

Astronomy

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OBSERVATORY
OPENS A HUGE
NEW MUSEUM

YOUR
READER
QUESTIONS
ANSWERED

STARFIELD
OPTICS
SCOPE
REVIEW

**BONUS
ONLINE
CONTENT
CODE p. 3**

Astronomers urge pause to Starlink launches



Citing environmental concerns, 120 astronomers and researchers implored the Federal Communications Commission (FCC) in an Oct. 24 letter to halt launches of internet satellites like SpaceX's Starlink.

The letter, which was organized by the Public Interest Research Group (PIRG), also urged FCC Space Bureau Chief Julie Kearney to investigate the potential negative environmental and health impacts of the vast projected increase in satellites being disposed of in the atmosphere.

The number of existing satellites has increased by a factor of 12 in the last five years, with SpaceX alone launching around 60 percent of them. And in 2022, the U.S. Government Accountability Office (GAO) predicted 58,000 satellites would be launched by the end of the decade.

Under existing practices, to avoid the possibility of long-term defunct space junk, satellites in large megaconstellations are placed in a low orbit so that they naturally deorbit after five years. They must then be replaced by subsequent launches.

Such satellites have increased global internet access. But the letter argues that unfettered competition between multiple megaconstellations should not be placed above possible environmental harms.

The American Astronomical Society (AAS) sent a letter to policymakers detailing similar concerns Sept. 27.

Increasingly, researchers have flagged potential environmental impacts from satellite megaconstellations — not only in emissions from launches but also metals burning up in the atmosphere



SIGNAL BOOST. A SpaceX Falcon 9 rocket lifts off from Space Launch Complex 40 at Cape Canaveral Space Force Station in Florida Dec. 8, 2024, carrying 23 Starlink satellites to orbit. SPACEX

when satellites reenter. The AAS estimated that a 42,000-satellite constellation vaporized on a five-year cycle would deposit at least 8,000 tons of metals into the atmosphere annually. And a study published in June in *Geophysical Research Letters* projected that the continuous disposal of megaconstellation satellites in the atmosphere would release nearly 400 tons of aluminum oxide compounds annually into the upper atmosphere, which could significantly deplete the ozone layer.

Satellite megaconstellations have already been under scrutiny for the light pollution they produce, which can negatively impact astronomical observations and animal behavior.

The problem, says PIRG, lies in how the FCC categorizes satellites under the National Environmental Protection Act (NEPA). This legislation requires an assessment of any major federal action that significantly affects the environment. In issuing licenses for satellites, the FCC has exempted large constellations from review. The letter calls on the FCC to end its practice of categorical exclusions for satellites, noting that the GAO found that the FCC "doesn't have a documented reason" for doing so.

The FCC is planning to review its categorical exclusion policies and expects to develop revisions to its current NEPA rules with the Council on Environmental Quality, which governs these policies, by July 1, 2025. —SAMANTHA HILL

VEGA'S SMOOTH DISK IS A MYSTERY

VEGA AND ITS ORBITING DEBRIS disk have been photographed countless times, but recently the James Webb Space Telescope (JWST) and the Hubble Space Telescope combined to capture it with unprecedented clarity. The

Hubble image (near right) highlights dust the size of smoke particles in Vega's 100-billion-mile-wide (160 billion kilometers) disk. At far right, JWST's infrared view shows sand-grain-sized dust; here, the outer dust ring is analogous to our solar system's

Kuiper Belt and extends 7 billion to 15 billion miles (11 billion to 24 billion km) from the star. Beyond it, a warm dust halo extends to 23 billion miles (37 billion km) out. The black spot at center in both images blocks the light of the brilliant star,

making the disk easier to see. Normally such disks are divided by gaps carved out by forming planets. And Vega's disk does display one faint gap, at about 60 astronomical units from the star. (One astronomical unit is the average Earth-Sun