

National Aeronautics and Space Administration



Headquarters

Washington, DC 20546-0001

June 28, 2021

Office of Communications

John R. Greenewald
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john@greenewald.com

FOIA: 21-HQ-F-00506

Dear Mr. Greenewald:

This responds to your Freedom of Information Act (FOIA) request dated and received June 7, 2021 at the NASA Headquarters FOIA Office. Your request was assigned the above-referenced tracking number. You have requested:

ALL emails sent to/from, bcc'd or cc'd, NASA administrator Bill Nelson which contain the following keywords:

"Unidentified Aerial"

and/or

"Unidentified Flying"

and/or

"UAP"

and/or

"UFO"

and/or

"Unidentified Spacecraft"

and/or

"Unidentified aircraft"

On June 10, 2021, you specified that the date range for the search be from May 3, 2021 to the present (June 10, 2021). In response to your request the responsive office conducted a search of Administrator Bill Nelson's incoming and outgoing emails for the date range specified using the search terms you requested. That search identified the enclosed document that is responsive to your request. We determined that all 16 pages are appropriate for release without excision and copies are enclosed.

Provisions of the FOIA allow us to recover part of the cost of complying with your request. In this instance, because the cost is below the \$50 minimum, there is no charge.

If you believe this to be an adverse determination, you have the right to appeal my action on your request. Your appeal must be received within 90 days of the date of this response. Please send your appeal to:

Administrator
NASA Headquarters
Executive Secretariat
ATTN: FOIA Appeals
MS 9R17
300 E Street S.W.
Washington, DC 2054

Both the envelope and letter of appeal should be clearly marked, "Appeal under the Freedom of Information Act." You must also include a copy of your initial request, the adverse determination, and any other correspondence with the FOIA office. In order to expedite the appellate process and ensure full consideration of your appeal, your appeal should contain a brief statement of the reasons you believe this initial determination should be reversed. Additional information on submitting an appeal is set forth in the NASA FOIA regulations at 14 C.F.R. § 1206.700.

If you have any questions, please feel free to contact me at martha.e.terry@nasa.gov. For further assistance and to discuss any aspect of your request you may contact:

Stephanie Fox
Chief FOIA Public Liaison
Freedom of Information Act Office
NASA Headquarters
300 E Street, S.W., 5P32
Washington D.C. 20546
Phone: 202-358-1553
Email: Stephanie.K.Fox@nasa.gov

Additionally, you may contact the Office of Government Information Services (OGIS) at the National Archives and Records Administration to inquire about the FOIA mediation services it offers. The contact information for OGIS is as follows: Office of Government Information Services, National Archives and Records Administration, 8601 Adelphi Road-OGIS, College Park, Maryland 20740-6001, e-mail at ogis@nara.gov; telephone at 202-741-5770; toll free at 1-877-684-6448; or facsimile at 202-741-5769.

Important: Please note that contacting any agency official including myself, NASA's Chief FOIA Public Liaison, and/or OGIS is not an alternative to filing an administrative appeal and does not stop the 90 day appeal clock.

Please contact me at martha.e.terry@nasa.gov if you require further assistance.

Sincerely,

A handwritten signature in black ink, appearing to read 'Martha Terry', with a stylized flourish at the end.

Martha Terry
NASA FOIA Officer
Headquarters, Office of Communications

This document is made available through the declassification efforts
and research of John Greenewald, Jr., creator of:

The Black Vault



The Black Vault is the largest online Freedom of Information Act (FOIA) document clearinghouse in the world. The research efforts here are responsible for the declassification of hundreds of thousands of pages released by the U.S. Government & Military.

Discover the Truth at: <http://www.theblackvault.com>

NASA INTERVIEW PREP DOCUMENT - as of 5-28-21 (internal distribution only)

From: Beutel, Allard (HQ-NA020) <allard.beutel@nasa.gov>
Sent: May 29, 2021 10:56:57 AM EDT
Received: May 29, 2021 10:57:36 AM EDT
Attachments: NASA INTERVIEW PREP DOCUMENT - as of 5-28-21.docx

Morning, attached is the latest interview prep document. The top four items are new:

- Fiscal Year 2022 NASA Full Budget Proposal
- Earth System Observatory
- Hurricanes and NASA
- Search for Life, Technosignatures, and UAP/UFOs

The upcoming events public dates section is update.

