

National Aeronautics and Space Administration



**Office of the Administrator**

Mary W. Jackson NASA Headquarters  
Washington, DC 20546-0001

July 28, 2022

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

Dear General Lyles:

Enclosed is NASA's response to the NASA Advisory Council (NAC) Recommendation 2022-01-05: NASA STEM Strategic Plan. This recommendation was publicly deliberated during the NAC virtual meeting held on March 1-2, 2022.

Please do not hesitate to contact me if you or the Council would like further background on NASA's response.

I look forward to receiving continued advice from the next NAC meeting.

Sincerely,

A handwritten signature in black ink that reads "Bill Nelson" with a long horizontal flourish extending to the right.

Enclosure

## NASA Advisory Council Recommendation

### NASA STEM Strategic Plan

2002-01-05

**Name of Committee:** STEM Engagement Committee

**Chair of Committee:** Mr. Daniel Dumbacher

**Date of Council Public Deliberation:** March 1, 2022

**Short Title of Recommendation:** NASA STEM Strategic Plan

#### **Recommendation:**

The Council recommends continued emphasis on the NASA STEM Strategic Plan (*NASA Strategy for STEM Engagement, 2020-2023*), especially integration and use across the NASA Mission Directorates.

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

The NASA Office of STEM Engagement has made significant progress in tracking the Strategic Plan status and coordinating across the NASA Mission Directorates. Continued momentum will continue to enhance the NASA STEM impact.

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

Lack of coordination across the Agency on STEM activities could lead to duplication of efforts and unaddressed priorities.

#### **NASA Response:**

NASA concurs with the recommendation for continued emphasis on the NASA STEM Strategic Plan (*NASA Strategy for STEM Engagement, 2020-2023*). The Office of STEM Engagement (OSTEM) continues to provide leadership across the Agency in aligning its STEM Engagement programs and activities to the Strategy for STEM Engagement. The STEM Engagement Council (SEC) consists of a group of STEM Engagement stakeholders from OSTEM, other functional offices (e.g., Office of the Chief Human Capital Officer, Office of Diversity and Equal Opportunity), and NASA Mission Directorates. Monthly meetings ensure coordination across the Agency on STEM Engagement activities and priorities. Additionally, the SEC oversees an annual comprehensive portfolio planning process, and this process analyzes alignment to the *NASA Strategy for STEM Engagement*. OSTEM is also coordinating performance and evaluation activities across STEM Engagement activities and will provide a report to the NASA Advisory Council's STEM Engagement Committee regarding its findings.

Enclosure

# **BACKGROUND INFORMATION**

**NASA Advisory Council**  
National Aeronautics and Space Administration  
Washington, DC 20546

*General Lester L. Lyles (USAF, Ret.), Chair*

April 8, 2022

Senator Bill Nelson  
Administrator  
National Aeronautics and Space Administration  
Washington, DC 20546

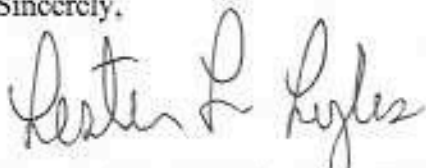
Dear Senator Nelson:

The NASA Advisory Council held its first meeting of 2022 on March 1-2, 2022. This was a virtual meeting due to the continued COVID-19 pandemic.

As a result of our deliberations, the Council approved seven recommendations and nine findings for your consideration. If you have any questions or wish to discuss this further, please do not hesitate to contact me.

I look forward to discussing these recommendations and findings with you in the near future.

Sincerely,



General Lester L. Lyles (USAF, Ret.)  
Chair

Enclosures

## NASA Advisory Council Recommendation

### Financial Commitment to the Commercial LEO Destinations 2022-01-01

**Name of Committee:** Human Exploration and Operations Committee

**Chair of Committee:** Mr. Wayne Hale

**Date of Council Public Deliberation:** March 1, 2022

**Short Title of Recommendation:** Financial Commitment to the Commercial LEO Destinations

#### **Recommendation:**

The Council recommends that NASA should determine its demand for Low Earth Orbit (LEO) services as soon as practical, but well in advance of International Space Station (ISS) retirement. This demand should be translated into a contractual commitment as soon as practical. NASA should begin transitioning its needs to the commercial providers well before the ISS is retired.

