
SPACEMAP
The Satellite's Guide to the Galaxy

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Welcome to SpaceMap. With over 40 years of expertise in Voronoi Diagrams and applied mathematics, we are committed to advancing space technology to new frontiers.

Our journey has been fueled by a passion for creating a safer, more sustainable, and efficient space.

1) World-Leading Scholar in Voronoi Diagrams

2) Professor at Hanyang University (1995–Present)

3) Professional Experience
   - Samsung Advanced Institute of Technology Korea (1991–1995)
   - Schlumberger Technology CAD/CAM Co. U.S. (1989–1991)

4) Expertise
   Over 40 years in research on Voronoi Diagrams, Applied mathematics;
   Theory, Algorithm, Software Implementations
   Applications including biology and space technology

2 Timeline

	2024.11.05 - 2025.01.28	Participating in SDA TAP LAB Apollo Accelerator Cohort V
'24	**2024.11**	DOD Contract
	2024.08.06 - 2024.10.29	Participated in SDA TAP LAB Apollo Accelerator Cohort IV
	2024.02	BRICC announcement of AFOSR success story
'23	**2023.07**	Selected for Deep Tech TIPS program by the Korean government
	2023.06	Seed funding
'22	**2022**	Received AFRL Award III
~	**2021.09**	SpaceMap founded
'03	**2020**	AFRL suggested commercialization of the technology
	2017	Received AFRL Award II
	2016	Received AFRL Award I
	2003	Established the Voronoi Diagram Research Center under the Leader Research Initiative (NRF/Korea) (2003-2025)

Vision

Innovative Platform for Safer, More Efficient and Sustainable Space

We aim at developing sustainable space industry by maximizing the safety, efficiency, and sustainability of space through accurate and efficient orbit prediction and collision avoidance technologies.

Mission

Building trust in the zero-trust space

Never trust! Always verify using our innovative platform and algorithms. We are committed to building trust in the space environment with full of uncertainties using our platform based on real-time algorithms. Three keywords are transparency, accountability, and innovation.

With accuracy and efficiency of priority, we are dedicated to contributing to space industry with safety, efficiency, and sustainability.

4 Business Achievements

SDA TAP LAB | Apollo Accelerator (US Space Force)

- Completed & Demoed in Cohort 4 (Aug-Nov 2024)
- Invited to Cohort 5 (Nov 2024-Jan 2025)

AOARD | Research Projects

- Optimal Design of Flight Plans for Orbital Objects
- Conjunction Prediction in SSA using Voronoi Diagrams
- Robust Construction of Voronoi Diagram

KARI*

RFI Interference Simulation Tool (2023)
AstroLibrary Licensing (2024)

* KARI : Korea Aerospace Research Institute

Korea Air Force

Conjunction Assessment Service Subscription
PRD* Work in Progress

* PRD : Product Requirement Document

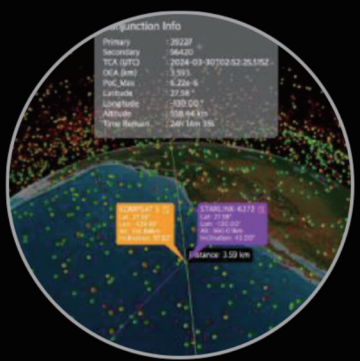
Incheon University

Platform API Subscription

42TALKS

The Platform for Space

A virtual meeting and collaboration platform with 4D space-time digital twin of the orbital environment, including satellites and debris. 42TALKS enables concurrent avoidance negotiations through real-time conjunction assessments and optimal collision avoidance.



Astro-1

The Guardian for Safety

Real-time conjunction assessment and optimal collision avoidance for both orbital and non-orbital motions, including consideration of tertiary conjunctions, etc.

AstroOrca

The Optimizer for Space

Mission optimizations, including data transmission across multi-orbits, launch planning, shuttle logistics for in-space refueling, ADR scheduling, etc.