-Allard

Attachment

1. NASA INTERVIEW PREP DOCUMENT - as of 5-28-21.docx

Type: application/vnd.openxmlformats-officedocument.wordprocessingml.document
Size: 59 KB (60,644 bytes)

Attachment #1

NASA INTERVIEW PREP DOCUMENT - as of 5-28-21.docx

Original view

13 pages (displayed on pages 4 to 16)



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NASA INTERVIEW PREP DOCUMENT

RECENT HOT TOPICS

Fiscal Year 2022 NASA Full Budget Proposal

On May 28, the Biden-Harris Administration released the full budget proposal for Fiscal Year 2022.

- President's Fiscal Year 2022 budget requests \$24.8 billion for NASA, an increase of more than 6% over what the agency received the previous year.

Overarching Points

- This funding request demonstrates the president's commitment to NASA and the people across the agency and its partners who have worked so hard this past year under the most difficult circumstances and achieved unprecedented success.
- The NASA workforce and the American people should be encouraged by what they see in this budget request. It is an investment in our future, and it shows confidence in what this agency has to offer. We owe it to the president and the American people to be good and responsible stewards of every tax dollar invested in NASA.
- This budget request includes the strongest NASA budget ever for science, which will help address the climate crisis at home and abroad, as well as advance robotic missions that will pave the way for astronauts to explore the Moon and Mars.
- This is also the strongest budget for exploration since the Apollo program.
- This budget request will restore America's global standing, promote racial and economic equity, and drive economic growth.

Supports Human Exploration of the Moon, Mars, and Beyond

- The president's funding request increases funding for Artemis by \$350 million and gives us the resources to advance America's bipartisan Moon to Mars space exploration plan, agreed to by the Administration and Congress.
- This request keeps us on the path toward a regular cadence of Artemis missions with crew to the Moon by the middle of the decade.
- NASA's human landing system contract award, with the goal of a human demonstration mission to the lunar surface by 2024, is under protest.
- NASA is currently reviewing the overall Artemis timeline based on appropriations and expected budget, and outcome of the human landing system protest. We hope to provide an updated Artemis timeline later this year following conclusion of the protest.
- The FY2022 budget request assumes an Artemis I launch no earlier than November 2021, an Artemis II launch no earlier than September 2023, followed by Artemis III targeted for late 2024 and Artemis IV for late 2025. Landing the first woman and first person of color on the lunar surface as part of the Artemis program will promote equity – signaling to every American they too can see themselves among the stars.
- With NASA's Space Launch System rocket and Orion spacecraft, as well as U.S. commercial partnerships with the human landing system and Gateway lunar outpost, we will send astronauts to the Moon to test technologies and exploration practices that will make future missions more productive than ever before.
- This budget funds an upgraded Space Launch System, known as Block1B, that can deliver larger cargos to lunar orbit.

Quick Reference

[Upcoming Events](#)
[Public Dates](#)



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- Gateway, built with our commercial and international partners, is important to sustainable lunar operations.
 - The foundation of our lunar outpost is targeted to launch no earlier than November 2024, with additional modules from our international partners launching later.
- We are working day and night to reduce risks and overcome the challenges of long-term human exploration of the Moon and Mars.
- The budget funds early design work and planning for additional surface architecture necessary including the lunar terrain vehicle and surface habitats to ensure our astronauts can explore more of the Moon than ever before and stay for increasingly longer periods of time in deep space.
- NASA's Lunar Surface Innovation Initiative is advancing technologies to support mission operations on the Moon. This budget includes funding for the preliminary design of a fission surface power system that could power operations on the Moon and Mars.

Further Robotic Exploration of the Solar System and the Universe

- This funding request also furthers robotic exploration of the solar system and the universe.
- The budget provides more than \$650 million for the Mars Sample Return mission, the highest priority large mission in planetary science.
- It includes strong support for planetary defense, including the near-Earth objects (NEO) Surveyor mission to detect asteroids and comets that could potentially impact Earth.

