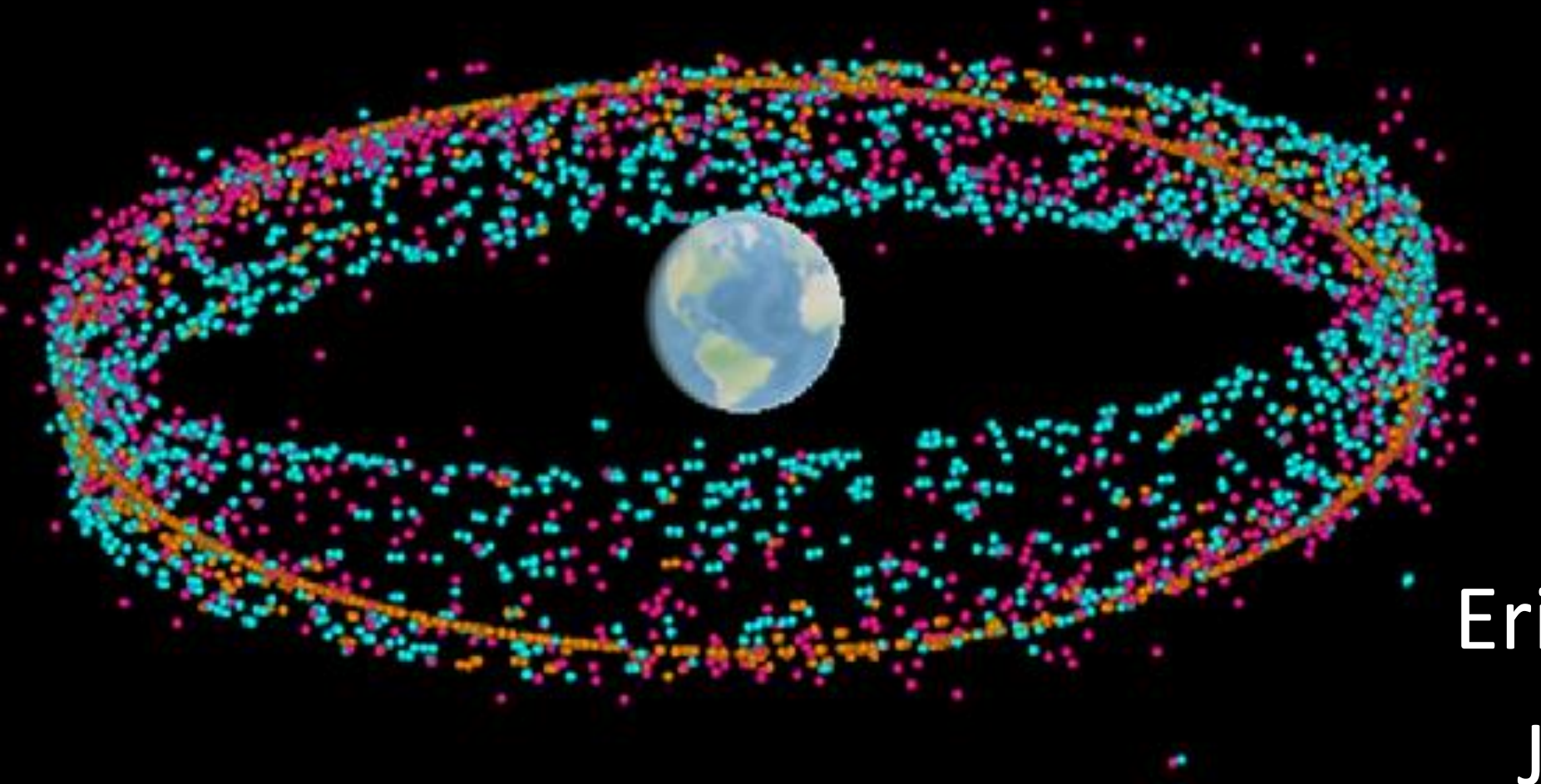
SDA among different SSA service providers: GEO perspective



Erika Rossetto

June, 2024

Current Organization

Chairman

Joe Chan
intelsat

Alex Cacioni
Inmarsat

Charles Law
SES

David Zamora
Eutelsat

Executive directors

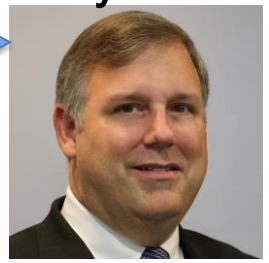
All SDA directors work with satellite operations

Lorenzo Arona
Avanti

Erika Rossetto
Claro

We have a great technical, legal and administrative Team

Andrew D'Uva
Strategy and Policy Advisor



Robert Hall
SDC Operations Manager

Dan Oltrogge
SDC Program Manager

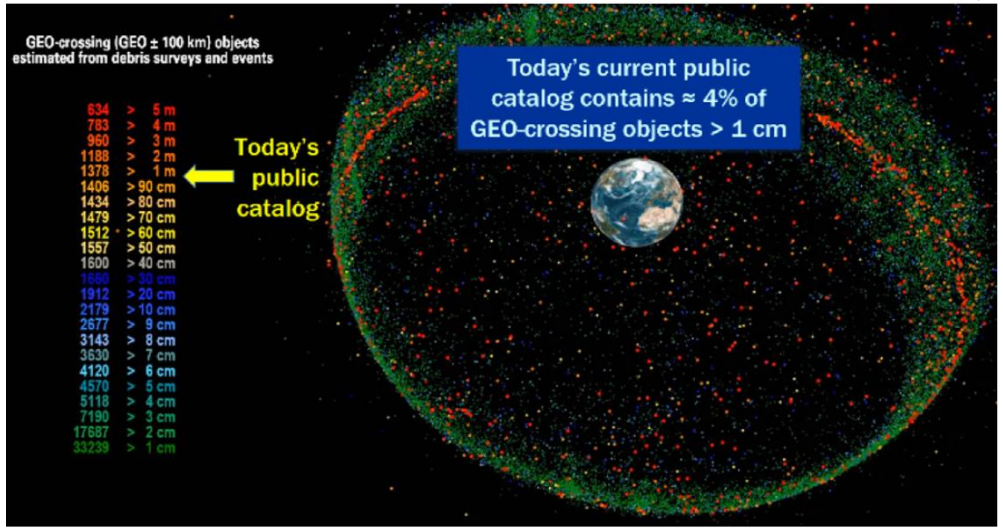
Marketing, social media and administrative support

