European Commission

The Space Strategy for Europe and Civil Aviation

Nathalie Le Cam, European Commission, DG GROW
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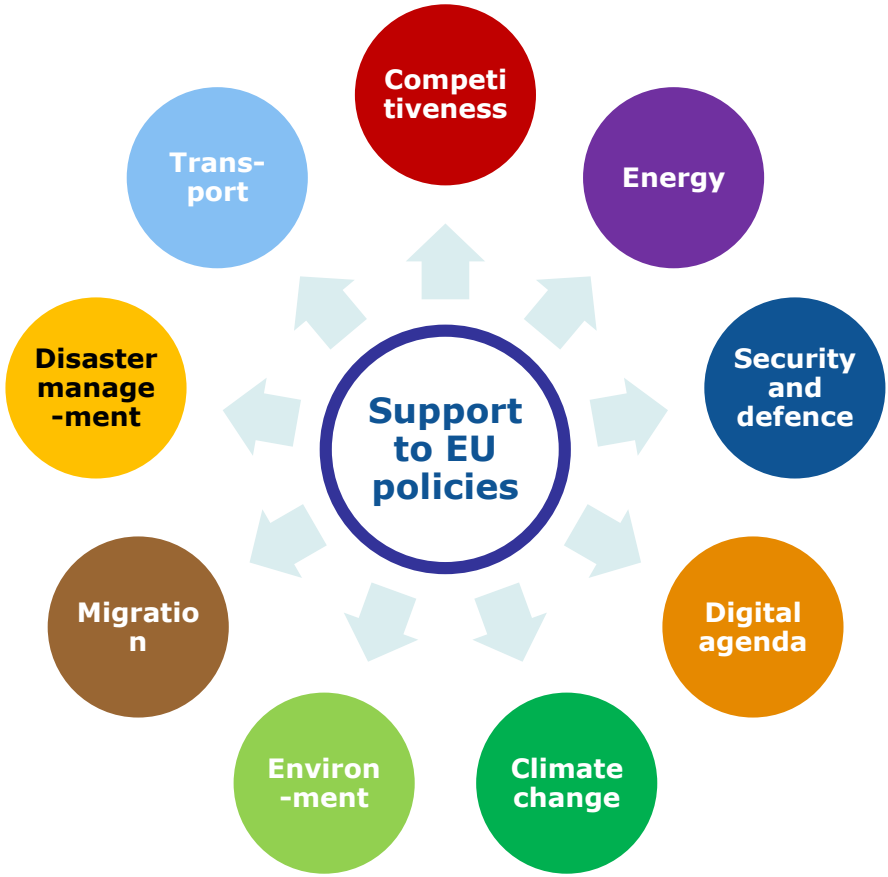
Space matters for Europe

