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**Space junk multiplies uncontrollably**

2024-2025 SPACE

oral sessions with C. Hamard

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[www.theguardian.com](https://www.theguardian.com/science/2024/oct/19/humanity-would-watch-helplessly-as-space-junk-multiplies-uncontrollably-has-the-number-of-satellite-launches-reached-a-tipping-point%22%20%5Ct%20%22_blank), by Shaoni Bhattacharya, Oct 2024

“Since the start of the space age, we’ve had a throwaway culture – a bit like plastics in the ocean,” says Nick Shave, managing director of Astroscale UK, an in-orbit servicing company headquartered in Japan.

Getting a satellite into orbit around the Earth used to be a big deal. From the launch of the first, Sputnik, in 1957, as it became easier and cheaper to put satellites into space, the numbers have boomed. In 2022, there were about 6,000 and by 2030, [one estimate suggests](https://www.gao.gov/assets/gao-22-105166.pdf) there will be nearly 60,000 satellites in orbit around our planet. Look up on a clear night now and [you may well see a bright train of dots](https://www.skyatnightmagazine.com/news/future-megaconstellations) traversing the sky. These are part of SpaceX’s “megaconstellation” of satellites, Starlink, which offers increased access to broadband communication across the world.

But the main international law, the UN’s 1967 Outer [Space](https://www.theguardian.com/science/space) treaty, is more than 50 years old.

There’s now a huge amount of junk, or space debris, in orbit. “That stuff’s dangerous, don’t get me wrong,” says John Janka, global government affairs and regulatory chief officer. “But there’s also –more than 1m pieces of debris between 1cm and 10cm that are lethal and non-trackable. What does that mean? It means you can’t see it, you can’t avoid it, and today you can’t shield your satellite against it.”

But the concern over debris is about more than it damaging an individual satellite or craft. Space operators are acutely aware of a danger known as the Kessler effect or syndrome, a theory that as the number of satellites increased, so would the probability of collisions. As collisions increase, the more debris is produced, and the greater the risk of more collisions. At a critical mass, one collision could trigger an unstoppable cascade of collisions, such that an entire orbit could be rendered useless.

A 2022 overview paper by Viasat paints [an almost apocalyptic picture](https://www.viasat.com/content/dam/us-site/corporate/documents/Viasat%20White%20Paper-Managing%20Mega-Constellation%20Risks%20in%20LEO%20%28Updated%20Nov%2022%29%20%28A4%29.pdf): “If a tipping point is reached, all of humanity would watch helplessly as space junk multiplies uncontrollably. Without timely intervention, we risk bringing the space age to an inglorious end, and trapping humanity on Earth under a layer of its own trash for centuries, or even millennia.”

It continues: “Not only an abrupt end to space exploration, but also the loss of all the benefits of space technology – including navigation, weather forecasting, climate measurements, and even satellite broadband (the intended purpose of the megaconstellations being deployed).”

As well as numbers, Janka points out, size is an issue. “We’re putting up tens of thousands of satellites, and we’re putting up increasingly bigger satellites into low Earth orbit – bigger in terms of cross-sectional area and mass – we’re finding that we’re having perhaps some unanticipated impact on things like collision risk.”

He compares it to a bigger sail on a boat catching more wind. “The bigger satellite, the more cross-sectional area, the greater chance of being hit by debris.” And bigger satellites create more debris when they are hit.

So what’s the solution? Tracking and manoeuvring satellites to avoid collisions is one way to manage risk. Elon Musk’s SpaceX manages its Starlink satellites in this way, and de-orbits those deemed “[at an elevated risk of becoming non-manoeuvrable](https://api.starlink.com/public-files/Commitment%20to%20Space%20Sustainability.pdf)”. (530 words)