



NASA OFFICE OF INSPECTOR GENERAL

OFFICE OF AUDITS
SUITE 8U71, 300 E ST SW
WASHINGTON, D.C. 20546-0001

December 1, 2020

TO: Kathy Lueders
Associate Administrator for Human Exploration and Operations Mission Directorate

Terrence W. Wilcutt
Chief of Safety and Mission Assurance

SUBJECT: Termination of Audit, *NASA's Challenges to Safely Return Humans to the Moon by 2024*
(IG-21-007; A-20-014-00)

The Office of Inspector General is closing its review of NASA's challenges associated with safely returning humans to the Moon by 2024 because our initial work revealed the Agency, at this relatively early point in its efforts, appears to be taking proactive measures to address the major potential safety issues and risks. The objective of this audit was to identify top safety challenges and NASA's actions to mitigate them.

We announced this review in August 2020 in part because the NASA Aerospace Safety Advisory Panel raised concerns over the Agency's plans to accelerate its return-to-the-Moon schedule and advised that "NASA must guard against undue schedule pressure that might lead to decisions adversely impacting safety and mission assurance."¹ The 2024 timeline was established to create a sense of urgency regarding returning American astronauts to the Moon, and NASA senior officials acknowledged the aggressiveness of this schedule. To meet our objective, we interviewed NASA officials and reviewed documentation related to NASA's lunar missions, known as the Artemis program. We also observed congressional hearings with the NASA Administrator and attended public briefings of the Aerospace Safety Advisory Panel. We did not, however, complete an assessment of the effectiveness of internal controls during our review.

Based upon our audit work completed to date, we found that the most significant challenge NASA currently faces in returning humans to the Moon by 2024 is budget uncertainty, a challenge that could ultimately affect the Agency's ability to safely accomplish the mission. NASA remains under a continuing budget resolution until December 11, 2020, with a second continuing resolution possible through the spring of 2021. The House of Representatives passed a bill to provide NASA

¹ Aerospace Safety Advisory Panel, *Annual Report for 2019* (January 2020).

\$600 million in its fiscal year 2021 appropriations for the Human Landing System (HLS), a key component of its lunar program, but the Administrator stated that the Agency needs the full \$3.2 billion in the President's 2021 budget request no later than March 2021 to develop the HLS in time to meet the 2024 deadline.²

Despite this budget uncertainty, the Agency is taking steps to address a variety of potential safety issues. In one example, the Agency preserved a series of eight tests on the core stage flight hardware for the Space Launch System (known as the Green Run), rather than skipping these in favor of accelerating the testing schedule. Additionally, NASA officials told us they are applying lessons learned from the Commercial Crew Program to the HLS contracts, notably in the area of contractor insight and oversight, to ensure the Agency has all the information it needs as development progresses. Lastly, NASA has intentionally delayed the start of detailed safety analyses for the Artemis III mission (the proposed lunar landing) since designs for the HLS have not yet been finalized.³ The Artemis Plan released in September 2020 states that a preliminary design-level review will be conducted in early 2021.⁴ This would include identifying hazardous conditions, their causes, and the development of hazard elimination or mitigation strategies to determine which designs are the most mature and most likely to meet the 2024 timeline to return humans to the Moon. Based upon our audit work performed to date and the Artemis program schedule, we determined that further review at this time by our office would not be the best use of our or NASA's resources.

While NASA has made significant progress to further its human exploration efforts, many questions remain about the total cost, schedule, and scope of the Agency's lunar ambitions. Achieving a human lunar landing by 2024 will require strong, consistent, and sustained leadership from the President, Congress, and NASA, as well as stable and timely funding. In 2019 and 2020, we identified returning to the Moon as a top management and performance challenge and will continue our oversight of NASA's management of the Artemis program and the Agency's human exploration efforts through other audits and reviews.⁵ While we are closing this review, we may initiate a similar assessment in the future if conditions warrant.

² Commerce, Justice, Science, and Related Agencies Appropriations Bill, 2021, H. Rep. No. 116-455 (2020). As of November 2020, the Senate had yet to decide on NASA's fiscal year 2021 appropriation.

³ In April 2020, NASA provided three companies—Blue Origin, Dynetics Incorporated, and Space Exploration Technologies Corporation—firm-fixed price, milestone-based contracts with a combined value of \$967 million for a 10-month base period to design and develop the Agency's HLS. During the base period, NASA intends to evaluate the companies' designs and then select two of the three companies to continue HLS development for future Moon missions.

⁴ NASA, *Artemis Plan: NASA's Lunar Exploration Program Overview* (September 2020).

⁵ NASA Office of Inspector General Top Management and Performance Challenges reports can be found at <https://oig.nasa.gov/challenges.html> (accessed November 3, 2020).

We appreciate the courtesies and cooperation provided during this review. If you have questions about this memorandum, contact Laurence Hawkins, Audit Operations and Quality Assurance Director, at 202-358-1543 or laurence.b.hawkins@nasa.gov.

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