

NASA Glenn Research Center's Core Competencies

Air-Breathing Propulsion

Capabilities

- System level assessments
- Computer Aided Design
- Design, Development, Test & Evaluation of complex hardware and facilities
- Computational Fluid Dynamics
- Systems Simulation
- Particle Image Velocimetry

Broad Areas

- Controls and dynamics
- Icing
- Acoustics, fluid mechanics, and heat transfer
- Aerothermodynamics and plasmas,
- Fluid Systems
- Structural Systems
- Mechanical Systems
- Thermal Systems
- Multidisciplinary design, optimization, modeling, and simulation
- Combustion Science and Diagnostics
- Active flow control
- Tribology, Coatings, Mechanical Components
- Structural Dynamics
- Turbo machinery

Communications Technology and Development

Capabilities

- Engineer communication systems, RF test equipment, SDRs and components
- Communications analyses (link budgets, propagation effects, satellite coverage, etc)
- Antenna Metrology/Characterization
- Space flight communications, systems analysis and engineering, and test and evaluation
- Network/system-level analyses, modeling and simulation
- 3-D Electromagnetic Modeling

Broad Areas

- High Data Rate Communications
- Electronic Materials for Semiconductors and Vacuum Electronic Devices
- Network Protocols and Technology
- RF and Optical Propagation
- Network-Centric Operations & Technology
- Nanotechnology (nanoantennas & nanoelectronics)
- Microwave and Wireless Components and Circuits
- Space Flight Communications
- Cryo-electronics
- Digital Communications & Navigation
- Advanced Antennas & Propagation
- Communications Components/Devices

In-Space Propulsion and Cryogenic Fluids Mgmt

Capabilities

- Design, Develop, Test and Evaluate rocket, reaction control, and electric propulsion engines
- Design, Develop, Test and Evaluate propellants
- Full scale cryogenic ascent main engine testing
- Cryogenic propellant turbopump chilldown testing

Broad Areas

- Cryogenic Fluids Management; handling, characterization, storage, and delivery
- Electric propulsion
- Chemical Propulsion Engines
- Thermal control test demonstrations

Power, Energy Storage and Conversion

Capabilities

- Power system modeling, analysis and simulation
- Design, Development, Test and Evaluate Power System Components

- Conceptual design and modeling of energy conversion systems
- Conceptual design and sizing of space power systems/components
- Power System Architecture and Design
- Electrical Controllers
- Power Management and Distribution
- Reliability and Endurance Testing - 24/7

Broad Areas

- Power Systems Engineering
- Power Systems Development
- Photovoltaics
- Batteries, Fuels Cells and Electrolyzers
- Thermal Energy Conversion

Materials and Structures for Extreme Environments

Capabilities

- Design and Testing of Integrated Structures
- Component Development and Testing
- Launch Vehicle and Spacecraft Ground Vibration Testing
- Structural Analysis and Optimization
- Vibration and Structural Dynamics Analysis and Testing
- Structural mechanics of large structures
- Modeling of Material Properties
- Material Application Engineering
- Multiscale Modeling
- Model Validation
- Structural Mechanics
- Evaluation of Micrometeoroid Impact

Broad Areas

- Spacecraft Materials Durability Research
- New structural concepts
- Space Mechanisms and Lubrication
- Application of advanced materials, structures, and mechanisms to aerospace systems

Physical Sciences and Biomedical Technologies in Space

Capabilities

- Space Environmental Effects Testing & Modeling
- Analysis & design of chemical processes for in-situ resource utilization
- Analytical & computational modeling of multiphase systems in variable gravity
- Protective Coatings, Surface Modification & Texturing
- Material flammability testing in reduced-gravity under a range of O₂/N₂ concentrations

Broad Areas

- Extreme Temperature Electronics
- Intercalated Graphite EMI & Radiation Shielding
- Space Radiators, Thermal Control Coatings & Thermal Management
- Fire prevention, detection and suppression in exploration environments
- Advanced cellular imaging & microscopy
- Sensors for fire detection & environment monitoring
- Computational & analytical modeling of complex interactive systems
- Combustion and reacting systems
- Space Environment Effects
- Fluid Physics and transport
- Bioscience and Technology

Other - Basic Engineering Discipline (fill in blank)

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