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EU SPACE WEEK 2023

7 - 9 November - Sevilla, Spain

Session Introduction Space Surveillance and Tracking

User Consultation Platform – SST session

Beatriz Gallardo, SST User Engagement Manager at EUSPA



Purpose and general information

- Present latest **status of EU SST** and **exchange views with users** on the approach of EU SST regarding basic/public and advanced/commercial services and marketplace.
- Event information:
 - 2 hours session
 - Hybrid (ZOOM platform)
 - Social Media channels: #EUSpace #EUSW #EUSST

Part I - Agenda

- 15.05 – 15.15: Welcome remarks
 - European Commission (Rodolphe Muñoz, Legal officer, DG DEFIS)
 - EU SST Partnership (Dr Pascal Faucher, Chairman, CNES)
- 15.15 – 15.30: EU SST Front Desk (João Alves, SST Team Leader, EUSPA)
- 15.30 – 15.45: Exchange of views on the approach of EU SST regarding basic/public and advanced/commercial services and Marketplace (Cristina Pérez, EU SST Head of Expert Team Services, AEE/CDTI)

Part II - Agenda

- 15.45 – 16.40: User Consultation (Cristina Pérez, ES)
 - EUMETSAT, Pier Luigi Righetti, Flight Dynamics Manager
 - HISDESAT, Carlos González, COMMS Satellite Operations and SSA Manager
 - HISPASAT, Manuel Sansegundo, Head of Space Segment Engineering, Operations and Satellite Monitoring & Control
 - ICEYE, Adam Śmiałek, Space System Engineer
 - SES, Charles Law, Flight Dynamics Team Leader
 - SPACEOPAL, Emiliano Agosta, Technical Director
 - VIASAT, John P. Janka, Chief Officer, Global Regulatory Affairs
- 16.40 – 16.50: Questions and Answers (Cristina Pérez, ES)
- 16:50 – 16.55: T.S. Kelso Award ceremony (Space Data Association representative)
- 16.55 – 17.00: Closure of the SST session (Beatriz Gallardo, EUSPA)

Part I - Speakers



Rodolphe Muñoz
European Commission



Pascal Faucher
Chair of EU SST Partnership
CNES



João Alves
SST Team Leader
EUSPA



Cristina Pérez
Head of EU SST
Services Expert Team
AEE/CDTI

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Space Surveillance and Tracking Front Desk

User Consultation Platform – SST session

João Alves, SST Team Leader at EUSPA



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EUSPA's mission

Linking space to user needs



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Exploitation



Security



Utilization

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EU SST

Space Surveillance and Tracking

Ensuring space safety
and sustainability

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PROGRAMME OF THE
EUROPEAN UNION