RadicalMoves
Marketing and PR for broadcast and satellite industries

GEO scenario

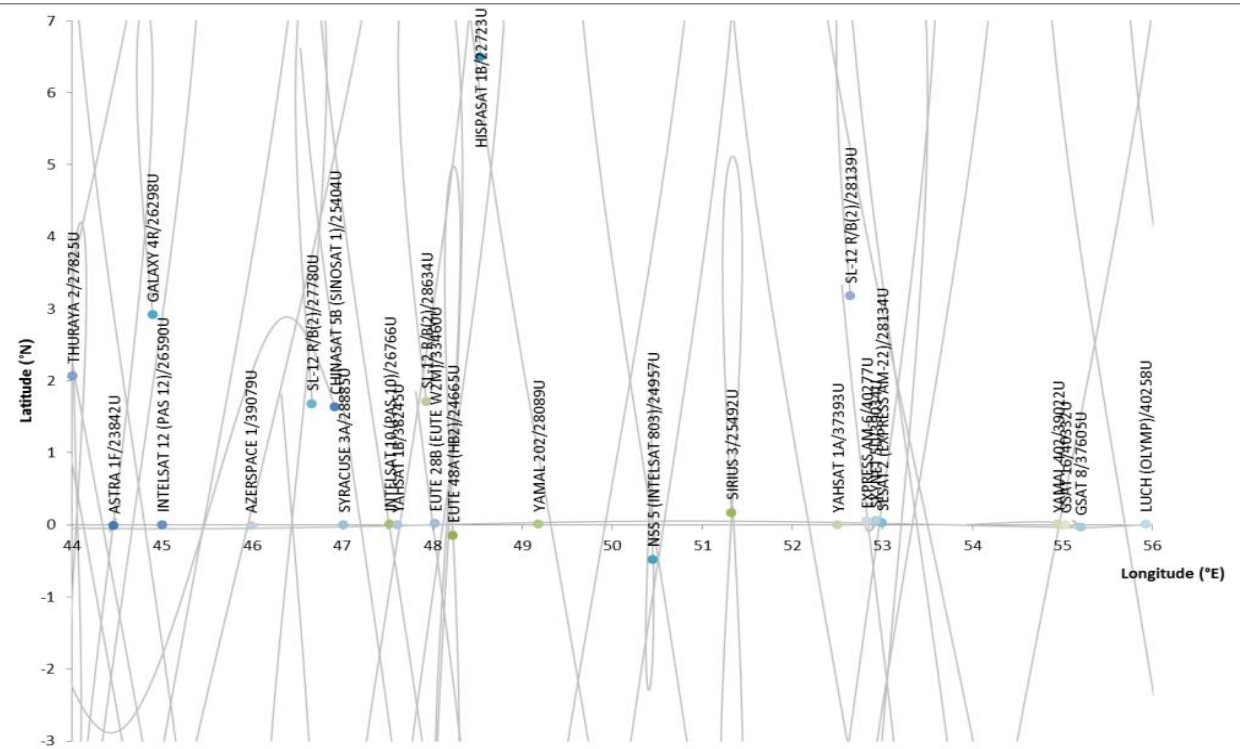
565 active GEO satellite ⇔ 253 are providing data to SDA;

1227 objects catalogued in GEO



Source: D.L.Oltrogge et al. at Acta Astronautica Volume 147, June 2018, Pages 316-345

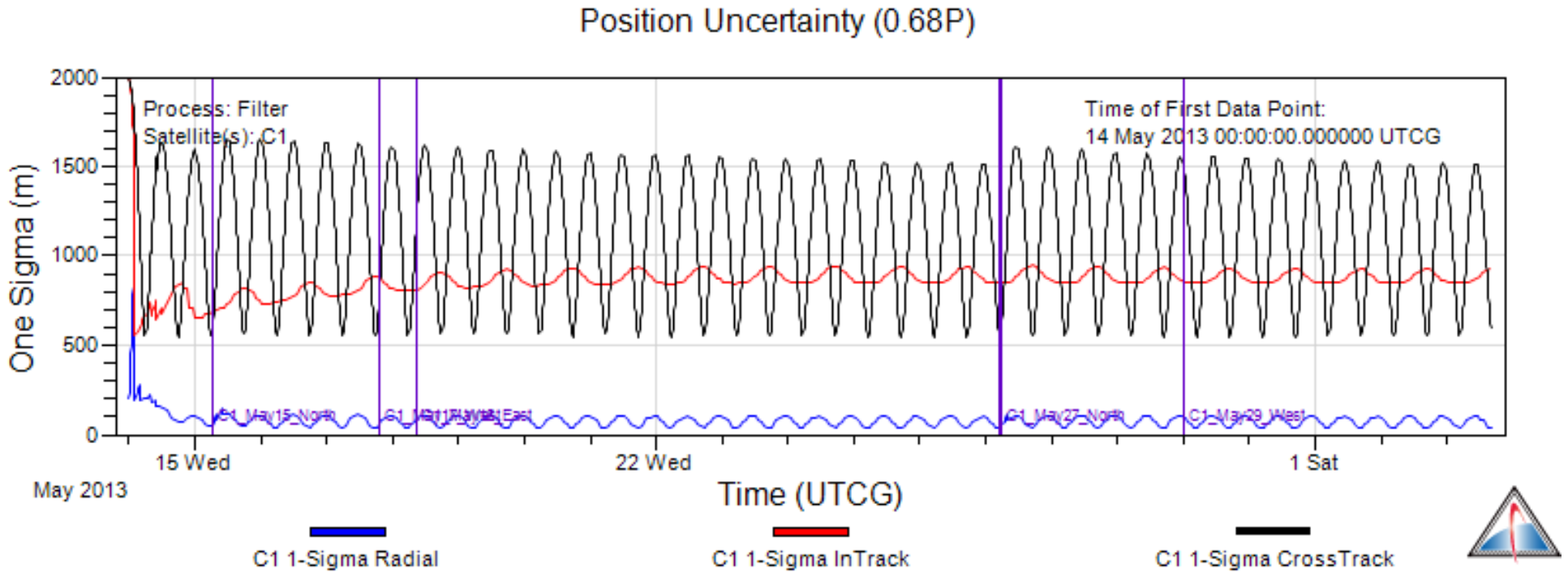
Even after reorbit, defunct satellites cross the GEO belt periodically



Source: Yahsat presentation at "First International CA Workshop em 2015."

