Long Term Sustainability of Outer Space Activities

- A Satellite Industry Perspective -

Vienna
14th February 2013

Presentation Outline

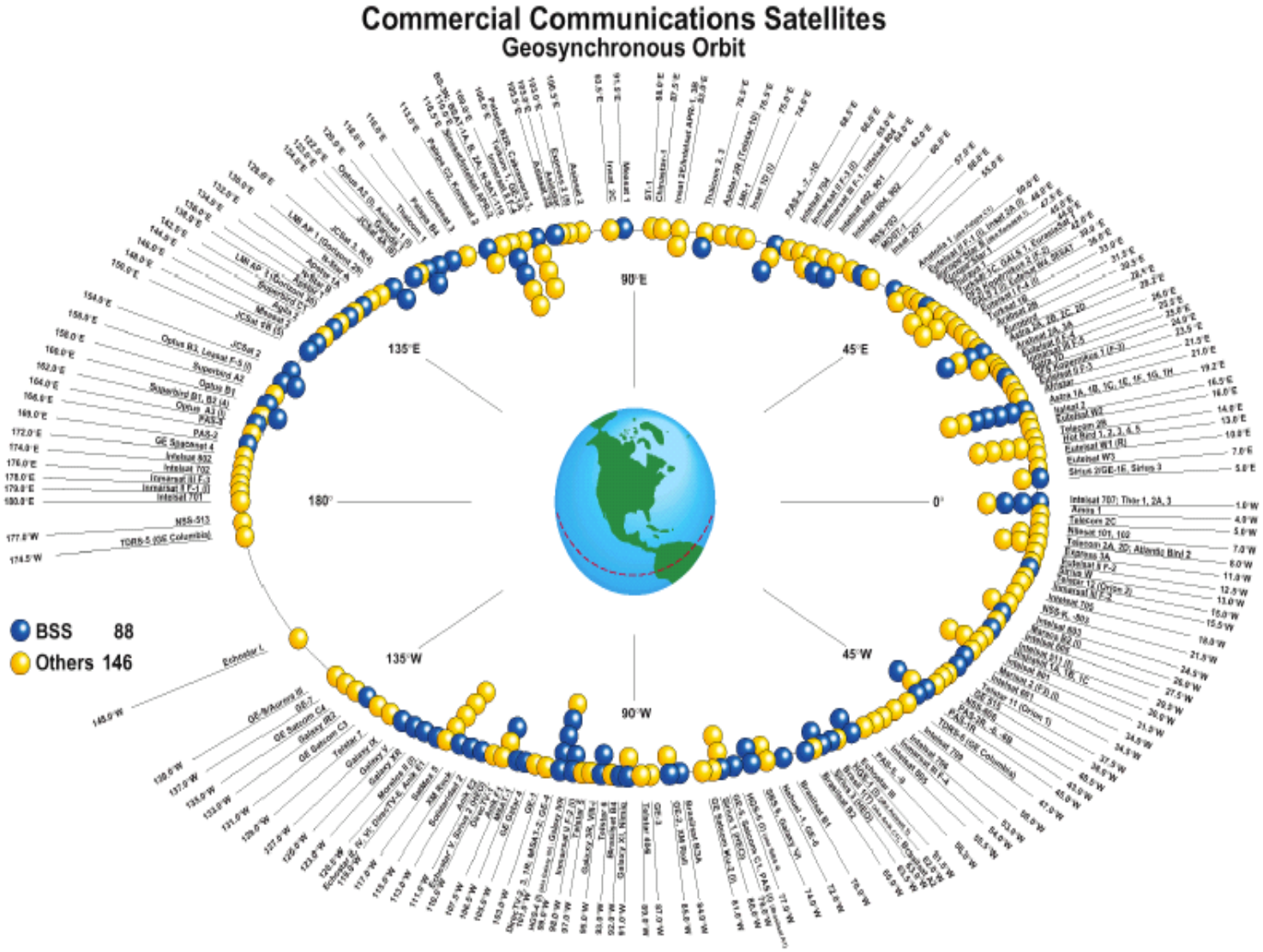
1. Introduction to the Commercial Satellite Industry
   - Patricia Cooper, President, Satellite Industry Association
2. Satellite Industry's Commitment to Sustainable Space Operations
   - Aarti Holla-Maini, Secretary General, European Satellite Operators' Association
3. Satellite Industry Investment in Improving the Integrity, Safety & Resilience of Space Operations
   - Stewart Sanders, Founding Chairman and Executive Director, Space Data Association, SVP SES

The Satellite Industry Association : 16 Years as the Voice of the U.S. Satellite Industry

