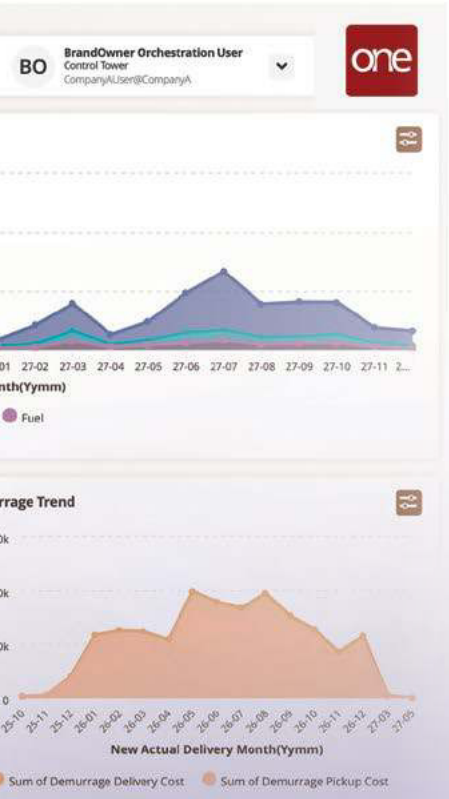
# CTMA Delivers Technology Transition Success Stories

**By Christina LaRose, NCMS**


The term “valley of death” is used in both the public and private sectors to describe the challenges of transitioning promising new inventions into sustained usage. To provide maximum assistance with technology transition, the CTMA Program leverages our network of industry, government, and academic partners to develop, demonstrate, and transition innovative technologies efficiently, with less risk and lower cost. Since 1998, the CTMA Program’s agile and streamlined contracting vehicle has successfully transitioned maintenance, sustainment, and logistics technologies into the DOD to improve warfighter readiness.

CTMA collaborations have developed and demonstrated numerous technologies, many of which have fully transitioned to the DOD and have been used for several years, including a portable fluid testing and diagnostic tool, a multi-pole switchable permanent magnet technology, a product lifecycle management (PLM) suite of digital tools, and a Platform as a Service (PaaS) technology.




## Spectro FieldLab 58—AMETEK/Spectro Scientific

Gas turbine engines power airplanes, ships, trains, electrical generators, and a wide range of other vital equipment. To function properly, gas turbine engines require oil to lubricate the air and gas compressors, to provide cooling, and to protect from sludge, rust, and corrosion. Yet, until recently, testing the quality of turbine oil required maintenance professionals to take an oil sample and send it to a lab for testing. This creates a burden for many industries with equipment operating in remote locations and demanding conditions, where taking equipment offline for service is time-consuming and costly.

To help maintainers understand the condition of their equipment immediately, a three-phase CTMA collaboration—the Expeditionary Fluid Assessment Capability (EFAC)—brought together AMETEK/Spectro Scientific, an electronic instruments manufacturer, with the US Air Force and Marine Corps to create the Spectro FieldLab 58, a battery-powered, portable fluid testing and diagnostic tool that provides maintenance personnel with real-time assessments of equipment fluid conditions. The FieldLab 58 delivers fast results of fluid chemistry contamination and viscosity. Additionally, the FieldLab 58 includes x-ray fluorescence and a filter particle counter to test for residue of 16 different elements.

First-generation FieldLab systems focused on ground-based systems and military customers. The current version includes performance upgrades to support commercial aviation, among other industries. Designed to assist maintenance professionals who manage high-value assets, the FieldLab is used in industries such as automotive, trucking, marine, power generation, industrial manufacturing, metals processing, mining, oil and gas exploration, and more. Maintainers can use the portable, lightweight device to obtain rapid oil analysis results with quality similar to oil analysis labs.

The FieldLab 58 is particularly useful in the aviation industry. As Bob Wopperer, AMETEK/Spectro Scientific's government lead noted, it is very important in aviation to monitor the bearings inside the gas turbine engine. The FieldLab 58 can start to pick up the metal

**The Spectro FieldLab 58 is a portable fluid testing and diagnostic tool that indicates fluid chemistry contamination, viscosity, and other measures of health. (Photo courtesy of AMETEK/Spectro Scientific.)**

shavings in the oil long before the bearing will fail. This technology alerts maintainers to change out those bearings before failure, preventing a potential crash.

## Multi-Pole Switchable Permanent Magnet Technology — Maglogix

As the only multi-pole (MP) switchable magnets in the industry, Maglogix magnets have found a place in the NCMS and CTMA community. These lightweight and powerful magnets work as well on thin steel as they do on thick, allowing for use in myriad environments where magnets could not be previously deployed. Military and civilian facilities are using Maglogix magnets to solve their safety and steel handling problems, and to create custom solutions that protect personnel and materiel. These MP magnets replace tack welds, lift all thicknesses of steel, tether equipment, and enhance operator safety while reducing fatigue. Maglogix magnets also allow for welding very close to the magnet without affecting the arc.

