

The background of the slide is a composite image of space exploration. On the left, a large, detailed Earth's moon is shown in a dark blue-grey color. Above it and to the left is a smaller, reddish-orange sphere representing Mars. A small spacecraft is positioned between the two celestial bodies, emitting a bright blue beam of light that extends towards the right. The upper portion of the background is a deep black space filled with numerous white stars. The lower portion shows a dark, silhouetted horizon line with a person's head and shoulders in profile on the right, looking up at the sky. The sky just above the horizon is a mix of dark blue and yellowish-orange, suggesting a sunset or sunrise.

EXPLORESPACE TECH

TECHNOLOGY DRIVES EXPLORATION

LEAD Outcome 2

NASA's Space Technology Mission Directorate | Strategic Technology Framework | August 2023

STMD Strategic Framework

THRUSTS			OUTCOMES	CAPABILITIES
 LEAD Ensuring American global leadership in space technology • Advance US space technology innovation and competitiveness in a global context • Encourage technology driven economic growth with an emphasis on the expanding space economy • Inspire and develop a diverse and powerful US aerospace technology community	 GO Rapid, Safe, & Efficient Space Transportation		• Develop nuclear technologies enabling fast in-space transits. • Develop cryogenic storage, transport, and fluid management technologies for surface and in-space applications. • Develop advanced propulsion technologies that enable future science/exploration missions.	• Nuclear Systems • Cryogenic Fluid Management • Advanced Propulsion
	 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.	• Entry, Descent, Landing, & Precision 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 Habitation System technologies.	• Advanced Power • In-Situ Resource Utilization • Advanced Thermal • Advanced Materials, Structures, & Construction • Advanced Habitation Systems
	 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. • Develop technologies for science instrumentation supporting new discoveries. • Develop transformative technologies that enable future NASA or commercial missions and discoveries	• Advanced Avionics Systems • Advanced Communications & Navigation • Advanced Robotics • Autonomous Systems • Satellite Servicing & Assembly • Advanced Manufacturing • Small Spacecraft • Rendezvous, Proximity Operations & Capture • Sensor & Instrumentation



LEAD

Ensuring American global leadership in space technology

Outcome 2: Encourage technology-driven economic growth with an emphasis on the expanding space economy.

- Foster the creation and growth of aerospace businesses.
- Increase the commercialization of NASA-supported technologies throughout the US economy.
- Partner in innovative ways for research and development to expand the aerospace sector.
- Collaborate with stakeholders in geographic communities across the country to leverage NASA resources in order to catalyze innovation for the benefit of the US economy.

Objective 1: Foster the creation and growth of aerospace businesses.

Approach

- ✓ Measure, where possible, STMD's impact on aerospace businesses in order to inform future programmatic decisions.

Potential Metrics

- Businesses/jobs/revenue created following engagement with an STMD Program.
- Amount of external investment (capital raised or corporate acquisition) industry partners receive following engagement with STMD.
- The % of STMD's program funding that is associated with a commercial need or use case.
- Number of activities that are intended to serve as a catalyst for growth of the aerospace industry (establishing/leading consortiums, supporting standards development, providing data sets, etc.).

Example Activities

- ✓ [Lunar Surface Innovation Consortium \(LSIC\)](#)
- ✓ [Consortium for Space Mobility and ISAM Capabilities \(COSMIC\)](#)
- ✓ [SmallSat Parts on Orbit Now \(SPOON\) database](#)



Objective 2: Increase the commercialization of NASA-supported technologies throughout the US economy.

Approach

- ✓ Track the commercialization of NASA-supported technologies in order to increase the economic impact of NASA's research and development investments.

Potential Metrics

- Technology Transfer Licensing fees and the number of Commercial Licenses
- The number of Technology Transfer Software Usage Agreements
- Amount of co-funding or cost sharing industry partners contribute for STMD R&D awards.
- Number of patents filed by industry partners for technologies related to the work done in partnership with STMD.

Example Activities

- ✓ [Technology Transfer Program](#)
- ✓ [I-Corps Program](#)
- ✓ [SBIR IGNITE](#)
- ✓ [SBIR Civilian Commercialization Readiness Pilot Program \(CCRPP\)](#)

Objective 3: Partner in innovative ways for research and development to expand the aerospace sector

