

Agency Priority Goal Action Plan

Artemis 2024 Lunar Landing

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Overview

Goal Statement

- Advance America's goal to land the first woman and the next man on the Moon by 2024 and pursue a sustainable program of exploration by demonstrating capabilities that advance lunar exploration. By September 30, 2021, NASA will launch Artemis I and make significant progress for Artemis II, as well as have multiple companies under contract to develop systems to land humans on the Moon.

Challenge

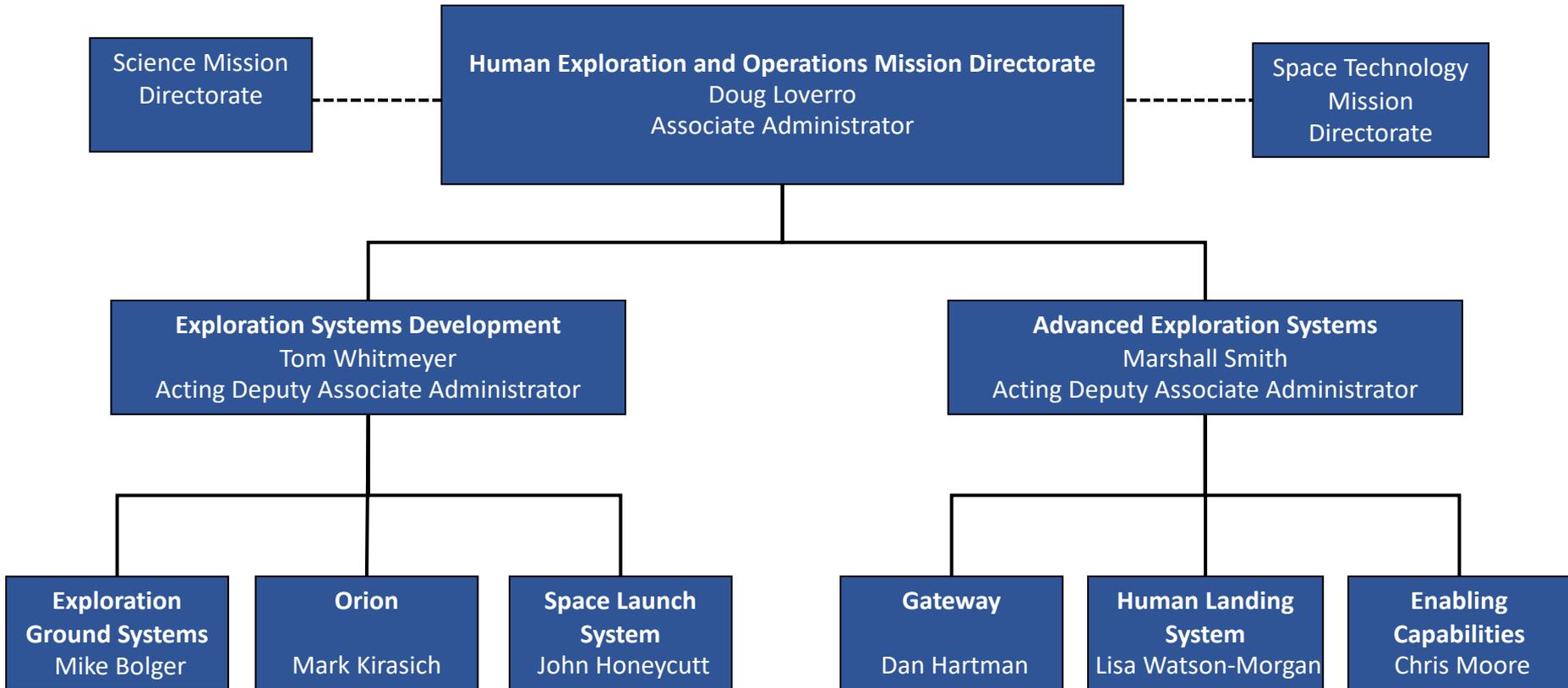
- Successfully execute long-duration space exploration missions - to the Moon and then Mars - while developing new commercial launch capabilities, launch vehicles, spacecraft, lunar lander, life support systems, ground support systems, surface habitation and mobility systems.

Opportunity

- These systems will carry humans to the Moon and farther into space than ever before.
- NASA is building a national capability that includes state-of-the-art facilities used by aerospace companies, a broader and more advanced supplier base to drive down costs and meet industry demands, and a highly skilled national workforce to support the growing aerospace field.
- NASA's human exploration portfolio will advance American leadership in space, creating a path for peace, diplomacy, and global cooperation.



Leadership & Implementation Team





Goal Structure & Strategies

- Exploration Systems Development (ESD) will systematically progress through major qualification, testing, and production milestones to ensure the success of the Space Launch System (SLS) and Orion spacecraft on Artemis I (uncrewed test flight), Artemis II (crewed test flight), and Artemis III (crewed mission to lunar surface)
- Advanced Exploration Systems (AES) will use innovative procurement and management approaches to develop the core capabilities (Gateway, Surface Suits, and Human Landing System) needed to conduct the lunar surface mission in 2024 and enable multiple launch options for lunar missions.
- The Space Technology Mission Directorate (STMD) will pursue the maturation of technologies that will enable exploration activities, including cryo fluid management, In-situ Resource Utilization (ISRU), kilowatt generation, precision landing, and Solar Electric Propulsion (SEP).
- The Science Mission Directorate will collaborate to identify the optimal lunar surface location for Artemis mission activities and operations, as well as the definition of science goals and objectives.



Summary of Progress – FY2020 Q1

During FY 2020 Q1, the major elements of Artemis 2024 - Orion, SLS, Exploration Ground System (EGS) and AES - each made measureable progress. No significant challenges were encountered during the reporting period.

