

FEB 2024

2024 UN COPUOS 61<sup>TH</sup> SCIENTIFIC AND TECHNICAL SUBCOMMITTEE

# 2023 Space Debris Activities and Status in Republic of Korea

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Ministry of Science and ICT



Korea Astronomy and  
Space Science Institute

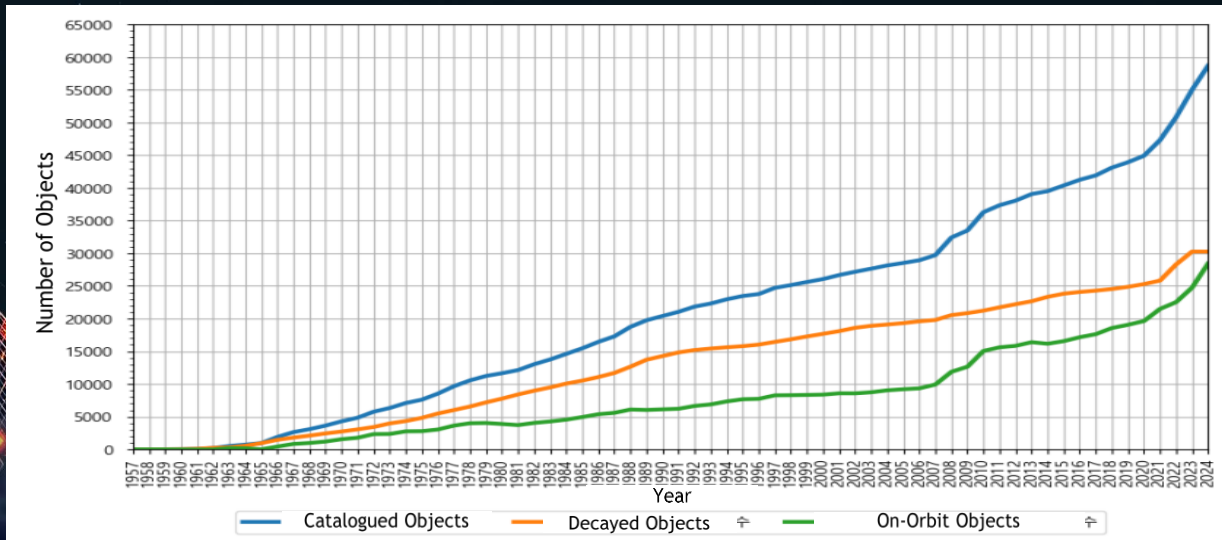
NSSAO 우주환경감시기관



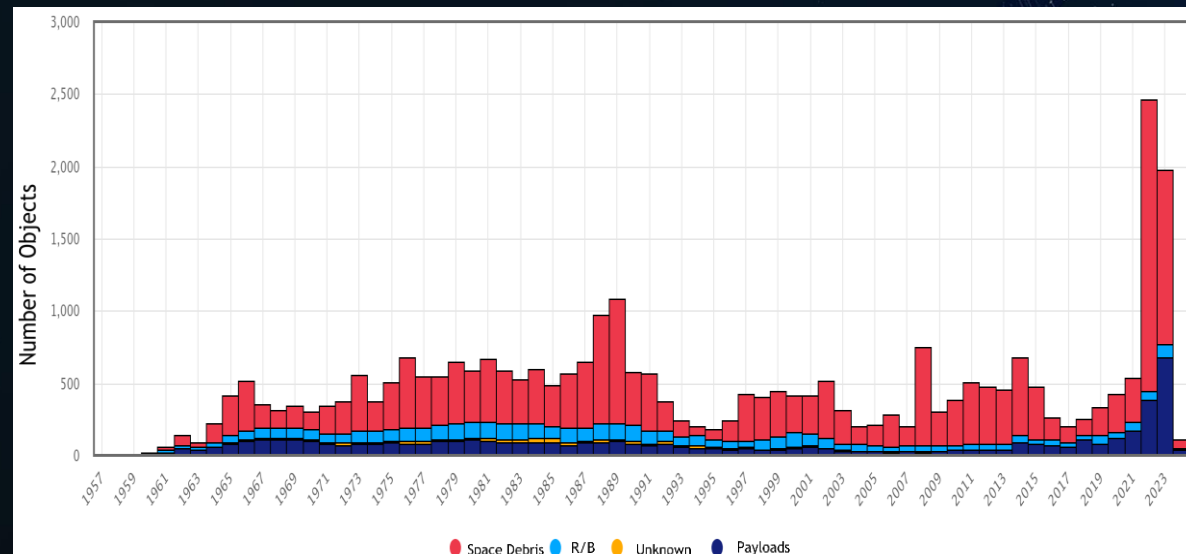
# Growth of Space Objects

Last Updated : 2024-01-26 06:17:40

TOTAL	ON ORBIT	TRACKABLE	DECAYED	SOURCE	ON ORBIT	TRACKABLE	DECAYED	TOTAL	
<b>58,848</b>	<b>28,248</b>	<b>25,157</b>	<b>30,600</b>	PAYLOADS	ACTIVE	INACTIVE	<b>12,077</b>	<b>4,957</b>	<b>17,318</b>
					<b>9,435</b>	<b>2,926</b>			
				DEBRIS	<b>15,887</b>		<b>25,643</b>	<b>41,530</b>	



