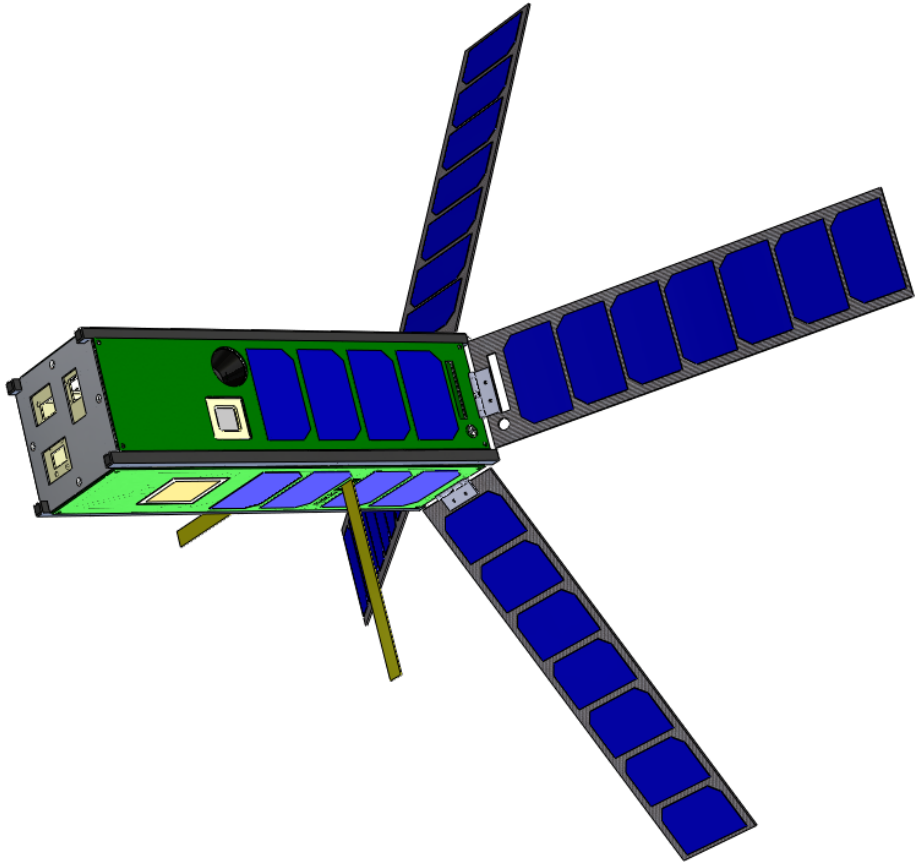
CADRE

CubeSat Investigating
Atmospheric
Density
Response to
Extreme Driving



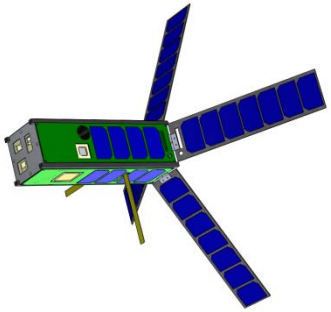
University of Michigan
CHDC Presentation

April 19, 2012

CADRE Communications Snapshot

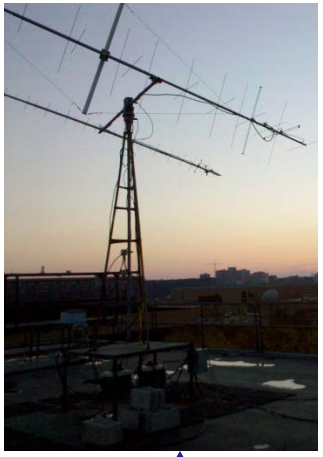
Low-rate Command Link
FSK, 9.6 kbps, No coding

CADRE



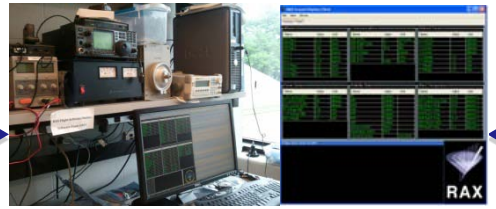
High-rate Science Data Link
S-band
BPSK/QPSK, <1 Mbps, Reed-Solomon coding

Low-rate Health Link
UHF, 437 MHz
FSK, 9.6 kbps, No coding



UMich Yagi Antenna

Options:
Umich SRB Dish
Peach Mountain
Others



Umich Ground Station

COM Overview

- Required science downlink rate of > 0.25 Mbps
  - WINCS payload drives requirement
- Radios
  - UHF: AstroDev Lithium-1
  - S-Band: Trade study (NRL Nimitz, Quasonix nanoTx)
- Ground station:
  - UHF: University of Michigan
  - S-Band: Trade study underway
- Antenna
  - UHF: Flexible stainless steel monopole antennas
  - S-Band: Custom circular polarized patch antennas

S-Band Licensing

- Option 1: NTIA Licensed Science Research Band (2200 – 2290 MHz)
  - Current configuration of NRL radio set to transmit at 2.2GHz
  - Uncertainty in ability to obtain license
- Option 2: FCC Experimental License (3100 - 3300 MHz)
  - Reviewing radio capability
  - Developing application package
- Option 3: ISM Band (2400 - 2500 MHz)
  - Can change registers in RF chip to transmit in ISM Band at 2.4GHz
  - Interference with WiFi and Bluetooth
    - Frequency survey underway to determine feasibility

Exploring Option 2 for FCC experimental license