spacetalk®

The global space traffic coordination platform

Zero Debris Booklet Implementation §4

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The Spacetalk company

Spacetalk SA is a private company registered in June 2023 in Switzerland.

The platform prototype was finalized at the end of 2023, and the project was presented to the COPUOS in February 2024.

2025 Geneva Center for Security Policy (GCSP) 1st Prize for Transformative Futures in Peace and Security.

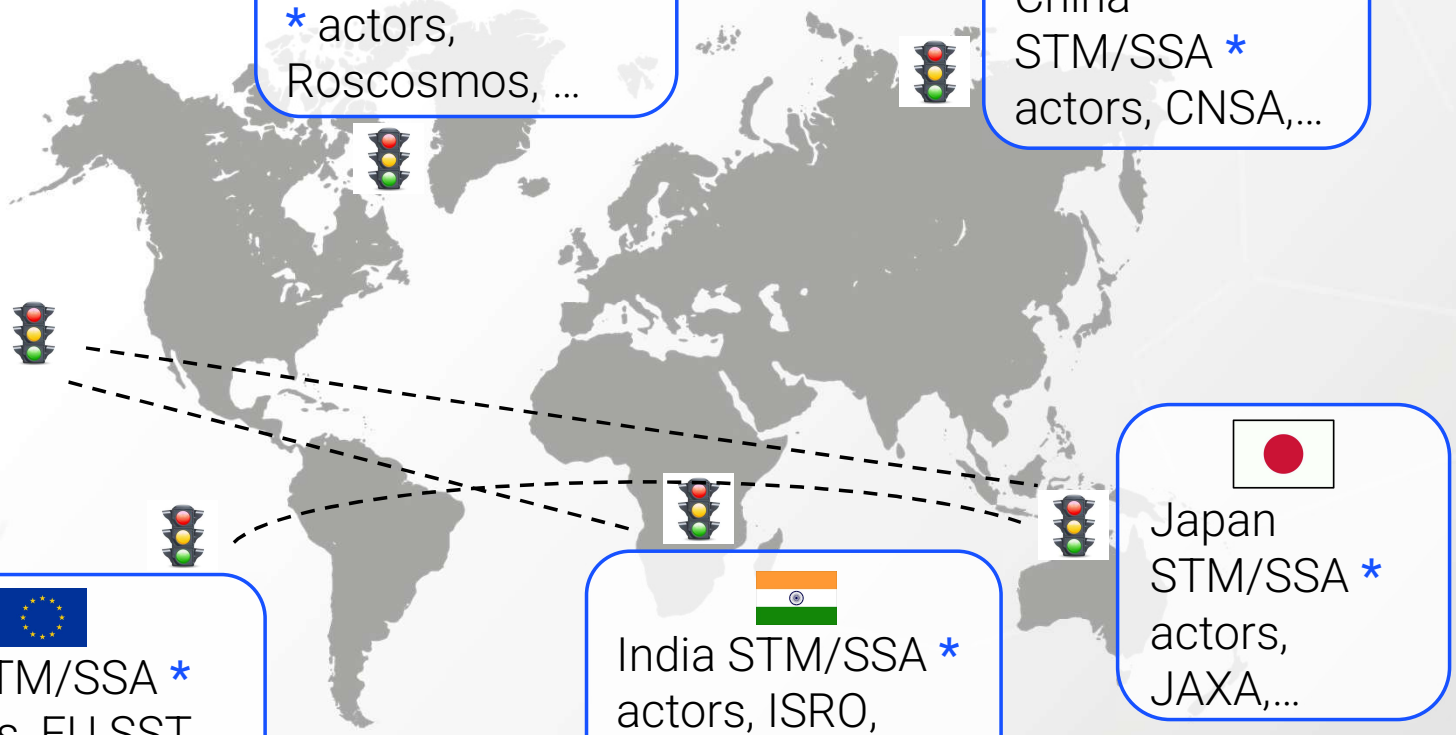
The platform MVP is scheduled to launch in August 2025.

www.spacetalk.ch

§4. Improve Space Traffic Surveillance and Coordination

With the increasing number of space objects being launched, space traffic coordination will play an essential role in ensuring sustainable operations. ***Routine and transparent information sharing****, along with active participation of spacecraft operators, is a fundamental requirement for efficient and timely collision avoidance operations.*

