aquila space
OPEN TECHNOLOGY FOR SPACE

Open Design: A New Approach for CubeSats

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Introduction

- Corvus-BC 6U overview

- Subsystems to be open sourced
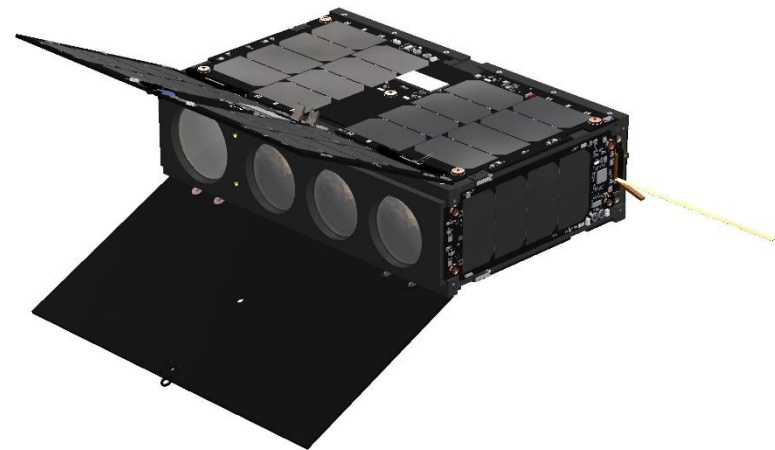
- Export control

- Future Rollout

Corvus-BC Overview

- 6U Form-factor
- 11 kg
- Imaging solution: 22 m GSD at 600 km, Red, Green, NIR spectral bands
- Flight computer: ARM A8 running Linux
- Power system: scalable 40Wh Li-Ion
- Communication: UHF transceiver running at 19.2 kbps for TT&C. Payload data is downlinked through Ka-band at 40 Mbps
- Solar panels: ARM M0+ processor, temperature, magnetometers sun sensors and magnetorquer coils
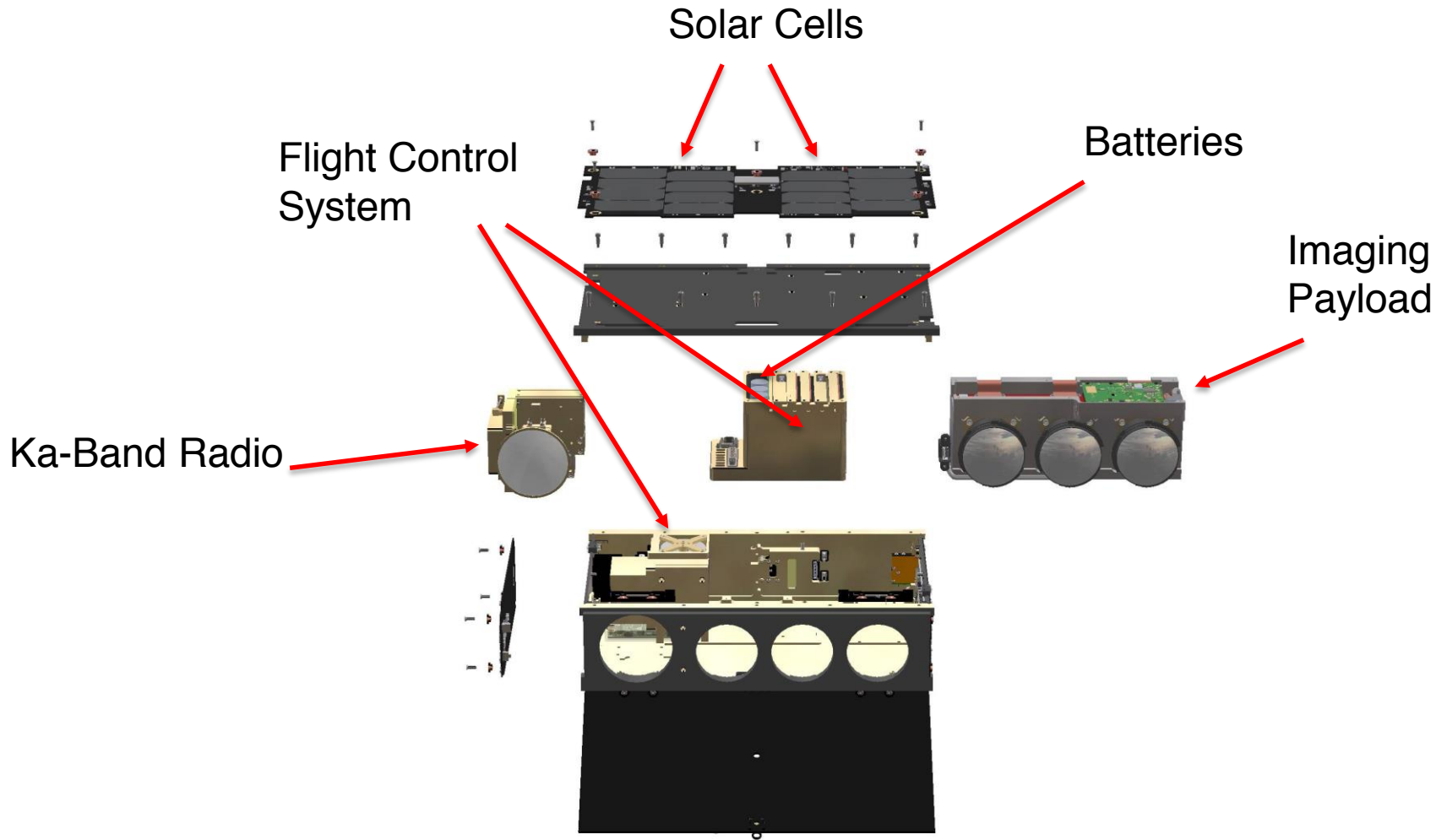- Control: 3-axis with three reaction wheels, star tracker, GPS and gyro
- Storage: 1 TB

