**F** The DARE spacecraft is simple & heritage rich.

**G** S/C Bus Features Support DARE’s Science Objectives

**Spacecraft Key Characteristics**
- **Operational Lifetime:** < 2 month transit followed by 2 years science operations at the moon.
- **Orbit Parameters:** Launch into Earth Phasing Orbit, inject into 500 x 125 km, ~3 inclination circular science orbit at moon.
- **LTV Compatibility:** Compliant with Standard LV defined in PRD 03 – MDEX 3918 ELV Summary info.
- **ADC/Architecture:** 3 axes stabilized, stellar inertial with RUV backup, 0.5 knowledge and control requirement during science with tracker off for 2 minutes.
- **Redundancy:** Mainly single string with safe and selective redundancy (classic C mission).
- **Electrical Power:** Direct Energy Transfer, 3.0Bt active area, body-fixed array.
- **100 Ah battery sized for 4.9 hour total lunar eclipse (282).
- **Thermal Control:** Passively cooled with two 72 cm radiators on top deck.
- **Telecom:** S-band omni LOMs to NEN for control during all mission phases. Keen-HGA to NEN for science data downlink at the moon. 6 Gbit/s of science and SOI data.
- **Transmission:** Broadband monoprop system using 415 N-Delta V thrusters and 4 N-S RCS thrusters for momentum control. 1.260 ms delta-V budget.
- **Avionics:** Micro-Borealis Technology Integrated Avionics Unit with RAD750 processor.
- **EMI:** EMI quiet bus. Faraday cage design with gasketed seams provides significant shielding over standard MIL-STD-461F emissions.
- **Structure:** Heritage aluminum composite, aluminum honeycomb panel design with EMI gasketing.
- **End of Life:** Controlled Lunar impact.

**Requirements and Margins**

- **Flight System Wet Mass:** 1590 kg
- **Missile Capacity (Science + SOI):** 6.02 Gb
- **Downlink:** 10 Mbps
- **Power:** 375W
- **Pointing Control:** (delta V / per axis)
- **Pointing Control:** (3/2 / per axis)
- **V-Margin:** (on statistical maneuvers)
- **Propellant Load (Tank capability):** 410 kg
- **EEM:** (RE 102/6b/bm)

**Power Margins are adequate for all mission phases**

**Notes:**
- V-Margin include contingency ranging from 5% to 30% based on component maturity
- Array capability assumes 20 deg of point, 47min orbital eclipse period, and no sun during one 30min down time every 4 orbits.
- Battery sized at 100 Ah for maximum total lunar eclipse of 4 hours (282). Avg DOD = 10% per orbit.

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**D** DARE Observatory (Instrument thermal shield transparent for clarity)

**E** DARE Ground Plane Deployment: Pre-Deployment (left), Post-Deployment (right) (Instrument thermal shield transparent for clarity)

**F** Command & Data Handling

- **Integrated Avionics Unit (IAU)**
  - Moog Broadreach
- **Single Board Computer (SBC)**
  - 960570 NC
- **SMAOB**
  - Ccd and im, FSW/WK, AD converter, ACS interfaces
  - 12 GB Flash Memory
  - Payload Interface
- **SACI**
  - Power distribution
  - 16 H-bridges
  - Value attenuation
- **Solar Array Interface:** Battery Charge Control

**G** Telecommunications

- **Ka-Band Transmitter**
  - SpaceMic 
  - 3-300 Gbps
- **S-band Transponder**
  - SpaceMic 
  - 3-300 Gbps

**H** Mass growth contingencies & margins are large

**I** DARE performance margins are substantial in all areas

**J** Mass growth contingencies & margins are large

**Notes:**
- Values include contingency ranging from 5% to 30% based on component maturity
- Array capability assumes 20 deg of point, 47min orbital eclipse period, and no sun during one 30min down time every 4 orbits.
- Battery sized at 100 Ah for maximum total lunar eclipse of 4 hours (282). Avg DOD = 10% per orbit.