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

Business viability of the Commercial LEO Destinations (CLDs) is as important as technical viability. The CLD contractors will regard NASA as an anchor tenant. A firm commitment by NASA will be essential in enabling the CLDs to attract additional customers and close the business case.

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

Long term availability of commercial LEO services depends on the business viability of the service providers. A lack of firm NASA commitment as a customer will dramatically reduce the business viability of the providers.

## NASA Advisory Council Recommendation

### All NASA Mission Directorates Re-evaluate Program Schedules and Manifest Due to COVID-19 Pandemic Supplier Performance 2022-01-02

**Name of Committee:** Human Exploration and Operations Committee

**Chair of Committee:** Mr. Wayne Hale

**Date of Council Public Deliberation:** March 1, 2022

**Short Title of Recommendation:** All NASA Mission Directorates Re-evaluate Program Schedules and Manifest Due to COVID-19 Pandemic Supplier Performance

#### **Recommendation:**

The Council recommends that all NASA Mission Directorates assess those elements of the launch manifest and program development schedules for which material procurement is on the critical path and ensure that sufficient planning buffer has been incorporated to address the mid-pandemic supply base performance.

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

Due to the COVID-19 global pandemic and the impact on the global labor market, microchip availability, and general industry impairment, typical delivery lead times for material procurements are running between 2x - 5x of what is normal.

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

NASA's various projects with near and intermediate term material procurements may miss schedule commitments due to unforeseen and unmitigated delivery schedule and quality risks from key suppliers. Given the scale of the programs, significant schedule slips due to material procurements will have significant downstream cost impacts to the affected programs.

## NASA Advisory Council Recommendation

### Request For Information (RFI) on Grant Augmentations to Mitigate Impacts of COVID-19 Pandemic 2022-01-03

**Name of Committee:** Science Committee

**Chair of Committee:** Dr. Meenakshi Wadhwa

**Date of Council Public Deliberation:** March 1, 2022

**Short Title of Recommendation:** Request For Information (RFI) on Grant Augmentations to Mitigate Impacts of COVID-19 Pandemic

#### **Recommendation:**

The Council appreciates NASA's recently implemented strategy to assist the most vulnerable members of the science community (graduate students, post-docs and early career researchers who are supported via grant funds) via the Request For Information (RFI) on grant augmentations required to support such personnel. Given that the impacts of the COVID-19 pandemic are still continuing, the Council recommends that the NASA Science Mission Directorate consider issuing another such RFI in the near term.

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

The impacts of the COVID-19 pandemic are still ongoing, and are presumably still being felt by graduate students, post-docs, and early career researchers.

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

Lack of adequate support during this critical time for these vulnerable members of the NASA science community could result in a permanent loss of this talent from the community. This could in turn have far reaching impacts on the future NASA workforce.

**NASA Advisory Council Recommendation**  
**Management of Translunar/Lunar Environment**  
**2022-01-04**

<b>Name of Committee:</b>	Science Committee
<b>Chair of Committee:</b>	Dr. Meenakshi Wadhwa
<b>Date of Council Public Deliberation:</b>	March 1, 2022
<b>Short Title of Recommendation:</b>	Management of Translunar/Lunar Environment

**Recommendation:**

In the spirit of the Artemis Accords, the Council recommends that the NASA Science Mission Directorate initiate a dialogue with the NASA Exploration Systems Development Mission Directorate, commercial entities, and other stakeholders to ensure best-practices and protocols are developed to enable beneficial, shared-use of the lunar environment.