Number of Space Objects



Number of Decayed Objects



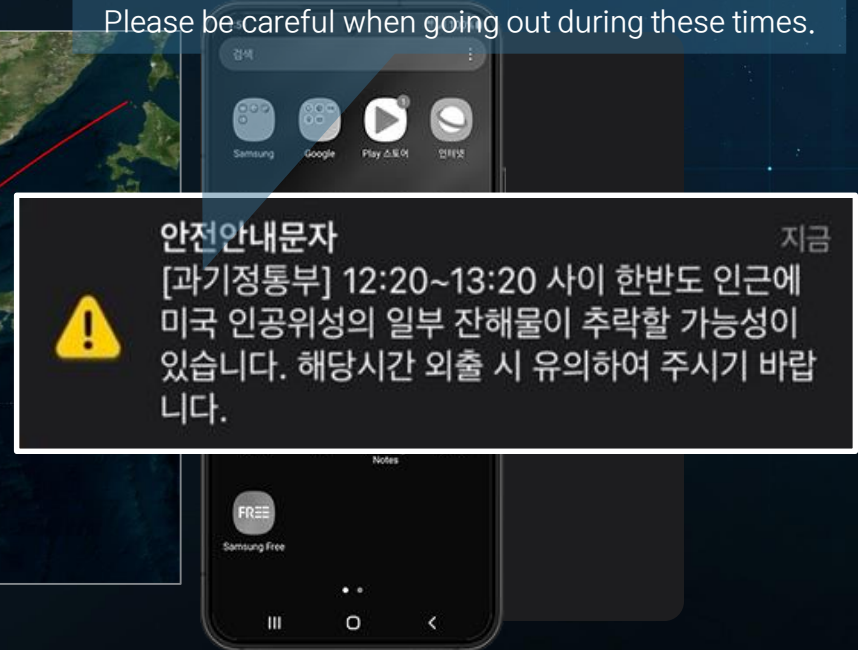


# Re-entry Situation



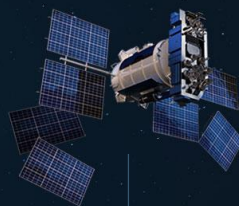
The Korean Peninsula was included in the predicted range of ERBS satellite reentry  
 The Ministry of Science and ICT warned of falling satellite debris on peninsula  
 > Space Risk Alert issued and Safety Information text sended

Ministry of Science and ICT] There is a possibility that some debris from an ERBS satellite may crash near the Korean Peninsula between 12:20 and 13:20. Please be careful when going out during these times.





# Space Object Re-entry Risk Monitoring

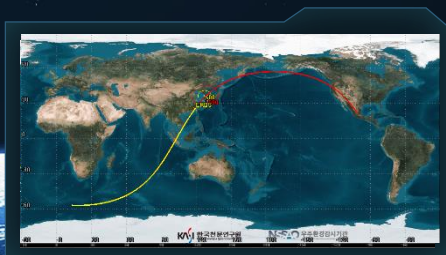
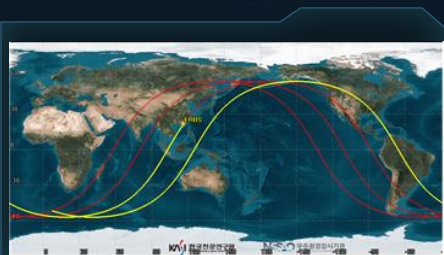


