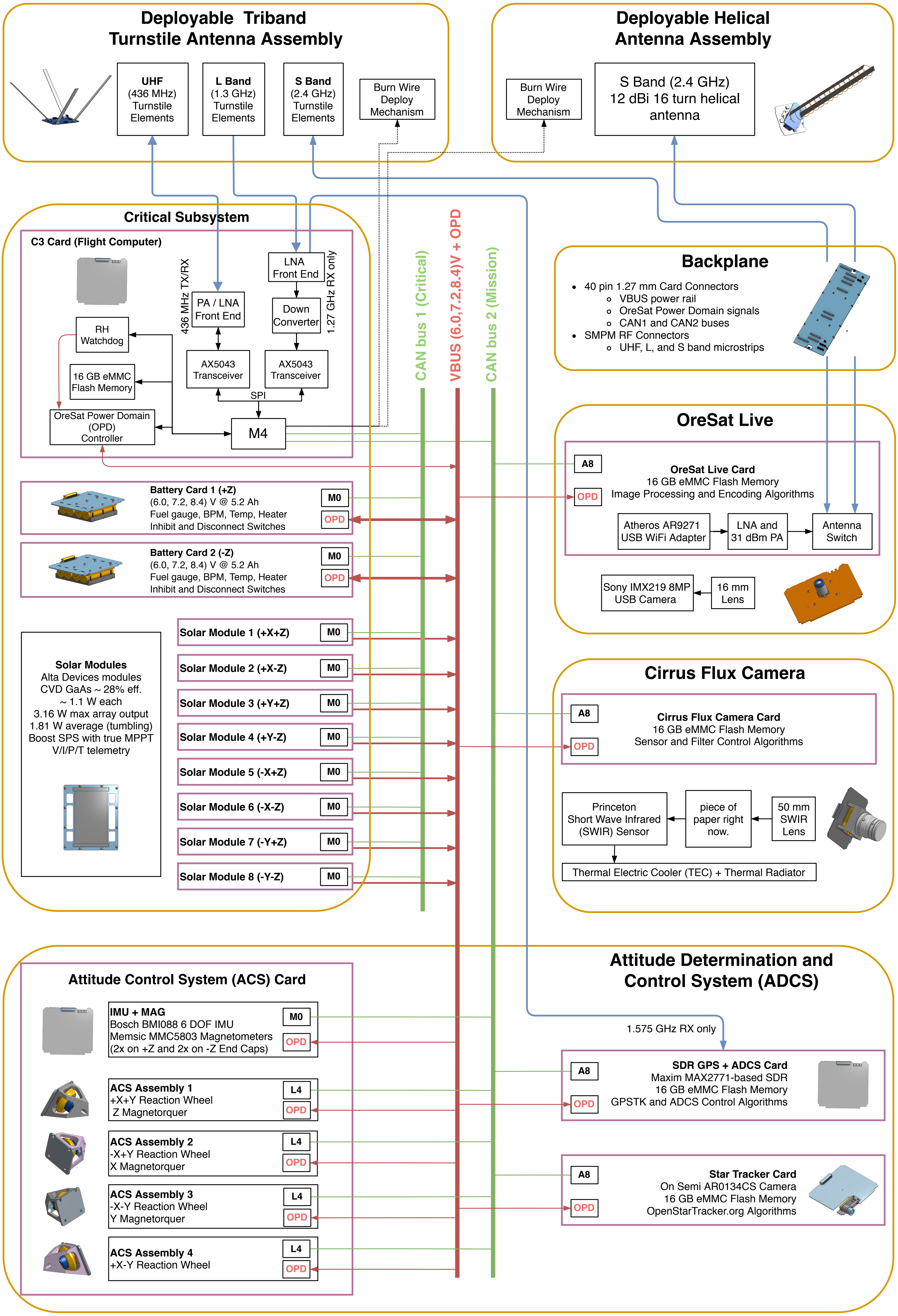


Deployable Triband Turnstile Antenna Assembly

UHF (436 MHz) Turnstile Elements

L Band (1.3 GHz) Turnstile Elements

S Band (2.4 GHz) Turnstile Elements

Burn Wire Deploy Mechanism

Deployable Helical Antenna Assembly

Burn Wire Deploy Mechanism

S Band (2.4 GHz) 12 dBi 16 turn helical antenna

Critical Subsystem

C3 Card (Flight Computer)