- During Q1, the Orion Artemis I Crew and Service Module (CSM) was transported to Plum Brook Station in Sandusky, OH, for the start of environmental testing. In preparation for the second mission, the Artemis II Crew Module Adaptor (CMA) primary and secondary structure was completed in Q1.
- All four RS-25 engines for the first SLS were structurally mated to the Core Stage on November 6, completing assembly of the rocket stage at Michoud Assembly Facility (MAF). The SLS liquid hydrogen structural test article (STA) test to failure was completed December 5, at Marshall Space Flight Center (MSFC). The Core Stage was transported via barge to Stennis Space Center, in preparation for the Green Run test.
- The EGS team successfully completed Core Stage pathfinder demonstration events, enabling completion of all Detailed Verification Objectives (DVaOs) and providing invaluable training and certifications for technicians, engineers, and move directors prior to actual Artemis I Core Stage operations.
- The Human Landing System (HLS) NextSTEP-2 Appendix* H Final Solicitation was released on September 30, and proposals were received on November 5. Proposal evaluation is on-going. Contract award, originally scheduled to be completed by the end of Q2, is now targeting Q3.

* Note – NASA issued the original Next Space Technologies for Exploration Partnerships (NextSTEP) Broad Agency Announcement (BAA) to U.S. industry in late 2014; the second NextSTEP BAA was released in April 2016 as an omnibus announcement with appendices that will solicit proposals in specific research areas <https://www.nasa.gov/content/nextstep-overview> .



Summary of Progress – FY2020 Q2

During FY 2020 Q2, Orion, Space Launch System (SLS), Exploration Ground System (EGS) and Advanced Exploration Systems (AES) - made measureable progress: Orion Artemis I Crew and Service Module (CSM) successfully completed Thermal Vacuum testing at Plum Brook Station in Sandusky, Ohio, and was transported back to the Kennedy Space Center (KSC) in Florida, and prepared for final assembly and test operations. The Artemis II Crew Module (CM) and Crew Module Adaptor (CMA) assembly work continued at KSC.

- In Q2, the Core Stage I was transported from Michoud Assembly Facility to Stennis Space Center. After the hardware was relocated to the B-2 Test Stand, the ground equipment necessary for lifting the stage into a vertical position and onto the stand was installed.
- The EGS team successfully completed Mobile Launcher Multi-Element Verification and Validation Testing in Q2. The team also completed the initial work necessary to complete Ground Support Equipment installation. Completion of these efforts mark a major milestone in preparing to support Artemis I Stacking and Operations Processing.
- The evaluation of the Human Landing System (HLS) NextSTEP-2 Appendix H Final Proposals was completed, and preparation were made for contract award in Q3.
- All but two of the HLS Studies (Risk Reduction, and Demonstrations - NextSTEP-2 Appendix E contracts) were completed.
- The first Gateway Logistics Service (GLS) contract was awarded to SpaceX on March 25, 2020.
- NASA's COVID-19 response framework was implemented in mid-March, and the impacts Agency-wide at both government and contractor facilities are not distinguishable from the actions that were delayed throughout the first half of Q3. More insight will be available later in the FY.



Key Milestones

Progress update for the Artemis 2024 Lunar Landing APG.

	N/A	FY 2020 Q1	Current Status FY 2020 Q2	Forecast FY 2020 Q3
Quarterly Rating		Green	Green	➡
Milestones Achieved		1 of 1	2 of 2*	

* Q3 milestone completed ahead of schedule

➡	Unchanged	⬆	Improving	⬇	Deteriorating
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Milestone Summary

Milestones	Milestone Due Date	Comments
Ship the Artemis I Orion spacecraft to Plum Brook Station for testing	FY 2020 Q1	Completed on November 25, 2019.
Integrated Human Landing System contract Awards (NextSTEP-2, Appendix H)	FY 2020 Q2	Scheduled for April 2020.
Award Gateway Logistics Contract	FY 2020 Q3	Completed on March 25, 2020.
Perform Green Run	FY 2020 Q4	
Initiate Artemis II Crew Module Functional Testing.	FY 2021 Q1	
Begin outfitting of the Artemis II Launch Vehicle Stage Adapter.	FY 2021 Q2	
Complete Artemis I Core Stage mate to Boosters	FY 2021 Q3	
Launch Artemis I	FY 2021 Q4	



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 materials, Quarterly Program Status Report packages, project schedules, and other program-internal documents.

Data Source(s):

- Press releases and program-internal documents indicating whether or not NASA has met its major quarterly development milestones such as Baseline Performance Review presentation.

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:

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

How the Agency Compensates for Data Limitations:

- Not applicable.



Additional Information

Contributing Programs

NASA Program Activities:

- The principal contributors to this goal are the Exploration Systems Development programs (Exploration Ground Systems, Orion, and Space Launch System) and the Advanced Exploration Systems programs (Gateway and Human Landing System).
- Other NASA organizations that contribute to the goal include the Space Communications and Navigation, Rocket Propulsion Test, and Exploration Research & Technology programs, both the Space Technology and Science Mission Directorates, and the Office of the Chief Technologist.

Other Federal Activities:

- Other federal contributors include the United States Air Force, United States Navy, and United States Army. NASA also conducts tests at Department of Defense facilities.

International Partners:

- The European Space Agency is a partner on the Orion Service Module, which will serve as the primary power and propulsion component of the Orion spacecraft.

Stakeholder/Congressional Consultations

- NASA provides regular status updates to Congress, including quarterly reports on SLS funding. NASA also provides regular progress briefings to Congressional staff.
- NASA supports regular audits by the Government Accountability Office (GAO) as part of both the annual "Assessment of Major Projects" report and other focused reviews.
- NASA provides status updates to the Aerospace Safety Advisory Panel and the NASA Advisory Council.