



National Aeronautics and
Space Administration

Hold for Release Until
Presented by Witness

June 15, 2021

Subcommittee on Commerce, Justice, Science, and Related Agencies

Committee on Appropriations

United States Senate

Statement of:
The Honorable Bill Nelson
Administrator

117th Congress

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Chairwoman Shaheen and Members of the Subcommittee, I am pleased to have this opportunity to discuss NASA's FY 2022 budget request of \$24.8 billion. This request represents an increase of \$1.6 billion, or 6.6 percent, above the FY 2021 enacted level.

But first, I would like to thank you for your ongoing support for NASA. This funding aligns closely with Administration priorities, including expanded climate change research; continued investment in human spaceflight through the International Space Station (ISS) and Artemis Programs that enhance global engagement and diplomacy; investments in cutting-edge research and development that fuel innovation, create high-paying jobs, grow the economy, and improve life on Earth; advancement of the U.S. aviation industrial base to build a green aviation system; and strengthening of a diverse Science, Technology, Engineering, and Math (STEM) workforce that inspires future generations.

NASA is more than the world's premier space exploration organization. NASA is a uniquely powerful source of national inspiration and international leadership. Over the past year, the NASA team has demonstrated remarkable resilience, overcoming COVID-19 challenges to press forward with a series of outstanding successes, including the historic first flight on another planet. NASA's landing of Perseverance on Mars is emblematic of an Agency, and a Nation, that can overcome challenges, to achieve whatever goals we set. To quote the President on a phone call to NASA Jet Propulsion Laboratory (JPL):

“We can land a rover on Mars. We can beat a pandemic. And with science, hope, and vision, there's not a damn thing we can't do as a country.”

With the resources entrusted to us by Congress and the American people, and the dedicated efforts of our commercial partners, we have returned human spaceflight to American soil on American rockets. Adapting what we have learned from these efforts, we are moving rapidly to return Americans to the surface of the Moon as quickly as we can safely do so. We are committed to landing the first woman and the first person of color on the Moon. We will use all of this Nation's capacity for innovation to develop the experience and capability around the Moon that will send Americans on to Mars. We are building the Space Launch System (SLS) and the Orion crew vehicle, to make deep space exploration possible, and we will soon launch the first, uncrewed mission in the Artemis lunar exploration program. During this flight, targeted for this year, the spacecraft will fly farther than any spacecraft built for humans has ever flown.

The budget request includes funding for the development of the Block 1B variant of SLS as well as funding for construction of a second Mobile Launcher, both of which will help support a robust Moon to Mars program.

On April 16, 2021, NASA announced it had selected SpaceX to continue development of the first commercial human lander that will safely carry the next two American astronauts to the lunar surface. The firm-fixed price, milestone-based contract total award value is \$2.89 billion, out of total requested five-year Human Landing System (HLS) funding of \$7.8 billion. This HLS contract award is under protest as of this time. While the human landing demonstration award is under protest, NASA is continuing to prepare for competition for the follow-on landings to the lunar surface. These services will provide human access to the lunar surface using the Gateway on a regularly recurring basis beyond the initial crewed demonstration mission. By taking a collaborative approach in working with industry and international partners while leveraging NASA's proven technical expertise and capabilities, we will return American astronauts to the Moon's surface once again, this time to explore new areas for longer periods of time.

For over 20 years, NASA has maintained a continuous human presence in Earth orbit, developing technology, skills, and knowledge needed for human exploration of the Moon and Mars. The budget request ensures that there will be no gap in human presence in Low Earth Orbit (LEO) by continuing to invest in commercial LEO destinations and services. The coming year will see a second commercial partner demonstrate crew transportation and begin regular crewed flights to the ISS. This regular cadence of crew rotation missions will contribute to the foundation of a more affordable and sustainable future for American human spaceflight. In addition, this will allow more capacity and resources for research and development projects on ISS, which are improving life on Earth and proving out the viability of a LEO economy.

NASA is on Mars now and studying the planet more intensively than ever before. The request includes funding to develop the mission that will return samples from Mars to Earth. With the successful landing of the Perseverance rover, we are now operating two rovers, a lander, and a helicopter on the surface of Mars, supported by an array of orbiting spacecraft. We continue to operate a constellation of spacecraft exploring the solar system while developing new missions to Earth's Moon and Jupiter's moon Europa, as well as a mission dedicated to detecting potentially hazardous Near-Earth Objects (NEOs). Later this year, we will launch the Lucy mission to explore the Trojan asteroids in the vicinity of Jupiter, to be followed in 2022 by the Psyche mission to a metallic asteroid. These asteroids are thought to be remnants of the primordial material that formed the outer planets. NASA recently announced a major return to our nearest planetary neighbor, Venus, selecting not one but two missions that will be run out of the Planetary Missions Program Office at Marshall Space Flight Center. The first mission, DAVINCI+, will measure the composition of Venus' atmosphere to understand how it formed and evolved, as well as determine whether the planet ever had an ocean. The second mission, VERITAS, will map Venus's surface to determine the planet's geologic history and understand why it developed so differently than Earth.