2023-01-08 17:00KST

2023-01-08 21:00KST

2023-01-09 03:30KST

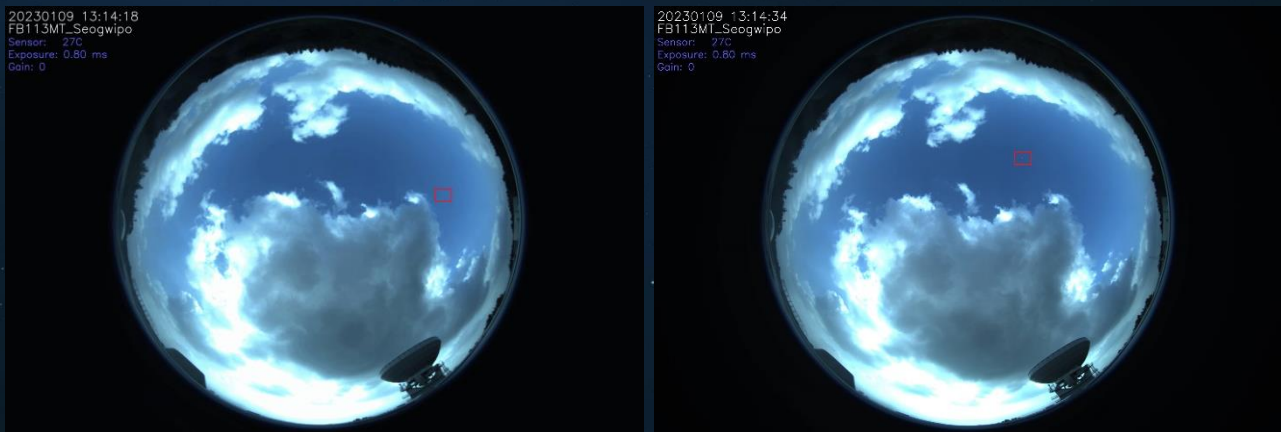
2023-01-09 07:30 KST



Time	KASI	CSpOC
D-3h	-	2023-01-09 13:06:00 ± 33min
D-6h	2023-01-09 12:49:01 ± 30min	2023-01-09 13:01:00 ± 1h
D-9h	2023-01-09 12:53:53 ± 30min	2023-01-09 13:27:00 ± 2h