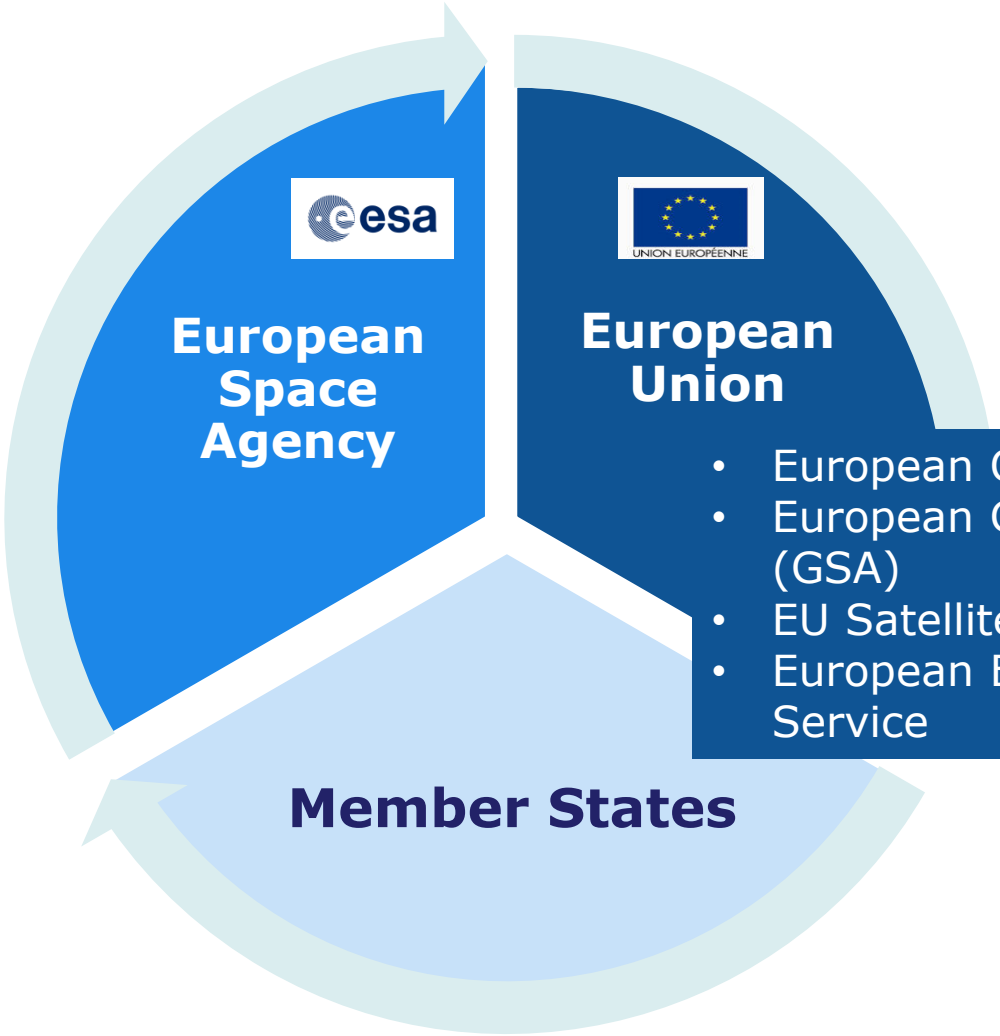
Direct economic impact

- 46-54 B€ industry value
- 230.000 professionals
- 7.5B€ per year total institutional budget
- 1/3 of world satellites are European
- EU will own 40 satellites in orbit by 2020
- EU budget for 2014-2020: 12B€

Policy impact

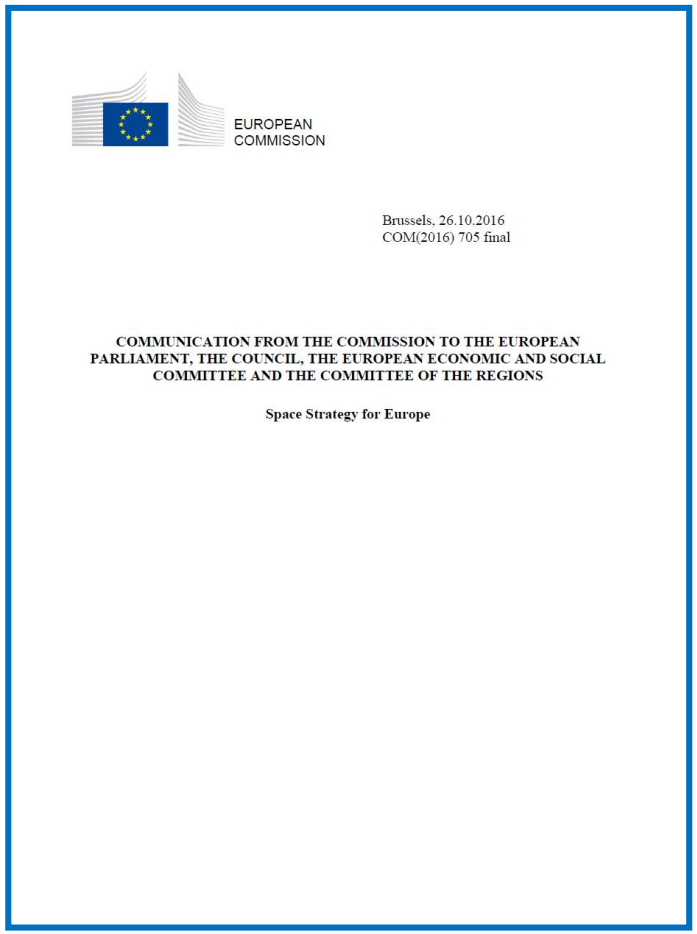


European institutional actors in space



Art. 189 TFEU

The Space Strategy for Europe



EUROPEAN COMMISSION

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Space Strategy for Europe

Bring the benefits of space to Earth !

