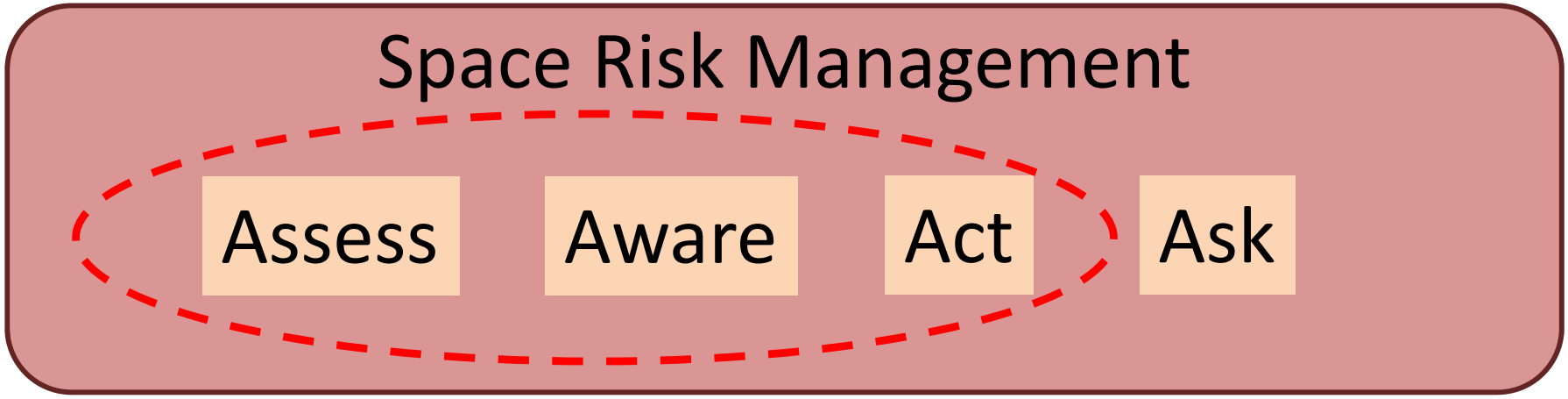
IAA Situation Report on Space Debris *2016*

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”



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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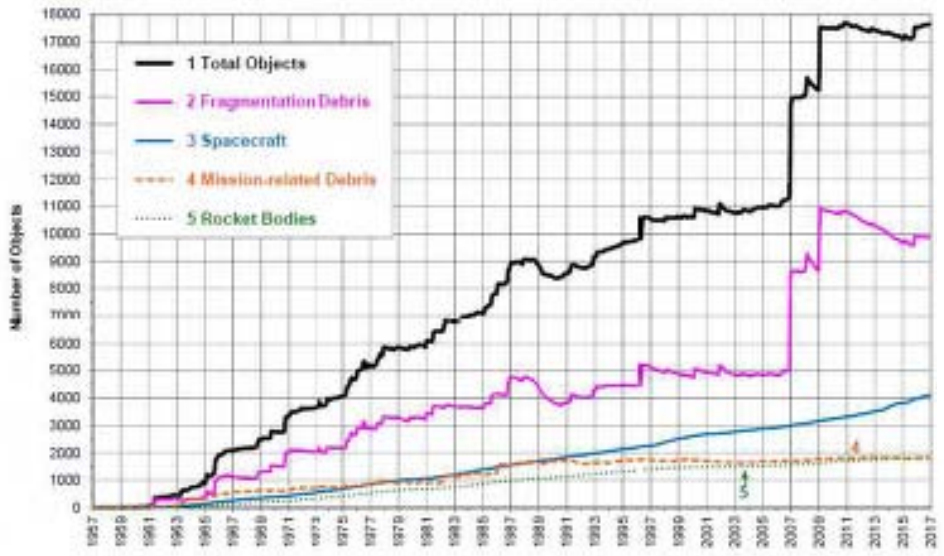
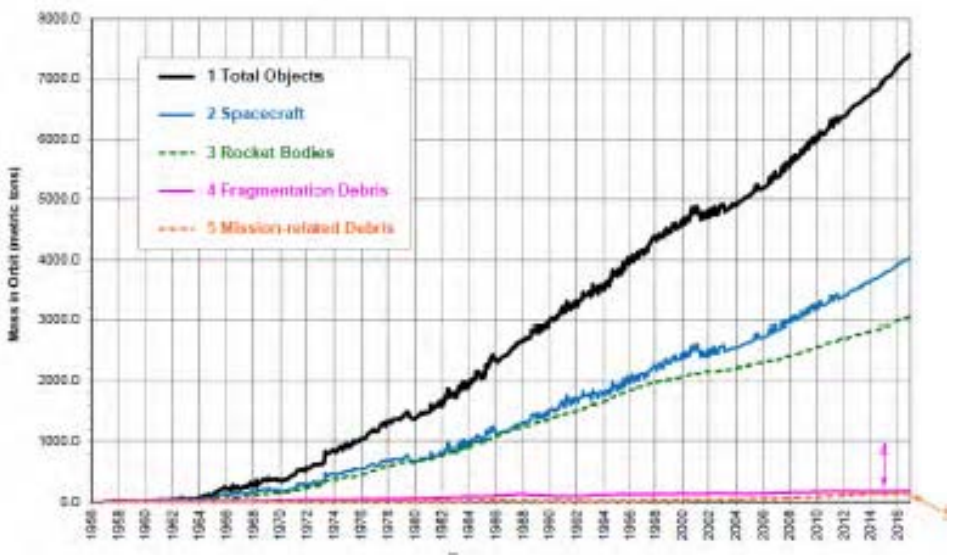
When

