

→ NEWSLETTER DECEMBER 2024

ESA's NEO Coordination Centre

Current NEO statistics

The discovery rate in November was comparable to last year during the same month.

- Known NEOs: 36 659 asteroids and 123 comets
- NEOs in risk list*: 1715
- NEOs designated during last month: 293
- NEOs discovered since 1 January 2024: 2614

Focus on

On 11-13 November 2024, ESA's Planetary Defence Office hosted an international workshop on improving size determination for potentially hazardous near-Earth objects (NEOs) in Darmstadt, Germany. Experts in photometry, thermal infrared, polarimetry, and stellar occultations discussed methods to refine size and albedo estimates, critical for assessing impact risks. Key outcomes included optimising observation strategies, using advanced models, and expanding polarimetric and thermal infrared capabilities. The event emphasised the need for interdisciplinary collaboration and better data integration to enhance the reliability of NEO size assessments. The workshop was funded by the European Commission and was attended by around 90 people both locally and remotely.

Upcoming interesting close approaches

A large object will fly by in early December.

- 2020 XR is likely the most significant known approacher of the month, with a fly-by on 4 December at roughly 6 lunar distances. It's a large object, about half a kilometre in diameter, and it will reach magnitude 13 during its closest approach.

Recent interesting close approaches

A moderate sized object discovered almost two decades ago had a close fly-by last month.

- 2006 WB was the most notable close approach during the month of November. It also reached magnitude 13, but in this case it was a slightly smaller object of about 100 metres, passing by at a bit more than 2 lunar distances.

News from the risk list

Only one new object reached a moderately prominent position in the risk list, before being fully removed.

- 2024 VE3 reached a cumulative Palermo Scale of about -3.6 during the month, for a few potential impacts from 2037 onward. They were all subsequently excluded with additional observations.

*The risk list of all known objects with a non-zero (although usually very low) impact probability can be found at <https://neo.ssa.esa.int/risk-list>

In other news

- In the early days of December, after the typical information cutoff in our newsletter, but before its publication, we had both a very close flyby and an impactor, showing how effective the worldwide surveys and alert systems have become at detecting these objects. More about these, and the successes of 2024, in the next issue!
- Hera is completing the Near-Earth Commissioning Phase, with a final review planned for 12 December. The first deep-space manoeuvre was completed on 22 November, and Hera is now on the appropriate trajectory for the Mars swing-by scheduled for 12 March 2025. All subsystems and units, both nominal and redundant, have been exercised and tested confirming excellent status of spacecraft. Both CubeSats have been switched on, batteries recharged, and system status analysed confirming excellent health.

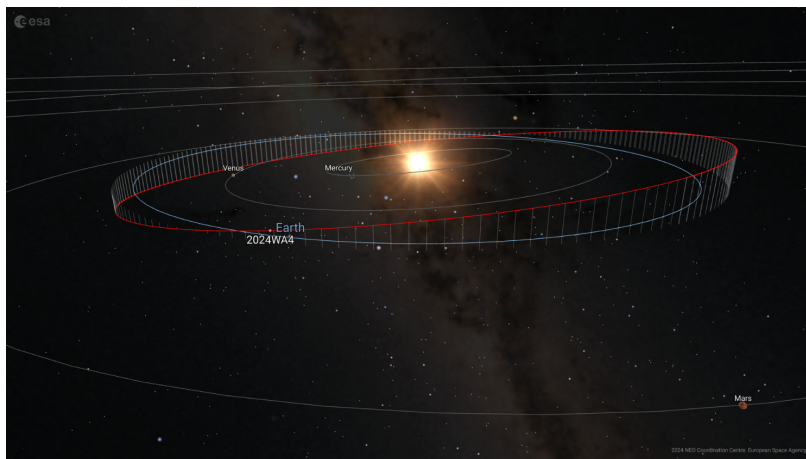
Upcoming events

- 9th IAA Planetary Defense Conference, 5-9 May 2025, Stellenbosch, South Africa
<https://iaaspace.org/event/9th-iaa-planetary-defense-conference-2025/>

List of NEOs discovered by our team in 2024

Since early 2024 our team started using a few hours of time at our two main follow-up facilities to perform some survey observations. The tests were successful, and we found a few new NEOs, listed in this table.

Object name	Absolute magnitude	Size range in m	Semiaxis in au	Eccentricity	Inclination in deg	Observatory code	Station
2024 EL4	24.8	30–70	1.832	0.49	9.5	W57	ESA TBT La Silla Observatory
2024 FS1	23.6	50–120	1.065	0.30	18.3	W57	ESA TBT La Silla Observatory
2024 FX2	23.4	60–130	2.121	0.53	3.5	W57	ESA TBT La Silla Observatory
2024 QA1	21.7	120–280	1.999	0.61	9.2	Z84	Calar Alto-Schmidt
2024 UT7	23.7	50–110	2.001	0.51	8.2	W57	ESA TBT La Silla Observatory
2024 WV1	26.8	12–27	1.585	0.35	8.3	Z84	Calar Alto-Schmidt
2024 WA4	26.8	12–27	1.098	0.06	6.6	Z84	Calar Alto-Schmidt
2024 WY5	24.1	40–90	1.274	0.21	25.0	Z84	Calar Alto-Schmidt



The plot shows the orbit of one of the latest NEOs discovered by our team, 2024 WA4.

The object is unusual because of its nearly circular, low inclination and Earth-like orbit, making it easily accessible by spacecraft. This is also evidenced by its low delta-V with respect to Earth, roughly 3 km/s.

[Credit: ESA / PDO]

Links for more information

Website: <https://neo.ssa.esa.int>

Close approaches page: <https://neo.ssa.esa.int/close-approaches>

Risk List: <https://neo.ssa.esa.int/risk-list>

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