

## space situational awareness

### → NEAR-EARTH OBJECTS

#### Current NEO statistics

Last month we crossed the threshold of 16 000 known NEOs.

- Known NEOs: 16 068 asteroids and 106 comets
- NEOs in risk list\*: 615
- New NEO discoveries since last month: 101
- NEOs discovered since 1 January 2017: 659

#### Focus on

In the acronym "NEO" the final letter O stands for "Object", because the group is generally understood to include both asteroids and comets that come close to Earth. It is however interesting to note that most aspects of the NEO discovery process we commonly associate with asteroids happened first for comets, which being brighter and more recognizable have been routinely discovered for centuries in the past. The first NEO discovered was therefore not (433) Eros, but comet 1P/Halley itself. In the 16th century, the discovery comet D/1770 L1 (Lexell), with its very close approach to Earth, was the first time when astronomers realized that small bodies can be dangerous to Earth. More recently, 41P/Tuttle-Giacobini-Kresak, discovered in 1858, rediscovered by chance during "visual surveys" in 1907 and 1951, and then recovered with a targeted search in 1962, replicates the recovery and follow-up process that is nowadays common for the thousands of near-Earth asteroids discovered every year.

#### Upcoming interesting close approaches

A half-kilometre object will come moderately close at the end of May.

- 2017 CS a roughly half-kilometre object that will come to about 8 lunar distances at the end of May, reaching magnitude 13.5.

#### Recent interesting close approaches

A very close fly-by of a tiny (roughly 5 m) object happened in early April.

- 2017 GM is a ~5 m object that came to 9 900 km from the surface of the Earth on 4 April, the sixth closest approach of a known NEO ever recorded.
- 2014 JO25 is a kilometre-sized asteroid that came to about 5 lunar distances on 19 April, reaching magnitude 11 during the close approach.

#### News from the risk list

Two large asteroids appeared on our risk list in April.

- 2017 HT2 is a large NEO, about a kilometre in diameter, discovered on 20 April by the Catalina Sky Survey. It currently ranks at the top of our list for impacts in the next century, with a Palermo Scale of  $-2.2$ . The high rating is mostly due to its large diameter, since its impact probability is less than 1 in 100 000.
- 2017 GM7 is another large object, about 800 metres in diameter, discovered earlier in April by the Pan-STARRS project. It also scored high in our risk list, but has subsequently been removed thanks to additional observations.

\* The risk list of all known objects with a non-zero (although usually very low) impact probability can be found at <http://bit.ly/neorisklist>

## In other news

- Final presentations of a number of activities carried out within the framework ESA's SSA-NEO segment have been given during an event on 30 March 2017 at ESRIN.
- On 31 March many European NEO observers gathered at ESRIN for presenting their activities and their contribution to the NEO follow-up observations coordinated by ESA. An open discussion on the role of Europe for present and future NEO observational efforts concluded the day.
- The apparition of near-Earth comet 41P/Tuttle-Giacobini-Kresak was remarkably bright: at the beginning of the month of April it reached a visual magnitude just below the threshold for naked-eye objects.

## Upcoming events

The venue of the next ACM meeting has been announced. It will be held in Flagstaff in June 2020.

- IAA Planetary Defense Conference, 15–19 May 2017, Tokyo, Japan  
<http://pdc.iaaweb.org/>
- CELMEC VII, 3–9 September 2017, San Martino al Cimino (VT), Italy  
<http://adams.dm.unipi.it/~simca/celmecVII/index.html>
- Asteroids, Comets and Meteors (ACM 2020) Conference, 14–19 June 2020, Flagstaff, USA

## Brightest fly-bys of next century

List of NEOs which are expected to become brighter than magnitude 8 at close approach during the next century. Miss distances are from the centre of the Earth.

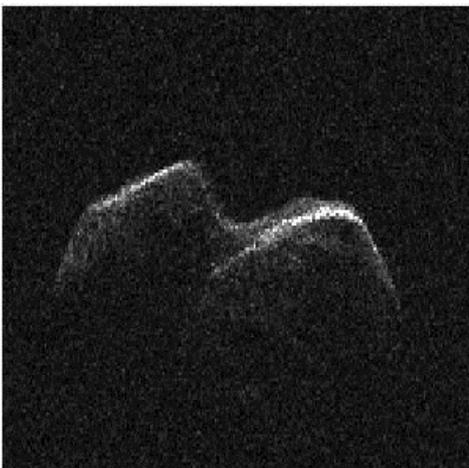
Object name	Close approach date	Miss distance in lunar distances	Miss distance in Earth radii	Miss distance in km	Size in m	Maximum brightness
(99942) Apophis	2029-04-13	0.10	6	38 000	375	2.8
(52768) 1998 OR2	2079-04-16	4.61	278	1 772 000	~ 2 500	6.6
(153814) 2001 WN5	2028-06-26	0.65	39	249 000	932	6.7
(433) Eros	2056-01-24	58.29	3 513	22 407 000	23 300	7.3
(137108) 1999 AN10	2027-08-07	1.01	61	390 000	~ 1 100	7.3
(66391) 1999 KW4	2036-05-25	6.04	364	2 323 000	1 600	7.9
(159857) 2004 LJ1	2038-11-16	7.72	465	2 967 000	3 070	8.0
(415029) 2011 UL21	2089-06-25	6.93	418	2 665 000	~ 3 000	8.0

## Links for more information

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

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

Risk List: <http://neo.ssa.esa.int/web/guest/risk-page> or <http://bit.ly/neorisklist>



Asteroid 2014 JO25 imaged by the Goldstone radar in California, USA.

The contact binary nature of the object, with two components of roughly equal size joint together, is evident from the image.

Image credits: NASA/JPL-Caltech/GSSR

[neo.ssa.esa.int](http://neo.ssa.esa.int)

To subscribe or unsubscribe to this newsletter and for further information please send an email to [neocc@ssa.esa.int](mailto:neocc@ssa.esa.int)

