# THE NASA ADVISORY COUNCIL

May 8 - 9, 2024

MEETING REPORT

Contents



***Prepared by Ms. Ashley Mae***
***Tom & Jerry, Inc.***

**Welcome & Introductions**

The National Aeronautics and Space Administration (NASA) Advisory Council (NAC) General Lester L. Lyles, United States Air Force (USAF)(Ret), chair, opened the meeting. Council members made individual introductions.

NASA Administrator, the Honorable Bill Nelson, was introduced and welcomed all council members of the NAC and those attending the meeting. Senator Nelson highlighted several NASA achievements including the James Webb Telescope; the Double Asteroid Redirection Test (DART), the Origins, Spectral Interpretation, Resource Identification, and Security-Regolith Explorer (Osiris-Rex) Sample Return; and Mars Sample Return (MSR). He discussed NASA's upcoming human exploration of the Moon and Mars and the relationship to new discoveries in propulsion. Senator Nelson addressed the budget, describing it as a considerable restraint. He mentioned NASA's international partnership growth and spoke on the Boeing Starliner launch delay.

NASA Deputy Administrator, Colonel (USAF)(Ret) Pamela Melroy, was introduced. Col. Melroy discussed the remarkable year with significant advancements in exploration systems, climate initiatives, international cooperation, and diverse achievements across crew missions, scientific discoveries, and technological innovations, all aligned with its core principles of science, national posture, and inspiration. The Agency has made considerable progress since the NAC last met, with strategic advancements setting the stage for long-term success. The ongoing Moon to Mars (M2M) strategy has seen two architecture concept reviews that connect various elements to the Agency's overarching vision: creating a blueprint for responsible, sustained human presence and exploration throughout the solar system. These iterative reviews, with a third planned for November, are now a staple practice, involving every facet of the Agency and ensuring alignment across all mission directorates. The Exploration Systems Directorate leads this comprehensive effort, with contributions from all sectors of the Agency.

The Agency is actively seeking feedback from the international community, industry, and academic partners to foster a shared vision for sustainable exploration. In addition to the M2M strategy, the Agency released a climate strategy that assesses the entire climate portfolio across all mission directorates and facilities. This strategy outlines four key priorities—innovate, inform, inspire, and partner—guiding the development of actionable objectives to address the climate crisis.

A space sustainability strategy was also introduced to adapt to the evolving space operating environment. The first volume, focusing on Earth orbit, integrates existing efforts, best practices, analytics, tools, and technologies in a comprehensive approach. Future volumes will address cislunar space, Earth, and deep space. Another significant initiative is the *NASA 2040* strategy, a comprehensive business strategy designed to optimize the Agency's operations and support the United States (US) and other cross-Agency technology strategies.

Efforts to improve acquisition and program management continue, building on initiatives from 2022. A risk tiger team was launched to enhance risk management across the Agency's programs, a crucial aspect of effective program management. These initiatives underscore the

Agency's commitment to a unified approach, leveraging the strengths of all centers and mission directorates while preserving workforce and infrastructure capabilities.

In Low-Earth Orbit (LEO), regular crew rotation flights continue, with Crew-9 scheduled for later this year, featuring NASA astronauts Zena Cardman, Nick Hague, Stephanie Wilson, and Russian cosmonaut Alexander Gorbunov. Don Pettit will fly on the next Soyuz mission, and Sierra Space's Dream Chaser will soon join the space station's cargo capabilities. Logistics remain critical for sustaining human presence and scientific endeavors in space.

Preparations for Artemis 2 are underway, with astronauts Reid Wiseman, Victor Glover, Christina Koch, and Jeremy Hansen training for their lunar mission. Hardware development for future Artemis missions is progressing, including Starship testing, spacesuits, Gateway modules, a second lunar lander, a lunar terrain vehicle, and a pressurized rover in collaboration with Japan.

The Agency is also advancing scientific and technological missions. The NASA-Indian Space Research Organization (ISRO) Synthetic Aperture Radar (NISAR) mission is set to launch later this year, providing valuable climate data. The Europa Clipper mission aims to explore Jupiter's icy moon for potential life-supporting conditions. The Advanced Composite Solar Cell system is currently in operation, using sunlight pressure for propulsion. The Heliophysics Big Year started with the October annular eclipse and continued with April's total solar eclipse, with millions of viewers. It will conclude in December with the Parker Solar Probe's closest approach to the sun.

