

## INTERNATIONAL ASTEROID WARNING NETWORK (IAWN)

### POTENTIAL ASTEROID IMPACT NOTIFICATION

Date: 29 January 2025

From: International Asteroid Warning Network (IAWN)

IAWN Coordinating Officer (NASA) for the IAWN Steering Committee

To: Chair (ESA), Space Mission Planning Advisory Group (SMPAG);

Planetary Defence Programme Officer, United Nations Office of Outer Space Affairs (UNOOSA)

Title: Potential for Impact of Near-Earth Asteroid 2024 YR4 on 22 December 2032

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| <b>Impact Probability</b>                     | 1.3% as calculated by NASA JPL Center for NEO Studies and ESA Near-Earth Objects Coordination Centre (NEOCC) with the NEO Dynamic Site (NEODyS)  |
| <b>Date of Potential Impact</b>               | 22 December 2032   |
| <b>Impact Risk Corridor</b>                   | Across the eastern Pacific Ocean, northern South America, the Atlantic Ocean, Africa, the Arabian Sea, and South Asia  |
| <b>Asteroid Size</b>                          | Most likely in the range 40–90 meters (130–300 feet) in size   |
| <b>Expected Damage Level if Impact Occurs</b> | Severe blast damage in the unlikely event of an impact   |
| <b>When will there be new information?</b>    | The asteroid will be observable, and information will be updated, through early April 2025 and then again starting in June 2028 when the asteroid will return to the vicinity of Earth |

#### ADDITIONAL DETAILS:

- **Notification Threshold:** 1% is the notification threshold for IAWN<sup>1</sup>
- **Impact Probability:** There is a 1.3% probability that near-Earth asteroid (NEA) 2024 YR4 could impact Earth on 22 December 2032. While there is large uncertainty in whether the asteroid will impact Earth, if an impact occurs it will be on this date. There is almost a 99% probability that 2024 YR4 will safely pass by Earth on this date.
- **Impact Probability Confirmation:** The impact probability was calculated by the NASA JPL Center for Near-Earth Object Studies (CNEOS) and ESA Near-Earth Objects Coordination Centre (NEOCC) with the NEO Dynamic Site (NEODyS), in coordination with the worldwide network of observatories in the International Asteroid Warning Network (IAWN) submitting observations to the Minor Planet Center (MPC).
- **Future Observability and Update to Impact Probability:** Future observations will reduce the uncertainty in the 2024 YR4's trajectory and impact probability. The NEA will be observable through early 2025 April, after which point it will become too faint to be observable from Earth until 2028 June when the asteroid's approximately 4 year orbit returns it to the vicinity of Earth. The NEA will be quite faint and will likely require large (2-meter and larger) telescopes. By the end of the 2025 observability window, the impact probability could increase to a couple tens of percent or it could more likely drop back below the notification threshold (1% impact probability). Detections of 2024 YR4 in archival images have not been found but searches will continue as the orbit is better constrained.

- **Impact Risk Corridor:** The impact risk corridor for 2024 YR4, which is the region of Earth along which a potential impact could occur, extends across the eastern Pacific Ocean, northern South America, the Atlantic Ocean, Africa, the Arabian Sea, and South Asia
- **Asteroid size:** 2024 YR4 is likely in the range 40–90 meters (130–300 feet). The size cannot be further constrained without deep space radar observations, thermal infrared observations, or imagery from a spacecraft that could closely approach the asteroid. Additionally, the asteroid is now too distant for radar observations and will not come within radar range until 2032.
- **Expected Damage Level if Impact Occurs:** Blast damage could occur as far as 50 km from the impact site, based on the larger end of the size range.
- **Discovery:** 2024 YR4 was first reported on 27 December 2024 by the Asteroid Terrestrial Last Alert System (ATLAS) station of the University of Hawai'i in Chile during NEA search operations for NASA. NASA-funded astronomers and the worldwide network of observatories of the IAWN continued to perform follow-up observations. Detections were also found in archival images taken on 25 and 26 December 2024.