4 strategic axis

- Encourage applications and user uptake
- Foster innovation and entrepreneurship
- Reinforce autonomy and security
- Strengthen Europe as global actor

https://ec.europa.eu/transparency/regdoc/rep/1/2016/EN/COM-2016-705-F1-EN-MAIN.PDF

EU space progammes and civil aviation

EGNOS

- Augments the GPS signal over Europe, EU owned and fully operational since 2011
- 2 main components: (limited) space segment with payloads on geostationary satellites, a ground segment with 40 stations all over Europe
- Delivers services, in particular for aviation and Safety-of-Life
- 424 existing EGNOS-based procedures - out of target of 800 - at 288 European airports (*Source EBAA - February 2017*)

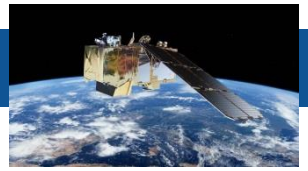
https://www.youtube.com/watch?v=aYVMG1jg7Fw

EU space progammes and civil aviation

GALILEO

- EU owned worldwide satellite navigation system ("EU GPS")
- 18 satellites in orbit (full operations by 2020)
- Three Initial Services since end 2016:
  - **Open Service**: a free mass-market service for positioning, navigation and timing
  - **Public Regulated Service**: encrypted to provide service continuity for government users such as civil protection services, customs officers and the police, during emergencies or crisis situations
  - **Search and Rescue Service**: Europe's contribution to the international distress beacon locating organisation COSPAS-SARSAT
- Galileo will contribute to integrity monitoring services for safety-of life applications, such as aviation (e.g. when combined with SBAS (typically EGNOS V3) or other GNSS systems (GPS) through ARAIM techniques – Consultation with aviation stakeholders ongoing)

EU space progammes and civil aviation


COPERNICUS

- The most advanced Earth Observation system in the world, created to answer big societal challenges (e.g. climate change, natural disasters, development);
- 18 satellites by 2029;
- All 6 services up and running operationally, serving a growing community of users world-wide;
- Full, free and open data: more than 50,000 users registered; more than 5 million products and more than 6 Petabytes downloaded *(new data platform to be operational by end of 2018);*
- Can support pollution and emissions monitoring, land-use at airports, weather forecast, ash cloud predictions, etc.

https://www.youtube.com/watch?v=MGJss4lDaBo

EU space progammes and civil aviation

Space Surveillance and Tracking

- Initial services provided since July 2016
  - Collision risk with debris
  - In-orbit fragmentations
  - Re-entry of space objects in atmosphere
- Consortium of 5 EU Member States + EU Satellite Centre
- Dual-use synergies
- Monitoring of re-entries for aviation safety

Video: EU Space Surveillance and Tracking (SST) – YouTube
Website: www.eusst.eu
Registration: https://sst.satcen.europa.eu