Two Commercial Lunar Payload Services (CLPS) missions to the moon have been completed, and more are scheduled, carrying NASA science and technology payloads. The Agency is on a steady course to work cohesively and achieve its mission, promising future scientific discoveries that benefit humanity. With guidance from NAC, the Agency is well-positioned to tackle the challenges ahead.

NASA Associate Administrator, Mr. James Free, was introduced. He also spoke on the Agency's remarkable year, highlighting the breadth of its programs and the dedication of its people. From advancements such as the X-59 and the successful launch of the Earth observation satellite, Plankton, Aerosol, Cloud, ocean Ecosystem (PACE), which captured stunning images off the coast of South Africa.

The crew missions have been particularly active, with five astronauts launched and five returned home this year. Witnessing Crew-8's progress and nearly attending Tracy's launch in Russia were notable moments. Additionally, the Agency engaged millions through the total solar eclipse, distributing two million eclipse glasses and achieving nearly 37 million broadcast views. The websites saw a 26-fold increase in traffic, demonstrating the robustness of the Chief Information Officer's (CIO) infrastructure.

Climate remains a key focus and the Agency proudly showcases its Earth observation spacecraft online. The importance of this work is highlighted in the Headquarters' east lobby, which visitors are encouraged to explore. The solar eclipse, observed by millions, was another highlight, with NASA Glenn being the only center directly under its path. The CLPS missions provided valuable lessons in interacting with providers, informing future evolutions in this area.

Contracts were awarded to three companies for lunar terrain vehicles, emphasizing innovative partnerships that leverage external investments. The recent graduation of the astronaut class, reflecting the nation's diversity, was a proud moment, especially during Women's History Month, when four women were on the space station simultaneously.

International cooperation remains a cornerstone of the Agency's operations. The International Space Station (ISS), now twenty-five years old, exemplifies this through its contributions to science, technology, and diplomacy. The Artemis Accords, now signed by thirty-nine countries, underscore a commitment to transparency and safe, collaborative operations in space.

Recent international agreements include the United Arab Emirates (UAE) providing an airlock for the Gateway lunar orbiting station and Japan's commitment to supply pressurized rovers. The European Space Agency's (ESA) International Habitation Module (I-Hab) and Canada's Canadarm3 are progressing well, enhancing Gateway's research and life support capabilities.

The MSR mission is on track, with significant focus on the heat shield for Artemis 2, supported by an independent review team (IRT). Program performance remains a priority, emphasizing the critical role of contractors. The breadth of the Agency's work spans incredible scientific achievements and technological advancements, all aligned with three core principles: science, national posture, and inspiration. The leadership embodies these principles daily, driving the Agency forward.

Gen. Lyles then opened the meeting up to allow council members to ask questions. They touched upon various aspects of NASA's operations, including international partnerships, workforce development, commercial dynamics, and technological advancements. Senator Nelson highlighted the enthusiasm of international partners and their lack of fiscal constraints, while Mr. Free clarified Italy's involvement in European Space Agency (ESA) projects. Col. Melroy discussed workforce strategies, emphasizing the need for training and infrastructure. Gen. Lyles underscored the importance of aeronautics alongside space exploration. Senator Nelson provided insights into the significance of NASA's partnerships with heads of state, highlighting practical benefits such as climate monitoring and agricultural support. Additionally, there was discussion on challenges related to attracting and retaining high-tech talent and managing new business dynamics in the commercial sector.

**NAC Priority Focus Areas**

General Lyles discussed that Senator Nelson, upon becoming the Administrator, identified five specific priority areas for focused review: international collaboration; commercial and industry partnerships; diversity, equity, inclusion, and accessibility (DEIA); climate change; and program management and acquisition. He appointed specific individuals to examine these areas and provide recommendations for NASA.

*International Collaboration*

For international collaboration, Senator Nelson selected the Honorable Jane Harman and Honorable Kay Bailey Hutchison due to their expertise and involvement in international activities. They emphasized NASA's efforts to enhance global cooperation, particularly through the Artemis Accords, which aim to promote space safety and the effective use of satellites.

