



JASMINE

Japan Astrometry/photometry Satellite Mission for INfrared Exploration (cf. Kawata et al. (PASJ, submitted; astro-ph))

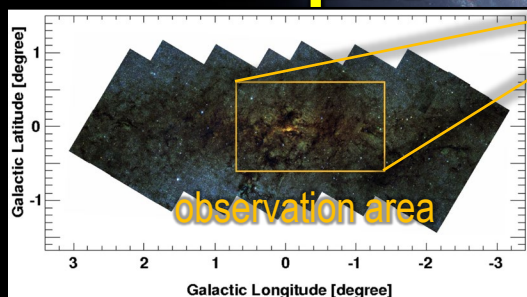
R. Kano (NAOJ) and JASMINE team

How did the Milky Way Galaxy form and evolve? How did the Earth, the planet that nurtures life, form and evolve?

Science Objective 1:
Exploration of the Structure of the Galactic Nuclear, which plays a key role in the formation of the Milky Way Galaxy.

“Galactic Center Archeology”

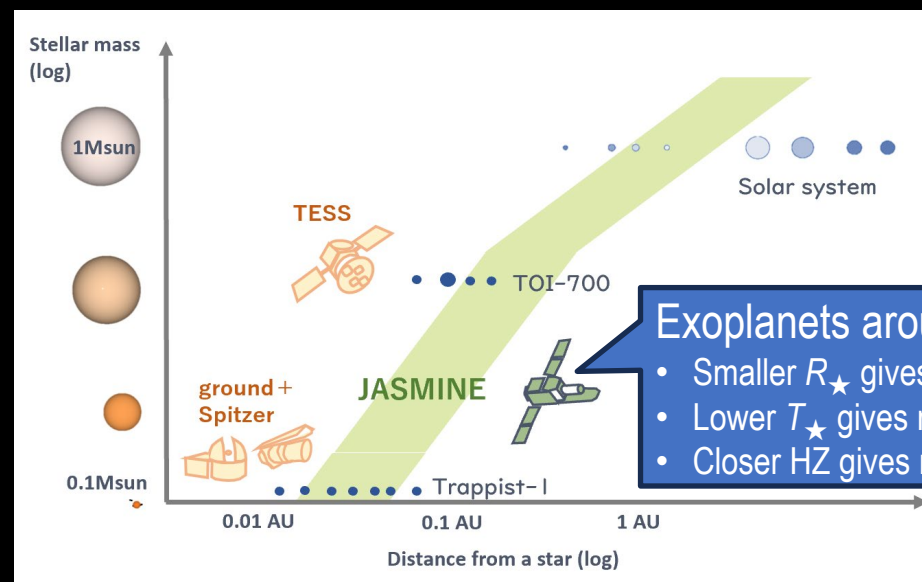
**IR Astrometry
in $\sim 25\mu\text{s}$**



Bulge, bar and inner disk along the line-of-sight are also important targets.

