

International Interdisciplinary Congress on Space Debris

Who is Afraid of Space Debris? The Response of Satellite Industry

Montreal
8 May 2009

Maria Buzdugan
Milbank, Tweed, Hadley & McCloy, LLP



Outline

- The Satellite Industry and Space Debris
- Government Response to Space Debris Impacting the Industry
- Satellite Manufacturers' and Launch Services Providers' Response
- Satellite Operators' Response
- Insurance Market Response
- Possible Alternative Solutions

The Satellite Industry and Space Debris

- Satellite industry is currently the main generator of space debris and is/will be debris' main victim.
- Generally, in the case of unregulated pollution, polluters will pollute excessively, enjoying the benefits of their polluting activities, but not bear the costs of pollution they have caused.
- The situation of space debris is somewhat different since it is more likely to create mutual harm, i.e. the debris generating party itself may be impacted by the debris it created.

Interested/Affected Parties

- **Satellite Operators** (Property loss/Third Party Liability)
- **Satellite Manufacturers** (Performance Warranties/Product Liability)
- **Launch Services Providers** (Third Party Liability)
- **TTC&M Services Providers** (Third Party Liability)
- **Space Insurers** (Property Loss and Liability Coverage and Subrogation Rights)
- **Governments** (“Appropriate State” Liability under International Space Law)

There's no Business like Space Business

- The satellite industry is very capital intensive, involves high risks and is heavily regulated
- Adding costs and/or adopting debris mitigating standards would not be undertaken by the industry unless:
 - the risk to be addressed is perceived as significant enough to warrant a response and
 - the proposed mitigation measures are technically feasible and there is an acceptable cost-benefit ratio.

Risks Posed by Space Debris – The Industry Perspective

- First Party Property Risks: Damage to satellites as a result of collision with space debris – risk of partial or total failure
- Third Party Liability Risk: Liability under international law (the Outer Space Treaty and the Liability Convention) as a result of collision of non-functional satellites (or pieces of satellites) with functional third-party satellites
 - liability based on fault for damage caused in outer space and absolute liability if damage is caused to aircraft in flight or on Earth

Government Response to Space Debris Impacting the Industry

- Several governments have imposed mandatory and/or recommended standards/practices applicable to all space missions, e.g.:
 - **The US:** 2004 FCC rules require FCC licensees (non-US applicants included) to move geostationary satellites at the end of their operating life into “graveyard orbits” and to submit orbital debris mitigation plans for satellites operating in non-geostationary orbit
 - **The Russian Federation:** General requirements regarding space debris mitigation on a voluntary basis (into force since January 1, 2009)
 - **The United Kingdom:** companies involved in launching, operating or procuring a launch for space objects are required to obtain a license. Satellite operators must show they have considered how they will dispose of their satellite once it has reached the end of its operational life
 - **Japan:** 1996 NASDA Debris Standard – moving geostationary satellites into a higher orbit at the end of operation; reducing the orbital lifetime of a mission terminated in LEO; minimizing damage posed by in-orbit collision; minimizing the number of objects released in orbit during operation of a space system

Satellite Manufacturers' and Launch Services Providers' Response

- **Manufacturers** provide no warranty for the satellite post-launch and request the satellite owner to procure a waiver of subrogation rights from the launch and in-orbit insurers.
- **Launch services providers:** Third party liability insurance is “de facto” mandatory for all launch agencies but the liability insurance limits vary from country to country.

Satellite Operators' Response

- Satellite operators generally address the risk posed by space debris through the purchase of insurance policies:
 - Launch and In-Orbit First Party Insurance -
Covering loss of or damage to (including loss of operational capability of) the insured satellite itself
 - In Orbit Third Party Liability Insurance -
Covering the insured's liability to third parties

Property Insurance and Space Debris

- Cost of Insurance (launch insurance premium is much higher than in orbit insurance premium)
- Maximum Insured Limit = maximum limit available at a given time on the insurance market
- Exclusions: [situations or circumstances to which the policy does not apply]: loss or damage or failure caused by, or resulting from, any anti-satellite device, or device employing laser or directed energy beams → the question of whether damage caused by pieces of orbital debris resulting from an ASAT test or attack, such as the Chinese test of 2007, would be covered
- In addition, depending on the coverage agreed to in the policy, loss of revenue/business profits and incidental and consequential damages are generally excluded

