EUROPEAN UNION
SATELLITE CENTRE

Analysis for decision making

Forging ahead with European Space Security: SatCen views

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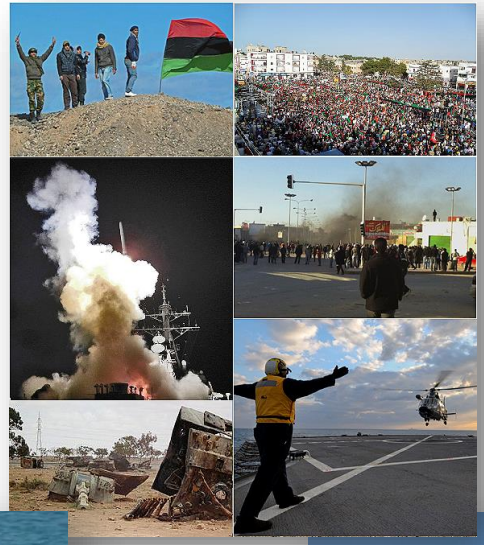
12th ESPI Autumn Conference on Security in Outer Space
Vienna, 27-28 September 2018

Current Engagements

Implementing the EU Global Strategy

- ***Operations***
- ***Regional Conflicts***
- ***Piracy***
- ***Migration***
- ***Proliferation WMD***
- ***Disasters humanitarian aid***



SatCen

A critical aspect

The EU SatCen is fully depending on Space assets, in other words on the « Security IN space ».

REACTIVITY: access to relevant space capacities at any moment (EO, secured communications, positioning, weather forecast…) → « integrated services » (easy and fast access)

The EU external action credibility is at stake!

Who We Are

Agency of the Council of the EU

CFSP/CSDP

HQ in Torrejón de Ardoz, Spain

Council Decision 2014/401/CFSP

EO Satellite Data: secure context

GEOINT Service Provider, 24/7 availability

Civilian agency with dual activities

What we do

Mission:

Support EU decision making and actions in the field of the CFSP / CSDP, incl. EU missions and operations, by providing products and services resulting from the **exploitation of relevant space assets** and collateral data.