Maglogix magnets are switchable—turning on and off without a power source, unlike electromagnets, which require a constant flow of electricity to maintain a magnetic field and will drop objects in the event of a power loss. Maglogix's magnets won the 2018 CTMA Technology Competition, which provides an opportunity for commercial and government sources to showcase maintenance innovations to DOD leaders.

A technology that is designed for easy modification, attachment, and integration, Maglogix's magnets have transitioned into multiple DOD services. Marines worldwide use these magnets for removing and installing wheel blast deflectors in Medium Tactical Vehicle Replacements (MTVRs), eliminating the need for maintainers to handle 240 pounds of sharp, rusty steel by hand, improving safety, and saving time.

Anniston Army Depot uses MP magnets for steel lifting, as MP magnets can lift up to 2,200 pounds of steel and are safer and easier to operate than previous magnet systems. Letterkenny Army Depot in Pennsylvania employs Maglogix's MX-V drill stand, which enables faster, more accurate drilling with much less effort, using far fewer drill bits.

Naval Base Kitsap utilizes Maglogix's magnets to hold fixtures on submarine hulls during upfits and repairs, even holding radiation detectors to ensure operator safety. Huntington Ingalls Industries (HII) and Electric Boat are using Maglogix's magnets in manufacturing processes to speed hull segment alignment of the Columbia-class submarines, eliminating scarring, hull failure potential, and need for engineer inspections, saving time, cost, manpower, and consumables. HII shipyards integrate Maglogix's magnets in multiple departments, eliminating tack welds, helping maintainers safely handle steel, and ending cut and crush injuries. Maglogix's magnets have sped up steel alignment at HII shipyards by up to 97%, achieving significant cost reduction.

Maglogix was awarded a Small Business Innovation Research

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(SBIR) grant, for a multi-year effort (2014-19), to attach new and experimental armor to the Family of Medium Tactical Vehicles (FMTV) cabs, using magnets to hold the armor in place. Ballistics testing and live IED explosion scenarios proved that Maglogix's magnets could hold the armor, dramatically reducing the up and down armor time and effort.

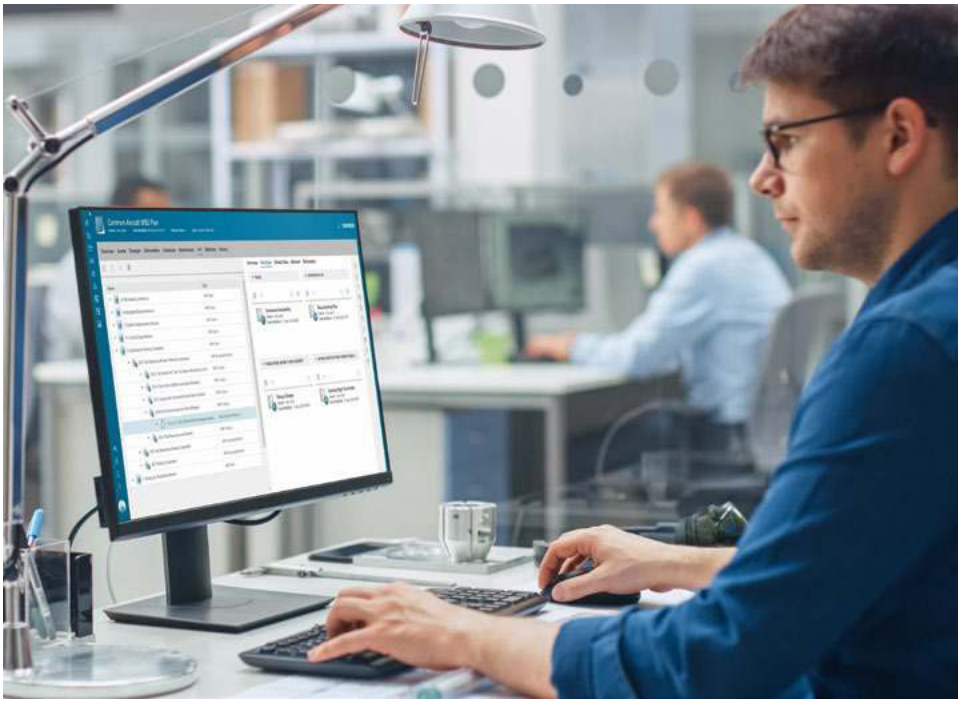
In 2022, Maglogix participated in the REPTX event at Port of Hueneme in California, performing a battle damage control and repair exercise, reducing the time required to perform five water infiltration scenarios by 95%. The Maglogix team created tether points where none existed and allowed for rapid deployment of test targets, along with lowering robots and equipment into the water and lower decks.

## Teamcenter — Siemens

Every major industry—automotive, aerospace, consumer products, utilities, gas, oil, electronics, medical equipment, and many more—uses product lifecycle management (PLM) systems to track their products from inception to end-of-life in order to improve efficiency, quality, and durability. Beginning with the concept and design phase, then moving through development, production, launch, and service, the PLM process ends with a focus on product disposal. Companies use PLM software to manage product data and processes including designs, electronics, embedded software, documentation, and bills of materials (BOMs). The CTMA Program completed a multi-phase collaboration with the digital industries division of Siemens to bring Teamcenter—the preeminent PLM suite of digital tools used in many commercial industries—to support the NAVAIR Fleet Readiness Centers (FRCs).

