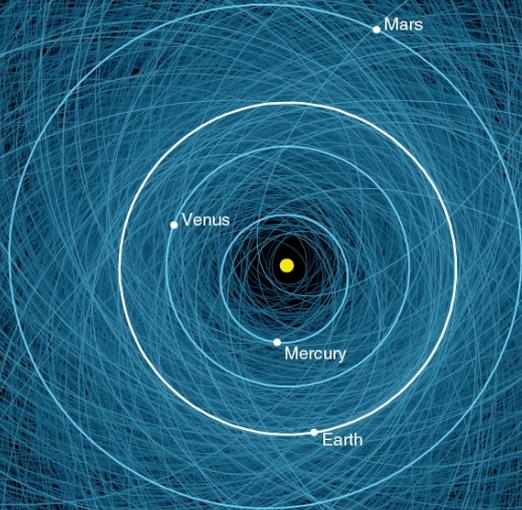


EXERCISE ONLY!!



**Impact Exercise, Day 3: September 3, 2024
Deflection Partially Successful But Large Fragment
Remains Headed for Impact, Possibly Still in U.S.**

Paul Chodas (Jet Propulsion Laboratory/California Institute of Technology)



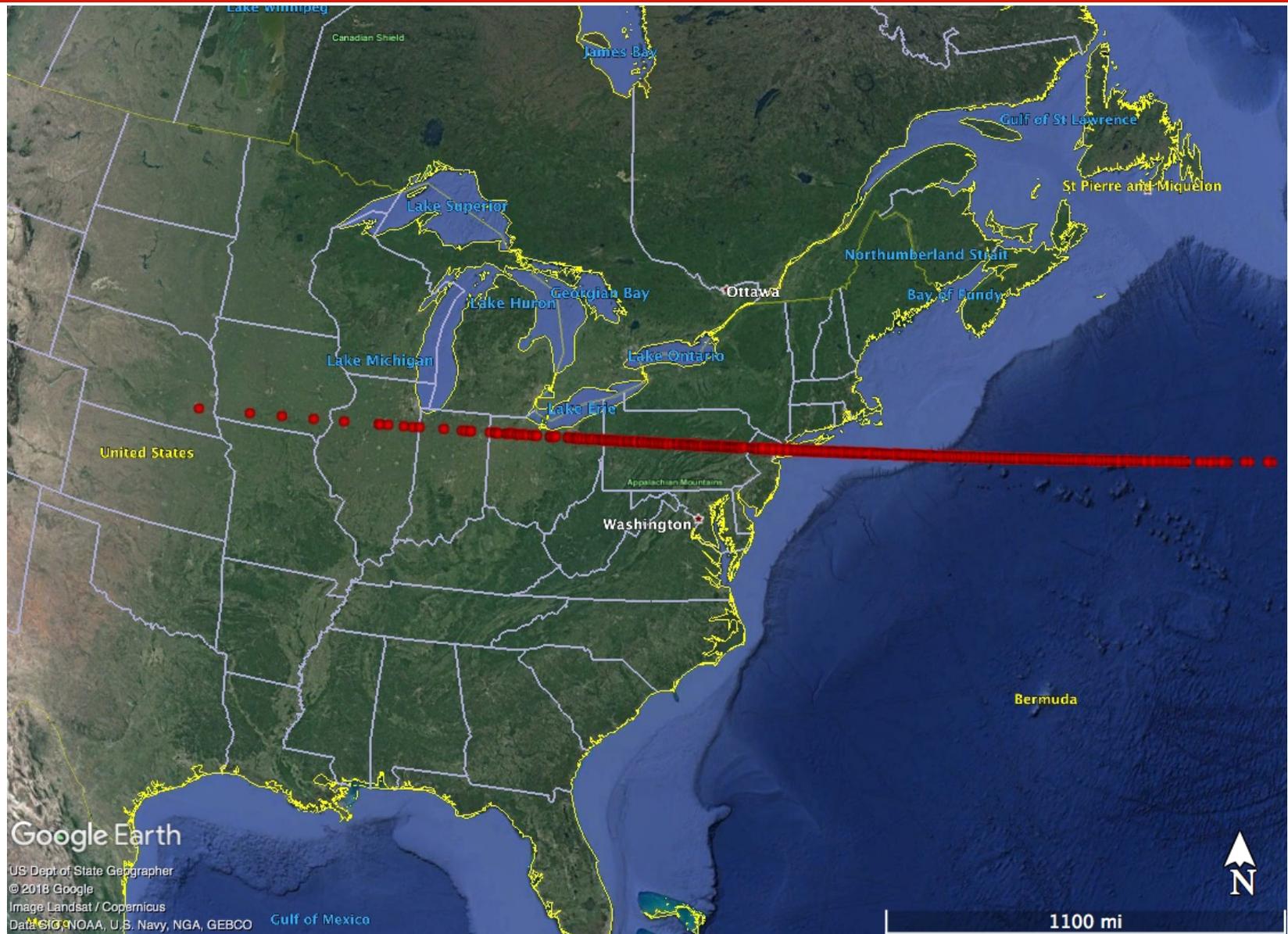
2019 PDC Fragments During Deflection

EXERCISE

- Three Kinetic Impactors (KIs) deflected asteroid 2019 PDC, but a large fragment about 50 to 80 meters in size (160 to 260 feet) broke away during the first KI deflection and remains on a collision course
- The reconnaissance spacecraft had been on station for 10 months; it observed a large fragment breaking away when the first KI struck; the other two strikes occurred on the main body, not the fragment
- Today, however, contact was lost with the reconnaissance mission, probably due to debris hitting the spacecraft
- Using the spacecraft imaging data, IAWN confirms that the asteroid's main body was successfully deflected, but the fragment was not;
- The precise velocity changes are uncertain because of the short observation period, but IAWN estimates the fragment is on a course towards impact in the eastern U.S. or the Atlantic Ocean
- For more info: <https://cneos.jpl.nasa.gov/pd/cs/pdc19/day4.html>



Impact Footprint for 2019 PDC Fragment





CNEOS NEO Deflection App (NDA)



