maintainers to confidently wield the tool while standing comfortably, and adds an integrated dust collection system and carry handle.

SAM Scaling Tool — PROBLEM — Paint Stripping Technology

Removing failing non-skid deck surfaces prior to resurfacing exposes artisans using the Aurand MP6 or other scaling tools to injury risks associated with vibration, poor postures, high grip forces, and repetitive stress.

Injured artisans often require surgery, therapy, and retraining.
Injured artisans lower net productivity, require training of replacements, and lower morale.

The difficulty of recruiting new artisans for difficult and dirty jobs makes keeping existing artisans healthy especially important.

Aircraft paint is made to withstand dramatic temperature changes, unrelenting UV exposure, and Mach+ airflow. Such durable paint is difficult to remove during repaint operations.

Pneumatic random orbital sanders are moderately effective on aircraft paint, but all such tools are hard to use in ergonomically challenging environments, such as on hands and knees.

An effective tool is needed that allows for more productivity and addresses the ergonomic challenges that make tool use on many surfaces so difficult.

SAM Scaling Tool — BENEFITS — Paint Stripping Technology

In addition to eliminating injuries associated with manual use of scaling tools, Temple Allen’s SAM systems:

- Reduce fatigue levels, reduce errors, and improve morale
- Generate more consistent results from each artisan
- Improve productivity by decreasing micro-breaks
- Make recruiting and retaining artisans easier
- Improve dust and debris collection

In addition to eliminating injuries associated with manual use of sanding tools, Temple Allen’s EMMA and SAM PS systems:

- Offer standard and enhanced sanding modes in one tool
- Generate more consistent results from each artisan
- Improve productivity by reducing micro-breaks
- Reduce fatigue levels, reduce errors, and improve morale

SAM Scaling Tool — TECHNOLOGY SOLUTION — Paint Stripping Technology

- Temple Allen’s SAM (“Standup Abrading Machine”) Scaling System mounts the same approved Aurand MP6 tool now in common use on an ergonomic and vibration-reducing handle
- Systems are 100% pneumatic and require only 95 psi clean, dry air – no electricity, no complicated infrastructure modifications
- Artisans can carry systems up stairs and to work area
- Pivoting handle accommodates height differences
- Artisans operate from full standing position
- Integrated vacuum and debris shroud
- Temple Allen’s patent pending Paint Stripping End Effector can be deployed on both EMMA™ and SAM™ systems
- Systems feature dual mode sanding for aggressive paint removal and proper feathering into adjoining surfaces
- Removal rate improved via concentrated sanding pressure
- Systems are 100% pneumatic and require only 95 psi clean, dry air – no electricity, no complex infrastructure modification
- Artisans protected from vibration exposure and injuries
- Artisans operate from comfortable position, allowing for safer and more productive work

THERMO FISHER SCIENTIFIC

Viewpoint™ Remote Monitoring Radiation Detection System

Rich Palatine | 770-703-9933 | rich.palatine@thermofisher.com | www.thermofisher.com

The ViewPoint system provides real-time personnel and environment monitoring during normal and outage operations. The ViewPoint system has the capability to integrate radiation and environmental, and general purpose detectors from Thermo Fisher Scientific's portfolio and other vendors. The ViewPoint system provides users the ability to centrally process and analyze instrument/detector data. A major benefit is the sturdy design which is robust, secure and scalable.

PROBLEM

Remote readings of radiation detectors is an essential ALARA tool in many high dose and dose rate fields. However, technology limitations, system complexity, and price ($$) often prohibit the leveraging of this effective ALARA solution.

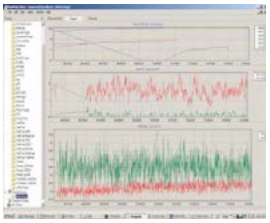
BENEFITS

- **Comprehensive coverage**-Integrates Thermo Fisher Scientific and third party personnel dosimetry and area monitors.
- **Simplify data management**-Centralization of instrument data providing an efficient, optimized operational management by integrating personnel, environmental, and process monitoring.
- **Enhanced data analysis**-User-friendly, highly customizable and configurable instrument data management with logging, reporting and sophisticated real-time trending.

