

INTERNATIONAL ASTEROID WARNING NETWORK (IAWN)

POTENTIAL ASTEROID IMPACT NOTIFICATION – HYPOTHETICAL SIMULATION

Date: August 1, 2024
 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: Potential for Impact of Near-Earth Asteroid 2024 PDC25

Impact Probability	1.6% as calculated by NASA JPL CNEOS and ESA NEOCC
Impact Date	24 April 2041
Impact Risk Corridor	Across Eastern Europe, the Mediterranean Sea, and Africa from the Barents Sea to the Cape of Good Hope, across the South Atlantic to the Antarctic coast, and to the South Pacific
Asteroid Size	Most likely in the range 90–160 m (300–520 ft) in diameter, but possibly in the range 50 - 280 meters (160 - 920 feet)
Expected Damage Level if Impact Occurs	Regional blast damage, likely extending up to 110 km from impact location, but possibly as far as 200km. Energy released most likely to be in the range 5–70 Mt, but possibly in the range 3–720 Mt
When will there be new information?	The asteroid will be observable, and information will be updated, through mid-December 2024 and then again starting in August 2025
Technical Information	https://cneos.jpl.nasa.gov/pd/cs/pdc25/

ADDITIONAL DETAILS:

- **Impact Probability:** There is a 1.6% 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). While there is uncertainty in whether the asteroid will impact Earth, if an impact occurs it will be on this date.
- **Impact Risk Corridor:** The impact risk corridor for 2024 PDC25, which is the region of Earth where a potential impact is possible, extends across Eastern Europe, the Mediterranean Sea, and Africa from the Barents Sea to the Cape of Good Hope, across the South Atlantic to the Antarctic coast near the Antarctic Peninsula, and to the South Pacific (see Graphic 2 below).
- **Discovery:** The near-Earth asteroid 2024 PDC25 has been tracked since it was first observed on 5 June 2024 by the Catalina Sky Survey of the University of Arizona near Tucson, Arizona, during near-Earth asteroid survey operations for NASA. Continued observations indicated a non-zero future impact probability that rose to 1% on 27 July. Since 1% is the notification threshold for IAWN, NASA CNEOS and ESA NEOCC coordinated closely with each other and with the Minor

Planet Center and the worldwide network of observatories in the IAWN on technical and observational confirmation before issuing this notification.

- **Future Observability and Updated Information:** Further observations will reduce the uncertainty in the asteroid's trajectory and impact probability. The asteroid will be observable through mid-December 2024, when it will then become unobservable from Earth until August 2025 through mid-November 2026. The asteroid will be quite faint and will likely require large (2-meter and larger) telescopes.
- **Asteroid size:** Most likely in the range 90–160 meters (300–520 feet) in diameter, but could be in the range 50–280 meters (160–920 feet) in size. The size range was estimated using infrared data from the James Webb Space Telescope (JWST) since it was able to point in the asteroid's direction. The size cannot be estimated with further precision without deep space radar observations or without imagery from a spacecraft that can closely approach the asteroid. The asteroid is too distant for radar observations and will not come within range 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 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

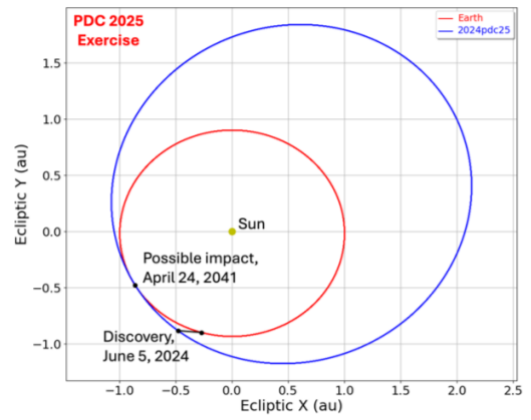
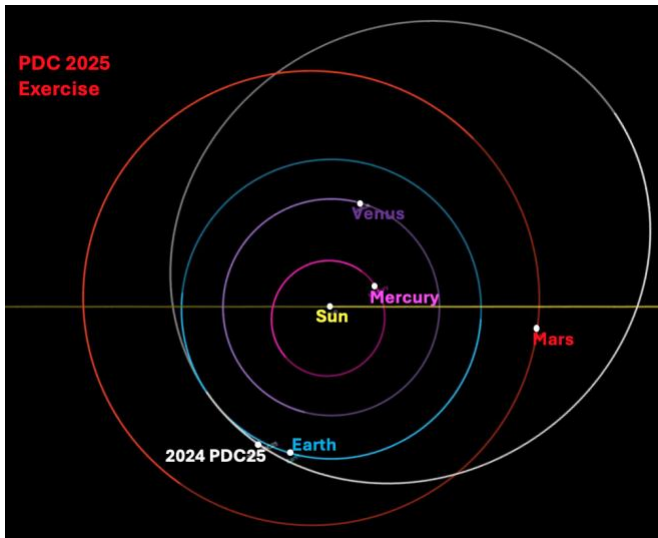
1. Helio-centric orbit diagram relative to Earth orbit
2. Impact risk corridor maps
3. Impact Risk Summary quadrant chart