Our activities

Geospatial intelligence

Training

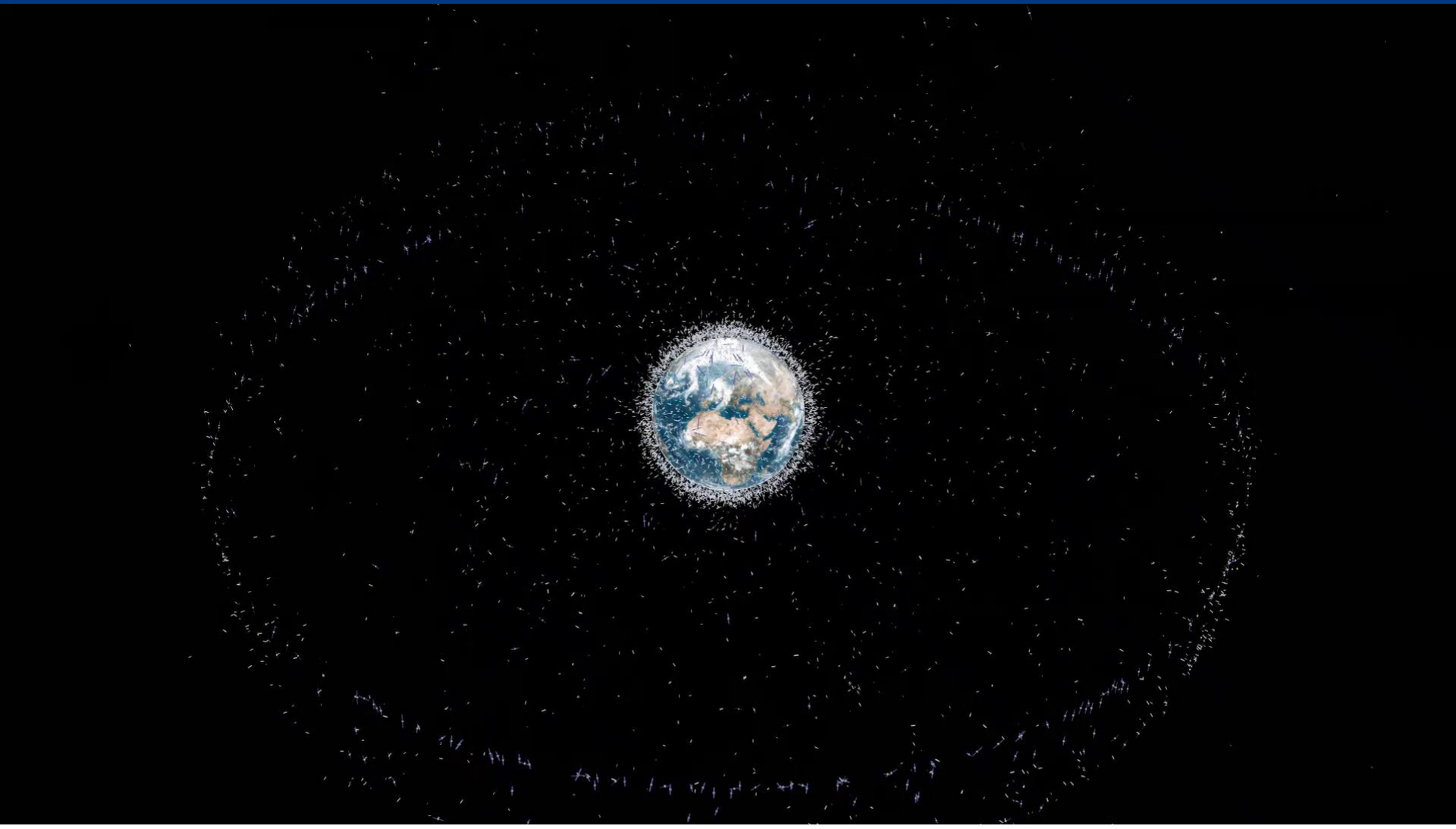
Cooperation with Union bodies and MS

Capability development

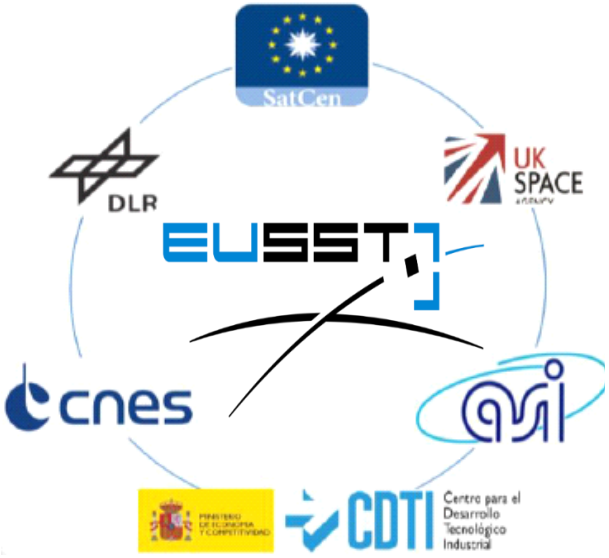
Development of IT technology

Support to CFSP/CSDP

EU SST framework programme



SatCen role in the EU SST support framework



In 2014, the EU adopted a Decision establishing a **SST Support Framework** for the **networking and operations** of SST assets owned by 5 EU Member States, as well as the **SatCen**, in order to provide SST services to EU Member States, EU institutions, spacecraft owners and operators, as well as civil protection authorities.

3 funding lines (Galileo, Copernicus, H2020)
167 M€ in current MFF 2014-2020

54 user accounts, 105 spacecraft registered
- Collision avoidance: 28
- Re-entry analysis: 37
- Fragmentation analysis: 31

