



**EU SST**  
Space Surveillance and Tracking

# EU Space Surveillance and Tracking Service Portfolio

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PROGRAMME OF THE  
EUROPEAN UNION

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### **The EU SST Service Portfolio**

is available on the SST Portal at: <https://portal.eusst.eu>

### **Third edition**

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# Foreword by the Chair of the SST Cooperation

Space is becoming increasingly congested, with new and more diverse actors, the development of large constellations, and a multiplication of small satellites. The fast-changing environment brings many opportunities, but also the unprecedented risk of collisions, and potential threats given the dual nature of space activities.

To protect space-based infrastructure, facilities and services, Space Situational Awareness is a key capability. Knowing and understanding events across different orbital regimes underpins the resilience of European Union space programmes such as Galileo and Copernicus.

Space Situational Awareness is a shared responsibility. In 2014, the European Union established the Space Surveillance and Tracking (EU SST) Support Framework. The EU SST Consortium has officially become a Partnership of 15 Member States of the European Union as of 11 November 2022. In addition to France, Germany, Italy, Poland, Portugal, Romania and Spain, the EU SST Partnership is now composed of eight new Member States: Austria, the Czech Republic, Denmark, Finland, Greece, Latvia, the Netherlands and Sweden. Those 15 Member States, in cooperation with the European Union Agency for the Space Programme (EUSPA) acting as front desk, put in common their national sensors and invest heavily at national level in space surveillance and tracking capabilities.

EU SST is building and running an operational system 24/7 to provide public services on collision avoidance, re-entry and fragmentation analysis. Our services are based on space surveillance and tracking data - mostly military data - shared between EU SST Member States through an operational database, as well as on data provided by external partners, and also rely on commercial SSA data coming from the dynamic European industry and start-ups ecosystem.

The public collision avoidance service is open worldwide to spacecraft operators since 1 January 2023, to ensure a minimum level of safety and sustainability in space. Today, more than 500 spacecraft - civil, military and commercial - of the European Union and its Member States, as well as from non-EU countries, are protected from risk of collision in all orbit regimes. For some members, there is a 40-years legacy in satellite operations and a large flight dynamics expertise which brings trust for our European users and operators. The opening of the collision avoidance public service worldwide will help developing and emerging countries to protect their satellites from risk of collision, thereby supporting capacity building and the implementation of United Nations long-term sustainability guidelines.

EU SST and its services are presented in this document. In 2023, we were proud to have been awarded the international T.S Kelso award in recognition of our contribution to spaceflight safety after eight years of operations and legacy in the SSA domain. We invite you to register and become part of our growing SST user community.



*Dr Pascal Faucher*

Chair of the SST Cooperation

# EU SST: Ensuring space safety and sustainability

The safety and security of European economies, societies and citizens rely on space-based applications such as communication, navigation and observation. However, due to the growing complexity of the orbital environment, space-based assets are increasingly at risk from collision with other operational spacecraft or debris. At the same time, objects may re-enter and cause damage on the ground. To mitigate these risks, we need to be able to survey and track such objects, and to provide this information to a variety of stakeholders.



*Illustration of space debris. It is estimated that more than 1 million objects larger than 1 cm currently orbit the Earth.*

Space Surveillance and Tracking (SST) is part of the Space Situational Awareness (SSA) component of the EU Space Programme, adopted by the European Union in 2021 with the Regulation (EU) 2021/696 of the European Parliament and of the Council. This Regulation foresaw the creation of an SST Partnership, which is composed, after the signature of the SST Partnership Agreement, of Constituting National Entities representing 15 EU Member States. An SST system is a network of ground-based and space-based sensors capable of surveying and tracking space objects, together with processing capabilities aiming to provide data, information and services on space objects that orbit around the Earth.

The SST Partnership and the European Union Agency for the Space Programme (EUSPA) acting as the EU SST Front Desk work together to develop the European SST Capability. The Partnership's Member States have networked their assets to provide, through the SST Service Provision Portal operated by EUSPA, a set of SST services to all EU Member States, EU institutions, spacecraft owners and operators, and other public and private entities.

The SST services assess the risk of in-orbit collisions and uncontrolled re-entry of space debris into the Earth's atmosphere, and detect and characterise in-orbit fragmentations.

The SST Partnership EU Member States are represented through their Constituting National Entities: Austria (FFG), Czech Republic (MDCR), Denmark (DALO), Finland (FMI), France (CNES), Germany (German Space Agency at DLR), Greece (NOA), Italy (ASI), Latvia (IZM), the Netherlands (EZ), Poland (POLSA), Portugal (PT MoD), Romania (ROSA), Spain (AEE) and Sweden (SNSA).



**SST Cooperation**

# The SST capability

The SST capability consists of three main functions: sensor, processing and service provision. Sensors from Member States contribute data that is analysed in the processing function and feeds a joint database and ultimately a catalogue; from this, products are derived for three services, generated by the **Operations Centres (OCs)** and delivered to users via the **SST Service Provision Portal (SST Portal)**.

The **Sensor function** consists of a network of sensors to survey and track space objects in all orbital regimes (LEO, MEO, HEO and GEO).