During recent trips to South America, noteworthy progress was made, including Brazil's and Argentina's commitments to the Artemis Accords and discussions with Colombia about space and defense cooperation.

NASA's international efforts also extend to promoting the use of satellites for various purposes, such as monitoring the Amazon rainforest. The organization engages in interagency collaboration and works closely with the Department of Defense and other entities to enhance space diplomacy and scientific cooperation. The importance of NASA's role in fostering international relationships and partnerships was highlighted, alongside the need for ongoing engagement and structured collaboration strategies.

The administrator's recent and upcoming trips to Italy and Saudi Arabia further demonstrate NASA's commitment to strengthening global partnerships. The importance of space diplomacy and the role of NASA in the international arena were underscored, with a call for continued support and advocacy for NASA's initiatives on a global scale.

*Commercial and Industry Partnerships*

Members focused on commercial and industry partnerships. The Honorable Eric Fanning and Honorable Charles F. Bolden Jr. reviewed recent articles and emphasized the importance of addressing challenges faced by small businesses, especially in the context of shrinking industrial bases. They shared insights from their involvement with the User Advisory Group to the National Space Council, stressing the need for better data to understand and address issues hindering small business participation in government contracts. They mentioned ongoing government studies aimed at identifying barriers to commercial sector engagement, including efforts by the DoD and others. They suggested that the studies be expanded to include the broader space sector.

The conversation also touched on the interconnectedness of NASA, DoD, and commercial industries, underscoring the importance of fostering collaboration and reducing barriers to entry for suppliers. Members expressed optimism about the potential for positive change but acknowledged the challenges posed by the current budgeting process, including the impact of continuing resolutions on program planning and international partnerships. Suggestions were made to articulate the implications of poorly phased funding and explore potential solutions, drawing from existing studies and expertise within the group. The discussion concluded with a commitment to further explore these issues and provide actionable recommendations to support NASA's mission and industry partnerships.

*Diversity, Equity, Inclusion and Accessibility*

Ms. Jacklyn Wynn discussed recent court cases impacting industry partnerships and outreach programs regarding DEIA. Two significant court cases were highlighted: *Students for Fair Admissions vs. Harvard* and *Ultima Service Corporation vs. US Department of Agriculture.* These cases have led to changes in policies affecting programs like the 8(a) program, impacting small businesses and educational institutions. Concerns were raised about the implications for NASA's partnerships and outreach initiatives, particularly with Historically Black Colleges and Universities (HBCU). Additionally, discussions revolved around workforce challenges, focusing

on skill-based hiring and labor harmony agreements, as well as preparations for future constraints, such as the Creating Helpful Incentives to Produce Semiconductors (CHIP) Act's ban on using chips from China. Strategies and responses from NASA and other agencies were noted as essential, with further exploration planned to address these evolving landscapes. Lastly, the role in leading NASA's strategy on the skilled technical workforce was highlighted as an area of interest for future discussions and understanding.

*Climate Change*

Dr. Waleed Abdalati's focus was on climate change and NASA's response. The urgency of addressing climate change was emphasized, with examples cited such as extreme weather events, disappearing ice covers, and rising sea levels. Congratulations were given for recent missions such as Surface Water and Ocean Topography (SWOT), Tropospheric Emissions: Monitoring of Pollution (TEMPO), and PACE, which are providing crucial data on various aspects of the Earth's system. However, it was noted that some longstanding missions like Terra, Aqua, and Aura are nearing the end of their operational lives and will not undergo further senior reviews due to fuel and instrument challenges. The potential impact of these losses on Earth observation capabilities was acknowledged, although efforts to optimize existing data and investments through the Earth Science to Action Plan were highlighted.

