INTERNATIONAL ASTEROID WARNING NETWORK (IAWN)

POTENTIAL ASTEROID IMPACT NOTIFICATION – HYPOTHETICAL SIMULATION

Date: 28 April 2028
From: International Asteroid Warning Network (IAWN)
Point of Contact: IAWN Coordinating Officer for the IAWN Steering Committee [email]
To: Chair, Space Mission Planning Advisory Group (SMPAG);
United Nations Office of Outer Space Affairs
Title: Updated potential for impact of Near-Earth Asteroid 2024 PDC25 using data from reconnaissance spacecraft flyby

Impact Probability	100% as calculated by NASA JPL CNEOS and ESA NEOCC
Impact Date	24 April 2041
Impact Risk Region	Extends 470 km across Angola and the Democratic Republic of the Congo
Asteroid Size	140–160 m (460–520 ft) in size
Expected Damage	Regional blast damage, likely extending 100–120 km (60–75 mi) from the impact location, but possibly as far as 130 km (80 mi). Energy released most likely to be in the range 60–105 Mt, but possibly in the range 45–160 Mt.
When will there be new information?	Telescopic data available starting in July 2029 will not add significantly to what is known of 2024 PDC25 from the reconnaissance spacecraft flyby. Additional spacecraft data would improve the impact risk predictions. The asteroid will not come within range for radar observations until 2041.
Technical Information	https://cneos.jpl.nasa.gov/pd/cs/pdc25/

ADDITIONAL DETAILS:
A reconnaissance spacecraft flew by asteroid 2024 PDC25 on 12 April 2028 and the data collected on the asteroid's position and physical properties were used to improve the predicted impact location and the expected damage.

- **Impact Probability:** There is a 100% probability that near-Earth asteroid 2024 PDC25 will impact Earth on 24 April 2041 as independently calculated by the NASA JPL Center for Near-Earth Object Studies (CNEOS) and the ESA Near-Earth Objects Coordination Centre (NEOCC).
- **Impact Risk Region:** The data collected by the reconnaissance spacecraft on the precise position of 2024 PDC25 was used by CNEOS and NEOCC to improve the asteroid's predicted trajectory and narrow the potential impact locations on the African continent. The region of possible impact locations for 2024 PDC25 extends 470 km across Angola and the Democratic Republic of the Congo (see Graphic 2 below).

- **Asteroid size:** 140–160 meters (460–520 feet) in size from images taken as the reconnaissance spacecraft flew by 2024 PDC25. The asteroid has an elongated shape, with an estimated axis ratio of around 2:1 (*i.e.,* the asteroid is around twice as long as it is wide).
- **Asteroid mass and expected damage:** The potential mass range calculated from data taken by the reconnaissance spacecraft is 2.0–7.0 x 10^9 kg, most likely between 2.8–4.1 x 10^9 kg. The mass range was used to update the expected damage that is detailed above.
- **Future observability and updated information:** Further telescopic observations will be possible starting in July 2029, but they will not add significantly to what is currently known about 2025 PDC from the data gathered by the flyby reconnaissance spacecraft. Additional spacecraft data would improve impact risk predictions. The asteroid will not come within range for radar observations until 2041.
- **Technical information:** The latest technical information concerning this and any future IAWN notifications about asteroid 2024 PDC25 is made available by IAWN to the worldwide community at https://cneos.jpl.nasa.gov/pd/cs/pdc25/

This notification is issued by the International Asteroid Warning Network (IAWN) in accordance with criteria and thresholds for impact response actions in report A/AC.105/C.1/2017/CRP.25 to the Scientific and Technical Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space. The threshold for issuing warnings of possible impact effects is a probability of impact greater than 1% and a rough size estimated to be greater than 10 meters (33 feet). IAWN is a worldwide collaboration of asteroid observers and modelers that was recommended by the United Nations. https://iawn.net*

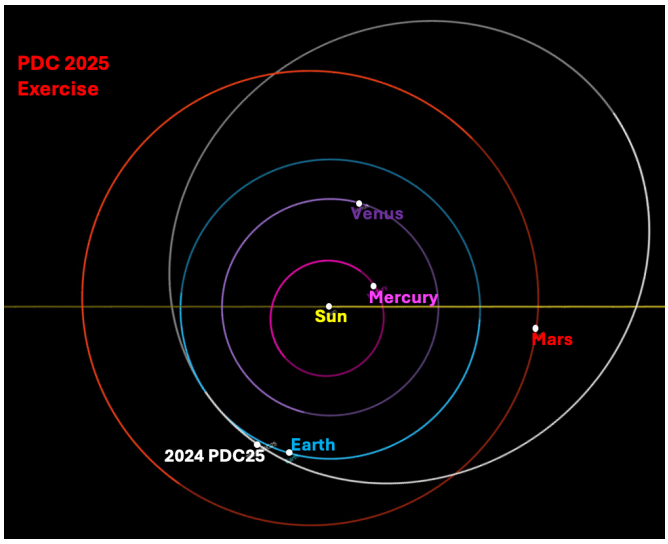
**The United Nations General Assembly in its resolution 70/82 of 9 December 2015 noted with satisfaction the establishment of the International Asteroid Warning Network (IAWN) and the Space Mission Planning Advisory Group (SMPAG) to implement recommendations for an international response to the near-Earth object impact threat that were endorsed by the Committee on the Peaceful Uses of Outer Space in 2013 (A/68/20, para. 144).*