**GRAVES radar**



**MADEIRATEL telescope**



**MFDR radar**



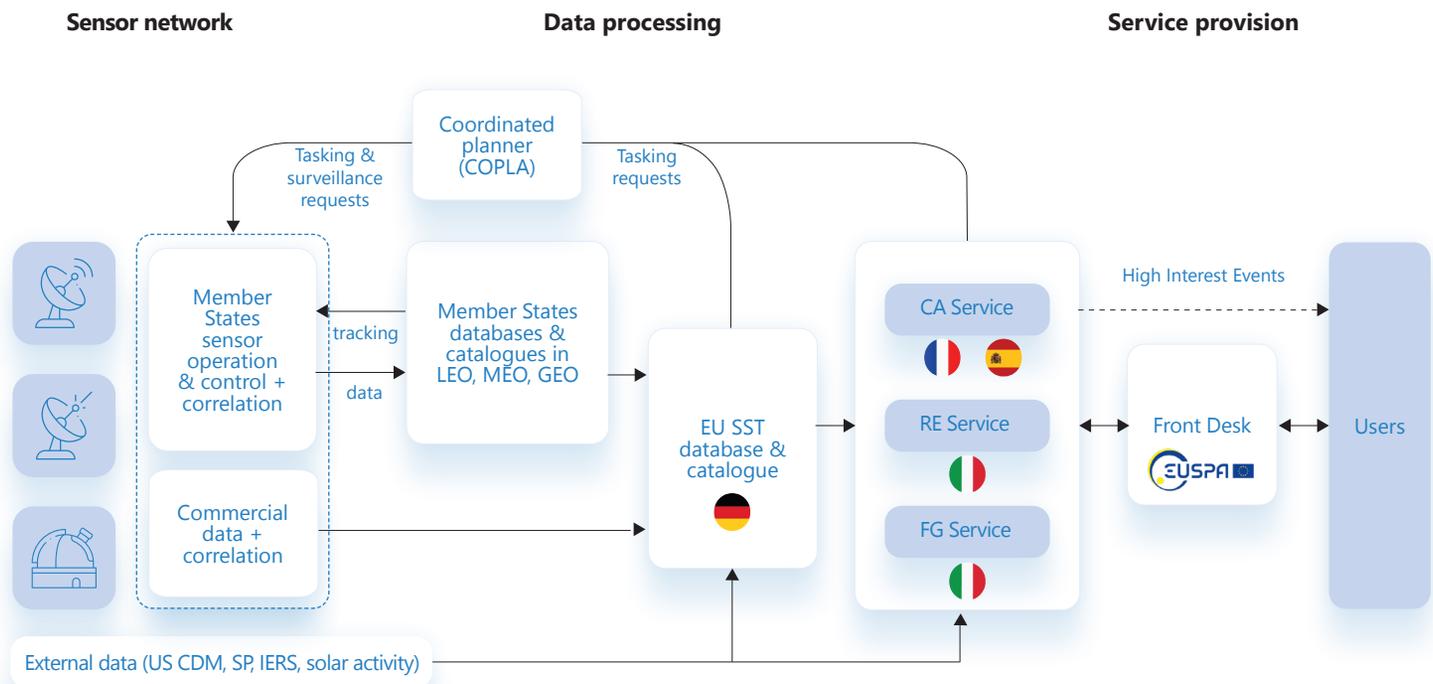
**TJO tracking telescope**

*The network of sensors is updated regularly based on calibration and integration procedures.  
Check the latest version on the EU SST website.*



The **Processing function** aims to coordinate the data-sharing between the different Operations Centres via a common database and to process thousands of daily measurements from the sensors contributing to EU SST. These data constitute the basis for a future EU SST Catalogue that will be used for the SST services. Germany is responsible for hosting the EU SST Database and generating the future EU SST Catalogue.

The **Service Provision function** is in charge of providing the SST services – Collision Avoidance (CA), Re-entry Analysis (RE) and Fragmentation Analysis (FG) – to users through a secure portal managed by EUSPA, which acts as Front Desk. More than 200 organisations are receiving these services and 500+ satellites are safeguarded from the risk of collision. The French and Spanish OCs are responsible for the CA service, while the Italian OC is in charge of the RE and FG services.



# The SST services

The SST capability provides three distinct services:

## Collision Avoidance (CA)

The Collision Avoidance service provides risk assessment of collision between spacecraft or between spacecraft and space debris, and generates collision avoidance alerts.



## Re-entry Analysis (RE)

The Re-entry Analysis service provides risk assessment of uncontrolled re-entry of space objects into the Earth's atmosphere, and generates related information.



## Fragmentation Analysis (FG)

The Fragmentation Analysis service provides detection and characterisation of in-orbit fragmentations, break-ups or collisions, and analyses all the available information regarding the object(s) involved in the event.



In all three services, for critical operations and events of media interest, EU SST produces in a timely and coordinated manner dedicated outputs to inform key stakeholders and for dissemination purposes.

The SST services are provided upon request to all EU Member States, EU institutions, spacecraft owners and operators, and other public and private entities.

Access to the services is free of charge and requires registration in the SST Portal (<https://portal.eusst.eu>). To become a registered user and be able to access one or more SST services, it is necessary to fill in a registration form, upon which the request will follow an approval process.

# Collision Avoidance service

The Collision Avoidance (CA) service provides risk assessment of collision between spacecraft and between spacecraft and space debris, and generates collision avoidance alerts. The service is provided worldwide and 24/7 during nominal operations, as well as during LEOP and EOL phases upon request of the Owner/Operator (O/O). It analyses all available information (e.g. EU SST contributing sensors data, external Conjunction Data Messages – CDMs) in order to detect:

- **Info Events (INFOS):** close approaches with a low level of risk;
- **Interest Events (IEs):** close approaches that require further analysis due to the level of risk, and
- **High-Interest Events (HIEs):** close approaches with a high level of risk, potentially requiring **Collision Avoidance Manoeuvres (CAMs)** to be performed by the O/O.

When required, tasking requests are sent to all sensors contributing to EU SST. Finally, a set of products are provided to the O/O. In case of need, direct dialogue can be established with the OC, 24/7, to help the O/O to better understand the event, discuss the products provided and enable the OC to propose CAMs based on the O/O constraints.

## Key features

The CA service is a **user-tailored service**, allowing the user to configure the thresholds for risk-level categorisation (i.e. HIE, IE and INFO) and advice on CAMs, based on geometrical, probabilistic and time variables.

This is done through a **Service Configuration Document (SCD)**, where the operational interfaces are also defined (e.g. files format, points of contact). The definition of this document, done in a collaborative manner between the O/O and the OC in charge and the Front Desk, is required before the service is provided.

The Service Configuration Document is filled in and accessible on the SST Portal.

3. Groups of Satellites

TEST

Group 1

4. TEST

This section summarizes different properties and configurations applicable to all satellites of group TEST.

4.1. Satellite Information

Please provide the following details for each satellite.

Name	International Designator	Serial ID	Orbit Region	Mission/Activity	HRP (km)	Epoch of Mean Epoch	Mean Age	Comments
A-1-14070000	1963-080A	1778	OTHER	no	+	1	1991-08-01/01	
64477 (7)A6	2020-020A	090000000	OTHER	no	+	0	1991-08-01/01	
06-1007-0003-0002	2002-10062L	1044022	HRP0	no	+	1	1991-08-01/01	

Name	Shape	Min. Area (m <sup>2</sup> )	Max. Area (m <sup>2</sup> )	Average Area (m <sup>2</sup> )	Length (m)	Width (m)	Height (m)	PDF Coefficient	Drag Area (m <sup>2</sup> )	Drag Coefficient
A-1-14070000										
64477 (7)A6										
06-1007-0003-0002										

4.2. Satellite Orbit Information

### Service Configuration Document

The CA service is provided on a **hot redundancy scheme** involving the French and Spanish OCs (FR-SSA and S3TOC), whereby two different OCs are ready to provide the services as a **single service provider** (the nominal OC). This provides robustness to the services while minimising the interfaces with the user. This scheme allows cooperation between the two OCs and analysis of discrepancies, if any.

The hot-redundant OC processes and generates products simultaneously with the nominal OC (without contact with the O/O), has visibility on O/O inputs and products provided by nominal and direct dialogue, and takes the lead only in case of nominal OC failover.