The balancing act of prioritizing missions and observables within budget constraints, with a recognition of the ongoing importance of sustained Earth observation efforts was discussed. Looking ahead, upcoming missions such as Climate Absolute Radiance and Refractivity Observatory (CLARREO) and SWOT were noted as promising endeavors to further the understanding of the Earth system. Despite challenges, there was optimism about NASA's continued contributions to Earth science and climate research. Additionally, it was highlighted that NASA's surface biology and geology projects, as reflected in the President's 2025 budget request, are facing delays due to resource constraints. These projects, originally planned as two satellites, are now being split into separate endeavors focusing on thermal infrared and visible/shortwave infrared observations. Similarly, the atmosphere observing system's cloud and precipitation aspects are transitioning from an internally developed mission to a request for external proposals due to budget limitations. These decisions align with recommendations from the decadal survey, emphasizing the need to manage costs. However, such adaptations pose risks to program stability and mission effectiveness. The Council discussed the broader context of budget challenges, including reductions, COVID-19 impacts, suboptimal funding phasing, and mission extensions affecting resource allocation. Despite these hurdles, there was optimism about ongoing missions' extensions and collaborations with the health community, underscoring NASA's expanding value proposition.

Concerns were raised about aging satellites without immediate successors, emphasizing the importance of coordinated international efforts to maintain observational continuity. The conversation also touched upon the potential for public-private partnerships, particularly with the insurance industry, to address climate-related challenges more effectively. Participants highlighted the need for a cohesive strategy to leverage diverse data sources and technologies, with NASA playing a pivotal role as a convener and facilitator. The presentation ended with a

discussion on NASA's aeronautics initiatives, focusing on fuel-efficient flight technologies and operational efficiency improvements. Overall, while acknowledging the constraints, there was discussion of the need for strategic investments and collaborative approaches to address climate and Earth observation challenges effectively.

*Program Management and Acquisition*
Mr. Charlie E. Williams, Jr., Ms. Krista Paquin, and Dr. M. Elisabeth Paté-Cornell were tasked with the program management and acquisition strategies. The Council has been supporting this effort, emphasizing the importance of an effective acquisition system at NASA to turn dollars and requirements into real capabilities. This acquisition system is crucial for the success of NASA's missions, as acknowledged by the Administrator. As NASA navigates budget challenges, the role of the acquisition system becomes even more significant, especially with the increasing reliance on the commercial sector. Reflecting on the detailed presentation given in January 2023, which included approximately thirty recommendations, the discussion focused on the stakeholders interviewed, the methodology used, and a summary of the previous report. Follow-up work was conducted in early 2023, involving interviews and meetings with NASA leadership to ensure industry alignment with the January 2023 presentation. Despite delays in planned meetings, the goal remains to revisit the material from the presentation and understand the progress made within NASA to date. The Council discussed the need for improvements in communication, acquisition strategies, contract types, and program performance. They stressed the importance of sharing best practices and maintaining consistency in strategic approaches. Emphasis was placed on the establishment of a NASA industry council to enhance communication and collaboration with the commercial sector.

All focus area discussions concluded with plans to finalize and approve recommendations at the next meeting and communicate the Council's findings and recommendations to NASA leadership for action.

**NASA Budget Report**
Mr. Jim Worm, NASA Chief Financial Officer (CFO) for Budget, and Mr. Craig McArthur, Deputy CFO for Strategic Insights and Budget, addressed the NAC, discussing the fiscal outlook for 2024 and 2025. Mr. Worm highlighted that the Fiscal Responsibility Act, which caps non-defense discretionary spending, significantly impacted NASA's budget. For 2024, NASA's budget request was nearly $2 billion higher than the 2023 enacted level, but the Act nullified this increase, resulting in an appropriation about half a billion dollars below the 2023 level. Most mission directorates experienced budget reductions except for exploration systems development, with key cuts including a 40% reduction for construction and environmental compliance and restoration, a 9% reduction for space technology, and a significant decrease in the science budget due to the MSR Mission pause. For 2025, the budget request is $25.4 billion, a 9.1% increase from the start of the Biden administration, focusing on the Artemis program, space operations, and science missions. The interconnectedness of science and exploration missions and the significant budget pressures were emphasized, particularly in space operations and the development of commercial LEO destinations (CLDs). They stressed the need for adequate

funding to maintain the International Space Station (ISS), develop a deorbit vehicle (DV), and ensure a seamless transition to commercial space stations post-ISS retirement.

