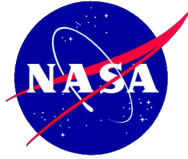


Agency Priority Goal Action Plan

# Commercial Low Earth Orbit Economy

**Goal Leader:** Phil McAlister, Human Exploration and Operations Mission Directorate (HEOMD)

**Deputy Goal Leader:** Angela Hart, LEO Commercialization Manager, Johnson Space Center (JSC)



# Overview

## Goal Statement

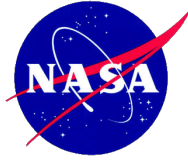
- Enable a robust commercial low Earth orbit economy in which transportation, habitation, and on-orbit services are available for purchase by NASA and other customers. By September 30, 2021, NASA will support the development of commercial services, including through releasing new business opportunities, supporting demonstration flights, beginning certification activities, and demonstrating commercial capabilities.

## Challenge

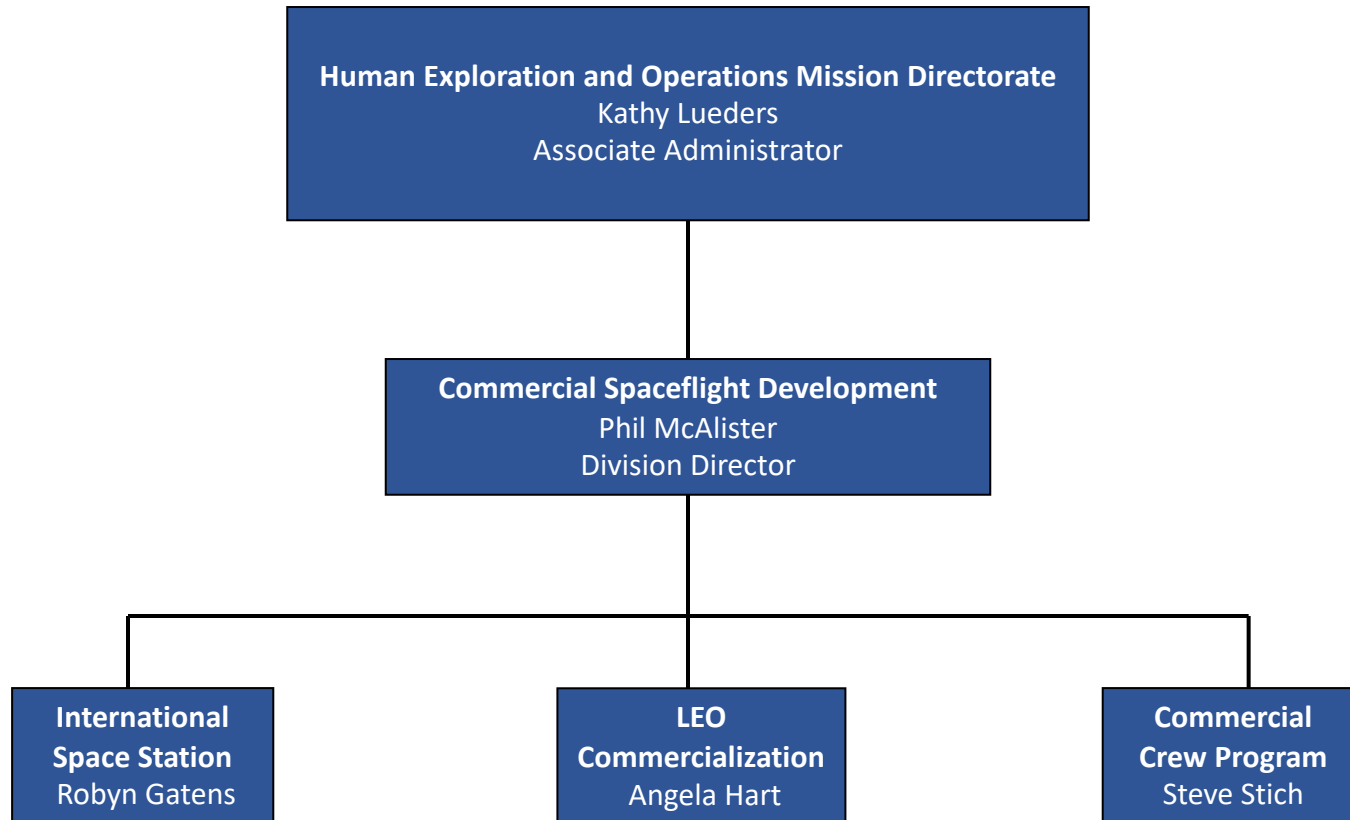
- Achieving safe, reliable, and cost-effective access to and from low Earth orbit and the ISS through the development of U.S. commercial crew space transportation capabilities. Partnering with industry to develop commercial destinations that will enable transition from the ISS, while stimulating growth of sustainable demand so NASA can be one of many customers.

