EU SST
Space Surveillance and Tracking

Ensuring space safety and sustainability

Demonstration of EU SST Collision Avoidance Service

SSA Training Events

03-04/06/2024

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#EUSpace

PROGRAMME OF THE EUROPEAN UNION

Space Surveillance and Tracking (SST) is part of a European Union civil flagship programme

- **The Space Regulation (2021/696/EU) established the Space Situational Awareness (SSA) flagship** aiming to develop a holistic approach against the main space hazards.

Regulation - 2021/696 - EN - EUR-Lex (europa.eu)

- **Space Situational Awareness** encompasses:

- **Space Surveillance and Tracking (SST)** to protect against: Space Debris (collision and re-entry)

- **Space Weather (SWE)** to protect against: Solar activities (solar flares, coronal mass ejections, geomagnetic storms …)

- **Near Earth Objects (NEO)** to protect against: Meteorites and asteroids

What are the goals of the European Union Space Surveillance and Tracking (EU SST)?

- **Protect space and ground infrastructures** against:
  - Collision in space
  - Re-entry
  - Fragmentation
- Use existing **EU Member States capabilities** (15 Member States)
- Develop an **operational** system 24/7
- Foster **Research activities** in the field of SST
- Propose a system of Collision Avoidance open to **non-EU countries**

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EU SST CA Service
General Introduction

EU SST Collision Avoidance Service – What is it?

Collision Avoidance (CA)

Risk assessment of conjunctions and generation of collision avoidance alerts

Described in the EU SST Service Portfolio :
https://portal.eusst.eu/portalng/public-download/ServicePortfolio

Key features

- **Public service provided for free to ensure the minimum safety of space flight operations**
- **Provision of Conjunction Data Messages (CDMs)** upon several set of thresholds (INFO, WARNING, ALERT)
- Service Agreement in the Service Configuration Document:
- **Hot redundancy scheme involving ES (S3TOC) and FR (FR SSA OC)** with harmonised service level and single service provider per registered user
- **Enhanced Analysis** support (e.g. covariance estimations, Hard Body Radius estimations, PoC sensitivity analysis and Scaled PoC computations)
- **Risk Mitigation** support: Collision Avoidance Manoeuvre (CAM) support if requested
- **On call team** available 24/7 to perform analysis, ensure the coordination with operators, provide support to operators requests
- Support to **all mission phases** (LEOP, End of Life,…)

Users – EU SST community

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200
ORGS
26 EU MS

Collision Avoidance

76
ORGS

491
Satellites

EU users

59
ORGS

331
Satellites

Non-EU users

17
ORGS

160
Satellites

EU SST user requirements to receive CA service

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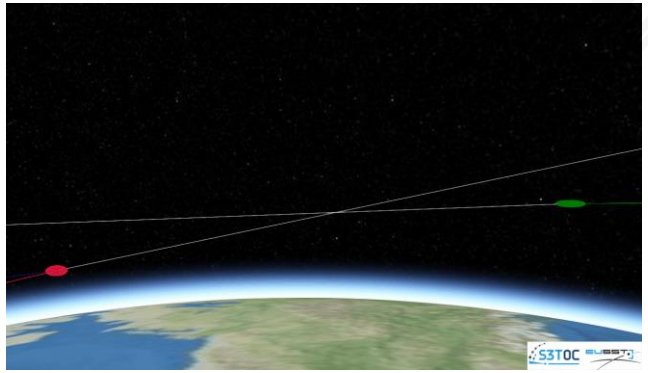
- Once a user is approved to receive the CA service, it needs to comply with four main requirements:
  1. Agree on the terms and conditions to access the EU SST services (at registration)
  2. Provide access to the US CDMs.
  3. Deliver timely ephemeris including manoeuvre information and, if possible, including covariance information. (*)
  4. **Agree on a Service Configuration Document (SCD).**

- Service Configuration Document (SCD) is an agreement between EU SST and the CA user on how the CA service is delivered
- Users are asked to provide:
  - **Contact information** (main Point of contact and on duty)
  - Data regarding their registered spacecraft:
    - Physical parameters (**Hard Body Radius** and mass)
    - Information regarding **ephemerides/manoeuvres**
      - uploads frequency, formats, duration, filename convention…
- EU SST CA OCs and users agree on:
  - **Thresholds to conduct risk assessment** (High interest Events (HIE), Interest events (IE)) based on geometry, scaled probability of collision and time to TCA
  - Communication: how and when to contact the user in case of HIE.
  - Does the user allow EU SST to share information regarding a risky conjunction with other O/O?



(*) If ephemeris cannot be generated by the O/O (i.e cubesats, small missions,etc) CA Operational Centres (OCs) might agree with the user to use external information (SP data)

Covariance information can be generated by the CA service OCs.

Key Concept - Scaled PoC

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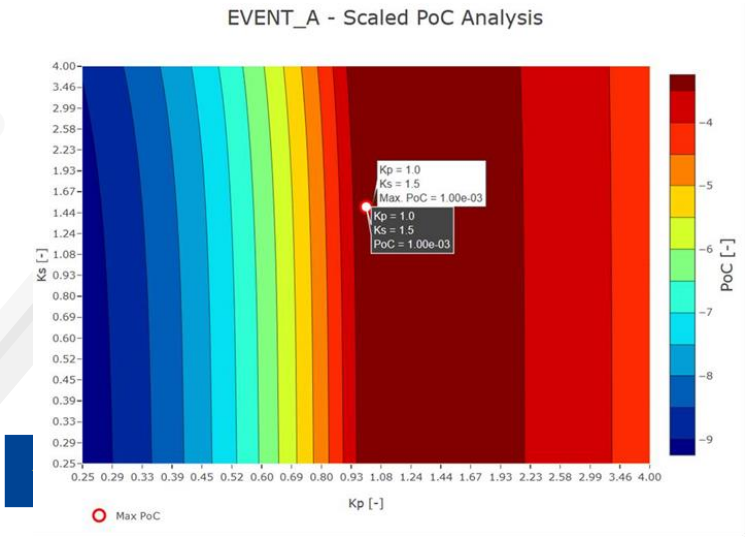
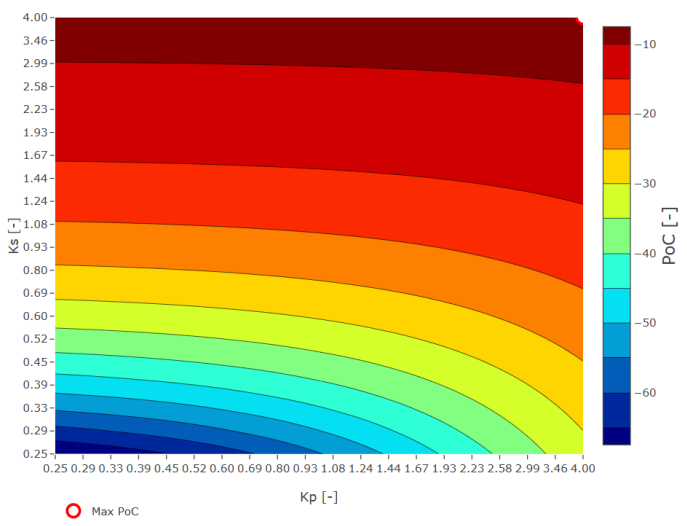
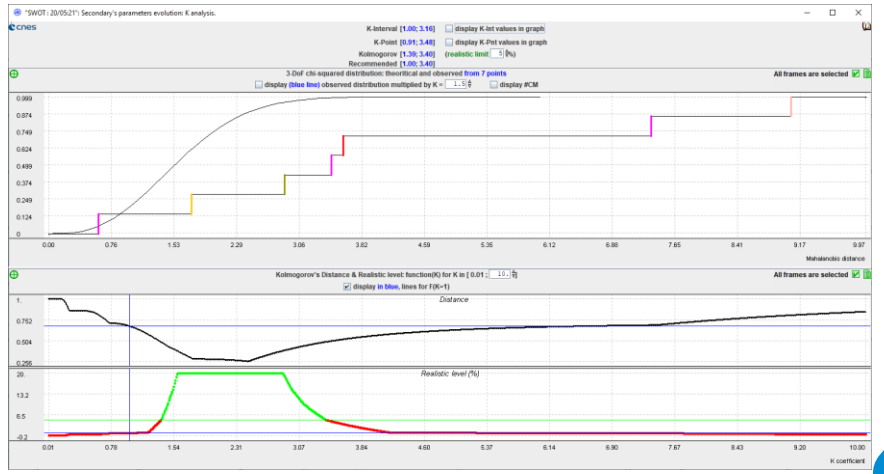
- EU SST uses the **Scaled PoC** to compute the risk level
- **Covariance is the key factor** to compute Probability of Collision
- Coefficients kp and ks for magnitude of variation of dispersions for primary and for secondary have been chosen from a statistical analysis in the past.
- C (combined covariance) = kp * Cp + ks * Cs with kp and ks independent scale factors applied to respective covariance
- Scaled PoC is defined as the maximum value of PoC when kp and ks are in a realistic interval
- Realistic intervals of kp and ks are computed automatically from past CDMs of the conjunctions

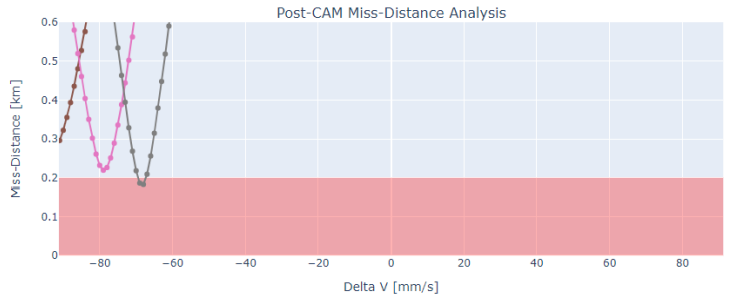


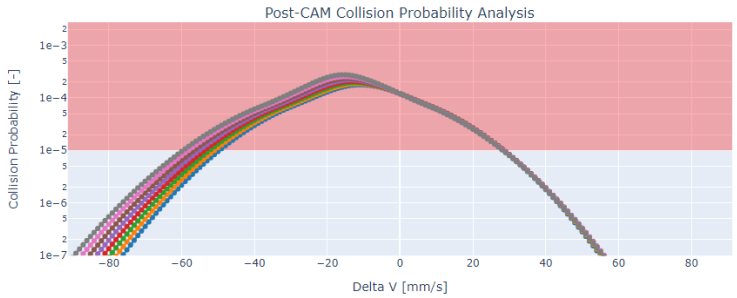


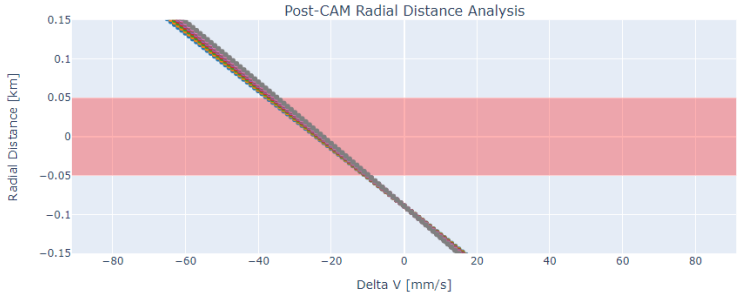


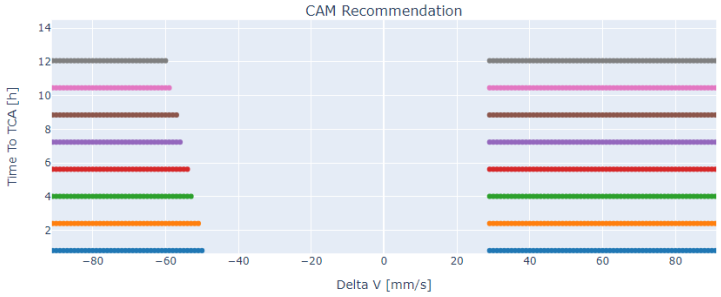
Key Concept – Risk Mitigation support

EU SST generates **a set of possible collision avoidance manoeuvres or risk mitigation actions** (i.e, adjust a SK manoeuvre, not to conduct any action) to allow the user to take an informed decision to ensure the safety of the flight space operations.









