



Ames Modular Common Spacecraft Bus

The Ames Modular Common Spacecraft Bus is a lightweight carbon composite structure designed to accommodate launch loads and provide attenuation of impact loads. It is also designed for ease of manufacturing and assembly. The modularity of the design is intended not only for multiple mission configurations, but also parallelism in development and assembly. The system-level components were drawn from low-cost flight-proven product lines.

Compatibility, Configurations, Targets

- Spacecraft Bus compatible with range of launch vehicles: Minotaur IV/V, Falcon 9, Atlas 5, and Delta IV
- Mission design lifetimes:
 - Orbiter: 2 Years as Orbiter or Free-Flyer
 - Lander: Operational during lunar day
- Modular design to support multiple configurations (3-5 stack orbiters/1-2 stack landers)
- Mission Targets:
 - Lunar Orbit
 - Lunar Surface (equatorial or polar sites)
 - Earth-Moon Lagrange points
 - Near Earth Objects (NEO)
 - Mars Orbit

Structure and SubSystem Summary

Mass: 200-280Kg dry mass (30-50Kg payloads), 300-600Kg wet mass

Modes: 3-axis or spin stabilized

Structure: Composite facesheet with aluminum core

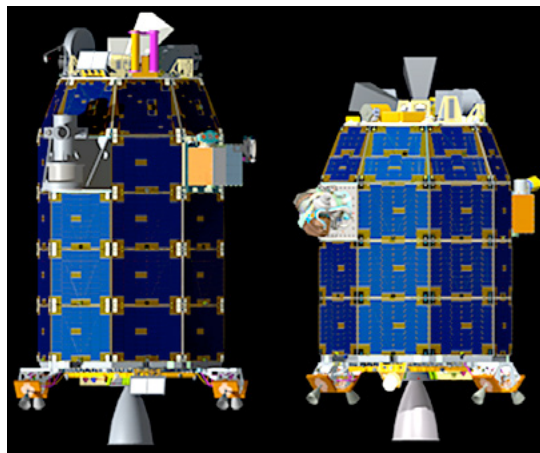
C&DH: Integrated Avionics Unit, RAD750 processor, 1GB TMR NVRAM

GN&C: Redundant star trackers with two heads, IMU, Reaction Wheels (x4), Sun Sensors (x12)

Software: VxWorks OS, cFE/cFS & OSAL, autcoded Simulink-based FSW

Power: Up to 460W BOL@1 AU, Body mounted ZTJ arrays, 24 A-h Li-Ion battery

Propulsion: Bi-propellant (MON-3/NTO), 1 Main Engine plus 4 RCS



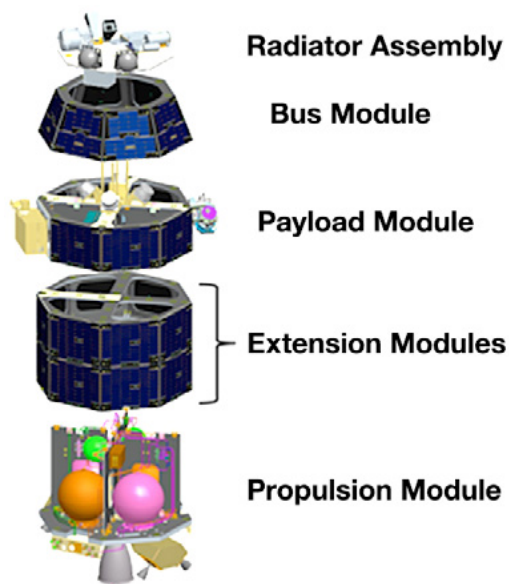
The spacecraft modules configured as a 5-stack (left) next to a 4-stack (right)

Comm: Coherent S-band or Coherent X/X/Ka-band Transponder

Antennas: 2-3 low-gain omnis plus medium gain S-Band or high gain X and Ka

Flight Heritage

The Ames Modular Common Bus successfully flew in the 4-stack configuration as the Lunar Atmosphere and Dust Environment Explorer (LADEE) Mission from Sept 2013 to April 2014.



Exploded view of the spacecraft, showing the individual functional modules

For more information about the Ames Engineering Directorate, visit:

<http://www.nasa.gov/centers/ames/engineering/>

For more information about the Modular Common Bus, contact:

Butler Hine
Project Manager
Programs and Projects Directorate
NASA Ames Research Center
Butler.P.Hine@nasa.gov

Chad Frost
Deputy Director, Engineering
NASA Ames Research Center
Chad@nasa.gov

National Aeronautics and Space Administration

Ames Research Center
Moffett Field, CA 94035

www.nasa.gov