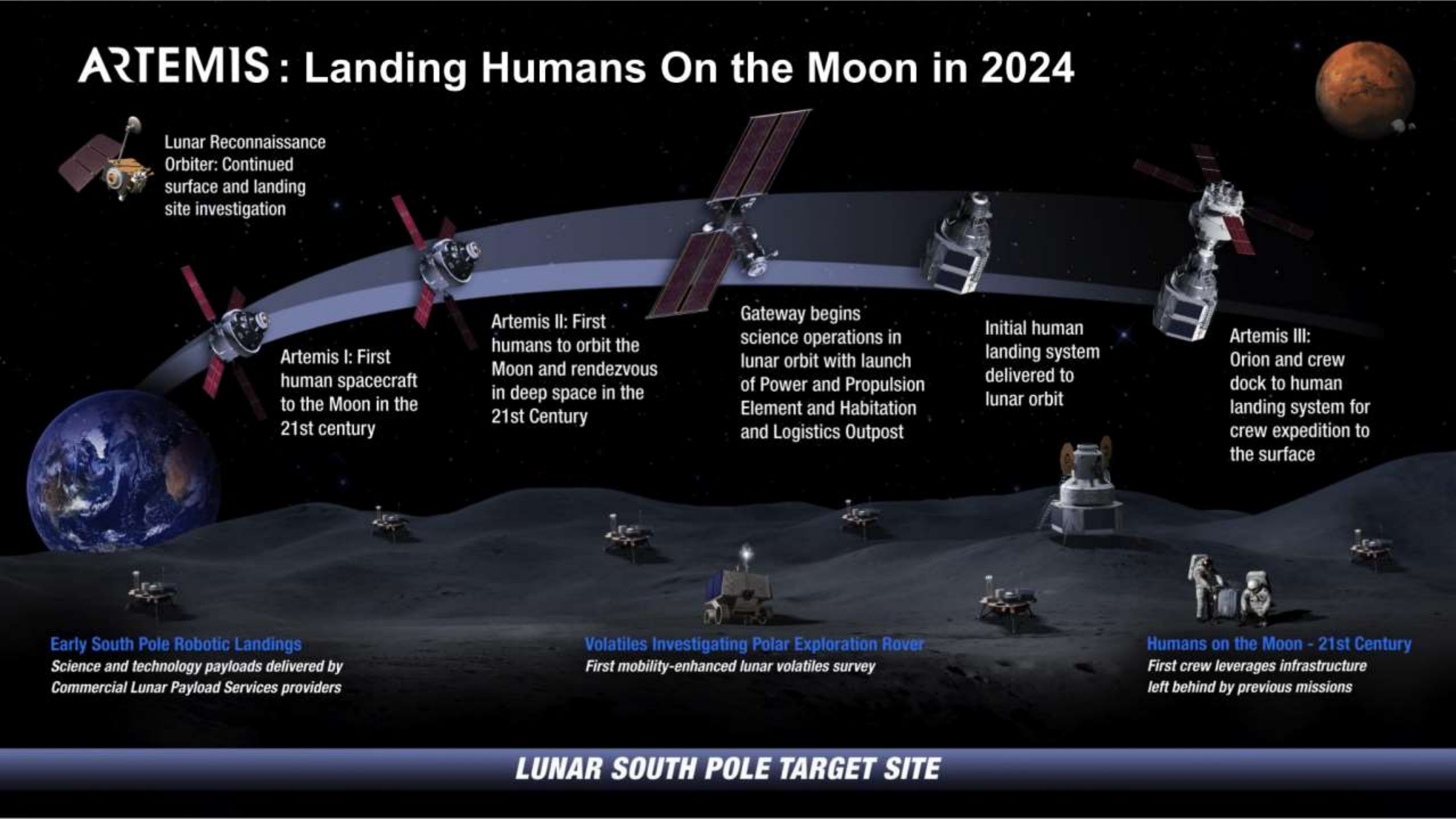
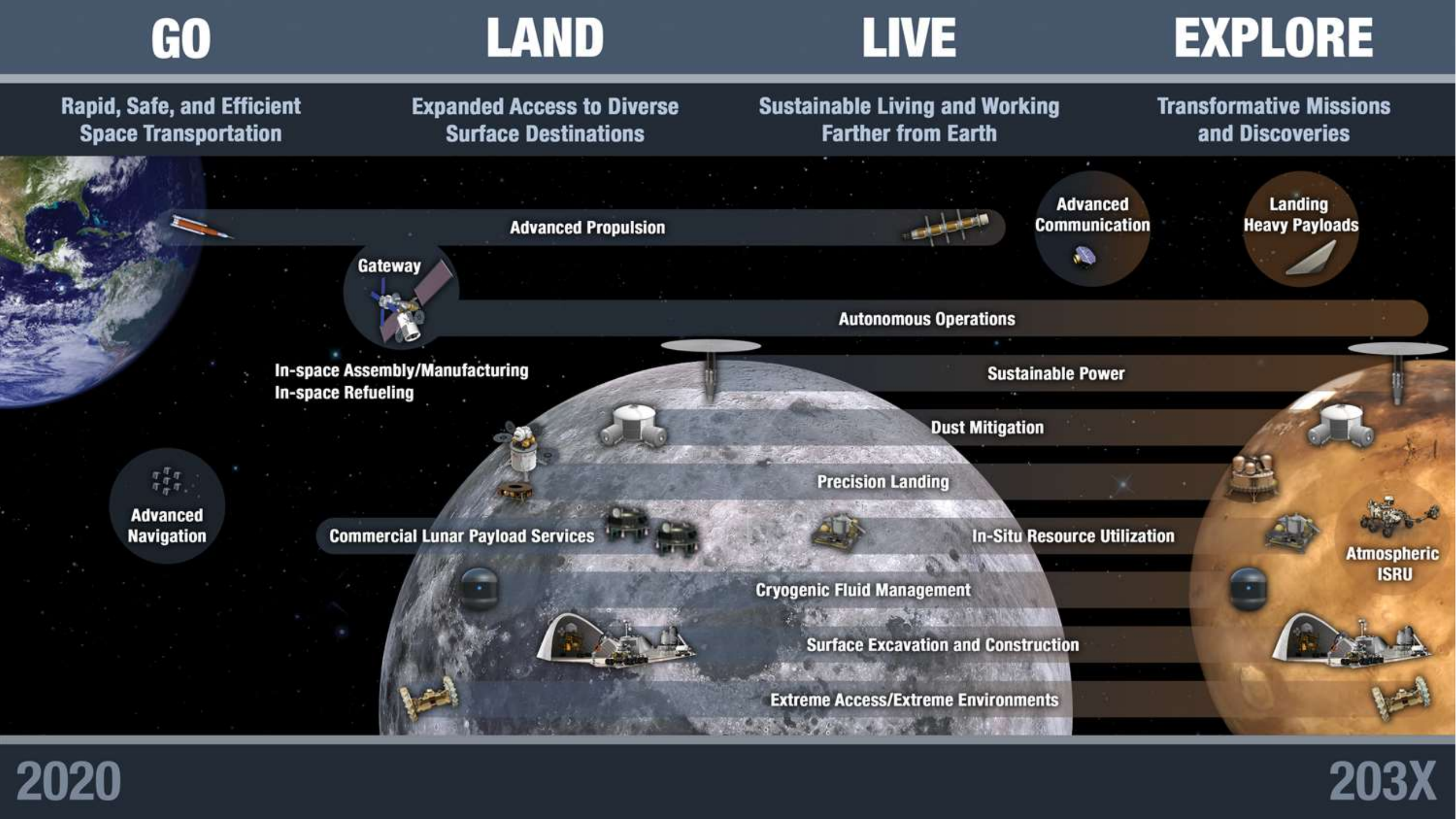
NASA Manufacturing Technology - Driving Exploration

