CubeSat Infrared Atmospheric Sounder (CIRAS)

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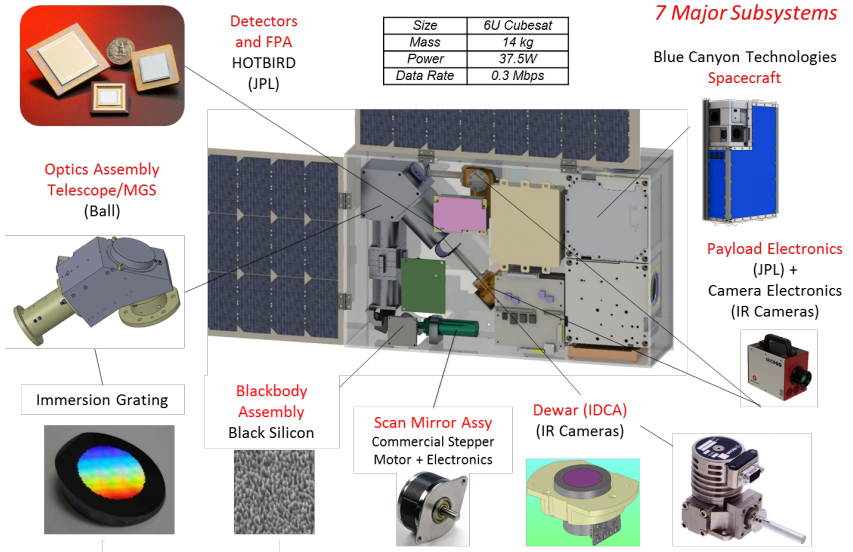
Objective

In-space validation of key technologies enabling high fidelity measurements of hyperspectral infrared radiances:

- Develop CIRAS as a 6U CubeSat atmospheric IR (4.08 – 5.13 microns) sounder to measure temperature and water vapor profiles with accuracy comparable to legacy IR sounders, e.g., AIRS on AQUA and CrIS on JPSS, but only in the lower troposphere (< 300 mb)
- Demonstrate key technologies for high accuracy infrared imaging and sounding including:
  - Hot-Bird Infrared Detector Materials
  - Lockheed Martin Micro Pulse Tube Cryocooler
  - MWIR Grating Spectrometer
- Perform retrievals of temperature and water vapor profiles in lower troposphere in MWIR to validate technology



Approach

- Develop CIRAS to test technologies for IR imaging and sounding in a CubeSat configuration
- Build and hybridize HOT-BIRD detectors to commercial ROIC, camera electronics and Dewar from IR Cameras
- Build new spectrometer based on proven grating spectrometer designs built at JPL and Ball Aerospace
- Develop immersed grating, black silicon slit and blackbody at JPL's MicroDevices Lab
- Integrate payload into Blue Canyon Technologies (BCT) 6U CubeSat
- Launch, acquire data, retrieve temperature and water vapor profiles covering at least 100 hours

Co-Is/Partners: UMBC, STC, BATC, IR Cameras, BCT

Key Milestones

• Preliminary System Requirements Review (SRR)	06/16
• Complete spacecraft conceptual design	02/17
• System Requirements Review (SRR)	05/17
• Complete payload subsystems and PDR/CDR	12/17
• Deliver payload to spacecraft bus integrator [Task Cancelled]	N/A
• Spacecraft delivery and Mission Readiness Review (MRR)	N/A
• Target Launch Date (NASA CSLI)	N/A
• Validate technologies for measurement of hyperspectral infrared radiances on 6U CubeSat	N/A

$TRL_{in} = 5$ $TRL_{current} = 5$