

SPACE TECHNOLOGY MISSION DIRECTORATE STRATEGIC THRUSTS

THRUSTS			OUTCOMES	CAPABILITIES
Lead Ensuring American global leadership in Space Technology • Lunar Exploration building to Mars and new discoveries at extreme locations • Robust national space technology engine to meet national needs • U.S. economic growth for space industry • Expanded commercial enterprise in space		Go Rapid, Safe, & Efficient Space Transportation	 Develop nuclear technologies enabling fast in-space transits. Develop near zero boil off Cryogenic Storage, Transport, and Fluid Management technologies for surface and in-space applications. Develop Advanced Propulsion technologies that enable future science/exploration missions. 	Advanced PropulsionCryogenic Fluid Management
		Land Expanded Access to Diverse Surface Destinations	 Enable Lunar/Mars global access with ~20t payloads to support human missions. Enable science missions entering/transiting planetary atmospheres and landing on planetary bodies. Develop technologies to land payloads within 50 meters accuracy and avoid landing hazards. 	Human & Robotic Entry, Descent, and LandingPrecision Landing
		Live Sustainable Living and Working Farther from Earth	 Develop exploration technologies and enable a vibrant space economy with supporting utilities and commodities Sustainable power sources and other surface utilities to enable continuous lunar and Mars surface operations. Scalable ISRU production/utilization capabilities including sustainable commodities on the lunar & Mars surface. Technologies that enable surviving the extreme lunar and Mars environments. Autonomous excavation, construction & outfitting capabilities targeting landing pads/structures/habitable buildings utilizing in situ resources. Enable long duration human exploration missions with Advanced Life Support & Human Performance technologies. 	 Advanced Power Systems Advanced Thermal Systems In-situ Propellant and Consumable Production Advanced Materials, Structures, and Manufacturing Advanced Life Support and Human Performance
		Explore Transformative Missions and Discoveries	 Develop next generation high performance computing, communications, and navigation. Develop advanced robotics and spacecraft autonomy technologies to enable and augment science/exploration missions. Develop technologies supporting emerging space industries including: Satellite Servicing & Assembly, In Space/Surface Manufacturing, and Small Spacecraft technologies. Develop vehicle platform technologies supporting new discoveries. 	 Advanced Avionics Advanced Communications & Navigation Autonomous Systems and Robotics On-orbit Servicing, Assembly, and Manufacturing Small Spacecraft

Note: Multiple Capabilities are cross cutting and support multiple Thrusts. Primary emphasis is shown

EXPLORE SPACE TECH

WITH SMALL SPACECRAFT

The Small Spacecraft Technology program expands the ability to execute unique missions through rapid development and demonstration of capabilities for small spacecraft applicable to exploration, science and the commercial space sector.



EXPLORESPACE TECH

THROUGH SUBORBITAL FLIGHT

The Flight Opportunities program facilitates rapid demonstration of promising technologies for space exploration, discovery, and the expansion of space commerce through suborbital testing with industry flight providers

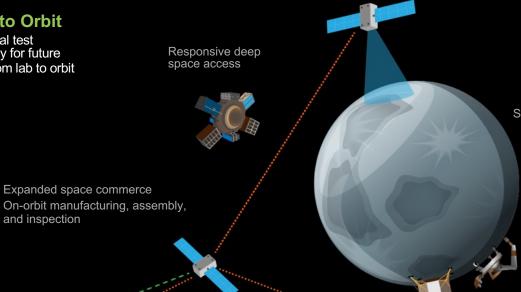


EXPLORE SPACE TECH CHANGING THE PACE OF SPACE

Leveraging small spacecraft and responsive launch to rapidly expand space capabilities at dramatically lower costs

Rapid Leap from Lab to Orbit

Commercial suborbital and orbital test capabilities de-risking technology for future missions. Technology moves from lab to orbit in <9 months.



Sustained deep space presence Commercial lunar activity In-situ resource extraction and utilization

On-Demand Missions Beyond Earth

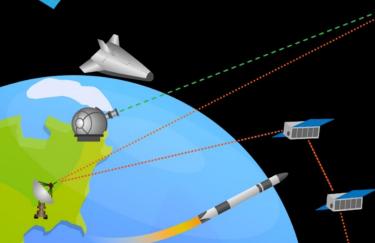
Targeted measurements of Moon, Mars, Venus, and the asteroid belt in response to events and opportunities. Capabilities are competitive with traditional systems but developed for <\$30M in <3 years.

Unparalleled Sensing Capabilities

Networked spacecraft providing multi-kilometer synthetic apertures and massive sensor webs of 30 to 100 spacecraft. Each node costs <\$10M to build and deliver to space.

Unprecedented Deep Space Infrastructure

Modular communications, navigation, and mission support that provides full coverage of Moon and Mars. Each node costs <\$20M to build and deliver to space.</p>

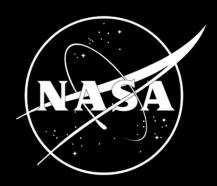


Expanded space commerce

and inspection

FAILURE (TO INNOVATE) IS NOT AN OPTION

- Rapid testing is critical to advance technology and reduce risk for space exploration, utilization, and discovery.
- Small spacecraft and responsive launch represent potential "disruptive innovations."
- We must preserve the community's agile development and risk-tolerant approach.
- We must harness the fast pace of innovation and leverage the evolving capabilities in industry and academia to enable unique, more affordable, and more resilient missions.



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