## Opportunity

- Enabling a U.S. industry-based capability can facilitate growth of a commercial market, providing new high-technology jobs, securing U.S. leadership, and reducing the cost of human access to and operations in space.
- Further opening the frontier for space exploration will support a robust economy in low-Earth orbit.



# Leadership & Implementation Team



# Goal Structure & Strategies

- Enable crew and cargo transportation capabilities that support establishment of a Commercial LEO economy.
- Support establishment of commercial LEO transportation systems and destinations for use by future customers, including industry, other US government agencies, other National and the general public.
- Partner with industry to support growth of sustainable demand for products and services in the LEO economy.
- Contributing Programs include NASA's Commercial Crew Program, Commercial LEO Development, and the International Space Station Program.



## NASA's Vision for Economic Development in Low-Earth Orbit (LEO)

**YOU ARE HERE**      EXPLORE THE PLAN AT [WWW.NASA.GOV/LEO-ECONOMY](http://WWW.NASA.GOV/LEO-ECONOMY)      INTERNATIONAL SPACE STATION

**LONG-TERM**

- NASA is one of many customers in a robust LEO economy
- Complete transition of ISS assets at end of life
- Conduct NASA's continued R&D on commercial destinations in LEO
- Purchase National Lab services from commercial provider(s)

**MID-TERM**

- Partner with industry to develop and demonstrate new LEO destinations
- Initiate phased transition to acquire needed services from commercial destinations rather than ISS
- Seek out and pursue opportunities to stimulate demand
- Initiate transition of ISS assets while still satisfying international partner agreements

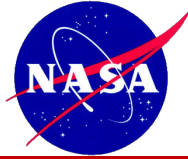
**NEAR-TERM**

- Share the agency's comprehensive plan for global commercial LEO development
  1. Establish ISS commercial use and pricing policy
  2. Enable private astronaut missions to ISS
  3. Initiate the process for commercial development of LEO destinations
  4. Seek out and pursue opportunities to stimulate demand
  5. Quantify NASA's long-term needs for activities in LEO

**FUTURE COMMERCIAL DESTINATIONS**

**ARTEMIS MISSIONS**

**COMMERCIAL PARTNER SPACECRAFT**



# Summary of Progress – FY 2020 Q4

- The SpaceX Demo-2 mission successfully concluded with the Dragon Spacecraft's splashdown in the Gulf of Mexico, near Pensacola, Florida. The Demo-2 Crewmembers were transported back to Johnson Space Center for post-flight recovery, and the spacecraft was returned to SpaceX for post-flight processing and to begin refurbishment for the upcoming Crew-2 mission.
- At the end of FY 2020, Boeing continued processing the CST-100, Starliner, in preparation for their re-flight of the Orbital Flight Test (OFT). As a result, NASA did not achieve the FY 2020 Q4 milestone for both commercial partners to complete demonstration missions.
- NASA's Commercial Crew Program and SpaceX continued making progress toward a Crew-1 launch this fall, with the Crew-1 Dragon completing final integration and checkout. Transport to Pad 39A for integration with the Falcon 9 launch vehicle was completed in FY 2021 Q1, to meet a planned Crew-1 launch this fall.
- NASA's Commercial Crew Program released a Request for Information (RFI) to industry in Q4, requesting suborbital system qualification and availability of commercial, crewed suborbital space transportation services data. NASA will use the 11 industry responses to inform the Suborbital Commercial (SubC) activity.
- While NASA's response to COVID-19 restricted access to some NASA and contractor facilities, mission specific work continued to be performed in support of the successful SpaceX Demo-2 launch, mission operations, and safe return of the crew.
- The heroic efforts of the entire industry/government team allowed projects to make notable progress toward enabling a robust commercial LEO economy during the COVID-19 pandemic. However, because NASA did not complete two milestones – make awards for the free-flyer solicitation and both commercial partners complete demonstration missions – this APG is rated red for FY 2020.



