IAA Situation Report on Space Debris 2016

IAA Academy Day
25 September 2017
Why

• Space debris is a potential risk for all space actors
  – Provides “assessment and awareness” to enable responsible “action and then ask if successful”

Space Risk Management

Assess  Aware  Act  Ask

Risk = Probability x Consequences

– Three potential ways to measure “success”
  • No damage from reentries
  • No more fragmentations
  • No satellite failures from debris impacts
What

• Current Status of the Space Debris Environment
• Measurements
• Space Situational Awareness Systems
• Collision Avoidance
• Hypervelocity Impact Effects and Protection
• Reentering Space Objects
• Future Environment
• Space Debris Mitigation
• Debris Remediation
• Legal Aspects of Space Debris
• International Aspects
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When

• Snapshot of “situation” in 2016: out of date before ink dried
• Data speed/variety makes assessing the total picture difficult
  – Orbital debris number growing at ~300/year
  – What you cannot see can kill you...
  – 90 countries operating satellites in space

Number: ~18,000  
Mass: ~7.5M kg
Where

- Space debris situation is changing on the ground and in space
The Most Important Step – ACT (1)

• Debris Mitigation
  – Prevent the generation of new debris
    • No mission-related debris
    • Passivate rocket bodies
    • 25-year rule: remove after operational life
  – Community compliance has only been ~60%
    • LEO: reentry
    • GEO: graveyard orbit
The Most Important Step – ACT (2)

- **Debris Remediation**
  - Remove debris already abandoned on-orbit

- Just-in-time Collision Avoidance (JCA)
  - Emergency response – deflect massive objects from collision
Next Step?

• Update
  – Improve and update of structure, text, and figures
  – Include data coming from major and minor players
    • China, India, Ukraine, Korea, etc.
  – Include new topics
    • Large Constellations, Nanosats, improvements of SSA, etc.

• Schedule
  – First draft by March 2018
  – Final draft for Peer Reviewing by October 2018
  – Publication in March 2019