

→ NEWSLETTER OCTOBER 2025

ESA's NEO Coordination Centre

Current NEO statistics

With more than 300 new NEOs, September is as usual a very prolific discovery month.

- Known NEOs: 39 460 asteroids and 123 comets
- NEOs in risk list*: 1834
- NEOs designated during last month: 309
- NEOs discovered since 1 January 2025: 2129

Focus on

In the March 2024 newsletter we introduced the different types of Earth co-orbitals. This month we focus on Earth quasi-satellites, which are small NEOs in a 1:1 mean motion resonance with our planet with a peculiar orbital dynamics. Unlike the Moon, quasi-satellites do not orbit Earth directly, but they appear to hover our planet in an Earth co-rotating frame while staying well outside the Hill's sphere of influence.

Quasi-satellites are typically temporary orbits: this dynamical state can last from decades to few centuries, until gravitational perturbations force it to a horseshoe orbit. Because of the proximity to our planet, quasi-satellites are also attractive targets for asteroid exploration missions.

Since roughly a month, Earth has a new known companion: 2025 PN7. This tiny decameter-sized asteroid was discovered by the Pan-STARRS 1 telescope and announced by the Minor Planet Center on 29 August. [Dynamical simulations](#) showed that 2025 PN7 is currently a quasi-satellite of Earth, and it will switch to a horseshoe orbit in about 120 years.

Upcoming interesting close approaches

None of the objects known at the beginning of October will come closer than the Moon or become brighter than magnitude 15 during the month.

Recent interesting close approaches

Two infrequent close approaches happened in September.

- 2025 RM1 was likely the most peculiar close approach of the month of September. A newly discovered object, with an estimated diameter between 30 and 60 metres, reached a minimum distance of about 100 000 km from the Earth on 3 September.
- 2025 FA22, target of an IAWN observing campaign, has been known since March of this year, when it reached a significant ranking in our risk list. All possible impacts are now excluded, but the object came to just a couple of lunar distances on 18 September, reaching magnitude 13 thanks to its diameter of about 200 metres.

News from the risk list

- 2025 SC5 reached the fifth position in our list in September for possible impacts in 2086. It is similar in size to 2024 YR4, which reached global news earlier this year. In this case its impact probability is much lower for now, peaking at just 1 in 2400.
- 2025 SQ4 is a much smaller Cheylabinsk-sized object, but it has a 1 in 250 chance of impacting over the next 100 years.

*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 new interstellar comet 3I/ATLAS will be observed by various interplanetary spacecraft and Martian missions during the next few months. These tests will provide interesting information on the observational capabilities of interplanetary assets to observe high-profile small bodies from unusual viewing angles, which could also become relevant for planetary defence targets.

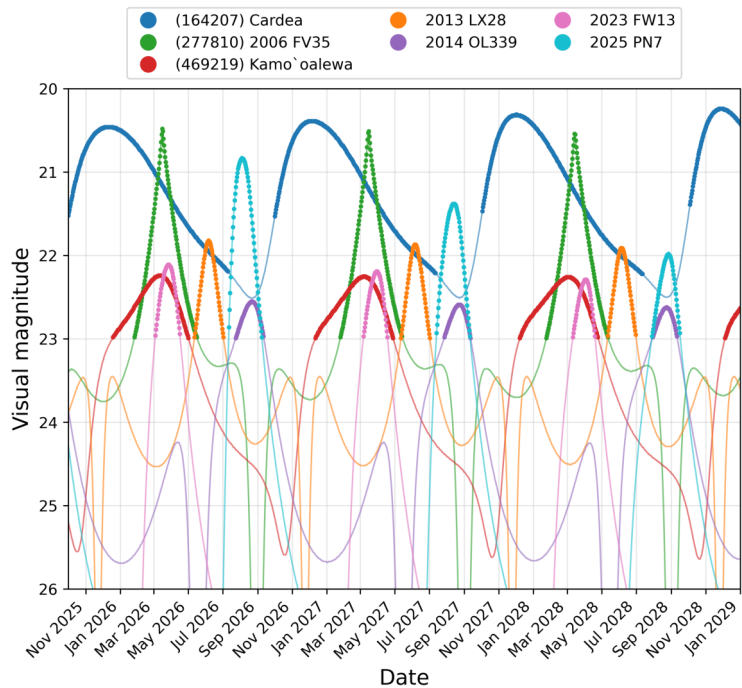
Upcoming events

- Asteroids, Comets, Meteors Conference, 6-10 July 2026, Poznań, Poland
<https://acm2026.eu/>

Visibility window of known Earth quasi-satellites

The table shows the known quasi-satellites of Earth, together with their absolute magnitude and size range. Unlike objects on a horseshoe orbit, quasi-satellites are observable from Earth every year and roughly in the same time window. The observability window, together with the maximum brightness for the next 4 years, are reported in the table. Due to their tiny size, some quasi-satellites remain quite faint, thus requiring semi-professional telescopes to be detected.

Object name	Absolute magnitude	Size range in m	Observability window	Maximum brightness
(164207) Cardea	21.1	163	October - July	20.5
(277810) 2006 FV35	21.7	120 - 270	February - May	20.5
(469219) Kamoʻoalewa	24.0	40 - 90	January - May	22.2
2013 LX28	21.8	110 - 250	May - July	21.8
2014 OL339	22.7	58	August - September	22.5
2023 FW13	25.9	17 - 40	March - May	22.1
2025 PN7	26.3	14 - 30	July - September	20.8



Visual magnitude of the known Earth quasi-satellites from October 2025 to January 2029.

The thick part of the curves highlights the visibility window, which in this case is identified by a visual magnitude smaller than 23 and a solar elongation larger than 60 deg.

[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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