**Major Reasons for the Recommendation:**

Use of the electromagnetic spectrum, access to orbital platforms, and mitigation of debris clutter must be proactively managed (via coordination between NASA, commercial interests, and other stakeholders) to protect and enable full utilization of the lunar environment for science and exploration.

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

Lack of such proactive management could result in significant loss of science opportunities.



## NASA Advisory Council Recommendation

### NASA STEM Strategic Plan

2022-01-05

**Name of Committee:** STEM Engagement Committee

**Chair of Committee:** Mr. Daniel Dumbacher

**Date of Council Public Deliberation:** March 1, 2022

**Short Title of Recommendation:** NASA STEM Strategic Plan

#### **Recommendation:**

The Council recommends continued emphasis on the NASA STEM Strategic Plan (*NASA Strategy for STEM Engagement, 2020-2023*), especially integration and use across the NASA Mission Directorates.

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

The NASA Office of STEM Engagement has made significant progress in tracking the Strategic Plan status and coordinating across the NASA Mission Directorates. Continued momentum will continue to enhance the NASA STEM impact.

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

Lack of coordination across the Agency on STEM activities could lead to duplication of efforts and unaddressed priorities.

**NASA Advisory Council Recommendation**

**Building Research Capabilities and Infrastructure  
at Minority Serving Institutions  
2022-01-06**

**Name of Committee:** STEM Engagement Committee

**Chair of Committee:** Mr. Daniel Dumbacher

**Date of Council Public Deliberation:** March 1, 2022

**Short Title of Recommendation:** Building Research Capabilities and Infrastructure at Minority Serving Institutions

**Recommendation:**

The Council recommends that the NASA Administrator and NASA Mission Directorates, along with the NASA Office of Procurement, should ensure that NASA assists building research capabilities and infrastructure at Minority Serving Institutions (MSIs).

**Major Reasons for the Recommendation:**

This will enable MSIs to be competitive and successful in contributing to NASA work and help build a strong K-12 pipeline of interest and engagement.

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

Lack of coordination impedes NASA's capability to build a diverse workforce for the future.

## NASA Advisory Council Recommendation

### Disruption of Schools and Other Identified Challenges Resulting from the Ongoing COVID-19 Pandemic 2022-01-07

**Name of Committee:** STEM Engagement Committee

**Chair of Committee:** Mr. Daniel Dumbacher

**Date of Council Public Deliberation:** March 1, 2022

**Short Title of Recommendation:** Disruption of Schools and Other Identified Challenges Resulting from the Ongoing COVID-19 Pandemic

#### **Recommendation:**

The Council recommends that NASA, other Federal STEM agencies, and other partners (current and potential) should collaborate to support the STEM education community in addressing the disruption of schools and other identified challenges resulting from the ongoing COVID-19 pandemic. NASA alone cannot solve this.

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

The pandemic has created significant disruption in the education community and NASA's STEM involvement can be key aspect of addressing resulting challenges.

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

There are long term implications to the workforce, lack of coordination around recovery efforts, duplication of efforts, gaps in support for the community, and could impact metrics/evaluation efforts.

## NASA Advisory Council Finding

### Diversity, Equity, Inclusion and Accessibility Initiatives

<b>Name of Committee:</b>	Science Committee
<b>Chair of Committee:</b>	Dr. Meenakshi Wadhwa
<b>Date of Council Public Deliberation:</b>	March 1, 2022
<b>Short Title of Finding:</b>	Diversity, Equity, Inclusion and Accessibility Initiatives

#### **Finding:**

The Council commends the NASA Science Mission Directorate for its recent efforts to promote and expand the diversity of its workforce along a multitude of axes. The Council finds that NASA's efforts in this area, particularly those that are anticipated to diversify its mission teams, are anticipated to pay dividends in promoting the best and most innovative science.

The Council noted that assessment of the impacts of the many pilot programs in various divisions (such as the Here to Observe, or H2O, pilot program which will bring students into science team meetings to encourage young people from under-represented groups to pursue careers in science) will be important for determining which of these many programs are most effective over the long term.