# Data Accuracy and Reliability

## Verification and Validation:

- NASA monitors and tracks its progress towards this goal using various Agency documents and reports, including Directorate Program Management Council (DPMC) materials, reports from the industry partners, and other program-internal documents.

## Data Source(s):

- Email(s), press releases, and program-internal documents indicating that NASA's industry partners continue to make progress maturing their transportation system technical and certification/verification efforts, including Baseline Performance Reviews.

## Level of Accuracy Required for Intended Use:

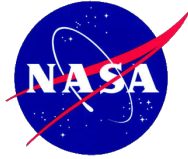
- Using the documents and reports referenced above, the Agency is able to accurately report at the end of each quarter on whether or not it has met its planned milestones.

## Data Limitations:

- Materials provided by NASA's industry partners may include company-proprietary information. Data are sufficiently accurate for their intended use.

## How the Agency Compensates for Data Limitations:

- NASA has not identified any data limitations that would preclude it from reporting accurate, reliable, and timely performance information.



# Additional Information

## Contributing Programs

### NASA Program Activities:

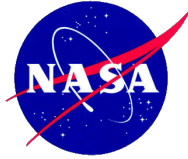
- Commercial Crew Program: Facilitates the development of safe, reliable, and cost-effective human space transportation by the U.S. commercial industry to and from low Earth orbit and the International Space Station (ISS).
- ISS Program: Develops and maintains the transportation service, interface, and safety requirements associated with crewed flights to and from the ISS.
- Launch Services Program (LSP): Manages NASA's launch vehicle services, dedicated to launching all types of science and operational spacecraft.
- Commercial LEO Development: Partners with industry to support development of commercial LEO destinations and growth of sustainable demand leading to a robust economy in low-Earth orbit.

### Other Federal Activities:

- Federal Aviation Administration (FAA), Office of Commercial Space Transportation: Ensures that commercially-developed, human-rated transportation systems meet FAA licensing requirements for launch and entry, and works with NASA on cross-agency licensing issues.
- United States Air Force, 45th Space Wing: Addresses launch range safety and crew rescue.
- Department of Commerce: Champion growth of space commerce.

## Stakeholder/Congressional Consultations

NASA provides quarterly updates to Congress on the status of required milestones under the Commercial Crew Transportation Capability contracts, as well as through other contracts and partnerships. NASA also consults regularly with experts from industry and academia, such as the NASA Advisory Council.



# Key Milestones

Progress update for the Commercial LEO Economy APG.

	FY 2020 Q1	FY 2020 Q2	FY 2020 Q3	Current Status FY 2020 Q4	Forecast FY 2021 Q1
Quarterly Rating	Yellow	Yellow	Yellow	Red	↑
Milestones Achieved	0 out of 1	1 out of 2	2 out of 3	2 out of 4	1 of 4

Unchanged
 Improving
 Deteriorating

## Milestone Summary

Milestones	Milestone Due Date	Comments
Make awards for the port solicitation – NextStep 2 Broad Agency Announcement (Appendix I).	FY 2020 Q1	Completed in January 2020.
Make awards for the free-flyer solicitation – NextStep 2 Broad Agency Announcement (Appendix K)	FY 2020 Q2	The awards for the Free-Flyer solicitation have been delayed.
Initiate astronaut training for initial private astronaut mission under a reimbursable space act agreement	FY 2020 Q3	Completed, with two SAA's signed and in place.
Both commercial crew industry partners complete demonstration missions	FY 2020 Q4	SpaceX completed their Demo-2 mission. Boeing continues to work toward the OFT re-flight.
Execute an outreach and communication campaign to expand pipeline of new entrants into the LEO economy	FY 2021 Q1	
Complete Preliminary Design Review for at least one port solicitation awardee	FY 2021 Q2	
Complete Preliminary Design Review for at least one free-flyer solicitation awardee	FY 2021 Q3	
Commence regular commercial crew operations	FY 2021 Q4	