Deployable Triband Turnstile Antenna Assembly

UHF (436 MHz) Turnstile Elements

L Band (1.3 GHz) Turnstile Elements

L1 Band (1.575 GHz) Turnstile Elements

Burn Wire Deploy Mechanism

Deployable Helical Antenna Assembly

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

Burn Wire Deploy Mechanism

Critical Subsystem

C3 Card (Flight Computer)

436 MHz TX/RX

1.27 GHz RX only

LNA Front End

PA / LNA Front End

Down Converter

RH Watchdog

16 GB eMMC Flash Memory

OreSat Power Domain (OPD) Controller

AX5043 Transceiver

AX5043 Transceiver

SPI

M4

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

Solar Modules
2x Spectrolabs XTE-SF
30% eff. GaAs
7.3 W / module
20.7 W max array output
VSIC 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

Qorvo TQP9111 PA + TQP3M9037 LNA

Sony IMX214 8MP USB Camera

COTS 25 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

Frequency Filters

25 mm SWIR Lens

Thermal Electric Cooler (TEC) + Thermal Radiator

ADCS 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

Attitude Determination and Control System (ADCS)

1.575 GHz RX only

SDR GPS Card
Maxim MAX2771-based GPS Receiver
16 GB eMMC Flash Memory
GNSS-SDR and ADCS Algorithms
A8
OPD

Star Tracker Card
On Semi AR0134CS Camera
16 GB eMMC Flash Memory
OpenStarTracker.org Algorithms
A8
OPD

OreSat0.5 Block Diagram
www.oresat.org
V5.5 2022/12/28

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)

= Subsystem = PCB = Power = Comm. = RF