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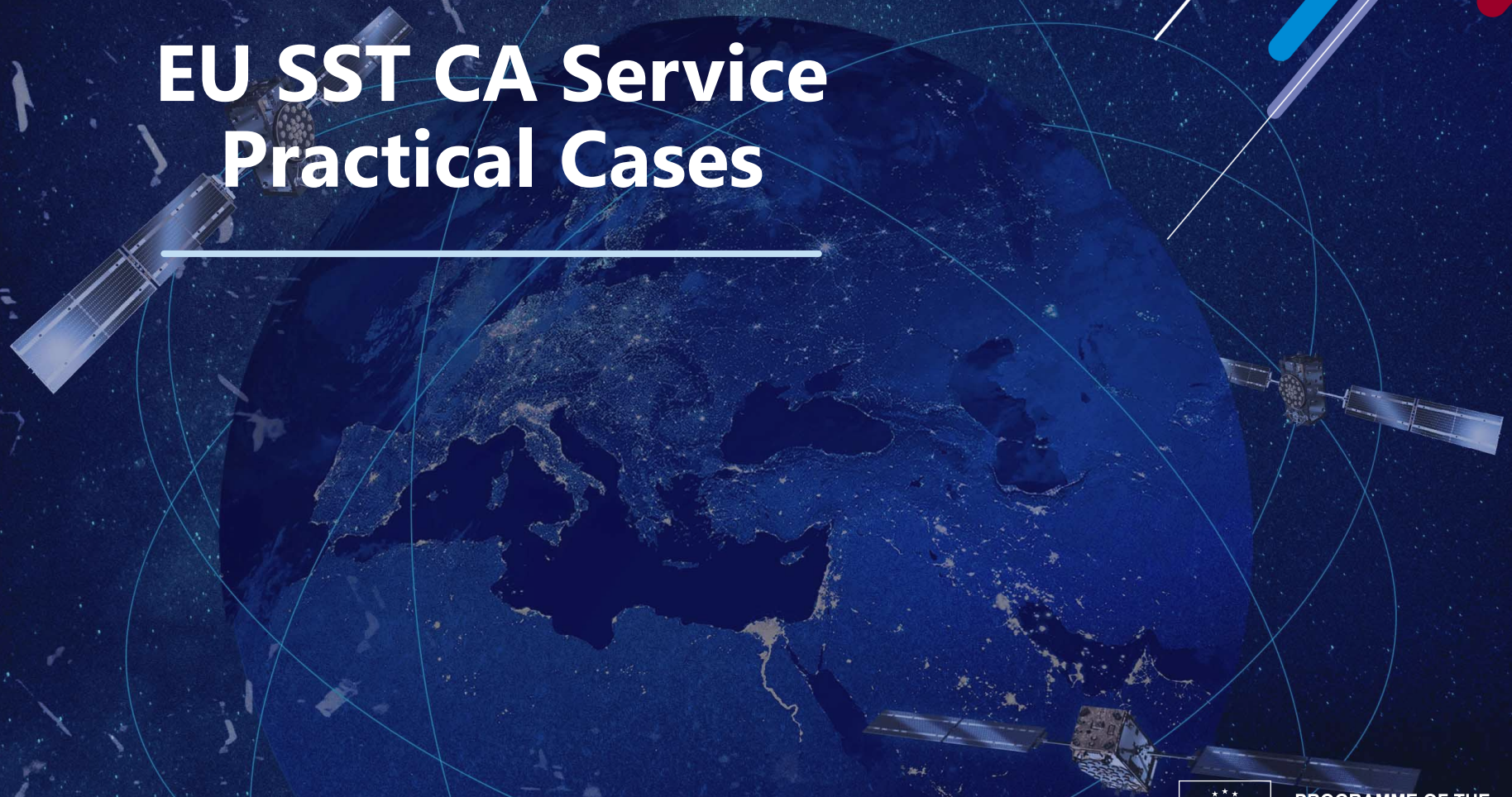
EU SST CA Service
Practical Cases



CA service: Practical cases

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- PLEIADES 1B vs AURA
  - Two active and manoeuvrable satellites
  - Good coordination between operators
  - LEO orbits

- ACTIVE_SC vs DECOMMISSIONED_SC
  - Active satellite vs decommissioned object
  - Objects are anonymized
  - Secondary well-tracked by the EU SST sensor network
  - GEO orbits

PLEIADES 1B vs AURA

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- PLEIADES 1B
  - CNES satellite, active and manoeuvrable
  - Launched in 2012
  - CA service provided by EU SST (FR SSA OC)

- AURA
  - NASA satellite, active and manoeuvrable
  - Launched in 2004
  - CA service provided by CARA (NASA)

PLEIADES 1B vs AURA

- EU SST detected risky conjunctions on the 17th of April 2024 (TCA<4-8 days)
- Both objects have similar semi-major axis
  - Multiple TCAs were detected between the 21st and the 25th of April
  - 29 conjunctions reached at least **WARNING** threshold
  - Among them, 12 conjunctions reached **ALERT** threshold (Scaled PoC > 5E-4)
- CDMs were computed using:
  - Primary source: ephemeris updated daily
  - Secondary source: FR catalogue orbit or 18th/19thSDS CDM (ephemerides not publicly available on Space-Track)
- Any orbital change can affect the severity level of all conjunctions
  - Mitigating a given conjunction may increase the risk level of another one
  - Uncoordinated mitigation actions performed on both sides may increase the risk

  → **Coordination is mandatory before taking any decision**

PLEIADES 1B vs AURA

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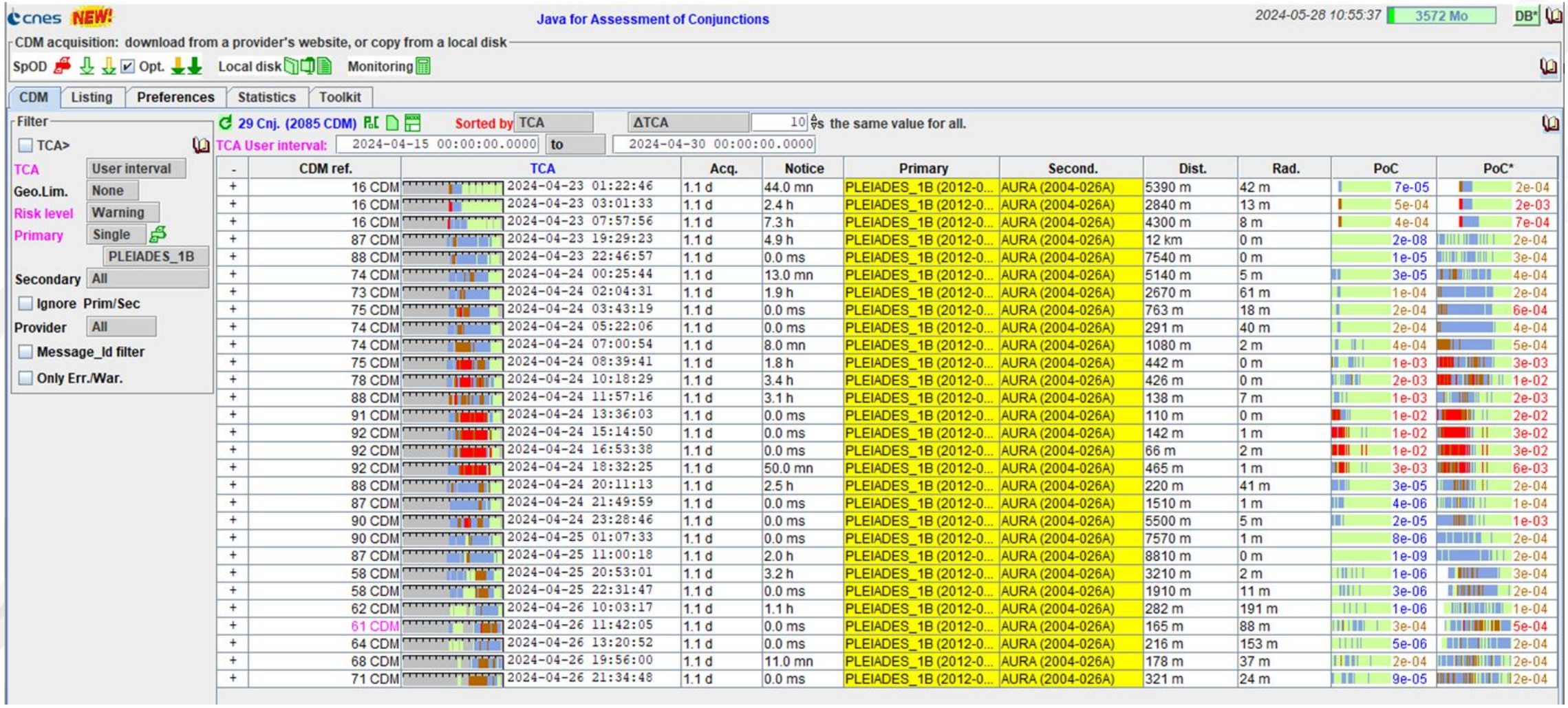
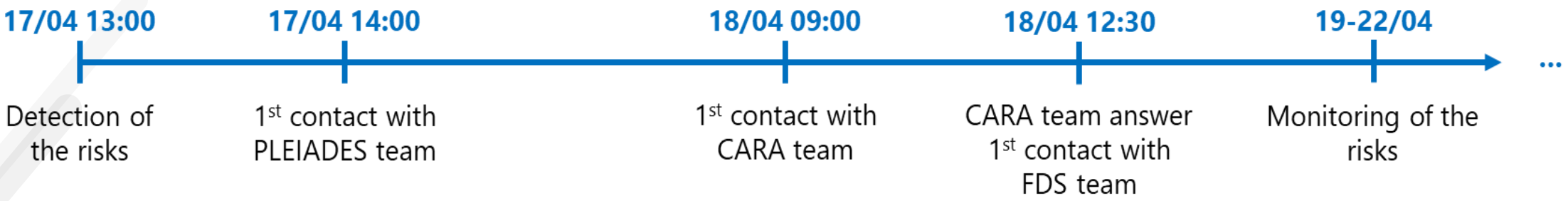


-	CDM ref.	TCA	Acq.	Notice	Primary	Second.	Dist.	Rad.	PoC	PoC*
+	16 CDM	2024-04-23 01:22:46	1.1 d	44.0 mn	PLEIADES_1B (2012-0...	AURA (2004-026A)	5390 m	42 m	7e-05	2e-04
+	16 CDM	2024-04-23 03:01:33	1.1 d	2.4 h	PLEIADES_1B (2012-0...	AURA (2004-026A)	2840 m	13 m	5e-04	2e-03
+	16 CDM	2024-04-23 07:57:56	1.1 d	7.3 h	PLEIADES_1B (2012-0...	AURA (2004-026A)	4300 m	8 m	4e-04	7e-04
+	87 CDM	2024-04-23 19:29:23	1.1 d	4.9 h	PLEIADES_1B (2012-0...	AURA (2004-026A)	12 km	0 m	2e-08	2e-04
+	88 CDM	2024-04-23 22:46:57	1.1 d	0.0 ms	PLEIADES_1B (2012-0...	AURA (2004-026A)	7540 m	0 m	1e-05	3e-04
+	74 CDM	2024-04-24 00:25:44	1.1 d	13.0 mn	PLEIADES_1B (2012-0...	AURA (2004-026A)	5140 m	5 m	3e-05	4e-04
+	73 CDM	2024-04-24 02:04:31	1.1 d	1.9 h	PLEIADES_1B (2012-0...	AURA (2004-026A)	2670 m	61 m	1e-04	2e-04
+	75 CDM	2024-04-24 03:43:19	1.1 d	0.0 ms	PLEIADES_1B (2012-0...	AURA (2004-026A)	763 m	18 m	2e-04	6e-04
+	74 CDM	2024-04-24 05:22:06	1.1 d	0.0 ms	PLEIADES_1B (2012-0...	AURA (2004-026A)	291 m	40 m	2e-04	4e-04
+	74 CDM	2024-04-24 07:00:54	1.1 d	8.0 mn	PLEIADES_1B (2012-0...	AURA (2004-026A)	1080 m	2 m	4e-04	5e-04
+	75 CDM	2024-04-24 08:39:41	1.1 d	1.8 h	PLEIADES_1B (2012-0...	AURA (2004-026A)	442 m	0 m	1e-03	3e-03
+	78 CDM	2024-04-24 10:18:29	1.1 d	3.4 h	PLEIADES_1B (2012-0...	AURA (2004-026A)	426 m	0 m	2e-03	1e-02
+	88 CDM	2024-04-24 11:57:16	1.1 d	3.1 h	PLEIADES_1B (2012-0...	AURA (2004-026A)	138 m	7 m	1e-03	2e-03
+	91 CDM	2024-04-24 13:36:03	1.1 d	0.0 ms	PLEIADES_1B (2012-0...	AURA (2004-026A)	110 m	0 m	1e-02	2e-02
+	92 CDM	2024-04-24 15:14:50	1.1 d	0.0 ms	PLEIADES_1B (2012-0...	AURA (2004-026A)	142 m	1 m	1e-02	3e-02
+	92 CDM	2024-04-24 16:53:38	1.1 d	0.0 ms	PLEIADES_1B (2012-0...	AURA (2004-026A)	66 m	2 m	1e-02	3e-02
+	92 CDM	2024-04-24 18:32:25	1.1 d	50.0 mn	PLEIADES_1B (2012-0...	AURA (2004-026A)	465 m	1 m	3e-03	6e-03
+	88 CDM	2024-04-24 20:11:13	1.1 d	2.5 h	PLEIADES_1B (2012-0...	AURA (2004-026A)	220 m	41 m	3e-05	2e-04
+	87 CDM	2024-04-24 21:49:59	1.1 d	0.0 ms	PLEIADES_1B (2012-0...	AURA (2004-026A)	1510 m	1 m	4e-06	1e-04
+	90 CDM	2024-04-24 23:28:46	1.1 d	0.0 ms	PLEIADES_1B (2012-0...	AURA (2004-026A)	5500 m	5 m	2e-05	1e-03
+	90 CDM	2024-04-25 01:07:33	1.1 d	0.0 ms	PLEIADES_1B (2012-0...	AURA (2004-026A)	7570 m	1 m	8e-06	2e-04
+	87 CDM	2024-04-25 11:00:18	1.1 d	2.0 h	PLEIADES_1B (2012-0...	AURA (2004-026A)	8810 m	0 m	1e-09	2e-04
+	58 CDM	2024-04-25 20:53:01	1.1 d	3.2 h	PLEIADES_1B (2012-0...	AURA (2004-026A)	3210 m	2 m	1e-06	3e-04
+	58 CDM	2024-04-25 22:31:47	1.1 d	0.0 ms	PLEIADES_1B (2012-0...	AURA (2004-026A)	1910 m	11 m	3e-06	2e-04
+	62 CDM	2024-04-26 10:03:17	1.1 d	1.1 h	PLEIADES_1B (2012-0...	AURA (2004-026A)	282 m	191 m	1e-06	1e-04
+	61 CDM	2024-04-26 11:42:05	1.1 d	0.0 ms	PLEIADES_1B (2012-0...	AURA (2004-026A)	165 m	88 m	3e-04	5e-04
+	64 CDM	2024-04-26 13:20:52	1.1 d	0.0 ms	PLEIADES_1B (2012-0...	AURA (2004-026A)	216 m	153 m	5e-06	2e-04
+	68 CDM	2024-04-26 19:56:00	1.1 d	11.0 mn	PLEIADES_1B (2012-0...	AURA (2004-026A)	178 m	37 m	2e-04	2e-04
+	71 CDM	2024-04-26 21:34:48	1.1 d	0.0 ms	PLEIADES_1B (2012-0...	AURA (2004-026A)	321 m	24 m	9e-05	2e-04