- Snapshot of “situation” in 2016: out of date before ink dried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

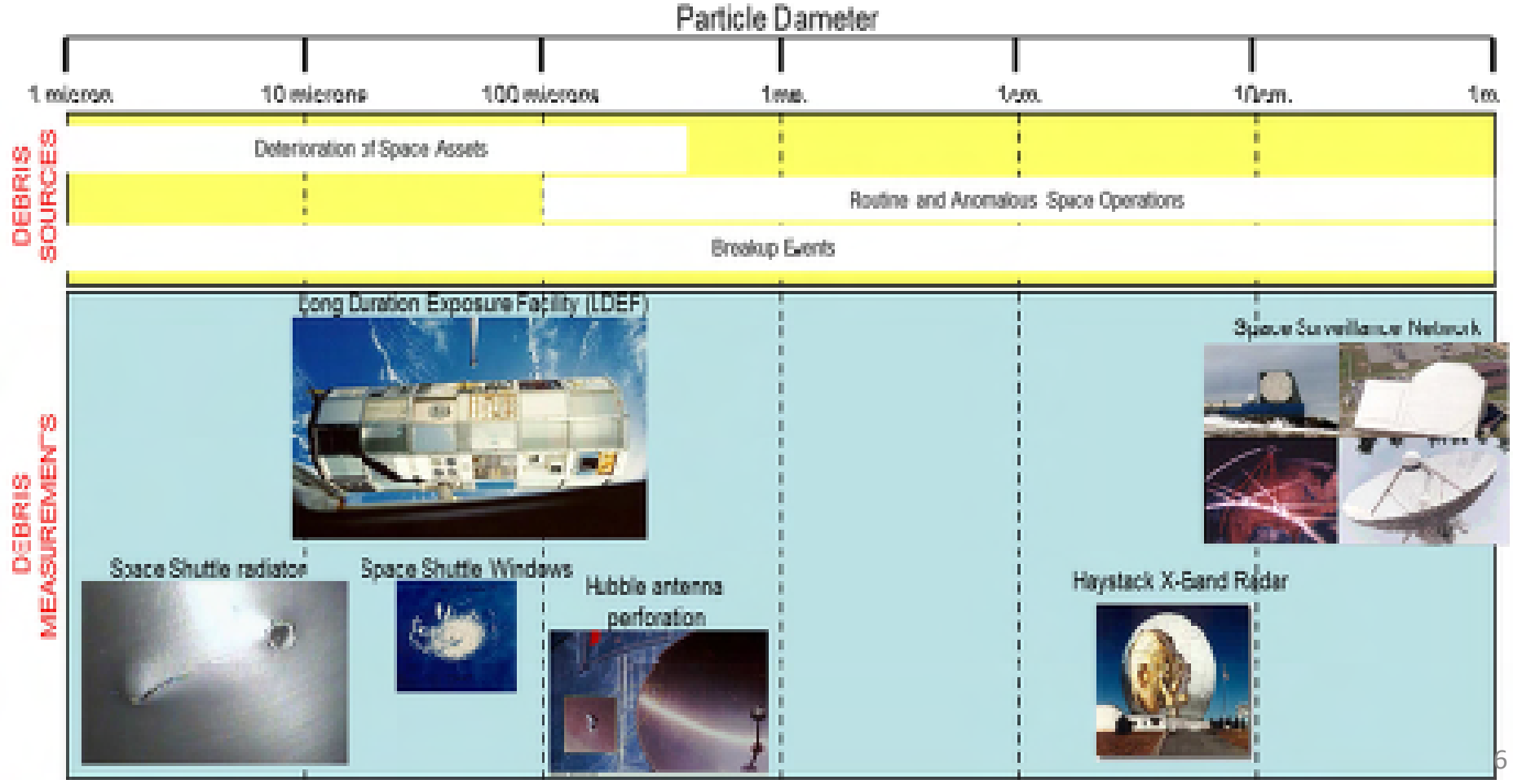


Mass: ~7.5M kg



Where