Current situation of Space Traffic Coordination (STC)



USA STM/SSA * actors, Space-Track, TraCSS, SDA, …

Russia STM/SSA * actors, Roscosmos, …

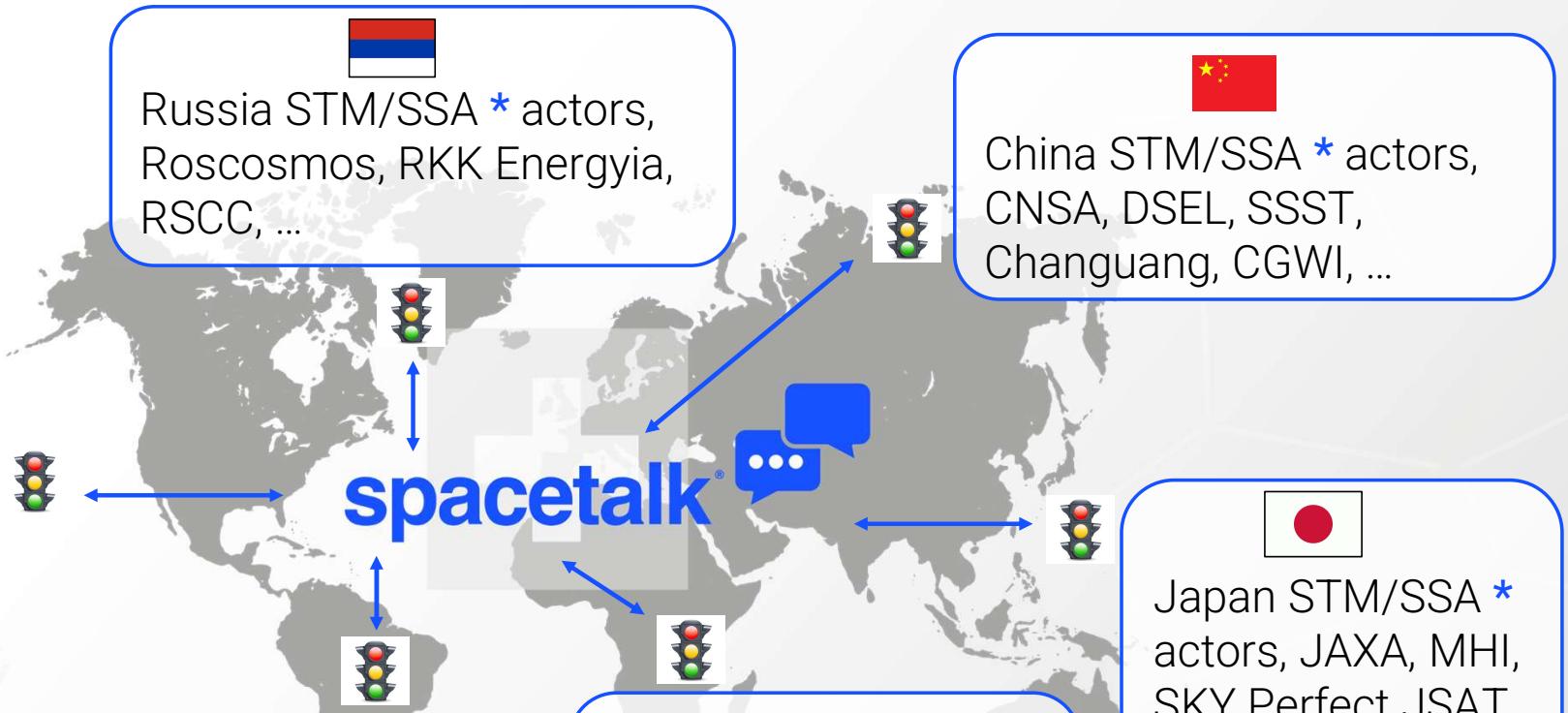
China STM/SSA * actors, CNSA,…

EU STM/SSA * actors, EU SST, ESA,…

India STM/SSA * actors, ISRO, NSIL, …

Japan STM/SSA * actors, JAXA,…

Objective > Enable the dialogue among ALL space stakeholders



Russia STM/SSA * actors, Roscosmos, RKK Energyia, RSCC, …

China STM/SSA * actors, CNSA, DSEL, SSST, Changuang, CGWI, …

USA STM/SSA* actors
NASA, SpaceX, Amazon Kuiper, Intelsat, …

Japan STM/SSA * actors, JAXA, MHI, SKY Perfect JSAT, …

EU STM/SSA * actors, ESA, EU SST, Arianespace, Eutelsat, IRIS, …

India STM/SSA * actors, ISRO, NSIL, Reliance Jio, Bharti Airtel, …

Building Trust trough Sound Governance

I. Diplomatic & legal approach

Managed by a Swiss company ensuring **transparency and neutrality**.

A platform where Members manage and share space data to mitigate their liability in Outer Space on their own initiative.

A Common Technical Denominator

II. Technical approach: a digital platform…

1. …providing **operational points of contact** for all space objects.
2. …centralising only the closely monitored (Know Your Customer) **Directory of space operators** and **Inventory of space objects**.
