

## ESA'S NEO Coordination Centre

### Current NEO statistics

The number of asteroids in the risk list increased in the last month by roughly 100 due to a change in the orbit determination weighting model.

- Known NEOs: 21 254 asteroids and 108 comets
- NEOs in risk list\*: 1002
- Number of NEOs designated during last month: 350
- NEOs discovered since 1 January 2019: 1969

### Focus on

A century ago, on 26 November 1919 (Thanksgiving Eve in the US), a major fireball event happened close to the border between the US states of Indiana and Michigan. The object came from the East, and generated an airburst event approximately over the city of Athens, Michigan.

Description by eyewitnesses included not just the bright light of the fireball, but also thunder-like sounds and, interestingly, a prolonged earthquake-like shake of the ground. The bright flash was seen as far as Chicago, about 150 km away on the other side of Lake Michigan. Damage to property was described in a way similar to what was experienced in Chelyabinsk during the 2013 event. Power plants and distribution lines were also heavily affected.

Despite the significance of the event, no meteorites were collected. It is possible that the vast majority of the asteroid mass could have fallen westward, into the waters of Lake Michigan.

### Upcoming interesting close approaches

A large NEO will have a bright close approach in November.

- (481394) 2006 SF6 is an object of about 400 m that will reach magnitude 14 during its fly-by. It will come as close as 11 lunar distances, on 21 November.

### Recent interesting close approaches

A small close approach, and a larger but distant one, were observable this month.

- 2019 UN13 is the closest of eleven close approachers that came within 1 lunar distance of the Earth in October. During its fly-by at 0.03 lunar distances this object, measuring 1-2 m, reached magnitude 14.
- (162082) 1998 HL1 reached magnitude 12 despite a much farther fly-by at about 17 lunar distances, because of its significantly larger size of about 500 m.

### News from the risk list

A high-rated object was completely removed from the risk list.

- 2019 SU3, a new object that reached a high rating in our risk list in September, is now off the list, thanks to radar measurements by the Arecibo observatory. This was complemented by optical observations obtained by various other observatories, including our team in collaboration with the San Pedro Mártir observatory in Mexico.

\* 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

- The risk list has been significantly updated due to a change in the error weighting model associated to the orbit determination process. That new model is described by [Veres et al. 2017](#).
- The International Meteor Conference was held in Bollmannsruh, Germany, between 3 and 6 October.

## Upcoming events

Relevant international meetings over the next months.

- Asteroids, Comets, Meteors Conference , 14–19 June 2020, Flagstaff, USA  
<https://www.hou.usra.edu/meetings/acm2020/>

## October closest approaches

Eleven objects came closer than the Moon during the month of October.

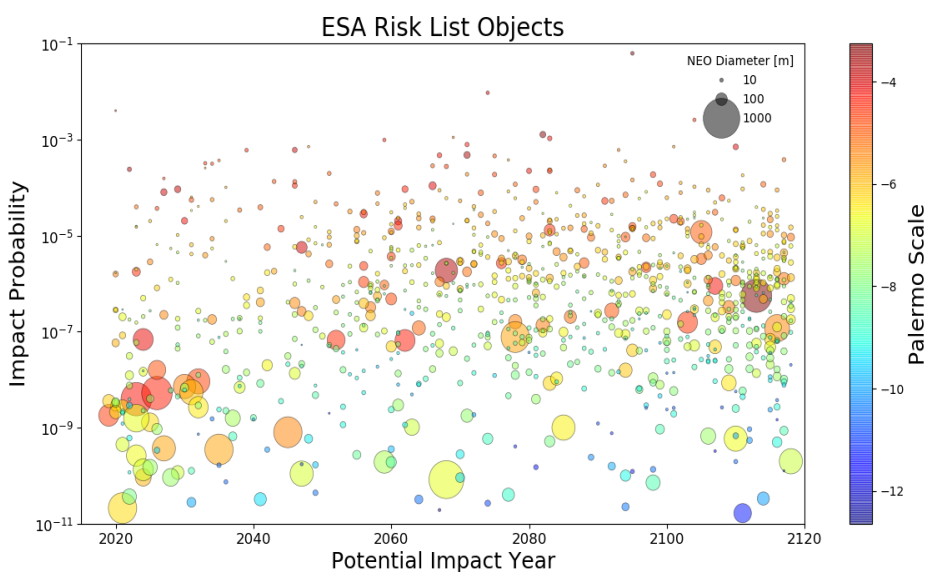
Object name	Close Approach Date	Miss distance in lunar distances	Miss distance in Earth radii	Miss distance in km from Earth surface	Size range in m	H magnitude	Discovery date
2019 UN13	2019-10-31	0.02	1	6 200	1–2	32.2	2019-10-31
2019 TN5	2019-10-05	0.32	18	120 000	6–13	28.3	2019-10-06
2019 U08	2019-10-25	0.39	24	150 000	4–9	29.2	2019-10-26
2019 SM8	2019-10-01	0.40	24	150 000	4–9	29.0	2019-09-30
2019 UD10	2019-10-27	0.42	25	160 000	6–14	28.2	2019-10-28
2019 UB8	2019-10-29	0.48	29	180 000	4–9	29.0	2019-10-26
2019 UU1	2019-10-18	0.57	34	220 000	2–5	30.4	2019-10-19
2019 UL3	2019-10-19	0.76	46	290 000	6–13	28.3	2019-10-22
2019 UG	2019-10-18	0.82	50	320 000	6–14	28.2	2019-10-19
2019 UN8	2019-10-23	0.92	55	350 000	3–7	29.7	2019-10-25
2019 SP3	2019-10-03	0.95	57	370 000	14–31	26.4	2019-09-22

## 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>



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