2022 SPACE DEBRIS ACTIVITIES IN FRANCE : HIGHLIGHTS

60th STSC Session - COPUOS –2023

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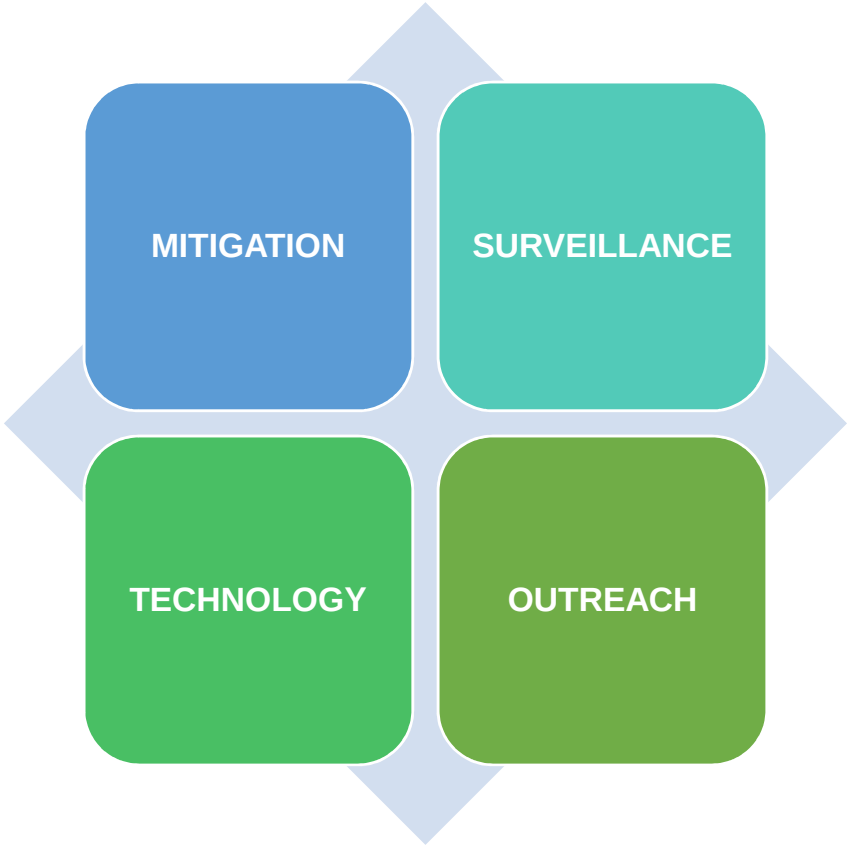
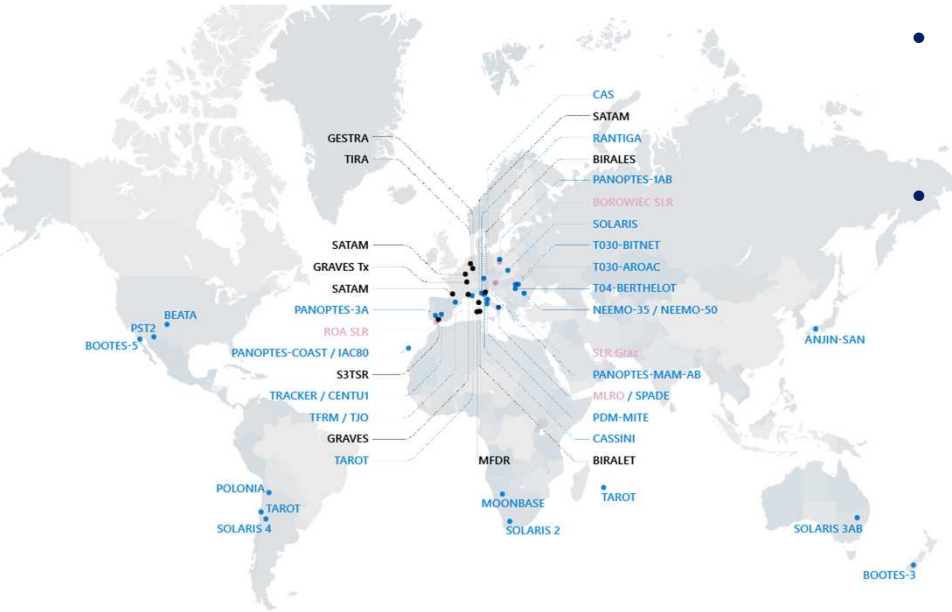
Space Debris : a CNES top priority



