

# IADC2023

## JAXA delegation Report

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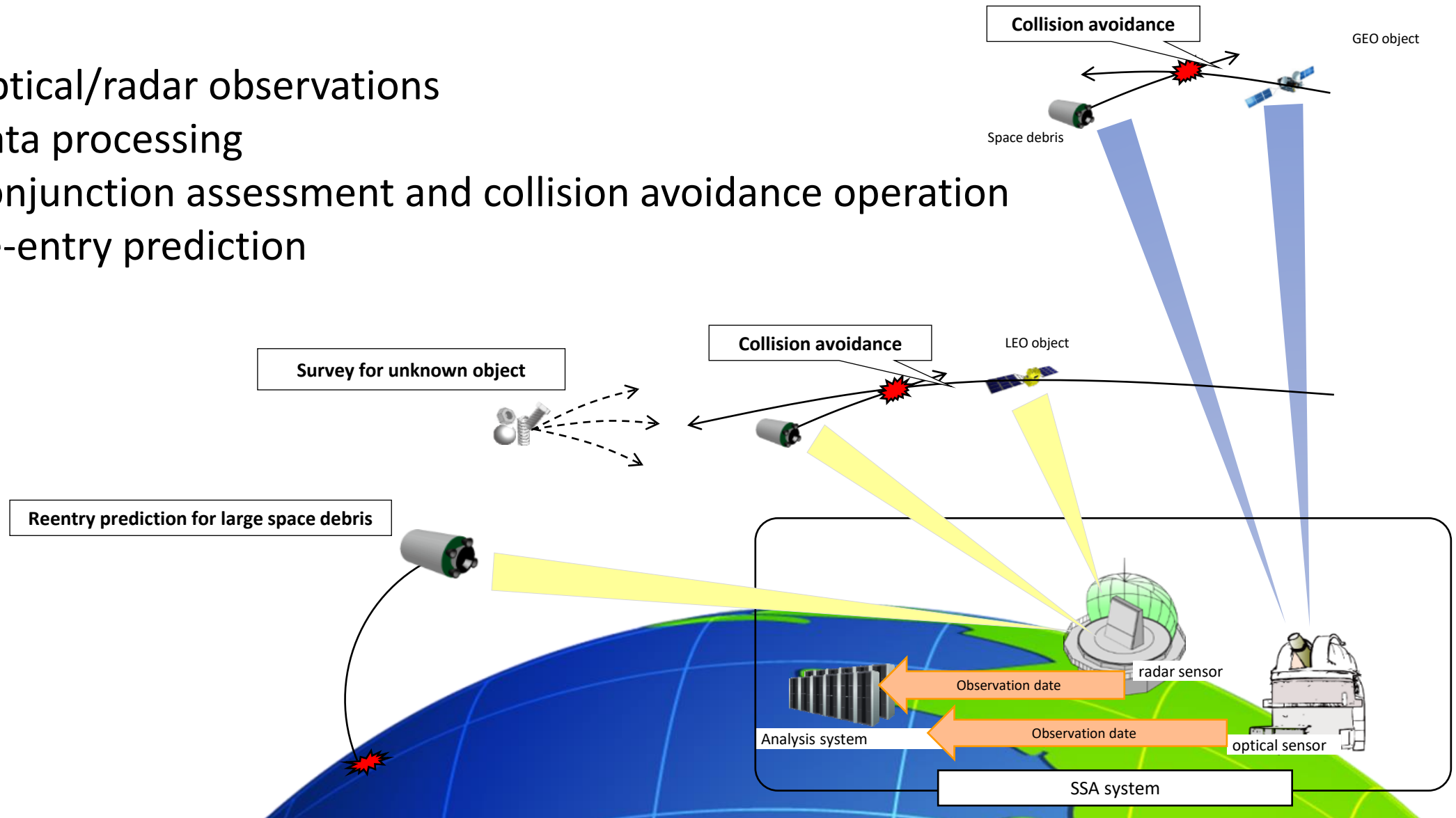
Flight Dynamics Team