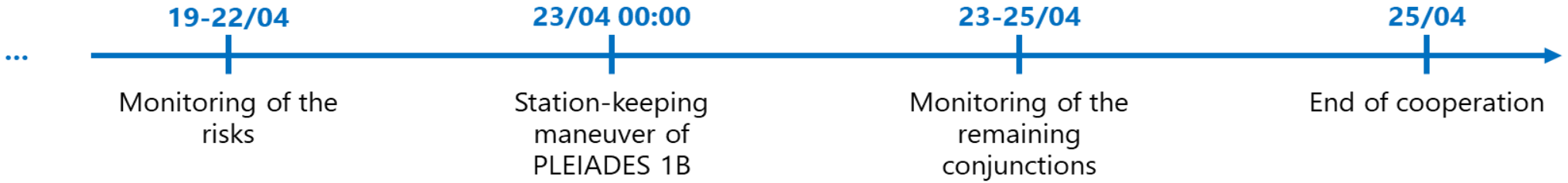
PLEIADES 1B vs AURA

- EU SST and CARA have been working together for years
  - Some international cooperation S/C (JASON, CALIPSO, SWOT…) are monitored by both teams
- EU SST asked CARA team to coordinate on the 18th of April
  - CARA team was quick to answer and open to coordination
  - Contact with AURA FDS team who agreed to send us daily ephemerides
- Daily ephemeris sent by AURA FDS team
  - Conjunctions monitored during the weekend
  - Multiple risks remain in **ALERT** with a high Scaled PoC



PLEIADES 1B vs AURA

- Both teams shared ephemerides throughout the event
  - Both CA providers assessed risk level independently and shared analyses
  - Need for mitigation confirmed, decision taken involving all parties
- Mitigation by PLEIADES 1B through station-keeping
  - Station-keeping would have been required in the next few days
  - Station-keeping manoeuvre changed to be conducted on the 23rd at 00:00
  - Ephemeris containing the new station keeping manoeuvre plan shared with AURA FDS and CARA team
  - Severity of all conjunctions decreased, reaching a low risk level (Scaled PoC < 1E-10)
  - Conjunctions still monitored during the following days after the maneuver
- End of the cooperation on the 25th of April



ACTIVE_SC vs DECOMMISSIONED_SC

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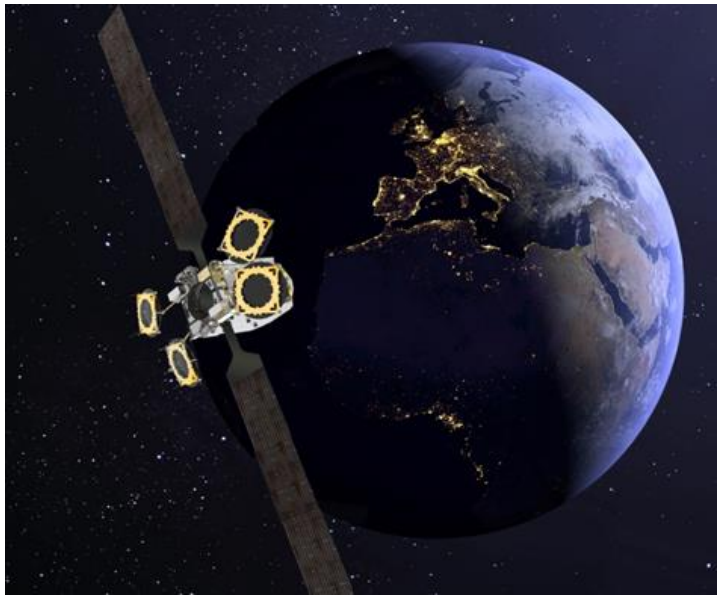
- ACTIVE_SC
  - GEO satellite, active and manoeuvrable
  - Launched in 2011



- DECOMMISSIONED_SC
  - Decommissioned satellite, non-manoeuvrable
  - Launched in 1990
  - Orbit close to GEO orbit

ACTIVE_SC vs DECOMMISSIONED_SC

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- TCA: 02/12/2023 18:37:14 UTC
  - Secondary object is an inactive payload: no coordination needed
- CDMs were computed using:
  - Primary source: ephemerides provided by the Operator, includes station-keeping manoeuvres
  - Secondary source: orbit from FR SSA OC catalogue or 18th/19thSDS CDM
- Conjunction detected on November 24th 2023
  - Miss Distance < 5 km and Radial Separation < 500m, Scaled PoC > 1E-5
  - Geometry & Scaled PoC are within **ALERT** reporting criteria
    - Only one criteria would have been needed to reach ALERT threshold
    - Orbits from FR SSA OC and 18th SDS are consistent with each other
  - More measurements required to refine the orbit of DECOMMISSIONED_SC, and confirm the severity level

→ **Tasking Request sent to the EU SST contributing sensors**

ACTIVE_SC vs DECOMMISSIONED_SC

EU SST
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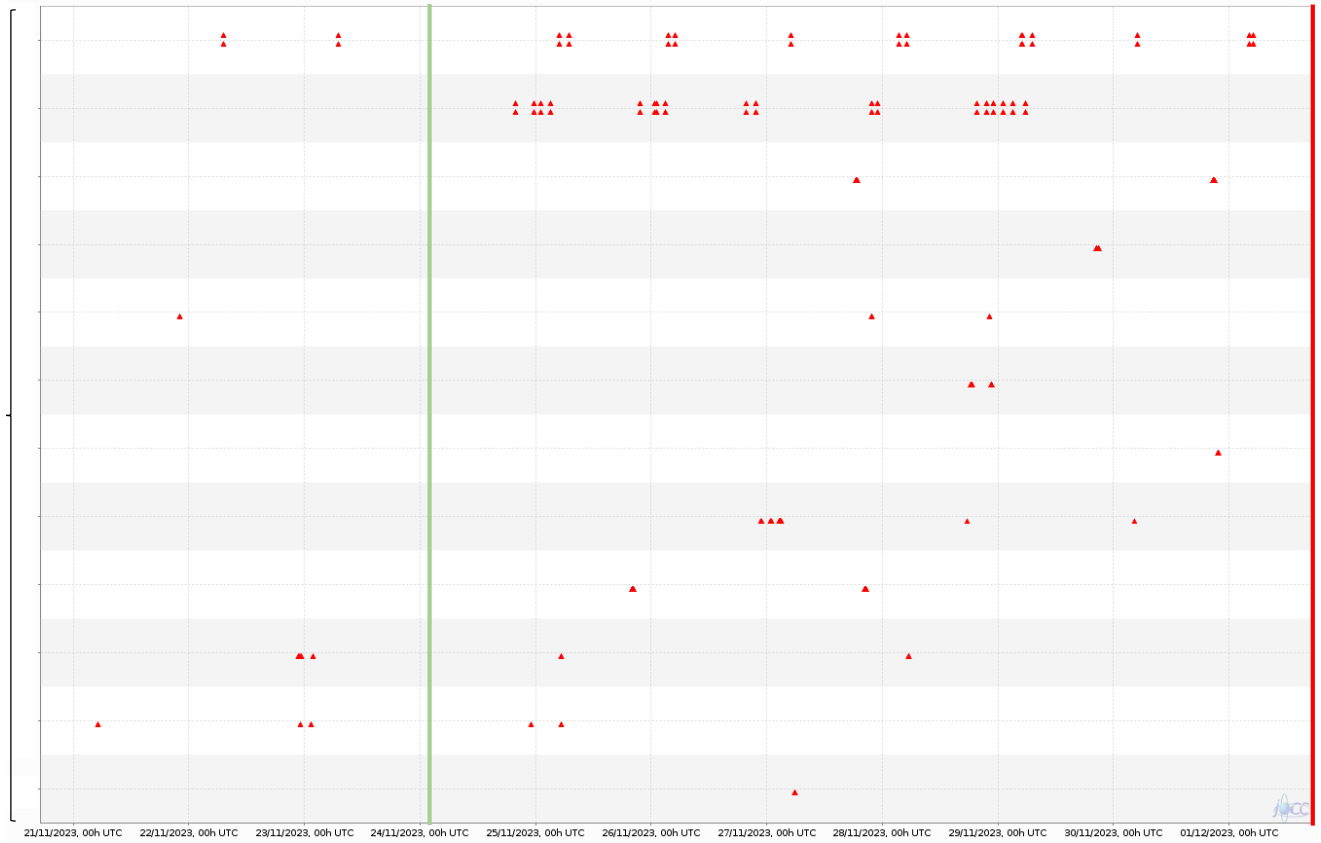
- FR SSA OC orbit determination:
  - Initial orbit was good
  - Orbit improved (uncertainties decreased) with reception of significant amount of measurements shared within EU SST after the Tasking Request creation

Measurements generated by 12 sensors contributing to EU SST



Tasking Request created

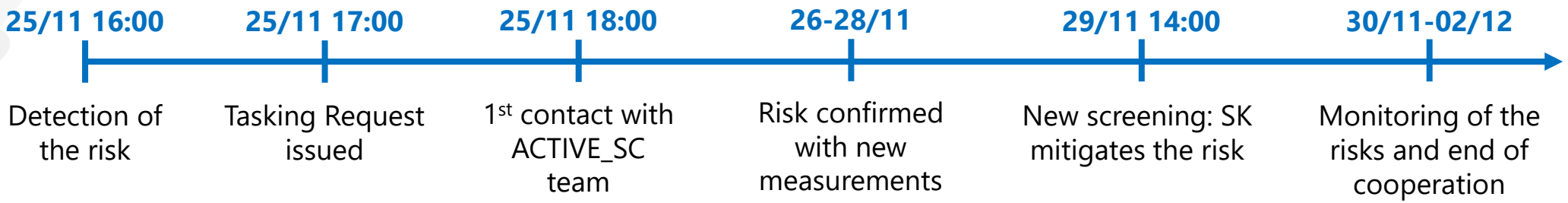
Time of Closest Approach

PROGRAMME OF THE EUROPEAN UNION

ACTIVE_SC vs DECOMMISSIONED_SC

- Mitigation strategy in GEO:
  - In GEO, Station-Keeping manoeuvres are performed every few days or weeks
    - Adaptation of SK manoeuvres limits extra costs of risky conjunction mitigation

- Coordination with ACTIVE_SC :
  - EU SST confirmed the risk level, and recommended to perform a mitigation action
  - ACTIVE_SC adapted its SK manoeuvres and provided a new ephemeris.
  - It was screened against the catalogue:
    - Scaled PoC dropped, Miss distance > 10km: Confirmation that this risky conjunction was mitigated
    - No other risk generated