Discussions also covered the DoD requirement of $400 million for repairing one of the three radars damaged by a typhoon in Guam. An inquiry about emergency supplemental funding for the deorbit vehicle and Guam funding revealed concerns about the budget's sufficiency for the USDV and Guam damage repairs. Also, there were no current estimates on the percentage of allocations expected from commercial developers for NASA. NASA is allowing flexibility in timelines and requirements to foster a robust marketplace, with developers targeting diverse markets like science and tourism. Concerns were raised about NASA's facility maintenance and deferred maintenance, estimated to take twenty years to address current needs. The Deep Space Network's (DSN) infrastructure needs were discussed, emphasizing the importance of adequate investment to support Artemis and other missions. The Agency is exploring creative funding mechanisms and a *NASA 2040* initiative to achieve sustainability.

**NAC Committee Reports**

Each NAC Committee provided summaries from their recent Committee meetings. Most of those Committee meetings featured briefings from, and discussions with, the relevant NASA technical Mission Directorate.

*NAC Science Committee Report*

Dr. Noël Bakhtian, Vice Chair of the NAC Science Committee, presented the report. She focused on NASA's numerous active science missions, noting that there are over 140 ongoing projects. Specific attention was given to the PAZ satellite, part of the Earth Science Division, which launched in February. The satellite provides crucial data on phytoplankton and their impact on fisheries, algal blooms, and air pollution. This was followed by an update on the Biological and Physical Sciences Division's research on phenomena in space environments, including experiments with 3D tissue chips.

The Planetary Science Division's achievements were highlighted, including the OSIRIS-Rex mission's successful asteroid sample return, which showed high carbon content and water, indicating potential life-building blocks. In Astrophysics, the James Webb Space Telescopes contributions were highlighted, comparing its infrared capabilities to Hubble's visible and ultraviolet light observations. The importance of the DSN was emphasized due to its role in mission communications, with recommendations by the Science Committee for increased funding and a sustainable management plan to address overburdening and deferred maintenance.

Dr. Bakhtian also covered the Transform to Open Science (TOPS) initiative aimed at fostering an inclusive culture of open-source science. The Science Mission Directorate's (SMD) IDEA (Inclusion, Diversity, Equity, Accessibility) principles were discussed, with specific examples like the Clipper Next Gen initiative, aimed at developing a diverse talent pipeline. The Committee recommended strategic improvements for IDEA activities. Concerns were raised about the challenges posed by budget constraints and state-level legal changes affecting DEI efforts, recommending NASA provide guidance to universities and project teams. Finally, the

need for more frequent NAC meetings was highlighted to ensure timely reception and action on Committee findings and recommendations.

*NAC Technology, Innovation, and Engineering Committee Report*
Mr. Michael Johns presented the Technology, Innovation, and Engineering (TI&E) Committee report. A summary of a joint Committee meeting with the Human Exploration and Operations (HEO) Committee in May, focusing on the M2M architecture and updates on the nuclear portfolio were discussed. In November, the Committee reviewed updates from the SMD, the Low-Earth Orbit Flight Test of an Inflatable Decelerator (LOFTID) project, the Advancing Collaborative Connections for Earth System Science (ACCESS) program, and the nuclear portfolio, combining Committee findings and recommendations from both the May and November meetings. The Council heard about transitioning fusion technologies into Artemis and discussed the alignment of SMD technologies with the M2M program.

Further updates included the lunar surface technology demonstration strategy, polar resource mining experiments, and the Lunar Surface Innovation Initiative (LSIC), emphasizing the Stellar Reference Unit (SRU) excavation, surface power, and extreme environment operations. The Committee reviewed the LSIC's role in developing surface exploration capabilities.

The space nuclear portfolio was discussed, focusing on nuclear thermal propulsion and the partnerships with Defense Advanced Research Projects Agency (DARPA) and other industry stakeholders. A demonstration mission is planned for 2027. Also discussed was nuclear electric propulsion, highlighting the need for future investment and a maturation plan for technology development.

The Committee commended the TechRise program, which engages students in grades 6-12 in technology experiments, reaching over 1100 students in forty-four states. They also reviewed the Small Business Innovation (SBIR)/ Small Business Technology Transfer (STTR) program's strategic refresh, emphasizing positive Research Operations & Integration (ROI), equitable access, and exemplary service to awardees. The NASA SBIR Ignite program and the Minority University Research and Education Project (MUREP) Partnership Annual Notification (MPLAN) were highlighted for their focus on commercialization and fostering partnerships with minority-serving institutions.