***French SSA Center (FR-SSA)***



***EUSPA SST Front Desk***



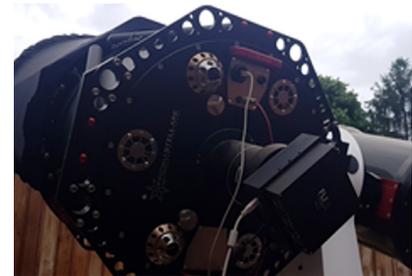
***BIRALES radar***



***S3TSR radar***



***SOLARIS-2 telescope***



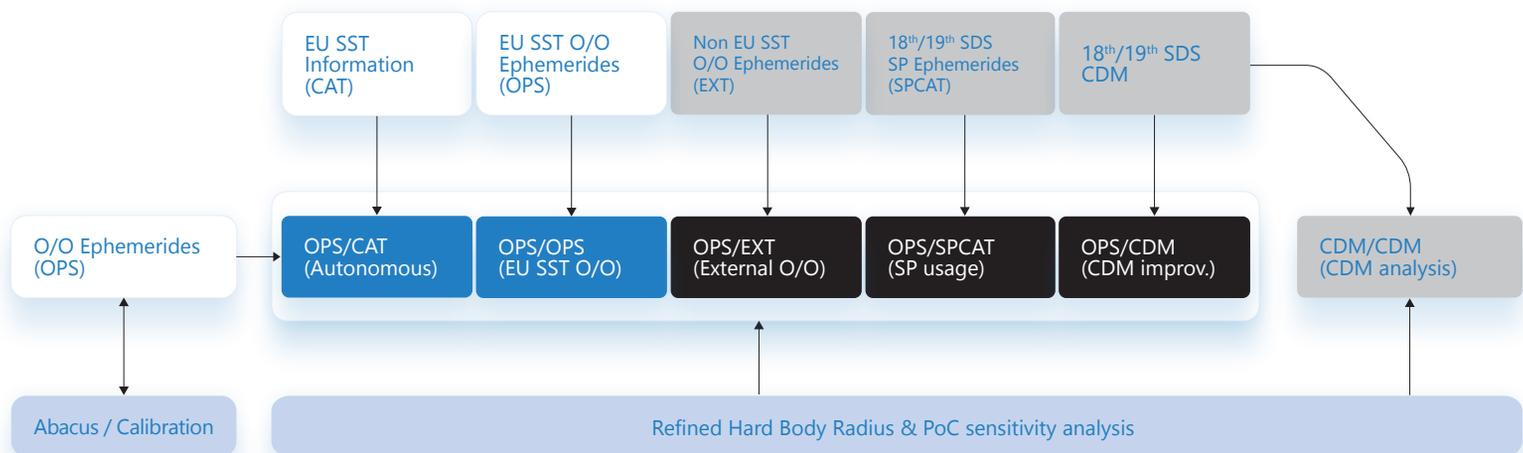
***NEEMO telescope***

The CA service provides three types of products: CDMs, reports associated with each CDM, and monthly reports.

The CDMs can be:

- **autonomous CDMs**, using data from the network of sensors contributing to EU SST (known as CAT), which are used to build national catalogues and the EU SST Catalogue,
- **operator's orbits CDMs** (OPS/OPS or OPS/EXT), based solely on the internal or external O/O ephemerides (known as OPS or EXT) and
- **enhanced CDMs**, based on using and refining external information (such as the US 18<sup>th</sup>/19<sup>th</sup> SDS<sup>1</sup> CDMs or the Special Perturbations (SPs) ephemerides). Using SP ephemerides enables tasking sensors in advance of the first 18<sup>th</sup>/19<sup>th</sup> SDS detection/notification (1<sup>st</sup> 18<sup>th</sup>/19<sup>th</sup> SDS CDM) and confirming when an event decreased its risk level (and thus stopped being reported by the 18<sup>th</sup>/19<sup>th</sup> SDS).

The different combinations of input information and consequent main types of EU SST CA CDMs are displayed in the diagram below.



The EU SST will provide autonomous or operator's orbit CDMs (when available) and enhance the CDM provided by the 18<sup>th</sup>/19<sup>th</sup> SDS. The users will receive one or more CDM types depending on the input data available for generating the CDMs.

For all CDMs produced, the OCs perform **O/O ephemerides analysis**, advanced **management of Hard Body Radius (HBR)** values and **Probability of Collision (PoC) Sensitivity analysis**. Ultimately, support may be provided to the O/O to mitigate the risk and define a **CAM**. However, the O/O is the sole responsible for deciding whether or not to implement an avoidance action.

<sup>1</sup> The 18<sup>th</sup>/19<sup>th</sup> Space Defense Squadrons (18<sup>th</sup>/19<sup>th</sup> SDS) perform the space surveillance mission for the US Air Force. 18<sup>th</sup>/19<sup>th</sup> SDS CDMs are provided through [space-track.org](https://space-track.org), and access to them is required for the OCs to provide enhanced products.

## Enhanced Analysis & Risk Mitigation support

### O/O ephemerides

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**Covariance estimations.** Compute covariance abacus by comparing statistically the predicted and determined (observed) orbits.

**Routine accuracy checks,** e.g. consistency with the CA Service configuration document, and with external data sources.

### HBR management

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**For the primary object,** the HBR used is provided by the O/O. The O/O can ask for a concrete HBR value to be used for particular conjunction events (when geometry is known) and provide additional information to compute more realistic HBR.

**For the secondary,** HBR used is taken (in priority order) from ESA's DISCOS database, from space-track.org (SATCAT info with minimum of 1 m for small objects), or from default values based on Operations Centre's information.

### PoC sensitivity analysis

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Non-precise estimations of the objects' covariance can result in an underestimation of the PoC value. It is best to find the maximum PoC by performing a parametrical analysis, reducing and incrementing the assumed covariance for both objects in an interval representative of the uncertainty of the covariance matrices. This analysis results in better insight into the conjunction event and provides a more conservative estimation of the PoC.

The OCs perform a sensitivity analysis of the PoC with respect to the covariance; the value used operationally is a scaled PoC.

### CAM support

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**Definition** of one or more potential avoidance manoeuvres, considering potential constraints from the O/O.

**Verification** against all available sources of information that the manoeuvre is also safe for other potential conjunctions.

### Support for exceptional operations

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**Screening** of manoeuvres (specific screening volumes, specific methods to compute PoC).

**Dedicated process** to provide feedback as soon as possible.

## Large vs Large Screening feature

Due to the catastrophic impact that a collision between **two large, non-maneuvrable objects** (with radar cross-section larger than 1 m<sup>2</sup>) could have on the population of space resident objects (with the probable generation of thousands of new fragments), the EU SST Collision Avoidance service provides **information on conjunctions** between two such objects.

In the Large vs Large Screening feature, all large, non-maneuvrable objects are screened against themselves (using the 18<sup>th</sup>/19<sup>th</sup> SDS Special Perturbation catalogue and the catalogue built with EU SST data by CA Operations Centres) and information is provided for conjunctions that are considered of high interest.