Credit: NASA/JPL-Caltech/ESO/R. Hurt

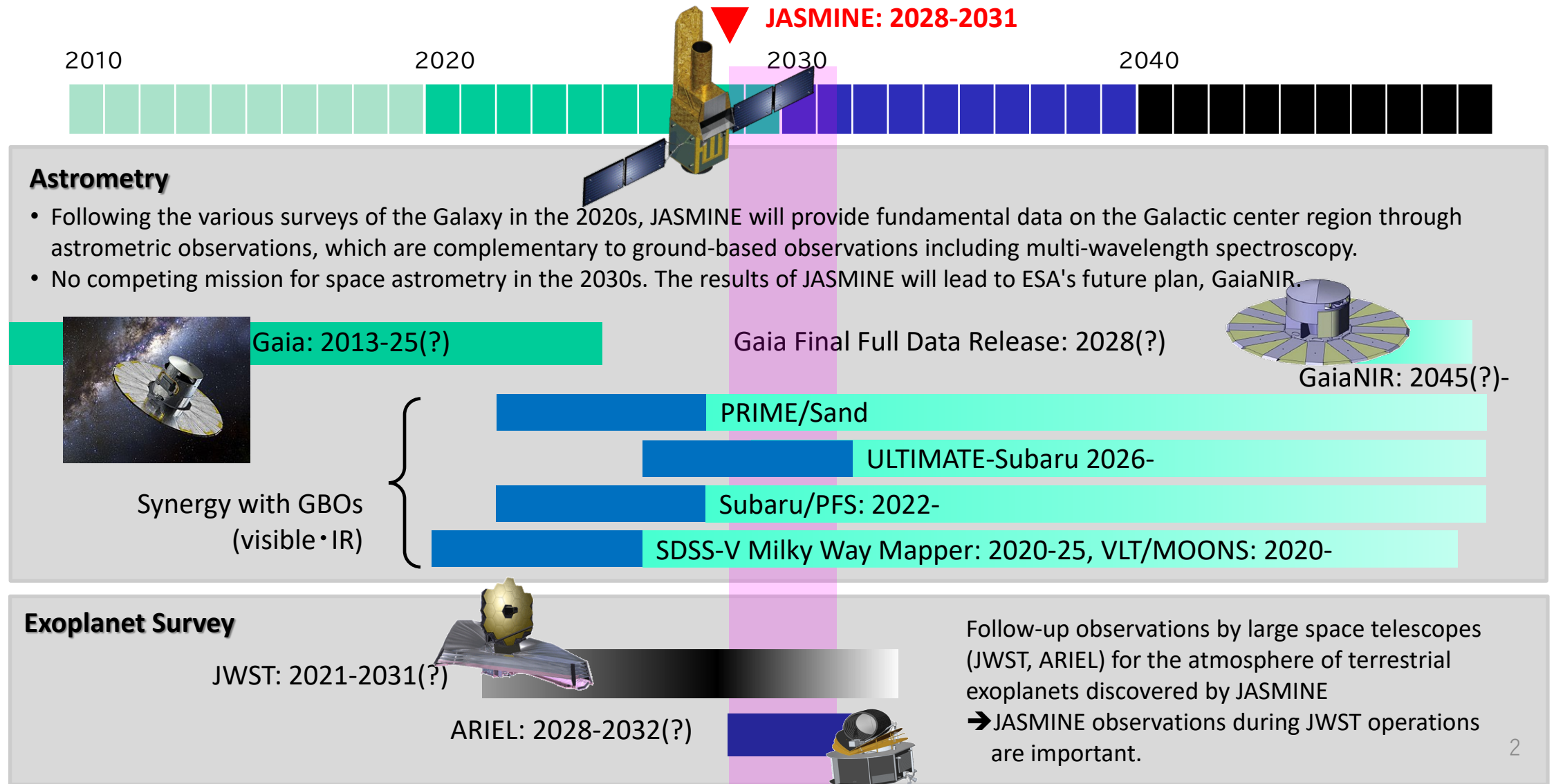
Science Objective 2
Search for Terrestrial Exoplanets
in habitable zone for future life exploration.