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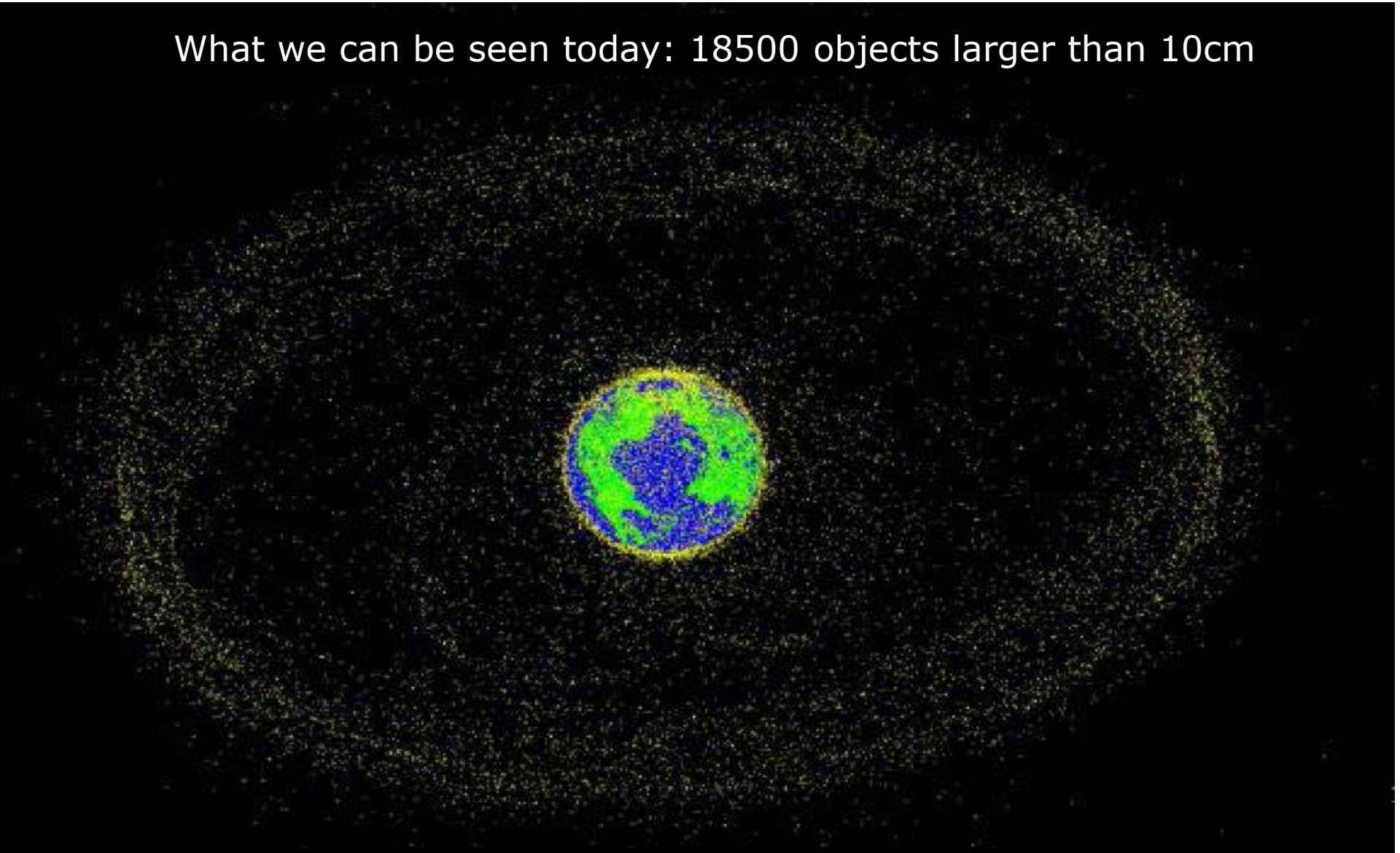
What we can be seen today: 18500 objects larger than 10cm