SDA features

Support to identify issues in orbit determination process



SDA features

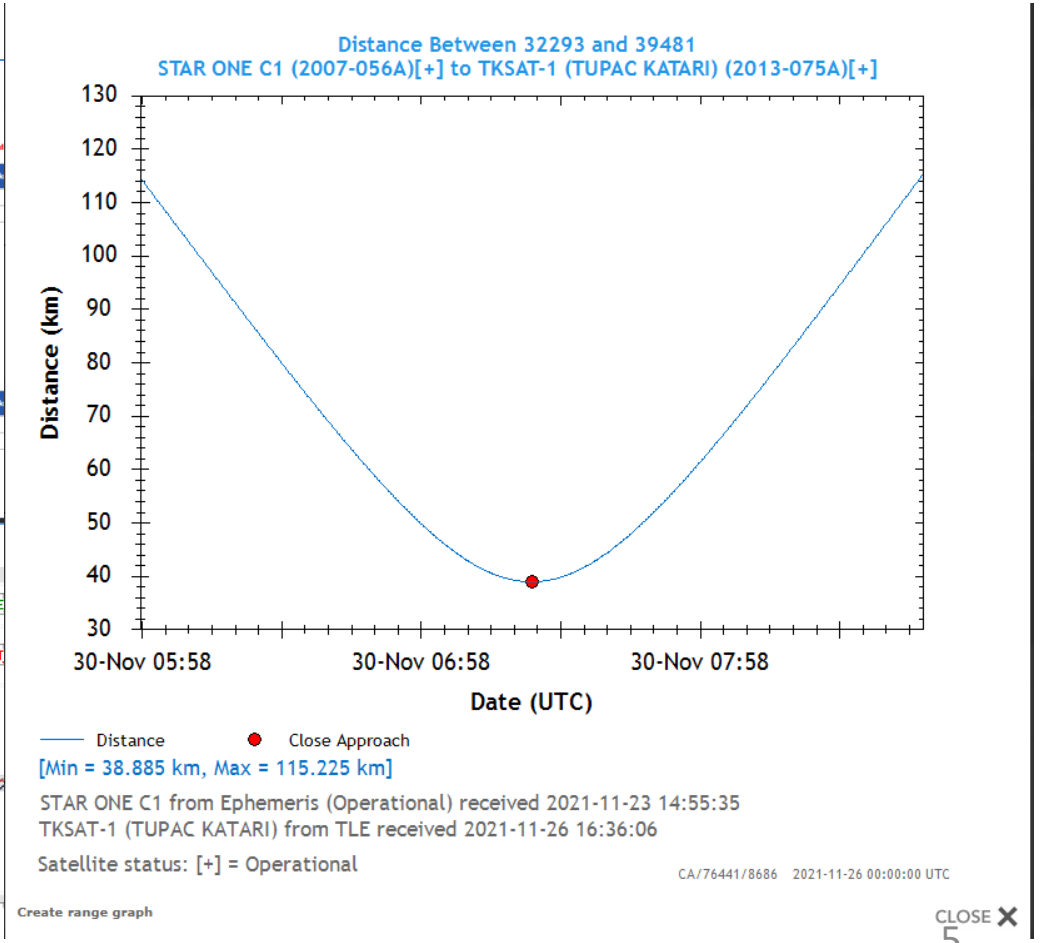
Conjunction Reports

Conjunction Reports

To view more items, click the page numbers at the bottom of the page.

ID	Source	Analysis Start Date (UTC)	Analysis Stop Date (UTC)	Status	# of Satellites
87137	Scheduled Run	2021-11-27 00:00:00.000	2021-12-04 00:00:00.000	Estimated start time: 2021-11-27 00:00:00	0
87135	Scheduled Run	2021-11-26 18:00:00.000	2021-12-03 18:00:00.000	Completed: 12 min 56 sec	23094
87132	Scheduled Run	2021-11-26 12:00:00.000	2021-12-03 12:00:00.000	Completed: 13 min 8 sec	23094
87130	Scheduled Run	2021-11-26 06:00:00.000	2021-12-03 06:00:00.000	Completed: 13 min 0 sec	23094
	Scheduled			Completed: 13 min 11	

	STAR ONE C1 (32293 | 2007-056A)		-38.0317	7.8155	2.1402	38.0919
	TKSAT-1 (TUPAC KATARI) (39481 | 2013-075A)		38.0301	-7.8074	-2.1969	38.0935
278830766	Start Date (UTC)	: 2021-11-30 06:57:33.595	Max Probability	:	2.64948331699495E-07	
	Time of Closest Approach (UTC)	: 2021-11-30 07:21:33.073	Duration (sec)	:	2876.4759	
	End Date (UTC)	: 2021-11-30 07:45:30.071	Minimum Range (km)	:	38.8854	
	Screening Threshold (m)	: 50000				



