CT & DH

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Mission Requirements (1 of 3)

- Provide the Capability to Decode, Authenticate and Process Unencrypted CCSDS Commands Received Via the Uplink
- Execute Critical Commands Without CPU Interaction
- Execute Stored Commands
- Distribute Commands to All Subsystems
- Provide Capability to Transfer Specific Uplink Data to Instrument for Control and Reprogramming
- Communicate With Vehicle Subsystems
  - ADCS, RCS, EPS, TCS, RFS, OCS, and Instrument

Mission Requirements (2 of 3)

- Collect State-of-Health (SOH) Telemetry From All Subsystems
- Collect, Store, and Buffer Instrument Science Data
  - Memory Size: 4 Gbits
  - Maximum Data Rate of 4 Mbps
  - Average Rate of 320 Kbps
- Store Science and Telemetry Data During Downlink Outages
- Provide for Downlink Capability of 409.6 Kbps of Science and Telemetry Data
- Provide Error Control Coding and Interleaving to Downlink Data Stream
- Maintain and Distribute Spacecraft Time

Mission Requirements (3 of 3)

- **Manage Vehicle Attitude for Successful Mission Orbit Insertion, Stabilization, and De-orbit**
- **Provide for Time to Achieve “Safe Distance” Between Third Stage and Space Segment Before GTO Maneuvers**
- **Provide Power Management Capability**
- **Provide for an Interface to EAGE for Initial Integration**
- **Support T0 Interface to the Launch Vehicle**
- **Design Mission Life: 5 Years**

Component Requirements (1 of 2)

- Class B Parts Screening
- Radiation Tolerance: 12.5 Krads (Behind 200 Mils Al)
- Meet EMI Requirements
- Survive Launch Environment
- Power < 24 Watts
- Mass < TBD Pounds
- Input Operating Voltage: 30 +/- 6 Vdc
- Fully Redundant
- Operating Temperature Range: 0 to 40 C
- Survival Temperature Range: -20 to 60 C
- Perform Environmental Testing in Accordance With NCST-TP-FM001, FAME Test Plan

Component Requirements (2 of 2)

- **Fame Spacecraft Controller (FSC) Processor**
  - **100% Margin of MIPS**
  - **100% Margin on Memory**
  - **Provide Reloadable EEPROM**
  - **Provide Protected Boot PROM**

Interface Requirements (1 of 3)

- ADCS
  - 2 Star Trackers
    - TBD Paraffin Actuate
  - 2 Inertial Measurement Units
  - TBD Accelerometers
  - TBD Torque Rods (Option)
  - 2 3-axis Magnetometer (Option)
  - Five Eye Sun Sensor
  - Sun Angle Sensor (Option)
- EPS
  - Load Control and Status
  - Voltage and Current Monitors
  - Trim Mass Control (Motor)
  - Trim Tabs Control (Motor)
  - Heater Control

Interface Requirements (2 of 3)

- Ordnance Control System (OCS)
  - AKM Ignition and Jettison
  - Fuel System Enable
  - Mechanism Release Commands
- Thermal Control System (TCS)
  - Temperature Monitors - TBD Thermistors
- RCS
  - Thruster Control - TBD Thrusters
  - Valve Control - TBD Latch Valves

Interface Requirements (3 of 3)

- RFS
  - 2 Kbps Uplink
  - Up to 409.6 Kbps Downlink
  - Status Telemetry - Temperature, Current, Voltage, Performance, Configuration
  - Control - TBD Hi-levels
- Instrument Interface
  - Quad High Speed Serial (QHSS) Data
  - 1553
  - Status Telemetry - Temperature, Current, Voltage, Configuration
- EAGE/TO
  - Integration and Launch

Issues

- **Large Number of Spacecraft I/O**
- **Redundancy Configuration**

Trade Studies

- **Spacecraft I/0 Configuration**
  - **Central: All I/O Coming From FSC**
  - **Distributed: Control From FSC, I/O Co-located With Subsystems**
  - **Hybrid of Central and Distributed I/O**
- **Processor Choices**
  - **RHC-3000**
  - **Rad6000**
  - **PowerPc**

Backup - Block Diagram