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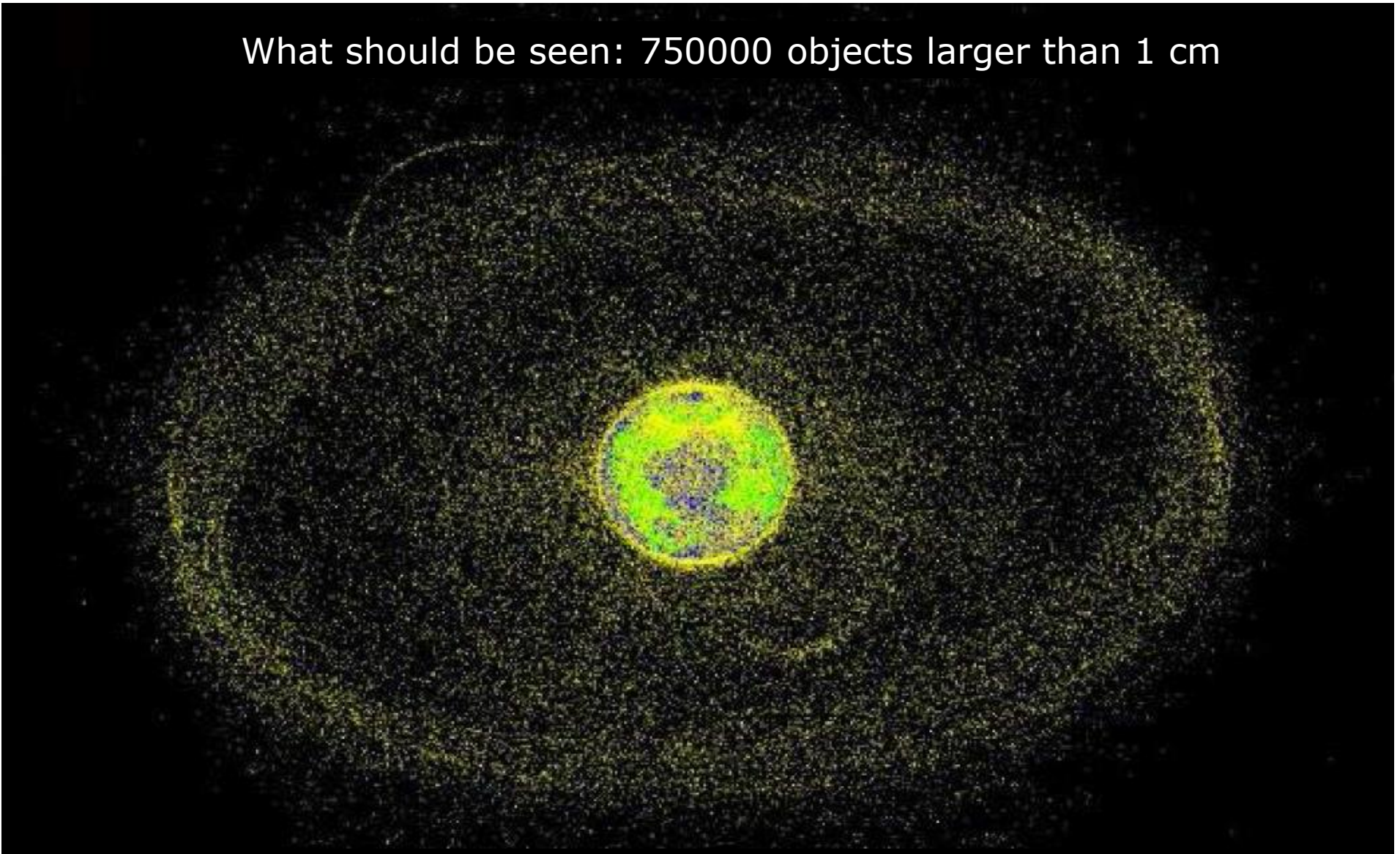
What should be seen: 750000 objects larger than 1 cm



