National Aeronautics and Space Administration

Space Technology Mission Directorate

Goddard Memorial Symposium

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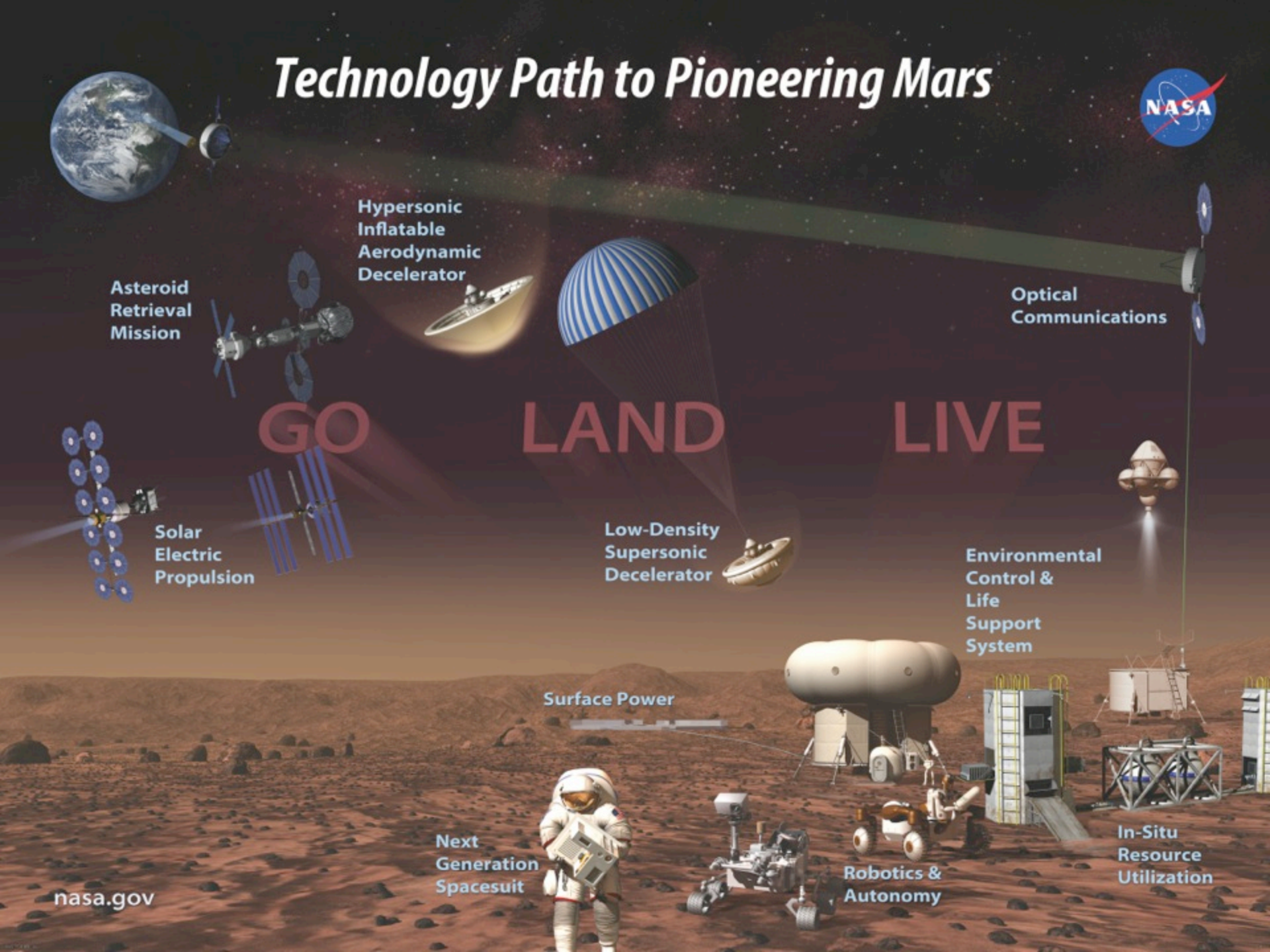
www.nasa.gov/spacetech

Space Technology Drives Exploration Video


Technology Path to Pioneering Mars
NASA
Hypersonic Inflatable Aerodynamic Decelerator
Asteroid Retrieval Mission
Optical Communications
GO
LAND
LIVE
Solar Electric Propulsion
Low-Density Supersonic Decelerator
Environmental Control & Life Support System
Surface Power
Next Generation Spacesuit
Robotics & Autonomy
In-Situ Resource Utilization
nasa.gov

Deep Space Exploration is Near

Space Technology will focus investments in 8 thrust areas that are key to future NASA missions and enhance national space capabilities.

High Power Solar Electric Propulsion

Deep space human exploration, science missions with investments in advanced solar arrays and advanced electric propulsion systems, high-power Hall thrusters and power processing units.

Application: *Improved Affordability of commercial and OGA Satellites*

Space Optical Comm

Substantially increase available bandwidth for near Earth space communications currently limited by power and frequency allocation limits. Increase communications throughput for deep space missions.

Application: *More bandwidth for Commercial and OGA Satellites*

Advanced Life Support & Resource Utilization

Technologies for human exploration mission including Mars atmospheric In-situ resource utilization, near closed loop air revitalization and water recovery, EVA gloves and radiation protection.

Application: *Air Revitalization for Mining Industry & other closed environments*

Mars Entry Descent & Landing Systems

Permits more capable science and future human missions to Mars. Includes, hypersonic and supersonic aerodynamic decelerators, next-gen TPS materials, retro-propulsion technology, instrumentation and modeling.

Application: *Returning research from ISS and other assets from space*

Space Robotic Systems

Creates future humanoid robotics, autonomy and remote operations technologies to substantially augments the capability of future human space flight missions.

Application: *Human safe Robotics for industrial use, Disaster Response, and Autonomous Operations*

Lightweight Space Structures

Targets substantial increases in launch mass, and allow for large decreases in needed structural mass for spacecraft and in-space structures.

Application: *Industrial Materials and Composites for large transportation structures*

Deep Space Navigation

Allows for more capable science and human exploration missions using advanced atomic clocks, x-ray detectors and fast light optical gyroscopes.

Application: *Next Generation GPS & launch vehicles*

Space Observatory Systems

Allows for significant gains in science capabilities including: coronagraph technology to characterize exoplanets, advances in surface materials and better control systems for large space optics.

Application: *Industrial Materials, Earth Observation*

THRUST AREAS

National Aeronautics and
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Technology Drives Innovation

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