Enhances Research and Development at NASA

- This funding request supports continued progress developing cutting-edge space technologies, transformative capabilities, and renewable energy, all of which feed the economy and create good paying American jobs.
- Investing in new technologies enhances NASA's missions and fosters the growing space economy.
- NASA routinely demonstrates new technologies, reducing overall risk and encouraging industry adoption. The budget includes \$500 million for technology demonstrations.
- It fully funds the On-orbit Servicing, Assembly, and Manufacturing 1 (OSAM-1) mission. Robotically refueling a satellite and manufacturing and assembling spacecraft parts in-orbit will foster a more sustainable space economy.
- Launching next month, our Laser Communications Relay Demonstration will demonstrate a technology that can provide 10-100 times better data rates than commonly used radio frequency communications systems. In the coming years, we'll further refine laser communications technology for use in deep space.
- More than \$280 million would be directed toward small business innovation research and technology transfer. The increase of \$60 million will provide more money to small companies to research new ideas and develop innovative solutions to challenging problems.
- An investment in NASA and space infrastructure reaffirms our nation is the world's premier partner in space collaboration, and we will be for decades to come.
- We are investing in aviation to make our skies safer, our fuels cleaner, and to get you to your destination faster than ever before. This also includes investing in next-generation



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aeronautics research that will safely integrate automated aircraft systems with piloted airplanes.

- This budget enhances American competitiveness in the global aviation industry including the first two flights of new X-57 and X-59 aircraft.
- NASA aeronautics is leading transformation of the way people and goods are moved through Advanced Air Mobility (air taxis, drone cargo deliveries, etc.), an emerging market expected to be worth \$115 billion a year by 2035.
 - It will help safely deliver revolutionary aviation capabilities to previously underserved local, regional, intraregional, and urban areas. NASA investments today will spur the advancements of tomorrow.
- The budget provides a \$30 million increase to accelerate transformative science at the frontiers of biological and physical sciences research in space.

Advances Climate Science

- Climate change has increasing economic and national security impacts, and this budget increases investments in climate research and science programs.
- This funding increases our ability to better understand Earth and how it works as an integrated system, from our oceans to our atmosphere and how it all impacts our daily lives.
- NASA is developing the next-generation Earth System Observatory. NASA's new Earth System Observatory will provide the world with an unprecedented understanding of our Earth's climate system, arming us with next-generation data critical to mitigating climate change, and protecting our communities in the face of natural hazards.
 - The Earth System Observatory will help improve our understanding of extreme weather events and our decision making on climate resilience, adaptation, and mitigation. It will also inform decisions that ensure communities have the resources they need to build resilience prior to these crises.
- Research on zero-emissions aviation
 - NASA Aeronautics is partnering with industry, academia and other agencies through the Sustainable Flight National Partnership to accomplish the aviation community's aggressive climate change agenda. Through advanced vehicle technologies, efficient airline operations and sustainable aviation fuels, collectively NASA and our federal government and industry partners aim to reduce carbon emissions from aviation by half by 2050, compared to 2005, and achieve net-zero emissions by 2060.
- NASA continues to lead the development of new small spacecraft capabilities. For example, small platforms can enable distributed observations for climate science.

Builds a Diverse Future STEM Workforce

- This budget invests in the Artemis Generation. It requests funding for NASA's STEM engagement efforts for the first time in five years to inspire the next generation of scientists, engineers, mathematicians, and explorers by supporting the agency's STEM efforts.
- With this budget, NASA will increase funding for Space Grant and MUREP and will work with university and consortia partners to implement initiatives focused on diversity, equity and inclusion.



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- NASA taps into the skills of a diverse group of partners and reaches new groups through our small business programs, academic partnerships, and prizes, challenges, and crowdsourcing activities.
- The Space Technology Mission Directorate is collaborating with OSTEM's Minority University Research and Education Project to offer research planning grants and incentivize partnerships between minority-serving institutions and small businesses, setting them up to apply to NASA opportunities.

Continues Research on the International Space Station

- The space station is a convergence of science, technology, and human innovation that demonstrates new technologies and enables research not possible on Earth. The space station remains the springboard to NASA's next great leap in exploration, including future human missions to the Moon and eventually to Mars.
- With continued support for the International Space Station and the Artemis program, the president welcomes the international community to join us as we push human exploration deeper into space.
- This budget supports early design maturation of multiple commercially owned and operated low-Earth orbit (LEO) destinations (free flyers) from which NASA, along with other customers, can purchase services and stimulate the growth of commercial activities in LEO.
- In addition to maintaining continuous U.S. access to a space station in LEO, these new and more cost-effective platforms will democratize access to space by lowering the barriers to entry for the next generation of researchers, technologists, and tourists.