EXERCISE

<https://cneos.jpl.nasa.gov/nda/nda.html>

Delta-V Mode | Intercept Mode

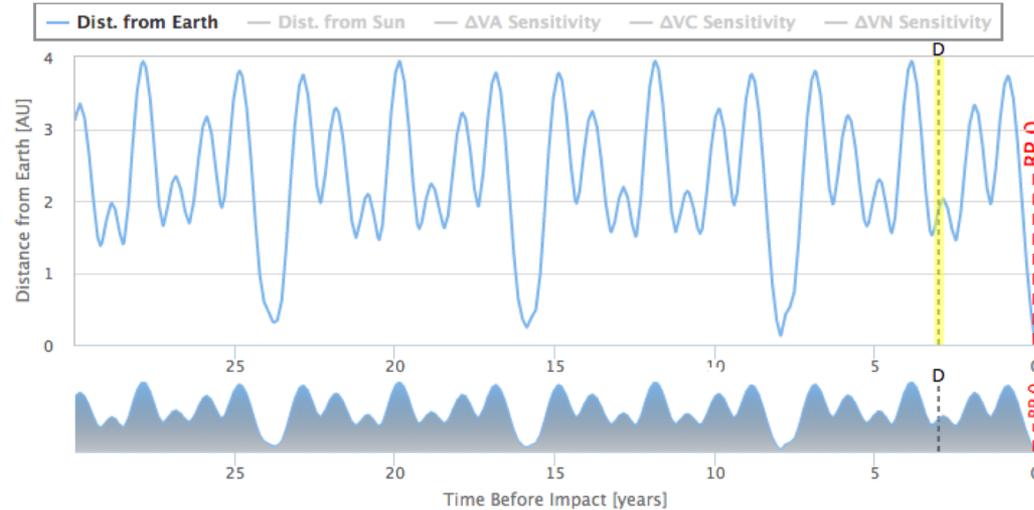
Time of Deflection (D): 1096 days

ΔVA : 0.000 mm/s
 ΔVC : 0.000 mm/s
 ΔVN : 0.000 mm/s

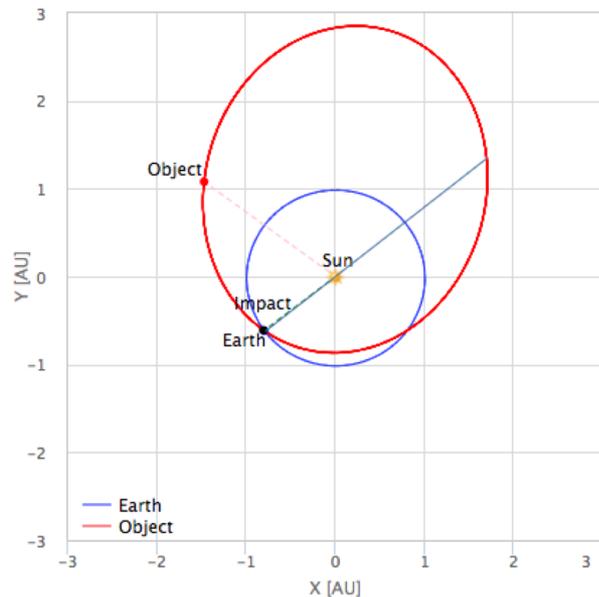
Simulated Near Earth Object (NEO)
PDC19a $q=0.92$ $i=129$ $e=0.096$ View Orbital Parameters

Object parameters are only applicable in Intercept Mode

Reset | Slider Δ 's | Advanced Mode | Tips



Orbit and Positions at Deflection



Orbit Changes

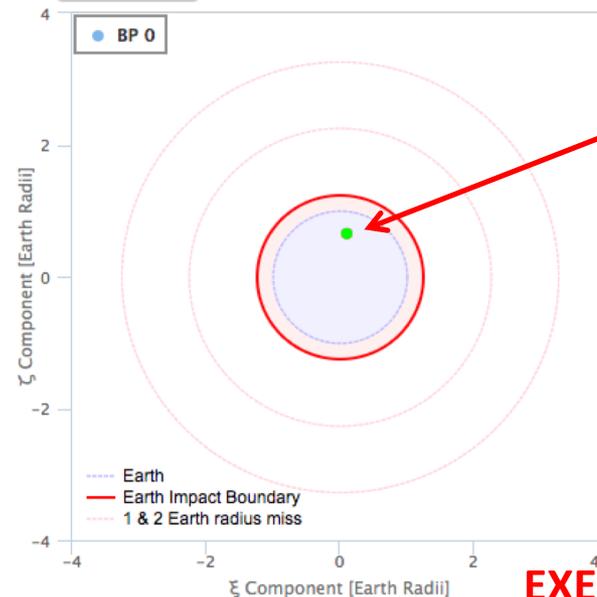
ΔVA : 0.000 mm/s
 ΔVC : 0.000 mm/s
 ΔVN : 0.000 mm/s
 Total ΔV : 0.000 mm/s
 Period at D: 970.980 d
 Δ Period: 0.0000 s

B-Plane Values

ζ (zeta): 0.653 R_e
 ξ (xi): 0.109 R_e
 B magnitude: 0.662 R_e
 Capture Rad.: 1.239 R_e
 Perigee Dist.: 0.446 R_e
IMPACT
 V_{∞} : 15.271 km/s
 * R_e = Earth Radii

Save Current Session
 Restore Session
 Deflection Map

B-Plane



Impact Location without deflection

EXERCISE ONLY!!



Ground Observations of the Fragment



- The deflection occurred while 2019 PDC was 1.7 au from Earth, almost on the other side of the Sun
- The deflection could not be observed directly from the ground because the solar elongation was low (less than 45 deg)
- IAWN has begun organizing a renewed ground-based observing campaign to track the fragment, in order to better assess its likely impact location
- Observations cannot begin for 3 months, when the asteroid emerges from behind the Sun