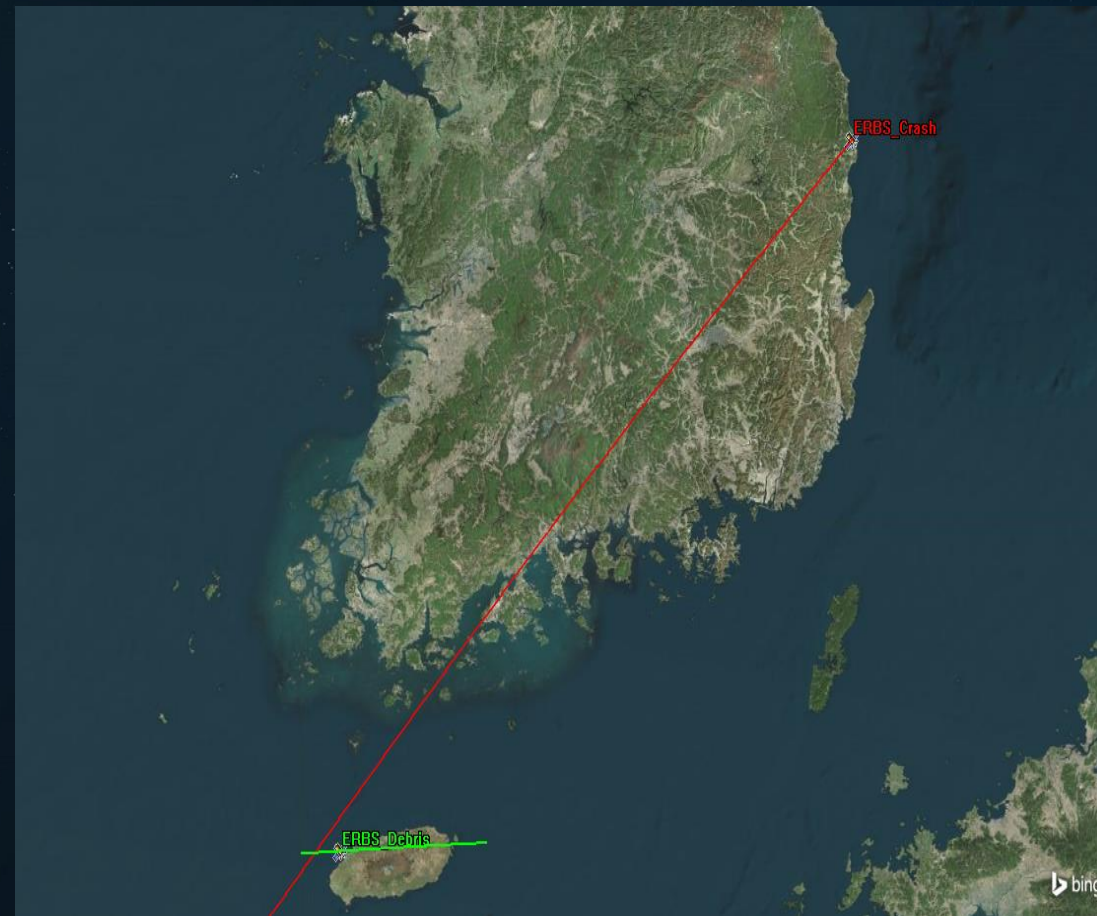
# Space Object Re-entry Observation



Monitored by Korea Meteorite Network ('23.1.9. 13:14)



Video captured by cell phone camera ('23.1.9. 13:10~13:13)



Analysis Result of ERBS Reentry Trajectory

# 1st Preparedness Plan for Space Risk('14~'23)



## SYSTEM

Building a quick response system against disasters resulting from space hazards



## TECHNOLOGY

Developing technologies and constructing facilities for monitoring space hazards



## INFRASTRUCTURE

Creating an environment for expanding capability of the response system (International cooperation, R/D, etc)



# OWL-Net(optical Wide-field patrol Network)

## Space Objects Tracking and Monitoring Network

### 5 Global Optical Space Surveillance Network composed of five robotic observatories

Track and Monitor LEO satellites and space debris and GEO belt

Observe for asteroids and comets



**OWL-4**  
LEMMON  
USA



**OWL-3**  
WISE  
ISRAEL



**OWL-1**  
SONGINO  
MONGOLIA



**OWL-0**  
HQ/  
TESTBED  
KASI



**OWL-5**  
BOHYUN  
KOREA



**OWL-2**  
OUKAIMEDEN  
MOROCCO





# K-M<sup>2</sup>ONET (KOREA METEOR MONITORING AND OBSERVATION NETWORK)

Observation of meteors falling down over the Korean peninsular  
Detection of fireballs and generation of information for the estimation of their falling trajectories and impact areas

16 monitoring stations was installed over the southern part of the Korean peninsula in 2023.



▶ Publicity at the national level that also contributes to science gifted education



▶ Plan to join the international meteor observation network

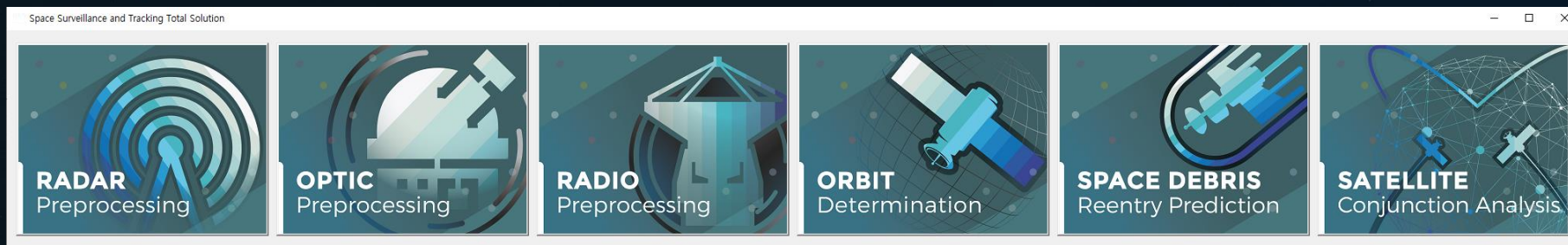




# KASIOPEIA

## (KASI's Orbit Prediction & Estimation, Integrated Analysis System)

KASIOPEIA is a comprehensive space situational awareness total solution for integration all phases from observation data preprocessing to predictive risk assessment