Mr. Johns reported on efforts related to SBIR and STTR programs, which aim to foster innovation and entrepreneurship among women and socioeconomically disadvantaged individuals. The refreshed strategy of these programs has enhanced equitable access and representation. For instance, in 2022, 24% of STTR research institution partners were minority-serving institutions, and 25% of SBIR awards were given to minority-owned and women-owned small businesses. To address feedback and application challenges, the programs introduced planning grants, evolving into the "End Plan" program, to connect small businesses and minority-serving institutions with research opportunities.

Discussion of the Exploration Science Strategy Office and CLPS, which provides rapid, affordable, frequent access to space using a commercial model occurred. Upcoming CLPS missions from 2024 to 2028 will deliver numerous payloads, showcasing the program's progress.

The Council also heard about the space technology research grants, which engage researchers from graduate students to senior faculty in critical science, space travel, and exploration projects. The Space Technology Research Institutes (STRI) have been successful in advancing technology and preparing underrepresented groups for larger funding opportunities. Strategic pivots in prioritizing shortfalls and managing technology across the TRL spectrum were presented. This involves aligning priorities with stakeholder needs and managing technology development by functional domains rather than Technology Readiness Levels (TRL) stages.

TI&E concluded with the findings and recommendations of its committee, emphasizing the need for continued investment in fission surface power and the importance of clearly identifying technology infusion paths in the M2M Program architecture. The overall discussions underscored progress and strategic developments within NASA's technology programs, highlighting efforts to enhance innovation, equity, and collaboration across various sectors.

*NAC Human Exploration and Operations Committee Report*

Ms. Lynn Cline, Interim Chair of HEO, reviewed the progress and challenges of both the Human Exploration and Operations Mission Directorate (HEOMD) and the Space Operations Mission Directorate (SOMD) within NASA. She noted that since the last report to the NAC, the Committee had met several times to discuss various aspects of these directorates. Key topics included the reorganization of HEOMD, which transitioned into two separate directorates. The Committee reviewed programs, focusing on areas such as requirements development, systems integration and engineering, and risk management. Ms. Cline noted the complexity of the portfolio and the challenges posed by reorganization and personnel changes. Despite these challenges, she expressed satisfaction with the established organization and personnel. She also discussed goals for 2024-25, including executing Artemis missions and developing a sustainable architecture for the M2M objectives. The HEO Committee highlighted the importance of collaboration between directorates and emphasized the need for clear communication and alignment of goals. Ms. Cline expressed concerns about potential gaps in LEO presence and urged close monitoring of commercial LEO programs in relation to the planned deorbiting of the ISS. Finally, she discussed the need for expansion and sustainment of the DSN and emphasized the importance of prioritizing this in budgetary planning. There were also discussions about potentially separating the Committees to better manage the breadth of topics within each directorate.

*NAC Aeronautics Committee Report*

Dr. John-Paul Clarke, chair of the Aeronautics Committee, presented the Committee report. In 2023, the Aeronautics Research Mission Directorate (ARMD) Advisory Board held three significant meetings: in March at the Armstrong Flight Research Center, in June at headquarters, and in November at Glenn Research Center. Another meeting occurred in March 2024 at headquarters, where the FY25 budget was reviewed. Discussions focused on workforce development, *NASA 2040* activities, and initiatives on wildfire management, particularly collaborations with California and Texas. The vital role of aviation in the national economy was emphasized, with contributions amounting to $1.25 trillion and supporting 2.2 million jobs. The NASA Aeronautics program, categorized into four primary areas—climate change and energy

security, ultra-efficient airliners, high-speed commercial flight, and advanced air mobility—includes significant projects like the truss-braced wing aircraft and blended wing body design.

The FY25 budget request for aeronautics is approximately $966 million, supporting various projects such as electrified powertrains and sustainable flight demonstrators. The budget also includes funding for the X-59 program to reduce sonic booms and initiatives to integrate advanced air mobility and next-generation air traffic management. STEM engagement and workforce development remain crucial, with the Transformative Aeronautics Concepts program collaborating with the Office of STEM Engagement to provide educational resources and partnerships. The University Innovation Project supports over one hundred universities, including forty HBCUs and Minority Serving Institutions (MSIs), fostering broader participation in NASA's research initiatives.