RH Watchdog

16 GB eMMC Flash Memory

OreSat Power Domain (OPD) Controller

436 MHz TX/RX

PA / LNA Front End

AX5043 Transceiver

1.27 GHz RX only

LNA Front End

Down Converter

AX5043 Transceiver

SPI

M4

Battery Card 1 (+Z)
(6.0, 7.2, 8.4) V @ 5.2 Ah
Fuel gauge, BPM, Temp, Heater
Inhibit and Disconnect Switches
M0
OPD

Battery Card 2 (-Z)
(6.0, 7.2, 8.4) V @ 5.2 Ah
Fuel gauge, BPM, Temp, Heater
Inhibit and Disconnect Switches
M0
OPD

Solar Modules
Alta Devices modules
CVD GaAs ~ 28% eff.
~ 1.1 W each
3.16 W max array output
1.81 W average (tumbling)
Boost SPS with true MPPT
V/I/P/T telemetry

Solar Module 1 (+X+Z) M0

Solar Module 2 (+X-Z) M0

Solar Module 3 (+Y+Z) M0

Solar Module 4 (+Y-Z) M0

Solar Module 5 (-X+Z) M0

Solar Module 6 (-X-Z) M0

Solar Module 7 (-Y+Z) M0

Solar Module 8 (-Y-Z) M0

CAN bus 1 (Critical)

VBUS (6.0,7.2,8.4)V + OPD

CAN bus 2 (Mission)

Backplane

- 40 pin 1.27 mm Card Connectors
  - VBUS power rail
  - OreSat Power Domain signals
  - CAN1 and CAN2 buses
- SMPM RF Connectors
  - UHF, L, and S band microstrips

OreSat Live

A8

OPD

OreSat Live Card
16 GB eMMC Flash Memory
Image Processing and Encoding Algorithms

Atheros AR9271 USB WiFi Adapter

LNA and 31 dBm PA

Antenna Switch

Sony IMX219 8MP USB Camera

16 mm Lens

Cirrus Flux Camera

A8

OPD

Cirrus Flux Camera Card
16 GB eMMC Flash Memory
Sensor and Filter Control Algorithms

Princeton Short Wave Infrared (SWIR) Sensor

piece of paper right now.

50 mm SWIR Lens

Thermal Electric Cooler (TEC) + Thermal Radiator

Attitude Determination and Control System (ADCS)

Attitude Control System (ACS) Card

IMU + MAG
Bosch BMI088 6 DOF IMU
Memsic MMC5803 Magnetometers
(2x on +Z and 2x on -Z End Caps)
M0
OPD

ACS Assembly 1
+X+Y Reaction Wheel
Z Magnetorquer
L4
OPD

ACS Assembly 2
-X+Y Reaction Wheel
X Magnetorquer
L4
OPD

ACS Assembly 3
-X-Y Reaction Wheel
Y Magnetorquer
L4
OPD

ACS Assembly 4
+X-Y Reaction Wheel
L4
OPD

1.575 GHz RX only

A8

OPD

SDR GPS + ADCS Card
Maxim MAX2771-based SDR
16 GB eMMC Flash Memory
GPSTK and ADCS Control Algorithms

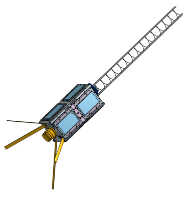
A8

OPD

Star Tracker Card
On Semi AR0134CS Camera
16 GB eMMC Flash Memory
OpenStarTracker.org Algorithms

OreSat Block Diagram

Oregon's First satellite
www.oresat.org
V5.0 2020/04/21



M0 = ST STM32F046K6 48 MHz 32 bit ARM Cortex-M0 running ChibiOS
L4 = ST STM32L452RE 80 MHz 32 bit ARM Cortex-M4F running ChibiOS
M4 = ST STM32F446 168 MHz 32 bit ARM Cortex-M4F running ChibiOS
A8 = Octavo OSD335x-SM 1 GHz 32 bit ARM Cortex-A8 running Linux
OPD = OreSat Power Domain (power bus + I2C card power control)