

The Clementine Mission Stewart Nozette, Space Experiments Directorate,
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During the past decade the Department of Defense, and the Ballistic Missile Defense Organization, BMDO (formally the Strategic Defense Initiative, SDIO) of the US Department of Defense (DoD) has invested heavily in space technology, focused on the development of lighter more cost effective components and systems. With the end of the Cold War many of these technologies can be made available to the civilian community. To further these efforts in dual-use application, BMDO and NASA have collaborated on the Clementine mission. The Clementine spacecraft was launched on 25 January 1994 as a test of many of the most advanced lightweight technologies ever developed by the DoD. Clementine is currently in lunar orbit performing the lunar mapping phase of its mission. The mission has been integrated by a Naval Research Laboratory government /industry team in less than two years. The spacecraft itself has a dry weight of about 227 kg made possible by using very lightweight components. The sensor suite, provided by a Lawrence Livermore National Laboratory/industry team consists of two star tracker cameras, an ultraviolet-visible camera, a short wave infrared camera, a long wave infrared camera, and LIDAR, weighs less than 7 kg and covers the wavelength range from 0.3 to 9.5 microns. Additional lightweight technologies (inertial measurement units, reaction wheels, batteries, computing systems, and solid state recorders) have also been incorporated in the basic system design. On 3 May, 1994 the spacecraft left lunar orbit. The planned flyby with near-Earth asteroid 1620 Geographos was aborted due to a software error on 7 May 1994. Continued engineering tests with the spacecraft are planned. A great deal of significant information will be returned by the Clementine during its two months in lunar orbit. The data (which would fill a small library of compact discs) will be distributed through NASA's Planetary Data System, a nationwide system of repositories for lunar and planetary flight data that is widely available to scientists. Images are also available to the public on Internet using "anonymous ftp" at clementine.s1.gov. Applications of Clementine technology are currently being pursued in various organizations.