3. …enabling the **sharing of space objects' trajectories, status and operations** with all or a defined group of actors.
4. …available in **7 languages**, compatible with all **data communication standards** with an **open API**.
5. **…where the administrator (Spacetalk) is not in charge of trajectory analysis → Members are responsible for providing orbital data and for analyzing trajectories**.

Members

A system addressed to:

- Satellite operators and launch service providers.
- Space Situational Awareness (SSA) and Space Traffic Management (STM) actors.
- Space agencies and governmental entities
- Relevant international organizations (ITU, COPUOS) and regulatory bodies.
- Space forces.
- Academics (astronomers, scientists).
- Insurers and other commercial space traffic stakeholders.

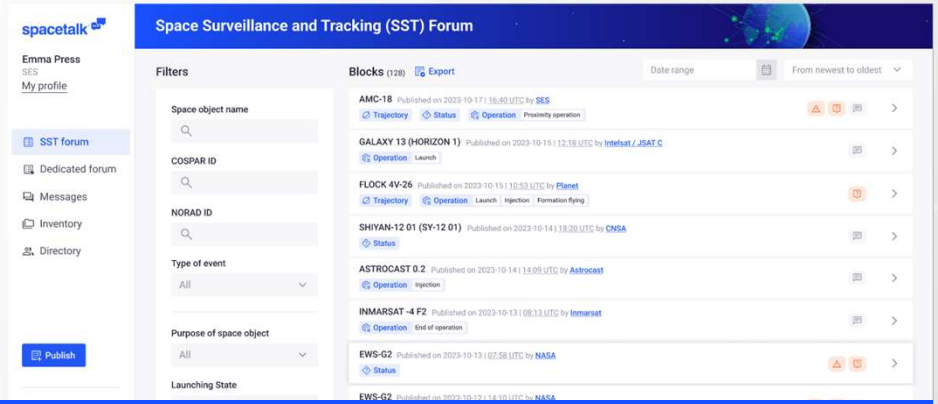
4.1. Improve Space Traffic Coordination and Information Sharing

A. Closer international collaboration for transparency in data and intent despite geopolitical/linguistic uncertainties

Key Enablers:

i. (…)

*ii. Establishment of an **international coordination system** which can support **data sharing**, ensure **interoperability**, and facilitate **multi-language** coordination.*



→ An international space traffic coordination system **for all space traffic stakeholders**, without exception.

→ Supporting **7 languages**.

