AURIA — Commercial-off-the-shelf (COTS) Planning & Scheduling Software

CPAW software has been deployed to operational small satellite missions. CPAW couples high fidelity spacecraft modeling with multiple advanced scheduling algorithms and a user-friendly interface to generate optimized collection plans for one or more satellites of various missions and sensor phenomenologies.

High-Fidelity Satellite & Ground Station Models

- **Slew Model –** Spacecraft/sensor attitude before and after imaging events
- **Imaging Model –** Imaging Modes & Targeting (Agile/Pushbroom/Beam/Frame)
- **Data Storage Model –** Record, playback, unprotect, delete
- **Power Model –** Battery charging and depletion, and/or duty cycle limits
- **Contact Scheduling Model –** Ground Station Location, Obscuration Masks

Operational Constraints

- **High Gain Antenna Constraints** (agility, blockages, discontinuities)
- **Bright Object Constraints** (sensor pointing to sun, moon, earth, sun glint)
- **Weather Constraints** (AFWA and NOAA GRIB cloud forecasts)
- **System Timing Constraints** (mission specific spacecraft timing constraints)
- **Target Access Constraints** (GSD, azimuth, incidence, sun angle, stereo, etc.)
- **Area Constraints** (South Atlantic Anomaly, sensor keep-out zones, etc.)

Advantage of COTS

- Rapid Deployment
- Inexpensive Sustainment
- Comprehensive REST API
- Feature Rich
- Lower Risk & Dependable
- Proven Operational Software
- Community of Users
- Dedicated Support Team
- Built on Years of Experience

Optimized Collection Planning

- Optimized Constellation Collection Planning
- Configurable Figure of Merit
- Automated Collection Planning Algorithms
- Manual Planning Option
- Collection Plan Map & Globe Visualization
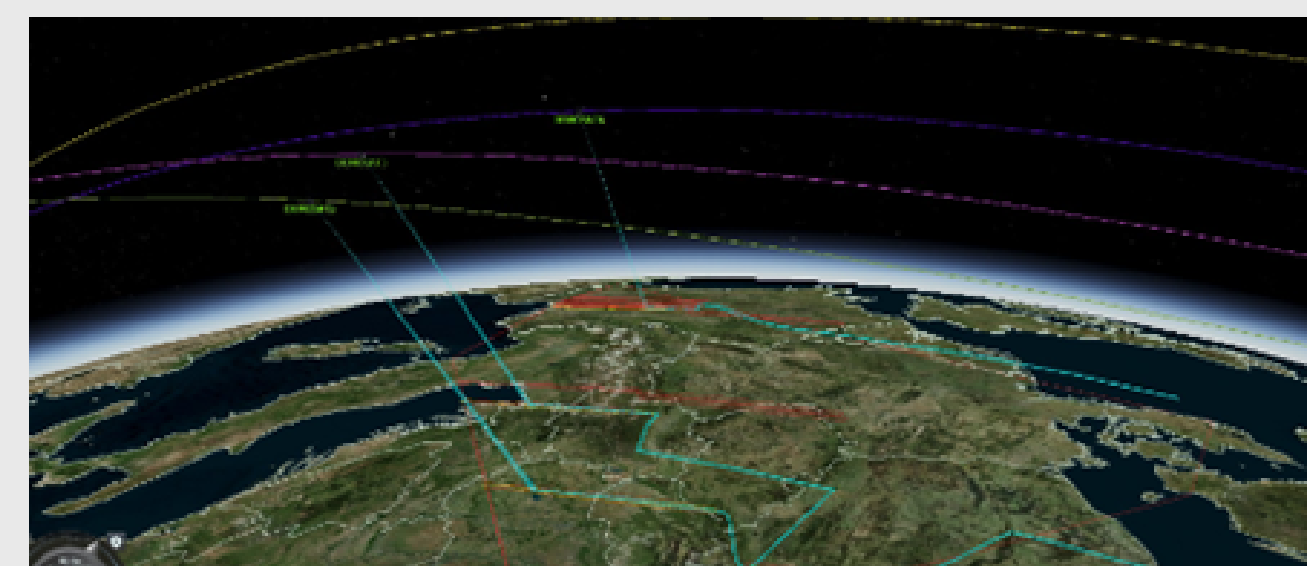
SatVu

