

## BACKGROUND & MOTIVATIONS

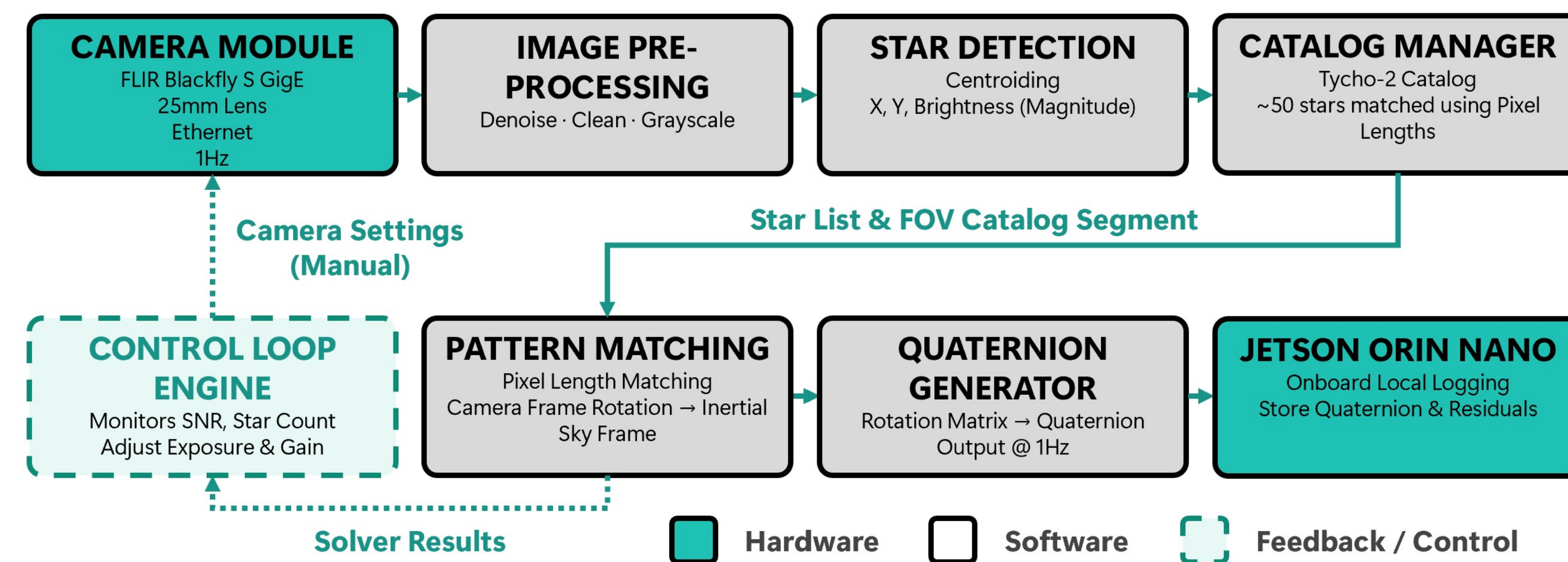
Sierra Space is a Colorado Aerospace company delivering satellite platforms, reusable spaceplanes, hypersonic technologies, propulsion systems, and infrastructure for the nation's most critical missions

- Star trackers are critical for spacecraft attitude determination
- Star trackers typically cost more than \$150,000 off-the-shelf
- Sierra Space is exploring options for in-house development to reduce costs