Earth System Observatory

On May 24, the White House and NASA announced new Earth System Observatory missions to help address and mitigate climate change:

- NASA will design a new set of Earth-focused missions to provide key information to guide efforts related to climate change, disaster mitigation, fighting forest fires, and improving real-time agricultural processes.
- With the Earth System Observatory, each satellite will be uniquely designed to complement the others, working in tandem to create a 3D, holistic view of Earth, from bedrock to atmosphere.
- "I've seen firsthand the impact of hurricanes made more intense and destructive by climate change, like Maria and Irma. The Biden-Harris Administration's response to climate change matches the magnitude of the threat: a whole of government, all hands-on-deck approach to meet this moment," said NASA Administrator Bill Nelson. "Over the past three decades, much of what we've learned about the Earth's changing climate is built on NASA satellite observations and research. NASA's new Earth System Observatory will expand that work, providing the world with an unprecedented understanding of our Earth's climate system, arming us with next-generation data critical to mitigating climate change, and protecting our communities in the face of natural disasters."
- The observatory follows recommendations from the 2017 Earth Science Decadal Survey by the National Academies of Sciences, Engineering and Medicine, which lays out ambitious but critically necessary research and observation guidance.
- Areas of focus for the observatory include:



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- Aerosols: Answering the critical question of how aerosols affect the global energy balance, a key source of uncertainty in predicting climate change.
- Cloud, Convection, and Precipitation: Tackling the largest sources of uncertainty in future projections of climate change, air quality forecasting, and prediction of severe weather.
- Mass Change: Providing drought assessment and forecasting, associated planning for water use for agriculture, as well as supporting natural hazard response.
- Surface Biology and Geology: Understanding climate changes that impact food and agriculture, habitation, and natural resources, by answering open questions about the fluxes of carbon, water, nutrients, and energy within and between ecosystems and the atmosphere, the ocean, and the Earth.
- Surface Deformation and Change: Quantifying models of sea-level and landscape change driven by climate change, hazard forecasts, and disaster impact assessments, including dynamics of earthquakes, volcanoes, landslides, glaciers, groundwater, and Earth's interior.
- NASA currently is initiating the formulation phase for the observatory.
- Among its first integrated parts is NASA's partnership with the Indian Space Research Organisation (ISRO), which brings together two different kinds of radar systems that can measure changes in Earth's surface less than a half-inch.
 - This capability will be utilized in one of the observatory's first missions intended as a pathfinder, called NISAR (NASA-ISRO synthetic aperture radar).
 - This mission will measure some of the planet's most complex processes such as ice-sheet collapse and natural hazards such as earthquakes, volcanoes, and landslides. NISAR can assist planners and decision makers with managing both hazards and natural resources in the future.

Hurricanes and NASA

June 1 is the official start of hurricane season for the Atlantic Ocean.

- After 2020 brought a record number of named storms in 2020, NASA is once again prepared to help understand and monitor these storms from its unique vantage point of space.
- NASA develops and launches satellites for NOAA, which is the lead federal agency for forecasting hurricanes. But the science of hurricanes doesn't start – or end – with forecasting.
- Global warming is increasing the heat in the ocean basins and already making it more likely that storms will intensify faster and be stronger, a phenomenon NASA scientists continue to study deeply.
- With the challenge posed by climate change, NASA has never been more committed to innovation in Earth science research.
 - Our next-generation Earth System Observatory, announced on May 24, missions will help us understand extreme weather events and other climate-fueled hazards to inform the solutions of the future.
- NASA researchers and data also support U.S. stakeholders before, during and after storms make landfall.
 - Stages of NASA Data:
 - Pre-storm assessment (feed weather prediction and forecasting models)



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- Near-real-time assessment (identify potential impacts ahead of landfall)
- Post-storm assessment (help identify needs for support after landfall)
- Data access and visualization
- The [NASA Disasters Mapping Portal](#) takes disaster-related data and puts it into understandable, usable formats real-time use and application with the goal to bridge the gap between science products and the people who can use the data to assist in preparedness, response, mitigation, and recovery.
 - After a hurricane makes landfall, NASA satellites are in prime position to identify impacts such as damage, flood depth and extent, power outages, rainfall accumulation, landslide risk, and even soil moisture.
 - That information helps local governments, the Army Corps of Engineers, and FEMA monitor infrastructure failures and disruptions, isolate contaminated water supplies, and identify hotspots for urgent response needs.
- NASA also does plenty of its own deep research on hurricanes and tropical cyclone dynamics. A few examples among many:
 - NASA's Global Modeling and Assimilation Office is pioneering the use of ultra-high-resolution global weather and micro-climate models.
 - The CPEX-AW airborne campaign planned in the Caribbean this August and September will pilot new technology to use LiDAR to better understand atmospheric winds and convective clouds in tropical storms.
 - NASA's Jet Propulsion Laboratory (JPL) is studying the use of artificial intelligence/machine learning to improve hurricane prediction capabilities using NASA satellite data.