Technology Solution

The system provides simple to deploy, and cost-effective radiation monitors that are capable of communicating with PC's and SMART mobile devise. The technology uses legacy radiation detectors commonly used in the Navy with communications technology also deployed in the shipyards.

VP SAT Remote Monitoring Station



Viewpoint™ S/w

TRANSCO PRODUCTS, INC.

Radvision 3D®

Jeremy Hilsabeck | 312-896-8458 | jhilsabeck@transcoproducts.com | www.transcoproducts.com

For more than 50 years Transco Products Inc. has been focused on manufacturing and providing service to the nuclear power industry. Transco provides innovative solutions to address the industry's need for permanent radiation shielding and metal reflective insulation and offers a full range of services including design, testing, fabrication, and installation. Our engineered products are designed to support site specific requirements for safety, quality, and performance and are manufactured under strict quality assurance requirements. In response to increased ALARA needs for both existing facilities and those to be built, Transco continues to lead the way in developing new, qualified products and services that respond to the complete range of customers' needs. Transco is pleased to present our RadVision3D® suite of radiation visualization and mitigation products and services, designed to give decision-makers valuable information for capital project planning.

PROBLEM

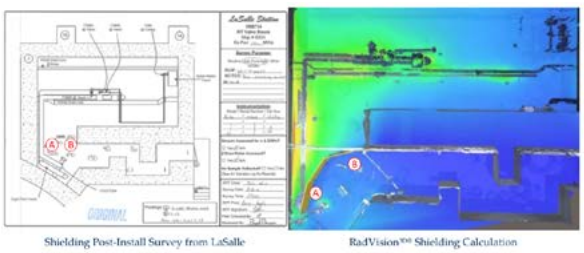
Traditional radiation surveys are performed manually by technicians and are communicated through printed, typically hand sketched dose and contamination maps. However, the complexity of both the plant geometry and the radiological conditions limits the information that can be gathered and communicated using traditional survey methods and maps.

BENEFITS

- Capture as-built, to scale plant geometry using LiDAR
- Visualize all radiometric sources and their location in an environment
- Capture isotopic information using CZT technology
- Virtually optimize shielding solutions and source removal
- Fully immerse workers in a virtual environment for realistic training and work planning

TECHNOLOGY SOLUTION

Introducing Transco's RadVision3D® suite of products and services for gamma radiation source mapping and intervention analysis – the RadVision3D® system (a) captures three-dimension optical, point-cloud (lidar) and gamma radiation data (b) analyzes and merges the data into 3D geometric/radiological models (c) generates interactive visualization tools and (d) employs these visualization tools into practical work applications such as shielding and work training.



Shielding Post-Install Survey from LaSalle — RadVision™ Shielding Calculation

Survey Location	Survey Data	RadVision™ Data	% Error
A	500 mRem/h	483 mRem/h	3.5%
B	290 mRem/h	270 mRem/h	7.4%

ENHANCED INSPECTION

VERISURF SOFTWARE, INC.

Complete Digital Solution for 3D Measurement

Brandon Wade | 208-720-3685 | brandon.wade@verisurf.com | www.verisurf.com

Verisurf Software, Inc. is a 3D measurement solutions company, committed to delivering advanced computer-aided surface analysis, inspection, tool building, assembly guidance, reverse engineering and education solutions. The software is compatible with all major CAD formats and interfaces with the latest in measurement technology and makes them more productive including all portable CMM's measuring arms, laser trackers, scanners, and laser projectors from Faro, Romer, Leica, API, Steinbichler, Aicon, Kreon, Creaform and more. Verisurf software helps manufacturers produce higher quality products in less time and at a lower cost with automated, model-based processes.

PROBLEM

Meeting manufacturing quality objectives requires confirmation that finished dimensions consistently meet design specs. Failure to meet such objectives can result in costly delays, expensive waste and scrap, or even catastrophic system failure. Avoiding these potential problems requires the integration of 3D metrology systems into overall production processes. Verisurf fulfills this requirement with an array of solutions that enable inspection, tool building, reverse engineering, guided assembly, and much more.

