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THE CLEMENTINE MISSION TO THE MOON

Abstract

Clementine was a technology demonstration mission jointly sponsored by the Department of Defense (DOD) and NASA that was launched on January 25, 1994. Its principal objective was to use the Moon, a near Earth asteroid, and the spacecraft's Interstage Adapter as targets to demonstrate lightweight sensor performance and several innovative spacecraft systems and technologies. The design, development, and operation of the Clementine spacecraft and ground system was performed by the Naval Research Laboratory. For over two months Clementine mapped the Moon, producing the first multispectral global digital map of the Moon, the first global topographic map, and contributing several other important scientific discoveries, including the discovery of what could be ice at the lunar South Pole. New experiments or schedule modifications were made with minimal constraints, maximizing science return, thus creating a new paradigm for mission operations. Clementine was the first mission known to conduct an in-flight autonomous operations experiment. After leaving the Moon, Clementine suffered an onboard failure that caused cancellation of the asteroid rendezvous. Despite this setback, NASA and the DOD took lessons learned from the Clementine mission and applied them to later missions. Clementine set the standard against which new small spacecraft missions are commonly measured. More than any other mission, Clementine had the most influence (scientifically, technically, and operationally) on the lunar missions being planned for the next decade and beyond.