space situational awareness

→ NEAR-EARTH OBJECTS

Current NEO statistics

The threshold of 18 000 known NEAs was crossed in April.

- Known NEOs: 18 085 asteroids and 107 comets
- NEOs in risk list*: 740
- Number of NEOs designated during last month: 149
- NEOs discovered since 1 January 2018: 634

Focus on

On 25 April 2018 ESA's Gaia Data Processing and Analysis Consortium published the second release of the mission data products (known as Data Release 2, or DR2 for short). For the first time, Gaia astrometry of more than 14 000 known asteroids was made public, showing that the spacecraft can achieve astrometric precisions at the milliarcsecond level. However, the asteroid observations are not the only part of DR2 that are relevant for NEO science: the mission also released its new catalogue of stellar sources, containing coordinates of almost 1.7 billion stars, and proper motion data for more than 1.3 billion of them. This catalogue of stars will become the reference system used to astrometrically calibrate astronomical images of other objects, and its exquisite precision will allow observers to determine the position of any asteroid with greatly increased accuracy. This will result in more accurate orbits, a better determination of non-gravitational effects acting on asteroids, and in turn a better predictability of future encounters and possibly collisions with our planet.

Upcoming interesting close approaches

A fly-by of a numbered asteroid will happen in May.

- Numbered asteroid (388945) 2008 TZ3, an object with a diameter of about 300 metres, will reach magnitude 13 this month, when flying-by at about 6 lunar distances.

Recent interesting close approaches

The closest fly-by of a ~ 100 m size object of the last decade happened in April.

- 2018 GE3 is an object with a diameter between 50 m and 100 m, discovered on 14 April, which had a fly-by at half lunar distance the following day. It was the largest object of at least this size known to fly-by our planet this close over the past decade.
- 2018 HV had a fly-by a week later, at roughly the same distance, but it was much smaller, with a diameter of only 10 meters or less.

News from the risk list

A new high-rated possible impactor was removed thanks to an archival precovery.

- 2018 GG2 ranked among the top objects of our risk list for a few days, reaching a Palermo Scale value of almost –2, until precovery observations from the Pan-STARRS1 survey led to the removal of all possible impact solutions.

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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://neo.ssa.esa.int/web/guest/risk-page

European Space Agency

In other news

- This year, for the Asteroid Day celebrations on 30 June, ESA will join ESO in Garching, near Munich, Germany for a day of asteroid-themed activities at the newly inaugurated ESO Supernova Centre. More information is available at https://supernova.eso.org/programme/detail/es1053/

Upcoming events

Relevant international meetings over the next months.

- Didymos Observer Workshop 2018, 19–21 June 2018, Prague, Czech Republic
  http://didymos2018-mtg.asu.cas.cz/
- European Planetary Science Congress, 16–21 September 2018, Berlin, Germany
  http://www.epsc2018.eu/
- AAS Division for Planetary Sciences Meeting, 21–26 October 2017, Knoxville, USA
  https://aas.org/meetings/dps50

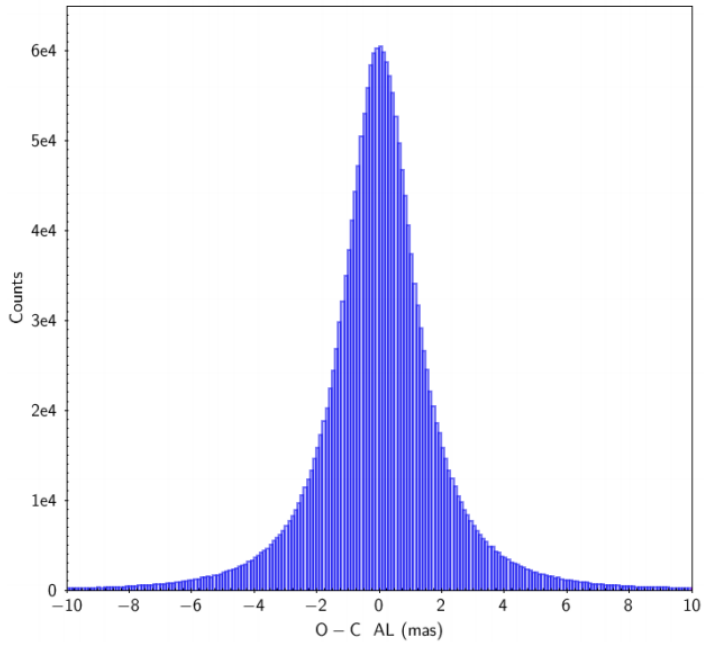
Closest approaches of large asteroids

List of the closest observed approaches of NEOs with an absolute magnitude larger than H=24, corresponding to approximately 50 metres.

Object name	Close approach date	Miss distance in lunar distances	Miss distance in Earth radii	Miss distance in km	Size range in m	H magnitude
2002 MN	2002-06-14	0.296	17.8	114 000	60–130	23.3
2018 GE3	2018-04-15	0.485	29.3	187 000	50–100	23.8
2018 AH	2018-01-02	0.756	45.6	291 000	80–190	22.5
(308635) 2005 YU55	2011-11-08	0.829	50.0	319 000	130–280	21.6
2011 XC2	2011-12-03	0.886	53.5	341 000	70–150	23.0

Links for more information

Website: http://neo.ssa.esa.int
Close approaches: http://neo.ssa.esa.int/close-approaches
Risk List: http://neo.ssa.esa.int/risk-page



Histogram showing the residuals of the along-scan (called "AL" in the figure) astrometric positions derived by Gaia for roughly 14 000 known asteroids.

The horizontal scale is expressed in milliarcseconds, and immediately shows the superb astrometric quality of Gaia, almost two orders of magnitude better than what can currently be obtained from the ground.

From the paper: Gaia Collaboration: F. Spoto et al., "Gaia Data Release 2. Observations of solar system objects", A&A, DOI: https://doi.org/10.1051/0004-6361/201832900

Credit: ESA / Gaia collaboration / F. Spoto et al.