

Ken Edgett Technical Talk Abstract (February 2017)

Curiosity's Mars Hand Lens Imager (MAHLI) in Gale crater

The Mars Hand Lens Imager (MAHLI) is a high-resolution color camera mounted on the Curiosity rover's robotic arm. It can observe rocks and regolith at resolutions as high as 14-20 microns per pixel. MAHLI was designed to be robust to challenging environments (including dust, temperature, vibration) and work within a specific scientific and engineering trade-space that permits distinction of very fine sand from coarse silt; facilitates identification of rock, regolith, and eolian sediment properties as good as or better than a geologist's hand lens; acquires images, mosaics, focus stacks, and stereo/multiple images for three-dimensional views; all while having a sufficient field of view and ability to focus at a range of distances so that the camera can do high resolution imaging, context imaging, sample extraction documentation, and hardware inspection. Since landing in 2012, MAHLI images have contributed to major science findings through direct observation of geologic targets and through science-enabling support imaging (e.g., wheel inspections; tool placement). MAHLI has been invaluable for distinguishing mudstones and sandstones; especially sandstones because identification of some of them has been quite challenging. Overall, the strata examined are fluvial conglomerates; fluvial, deltaic, and eolian sandstones; and very fine-grained rocks that include lacustrine mudstones. A copy of MAHLI, named WATSON (Wide Angle Topographic Sensor for Operations and eNginEering), will accompany the SHERLOC (Scanning Habitable Environments with Raman & Luminescence for Organics & Chemicals) instrument on NASA's Mars 2020 rover.