SDA features

CDM Analysis

Latest CDM Analysis Results for STARONE

As of 2021 Nov 24 12:23:13 UTC

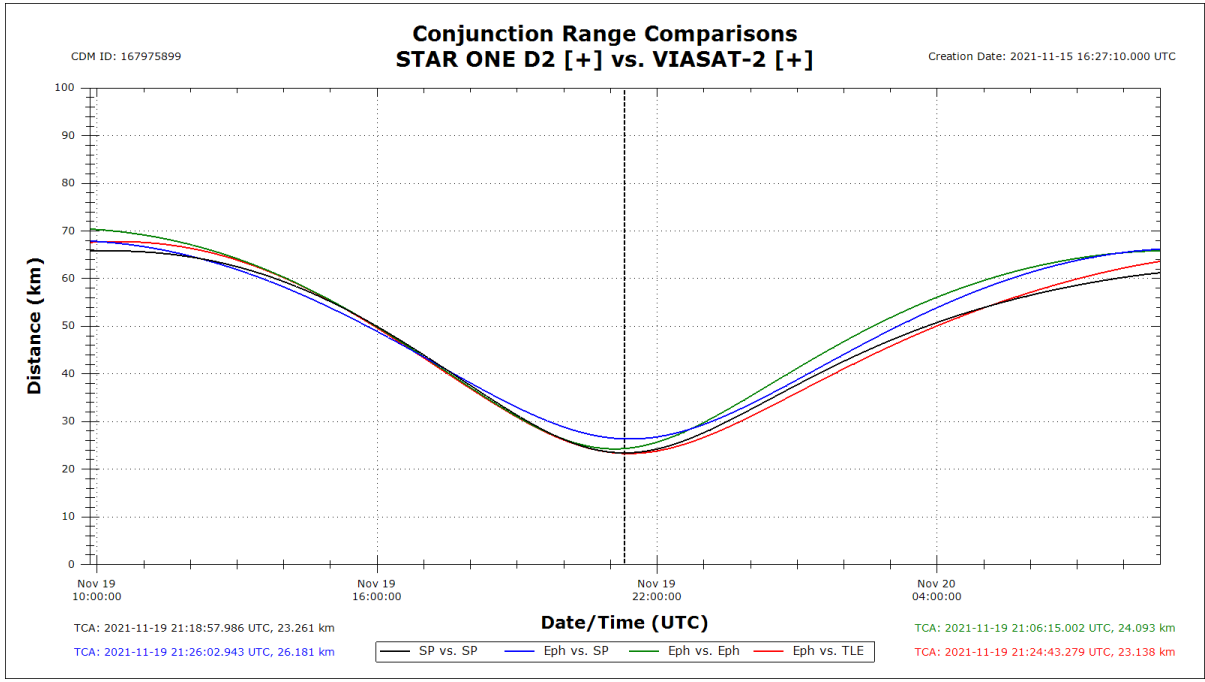
- 6 new CDMs
- 3 CDMs skipped because the TCA was past or beyond 7 days
- 3 CDMs analyzed
- No alerts, warnings, or cautions detected (best results)

Primary CDM Results	Secondary Best Results
49055/STAR ONE D2 [+]	42740/VIASAT-2 [+]
CDM TCA: 2021-11-28 20:25:36.426 UTC, 24.433 km [SvS]	Best TCA: 2021-11-28 20:42:16.531 UTC, 40.132 km [EvE]
CDM TCA: 2021-11-29 20:20:18.452 UTC, 21.637 km [SvS]	Best TCA: 2021-11-29 20:42:01.155 UTC, 37.457 km [EvE]
CDM TCA: 2021-11-30 20:15:05.971 UTC, 18.836 km [SvS]	Best TCA: 2021-11-30 20:41:40.100 UTC, 34.630 km [EvE]

Orbital data used for each CDM or Best result is shown as [AvB], where A is the data used for the primary object and B is the data used for the secondary object. The individual orbital data types are:

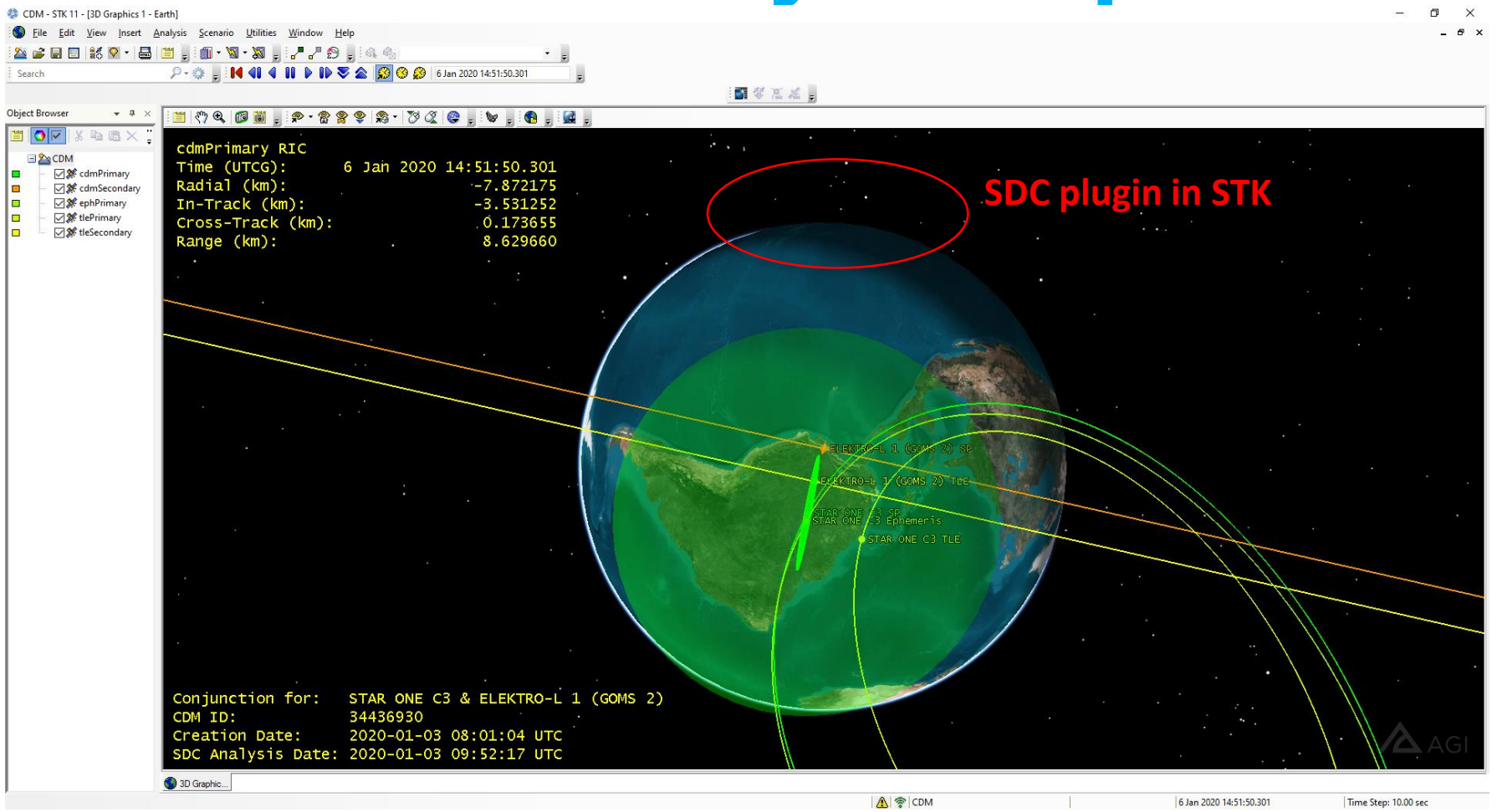
- S = SP state vector contained in the CDM
- O = Owner/Operator ephemeris used by 18 SPCS
- E = Ephemeris data uploaded by SDA operator to the SDC
- T = TLE data

For additional information on how to interpret and use these CDM Analysis Summaries, please see the CDM Analysis Tutorial.



