

## space situational awareness

### → NEAR-EARTH OBJECTS

#### Current NEO statistics

The number of monthly NEO discoveries is starting to decrease due to the shorter nights and poorer summer weather at some survey sites.

- Known NEOs: 16 249 asteroids and 106 comets
- NEOs in risk list\*: 633
- New NEO discoveries since last month: 61
- NEOs discovered since 1 January 2017: 843

#### Focus on

The month of June 2002, 15 years ago, marked the kick-off of six parallel preliminary studies carried out by ESA's General Studies Programme (GSP) in order to analyse possible asteroid missions. Three of those studies were devoted to in-orbit telescopes for NEO discovery and characterisation, other two were devoted to asteroid rendezvous missions and finally one for asteroid rendezvous and impact. Once the studies ended, ESA asked the NEO Mission Advisory Panel (NEOMAP) to choose the most interesting concept for a phase A study. NEOMAP, formed by a group of renowned asteroid scientists, unanimously selected the Don Quijote mission for further analysis, based on a kinetic impactor (Hidalgo S/C) supported by an orbiting spacecraft to analyse the outcome of the impact (Sancho S/C). In the words of ESA's study manager and lead of the AIM mission study work, Andrés Gálvez, "ESA's mission preparation work both with Don Quijote and AIM have helped the NEO community by putting forward very concrete concepts and R&D activities for scientists and engineers to work on". The Agency's effort on Planetary Defense has continued with the recent AIM mission definition work.

#### Upcoming interesting close approaches

Only one moderately bright close approach is predicted for July.

- 2017 MC4 is a ~200-metre object discovered at the end of June, which will come at ~7.5 lunar distances on 11 July, reaching  $V \sim 15.5$ .

#### Recent interesting close approaches

Only two small objects came closer than 1 lunar distance in June.

- (418094) 2007 WV4 is ~900-meter object that had a close fly-by on 01 June at 8 lunar distances.
- 2017 KQ27 and 2017 MF are two small objects that came at 1 lunar distance in June, the second one being the brightest close approach of the month.

#### News from the risk list

Four objects with Palermo Scale lower than  $-4$  entered the risk list in June:

- 2017 LD and 2017 MB1, a ~10 m and ~800 m objects respectively, are still in our risk list after having decreased their Palermo Scale.
- 2017 LO1 and 2017 LU are two ~800 m NEO that were removed from the list.

\* 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

- On 1st of June the head of NEOCC changed: Ettore Perozzi, who was the local coordinator of the NEOCC since the very beginning, took up a new position in the Italian Space Agency (ASI). He will remain in the field of asteroids. We thank Ettore for his tremendous work, without him the NEOCC would not be in such a successful state as it is today. Luckily we found a very good successor: Juan Luis Cano. He has a profound knowledge and expertise in celestial mechanics, astrodynamics and the needed mathematical tools and methods to address orbit determination and prediction problems. He has participated as mission analyst in several ESA missions such as Smart-1, ExoMars, BepiColombo, Solar Orbiter, JUICE, Proba-3. He also participated in numerous asteroid mission studies (Marco Polo, Don Quijote, Proba-IP, AIDA/AIM). We wish him a successful start in his new position.

## Upcoming events

List of relevant meetings for the near future.

- CELMEC VII, 3–9 September 2017, San Martino al Cimino (VT), Italy  
<http://adams.dm.unipi.it/~simca/celmecVII/index.html>
- European Planetary Science Congress, 17–22 September 2017, Riga, Latvia  
<http://www.epsc2017.eu/>
- AAS Division for Planetary Sciences Meeting, 15–20 October 2017, Provo, UT, USA  
<http://dps.aas.org/meetings/current>

## NEAs with the shortest orbital period

List of the 10 known asteroids with the shortest orbital periods.

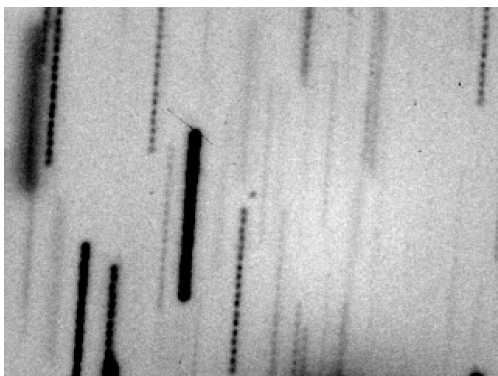
Object name	Sidereal period in days	Perihelion in au	Aphelion in au	Inclination in degrees	Size in m	Absolute magnitude H	Discovery date
2007 EB26	148	0.116	0.979	8.5	~ 510	19.6	2007-03-10
2013 JX28	170	0.262	0.940	10.8	~ 445	19.9	2013-05-11
(418265) 2008 EA32	177	0.428	0.804	28.3	~ 2200	16.4	2008-03-10
(164294)2004 XZ130	177	0.337	0.898	3.0	~ 350	20.4	2004-12-13
2010 XB11	177	0.288	0.948	29.9	~ 440	19.9	2010-12-02
2016 XK24	181	0.254	0.998	6.0	~ 270	21.0	2016-12-11
(325102) 2008 EY5	181	0.234	1.019	5.1	~ 360	20.1	2008-03-04
(434326) 2004 JG6	185	0.298	0.973	18.9	~ 840	18.5	2004-05-11
(202683) 2006 US216	186	0.279	0.562	3.4	~ 470	19.8	2006-10-30
(289227) 2004XY60	187	0.130	1.150	23.8	470	19.0	2004-12-14

## 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>



Asteroid 1991 VG as seen in the recovery images taken with VLT on 30 May 2017.

The image is a stack of 18 consecutive frames, each 1 minute long, aligned on the motion of the object.

Image credit: ESA NEOCC / ESO

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