

# DirecTV races to decommission broken Boeing satellite before it's lithium ion batteries explode

**Boeing satellite has the usual irreversible damage to it's lithium ion batteries, creating explosion risk.**

[Jon Brodkin](#) -

 Illustration of a satellite orbiting Earth.

[Enlarge](#) / Illustration—not the actual Boeing satellite used by DirecTV.

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DirecTV is scrambling to move a broken Boeing satellite out of its standard orbit in order to limit the risk of "an accidental explosion."

As [Space News reported today](#), DirecTV [asked the Federal Communications Commission](#) for a rules waiver so it can

"conduct emergency operations to de-orbit the Spaceway-1 satellite," which is at risk of explosion because of damage to batteries. The 15-year-old Boeing 702HP satellite is in a geostationary orbit.

DirecTV, which is owned by AT&T, is coordinating with Intelsat on a plan to move Spaceway-1 into a new orbit. DirecTV already disabled the satellite's primary function, which is to provide backup Ka-band capacity in Alaska. The satellite can operate on power reserves from its solar panels, but that won't be possible during the coming eclipse season, DirecTV explained in its FCC filing:

In December, Spaceway-1 suffered a major anomaly that resulted in significant and irreversible thermal damage to its batteries. Boeing, the spacecraft manufacturer, concluded based on all available data that the batteries' cells cannot be guaranteed to withstand the pressures needed to support safe operation of the spacecraft in eclipse operations; rather, there is a significant risk that these battery cells could burst. As payload operations have been terminated, the spacecraft has had sufficient power margin to avoid use of the batteries during sunlight operations. However, use of the batteries during eclipse is unavoidable and there is no ability to isolate damaged battery cells. The risk of a catastrophic battery failure makes it urgent that Spaceway-1 be fully de-orbited and decommissioned prior to the February 25th start of eclipse season.

## **Not enough time to deplete fuel**

Under the standard process for taking satellites out of their normal orbits, "Spaceway-1 would complete its end-of-life maneuvers and then discharge all remaining bipropellant prior to decommissioning the spacecraft," DirecTV wrote.

But because of the explosion risk, there isn't enough time to fully deplete the bipropellant. That's why DirecTV asked for a waiver from the rules.

"Waiver is appropriate in this case because grant would not undermine the purpose of the rule, which is to reduce the risk of accidental explosion," DirecTV wrote. The waiver "will reduce the potential for harm to other geostationary satellite operators," DirecTV said.

DirecTV said it intends to discharge as much fuel as possible before completing the move but that "the priority remains the complete decommissioning of the satellite prior to commencement of the spring eclipse season to limit the risk of an accidental explosion." In the time available, DirecTV said "it will be able to deplete only a nominal portion of the approximately 73kg of bipropellant remaining onboard Spaceway-1." Fully depleting the bipropellant would take two or three months.

"Delayed de-orbit maneuvers or prolonged propellant depletion strategies are not possible given the heightened likelihood of catastrophic failure of the Spaceway-1 satellite should the damaged battery be recharged," the filing said.

DirecTV and Intelsat "are exploring feasible alternatives" for satellite-tracking ground stations "that can maintain ground visibility as the satellite transits from its current orbital position."

"In the absence of additional ground station solutions, Spaceway-1 will first need to increase its eastward drift before turning around and completing a near-continuous burn until it reaches its disposal orbit," DirecTV said.

## **New orbit 300km above other satellites**

DirecTV described its plan as "de-orbiting" and moving the satellite into a "disposal orbit," which would suggest bringing it closer to Earth and letting it burn up in the atmosphere. But the filing also says the new orbit will be "300km above the geostationary arc," which would make it a [graveyard orbit](#). Assuming that's the case, Spaceway-1 would remain indefinitely in an orbit that's well above other geostationary satellites. We've asked AT&T for clarification on this point.

DirecTV asked for a 30-day waiver "beginning no later than January 20, 2020," so it may have already received permission and begun the operation, which is expected to take 21 days. We contacted DirecTV owner AT&T and the FCC about the status of the waiver request this morning and will update this article if we get any response.

DirecTV said that no customers were affected by the satellite problem, since it was just providing backup capacity. DirecTV said it "is currently exploring plans to relocate on-orbit assets to replace the backup capacity lost by the decommissioning of Spaceway-1."