EXERCISE

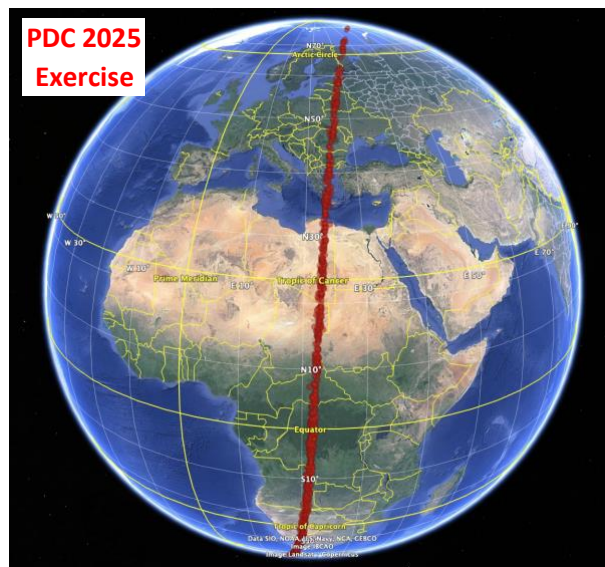
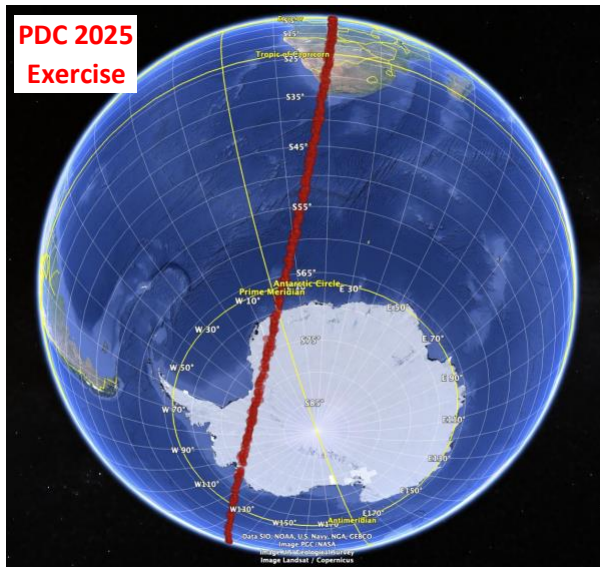
EXERCISE

EXERCISE

1.



2.



EXERCISE

EXERCISE


EXERCISE


3.

HYPOTHETICAL EXERCISE

Impact Risk Dashboard


Assessment 1 — Initial Discovery & SMPAG Notification — 1 August 2024





Asteroid Characterization Summary

- ~1.6% chance of Earth impact on 24 April 2041 (~17 years) from a hazardous asteroid with uncertain size and properties
- Available observation data: Ground-based brightness estimates; JWST estimated diameter and determined S taxonomy
- Diameter: 50–280 m (160–920 ft), most likely 90–160 m (300–520 ft), median size 125 m (412 ft)
- Impact Energy: 3–720 Mt, most likely 5–70 Mt, median 50 Mt
- Properties: S type bulk density ranges, unknown structure



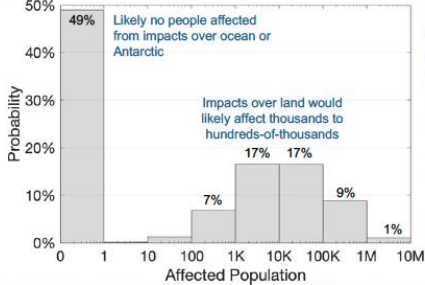
Risk Region Swath Map

Regions potentially at risk, given range of damage locations and sizes. Median-sized damage areas are shown at sample locations.

Hazard Summary

- Large ranges of potential damage sizes, severities, and locations
- Primary hazard is a high-energy, low-altitude airburst and fireball causing destructive blast waves over large areas
- Blast damage could likely reach unsurvivable levels near airburst, with serious damage likely extending ~40–110 km (~20–70 mi) in radius, and possibly out over 200 km (120 mi) or more
- Likely damage sizes could span multiple metropolitan areas or counties, while large damage sizes could span regions or states
- Airbursts in this size range are unlikely to cause significant tsunami, but largest cases could cause inundation damage if near coasts

Affected Population Risks (given Earth-impact)



Probabilities of how many people could be affected by the potential damage

Range: 0–5M ppl
~52K avg. if Earth impact occurs
~830 total avg. risk (with 1.6% Earth-impact probability)

PDC25 Exercise, NASA ATAP
HYPOTHETICAL EXERCISE
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