European Conference on On-Orbit Satellite Servicing and Active Debris Removal
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Insurer’s Perspective and Expectations

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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+“
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

→ 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)

& 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)
Thank You

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