→ NEWSLETTER NOVEMBER 2024

ESA's NEO Coordination Centre

Current NEO statistics

With more than 450 discoveries in a single month, October proves to still be the most prolific month of the year for NEO discoveries.

- Known NEOs: 36 336 asteroids and 122 comets
- NEOs in risk list*: 1694
- NEOs designated during last month: 457
- NEOs discovered since 1 January 2024: 2343

Focus on

The month of October saw the addition of a tenth asteroid to the list of known imminent impactors, but in a slightly unusual way. On the morning of 22 October the ATLAS survey obtained images that included detections of a small object in a high-probability collision course. However, due to the location of the object near the edge of two adjacent fields, the candidate was recognised as a moving object only a few hours later. By the time the astrometry reached the impact monitoring systems, the impact had already happened. However, it was possible to indirectly confirm the impact thanks to prediscovery detections obtained by the Catalina Sky Survey, together with a signal from a flash detected by the meteorological GOES satellite. This set of detections is sufficient to fully confirm the impact trajectory of the object, which we now know collided with our planet in the Pacific Ocean. The asteroid has subsequently been designated 2024 UQ, and it's the third imminent impactor detected in 2024.

Upcoming interesting close approaches

An asteroid discovered almost two decades ago is having a fly-by in November.

- 2006 WB is a large well-known asteroid, with a diameter of about 100 metres, which is expected to reach 2.3 lunar distances on 26 November.

Recent interesting close approaches

Two unusual close approaches happened in October: a tiny object came very close, and a larger one flew-by just a bit farther away.

- 2024 UG9 is a small asteroid, with a diameter between 1 and 2 metres, which was discovered on the morning of 30 October by the Mt. Lemmon station of the Catalina Sky Survey. Follow-up collected by various telescopes, including many operated by our team, showed that the object approached the Earth at about 8850 km from its centre, making it the third-closest non-impacting asteroid fly-by ever observed.
- 2024 TH11 was another peculiar close approacher of the month: on 10 October it came to less than 30 000 km from the Earth centre, and thanks to its diameter of 10 to 20 metres it reached a visual magnitude of almost 10. An object of this size coming so close to our planet is an infrequent occurrence.

News from the risk list

In the last months, no NEOs entered or left the top positions of our risk list.

*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

- ESA's Hera mission successfully launched on 7 October, and it is now on its way for a flyby with Mars in March 2025. The spacecraft performed its first deep-space maneuver, and the CubeSats Milani and Juventas were also switched on. All systems are working nominally.

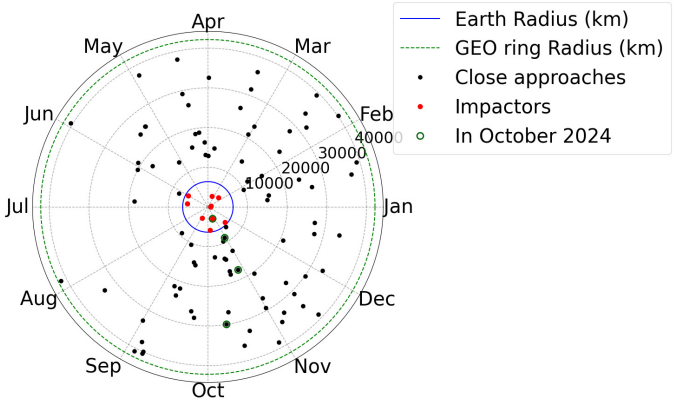
Upcoming events

- EU-ESA Workshop on Size Determination of Potentially Hazardous Near-Earth Objects, 11-13 November 2024, Darmstadt, Germany
  https://indico.esa.int/event/530
- 9th IAA Planetary Defense Conference, 5-9 May 2025, Stellenbosch, South Africa
  https://iaaspace.org/event/9th-iaa-planetary-defense-conference-2025/

List of past impactors

The table below contains the updated list of known asteroids detected in space before impact. It now includes 2024 RW1 and 2024 UQ, which, along with 2024 BX1, are the three impactors discovered this year.

Object name	Impact time in UT	Time between discovery and impact in hours	Impact latitude in deg	Impact longitude in deg	Size range in m	H magnitude	Expected energy in kt of TNT equivalent	Discovery site
2024 UQ	2024-10-22 10:54	2	30 N	136 W	1—2	32.9	0.08	ATLAS-HKO, Haleakala
2024 RW1	2024-09-04 16:39	11	18 N	123 E	1—2	32.1	0.2	Mt. Lemmon Survey
2024 BX1	2024-01-21 00:33	3	54 N	12 E	1—2	32.7	0.04	GINOP-KHK, Piszkesteto
2023 CX1	2023-02-13 02:59	7	50 N	1 E	1—2	32.8	0.04	GINOP-KHK, Piszkesteto
2022 WJ1	2022-11-19 08:27	4	43 N	79 W	0.5—1	33.6	0.009	Mt. Lemmon Survey
2022 EB5	2022-03-11 21:22	2	70 N	8 W	1—3	31.4	0.3	GINOP-KHK, Piszkesteto
2019 MO	~ 2019-06-22 21:30	~ 13	~ 15 N	~ 70 W	4—8	29.3	3.8	ATLAS-MLO, Mauna Loa
2018 LA	2018-06-02 16:44	8	21 S	24 E	2—5	30.5	0.9	Mt. Lemmon Survey
2014 AA	~ 2014-01-02 02:30	~ 22	~ 13 N	~ 30 W	2—4	30.9	0.2	Mt. Lemmon Survey
2008 TC3	2008-10-07 02:45	20	21 N	31 E	4	30.3	0.7	Mt. Lemmon Survey



Polar plot representing the geocentric distance of known close approachers versus the time of the year when the close approach happened, extending from the Earth to the Geostationary ring.

The 10 known impactors are plotted as red points near the centre, with 2024 UQ highlighted. Three other close approachers of the last month, including 2024 UQ9, are also highlighted.

The plot also very nicely shows the increase of discoveries that usually happen every year around September to October, and which is also evidenced by the large number of new discoveries reported in this issue of the newsletter.

[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