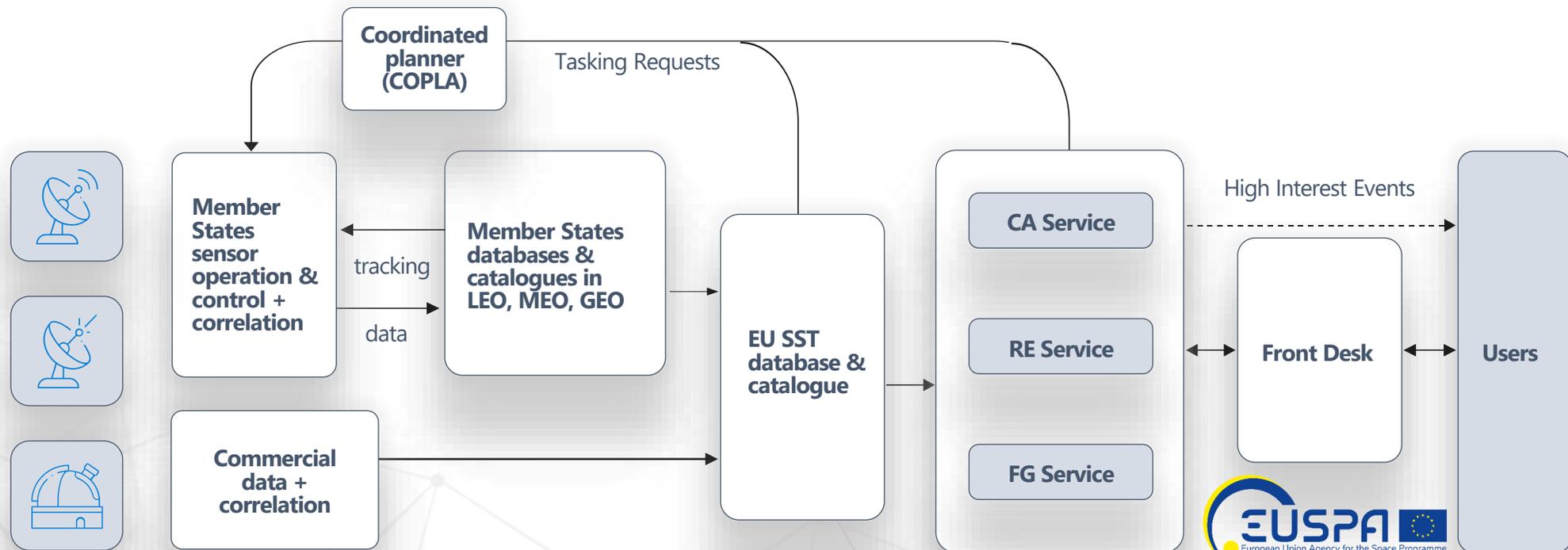
Operations - Overview



Sensor network

Data processing

Service provision



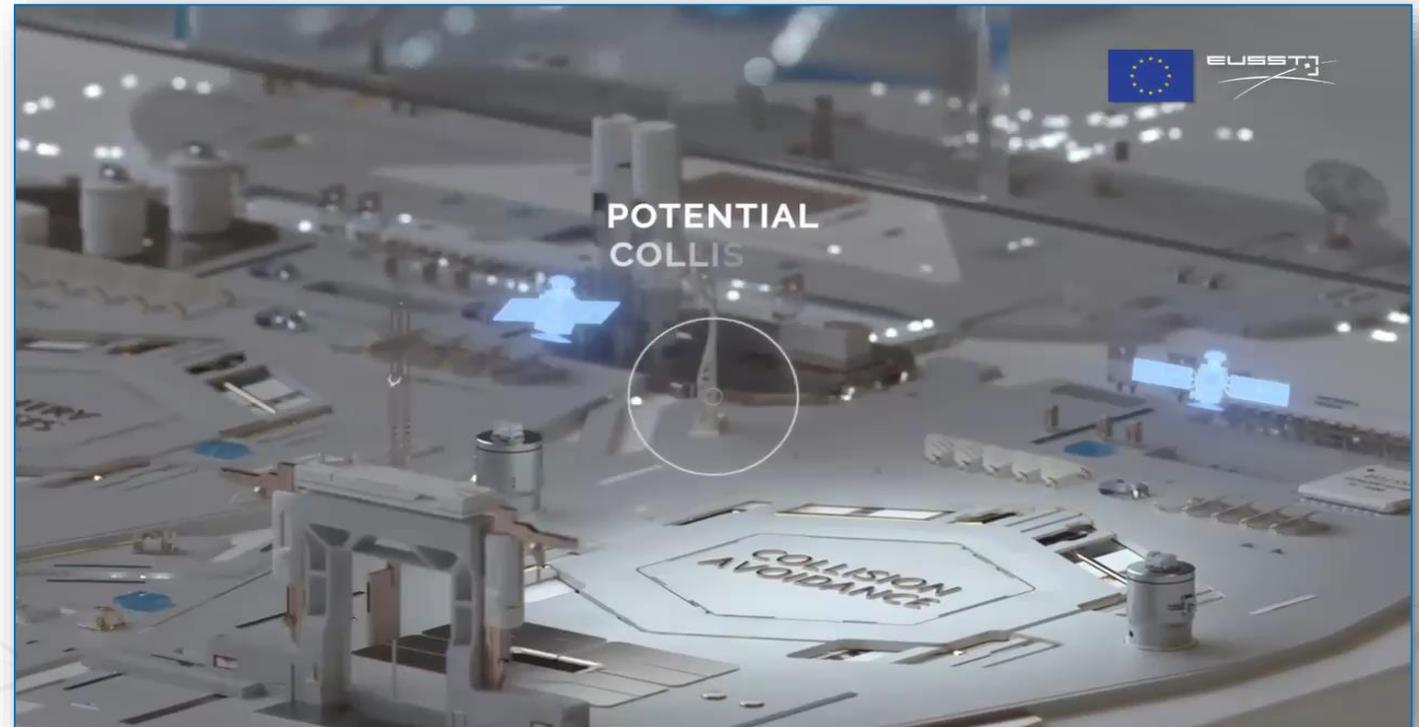
Collision Avoidance Service



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Risk assessment of collision and generation of collision avoidance alerts

- Provided to owner and/or operator of spacecraft – user configurable
- Enhanced Analysis & Risk Mitigation support (e.g. covariance estimations, HBR estimations, PoC sensitivity analysis, CAM support)



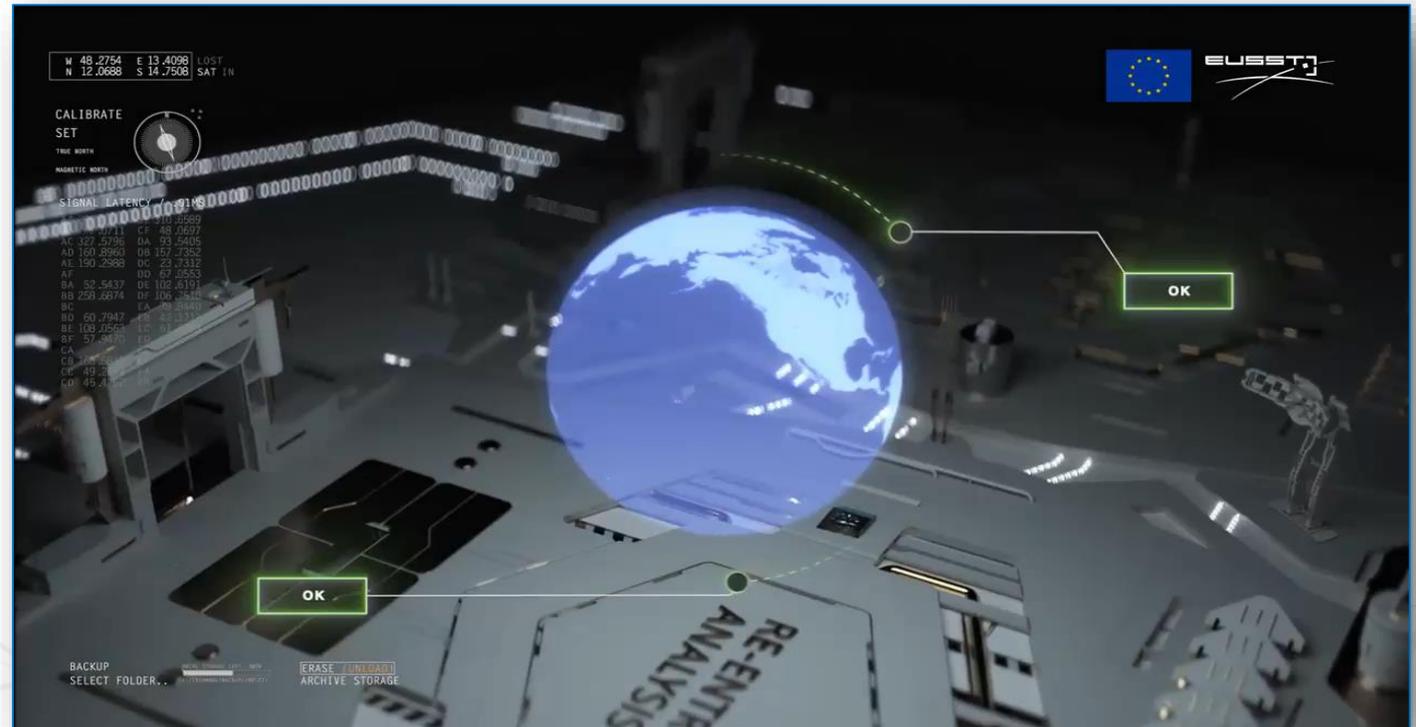


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Re-entry Analysis Service

Risk assessment of space objects re-entry into the Earth's atmosphere

- Long and short term predictions of re-entry of large objects
- Provision of overflights over areas of interest

