

QB50-Challenger

QB50-Challenger is one of 39 2U CubeSats that are part of the international QB50 project being coordinated by the Von Karman Institute for Fluid Dynamics to study thermosphere. Details on the program can be found at <https://www.qb50.eu/>. QB50 Challenger is expected to launch on the Orbital ATK launch (OA-7) scheduled for March 19, 2017 and arrive to the Space Station a few days later. Deployment from the Space Station is expected 3-9 months after arrival sometime in the June to December 2017 timeframe. Orbital analysis indicates that QB50 will last in orbit for 9-12 months post deployment.

QB50-Challenger will be carrying an Ion-Mass Spectrometer that will be measuring the temperature and composition of the thermosphere as the CubeSat descends in altitude. The purpose of this experiment is to provide an improved scientific understanding of the lower thermosphere and the space weather implications.

The core communication system for the spacecraft is an AstroDev Li-1 radio operating at 437.510MHz. This frequency has been coordinated and approved by the IRAU in 2015. QB50-Challenger is operating GMSK at 9600bps in a half-duplex mode with a 15kHz bandwidth. The ground station is located at the University of Colorado. This is the identical configuration that has been used for the CSSWE (WG2XDS) and MinXSS (WH2XSF) cubesats. The transmitter can be disabled with a command from the ground.

A secondary Globalstar simplex radio (STX-2) built by Near Space Launch (<https://nearspacelaunch.com/satellite-products/>) is also included on the CubeSat. The purpose of the STX-2 is to provide early orbit GPS position data to aid in the early mission orbit determination. Such a system will aid JSPOC in the precise orbit determination of CubeSats. Rapid determination of orbital elements is critical in supporting JSPOC in identifying and tracking CubeSats. The Globalstar simplex radio will operate in the L-band spectrum assigned to Globalstar LLC and will operate in the frequency range 1615MHz to 1617.5MHz, above the 1610.6 to 1613.8 band which includes the RADIO ASTRONOMY service. We are using the same radio that was flown on the TSAT mission (WG9XGY).