>1.5 M products throughout the portal

SatCen

EU SatCen is the EU SST Front Desk, facing **users**

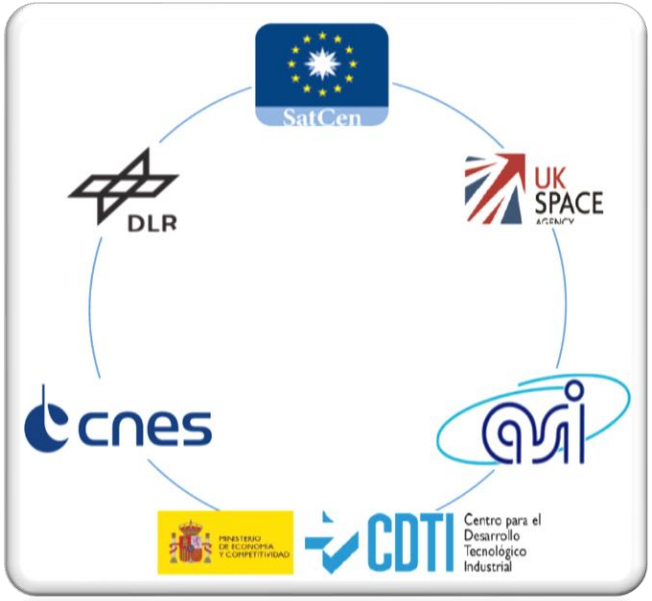
EUSST Service Provision Portal https://sst.satcen.europa.eu

EUSST Service Provision Help Desk sst.helpdesk@satcen.europa.eu

SatCen

SatCen role

SST Consortium. Currently composed of 5 national designated entities (ASI, CDTI, CNES, DLR, UKSA) + 3 newcomers



Activity approved by SatCen Board. Cost neutral to MS

EU SatCen is the **SST Front Desk**, the EU element in the SST Support Framework, facing SST users

SST Functions

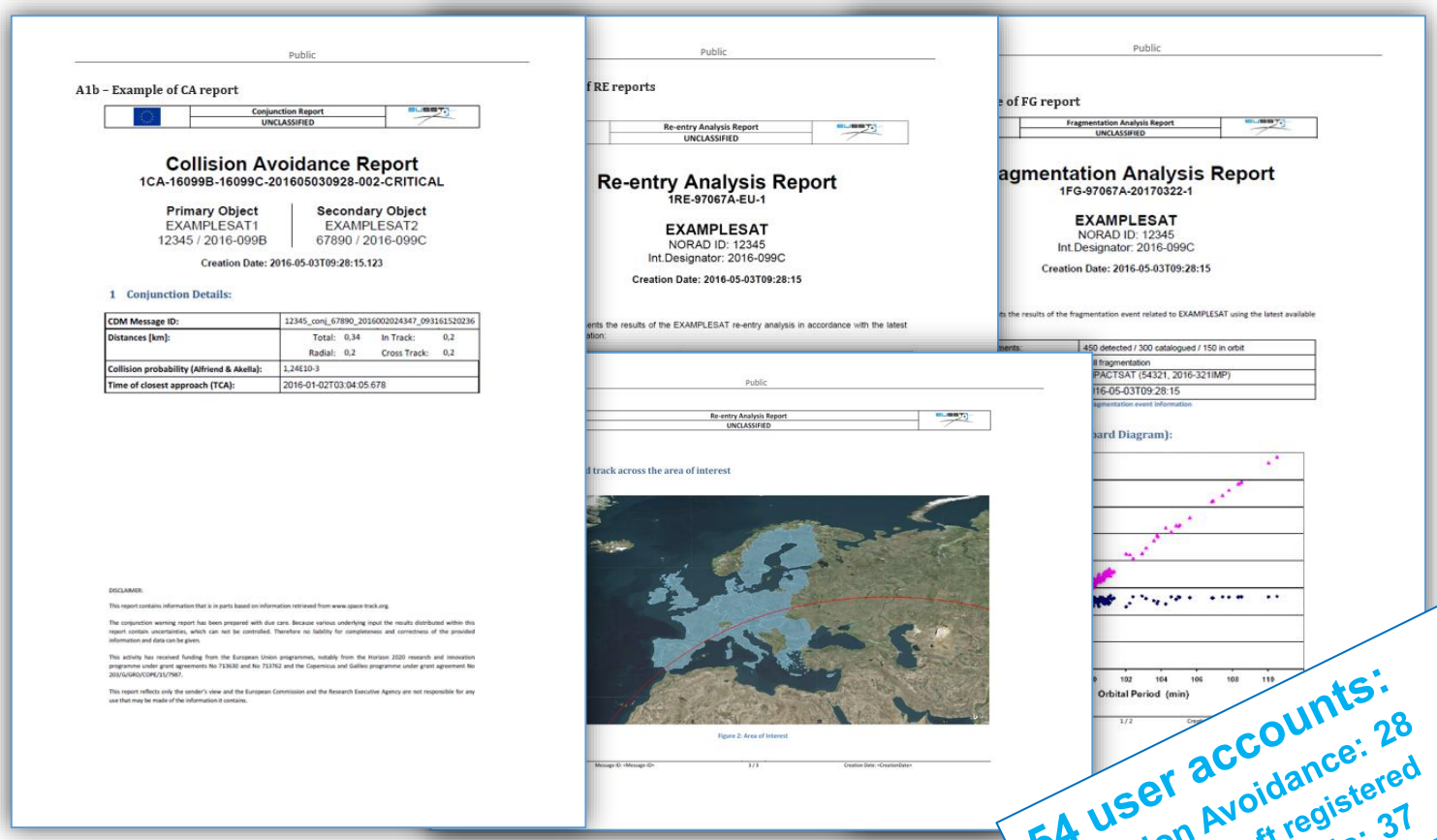
Sensor → Processing → Service Provision → **SST users**