SIA MEMBER COMPANIES

Commercial Satellite Operators' Presence in Space Today

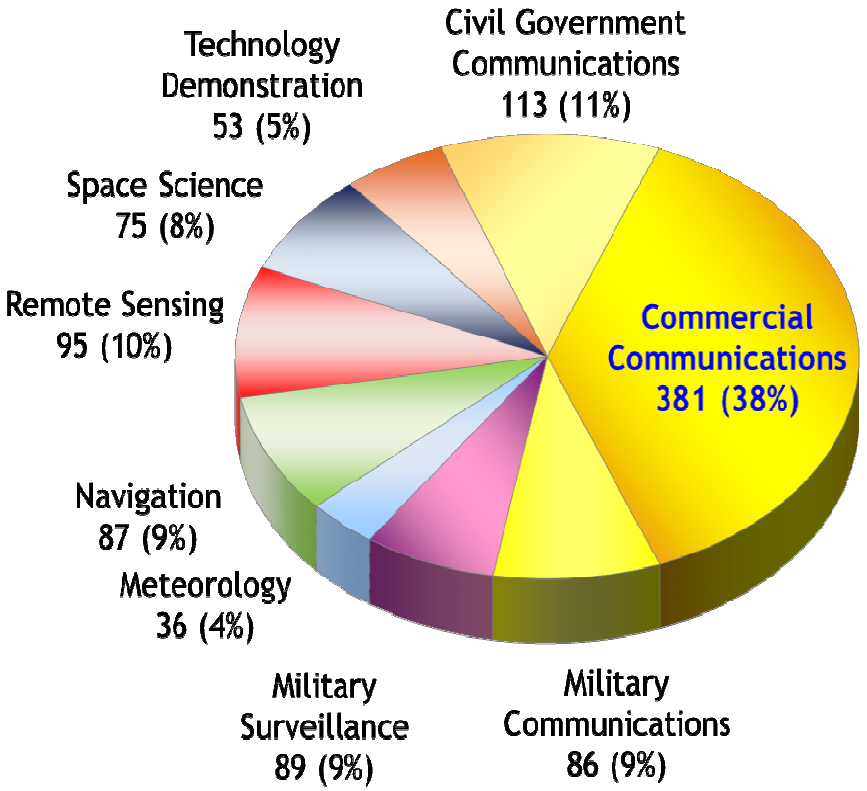
Figure 3: Geostationary Satellites by Orbital Location



- The satellite industry has more than 50 years of on-orbit experience
- Companies from more than 50 countries on 6 continents operate satellites

The Heritage of the Commercial Satellite Industry

- Global satellite industry revenues totaled $177 billion in 2011, generated by satellite manufacturing, launch, satellite services and ground equipment
- Satellite industry revenues represented 60 percent of the global space sector in 2011
- On orbit, 39% of the 994 total satellites in operation in May 2012 were commercial satellites
- By far, most commercial satellites were launched to provide communications services (97%); an additional 3% minority provide imaging/remote sensing functions



The Satellite Industry's Contributions to Economic Development

- Commercial satellite sector is an economic driver
  - Average global growth rate of over 10% over past decade, with high-quality, high-tech jobs
- Satellites use their space platform to provide critical communications services
  - Media & Entertainment: Deliver thousands of TV channels to every continent, and transmit breaking news coverage from around the world
  - Communications Resilience : Restore and back-up domestic and international fiber and cellular networks to ensure continuity of communications during disruptive events
  - Enterprise Connections: Link business locations for natural resources, retail, and banking companies
  - Emergency and Disaster Relief: Connect first responders during emergencies and for disaster relief and recovery
  - Rural and Remote: Provide communications to citizens in rural, remote, and hard-to-reach corners of the world cheaply – often when no other alternatives exist
  - National Security and Defense: Secure communications for national & global security institutions
- Citizens depend on satellite services
  - 154 million Satellite TV subscribers worldwide in 2011
  - 21 million Satellite Radio subscribers worldwide in 2011
  - Internet backbone extended to millions worldwide and consumer internet service directly to tens of thousands of homes, commercial airliners, and ships

ESOA Members:
European Satellite Operators + Supporting Industry

ESOA
European Satellite Operators Association

ASTRIUM AN EADS COMPANY Services
avanti communications
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eutelsat
HELLAS SAT
hispasat
inmarsat The mobile satellite company™
INTELSAT Closer, by far
SES your satellite company
telenor satellite broadcasting
Telespazio A Finmeccanica/Thales Company

- 11 existing operators, 2 emerging operators, supporting industry
- Flying over 160 satellites
- Global coverage with communications services

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ASIC ATRIUM SPACE INSURANCE CONSORTIUM
orbital
ASTRIUM AN EADS COMPANY Satellites
BRIT GLOBAL SPECIALTY
HISCOX
MAINSAT
MARSH
Munich RE
Newtec SHAPING THE FUTURE OF SATELLITE COMMUNICATIONS
O3b Networks
solaris mobile
Swiss Re
ThalesAlenia Space

Satellite Operator Views on Space Sustainability

SUSTAINABLE SPACE OPERATIONS ARE OF FUNDAMENTAL IMPORTANCE:

- Long-term investments by satellite operators into assets with long life-cycles: once launched, satellites are difficult to modify
- Long-term risk profile: operations in space need to be considered over the lifetime of the satellites *(risks include collision, fuel shortage, mechanical failure)*
- Long-term contracts for essential services for the proper functioning of society *(global information via broadcasting/ emergency communications/ maritime safety/ GSM backhaul/ rural connectivity/ security & defense)*

MAINTAINING A SUSTAINABLE SPACE ENVIRONMENT IMPLIES:

- Responsible behavior by those launching/ operating space objects
- Responsible regulation of space-related activities in particular spectrum management/ allocation of orbital slots & associated frequencies by the appropriate agencies

= A safe & enabling environment for satellite operation that avoids unnecessary regulatory burdens

This depends on a respectful dialogue between all stakeholders to find sensible & pragmatic solutions that do not hamper operations that ultimately serve governments & citizens alike

European Satellite Operators Association

Responsible Behavior: What do we do?

SATELLITE OPERATORS HAVE A VESTED INTEREST IN ENSURING SAFE OPERATIONS AS DISRUPTIONS DAMAGE CUSTOMER RELATIONSHIPS, HARM USERS, & COST MONEY!

- They have decades of experience in safe space operations & comply with international, regional & national regulations

INDUSTRY BEST PRACTICES ARE STATE OF THE ART & EVOLVE CONSTANTLY, E.G.

- GEO operators send their satellites into graveyard orbit to prevent collisions & debris
- Some Satellite operators carry Space Situational Awareness sensors on their satellites to monitor & react to the space environment to avoid collisions & interference
- New standards are emerging to ensure secure uplinks from identified sources (carrier ID)
- Increasing collaboration amongst the space industry:
- *The Satellite Interference Reduction Group*
- *The Space Data Association*

Responsible Regulation: The Importance of the International Dimension

European Satellite Operators Association

SATELLITES ARE NECESSARILY AN INTERNATIONAL BUSINESS:

- A GEO satellite covers one third of the earth's surface
- Some operators operate global fleets (up to 52 satellites!)
- Actors from multiple states own & operate satellites
- All operators rely on the ITU for allocation of orbital slots & associated frequencies

➡ **GLOBAL REACH IS A SATELLITE CORE STRENGTH**

THE ITU PLAYS A FUNDAMENTAL ROLE:

- It allocates spectrum to satellite & terrestrial systems & so aims to prevent interference between them & between satellite operators
- It reviews & updates all rules related to access to & use of radio spectrum & the GEO orbit at the WRC (World Radio Conference) every 3-4 years, and is the accepted means of achieving international consensus in these matters

THE IMPORTANCE OF THE WTO & INTERNATIONAL TRADE:

- The satellite industry relies on "Open Skies" & equally open trade relations between states, so their inherently international services can

Space Data Association Overview

SDA Executive Members: eutelsat COMMUNICATIONS inmarsat INTELSAT SES

Chief Technology Adviser / SDC Operator: agi

- SDA is a not-for-profit association formed by and for satellite operators
  - Membership is open to all satellite operators in all orbital regimes
  - Fundamentally an operational entity focused on real-time critical technical activities

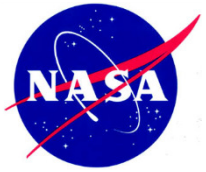
- Enhances "Safety of flight"
  - *Definition: The condition where satellites are positioned and operated in a manner that preserves their long-term operational viability, the long-term operational viability of any other satellites, and the preservation of the orbital regime(s) involved*

- Provides reliable, secure, automated, efficient sharing of data critical to the safety and integrity of the space environment and the RF spectrum
  - Physical conjunction management including planned manoeuvres
  - RF Interference mitigation support
  - Other data sharing under consideration (Space Weather, Carrier ID)

- Strong legal agreements protect member data from disclosure/misuse
  - Encourages participation and addresses historical vulnerabilities

SDA Participating Operators

Current participation: 19 satellite operators, 333 satellites



SDA - A Tool for Collaborative SSA and Safe Space Operations

- Space Data Center
  - Distributed, secure environment providing assured availability
  - Secure, legally protected sharing of proprietary data
  - Authoritative, verified, normalized, current data
  - Automated validation of data and analysis/reporting

- Significantly improves and adds to heritage processes
  - Efficient, timely, accurate conjunction assessments / ops
  - Consolidated use of best available operator data including planned maneuvers
  - Significantly reduces false alarms, missed events: increases safety and efficiency
  - Addresses format inconsistencies and inherent errors
  - Supports improved EMI/RFI geolocation and resolution support

- SDA community facilitates evolution and adoption of best practices by satellite operators

SDA Enhances Satellite Operations & Lowers Operational Costs

For More Information

- Satellite Industry Association

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  www.esoa.net

  +32 (2) 550 3575
- Space Data Association

  www.space-data.org