TELECOM OPERATORS GROUND SEGMENT MARKET LEADERSHIP

ANY MISSION LEO/MEO/GEO/HEO

FROM ONE SATELLITE TO MASSIVE FLEETS

DAILY MONITORING FOCUS ON SAFETY

WE FIT TO CUSTOMER NEEDS

HALF OF THE TOP SATELLITE OPERATORS COUNT ON OUR PRODUTCS

Focusoc TEAM

Focusoc

A product by:

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INNOVATING SOLUTIONS

For more information about *Focusoc* services:
marketing-GMV-AD@gmv.com

Product Info at:
www.gmv.com/en/Products/focussuite

Focusoc

Focus operations centre for collision avoidance

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What is *Focusoc*?

GMV's *Focusoc* operations center provides safety of flight services based on the augmentation of the services currently provided by the 18SPCS (formerly JSpOC) as per a dedicated SSA Data Sharing Agreement signed in Q1 2017 between USSTRATCOM and GMV.
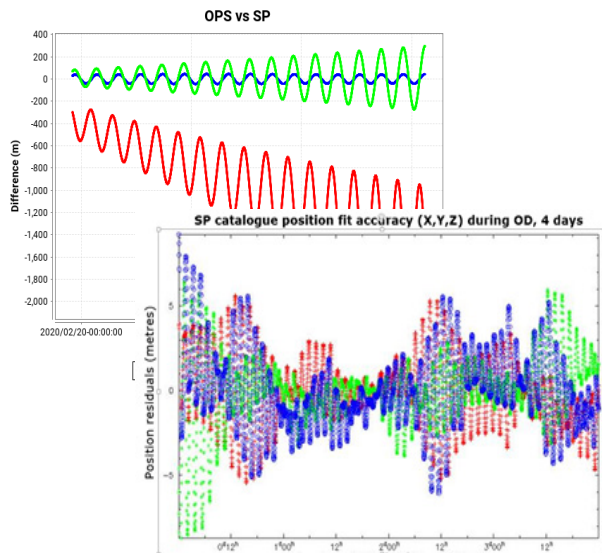
Conjunction Assessment (CA) & Collision Avoidance (COLA) services overcoming issues identified on the free-of-charge services from the 18SPCS:

- Use of GMV's operational *Focuscloseap* tool with O/O operational orbits provided and the 18SPCS SP catalogue, as a tool or as a service.
- Simplification of iterative process for COLA manoeuvre planning by avoiding having the 18SPCS in the loop for all screenings. **Automated** regular screenings against operational orbits, including SK and COLA manoeuvres.
- **18SPCS SP catalogue** is downloaded and **propagated** to extend its validity up to 2 weeks in order to anticipate upcoming CDMs, reducing urgency of operations.
- If needed, **data collection** for orbit refinement and risk reassessment from a large set of collaborating telescopes worldwide.

SP catalogue accuracy check

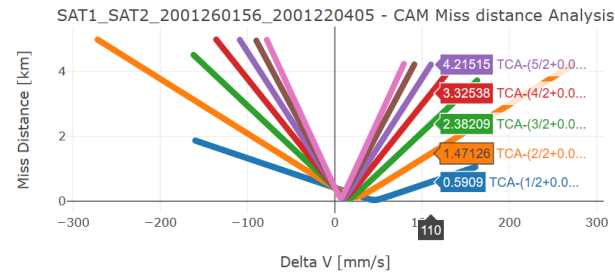GMV's **accuracy checks** on the SP catalogue

- Collection of optical data for GEO and POD data from **EU/ESA/EUMETSAT's Sentinel satellites** for LEO.
- Excellent OD solutions
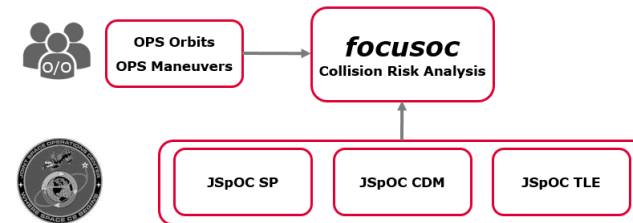- Main errors in along-track direction, low radial errors

OPS vs SP

SP catalogue position fit accuracy (X,Y,Z) during OD, 4 days

Focuscloseap FOR CA & COLA

Focuscloseap provided with the service, is GMV's operational COTS collision risk assessment tool part of GMV's *Focussuite* Flight Dynamics solution already present in a large number of telecom operators.

