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Subcommittee on Space and Aeronautics
Committee on Space Science & Technology
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From Detection to Deflection: Evaluating NASA's Planetary Defense Strategy

Chairman Babin, Ranking Member Lofgren, Chairman Haridopolos, Ranking Member Foushee, and distinguished members of the Subcommittee, thank you for your support of planetary defense, and for the opportunity to speak with you today about the Smithsonian Astrophysical Observatory's national and global efforts to defend our home planet from the threat of Near-Earth Objects (NEOs). I appear before you as the Director of the Minor Planet Center (MPC), whose global mandate and reach places us at the heart of planetary defense.

The Minor Planet Center, established in 1947 and operated by the Smithsonian Astrophysical Observatory since 1978, is the internationally recognized authority for the collection, processing, and dissemination of observational data on the positions of small bodies in our solar system. This includes comets, natural satellites, and asteroids of all kinds, including those whose orbit might lead to a collision with Earth. Sanctioned by the International Astronomical Union, we serve as the world's official clearinghouse for asteroid tracking. Our Center is both funded by, and works closely with, our colleagues at NASA's Planetary Defense Coordination Office.

Each year, the Minor Planet Center processes more than 50 million observations submitted from over 2,600 observatories across 80 countries. Among these data are the critical early detections of near-Earth objects—some of which may pose potential hazards to Earth. We track the orbits of all 38,000 known NEOs, including the more than 2,400 known potentially hazardous objects. An impact by *any one* of these objects would be devastating.

With these stakes in mind, identifying these threats requires the Minor Planet Center to combine technical expertise and highly complex modeling with critically needed human judgement. Our systems must rapidly distinguish new objects from known ones, prioritize those with potential risk, and publish the orbital data to be used by researchers, planetary defense planners, and decision-makers worldwide.

As the keystone of global coordination in this arena, the Minor Planet Center is central to the first and arguably most vital component of planetary defense: detection and tracking. Our near-Earth object dataset enables rapid follow-up by astronomers worldwide, refines orbital paths and ensures timely assessments of potential impact risk.

One recent example is the near-Earth object 2024 YR4—initially flagged as a potential impactor with a small probability of Earth collision in 2032. Had it hit Earth, it would have done so with a kinetic energy equivalent to the detonation of an 8 Megaton bomb, enough to kill millions if it impacted near a population center. The MPC is a critical node of the International Asteroid Warning Network. Thanks to its swift coordination and sharing of global data, continued observations by astronomers worldwide allowed precision orbit determination nodes such as NASA's Center for NEO Studies and ESA's Near-Earth Object Coordination Centre to rule out that threat within weeks. However, the scenario served as a critical reminder: early detection offers our best—and possibly only—opportunity to mount mitigation efforts, especially if years of lead time are needed to prepare a response.

Beyond natural objects, the MPC also plays a supporting role in broader space domain awareness. We regularly filter out observations of artificial satellites and pass the data to our colleagues at the United States Space Force to contribute to national tracking of orbital assets and debris. This capability to distinguish between natural and artificial space objects is important for rapid identification of hazardous asteroids and is increasingly critical in an era of growing orbital congestion.

But we face real challenges. When the Vera Rubin Observatory and NASA's NEO Surveyor mission come online, they will send the Minor Planet Center ten times more NEO data than it currently receives from all other sources combined. We have made improvements in our hardware, software, and processes to ensure that the planetary defense community is able to utilize this wealth of new data to safeguard us all. One such example of this is the Minor Planet Center's development of AI techniques to improve the speed and accuracy with which we identify NEOs within the stream of data sent to us, and we will continue to work with our colleagues at the Smithsonian Astrophysical Observatory's AstroAI Center on further applications of AI in Planetary Defense, and in particular to the processing of data from the NEO Surveyor mission.

Moreover, we are exploring international collaborations, particularly with the European Space Agency, to support 24/7 operations and shared analytical tools.

Chairman and Members, planetary defense is not a theoretical exercise. It is a practical, ongoing, and globally shared responsibility. The Minor Planet Center is not just a data repository—it is the global nexus of asteroid tracking. The Smithsonian Astrophysical Observatory and the Minor Planet Center are proud of our work and global leadership in safety, diplomacy, and preparedness.

Thank you again for your attention and your continued support for this critical mission. I look forward to your questions.