### Large vs Large Screening Events List [?](#)

Publish Date	TCA	Miss Distance	Radial Miss Distance	Product ID		
2024-03-26T04:23:06Z	2024-03-28T04:36:19Z	203.28 m	16.82 m	3CA-150588-23136A-202403280436-001		
^ <b>Event Timeline</b> <a href="#">?</a> 						
< < Page 1 of 1 > > 10 items per page 1 - 1 of 1 items						
2024-03-26T04:23:06Z	2024-03-28T06:13:33Z	203.28 m	16.82 m	3CA-150588-23136A-202403280436-001		
▶ <b>SL-3 R/B</b>						
1983-0038 40965 Autonomous Orbit: No	Radius: 1.00 m AP: 751.85 km PE: 497.85 km	2023-136A 57797 Autonomous Orbit: No	Radius: 10.00 m AP: 703.10 km PE: 665.12 km	TCA: 2024-03-28T04:36:19Z	RMD: 16.82 m MD: 203.28 m CDM Type: SPCAT/SPCAT	CA-150588-23136A-202403280436
▶ <b>COSMOS 252</b>						
1968-097A 03330 Autonomous Orbit: No	Radius: 3.00 m AP: 2059.00 km PE: 361.00 km	2020-056E 46116 Autonomous Orbit: No	Radius: 5.65 m AP: 34796.00 km PE: 275.00 km	TCA: 2024-03-29T13:26:42Z	RMD: 1495.98 m MD: 2842.48 m CDM Type: SPCAT/SPCAT	CA-68097A-20056E-202403291326
< < Page 2 of 2 > > 5 items per page 6 - 8 of 8 events						

2024-03-26 11:53:40 UTC

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### Large vs Large Screening feature

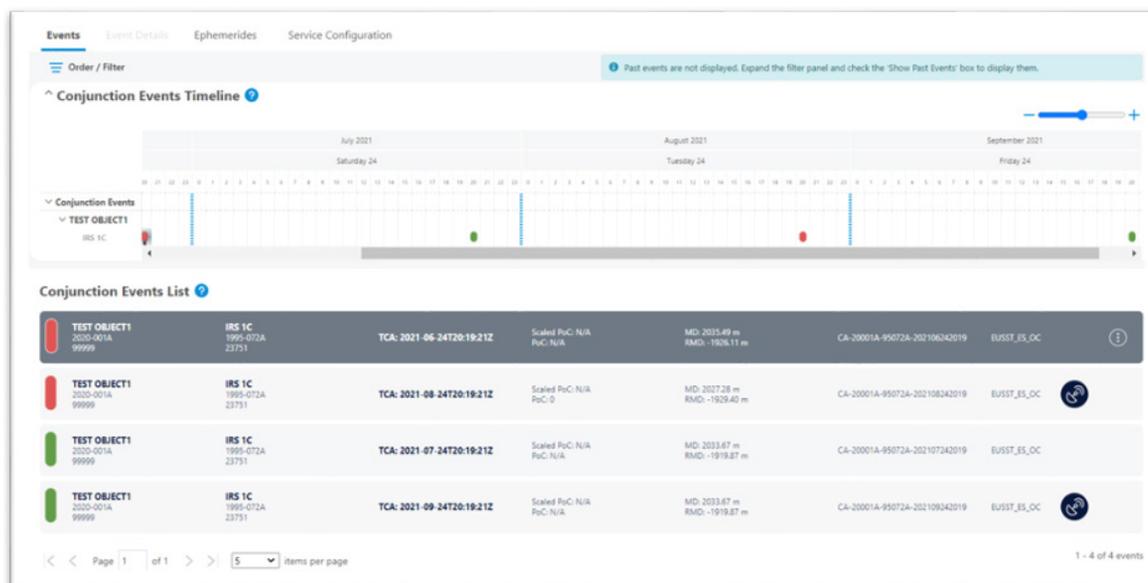


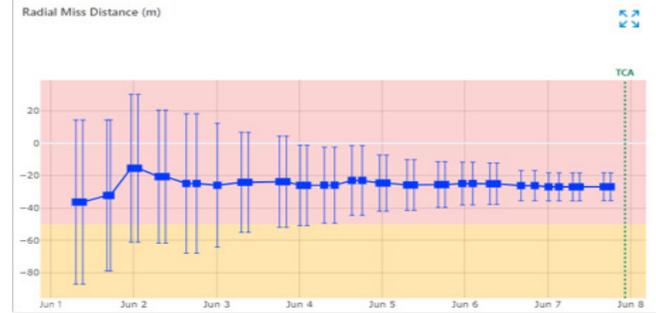
## Portal

The delivery of the CA service between users and the nominal OCs is carried out via the SST Portal and complemented by direct dialogue between the O/O and the nominal OC established when needed according to the SCD (with traceability to SST Front Desk and redundant OC).

The SST Portal enables users to:

- access CA events and service products information, or download them, either through its REST API or through its web interface;
- upload ephemerides and manoeuvre information (or any other type of file), either through the REST API or the web interface;
- view the evolution of conjunctions (e.g. PoC, scaled PoC, miss distances);
- download the applicable CA Service Configuration Document and manage new revisions;
- customise the CA service's email notification configuration;
- exchange and communicate more efficiently with other CA users, OCs and SST Front Desk when potential collisions are detected through the EU SST Communication & Coordination Platform (e.g. involved CA users can discuss proposed actions and recommendations with the coordination and support of EU SST); and
- access the CA service users statistical reports.

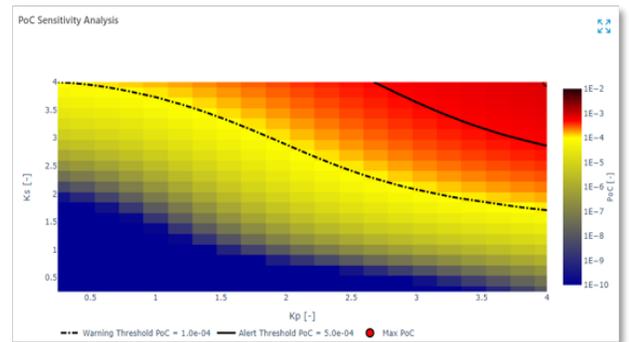
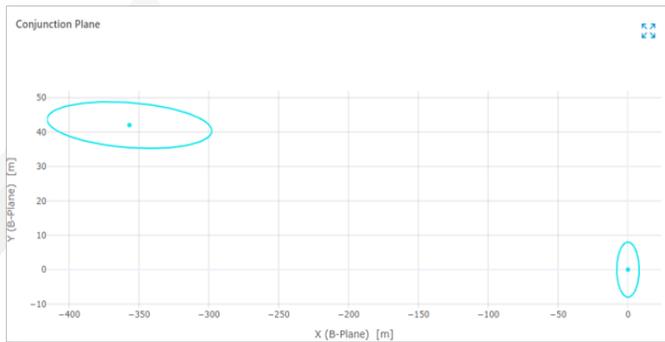