AstroLibrary

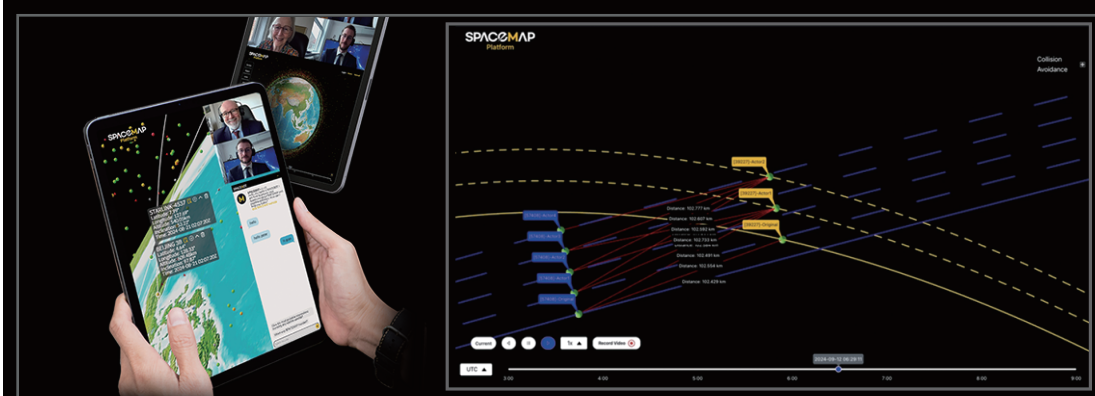
The Toolkit for Software

RESTful APIs for accessing powerful Space-Map functions via JavaScript and Python interfaces, with a computation engine implemented in C++ for space-time AI algorithms.

7 Key Services

42 TALKS

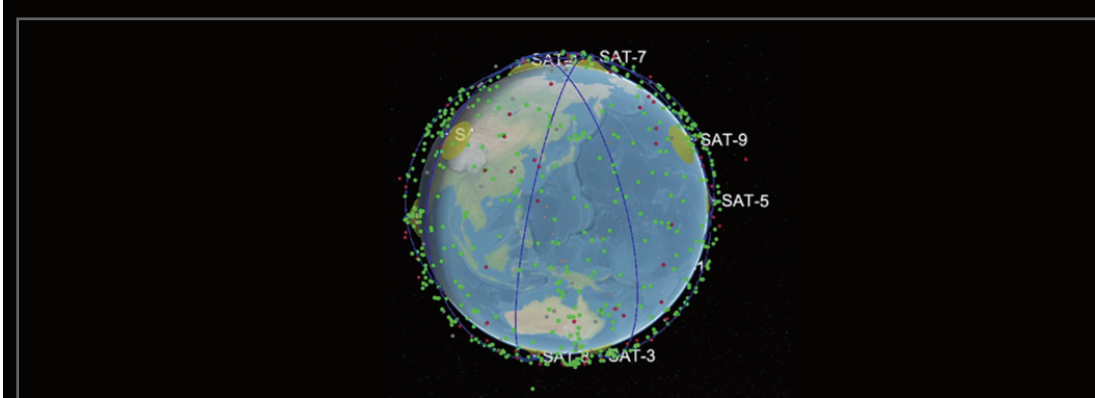
A virtual meeting and collaboration platform featuring 4D space-time modeling:



- Visualizing & sharing conjunctions and maneuvers of satellites
- Generating & evaluating maneuver alternatives
- Communicating & negotiating via 4D space-time models using text, voice, and video

Constellation Designer

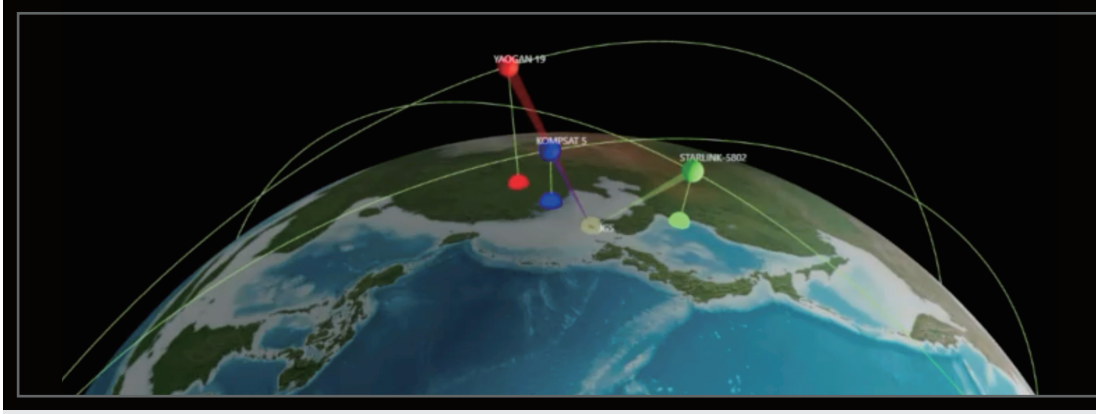
Finds optimal satellite constellation design with



