A vital requirement of the EDLCAM system was that it would not interfere with the flight system during EDL. The camera system design could not compel changes to the flight hardware or software systems inherited from the Mars Science Library (MSL) Curiosity rover. The camera systems' minimum frame rate requirements were 30 frames per second (fps) to capture images of the parachute. The three PUC cameras were to start capturing images at a frame rate of 75 fps prior to parachute deployment and drop the frame rate to 30 fps after thirty seconds until the backshell separation about ninety-eight seconds later. Each PUC was expected to take approximately 5,190 images – a total of 15,750 for the system. The RDC camera system was to start capturing images just before heatshield separation and continuing through touchdown on the surface of Mars. The RDC captured images at 30 fps for approximately 260 seconds for a total of about 7,800 images. The RUC camera system was to start capturing images just prior to the rover separating from the descent stage and continuing through rover touchdown on the surface of Mars. The RUC captured data at 30 fps for approximately 140 seconds for a total of about 4,200 images.

LCAM Camera

The LCAM camera requirements include a field of view, a resolution of 1024 x 1024 pixels, and a global-shutter sensor. The camera system solution also needed to have a frame latency of less than 100 milliseconds between the camera image trigger and the last pixel output of the image, a frame rate of up to 2 Hz, and an SNR of greater than 80:1 with approximately one millisecond exposure time under the illumination conditions of the Mars environment.

Solution

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