



In-Space Propulsion Systems

Johnson Space Center (JSC) has led the development and certification of a majority of NASA in-space on-board human spacecraft propulsion systems and is actively engaged in the development and demonstration of advanced propulsion system technologies. Expertise is available to support development of cold/warm gas, monopropellant, bipropellant, and cryogenic propulsion systems over the full project life cycle of a project, from concept definition to flight.

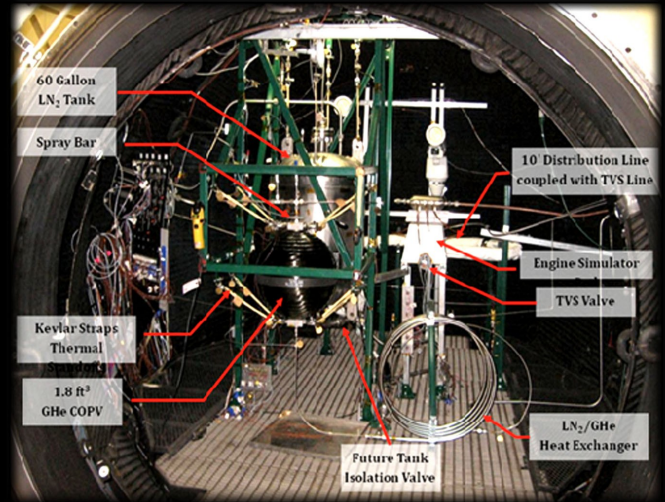
Services Provided

- System Design and Vehicle Integration
 - From conceptual to detailed design
 - In-house developed design tools
- Thermal Fluid Network Modeling
 - Water hammer and gas dynamics analysis
 - Thermal modeling of cryogenic systems
- Rocket Engine Performance and Kinetics Codes
 - Nozzle design and performance analysis
 - Combustion kinetics modeling
 - Analysis tools: ONC, TDK, REDTOP-Pro
- Computational Fluid Dynamics (CFD) – injector flow modeling, internal flows (FLUENT)
- Thermal Mechanical Design and Analysis
 - Pro-E mechanical design solid and modeling
 - Integrated system design



Integrated Cryogenic Propulsion System Thermal-Vacuum Chamber Testing

The 15-ft high vacuum (10^{-05} torr) test chamber provides integrated system testing to support technology development and demonstration for space storable cryogenic propulsion systems.



Liquid Oxygen – Methane CryoCart Mobile Test Platform

CryoCart provides a flexible test platform for the screening and evaluation of small components and systems. Fully mobile and portable with on-board data acquisition, the separate LO₂ and Methane carts have on-board helium pressurization and can be operated individually or as a pair with minimal operational overhead (2 operators). The carts are capable of providing propellant flow rates to support <1 lbf to 100 lbf class thruster hot fires.

Liquid Oxygen – Methane Terrestrial Free Flyer Test Bed (Morpheus)

Versatile platform to support integrated vehicle-level test and demonstration of spacecraft systems, including nontoxic propellant technologies, integrated propulsion/avionics/GN&C architectures, and Autonomous Landing Hazard Avoidance Technology (ALHAT). Ability to fly analog trajectories, such as lunar descent, using LO₂/Methane propulsion for low-cost testing with rapid recycle time.



Advanced Propulsion Physics Laboratory

JSC is developing a low-thrust, high-fidelity advanced propulsion research laboratory to further explore current advanced physics models. Advanced propulsion physics investigations require sensitive and dedicated laboratory setup with the ability to test in air and in vacuum, with good vibration/environment isolation and quality data acquisition and processing systems.

We have developed customer-friendly agreements to streamline business relationships and are eager to share our unique facilities and expertise with new customers. We invite your inquiries regarding application or adaptation of our capabilities to satisfy your special requirements. Briefings on general or specific subjects of mutual interest can be arranged at JSC or at your business site.

Facility Testing Information

<http://jsceng.nasa.gov>

Point of Contact

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