SDA features

Extra CDM Analysis Option



Ephemeris vs SP Catalogue Screening

STARONE Status

Legend		
Alert	Warning	Caution

Detailed Results

Primary	Secondary
32293/STAR ONE C1 [+] [SDC: 5.54 days old]	48838/SXM-8 [+] [SDC: 1.54 days old]
	TCA: 2021-11-26 19:30:59.500 UTC, 49.597 km
40733/STAR ONE C4 [+] [SDC: 2.04 days old]	42740/VIASAT-2 [+] [SDC: 0.50 days old]
	TCA: 2021-11-23 03:30:46.471 UTC, 48.609 km
	TCA: 2021-11-24 01:55:58.081 UTC, 49.309 km
49055/STAR ONE D2 [+] [SDC: 3.54 days old]	42740/VIASAT-2 [+] [SDC: 0.50 days old]
	TCA: 2021-11-22 20:56:36.205 UTC, 39.780 km
	TCA: 2021-11-23 20:53:37.561 UTC, 39.580 km
	TCA: 2021-11-24 20:44:50.347 UTC, 39.353 km
	TCA: 2021-11-25 20:39:44.176 UTC, 43.841 km
	TCA: 2021-11-26 20:42:52.404 UTC, 49.138 km

For additional information on how to interpret and use these SDC SP Screening results, please see the SDC SP Screening Tutorial.

Robert Hall
SDC Operations Manager
COMSPOC Corp.

Current STARONE Status

As of 2021 Nov 27 15:40:20 UTC

Legend		
Alert	Warning	Caution

Recent Analysis Results					
Type	Report	Analyzed	Alerts	Warnings	Cautions
SP	2021-11-27 14:37:46 UTC	6	0	0	0
SP	2021-11-26 17:42:05 UTC	6	0	0	0
CDM	2021-11-26 00:17:35 UTC	0	0	0	0
SP	2021-11-25 14:41:56 UTC	6	0	0	0
CDM	2021-11-25 00:15:35 UTC	0	0	0	0
SP	2021-11-24 17:23:42 UTC	5	0	0	0
CDM	2021-11-24 17:22:32 UTC	0	0	0	0
CDM	2021-11-24 12:23:13 UTC	3	0	0	0
SP	2021-11-23 17:09:41 UTC	6	0	0	0
CDM	2021-11-23 15:26:23 UTC	5	0	0	0
SP	2021-11-22 14:43:52 UTC	8	0	0	0
SP	2021-11-21 14:33:03 UTC	8	0	0	0
CDM	2021-11-21 00:26:07 UTC	6	0	0	0
SP	2021-11-20 14:41:36 UTC	9	0	0	0

Ephemeris Data Status

Ephemeris Upload/Start Age (days)							
< 0	0–1	1–2	2–3	3–4	4–5	5–6	> 6

Ephemeris Stop (days)						
< 7	7–8	8–9	9–10	10–11	11–12	> 12

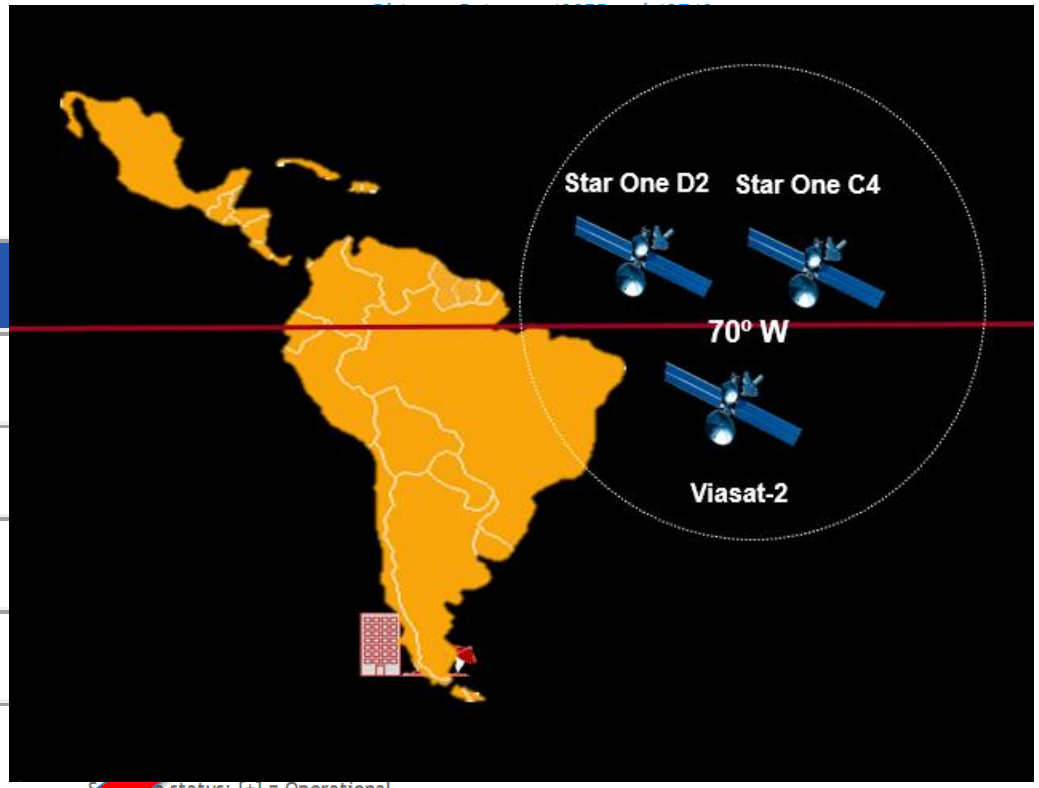
STARONE				Comparisons
Name	Catalog Number	Upload Time (UTC)	Ephemeris Start (UTC)	Ephemeris Stop (UTC)
STAR ONE C1	32293	2021 Nov 23 14:55:31	2021 Nov 23 00:00:00.000	2022 Jan 18 13:30:00.000
STAR ONE C2	32768	2021 Nov 26 00:28:15	2021 Nov 22 22:30:00.000	2021 Dec 22 22:30:00.000
STAR ONE C3	38991	2021 Nov 26	2021 Nov 26	2021 Dec 24