Example of the Miss Distance evolution



Example of the Risk History evolution based on PoC and Scaled PoC



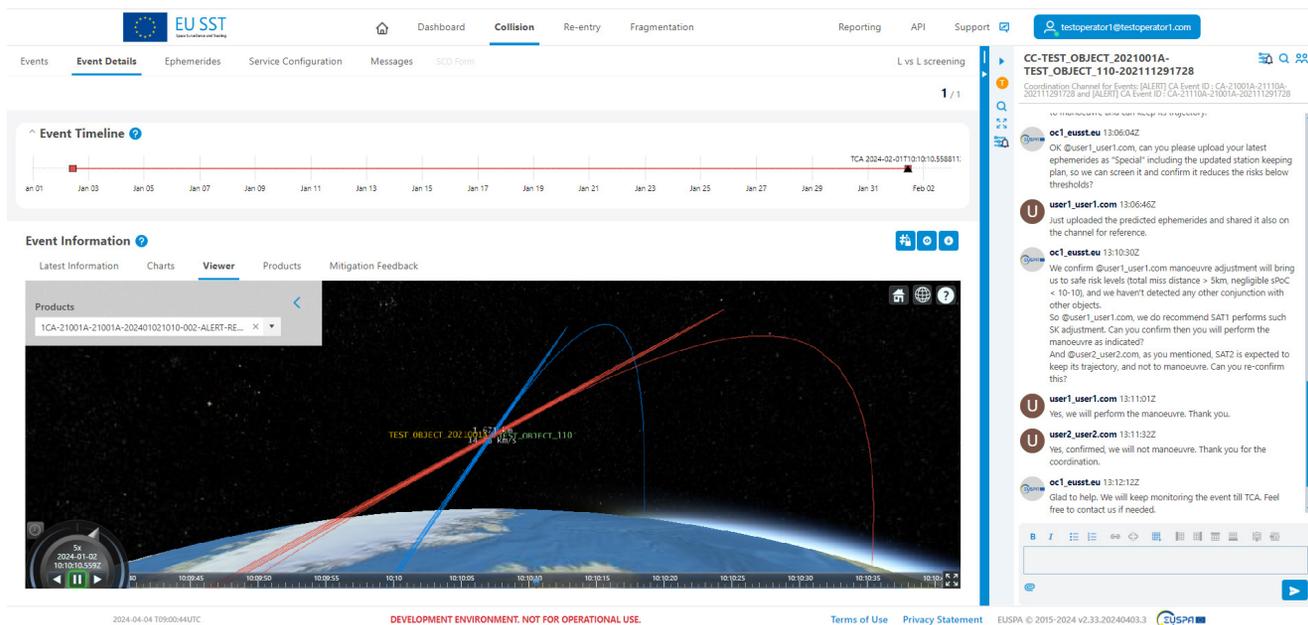
Conjunction Plane and PoC Sensitivity Analysis

## EU SST Communication & Coordination Platform

To facilitate the communication and coordination between EU SST and satellite operators, a dedicated platform developed by the SST Front Desk and integrated in the EU SST Portal is available to all EU SST Collision Avoidance service users.

The EU SST Communication & Coordination Platform allows CA users to **exchange and communicate more efficiently** when **potential collisions** have been detected. Users can discuss proposed actions and recommendations among themselves and with the coordination and support of the EU SST Operations Centres in dedicated channels.

The platform is designed to enhance the implementation of the already well-established EU SST Collision Avoidance operational procedures, in the context of the CA service features that are described in this Service Portfolio. Its operational use is also to be gradually extended, and future developments will include the possibility of access for non-registered users in case of need.



The screenshot displays the EU SST Communication & Coordination Platform interface. At the top, the navigation bar includes 'Dashboard', 'Collision' (selected), 'Re-entry', 'Fragmentation', 'Reporting', 'API', and 'Support'. The user is logged in as 'testoperator1@testoperator1.com'. Below the navigation bar, there are tabs for 'Events', 'Event Details', 'Ephemerides', 'Service Configuration', 'Messages', and 'SCD Form'. The main content area is divided into three sections: 'Event Timeline' showing a timeline from Jan 01 to Feb 02 with a red marker at TCA 2024-02-01T10:10:55.8811; 'Event Information' with tabs for 'Latest Information', 'Charts', 'Viewer' (selected), 'Products', and 'Mitigation Feedback'; and a 3D visualization of satellite trajectories around Earth, showing two objects, TEST\_OBJECT\_20211001A and TEST\_OBJECT\_110, with their respective paths and a predicted collision point. On the right side, there is a chat window titled 'CC-TEST\_OBJECT\_2021001A-TEST\_OBJECT\_110-202111291728' containing a series of messages from users and operators discussing the collision avoidance event and the planned manoeuvre.

### EU SST Communication & Coordination Platform

# Re-entry Analysis service

The Re-entry Analysis (RE) service provides risk assessment of the uncontrolled re-entry of space objects into the Earth's atmosphere that may constitute a potential risk to the safety of EU citizens and to terrestrial infrastructure. All available information (data from sensors contributing to EU SST and other re-entry information from external sources) is analysed in order to carry out re-entry predictions, both **long-term** (within 30 days) and **short-term** (a few days). The latter include overflight predictions providing ground tracks over customisable areas of interest.

## Key features

The RE service, provided by the Italian OC (C-SSA), routinely monitors all rocket bodies, specific objects of interest and objects with a mass greater than 2,000 kg or, if no mass information is available, radar cross-section larger than 1 m<sup>2</sup>. When such objects are close to re-entry, C-SSA sends a tasking request to all sensors contributing to EU SST, in order to acquire additional data and improve the accuracy of predictions, generating autonomous products, if possible.

The service is customised by allowing users to select **Areas of Interest (AOIs)**, in the form of EU countries and their related territories, and receiving the re-entry products accordingly.

Considering the **uncertainties surrounding re-entry predictions, the AOI is derived from the overflight analysis**, without any certainty that the re-entering objects will impact on the specified territory.

Re-entry products are associated to a risk index related to the estimated mass of the object. The index can be adjusted by the OC in charge of the service on case by case analysis, based on the available knowledge on the re-entering object (composition, material, etc.), and on the computation approaches at its disposal.

Areas of Interest

Selecting a country encompasses its overseas territories even if those are not visible in the map.



Select your Areas of Interest:

- EU Countries
    - Austria
    - Belgium
    - Bulgaria
    - Croatia
    - Cyprus
    - Czech Republic
    - > Denmark
    - Estonia
    - Finland
    - > France
    - Germany
    - Greece
    - Hungary
    - Ireland
  - Italy
  - Latvia
  - Lithuania
  - Luxembourg
  - Malta
  - > Netherlands
  - Poland
  - > Portugal
  - Romania
  - Slovakia
  - Slovenia
  - > Spain
  - Sweden
- Non EU (including oceans)
    - United Kingdom

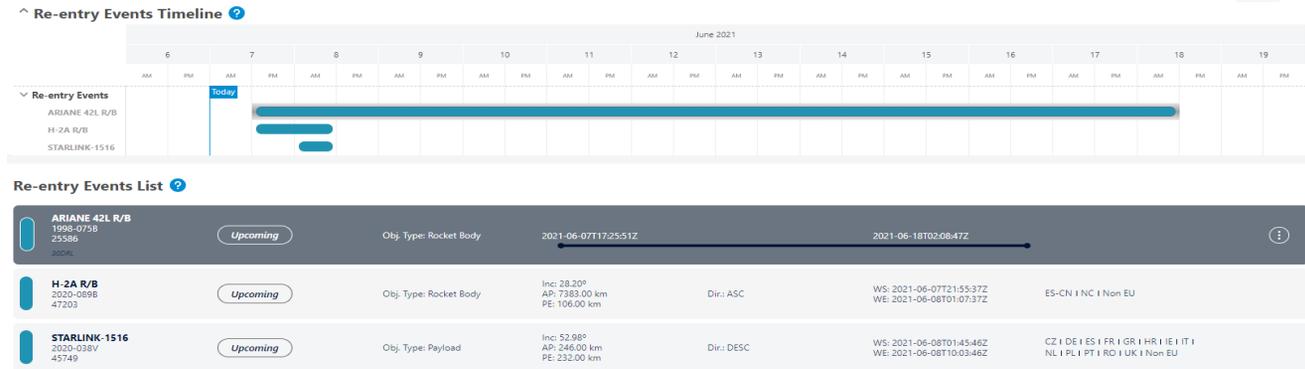
### RE service AOIs configuration in the SST Portal

