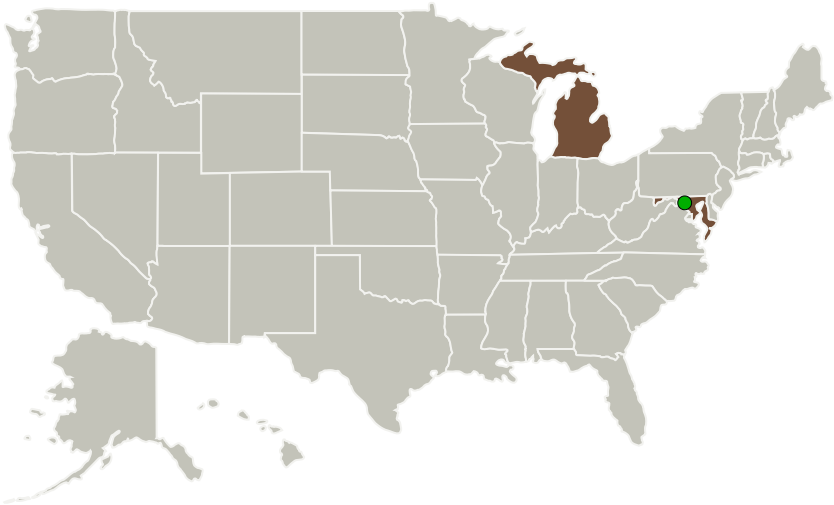
Quantitative Nutrient Analyzer for Autonomous Ocean Deployment, Phase I

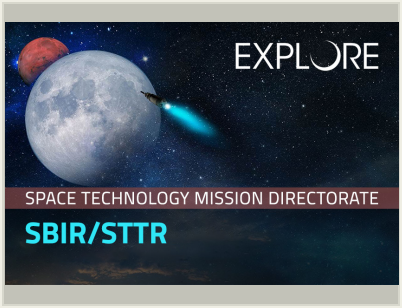
Completed Technology Project (2012 - 2012)

Project Introduction

Translume, in collaboration with Dr. Joseph Needoba, Oregon Health and Science University, proposes to develop a microfluidic colorimetric sensor for the quantitative measurement of important inorganic nutrients in estuaries, coastal waters, and oceans. The technology will first be demonstrated using the relatively simple analytical approach for measuring nitride. In a subsequent phase we will adapt the instrument to measure ammonium and phosphate. Our device will be designed to be inexpensive and will operate autonomously on oceanographic platforms, such as moored buoys, underwater gliders, autonomous vehicles, or underway sampling devices on ships. It will be designed to monitor range of concentrations (nanomolar to micromolar), and will operate unattended for weeks. It will be extremely robust, use very low volumes of reagents and power consumption will be minimized. Monolithic in nature, fabrication costs will be low, permitting global deployment of numerous field units and enhancing NASA¿s Earth science research capabilities. The key advancement is the integration of two analytical chambers in a single glass monolith, with each chamber optimized for a given concentration range. One of the chambers will have a very long pathlength to enable the development of autonomous wet chemistry analyzers for open ocean applications using a variety of platforms and vehicles.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Translume, Inc.	Lead Organization	Industry	Ann Arbor, Michigan
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Maryland	Michigan

Project Transitions

February 2012: Project Start

August 2012: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138430)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Translume, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

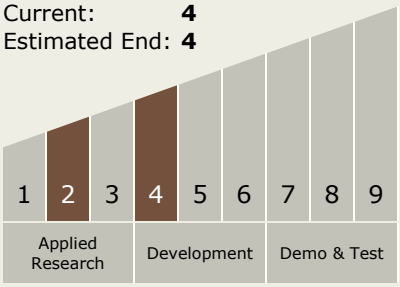
Carlos Torrez

Principal Investigator:

Tom Haddock

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX04 Robotic Systems
  └ TX04.2 Mobility
    └ TX04.2.4 Surface Mobility

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System