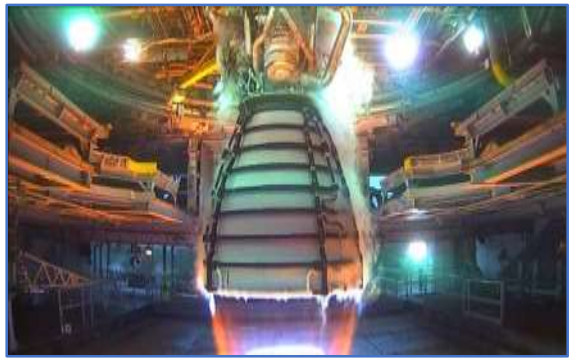
National Science and Technology Council, Subcommittee for Advanced Manufacturing, R&D Workshop

John Vickers, Principal Technologist, Space Technology Mission Directorate | 06.24.20

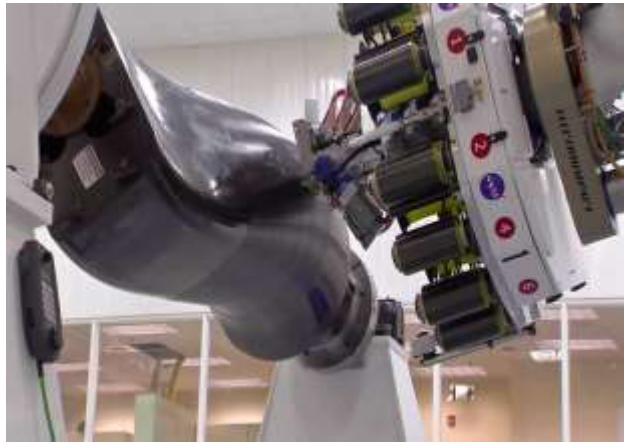

ARTEMIS : Landing Humans On the Moon in 2024
Lunar Reconnaissance Orbiter: Continued surface and landing site investigation
Artemis I: First human spacecraft to the Moon in the 21st century
Artemis II: First humans to orbit the Moon and rendezvous in deep space in the 21st Century
Gateway begins science operations in lunar orbit with launch of Power and Propulsion Element and Habitation and Logistics Outpost
Initial human landing system delivered to lunar orbit
Artemis III: Orion and crew dock to human landing system for crew expedition to the surface
Early South Pole Robotic Landings
Science and technology payloads delivered by Commercial Lunar Payload Services providers
Volatiles Investigating Polar Exploration Rover
First mobility-enhanced lunar volatiles survey
Humans on the Moon - 21st Century
First crew leverages infrastructure left behind by previous missions
LUNAR SOUTH POLE TARGET SITE


GO
LAND
LIVE
EXPLORE
Rapid, Safe, and Efficient Space Transportation
Expanded Access to Diverse Surface Destinations
Sustainable Living and Working Farther from Earth
Transformative Missions and Discoveries
Advanced Propulsion
Advanced Communication
Landing Heavy Payloads
Gateway
Autonomous Operations
In-space Assembly/Manufacturing
In-space Refueling
Sustainable Power
Dust Mitigation
Advanced Navigation
Precision Landing
Commercial Lunar Payload Services
In-Situ Resource Utilization
Atmospheric ISRU
Cryogenic Fluid Management
Surface Excavation and Construction
Extreme Access/Extreme Environments
2020
203X

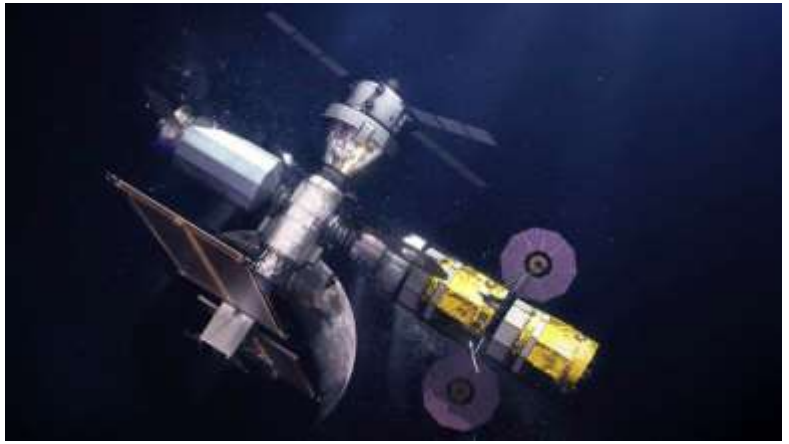
NASA Manufacturing Is……



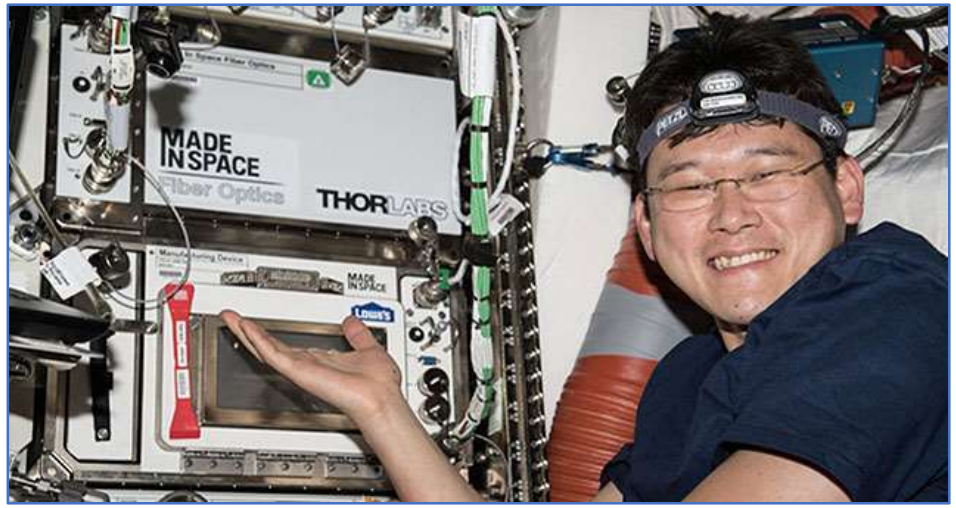
Space Technology



Human Exploration and Operations



Science Missions



Space Technology Research Grants and STEM

NASA Space Technology Graduate Research Opportunities (NSTGRO)

