

WHO

SYSCOM: ONR

Sponsoring Program: NAVAIR

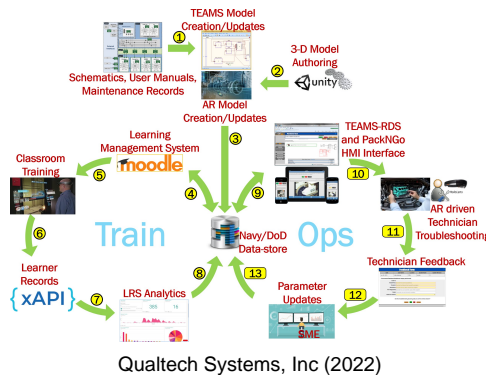
Transition Target: Marine Corps Engineer School (MCES), Marine Corps Combat Service Support Schools (MCCSSS)

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Other Transition Opportunities: Marine Corps Communication-Electronics School (MCCES)  
3rd Battalion, 5th Marines (V35)

Notes: The CONOPS is described below:

1. Build a cause-effect dependency TEAMS® model of interconnected components of the Navy equipment.
2. Generate AR content to render the guided troubleshooting steps by the TEAMS® reasoner.
3. Deploy "TEAMS® + AR" model for schoolhouse technician training, and guided troubleshooting in the field.
4. Utilize Moodle Learning Management System for knowledge management and hosting of training content.
5. Automatically generate training content in Moodle using model-based fault reasoning.
6. Students undergo maintenance training in the schoolhouse with simulated failures.
7. Convert training steps recorded by TEAMS-RDS® to xAPI learner records and log in Learning Record Store.
8. Analytics from the Learning Record Store is mined to assess problem areas in the training regimens.
9. The TEAMS® model is deployed to run-time reasoners, TEAMS-RDS® and TEAMATE®, for field operations.
10. Field troubleshooting by technicians using TEAMS-RDS® on tablet, or HoloLens for hands-free operations.
11. Technician feedback, including pictures or videos during troubleshooting is incorporated into the model.
12. Subject Matter Expert reviews feedback, verifies model quality via TEAMS® analyses, and updates model.
13. The updated model is re-deployed within the training facility for in-house training.



Qualtech Systems, Inc (2022)

WHAT

Operational Need and Improvement: Schoolhouses have the need to modernize training for technicians that maintain Marine Corps equipment. However, there is a disconnect between maintenance operations in the field and what is taught in the schoolhouse. This results in training material always lagging the equipment. Furthermore, the training lacks standardized metrics that can quantitatively measure the cognitive grasp of a student population. Hence, there is a need to keep the training up to date with operations via a single-source-of-truth knowledge repository.

- Specifications Required:
- Integration of Augmented Reality/Virtual Reality (AR/VR) into Naval maintenance training and operations
  - Learning Sciences approach to assess human performance and adapt the training tasks to learner's skills
  - Seamlessly incorporating feedback from the field into schoolhouse training
  - Connected-disconnected operations
  - Seamless immersive training content creation pipeline

Technology Developed: Model-based decision support solution that combines system health management with learning sciences and commercial AR/VR hardware for efficient maintenance in a "hands-free" environment and training within a schoolhouse. Agile TrainOps (Training + Operations) paradigm with a continuous improvement process, encompassing field deployment, efficient troubleshooting sessions driven by intelligent reasoners, model refinements through operational maintenance data capture and technician feedback to improve schoolhouse training.

- Warfighter Value:
- Reduces the technician's reliance on shore support and paper procedures
  - Aids in building and sustaining necessary knowledge, skills and abilities (KSAs) in maintenance technicians
  - AR-driven maintenance performed in the field becomes an integral part of system "life-cycle"
  - Performance and experience gained in the field is channeled back into the "schoolhouse" training (after action review - AAR) for improved maintenance effectiveness in the Navy
  - Less technicians performing a wide variety of maintenance tasks, saving time and reducing task errors

WHEN

Contract Number: N68335-20-C-0830      Ending on: Aug 09, 2025

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Development of the Immersive Training Content Creation Pipeline's software components	Low	Internal evaluation and prototype testing, including creating in-house digital courses from MCES and MCCSSS training material	6	1st QTR FY24
Technology undergoing trials at MCES	Medium	Democratization of immersive content creation at the hands of the schoolhouse instructors	7	2nd QTR FY24
Technology evaluation by MCCSSS instructors	Medium	Ability to transfer a course Annex to an in-house Moodle instance for student training	7	3rd QTR FY24
Technology deployment at 3rd Battalion, 5th Marines (V35)	Medium	Ease of installing the immersive content pipeline software components rapidly in a Marine Corps facility	7	4th QTR FY24

HOW

- Projected Business Model:
- The initial development costs of the Maintenance Training addon modules will be covered by SBIR funds. There will not be any additional manufacturing cost incurred.
  - Once development is complete, seek commercialization partners in consultation with the Navy TPOC, specifically partnerships with technology primes
  - Utilize sales and marketing channels such as seminars/webinars, trade shows, customer forums, press releases and social channels

- Company Objectives:
- Efficient delivery of learning content for schoolhouses
  - Application of AR/VR technologies for maintenance operations and training
  - Support for distributed learning
  - Learning Sciences -driven training customization

- Potential Commercial Applications:
- Military AR (MAR): Creating an agile warfighter through effective training
  - Manufacturing: Bridge the skill gap by providing expert remote assistance and support in operations
  - Maintenance, Repair and Overhaul (MRO): Attaining efficiency by accelerating the maintenance and repair activities
  - Energy and Utilities: Improve first-time fix rates for critical equipment and increase technician safety