<sup>1</sup>*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>*

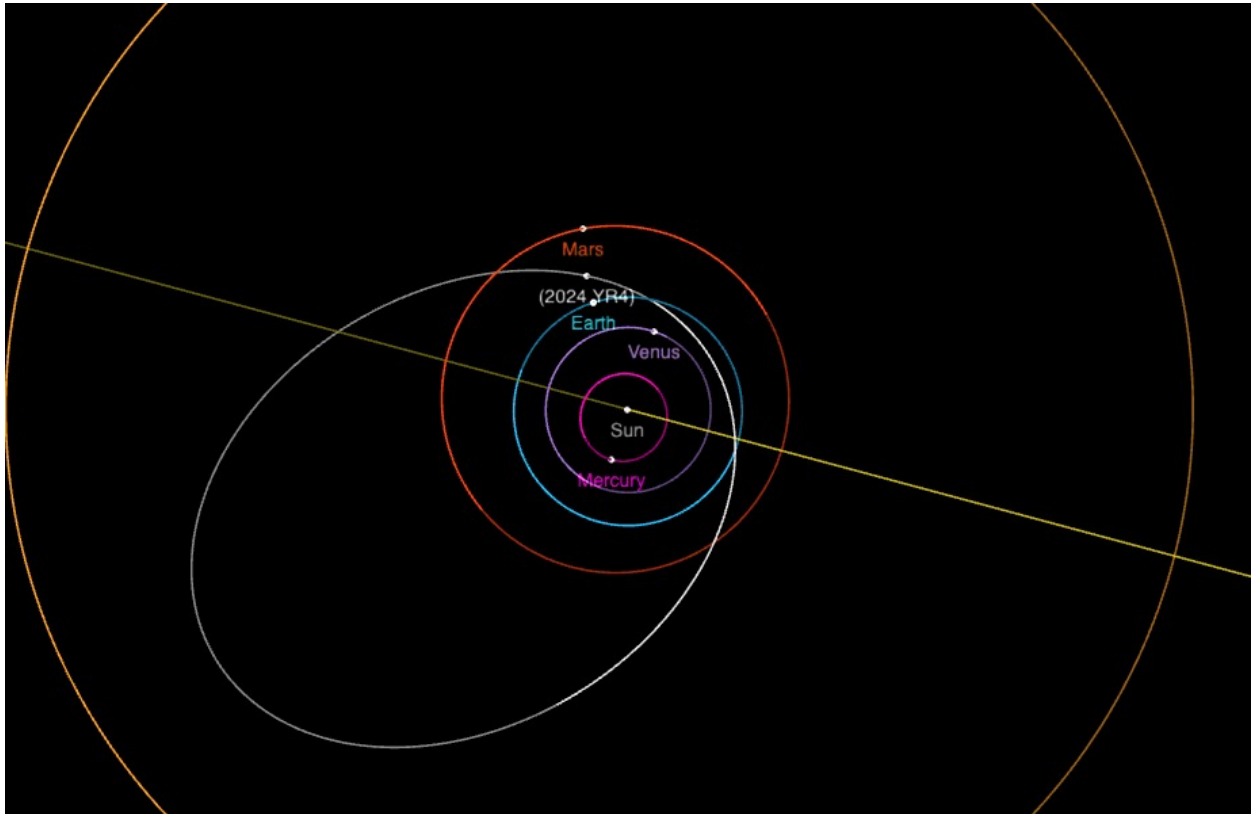
*The Committee in its annual reports (e.g. [A/78/20, para. 119](#)) notes that should a credible threat of impact be discovered by the IAWN, available information would be provided by IAWN and disseminated to all Member States through the Office for Outer Space Affairs. The Office for Outer Space Affairs 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. IAWN also provides information to SMPAG.*

*\*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](#)).*

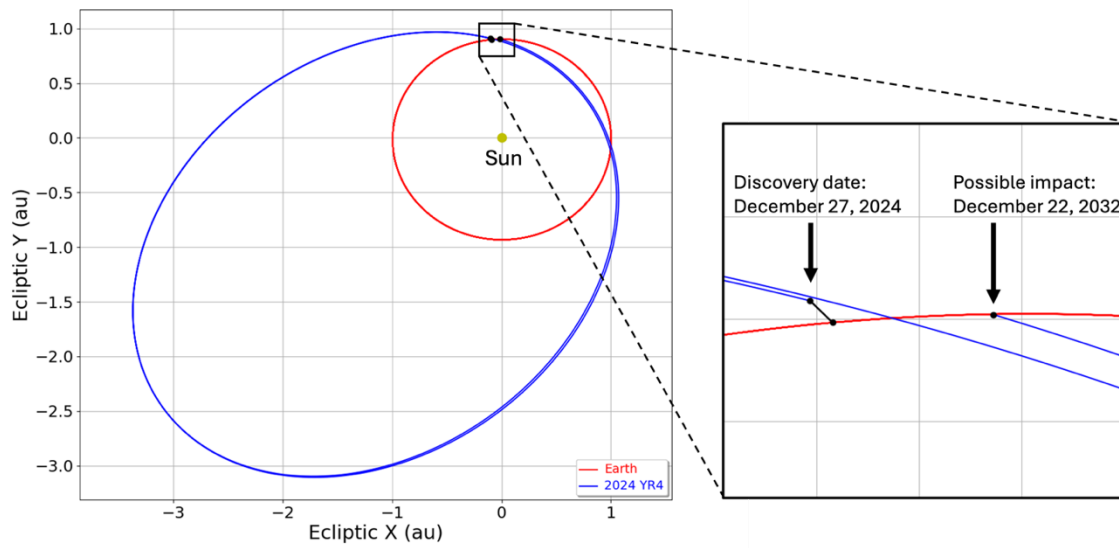
## Graphics and Websites

1. Helio-centric orbit diagram of 2024 YR4 relative to Earth orbit
2. Position relative to Earth orbit of 2024 YR4 at discovery in December 2024 and after two orbits of the asteroid around the Sun on 22 December 2032
3. Possible locations of 2024 YR4 relative to Earth on 22 December 2032 from Monte Carlo modeling

1.



2.



3.