- Min. collision risk
- Max. scan coverage

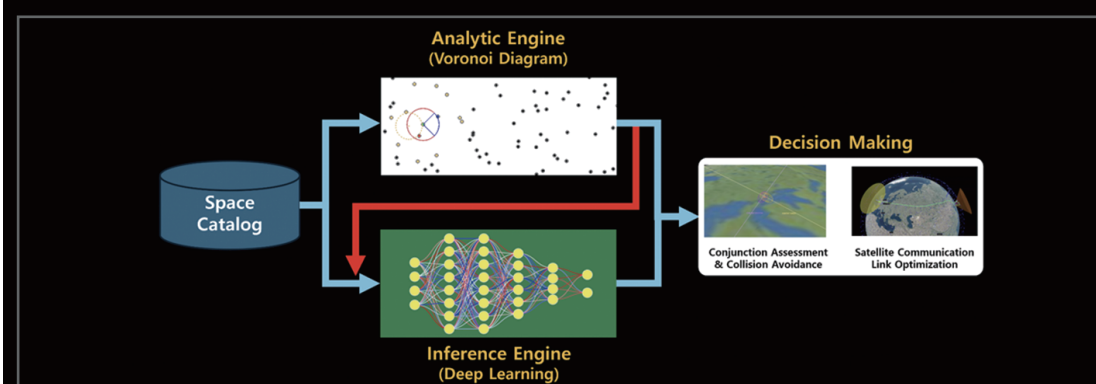
8 Core Technologies

RFI Scanner | Predicts RF (radio frequency) interferers:



- Identifies all satellites interfering with data downlinks

Core Technologies | Deep learning integrated with Voronoi for real-time solutions to spatiotemporal challenges involving space assets over time:



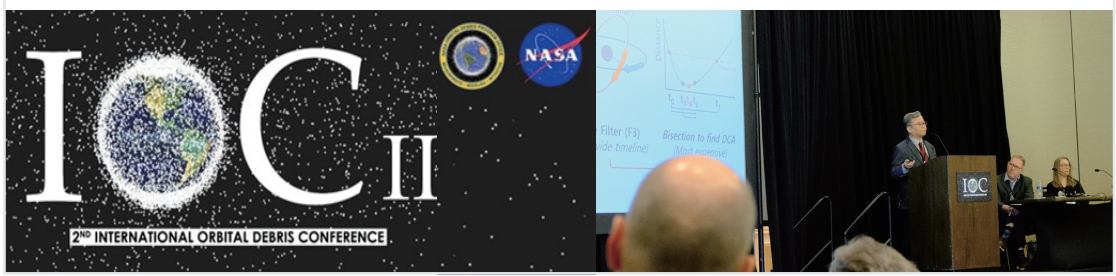
- Short-term decisions using the Voronoi diagram
- Long-term decisions through deep learning

9 Major Presentations

NASA IOC II

(Int'l Orbital Debris Conference) - Houston,TX, Dec 4, '23

AstroLibrary
A library for real-time conjunction assessment and collision avoidance



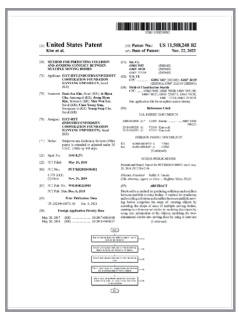
AMOS 2024

(Advanced Maui Optical Space Surveillance Technologies Conference) - Maui,HI, Sep 18, '24

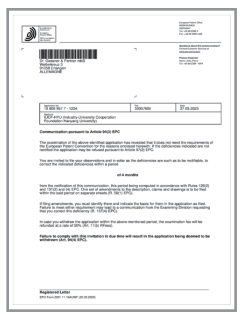
Real-time Conjunction Assessment and Collision Avoidance with Passive Ranging and Optical Measurements

– A Comparative Analysis with Traditional Data Sources

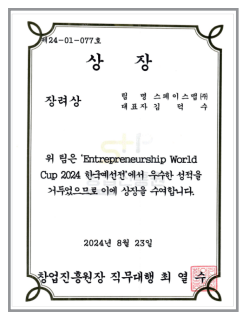
10 Certifications Awards



[U.S] Method for Predicting Collision and Avoiding Conflict between Multiple Moving Bodies



[ER] Method for Predicting Collision and Avoiding Conflict between Multiple Moving Bodies



Entrepreneurship WorldCup 2024 Korean Qualifier Encouragement Award

Methods for updating voronoi diagram of circle, method for inter-particle collision using the same

Method and system for establishing predictive model of plant abnormality

Method for predicting collision among moving objects

Method for predicting and avoiding collision and conflict/conjunction among moving objects(1)

Method for predicting and avoiding collision and conflict/conjunction among moving objects(2)

QuickhullDisk: A program to compute the convex hull of a two-dimensional set of disks

Shortest path avoiding for Disc Obstacles

Dynamic Voronoi Diagram for Moving Disks

Voronoi-based Agent Model for Epidemic Spread Prediction

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