NASA SBIR/STTR Technologies

High Chamber Pressure, Light Weight Thrusters

PI: Tim McKechnie/Plasma Processes, Inc.-Huntsville, AL

SBIR Proposal No: S3.08-9174

Identification and Significance of Innovation

- Bi-Propellant rocket engines are used extensively in propulsion systems.
- Mars Ascent Vehicle requires the highest performance and propellant mass fraction for mission success.
- Higher chamber pressures and lighter weight construction can increase performance of state-of-the-art bi-propellant propulsion systems.
- Metal lined carbon-carbon composite structure provides a 90% weight savings while keeping a proven pressure seal and compatibility with bi-propellants.

Iridium Lined Carbon-Carbon Thrust Chamber Prototype

Technical Objectives and Work Plan

- Design prototype of iridium lined thrust chamber with a combustion pressure exceeding 500 psi;
- Evaluate braiding and densification techniques to form carbon-carbon chamber;
- Develop concept and technology for joining iridium lined carbon-carbon thrust chamber with injector and nozzle extension;
- Demonstrate a joining concept on tube samples and characterize the joint after thermal cycle testing;
- Fabricate prototype of metal lined carbon-carbon thrust chamber with joining flanges

NASA and Non-NASA Applications

- Mono-propellant and Bi-propellant rocket engines
- Reaction Control Systems
- Apogee Engines
- Mars Ascent Vehicle, Altair lunar lander

SBIR Industrial Partner: AEROJET

Firm Contacts

PI: Tim McKechnie, timmck@plasmapros.com

Business: Angela Hattaway, ahattaway@plasmapros.com

NON-PROPRIETARY DATA