Search for Life, Technosignatures, and UAP/UFOs

Public and media interest in the topic of Unidentified Aerial Phenomenon/Unidentified Flying Objects (UAP/UFOs) has seen an uptick in recent weeks following reports about the Department of Defense's release of three unclassified Navy videos. Likewise, the 2021 Intelligence Authorization Act, signed in December 2020, stipulated the government had 180 days to gather and analyze data from disparate agencies. Below is our response to the public and media who call for NASA comment:

- One of NASA's key goals is the search for life in the universe. To date, NASA has yet to find any credible evidence of extraterrestrial life, however, NASA is exploring the solar system and beyond to help us answer fundamental questions, including whether we are alone in the universe. We stand ready to support the rest of the government in the search for life in the universe, be it close to home, on the planets or moons of our solar system, or deeper into space.

NASA Administrator Fighting for Funding for NASA Missions

On May 19, NASA Administrator Sen. Bill Nelson testified virtually about NASA's fiscal year 2022 budget in front of the House Committee on Science, Space, and Technology. Sen. Nelson emphasized the support necessary to continue pursuing NASA's goals and missions. On May 21, he sent a [video](#) and following message to NASA employees:

- President Biden's discretionary funding request for NASA – \$24.8 billion – clearly demonstrates the Biden-Harris Administration's commitment to NASA, especially in light of the difficult circumstances of the past year. The full details of the president's budget



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request are expected next week and will provide further insight into funding for all NASA programs.

Of course, NASA's goals and missions are challenging and require robust funding to see them through to completion. That's why I asked Congress yesterday, in a hearing before the House Appropriations Commerce, Justice, and Science Subcommittee, to include NASA in the upcoming American Jobs Plan, in addition to the president's full budget request.

NASA missions support tens of thousands of jobs nationwide and the Jobs Plan's focus on infrastructure, research, and development is an opportunity for Congress to include funding for NASA's critical missions, including the Artemis program, while also supporting good-paying American jobs.

China's Zhurong Mars rover landing last week is an example of why NASA's inclusion in the Jobs Bill is important – there is no time to wait.

Investments in technologies like nuclear thermal propulsion, advanced spacesuits, and updated, green infrastructure at our centers are important to our nation and NASA's future as a leader in space, innovation, and jobs around the country. I'm fighting to ensure the agency has the resources we need to continue that incredible legacy.

China Mars Lander

On May 14 (Eastern Time), China's Tianwen-1 orbiter deployed its rover, recently named "Zhurong," to the surface of Mars. NASA has been asked to comment on several aspects of the landing. On May 19, NASA Administrator Sen. Bill Nelson issued the following statement after the China National Space Administration's (CNSA's) release of the first photos from the Zhurong Mars rover:

- "Congratulations to the China National Space Administration on receiving the first images from the Zhurong Mars rover!" Nelson said. "As the international scientific community of robotic explorers on Mars grows, the United States and the world look forward to the discoveries Zhurong will make to advance humanity's knowledge of the Red Planet. I look forward to future international discoveries, which will help inform and develop the capabilities needed to land human boots on Mars."

CNSA's successful landing of the Zhurong rover last week makes it only the second nation to ever land successfully on Mars. Zhurong joins active NASA missions – the Curiosity and Perseverance rovers and Insight Lander – in exploring the surface of the Red Planet.

- The week of May 16, media outlets asked whether CNSA used NASA animation from a Mars mission a decade ago for animation related to its Zhurong Mars lander. The following is our response:
 - NASA's imagery is made freely available for use by the public.
 - If pressed for more:
 - For questions about the Zhurong animation, please check directly with the China National Space Administration.



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- NASA also was asked the week of May 16 whether the agency's InSight Mars lander was able to detect Zhurong's landing. The following is our response:
 - As part of its normal science, InSight's data acquired seismic and atmospheric measurements at the time of Zhurong's landing. As we did with NASA's Perseverance landing, the InSight science team examined seismic and pressure oscillation signals associated with the Zhurong landing. Based on preliminary examination of the data, we don't appear to have detected it, just as we didn't with Perseverance.
- Below is NASA's initial public comment about the landing from Science Mission Directorate Associate Administrator Dr. Thomas Zurbuchen on [Twitter](#):
 - "Congratulations to CNSA's #Tianwen1 team for the successful landing of China's first Mars exploration rover, #Zhurong! Together with the global science community, I look forward to the important contributions this mission will make to humanity's understanding of the Red Planet."