During the recent meeting, the University Innovation (UI) program was highlighted, having awarded 104 universities over seven years, with about 80 to 85 active universities at any given time. Notably, 30% of UI leads are from minority-serving institutions, showcasing the program's success in increasing diversity in aeronautics research. The meeting also addressed transformative aeronautic concepts, emphasizing innovative ideas and postdoctoral programs to attract early-career researchers to NASA. Efforts to engage non-STEM majors, such as journalists, were also discussed to broaden public understanding and support for aeronautics.

Dr. Clarke presented the Advanced Capabilities for Emergency Response Operations (ACERO) program, which integrates NASA's air traffic control capabilities to support wildfire emergency responders. Initially piloted in California, this program is expanding to other states, including Texas. The Committee emphasized the importance of this initiative for enhancing wildfire response through improved communication, coordination, and remote sensing. Overall, the Council commended ARMD's efforts in workforce development, university innovation, and the ACERO program, highlighting their importance in advancing NASA's aeronautics mission and addressing critical challenges.

*NAC STEM Engagement Committee Report*

Mr. Daniel Dumbacher, chair of the STEM Engagement Committee, presented the report with assistance from Mr. Mike Kincaid, Associate Administrator of the Office of STEM Engagement. In 2023, the Committee held three significant meetings. During the recent Outreach and STEM Engagement Committee meeting, several key points were discussed regarding the critical importance of outreach and STEM engagement. Led by Mike Kincaid and his team at NASA, the Committee emphasized their successful efforts in engaging with minority-serving institutions and forming strategic partnerships. Although the Committee has not met frequently, the recent fact-finding discussion aimed to bring new members up to speed, setting the stage for future activities.

The meeting reviewed the strategic goals of NASA's Office of STEM Engagement, focusing on creating opportunities for a diverse set of students, building a diverse future STEM workforce, and attracting a diverse group of students to STEM. The Committee praised the office for its strategic planning and implementation. Notable initiatives include the Artemis Star STEM

Learning Pathway and the development of educational resources like the Artemis Camp guides and the "First Woman" graphic novel, now in its second iteration and being translated into French with the Canadian Space Agency.

A significant partnership highlighted was with Minecraft, which integrates NASA content and has reached millions of users, thereby engaging a younger audience with NASA's mission. The recent total solar eclipse event was commended for its success in raising awareness and engaging the public in STEM activities.

The Committee also discussed the importance of MUREP and has seen increased funding and outreach efforts. The technical assistance workshops and capability statements were noted for their role in building the capacity of minority-serving institutions. The Committee emphasized the importance of metrics and progress measurement in STEM engagement, acknowledging the Office of STEM Engagement's leadership in this area.

Finally, strategic partnerships were discussed, including ongoing collaborations with various government agencies and minority organizations. The Committee underscored the importance of these partnerships in extending NASA's reach and impact. The Council commended the Office of STEM Engagement for its outstanding job in coordinating across mission directorates, developing robust metrics to measure progress, and incorporating Committee recommendations into their strategies. They emphasized the importance of recognizing the quality and excellence in all STEM activities, ensuring that diversity and inclusion efforts do not compromise standards. They recommended continued support for minority-serving institutions, facilitating deeper understanding and collaboration among these institutions, and maintaining high visibility for diverse role models. Additionally, they suggested developing new ways to engage underrepresented communities at various educational levels to build a robust pipeline for future STEM talent.

**Adjournment**

Gen. Lyles opened the meeting for public comments. No comments were received.

Gen. Lyles then formally adjourned the meeting with appreciation for the Council and Committee's dedication.