Which are the SST services?

Collision avoidance

Re-entry analysis

Fragmentation analysis



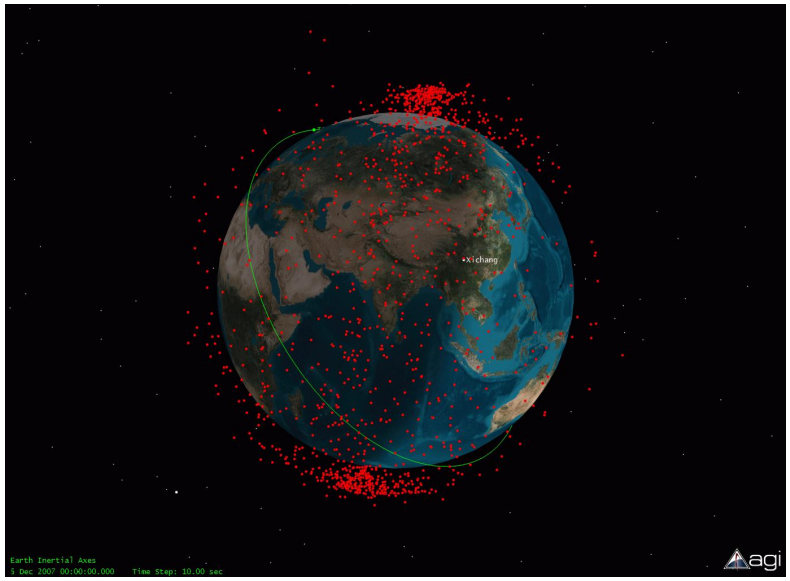
54 user accounts:
Collision Avoidance: 28
105 Spacecraft registered
Re-entry Analysis: 37
Fragmentation Analysis: 31

>1.5 M products throughout the portal

Initial services started 1st July 2016 through SatCen

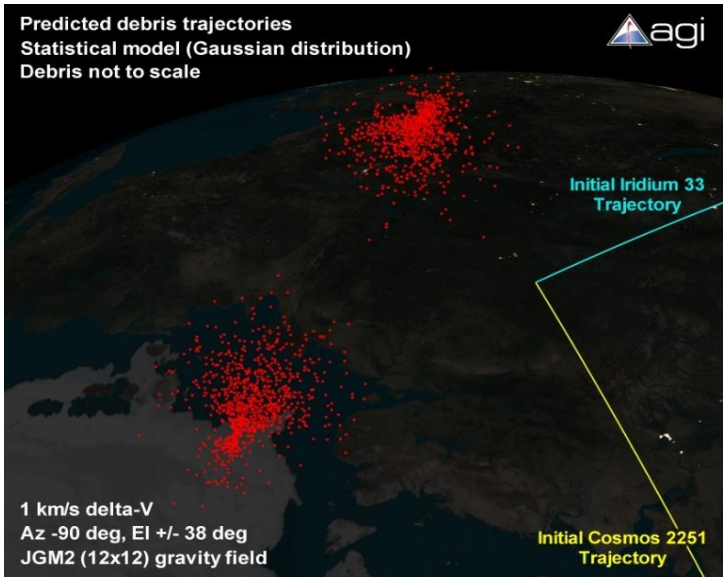
2 Fragmentation examples

Fengyun ASAT
(2007)