Implementing a PLM system for the first time can present

**Pictured is a Maglogix HandLifter. These magnets can replace tack welds, enabling maintainers to weld very close without affecting the welding arc. These magnets can also be used as a hand rest, which reduces operator fatigue and increases safety. (Photo by Ted Brooks, courtesy of Maglogix.)**



**Teamcenter PLM software enables traceable, connected, and synchronized data for products to be fully accessible throughout a product's life cycle.**

multiple challenges. Reams of product-related data may exist, but often much of it remains disorganized, dispersed throughout different workgroups, and hard to access. Consequently, extracting the right data and translating it into actionable intelligence is often difficult. A series of projects were executed to develop "PLM-in-a-Box–Early Acquisition Edition," focused on the specific needs of DOD partners. The templated solution contains the virtual machine application copy and supporting documentation to enable deployment to a host environment for PLM onboarding and ongoing program management.

NAVAIR uses Teamcenter to integrate all the technical data for airplanes, helicopters, and support equipment. The system greatly enhances the ability of FRCs to manage technical data, perform reverse engineering on out-of-production parts, update legacy CAD/CAM data, and validate and inspect data.

NAVAIR also uses Teamcenter as a digital/virtual depot, which equips stakeholders with a proven, reusable process for all maintenance and repairs. Employing this PLM system successfully reduced cycle times and costs, along with providing needed data to support the Navy's goal of fleet readiness. Since the project's completion in 2020, three FRC locations—Southeast, Southwest, and East—have been sharing data, resources, and manufacturing capabilities throughout the life cycle of their products.

The success with NAVAIR has paved the way for the use of Teamcenter throughout the DOD. For instance, since early 2021 the software has been the standard PLM system for the Air Force, which uses Teamcenter as the foundational system of record to support its digital acquisition and sustainment strategy for critical systems and technologies across the service.

"CTMA was the prime mover for enabling the PLM in the FRCs in NAVAIR," said Greg Kilchenstein, NCMS's Chief Technologist. "The project we executed through CTMA led the way for the entire DOD."

## The NEO Platform — One Network Enterprises

One Network Enterprises' NEO Platform is sometimes compared to renting a car: while you don't own the technology, it still gets you where you need to go. The NEO Platform—a cloud-based development and deployment environment—is provided by a third-party company that maintains servers, networks, storage, software, and databases. In both the public and private sectors, many organizations use Platform as a Service (PaaS) to reduce their infrastructure management and to conveniently adopt new applications and technologies. For example, by fusing and federating information, PaaS enables the supply system and the maintenance management information system to communicate.

One Network, a multi-party digital platform company and an NCMS member, has been supporting the DOD

since 2007, with projects in all DOD major service arms. Among One Network's implementations are several accountable property systems of record (APSRs) supporting mission critical operations on the .mil network. The CTMA Program has helped to advance PaaS technology with industry partner One Network Enterprises in five separate projects.

One CTMA collaboration with One Network helped to advance the Marine Corps' Logistics Information Technology (Log IT) system by improving the system's communications, efficiency, data mining, analysis, and visualization. After three years and four months of implementation, using PaaS in the Marine Corps' IT system saved $9.9 million.

"If you look at supply chain, ERP [enterprise resource planning] systems, and software today in commercial industry or in the military, the complexities are defined by the sheer volume of users, the number of parties across supplier or client base, across multiple tiers," said Drew Juska, Director, Industrial, Automotive & Aerospace at One Network. "By creating a single version of truth, the NEO Platform enables the flexibility to observe all of these transactions across multiple parties in the network."

"Platform as a Service is now being transitioned to all the military services to enable information-based decisions," said Debbie Lilu, NCMS's Vice President of Maintenance & Sustainment, and Business Development.

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>
> *-Greg Kilchenstein, NCMS*

Moreover, leading global organizations have joined One Network's Digital Supply Chain Network™, helping to transform industries such as retail, food service, consumer goods, automotive, healthcare, public sector, telecom, defense, and logistics.

"Three out of the five top grocery retailers comprising 35% of the US market operate on the Digital Supply Chain Network," said Juska. "In the manufacturing industry, with One Network, all the suppliers are connected, so companies are immediately able to identify the location of needed parts."

## CTMA Fuels Technology Transition

NCMS's CTMA Program facilitates technology transition by creating collaborative project teams connecting the DOD with trusted, vetted industry and academic providers.

The framework enables new technologies to be adopted and adapted to meet DOD requirements in a streamlined way. Companies that partner on CTMA projects benefit by gaining access to DOD facilities and equipment, reducing the cost of research and development through leveraging and sharing, lowering time between innovation and commercial production, and enhancing DOD preparedness while achieving corporate objectives. The DOD benefits from CTMA projects by securing commercially available technology solutions and gaining the ability to test, evaluate, and fine-tune those technologies prior to acquisition. To learn more about the CTMA Program, please visit: https://www.ncms.org/ctma/. ◄