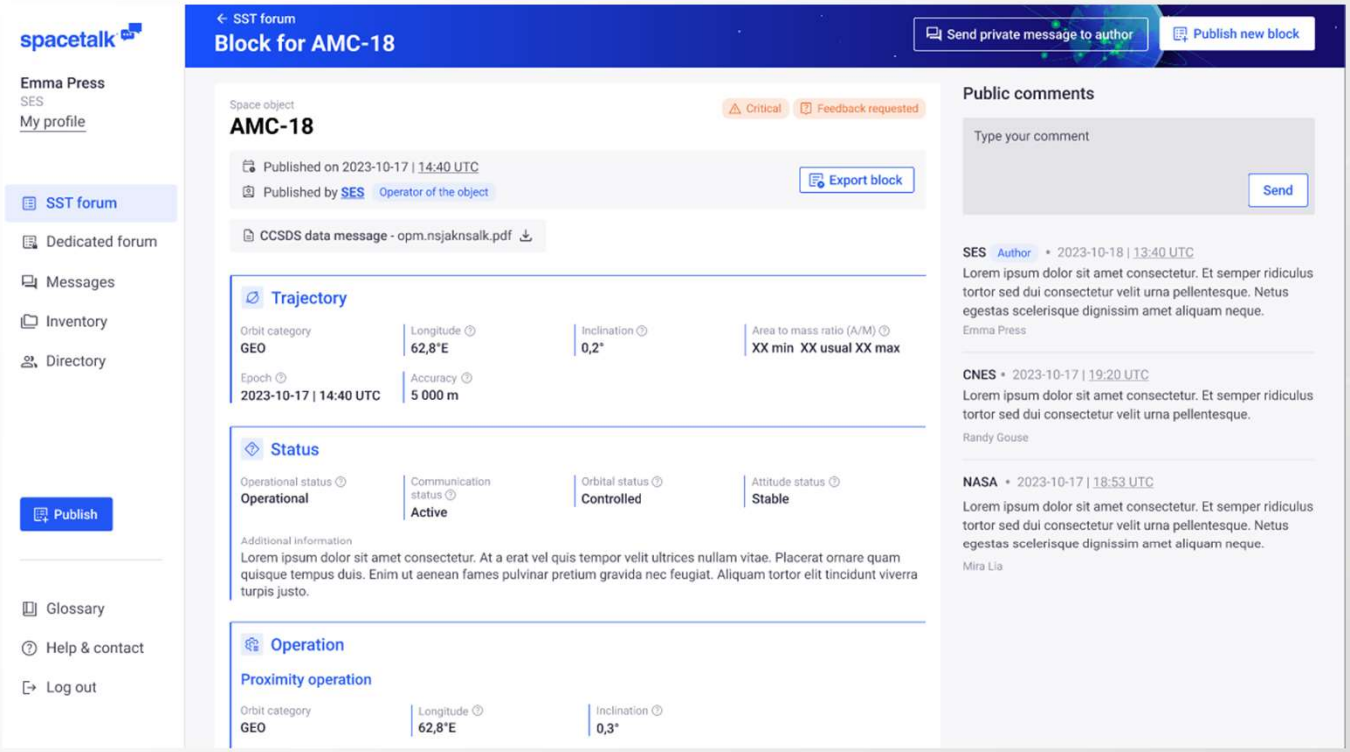
→ **Interoperability** ensured through open API and compatibility with all space data sharing communication standard (e.g. CCSDS, TLE, …).

4.1. Improve Space Traffic Coordination and Information Sharing

A. Closer international collaboration for transparency in data and intent despite geopolitical/linguistic uncertainties

Key Enablers:

*i. Adoption of **standardised guidelines** (e.g. CCSDS) with defined **standards** on manoeuvring rules, data exchange (ephemeris, manoeuvre plans, Spacecraft attitude States), uncertainty assessment (e.g. uncertainty realism), methodologies, and **catalogue** information.*



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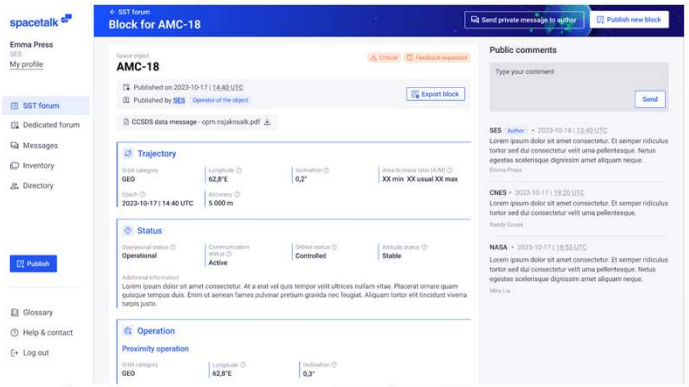
A. Closer international collaboration for transparency in data and intent despite geopolitical/linguistic uncertainties



→ **Creation of an orbital data standard named "Space Surveillance and Tracking Block"** (SST Block).

