

# Trash in the Skies III: Prospects for Active Removal of Space Debris

Legal Considerations

James E. Dunstan

Mobius Legal Group, PLLC



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# Orbital Debris is an international “Tragedy of the Commons”

Nearly 50 countries either  
exclusively or jointly control  
objects in Earth orbit (roughly  
25% of all countries)



# Is There a Duty to Dispose of Space Junk under International Law?

Simple answer is: NO

We have international guidelines and domestic regulatory requirements that are often ignored.



# How has this all played out?



- Envisat
  - 8,000 kg, 26x10x5 meters
  - Launched into the crowded 790 km polar orbit
  - Launched in 2002 (after ESA guidelines adopted)
  - Expected life of 5 years
  - Operated well beyond its expected life until 2012 when controllers lost contact
  - No attempt to deorbit, reorbit or even save the batteries and onboard fuel
  - ESA claims that since Envisat was designed and partially built prior to adoption of guidelines, they do not apply
  - Estimates are that it will remain in orbit for between 100 and 150 years



# How has this all played out?

- Iridium
  - FCC order of July 31, 2014
  - Allowing Iridium to modify its debris mitigation plan for 10 satellites to allow them to deorbit in 25 years rather than in “a few months” as originally planned at EOL
  - Why? Iridium is operating these satellites well beyond their original intended life and currently 7 satellites lack sufficient fuel to comply with the original orbital debris plan

Federal Communications Commission

DA 14-1118

Before the  
Federal Communications Commission  
Washington, D.C. 20554

In the Matter of )

Iridium Constellation LLC )

Application for Modification of Big LEO License  
to Change the Orbital Debris Mitigation Plan )

File No.: SAT-MOD-20080701-00140  
Call Sign: S2110

## ORDER AND AUTHORIZATION

Adopted: July 31, 2014

Released: July 31, 2014

By the Chief, Satellite Division, International Bureau:

### I. INTRODUCTION

1. By this Order, we authorize Iridium Constellation LLC (Iridium) to operate up to ten of its non-geostationary orbit (NGSO) space stations under a revised orbital debris mitigation plan, which extends the post-mission atmospheric re-entry period from within a few months to within 25 years. We deny, at this time, Iridium's request to operate its remaining space stations under the revised plan. This action will allow Iridium to continue seamless operation of its satellite constellation while mitigating the risks associated with the post-mission disposal of its satellites.



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# How has this all played out?

- EchoStar III
  - Launched 10/5/1997 into a geostationary orbit.
  - Design life of 12 years.
  - EchoStar requested in 2017 authority to move the satellite from  $61.8^{\circ}$  W.L. to  $86.85^{\circ}$  W.L. and operate for 4-5 months.
  - No mention was made in request or FCC grant that the satellite was well beyond its design life.
  - EchoStar began maneuver then lost contact on August 2, 2017 and E-III was drifting westward at 0.1 degrees per day.
  - EchoStar regained control a few weeks later and boosted E-III into a graveyard orbit.



# The Moral?

How can we get serious about debris removal when we're not serious about the debris problem itself?



So, let's just go get the bad stuff!

# Not so Fast

## – Article VII of the Outer Space Treaty

“A State Party to the Treaty on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body.

Ownership of objects launched into outer space, including objects landed or constructed on a celestial body, and of their component parts, is not affected by their presence in outer space or on a celestial body or by their return to the Earth.”

# Overcoming Legal Challenges

- There is nothing fundamentally wrong with the International Treaties, they just need to be reinterpreted:
  - Leaving debris in orbit uncontrolled should not absolve the launching state from fault liability as is currently the case. Indeed, the reverse should be true as in maritime law: vessels left derelict and a hazard to navigation are the responsibility of the party leaving it there. *Corfu Channel* case.
  - Once an operator loses the ability to control an object, it should be deemed abandoned and subject to reclamation and removal using theories of “finds” and “salvage” under international maritime law.
  - Transfer of ownership of on-orbit objects should be facilitated and fully recognized, as is the case with operational satellites (e.g. China in 1997 and Hong Kong satellites, Isle of Man satellite transfers)



# Further U.S. Government Action Required:

- USG needs to take a strong position in the international space community that the days of “Big Sky” and “let God sort it out” are over.
- Bilateral discussions are required between the U.S. (State Department with some input from NASA) and Russia vis-à-vis Russian upper stages to allow for clean up.
- Congress needs to pass legislation similar to 49 U.S.C. Sec. 70112 to cover some of the potential liability of private debris removal operators in case of accident in course of removal.
- Congress needs to designate a single agency to regulate debris mitigation and clean-up. Currently, 5 different agencies have some jurisdiction over orbital debris.
- USG needs to invest in orbital debris removal technology research, then turn it over to the private sector to implement.



# Thank You!

James E. Dunstan

Mobius Legal Group, PLLC

[jdunstan@mobiuslegal.com](mailto:jdunstan@mobiuslegal.com)



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