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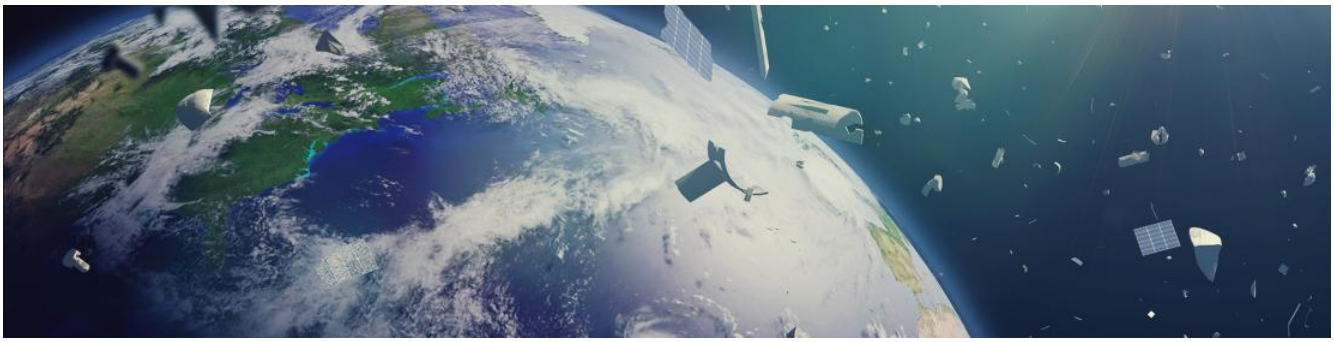

Rethinking space junk in an age of satellite overload

From recycling old satellites in space to turning rocket parts into fuel or beaming debris back to Earth, researchers are exploring new ways to tackle the growing problem of space junk.

07 April 2026 - By JONATHAN O'CALLAGHAN

For decades, we have been littering space with decommissioned satellites and rocket parts orbiting our planet. Now this space debris poses a growing threat to the satellites and spacecraft we rely on. But researchers believe some of this debris could be turned into a valuable resource.

According to the European Space Agency, more than 2 700 dead satellites are currently orbiting Earth, along with around 54 000 objects larger than a golf ball and an estimated 140 million pieces bigger than a fleck of paint.

Over the years, many solutions have been proposed – from new regulations to limit debris to technologies designed to remove it. However, two EU-funded research initiatives are taking a different approach as part of a European Innovation Council (EIC) push to tackle space debris.

Through its support for high-risk research, the EIC is helping scientists test radically new ways to deal with space debris, including dismantling and recycling old satellites in space and "beaming" smaller fragments back into Earth's atmosphere where they will burn up and disintegrate.

Salvaging the wreckage

A team of companies and universities from the UK, Spain, Estonia and Sweden is exploring whether old satellites could be taken apart and reused directly in space. Their work, known as DEXTER, was launched in 2025 and is led by Leonard Felicetti, a space engineering associate professor at Cranfield University in the UK.

"We are cluttering space with new objects," said Felicetti. "What we want to do is to try and reuse the material that is already there."

Satellites are built from valuable materials such as aluminium. While some eventually fall back to Earth and burn up, others remain in orbit for decades or even centuries. The idea is to recover those materials before they become a long-term hazard.

The DEXTER team is tackling two key challenges: how to safely dismantle satellites in orbit and how to reuse their materials in a meaningful way.

One option is to repurpose the metal to build new structures in space, such as rigid frameworks that could support or extend satellites. Another more ambitious idea is to turn that material into fuel.

To get there, old satellites would first need to be captured and taken apart. Researchers are developing tools that could make this possible, including robotic arms to grab debris and lasers capable of cutting through metal in space-like conditions. Early tests are already under way in the lab.

Turning scrap metal into fuel is more complex. One idea being explored by project partner Magdrive in the UK is whether aluminium could be converted into plasma and used in an ion thruster – a type of engine that propels spacecraft using charged particles.

“It’s not a classical chemical fuel,” Felicetti said. “But it could offer a new way to power satellites using materials that are already in orbit.”

How such fuel would be stored or shared is still an open question. One possibility is to create refuelling depots in space, where spacecraft could dock and take on fuel produced from recycled debris.

For now, the focus is on proving the concept. The team hopes to demonstrate key technologies in orbit within the next few years.

Beaming debris back down

While some researchers are looking to reuse debris, others are focused on removing it altogether, especially the smaller fragments that are hardest to track and most dangerous.

Some companies have already tested spacecraft that can attach to large pieces of debris and pull them back into the atmosphere. But this approach does not work well for tiny fragments, which are far more numerous.

Led by the French start-up OSMOS X, researchers from France, Germany, Luxembourg and Spain are collaborating in an EU-funded initiative called ALBATOR. The team is testing whether smaller fragments of debris can be beamed out of orbit using a stream of charged particles.

OSMOS X CEO Matthieu Cavellier calls it an “ion blower” – a device mounted on a spacecraft that nudges debris back into Earth’s atmosphere, where it burns up.

The aim is to target debris down to a millimetre in size, including fragments left over from a satellite collision. Though small, they can create big problems.

“Imagine two satellites collide,” Cavellier said. “You need to act quickly to clean up the debris before it spreads.” Time matters because each collision can generate new debris that triggers further collisions, a cascade known as the Kessler syndrome.

Keeping space open

The ALBATOR team envisions a fleet of spacecraft that could be deployed when needed, flying into debris clouds and clearing them using short bursts from the ion beam.

The technology is still being tested, with plans for experiments in a vacuum chamber in Germany in 2027, ahead of a future mission to space.

Space is becoming an increasingly busy and essential part of modern life, and the risks posed by debris are growing. The most immediate benefit of both projects is keeping Earth's orbit usable and open for future generations.

For Felicetti, the goal is not just to remove a hazard, but to rethink how we use space altogether.

"Space debris is a problem because it can collide with other satellites," he said. "Our intention is to transform this liability into an opportunity."

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More info

- DEXTER (CORDIS)
- DEXTER project website
- ALBATOR (CORDIS)
- ALBATOR project website
- European Space Agency
- Space Situational Awareness – Europe's eyes on space