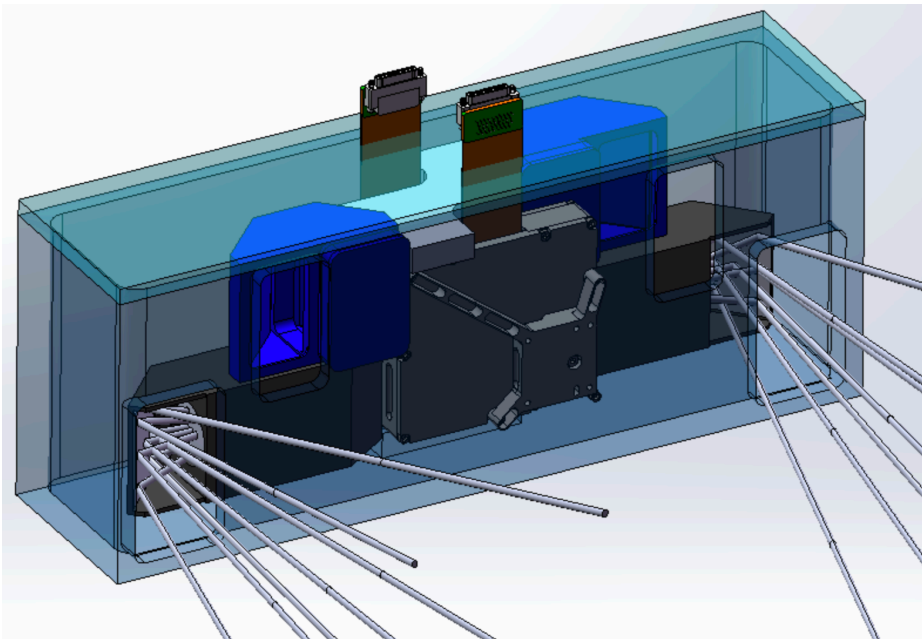


**COLD LIGHTWEIGHT IMAGERS FOR EUROPA (C-LIFE).** S. Byrne, C. d'Aubigny, C.D. Merrill, B. Rizk, S. Meyer, A.M. Baller, C.W. Cook

C-LIFE is a landed camera suite consisting of a color Context Reconnaissance Stereo Imager and an LED flashlight that can also identify biogenic material through fluorescence. The C-LIFE design leverages ongoing work from our ICEE-2 and COLDTech awards in low-temperature detector qualification, radiation modeling and mechanical design. It takes advantage of our development work on the Descent Imager for Europa Hazard Avoidance and Radiation Durability (DIEHARD) and camera development on other missions. The C-LIFE camera head is mounted on the Europa Lander's high gain antenna, which provides tilt and pan capability. Minimal electronics in the camera head control and read out the detector and LEDs. Most camera functions and image processing are performed by electronics in the lander vault. C-LIFE contains no moving parts. In lieu of a focus mechanism, C-LIFE utilizes high F/number optics and a field of view elongated in the vertical direction with progressive focus from top (infinity e.g. imaging horizon) to bottom (close e.g. imaging sample delivery port). Strip filters (that match Clipper's EIS) on the detectors and partly-overlapping images provide color coverage. C-LIFE is warmed for operation, but is otherwise unheated to conserve energy. We combine two independent eyes into one mechanical housing (Figure 1) with a dual periscope design, which reduces the mechanical envelope, shielding mass, heating energy and total cabling distance. LEDs are used for illumination and to excite fluorescence in three bands. These three bands can identify the presence of key metabolic biomarkers and discriminate the quantities of live cells, dead cells and spores in a terrestrial setting.



**Figure 1.** A dual-periscope design folds optical trains to mutually shield focal planes. Fold mirrors locate LEDs inside the camera for shielding.