National Aeronautics and
Space Administration

Headquarters
Washington, DC 20546-0001

Reply to Attn of: Office of the Chief Scientist

September 18, 2019

Dr. Margaret Kivelson
Chair, Space Studies Board
National Academies of Science, Engineering, and Medicine
500 5th Street NW
Washington DC, 20001

Dear Dr. Kivelson,

I would like to express my sincere appreciation for the ad-hoc Committee's report "Finding Hazardous Asteroids Using Infrared and Visible Wavelength Telescopes." I would also like to express our gratitude to the National Academies staff for their diligent support of this effort. The Report recommends five actions that NASA should undertake. The analysis and guidance provided in the Report represents valuable input to the planning and implementation of NASA's Near Earth Object (NEO) program. The Report was accomplished expeditiously and provided in a timely manner, which is very much appreciated.

Both the Office of Chief Scientist and key personnel in the Science Mission Directorate have reviewed the findings and recommendations of the report, and I am pleased to convey NASA's completed responses to them. In general, our existing planning appears well aligned with the report, although we cannot currently accomplish the full suite of recommendations within the existing budget, your report provides a solid foundation for further justification of plans within NASA's NEO program. Please do not hesitate to contact Drs. Green or New with any questions about NASA's response. Dr. New can be reached at (202) 358-1766 or michael.h.new@nasa.gov.

Sincerely

James L. Green
NASA Chief Scientist

CC:
Dr. Thomas Zurbuchen
Dr. Michael New
Dr. Lindley Johnson

NASA RESPONSE TO THE NATIONAL ACADEMIES OF SCIENCE, ENGINEERING, AND MEDICINE REPORT

FINDING HAZARDOUS ASTEROIDS USING INFRARED AND VISIBLE WAVELENGTH TELESCOPES (2019)

Recommendation: Objects smaller than 140 meters in diameter can pose a local damage threat. When they are detected, their orbits and physical properties should be determined, and the objects should be monitored insofar as possible.

> ***Response:*** *NASA concurs with this recommendation. NASA-funded Near-Earth Object (NEO) survey projects will continue to collect observations and determine the orbital trajectories and physical properties for all objects detected, regardless of size, insofar as our capabilities make possible per funding and directives provided by Congress.*

Recommendation: If the completeness and size requirements given in the George E. Brown, Jr. Near-Earth Object Survey Act are to be accomplished in a timely fashion (*i.e.*, approximately 10 years), NASA should fund a dedicated space-based infrared survey telescope. Early detection is important to enable deflection of a dangerous asteroid. The design parameters, such as wavelength bands, field of view, and cadence, should be optimized to maximize near Earth object detection efficiency for the relevant size range and the acquisition of reliable diameters.

> ***Response:*** *Several NASA sponsored studies have reached this same conclusion. The Science Mission Directorate will now pursue an NEO surveillance capability similar to that described in the report with a life-cycle-cost and development schedule compatible with the budget appropriated for the Planetary Defense Program.*

Recommendation: Missions meeting high-priority planetary defense objectives should not be required to compete against missions meeting high-priority science objectives.

> ***Response:*** *NASA agrees with the sentiment of this finding. That is why a separate budget line sufficient to support development of small to modest-sized flight missions has been established for Planetary Defense.*

Recommendation: If NASA develops a space-based infrared near Earth object (NEO) survey telescope, it should also continue to fund both short- and long-term ground-based observations to refine the orbits and physical properties of NEOs to assess the risk they might pose to Earth, and to achieve the George E. Brown, Jr. Near-Earth Object Survey Act goals.

> ***Response:*** *NASA concurs with this recommendation and will continue and enhance ground-based observations where possible within the Planetary Defense Program budget.*

NASA will also continue to collaborate with other US government entities and international partners when possible, since they play an important role in follow-up, detection, and characterization of Earth approaching NEOs.

Recommendation: All observational data, both ground- and space-based, obtained under NASA funding supporting the George E. Brown, Jr. Near-Earth Object Survey Act, should be archived in a publicly available database as soon as practicable after it is obtained. NASA should continue to support the utilization of such data and provide resources to extract near Earth object detections from legacy databases and those archived in future surveys and their associated follow-up programs.

Response: *NASA concurs with this recommendation and will continue efforts to adequately archive all data collected on NEOs, and make such data publically available to the maximum extent practical.*