SURVEILLANCE : France involved in EUSST



- **CAESAR is the CNES operational collision avoidance service**
  - 2 on-calls teams to monitor the fleet on a 24/7 basis
- **EU SST rely on CNES and CDTI to provide a free of charge collision avoidance service to all European Union satellite operators (~300 satellites)**

293 Satellites

42 ORGS

- **Statistics in 2021 :**
  - 2,7 millions CDM managed (7400+ a day)
  - 17 avoidance manoeuvers
- **Service open to non EU users beginning of 2023**

MITIGATION : France is active in standards and guideline setting fora

- France actively supports international groups in charge of establishing best practices, guidelines and standards :

  - ECSS : CNES has setup and conducts a STM mirror group and participate to debris mirror group
  - ISO : active participation to TC20/SC14 WG3 (system & operations) & WG7 (debris mitigation)
  - UN COPUOS : participation to LTS working groups
  - IADC : France chaired IADC in 2020 and engaged action for regular IADC public environment report dedicated to quantify criticality of debris proliferation

France has translated international guidelines and standards in its regulation : French Space law

MITIGATION : French Space Law has demonstrated its efficiency for 10 years

EUTELSAT
GLOBALSTAR
AIRBUS GEO
CSUM
CSUT
ADS
TAS
UNSEENLABS
CNES
LATMOS

81
in flight satellites

18
Transferts

140
Satellites granted licence since 2011

41
Disposals

7 imminent launches

2022 highlights :

- 13 new licences in 2022
- 4 Successful disposals

French Space Law new rulemaking in progress

- In Orbit servicing
- Nanosatellites
- Large constellations
- Spaceports
- Micro-launchers

French Technical Regulation update

- **Context** :
  - Update of the French Space Operation Act (FSOA)
  - Need to adapt the contents of the associated Technical Regulation (TR) in particular due to the New Space environment
    - ✓ Increased space traffic
    - ✓ Diversification and multiplication of space actors
    - ✓ Development of innovative systems
  - Emergence of « **Space Traffic Management** » concept

- **Aim** :
  - Overcome the **risk related to debris** in orbit
  - **Limit debris generation** through preventive measures
  - Pushing technological developments : **vector of innovation**
  - Provide a **regulatory framework for new innovative activities** (e.g. On Orbit Servicing)

- **Methods** :
  - Work started in July 2020 with a feedback on the application of the current TR
  - Ensure coherence with International standards/regulations (e.g. FCC, ODMSP, ISO, WG ESA, …)
  - Close coordination with French Operators and Industrial partners
  - **Under official review in France up to March 2023** foreseen to be extended to international entities

TR envisaged evolutions perimeter

Feedback on the application of the current TR

- Removal of ambiguities, clarification of expectations, formalization of processes already in place, …

Consideration of the New Space perimeter

- In-Orbit Servicing, Constellations, Nanosatellites, …

Better consideration of the risk of collision

- Adapt the requirements to international rules, taking into account the current space environment in orbit, …

Identification and tracking of space objects

- Encourage the use of a system facilitating identification and tracking

Restriction of orbital lifetime

- Condition re-entry duration to the duration of the operational mission, …

Higher requirements on probability of successful disposal

- Comply with international guidelines (probability of 0.9 – IADC / ISO)

TECHNOLOGY : Tech4SpaceCare

Tech4SpaceCare Initiative aiming to develop technological elements for orbital systems to ensure the sustainable use of space and the safety of space operations

- **T4SC-1 : Increase SSA measurement accuracy**
- **T4SC-2 : Improving satellite passivation at end of life**
- **T4SC-3 : Protection against High velocity impacts**
- **T4SC-4 : Prepare spacecraft to ADR/IOS**
- **T4SC-5 : Decrease orbit duration after EoL**
- **T4SC-6 : Minimize risk during reentries**
- **T4SC-7 : Developing onboard anti-collision**
- **T4SC-8 : Improve missions extension and failures detection**
- **T4SC-9 : Darkening of satellites in low Earth orbit**

T4SC

OUTREACH

- **Publication in international Conferences**
- **CNES deeply involved in IAF debris and STM group**
- Learning sessions to operators, industrial, universities on debris & regulation
- **Workshops organisation**
  - 9th Workshop on Satellite End Of Life & Sustainable Technologies - CNES HQ - Paris, Jan 22-23, 2022
  - International Conjunction Assessment Workshop, CNES HQ – Paris, May 2023
  - European Workshop on Space Debris Modeling and Remediation - CNES HQ - Paris - 2024

Thank you for your attention