2000 > 10 cm trackable debris

Iridium33 – Cosmos 2251 collision
(2009)

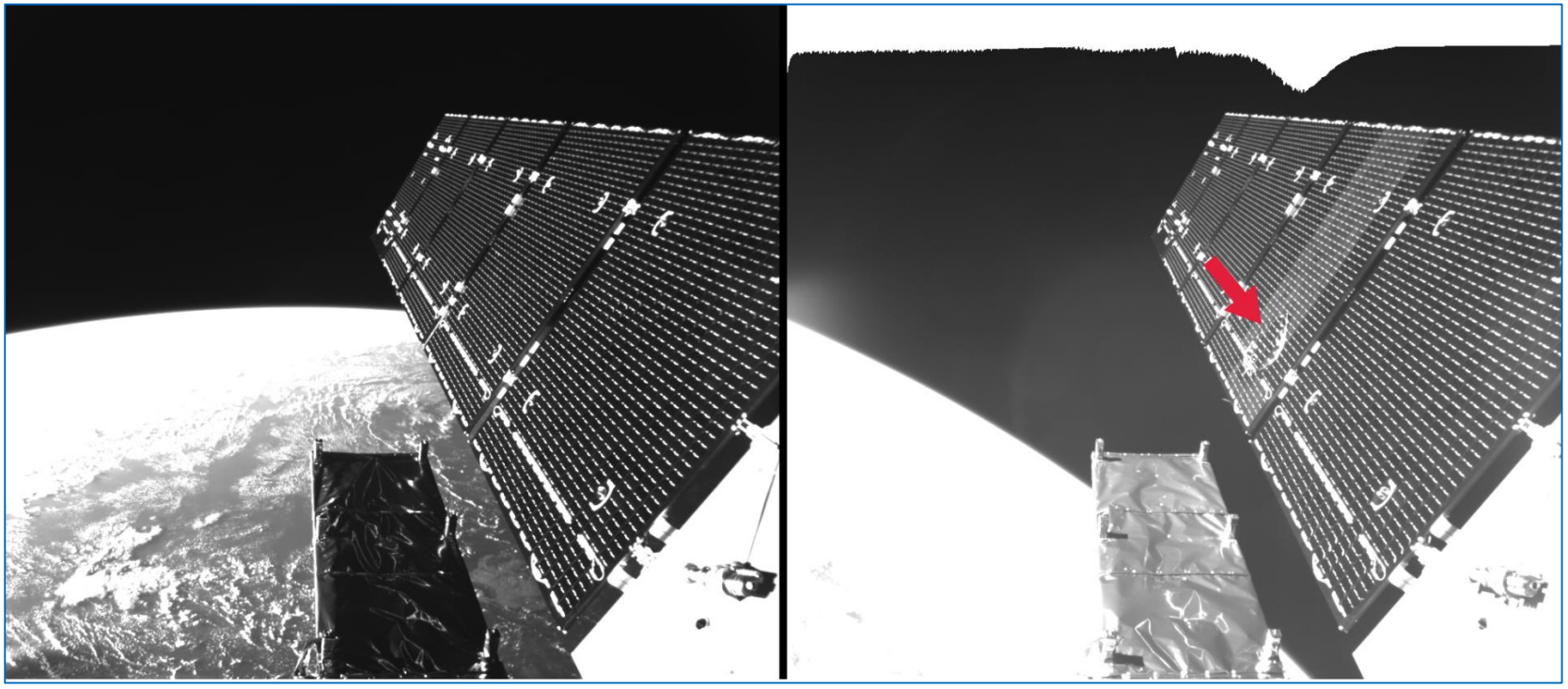


3000 > 10 cm trackable debris

More events have happened

Statistically, one catastrophic fragmentation is expected every 5-10 years

Sentinel 1A event – 2016/08/23

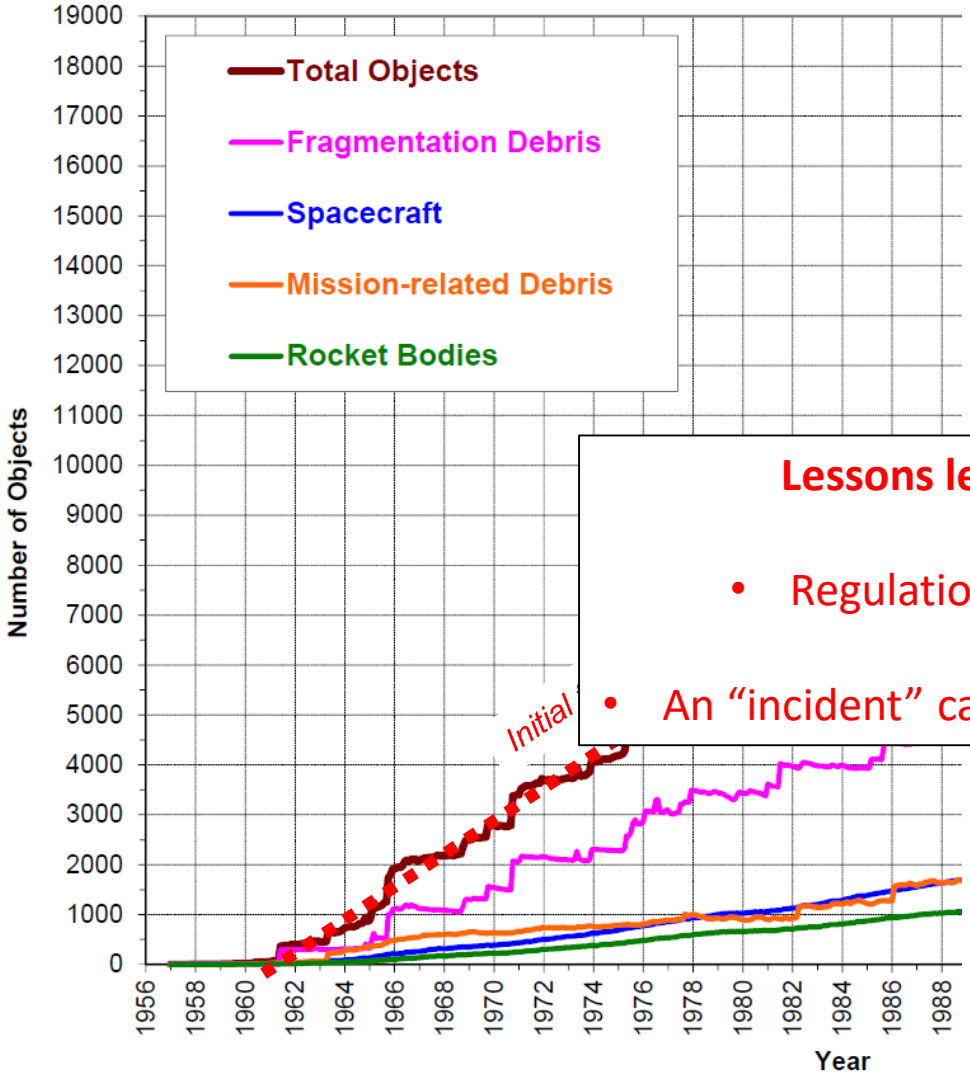


Estimates indicate that the particle was a few millimetres in size…

History of space debris population: the evolution phases

Number of Objects in Earth Orbit by Object Type officially cataloged by the U.S. Space Surveillance Network. Typical size > 10 cm

4 phases: 1. No regulation 2. Regulation in place 3/."Incidents" 4.Back to initial trend



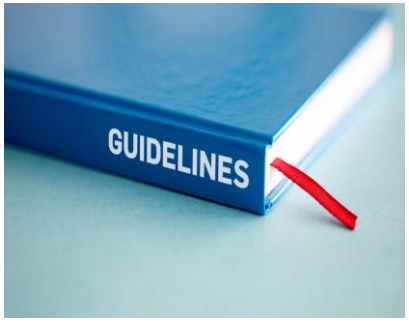
Lessons learned:

- Regulation pays off
- An "incident" can ruin all efforts

The current regulation: the COPUOS Space Debris Mitigation Guidelines

UNITED NATIONS
Committee on the Peaceful Uses of Outer Space

In December 2007, the General Assembly endorsed these Guidelines and agreed that the voluntary guidelines for the mitigation of space debris reflected the existing practices as developed by a number of national and international organizations, and invited Member States to implement those guidelines through relevant national mechanisms.



