# Amazon joins satellite race amid growing concerns over space debris and congestion



On the evening of April 28th, Amazon launched its inaugural batch of 27 Project Kuiper satellites, entering the competitive arena of mega constellations alongside established operators like SpaceX’s Starlink and the UK-based OneWeb. This expansion contributes to a broader surge in satellite deployments, as multiple companies, including Chinese entities such as the government-backed Guowang constellation and the commercial Qianfan project, aim to place thousands of satellites into low-Earth orbit (LEO).

According to a recent report by the European Space Agency (ESA), over 2,500 objects were launched into LEO in 2024 alone—more than five times the total launches any year prior to 2020. The majority of these launches support commercial satellite constellations, driving an unprecedented increase in orbital traffic. ESA forecasts that by 2050, there could be nearly 50,000 objects larger than 10cm orbiting Earth, with an average of eight satellites launched each day, adding approximately four tons of material into space daily.

These satellites facilitate vital services like global communications and internet access in remote or disaster-stricken areas. However, the rapid proliferation of satellites is escalating the risk of orbital overcrowding. LEO, home to thousands of active satellites and an equally large number of debris fragments, is becoming increasingly congested. Vishnu Reddy, a debris researcher at the University of Arizona, describes the situation as “a race to fill low-Earth orbit.”

The abundance of debris, travelling at high speeds, poses substantial collision risks. ESA estimates over 1.2 million objects are capable of causing catastrophic damage if they collide with operational spacecraft. Should collisions between debris fragments occur, a cascade effect—known as the Kessler syndrome—could ensue, exponentially increasing debris and potentially rendering certain orbital paths unusable. Olivier Hainaut, an astronomer at the European Southern Observatory, cautions that, “if they put too many [satellites], there will be collisions. And once you start having collisions, you could have a chain reaction.”

The overcrowding issue already affects operational efficiency, with satellites potentially interfering with each other’s transmissions. Climate change further complicates the problem, as increased greenhouse gases cause the upper atmosphere to contract, diminishing its natural ability to drag debris back to Earth.

Responsibility for tracking and mitigating collisions largely falls to satellite operators, but enforcement and coordination are fragmented. The US Space Force monitors space objects, updating catalogs regularly, but satellite companies are expected to manage and avoid potential collisions independently. Reddy noted, “the hope is that people will be able to fend for themselves, based on what is freely being provided by the United States.” Amazon has not publicly commented on its plans for safely deorbiting Kuiper satellites or managing orbital conjunctions.

When potential collisions—termed conjunctions—arise, satellites must adjust orbit using limited fuel, impacting operational profitability. “Now you have the people at Starlink and Kuiper who have to decide who’s going to burn the gas to avoid hitting each other,” Reddy said. Coordination challenges heighten given the lack of formal rules or clear responsibilities governing such maneuvers. In emergencies, operators might need to communicate with foreign companies, complicating prompt action.

A serious near-collision in 2019 between a Starlink satellite and the ESA’s Aeolus satellite underscored these risks. ESA had to execute an emergency maneuver to avoid collision, and attempts to coordinate with SpaceX were initially hindered by communication errors. Holger Krag, head of ESA’s Space Safety Programme, described the incident as “a template for what we see every day,” highlighting the absence of international legal frameworks akin to air traffic control for spacecraft.

Currently, space law remains anchored to the Outer Space Treaty of 1967, which did not anticipate commercial satellite operations. Experts agree that new, enforceable international regulations are required but note the lack of political will for comprehensive global cooperation. Josef Aschbacher, ESA’s director general, summed up the sentiment at a recent conference: “The message is crystal clear: space debris is a problem and we have to do something about it.”

As the number of satellites continues to climb, the complexities of managing shared space traffic and mitigating debris risks present ongoing challenges. Industry experts advocate for the satellite operators themselves to spearhead the development of norms and practices to mitigate collision risks, leveraging their operational experience to address an issue that spans national borders and regulatory voids.

Source: [Noah Wire Services](https://www.noahwire.com)

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