NASA is a critical piece of the Administration's efforts to understand and address global climate change. The request supports the continued development of high-priority missions including Plankton, Aerosol, Cloud, ocean Ecosystem (PACE); Climate Absolute Radiance and Refractivity Observatory (CLARREO) Pathfinder; and Landsat 9, while also supporting acquisition of Earth Science observation data for commercial SmallSat constellations. In a major step forward for Earth Science, we have initiated a mission concept for NASA's Earth System Observatory, a new architecture for deploying and integrating next-generation spaceborne Earth observation systems. The Observatory includes development of four core strategic missions for launch this decade, and will provide the world an unprecedented understanding of the critical interactions between Earth's atmosphere, land, ocean, and ice processes. These processes define how the changing climate will play out at regional and local levels, and on near- to long-term time

scales. The Earth System Observatory builds on NASA's Earth Science Division's current observations of Earth on a global scale, a fleet of 16 major Earth observatories plus six Earth observation instruments on the ISS, SmallSats, CubeSats, and missions flown by piloted and unpiloted aircraft.

Later this year, NASA will launch the James Webb Space Telescope (Webb), the largest and most complex space science observatory ever built. Webb is an infrared telescope designed to observe the farthest objects, broadening and transforming our understanding of the early universe. It will see the light from the first galaxies that formed in the early universe after the Big Bang, and observe the birth of stellar systems, as well as explore distant worlds and study the atmospheres of planets orbiting other stars – known as exoplanets – searching for chemical fingerprints of habitability. Webb will join a constellation of operating astrophysics observatories including the Hubble Space Telescope, Chandra X-Ray Observatory, and seven other operating missions. The request supports the development of the Nancy Grace Roman Space telescope, designed to unravel the secrets of dark energy and dark matter, and to search for and image exoplanets.

Supporting all of these efforts, NASA is developing new technologies ranging from robotic servicing technology to extend the life of orbiting spacecraft to laser communications for space. Launching this year, the Laser Communications Relay Demonstration will showcase the unique capabilities of optical communications to radically increase the volume of information a signal can carry. In FY 2022, NASA will deliver the Polar Resources Ice Mining Experiment-1 to Intuitive Machines, who will transport this first-of-its-kind, *in situ* resource utilization demonstration to the Moon. This experiment will robotically sample and analyze ice from below the surface and study the drill cuttings for water and other chemical compounds to help scientists understand the potential of using resources found on the Moon. The Low-Earth Orbit Flight Test of an Inflatable Decelerator will complete fabrication of its flight hardware for an FY 2022 demonstration of space braking technology that will enable a variety of proposed NASA missions to destinations such as Mars, Venus, and Titan, as well as return to Earth. The On-orbit Servicing, Assembly, and Manufacturing-2 project is working toward a late 2022 launch to build, assemble, and deploy its own operational solar arrays in space. NASA is continuing to spur a vibrant space economy through a new Industry and Commerce Innovation opportunity that will invest in technologies needed by commercial space stakeholders.

NASA's aeronautics research will make significant contributions to the national effort to address global climate change, through vehicle technology development and advanced airspace operations, as well as serving as a vital source of innovation for the country's leading export industry, commercial aviation. The request increases funding for planned green aviation initiatives across these programs and supports the continued development of the X-59 Low Boom Flight Demonstrator, as well as early designs of a Sustainable Flight Demonstrator. This year, we will fly the first test flight of the X-57 Maxwell, NASA's first all-electric X-plane – a major step forward in efforts to develop a more sustainable aeronautics industry.

For the first time in many years, NASA's budget request includes funding for its Office of STEM engagement. With a significant increase over recent appropriated funding, the budget request for STEM engagement will increase investment in the Nation's next generation of scientists, engineers, technologists, mathematicians, and explorers.

NASA is uniquely positioned to support Administration priorities. The Agency is helping to restore America's global standing, demonstrating the power of a diverse, unified democracy to overcome challenges and achieve great goals. As a source of innovation, and by directly promoting the growth of space and aeronautics industries, NASA plays an important supporting role in creating skilled, high-paying jobs. We are critical to the Administration's efforts to expand climate research and investment in innovative sustainable technologies. In addition, NASA is accelerating efforts to further diversity, equity,

and inclusion. NASA has long understood that diversity, equity, and inclusion is not simply a matter of justice or fairness, but rather a source of strength and innovation and critical thinking.

Conclusion

The FY 2022 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 the broad array of benefits this Agency delivers for the Nation.

Madam Chair, I would be pleased to respond to your questions and those of other Members of the Subcommittee.