Three fundamental principles:

1. The prevention of in-orbit break-ups;
2. The removal of spacecraft and orbital stages that have reached the end of their mission from the useful and densely populated orbit regions no longer than 25 years after completion of mission;
3. Limiting the objects released during normal operations.

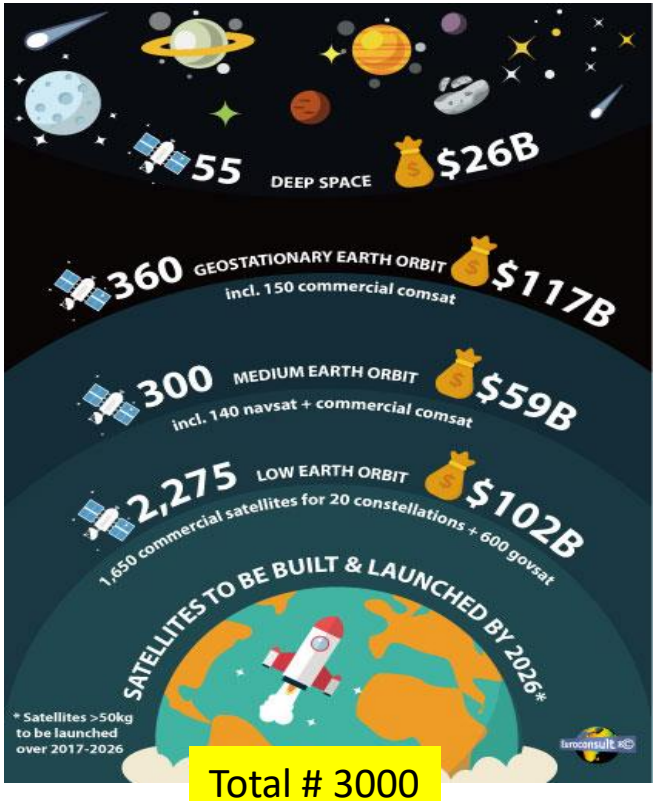
These guidelines are not bidding and 11 years old

SatCen

The game changers

1. The explosion of the satellite population

Satellites > 50 kg over 2017-2026



Total # 3000

Satellites < 500 kg over 2017-2026

(1187 between 2008 and 2017)

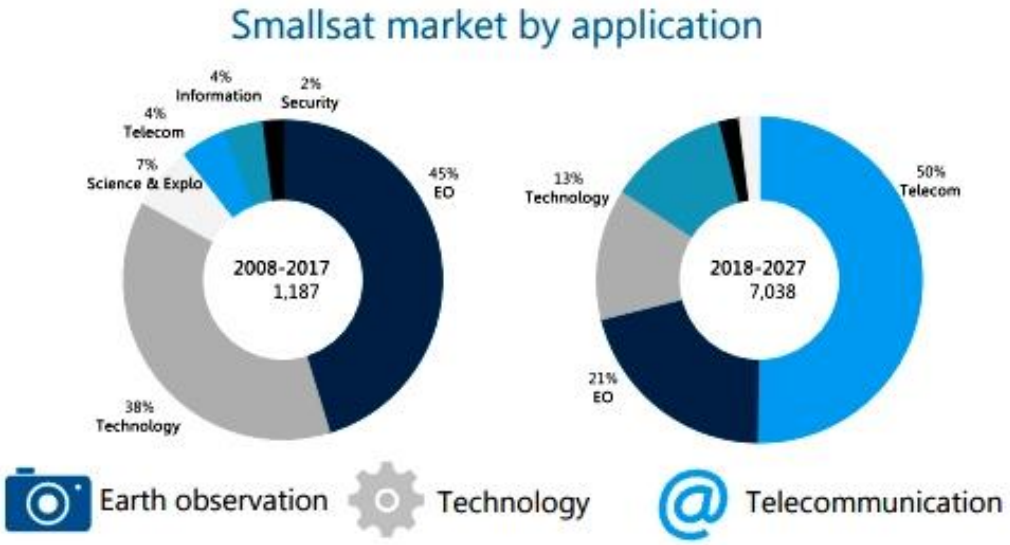
The increase in number of satellites will mainly come from smallsats

Greater number of small objects to track (down to 10 cm)

PROSPECTS FOR THE SMALL SATELLITE MARKET // AN EXTRACT

The game changers

2. The increasing position of private companies



Most smallsats will have commercial missions

Private constellations will dominate the smallsat market

Debris is thus an important issue for smallsat operators

The game changers

3. Propulsion for microsatellites

- Without a propulsion system, satellites cannot manoeuvre; it can neither avoid collisions nor re-enter at the end of its life.