SDA features

Neighborhood Watch list, very helpful for colocated satellite

Neighborhood Watch

Primary Satellite	Neighbor Satellite
STAR ONE C3 (38991|2012-062A)	GOES 16 (41866|2016-071A)
STAR ONE C3 (38991|2012-062A)	SGDC (42692|2017-023B)
STAR ONE C4 (40733|2015-034B)	VIASAT-2 (42740|2017-029A)
STAR ONE D2 (49055|2021-069A)	VIASAT-2 (42740|2017-029A)



SDA features

Support during LEOP phase

Conjunction Analysis

Scheduled Conjunction Job: 82962
Analysis Start (UTC): 2021-08-08 12:00:00.000
Analysis End (UTC): 2021-08-15 12:00:00.000

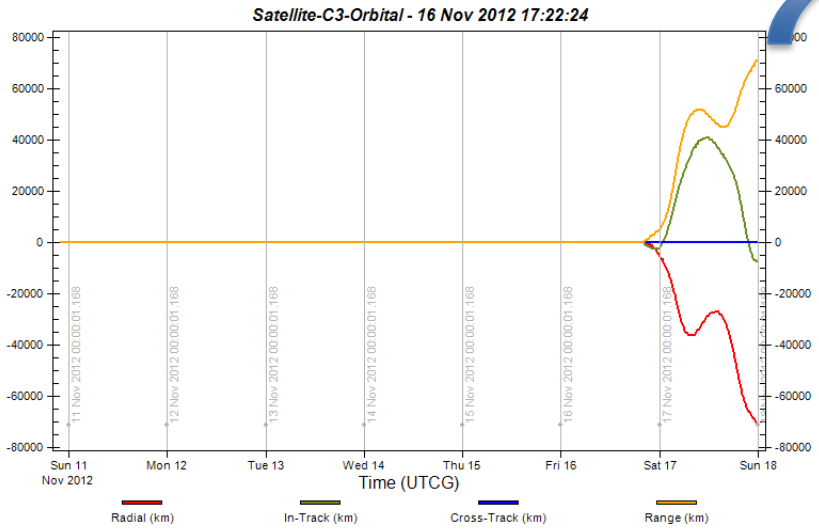
This Conjunction Job (ID 82962) contains ephemerides that did not span the entire analysis interval. Click here to view them.

Satellites	Cross-Track (km)	In-Track (km)	Radial (km)	Meridian (km)	Time of Closest Approach(UTC)	St En
Star One D2 Launch (77762|2021-7621)	-0.1153	-6.6124	-0.6717	0.6816	2021-08-08 17:07:09	20
STAR ONE D2 (49055|2021-069A)	0.1155	6.6125	0.6707	0.6806		20

Satellite Name
Star One D2 Lau
STAR ONE D2 (4

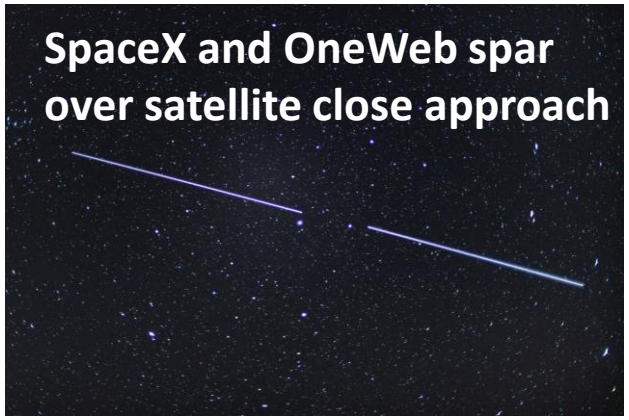
SDA features

Support during LEOP phase



Satellites	Cross-Track (km)	In-Track (km)	Radial (km)	Meridian (km)	Time of Closest Approach(UTC)	Start Date (UTC) End Date (UTC)	Duration (sec) Probability	Minimal Range (km)	Screening Threshold (m)
EUTELSAT 28A (26719|2001-011A)	3.1531	0.2316	-1.1959	3.3723	2012-11-13 07:23:01	2012-11-13 07:22:13	96.2902	3.3803	50000.0000
Star One C3 Launch (77760|2012-314L)	-3.1573	-0.1670	1.1957	3.3761		2012-11-13 07:23:49	1.159066E-006		

Satellite Name	Data Type	Last Upload	Name	Contact Phone	Contact E-mail
EUTELSAT 28A (26719|2001-011A)	Ephemeris	2012-11-02 14:59:58	Check Phonebook	Member POC	Member POC

