Space Technology Leadership

Goal Leader:

Michael Green, Deputy Associate Administrator for Management, Space Technology Mission Directorate
Goal Overview

Goal statement

Ensure American global leadership in space technology innovations through increased partnering with industry and demonstrating key lunar surface and deep space technologies. By September 30, 2023: NASA will demonstrate leadership in space technology by:

- Enhancing partnerships with industry through delivery or completion of milestones for at least 4 Tipping Point opportunities, and at least 3 critical small business technology transitions to develop capabilities that support NASA and commercial needs;
- Delivering at least 3 new technologies that will be demonstrated on the lunar surface or in lunar orbit; and
- Completing at least 2 major milestones for projects that increase the Nation’s capabilities in deep space.

Problem to Be Solved

- Through industry partnerships, transferring technologies beyond NASA, facilitating the commercialization of space technologies, and stimulating growth of the U.S. space economy. Laying the groundwork for the aerospace breakthroughs of tomorrow through demonstration of new technologies on the lunar surface and in deep space.

What Success Looks Like

- Complete at least 4 milestones for Tipping Point opportunities, which supports space technology development through public-private partnerships with industry
- Deliver at least 3 critical small business transitions through NASA’s SBIR/STTR Program, which funds the research, development, and demonstration of innovative technologies, with the goal of infusing the technologies into NASA missions and commercialization
- Deliver at least 3 new technologies that will be demonstrated on the lunar surface or in lunar orbit. This includes completing the testing in preparation for shipment.
- Complete at least 2 major milestones for deep space projects to support future robotic and human space exploration missions
## Goal target(s)

In the table below, please repeat the key metrics included in the goal statement (previous slide) that will be used to track progress. **Please update this column each quarter.**

### Tracking the goal

<table>
<thead>
<tr>
<th>Achievement statement</th>
<th>Key indicator(s)</th>
<th>Quantify progress</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>09/30/2023</strong></td>
<td>Complete milestones for at least 4 Tipping Point opportunities: • 3 CFM Tipping Points projects • LTE Proximity Communications Tipping Point</td>
<td>Tipping Point</td>
<td>4</td>
</tr>
<tr>
<td><strong>09/30/2023</strong></td>
<td>Deliver at least 3 critical small business technology transitions • 3 SBIR/STTR sequentials</td>
<td>STTR</td>
<td>3</td>
</tr>
<tr>
<td><strong>09/30/2023</strong></td>
<td>Deliver at least 3 new technologies that will be demonstrated on the lunar surface or in lunar orbit • CAPSTONE (completed) • PRIME-1 • CADRE</td>
<td>Lunar Technology</td>
<td>3</td>
</tr>
<tr>
<td><strong>09/30/2023</strong></td>
<td>Complete at least 2 major milestones for deep space projects • SEP (completed) • DSOC</td>
<td>Deep Space Projects</td>
<td>2</td>
</tr>
</tbody>
</table>

* Even qualitative targets! If the target is to achieve a qualitative outcome, quantify progress this way: 1="Yes, we achieved it", 0="No, not yet"

** As of 10/1/2021
Space Technology Mission Directorate
Associate Administrator: James Reuter
Deputy Associate Administrator: Prasun Desai
Goal Leader: G. Michael Green, Deputy Associate Administrator for Management

Early Stage Innovations & Partnerships
Director: Jenn Gustetic

Technology Demonstrations
Director: Trudy Kortes

Technology Maturation
Director: Niki Werkheiser

Small Spacecraft Technology
Director: Chris Baker

SBIR/STTR
Program Executive: Jason Kessler
Goal Strategies

Achievement of this APG will require working closely with stakeholders, enlisting partnerships, utilizing evidence-based decision making, and promoting diversity, equity, inclusion, and accessibility. Specific strategies to support these efforts include:

• Employing a merit-based competition model, with a portfolio approach spanning a range of discipline areas and technology readiness levels.
• Integration across programs to identify and successfully transition and transfer new capabilities.
• Working with potential stakeholders up front and continuously engaging with them as we go through conception, maturation, and demonstration.
• Focusing on evidence-based decision making with continuous improvement of data management and analysis capabilities. This includes focused, outcome-based requirements and documentation that will inform future investments.
• Increasing the diversity of our innovation community to broaden our base of innovators, ensuring new perspectives and more comprehensive capture of promising ideas.
Key indicators