Property Insurance and Space Debris

- At the 15th International Space Insurance Conference held in April in Venice, insurance experts pointed out that the Cosmos and Iridium satellites collision raised unique insurance and legal issues and may require revisiting standard space insurance policies in order to manage the “newly discovered” risk of collision.
- According to the same sources, there are over \$1 billion worth of insured satellites at or below the altitude of the collision.

Third Party Liability Insurance

- Given that several debris mitigation practices such as the legal requirement for disposal of satellites at end-of-life, are becoming a standard across the industry, a satellite operator that does not comply with such practice may be found at “fault” and the “appropriate State” held liable under international law for damage caused by its space debris
- Liability insurance is “de facto” mandatory for all launch agencies but very few States impose the obligation to procure liability insurance upon satellite operators
- Mandatory liability insurance limits vary from country to country – practically limits cannot exceed the limits available on the insurance market

Third Party Liability Insurance

- Policy period = 12 months maximum
- Coverage on an “occurrence” basis: are covered only the liabilities relating to occurrences having taken place during the period of coverage
- “Occurrence” = accident or incident or continuous or repeated exposure to conditions caused by an insured space object/space product and causing bodily injury and/or property damage to third parties

3rd Party Liability Insurance and Space Debris

- Time of “occurrence” question is significant in case of space debris since space debris might cause damage decades following decommission or total failure of the satellite
- Third party liability insurance for satellites that have reached their end-of-life or have become non-functional is offered extremely rarely
- Identification of the source of debris that caused the damage is a challenge

Insurance Market Response to Space Debris

- Insurance is reactive in nature meaning that its cycles are directed by the size of the underwriting capacity and the frequency of losses caused by a certain hazard. In case a series of losses is due to the same cause, space insurers may exclude that risk in new policies. Also, if there are several large claims, the sector would become unprofitable and the available capacity will diminish, which in turn will reflect in higher rates.
- Given the increased risk of collision with space debris in LEO, a reaction from the market is possible.

Role of Space Insurance

- Space liability insurance cannot be the paramount solution to space debris:
 - Space liability insurers cannot provide unlimited coverage in either amount or duration
 - The space liability insurance market is extremely volatile: available limits could disappear following a significant incident
 - But, the insurance market could consider assuming a “preventive role” in imposing conditions on insurance seekers to decrease the production of orbital debris: for example, the cost of premiums could reflect the level of risk of producing debris associated with a particular type of launcher, payload and/or mission

Possible Alternative Solutions

- For liability coverage in excess of available insurance limits, alternative solutions could be set up: State(s) guarantees, international compensation fund, compulsory reinsurance schemes backed by the States
- Pollution permit system and emission trading: pollution permits work by obligating polluters to pay for their noxious emissions
- Financial penalties could be levied for debris generation, similar to a littering fine on Earth
- Taxes or fees could also be levied on space activities, including deposit-refund schemes
- Bonds could be offered for space activities and be redeemable upon proof of compliance with overall debris reduction goals

Possible Alternative Solutions

- A commercial space debris removal company to work with insurance companies and/or satellite operators to clean up the space debris –costs of operation of such company shared among the users
- Establishing a communal insurance pool to compensate loss resulting from space debris produced from unidentified sources
- Adopting “rules of the road” to manage satellite traffic to avoid collisions

Conclusion

- Orbital debris is increasingly becoming a concern to satellite operators as well as insurers. While commercial satellite operations in the geostationary orbit currently are not seriously threatened by orbital debris, the satellites in the low-Earth orbit are already faced with higher collision risks.
- Balancing the costs of space debris mitigation actions with the benefits (or avoided damages) of preserving the space environment is a difficult but important objective for the industry.
- Space is already an expensive location in which to operate and debris mitigation can add to the expenses.
- Cost-effective ways can be developed by all the parties involved/affected.