Space Tracking and Communications Center

Japan Aerospace Exploration Agency

# Space Situational Awareness Activities at JAXA

- Optical/radar observations
- Data processing
- Conjunction assessment and collision avoidance operation
- Re-entry prediction

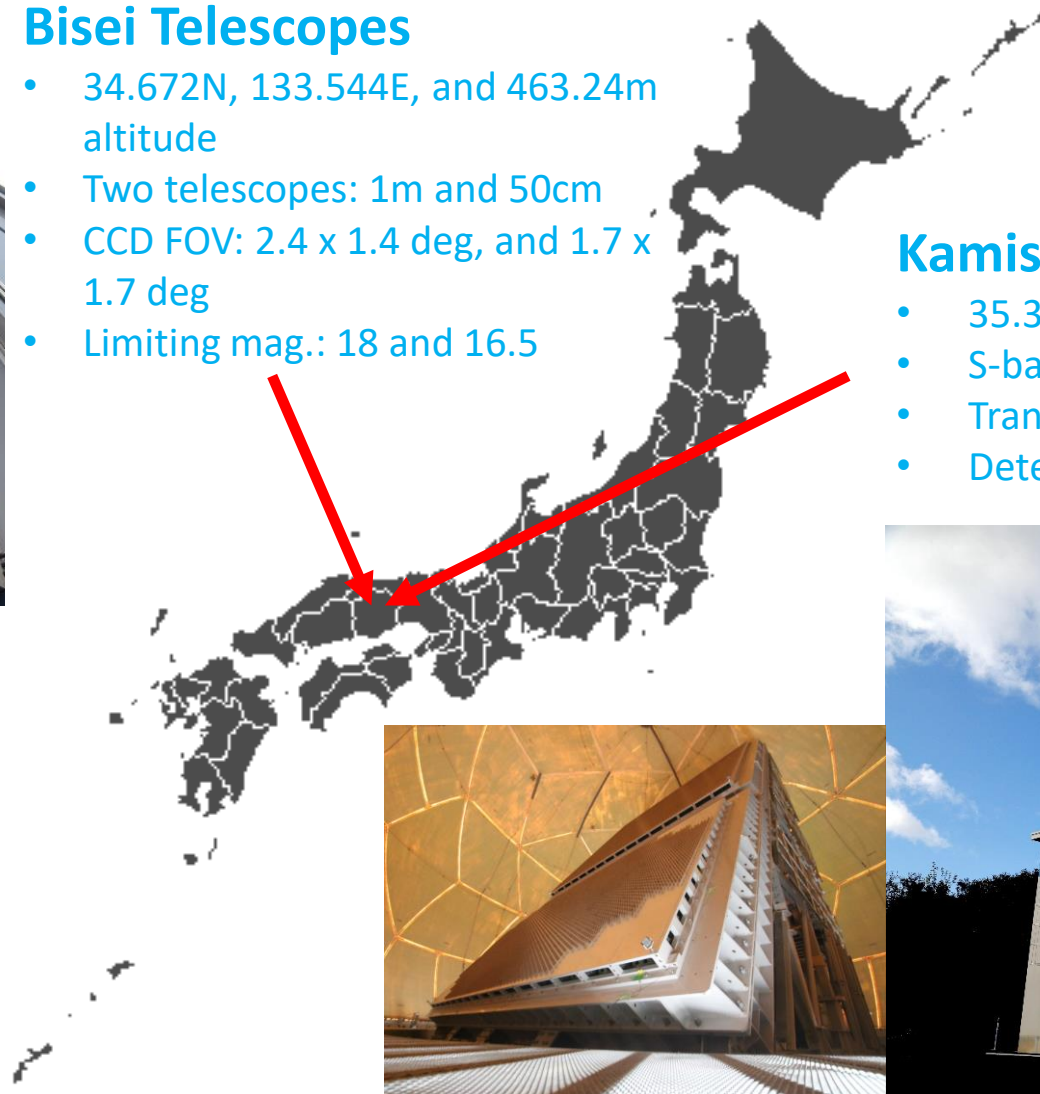


# Optical/radar Sensors



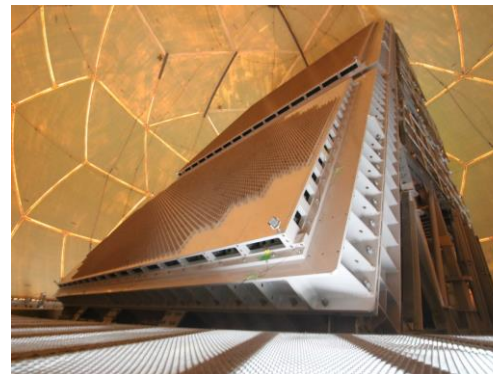
## Bisei Telescopes

- 34.672N, 133.544E, and 463.24m altitude
- Two telescopes: 1m and 50cm
- CCD FOV: 2.4 x 1.4 deg, and 1.7 x 1.7 deg
- Limiting mag.: 18 and 16.5



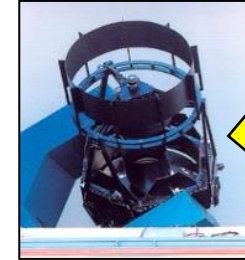
## Kamisaibara radar

- 35.312N, 133.941E, and 801.50m altitude
- S-band phased array radar
- Transmission power(max): 750kW
- Detectability: 10cm diameter at 650km altitude



# Major Specifications and Schedule

		New System	Present System
Radar	Observation capability	<u>10 cm <math>\Phi</math></u> (650 km high)	1.6 m $\Phi$ (650 km high)
