

Topic: N121-053

Luna Innovations Incorporated

Rapid Fluorescent Assays for Coliforms in Shipboard Wastewater

The Navy is investigating the performance of Type II Marine Sanitation Devices (MSDs). Technology to rapidly determine if MSD performance is within operational parameters would enhance the effectiveness of the investigation. Luna's technology, a portable and rapid assay to detect fecal coliforms in MSD effluent, solves that problem. This assay will be transitioned for shipboard evaluation of MSDs, and then integrated within the Coast Guard and Military Sealift Command. The system enables rapid MSD installation and optimization and minimizes onboard storage requirements prior to discharge. Luna, a technology development company with focuses on healthcare, telecommunications, and defense applications, has distributed prototype kits and verified E. coli detection. Our goal is to integrate the assay with selected MSD vendors and to transition it for commercial use in environmental field-based water quality monitoring.

Technology Category Alignment:

None

None

None

Contact:

Christopher K. Tison, Ph.D.

tisonc@lunainc.com

(434) 220-2518

<http://www.lunainc.com>

SYSKOM: NAVSEA

Contract: N00024-15-C-4025

 Corporate Brochure: https://navystp.com/vtm/open_file?type=brochure&id=N00024-15-C-4025

Department of the Navy SBIR/STTR Transition Program

Statement A: Approved for Release. Distribution is unlimited.

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Rapid Fluorescent Assays for Coliforms in Shipboard Wastewater

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WHO

SYSCOM: NAVSEA

Sponsoring Program: Naval Systems Engineering Directorate, Technology Office, SBIR Office (SEA05T1R)

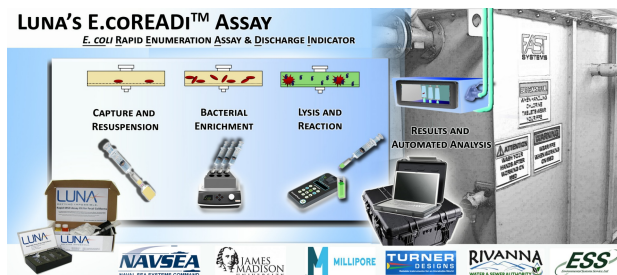
Transition Target: Shipboard evaluation of Type II Marine Sanitation Devices (MSDs)

TPOC:
(301) 227-5157

Other transition opportunities:

Transition to the US Coast Guard and Military Sealift Command is likely, as both currently utilize MSDs. The United States Army Tank Automotive Research Development and Engineering Center is also developing mobile wastewater treatment facilities in need of E. coli detection technologies. Luna is currently funded under an SBIR Phase II program for the development of an automated water quality analysis suite. By integrating the E. coli detection technology developed under this Navy program with the advanced sensor suite being developed with the Army, a complete solution to the DOD water analysis needs is possible.

Notes: The three stages of Luna's E.coREADi Assay Kit are illustrated in the above graphic. E.coREADi is a simple, rapid, and sensitive technology for quantifying E. coli concentration in wastewater effluent.



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WHAT

Operational Need and Improvement: The Navy is investigating the performance of Type II MSDs. Technology to rapidly determine if MSD performance is within operational parameters would enhance the effectiveness of the investigation. The Navy therefore needs an innovative, cost-effective water analysis technology that is suitable for a marine environment, can be operated and maintained with minimal training, and which will provide near-time measurement of E. coli.

Specifications Required: Innovative methods are required for quantitative, accurate measurement of E. coli concentration in near-time or within a few hours. Regulations require monitoring of 20-250 colony forming units per 100 milliliters (CFU/100 mL) or less. Minimum detectable limits required by the Navy are less than three CFU/100 mL. The sensor must be robust, simple, compact, low-cost, and require low maintenance and use of consumables.

Technology Developed: Luna is developing the E.coREADi assay to serve as a rapid, low-cost, user-friendly technology for determining fecal contamination (represented by E. coli concentration) in water. The detection system allows reporting on less than three CFU/100 mL water sample in less than five hours. This provides substantial cost, time, and space savings and allows accurate monitoring of wastewater quality.

Warfighter Value: The investigation of type II MSDs performance for consideration of integration onto Navy ships is hampered by the ability to monitor their performance. Existing methods to measure fecal coliform load require trained personnel, equipped laboratories, and ≥ 24 hours. To provide the needed detection system and single-shift response, Luna's assay reports on E. coli presence in less than five hours. This will ensure that technology provided to the Navy meets performance at minimal life cycle cost to meet operational requirements.

WHEN

Contract Number: N00024-15-C-4025 **Ending on:** March 1, 2017

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Confirm the feasibility of E. coli detection.	N/A	E. coli will be detected at less than three CFU/100 mL and compared to standard methods.	2	September 2013
Deliver prototype platforms to early adopters.	N/A	A functional kit will be delivered to partners and confirmatory testing will be performed.	4	October 2015
Receive regulatory approval as standard method.	High	Environmental Protection Agency standard method analysis will be completed and approval received.	6	May 2018
Begin distribution and/or licensing of the E.coREADi kit.	High	E.coREADi will be packaged for sales to industrial users and Navy acquisition.	8	October 2018

HOW

Projected Business Model: Luna envisions licensing of the technology to a water analysis company with regulatory experience and international market awareness, such as IDEXX Laboratories. Luna is also preparing for independent EPA standard test method product approval. This would involve kit testing with our partners, Environmental Systems Services, and will aid in future licensing and distribution discussions. As the majority of the kit consists of commercial-off-the-shelf components, it is possible that Luna could also serve as a technology distributor.

Company Objectives: Luna's objective is to expand from MSD analysis to the larger wastewater analysis community - a multibillion dollar industry. Additionally, we are working with Army funding to incorporate additional water analysis metrics into a "sensor suite" that could revolutionize the water analysis industry. We aim to license these technologies to a company like IDEXX for rapid, international roll out of the technology across the water industry.

Potential Commercial Applications: Luna's E.coREADi Assay Kit could find broad acceptance across the commercial cruise and shipping industry, municipal water treatment facilities, and within environmental test services. Luna has established relationships in all communities and will work to drive commercial acceptance of the technology to generate the "pull" required for transition to the Navy. By providing quantitative results in less than five hours, the technology enables same-day results and therefore substantially reduces hands-on time, required facilities space, and enables rapid feedback to treatment facilities that may not be functioning properly.

Contact: Christopher K. Tison, Ph.D., Senior Research Scientist and Team Lead, Biomedical Technologies, Luna Innovations Incorporated
tisonc@lunainc.com (434) 220-2518