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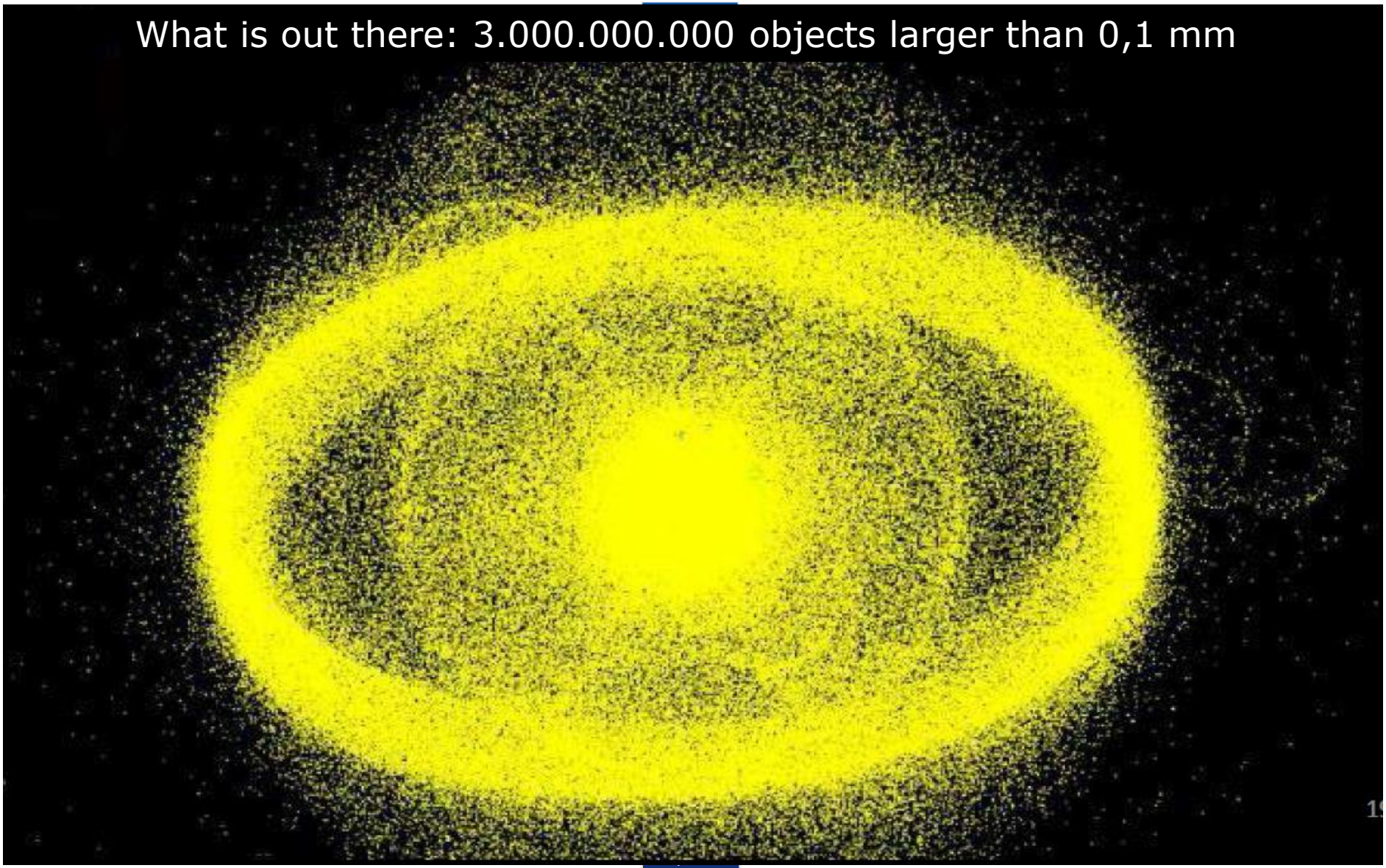
