

EU Space Surveillance and Tracking Framework

Space Surveillance and Tracking in Europe

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The foundation Decision 541/2014/EU for a Support Framework

Decision of the European Parliament and of the Council of 16 April 2014 establishing a Framework for Space Surveillance and Tracking Support

« Ensuring the long-term availability of European and national space infrastructure, facilities and services which are essential for the safety and security of the economies, societies and citizens in Europe » (article 3)

With the aim to (article 4):

« Establish a SST capability at European level and with an appropriate level of autonomy » :

- (a) The establishment and operation of a **sensor function** consisting of a network of Member State ground-based and/or spacebased sensors, including national sensors developed through ESA, to survey and track space objects and to produce a database thereof;
- (b) The establishment and operation of a **processing function** to process and analyse the SST data at national level to produce SST information and services for transmission to the SST service provision function;
- (c) The setting up of a function to provide **SST services** as defined in Article 5(1) to the entities referred to in Article 5(2).

Governance of the Consortium State of play



Service provision model

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Sensor Network (In operation as of 1st April 2019)

Systematic operational campaigns providing European measurements for each service (CA, RE, FG)





Sensor Network (In operation as of 1st April 2019)





Data sharing through a database Towards a European catalogue



Initial development + operation phase from 2019 up to Dec. 2021



Service provision to users 3 operational services

Collision Avoidance (CA)

Conjunction Data Messages (CDMs) and CA Reports – made available to registered users on Service Provision Portal for HIE: Event-ID, Object-ID, creation-date, TCA, CDM-ID, miss-distance, Pc.

Analysis of all available information (US CDM, EUSST CDM, MS sensor data, other)

Detection of High Interest Event (HIE)

Operational observation campaigns for each HIE to provide European data

Mitigation recommendation and maneuver support, if needed (dialogue between user and OC)



Re-entry Analysis (RE)

30 days RE list and RE Reports – available to registered users via Service Provision Portal.

- 30 days RE list: object name, type, max latitude, size, RE prediction date range
- RE report: Event-ID, Product-ID, Object-ID and type, creation-date, RE-epoch, RE-location, figure with ground track

Detection of RE events (as per criteria defined in the Service Portfolio)

Operational observation campaigns for each event to provide European data



Fragmentation Analysis (FG)

Short-term and Medium-term FG Reports – made available to registered users on service provision portal:

- Short-term report: Event-ID, Object-ID, creation-date, number of detected fragments, type of fragmentation
- Medium-term report: FG distribution (Gabbard diagram), fragments cloud distribution

Detection of FG events

Operational observation campaigns for each event to provide European data





Added value CA service Unique role of EU SST



EU as provider of alerts (High Interest Events) and recommendations of avoidance manoeuver

Service provision to registered spacecraft operators in Europe

* CDM are Conjunction Data Messages, neither conjunction alerts, nor avoidance maneuver recommendations

Operational CA service consists in:

- Automatic acquisition, checks and analysis of all incoming information: CDM (coming from the US, or autonomously generated by EU), ephemeris from S/C operator
- ✓ Among those CDM, detection of HIE (close approaches which need to be further analyzed because of their high level of risk, based on thresholds, on scaled probability of collision and geometry, defined by the S/C operator)
- ✓ Observation campaigns: in case of HIE, use of EU sensors to refine the orbit of the secondary object
- ✓ Direct interaction with the user in case of alert (according to thresholds defined by the S/C operator)
- ✓ Support provided to the S/C operator to determine an avoidance action (if needed)



Service Provision EUSST Front Desk

SST Consortium

Responsible for generating the SST services and their information

SST Front Desk

Interface for the delivery of the SST services in accordance with the Data and Information Policy

SST Users

SST services to be provided to:









EUSST Service Provision Portal for the delivery of the SST information and services and a **EUSST Helpdesk** to support users





User approval and uptake



- All Member States
- the Council
- the Commission
- the EEAS
- public and private spacecraft owners and operators
- public authorities concerned with civil protection.





Q2-18

Q4-17

Q3-17

Q1-18

Q3-18

Q4-18

Q1-19

Q2-19

Q3-19

18

Q4-16

Q1-17

Q3-17

Q2-17

Q4-17

Q1-18

Q2-18

Q3-18

Q4-18

Q1-19

Q2-19

Q3-19

Q3-16

*Metrics as of end of September-2019. In Q2, Q3-19 the decrease of users is due to one organization requesting to merge several associated user accounts (10 accounts have been transformed into 2).

Q1-17

Q2-17

18

Q4-16

Q3-16

17

Q1-17

Q2-17

Q3-17

Q4-17

Q3-18

Q1-18

Q2-18

Q4-18

Q1-19

Q2-19

Q3-19

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Q4-16

Q3-16



Users - Organisations





Users Satellites registered for CA



Architecture studies: LEO

Performance chart of an expected EU SST survey radars network by 2028



Performance chart of an expected EU SST survey radars network by 2021



Architecture studies: GEO



European context Upcoming legislation on SST/SSA for 2021-2027

- Space security is strategic for Europe ; protection of EU investment in space, such as Galileo and Copernicus, is of paramount importance
- The European Union is preparing the future multi-annual budget (2021-2027). Process is still under negotiation at EU level
- As part of the EU Space Regulation, SSA is a flagship programme along with Galileo, Copernicus and Govsatcom
- □ The duality and security dimension of SSA is going to be an important challenge in Europe
- □ Further EU initiatives to be taken into consideration:
 - European Defence Fund (EDF) and European Defence Industrial Development Programme (EDIDP)
 - Permanent Structure Cooperation (PESCO)
 - R&D funds : Horizon Europe

Thank you

User Registration & Service Request https://sst.satcen.europa.eu

Helpdesk sst.helpdesk@satcen.europa.eu

General Information