## DESIGN REQUIREMENTS & SPECIFICATIONS

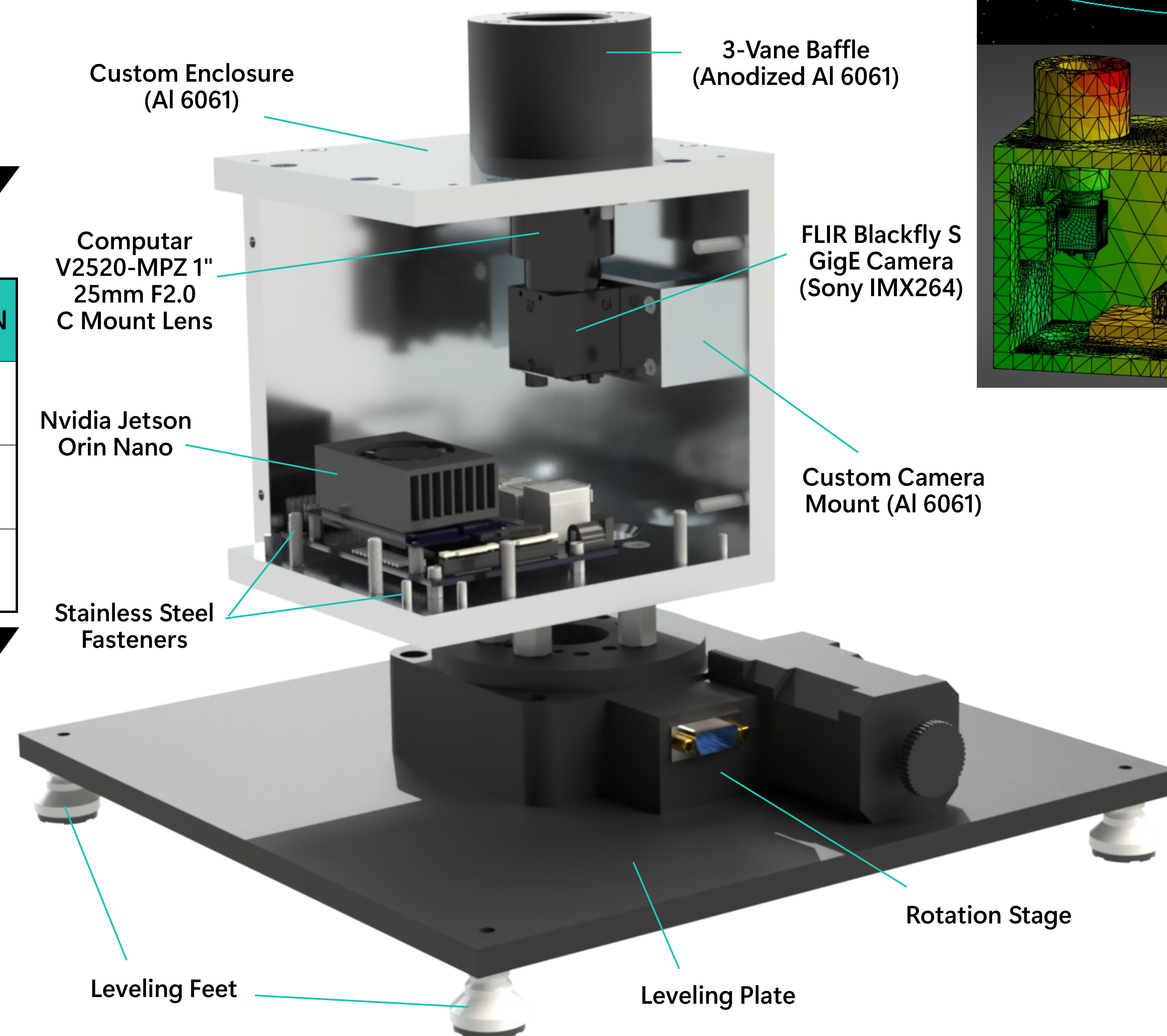
SIZING & COST	SOFTWARE	ELECTRONICS	ATTITUDE & APPLICATION
✓ Size < 1' x 1' x 1'	✓ Python	✓ < 50 Watts	✓ 20 arcseconds (Precision ± 5 arcseconds)
✓ < 5 kg (~11 lbs)	✓ Output Quaternions	✓ 26-34 Volts	✓ Field-of-view < 55°
✓ < \$5,000	✓ 0.5-1.5 fps	✓ 4 year life* (when flight ready)	✓ Geostationary Earth Orbit

