Space Dynamics LABORATORY
Utah State University Research Foundation

PEARL

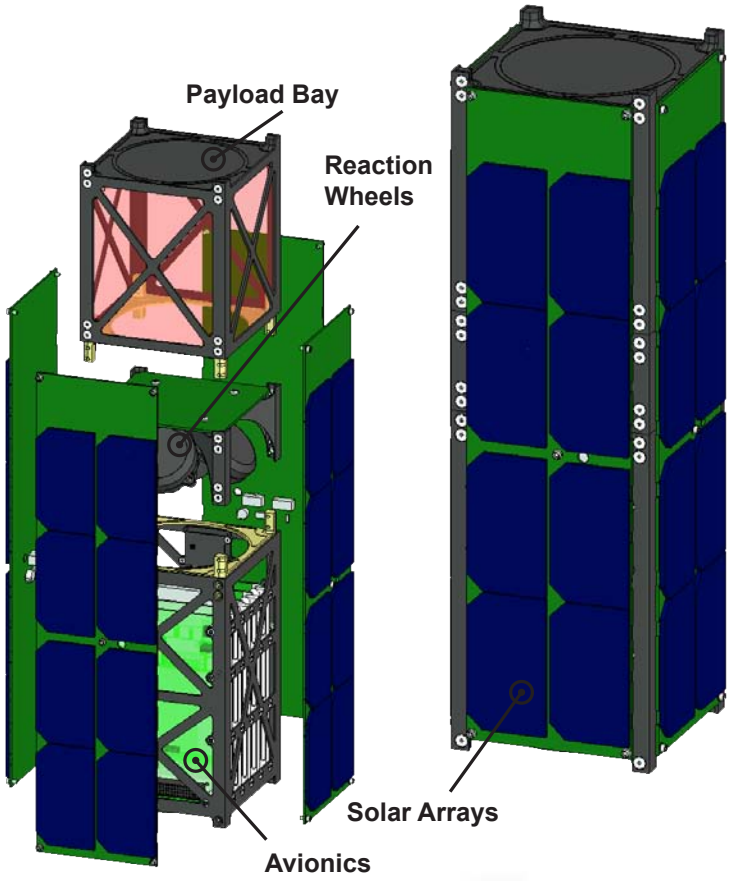
Pico-satellite Exo-Atmospheric Research Laboratory

The PEARL spacecraft platform has been designed from the ground up to provide high capability in a CubeSat form factor. The initial 3U version of the platform is a highly capable spacecraft bus. Increased processing and pointing control provide the utility necessary for relevant scientific or military missions.

The PEARL platform is a set of standard and customizable components that can be assembled into mission-specific configurations while minimizing non-recurring engineering costs and development schedules.

At 109 by 109 by 341 mm, the 3U version of PEARL is one of the smallest spacecraft to provide such capabilities as a Vx Works operating system, 3-axis attitude control with a high order Kalman Filter, and floating point operations for navigation and mission data processing.

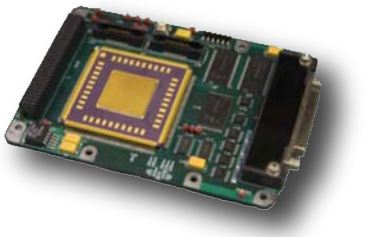
Additional options available for PEARL are 1U and 1.5 U options. Spin stabilized spacecraft configurations are available with deployable booms. An optional deployable solar array is under development for missions requiring greater power generation.



PEARL Program
- 1-3U options
- Current focus is 3U design
- 12-18 month development program

3U PEARL Specifications:
- ~8W EOL standard
- ~16W EOL, optional deployed array
- LEON3 based radiation tolerant single board computer
- 11-66 MIPS (configurable)
- PCI-104 bus
- 128 Mbytes on-board memory
- Vx Works or LINUX OS
- Floating point processing
- High order Kalman filter
- Tetrahedral reaction wheel module
- GPS and 3-axis stability <1°
- 38.4 kbps downlink data rate (S-band)

Payload Accommodations:
- 1U payload bay
- ~1 W EOL (orbit average) standard
- >1 W with deployable arrays
- PCI-104 PCI card slot (expanded to ~9 x 13 cm)
- Additional RS-422 asynchronous interface



Single Board Computer

Reaction Wheel Prototype

3U PEARL Mockup