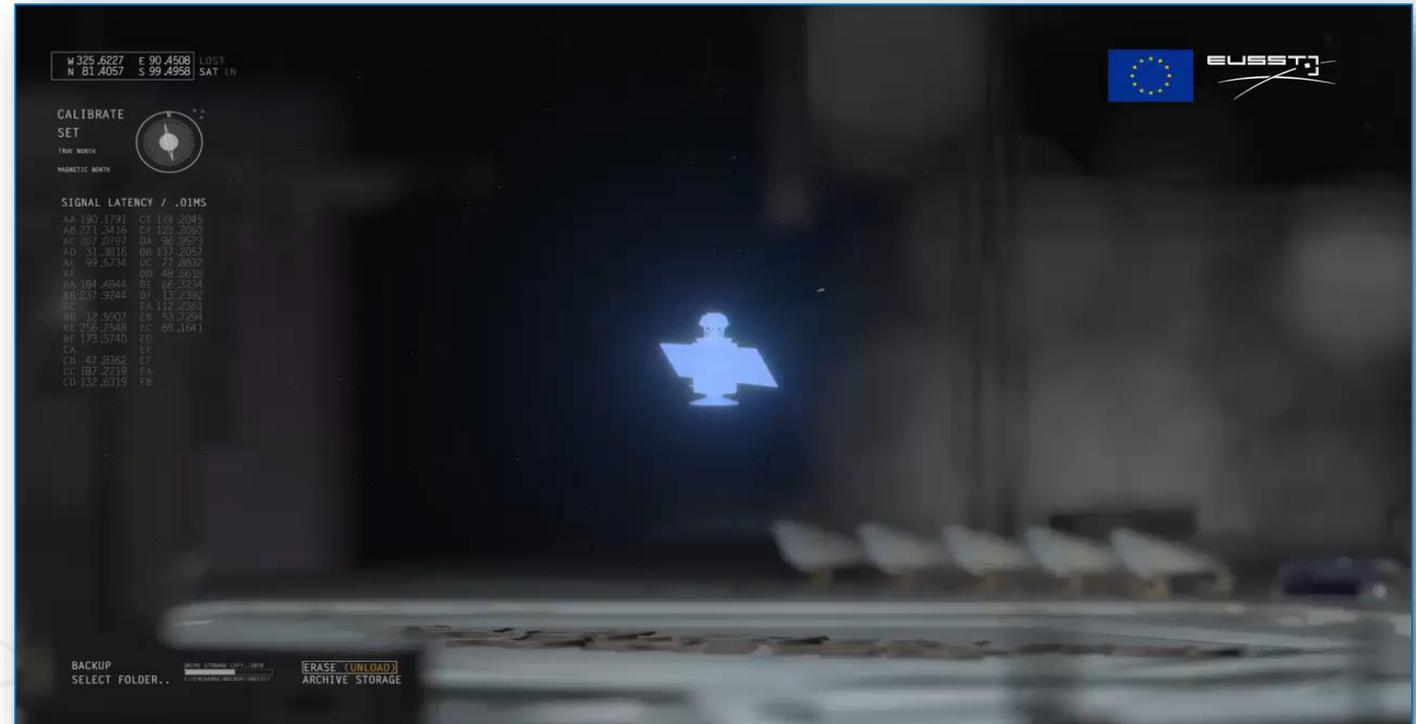


Fragmentation Analysis Service



Detection and characterisation of in-orbit fragmentations

- Notifications of in-space fragmentations
- Reports on number of fragments and orbital regions affected
- Long term analysis and simulations provided (using breakup model)





EU SST
Space Surveillance and Tracking

Ensuring space safety
and sustainability

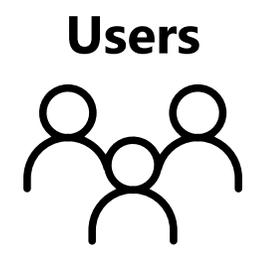
EU SST Front Desk

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+200
ORGS
+400
Satellites



- all Member States
- the EEAS, Commission, Council
- spacecraft owners and operators
- other public and private entities
- international SST users

What is the SST Front Desk?

