

# NASA SBIR/STTR Technologies

## Proposal No. X3.03-9108 – Rapid Coliform Detector



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### Identification and Significance of Innovation

- The Rapid Coliform Detector (RCD) is a rapid nucleic acid-based detector for spaceflight water systems to enable detection of *E.coli* in 30 minutes.
- Minimal consumables and crew time.
- A patented polymerase enzyme enables rapid isothermal RNA amplification.
- Reagent has superior long-term shelf life and thermal stability.
- Nucleic acid lateral flow device displays presence or absence of *E. coli*.
- Single device concentrates water sample, mixes with reagent, heats to support amplification, cools to support detection, and displays result.

Expected TRL Range at the end of Contract (1-9): 4



### Technical Objectives and Work Plan

#### *Objective*

To develop the chemistry and hardware designs for rapid isothermal amplification and detection of *E. coli* genetic material, and to determine the feasibility of rapid *E. coli* detection in a spaceflight environment.

#### *Work Plan*

1. Develop requirements for ground and flight RCD systems.
2. Design the detection system for *E. coli* rRNA.
3. Develop isothermal amplification chemistry.
4. Design and fabricate prototype RCD cartridges to perform sample concentration, reagent mixing, heating for amplification, and application to the readout device.
5. Test prototype RCD cartridge for basic functionality and ability to detect *E.coli*.
6. Develop conceptual designs of a spaceflight RCD cartridge and process controller.

### NASA and Non-NASA Applications

RCD indicates the presence of *E. coli* within 30 minutes in spaceflight potable water systems. Further advances would enable rapid quantitative analysis of *E. coli* and other microbes in a number of fluids.

Non-NASA application included military use in remote or resource limited environments. RCD can be used for surface water quality testing for research and surveillance. The RCD approach provides the ability to quickly test potable water samples for real estate, new well, and new construction applications. RCD technology can also be used for water quality assessment for the aquaculture industry.

### Firm Contacts

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**NON-PROPRIETARY DATA**