

## ESA's NEO Coordination Centre

### Current NEO statistics

After only 4 months this year, we already have more than 1000 new NEO discoveries.

- Known NEOs: 28 849 asteroids and 117 comets
- NEOs in risk list\*: 1363
- NEOs designated during last month: 233
- NEOs discovered since 1 January 2022: 1045

### Focus on

ESA's PDO is not only looking after space rocks while they are in space. Some of them actually collide with the Earth while orbiting the Sun and produce spectacular fireballs in the atmosphere. In rare cases, fragments even reach the surface. ESA contributes four cameras to the so-called **AllSky7** fireball camera network, one of the various systems consisting of several dozen cameras in Europe and the USA detecting these fireballs and observing their trajectory through the atmosphere. One of the ESA cameras is positioned at ESA's Cebreros ground station, west of Madrid; another ESA camera was recently placed strategically in Casas de Millán (Badajoz, Spain), between the Cebreros camera and an already existing one in Portugal. One is close to ESA's establishment ESTEC in the Netherlands, and one in the Bavarian Forest in Germany. In one AllSky7 system, seven individual cameras monitor the entire sky 24/7 and automatically detect moving objects in their field of view. On several occasions, observations from the cameras could be matched with detections made by other networks and resulted in successful determinations of the flight path through the atmosphere and the interplanetary orbit.

### Upcoming interesting close approaches

Two large numbered objects will have distant approaches in May.

- (7335) 1989 JA is a kilometre-sized asteroid that will approach Earth at about 10 lunar distances on 27 May. It will reach magnitude 12 at close approach.
- (467460) 2006 JF42 is about half the size, and will approach to 15 lunar distances.

### Recent interesting close approaches

A tiny object was found before a very close fly-by.

- 2022 GQ5 had a fly-by just 12 500 km above the Earth surface on 8 April. It is a tiny object, less than 2 metres in diameter, but despite the small size it was found when it was still incoming, at about one lunar distance.

### News from the risk list

This month we briefly discuss the outcome of an ESA-funded search for precoveries.

- A team of astronomers from the University of Groningen in the Netherlands, funded by an ESA contract, used the archive of the OmegaCAM instrument of ESO's VLT Survey Telescope to locate precovery detections of objects in our risk list. The team successfully found detections of four listed objects (see figure in the next page), and extracted high-precision Gaia-based astrometry. When added to our impact monitoring computations, the extra data led to the removal of three of the objects, but a slight risk increase for a fourth tiny one (2021 FM2).

\*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 annual Asteroid Day Live events will be broadcast from Luxembourg and elsewhere on June 30. You can read about the initiative, schedule of events, and speakers at <https://asteroidday.org/>.
- A new release of fireball data from U.S. government sensors has been made available on NASA JPL's website, including lightcurve information for many events.

## Upcoming events

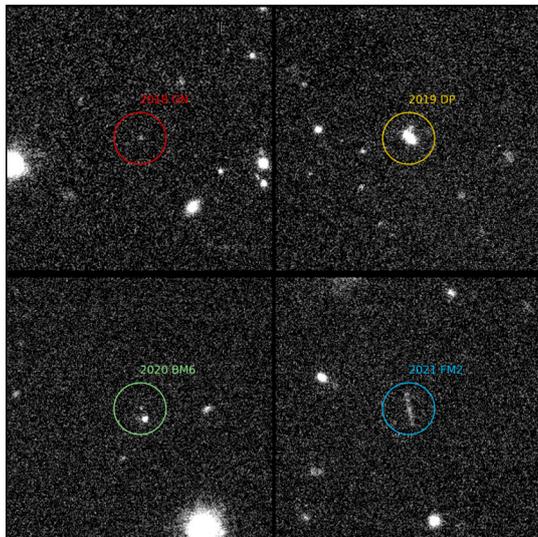
Four events are on the list of relevant international meetings in the coming months.

- Apophis T-7 Years: Knowledge Opportunities for the Science of Planetary Defense, 11-13 May 2022, virtual <https://www.hou.usra.edu/meetings/apophis2022>
- Hera Mission International Workshop, 30 May - 3 June 2022, Nice, France <https://www.heramission.space/heraworkshop2022>
- Europlanet Science Congress (EPSC) 2022, 18-23 September 2022, Granada, Spain <https://www.epsc2022.eu>
- 54<sup>th</sup> Annual Meeting of the AAS Division for Planetary Sciences, 2-7 October 2022, London, Canada <https://dps.aas.org/meetings/future>

## Smallest asteroids discovered in space

The table shows all known asteroids with an absolute magnitude fainter or equal to 32. They correspond to a diameter of roughly one meter, close to what is typically seen as the fireball regime.

| Object name | Size range<br>in m | H magnitude | Discovery date | Discovery site      |
|-------------|--------------------|-------------|----------------|---------------------|
| 2008 TS26   | 0.6–1.4            | 33.2        | 2008-10-09     | Mt. Lemmon Survey   |
| 2021 B0     | 0.7–1.5            | 33.0        | 2021-01-17     | Mt. Lemmon Survey   |
| 2020 CW     | 0.8–1.8            | 32.6        | 2020-02-01     | Mt. Lemmon Survey   |
| 2019 AS5    | 0.9–2.0            | 32.4        | 2019-01-08     | Mt. Lemmon Survey   |
| 2019 UN13   | 1.0–2.2            | 32.2        | 2019-10-31     | Catalina Sky Survey |
| 2011 CQ1    | 1.1–2.4            | 32.0        | 2011-02-04     | Catalina Sky Survey |
| 2017 UL6    | 1.1–2.4            | 32.0        | 2017-10-27     | Mt. Lemmon Survey   |



Images of the four risk list asteroids detected by the University of Groningen team in the OmegaCAM archive.

The detections are all very clear and have high signal-to-noise ratios. They provided excellent astrometry that helped the risk assessment for these bodies.

[Credit: Teymoor Saifollahi (RUG) / ESO / VST]

## 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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