# Appendix A

**NAC Council Members**

General Lester L. Lyles, USAF (Ret), Chair
Dr. Waleed Abdalati
The Honorable Charles F. Bolden Jr.
Dr. John-Paul Clarke
Mr. Daniel L. Dumbacher
The Honorable Eric Fanning
Ms. Lynn Cline
The Honorable Jane Harman
The Honorable Kay Bailey Hutchinson
Mr. Michael Johns
Dr. John Daniel Olivas
Ms. Krista Paquin
Dr. M. Elisabeth Paté-Cornell
Mr. Charlie E. Williams, Jr.
Ms. Jacklyn Mitchell Wynn
Dr. Margaret G. Kivelson, Ex Officio
Dr. Ilan Kroo, Ex Officio

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Ms. Lisa Hackley, NASA
Ms. Ashley Mae, Tom & Jerry, Inc, Technical Writer
Ms. Dara Touma, NASA
Ms. Jamie Krauk, NASA
Ms. Amy Ries, Tom & Jerry, Inc

# Appendix B

**Meeting Attendees**

Amy Ries, Tom & Jerry, Inc
Ashley Mae, Tom & Jerry, Inc
Carol Hamilton, NASA
Charlie E. Williams, Jr., NAC
Daniel L. Dumbacher, NAC
Dara Touma, NASA
Eric Fanning, NAC
General Lester L. Lyles, USAF (Ret), NAC
Ilan Kroo, NAC
J. Craig McArthur, NASA
Jamie Krauk, NASA
Jim Worm, NASA
John Daniel Olivas, NAC
Kay Bailey Hutchinson, NAC
Krista Paquin, NAC
Lisa Hackley, NASA
London Johnson, Leidos
Lynn Cline, NAC
M. Elisabeth Paté-Cornell, NAC
Noël Bakhtian, Bezos Earth Fund
Reagan Hunter, NASA
Thomas Zimmerman, NASA
Waleed Abdalati, NAC

# Appendix C
## Presentations

1. NASA Administrator Travel to South America, *J. Harman, K. Bailey Hutchinson*
2. Delivery on Diversity, Equity, and Inclusion, *J. Wynn*
3. The Earth is Surprising Us, *W. Abdalati*
4. Program Management and Acquisition Priority Focus Area, *C. Williams, K. Paquin, E. Paté-Cornell*
5. FY 2024 Enacted Budget and FY 2025 Budget Request, *J. Worm, C. McArthur*
6. NAC Science Committee, *N. Bakhtian*
7. Technology, Innovation, and Engineering Committee Report NASA Advisory Council Meeting, *M. Johns*
8. Human Exploration and Operations Committee, *L. Cline*
9. NAC Aeronautics Committee Report, *Clarke*
10. NAC STEM Engagement Committee Meeting, *D. Dumbacher, M. Kincaid*

# Appendix D
# Agenda

**NASA Advisory Council Meeting**
**Hybrid**
**May 8, 2024**

Wednesday, May 8

| | | |
|---|---|---|
| 0930 AM | Welcome & Introductions | Gen. Lyles |
| 0945 AM | Opening & Administrator Remarks | Senator Nelson, Col. Melroy, Mr. Free |
| 1015 AM | NAC Q&A/Discussion | All |
| 1030 AM | Break | |
| 1045 AM | International Collaboration | Hon. Harman/Hon. Hutchinson |
| 1130 AM | Commercial and Industry Partnerships | Hon. Fanning, Hon. Bolden |
| 1215 PM | Lunch | |
| 1245 PM | Diversity, Equity, Inclusion & Accessibility | Ms. Wynn |
| 0100 PM | Climate Change | Dr. Abdalati |
| 0145 PM | Program Management & Acquisition | Mr. Williams, Ms. Paquin |
| 0230 PM | Wrap Up – NAC Focus Area | Gen. Lyles |
| 0235 PM | Break | |
| 0245 PM | NASA 2024/2025 Budget Report | Mr. Worm, and Mr. McArthur |
| 0330 PM | Science Committee Report | Dr. Bakhtian |
| 0415 PM | Technology, Innovation and Engineering Report | Mr. Johns |
| 0500 PM | Adjourn | |

# Agenda

**NASA Advisory Council Meeting**
**Hybrid**
**May 9, 2024**

Thursday, May 9

| | | |
|---|---|---|
| 0900 AM | Welcome | Gen. Lyles |
| 0915 AM | Human Exploration and Operations Report | Ms. Cline |
| 1000 AM | Aeronautics Committee Report | Dr. Clarke |
| 1045 AM | Break | |
| 1100 AM | STEM Engagement Committee Report | Mr. Dumbacher |
| 1145 PM | Wrap-Up & Roundtable Remarks | Gen. Lyles |
| 1200 PM | Adjourn | |