Corvus-BC Overview

Solar Cells

Flight Control System

Batteries

Imaging Payload

Ka-Band Radio

Corvus-BC Overview

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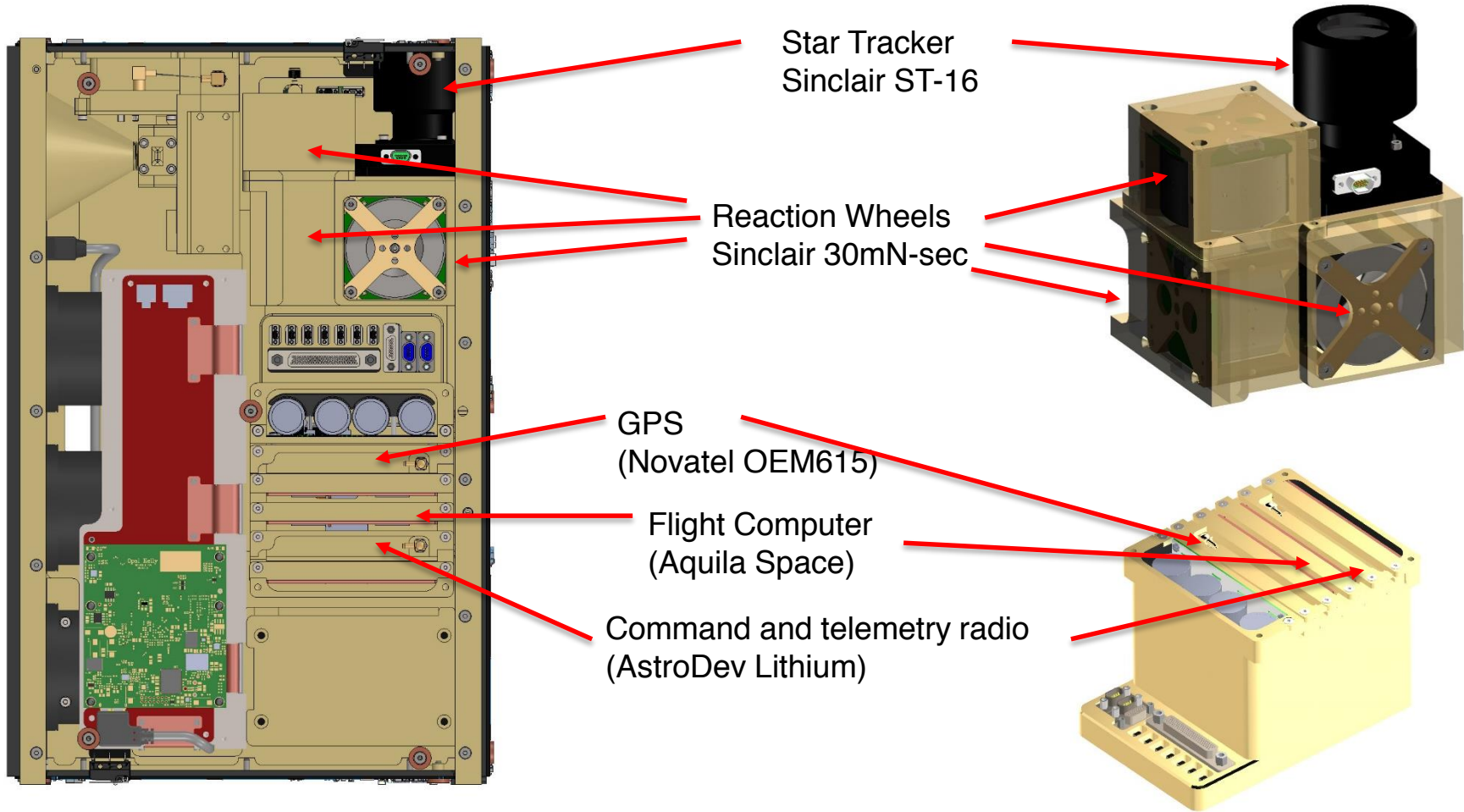
Ka-Band Radio

