

Space objects will still be hard to protect despite new policy

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A new space traffic management policy signed by President Donald Trump could help prevent thousands of space objects from colliding, but sufficient technical solutions are lacking, says Carolin Frueh, Purdue assistant professor of aeronautics and astronautics.

Space [traffic](#) is much more congested and unpredictable than air traffic on earth. "For [air traffic](#), there are multiple radars tracking several airplanes per hour, but for [space](#) traffic, only a few sensors on earth are tracking about 20,000 known objects," Frueh said. "If we include the objects that are smaller in size, then we're talking about 100,000 or more objects that are of interest – and all of them different dimensions."

The smaller objects are worth taking into account. "An [object](#) only a quarter of an inch or smaller might travel faster than a bullet, so it can still cause tremendous damage," Frueh said.

Space Policy Directive 3 calls for establishing an open-access data repository of all known space objects. Currently, U.S. Strategic Command via the website space-track.org offers a public catalog of around 16,000 unclassified objects of known origin, said Frueh, but research hasn't caught up yet with how to reliably characterize and continuously track everything ranging from satellites and rocket boosters to tiny debris.

"Maintaining an open-access catalog with at least basic information is crucial for the sustainable use of space, but currently the quality of the

data is not disclosed – severely hindering development of solutions for space traffic management," Frueh said.

Limited communication with space objects exacerbates the problem. "Airplanes have responsive pilots for direct communication," Frueh said. "A space satellite only has windows of communication, and that's with an autonomous system that doesn't have a pilot."

The number of objects in space and the frequency of traffic jams also keeps increasing. "How many objects there are keeps going up so much that research results from five years ago need new solutions," Frueh said.

Even if all space objects were characterized, many would still be difficult to prevent from crashing into each other. "The majority of objects are dysfunctional have limited capability to maneuver or even control their altitude in some cases," Frueh said. "It's also hard to reliably predict collisions."

The new policy could be effective, said Frueh, at ensuring launched spacecraft aren't in space long enough for objects to fall off and contribute to debris – and that the mess will be picked up if they do.

"The directive enforces national space debris mitigation standards and best practices, which could mean making it finally mandatory for spacecraft to burn up in the Earth's atmosphere within 25 years of shutting down," Frueh said. "This new legislation also commits the U.S. to exploring active space debris removal, actively taking down defunct satellites so that they no longer pose a risk to other objects. Active removal has so far only been explored theoretically in paper studies."

Provided by Purdue University

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