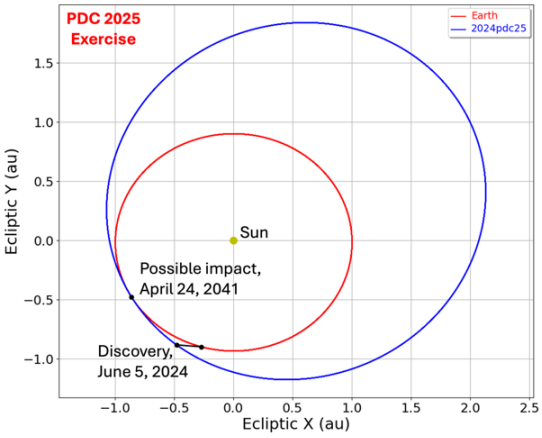
The Committee in its annual reports (e.g. A/78/20, para. 119) notes that should a credible threat of impact be discovered by the IAWN, available information would be provided by IAWN and disseminated to all Member States through the Office for Outer Space Affairs. The Office for Outer Space Affairs disseminates information pursuant to General Assembly resolution 78/72, paragraph 14, concerning the work carried out by the International Asteroid Warning Network (IAWN) and the Space Mission Planning Advisory Group (SMPAG) and in its capacity as the permanent secretariat of SMPAG.

Graphics

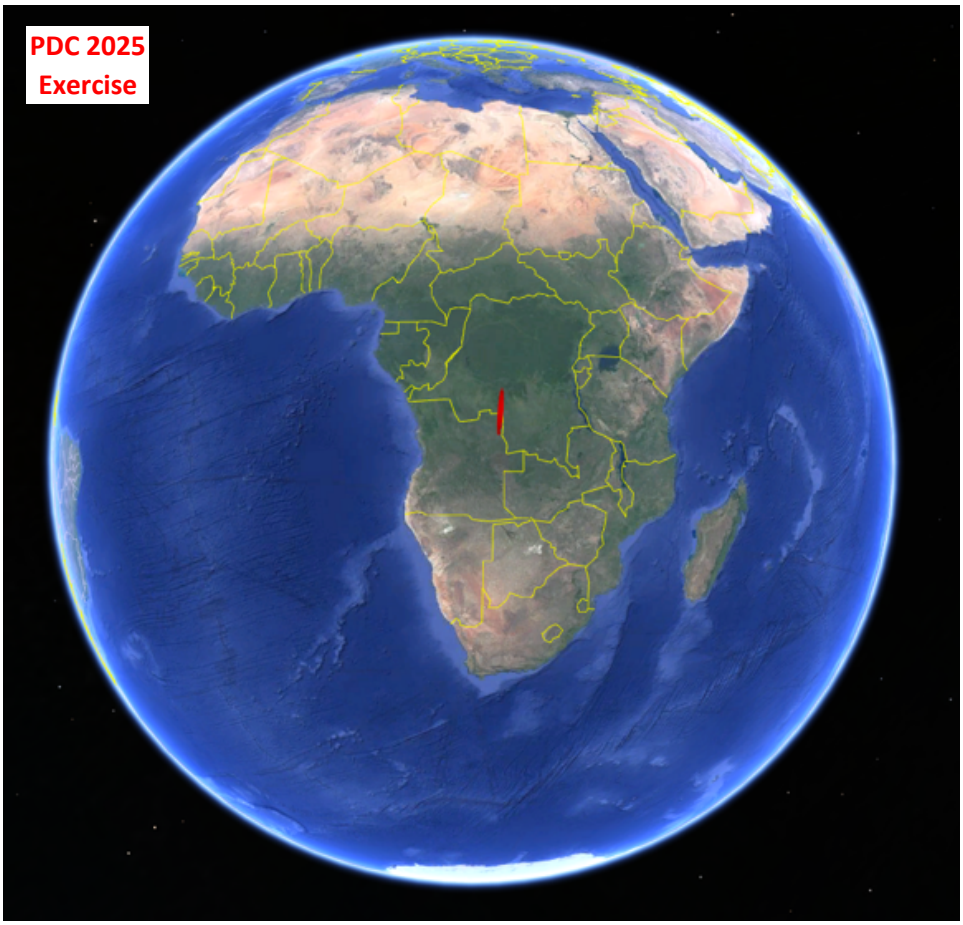
1. Helio-centric orbit diagram relative to Earth orbit
2. Impact risk region maps
3. Impact risk summary chart

1.

