

→ CAFS FOR 2021 PDC - DAY 2

ESA's NEO Coordination Centre

This document does not describe a real potential asteroid impact. The information here is fictional and provided only to support an emergency response exercise conducted during the International Academy of Astronautics (IAA) 2021 Planetary Defense Conference (virtually) in Vienna, Austria, 26-30 April 2021. This is only an exercise.

Close approach fact sheet for asteroid 2021PDC

Status as of: 2021 May 02 15:25 UTC.

A large asteroid has 100% probability to impact the Earth in 20 October. NEOCC is providing this CAFS as this case fulfils the criteria of both ESA and IAWN for generating an *impact warning message*.

| | |
|-----------------------------------|--------------|
| Impact date | 2021-10-20 |
| Impact time | ~ 17:13 UTC |
| Velocity at entry interface point | ~ 15.43 km/s |
| Size range | 76-226 m |
| Discovery date | 2021-04-19 |
| Discovery site | PDC EXERCISE |

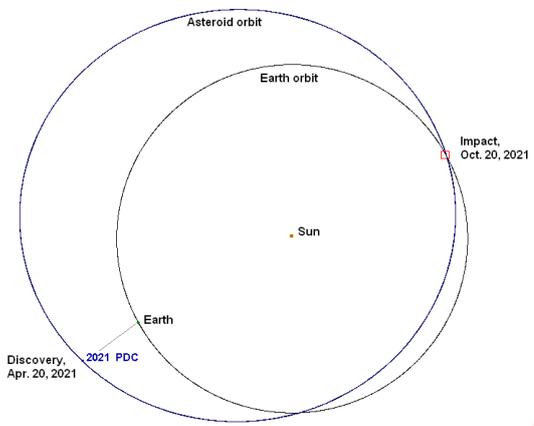
All error bars quoted in this table correspond to one standard deviation.

Orbit information

All orbital elements in this table are referred to the ecliptic reference system at J2000.0 epoch and to the pre-impact conditions.

| Date before the possible impact | Orbital period (years/days) | Aphelion distance (au) | Perihelion distance (au) | Eccentricity | Inclination (deg) |
|---------------------------------|-----------------------------|------------------------|--------------------------|--------------|-------------------|
| 2021-09-19 | 1.41/515 | 1.596 | 0.923 | 0.2673 | 15.73 |

EXERCISE



Source: JPL

EXERCISE

Physical and mitigation information

| Days to closest approach | Impact probability | Composition | Rotation period (hours) |
|--------------------------|--------------------|-------------|-------------------------|
| ~ 171 | 1 | Unknown | Unknown |

Observational information

The asteroid continues to be tracked almost every night and will remain observable from now until the potential impact. Large telescopes will be required for these observations, since the asteroid will remain very faint. Today's update was prompted by the discovery of new detections from archived sky images taken in 2014, when 2021 PDC made a distant passage by Earth.

Other information

| Encounter peculiarities | Previous encounter | Next encounter |
|-----------------------------|--------------------|----------------|
| Object on impact trajectory | 2014-06-06 | Unknown |

Only encounters within 0.05 au are considered.

Links

NEO information:

<https://neo.ssa.esa.int/pdc-2021-impact-exercise>

Close approaches page:

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



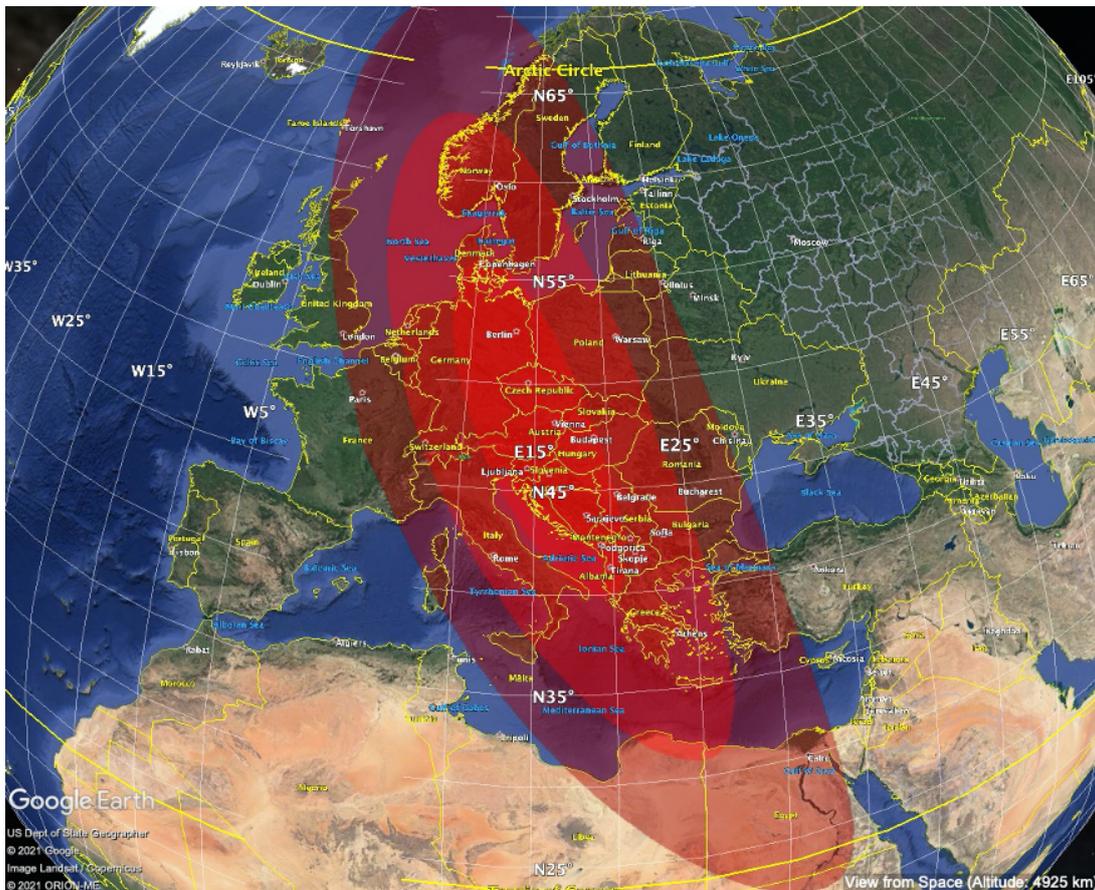
Impact risk information sheet for asteroid 2021PDC

Impact information

| Size (m) | Impact date (UTC) | IP | TS | Velocity (km/s) | Angle (°) | Expected energy (Mt TNT equiv.) |
|----------|------------------------|----|----|-----------------|-----------|---------------------------------|
| 76-226 | 2021-10-20 17:13:00 | 1 | 4 | 15.43 | 0-90 | 35-237 |

Impact corridor plot

The potential impact location can be anywhere within a large region covering much of Europe and reaching into northern Africa. Countries near the center of the impact region include Denmark, Germany, Czech Republic, Austria, Slovakia, Hungary, Slovenia, Croatia, Serbia, Montenegro and Albania. The region extends to Norway and Sweden on the north, England, France and Italy on the west, Poland, Romania and Bulgaria on the east, and Greece and Egypt on the south.



The different shadings in the figure indicate the impact probability levels: 40% inside the central dark red region, 87% inside the boundary of the medium red region, and 99% inside the entire region. Source: JPL.

Impact effects

The predominant hazard is an airburst causing blast overpressures possibly reaching unsurvivable levels. The size of the potential blast damage area could range from local (a few kilometers) at the small end at the possible range of asteroid sizes, to regional (hundreds of kilometers) at the large end.

Owed to uncertainties in the measurements, the real object diameter and density might even vary more than accounted for in the standard assumptions. The full possible diameter range is 35 to 700 m and the full range of potential impact energies ranges from 1.2 Mt TNT equivalent up to 13 Gt TNT equivalent.