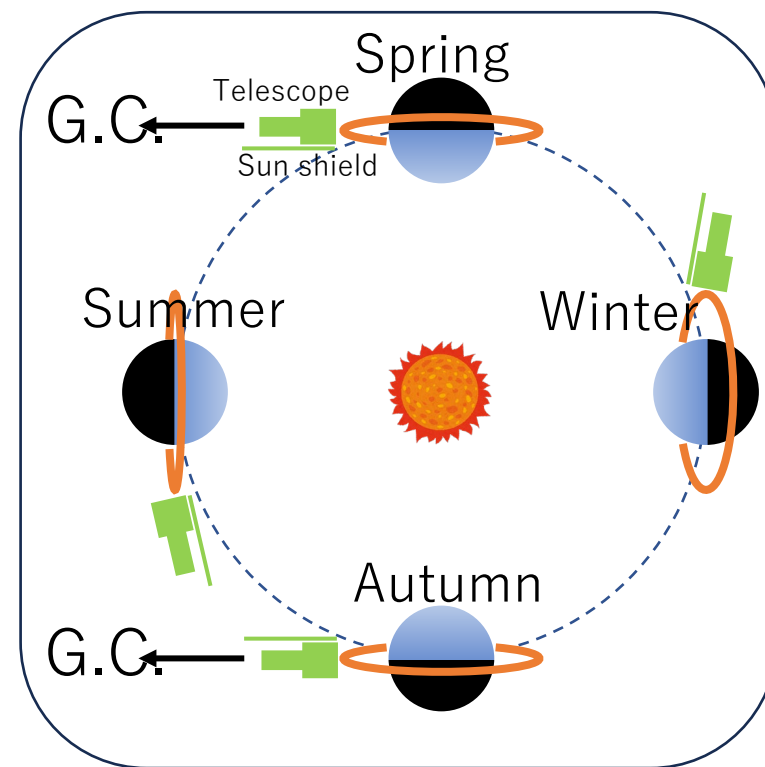
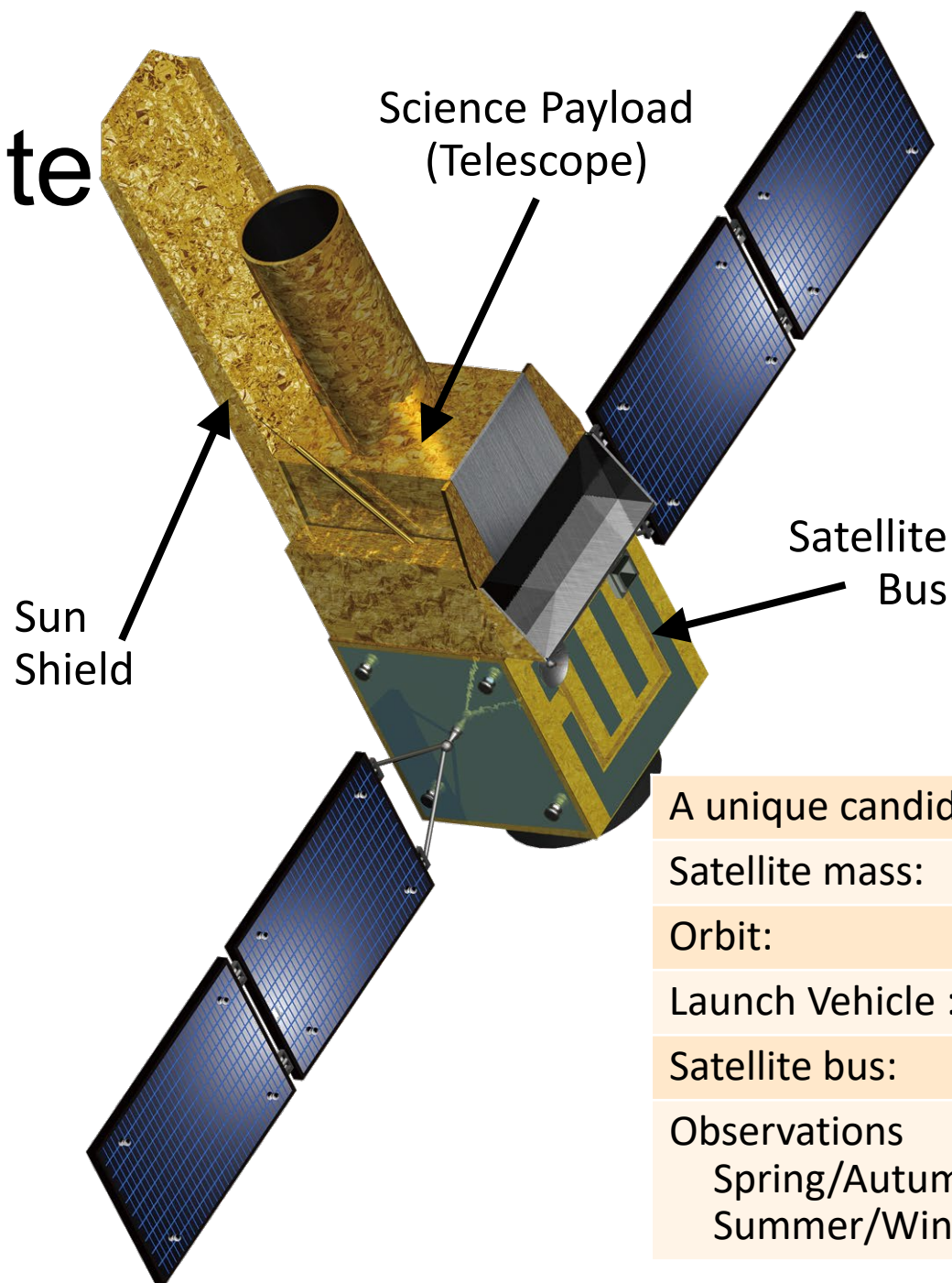
Exoplanets around mid-M stars

- Smaller $R_{\star}$ gives deeper transit signals.
- Lower $T_{\star}$ gives more advantage in IR.
- Closer HZ gives more frequent transits.

