

→ NEWSLETTER JULY 2022

ESA's NEO Coordination Centre

Current NEO statistics

Current NEO statistics are provided below.

- Known NEOs: 29 162 asteroids and 118 comets
- NEOs in risk list*: 1377
- NEOs designated during last month: 124
- NEOs discovered since 1 January 2022: 1357

Focus on

The computation of the orbit of an asteroid or a comet is not just the determination of its six orbital elements, but also of the uncertainties that are associated to each of them. This is typically called a "covariance matrix". This approach, while mathematically ideal, results in an "uncertainty" that is expressed by 21 different numbers, and does not immediately convey the information of how accurate or inaccurate a certain orbit is. For this reason, single-valued uncertainty parameters have been developed and discussed in the literature. Among them, the probably most commonly used is the so-called "U parameter", a metric that combines the uncertainty of an object's perihelion time and orbital period. It provides a single number that quantifies the uncertainty of the orbit. This parameter ranges from about 10 for a poorly determined orbit (e.g., a new discovery) to about zero for a well-characterised one (e.g., a numbered asteroid). You can now find this quantity on our web portal too, in the section dedicated to each asteroid.

Upcoming interesting close approaches

Only one moderately close approacher is known today, but as usual a few others will likely be discovered during the month.

- 2022 MB₃ is the closest known approacher for July, a 15 metre asteroid flying by at 2 lunar distances on the first day of the month.

Recent interesting close approaches

Only two known objects came closer than the Moon in June.

- 2022 LU₂ and 2022 MN₁, both about 10 metres in size, are the only two known objects that came closer than the Moon during the past month, on June 8 and 28 respectively.

News from the risk list

The highest-rated asteroid of our risk list has been removed thanks to observations obtained by our ESA-ESO collaboration.

- The main risk list development of the month is the recovery and subsequent removal from the list of 2021 QM₁, the object that previously occupied the first position of our list. The removal is due to a challenging observation obtained by our team in collaboration with ESO, using ESO's VLT in Chile. With almost 2 hours of observation time VLT was able to successfully detect the object at a magnitude fainter than 27, a record breaking observation for the field of NEOs.

*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 large number of initiatives related to Asteroid Day were held globally on 30 June, including the live event in Luxembourg and many other presentations in various countries.

Upcoming events

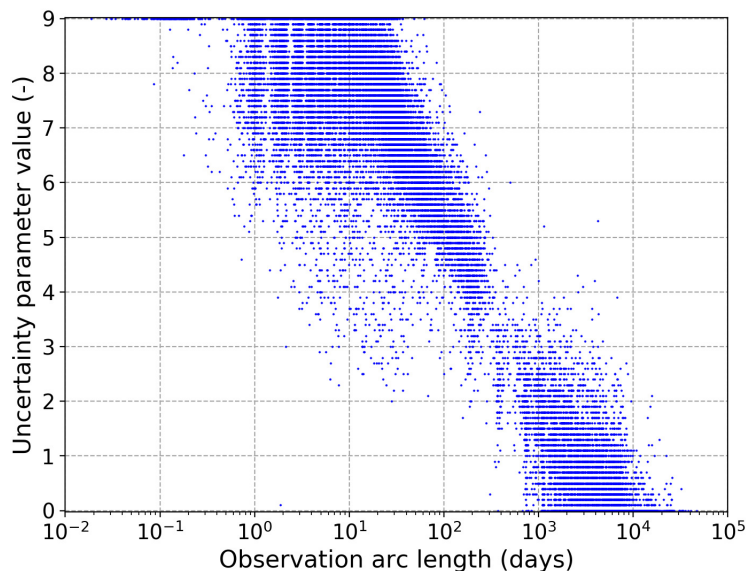
A fireball meeting will happen in summer, and the usual EPSC and DPS meetings will be held in the fall.

- Workshop #3 on Fireballs and their Detection, 13-14 August 2022, Glasgow, UK
<https://www.europlanet-society.org/workshop-3-on-fireballs-and-their-detection/>
- Europlanet Science Congress (EPSC) 2022, 18-23 September 2022, Granada, Spain
<https://www.epsc2022.eu>
- 54th Annual Meeting of the AAS Division for Planetary Sciences, 2-7 October 2022, London, Canada
<https://dps.aas.org/meetings/future>

Current risk list

The table shows the top ten objects currently in risk list.

Designator	Size range in m	Date of possible impact	Impact probability	Palermo scale	Torino scale	Impact velocity in km/s
2010 RF12	6–13	2095-09-05 23:49	1/14	-3.07	0	12.29
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	1/1 150	-3.37	0	11.27
2008 JL3	23–50	2027-05-01 09:06	1/7 000	-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	1/1 400	-3.90	0	14.21
2012 QD8	60–140	2047-03-08 23:18	1/170 000	-3.90	0	23.58
2005 QK76	24–55	2030-02-26 08:15	1/30 000	-4.05	0	22.66



The figure summarises how the uncertainty parameter U correlates with the length of the observed arc for all asteroids in our database.

The trend is roughly linear in a semi-logarithmic scale, but some objects are evident as clear outliers. These are likely asteroids that got a particularly dense observational coverage at geometries that favored the orbit determination process, such as during close fly-bys observed on both sides of their encounter with the Earth.

The behavior is similar to what was determined by a previous ESA [study](#) performed by IMCCE – Observatoire de Paris.

[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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