Approach

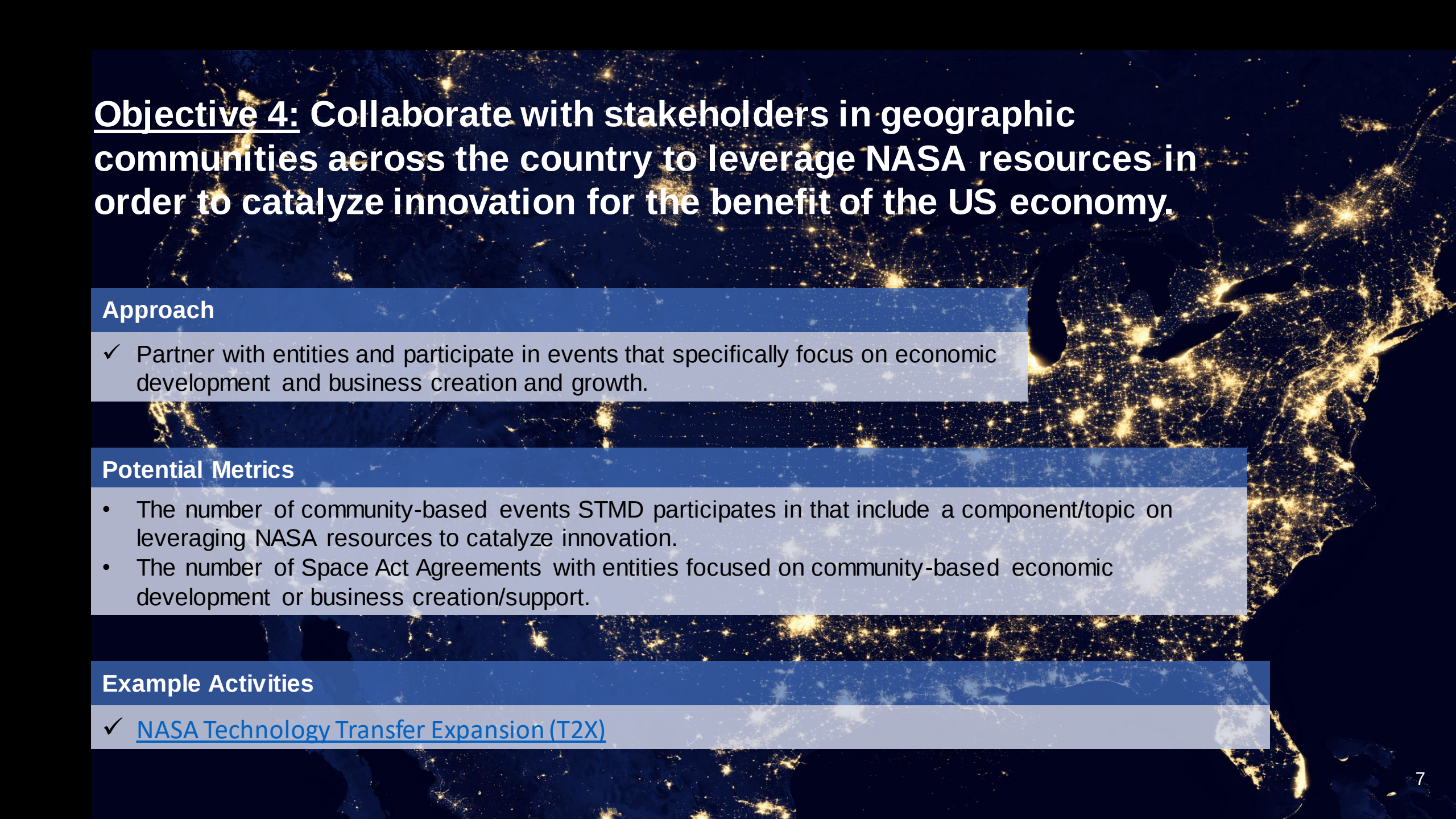
- ✓ Leverage partnering mechanisms and approaches that can support commercial needs and industry growth.

Potential Metrics

- The % of STMD's extramural budget that utilizes mechanisms other than cost reimbursement contracts.
- The number of 'resource use agreements' (such as Announcements of Collaborative Opportunities and Space Act Agreements) used to access NASA capabilities, facilities, expertise).
- The number of Prizes, Challenges, and Crowd Sourcing competitions with an identified external need or use case.

Example Activities

- ✓ [Announcement of Collaborative Opportunities \(ACO\)](#)
- ✓ [Tipping Point Solicitations](#)
- ✓ [NASA TechFlights](#)
- ✓ [Prizes, Challenges and Crowdsourcing](#)



Objective 4: Collaborate with stakeholders in geographic communities across the country to leverage NASA resources in order to catalyze innovation for the benefit of the US economy.

Approach

- ✓ Partner with entities and participate in events that specifically focus on economic development and business creation and growth.

Potential Metrics

- The number of community-based events STMD participates in that include a component/topic on leveraging NASA resources to catalyze innovation.
- The number of Space Act Agreements with entities focused on community-based economic development or business creation/support.

Example Activities

- ✓ [NASA Technology Transfer Expansion \(T2X\)](#)