Object mass	Unknown mass	m < 5,000 kg	5,000 kg < m < 8,000 kg	m > 8,000 kg
Risk Index	Not available	Minor	Medium	Major

### Object mass and Risk Index correlation for RE products

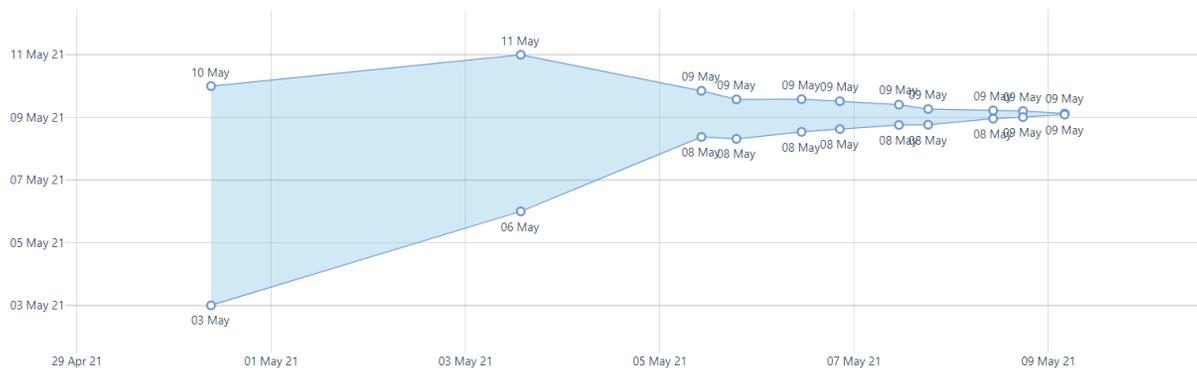
## Products

**30 Days Re-entry List.** This product provides a list of all space objects predicted to re-enter the Earth's atmosphere in an uncontrolled manner within 30 days. The list is available to users through the SST Portal, and updated on a weekly basis or when necessary.



### 30 Days Re-entry List

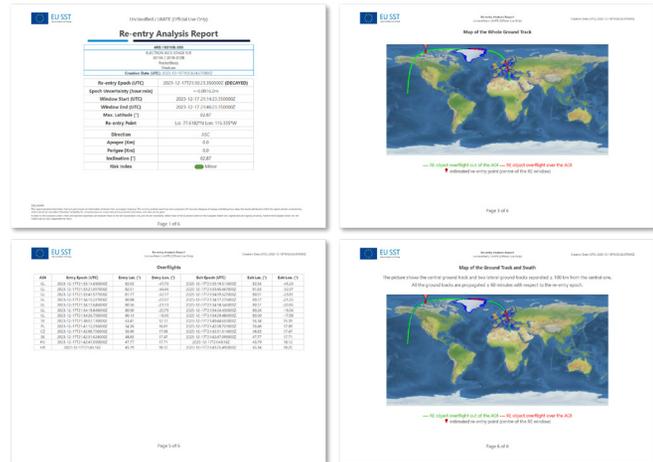
This long-term analysis prediction includes a re-entry window evolution with an accuracy of one day, as presented in the figure below.



**RE Window Evolution in the SST Portal**

**Re-entry Report.** This product includes a detailed analysis focusing on the objects expected to re-enter approximately 3-4 days before the predicted re-entry epoch. This Re-entry Report complements the 30 Days Re-entry List by providing orbital information, ground tracks as 2D maps for the overflight, and the ground swath to confirm the re-entry in the final report.

Confirmation of the re-entry event is also provided through a final/decay RE report, which is released either after space-track decay confirmation or no later than three days after the last re-entry epoch estimation, or after three no-shows by sensors contributing to EU SST.

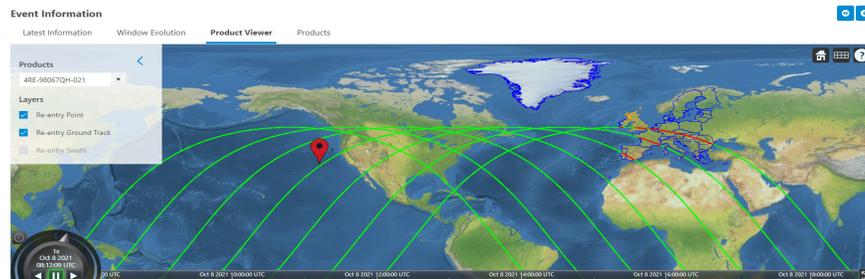


**Re-entry Report**

## Portal

The delivery of the RE service between the approved users and the OC is carried out via the SST Portal, which enables users to:

- access RE service products information, or download the RE reports, either through its REST API or its web interface;
- customise the 30 days re-entry list or RE reports email notifications configuration, including the risk index;
- view the re-entry window prediction evolution of a particular space object,
- configure the user's AOI, and
- access the RE service users statistical reports.



**RE Product Viewer**

# Fragmentation Analysis service

The Fragmentation Analysis (FG) service provides detection and characterisation of in-orbit fragmentations. All available information (data from sensors contributing to EU SST and other fragmentation information from external sources, i.e. 18<sup>th</sup>/19<sup>th</sup> SDS or O/O) is subjected to short, mid and long-term analysis, concluding with the provision of different FG products.

## Key features

The **Short-term FG analysis** aims to confirm quickly an FG event, providing:

- the data sources (from sensors contributing to EU SST and/or external sources);
- fragmentation event characterisation (e.g. FG event type, number of detected fragments, orbital regime), and
- object(s) identification and characterisation (e.g. object type, apogee/perigee of the parent object(s) at the event time).

The **Medium-term FG analysis** provides further details on the event, based on the orbital parameters of the catalogued fragments. This analysis includes:

- fragments distribution delivered as visual information (e.g. Gabbard diagram);
- 3D graph of the position of the object(s) at the event time;
- 3D cloud evolution of the fragments at the time of the report creation and after 1-2 months;
- orbital parameters dispersion of the fragments at different moments in time, and
- early Impact Risk Analysis for specific altitude layers including assets of interest (e.g. Galileo and Copernicus fleets).

The **Long-term FG analysis** complements previous analyses, with information on:

- event update;
- simulations of the event using an adequate breakup/collision model;
- number of fragments expected greater than 7 cm;
- Area to Mass ratio distribution;
- Delta Velocity distribution, and
- objects' spatial density evolution.

These analyses are subject to the information available for each FG event, with C-SSA sending a tasking request to the EU SST sensors as soon as the event is confirmed.