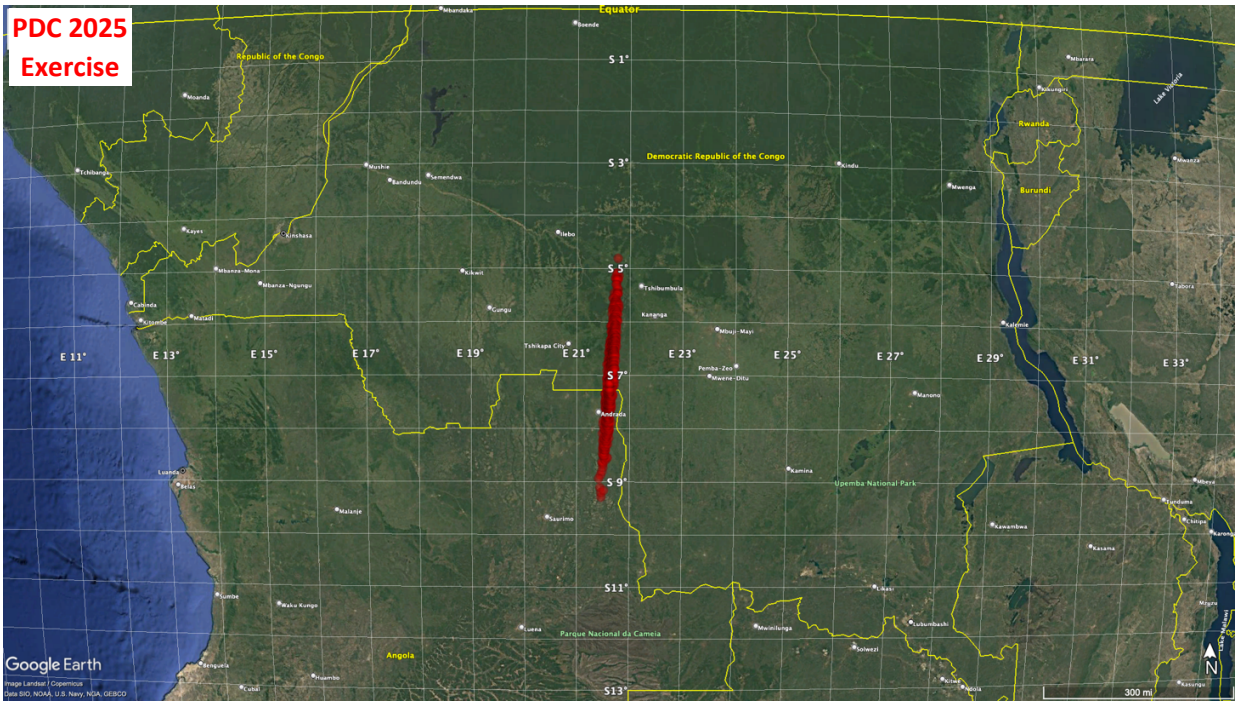

PDC 2025
Exercise
Venus
Mercury
Sun
Mars
Earth
2024 PDC25


PDC 2025
Exercise
Earth
2024pdc25
Sun
Possible impact,
April 24, 2041
Discovery,
June 5, 2024
Ecliptic Y (au)
Ecliptic X (au)
1.5
1.0
0.5
0.0
−0.5
−1.0
−1.0
−0.5
0.0
0.5
1.0
1.5
2.0
2.5