Synergy with other missions



Satellite



A unique candidate for the 3rd M-class JAXA satellite

Satellite mass: ~ 600 kg

Orbit: Sun Synchronous with $h > 550$ km

Launch Vehicle : JAXA Epsilon-S

Satellite bus: Small Standard Bus

Observations

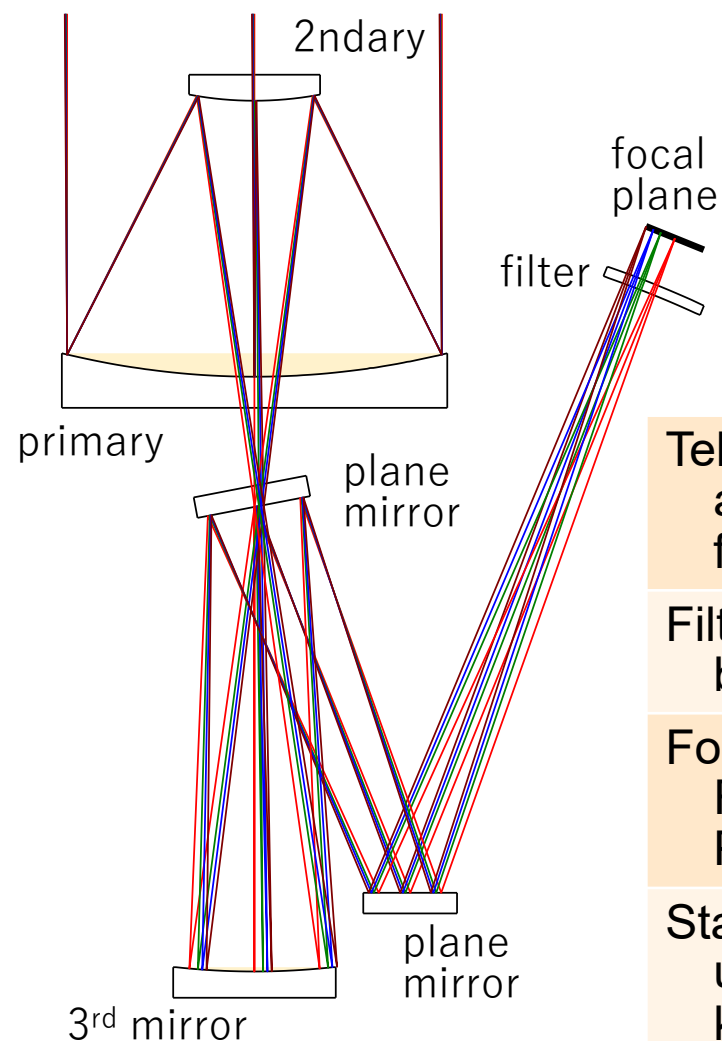
Spring/Autumn: Astrometry for G.C.

Summer/Winter: Exoplanet survey

Science Payload Instrument

Telescope

“Korsch optics”



Telescope aperture	360 mm
focal length	4370 mm

Filter bandpass	1.0~1.6 μm
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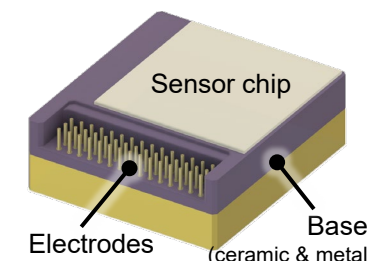
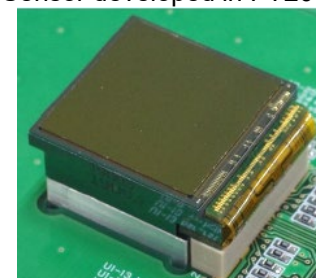
Focal plane FOV	0.52 deg
Plate scale	0.4 "/pixel

Stable Telescope Structure using low-CTE materials	keep temperature $\sim 0.1\text{K}$
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Detector Subsystem

IR sensors in space are being developed based on the InGaAs sensor developed by NAOJ/ATC in FY 2019.