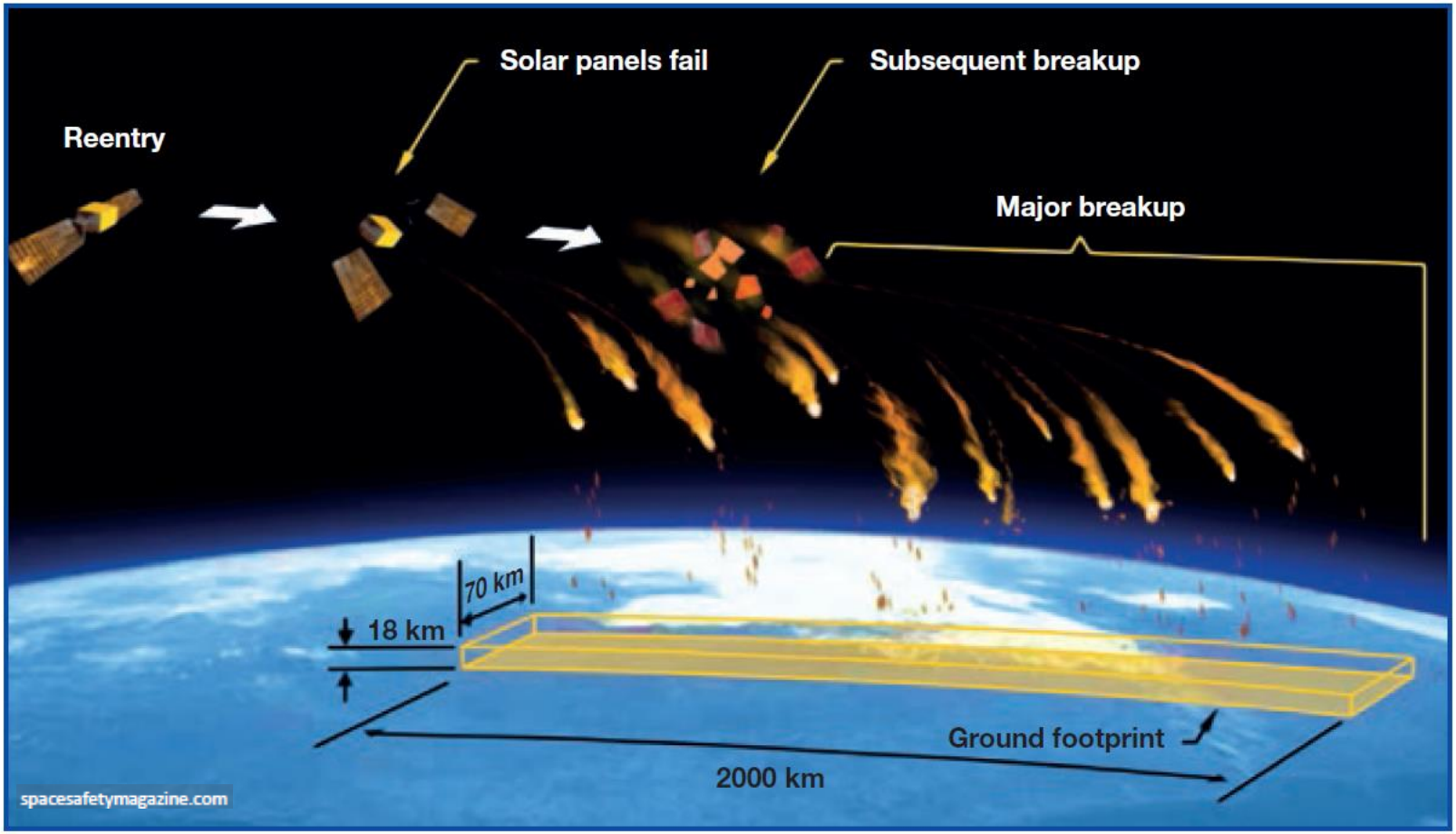
What is out there: 3.000.000.000 objects larger than 0,1 mm