Radar Observation  
Preprocessing



Optical Observation  
Preprocessing



Ranging  
Preprocessing



Orbit  
Determination

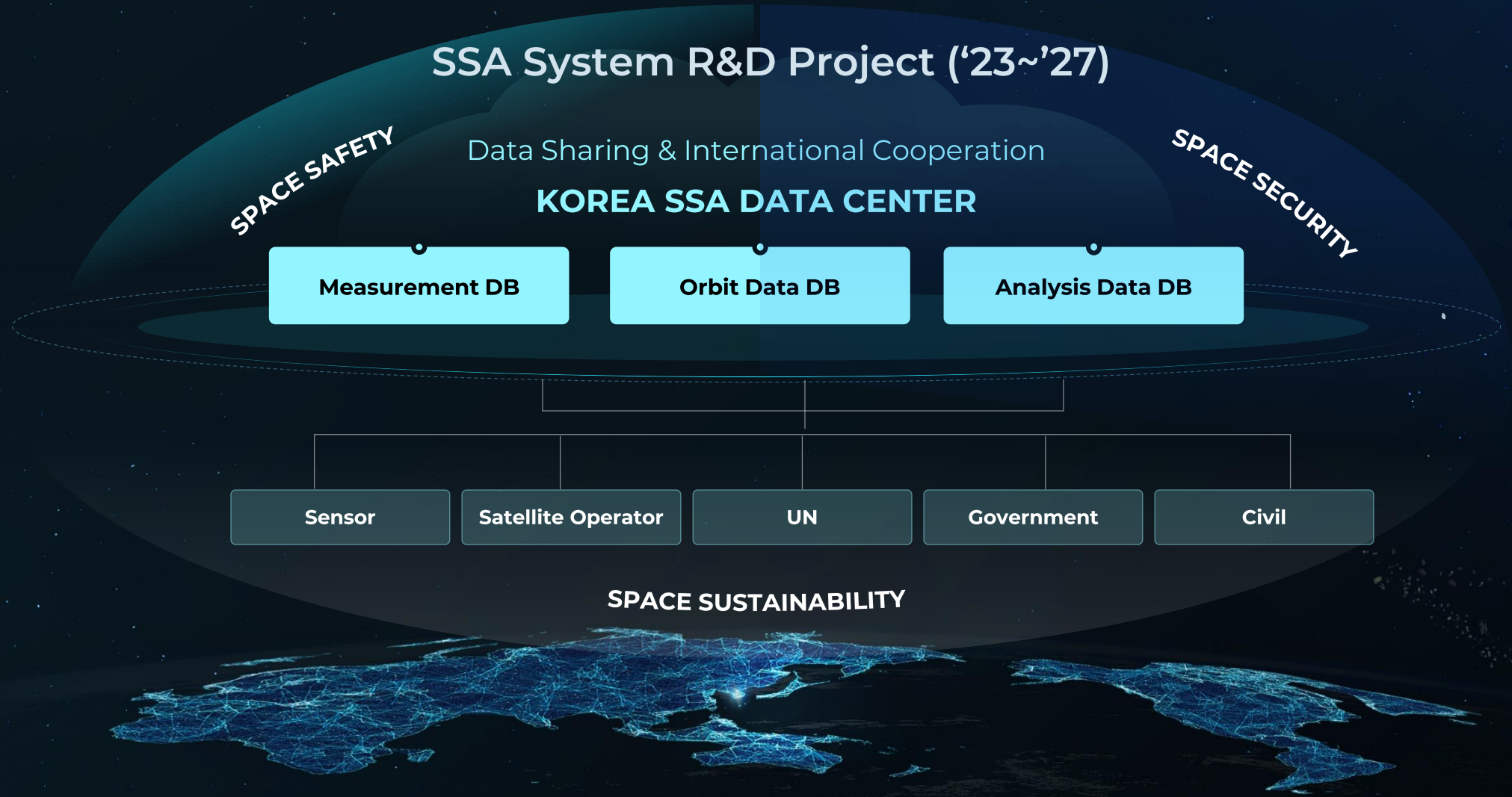


Re-entry  
Prediction



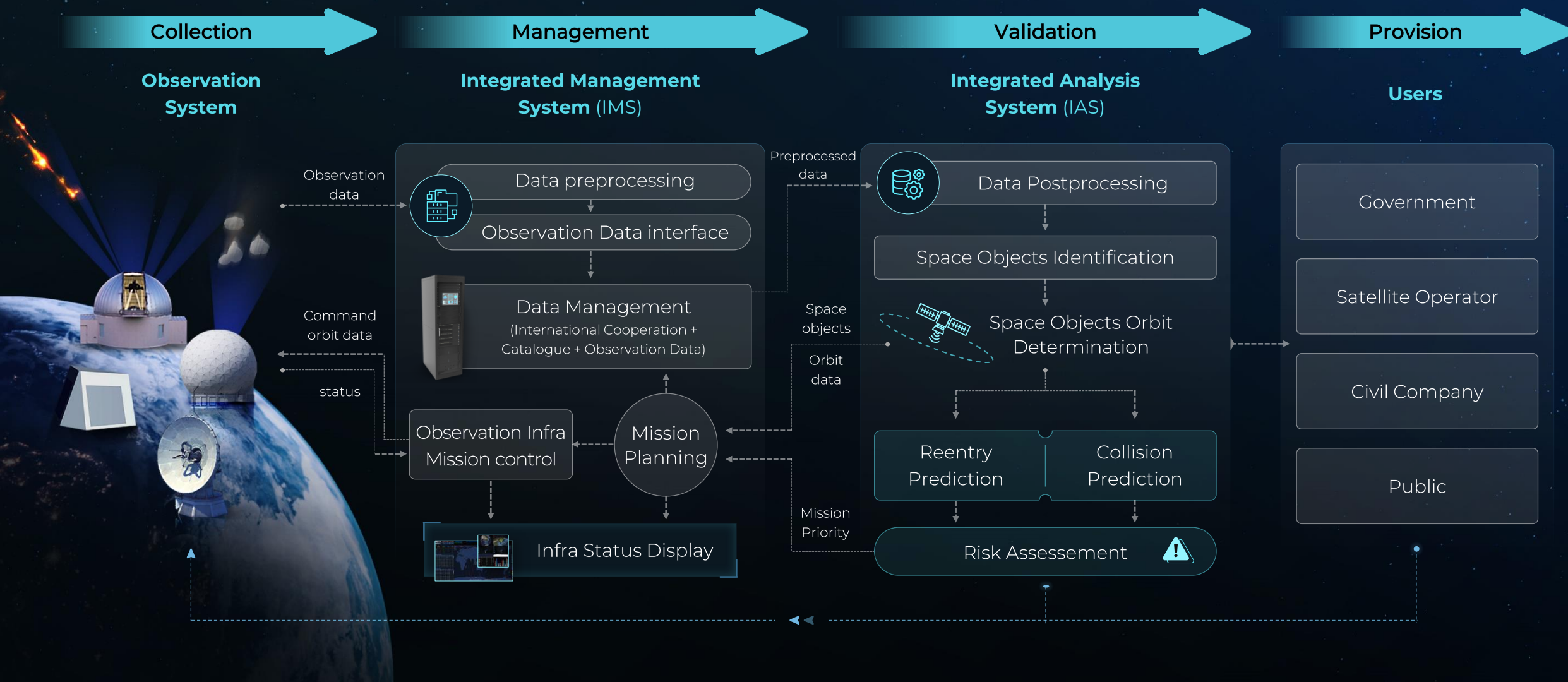
Conjunction  
Analysis

# SSA System Development



# KEPLER

## (Korea Enhanced Platform for Lowering Space Risk)





# 2<sup>st</sup> Preparedness Plan for Space Risk('24~'33) (in preparing)

## SYSTEM



**Strengthening the national space risk response system**

- SSA/STM System and Leading discussion on International Cooperation
- Expansion of SSA area