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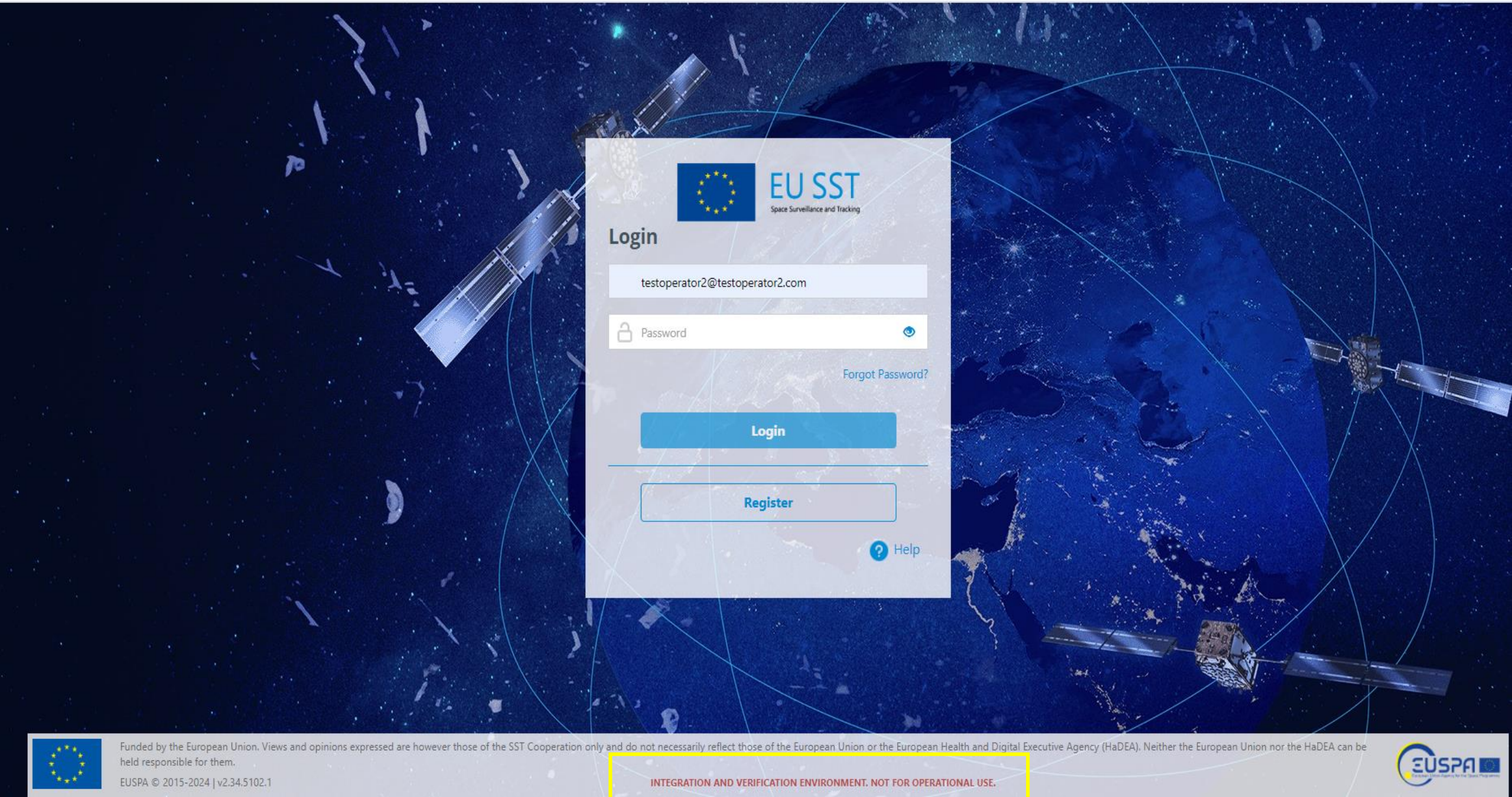
EU SST Service Provision Portal CA Demo

Integration and Verification Environment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New EU SST Portal Release (v2.33.0)

EU SST is pleased to announce that a new release (v2.33.0) of the EU SST Service Provision Portal is now available. The relevant changes for you in this version are:

- New Collision Avoidance emails ...

Read More

April 30, 2024 / **Portal**

New EU SST Portal Release (v2.32.0)

EU SST is pleased to announce that a new release (v2.32.0) of the EU SST Service Provision Portal is now available. The relevant changes for you in this version are:

- Updated terms and conditions ...

Read More

April 2, 2024 / **Portal**

5th User Satisfaction Campaign!

As a user of the EU Space Surveillance and Tracking (EU SST) Service Provision Portal, your feedback is very important to improve the EU SST services (Collision Avoidance, Re-entry Analysis and Fragmentation Analysis). This is ...

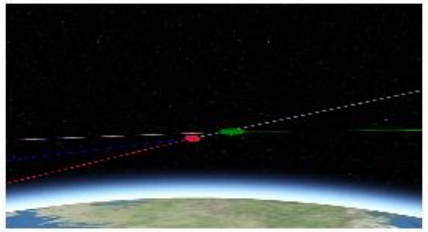
Read More

March 25, 2024 / **Users**

Have you manoeuvred? Let us know!

Based on collected user needs, it is now possible for users to provide feedback on ...

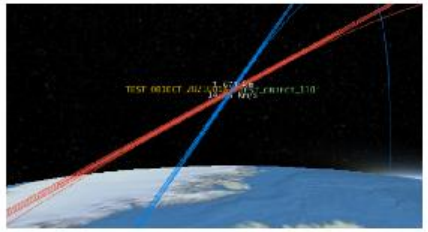
February 9, 2024 **Portal**, **Users**



New EU SST Portal Release (v2.30.1)

EU SST is pleased to announce that a new release (v2.30.1) of the EU SST ...

January 29, 2024 **Portal**



New EU SST Portal Release (v2.28.0)

EU SST is pleased to announce that a new release (v2.28.0) of the EU SST ...

December 20, 2023 **Portal**

EU SST takes part in EUSPA's User Consultation Pla...

On 7 November, the EU Space Surveillance and Tracking (EU SST) participated for the first ...

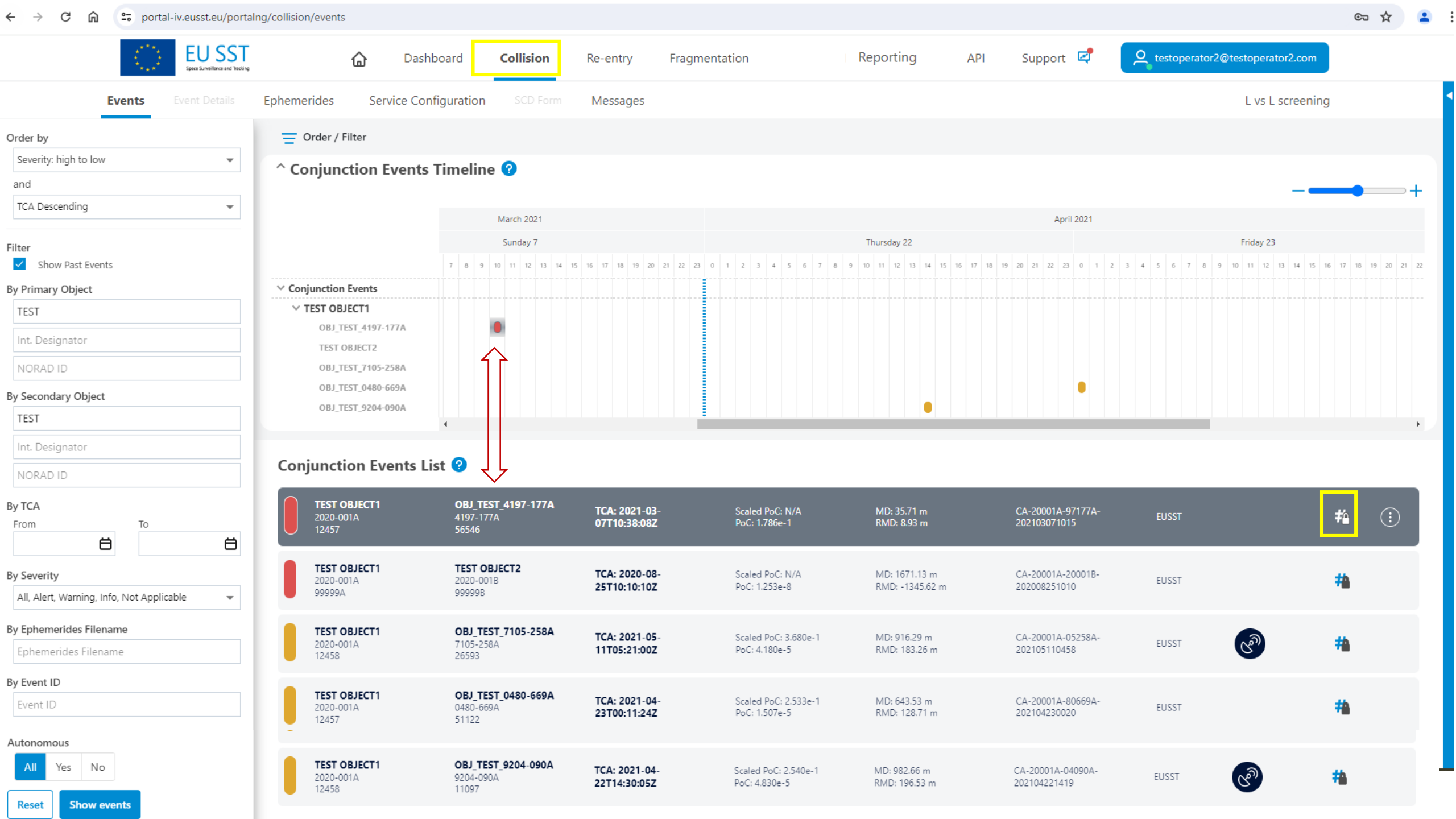
December 18, 2023 **Events**

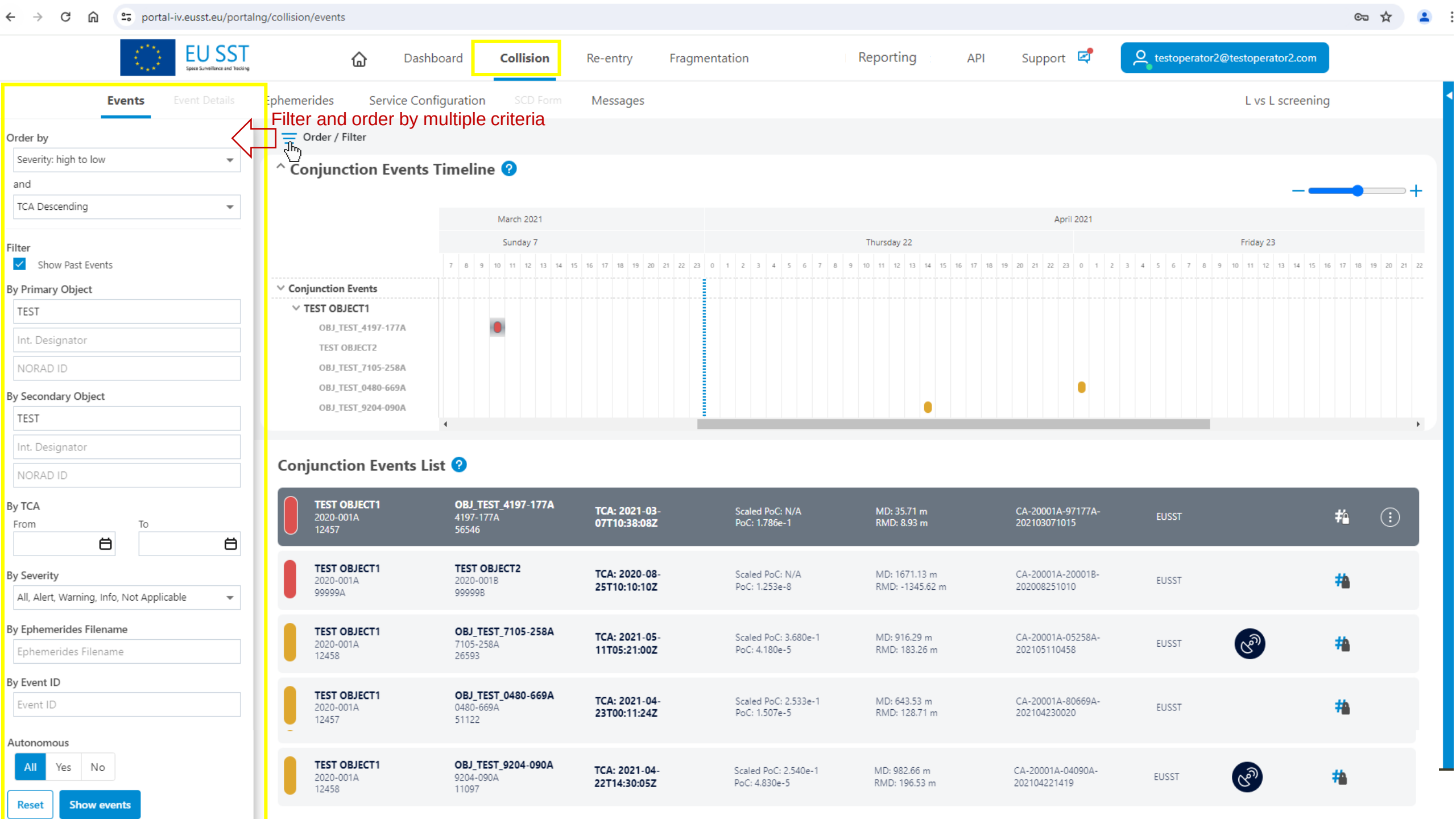
EUSPA, the new EU SST Front Desk

On 1 July 2023, the European Union Agency for the Space Programme (EUSPA) has officially ...

