

space situational awareness

→ NEAR-EARTH OBJECTS

Current NEO statistics

Almost 2000 new NEOs have been discovered in 2016, about 90% of which were found by the Catalina Sky Survey and Pan-STARRS.

- Known NEOs: 15 410 asteroids and 106 comets
- NEOs in risk list*: 586
- New NEO discoveries since last month: 106
- NEOs discovered since 1 January 2016: 1888

Focus on

During 2015-2016 ESA funded the development of two small robotic observatories, called the Test-Bed Telescopes (TBTs). The main goal is to develop and test a fully automated telescope control system to observe NEOs and space debris. The system is designed to perform the entire chain of observations autonomously, from scheduling to image processing, analysis and detection of moving objects. It can operate both as a follow-up telescope and a survey instrument. Both telescopes have a 56 cm aperture, a 2.5° field of view, and excellent non-sidereal tracking capabilities up to 40"/s.

The first telescope is now operational in Cebreros, near Madrid, hosted at at ESA's satellite tracking station. The other will be installed in the Southern Hemisphere and it is likely to become a relevant contributor to the still scarce network of discovery sites South of the Equator.

Upcoming interesting close approaches

A large NEO will fly by on the second day of the year.

- (226514) 2003 UX34, 400 m object, will fly-by on 2 January, at 19 lunar distances.

Recent interesting close approaches

Our growing ability to survey the sky allows to spot an increasing number of NEOs approaching our planet. The exact number depends on the chosen distance threshold, which in our case is 0.05 au or about 19 lunar distances.

- 2008 UL90, an 800 m object, came to ~15 lunar distances, reaching magnitude 17. It became observable from the ground only during its outgoing trajectory.
- 2016 YJ, 2016 XE and 2016 XW20 flew-by in December between 1 and 2 lunar distances. They were all small objects, less than 20 metres in diameter, and therefore they only reached magnitude 18 as seen from Earth.
- In December we had quite a few close approaches clustered together, five on the 14 and then again four on the 21. Although this may look unusual, it is expected that a few such clusters will occur in any given month, at the current discovery rate.

News from the risk list

A new object entered the top ten risk list for a few days.

- 2016 XP23 reached a Palermo Scale value higher than -3 since the second half of December, and it is still near the top of our risk list.

* 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 ESA Council Meeting at Ministerial Level was held in Luzern (Switzerland) in December. It approved the evolution of the SSA (Space Situational Awareness) programme, which includes NEO-related activities.
- The United Nations General Assembly formally recognized 30 June as international Asteroid Day.
- The Gaia Follow-up Network has started producing alerts on unknown asteroid candidates discovered by the spacecraft.

Upcoming events

The spring of 2017 will see two major events in the field of NEOs, the ACM meeting in Montevideo in April and the PDC in Tokyo in May.

- 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/>

Highest rated objects added to the risk list in 2016

The table presents the top 10 objects entering the risk list in 2016 and still present, ranked by current Palermo Scale.

Object name	Size in m	Date/Time of possible impact (UTC)	Impact probability	Palermo Scale	Torino Scale	Velocity in km/s	In list since (days)
2016 XP23	~ 500	2110-11-01 20:18	1/160000	-2.65	0	27.25	14
2016 NL56	~ 600	2020-06-22 15:42	1/1000000000	-3.70	0	38.42	88
2016 NL39	~ 13	2075-06-28 07:42	1/700	-4.38	0	11.85	147
2016 RD34	~ 13	2051-05-21 00:59	1/2300	-4.62	0	11.24	105
2016 WN55	~ 400	2027-09-12 17:31	1/200000000	-4.84	0	18.95	13
2016 WJ1	~ 230	2115-06-14 15:56	1/5000000	-5.16	0	18.58	38
2016 WG	~ 90	2076-06-23 06:55	1/1700000	-5.18	0	26.09	37
2016 EU28	~ 6	2035-02-28 09:50	1/3000	-5.19	0	13.18	280
2016 FV13	~ 28	2114-04-12 15:37	1/40000	-5.30	0	15.73	254
2016 SR2	~ 23	2101-10-07 11:50	1/21000	-5.35	0	12.66	90

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 new 56 cm Test-Bed Telescope recently installed in Cebreros, Spain.

The wide-field prime focus camera is visible at the top of the tube in the left image.

The right panel shows the clamshell dome housing the telescope.

Image credits: ESA NEOCC / TBT Team

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