

→ NEWSLETTER OCTOBER 2024

ESA's NEO Coordination Centre

Current NEO statistics

The number of monthly NEO discoveries rose sharply in September, as is often the case after the Northern hemisphere summer months.

- Known NEOs: 35 909 asteroids and 122 comets
- NEOs in risk list*: 1662
- NEOs designated during last month: 434
- NEOs discovered since 1 January 2024: 1881

Focus on

If all systems are go, ESA's Hera mission will be launched from Cape Canaveral on Monday, 7 October 2024, aboard a SpaceX Falcon 9 rocket. The mission, a first in many aspects and a crucial step in planetary defence, is designed to study the binary asteroid (65803) Didymos and its moon Dimorphos. In 2022, NASA's DART mission successfully altered Dimorphos' orbit through a kinetic impact, shortening its period by roughly 33 minutes. After the rendezvous with the Didymos-Dimorphos system in 2026, Hera will deploy two CubeSats, Milani and Juventas, to characterise the asteroid's surface. Moreover, it will conduct detailed observations to analyse the crater left by DART's impact, the internal structure, and surface composition of Dimorphos.

Upcoming interesting close approaches

A well known asteroid will have a fly-by this month.

- (363027) 1998 ST27 is probably the most notable close approach for the upcoming month. It's a 400 metre asteroid, and it will pass by at less than 10 lunar distances on 12 October. Due to its large size, it is expected to reach magnitude 13 around its closest approach.

Recent interesting close approaches

A tiny object hit our planet, while a few more small ones and a large one flew by.

- 2024 RW1, the small asteroid that fell into the Pacific Ocean on 4 September, was of course the closest known approacher of the month.
- 2024 RC42, 2024 RL3, 2024 SV2 and 2024 RX13 were four additional small asteroids that came to within 100 000 km of the Earth in September. They were all quite small, with sizes ranging from 1 to 10 metres. The two largest ones, 2024 RL3 and 2024 SV2, became brighter than magnitude 13 at their closest point.
- 2024 ON, on the other hand, was a much larger 350 metre object that flew by at just 2.6 lunar distances. It gathered some attention due to the short time of just 1.5 months between its discovery and its closest approach.

News from the risk list

A new object reached the top of our risk list, but was subsequently removed.

- 2024 QP2, a newly discovered Chelyabinsk-sized asteroid, reached the top of our risk list in September, for a possible impact 10 years from now. The object remained easily observable for the subsequent weeks, and was removed entirely from the risk list at the end of the month.

*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

- Two comets are attracting some attention this month: C/2023 A3 (Tsuchinshan-ATLAS) and C/2024 S1 (ATLAS). Both have a perihelion distance of less than 1.3 au, but they are not considered near-Earth comets. This is because the definition also requires an orbital period of less than 200 years. These are both long-period comets on near-parabolic orbits, and therefore don't qualify as a near-Earth comet, and by extension as a near-Earth object.

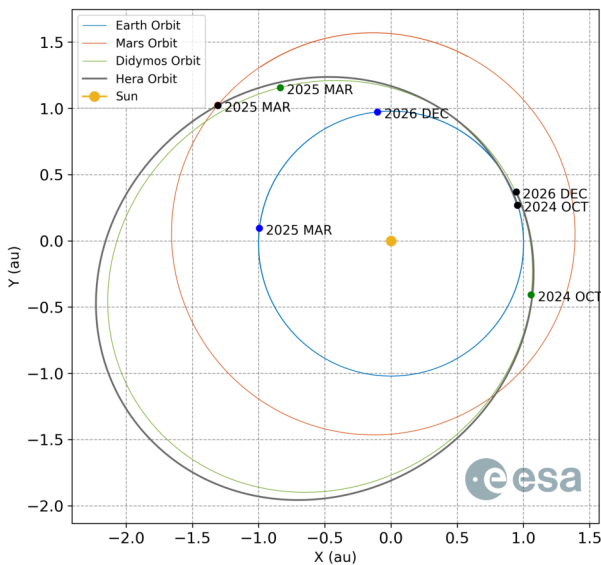
Upcoming events

- 56th Annual Meeting of the AAS Division for Planetary Sciences (DPS), 6-10 October 2024, Boise, USA
<https://aas.org/meetings/dps56>
- 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 binary NEAs

This table lists known NEA binaries with the smallest MOID (Minimum Orbit Intersection Distance) with our planet, up to a MOID of 2 lunar distances. (65803) Didymos, the target of Hera, has a MOID of more than 15 lunar distances, almost 10 times more than the last object in the table.

Object name	MOID in au	MOID in LD
2005 LW3	0.00113	0.440
2020 BX12	0.00129	0.504
2015 TD144	0.00136	0.528
(410777) 2009 FD	0.00187	0.730
(612098) 1999 RM45	0.00316	1.230
(69230) Hermes	0.00431	1.680
(164121) 2003 YT1	0.00460	1.790
(143649) 2003 QQ47	0.00463	1.800
(350751) 2002 AW	0.00488	1.900



The plot displays the trajectory of ESA's Hera spacecraft (in dark gray), from the time of launch next week to the rendezvous with (65803) Didymos two years from now. The orbits of Earth (in blue), Mars (in red), and Didymos (in green) are also shown.

The positions of Earth, Didymos, and the Hera spacecraft on October 2024, March 2025, and December 2026 are marked with a filled circle, along with the corresponding label.

The Hera spacecraft will make a fly-by of Mars around March 2025, using the planet gravity in order to gain speed to reach Didymos.

[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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