→ Covering Trajectory (ephemeris), Status (manoeuvre capacity, attitude) and Operation (manoeuvre plans such as proximity operation, re-entry, etc.) + catalogue information.

→ Compatibility (translating) with all space data communication standard (e.g. CCSDS, TLE, ...).

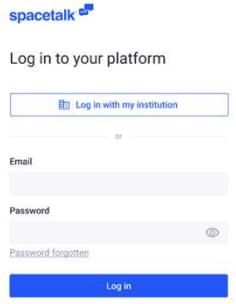
► Hands-off! not covering manoeuvring rules or methodologies (Private Forum & partners).

4.1. Improve Space Traffic Coordination and Information Sharing

B. Improved communication, both between space surveillance segments and ground segments, as well as between parties involved in Conjunctions

Key Enablers:

*i. Standardised infrastructure for the sharing of data which is **safe, secure**, and with both **centralised and distributed** infrastructures to enable automation, low latency and high service availability.*



→ Platform hosting in Switzerland.

→ **Secured access** provided by WISeKey Switzerland SA.

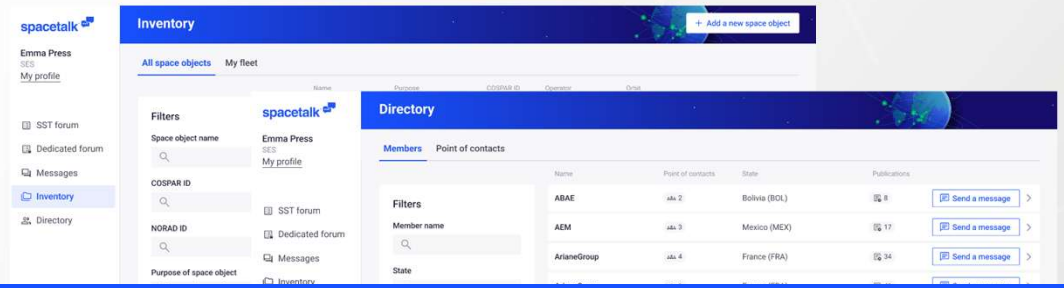
→ Open API, 24/7 customer support.

4.1. Improve Space Traffic Coordination and Information Sharing

B. Improved communication, both between space surveillance segments and ground segments, as well as between parties involved in Conjunctions

Key Enablers:

ii. ***Standardised data infrastructure*** *for the sharing of operational information, particularly operators'* ***contact detail, operational information*** *(mission phase, spacecraft status, manoeuvre notification, manoeuvre/operator capability) and validated* ***spacecraft characteristics*** *and* ***operators' capabilities****.*



→ Closely monitored and detailed (KYC):

- **Inventory** (catalogue) of space objects.
- **Directory** of space actors (Members) with Points of Contact (PoC).

→ Standard through SST Block (previous slide).

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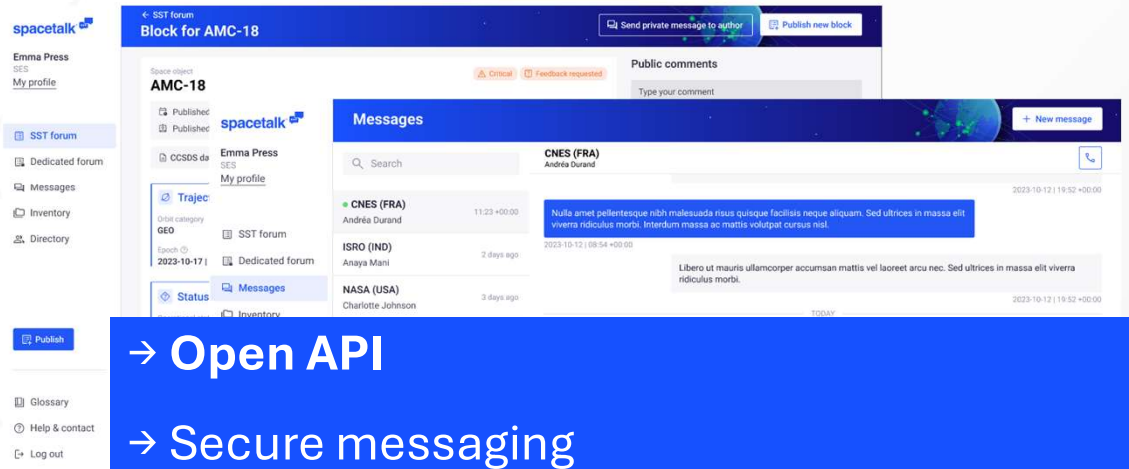