Key indicators as of FY 2022 Q1
17% have been achieved
83% have not been achieved
### Key Milestones

#### Milestone Summary

<table>
<thead>
<tr>
<th>Key Milestone</th>
<th>Milestone Due Date</th>
<th>Milestone Status</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final assembly of the Cislunar Autonomous Positioning System Technology</td>
<td>FY 2022 Q1</td>
<td>G</td>
<td>The CAPSTONE spacecraft completed final assembly on 2/15 in</td>
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<tr>
<td>Operations and Navigation Experiment (CAPSTONE) spacecraft in preparation</td>
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<td>preparation for pre-shipment testing.</td>
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<tr>
<td>for pre-shipment testing</td>
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<tr>
<td>Deliver the Polar Resources Ice Mining Experiment (PRIME)-1 to Intuitive</td>
<td>FY 2022 Q3</td>
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<td>Machines for integration with their Commercial Lunar Payload Services (CLPS)</td>
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<td>lander, in preparation for their mission</td>
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<tr>
<td>Complete 3 early design milestones for Cryogenic Fluid Management (CFM)</td>
<td>FY 2022 Q4</td>
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<td>Tipping Point projects</td>
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<tr>
<td>Transition 3 SBIR/STTR sequentials planned to be completed in CY 2022 to</td>
<td>FY 2023 Q1</td>
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<td>stakeholder programs for planned follow-on use/development and integration</td>
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<td>into future systems and demonstrations</td>
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<td>Deliver the LTE Proximity Communications Tipping Point with Nokia to Intuitive Machines for integration to their CLPS Lander</td>
<td>FY 2023 Q2</td>
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<tr>
<td>Deliver the Cooperative Autonomous Distributed Robotic Explorers (CADRE)</td>
<td>FY 2023 Q3</td>
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<td>to the CLPS vendor for integration to their lander</td>
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<tr>
<td>Initiate primary mission operations of the Deep Space Optical Communications</td>
<td>FY 2023 Q4</td>
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<td>(DSOC)</td>
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While delayed beyond Q1 as originally planned, NASA achieved the Q1 milestone on 2/15/2022 to complete assembly of the Cislunar Autonomous Positioning System Technology Operations and Navigation Experiment (CAPSTONE) spacecraft in preparation for pre-shipment testing.

Due to delays with launch vehicle readiness, the spacecraft team decided to perform a firmware update on a radio and fix a wire harnessing issue that effected the camera system. Both updates were in support of tertiary mission objectives and would not have been required for the primary mission. Given the projected launch vehicle slip, the team delayed the final build to make the updates.

Data accuracy & reliability

Verification and Validation:
  o NASA monitors and tracks its progress towards this goal using various Agency documents and reports.

Data Source(s):
  o Mission Directorate-level documentation (e.g., DPMC Decision Memos and Minutes, meeting documentation, monthly program review assessments).
  o Program-level documentation.
  o Data systems (e.g., SPAR, SMART, TechPort).

Level of Accuracy Required for Intended Use:
  o Using the documents and reports referenced above.

Data Limitations:
  o Materials from the industry partners may include company proprietary information; such information cannot be released publicly.

How the Agency Compensates for Data Limitations:
  o NASA has not identified any data limitations that would preclude it from reporting accurate, reliable, and timely performance information.
### Contributing Programs
- Early-Stage Innovation and Partnerships; SBIR and STTR; Technology Demonstration; Technology Maturation
- Organizations:
  - Space Technology Mission Directorate

### Program Activities:
- Early-Stage Innovation and Partnerships; SBIR and STTR; Technology Demonstration; Technology Maturation; Small Spacecraft Technology

### Policies:
- STMD complies with all relevant federal regulations and NASA policies.

### Other Federal Activities:
- Activity – contribution

### Stakeholder / Congressional Consultations
- NASA provides updates to Congress on the status of required milestones, in addition to quarterly updates to the Office of Management and Budget (OMB) and the Office of Science and Technology Policy (OSTP). NASA also routinely provides status to the Government Accountability Office (GAO).