SST Front Desk
Interface for the delivery of SST services



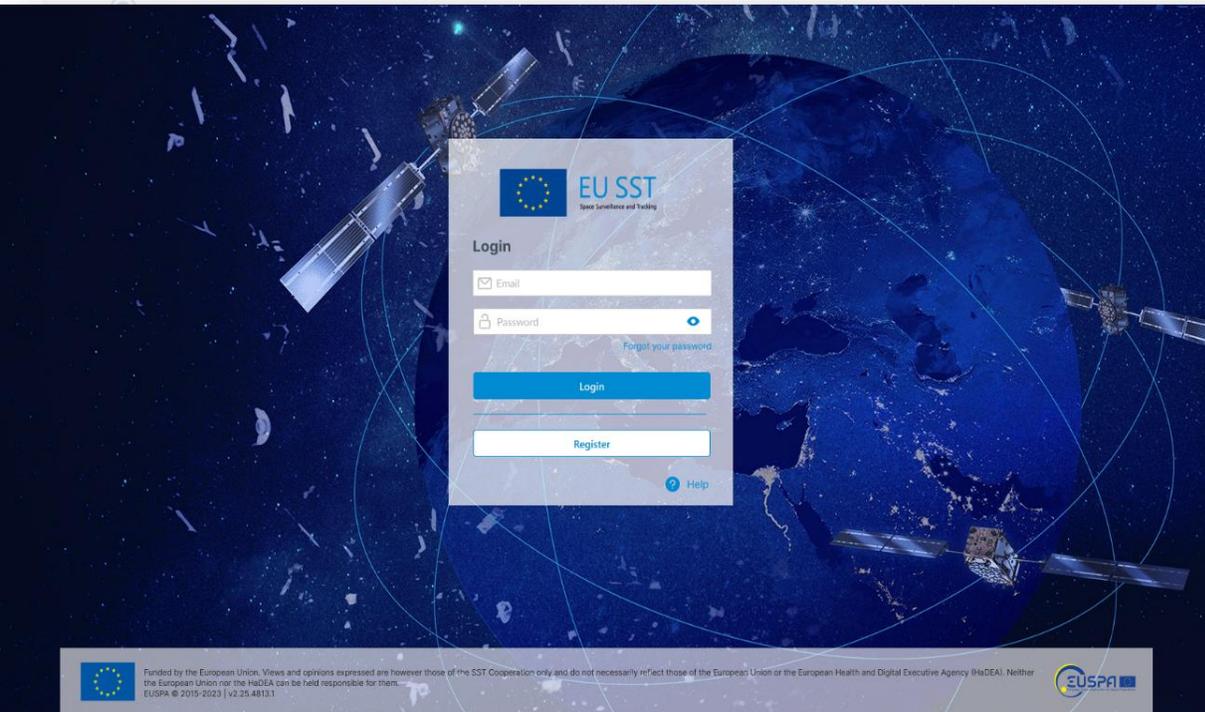
SST Partnership



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SST Portal & Helpdesk

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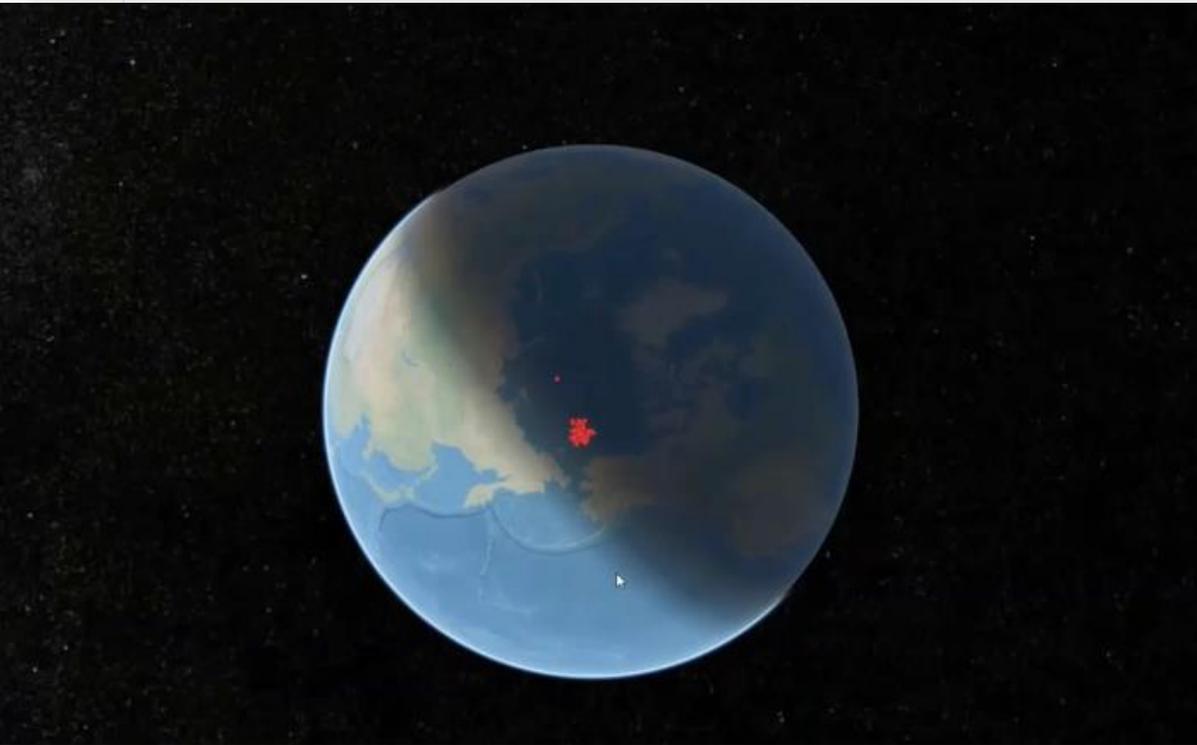
- **Interface for service provision, incl. communication and coordination platform**, and new related features being developed e.g. maneuvers recommendations.



- **Main support channel for users**, regularly in contact with satellite operators for service establishment, advanced support, user needs collection, etc.

SST Taskforce & Reporting activities

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- Taskforce lead by EUSPA for coordinating the handling of **events of critical/high risk level** that may affect the security of the Union or its Members States.



- **Reporting and performance monitoring** activities, of all system functions e.g. sensors, processing, services, through a dedicated reporting platform.

User Engagement & Communication

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USER CONSULTATION PLATFORM 2023

7 November
Sevilla, Spain


European Union Agency for the Space Programme


Space Academy



- Gather **user feedback and needs**, while promoting and encouraging the use of the SST services.
- Communication activities to **maximize outreach** e.g. videos, social media, website, service portfolio, leaflet, factsheet.

Satellites split by type



419
Satellites

LEO

176

Optsat-3000
 SAR-LUPE 1, 2, 3, 4, 5
 BIROS
 Tandem-X, Terrasar-X
 PAZ
 Brik-II
 CHEOPS
 METOP B, C
 SENTINEL 1A, 1B, 2A, 2B, 3A, 3B, 5P, 6A
 DEIMOS 1, 2
 FossaSat 2E8, 12, 13, 14, 15, 16, 17
 ION-SCV 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
 NEPT-1
 Reaktor HW,
 Sunstorm, W-CUBE
 Spartan, Platform 1, 2
 Urdaneta, Gei-sat pre.
 Suomi-100
 TRISAT
 UPMSat-2
 NEMO-HD
 CSO-1, 2
 CERES 1, 2, 3
 VENμS, SARAL
 CALIPSO
 JASON 3
 PLEIADES 1A, 1B
 SMOS
 ANGELS, EYESAT
 SWOT
 NESS
 BRITE PL-1, PL-2
 Odin, GMS-T, MATS
 GomX-4A, 4B
 XR-1, ICEYE-X1, 2, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 23, 27, 30
 HiVE01
 Spacevan-001
 Star Vibe
 Arthur-1, Gregoire
 PLATINO-1
 Protomethee

DELFI C3, N3XT, PQ
 HUMSAT-2D, LUME-1
 Robusta 1B
 AISSat 1, 2
 NorSat 1, 2, 3, TD
 ELO3, 4
 YAM-2, 3, 5
 Globalstar M065, M066, M069, M070, M071, M072, M073, M074, M075, M076, M077, M078, M079, M080, M081, M082, M083, M084, M085, M086, M088, M089, M090, M091, M092, M093, M094, M095, M096, M097, M087
 Astrocast 1, 2, 101, 102, 103, 104, 105, 201, 202, 203, 204, 205, 301, 302, 303, 304
 Droid.001

MEO

58

GSAT / Galileo
 0101, 0102, 0103, 0104, 0201, 0202, 0203, 0204, 0205, 0206, 0208, 0209, 0210, 0211, 0207, 0212, 0213, 0214, 0215, 0216, 0217, 0218, 0219, 0220, 0221, 0222, 0223, 0224
 O3B PFM, O3B FM 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, mPower 1, 2, 3, 4, 5, 6
 ALPHA
 CELESTA, MT-Cube-2
 TRISAT-R