## NASA Advisory Council Finding

### Unintended Consequences of NASA Science Mission Directorate Open Science Policy

<b>Name of Committee:</b>	Science Committee
<b>Chair of Committee:</b>	Dr. Meenakshi Wadhwa
<b>Date of Council Public Deliberation:</b>	March 1, 2022
<b>Short Title of Finding:</b>	Unintended Consequences of NASA Science Mission Directorate Open Science Policy

#### **Finding:**

The Council finds that there could be unintended negative consequences, especially to Principal Investigators from under-represented groups and smaller institutions with limited institutional infrastructure support, resulting from potentially inadequate funding for the implementation of the NASA Science Mission Directorate Open Science Policy (SPD-41).

## **NASA Advisory Council Finding**

### **NASA Science Mission Directorate Open Science Policy as it Relates to Open Source Software and Data**

<b>Name of Committee:</b>	Science Committee
<b>Chair of Committee:</b>	Dr. Meenakshi Wadhwa
<b>Date of Council Public Deliberation:</b>	March 1, 2022
<b>Short Title of Finding:</b>	NASA Science Mission Directorate Open Science Policy as it Relates to Open Source Software and Data

#### **Finding:**

The Council recognizes that screening and validation for safety, security and functionality of any open source software and data will be required prior to introduction into NASA's systems. It is important to ensure that processes will be in place for this purpose.

**NASA Advisory Council Finding**  
**NASA Science Mission Directorate**  
**Effectively Addressing COVID-19 Pandemic Challenges**

<b>Name of Committee:</b>	Science Committee
<b>Chair of Committee:</b>	Dr. Meenakshi Wadhwa
<b>Date of Council Public Deliberation:</b>	March 1, 2022
<b>Short Title of Finding:</b>	NASA Science Mission Directorate Effectively Addressing COVID-19 Pandemic Challenges

**Finding:**

The NASA Science Mission Directorate (SMD) is effectively addressing challenges presented by the COVID-19 pandemic and continues to prudently develop a success-oriented trajectory given the uncertainties of the ongoing pandemic environment.

The COVID-19 impacts on NASA SMD programs and mission activities are sobering. The Council is grateful that NASA has continued operating most current missions and identified and enabled launch-window critical missions to be prioritized, while continuing the proposal solicitation and review process for funding proposals. That so much mission and programmatic work is continuing during this pandemic is a testament to the dedication and commitment of the NASA workforce.

The NASA SMD leadership team has provided frequent and forthright communication to the science community as it has attempted to mitigate deleterious effects to the portfolio and to maintain a trajectory for continued scientific success. These actions highlight how NASA SMD can provide novel leadership approaches to coordinate and to drive innovative action from the community to respond and manage threats to the Nation.

**NASA Advisory Council Finding**  
**Space Nuclear Power and Propulsion Systems**  
**and Commercial Space Engagement**

<b>Name of Committee:</b>	Technology, Innovation and Engineering Committee
<b>Chair of Committee:</b>	Mr. Michael Johns
<b>Date of Council Public Deliberation:</b>	March 1, 2022
<b>Short Title of Finding:</b>	Space Nuclear Power and Propulsion Systems and Commercial Space Engagement

**Finding:**

The Council believes that the NASA Space Technology Mission Directorate should:

- Focus on the delivery of a nuclear surface power system for demonstration and use on the Moon by the late 2020s and for future human Mars missions.
- Continue cryogenic fluid management technology development and demonstrations, completing by the late 2020s to align with needs of surface power and in-space propulsion.
- Continue technology investments in Nuclear Thermal Propulsion (NTP)/Nuclear Electric Propulsion (NEP); complete the assessment of NTP/NEP and make a propulsion architecture selection when appropriate based on the National Academy Study recommendation.
- Continue annual Tipping Point and Announcement of Collaborative Opportunities calls (vitaly important for robust commercial space economy); this year's Tipping Points will be funded Space Act Agreements.