## SOFTWARE BLOCK DIAGRAM

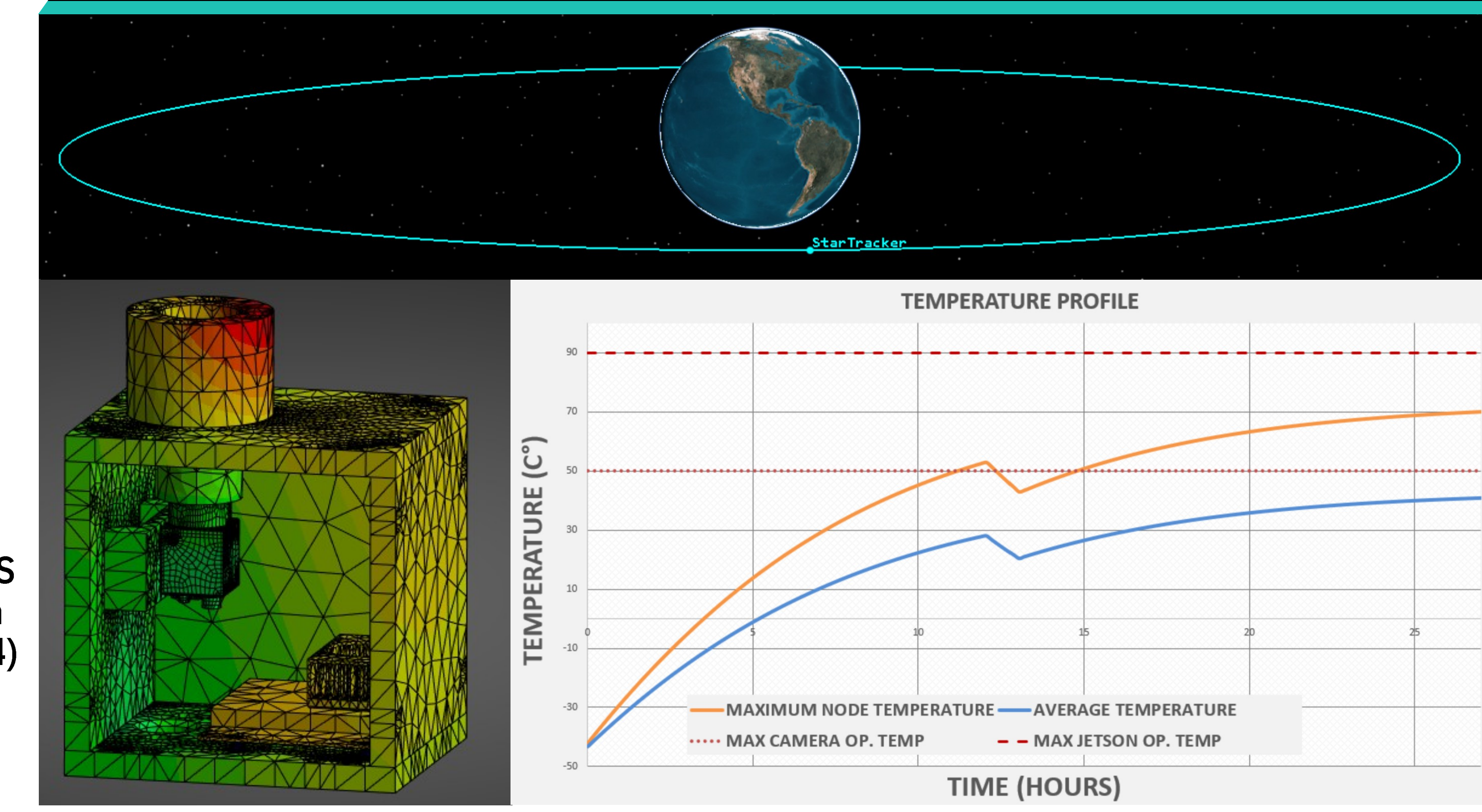


## DESIGN OVERVIEW

- Final form factor: 5" x 6" x 8"
- Mass: 3.85 kg (8.49 lbs)
- Externally powered
- Radiation resistant



