

The NASA Crustal Dynamics Project's Use of Satellite and Lunar Laser Ranging to Meet Its Multiple Objectives

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As the NASA Crustal Dynamics Project got underway in 1979, a multi-faceted, multi-year plan was laid out to make use of the new technologies of Satellite and Lunar Laser Ranging and Very Long Baseline Interferometry to meet the project's five major science objectives. This talk will focus on how the project came to be and the importance of the laser ranging to its success.

During the 1970's, a number of demonstration campaigns sponsored by NASA and other agencies had shown the capabilities laser ranging to provide high quality data products for the global geo-science community. A number of countries had begun their own laser ranging stations, but there was not yet a central scientific focus that could spur on support within their own governments. But, with the NASA announcement of the creation of the Crustal Dynamics Project with its clearly stated scientific objectives and implementation plans, the global community was strongly encouraged and a strong international cooperative effort began.

The project funded and coordinated the US satellite and lunar laser ranging capabilities of the Goddard Laser Tracking Network, the University of Texas, University of Hawaii, and the Smithsonian Astrophysical Observatory. It was a major player in promoting international cooperation and technically supporting key stations around the globe. It organized special regional campaigns in the American West to measure plate motion along the plate boundary between the North American and Pacific plates and consistently repeated these measurements over more than a decade to produce high quality results. Over the project's life, it supported the research and development efforts of leading technological groups at Goddard and in academia to systematically improve the capabilities of the major laser stations and to develop new highly transportable stations.

Overlaid on the project's activities to meet its own science objectives were the ever growing requests for laser ranging to new US and foreign satellites equipped with retro-reflectors to provide high precision orbit determination. This demand grew from under ten satellites in the early 1980's to over 45 by fifteen years later. The project was able to support these needs and remain on track for its own campaigns.