## TECHNOLOGY



**SSA System  
Optical, Radar, Laser System +  
Integrated Analysis System**

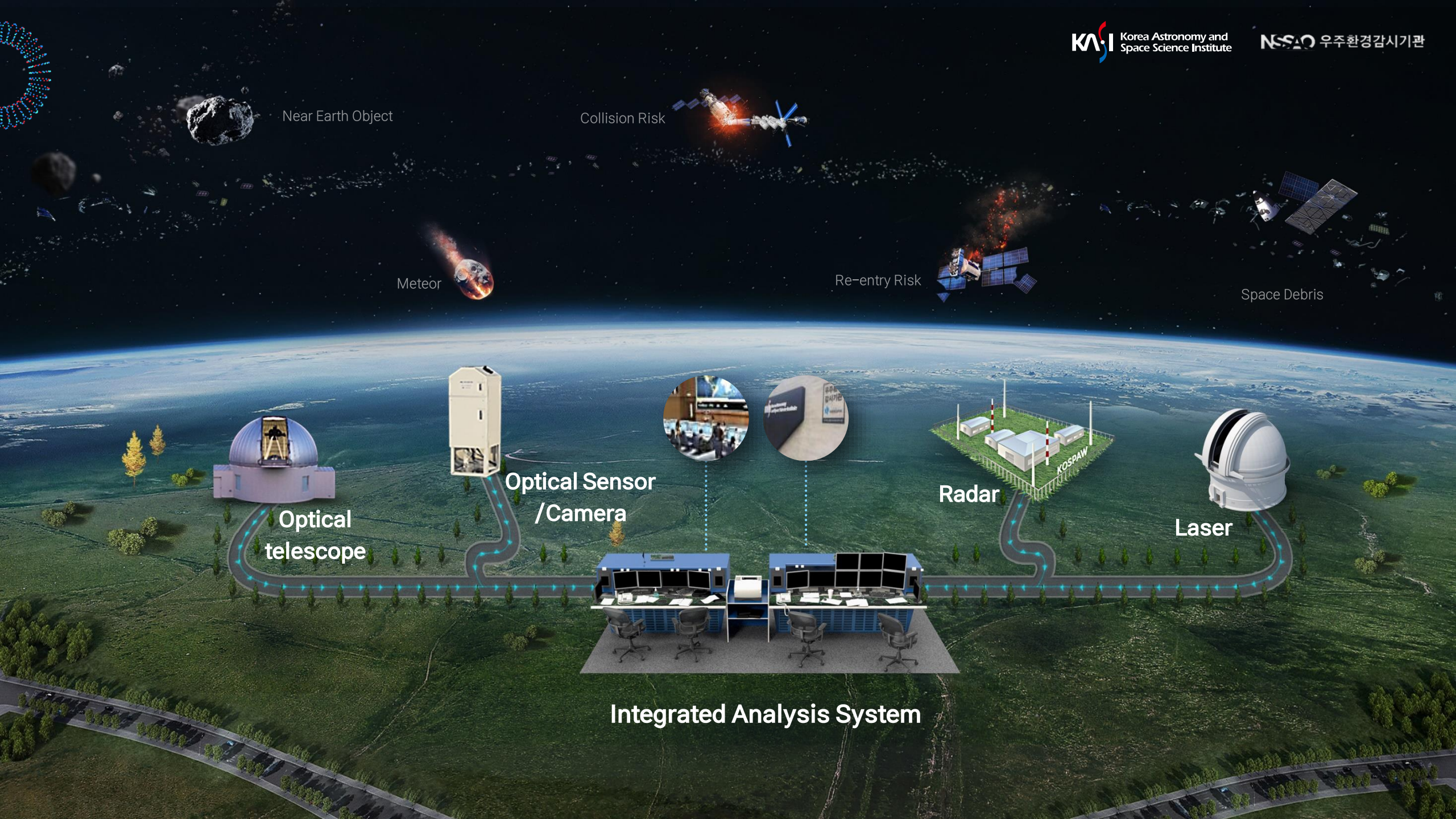
- OWL-Net Operation and Upgrade
- SLR Operation and Upgrade
- New Radar System Development
- KEPLER System Development

## SPACE INDUSTRY & CAPACITY BUILDING



**Creating SSA/STM Industry  
Capacity Building**

- SSA/STM Industry Promotion
- Civil-Military Cooperation
- International Contribution



Near Earth Object

Collision Risk

Meteor

Re-entry Risk

Space Debris


Optical telescope

Optical Sensor /Camera

Radar

Laser

Integrated Analysis System

A detailed illustration of Earth from space, showing the curvature of the planet and the atmosphere. The right side of the image is filled with a dense field of space debris, including various satellite components, solar panels, and a large satellite with a bright orange glow. Several bright streaks, likely meteors or re-entering spacecraft, are visible in the dark background of space.

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# THANK YOU

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Ministry of Science and ICT



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NSSO 우주환경감시기관