Human Landing System Sen. Cantwell Amendment

On May 12, Sen. Maria Cantwell offered an amendment in committee markup of the Endless Frontier Act that included language and proposed funding related to NASA's Human Landing System for the Artemis program. Below is our response to the public and media who call for comment:

- NASA is excited to return to the Moon with more robot and human explorers than ever before as part of the Artemis program. Both government and commercial capabilities are necessary to enable long-term exploration on and around the Moon. By purchasing commercial services to take astronauts from lunar orbit to land on the surface of the Moon, we will ensure a robust deep space transportation system is in place as we learn to live and work on another world for the benefit of all. NASA is unable to comment on the proposed amendment due to ongoing litigation of the recent human landing system selection.

More information can be found here: <https://www.nasa.gov/nextstep/humanlander2>

Webb Telescope Reported Possible Launch Delay

On May 12, Space News [reported](#) ongoing work to address a problem seen on two previous Ariane 5 rocket launches could delay the high-profile launch of NASA's James Webb Space Telescope. Below is our response to calls for comment:

- The launch readiness date for NASA's James Webb Space Telescope, which will be the premier observatory of the next decade, is Oct. 31, 2021. Webb is on schedule for that date, but we know schedule margin is tight. We are working closely with ESA and Arianespace on their launch vehicle readiness, and should a launch date change be needed, Webb has launch windows available almost every day of the year. Webb will study every phase in the history of our universe, including the first luminous glows after the creation of the cosmos, the formation of solar systems capable of supporting life on planets like Earth, and the evolution of our own solar system.

Roscosmos Spaceflight Participants to the International Space Station Announcements

On May 13, Roscosmos [announced](#) it plans to send spaceflight participants (non professional astronauts) for short trips to the International Space Station this year, including an actress and



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filmmaker on a Soyuz flight in October. Below is the response to the public and media who ask for NASA comment:

- This year is truly a renaissance for human spaceflight both as we fly NASA and international partner astronauts on U.S. commercial crew spacecraft to the International Space Station and also as we see the expansion of private astronaut missions. As more people fly to space and do more things during their spaceflights, it attracts even more people to do more activities in low-Earth orbit, and reflects the growing market we envisioned the Commercial Crew Program enabling when we embarked on it about 10 years ago.

Webb Name Webb Telescope Name Statement

On May 7, Slate.com posted an [article](#) with the headline and sub-headline “The James Webb Space Telescope Hasn’t Launched Yet. In One Way, It’s Already a Relic. It will collect important data, but what does its name say about who it’s for?” Below is our response to the public and media who call for comment:

- NASA is aware of concerns that have arisen about James E. Webb, and we are working with historians to examine his role in government. NASA named its next generation observatory, the James Webb Space Telescope, after its second administrator, who helped establish the Apollo Program that landed humans on the Moon. The agency made the naming decision in recognition of Webb’s role in retaining an active science program at NASA in the agency’s early years. Webb’s work as administrator laid the groundwork for today’s accomplishments, and science remains a critical part of NASA’s work: to understand the universe, advance exploration, and inspire the next generation.

NASA’s Ingenuity Mars Helicopter

On April 19, NASA’s Ingenuity Mars Helicopter successfully completed the first attempt at powered, controlled flight of an aircraft on another planet. The experimental rotorcraft was carried to the Red Planet on NASA’s Perseverance Mars rover. Ingenuity progressively added more complex flights on April 22, April 25, April 30, May 7, and May 23. On April 30, NASA [announced](#) that after its next two demonstration flights, Ingenuity will embark on a new operations demonstration phase, exploring how aerial scouting and other functions could benefit future exploration of Mars and other worlds.

- Ingenuity Key points:
 - Ingenuity is the first aircraft to attempt and achieve controlled flight on another planet (a “Wright Brothers” moment).
 - Ingenuity had already demonstrated feats of engineering – shrinking its size and mass, working with specialized materials, demonstrating flight in a thin atmosphere while still on Earth.
 - Tests on Earth proved many of its engineering principles.
 - With Ingenuity’s success, future Mars exploration could include an ambitious aerial dimension.
 - Ingenuity is a technology demonstration. Its experimental mission is separate from the rover, but we do tech demos because they advance our capabilities and help prove concepts for future mission.
- Ingenuity’s technology demonstration objectives are:
 - Prove powered flight in the thin atmosphere of Mars.



