Identification and Significance of Innovation
* The Nitrous Oxide Ethane-Ethylene (NEE) engine can provide spacecraft with non-toxic, non cryogenic high performance propulsion.
• The NEE engine uses Nitrous Oxide as an autogenously pressurizing oxidizer, and a mixture of Ethane and Ethylene is used in the same manner as fuel.
• N2O can also be used for RCS. Eliminates hydrazine.
• All S/C propulsion with just 2 autogenous propellants.
• Does not freeze till below -90 C
• The NEE offers significantly higher performance than any other nontoxic storable propellant combination. Isp > 315 s

Technical Objectives

Work Plan
Month 1: Design and Analysis
Month 2: Design of Phase I NEE N2O/Ethane-Ethylene rocket engine, prototype lightweight tankage, and test stand.
Month 3: Test stand fabrication including instrumentation, engine fabrication, and water flow tests.
Month 4: NEE engine flow testing and start of hot fire testing
Month 5: Engine testing, redesign, re-fabrication as required.
Month 6: Continued engine testing, Write final report

NASA Applications
Spacecraft propulsion for both small and large satellites
Upper stage propulsion. Planet Ascent. Outer solar system ops.
Non Toxic Propulsion, w/one fluid for RCS and oxidizer
Can also be integrated with LSS using N2O for breathing gas

Non-NASA Applications
Non Toxic Storable Upper Stages
Orbit Transfer Vehicles
Launch Vehicles
Missile propulsion

Contacts
Robert Zubrin (303)980-0890
Zubrin@aol.com
www.Pioneerastro.com