

Space datacenters proposed by Musk and Bezos ‘catastrophic’ for planet, experts warn

petition demands review of plans from tech companies amid fears of environmental destruction

Space datacenters proposed by SpaceX, Jeff Bezos’s Blue Origin and others would release staggering levels of pollution that would probably **alter** the Earth’s atmosphere and be “catastrophic” for the planet, space industry experts and environmental groups warn in a new petition demanding a review of their impacts.

Among other issues, pollution from satellites and rockets burning up upon re-entry appears to be accumulating in the stratosphere at alarming levels. The spacecraft release black soot, rare metals, aluminum oxides and other pollutants with unknown effects. Some scientists fear the pollution could destroy the ozone layer, potentially expose some people to higher levels of ultraviolet radiation, or help further destabilize the planet during the climate crisis. The pollution could also end up back on Earth, and millions of satellites would create a major source of light pollution.

The petition submitted to the FCC calls for a pause on new licenses for space data center projects, arguing that the plans “violate federal law”. “these same proponents have refused to embrace any inquiry into the impacts of their self-claimed epochal technology on the environment, science, economy, or other values.” (...)

Putting millions of additional satellites into orbit would create a significant environmental risk, said Steve Volz, the former head of the National Oceanic and Atmospheric Administration (Noaa) satellite office. “There is a lot of complex material in these things, and even if they do burn up, you do not want to be filling up the atmosphere **with refuse** from these any more than you would want it coming from a smoke stack,” Volz said. Volz was with the agency until he was put on leave and eventually fired under the Trump administration.

The number of active satellites in orbit has grown exponentially from about 1,400 in 2015 to about 15,000 currently. As many as 100,000 are expected to be in orbit within the decade, not including the datacenter networks. Spacecraft can cause problems on their way up and down. Launches emit a range of emissions like black carbon, nitrogen oxides, carbon monoxide, aluminum oxide, chlorine gases and, once in orbit, mercury. When satellites are decommissioned five to 15 years later, they release metals as they vaporize. That’s injecting pollutants into previously **pristine** parts of the stratosphere, a highly sensitive system, and there’s very little understanding of the consequences.

Scientists only began to discover some of the impact in late 2023, when a Noaa-sponsored stratospheric measurement flight found metals in sulfuric acid aerosols that make up much of the stratosphere. These aerosols are thought to play an outsize role in regulating the Earth’s temperature, and may partly function as a planetary “sunscreen” by creating high-level clouds that reflect solar radiation, and they simultaneously keep greenhouse gases and pollution from entering the ozone layer from below.

But how the spacecraft metals, naturally occurring metals and sulfuric acid aerosols interact is “largely unknown”, scientists behind the study said. Further research has not been conducted under Trump.

Meanwhile, advocates say plants and animals rely on the darkness, and light pollution is contributing to firefly and other insect die-offs. “These projects could permanently alter the night sky as we know it,” said Ruskin Hartley, executive director of DarkSky International. “The FCC needs to take seriously its obligation to ensure these projects do not cause unnecessary harm to naturally dark skies.”

Cole Donovan, a former Noaa space policy expert now with the Stand Up for Science non-profit, noted that the space datacenters would demand a huge amount of rare metals and other resources that are already in short supply, creating another environmental challenge on the ground.

The petition notes that SpaceX claims in its FCC application that its orbital datacenters will “ensur[e] humanity’s multi-planetary future amongst the stars”, but its only reference to environmental risk is a claim that it would “develop industry-leading brightness mitigations”, though it offers no other detail.

Ultimately, the tech companies’ FCC applications provide no meaningful consideration of environmental consequences, the petition states.