- Several companies are **NOW** proposing propulsion systems for smallsats and microsats.

DSI DEEP SPACE INDUSTRIES · ThrustMe · Accion SYSTEMS · RAFAEL ADVANCED DEFENSE SYSTEMS LTD. · SITAEL

exotrail · ELTA Electronics for Harsh Environment · PHASEFOUR · ENPULSION · Apollo Fusion

The number of customers for collision avoidance analysis will be much bigger

Conclusion

To overcome the short-term challenges, there is a need to address in parallel the following points:

- Upgrade the means and services of detection and collision analysis(MS will);
- Update the current COPUOS guidelines (up to space traffic management?);
- Make all efforts to make the new regulation binding, or at least better adhered to, in particular by private companies;
- Enhance international cooperation in this field.

Engaged for Excellence

Thank you for your attention!

Pascal Legai
Director
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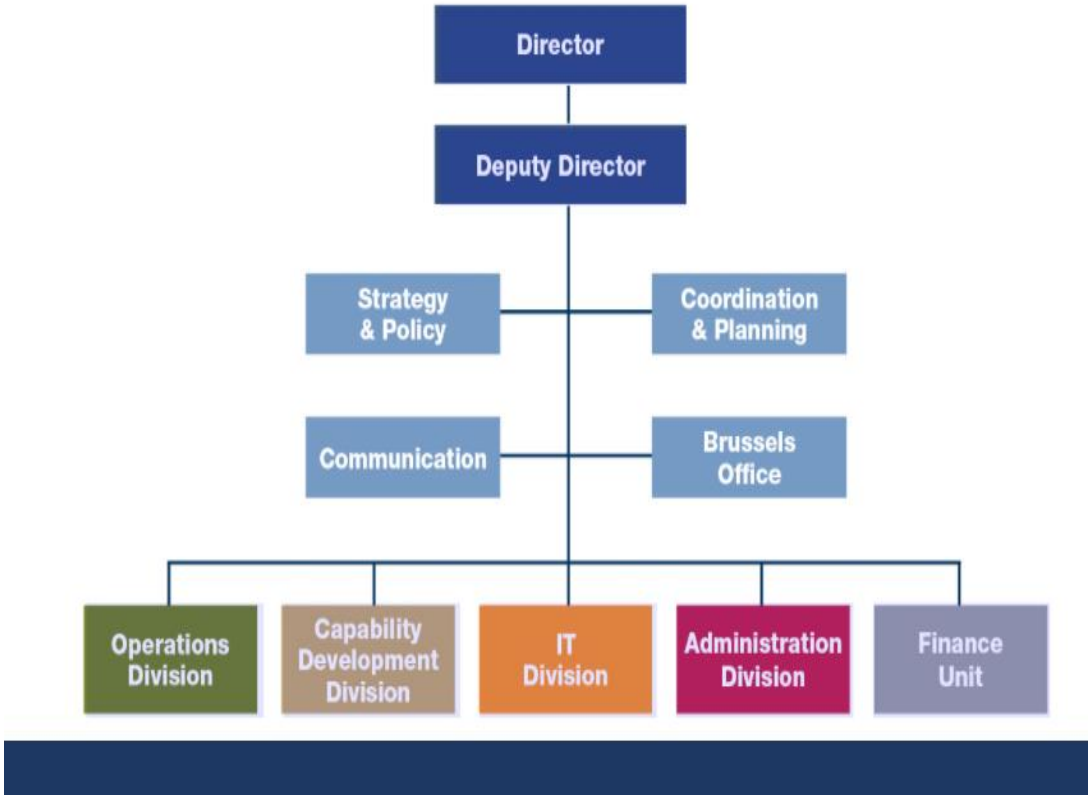
Staff, Structure and Budget



STAFF

- **90** permanent staff
- **40** temporary staff
- **6** SNEs
  - **TOTAL: 136 staff**

BUDGET

- **12,838,998** Member States
- **13,909,195** Commission