

ESA's NEO Coordination Centre

Current NEO statistics

The year began with about 200 new NEOs in a month, less than the recent average.

- Known NEOs: 31 207 asteroids and 118 comets
- NEOs in risk list*: 1442
- NEOs designated during last month: 192
- NEOs discovered since 1 January 2023: 205

Focus on

The 15th of February marks the 10th anniversary of the Chelyabinsk event, the most notable Earth impact of an asteroid since the even larger Tunguska event 105 years earlier. In the morning hours of that day, a 20-metre asteroid entered our atmosphere at a shallow angle relative to the surface and exploded in an airburst roughly 30 km above the city of Chelyabinsk, in the Russian Urals region. The resulting shockwave hit the surface shortly afterwards, causing widespread damage to thousands of buildings. But, thanks to modern technology, the chain of events it set in motion did not end there: the impact was filmed by hundreds of cameras and the videos quickly spread across the world over the internet, providing for the first time a near real-time account of the effects of an asteroidal impact over a populated area. This, in turn, has helped to increase public and political awareness of the asteroidal threat, leading to increased investments in the topic. As one of the many examples, the Chelyabinsk asteroid came from the direction of the Sun, and ESA is now studying a space mission specifically designed to detect similar objects approaching from that direction.

Upcoming interesting close approaches

A large object will have a distant fly-by in February.

- (199145) 2005 YF128 is a km-sized asteroid that will fly-by the Earth safely at 13 lunar distances on 16 February, reaching magnitude 13.

Recent interesting close approaches

A small object flew-by the Earth, the fourth-closest non-impacting fly-by ever found.

- 2023 BU approached our planet on 27 January at just 3600 km from the surface. With a size of about 5 metres, it is comparable to the small impactors discovered by surveys in the past. What made the approach particularly interesting is the significant advance warning we had: the object was found by Gennady Borisov, from Crimea (the same observer who discovered the interstellar comet 2I/Borisov), more than 5 days before the approach. Had it been on an impacting trajectory, we would have had a significant amount of time to perform targeted observations.

News from the risk list

We have a new high-rated object in our risk list.

- 2023 AJ1 is a new addition to our risk list, which reached Torino Scale 1 shortly after discovery, due to its size of about 300 metres and an overall impact probability of about 1 in 15 000 for year 2096. Further observations are in progress, and are already lowering the impact probability and should soon clarify the possible threat.

*The risk list of all known objects with a non-zero (although usually very low) impact probability can be found at <https://neo.ssa.esa.int/risk-list>

In other news

- The second edition of ESA's NEO and Debris Detection Conference was held in Darmstadt in January. Roughly 200 participants discussed possible synergies between the NEO and the SST domains.
- The list of presenters for the upcoming IAA Planetary Defense Conference in Vienna has been decided, and the final programme will be available soon. A large part of the material for the Hypothetical Asteroid Threat Exercise is already available [online](#).

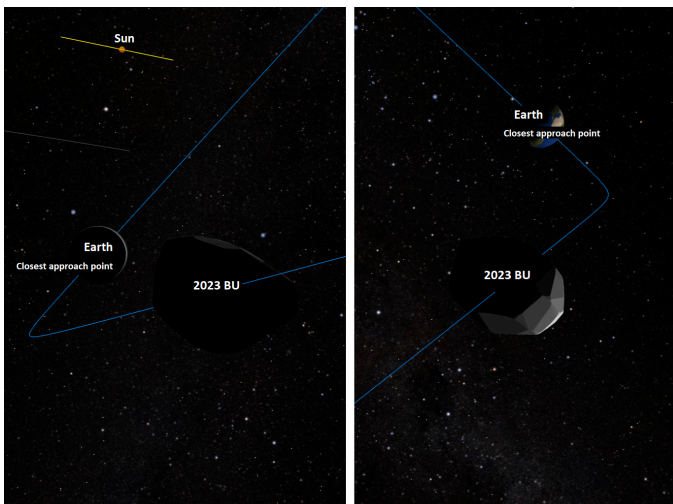
Upcoming events

- 8th IAA Planetary Defense Conference, 3-7 April 2023, Vienna, Austria
<https://iaaspace.org/event/8th-iaa-planetary-defense-conference-2023/>
- Asteroids, Comets, Meteors Conference, 18-23 June 2023, Flagstaff, USA
<https://www.hou.usra.edu/meetings/acm2023/>
- 55th Annual Meeting of the AAS Division for Planetary Sciences (joint meeting with the Europlanet Science Congress (EPSC) 2023), 1-6 October 2023, San Antonio, USA
<https://dps.aas.org/meetings/future>

Past known closest approaches

The table shows the list of the past closest approaches of known NEAs. It contains only objects that approached within 1 Earth radius but did not impact.

Object name	Close approach date	Miss distance in Earth radii	Miss distance in km	Size range in m	H magnitude
2020 VT4	2020-11-13	0.06	400	5–11	28.7
2020 QG	2020-08-16	0.46	2 900	3–6	29.9
2021 UA1	2021-10-25	0.48	3 000	1–3	31.8
2023 BU	2023-01-27	0.56	3 600	3–7	29.5
2011 CQ1	2011-02-04	0.86	5 500	1–2	32.0
2019 UN13	2019-10-31	0.98	6 200	1–2	32.2
2008 TS26	2008-10-09	1.00	6 400	1–1	33.2



The two images show the position of 2023 BU with respect to the Earth shortly before and after its closest approach.

The views, roughly aligned with the point of view of the asteroid, show that the asteroid came in from a direction close to opposition (left image). However, the gravitational deflection was so strong that the outgoing trajectory was also mostly in the night sky (right image).

This unusual geometry meant that it could be easily observed from Earth at night both before and after the approach, resulting in an exquisitely accurate knowledge of the object's trajectory: we know the distance of the closest approach to a precision of about 20 meters.

[Credit: ESA / PDO]

Links for more information

Website: <https://neo.ssa.esa.int>

Close approaches page: <https://neo.ssa.esa.int/close-approaches>

Risk List: <https://neo.ssa.esa.int/risk-list>

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