- *Focuscloseap* performs all Conjuncton Analysis operations for your fleet
- Includes middle-man processing (CDM handling)
- Generation of detailed plots for expert analysis
- Collision Avoidance Manoeuvre (CAM) assessment

SAT1_SAT2_2001260156_2001220405 - CAM Miss distance Analysis

- Multiple sources of orbital information:

- Generation of internal CDMs and summary reports

CONJUNCTION DETECTION REPORT

Execution Time : 2018/02/06-01:11:12.226
Report Interval Start : 2018/02/06-00:00:00.000
Report Interval End : 2018/02/20-00:00:00.000
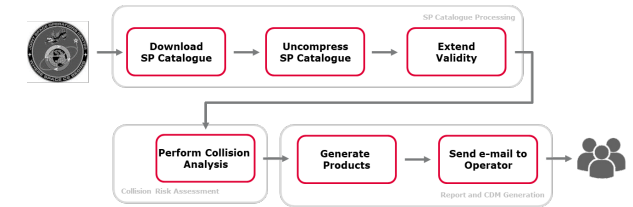**Number of detected conjunctions :** 9 Conjunctions

High risk conjunctions are marked in red :

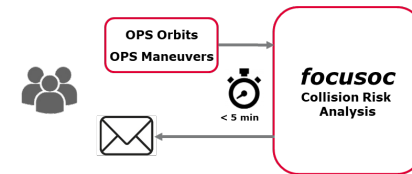| Id	Target	Chaser	Target Src/Age	Chaser Src/Age	TCA	Miss Dist (km)	Collision Prob	Max Collision Prob	Rad Dist (km)	Along Dist (km)	Cross Dist (km)	High Risk
511	SAT1	AMOS 5	OPS/ 0.0	CAT/ 0.0	2018/02/12-21:01:05	17.924	0.000E+000	2.700E-005	-7.575	-16.177	1.478	
512	SAT2	ARIANE 5 R/B	OPS/ 2.0	CAT/ 0.0	2018/02/12-22:38:27	35.206	0.000E+000	1.375E-005	16.988	-30.725	2.617	
513	SAT2	COSMOS 2085	OPS/ 2.0	CAT/ 0.0	2018/02/13-08:01:24	8.517	0.000E+000	5.682E-005	8.095	-2.625	-0.346	X
514	SAT3	GORIZONT 22	OPS/ 2.3	CAT/ 0.0	2018/02/13-08:58:13	40.326	0.000E+000	1.200E-005	-3.067	40.039	3.697	
515	SAT4	COSMOS 2085	OPS/ 5.0	CAT/ 0.0	2018/02/13-19:59:23	4.952	0.000E+000	9.773E-005	-4.429	2.196	-0.288	X
516	SAT4	COSMOS 2085	OPS/ 5.0	CAT/ 0.0	2018/02/14-07:57:26	21.462	0.000E+000	2.255E-005	8.197	-19.663	-2.610	
517	SAT5	RADUGA 21	OPS/ 0.0	CAT/ 0.0	2018/02/17-10:58:50	6.652	0.000E+000	7.275E-005	-3.794	-5.425	-0.660	X
518	SAT6	RADUGA 17	OPS/ 3.6	CAT/ 0.0	2018/02/17-13:59:34	41.842	0.000E+000	1.157E-005	-34.021	-24.212	-2.665	
519	SAT7	ARIANE 44LP R/B	OPS/ 2.9	CAT/ 0.0	2018/02/18-10:54:44	25.055	0.000E+000	1.932E-005	-3.795	-24.586	-2.980	

Focusoc key features

Cost-effective solution based on the exploitation of the precise 18SPCS SP catalogue

Automated execution as soon as new fresh SP catalogue is available, in order to have frequent updates of the situational awareness of the satellites

Short latency on Demand Analysis when required by the user, *Focusoc* provides immediate evolution of the risk of a given conjunction event

Expert support on a daily basis (e-mail and phone) by a dedicated team with a wide experience in Space Surveillance and Tracking, and Flight Dynamics

Collision risk assessment and warning including the submission of high risk conjunction and CDM

Characterization of close-conjunction events, including the computation of the collision probability.

Conjunction analysis process storage of results in the data-store, accessible through ftp

Analyses high-interest events by means of dedicated tracking campaign (on demand) and collision avoidance manoeuvres performance analysis

Sensors networks the solution proposed by GMV for the refinement of high risk conjunctions is based on the availability of a varying and flexible number of third party telescopes and radar data providers

Secure FTP is used within *Focusoc* so that users can upload orbit ephemeris to the service in a dedicated private account. GMV's FTP server uses SSL/TLS secure connection protocol to ensure the privacy of each operator's data.