# Mission Development Experience

Over the past four years, SSRL has developed two previous CubeSat missions. The first, COPPER, is a 1U CubeSat that carries a small infrared imaging payload designed to document the deployment sequence of other spacecraft from the launch vehicle upper stage. COPPER was selected for launch by NASA’s CubeSat Launch Initiative as part of the Educational Launch of Nanosatellites (ELaNa) in January of 2011. After 3+ years of development, COPPER was launched on November 19th, 2013 on board a Orbital Sciences Minotaur I rocket out of Wallops, Virginia.

SSRL’s second spacecraft, Argus, is a 2U CubeSat that carries a radiation modeling payload designed by Vanderbilt University to analyze how the radiation environment of space affects small scale electronics in order to provide calibration data for ground based experiments. Argus was selected for launch by NASA’s CubeSat Launch Initiative as part of the ELaNa program in February of 2012, and is scheduled for launch in July of 2014.

Both COPPER and Argus utilize a common component and software architecture, the SLU Core Aerospace Research and Application Bus (SCARAB), which consists of the Pumpkin motherboard with a PIC-24 processor, the Astrodev Helium radio, Clyde Space Electrical Power System (EPS), and spacecraft operating system. Altogether, SCARAB occupies approximately 1U of space and can accommodate various payloads so long as they conform to the CubeSat bus. By utilizing this common architecture of commercial off the shelf parts, spacecraft complexity and development time were significantly reduced and gives future missions utilizing SCARAB a degree of flight heritage.