NASA SBIR/STTR Technologies

High Energy, Low Temperature Gelled Bi-propellant Formulation for Long-duration In-space Propulsion

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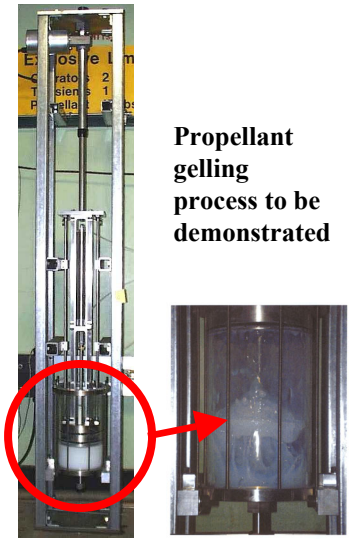
Proposal No: X6.05-7729

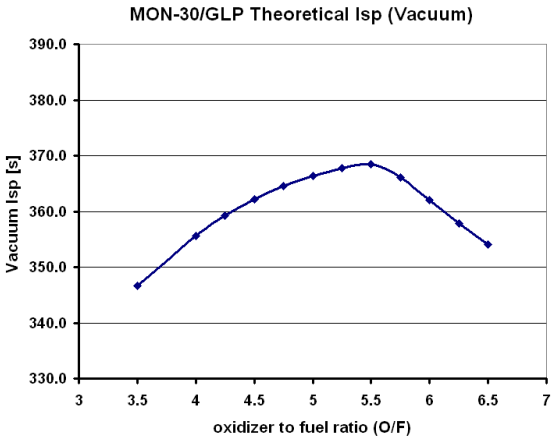
Identification and Significance of Innovation

Gelled propellant formulations enable in-space propulsion systems (including both attitude control and ΔV propulsion) that require minimal use of heaters for long-duration missions. Propellant toxicity will be minimized by the use of a gelled hydrocarbon fuel and a gelled oxidizer. A competitive Isp of more than 360 seconds is achievable.



Propellant gelling process to be demonstrated

Predicted Isp to be validated



Technical Objectives

Formulate a Liquid Propane/MON-30 (70% N_2O_4 + 30% NO) bipropellant system for long-duration missions requiring minimal use of heaters.

Work Plan

- Gel of MON-30 and Liquid Propane at US Army AMRDEC facilities
- Measure the propellant physical properties
- Simulate gel-propellant thruster flow network
- Simulate gel expulsion from spherical tanks

NASA Applications

In-space propulsion applications including spacecraft attitude control, orbit insertion, translunar injection, lunar descent, lunar ascent, trans-Mars injection, Mars descent, and Mars ascent, as well as other spacecraft pointing and translation systems.

Non-NASA Applications

Commercial applications for these bi-propellants include: airbag inflators for automobiles, emergency escape systems for aircraft, underwater propulsion, demolitions of structures, and high-performance upper stage and DACS applications, especially for shipboard deployment of the Kinetic Energy Interceptor.

Firm Contacts

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