## NASA Advisory Council Finding

### NASA Aeronautics Research Mission Directorate Budget

<b>Name of Committee:</b>	Aeronautics Committee
<b>Chair of Committee:</b>	Dr. John-Paul Clarke ( <i>Vice Chair</i> )
<b>Date of Council Public Deliberation:</b>	March 1, 2022
<b>Short Title of Recommendation:</b>	NASA Aeronautics Research Mission Directorate Budget

#### **Finding:**

The Council is pleased to see NASA's Aeronautics Research Mission Directorate receiving a higher budget during recent years in both the President's Budget request and in the official budget appropriated by Congress. While pleased with the increase in funding, the Council also sees an opportunity for NASA Aeronautics to advocate for more funding to its programs and projects investigating and implementing sustainable aviation technology and practices, sensing high potential for Congress and the public to see the benefit of these activities. One such area is the use of Unmanned Air Vehicles and Advanced Air Mobility that have the potential to substantially reduce emission by replacing automobiles and delivery vans with electric powered air vehicles.

## NASA Advisory Council Finding

### NASA Aeronautics Research Mission Directorate Programs Overview: Airspace Technology Demonstration-2

<b>Name of Committee:</b>	Aeronautics Committee
<b>Chair of Committee:</b>	Dr. John-Paul Clarke ( <i>Vice Chair</i> )
<b>Date of Council Public Deliberation:</b>	March 1, 2022
<b>Short Title of Recommendation:</b>	NASA Aeronautics Research Mission Directorate Programs Overview: Airspace Technology Demonstration-2

#### **Finding:**

The Council commends the NASA Aeronautics Research Mission Directorate for establishing the value of the research done by Airspace Technology Demonstration-2 (ATD-2) and for transferring the technology to the Federal Aviation Administration. Stemming from this success, the Council encourages NASA to keep the ball rolling with continued, subsequent successes in more air traffic management and sustainability-related activities. Council members note there is still much work to be done in the areas of increasing capacity and requirements to meet the net zero by 2050 goal, and steps like the ATD-2 completion and transfer could be just one of many more to come.

## NASA Advisory Council Finding

### NASA Aeronautics Research Mission Directorate Programs Overview: University Leadership Initiative

<b>Name of Committee:</b>	Aeronautics Committee
<b>Chair of Committee:</b>	Dr. John-Paul Clarke ( <i>Vice Chair</i> )
<b>Date of Council Public Deliberation:</b>	March 1, 2022
<b>Short Title of Recommendation:</b>	NASA Aeronautics Research Mission Directorate Programs Overview: University Leadership Initiative

#### **Finding:**

The Council applauds NASA for the University Leadership Initiative (ULI) activity and its benefits to aviation in the United States. ULI brings the best academic minds together to work on solutions to aeronautical challenges – enabling collaboration across universities and promoting aeronautics programs for students to enter. The Council sees ULI bringing new innovative ideas for the electrification of aircraft, material development and sustainability to industry.

**NASA Advisory Council Finding**  
**NASA Office of STEM Engagement**

**Name of Committee:** STEM Engagement Committee

**Chair of Committee:** Mr. Daniel Dumbacher

**Date of Council Public Deliberation:** March 1, 2022

**Short Title of Finding:** NASA Office of STEM Engagement

**Finding:**

- The Council finds that there continues to be clear evidence that progress being made on the strategic goals and vision for the NASA Office of STEM Engagement (OSTEM). It recognizes the thoughtful design and approach to evaluating the progress of the OSTEM activities. Future work will assess metrics and outcomes used to measure performance.
- There has been good success identifying and making resources available for educators and STEM community.
- With regard to internships data, there is marked progress in reaching a more diverse pool of students. The STEM Engagement Committee plans future discussions to better understand process and infrastructure for internship recruiting.
- There is evidence of significant progress in building STEM Community partnerships.
- The Diversity, Equity and Inclusion effort is exceptional and is well placed to leverage future progress.