Handheld Universal Lunar Camera

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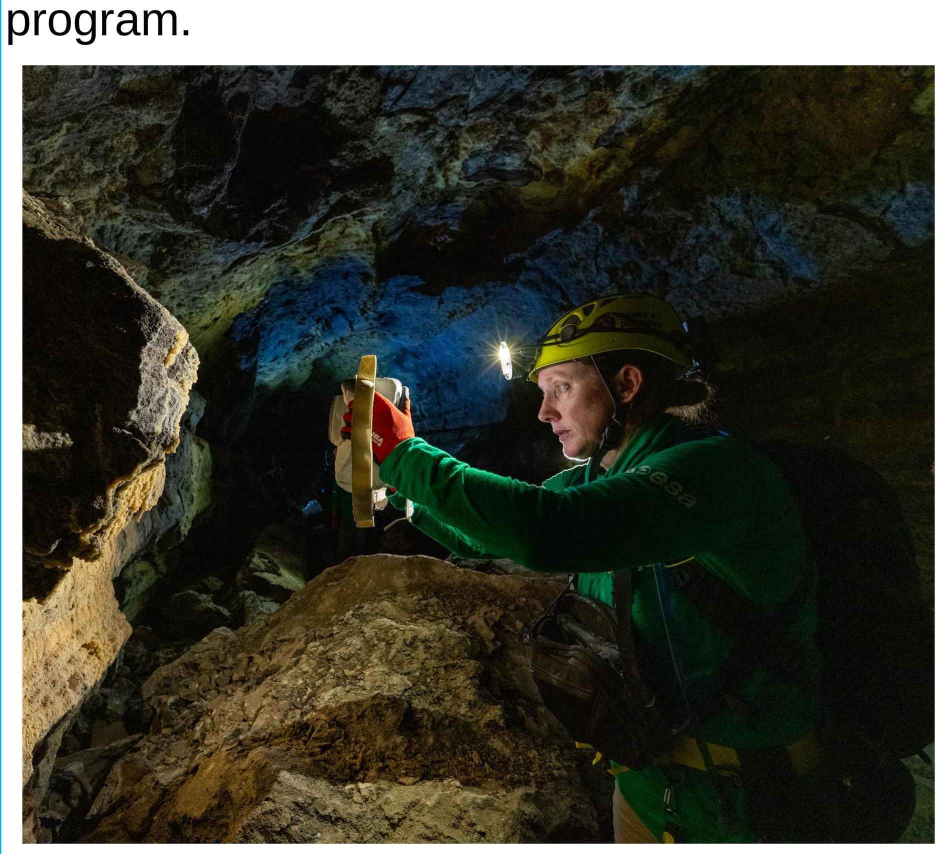
Introduction

The Handheld Universal Lunar Camera (HULC) project is a proposed project to fly a commercial off the Shelf (COTS) unit to be used in all aspects of the Artemis Program. This will include use on Orion, Gateway, Human Lander, and on EVA operations at all locations, which will include lunar surface use. The HULC is planned to be COTS with minimal modification; extensive testing must be done to ensure usability in lunar environments.

Field Tests

Extensive field testing of the camera is being performed to ensure ease of use in the lunar environment. Testing was performed with ESA during their PANGEA testing (seen below), and at NASA's JETT3 and JETT5 tests. Ergonomic testing has been performed extensively on the grip using the JSC crew glovebox facility. Feedback has been obtained from various astronauts to ensure an intuitive and easy to use system for the Artemis program.

Geological sample image taken of a lava tube during PANGEA Testing.

