BRIEFING CHART

NASA SBIR/STTR Technologies

Compact Vacuum Pump for Titan Lander Missions

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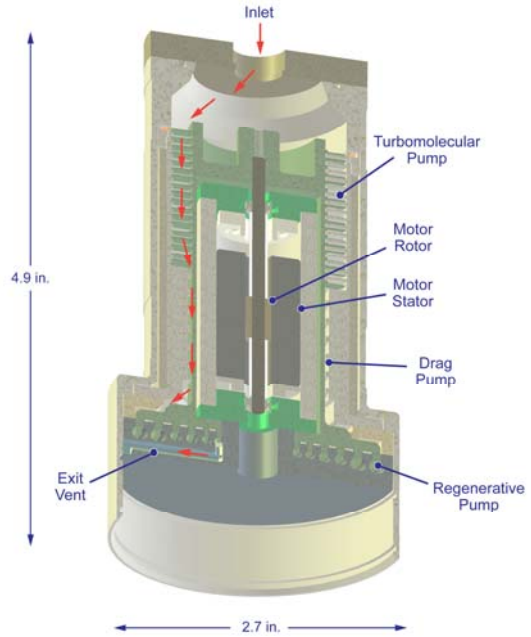
Identification and Significance of Innovation

- Titan has been identified as an interesting target for a future NASA planetary mission.
- NASA has identified the development of organic analysis instruments and their supporting instrumentation as high needs before a mission to Titan can take place.
- A miniature vacuum pump that can generate hard vacuum levels and exhaust to greater than 1 atm is needed to support mass spectrometry on Titan and on the ground.
- Creare proposes to design, build, test, and deliver a high vacuum pump based on combining a hybrid TMP/MDP with a regenerative pump to achieve planetary lander and terrestrial mass spectrometry goals.

Expected TRL Range at the end of Contract: 5–6



Conceptual Diagram of Creare's Compact Vacuum Pump for Titan Lander Missions

Phase I Technical Objectives

- Define performance specifications for compact vacuum pump.
- Demonstrate performance of regenerative pump with laboratory tests.
- Prove feasibility of overall vacuum system design for space and terrestrial applications.

Phase I Work Plan

Task 1—Define Specifications
Task 2—Design, Build, and Test Pump Components
Task 3—Design Complete Vacuum Pump
Task 4—Manage and Report

NASA Applications

- Planetary exploration initiatives (especially Titan).
- Atmospheric measurement instrumentation.
- 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.

Contacts

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