

→ NEWSLETTER OCTOBER 2022

ESA's NEO Coordination Centre

Current NEO statistics

The threshold of 30 000 known NEAs will likely be crossed in October.

- Known NEOs: 29 955 asteroids and 117 comets
- NEOs in risk list*: 1424
- NEOs designated during last month: 422
- NEOs discovered since 1 January 2022: 2138

Focus on

Last month, NEOCC astronomers were very busy with the preparations for the DART impact. Observations of the event were particularly challenging for two main reasons. At the moment of impact, the target was only visible from a very limited part of the world, mainly around the Southern part of Africa. Also, the theoretical models were unclear on what to expect: predictions ranged from no brightening to up to six magnitudes. Since we had only one shot to observe the event, bad weather could ruin any observations. The NEOCC has contracts with telescopes in Les Makes (La Réunion) and in Namibia, but additionally we contacted several observers with telescopes in the region for help. Out of all the telescopes at our disposal, the 0.6 m in Les Makes was the largest and the most ideally located, with the event almost directly overhead. It had recently received a new fast CMOS camera, and our team had been working hard to make sure it was ready for observing the impact. In the end, while the weather turned cloudy over Namibia and parts of Southern Africa, the sky over Les Makes was perfect for the observations. A seasoned team of observers on site under the careful guidance of the NEOCC obtained a fantastic set of images that were transferred to us for analysis, and we were awe-struck by the visible plume of ejected material and the brightening we saw. The video of our images of the impact is available on our [portal](#), while the scientific analysis of the observations is still ongoing.

Upcoming interesting close approaches

No object known at the end of September will have a relevant approach in October.

Recent interesting close approaches

Two tiny objects and three slightly larger ones became close and bright in September.

- 2022 SK4, roughly 3 m in size, reached a distance of just 15 000 km from the Earth centre, ranking among the 20 closest approaches ever observed.
- 2022 RT1, an even smaller object, also came closer than the geostationary ring.
- 2022 SF19, 2022 SD9 and 2022 RB2 also came closer than the Moon, reaching magnitude 13 at close approach. They were 5 to 10 metres in size.

News from the risk list

The highest-rated object in our risk list is finally gone.

- 2010 RF12, the highest-rated object for most of the past decade, has been removed thanks to a recovery by David Tholen in Hawaii, confirmed by our team with VLT.
- 2022 QX4 reached a Palermo Scale value of almost -2 in September. However, archival data located by amateur astronomers in publicly available archives, including [our own](#), led to the complete removal of all impact solutions.

*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

- A new preprint published on [arXiv](#) presents a candidate detection of the progenitor of a fireball in the ATLAS image archive. If confirmed, it would be the sixth impactor for which observations while still in space have been found.

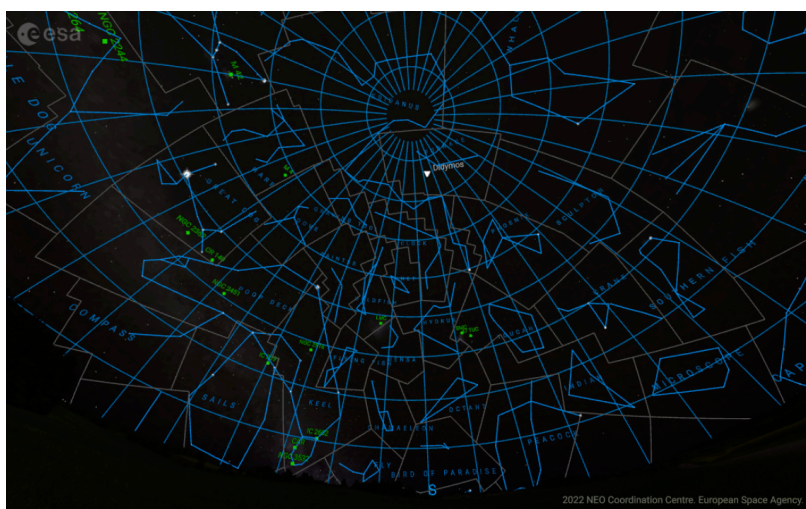
Upcoming events

- 54th Annual Meeting of the AAS Division for Planetary Sciences, 2-7 October 2022, London, Canada
<https://aas.org/meetings/dps54>
- Exploration of Asteroids Symposium at the 2nd International Stardust Conference, 7-11 November 2022, Noordwijk, The Netherlands
<http://www.stardust-network.eu/starcon2/>
- EC-ESA Workshop on NEO Imminent Impactors Warning Coordination, 12-14 December 2022, Darmstadt, Germany
<https://indico.esa.int/event/422/>
- 2nd ESA NEO and Debris Detection Conference, 24-26 January 2023, Darmstadt, Germany
[https://neo-sst-conference.sdo.esa.int/](https://neo-sst-conference.sdo.esoc.esa.int/)

Current risk list

The table shows the top ten objects currently in our risk list, after the removal of 2010 RF12 from the first position.

Designator	Size range in m	Date of possible impact	Impact probability	Palermo scale	Torino scale	Impact velocity in km/s
1979 XB	500–1200	2056-12-12 21:39	1 / 3 500 000	-3.22	0	27.54
2000 SG344	29–70	2071-09-16 00:57	1 / 1100	-3.37	0	11.27
2008 JL3	23–50	2027-05-01 09:06	1 / 7000	-3.66	0	14.01
2021 GX9	22–50	2032-04-16 21:51	1 / 20 000	-3.67	0	20.17
2020 FA5	160–400	2110-10-29 06:46	1 / 600 000	-3.74	0	29.34
2018 JD	12–27	2067-05-08 13:22	1 / 800	-3.82	0	13.76
2011 DU9	12–27	2046-02-23 20:45	1 / 1400	-3.90	0	14.21
2012 QD8	60–140	2047-03-08 23:18	1 / 170 000	-3.90	0	23.58
2005 QK76	24–50	2030-02-26 08:15	1 / 30 000	-4.05	0	22.66
2017 WT28	6–14	2104-11-24 16:31	1 / 150	-4.11	0	12.04



Location of the Didymos system in the sky above La Réunion at the time of the DART impact, highlighting the ideal location of the site.

The image has been generated with our recently released Sky Chart Display Tool, a component of the [NEO Toolkit](#) now available on our portal.

[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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