GEO

185

COMSATBW-1, 2
 XTAR-EUR, SPAINSAT
 METEOSAT-9, 10, 11, 12
 ASTRA 1KR, 1L, 1M, 1N, 2A, 2C, 2E, 2F, 2G, 3B, 5B
 AMC 3, 6, 11, 15, 18, 21
 SES 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16/Govsat-1, 17, 18, 19, 20, 21, 22
 NSS 7, 9, 10, 11, 12
 SIRIUS 4, QUETZSAT 1, CIEL 2
 EDRS-C
 GRAVITY SPACE 1
 AMAZONAS 2, 3, 5, HISPASAT 30W-5, 30W-6, 36W-1, 74W-1, AMZ-NX
 HYLAS 1, 2, 4
 ATHENA-FIDUS
 SYRACUSE 3A, 3B, 4A, 4B
 HELLAS-SAT 2, 3, 4
 EUTE 10A, 16A, 172A, 21B, 36B, 3B, 65W, 7WA, 70B, 7A, 7B, 8WB, 9A, 9B, HB 13B, 13C, 13D, KASAT 9A, 12WB, 172B, 7C, 5 WEST B, Konnect, Quantum, KVHTS, HB13F, HB13G, E10B
 INMARSAT 3F1, 3F2, 3F3, 3F5, 4F1, 4F2, 4F3, AF1, 5F1, 5F2, 5F3, 5F4, GX5, 6F1, 6F2
 VIASAT 1, 2, Wildblue 1
 Thor 5, 6, 7
 G25, 11, 12, 13, 14, 15, 16, 17, 18, 19, 23, 28, 30, 31, 32, 33, 34, 35, 36, 37, 3C
 H2, 3e
 IS10, 1002, 11, 14, 15, 16, 17, 18, 19, 1R, 20, 21, 22, 23, 25, 28, 30, 31, 32e, 33e, 34, 35e, 36, 37e, 38, 39, 40e, 5, 9, 901, 902, 904, 905, 906
 MEASAT 3A, 3B, 3D
 BADR-8
 SATRIA (NST)

Commercial

313

Civil

83

Military

23

Facts and figures – Services and Front Desk

781 high-risk close approaches monitored in the last year

94 re-entries monitored in the last year (of which 2% of major risk)

6 fragmentation events first reported in the last year



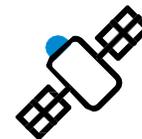
>123k

products delivered through the SST Portal in the last year



123

new users registered in the last year



109

new satellites registered in the last year



604

user requests handled by the SST Helpdesk in the last year



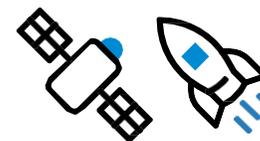
9434

monthly average website visitors in the last year



>10k

social media followers in total



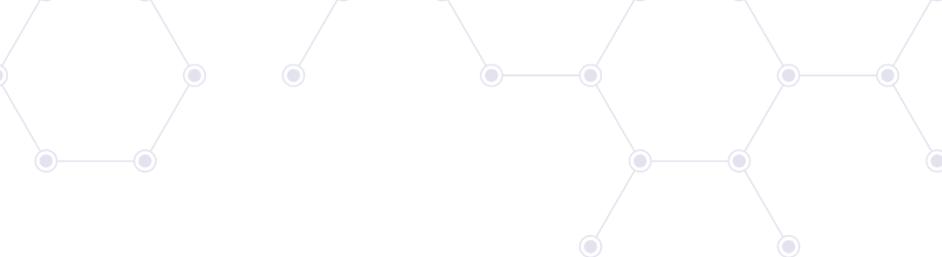
4

taskforce activations for critical events in the last year



68

indicators monitored to report on the performance of EU SST



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How UCP can contribute to
enhance EU SST services?

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Exchange of views on the approach of EU SST
regarding public/basic and commercial/advanced
services and Marketplace



User Consultation Platform – SST session

Cristina Pérez, Head of EU SST Service provision Expert Team, ES



What is EU SST?

EU SST Partnership

15 EU Member States

- Austria, Czech Republic, Denmark, Finland, France, Germany, Greece, Italy, Latvia, the Netherlands, Poland, Portugal, Romania, Spain, Sweden



EUSPA
as Front Desk

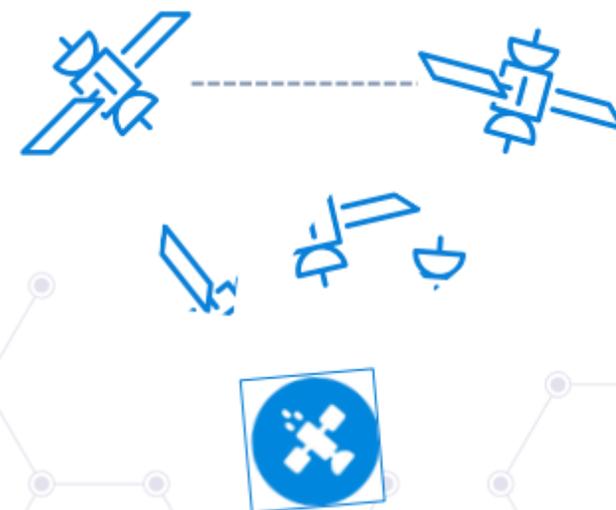


Overseen by
European Commission



EU SST Services

- EU SST services are to be provided **free of charge and configurable to the users' needs**, according to the Space Regulation.
- The public/basic services are intended to be a **public service** to ensure the safety of the space operations.
- EU SST intends to be a **public catalyst**.



EU SST Services

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Collision Avoidance (CA)



Risk assessment of collision and generation of collision avoidance alerts

- **User-tailored** service (SCD)
- Hot redundancy scheme involving ES (S3TOC) and FR (COO) with harmonised service level and single service provider per registered user
- Enhanced **Analysis & Risk Mitigation** support (e.g. covariance estimations, HBR estimations, PoC sensitivity analysis, CAM support)



Fragmentation Analysis (FG)



Detection and characterisation of in-orbit fragmentations

- Provided by IT (C-SSA)
- Short-term notification to **confirm quickly an FG event**
- Medium-term FG analysis based on the orbital parameters of the **catalogued fragments** e.g. Gabbard Diagram
- Long-term FG analysis (**with simulations with breakup model**)



Re-entry Analysis (RE)



Risk assessment of space objects re-entry into the Earth's atmosphere

- Provided by IT (C-SSA)
- Long-term (within 30 days) **re-entry predictions**
- Short-term (a few days) overflight predictions with **ground tracks over customizable areas of interest**



Service tailored to users' needs: To whom shall we provide the CA service and how?



Non-man small satellites

- Non-manoeuvable
- No ephemeris (most)
- **Service:**
Standard service
CA Products
Predefined thresholds



Manoeuvrable

- Manoeuvrable
- Ephemeris usually provided
- **Service:**
Tailored service
CA Products
Config. thresholds
CAM Design
CAM Screening
HIE interactions



Large constellations

There is a need for EU SST to keep technological capabilities to provide services to constellations for EU assets (IRIS2).