Mission: To capture the highest resolution thermal data, from space, for a safer and more sustainable Earth

About SatVu

- High resolution thermal imagery
- Near real-time infrared technology
- Globally scalable with uniform coverage
- Night monitoring

Imaging Specifications

- High resolution - 3.5m GSD NADIR
- Mid-infrared - 3.4-5.0 μm
- Sensitivity - <2K
- Video - up to 60 sec @ 25 frames/sec
- Day & Night Imaging

Satellite Constellation Specs

- Targeting 9 Satellite constellation - 2 in Polar, 7 in MIO
- 10 – 20 revisits per day over same target
- Global coverage
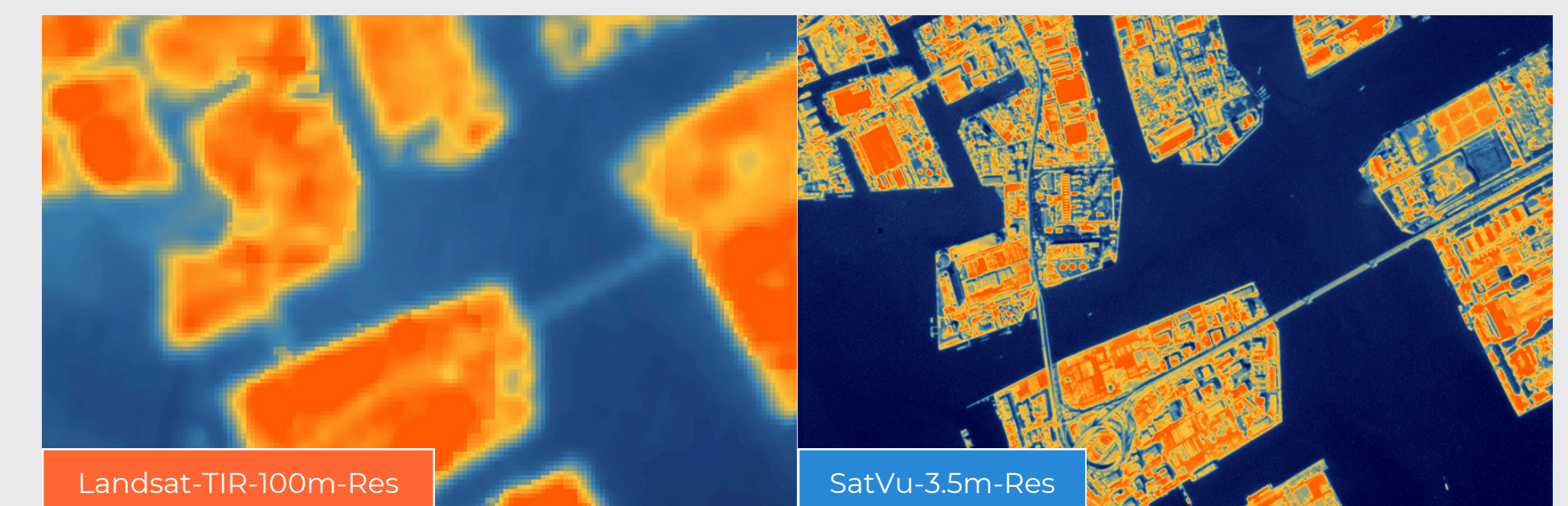- Agile bus/camera
- Fully tasked from web-based platform
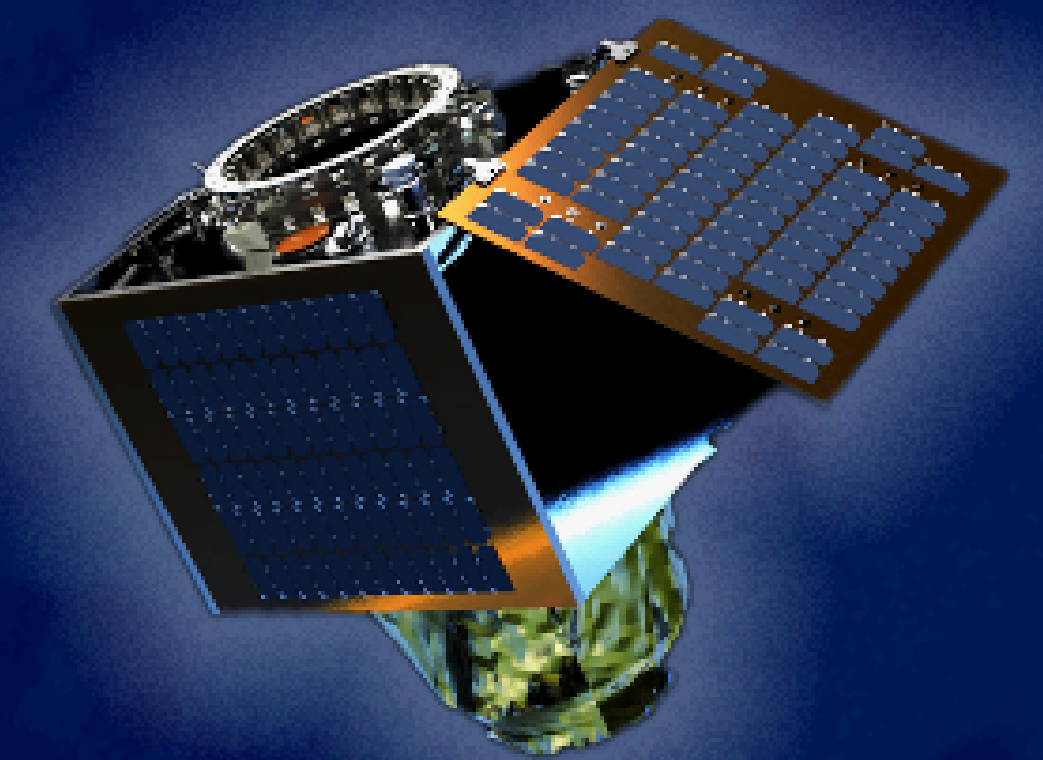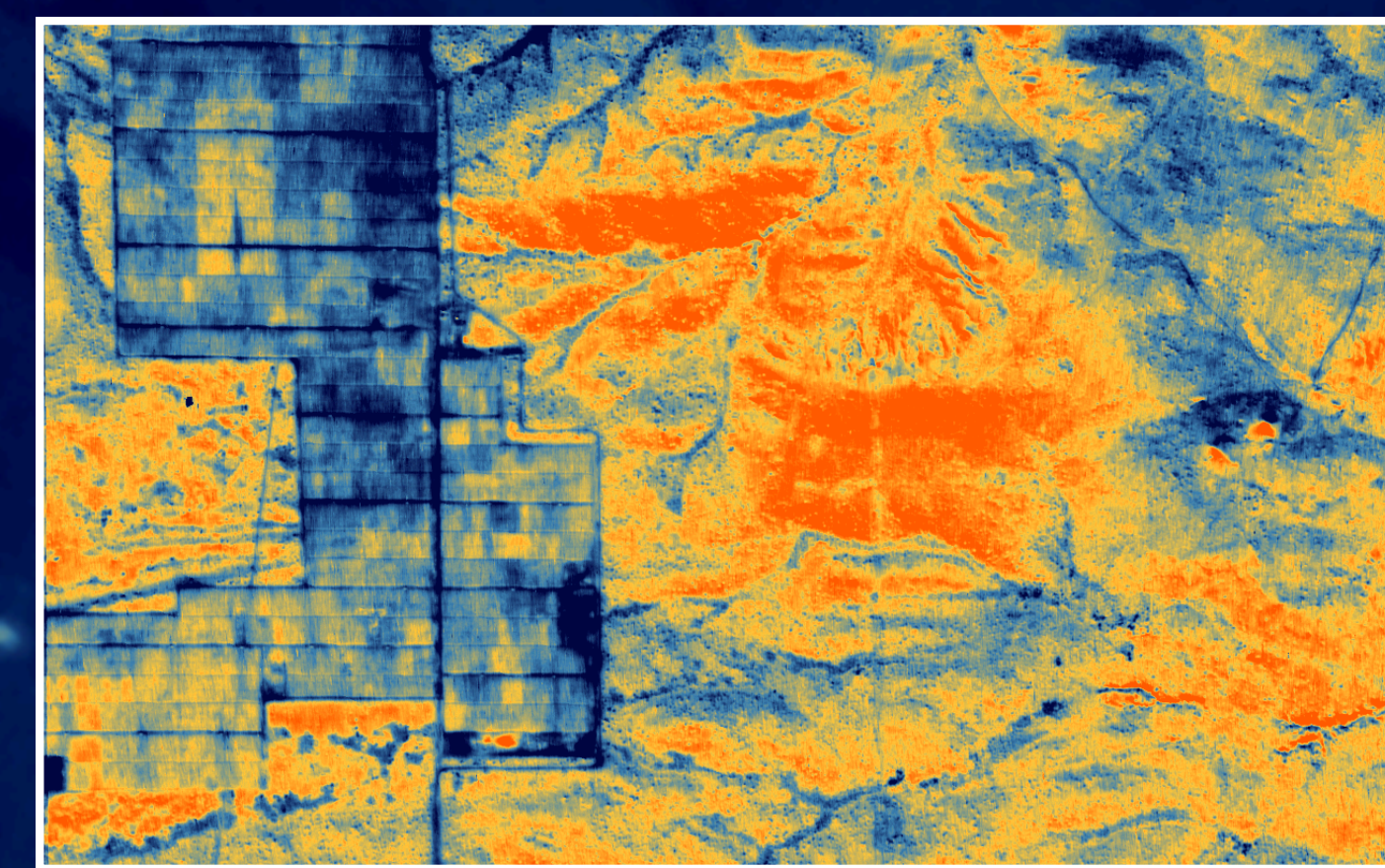
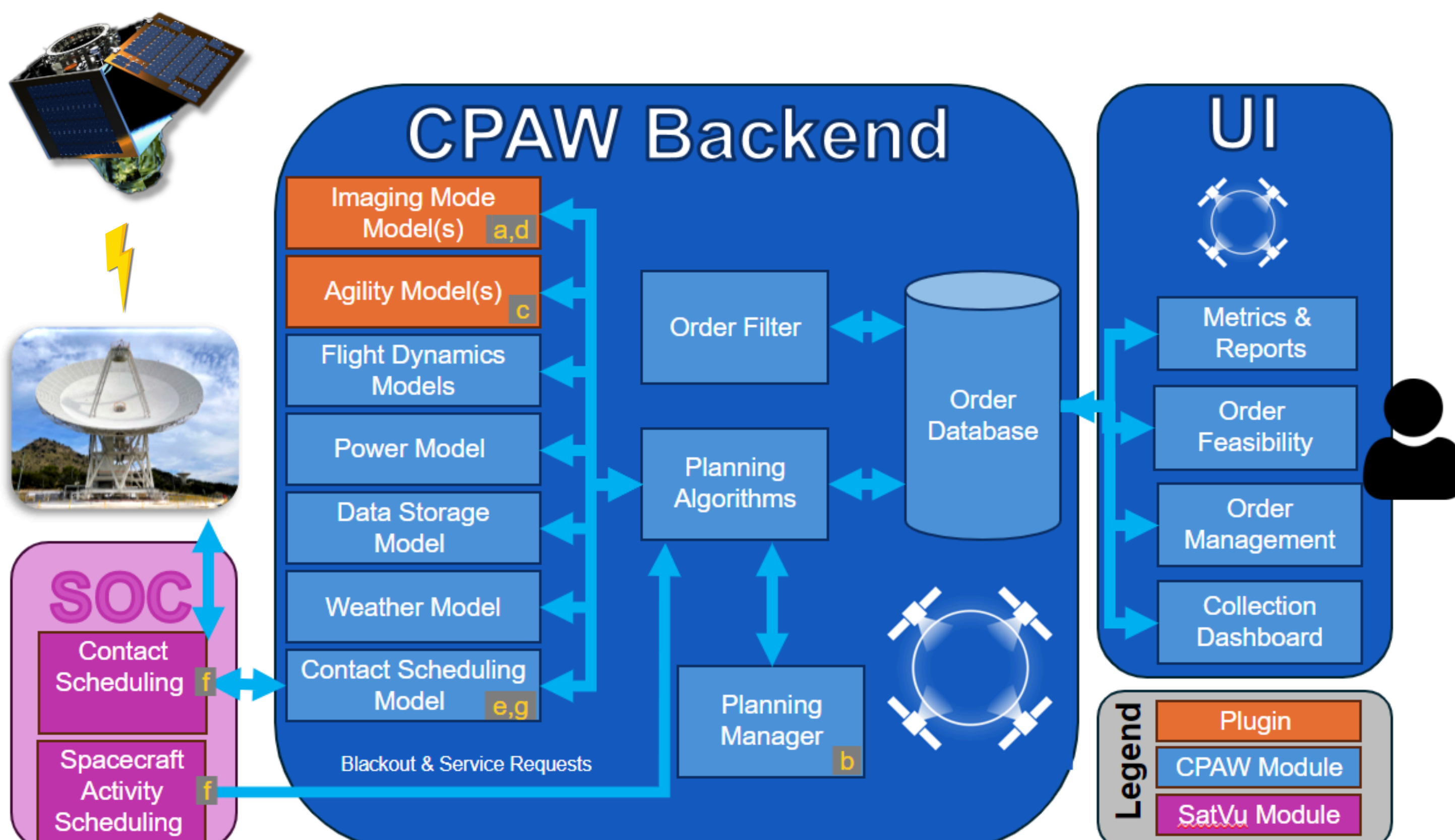### CPAW for Thermal Imaging

