→ NEWSLETTER FEBRUARY 2022

ESA's NEO Coordination Centre

Current NEO statistics

During the month of January we crossed the threshold of 28 000 known NEOs.

- Known NEOs: 28 029 asteroids and 117 comets
- NEOs in risk list*: 1329
- Number of NEOs designated during last month: 265
- NEOs discovered since 1 January 2021: 265

Focus on

Two papers recently published in The Astrophysical Journal Letters and in Nature Communications confirmed that 2020 XL5 is the second known Earth Trojan asteroid. In the latter, Santana-Ros *et al.* (including members of our team) used precovery and follow-up observations to prove that the object will reside around the Sun–Earth's Lagrangian point L4 for the next 4000 years at least. The asteroid is roughly 1 km in size, making it larger than the other known Earth Trojan, 2010 TK7.

Upcoming interesting close approaches

No objects known at the beginning of the month will have any significant close approaches during the month of February.

Recent interesting close approaches

A distant fly-by attracted media attention, while other smaller objects came closer during the month.

- (7482) 1994 PC1 triggered significant media attention during the month of January, because of its moderately close approach just above 5 lunar distances. Due to its size of about one kilometre, it reached magnitude 10 at the closest approach.
- Five newly-discovered objects, 2022 AC4, 2022 BN, 2022 BT, 2022 AY5 and 2022 AV13, all reached a distance of approximately 100 000 km from the Earth in January. They were all very small though, less than 10 metres in diameter.

News from the risk list

Many new objects reached high-ranked positions in our risk list in January.

- 2022 AE1 is a newly-discovered moderately large NEO, roughly 50 to 100 metres in diameter, that reached an impact probability of almost 1 in 1000 for a possible impact in July next year. With a Palermo Scale level of −0.7 (and a Torino Scale level of 1), it was the highest-rated new impactor of the last decade. Observations gathered by our team with the 0.8 m Schmidt telescope at Calar Alto right after the full moon, led to the removal of the object from the risk list.
- 2022 BX1 also briefly reached a Torino Scale level of 1, for an impact in 2061. In this case, the impact probability reached a peak of roughly 1 in 9000. The chances of impact are now significantly lower, due to additional recent observations.
- 2022 AP7 is still high-rated in our risk list. However, in this case the impact probability is extremely low, less than 1 in a million, but the rating is pushed up by its kilometre-level diameter.
- 2022 AY1, 2022 AE2 and 2022 AY2 all also reached high levels in the risk list during 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

- On 24 January, the James Webb Space Telescope successfully arrived in its operational orbit around L2, one of the Lagrange points in the Earth-Sun system.

Upcoming events

Four events are in the list of relevant international meetings in the coming months.

- Apophis T-7 Years: Knowledge Opportunities for the Science of Planetary Defense, 11-13 May 2022, virtual https://www.hou.usra.edu/meetings/apophis2022
- 53rd Lunar and Planetary Science Conference, 7-11 March 2022, The Woodlands, Texas, USA https://www.hou.usra.edu/meetings/lpsc2022
- Europlanet Science Congress (EPSC) 2022, 18-23 September 2022, Granada, Spain https://www.europlanet-society.org/epsc
- 54th Annual Meeting of the AAS Division for Planetary Sciences, 2-7 October 2022, London, Canada https://dps.aas.org/meetings/future

List of objects that reached Torino Scale 1

The table shows the list of the objects which reached Torino Scale 1 in the last 3 years. The impact probability and Palermo Scale are the maximum values reached by the objects.

Designator	Impact date	Impact probability	Palermo Scale	Size range in m	H magnitude	Discovery date	First day with Torino Scale =1	Last day with Torino Scale =1	Removed from the risk list
2022 BX1	2061-07-11	1 / 9000	-2.28	120—270	21.7	2022-01-25	2022-01-29	2022-01-29	Still in risk list
2022 AE1	2023-07-04	1 / 1200	-0.66	50—120	23.5	2022-01-06	2022-01-09	2022-01-14	2022-01-22
2021 TP21	2081-03-27	1 / 50 000	-2.22	240—500	20.2	2021-10-11	2021-10-30	2021-10-30	2021-11-04
2021 TA8	2034-05-03	1 / 9000	-1.45	150—300	21.2	2021-10-03	2021-10-11	2021-10-12	2021-10-12
2020 XR	2028-12-01	1 / 22 000	-1.02	290—600	19.8	2020-12-04	2020-12-08	2020-12-13	2020-12-13
2020 NK1	2093-08-03	1 / 90 000	-1.74	400—900	19.1	2020-07-13	2020-07-17	2020-07-28	2020-08-01
2020 DR2	2081-09-09	1 / 70 000	-1.69	500—1 000	18.8	2020-02-20	2020-02-27	2020-03-08	2020-03-11
2020 BW14	2046-10-14	1 / 40 000	-1.09	600—1 300	18.3	2020-01-28	2020-02-05	2020-02-09	2020-02-10
2020 AN3	2106-01-15	1 / 11 000	-1.88	210—500	20.5	2020-01-14	2020-01-16	2020-01-16	2020-05-29

This beautiful fireball was recorded on the morning of 19 January at 04:09 UTC by the allsky7 camera at the ESA groundstation in Cebreros, west of Madrid (Spain). The camera is installed next to the robotic TBT1 telescope that searches for near-Earth asteroids.

[Credit: ESA/AMS81 AllSky7 Fireball Network, www.allsky7.net]

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