	# of simultaneously observable objects	<u>Max 30</u>	Max 10
Telescope	Limiting magnitude	18th (1m $\Phi$ telescope) 16.5th (50cm $\Phi$ telescope)	18th (1m $\Phi$ telescope) 16.5th (50cm $\Phi$ telescope)
Analysis system	# of managed objects	<u>Max 100,000</u>	Max 30,000
	# of observation paths (radar)	<u>10,000 paths/day</u>	200 paths/day



JFY	2016	2017	2018	2019	2020	2021	2022	2023
Basic Plan on Space Policy	Construct SSA facilities and an operational framework integrated with MOD, JAXA and other Japanese governmental institutions.							
	Preliminary Design	Detail Design				Integration Test	Trial Operation	
			Development					

# Any Question?

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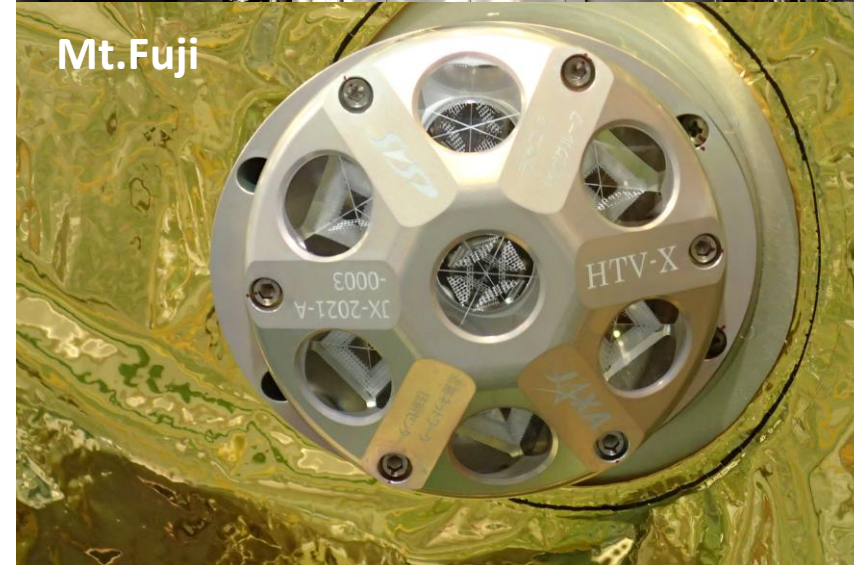
# R/D Activities

- Atmospheric Density Modeling
- Realistic Covariance Generation
- Lightcurve Inversion
- Satellite laser ranging
- Small SLR reflector (Mt.Fuji)
- Precise Orbit Determination
- Tsukuba Telescope (20cm)