Coordination & Communication Platform

Context

EU SST has been working on the definition of activities to Support mitigation and remediation services, as dictated by the Space Regulation

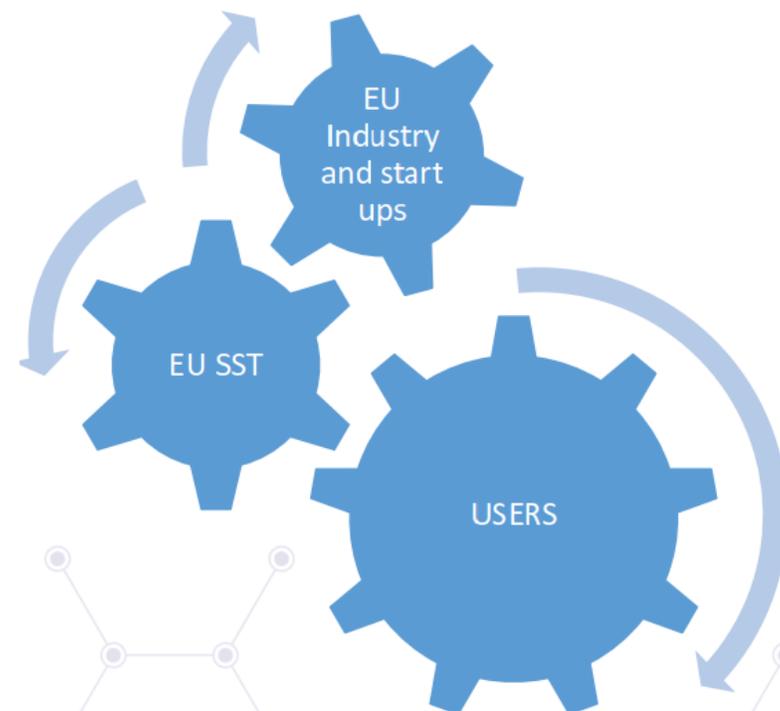
In parallel, COM has set up a European Industry and Start-Up forum (EISF) to foster cooperation with the space industry ecosystem in SST/STM activities

The EISF has been proved to be a success with more than 200 people attending from 50 different European Union SST/STM-related companies. It is now in its 5th edition in November!

Under this EISF there is a WG related to services, where COM, EU SST and industry are working together in shaping the vision of what basic services and advanced services are, so companies can build up their business case

How UCP can contribute to enhance EU SST services?

- There are feedback campaigns and regular bilateral meetings in place to collect EU SST user needs (to be enhanced in the future!)
- With this consultation we are closing the loop with industry and start-up, EU SST and users

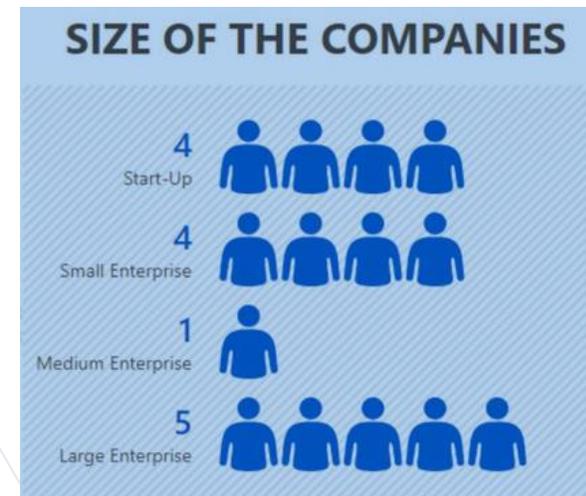


European Union Industry and Start-up Forum (EISF)