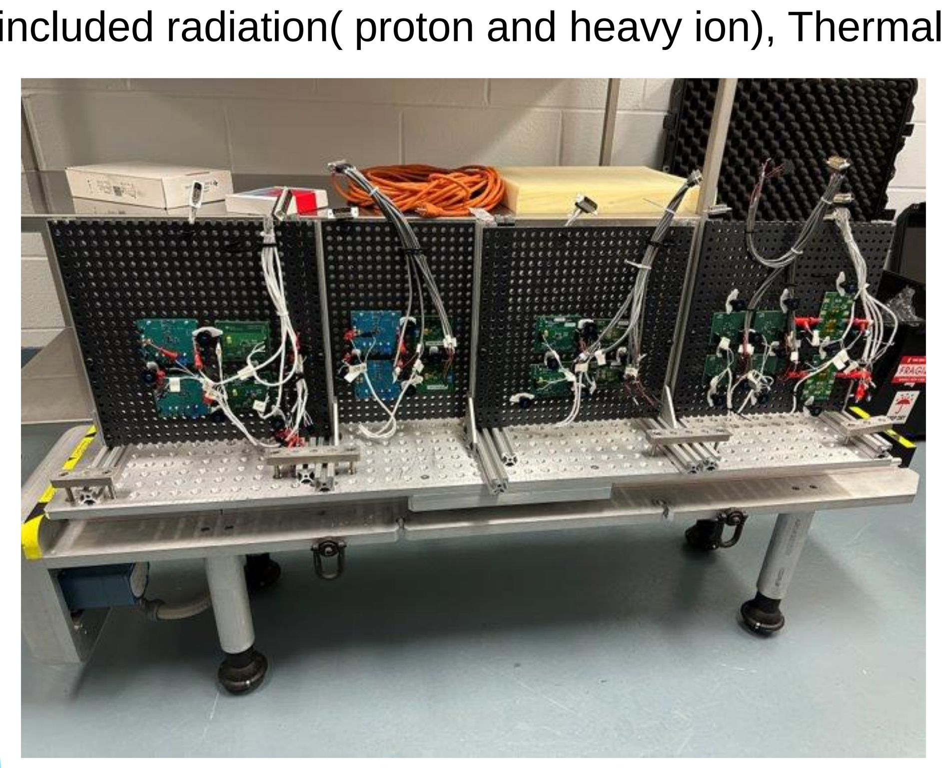


NASA astronaut Jessica Wittner uses an early design of the Artemis lunar camera to take photos during PANGEA testing.

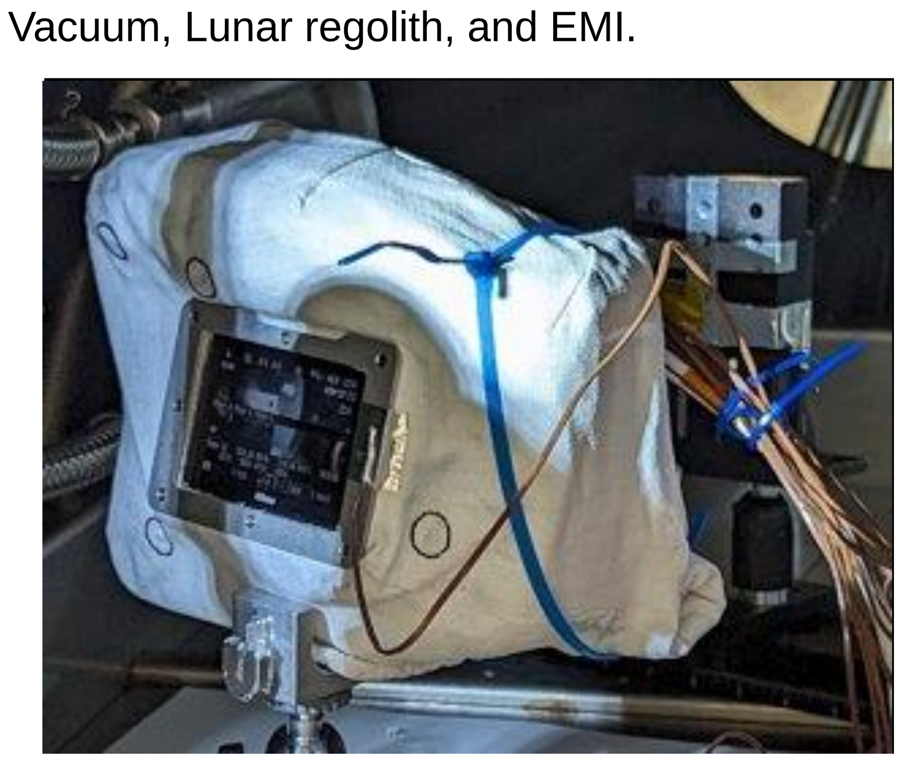
NASA astronauts Zena Cardman and Drew Feustel practice using an early design of the Handheld Universal Lunar Camera during JETT testing.

