China’s spiraling space station will plunge to Earth in about a week

After a couple years of anticipation, China’s first human space station – Tiangong-1 – will drop out of its orbit in about a week and plunge into Earth’s atmosphere. The European Space Agency has pinpointed the vehicle’s reentry date to sometime between March 30th and April 2nd, with the event most likely happening on April Fools’ Day. Once the station descends, it will finally put an end to all of the anxiety over the location of this vehicle’s landing.

Tiangong-1’s fall has caused a lot of concern because China no longer has control of the space station. The country’s engineers can’t just fire up the vehicle’s engines again and deposit it over open ocean. Tiangong-1 is pretty heavy, too. It weighed nearly 19,000 pounds (8,500 kilograms) when it first launched in 2011, making it one of the more massive objects to do an uncontrolled dive back to Earth. It’s also fairly dense, so while much of it will burn up in the atmosphere, it’s possible some big chunks of the station could make it all the way to the ground.

Of course, the chances of any bits of this station hitting you – or anyone, really – are incredibly remote. You can read here why the odds are in your favor (though it may not be enough to allay people’s fears). Additionally, we’ve been through this before with much bigger objects. While most spacecraft operators have a plan to safely get rid of vehicles this big, Tiangong-1 ranks the 50th heaviest object to do an uncontrolled reentry into Earth’s atmosphere, according to calculations done by Jonathan McDowell, an astrophysicist at Harvard and spaceflight expert.

Still, tracking experts won't know for sure exactly *where* Tiangong-1 is going to come down until the day it happens. All we know for sure is that the station is waffling between 43 degrees North and 43 degrees South latitude, which covers most of South America, Africa, and Australia, as well as portions of North America, Asia, and Europe. So it's going to fall somewhere between those two regions. There's a higher probability that Tiangong-1 will fall somewhere around these boundaries, though, since the space station actually spends more time at the upper and lower latitudes of its orbit. But it's only a slightly higher chance, and there's still quite a big amount of area where the station can go down.

A map showing the possible region where Tiangong-1 might fall. There is a slightly higher chance of it falling in the yellow regions, but it can fall in the green region as well.
Image: Aerospace Corporation

The uncertainty of the reentry point stems from the fact that the space station is moving fast – about 17,000 miles per hour, to be exact. So being off by just an hour means being off by around 17,000 miles. However, trackers are able to narrow things down as we get closer to the exact date. "As we get into the last day, we'll probably have an error bar of a few hours," McDowell tells *The Verge*. "Three hours is twice around the world. And once it gets down to plus or minus six hours, you can start ruling out continents."

Agencies like NASA and ESA are keeping tabs on Tiangong-1, as well as the Aerospace Corporation, a nonprofit that provides research and guidance on space missions. Trackers are continuously monitoring the height of the space station over

time, how the vehicle is oriented, and how the upper atmosphere of Earth is behaving. The reason that satellites fall out of space at all is because of the very thin atmosphere that exists in lower Earth orbit. Air particles are constantly bumping into objects orbiting at this height, nudging them slowly downward. The more air bombarding a satellite, the faster it goes down.

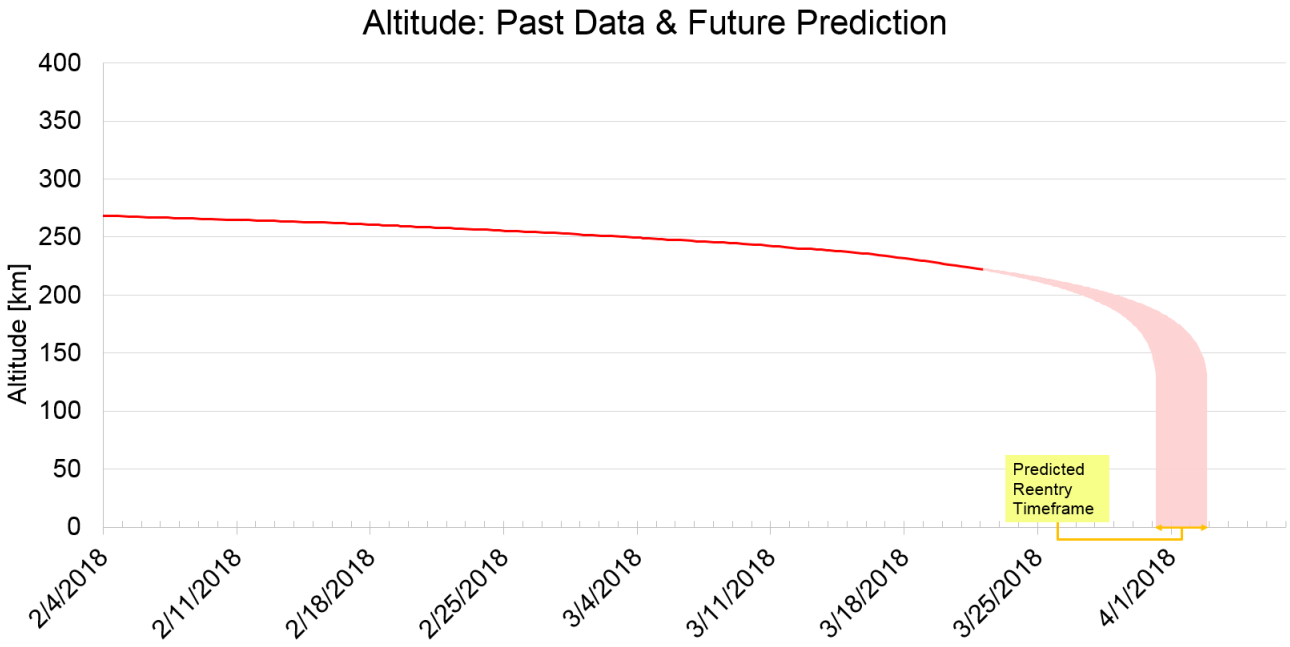


Image: Aerospace Corporation

Solar activity can affect this process, too. X-rays and extra particles streaming from the Sun can make the upper atmosphere more dense, and that can speed up an object's fall to Earth. Since we're only about a week out from Tiangong-1's reentry, trackers have a better idea of how the atmosphere is going to behave during that time. "It's predictable what the Sun is going to do," says McDowell. "With less time between now and reentry, there's less time for the Sun to do something really berserk."

But for now, Tiangong's estimated reentry date could be off by one or two days, according to The Aerospace Corporation.

Experts will be able to decrease those error estimates over the next week, which means more waiting until this weekend. “Really it’s just ‘wait and see,’ right now, and [we’ll] keep refining the estimates until the error bars get low enough,” says McDowell. “And then on the last day, there will be frantic attempts to model the final hours and get a prediction for exactly where it’s coming down.”

But if it makes you feel better, you have much better odds of winning the Mega Millions lottery than getting hit by space debris in your lifetime.

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