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- The Red Planet has lower gravity (about one-third that of Earth) but its atmosphere is just 1% as thick, making it much harder to generate lift.
- Demonstrate miniaturized flying technology.
 - That requires shrinking down onboard computers, electronics and other parts so that the helicopter is light enough to take off.
- Operate autonomously.
 - Ingenuity will use solar power to charge its batteries and rely on internal heaters to maintain operational temperatures during the cold Martian nights. After receiving commands from Earth relayed through the rover, each test flight is performed without real-time input from Mars Helicopter mission controllers.
- NASA's Perseverance Mars rover mission objectives are:
 - Take samples to leave on the surface for return to Earth in a few years. First leg of a round trip to Mars.
 - Search for signs of ancient microbial life as the rover explores a crater that billions of years ago might have been a large body of water like a lake.
 - Characterize the geology and climate of Mars.
 - Help pave the way for human exploration beyond the Moon.
- Perseverance Mars rover Key Points:
 - The Perseverance rover is the most capable rover ever sent to Mars and builds on the legacy of NASA's Mars Exploration Program and earlier rovers.
 - The mission embodies our nation's spirit of persevering even in the most challenging of situations, providing inspiration and advancing science and exploration. The mission itself personifies the human ideal of persevering toward the future.
 - The Mars 2020 mission is part of America's larger Moon to Mars exploration approach, which includes astronaut missions to the Moon that prepare for human exploration of the Red Planet.
 - NASA is committed to working with our international partners to accomplish stunning achievements in science, technology and exploration, and this mission reinforces those strong bonds.
 - Perseverance is the beginning of the first round-trip to another planet. The rover will collect rock and soil samples for return to Earth by future missions that could possibly confirm the ultimate astrobiology question: does life exist, or did it, elsewhere?
 - Perseverance carries the most sophisticated suite of instruments ever sent to Mars.
 - The mission addresses high-priority science goals to:
 - Return samples from Mars.
 - Search for clues about the potential for past life on Mars.
 - Find out what Mars' environment was like billions of years ago, and what might be preserved in the unique rocks of Jezero Crater.
 - Study what the planet's environment is like today.
 - NASA's robotic exploration of Mars is paving the way for future human missions to the Red Planet and will gather knowledge and demonstrate technologies that address the challenges of those human expeditions. Some relevant technologies include:
 - Entry, descent and landing technology.



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- In situ resource use.
- Terrain-relative navigation.
- The public will get to ride along. The mission has more cameras than any previous interplanetary mission, and while we have “felt” vibrations in response to wind with the InSight lander’s seismometer and “translated” them into sounds that we could hear with the human ear, two microphones on Perseverance will attempt for the first time to hear audio of the rover’s operations and travels, as well as the environment at Mars.
- Perseverance joins a fleet that right now includes a rover, a lander and multiple orbiters. This is the 9th U.S. mission to land and the 5th rover. The U.S. is the only nation to successfully land on Mars.
- On April 20, a toaster-size experimental instrument aboard Perseverance called the Mars Oxygen In-Situ Resource Utilization Experiment ([MOXIE](#)) converted some of the Red Planet’s thin, carbon dioxide-rich atmosphere into oxygen – the first time this has ever been done.
 - While the technology demonstration is just getting started, it could pave the way for science fiction to become science fact – isolating and storing oxygen on Mars to help power rockets that could lift astronauts off the planet’s surface. Such devices also might one day provide breathable air for astronauts themselves.

UPCOMING EVENTS PUBLIC DATES

*Below are the publicly listed dates of some high-profile activities/events/milestones in 2021. Internal planning, target, and pre-decisional dates are not listed below as they’re not official and public yet. The public dates listed are as specific as they can be, at this time. This list will be regularly updated and added to, as appropriate. Text in **red** is newly updated public information:*

