

Amateur astronomers say Chinese space station could crash to Earth – are they right?

July 19 2016, by Daniel Brown



The Changzheng-2F rocket with the Shenzhou-10 manned spacecraft carries three Chinese astronauts to the space station Tiangong-1. Credit: EPA/STR

China's first space station, Tiangong-1, has hit the headlines after satellite trackers suggested [it might be out of control](#) and about to crash to Earth – potentially [into a populated area](#).

So should we worry? If China had indeed lost control of the module, it is not certain that it would end up in a trajectory that would make it crash

into Earth anytime soon. But even if it does, [it will not create an enormous fireball](#), which you may think and would not be likely to cause widespread damage.

The event is nevertheless extremely interesting as it demonstrates the increasing role of [amateur astronomers](#) in keeping an eye on space missions – even the most secretive ones.

China is just one of many nations currently exploring space using manned and unmanned space probes. In 2011, China successfully deployed its first space station "Tiangong" into orbit around Earth at an altitude of 350-400km. This space laboratory module [weighs 8.5 tonnes is 12 metres long with a diameter of three metres](#). That is fairly small, in fact it is smaller than the [American Skylab station](#) launched in 1973.

Tiangong had an estimated lifetime of two years. Its main purpose was to test important docking manoeuvres for resupplying and operating a space station. During its lifetime, two Chinese Shenzhou missions (9 and 10) visited the space station, each consisting of three crew members including a female "taikonaut".

Status of Tiangong

Just like the International Space Station, Tiangong can be easily observed from Earth as it is very bright and moves quickly across the sky. Therefore, amateur astronomers regularly observe it and other such objects. Even though Tiangong is many times smaller than the ISS and cannot be easily be seen in high resolution, the path and its brightness can still be measured reliably.



We survived MIR crashing ... and it was way bigger! Credit: NASA

This information can help determine its orbit and rotation, giving an indication of the health of the space station. Amateur astronomer [Thomas Dorman, an experienced satellite tracker](#) from Texas, US, suggested the Chinese had lost control of Tiangong when he noticed the

space station was rotating a certain way.

Tiangong was in sleep mode as it was never intended to be revisited beyond 2013. In fact, the [China Manned Space Engineering](#) office stated the space station had ended its mission and terminated data services in March this year. The organisation also reported that their [telemetry service had failed](#), making their space station effectively impossible to contact. The latest reports from some satellite trackers suggest it might now be on a trajectory to crash into Earth. However, Dorman also suggested that China could still awaken Tiangong for a coordinated reentry and may be saving its remaining fuel for this.

The lack of a statement from the China Manned Space Engineering office has been interpreted by some as an additional indication that the space station is indeed about to burn up in our atmosphere. However, this doesn't mean that it is. [T.S. Kelso](#), a senior research astrodynamacist at the [Center for Space Standards & Innovation](#) in the US, stated that the station was shifted into a higher orbit at the start of this year and its altitude is decreasing much more slowly than before.

As a result, Tiangong might have a fairly long lifespan, possibly not burning up until 2017. And we should not forget the political dimension to coverage of Tiangong by Western media. As an [anonymous source told the Global Times](#), suggesting that the Tiangong situation is different in nature to the uncontrolled reentry of the [US Skylab in 1979](#) over the Indian Ocean is basically a way of making China look threatening.

We have survived even greater objects than SKylab re-entering Earth's atmosphere. In 2001, the 150 tonne MIR [space station](#) burnt up during planned reentry – but the event resulted only in a few holiday snaps of the fragments, taken by tourists on the remote Fiji Islands. Alter all, most of our planet is covered by ocean or wilderness so even if some fragments did hit the Earth, they are extremely unlikely to hit a

populated area.

Lessons learned?

It is interesting that the coverage has been triggered by amateur astronomers' observations of Tiangong. Everyone can observe and monitor the existence of satellites in orbit – keeping tabs on what goes on up there. Therefore, it becomes a lot harder keeping things secretly in orbit, as demonstrated by the regular tracking of the [US X-37B Space Plane](#). The details of the mission, launched by the US Air Force, are mostly classified.



Tiangong-1. Credit: TMRO/youtube, CC BY

The Chinese space agency is faced with an interesting situation of global

impact. Can they prove that they have an open and responsible space policy, as [outlined by Dean Cheng](#), a senior research fellow at the Asian Studies Center at the Heritage Foundation, US. This might be achieved by publishing a reentry trajectory, including times and a location.

This would be an important positive signal given China's increasingly active space programme, as well as their past track record including the [intentional destruction of one of their satellites](#) in 2011, which caused a vast cloud of space debris. Some 900 objects are now part of the ever increasing cloud of space junk that is becoming more and more of a problem for satellites and future space stations, including Tiangong 2, which will be launched this September.

What is becoming increasingly evident is that we need globally recognised and enforceable space legislation that ensures safe and responsible operations in space – specifically around the Earth. But Space Law is still in its infancy, as exemplified by the Outer Space and Moon Treaty. This was created in the 1960s but has still not been recognised by all states.

Nevertheless, the coverage of Tiangong makes it apparent that we do not have to rely on a specific monitoring organisation with custom-made observatories, directly or indirectly funded by the space industry, and therefore not really independent, for an insight into what is going on around the Earth. We, the people, are now able to do this by ourselves. So we are turning the tables on space agencies and industries around the world: we are watching them.

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