- Space debris situation is changing on the ground and in space

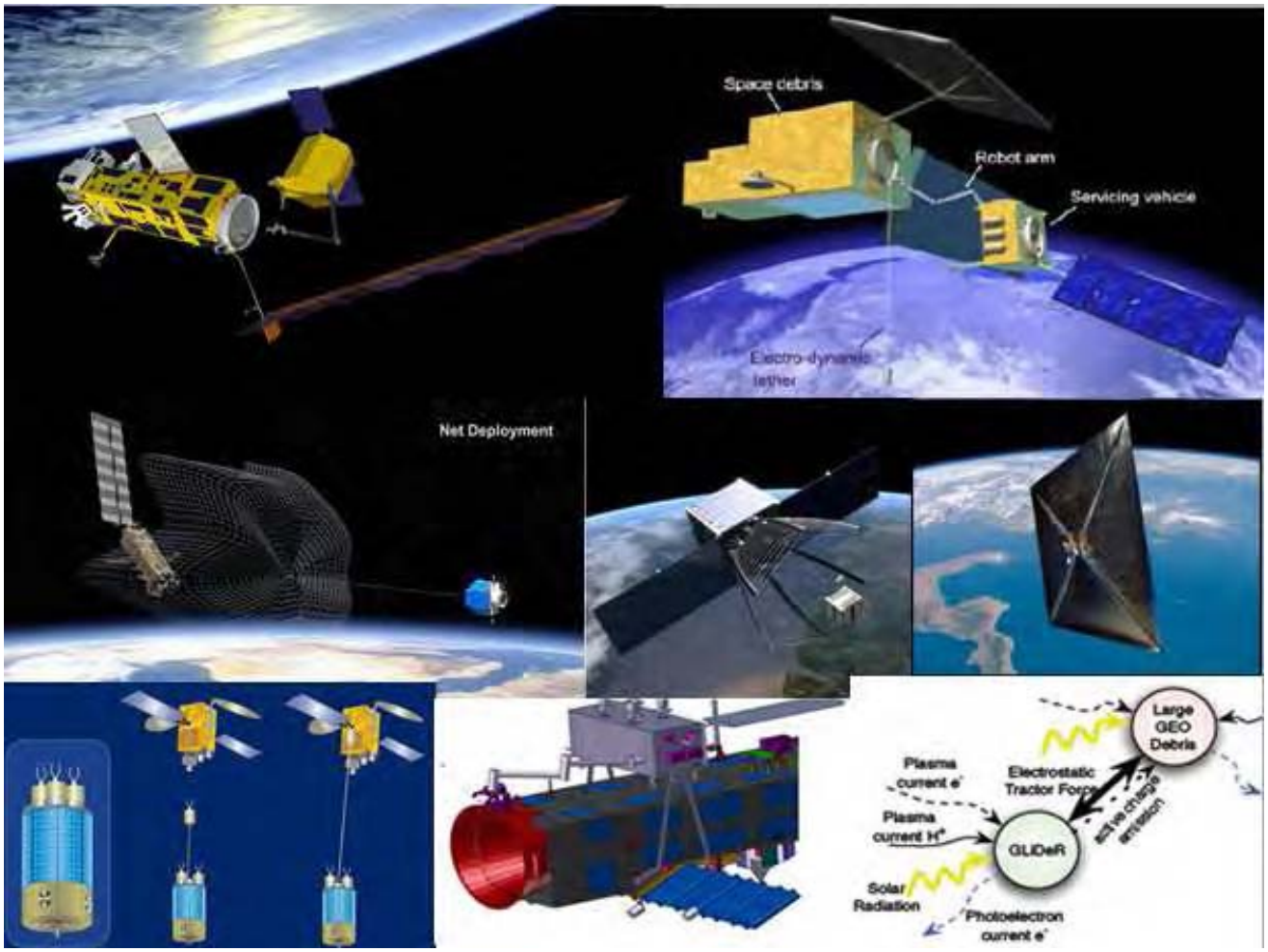


The Most Important Step – ACT (1)

- **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