## Products

- Short-term FG analysis notification.** This product consists of an email notification sent once the event is confirmed. Since fragmentation events may be difficult to detect, the short-term product might take a few days to be delivered.
- Medium-term FG analysis report.** This is generated when fragments are catalogued and their orbital parameters are known, within three weeks after the short-term FG analysis product.
- Long-term FG analysis report.** This provides further analysis on the evolution of the fragments, within three months after the short-term FG analysis product.

Event Information	
Product ID:	4FG-98197B-20210410-002-MEDIUM
Epoch:	10/04/2021 12:06:45.000 UTC
Detection Epoch:	15/04/2021 14:30:45.585 UTC
Type:	collision
Fragments detected:	16

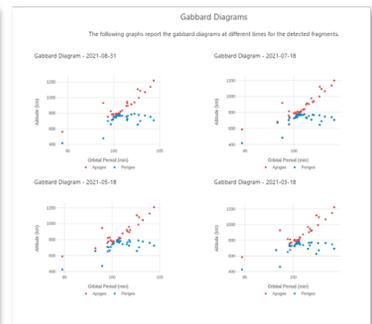
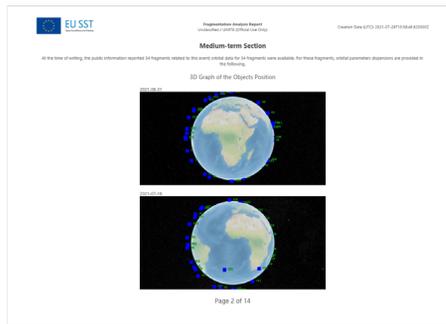
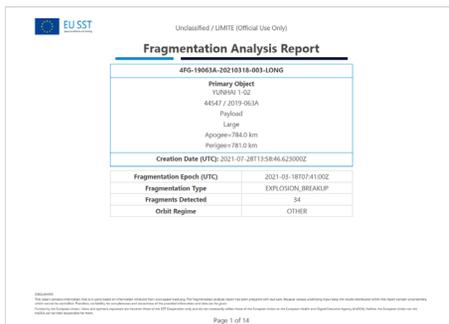
  

Object Information			
Name:	FRAG_OBJ_B	Name:	GPM
Identifiers:	1998-197B / 25589	Identifiers:	2014-211C / 39585
Type:	Payload	Type:	Payload
Orbit Regime:	LEO	Orbit Regime:	LEO
Apogee:	420	Apogee:	408

Source Information	
Autonomous:	Yes
Source:	ESUST

*Email notifications (FG events)*

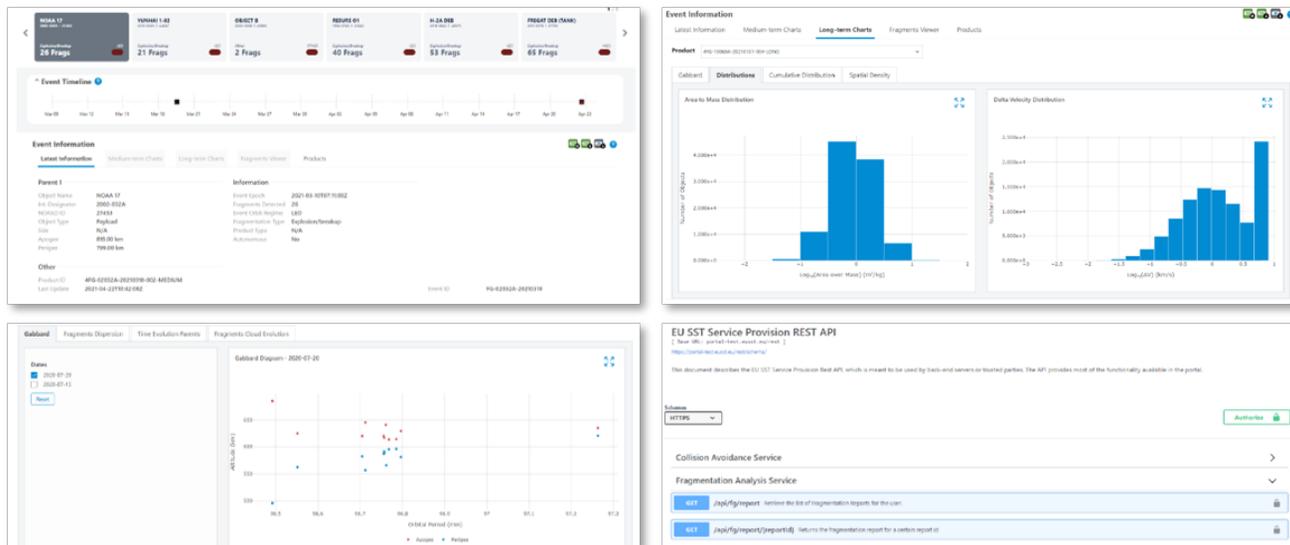


*FG long-term analysis report*

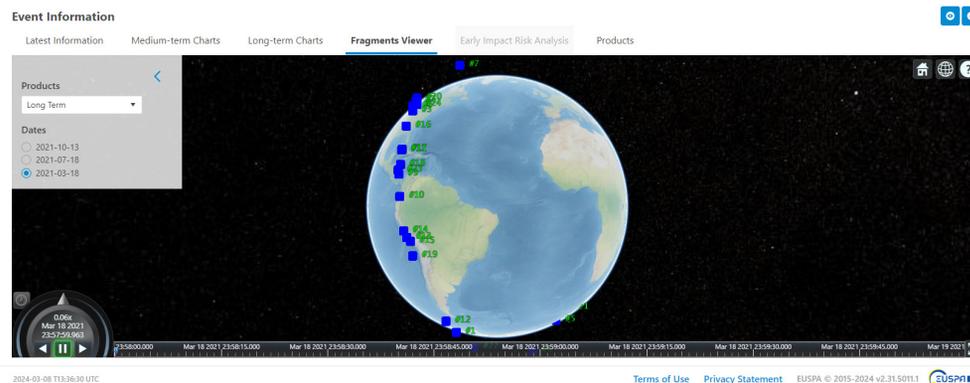
## Portal

The delivery of the FG service between the approved users and the OC is carried out via the SST Portal, which enables users to:

- access the information of FG service products or download them, either through its REST API or its web interface,
- receive email notifications when new/updated FG products are available, and
- access the FG service users statistical reports.



*FG service web and REST API interfaces*



*FG service fragments viewer on the SST Portal*

# User engagement

EU SST is constantly seeking ways to enhance the quality, efficiency and value of the SST services, as well as to increase user adoption and satisfaction. Users can provide their feedback and needs through different channels:

- **User satisfaction campaigns:** surveys targeted to registered users and aimed at collecting user satisfaction for all SST services and the EU SST Front Desk.
- **Bilateral meetings:** meetings between EU SST and Collision Avoidance users for the tailoring of the service and the establishment of interfaces.
- **User Consultation Platform and workshops:** dedicated seminars to consult users about specific topics (e.g. new services).
- **Helpdesk:** capability that allows users to provide their feedback and suggestions at any time. This includes the Communication and Coordination Platform Helpdesk support channel, email, phone or contact forms on the Portal.