## ENVIRONMENTAL MODEL



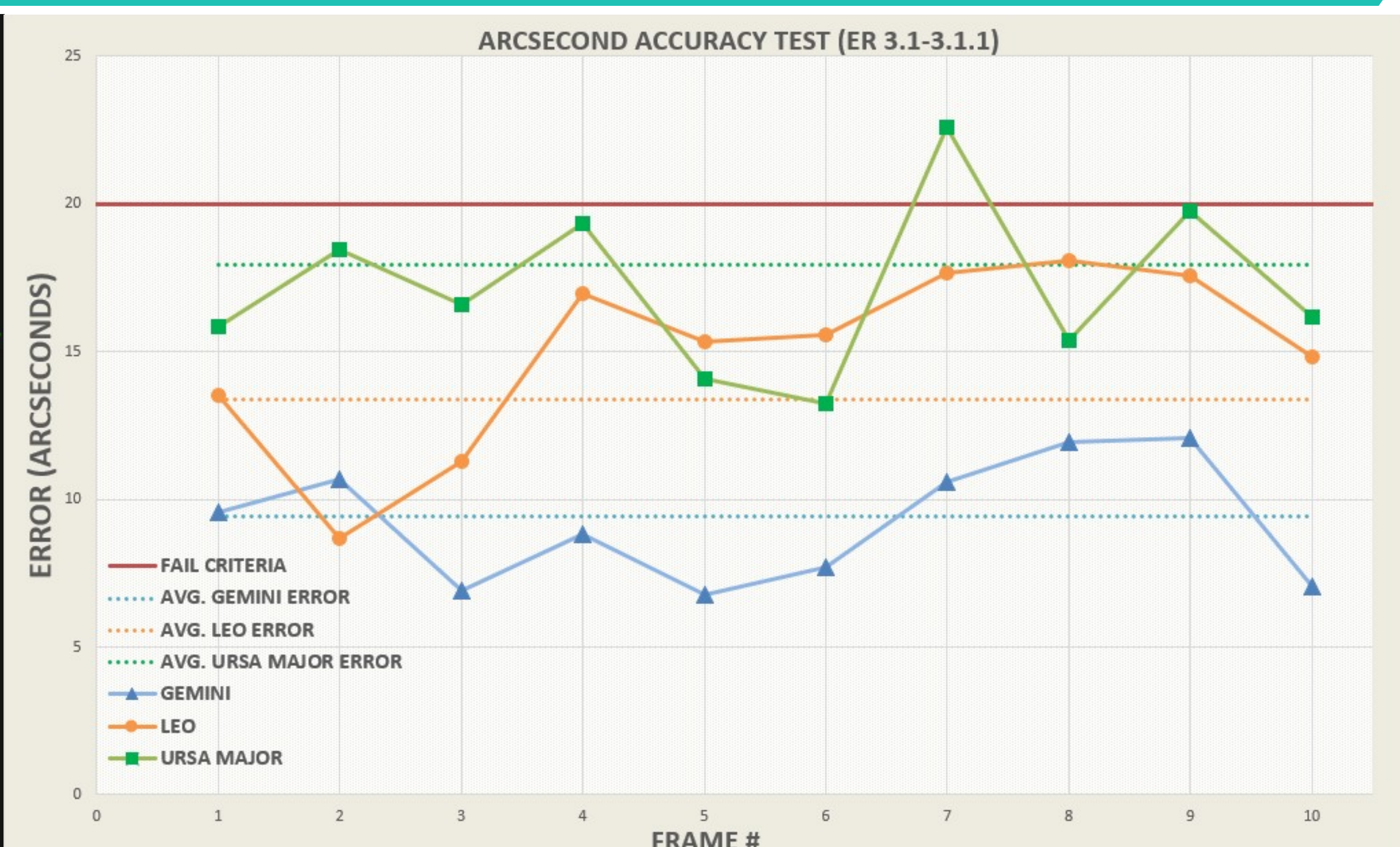
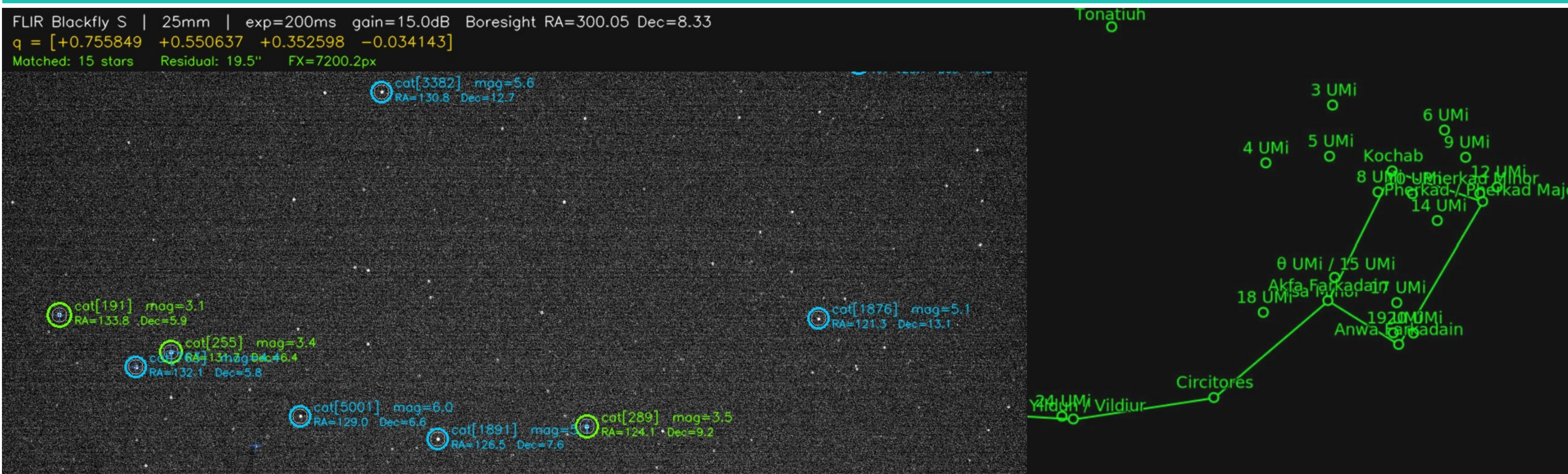
## COST PROFILE

Total estimated cost to produce: \$3,643.79 per assembly

- 10 custom machined parts: \$1,933.28 (Includes labor, tooling, equipment, and overhead)
- 71 fasteners and 6 commercial off-the-shelf parts

Estimated Costs	Cost for One Unit	Cost for 10,000 Units
Flight Ready Star Tracker	\$10,000 to produce	\$100 Million to produce
Competitor	\$150,000 to purchase	\$1.5 Billion to purchase

## TESTING & RESULTS



## NEXT STEPS

Develop flight ready system via:

- Vibration analysis & testing
- Selecting flight ready materials
- TVAC testing
- Radiation fault testing
- Optimize volume
- Decrease mass
- Mitigate high camera temps

A SPECIAL THANKS TO:

Nic Burger | Nick Conant | Toni Erwin | Dr. James Harper | Andy Kain | Dr. Daria Kotys-Schwartz | Victoria Lanaghan | Chase Logsdon | Patrick Maguire | Patrick McSpadden | Greg Potts | Dr. Greg Rieker