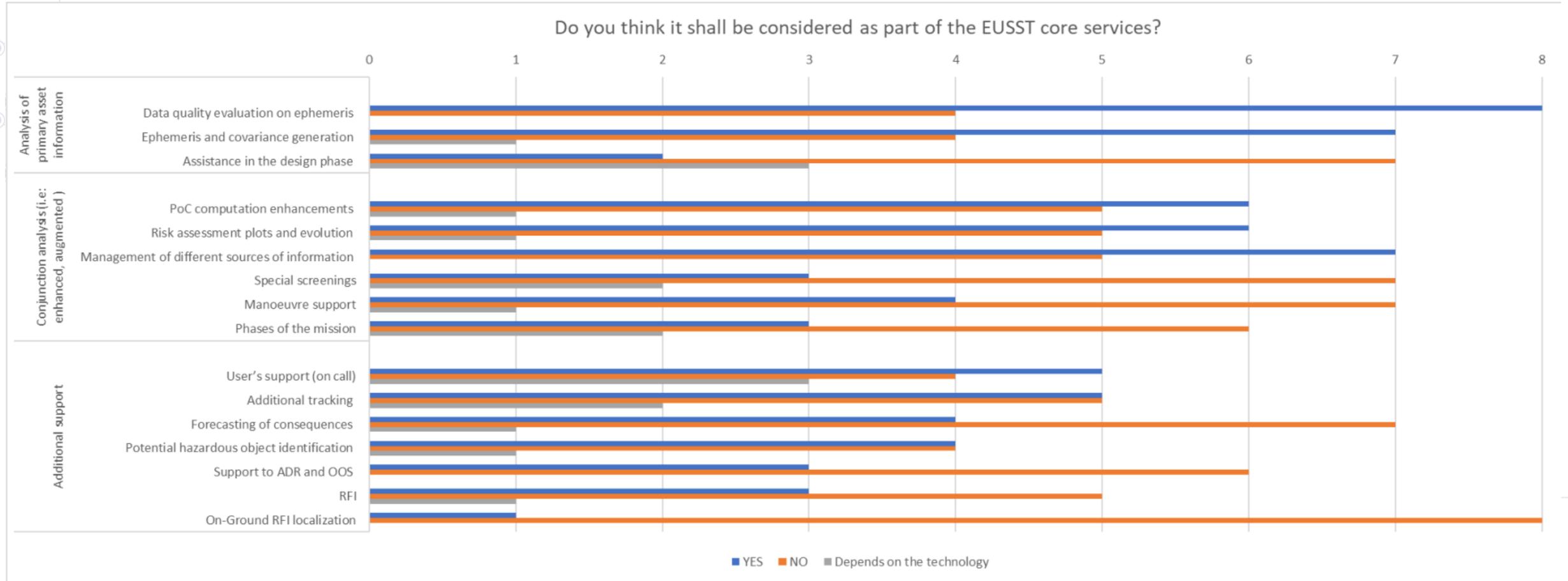
MS distribution



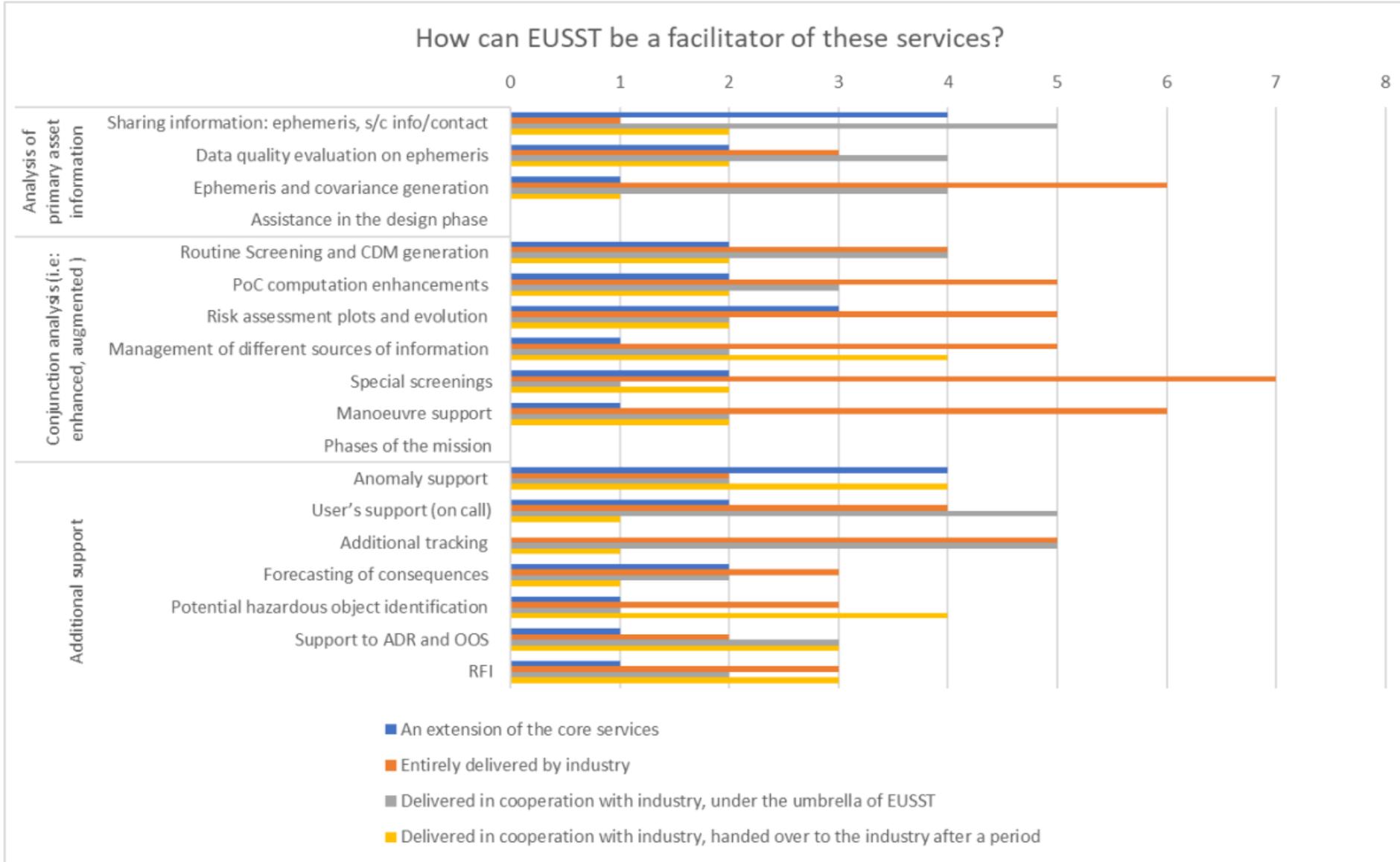
- Last May, a survey was conducted with 14 companies participating
- The questionnaire contained three main topics:
 - Understanding of public/basic and commercial/advance services and the status of operability and research activities
 - How can EU SST contribute to being a public catalyzer?
 - Would you be interested in EU SST developing a European centralized hub to offer SST services (marketplace)?



European Union Industry and Start-up Forum (EISF)



European Union Industry and Start-up Forum (EISF)



EU SST public/basic and advanced/commercial services (for discussion)

1. Analysis of primary asset information

- 1.1 Sharing information: ephemeris, s/c info/contact
- 1.2 Data quality evaluation on ephemeris
- 1.3 Ephemeris and covariance generation

2. Conjunction analysis

- 2.1 Routine Screening and CDM generation
- 2.2 PoC computation enhancements
- 2.3 Risk assessment plots and evolution
- 2.4 Management of different sources of information
- 2.5 Special screenings
- 2.6 Manoeuvre support
- 2.7 Conjunction analysis on different phases of the mission (EOL, LEOP, launch)

3. Additional support

- 3.1 Anomaly support
- 3.2 User's support (on call)
- 3.3 Additional tracking
- 3.4 Forecasting of consequences of a potential collision

WORK IN
PROGRESS

4. Re entry analysis

5. Fragmentation
analysis

6. Identification of the
top dangerous objects
based on risk indexes

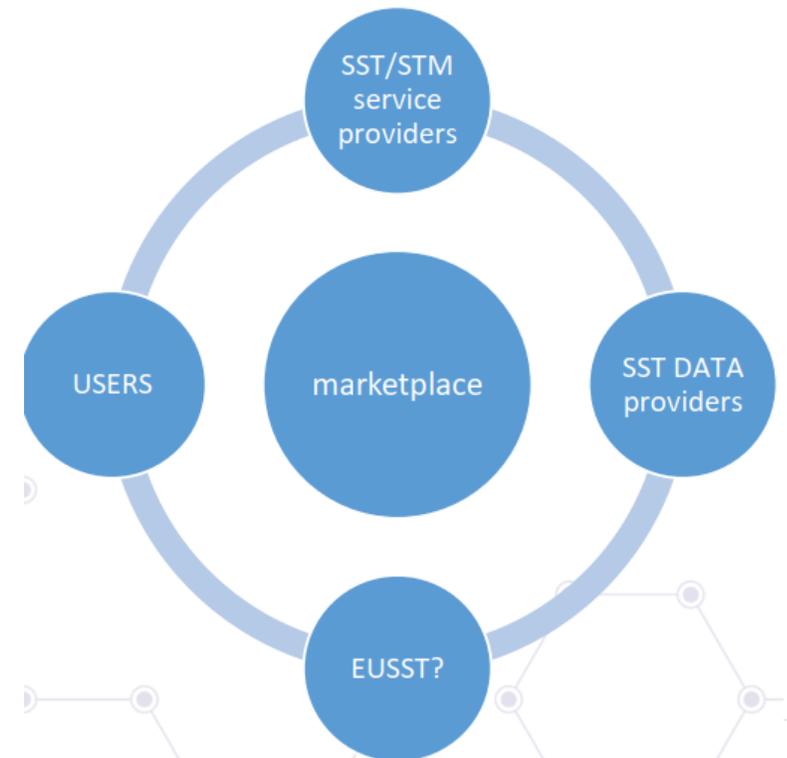
7. Support to Active
Debris Removal and in-
orbit proximity
operations