July 3, 2023 **Events**

CCP Channels
You have unread messages.


portal-iv.eusst.eu/portalng/collision/events
EU SST
Space Surveillance and Tracking
Dashboard
Collision
Re-entry
Fragmentation
Reporting
API
Support
testoperator2@testoperator2.com
Events
Event Details
Ephemerides
Service Configuration
SCD Form
Messages
L vs L screening
Order by
Severity: high to low
and
TCA Descending
Filter
Show Past Events
By Primary Object
TEST
Int. Designator
NORAD ID
By Secondary Object
TEST
Int. Designator
NORAD ID
By TCA
From
To
By Severity
All, Alert, Warning, Info, Not Applicable
By Ephemerides Filename
Ephemerides Filename
By Event ID
Event ID
Autonomous
All
Yes
No
Reset
Show events
Order / Filter
Conjunction Events Timeline
March 2021
April 2021
Sunday 7
Thursday 22
Friday 23
Conjunction Events
TEST OBJECT1
OBJ_TEST_4197-177A
TEST OBJECT2
OBJ_TEST_7105-258A
OBJ_TEST_0480-669A
OBJ_TEST_9204-090A
Conjunction Events List
TEST OBJECT1 2020-001A 12457
OBJ_TEST_4197-177A 4197-177A 56546
TCA: 2021-03-07T10:38:08Z
Scaled PoC: N/A PoC: 1.786e-1
MD: 35.71 m RMD: 8.93 m
CA-20001A-97177A-202103071015
EUSST
TEST OBJECT1 2020-001A 99999A
TEST OBJECT2 2020-001B 99999B
TCA: 2020-08-25T10:10:10Z
Scaled PoC: N/A PoC: 1.253e-8
MD: 1671.13 m RMD: -1345.62 m
CA-20001A-20001B-202008251010
EUSST
TEST OBJECT1 2020-001A 12458
OBJ_TEST_7105-258A 7105-258A 26593
TCA: 2021-05-11T05:21:00Z
Scaled PoC: 3.680e-1 PoC: 4.180e-5
MD: 916.29 m RMD: 183.26 m
CA-20001A-05258A-202105110458
EUSST
TEST OBJECT1 2020-001A 12457
OBJ_TEST_0480-669A 0480-669A 51122
TCA: 2021-04-23T00:11:24Z
Scaled PoC: 2.533e-1 PoC: 1.507e-5
MD: 643.53 m RMD: 128.71 m
CA-20001A-80669A-202104230020
EUSST
TEST OBJECT1 2020-001A 12458
OBJ_TEST_9204-090A 9204-090A 11097
TCA: 2021-04-22T14:30:05Z
Scaled PoC: 2.540e-1 PoC: 4.830e-5
MD: 982.66 m RMD: 196.53 m
CA-20001A-04090A-202104221419
EUSST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L vs L screening
Filter and order by multiple criteria
Order / Filter
Order by
Severity: high to low
and
TCA Descending
Filter
Show Past Events
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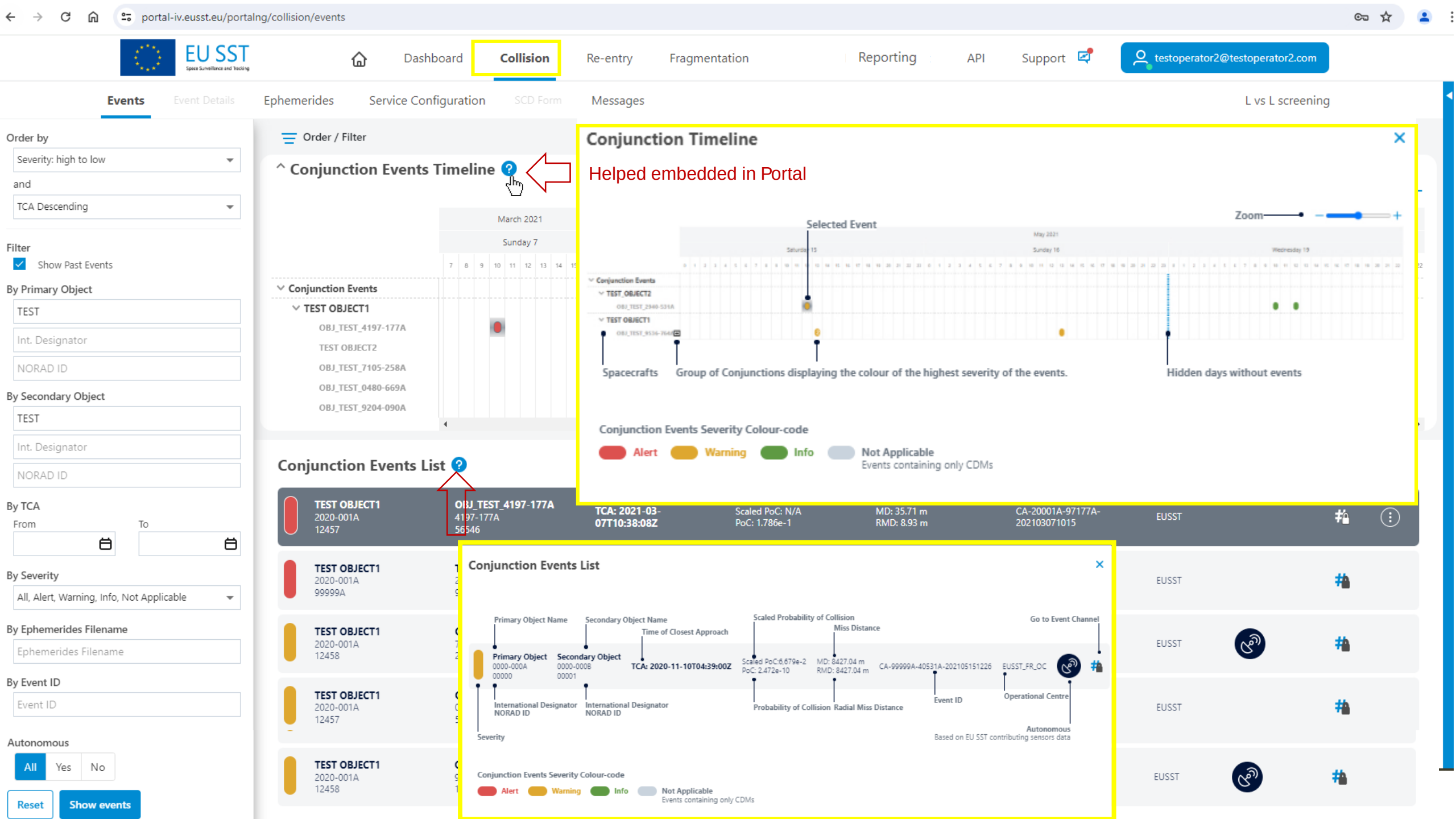
Int. Designator
NORAD ID
By Secondary Object
TEST
Int. Designator
NORAD ID
By TCA
From
To
By Severity
All, Alert, Warning, Info, Not Applicable
By Ephemerides Filename
Ephemerides Filename
By Event ID
Event ID
Autonomous
All
Yes
No
Reset
Show events
Conjunction Events Timeline
March 2021
April 2021
Sunday 7
Thursday 22
Friday 23
Conjunction Events
TEST OBJECT1
OBJ_TEST_4197-177A
TEST OBJECT2
OBJ_TEST_7105-258A
OBJ_TEST_0480-669A
OBJ_TEST_9204-090A
Conjunction Events List
TEST OBJECT1 2020-001A 12457
OBJ_TEST_4197-177A 4197-177A 56546
TCA: 2021-03-07T10:38:08Z
Scaled PoC: N/A PoC: 1.786e-1
MD: 35.71 m RMD: 8.93 m
CA-20001A-97177A-202103071015
EUSST
TEST OBJECT1 2020-001A 99999A
TEST OBJECT2 2020-001B 99999B
TCA: 2020-08-25T10:10:10Z
Scaled PoC: N/A PoC: 1.253e-8
MD: 1671.13 m RMD: -1345.62 m
CA-20001A-20001B-202008251010
EUSST
TEST OBJECT1 2020-001A 12458
OBJ_TEST_7105-258A 7105-258A 26593
TCA: 2021-05-11T05:21:00Z
Scaled PoC: 3.680e-1 PoC: 4.180e-5
MD: 916.29 m RMD: 183.26 m
CA-20001A-05258A-202105110458
EUSST
TEST OBJECT1 2020-001A 12457
OBJ_TEST_0480-669A 0480-669A 51122
TCA: 2021-04-23T00:11:24Z
Scaled PoC: 2.533e-1 PoC: 1.507e-5
MD: 643.53 m RMD: 128.71 m
CA-20001A-80669A-202104230020
EUSST
TEST OBJECT1 2020-001A 12458
OBJ_TEST_9204-090A 9204-090A 11097
TCA: 2021-04-22T14:30:05Z
Scaled PoC: 2.540e-1 PoC: 4.830e-5
MD: 982.66 m RMD: 196.53 m
CA-20001A-04090A-202104221419
EUSST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By Ephemerides Filename
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Order / Filter
Conjunction Events Timeline
March 2021
Sunday 7
Conjunction Events
TEST OBJECT1
OBJ_TEST_4197-177A
TEST OBJECT2
OBJ_TEST_7105-258A
OBJ_TEST_0480-669A
OBJ_TEST_9204-090A
Conjunction Timeline
Helped embedded in Portal
Zoom
Selected Event
Spacecrafts
Group of Conjunctions displaying the colour of the highest severity of the events.
Hidden days without events
Conjunction Events Severity Colour-code
Alert
Warning
Info
Not Applicable
Events containing only CDMs
Conjunction Events List
TEST OBJECT1
2020-001A
12457
OBJ_TEST_4197-177A
4197-177A
56546
TCA: 2021-03-07T10:38:08Z
Scaled PoC: N/A
PoC: 1.786e-1
MD: 35.71 m
RMD: 8.93 m
CA-20001A-97177A-202103071015
EUSST
TEST OBJECT1
2020-001A
99999A
TEST OBJECT1
2020-001A
12458
TEST OBJECT1
2020-001A
12457
TEST OBJECT1
2020-001A
12458
Conjunction Events List
Primary Object Name
Secondary Object Name
Time of Closest Approach
Scaled Probability of Collision
Miss Distance
Go to Event Channel
Primary Object
0000-000A
00000
Secondary Object
0000-0008
00001
TCA: 2020-11-10T04:39:00Z
Scaled PoC:6.679e-2
PoC: 2.472e-10
MD: 8427.04 m
RMD: 8427.04 m
CA-99999A-40531A-202105151226
EUSST_FR_OC
International Designator
NORAD ID
International Designator
NORAD ID
Probability of Collision
Radial Miss Distance
Event ID
Operational Centre
Severity
Autonomous
Based on EU SST contributing sensors data
Conjunction Events Severity Colour-code
Alert
Warning
Info
Not Applicable
Events containing only CDMs

Order by

Severity: high to low

and

TCA Descending

Filter

Show Past Events

By Primary Object

TEST

Int. Designator

NORAD ID

By Secondary Object

TEST

Int. Designator

NORAD ID

By TCA

From

To

By Severity

All, Alert, Warning, Info, Not Applicable

By Ephemerides Filename

Ephemerides Filename

By Event ID

Event ID

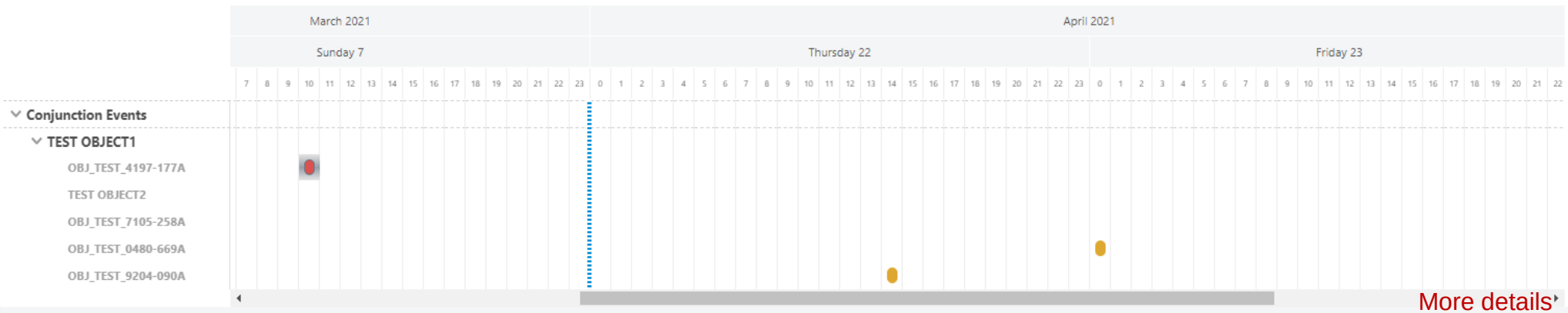
Autonomous

All | Yes | No

Reset | Show events

Order / Filter

Conjunction Events Timeline



Conjunction Events List

More details

TEST OBJECT1 2020-001A 12457	OBJ_TEST_4197-177A 4197-177A 56546	TCA: 2021-03-07T10:38:08Z	Scaled PoC: N/A PoC: 1.786e-1	MD: 35.71 m RMD: 8.93 m	CA-20001A-97177A-202103071015	EUSST	
TEST OBJECT1 2020-001A 99999A	TEST OBJECT2 2020-001B 99999B	TCA: 2020-08-25T10:10:10Z	Scaled PoC: N/A PoC: 1.253e-8	MD: 1671.13 m RMD: -1345.62 m	CA-20001A-20001B-202008251010	EUSST	
TEST OBJECT1 2020-001A 12458	OBJ_TEST_7105-258A 7105-258A 26593	TCA: 2021-05-11T05:21:00Z	Scaled PoC: 3.680e-1 PoC: 4.180e-5	MD: 916.29 m RMD: 183.26 m	CA-20001A-05258A-202105110458	EUSST	
TEST OBJECT1 2020-001A 12457	OBJ_TEST_0480-669A 0480-669A 51122	TCA: 2021-04-23T00:11:24Z	Scaled PoC: 2.533e-1 PoC: 1.507e-5	MD: 643.53 m RMD: 128.71 m	CA-20001A-80669A-202104230020	EUSST	
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EU SST

Dashboard | **Collision** | Re-entry | Fragmentation | Reporting | API | Support | testoperator2@testoperator2.com

Events | **Event Details** | Ephemerides | Service Configuration | SCD Form | Messages | L vs L screening