- Graduate student research in space technology; research conducted on campuses and at NASA Centers and not-for-profit R&D labs

Early Career Faculty (ECF)

- Focused on supporting outstanding faculty researchers early in their careers as they conduct space technology research of high priority to NASA's Mission Directorates

Early Stage Innovations (ESI)

- University-led, possibly multiple investigator, efforts on early-stage space technology research of high priority to NASA's Mission Directorates
- Paid teaming with other universities, industry, and non-profits permitted

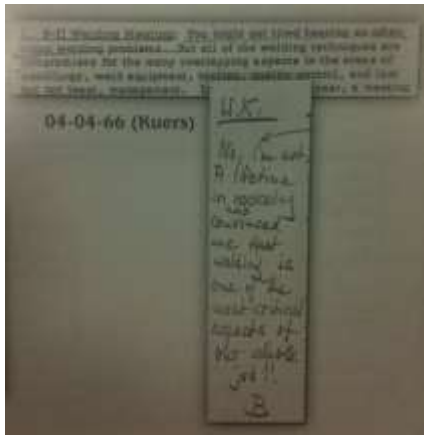
Lunar Surface Technology Research (LuSTR) Opportunities

- University-led efforts addressing high priority lunar surface challenges
- Short duration, high value grants with emphasis on potential infusion
- Paid teaming with other universities, industry, and non-profits encouraged

Space Technology Research Institutes (STRI)

- University-led, integrated, multidisciplinary teams focused on high-priority early-stage space technology research for several years

Sustainable Exploration
Links Discovery, Science and Commerce



The object of your mission is to explore the Missouri river…and its communication with the waters of the Pacific ocean…. for the ***purposes of commerce.***

Thomas Jefferson, 1803

We are Going…

www.nasa.gov/spacetech

The NASA Charge to the Moon

In keeping with SPD-1, NASA is charged with landing the first American woman and next American man at the South Pole of the Moon by 2024, followed by a sustained presence on and around the Moon by 2028.

NASA will "use all means necessary" to ensure mission success in moving us forward to the Moon.

Vice President Mike Pence speaks about NASA's mandate to return American astronauts to the Moon and on to Mars at the U.S. Space & Rocket Center in Huntsville, Alabama.

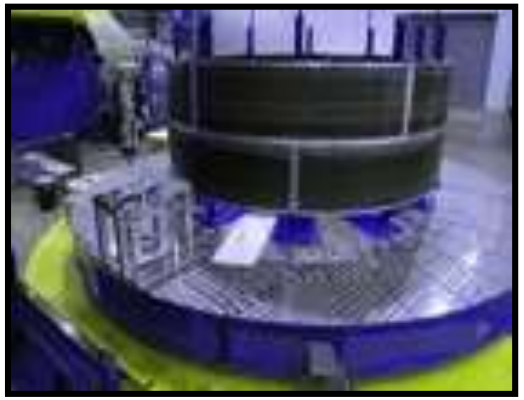
NASA Centers and Facilities

NASA's Headquarters, located in Washington, DC, provides the overall guidance and direction to the agency under the leadership of the Administrator. A skilled and diverse group of technical and business professionals conduct day-to-day activities throughout our ten field Centers and a variety of unique facilities.

NASA National Center for Advanced Manufacturing (NCAM)

Aerospace materials and manufacturing technology development and collaboration

- Public/Private Partnership – Cooperative Agreement between NASA, the State of Louisiana, Louisiana State University and the University of New Orleans. Located at the Michoud Assembly Facility, New Orleans, LA.



- Research and Innovation Ecosystem - Foster an integrated framework of technology partners – Government, Industry, Academia
- Provide discovery, development and validation of technology advancements to transition materials & manufacturing solutions
- Access to NASA advanced manufacturing infrastructure to further research and development, education/workforce, and the economic vitality of Louisiana and the Nation
- Provide a strategic opportunity for partners to significantly improve their R&D capability
- Focus areas: *Composites, metals joining, additive manufacturing, smart manufacturing (lean, virtual/augmented reality, data analytics and cyber), robotics and automation*