- **State of NASA – June 2:** NASA Administrator Bill Nelson’s first live address to the NASA workforce about the state of the agency and its activities
- **Russian Spacewalk on the International Space Station - June 2:** Russian EVA 48 (Novitskiy and Dubrov) from Poisk to dismantle cables for Pirs docking compartment undocking
- **SpaceX CRS-22 – June 3:** Next commercial [resupply services](#) mission to space station from Florida
- **Laser Comm – June 23:** NASA’s [Laser Communications Relay Demonstration](#) to test optical communications launches from Florida
- **Boeing Orbital Flight Test-2 – July 30 –** Boeing’s uncrewed CST-100 Starliner OFT-2 (Orbital Flight Test-2) launch from Florida to the International Space Station
- **Northrop Grumman CRS-16 – July 2021:** Commercial [resupply services](#) mission to space station from Virginia
- **X-57 – Fall 2021 --** Flight test for NASA’s first all-electric plane, [X-57](#), at Armstrong Flight Research Center
- **Landsat 9 – September:** NASA and U.S. Geological Survey launch latest Earth observation satellite, [Landsat 9](#), from California
- **CAPSTONE – Fall 2021:** NASA [CubeSat](#) to validate new navigation technologies and verify dynamics in Gateway’s planned orbit will launch to space
- **Imaging X-Ray Polarimetry Explorer – Fall 2021:** NASA’s [IXPE](#) mission to discover hidden astronomical objects in the universe launches from Florida



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- **SpaceX CRS-23 – Fall 2021:** Commercial [resupply services](#) mission to space station from Florida
- **Lucy – Oct 16:** NASA's [Lucy](#) mission to study the Trojan asteroids of Jupiter will launch from Florida
- **SpaceX Crew-3 – No earlier than Oct. 23:** [Crew-3](#) will launch to station from Florida
- **SpaceX Crew-2 Return – No Earlier than Oct. 31:** Crew-2 returns to Earth
- **Webb Telescope – (Launch Readiness Date) Oct. 31:** NASA's [James Webb Space Telescope](#) to help answer questions about our cosmic origins launches from French Guiana
- **DART – Nov. 24:** Window opens to launch Double Asteroid Redirection Test from California, NASA's first flight demonstration for planetary defense
- **Webb Telescope – November/December:** The [James Webb Space Telescope](#) completes mission deployments/arrives in its L2 (second Lagrange Point) orbit about 29 days after launch
- **Artemis I - November:** NASA reviewing launch date for [first integrated flight test](#) of the uncrewed Space Launch System rocket and Orion spacecraft launches on a multi-week mission around the Moon
- **Orion splashdown:** NASA's [Orion](#) spacecraft splashes down on Earth following a multi-week mission around the Moon
- **Geostationary Operational Environmental Satellite-T – December:** NASA and NOAA's latest weather satellite, [GOES-T](#), launches from Florida
- **Astrobotic's CLPS Flight – Late 2021:** Suite of robotic NASA payloads sent to the lunar surface as part of a [Commercial Lunar Payload Services](#) delivery. Landing takes place in the following weeks
- **Boeing's Crew Flight Test – Under review pending OFT-2:** Boeing's CFT earliest possible launch to space station from Florida
- **Boeing Starliner-1 – Under review pending outcome of earlier flight tests:** Launch date for first operational Boeing commercial crew launch to space station from Florida
- **Astronaut Candidates – 2021:** NASA will announce selections for the next class of [astronaut candidates](#) to begin training
- **Intuitive Machines' CLPS Flight – Early 2022:** Suite of robotic NASA payloads sent lunar surface as part of a [Commercial Lunar Payload Services](#) delivery. Landing takes place in the following weeks

AGENCY COMMUNICATION THEME PRIORITIES

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Earth

NASA uses the vantage point of space to understand and explore our home planet, improve lives and safeguard our future.

Tagline: **Your Home. Our Mission.**

Flight

NASA explores new technologies to make aircraft quieter and faster, get you gate-to-gate safely and on time, and transform aviation into a new economic engine at all altitudes.

Tagline: **NASA is With You When You Fly.**

Humans in Space

NASA leads human space exploration in low-Earth orbit with commercial and international



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partners to enable missions to the Moon and Mars. International Space Station missions are a catalyst for economic development and the advancement of scientific knowledge and new technologies that improve our lives.

Tagline: **Leading Discovery, Improving Life on Earth.**

Moon to Mars

NASA is leading a sustainable return to the Moon with commercial and international partners to expand human presence in space and bring back new knowledge and opportunities.

Tagline: **Moon Lights the Way.**

Solar System & Beyond

NASA is exploring our Solar System and beyond, uncovering worlds, stars, and cosmic mysteries near and far with our powerful fleet of space and ground-based missions.

Tagline: **Discovering the Secrets of the Universe.**

Space Tech

NASA technologies advance capabilities for space exploration, promote America's global leadership in innovation and transform the world around us.

Tagline: **Technology Drives Exploration.**

-end-