

# NASA just shut down a planetary defense mission that tracks asteroids. Now what?

August 13 2024, by Steven Tingay

---



Artist's impression of NEOWISE spacecraft. Credit: NASA/Caltech-JPL

Launched in 2011, NASA's [NEOWISE mission](#) operated in Earth's orbit until late last week. It detected more than 3,000 [near-Earth objects](#) or NEOs—asteroids or comets whose orbits can bring them close to Earth, even with the possibility of a collision. NEOWISE was shut down on August 8.

Surveying the population of NEOs is central to the emerging concept of

[planetary defense](#). That is, understanding and mitigating the risk of collision from asteroids large enough to do significant damage to Earth.

NEOWISE has made fundamental contributions to establishing the knowledge base for planetary defense, with more than 200 of the 3,000 objects it studied not known to us previously.

Now at mission end, and commanded by NASA to shut itself down, NEOWISE will re-enter Earth's atmosphere before the end of this year. Where does that leave us with defending our planet?

## **From astrophysics to planetary defense**

NEOWISE started life as a different mission, simply called WISE ([Wide-field Infrared Survey Explorer](#)). It was designed to study the [infrared radiation](#) from distant galaxies in the universe.

Infrared means "beyond red"—[infrared light](#) sits just past the red end of the spectrum of colors humans can see. We know [infrared radiation](#) better as the heat from the sun, for example, or from a radiator keeping us warm in winter.

When the coolant on the WISE mission ran out and these sensitive observations of galaxies couldn't be carried out any more, NASA granted a mission extension under the NEOWISE name. They realized the telescope system was still sensitive enough to detect asteroids and comets that come close to Earth and the sun, thereby having a very strong infrared signal.

NASA has an extraordinary history of squeezing extra life out of [missions that reach completion](#). In this case, NEOWISE represented an entire second life, in an entirely different area of research.

## How will we defend Earth now?

As well as the discovery and study of thousands of NEOs, NEOWISE established the foundation of knowledge that has informed a new, dedicated planetary defense [mission](#). NASA's [NEO Surveyor](#) will be launched in 2027.

NEO Surveyor's goal is to discover approximately two thirds of all NEOs larger than 140 meters in diameter, over a five-year baseline survey. This is a big step toward fulfilling the mandate the [United States Congress has provided to NASA](#): to discover 90% of all NEOs in this size range.

If they hit Earth, asteroids of this size could cause mass casualties if the impact were over a large metropolitan region.

You might think this poses a bit of a risk—shutting down NEOWISE three years before launching NEO Surveyor. What happens if one of these big asteroids comes our way in the next few years?

The risks are very small, as estimates show asteroids 140 meters in diameter impact Earth only approximately every 20,000 years. So, we would have to be extremely unlucky to have one in any given three-year period, especially impacting a place that would cause a large amount of damage. Only around 3% of Earth's surface [is occupied by urban areas](#).

NASA doesn't really have much of a choice with the end of NEOWISE. The sun's 11-year activity cycle is picking up and causing Earth's upper atmosphere, the [ionosphere](#), to thicken. NEOWISE is flying through this ionosphere and can't raise its orbit, so the ionosphere is inevitably dragging NEOWISE back to Earth.

NEO Surveyor started construction in 2023, so a 2027 launch is pretty impressively rapid, which is minimizing the gap between NEOWISE and

NEO Surveyor.

NEOWISE is scheduled to enter Earth's atmosphere before the end of the year, but we don't know precisely when.

Weighing almost 700kg, some of NEOWISE itself is likely to impact the surface of Earth. Hopefully it stays away from populated areas in the process—some recent re-entry events have resulted in [space debris falling reasonably close to populated areas](#).

## **An asteroid is coming! What next?**

Knowing about an asteroid on a collision course with Earth is one thing. Doing something about it is another thing altogether.

Huge steps toward planetary defense occurred two years ago, when [the DART mission](#) flew to an [asteroid](#), impacted it, and changed its trajectory. This demonstrated that it's possible to change the course of asteroids, which could be used in the future to protect Earth from a collision.

Predicting potential Earth impacts as far as possible in advance, years preferably, gives the DART-style technology approach a chance.

The pioneering work of NEOWISE, and the upcoming comprehensive observations of NEO Surveyor, will place an enormous amount of information in our scientific bank, which will never go out of date and will be the basis for planetary defense for perhaps hundreds of years into the future.

This article is republished from [The Conversation](#) under a Creative Commons license. Read the [original article](#).

Provided by The Conversation

Citation: NASA just shut down a planetary defense mission that tracks asteroids. Now what? (2024, August 13) retrieved 13 August 2024 from <https://phys.org/news/2024-08-nasa-planetary-defense-mission-tracks.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.