1 / 4

TEST OBJECT2
2020-001B | 12458
OBJ_TEST_0033-352A
0033-352A | 28754
Status: Debris
Size: Medium | HBR: 632.87 m
TCA: 2021-05-09T15:02:00Z
SPoC: 2.293e-1 MD: 400.50 m
PoC: 8.010e-1 RMD: 80.10 m
3 days

TEST OBJECT2
2020-001B | 12458
OBJ_TEST_3934-567A
3934-567A | 89362
Status: N/A
Size: N/A | HBR: N/A
TCA: 2021-04-21T00:22:05Z
SPoC: 5.003e-1 MD: 428.67 m
PoC: 8.574e-1 RMD: 85.73 m
3 days

TEST OBJECT1
2020-001A | 12457
OBJ_TEST_6481-985A
6481-985A | 38980
Status: N/A
Size: N/A | HBR: N/A
TCA: 2021-04-21T00:05:23Z
SPoC: 7.075e-1 MD: 464.13 m
PoC: 9.283e-1 RMD: 92.83 m
3 days

TEST OBJECT1
2020-001A | 12457
OBJ_TEST_7664-474A
7664-474A | 38071
Status: N/A
Size: N/A | HBR: N/A
TCA: 2021-03-29T11:54:40Z
SPoC: N/A MD: 33.77 m
PoC: 1.690e-1 RMD: 8.44 m
5 days

TEST OBJECT1
2020-001A | 12457
OBJ_TEST_5695-017A
5695-017A | 43685
Status: N/A
Size: N/A | HBR: N/A
TCA: 2021-03-19T19:04:24Z
SPoC: N/A MD: 155.37 m
PoC: 7.769e-1 RMD: 38.84 m
6 days

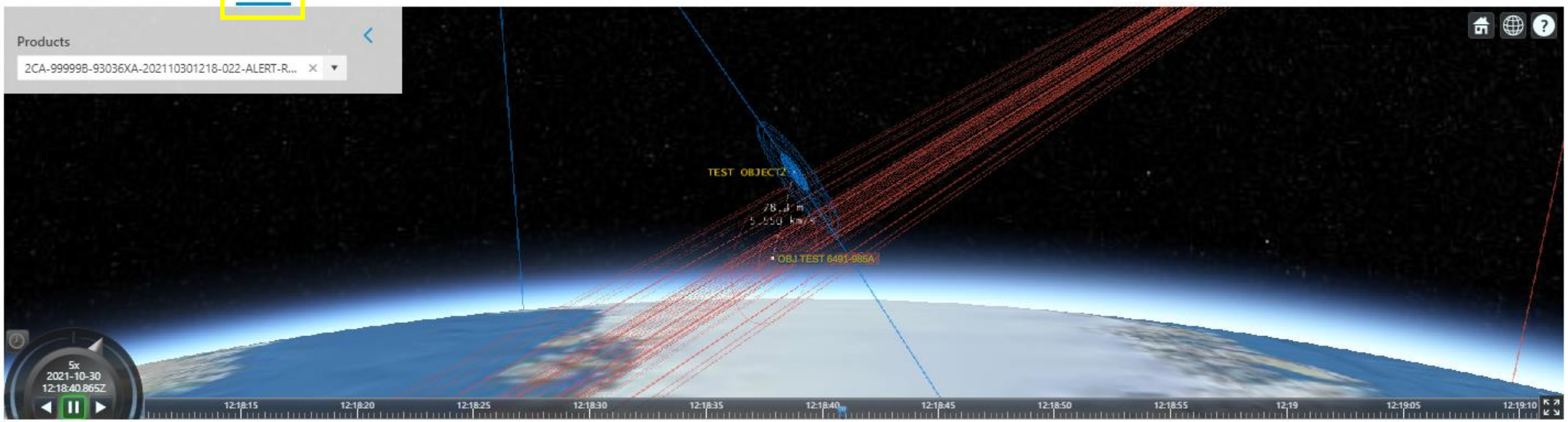
TEST OBJECT1
2020-001A | 12457
OBJ_TEST_4197-177A
4197-177A | 56546
Status: N/A
Size: N/A | HBR: N/A
TCA: 2021-03-07T10:38:08Z
SPoC: N/A MD: 35.71 m
PoC: 1.786e-1 RMD: 8.93 m
6 days

Event Timeline

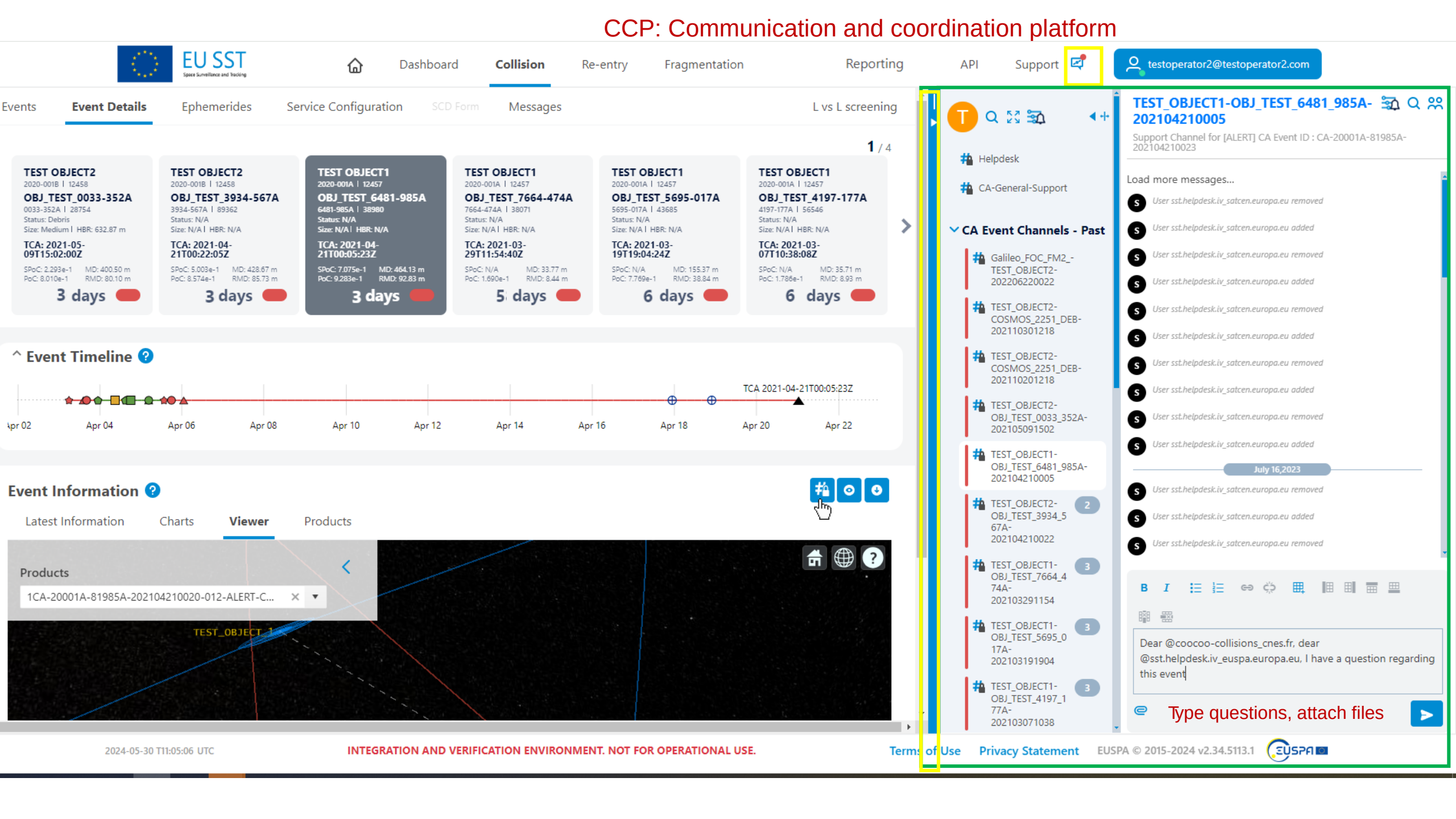
Event Information

Latest Information | Charts | **Viewer** | Products

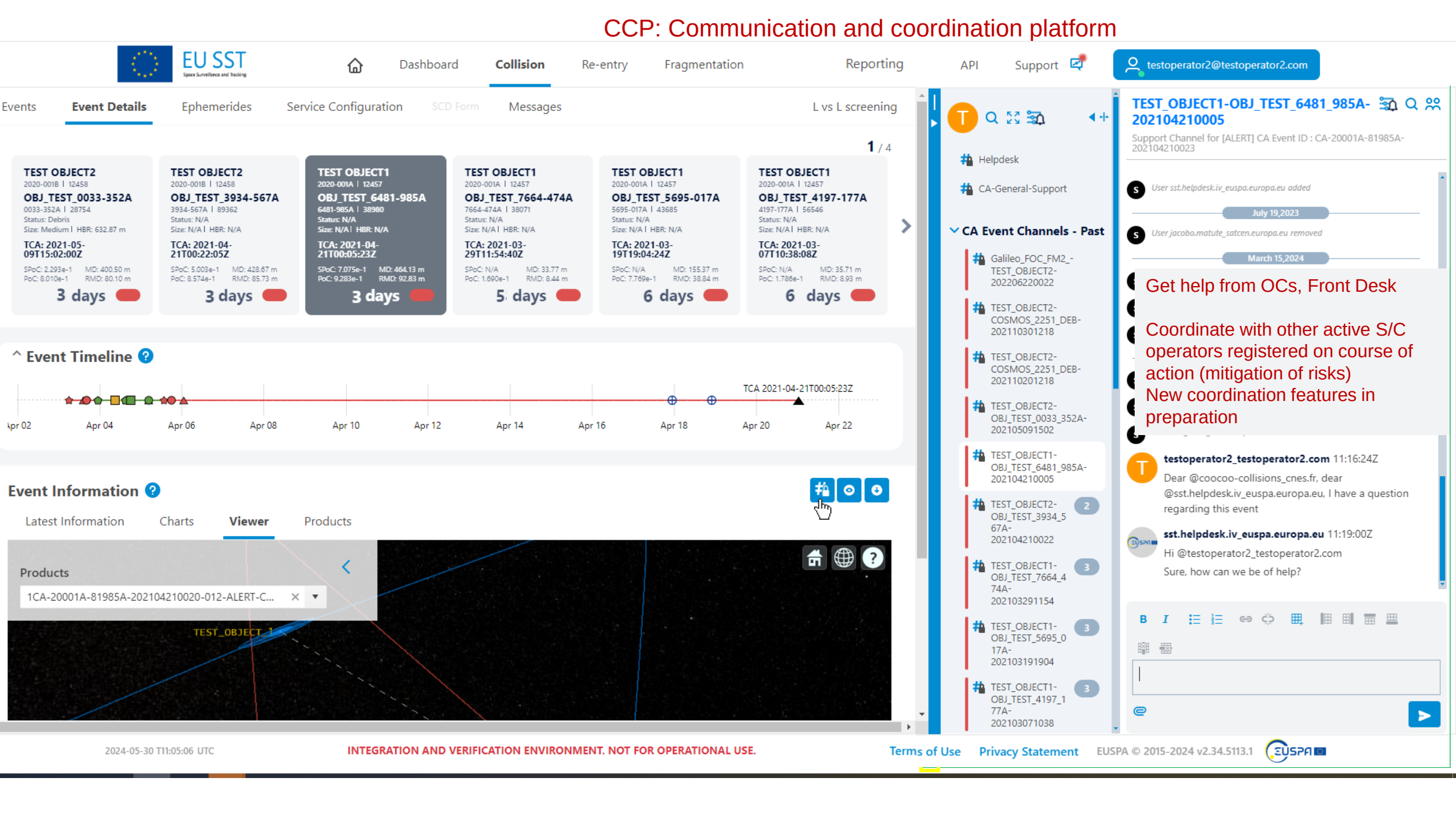
Conjunction viewer: 1 and 3 sigma ellipses



CCP: Communication and coordination platform



CCP: Communication and coordination platform



EU SST

Dashboard | **Collision** | Re-entry | Fragmentation | Reporting | API | Support | testoperator2@testoperator2.com

Events | **Event Details** | Ephemerides | Service Configuration | SCD Form | Messages | L vs L screening

1 / 4

TEST OBJECT2
2020-001B | 12458
OBJ_TEST_0033-352A
0033-352A | 28754
Status: Debris
Size: Medium | HBR: 632.87 m
TCA: 2021-05-09T15:02:00Z
SPoC: 2.293e-1 MD: 400.50 m
PoC: 8.010e-1 RMD: 80.10 m
3 days

TEST OBJECT2
2020-001B | 12458
OBJ_TEST_3934-567A
3934-567A | 89362
Status: N/A
Size: N/A | HBR: N/A
TCA: 2021-04-21T00:22:05Z
SPoC: 5.003e-1 MD: 428.67 m
PoC: 8.574e-1 RMD: 85.73 m
3 days

TEST OBJECT1
2020-001A | 12457
OBJ_TEST_6481-985A
6481-985A | 38980
Status: N/A
Size: N/A | HBR: N/A
TCA: 2021-04-21T00:05:23Z
SPoC: 7.075e-1 MD: 464.13 m
PoC: 9.283e-1 RMD: 92.83 m
3 days

