

EXERCISE

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NOT A REAL WORLD EVENT *This is part of an asteroid threat exercise conducted during the 2015 IAA Planetary Defense Conference.*

Deflection Mission Partially Successful, Threat from Smaller Object Being Assessed

Paul W. Chodas (International Asteroid Warning Network/JPL)

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Deflection Partially Successful, Threat from Smaller Fragment Being Assessed

- ▶ Five of six kinetic impactors were successfully launched to deflect asteroid 2015 PDC in August 2019
- ▶ Images from the leading KI spacecraft revealed the asteroid to be a 300-m long rubble pile looking much like Itokawa
- ▶ The first KI deflection was successful, but during the second deflection, a large fragment split off from the main body
- ▶ The third and fourth KI missions also succeeded, but had no effect on the fragment; the fifth failed earlier during a TCM
- ▶ The Indian flyby observer imaged the asteroid and a 60 to 100 meter fragment on approach, but then lost attitude control due to debris hits; the deflection delta-v imparted to the fragment could not be determined from the images.
- ▶ For more info: <http://neo.jpl.nasa.gov/pdc15/day5-1.html>

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Ground Observations of the Fragment

- ▶ The deflection could not be observed directly from the ground because the asteroid was too close to the Sun, and the solar elongation was only getting smaller
- ▶ Finally, in Nov. 2020, the asteroid emerged from behind the Sun and ground-based observations resumed; two distinct objects have been observed for over 2 months now
- ▶ IAWN has released a statement explaining that the deflection velocity imparted to the fragment is very uncertain, and it may not have been enough to deflect the fragment off the Earth; it estimates the impact probability at 54%
- ▶ Unfortunately, the asteroid is once again moving to the other side of the Sun; further observations will not be possible for 12 months

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Updated Risk Corridor for PDC Fragment

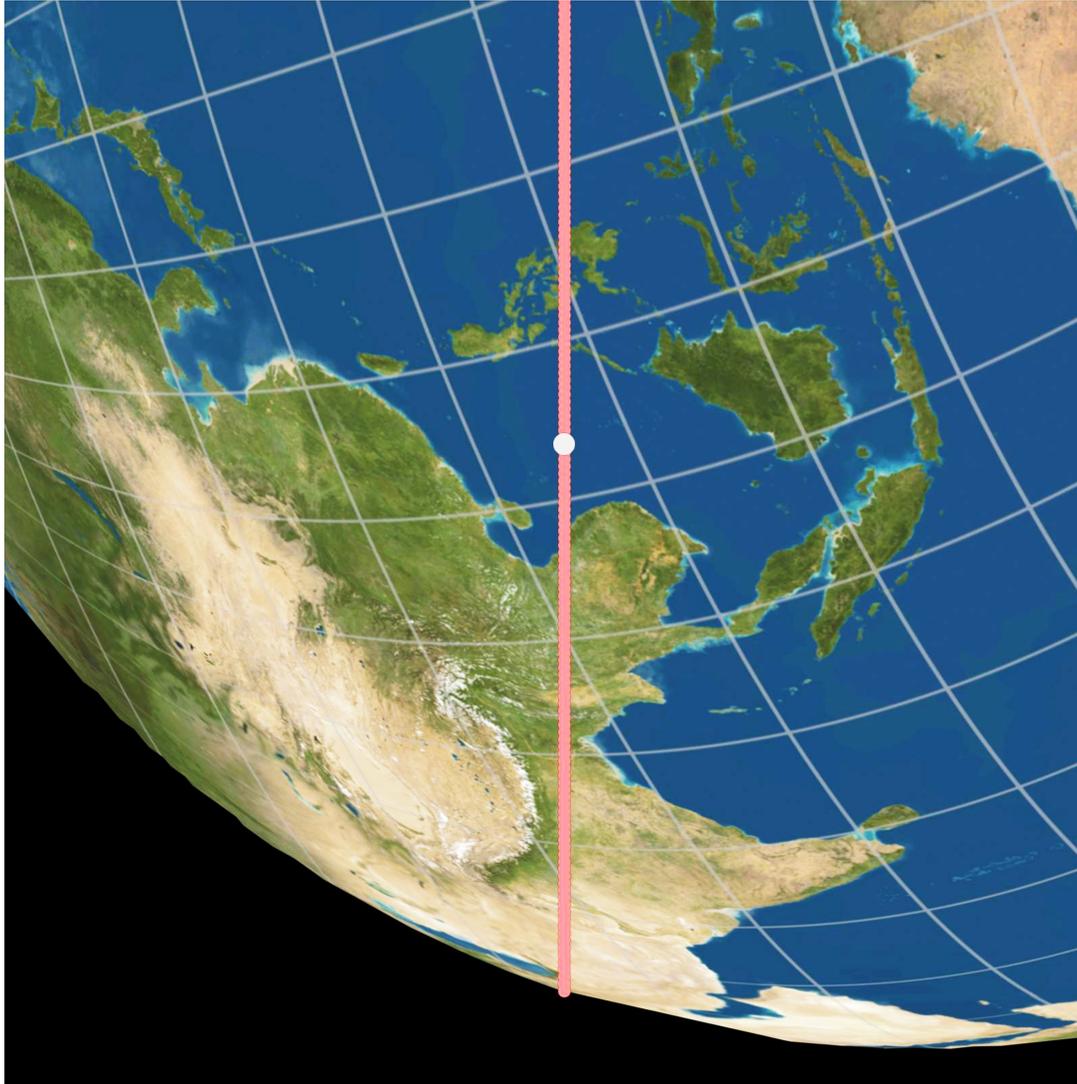


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Other Observer and Deflection Options

- ▶ China successfully launched a rendezvous observer mission just after the KI deflections occurred in March 2020, but control of the spacecraft was lost for unknown reasons during its Venus flyby in June 2020
- ▶ Although several nuclear deflection missions were on track for launch in March 2020, none were launched due to continuing strong opposition from many countries
- ▶ Rumors circulated that the Chinese observer spacecraft also carried a secret nuclear device for deflection, but these claims were vigorously denied

Close-up of Risk Corridor in B-Plane



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