

## space situational awareness

### → NEAR-EARTH OBJECTS

#### Current NEO statistics

Two large objects have been observed in the month of July. (85989) 1999 JD6 had a distant encounter with the Earth, while the newly discovered asteroid 2015 OL35 entered our priority list for follow-up observations.

- Known NEOs: 12 824 asteroids and 104 comets
- NEOs in risk list\*: 520
- New NEO discoveries since last month: 49
- NEOs discovered since 1 January 2015: 868

#### Focus on

August sees the arrival of comet 67P/Churyumov-Gerasimenko at perihelion, followed by the ESA spacecraft Rosetta and its lander Philae. This comet is one of the few known Near-Earth Comets (NECs). They are defined, similarly to NEAs, as comets that can come to within 1.3 au of the Sun. However, since the comet population also includes long-period objects, which only visit the inner solar system once, the additional requirement for an orbital period of less than 200 years is often imposed. NECs only constitute less than 1 % of the NEO population, and they are not currently included in our impact monitoring activities since they are difficult to predict due to the non-gravitational forces affecting their motion.

#### Upcoming interesting close approaches

No known object will come within 15 lunar distances from Earth in August. But it is expected that a few will be discovered in the days just before the close approach.

#### Recent interesting close approaches

A large object flew past Earth in early July.

- (85989) 1999 JD6, an object just exceeding 2 km in size with a well determined orbit, passed at a safe 18 lunar distances (more than 7 million km).
- 2015 HM10 is an object of about 80 meters which came to about the distance of the Moon on 7 July. It was discovered only a few months ago, showing that large object can still be found only weeks before a very close approach to our planet.

#### News from the risk list

A new object which appeared on the risk list, 2015 NK13, was briefly ranked as the most dangerous known asteroid for the current century before its impact probability dropped a bit thanks to follow-up observations, although it still remains in the list.

- 2015 NK13 currently has a probability of about 1 in 100 000 to collide with our planet in the next century; it is a large 400 m object capable of causing significant ground damage.
- A km-size NEA, 2015 OL35, was discovered by Pan-STARRS and entered the risk list; follow-up observations are needed to improve the accuracy of its orbit (further details at: <http://neo.ssa.esa.int/web/guest/priority-list>).

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\* 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

- The NEOCC obtained observations of 2008 LG<sub>2</sub>, the faintest NEO ever observed, thanks to our ongoing collaboration with ESO's VLT. More information is available via <http://neo.ssa.esa.int>.
- Sylvio Ferraz Mello has been awarded the 2015 Brouwer Award from the Division of Dynamical Astronomy of the American Astronomical Society, in recognition for his work on the dynamics of the Solar System. Announcement available at [http://dda.aas.org/brouwer\\_award/brouw2015.html](http://dda.aas.org/brouwer_award/brouw2015.html).

## Upcoming events

The IAU Symposium 318, entitled "Asteroids: New Observations, New Models", which includes significant sections on NEO science, is being held this month in Honolulu, Hawaii.

- IAU General Assembly, 3–17 August 2015, Honolulu, USA  
<http://astronomy2015.org>
- European Planetary Science Congress, 17 September – 2 October 2015, Nantes, France  
<http://www.epsc2015.eu>
- AAS Division for Planetary Sciences Meeting, 8–13 November 2015, National Harbor, USA  
<http://aas.org/meetings/dps47>
- Asteroids & Planetary Defense session at the AGU Fall Meeting, 14–18 December 2015, San Francisco, USA  
<https://agu.confex.com/agu/fm15/preliminaryview.cgi/Session7518>
- Planetary Defense session at the 2016 IEEE Aerospace Conference, 5–12 March 2016, Big Sky, USA  
<http://www.aeroconf.org/>

## List of closest approaches in the past year

Only six known objects came within 100 000 km of the Earth in the past 12 months. They were all 20 meters or less in diameter, comparable or smaller to the object that exploded over Chelyabinsk, Russia, in 2013. All the distances in the table are referred to the centre of the Earth.

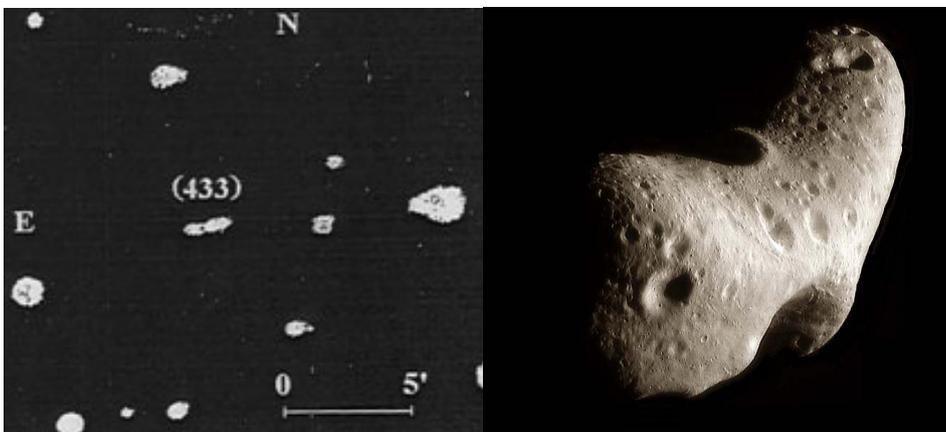
Object name	Close approach date	Miss distance in au	Miss distance in lunar distances	Miss distance in km	Size in m	H magnitude
2015 DD1	2015-02-17	0.00026	0.10	32 900	~ 4	30.3
2014 RC	2014-09-08	0.00027	0.10	33 500	~ 19	26.8
2014 RA	2014-09-01	0.00038	0.15	50 300	~ 7	28.8
2015 HD1	2015-04-21	0.00040	0.15	52 700	~ 14	27.4
2014 SG1	2014-09-21	0.00053	0.21	73 200	~ 6	29.1
2014 TL	2014-10-02	0.00066	0.26	91 700	~ 11	27.8

## 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>



(433) Eros was discovered by Carl Gustav Witt exactly 117 years ago. The left image is the discovery plate exposed by Witt on 13 August 1898.

Eros was also the first NEA visited by a spacecraft, when the NASA NEAR Shoemaker mission completed its rendezvous and landing between 1998 and 2001

Image credit: Carl Gustav Witt / NEAR Project, NLR, JHUAPL, Goddard SVS, NASA

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