National Aeronautics and
Space Administration

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Committee on Science, Space,
and Technology

United States House of Representatives

Statement by:

Dr. Nicola J. Fox, Associate Administrator, Science Mission Directorate

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Associate Administrator, Science Mission Directorate
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In December 2024, NASA discovered an asteroid about the size of a 15-story building called 2024 YR4 using the ATLAS sky survey system in Chile. This asteroid continued to be monitored by NASA and the worldwide planetary defense community, who reported their observations to the NASA-funded Minor Planet Center, the international clearinghouse for small body position measurements. By the end of January, 2024 YR4 had been observed long enough for the NASA Jet Propulsion Lab's Center for Near-Earth Object Studies to determine the asteroid had a one percent chance of Earth impact on December 22, 2032.

While a one percent chance may seem low, it is rare for an object of this size to reach such a probability. The last time this happened was in 2004 with the asteroid Apophis. One percent is also the threshold at which NASA notifies other U.S. Government agencies, and where the International Asteroid Warning Network notifies the United Nations Office for Outer Space Affairs for dissemination to UN member states. While NASA already had these notification procedures in place, this marked the first time they were exercised.

NASA continued to track 2024 YR4 using a network of observatories to further refine the asteroid's orbit. As NASA publicly updated 2024 YR4's impact probability based on our evolving understanding of the data, the world saw the science of planetary defense in action.

By late February 2025, we had collected enough data to rule out 2024 YR4 as a significant impact threat to Earth for the foreseeable future. NASA still observed 2024 YR4 with the James Webb Space Telescope to further constrain its size and orbit. This was the smallest object Webb ever observed and proved the telescope's data will be valuable in helping characterize asteroids of interest in the future.

This event underscores NASA's critical role in defending the planet from asteroid impacts using early detection systems, advanced modeling, and international coordination. NASA remains at the forefront of maturing asteroid detection technologies and ensuring Earth's safety from these cosmic threats. Near-Earth Objects, or NEOs, are asteroids and comets with orbits around the Sun that approach within 30 million miles of Earth's orbit. NASA has been involved in finding and better understanding NEOs since 1998. To date, NASA-funded telescopes have been responsible for 96% of all NEO discoveries. We do not know of any sizeable object that has a significant risk of impacting Earth in the next 100 years. However, there are more yet to be found, and NASA continues the work authorized by the George E. Brown, Jr. Near-Earth Object Survey, Sec. 321 of the NASA Authorization Act of 2005 (P.L. 109-155), reaffirmed by this Committee in the NASA Authorization Act of 2022 (Title VII of P.L. 117-17).

To better understand NEOs, NASA leads a wide array of international activities including a long-standing ground-based network of telescopes, multiple flight missions to study both asteroids and comets, and conceptual studies and technology development efforts that improve our ability to find and characterize NEOs.

The agency is currently building the NEO Surveyor mission, which will be the world's first space telescope dedicated specifically to hazardous asteroid detection. Confirmed to launch no earlier than June 2028, NEO Surveyor will build on the success of NASA's Near-Earth Object Wide-Field Infrared Survey Explorer (NEOWISE), an astrophysics spacecraft that was repurposed to hunt for asteroids and comets after the successful completion of its first mission to map black holes and galaxies. NEO Surveyor will use infrared detectors to find even the most elusive and potentially hazardous NEOs that approach Earth's orbit.

NEO Surveyor is currently being built to detect and characterize an estimated two-thirds of potentially hazardous asteroids 140 meters and larger within five years of operation. NEO Surveyor – in tandem with ground-based surveys – will greatly accelerate the rate at which NASA can discover NEOs and determine any future impact threats to Earth by better defining their sizes and orbits. Understanding an asteroid's physical properties is key to determining whether it would do damage should it impact Earth or if it would disintegrate in our atmosphere.

NASA's Planetary Defense Coordination Office (PDCO), within the Science Mission Directorate, is the primary U.S. Government entity responsible for finding, tracking, and characterizing potentially hazardous NEOs. To that end, the PDCO funds researchers that use ground- and space-based assets to find, track, and better understand objects that could pose an impact threat. Under the National Strategy and Action Plan for Planetary Defense, the PDCO also collaborates with other federal agencies to guide planning in preparation for an actual impact threat.

The PDCO also chairs the International Asteroid Warning Network for NASA and participates in the European Space Agency-chaired Space Mission Planning Advisory Group – both of which are endorsed by the United Nations to help address the global asteroid impact hazard. Additionally, the PDCO works with international space agencies to simulate asteroid threats through tabletop exercises. These exercises, including one held earlier this month in South Africa at the International Planetary Defense Conference, allow NASA and its global partners to test the notification and emergency procedures that would be needed if an asteroid threat were ever discovered.

The PDCO also works to bring asteroid deflection and mitigation strategies to fruition. In 2022, NASA successfully demonstrated one method of asteroid deflection using a kinetic impactor spacecraft with its Double Asteroid Redirection Test, or "DART" mission, which intentionally crashed into an asteroid to see if we could change its orbital path in space.

DART successfully collided with its asteroid target, which was about 7 million miles away from Earth, and changed the amount of time that the asteroid took to complete one orbit by over 30 minutes. It was the first-time humanity had moved a celestial body in space, and it proved that an asteroid impact is a natural disaster that humans could prevent with enough warning time. However, if we are going to protect the Earth from potential asteroid threats with a mission like DART, we must first discover those threats, which is why finding those potentially hazardous asteroids remains a top priority for NASA's planetary defense program.

Successfully identifying, characterizing, and potentially preventing an impact requires continued observations from multiple assets, collaboration with NASA's international partners, and an engaged scientific community to help assess the data. NASA is the global focal point for these efforts and funds key infrastructure and activities that support worldwide observation and analysis of NEOs. These activities rely on the larger scientific and engineering communities to disseminate information about NEOs and to collect lessons learned from real-world asteroid events such as 2024 YR4.

Through advanced observation networks, sophisticated modeling and analysis tools, and partnerships with scientists around the world, NASA leads the global community in planetary defense. NASA's ability to quickly identify risks, mobilize resources, and deliver clear assessments is critical.

Continued U.S. leadership in NEO detection, tracking, and characterization ensures that the world remains prepared to detect hazardous objects early, understand their nature, and develop strategies to mitigate potential threats, turning what was once an unpredictable natural disaster into a potentially manageable and preventable risk. An asteroid impact wiped out the dinosaurs – but the dinosaurs did not have a space program. We do, and NASA will continue to discover and innovate for the benefit and safety of all.