Sensor developed in FY2019



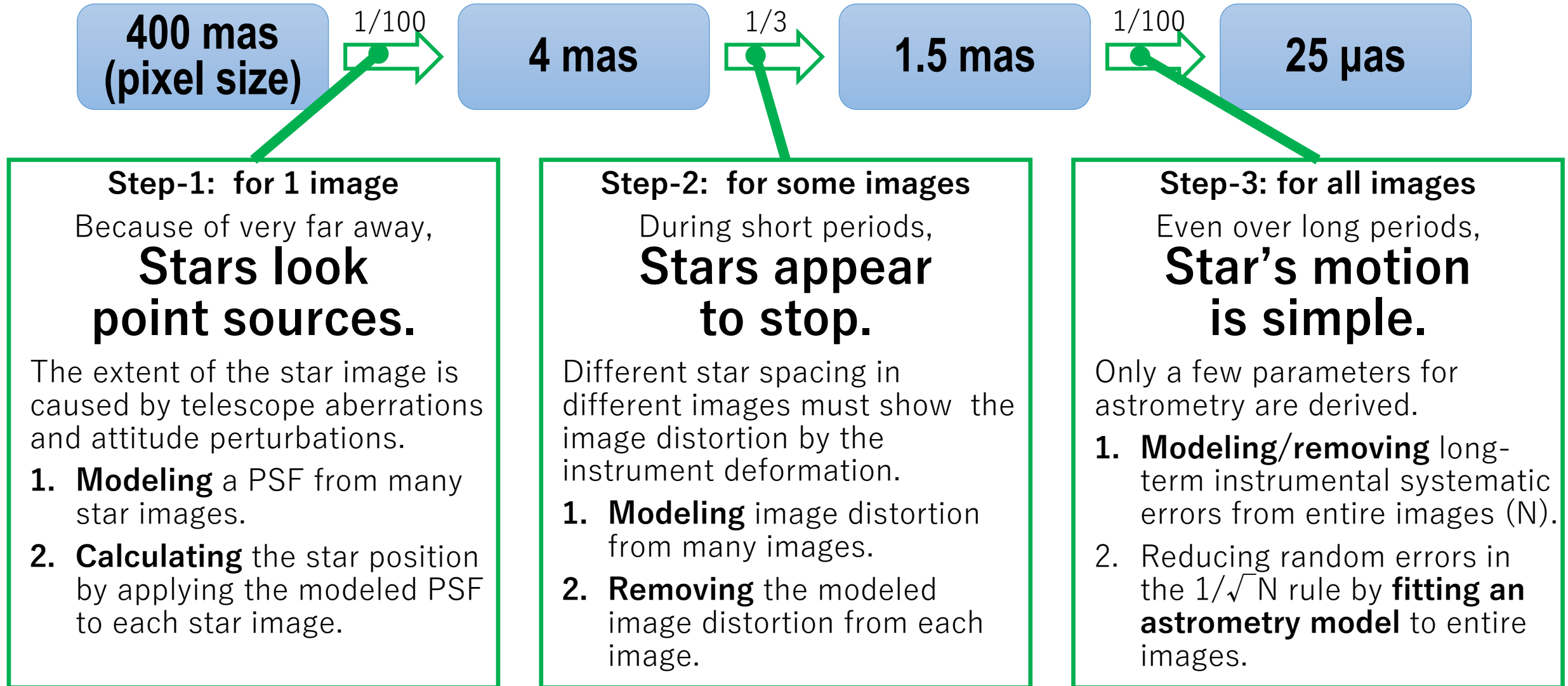
The cooling system is now being designed by NAOJ/ATC, and the performance are also being performed in ATC.

InGaAs Sensors	
Sensor size	19.2 × 19.2 mm
Pixel format	1920 × 1920
Pixel size	10 × 10 μm

Cooling system without vibration	170K by Radiator & Peltier
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Flat-calibration light source

Data Analysis in Astrometry



Roles of NAOJ

NAOJ/JASMINE Project Office as a major group in the JASMINE team together with ISAS/JAXA and universities.

- **promotes JASMINE,**
- **develops the science payload instrument** together with **NAOJ/ATC,**
- **prepares the system for data analysis and catalog release** together with **NAOJ/ADC,** and,
- **leads the JASMINE science** with supports from the science community (e.g., the JASMINE Consortium) including science collaborations and joint observations.

Schedule