TEST OBJECT1
2020-001A | 12457
OBJ_TEST_7664-474A
7664-474A | 38071
Status: N/A
Size: N/A | HBR: N/A
TCA: 2021-03-29T11:54:40Z
SPoC: N/A MD: 33.77 m
PoC: 1.690e-1 RMD: 8.44 m
5 days

TEST OBJECT1
2020-001A | 12457
OBJ_TEST_5695-017A
5695-017A | 43685
Status: N/A
Size: N/A | HBR: N/A
TCA: 2021-03-19T19:04:24Z
SPoC: N/A MD: 155.37 m
PoC: 7.769e-1 RMD: 38.84 m
6 days

TEST OBJECT1
2020-001A | 12457
OBJ_TEST_4197-177A
4197-177A | 56546
Status: N/A
Size: N/A | HBR: N/A
TCA: 2021-03-07T10:38:08Z
SPoC: N/A MD: 35.71 m
PoC: 1.786e-1 RMD: 8.93 m
6 days

Event Timeline

Event Information

Latest info: last product of a conjunction

CCP
View/download
reports/CDMS

Latest Information | Charts | Viewer | Products

Severity: ALERT
TCA: 2021-04-21T00:05:23Z

Primary

Primary Name	TEST OBJECT1
Int. Designator	2020-001A
NORAD ID	12457
Hard Body Radius	N/A

Secondary

Secondary Name	OBJ_TEST_6481-985A
Int. Designator	6481-985A
NORAD ID	38980
Hard Body Radius	N/A
Size	Small
Orbit Regime	LEO
Status	Debris

Conjunction Properties

Scaled PoC	1.776e-5	Miss Distance	78.29 m	Relative Velocity	5550.07 m/s
PoC	1.452e-5	Radial Miss Distance	-26.72 m	Radial R. Velocity	-15.07 m/s
PoC Method	AKELLAALFRIEND-2000	Transverse Miss Distance	-68.31 m	Transverse R. Velocity	-2059.43 m/s
Scale Factor KP/KS	2.00 / 1.32	Normal Miss Distance	27.37 m	Normal R. Velocity	-5153.81 m/s
Highest SPoC	1.776e-5	Min. Miss Distance	78.29 m	Apparent Incidence Angle	111.80°

Product Details

Severity	ALERT
Product ID	2CA-99999B-93036XA-202110301218-022-ALERT-REPORT
Autonomous	No

EU SST

Dashboard | **Collision** | Re-entry | Fragmentation | Reporting | API | Support | testoperator2@testoperator2.com

Events | **Event Details** | Ephemerides | Service Configuration | SCD Form | Messages | L vs L screening

1 / 4

TEST OBJECT2
2020-001B | 12458
OBJ_TEST_0033-352A
0033-352A | 28754
Status: Debris
Size: Medium | HBR: 632.87 m
TCA: 2021-05-09T15:02:00Z
SPoC: 2.293e-1 MD: 400.50 m
PoC: 8.010e-1 RMD: 80.10 m
3 days

TEST OBJECT2
2020-001B | 12458
OBJ_TEST_3934-567A
3934-567A | 89362
Status: N/A
Size: N/A | HBR: N/A
TCA: 2021-04-21T00:22:05Z
SPoC: 5.003e-1 MD: 428.67 m
PoC: 8.574e-1 RMD: 85.73 m
3 days

TEST OBJECT1
2020-001A | 12457
OBJ_TEST_6481-985A
6481-985A | 38980
Status: N/A
Size: N/A | HBR: N/A
TCA: 2021-04-21T00:05:23Z
SPoC: 7.075e-1 MD: 464.13 m
PoC: 9.283e-1 RMD: 92.83 m
3 days

TEST OBJECT1
2020-001A | 12457
OBJ_TEST_7664-474A
7664-474A | 38071
Status: N/A
Size: N/A | HBR: N/A
TCA: 2021-03-29T11:54:40Z
SPoC: N/A MD: 33.77 m
PoC: 1.690e-1 RMD: 8.44 m
5 days

TEST OBJECT1
2020-001A | 12457
OBJ_TEST_5695-017A
5695-017A | 43685
Status: N/A
Size: N/A | HBR: N/A
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SPoC: N/A MD: 155.37 m
PoC: 7.769e-1 RMD: 38.84 m
6 days

TEST OBJECT1
2020-001A | 12457
OBJ_TEST_4197-177A
4197-177A | 56546
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Size: N/A | HBR: N/A
TCA: 2021-03-07T10:38:08Z
SPoC: N/A MD: 35.71 m
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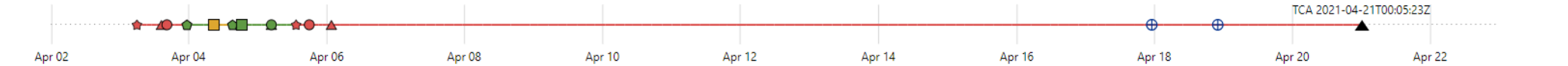
6 days

Event Timeline



Event Information

Latest Information | **Charts** | Viewer | Products

Interactive charts display conjunction evolution in a graphical way

Geometry History | Risk History | **Conjunction Plane** | PoC Sensitivity Analysis

Products

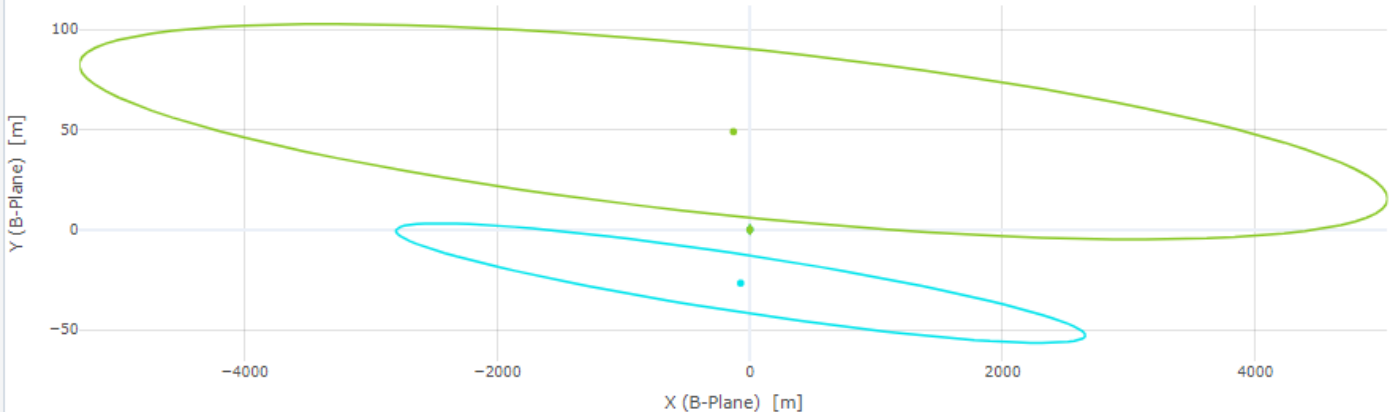
2 items selected

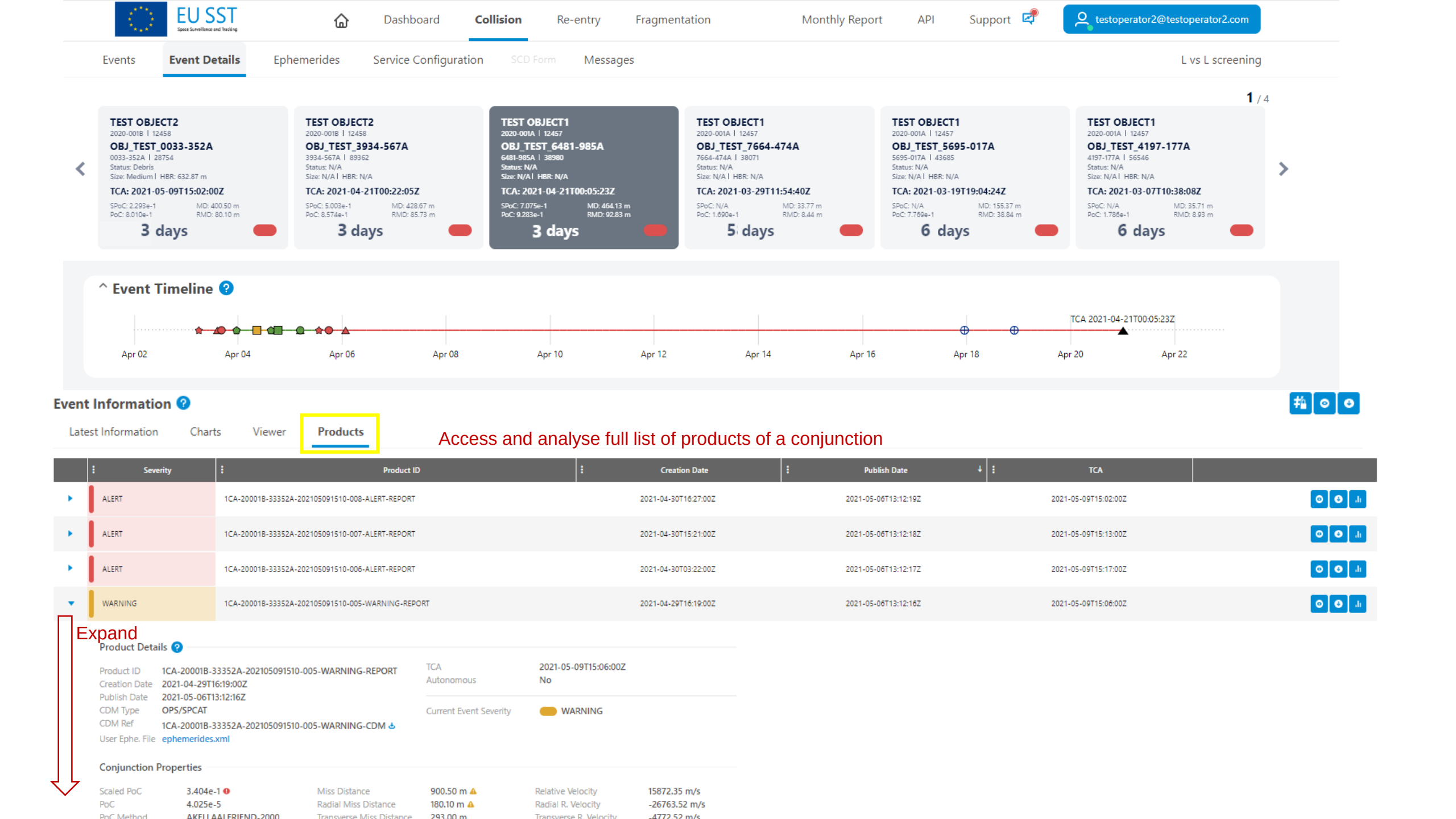
Compare multiple products

Selected products
- 2CA-99999B-93036XA-202110301218-009-ALERT-REPORT
- 2CA-99999B-93036XA-202110301218-022-ALERT-REPORT

Reset

Conjunction Plane

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SPoC: 2.293e-1
PoC: 8.010e-1
MD: 400.50 m
RMD: 80.10 m
3 days
TEST OBJECT2
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OBJ_TEST_3934-567A
3934-567A | 89362
Status: N/A
Size: N/A | HBR: N/A
TCA: 2021-04-21T00:22:05Z
SPoC: 5.003e-1
PoC: 8.574e-1
MD: 428.67 m
RMD: 85.73 m
3 days
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OBJ_TEST_6481-985A
6481-985A | 38980
Status: N/A
Size: N/A | HBR: N/A
TCA: 2021-04-21T00:05:23Z
SPoC: 7.075e-1
PoC: 9.283e-1
MD: 464.13 m
RMD: 92.83 m
3 days
TEST OBJECT1
2020-001A | 12457
OBJ_TEST_7664-474A
7664-474A | 38071
Status: N/A
Size: N/A | HBR: N/A
TCA: 2021-03-29T11:54:40Z
SPoC: N/A
PoC: 1.690e-1
MD: 33.77 m
RMD: 8.44 m
5 days
TEST OBJECT1
2020-001A | 12457
OBJ_TEST_5695-017A
5695-017A | 43685
Status: N/A
Size: N/A | HBR: N/A
TCA: 2021-03-19T19:04:24Z
SPoC: N/A
PoC: 7.769e-1
MD: 155.37 m
RMD: 38.84 m
6 days
TEST OBJECT1
2020-001A | 12457
OBJ_TEST_4197-177A
4197-177A | 56546
Status: N/A
Size: N/A | HBR: N/A
TCA: 2021-03-07T10:38:08Z
SPoC: N/A
PoC: 1.786e-1
MD: 35.71 m
RMD: 8.93 m
6 days
Event Timeline
TCA 2021-04-21T00:05:23Z
Apr 02
Apr 04
Apr 06
Apr 08
Apr 10
Apr 12
Apr 14
Apr 16
Apr 18
Apr 20
Apr 22
Event Information
Latest Information
Charts
Viewer
Products
Access and analyse full list of products of a conjunction
Severity
Product ID
Creation Date
Publish Date
TCA
ALERT
1CA-20001B-33352A-202105091510-008-ALERT-REPORT
2021-04-30T16:27:00Z
2021-05-06T13:12:19Z
2021-05-09T15:02:00Z
ALERT
1CA-20001B-33352A-202105091510-007-ALERT-REPORT
2021-04-30T15:21:00Z
2021-05-06T13:12:18Z
2021-05-09T15:13:00Z
ALERT
1CA-20001B-33352A-202105091510-006-ALERT-REPORT
2021-04-30T03:22:00Z
2021-05-06T13:12:17Z
2021-05-09T15:17:00Z
WARNING
1CA-20001B-33352A-202105091510-005-WARNING-REPORT
2021-04-29T16:19:00Z
2021-05-06T13:12:16Z
2021-05-09T15:06:00Z
Expand
Product Details
Product ID 1CA-20001B-33352A-202105091510-005-WARNING-REPORT
Creation Date 2021-04-29T16:19:00Z
Publish Date 2021-05-06T13:12:16Z
CDM Type OPS/SPCAT
CDM Ref 1CA-20001B-33352A-202105091510-005-WARNING-CDM
User Ephe. File ephemerides.xml
TCA 2021-05-09T15:06:00Z
Autonomous No
Current Event Severity WARNING
Conjunction Properties
Scaled PoC 3.404e-1
PoC 4.025e-5
Miss Distance 900.50 m
Radial Miss Distance 180.10 m
Relative Velocity 15872.35 m/s
Radial R. Velocity -26763.52 m/s

