

National Aeronautics and Space Administration

Office of the Administrator  
Washington, DC 20546-0001



June 22, 2020

General Lester L. Lyles, USAF (Ret.)  
Chair  
NASA Advisory Council  
Washington, DC 20546

Dear General Lyles:

Enclosed are NASA's responses to two recommendations from the NASA Advisory Council meeting held on October 31 - November 1, 2019, at the NASA Kennedy Space Center. Please do not hesitate to contact me if the Council would like further background on these responses. I appreciate the Council's thoughtful consideration leading to the recommendations and welcome its continued findings, recommendations, and advice concerning the U.S. civil space program.

I look forward to working closely with you and members of the Council in the future.

Sincerely,

A handwritten signature in black ink that reads "Jim Bridenstine". The signature is written in a cursive style.

James F. Bridenstine  
Administrator

Enclosures:

2019-02-01 (HEOC-01) Human Lunar Lander Development for Safety  
2019-02-02 (HEOC-02) Longevity of the International Space Station

## **NASA Advisory Council Recommendation**

### **Human Lunar Lander Development for Safety 2019-02-01 (HEOC-01)**

#### **Recommendation:**

NASA should review, with an acceptable team, the requirement for in-flight testing of the Human Landing System. Serious consideration should be given to demonstrating through flight test the ability to deorbit, land on, and ascend from the lunar surface under the expected physical and environmental conditions.

#### **Major Reasons for the Recommendation:**

A critical step in the development of the Human Landing System is the plan for human flight certification and its execution. While there may not be a single correct or acceptable approach, systems developed for human space flight in the past have found that uncrewed end-to-end flight tests have been extremely valuable. Partial or ground testing may be options but the Council strongly recommends flight testing.

#### **Consequences of No Action on the Recommendation:**

Inadequate design may not be uncovered prior to human use.

#### **NASA Response:**

NASA concurs. It is of paramount importance that we test the Human Lander System (HLS) under true flight conditions prior to committing it to a crewed lunar mission. The Associate Administrator for Human Exploration and Operations intends to make this a requirement for the HLS developers. NASA has not currently decided if such a demonstration requires an actual lunar landing or something short of that goal such as in-space demonstration of all the relevant elements following simulated mission timelines and thermal conditions such as will be faced in a true lunar expedition. Additionally, since software is such a critical element of present day space systems, we will need to access the level of software maturity that needs to be matched to the hardware demonstrated in such a test.

Currently, NASA is in a blackout period due to the ongoing evaluation of the NextSTEP HLS Appendix H proposals to the solicitation released on September 30, 2019, so the ability of the Agency to modify solicitation requirements or share contractor plans at this time is limited.

Following contract awards, the contractors selected will work with NASA technical authorities and independent reviewers to further develop their proposals and refine their testing plans to the point they are considered sufficient for the effort. But, our intent is to require a test flight that either performs or completely simulates the relevant flight conditions for an actual landing.

Enclosure 1

**Longevity of the International Space Station  
2019-02-02 (HEOC-2)**

**Recommendation:**

The Council recommends that NASA perform an analysis of the safe and useful life of the International Space Station (ISS) past 2028 with emphasis on the structure and other critical systems that cannot be replaced on orbit.

**Major Reasons for the Recommendation:**

An engineering analysis has been performed that shows that the ISS can operate safely until 2028. The Council believes a Low Earth Orbit (LEO) platform to continue research for deep space, long-duration missions will be needed past 2028. Enabling commercial LEO platforms and services should remain NASA's goal, but the Agency should understand the safe remaining life of the ISS in case the commercial platforms and services are not available by 2028.

**Consequence of No Action on the Recommendation:**

NASA will not have the critical information necessary to make an informed decision about ISS life extension.

**NASA Response:**

NASA concurs that an analysis of the lifetime of ISS beyond 2028 is an appropriate study to undertake and will begin this analysis this year. Furthermore, NASA agrees that a lifetime analysis of the International Space Station is a necessary tool for making informed decisions about ISS life extension, and that a LEO platform will continue to be necessary beyond the lifetime of the ISS. NASA has performed a lifetime analysis that indicates no significant areas that would preclude continued ISS operations through 2028. NASA will initiate a post 2028 certification activity balancing needed completion date and impacts to limited resources.