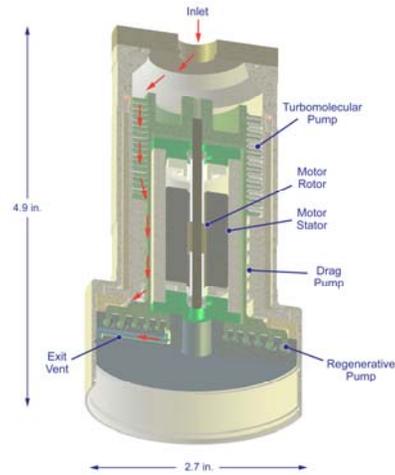


NASA SBIR/STTR Technologies
 Compact Vacuum Pump for Titan Lander Missions
 PI: Paul H. Sorensen/Creare Incorporated, Hanover, NH
 Proposal No.: 09-S1.09-9459

Identification and Significance of Innovation

- New, miniature mass spectrometers are being developed at NASA for use in planetary and atmospheric exploration.
- DHS and DoD use similar detectors for toxic industrial chemicals, biological warfare agents, and explosives.
- Compact, Low-power, rugged vacuum systems are needed to support all of the above applications in space and on the ground.
- Creare proposes to design, build, test, and deliver a benchtop compact, low-power, rugged high vacuum system whose performance is optimized for miniature mass spectrometers used in space and on Earth

Expected TRL Range at the end of Contract (1-9): 5-6



Cutaway Illustration of a compact Low-power and Rugged Pump for Mass Spectrometer Applications in Space and on Earth

Phase II Technical Objectives

- Develop high-speed motor for regenerative pump.
- Fabricate regenerative pump, molecular drag pump and turbomolecular pumps.
- Demonstrate performance of pump design.
- Verify desired lifetime of pump/motor under realistic environmental conditions.

Phase II Work Plan

- Task 1: Design Regenerative Pump
- Task 2: Fabricate Regenerative Pump
- Task 3: Fabricate and Assemble Prototype Vacuum Pump System
- Task 4: Test Prototype Pump Performance
- Task 5: Design Compact Vacuum Pump
- Task 6: Manage and Report

NASA Applications

- Planetary exploration initiatives.
- Atmospheric measurement instrumentation.
- Environmental monitoring on ISS.
- Health and safety near launch facilities.

Non-NASA Applications

- Portable/remote mass spectrometers used to detect chemical and biological weapons, toxic industrial chemicals, and explosives.
- Military and homeland security instrumentation.

Contact

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