

space situational awareness

→ NEAR-EARTH OBJECTS

Current NEO statistics

Nearing the end of the summer season, the rate of NEO discoveries is increasing.

- Known NEOs: 14 688 asteroids and 107 comets
- NEOs in risk list*: 551
- New NEO discoveries since last month: 103
- NEOs discovered since 1 January 2016: 1168

Focus on

The NEO Coordination Centre web portal is an evolving environment: new services are added whenever ready to be made publicly available. This is the case for two software packages addressing key issues in NEO science: an updated NEO population model and an NEO propagator. The former provides a realistic unbiased NEO population and the associated programs for performing a wide variety of simulations. The latter allows to carry out orbit determination and impact monitoring of individual objects. They are resulting from ESA contracts and have already produced good results in scientific and technological applications. The *NEO Population Model* and *NEO Propagator* packages can be found on our web site under the “Tools” menu bar, accompanied by exhaustive descriptions. They can be freely downloaded and used.

Upcoming interesting close approaches

Two large objects will safely fly-by in early September.

- 2016 LX48 and 2009 ES are two large objects, about 600 and 300 metres in diameter, which will fly-by at ~ 18 lunar distances during the first half of the month. They should both reach magnitude 15, easily observable with small telescopes. Their fly-by trajectories are well known, and neither poses any impact threat.

Recent interesting close approaches

Two interesting 30-metre objects were found last month.

- 2016 QA2, a 30-metre object discovered by the Brazilian SONEAR project, flew-by the Earth on 28 August at about 80 000 km from its surface.
- Also with a diameter of about 30 metres, recently discovered 2016 PQ is the 7th-largest known object whose current orbit has a minimum distance from the orbit of the Earth of less than 1 Earth radius. However, the object itself will not come particularly close to our planet at least for the next century.

News from the risk list

A numbered NEO was observed with the VLT.

- (443104) 2013 XK22, one of the very few numbered objects in the risk list, has been observed by our team with ESO's Very Large Telescope. The overall risk assessment has not changed significantly, but the impact probability is now a bit lower.
- The impact risk from 2016 NL39, an object that has been on the list for the last few weeks, has been lowered by recent 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

- The OSIRIS-Rex mission to asteroid (101955) Bennu is scheduled to launch from Cape Canaveral on 8 September. It will reach its target in 2018, beginning a 2-year detailed study of the asteroid.
- In the meantime, the Japanese Hayabusa 2 spacecraft is already en route to asteroid (162173) Ryugu, which will also be reached in 2018.

Upcoming events

A few major conferences with sessions dedicated to planetary defence will happen over the next months.

- AAS Division for Planetary Sciences Meeting (jointly 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 & Planetary Defense session at the AGU Fall Meeting, 12–16 December 2016, San Francisco, USA
<https://fallmeeting.agu.org/2016/>
- Asteroids, Comets and Meteors (ACM 2017) Conference, 10–14 April 2017, Montevideo, Uruguay
<http://acm2017.uy/>
- IAUS 330: Astrometry and Astrophysics in the Gaia sky, 24–28 April 2017, Nice, France
<http://www.iau.org/science/meetings/future/symposia/1163/>
- IAA Planetary Defense Conference, 15–19 May 2017, Tokyo, Japan
<http://pdc.iaaweb.org/>

List of closest approaches in the past year

Six known objects came within 50 000 km of the Earth in the past 12 months. About one year ago we published a similar table with a threshold twice as large, and it also contained six objects, a further proof that observers are becoming more efficient at following-up small nearby objects.

Object name	Close approach date	Miss distance in lunar distances	Miss distance in Earth radii	Miss distance in km	Size in m	H magnitude
2016 DY30	2016-02-26	0.02	1.2	8 000	~ 3	30.5
2015 SK7	2015-09-23	0.05	3.2	20 000	~ 7	28.8
2016 AH164	2016-01-12	0.05	3.2	20 000	~ 5	29.7
2016 EF195	2016-03-11	0.07	4.1	26 000	~ 30	25.7
2015 VY105	2015-11-15	0.07	4.4	28 000	~ 7	29.0
2016 AN164	2016-01-15	0.08	4.8	31 000	~ 3	30.5

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 (443104) 2013 XK22 as seen with the 8.2 metre Very Large Telescope on 30 July 2016. At that time the object had a magnitude of about 23.5.

The image is a stack of 8 separate exposures, each 5 seconds long, which were co-added following the motion of the object. Therefore, the asteroid appears as a single point source (marked by the arrow), while the stationary stars are each duplicated 8 times.

Image credit: ESA / ESO

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