→ **Open API**

→ Secure messaging

→ Orbital data standard allowing communication of anomalies and failures (previous slide)

→ Allow communication of the original data standard

Key Enablers:

iii. ***Machine-to-machine exchanges*** *for close approach management and efficient, standardised* ***operator-to operator*** *interaction.*

iv. *Established information-sharing about* ***anomalies and failures****.*

4.1. Improve Space Traffic Coordination and Information Sharing

C. A process to evaluate the accuracy and reliability of collision risk analysis providers to ensure that only providers who meet defined accuracy standards - based on standardised datasets and validated models - are used for operational decision-making.

Key Enablers:

i. Methods and metrics to quantify collision risk analysis accuracy. ✗

ii. Collaborative platforms where providers can share insights, methodologies, and Datasets. ✓

iii. Access to information about any other objects involved in the Conjunction. ✓

iv. Collection of data on manoeuvrability, ephemeris, collision-relevant surface area (accounting for collision geometry and spacecraft attitude). ✓

v. Availability of Covariance Realism data for different objects and operators (acting as a trustworthiness indicator). ✗ ✓

→ **Transparency** for each member, deducted from a Know Your Customer (KYC) process, clearly identifying each member, providing a **backlog** of past analyses, and elaborating a **rating**.

4.4. Robust Tasking of Tracking of Larger Catalogues

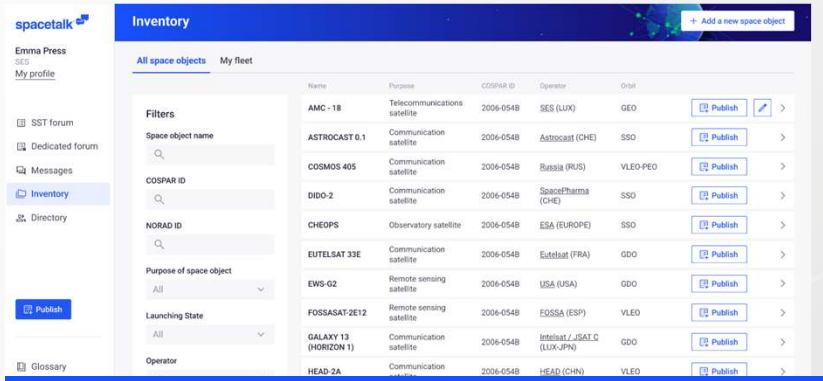
A. Informative hub about space debris tracking and collision risks.

Key Enablers:

i. ***Consolidated and open space debris catalogues*** *and datasets with space debris detection across damage-causing size regimes.*

ii. *Operator-usable mechanisms for* ***on-demand space surveillance****.*

iii. *Availability of data sharing* ***between SSA10 providers*** *(ideally raw measurements).*



→ Consolidated and closely monitored Inventory (catalogue) of all space objects including space debris.

→ **Provision of SSA services by the platform's Members.**

4.4. Robust Tasking of Tracking of Larger Catalogues

B. Fusion of heterogenous space surveillance data sources

Key Enablers:

i. Test data for calibration and open access sensor products.

ii. Improved data processing pipelines incorporating fusion methodologies that take into account uncertainty when mixing data products and in the provision of derived uncertainty.

iii. Promoting the combination of non-traditional SSA sensors such as ground station (amateur or professional), in-orbit sensors, and other existing sensors, to provide additional data types for SSA

→ Space data hub.

→ **Private Fora (technical fora).**

→ Availability for all SSA & STM

Questions?