

**WHO**

**SYSCOM:** NAVFAC

**Sponsoring Program:** Naval Facilities Engineering Systems Command (NAVFAC)

**Transition Target:** NAVFAC, particularly Mobile Utilities Support Equipment Division (MUSE), Marine Corps Systems Command (MCSC), NAVSEA

**Other Transition Opportunities:** All other DoD branches for operations and emergency response; remote, island, rural, and tribal communities; microgrids; off-grid industrial sites; industrial and energy production sites including those focused on hydrogen production.

**Notes:** PAX H2(O) is a low-temperature distillation system that uses waste heat to purify water of any salinity with lower maintenance and higher recovery rates than reverse osmosis (RO). Originally targeted at integration with hydrogen electrolyzers, the technology target has expanded to expeditionary forces and installations seeking water resilience. PAX Scientific engineers are developing a multiple-effect system (see image) that will reach TRL7 in June 2024.

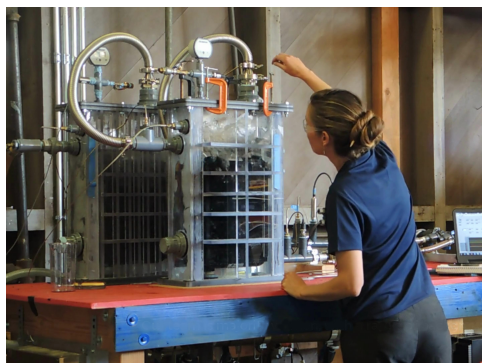


Image courtesy of PAX Scientific, 2023

**WHAT**

**Operational Need and Improvement:** Potable water from robust, simple, and energy-efficient systems will greatly enhance mission performance and bolster water resilience in expeditionary environments and on remote DoD installations.

Compared to the current baseline of reverse osmosis water purification (RO), PAX H2(O) purifies water of any salinity, is filter and chemical free, with lower maintenance time and cost, and higher water recovery rates.

**Specifications Required:** The product developed for expeditionary forces will have similar size, weight, power and cost as Lightweight Potable Water Systems (LPWS), and be able to integrate with waste heat and renewable energy sources including diesel generators and/or photovoltaic panels.

The product targeted at installations and naval piers will integrate with waste heat equipment (particularly diesel generators) and can leverage installed photovoltaic systems to provide potable water during grid outages.

**Technology Developed:** Inspired by the use of waste heat in natural systems, PAX H2(O) is a low-temperature distillation system with very low maintenance and electricity requirements.

Innovation in materials and process steps enables cost-effective distillation at smaller scale.

The technology is currently at TRL6 and will exit Phase II in June 2024 at TRL7.

It is ideally suited to environments with renewable energy and high-salinity water sources.

**Warfighter Value:** Water resilience with lower maintenance and higher water recovery than the baseline RO solution is a key value for the warfighter. The technology also expands the use of saline water and renewable energy sources, modernizing key capabilities while minimizing logistics requirements.

**WHEN**

**Contract Number:** N68335-22-C-0195

**Ending on:** Apr 14, 2024

Milestone	Risk Level	Measure of Success	Ending TRL	Date
System process and techno-economic model	Medium	Prototype performance compared well to projected success	5	2nd QTR FY22
Single-effect unit integration with waste heat source (hydrogen electrolyzer)	Medium	Water production volume and quality met projections	6	2nd QTR FY23
Multiple-effect unit operating with waste heat (hydrogen electrolyzer)	Medium	Independent operation and water quality testing	7	3rd QTR FY24

**HOW**

**Projected Business Model:** PAX H2(O) can evolve to:

A core military grade system that is compact, robust, easy to handle and deploy for potable water at remote bases on shore and offshore.

A modular, scalable, and highly-efficient water distiller and hydrogen generator ranging a span of sizes and industry uses.

Our business model is to contract manufacture key components and license manufacturers (at the system level) such as those for reverse osmosis systems, generators, and/or commercial chillers/coolers.

**Company Objectives:**

In the DoD, we are seeking a primary transition advocate to move beyond Phase II, with funded long-term test and demonstration opportunities, and Program of Record opportunities.

Commercially, our objective is to partner with prime contractors and major tier suppliers to manufacture and distribute portable/scalable units as well as systems specifically designed to integrate with hydrogen electrolyzers.

**Potential Commercial Applications:** Target market sectors include potable water for off-grid, rural, and microgrid environments, particularly those with high-salinity water sources; and ultrapure water for hydrogen electrolysis.

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