The screenshot shows a web-based survey form titled "EU SST User Satisfaction Campaign". It includes a search bar, the EU SST logo, and a consent form for data processing. The survey questions are as follows:

1. How would you rate the overall service provided by EU SST?  
Please rate on a scale of 1 to 10, where 10 is the most positive rating.

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

2. Please, indicate the SST service(s) you are currently registered with:  
Select all that apply (or none if not applicable)

- CA - Collision Avoidance
- PFD - Fragmentation Analysis
- RFD - Re-entry Analysis

3. Have you identified a need that is not covered by the current SST services?  
Please describe the need.

0 / 250 characters remaining

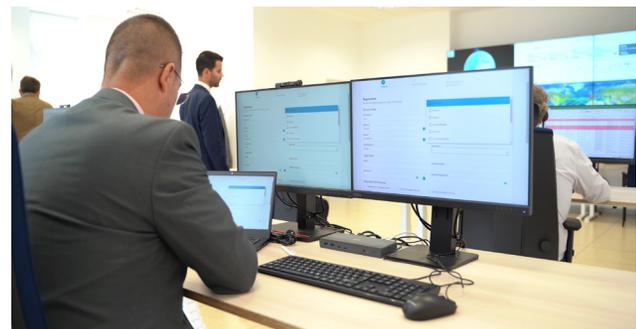
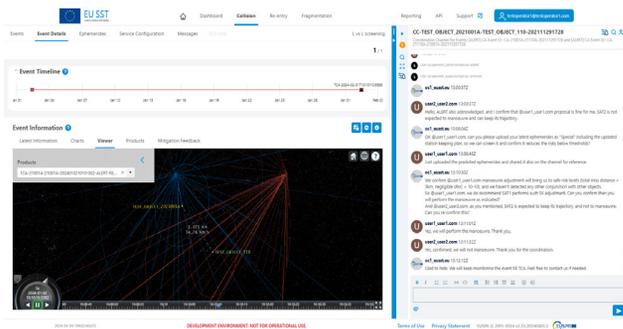
*User satisfaction campaign*



*Bilateral meeting with CA user*



### *EUSPA User Consultation Platform*



### *EU SST Helpdesk*

More information about the EU SST capability and the SST services is available on the **EU SST website** <https://www.eusst.eu> and the **EU Space Academy** <https://www.euspa.europa.eu/spaceacademy>.

# Glossary

## Autonomous Product

Product generated with data from sensors contributing to EU SST.

## Conjunction Event

Close approach of two or more space objects that triggers a set of analyses and produces SST information related to a single conjunction.

## EU SST Catalogue

A catalogue of orbit data to be generated by the EU SST. It shall allow predicting the position, velocity and associated uncertainty of the objects for generating the EU SST services.

## EU SST Database

A database that hosts data from EU SST contributing sensors, orbits from national catalogues, and from the EU SST Catalogue.

## Fragmentation Event

Destructive disassociation of a single space object into two or more pieces that may trigger a set of analyses and produce SST information related to a single fragmentation and/or fragments.

## High-Interest Event

Conjunction event that has miss

distances less than or equal to and/or a collision probability higher or equal to given ALERT thresholds, defined by the O/O in the SCD.

## Hot Redundant OC

Operation Centre in charge of supporting the service provision, simultaneously and collaboratively with the nominal OC.

## Info Event

Conjunction event with a low risk level, provided optionally to the user to complement close approach products (with INFO thresholds defined by the O/O).

## Interest Event

Conjunction event with miss distances less than or equal to and/or in a collision probability higher or equal to given WARNING thresholds defined by O/O in SCD.

## Nominal OC

OC in charge of providing the service through the SST Portal.

## Re-entry Event

Space object re-entering the Earth's atmosphere that may trigger a set of analyses and produce SST information

related to a single re-entering object.

## Service Configuration Document

Document containing the service configuration, and operational and technical interfaces between the O/O and SST Cooperation for the CA service.

## SST Partnership

Partnership of national entities established in the context of the EU Space Regulation, formed by Austria, Czech Republic, Denmark, Finland, France, Germany, Greece, Italy, Latvia, the Netherlands, Poland, Portugal, Romania, Spain and Sweden.

## SST Cooperation

Cooperation of the SST Partnership and EUSPA in the scope of the EU Space Regulation.

## SST Front Desk

Infrastructure and related interfaces (SST Portal and Helpdesk), managed by EUSPA, to provide SST services.

## SST Portal

Main interface for delivering SST services to users in accordance with the Data Policy.

# Acronyms

## 18<sup>th</sup>/19<sup>th</sup> SDS

US Air Force Space Defense Squadrons

## AAE

Spanish Space Agency / Agencia Espacial Española

## AOI

Areas of Interest

## API

Application Programming Interface

## ASI

Italian Space Agency / Agenzia Spaziale Italiana

## C-SSA

Italian Operations Centre / Centro Space Situational Awareness

## CA

Collision Avoidance

## CAM

Collision Avoidance Manoeuvre

## CAT

OC CATalogue source for CDM generation

## CDM

Conjunction Data Message. CCSDS standard.

## CNES

National Centre of Space Studies / Centre National d'Études Spatiales

## DALO

Danish Ministry of Defence Acquisition and Logistics Organisation

## DLR

German Aerospace Centre (German Space Agency at DLR) / Deutsches Zentrum für Luft und Raumfahrt

## EOL

End-Of-Life

## ESA

European Space Agency

## EU

European Union

## EU SST

European Union Space Surveillance and Tracking

## EUSPA

European Union Agency for the Space Programme

## EZ

Ministry of Economic Affairs of the Netherlands / Ministerie van Economische Zaken

## FFG

Austrian Research Promotion Agency / Österreichische Forschungsförderungsgesellschaft

## FG

Fragmentation Analysis

## FMI

Finnish Meteorological Institute

## FR-SSA

French SSA Center

## GeO

Geosynchronous Equatorial Orbit

## HBR

Hard Body Radius

## HEO

Highly Elliptical Orbit

## HIE

High-Interest Event

## IE

Interest Event

## IERS

International Earth Rotation and Reference Systems Service

## IZM

Ministry of Education and Science of Latvia / Izglītības un zinātnes ministrija

## LEO

Low Earth Orbit

## LEOP

Launch and Early Orbit Phase

## MDCR

Ministry of Transport of Czech Republic / Ministerstvo dopravy ČR

## MEO

Medium Earth Orbit

## NOA

National Observatory of Athens

## O/O

Satellite Owner/Operator

## OC

Operations Centre

## OPS

O/O ePhemeriS source for CDM generation

## PoC

Probability of Collision

## POLSA

Polish Space Agency

## PT MoD

Portuguese Ministry of Defence

## RE

Re-entry Analysis

## ROSA

Romanian Space Agency

## S3TOC

Spanish SST Operations Centre

## SCD

Service Configuration Document

## SNSA

Swedish National Space Agency

## SP/SPCAT

Special Perturbations catalogue from 18th SPCS

## SST

Space Surveillance and Tracking

# EU Space Surveillance and Tracking

Find out more on  
[www.eusst.eu](http://www.eusst.eu)



#EUSpace 