BENEFITS

- Complete digital solution for 3D measurement
- CAD-based
- Enables flexible measurement workflows
- Inspect to CAD or blueprint nominals
- Common platform for CMMs, trackers, & arms
- Complies with industry standards
- Integrated CAD/CAM/CAI
- Built-in translation validation
- Easy-to-learn, easy-to-navigate interface
- Multiple, useful capabilities unique to Verisurf

TECHNOLOGY SOLUTION

Verisurf develops and markets CAD-based, 3D measurement software and hardware solutions for manufacturers that is used to manage inspection, tool building, reverse engineering, and guided assembly workflows. Supports all common measurement hardware including manual and programmable CMMs, portable CMM arms, laser trackers, laser radar, and laser projectors. Supports all common geometry file types.

ZOLLER INC.

Tool Presetting, Measuring, Inspection, Automation & Tool Management Solutions

Michael Gallier | 734-887-0450 | gallier@zoller-usa.com | www.zoller-usa.com

ZOLLER Inc. is a technology focused company that has been developing innovative tool presetting and inspection machines as well as Tool Management Solutions software for optimal management of cutting tools for over 70 years. The portfolio of solutions ranges from tool presetting, inspection, balancing & shrinking machines to integrated automation and tool storage options, as well as TMS Tool Management Solutions software with interfaces to most major CAD/CAM programs. ZOLLER's equipment and technology is used worldwide, particularly in the automotive and aerospace industries, in hydraulics and pneumatics manufacturing, as well as many other emerging fields and markets. The ZOLLER brand stands for technological innovation, a consistent commitment to quality and a sense of efficiency. Our integrated hardware and software solutions are developed in-house in order to provide verifiable productivity increases and grow with the challenges of the future of modern manufacturing. Our promise to our customers is a clear, consistent and traceable increase in productivity in their production processes. More speed, higher quality parts, and secure processes; This is what our solutions stand for.

PROBLEM	BENEFITS
Manufacturing inefficiency can lead to longer production times, less accuracy and repeatability, and lower quality parts. These challenges include bottlenecks, missing tools, higher scrap, and under-utilized machine tool spindles. If you're not making chips, you're losing money.	Tool presetting, measurement, inspection, automation and tool management from ZOLLER eliminate machine tool downtime for presetting and missing tools thanks to tool management with traceability, and ensure repeatable accurate inspection and measurement results and faster, more efficient production processes.
TECHNOLOGY SOLUTION	
ZOLLER's solutions in its four core areas of business (tool presetting & measuring, inspection & measuring, automation and tool management software) are modular, and fit into your existing manufacturing processes whilst meeting your exact specifications. With ZOLLER, users are fully prepared for the challenges of Industry 4.0.	

Technology Index

READY SYSTEMS @ THE SPEED OF RELEVANCE

DEPARTMENT OF DEFENSE MAINTENANCE SYMPOSIUM

SAVE THE DATE:

DECEMBER 9-12, 2019
SPOKANE, WASHINGTON
sae.org/dod

P19349335

Administrative support provided by SAE International under contract with the U.S. Department of Defense

Just announced

NCMS MEMBERS MEETING & TECHNOLOGY SHOWCASE

Army Research Laboratory
Aberdeen Proving Ground
Aberdeen, MD

The NCMS Members Meeting welcomes current and prospective NCMS members to a morning meeting session and complementary breakfast and presentations by NCMS staff and current members.

Immediately following will be an NCMS Technology Showcase that will welcome representatives from several DoD installations, industry/academic partners, and local, state, and federal government to tour the technologies from some of our most innovative industry partners.

SAVE THE DATE

SEPTEMBER 19, 2019

TECHNOLOGY REQUESTS
Numerous specific technology requests from ARL.

FACE-TO-FACE
Interact directly with government representatives who would use or implement your technology.

OUR STRATEGY
Engage directly with the NCMS ecosystem and see first hand how the network can work for you.

FOR MORE INFORMATION
visit www.ncms.org/events

NCMS
NATIONAL CENTER FOR MANUFACTURING SCIENCES