SatVu Targeted Imaging:
- Higher resolution
- Concentrated targeting
- Larger solution space
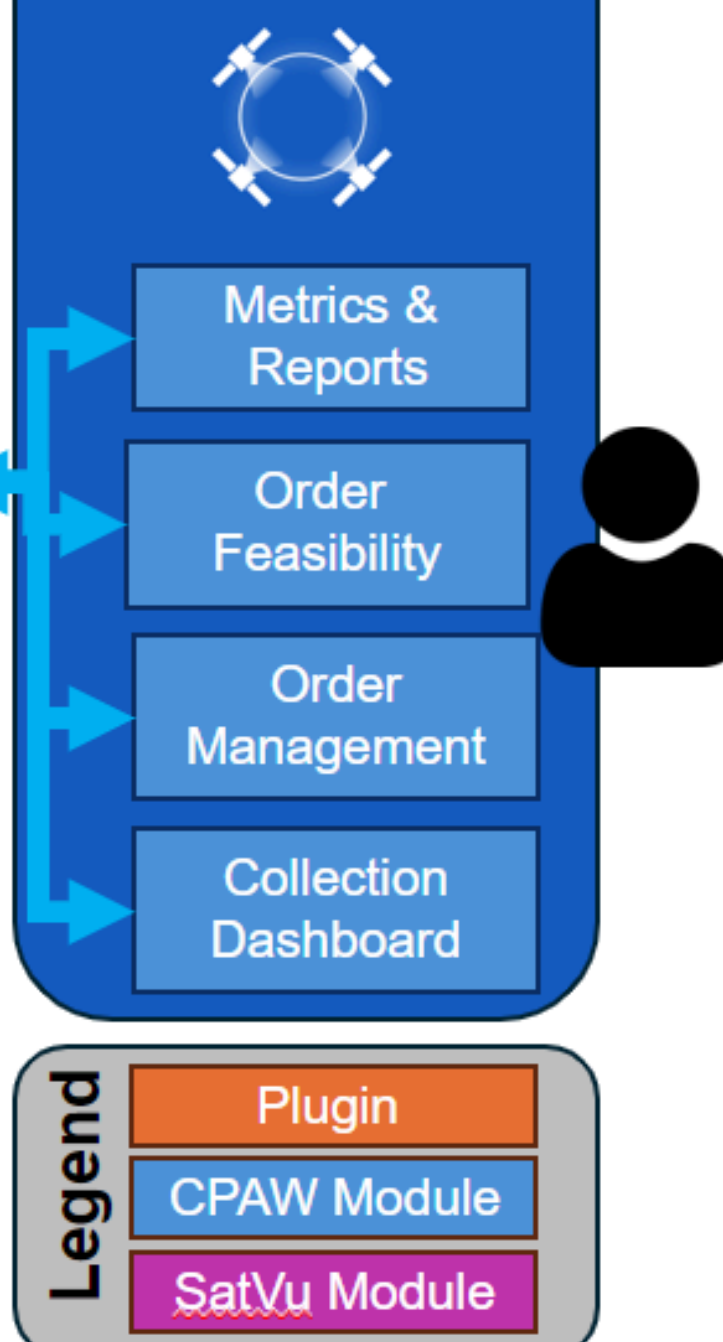
Landsat Comprehensive Coverage:
- Lower resolution
- More area imaged