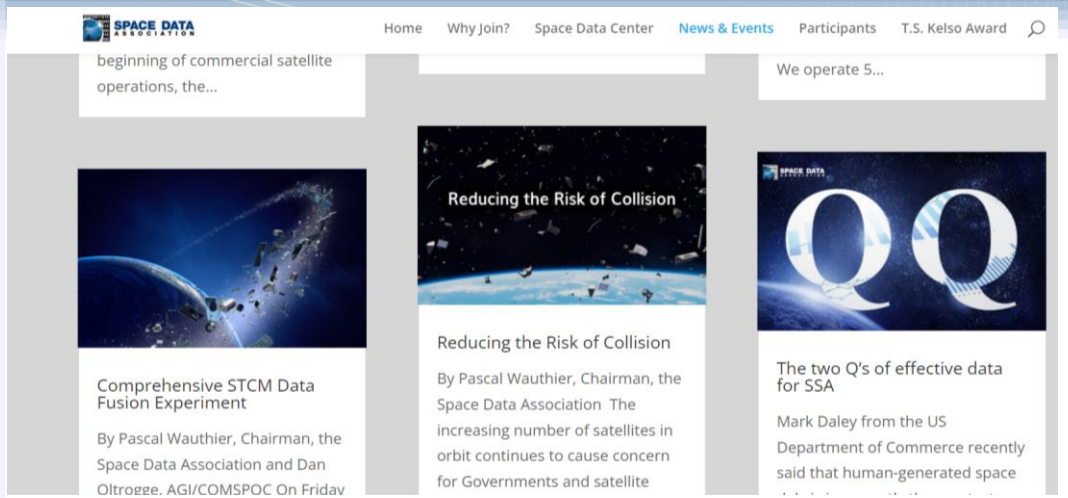


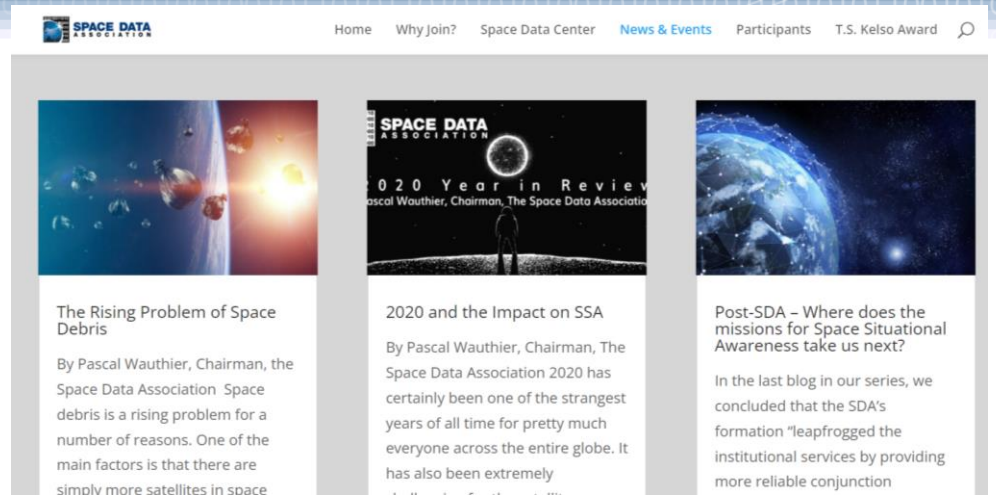
EUTELSAT 28B (33460 | 2008-065B)	32.0589	0.5865	25.202	40.7788
Star One C3 Launch (77760 | 2012-314L)	-32.0739	0.0057	-25.1896	40.783