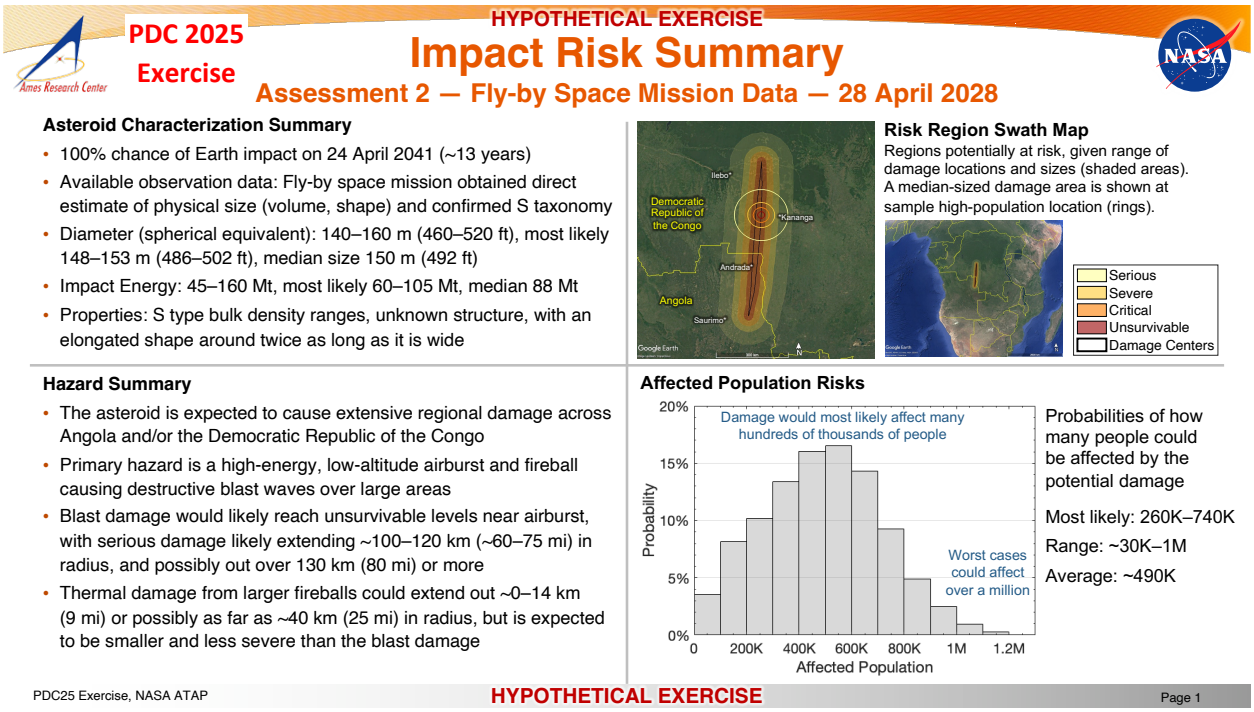
2a.


PDC 2025
Exercise

2b.


PDC 2025
Exercise
Equator
S 1°
S 3°
S 5°
S 7°
S 9°
S11°
S13°
E 11°
E 13°
E 15°
E 17°
E 19°
E 21°
E 23°
E 25°
E 27°
E 29°
E 31°
E 33°
Republic of the Congo
Democratic Republic of the Congo
Rwanda
Burundi
Angola
Upemba National Park
Parque Nacional da Cameia
Google Earth
300 mi
N

3.


PDC 2025
Exercise
HYPOTHETICAL EXERCISE
Impact Risk Summary
Assessment 2 — Fly-by Space Mission Data — 28 April 2028
Ames Research Center
NASA
Asteroid Characterization Summary
• 100% chance of Earth impact on 24 April 2041 (~13 years)
• Available observation data: Fly-by space mission obtained direct estimate of physical size (volume, shape) and confirmed S taxonomy
• Diameter (spherical equivalent): 140–160 m (460–520 ft), most likely 148–153 m (486–502 ft), median size 150 m (492 ft)
• Impact Energy: 45–160 Mt, most likely 60–105 Mt, median 88 Mt
• Properties: S type bulk density ranges, unknown structure, with an elongated shape around twice as long as it is wide
Risk Region Swath Map
Regions potentially at risk, given range of damage locations and sizes (shaded areas). A median-sized damage area is shown at sample high-population location (rings).
Democratic Republic of the Congo
Angola
Kananga
Andrada*
Saurimo*
Serious
Severe
Critical
Unsurvivable
Damage Centers
Hazard Summary
• The asteroid is expected to cause extensive regional damage across Angola and/or the Democratic Republic of the Congo
• Primary hazard is a high-energy, low-altitude airburst and fireball causing destructive blast waves over large areas
• Blast damage would likely reach unsurvivable levels near airburst, with serious damage likely extending ~100–120 km (~60–75 mi) in radius, and possibly out over 130 km (80 mi) or more
• Thermal damage from larger fireballs could extend out ~0–14 km (9 mi) or possibly as far as ~40 km (25 mi) in radius, but is expected to be smaller and less severe than the blast damage
Affected Population Risks
Damage would most likely affect many hundreds of thousands of people
Worst cases could affect over a million
Probability
20%
15%
10%
5%
0%
0
200K
400K
600K
800K
1M
1.2M
Affected Population
Probabilities of how many people could be affected by the potential damage
Most likely: 260K–740K
Range: ~30K–1M
Average: ~490K
PDC25 Exercise, NASA ATAP
HYPOTHETICAL EXERCISE
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