Landsat-TIR-100m-Res | SatVu-3.5m-Res

CPAW Backend

- Imaging Mode Model(s) [a,d]
- Agility Model(s) [c]
- Flight Dynamics Models
- Power Model
- Data Storage Model
- Weather Model
- Contact Scheduling Model [e,g]
- Order Filter
- Order Database
- Planning Algorithms
- Planning Manager [b]
- Blackout & Service Requests

SOC
- Contact Scheduling [f]
- Spacecraft Activity Scheduling [f]

UI
- Metrics & Reports
- Order Feasibility
- Order Management
- Collection Dashboard

Legend
- Plugin
- CPAW Module
- SatVu Module

SatVu Mission Solution in CPAW

CPAW was configured to satisfy ~85% of the mission needs out of the box. The following mission specific updates met the remaining requirements:

a. **Thermal Model –** Thermal constraints are applied via configurable sensor duty cycles
b. **Freeze Time Model –** A defined time within the SatVu plan where changes are no longer accepted
c. **Slew Model –** Eigenvalue-based rotation model & unique timing between images, downlinks, & cruise events
d. **Imaging Model –** Additional attitude constraints to mandate off-nadir imaging
e. **Ground Station Tracking –** Slewing the spacecraft to point the antenna to the ground station during contacts
f. **Interfaces –** RESTful OGC SPS Interface standard for tasking request, response, cancel, & status
g. **Contact Schedule Optimization –** Imaging plan driven contact scheduling to minimize communication cost

Contact: Neil Dhingra
Director – Optimization & Machine Learning, *Auria*
neil.dhingra@auria.space

Contact: Georgina Orso
Head of Marketing, *SatVu*
georgina.orso@satellitevu.com

Discover More & What's Next!