



**European Conference on On-Orbit
Satellite Servicing and
Active Debris Removal**

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Insurer's Perspective and Expectations



ARGO GROUP

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1. Space Insurance Overview

- A highly technical/specialist insurance sector
- Insurance policy conditions and pricing strongly correlated to technical risk profile
- Major risks covered: GEO broadcast platforms (90%) and LEO imagery/navigation/telecom s/c (10%)
- Launch & commissioning = most exposed mission phases, risk is by nature volatile (“all or nothing”)
- Highly volatile market: Annual market Premium volume ~ Average Ariane 5 Amount of Insurance (~700MUSD in 2012)
 - Need for consistent risk assessment and financial sustainability



... at Argo International

Space Insurance Products

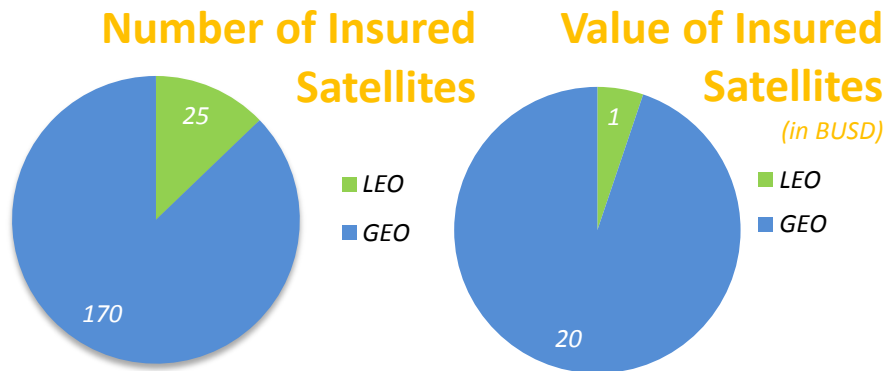
- Launch Phase cover
- Commissioning and Early Operational Phase cover
- Incentives & Warranty Pay Back insurance
- Service interruption / loss of revenues
- Third-Party Legal Liability (for launch and in-orbit operations)

Key Financial Ratings

- Lloyd's: A.M. Best “A”, S&P “A+”
- Argo Group: A.M. Best “A”, S&P “A-”

2. How space debris risks are being handled

- In GEO (the majority of insured assets), risk is **negligible** (debris catastrophic risk ~ 10^{-9} annual but steadily growing)
- In LEO: insured constellations see **large increase** in debris risk (~ 10^{-5} with inclination & altitude discrepancies)



Currently...

- « all risks », 1-year insurance covers, w/ specific exclusions
- No debris-specific clause:
- No subrogation rights within industry (in space procurement contracts) but often insurers' subrogation rights (in case of claims)
- Weak legal framework (unclear concept of "fault")
- In-orbit losses and failures to be demonstrated

Next...

- Space Debris Risk considered low but increasing, potentially catastrophic and difficult to assess (large uncertainties in terms of identification of objects in GEO, debris position and velocity, projections following collision/fragmentation and actual impact of critical collisions at system level)
- Worst-case scenarios being updated on a regular basis (e.g. Lloyd's guidelines on Realistic Disaster Scenarios include space debris provisions)
- Highly reactive market, meaning that tailored policies or exclusions could rapidly be put together to respond to new risk profiles and changing environments.

3. Active Debris Removal

- Necessary operations, from a sustainable use of space standpoint, and could be critically needed in case of large debris clouds generation
- **Third-Party Legal Liability is challenging** (impacts on neighbouring satellites hard to assess, and to demonstrate in case of damage) and requires **active collaboration with Customers/Insurers alike**
- **Raises awareness** on space debris reality and opens new ways of innovation
- **Paves way to new innovative concepts**

& On-Orbit Servicing

- **Could bring key resolution to insurance losses** (some major losses over past couple of years could have been resolved with refuelling/reboost solutions, to be traded against salvage rights)
- **Introduces new risk profiles** (due to the servicing operations themselves, but also on modified hardware in-orbit, and on extended hardware past their design life)
- **First-Party Property cover difficult to provide** (unproven technologies, first-flight items)
- **Third-Party Legal Liability highly exposed** (no precedent)

→ **Need for Insurer's insights early in design phase:**

- **Overall Trade-off necessary:** Potential Benefits (economics, safety, sustainability) vs New risks
- **Cross first-party/third-party risk assessment (end-to-end coverage solutions)**
- **Insurance already involved in Maximum Probable Loss definitions**
- **Requires in-depth technical visibility** (e.g. testing, qualification, heritage, margins, redundancies, reluctance to one-off missions)
- **Insurers represent multiple parties at stake** (in the interest of overall risk reduction)
- **Opportunity to jointly promote such initiatives** aimed at better understanding space risks (in situ measurements, radar tracking and debris catalogue, collaborative databases, improved conjunction analyses), and **reducing them** (risk monitoring/mitigation measures, optimized avoidance manoeuvres)



Thank You



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