

ESA's NEO Coordination Centre

Current NEO statistics

There are ~350 more objects discovered this year than in the same period of 2019.

- Known NEOs: 23 423 asteroids and 111 comets
- NEOs in risk list*: 1077
- Number of NEOs designated during last month: 263
- NEOs discovered since 1 January 2020: 1740

Focus on

On 16 August, asteroid 2020 QG was discovered by the Zwicky Transient Facility, a multi-purpose survey searching for moving objects funded by NASA's NEO Observations program. Follow-up obtained from Europe a few hours later showed that the object had come very close to the Earth, having flown just 3000 km over the Indian Ocean a few hours before discovery.

In theory, this distance would qualify 2020 QG as the closest NEO ever observed during a fly-by, excluding the four actual impactors. But is this true? It depends on what we call "fly-by", and our definition of "observed". If we restrict ourselves to objects discovered by telescopes while in space, and therefore designated by the MPC, then the record is indeed held by 2020 QG. However, there is another fascinating class of events that may beat it: the so-called grazing fireballs. They are similar to a normal fireball, caused when a small asteroid enters Earth's atmosphere; however, in this case the object itself travels through the atmosphere at a shallow angle, insufficient to make it fall to the ground. The meteoroid therefore "flies away" after the very close encounter, leaving Earth's atmosphere and returning to space. These events are of course rare, representing just a tiny fraction of all observed fireballs. However, a few well-known cases have been recorded, the most famous being the so called "Grand Teton fireball", observed and filmed by multiple eyewitnesses in 1972 over the Western United States and Canada: it came to about 60 km from Earth's surface, and would therefore beat the record of 2020 QG.

Upcoming interesting close approaches

No object known at the end of August will have any significant close approach during the month of September.

Recent interesting close approaches

Three objects came very close in August.

- In addition to 2020 QG, 2020 PA and 2020 QY2 also came close to the Earth, all passing within 0.2 lunar distances. They were all tiny, smaller than 10 metres.

News from the risk list

Two objects reached the top positions of our risk list in August.

- 2020 PB1 and 2020 PQ6 both reached high rankings. The former has, in the meantime, been removed thanks to observations obtained by our team with ESA's OGS telescope. The latter is still listed, with an impact probability of 1 in 2000 in 2029.

* 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

- On 11 August, OSIRIS-REx completed its second successful sample collection rehearsal and is now ready for the main event – touching down on asteroid Bennu’s surface in late October.
- We are releasing our fourth PDO riddle with this newsletter and with a deadline on 25 September. Find the release information here: <http://neo.ssa.esa.int/neo-occ-riddles>.

Upcoming events

Relevant international meetings over the next months.

- Apophis T-9 Years, 9–10 November 2020, Nice, France
<https://www.hou.usra.edu/meetings/apophis2020/>
- Hera Community Workshop, 11–13 November 2020, Nice, France
<https://www.cosmos.esa.int/web/hera-community-workshop/>

List of closest approaches of known asteroids

Since the advent of NEO surveys and not counting the four known Earth impactors, 13 objects have been discovered that came closer than two Earth radii from the Earth surface.

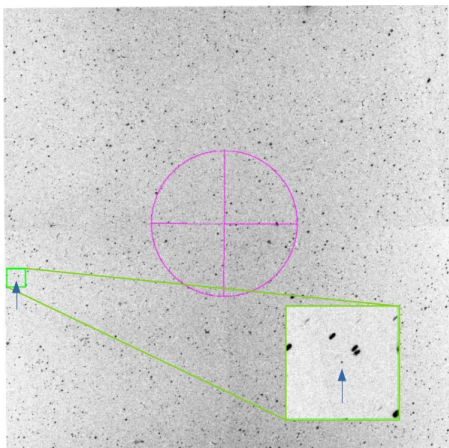
Object name	H magnitude	Size range in m	Close approach date	Miss distance in lunar distances	Miss distance in Earth radii	Miss distance in km	V magnitude
2020 QG	29.9	3–6	2020-08-16	0.008	0.5	2 900	9.6
2011 CQ1	32.0	1–2	2011-02-04	0.014	0.9	5 500	12.9
2019 UN13	32.2	1–2	2019-10-31	~ 0.016	~ 1.0	~ 6 200	12.9
2008 TS26	33.2	~ 1	2008-10-09	~ 0.017	~ 1.0	~ 6 400	14.1
2004 FU162	28.7	5–11	2004-03-31	~ 0.017	~ 1.0	~ 6 500	10.0
2020 JJ	30.0	3–6	2020-05-04	0.018	1.1	7 000	9.8
2018 UA	30.1	3–6	2018-10-19	0.019	1.1	7 300	10.6
2016 DY30	30.5	2–5	2016-02-25	0.021	1.2	7 900	11.7
2019 AS5	32.4	1–2	2019-01-08	0.023	1.4	8 700	14.2
2020 CW	32.6	1–2	2020-02-01	0.024	1.5	9 300	14.6
2017 GM	29.9	3–6	2017-04-04	0.026	1.5	9 900	12.0
2017 UJ2	30.9	2–4	2017-10-20	0.030	1.8	11 500	13.4
2011 MD	28.0	6	2011-06-27	0.032	1.9	12 300	10.6

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>



Astronomers at the Thuringian State Observatory (TLS) in Germany, in cooperation with ESA, observed 2020 QG in the night of 16 August. When 2020 QG appeared on the list of potential targets, the astronomer on duty, Dr. Stanislav Melnikov, decided to observe it. Using the large-format TAUkam camera and with some luck he and night assistant Dipl.-Ing. Uwe Laux succeeded to obtain three images which showed the object close to the border. The positions were measured by Dr. Bringfried Stecklum and sent to the MPC. The image shows the 1.3 x 1.3 square degree field with 2020 QG in the zoomed cutout. The centre of the circle marks the asteroid predicted location, whereas the zoomed region presents the area where it was actually found.

[Credit: TLS Tautenburg]

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