Star-tracker & Reaction Wheels

Imaging Payload

Flight Control System ("the rack")

- Batteries
- GPS
- UHF TT&C Radio
- Flight Computer

Corvus-BC Overview

Star Tracker
Sinclair ST-16

Reaction Wheels
Sinclair 30mN-sec

GPS
(Novatel OEM615)

Flight Computer
(Aquila Space)

Command and telemetry radio
(AstroDev Lithium)

To be open sourced

Star-tracker & Reaction Wheels

Flight Control System ("the rack")
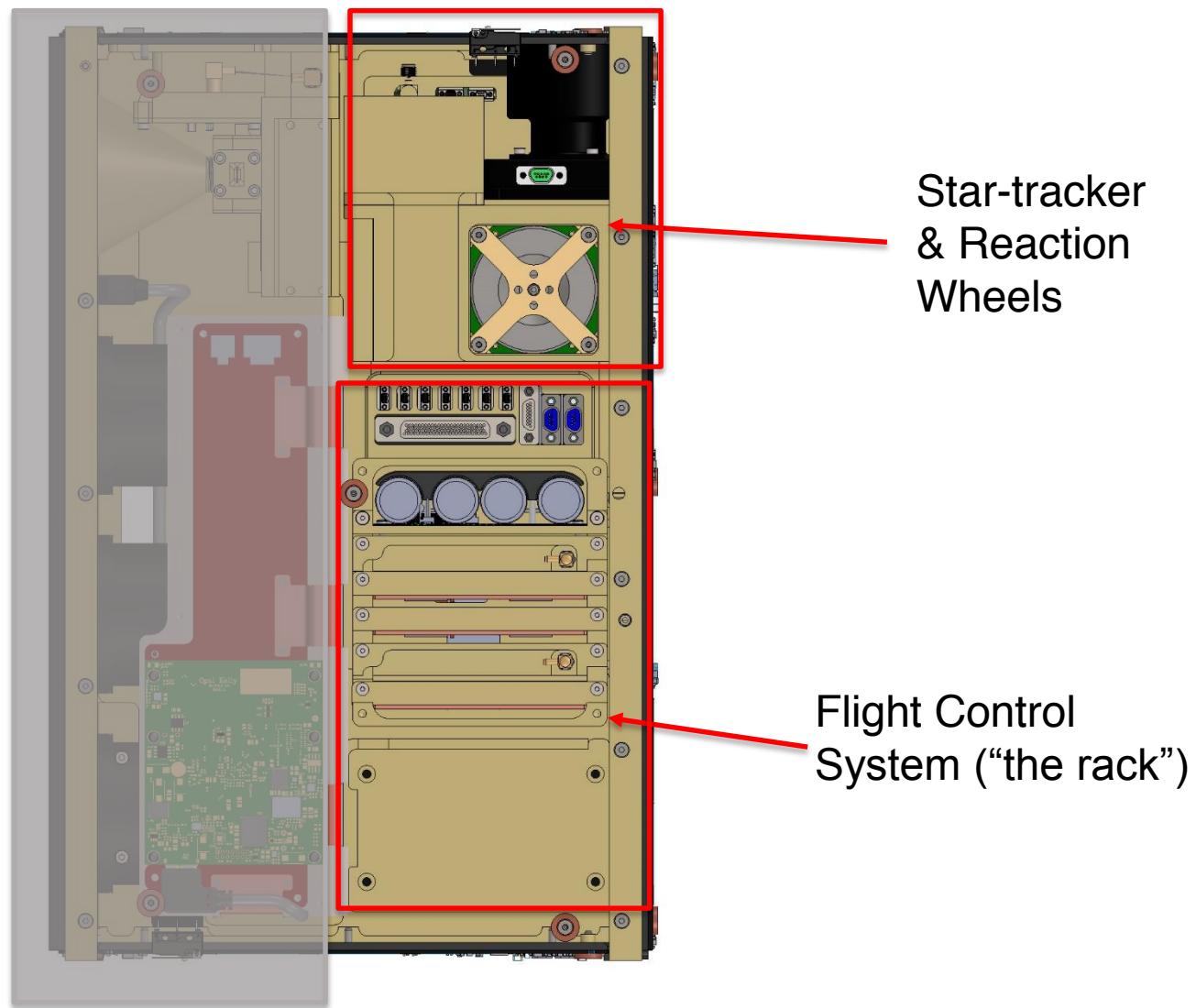
Technology included

- Source Code

- Schematics (Altium)

- PCB Layout files (Altium)

- Bill of materials

- Drawings (Solidworks)

- Part files (Solidworks)

- Testing procedures

- Assembly procedures

- Harness diagrams

GPL License

Motivation

- Reduce the price of remote sensing data

- Create a larger developer community that together can develop cheaper and more robust hardware/software space systems

- Enable faster technology integration

- Reduce the spacecraft costs while improving the reliability

- Changing company focus from hardware-centeric to data-centeric business model

Open Source is not a business model

Who can participate?

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- Initial release will be to individuals and organizations in the A5 Country Group:

