

# space situational awareness

## → NEAR-EARTH OBJECTS

### Current NEO statistics

October 2018 saw a decrease of about 40% in the discovery rate, compared with the same period of 2017.

- Known NEOs: 18 924 asteroids and 107 comets
- NEOs in risk list\*: 780
- Number of NEOs designated during last month: 186
- NEOs discovered since 1 January 2018: 1468

### Focus on

On 19 October a very small asteroid, designated as 2018 UA, was discovered by the Catalina Sky Survey, and quickly flagged as a potential very close approacher. Immediate follow-up observations by both Catalina and the Spacewatch project led to a much more accurate orbit solution. It shows a very close fly-by at just 7000 km from the Earth surface. This would be the closest known approach of a non-impacting asteroid over the last 7 years. Additional observations were collected from Siding Spring, Australia, and by our team in collaboration with the Sobaeksan Optical Astronomy Observatory in South Korea: they allowed the determination of the fly-by distance with a precision of a few kilometres, and of the time of closest approach to much better than a minute.

### Upcoming interesting close approaches

An interesting object is having a fly-by this month.

- 2002 VE68 approaches our planet on 4 November, at about 15 lunar distances. The object is interesting because it is a “quasi-satellite” of Venus, orbiting in a 1:1 resonance with the planet.
- 2018 TF3 is a newly discovered asteroid that will become brighter than magnitude 15 in early November, when it will fly-by at about 8 lunar distances.

### Recent interesting close approaches

Four objects, having estimated sizes below 10 meters, came closer than the Moon last month.

- In addition to 2018 UA, which was already discussed above, three other objects came closer than the Moon last month: 2018 TV5, 2018 UL and 2018 TV. They all reached roughly magnitude 15 around the time of close approach.

### News from the risk list

New observations led to a decrease of impact probability for one of the objects discussed over the past months.

- New observations of 2018 NL obtained by our team with ESO’s Very Large Telescope in Chile resulted in a significant decrease of its impact probability, which is now at about 1 in 20 000 for all possible close approaches of the next century.

\* 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/risk-page>

## In other news

- JAXA's Hayabusa2 mission deployed the European-built MASCOT lander on the surface of asteroid (162173) Ryugu on 3 October 2018. The lander successfully operated on the surface for almost a day.
- In the meantime, NASA's OSIRIS-REx performed three Asteroid Approach Manoeuvres on its way to asteroid (101955) Bennu.

## Upcoming events

Relevant international meetings over the next months.

- Hera Community Workshop, 15–16 November 2018, Berlin, Germany  
<https://www.cosmos.esa.int/web/hera-community-workshop/>
- NEO and Debris Detection Conference, 22–24 January 2019, Darmstadt, Germany  
<https://neo-sst-conference.sdo.esoc.esa.int/>
- IAA Planetary Defense Conference, 29 April–3 May 2019, College Park, USA  
<http://pdc.iaaweb.org/>

## List of closest approaches in the past year

Only seven objects came closer than 50 000 km to the Earth surface over the past 13 months (since we last reported on this in our newsletter), including the impactor 2018 LA last June.

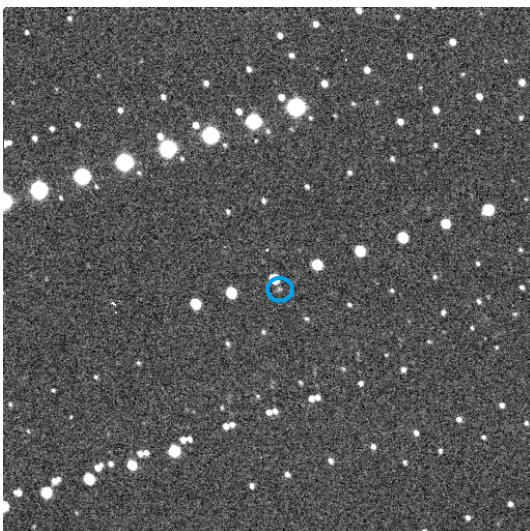
Object name	Close Approach Date	Miss distance in lunar distances	Miss distance in Earth radii	Miss distance in km from Earth surface	Size range in m	H magnitude	Discovery date
2018 LA	2018-06-02	0	0	0	2–5	30.5	2018-06-02
2018 UA	2018-10-19	0.02	1.1	7 000	2–5	30.2	2018-09-07
2017 UJ2	2017-10-20	0.03	1.8	12 000	2–4	30.9	2018-09-06
2017 WE30	2017-11-26	0.06	3.7	24 000	1–3	31.8	2018-09-07
2018 PD20	2018-08-10	0.07	4.3	27 000	9–20	27.4	2018-09-09
2018 BD	2018-01-18	0.09	5.1	30 000	2–5	30.2	2018-09-07
2018 SM	2018-09-15	0.09	5.7	40 000	4–8	29.4	2018-09-03

## 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>



Detection of close approaching asteroid 2018 UA obtained on 19 October 2018 at 10:45 UT, just 4 hours before reaching its closest distance from the Earth.

The image is a stack of 8 frames, 4 seconds each, exposed with the 61 cm telescope at the Optical Astronomy Observatory in South Korea.

Upon closer inspection it is possible to notice that the image of the object (circled in blue) is slightly elongated. This is due to the increasing velocity of its motion in the sky during the few minutes covered by this observation, which resulted in a slight smearing of the detection.

[Credit: KASI, ESA/NEOCC]

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