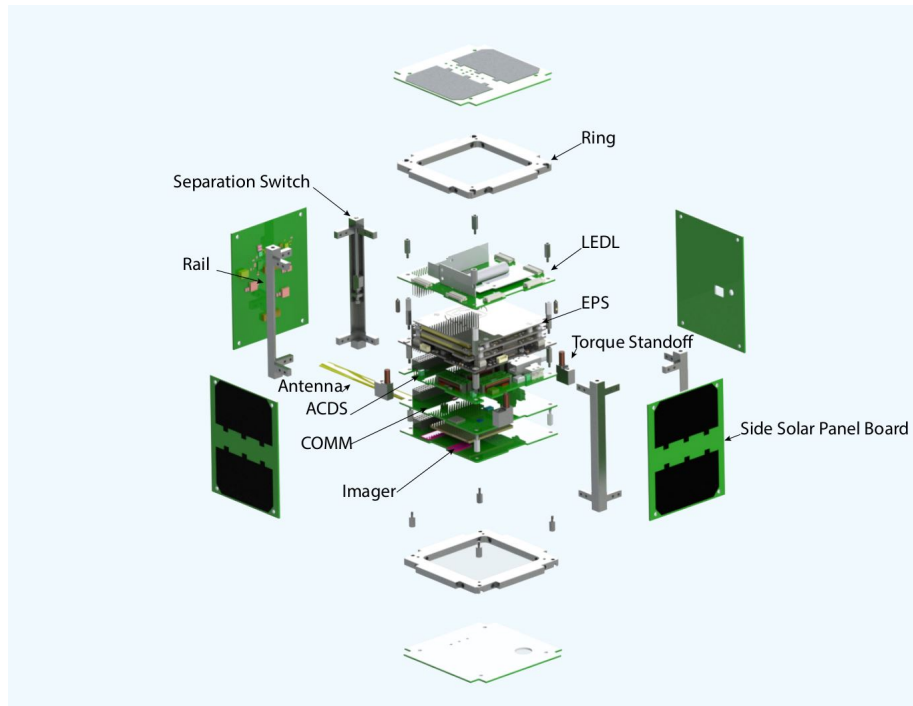


ELaNa-12 ODAR

ARC1 – UAF – 1U



The Alaska Research CubeSat 1 (ARC1) will be the first satellite designed, built, tested, and operated by students from the University of Alaska Fairbanks (UAF). This satellite is designed as both an educational tool and a platform to facilitate rapid development of scientific and technology demonstration missions at UAF. Successful implementation of this development platform will demonstrate the ability of UAF students to compete for future Low Earth Orbit (LEO) research opportunities. ARC1 will achieve one educational mission objective (EMO) and three science mission objectives (SMO) which serve to demonstrate what capabilities are available for future missions, and identify unforeseen system issues to be improved.

- EMO1: Provide an authentic, interdisciplinary, hands-on student experiences in science and engineering through the design, development, operation of a student small satellite mission.
- SMO1: Characterize thermal and vibration environment inside the launch vehicle from ignition to orbit insertion.
- SMO2: Validate a novel low power Attitude Control and Determination Systems (ACDS).
- SMO3: Validate a high bandwidth communication system by obtaining images of changing snow/ice coverage in arctic region.

#### CONOPS:

Upon deployment from the P-POD, ARC1 will power up and start counting down timers. At 45 minutes, the antenna will be deployed and the beacon will start transmitting. Once contact has been established with ARC1 then the LEDL and ADCS data can be downloaded to complete the primary mission. Once the primary mission is complete the camera will be activated to take pictures of the arctic. This will continue until ARC1 is shut down after 1 year.

Hazards: There are no pressure vessels, hazardous or exotic materials.

#### Batteries:

There are two power systems on ARC1, the Clyde EPS and the LEDL battery. The Clyde EPS uses standard Lithium Ion Polymer cells to store energy from the solar cells and power ARC1 after P-POD ejection. The Clyde EPS contains over-charge/current protection. The Clyde EPS cells carry the UL listing number MH13654. The LEDL battery uses Lithium Iorn Disulfide cells and powers the LEDL during launch so it can log launch data. The LEDL battery is not rechargeable and is not used after data logging is complete. The LEDL cells carry the UL listing number MH29980. Overcurrent protection is provided for the LEDL cells.