

ESA's NEO Coordination Centre

Current NEO statistics

The number of discovered NEAs in this year is already over 2000 objects.

- Known NEOs: 23 768 asteroids and 111 comets
- NEOs in risk list*: 1093
- Number of NEOs designated during last month: 345
- NEOs discovered since 1 January 2020: 2085

Focus on

On 17 September the Pan-STARRS 1 telescope in Hawaii discovered a new NEO in an interesting orbit, quite similar to the Earth's. The object, now designated 2020 SO, is heading towards our planet. It will soon encounter it with a very low relative velocity, so low that the Earth will temporarily capture it and keep it in orbit for a few months. Earlier this year another asteroid, 2020 CD₃, was also found in a captured orbit around the Earth, a state that is informally called "minimoon". Will 2020 SO be our next minimoon? Dynamically yes, because it will indeed be captured by our planet. However, we are still not sure that this object is actually an asteroid. It may also be a piece of artificial hardware, such as the upper stage of a rocket from decades ago, which entered into heliocentric orbit and is now coming back towards the Earth. There are only two ways to know for sure: one is to observe its colour or spectrum and compare it with natural and artificial objects, the second is to carefully study its trajectory and attempt to detect the push of solar radiation acting on it. If we see evidence of a significant force, then we know that the object is light, and therefore likely an empty piece of hardware of man-made origin. New data is being acquired, and we should soon be able to determine the true nature of this interesting object.

Upcoming interesting close approaches

No known object will come closer than the Moon during the month of October.

Recent interesting close approaches

Eleven known objects came closer than the Moon in September.

- 2020 SW is a tiny asteroid of about 5 meters that had a very close approach on 24 September, flying by the Earth at less than 22 000 km from its surface.

News from the risk list

An object increased its ranking in our risk list, while another one was removed.

- 2020 OB is a new entry in the top positions of our risk list. The object had been discovered back in July, and scored a moderate value in Palermo Scale. However, the addition of archival observations reported in September increased its rating, and the object is now at the fourth position of our risk list.
- 2020 PG6, another object that entered the top positions of our list during the summer months, has been fully removed from the list thanks to a NASA-supported challenging twilight observation performed with the Lowell Discovery Telescope and in collaboration with our team.

* The risk list of all known objects with a non-zero (although usually very low) impact probability can be found at <http://neo.ssa.esa.int/risk-page>

In other news

- We are releasing our fifth PDO riddle with this newsletter and with a deadline on 25 October. Find the release information here: <http://neo.ssa.esa.int/neocc-riddles>.
- Two targets have been selected by JAXA to extend the mission of Hayabusa-2. The objects are 2001 AV43 and 1998 KY26, both measuring several tens of meters and being fast rotators.
- NASA's OSIRIS-REx will perform its first attempt of its Touch-And-Go (TAG) sample collection event over Bennu on 20 October.

Upcoming events

Relevant international meetings over the next months.

- Apophis T-9 Years, 4-6 November 2020 (virtual event)
<https://www.hou.usra.edu/meetings/apophis2020/>

List of designated objects temporarily captured by the Earth

List of designated objects temporarily captured by the Earth, with the time span during which the gravitational binding energy of the object with respect to the planet was negative.

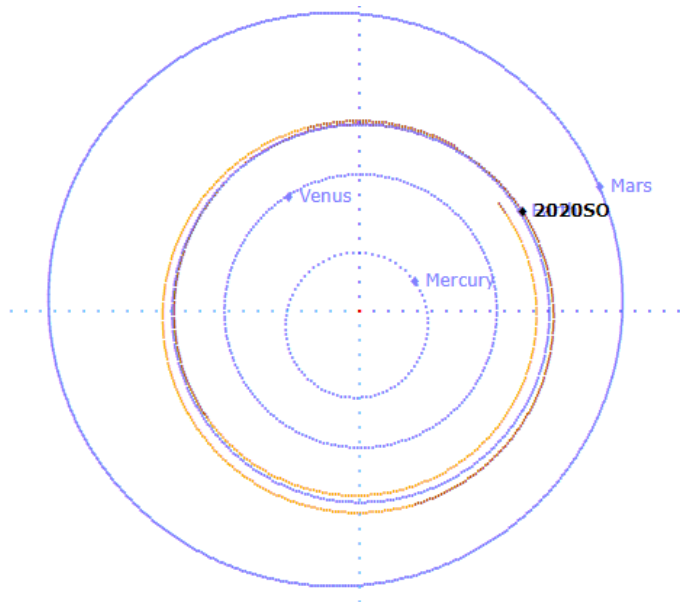
Object name	Captured on	Leaving on	Discovery date	Discovery site	H magnitude	Size range in m
1991 VG	1992-02	1992-03	1991-11-06	Spacewatch	28.2	6-14
2006 RH120	2006-06	2007-09	2006-09-14	Catalina Sky Survey	29.6	3-7
2020 CD3	~ 2017	2020-05	2020-02-15	Mt. Lemmon Survey	31.7	1-3
2020 SO	2020-10	~ 2021-04	2020-09-17	Pan-STARRS 1	28.4	5-12

Links for more information

Website: <http://neo.ssa.esa.int>

Close approaches: <http://neo.ssa.esa.int/close-approaches>

Risk List: <http://neo.ssa.esa.int/risk-page>



The orbit of 2020 SO before and after the upcoming interaction and temporary capture by the Earth.

The plot clearly shows that the orbit is extremely Earth-like, the result of the low relative velocity between the object and the Earth.

This behavior is also commonly seen on pieces of artificial hardware that entered a heliocentric orbit, and it might be suggestive of a man-made origin for 2020 SO.

[Credit: ESA NEOCC]

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