# Amazon launches first Kuiper satellites amid rising space congestion concerns



On the evening of April 28th, Amazon initiated the first launch of its Project Kuiper satellites, marking its entry into the competitive arena of mega satellite constellations, a field already dominated by companies such as SpaceX with its Starlink service. Amazon now has 27 satellites in low-Earth orbit, joining a growing number of firms, including the UK-based OneWeb and multiple Chinese projects, in deploying large constellations that could eventually number in the thousands.

An extensive report by the European Space Agency (ESA) highlights a significant surge in satellite launches, noting that over 2,500 objects were sent into low-Earth orbit during 2024 alone—more than five times the annual figures before 2020. These commercial satellite deployments now dominate the volume of launches, contributing to an estimated presence of nearly 50,000 objects larger than 10cm in orbit by 2050. This trend translates to an average of eight satellites launched daily, collectively adding around four tons of material to space each day.

While these satellite constellations aim to enhance communication capabilities, especially for remote or disaster-stricken areas, the exponential increase in objects is causing serious overcrowding in orbital space. ESA’s report underscores that the number of active satellites now rivals the number of space debris fragments, many of which travel at high velocities capable of causing catastrophic collisions.

“The satellite operators are obviously tempted to put more and more satellites,” said Olivier Hainaut, an astronomer at the European Southern Observatory, who has studied the visibility impact of Starlink satellites. “However, if they put too many, there will be collisions. And once you start having collisions, you could have a chain reaction, Kessler syndrome, and you can have a whole range of orbits rendered unusable.”

This cascading risk of collision, known as the Kessler syndrome, could jeopardise the usability of key orbits for future missions. Moreover, satellite interference is increasingly problematic when satellites are too close together, and factors like climate change—by shrinking the upper atmosphere—are reducing natural debris clearance mechanisms, exacerbating the congestion problem.

Current debris management remains fragmented and largely reliant on operators themselves. The US Space Force diligently tracks many orbiting objects and updates catalogs multiple times daily, providing data that operators use to avoid collisions, but there is no central authority enforcing responsibilities. “Satellite operators are responsible for their satellites,” explained Vishnu Reddy, a debris researcher at the University of Arizona. “The hope is that people will be able to fend for themselves, based on what is freely being provided by the United States.”

For operational satellites, such as those by SpaceX and Amazon, there is an expectation that defunct satellites be deorbited responsibly. SpaceX is noted for deorbiting its Starlink satellites within a few years by utilising relatively low orbital altitudes where natural atmospheric drag facilitates re-entry. Amazon’s Kuiper satellites are launched at slightly higher altitudes, but still face eventual deorbiting through crowded orbital ranges, raising questions about how they will manage safe re-entry. Amazon has not publicly detailed its deorbit plans or collision management strategies.

The financial and operational cost of collision avoidance is another growing concern. Every necessary manoeuvre to avoid collision consumes a satellite’s limited fuel, impacting operational longevity and profit. “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, and that’s going to eat into their profit,” Reddy noted.

The stakes extend beyond commercial operators. Thousands of smaller debris pieces lack clear ownership or management, making collision prediction and prevention especially difficult. A significant collision resulting in a cloud of debris could trigger a series of further collisions, creating an uncontrollable debris cascade.

The lack of formal international regulation for space traffic management presents a persistent challenge. Holger Krag, ESA’s Head of Space Safety Programme, pointed out the limitations: “We are far away from a clear flight rule that would solve exactly the situation that Aeolus and Starlink had,” referring to a 2019 near-collision between an ESA Aeolus satellite and a Starlink satellite. ESA had to take emergency action to avoid the collision, but communication with SpaceX was hampered by technical issues.

Currently, satellite operators largely rely on voluntary cooperation, which may be insufficient as the number of players and satellites grows. Reddy emphasises the need for satellite companies to take the lead in establishing operational norms and guidelines, proposing that experienced operators like SpaceX develop coordinated approaches rather than waiting for slow-moving international agreements.

The increasing complexity of space traffic is also heightened by geopolitical dimensions. As new constellations emerge from diverse countries, including China’s government-supported Guowang and commercial Thousand Sails projects, questions arise over coordination and responsibility when satellites from different nations potentially come into conflict. “Who’s gonna move? Are we going to sit there and see who blinks first?” Reddy asked.

Josef Aschbacher, director general of ESA, summarised the prevailing sentiment at a recent space debris conference: “The message is crystal clear: space debris is a problem and we have to do something about it.” The urgency to create enforceable rules for space traffic and debris management is underscored by the reality that as satellite mega constellations expand, the window for safe, sustainable operations narrows.

The evolving landscape of satellite deployments thus presents a dual challenge: harnessing the transformative benefits of global connectivity and communication technology, while managing an increasingly congested orbital environment without a comprehensive international regulatory framework. The race to populate low-Earth orbit continues, but with it grows the imperative for coordinated action and innovation in space traffic management to ensure the continued stability and accessibility of near-Earth space.

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

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