space situational awareness

→ NEAR-EARTH OBJECTS

Current NEO statistics

With the end of monsoon season in the US Southwest, the rate of NEO discoveries is back to more typical rates of 200 new objects per month.

- Known NEOs: 16 698 asteroids and 106 comets
- NEOs in risk list*: 661
- Number of NEOs designated during last month: 202
- NEOs discovered since 1 January 2017: 1286

Focus on

Asteroid 2012 TC4 is the target of an international observing campaign that will culminate this month during its close fly-by with Earth. The object will safely fly at about 44 000 km from the Earth surface, with no chance of collision with our planet. However, the observations collected so far show that the object has the possibility of coming back in the vicinity of Earth a few times over the next century, and at some dates there is a non-negligible chance of a collision, typically less than 0.1%. Despite the still uncertain nature of these encounters, it is already possible to estimate the region of the Earth where such an impact may occur, which is a thin and long curve running over the globe called the "impact corridor". This corridor typically represents the uncertainty existing in the time of the asteroid arrival.

Upcoming interesting close approaches

A large asteroid is going to pass by Earth moderately close in October.

- (171576) 1999 VP11 is a ~800-metre object which will reach V~12.5 passing at ~5.8 lunar distances on 22 October.

Recent interesting close approaches

Six objects passed by the Earth closer than the Moon during the last month, but none of them reached the magnitude of (3122) Florence, a farther but larger object.

- (3122) Florence, with its 4350 m diameter, passed by the Earth on 01 September at ~18.4 lunar distances, reaching the remarkable magnitude of ~8.5.
- 2017 QB35, 2017 SQ2, 2017 SR2, 2017 SM2, 2017 SS12 and 2017 SU17, ranging from about 5 to 40 metres in diameter, all passed closer than the Moon this month. For further details refer to the table in the next page.

News from the risk list

A well known ~20 metre diameter object reached an impact probability higher than 1/500 about mid-month:

- 2012 TC4, one of the faintest objects ever detected, climbed the risk list this month, reaching a Palermo Scale of –3.6 on 15 September, then quickly dropping out of the top 20 risky objects in our list.

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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

In other news

- The Seventh International Meeting on Celestial Mechanics (CELMEC VII) took place in Viterbo (Italy) at the beginning of last month.
- Radar images of asteroid (3122) Florence obtained by NASA's 70-meter antenna at Goldstone have revealed that the asteroid has two small moons. This is the third triple system discovered within the NEA population.

Upcoming events

The annual DPS meeting is happening this month in Utah, USA.

- AAS Division for Planetary Sciences Meeting, 15–20 October 2017, Provo, UT, USA
  http://dps.aas.org/meetings/current
- Planetary Defense session at the 2018 IEEE Aerospace Conference, 3–10 March 2018, Big Sky, USA
  http://www.aeroconf.org/

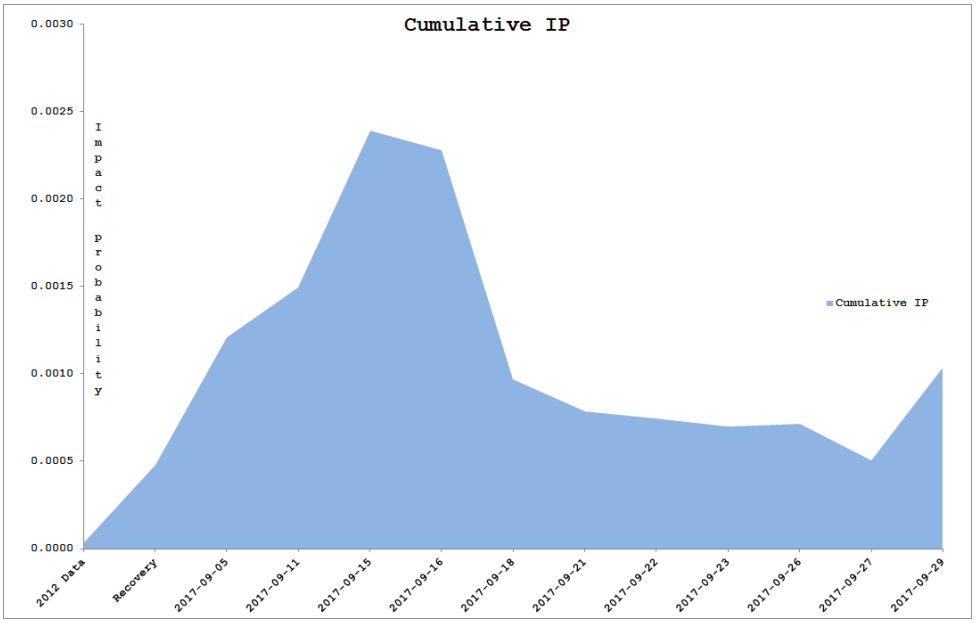
September closest approaches

Six objects came closer than the Moon this month, all discovered during the same week of their close approach.

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
2017 QB35	2017-09-03	0.92	55	353 000	4–8	29.3	2017-08-31
2017 SQ2	2017-09-14	0.49	30	188 000	18–40	25.8	2017-09-18
2017 SR2	2017-09-20	0.22	13	83 000	5–11	28.6	2017-09-20
2017 SM2	2017-09-20	0.80	48	308 000	9–21	27.3	2017-09-25
2017 SS12	2017-09-24	0.65	39	248 000	10–23	27.1	2017-09-25
2017 SU17	2017-09-24	0.72	43	276 000	7–15	27.8	2017-09-26

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



Evolution of the impact probability (IP) of 2012 TC4 for the next 100 years, as computed following each batch of new observations reported during the ongoing period. The IP provided is of a cumulative nature as it adds the probabilities associated to all the encounters identified in the time period considered.