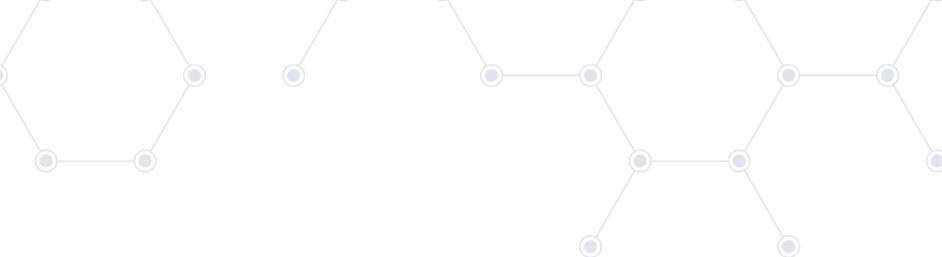
8. Inter-Orbit Radio
Frequency Interference
(RFI) anticipation
and characterisation

Preliminary results
from the EISF

Service Marketplace

- Marketplace is intended to be a platform based on the EU SST Portal where users can meet SST/STM services and SST data providers
 - What would be the role of EU SST?
 - Would you be interested in such platform?
 - What kind of data/information exchanges do you expect there?





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Part II – Roundtable speakers



- EUMETSAT, **Pier Luigi Righetti**, Flight Dynamics Manager
- HISDESAT, **Carlos González**, COMMS Satellite Operations and SSA Manager
- HISPASAT, **Manuel Sansegundo**, Head of Space Segment Engineering, Operations and Satellite Monitoring & Control
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- VIASAT, **John P. Janka**, Chief Officer, Global Regulatory Affairs

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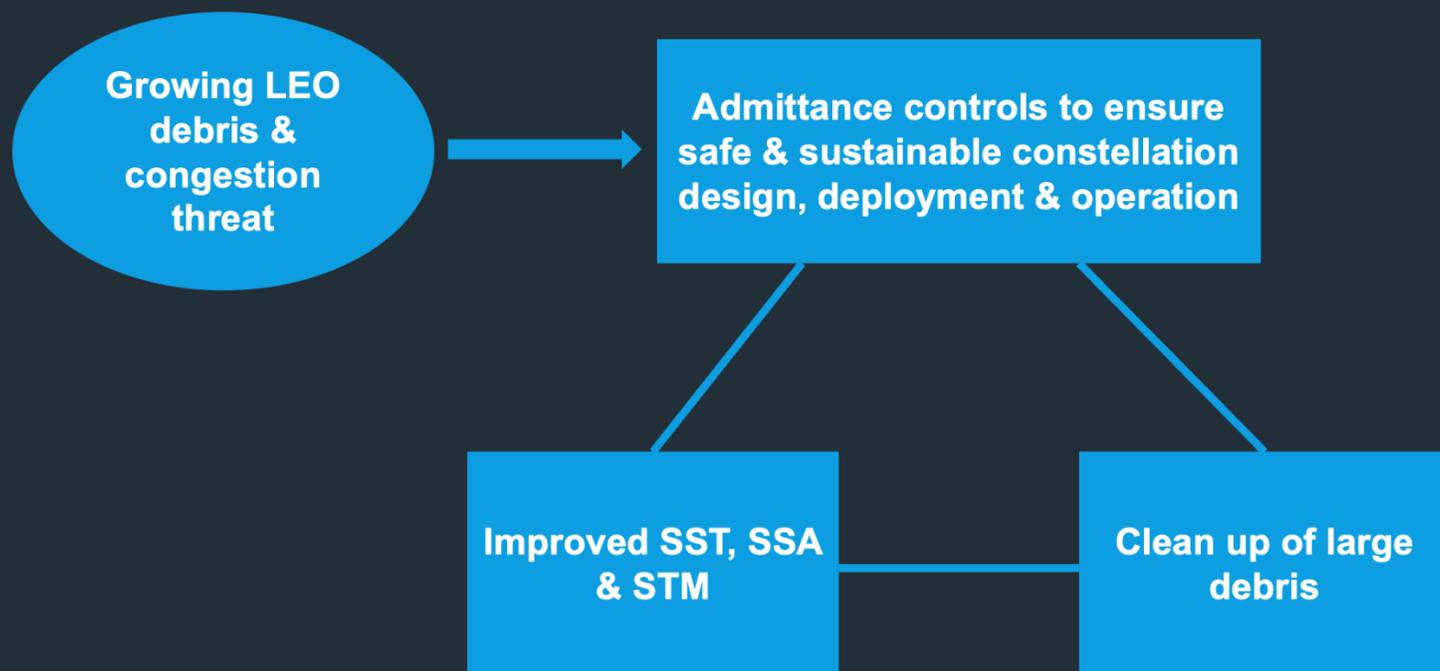
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User Consultation

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We Need A Holistic Approach

Collision Risk Management is a Three-Legged Stool



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User Consultation

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Questions and Answers

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T.S. Kelso Award Ceremony

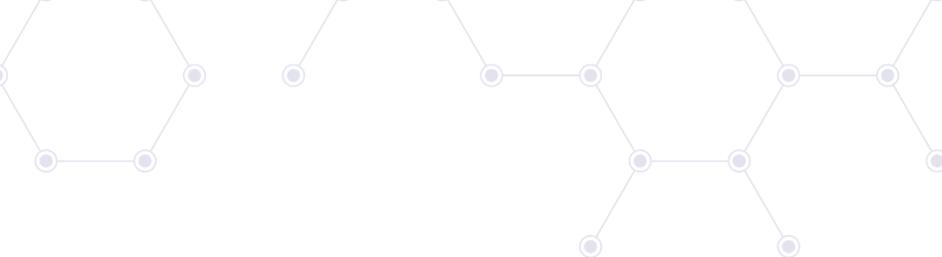
Recognition of outstanding contributions to space flight safety

presented by Charles Law
Space Data Association representative

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Conclusions

- SST is part of the SSA component of the EU Space Programme.
- EU SST Partnership and EUSPA provide SST services (Collision Avoidance, Re-entry Analysis and Fragmentation Analysis) to +190 organizations through the EU SST Front Desk.
- EU SST performs several user engagement activities to align services with users' needs (UFC, bilateral meetings, ...)
- This User Consultation Platform aims at exchanging views regarding the EU SST approach on the basic/public and advanced/commercial services and the marketplace.
- Results will be shared with the EU industry to feed discussions and prepare future evolution of the SST services.



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