

→ NEWSLETTER JANUARY 2025

ESA's NEO Coordination Centre

Current NEO statistics

Thanks to a fruitful month in December, we end 2024 with more than 3000 new near-Earth asteroids, almost 200 more than the previous year.

- Known NEOs: 37 131 asteroids and 123 comets
- NEOs in risk list*: 1731
- NEOs designated during last month: 472
- NEOs discovered since 1 January 2024: 3087

Focus on

The annual rate of NEO discoveries has flattened out at about 3000 over the past five years, reflecting the reduction in the number of undiscovered objects, especially larger ones. What hasn't flattened out, on the other hand, is our capability to discover smaller asteroids that pass extremely close to our planet. Discovering these small and fast-moving objects is challenging, as they typically become bright enough to be detected only hours before their closest approach or impact. The table and figure on the second page of this newsletter highlight the excellent discovery record of 2024: of the 11 imminent impactors identified to date, 4 were discovered last year, as were 3 of the 4 closest non-impacting approachers. In total, nearly half of the top-15 closest approaching objects have been discovered in the last 12 months alone. Of course, this surge in discoveries is not the result of more asteroids passing close to us. Instead, it reflects our improved ability to discover these objects and quickly determine their incoming trajectory with additional follow-up observations. These results highlight the growing preparedness of the NEO discovery and follow-up community to promptly detect incoming objects, which will prove extremely valuable if, or when, a larger asteroid shows up on our doorstep.

Upcoming interesting close approaches

No NEAs known at the end of 2024 will come closer than 2 lunar distances in January.

Recent interesting close approaches

However, December was rich of very close approachers, including an impactor.

- 2024 XA1 is the eleventh asteroid discovered before its impact with our planet. A tiny object of about a metre, it was discovered about 10 hours before its entry into Earth's atmosphere over a remote area of the Sakha Republic, Russia.
- 2024 XA barely missed our planet just a couple of days earlier, passing by at just 1350 km from the surface, the second-closest non-impacting fly-by ever observed.
- 2024 YW8, 2024 XA6 and 2024 XQ3 also approached the Earth closer than the geostationary ring. The second object was a Chelyabinsk-sized asteroid, and reached magnitude 12 around its closest approach.

News from the risk list

We close the year with a new highest-rated object in our risk list.

- 2024 YR4 is the newest top ranked entry in our risk list. With a diameter between 50 and 100 metres, and an impact probability higher than 1 in 1000 just 8 years from now, it is the first asteroid reaching Torino Scale 1 during the entire year 2024.

*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

- The United Nations General Assembly declared 2029 the International Year of Asteroid Awareness and Planetary Defence to take advantage of the close approach of (99942) Apophis and raise global awareness about asteroids.

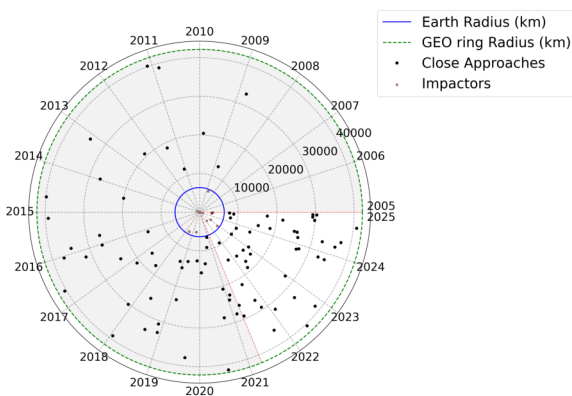
Upcoming events

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

Past known closest approaches

The table presents the list of the closest past approaches of known NEAs, including those that impacted the Earth. The “Incoming perigee” column indicates the perigee of the geocentric trajectory, i.e. the minimum distance from Earth’s centre that the object would have reached if it had not collided with the Earth surface.

Object name	Close approach date	Miss distance in Earth radii	Miss distance in km	Incoming perigee in km	Size range in m	H magnitude
2014 AA	2014-01-02	0	0	~ 600	2–4	30.9
2024 BX1	2024-01-21	0	0	774	1–2	32.7
2022 EB5	2022-03-11	0	0	2893	1–3	31.4
2024 UQ	2024-10-22	0	0	~ 3130	1–2	32.9
2024 RW1	2024-09-04	0	0	3138	1–2	32.1
2024 XA1	2024-12-03	0	0	3424	1–2	32.8
2023 CX1	2023-02-13	0	0	3497	1–2	32.8
2019 M0	2019-06-22	0	0	~ 5300	4–8	29.3
2018 LA	2018-06-02	0	0	5650	2–5	30.5
2022 WJ1	2022-11-19	0	0	5795	0.5–1	33.6
2008 TC3	2008-10-07	0	0	5848	2–5	30.3
2020 VT4	2020-11-13	0.06	370	6740	5–11	28.6
2024 XA	2024-12-01	0.21	1350	7725	1–3	30.8
2024 LH1	2024-06-06	0.27	1700	8098	2–4	30.8
2024 UG9	2024-10-30	0.39	2500	8849	1–2	32.5



The figure presents all known approachers closer than the geostationary ring discovered in the last 20 years. The two sectors each contain 50% of the objects, showing that half of the known close approachers have been discovered in the last 4 years. This highlights again the increased capabilities of the NEO community at discovering small objects coming very close to our planet.

(Please note that, due to similarities in their approach geometry, three of the impactors from 2024 almost coincide both in time and distance from the centre of the Earth, making them difficult to distinguish in the plot.)

[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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