**Tsukuba SLR**

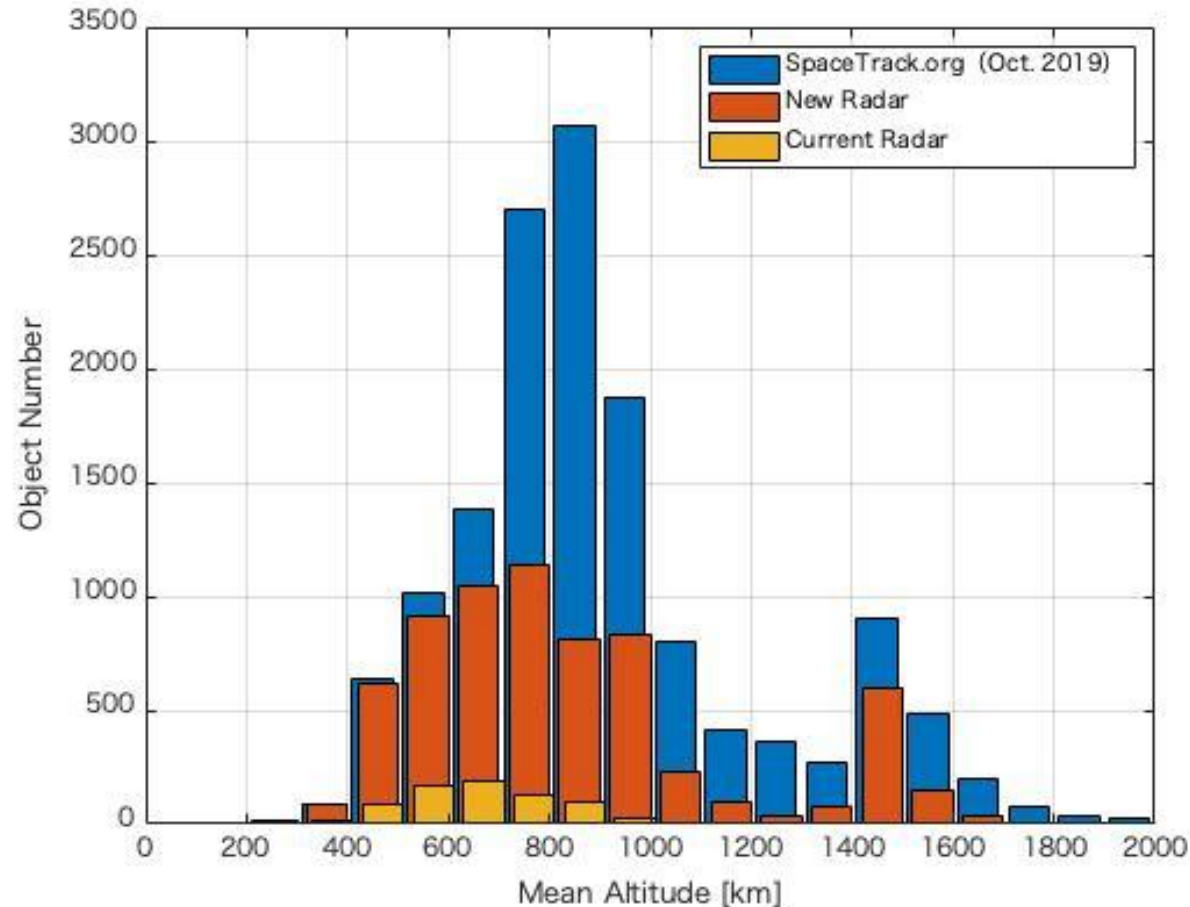


**Mt.Fuji**





## Comparison of Current Radar and New Radar



This graph shows the mean altitude distribution of objects that can be observed by JAXA's current radar (yellow) and that of the future SSA radar (orange), in comparison to the number of space debris published by CSPOC as of October 2019 (blue). CSPOC publication includes the number of objects that cannot be observed by JAXA's radar located at Okayama Prefecture.