Environmental Testing

A plethora of environmental tests have been performed on the HULC. Environmental testing is still ongoing. This is to ensure proper operation of the system on the lunar surface. Thus far, testing has included radiation(proton and heavy ion), Thermal Vacuum, Lunar regolith, and EMI.



Test Articles at NSRL for Heavy Ion Testing



Early version of Thermal blanket being prepared for TVAC

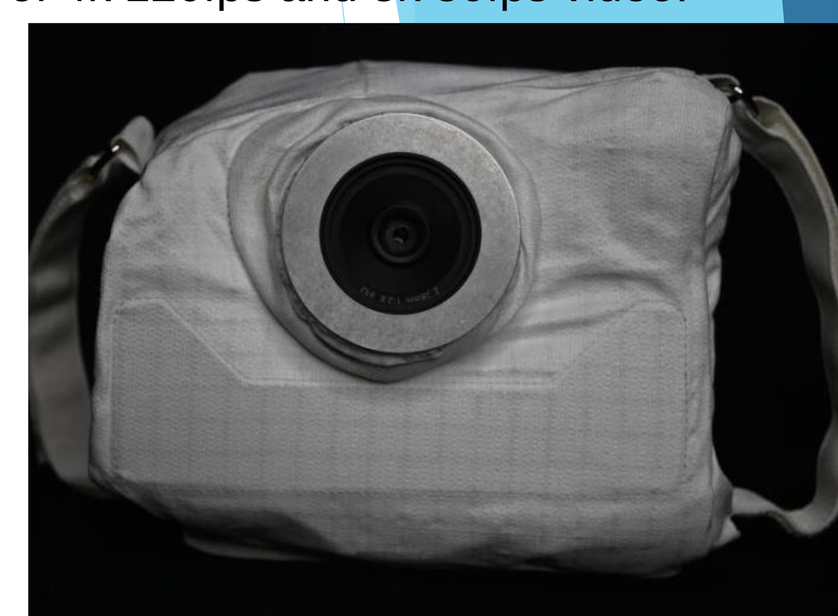
Close up shot of the camera taken at a Proton radiation test

Picture of the HULC during dust testing

Nikon Z9

The Nikon Z9 has been selected as the handheld camera of choice for the Artemis program. Nikon has a rich history of working with NASA in support of human space flight. The Z9 was selected as Nikon's most suitable camera. The Z9 was designed to be a ruggedized, high-quality camera with excellent video and photo capabilities. The Z9 features a cutting edge stacked CMOS sensor with a maximum resolution of 82566x5504 capable of capturing 45.4 Megapixel images (equivalent to 35mm film). The camera is also capable of 4k 120fps and 8k 30fps video.

Stock Nikon Z9.



Front view of Z9 in a thermal blanket.

Ergonomics testing at JSC crew Glovebox

Rear view of Z9 in a thermal blanket.

Space Act Agreement

The HULC project officially entered into a Space Act agreement with Nikon this year. Nikon collaborates with the HULC team to enact requested modifications. These modifications include changes to the firmware and changes to the hardware of the camera. In return, Nikon is provided with test data obtained during environmental testing of the Z9, and the opportunity to develop a camera for the lunar surface.

HULC team members meeting with Nikon leadership.

Grip Modification Timeline