Argentina	France	Luxembourg	Switzerland
Australia	Germany	Netherlands	Turkey
Austria	Greece	New Zealand	United Kingdom
Belgium	Hungary	Norway	
Bulgaria	Iceland	Poland	
Canada	Ireland	Portugal	
Croatia	Italy	Romania	
Czech Republic	Japan	Slovakia	
Denmark	Korea, South	Slovenia	
Estonia	Latvia	Spain	
Finland	Lithuania	Sweden	

(and also the United States)

Community Platform

- A password protected community website will be setup
    - Technical files, wiki pages, bug tracker, email list, forums, etc
    - Similar to GitHub or Trac

- Users must create accounts, sign US Dept. of Commerce forms, and be authenticated

- Once on the site technical data can be exchanged in full compliance of EAR laws and regulations within the community website

- All of our technology is now controlled under EAR (not under ITAR)
    - All updates/patches/fixes must be ITAR free

Look for early adopters

- We are actively looking for early adopters
  - Universities
  - Companies
  - Individuals

- Future directions (let's brainstorm!)
  - New ADCS algorithms
  - Propulsion
  - Local Ethernet (within the spacecraft)
  - Firecode/backdoor spacecraft reset receiver
  - Ground segment (software & hardware)
  - What else?...

Questions?

I'm here all week … please
come find me!