EU SST

Dashboard | Collision | Re-entry | Fragmentation | Monthly Report | API | Support | testoperator2@testoperator2.com

Events | Event Details | Ephemerides | Service Configuration | SCD Form | Messages | L vs L screening

Ephemerides upload

Uploaded Ephemerides

See screening status and number of CDMs

Manually or via API

Upload

Satellite Name	International Designator	Screening Status	Uploaded by User	Attachments	Description	Upload Date	Planned Maneuvers	
Galileo IOV-1 PFM	2011-060A	Screened (10)	Yes	3CA-19092E-98067A-202309012352-001-WARNING-REPORT.xml File Type: Other Size: 9881 b	dummy	2024-01-24T 15:00:33Z		
TEST OBJECT1	2020-001A	Not Screened		2CA-16011A-77065FR-202308180100-014-INFO-CDM.xml File Type: Cdm Size: 7285 b		2023-08-17T 09:15:47Z		
Galileo FOC FM2 (Galileo 6)	2014-050B	Not Screened	Yes	unix.opm File Type: Opm Size: 1161 b	test from API	2023-08-15T 14:28:03Z		
Galileo FOC FM2 (Galileo 6)	2014-050B	Not Screened	Yes	unix.opm File Type: Oem Size: 1161 b	unix.opm uploaded and selecting oem	2023-08-15T 14:00:51Z		
Galileo FOC FM3 (Galileo 7)	2015-017A	Not Screened	Yes	unix.opm File Type: Opm Size: 1161 b	test unix file with extension opm	2023-08-15T 13:47:21Z		
Galileo FOC FM3 (Galileo 7)	2015-017A	Not Screened	Yes	unix.txt File Type: Opm Size: 1161 b	upload aftr unzip	2023-08-15T 09:59:40Z		
Galileo FOC FM2 (Galileo 6)	2014-050B	Not Screened	Yes	unix.txt File Type: Opm Size: 1161 b	new unix test	2023-08-15T 09:57:35Z		
Galileo FOC FM2 (Galileo 6)	2014-050B	Not Screened	Yes	14016A_PRED_20230815_000021_20230822_235838_20230815_062519.opm File Type: Opm Size: 1121 b	Unix ascii file	2023-08-15T 09:54:18Z		
Galileo FOC FM2 (Galileo 6)	2014-050B	Not Screened	Yes	14016A_20230815_000021_20230822_235838_20230815_062519.oem File Type: Oem Size: 2400778 b 14016A_PRED_20230815_000021_20230822_235838_20230815_062519.opm File Type: Opm Size: 1165 b	Test both OEM and OPM in same upload	2023-08-15T 09:51:10Z		
Galileo FOC FM2 (Galileo 6)	2014-050B	Not Screened	Yes	14016A_PRED_20230815_000021_20230822_235838_20230815_062519.zip File Type: Opm Size: 739 b	ffddfafd	2023-08-15T 09:49:57Z		

Manoeuvres inside an OPM

Page 1 of 3 | 10 items per page

1 - 10 of 29 items

EU SST

Dashboard | Collision | Re-entry | Reporting | API | Support | testoperator2@testoperator2.com

Events | Event Details | Ephemerides | Service Configuration | SCD Form | Messages | L vs L screening

Service configuration

Notifications

Select if you want to receive notifications

Enable Notifications

Configure notifications: not at all, or for certain cases

Select the Severity and Type of Product for which you want to receive notifications:

Severity:

- [x] Alert
- [ ] Warning
- [ ] Info
- [ ] Not Applicable

Product type:

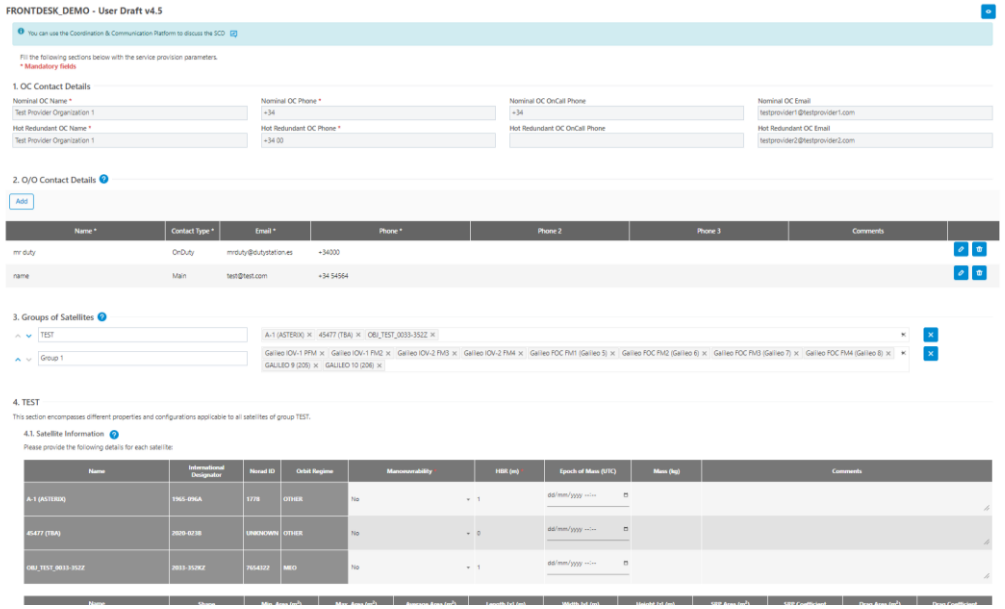
- [x] CDMs
- [x] CA Reports

Receive daily aggregation email

Save

Service Configuration Documents

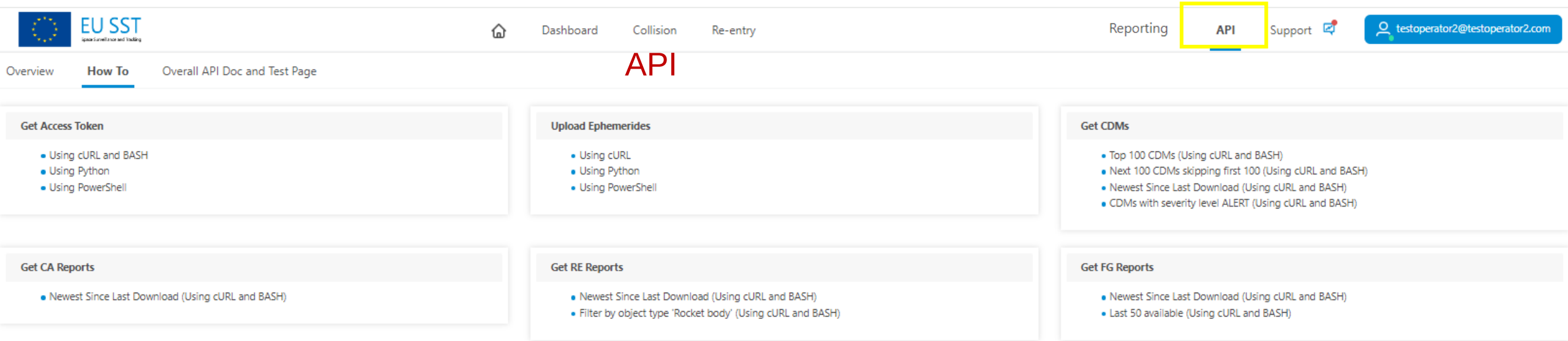
Version	Status	Issued
v4.5 - Current Version	User Draft	
v4.0 - Latest Final	Final	2024-02-22T15:47:39Z
v3.4	Final	2024-02-22T15:25:50Z
v3.3	Final	2024-02-22T15:21:49Z
v3.0	Final	2024-01-24T10:18:10Z
v2.2	Final	2024-01-10T14:54:58Z
v2.0	Final	2023-10-24T14:53:15Z
v1.1	Final	2023-10-24T14:50:47Z



Living document

Service Configuration Document (SCD) reflect agreements between EU SST and user on tailoring of service:

- Communication means
- Satellite details: Hard Body Radius, manoeuvrability…
- Thresholds: time to TCA, PoC, geometrical…
- Ephemerides upload frequencies, formats…



API

API:
Automation of most tasks
Front Desk can provide support in setting up scripts

verview How To **Overall API Doc and Test Page**

Select a definition v 2.2

EU SST Service Provision REST API 2.2

2.2 OAS3

https://portalusersapi-iv.eusst.eu/swagger/v2.2/swagger.json

This document describes the EU SST Service Provision Rest API, which is meant to be used by back-end servers or trusted parties. The API provides most of the functionality available in the portal.

Servers https://portalusersapi-iv.eusst.eu

Authorize

API test page

Test your desired calls to the various endpoints

Collision Avoidance Service

- GET /api/ca/cdm Retrieve the list of CDMs for the user.
- GET /api/ca/report Retrieve the list of Conjunction Reports for the user.
- GET /api/ca/cdm/{cdmId} Returns the cdm xml file for a certain id
- GET /api/ca/report/{reportId} Returns the Conjunction report for a certain report id

Collision Avoidance Service - Data Uploads

- POST /api/ca/data-upload Upload a data file associated to a specific S/C.
- GET /api/ca/data-upload Get all uploaded files' information applicable to the user.
- GET /api/ca/data-upload/{dataUploadId} Returns the data upload for a certain data upload id
- DELETE /api/ca/data-upload/{dataUploadId} Delete a specific file upload.

Collision Avoidance Service - Large vs. Large Conjunctions

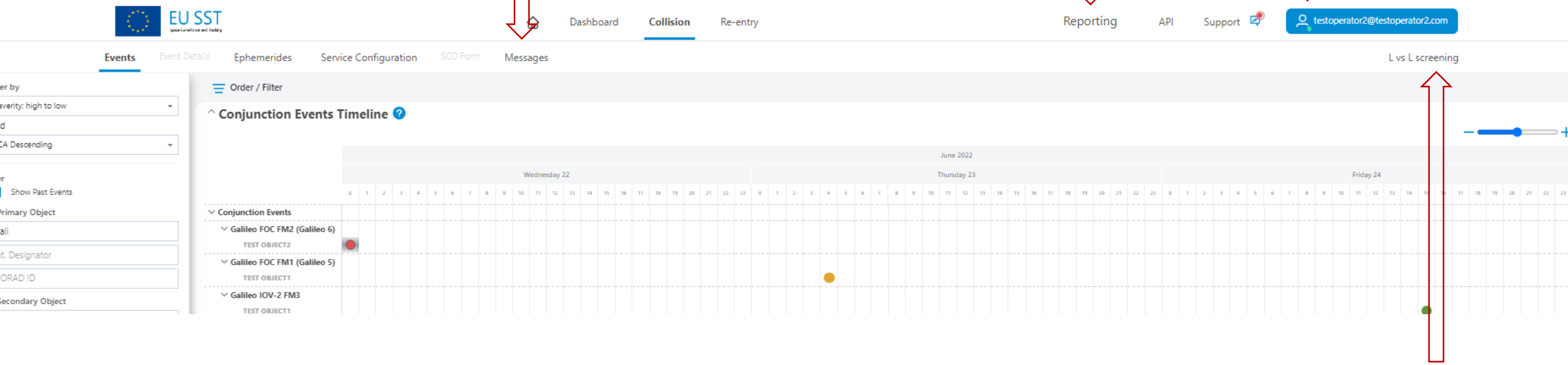
- GET /api/ca/lvsl/event Retrieve the list of LvsL Conjunction Events.
- GET /api/ca/lvsl/event({object}) Retrieve the list of LvsL Conjunction Events for a certain object.
- GET /api/ca/lvsl/event({object1})/with({object2}) Retrieve the list of LvsL Conjunction Events between two objects.
- GET /api/ca/lvsl/event/{eventId} Retrieve latest update of a certain LvsL Conjunction Event.
- GET /api/ca/lvsl/event/{eventId}/report Retrieve the list of LvsL Conjunction Reports for a certain event.

And more…

Messages exchanged with OCs

User reports with statistical info

Profile: change pwd, change contact details, get API credentials ADMIN feature



Large vs Large Public list of conjunctions

EU SST
Space Surveillance and Tracking

Ensuring space safety
and sustainability

Thank You

https://www.eusst.eu
Portal: https://portal.eusst.eu

PROGRAMME OF THE
EUROPEAN UNION