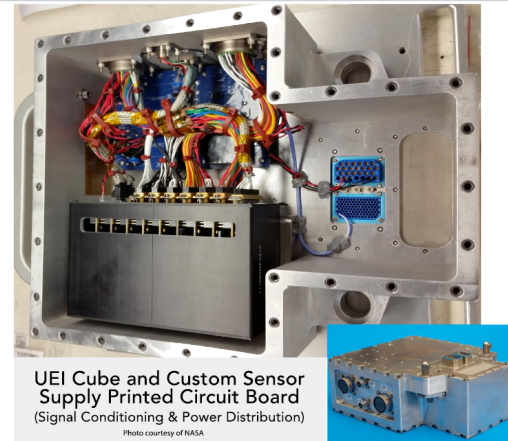


UEI CUBES Used in NASA's Flow Boiling & Condensation Experiment (FBCE)

OVERVIEW

To address the increasing need for power as space missions become longer and more complex, NASA's FBCE developed a two-phase thermal management system which would be smaller, lighter, and remove heat more efficiently than the single-phase system. By comparing microgravity data against Earth's gravity, and other force parameters, FBCE helped determine the minimum flow criteria for ensuring gravity independent flow boiling and condensation. Ultimately, the goal for FBCE was to examine how boiling and condensation differ in microgravity to aid in designing future heat-transfer systems. The data would be used to create an integrated two-phase flow boiling and condensation facility on the International Space Station (ISS). This facility would serve as the primary platform for obtaining two-phase flow and heat transfer data in different gravity conditions such as microgravity and partial gravity.



UEI Cube and Custom Sensor Supply Printed Circuit Board (Signal Conditioning & Power Distribution)
Photo courtesy of NASA

THE IMMEDIATE CHALLENGES

- 1 NASA needed rugged and flexible hardware with a small and lightweight form factor that fit their strict requirements and could manage thermal signal condition data and control.
- 2 The DAQ system needed to be able to operate in various gravitational conditions and handle the rigors of space.

WHERE UEI FITS IN

- 2 UEI [PowerDNA 7-Slot I/O Cubes](#) were used in 2 remote data acquisition modules connected to the FBCE.
- UEI offers a variety of thermal management I/O boards including the [12 Channel Fully Isolated Thermocouple Input Board](#), and other analog & digital I/O solutions.
- The ruggedness of UEI's PowerDNA Cubes (up to 5 g vibration, 50 g shock, -40 to +85°C) and flexible sizing options (1, 3, 6, or 7 available I/O slots) helped the FBCE achieve success.

END RESULT ON AUGUST 12, 2021 THE FBCE ARRIVED AT THE ISS VIA THE CYGNUS NG-16 SPACECRAFT.

- [WIN]** UEI's products assisted in the largest phase change experiment to be conducted in space.
- [WIN]** The reliability, ruggedness, and flexibility of UEI hardware has allowed for testing to be conducted under various gravitational conditions.
- [WIN]** UEI's [10 Year Availability Guarantee](#) on all COTS hardware removes the worry of obsolescence and ensures NASA will be able to continue its progress for years to come.

ASK US HOW UEI CAN DO THE SAME FOR YOUR ORGANIZATION!

