

# Department of the Navy SBIR/STTR Transition Program

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NAVSEA #2020-0486

Topic # N141-024

Development of a Greywater Recycling System for Galley-Scullery Wastewater Mainstream Engineering Corporation

## WHO

**SYSCOM:** NAVSEA

**Sponsoring Program:** PEO USC

**Transition Target:** PMS501, Littoral Combat Ship Program Office

**TPOC:**  
(301) 227-5154

### Other transition opportunities:

There are a wide variety of applications where the GSWCS can reduce water, labor, and energy use, including large manned vessels (e.g., cruise ships, cargo ships, tankers) as well as shipboard or land kitchens (e.g., restaurants, food service operations).

**Notes:** The Navy has increased operations in littoral waters, leading to costly upgrades to increase the size of CHT tanks. The retrofits can cost over \$500,000 per ship and can be avoided through use of GSWCS technology.



Photo Courtesy of U.S. Navy, JPEG ID:140723-N-OL640-024

## WHAT

**Operational Need and Improvement:** Naval littoral combat ships (LCSs) are prohibited from discharging blackwater in littoral zones due to local and federal wastewater disposal regulations. Grey water generated by the galley, scullery, and other shipboard operations is combined with blackwater and must be stored aboard the ship in central holding transfer (CHT) tanks until it can be safely offloaded shore side or at sea beyond littoral waters. Increasing the size of CHT tanks requires very expensive and time consuming retrofits, while current commercial water processing technologies require increased maintenance and consumables.

**Specifications Required:** An autonomous grey water treatment system that fits in the available galley, scullery, or CHT space that can process 50 gal/h of grey water to meet MARPOL and ever increasing regulations. The system shall have minimal consumables, capability to be bypassed in the event of failure, and be equipped with monitoring technology to verify water quality.

**Technology Developed:** Mainstream Engineering is developing a galley-scullery water conservation system that uses smart sensors to process feed water based on contamination levels to greatly reduce the volume of water sent to the CHT tank. The processing technology requires reduced maintenance and is lower cost than commercial units. This program will result in a production ready unit tested and delivered to the Navy that processes 50 gal/h.

**Warfighter Value:** The galley-scullery water conservation system enables the LCSs to operate in littoral zones for extended periods of time while remaining compliant with all federal wastewater regulations. The system reduces the amount of water waste generated by reducing grey water sent to the CHT by up to 75%, which reduces the rate at which the CHT must be emptied, cleaned, and maintained. This technology is simple to retrofit into an LCS, increases mission time, and lowers grey water disposal costs.

## WHEN

**Contract Number:** N68335-20-C-0240 **Ending on:** December 20, 2021

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Demonstrate 1st Generation High Fidelity Prototype	Med	Prototype system capable of processing 50 gal/h of grey water to MARPOL regulations	TRL 4	December 2020
Deliver 2nd Generation Production Test Unit	Low	Packaged modular system capable of processing 50 gal/h of grey water to MARPOL regulations	TRL 6	December 2021

## HOW

**Projected Business Model:** Mainstream is looking to work with the government and prime contractors to integrate the modular system into available ship space claims to reduce environmental waste and holding tank processing demands. We plan to roll out the initial 50 gal/h system demonstrated through this program and adapt it to different flow targets.

**Company Objectives:** Mainstream has previously developed grey water recycling systems for the Army and are looking for customers who have interest in improved water management and re-use. Our modular system has capabilities to reduce the volume of water waste as well as provide water for re-use. We envision our technology's modular nature will make it straightforward to scale and retrofit for ships of many different sizes.

**Potential Commercial Applications:** This technology can be leveraged in sewage treatment plants and grinder/disinfectant systems aboard many large commercial vessels to enable discharge of waste in littoral waters without violating MARPOL regulations.

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