

Defining Space Traffic Management Requirements

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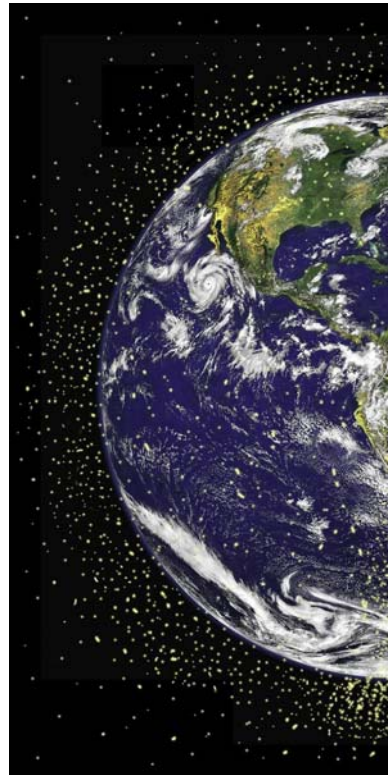
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Defining the STM Influence Zone

1 - A Space Traffic Management Zone* must be defined and enforced

- Most space traffic uses LEO between 600 km and 1200 km, implying a global traffic zone
- LEO satellite operators must be licensed
- Satellites must conform to STM regime regulations
- Surveillance and enforcement procedures must be established

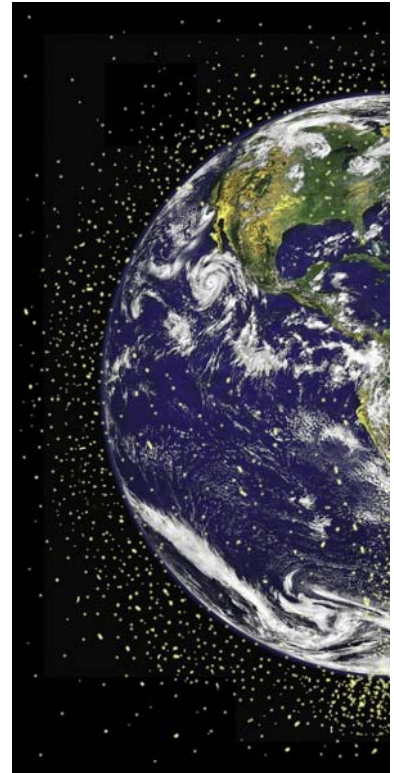


*The Air Traffic Management Zone is from 700 ft AGL to 60,000 ft MSL

Defining the STM Authority

2 - All spacefaring nations must agree and be accountable

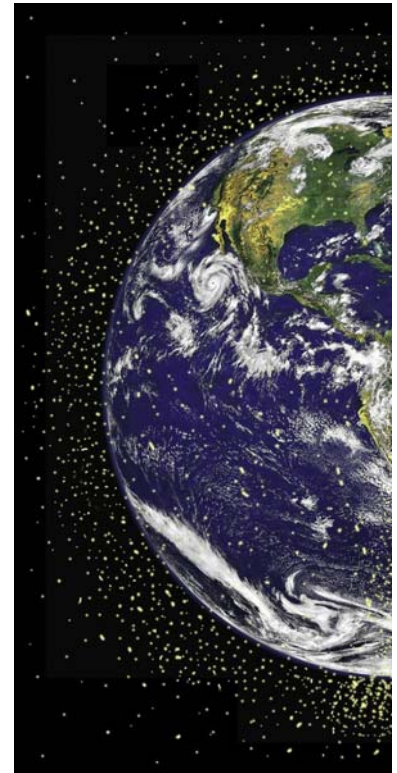
- No national borders in space
- In low-earth orbits, all satellites use the same region of space
- An organization with international representation will have to oversee and control space traffic



Defining New Space Laws and Treaties

3 - Space laws and treaties for STM

- New laws and treaties are needed in order to implement and manage space traffic
- Liability laws and limits must be established
- Regulations governing licensing and enforcement of traffic laws must be established

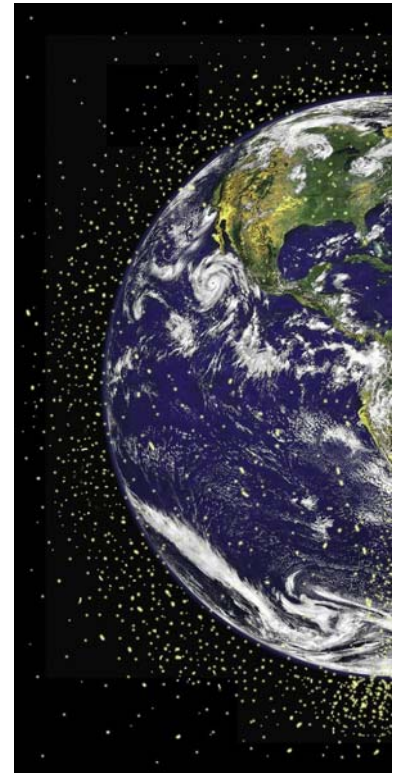


Defining Satellite Requirements

4 - Satellite Design Impacts

- Future satellites must have tracking transponders and agile maneuvering capabilities
- Licensed satellites must be capable of assured de-orbit and may be serviced and refueled periodically
- All satellites must carry “small” debris* shielding

*RSOs of less than 1 mm in size



Preparing the Space Environment for STM

Permanent debris remediation processes are required for safe space flight

- Identification of controlled and uncontrolled space zones
- Comprehensive detection, identification and tracking of the debris population in controlled space
- Permanent removal processes for debris that is either <10 cm or represents major threats to constellations within controlled space



Conclusions

- The STM challenge is like that of Air Traffic Control except all objects are travelling independently at Mach 25 in all directions with little or no position or velocity control.
- Controlled and uncontrolled zones of space must be identified and managed.
- All spacefaring nations must agree on requirements.
- New international space laws and regulations must be created and approved.
- A certain percentage of threatening debris must be continuously and permanently managed.
- New generation satellites will be required to carry agile maneuvering systems and tracking transponders.

