Structural:

1. The structure shall conform to the mechanical specifications for a 1U CubeSat as defined in the CubeSat Design Specification rev. 13.
2. The structure shall include two rail-mounted deployment switches in addition to the foot-mounted switch specified in the CDS.
3. The interior of the structure shall include four threaded rods whose dimensions conform to the PC/104 Specification v2.6 for mounting internal electronics.
4. The exterior of the structure shall accommodate the mounting of solar panels and associated electrical wiring.
5. The exterior of the structure shall accommodate the mounting of antennas and associated tie-downs and burn wires.
6. The exterior of the structure shall provide access to charging and programming ports.
7. The as-built structure shall conform to the tolerances listed in the 1U CubeSat acceptance checklist.
8. The structure shall use metric fasteners.

Electrical (Motherboard):

1. The spacecraft motherboard shall conform to the mechanical specifications in the PC/104 Specification v2.6.
2. Materials used shall be compliant with the outgassing specifications in the CubeSat Design Specification rev. 13.
3. The spacecraft motherboard shall have connectors for six solar panels.
4. The spacecraft motherboard shall accommodate four 18650 battery cells in through-hole or surface-mount battery holders.
5. The spacecraft motherboard shall include a solar battery charging circuit.
6. The spacecraft motherboard shall be capable of monitoring battery voltage and charging current.
7. The spacecraft motherboard shall include 3.3 volt and 5 volt power regulators capable of supplying at least 1 amp of current.
8. The spacecraft motherboard shall include an ARM microcontroller capable of running CircuitPython.
9. The spacecraft motherboard shall include a 3-axis gyroscope
10. The spacecraft motherboard shall include a 3-axis magnetometer.
11. The spacecraft motherboard shall include two burn-wire circuits.
12. The spacecraft motherboard shall include three H-bridge circuits capable of driving magnetic torque coils.
13. The spacecraft motherboard shall include a Telemetry & Command radio capable of transmitting and receiving in the 70 cm band with a TX power of at least 500 mW.
14. The spacecraft motherboard shall include externally accessible ports for charging and programming.
15. The spacecraft motherboard shall provide power and data interfaces to the payload.

Electrical (Solar Panels):

1. Solar panels shall be mounted to all six external faces of the spacecraft.
2. Materials used shall be compliant with the outgassing specifications in the CubeSat Design Specification rev. 13.
3. Each solar panel shall have an open-circuit voltage of at least 8.4 volts.
4. Each solar panel shall provide a peak power of at least 1 Watt.
5. Each solar panel shall include bypass and reverse-protection diodes.
6. Each solar panel shall include a magnetic torque coil.
7. Solar panels shall include burn wires and tie-downs for antenna deployment.
8. At least one solar panel shall include a GPS patch antenna.

Electrical (Antenna):

1. The antenna system shall accommodate both the T&C radio and the payload radio with matched 50 ohm connections.
2. The antenna system shall conform to the mechanical specifications in the CubeSat Design Specification rev. 13 in its launch configuration.
3. Materials used shall be compliant with the outgassing specifications in the CubeSat Design Specification rev. 13.
4. The antenna system shall be deployed using a burn wire and tie down arrangement.
5. The antenna system shall have an isotropic gain pattern.

Flight Software and ADCS:

1. The flight software shall include delay timers for deployables and radio transmissions in accordance with the CubeSat Design Specification rev. 13.
2. The flight software shall transmit a beacon signal containing spacecraft health and telemetry data at least once per minute under normal operating conditions.
3. The flight software shall include a low-power “safe mode.”
4. The flight software shall
5. The ADCS system shall be capable of detumbling the satellite from an initial angular velocity of 30 deg/sec about any axis.
6. Detumbling shall be completed within 24 hours of spacecraft deployment.
7. After detumbling, angular velocity shall be regulated to less than 1 deg/sec.
8. All ADCS functionality shall be implemented on the onboard ARM microcontroller.

Payload:

1. The payload shall conform to the mechanical specifications of the PC/104 Specification v2.6.
2. Materials used shall be compliant with the outgassing specifications in the CubeSat Design Specification rev. 13.
3. The payload shall include a single-board computer capable of running GNURadio.
4. The payload shall include a software-defined radio with a frequency stability of a 0.5 ppm or better capable of receiving signals from 400-440 MHz.
5. The payload shall include a GPS receiver for precision timing and orbit determination.

6. The payload interface with the motherboard shall include regulated power, a UART serial data connection between the single-board computer and the ARM microcontroller, and a master enable pin to that completely powers off the payload when pulled low.
7. A port to allow programming of the single-board computer shall be accessible from the outside of the spacecraft.