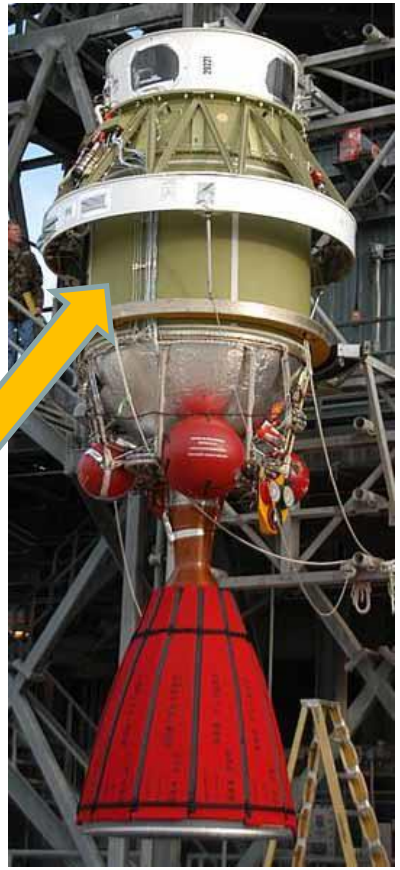


Dimensions of airspace affected by a spacecraft reentry event.

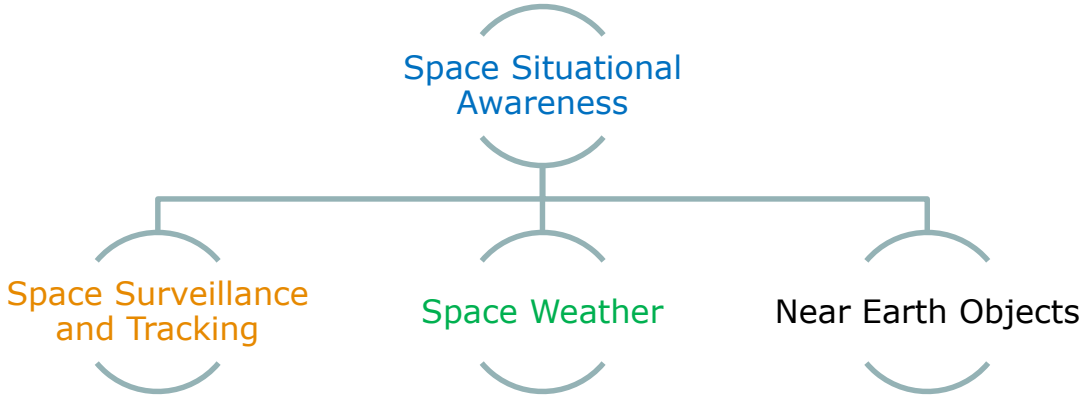
Space surveillance and tracking: facts and figures on re-entry

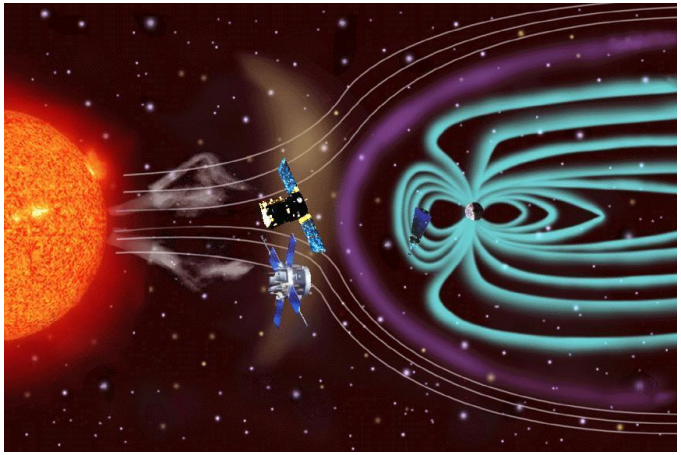
Since the begining of space flights…

- More than 41.500t of man-made objects have been placed in space
- More than 33.000t re-entered
- Currently about 7.000t in orbit
- About 50-100t re-entering each year
- Typical objects recovered: payloads or rocket bodies (fuel tanks, pressure tanks, etc.)
- Predictions uncertain: about 20% of remaining lifetime
- The break up occurs at about 78 km
- Re-entry predictions rely on space weather information



From Space Surveillance and Tracking to Space Situational Awareness





- European space weather services under development
- Taking into account specific regional requirements
- In line with ICAO initiative on provision of space weather services for civil aviation
- Ensuring international cooperation

Emerging aviation needs and potential responses by EU space policy

- Better CNS capabilities:
  - Secure communications and links
  - More precise navigation means
  - Continued surveillance
- RPAS
- Faster and higher altitude flights
- Integration of launches into air traffic
- Enhanced space weather predictions
- Congestion of lower orbits in outer space (LEO)

Legislative proposals for a new legal framework on space: by end 2018

Conclusion

Aviation safety and **space sustainability** are key priorities for the European Union and its Member States.

The European Union, with its Member States and its partners, is coordinating several policies and actions for a regional contribution to the global challenges posed by aviation and space activities.