

## space situational awareness

### → NEAR-EARTH OBJECTS

#### Current NEO statistics

Only 84 new NEOs have been discovered in July 2016, but this number is still significantly larger than the 49 discovered over the same period of 2015.

- Known NEOs: 14 569 asteroids and 107 comets
- NEOs in risk list\*: 548
- New NEO discoveries since last month: 84
- NEOs discovered since 1 January 2016: 1048

#### Focus on

2016 NA39 is a newly-discovered asteroid that for a few days in mid-July deserved attention. Because of its large size, around one kilometre, it became the highest rated object with possible impacts in the current century, scoring as high as Palermo Scale of  $-2.6$ . However, follow-up observations by the Spacewatch project resulted in the complete removal of every impact solution, eventually leading to the reclassification of the object as a main-belt asteroid.

This case is emblematic of two common behaviours of recently discovered NEOs. First, it shows how the impact assessment can change quickly when just a few observations are added: the impact probability drops suddenly to zero once the orbit improves enough to exclude all the impacts. Secondly, the initial interpretation of 2016 NA39 as an NEO and the subsequent reclassification as a main-belt asteroid is also typical for objects discovered around  $110^\circ$  of solar elongation. Due to geometry effects the initial observations can often be interpreted as either a new large NEO or a more distant main-belt asteroid. In some cases, automatic orbit determination procedures may select the first option, but the second is often more likely due to the much larger number of objects in the main belt.

#### Upcoming interesting close approaches

One old object will come moderately close in early August.

- 2005 OH3 is an object discovered more than a decade ago, about 30 metres in size. It will fly by the Earth at about 5 lunar distances in early August.

#### Recent interesting close approaches

Three small objects came close in early July.

- 2016 NA, 2016 NJ22 and 2016 NK22 are new discoveries that came to about a lunar distance in early July. They are small objects, with a diameter of 5 to 20 metres.

#### News from the risk list

A few objects were removed from the list thanks to archival searches.

- 2016 NO16, 2016 EG86, 2010 CA, and 2013 VJ13, previously on the risk list with Palermo Scale values around  $-5$ , have been removed during the month of July thanks to the identification of prediscovery archival observations by our team.

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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

- In a bit more than a month OSIRIS-Rex will launch from Cape Canaveral, en route to asteroid (101955) Benu.

## Upcoming events

The next major conference about NEOs will be the DPS/EPSC meeting in Pasadena in October.

- AAS Division for Planetary Sciences Meeting (joint with EPSC), 16–21 October 2016, Pasadena, USA  
<http://dps.aas.org/meetings/current>
- Stardust Final Conference, 31 October–4 November 2016, ESTEC, Noordwijk, The Netherlands  
<http://www.stardust2013.eu/Training/Conferences/StardustFinalConference/tabid/5484/Default.aspx>
- Asteroids, Comets and Meteors (ACM 2017) Conference, 10–14 April 2017, Montevideo, Uruguay  
<http://acm2017.uy/>
- IAA Planetary Defense Conference, 15–19 May 2017, Tokyo, Japan  
<http://pdc.iaaweb.org/>

## List of closest approaches in the past year

Over the past twelve months 13 known objects came within 100 000 km of the Earth, more than twice as many as last year, reflecting the increased efficiency of the NEO follow-up. All distances are referred to the centre of the Earth.

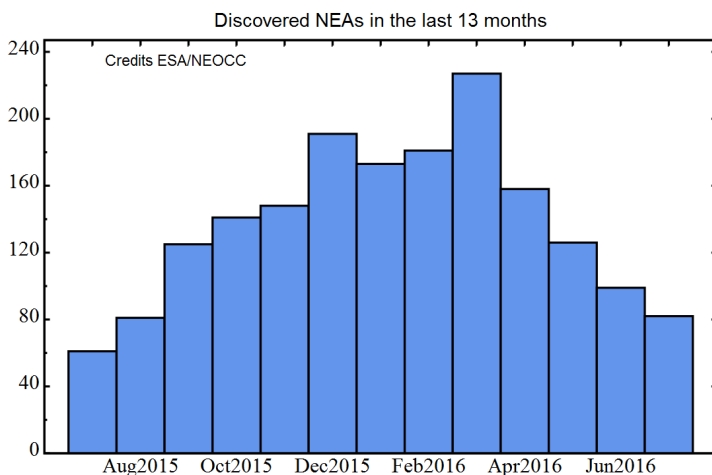
Object name	Close approach date	Miss distance in au	Miss distance in lunar distances	Miss distance in km	Size in m	H magnitude
2016 DY30	2016-02-26	0.00005	0.02	7 900	~ 3	30.5
2015 SK7	2015-09-23	0.00014	0.05	20 200	~ 7	28.8
2016 AH164	2016-01-12	0.00014	0.05	20 300	~ 5	29.7
2016 EF195	2016-03-11	0.00017	0.07	25 900	~ 31	25.7
2015 VY105	2015-11-15	0.00019	0.07	28 300	~ 7	29.0
2016 AN164	2016-01-15	0.00021	0.08	30 700	~ 3	30.5
2016 GN134	2016-04-05	0.00034	0.13	50 900	~ 4	30.3
2015 YJ	2015-12-14	0.00043	0.17	64 800	~ 9	28.3
2016 LP10	2016-06-10	0.00044	0.17	65 300	~ 5	29.5
2016 CM194	2016-02-13	0.00047	0.18	71 000	~ 12	27.7
2015 PK	2015-08-06	0.00049	0.19	73 100	~ 10	28.1
2015 VU64	2015-11-07	0.00063	0.24	94 000	~ 3	30.6
2016 AQ164	2016-01-11	0.00066	0.25	98 000	~ 4	29.9

## 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>



The monthly discovery rate of NEAs over the last 13 months.

Due to a combination of short nights in the Northern hemisphere, and the monsoon season in the US Southwest where most major surveys are located, the months of June to September are usually the poorest in terms of NEO discoveries.

Image credit: ESA / NEOCC

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

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