Start Date (UTC) : 2012-11-13 07:24:18 Max Probability : 7.9625033316437-09

11

Discussion and education

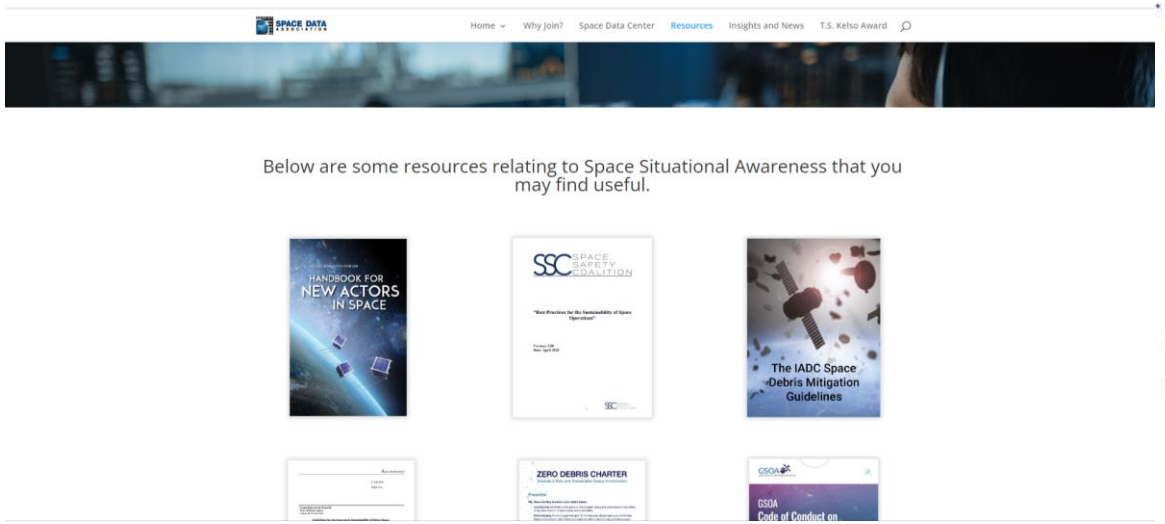


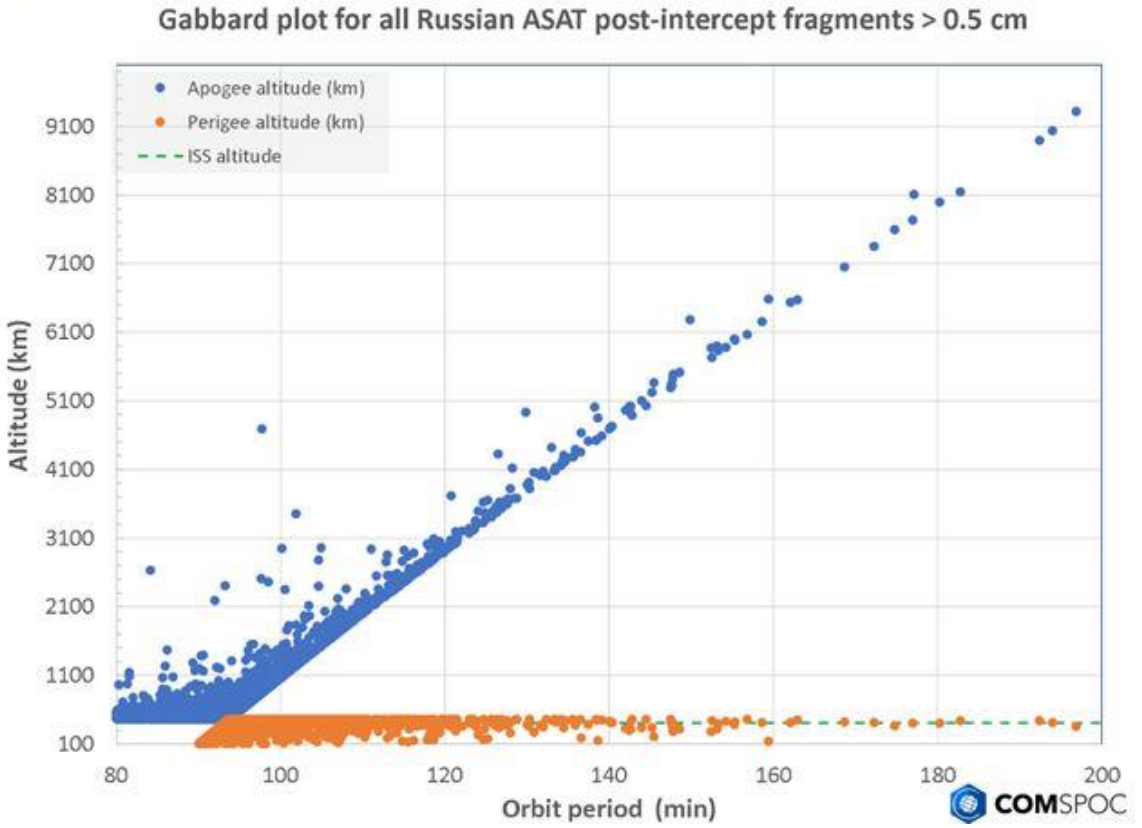


Honoring who has dedicated several Years to space safety

Yearly recognizing who is contributing to a better space environment

Discussion and education





Source:[COMSPOC NEWS - Ruminations and Analysis on a Russian ASAT]

Discussion and education

SPACE DATA ASSOCIATION

Home | Why Join? | Space Data Center | News & Events | Participants | T.S. Kelso Award

Space Domain Awareness: A Global Issue

The space industry is growing exponentially and the need for all space users to operate in a responsible way is greater than ever. Unlike land or sea mass on Earth, or even airspace, space is a global domain, and no one country or organization can fully regulate and monitor it. The industry currently relies on both government, and commercially provided space situational data to track satellites, dangerous debris, and military action in space. All of these systems have however not developed at the same pace as the space industry has expanded. This is an issue, not just because of the need to track and avoid an increased number of functional satellites in space, but also because as activity increases, so does the volume of

See more on SDA's Blog, Web Page and LinkedIn

Contributing with other initiatives

Office of Space Commerce

Helping U.S. businesses use the unique medium of space to benefit our economy

Home | About Us | Issues & Activities | Business with NOAA | Business with the Government | Policies | Regula

Home › SSA/STM › Public Comments on Basic SSA Services RFI

Public Comments on Basic SSA Services RFI

POSTED ON FEBRUARY 24, 2023 POSTED IN SSA/STM TAGGED WITH RFI

Below are the public comments received by the Office of Space Commerce in response to o
2023.

Comments are listed in the order of receipt. They are posted as PDFs.

1. ExoAnalytic Solutions
2. Anonymous
3. Inmarsat
4. Avanti
5. SES
6. Vyoma
7. Kayhan Space
8. Stratagem Group
9. HEO Robotics
10. Yahsat
11. BlueStaq
12. Spire Global
13. Palantir
14. Space Data Association
15. Secure World Foundation
16. General Dynamics Information Technology
17. KBR

SPACE DAT
ASSOCIATIO

Via Electronic Submission

February 27, 2023

United States Department of Commerce
National Oceanic and Atmospheric Administration
Office of Space Commerce
Attn: Richard DalBello, Director

In Re: *Request for Information on Scope of Civil Space Situational Awareness Services* iss
by the National Oceanic and Atmospheric Administration on January 26, 2023

Access to accurate, timely space situational awareness services are essential to ensuring continued safe space operations for all, preserving U.S. leadership, and enabling U.S. indus to make increasing use of space. The Space Data Association Limited ("SDA") is pleased to provide its response to the above-captioned Request for Information.

As further described below, SDA considers the planned Traffic Management System for Sp ("TraCSS") program services are critically important for flight safety and the long-term sustainability of the space environment. We applaud the U.S. Department of Commerce's ("DoC") vision in improving on the important services now being provided by the Departm of Defense ("DoD") and demonstrating ongoing leadership and commitment by the Unitec States in this area.

About the SDA

The SDA is an open, commercially operated, non-profit risk management entity dedicated safety of flight and space sustainability.[1] SDA's stakeholder participants are commercial, ci and military satellite operators who have invested tens of billions of dollars in satellites on and have come together to reduce the risk of satellite operations.

The SDA has been fully operational for almost twelve years now and was developed witho any government funds. The SDA's Space Data Center (SDC), operated by a U.S. commercia company, COMSPOC Corporation, has demonstrated reliability of more than 99.99% over twelve years. The SDA's "crowd-sourcing" model addresses proprietary and intellectual

Relationship of the Space Data Association to DoC and TraCSS

SDA has consistently stated that DoC should qualitatively improve on the legacy DoD products for SSA and conjunction assessment to enhance safety of flight. This is because "safety" is not DoD's mission nor the result of its public products. New space operational paradigms including proliferated LEO constellations, electric propulsion with its constant low-thrust maneuvers, on-orbit servicing, space tourism, and autonomous flight operations challenge legacy flight safety capabilities. The SDA has mined its conjunction data to determine that close approaches are occurring five times more often than just five years ago. This dramatic change is due to the ever-increasing presence of orbital debris, our improving knowledge of the hazardous debris already present in orbit, and a more than doubling of the active spacecraft population over these five years.

We have enjoyed an ongoing relationship with the Department of Commerce. The SDA helped conceive and conduct a data fusion exercise for Space Traffic Coordination and Management (STCM) in September 2020. NOAA, in its role as a weather satellite operator, participated in this exercise. Implemented and conducted in just four weeks, this STCM data fusion campaign demonstrated how commercial innovation and capabilities, in partnership with government data and participation, were able to achieve dramatic improvements in SSA knowledge. For example, accuracy improvements of between ten and fifty percent in Low Earth Orbit, tenfold

3

accuracy improvements in GEO, and as much as one thousand times improvements in the Launch and Early Orbit Phase of LEO missions were achieved. This study was unique in taking a requirements-based approach by assessing what positional accuracy requirements must be met to allow SSA data to meet the needs of operators and the way they conduct flight safety. The results of this rapid demonstration led us to conclude that such a government/industry partnership is not only effective, but imperative if we are to effectively address and facilitate enduring space sustainability.

In Summary…

- SDA is the only SSA organization formed by satellite operators;
- SDA provides a valuable service and support to its members for a long time counting on great heritage;
- SDA promotes education and important discussion to build a safer space environment;
- SDA continues to advocate for improvements to space safety and is involved in several initiatives.