

→ NEWSLETTER FEBRUARY 2025

ESA's NEO Coordination Centre

Current NEO statistics

After the usual discovery peak in the fall, about 200 new NEOs were found in January.

- Known NEOs: 37 365 asteroids and 123 comets
- NEOs in risk list*: 1743
- NEOs designated during last month: 196
- NEOs discovered since 1 January 2025: 234

Focus on

The new top entry on our risk list, 2024 YR4, has entered the stage as the first ever NEO to score level 3 in the Torino impact hazard scale. With a diameter between 40 and 90 metres, and an impact probability for an impact in 2032 currently hovering around 1.5%, it is classified as an event “meriting attention by astronomers”, and has therefore triggered intense observational activity in the planetary defence community. Up-to-date information on this object, including daily updates of its estimated impact probability, is always available on our website. In this newsletter, however, we would like to briefly compare it with past cases that rose to prominence and subsequently fell to zero. The most famous case was (99942) Apophis, which reached level 4 in December 2004, shortly after its rediscovery. A few days later its impact probability reached 3%, the highest ever recorded for a significantly large asteroid. Preccovery data from early 2004 quickly clarified that the object was not going to impact in 2029. Unfortunately, for 2024 YR4, careful searches for preccovery detections have so far come up empty handed. Only one other object has so far reached a rating higher than 1 in the Torino scale, with (144898) 2004 VD17 reaching level 2 in February 2006, and remaining at that level for a few months, until dropping first to 1 and then to 0. In addition to these special cases, about 60 other objects have reached level 1 since the scale was defined in 1999, an average rate of 2 to 3 per year: they have all since dropped to zero thanks to additional observations.

Upcoming interesting close approaches

Only one known object will come significantly close in February.

- 2025 BB2 is the only object known at the beginning of January that will come closer than the Moon in February, reaching magnitude 14.

Recent interesting close approaches

One asteroid came very close in January, while all other known ones stayed far away.

- 2025 BP6 came closer than 10 000 km on 26 January 2025, the seventh closest non-impacting asteroid discovered so far.

News from the risk list

The first-ever Torino Scale 3 object is now at the top of our risk list.

- 2024 YR4, the main focus of this newsletter, is the highlight of the period. For more information on this object, including daily impact probability updates using all available observations, please follow our web portal, and the official communications released by ESA and the International Asteroid Warning Network.

*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

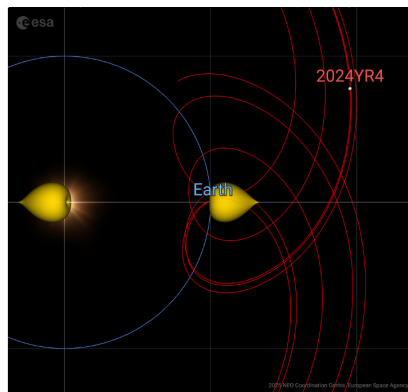
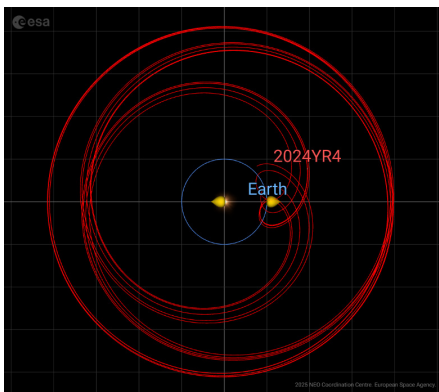
- Apophis T-4 Years: Knowledge Opportunity for the Science of Planetary Defense, 9–10 April, 2025, Tokyo, Japan <https://www.hou.usra.edu/meetings/apophis2025>
- 9th IAA Planetary Defense Conference, 5-9 May 2025, Stellenbosch, South Africa <https://iaaspace.org/event/9th-iaa-planetary-defense-conference-2025/>
- Meteoroids 2025, 7-11 July 2025, Perth, Australia <https://meteoroids2025.gfo.rocks>

Highest-rated historical objects in the risk list

The table lists all objects that reached a Palermo Scale value higher than -0.50 since the definition of the scale 25 years ago. In the more technical Palermo Scale, 2024 YR4 ranks lower than other past cases, mostly due to its smaller size.

Object name	Palermo Scale	Torino Scale	Impact date	Computation date	Currently in risk list
(99942) Apophis	+1.07	4	2029-04-13	2004-12-27	no
(89959) 2002 NT7	+0.18	1	2019-02-01	2002-07-22	no
(29075) 1950 DA	+0.17	Not defined*	2880-03-16	2002-04-05	yes
(144898) 2004 VD17	-0.23	2	2102-05-02	2006-04-05	no
2011 SM68	-0.29	1	2016-10-17	2011-09-30	no
2024 YR4	-0.43	3	2032-12-22	2025-01-31	yes
(410777) 2009 FD	-0.43	Not defined*	2185-03-29	2014-05-30	no
(523662) 2012 MU2	-0.47	1	2015-06-01	2012-06-24	no

*TS is not defined for impacts that would occur more than 100 years in the future.



Left figure: snapshot of the [Synodic Orbit Visualisation Tool](#) showing the ~ 4 year resonance pattern of the trajectory of 2024 YR4 (in red) from December 2012 to December 2032.

Right figure: detail of the vicinity of Earth (orbit in blue), showing the visibility regions for a limiting magnitude of 22, highlighting the progressive approach of 2024 YR4's trajectory to Earth.

[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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