

Satellite Industry Interaction with Government to support the Long Term Sustainability of Space

Presented to: UN General Assembly Joint Panel Discussion of the First and Fourth Committees October 12th, 2017

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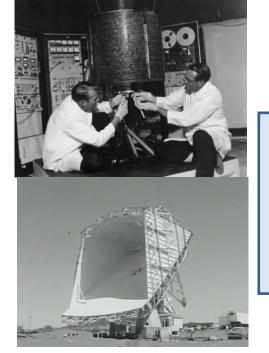


- Progression of Commercial Satellites
- Uses and End Benefits of Commercial Space Activities
- Industry Actions for Safe Space Operations
- Importance of Long-term Sustainability Efforts for Commercial Space Development
- Satellite Industry Government Relations



Commercial Satellites: 52 year legacy



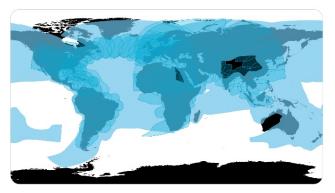


1965

52 YEARS Technology Coverage/Capability Applications











Today

Commercial Satellites: Technology Uses



Operational Satellites by Function

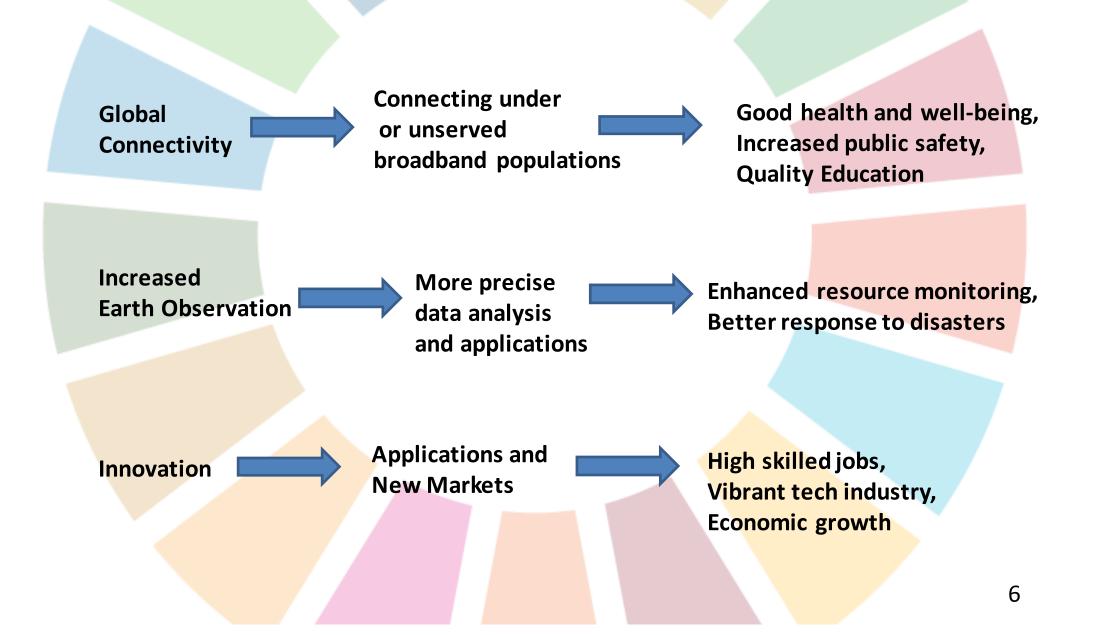
(as of December 31, 2016) Non-Profit Communications (1%) Meteorology Space observation (1%) Scientific 2% Commercial Navigation 5% Communications 7% Military Surveillance 35% 6% 1,459 **Total Operational** 12% R&D **Satellites** 14% 19% Government Communications Earth Observation

As of December 31, 2016, 41% of on-orbit spacecraft are commercially-owned, with diverse purposes:

- Broadband
- Global Communications
- Direct to Home Broadcast Services
- Mobile Communications
- High-resolution Optical Imaging
- RADAR imaging
- Short-wave Infrared Imaging
- Radio-frequency occultation (weather information)
- Timing and Navigation applications

Commercial Satellites: End benefits





Industry actions for Safe Space Operations



- System and Operations Redundancy
- Encouraging cybersecurity of satellite systems
- Data sharing
 - Precise location of satellites
 - Maneuver notification
 - Minimizing the effects of radio-frequency interference
- End of life disposal/de-orbiting

Satellite Industry Interaction with Government



Partnerships Dialogue **Technology and Standards** development Formal industry advisory • Joint research • committees Government as a customer **Govt-Industry Workshops** Education and Outreach to Ad hoc interaction • public **Advocacy** International Input Predictable and certain • regulatory regime Support to U.S. delegation Efficient licensing • ITU and Regionally processes **UN COPUOS** Effective spectrum • International Development • allocation and usage **Disaster Charter** Long-term vision



- Satellite industry committed to conducting responsible space operations
- 50 + year legacy of expertise
- Current actions for safe-space operations
- Industry is engaged and involved



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