Sally K. Ride Papers - Climate Change Committees /Speeches [including a few by Ride]

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EarthQuest
Winter 1988

The Earth Observing System

In mid-January, NASA's Office of Space Science and Applications, Earth Science and Applications Division, issued an Announcement of Opportunity (AO) calling for proposals for scientific investigations to become a part of the Earth Observing System (Eos). Proposals are also solicited for scientific investigations that involve either earth observing instruments to fly as attached payloads on the manned Space Station or non-earth observing instruments to fly in polar orbit with Eos as secondary payloads. Eos will consist of a broad array of both research and operational instruments aboard four polar-orbiting platforms, the first two provided as part of Space Station, with a data and information system that will handle the massive volume of data acquired by the sensors.

Eos began as a mission concept in early 1982 with an in-house NASA study of possible uses of space platforms in polar orbits: a concept then known as System Z. Following a reorganization at NASA headquarters in early 1983 that brought all earth science activities into a single division, NASA took steps to involve a wider community, including NOAA representatives, in the development of the System Z concept. A result of this was the creation of an Eos Science and Mission Requirements Working Group, which later became the Eos Science Steering Committee. The charge to this group was to consider all aspects of earth science, restricted only by a requirement to focus on observations that could be made from low earth orbit. Over the years, the Eos Science Steering Committee has continued the work of the original working group in overseeing the overall development of the Eos concept and in ensuring that the mission that was planned remained faithful to the original intent of the science community.

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number of instruments. The desire to observe terrestrial biota under conditions of maximum and minimum stress, coupled with the assumed continuation of relevant Landsat and NOAA observations, led to the choice of an afternoon equator-crossing time for the Eos platforms.

The Eos Science Steering Committee addressed NOAA requirements for an Eos mission by shifting the altitude for platforms from 705 km to 824 km. The related issue of the need for a morning equator crossing time was also considered. It was recognized that certain variables such as those measured by scatterometers, radars altimeters, and earth radiation budget instruments, merited more frequent and/or more intense measurement. As needs were identified, the scope of Eos grew from two polar platforms for research to three for research and

operations. Eventually, as the instrument-carrying capabilities of various platforms were better defined, the requirement was increased to four polar platforms – the number described in the January AO. The are necessary to accommodate most of the original set of instruments needed to fulfill the observational objectives of Eos as well as the required operational payloads.

Given the broad scope of the Eos mission, it was soon recognized that a more extensive planning effort was needed to ready the Eos concept for implementation. Panels of NASA and other scientists and technical experts were appointed to study the Eos data and information system and three of the Eos scientific instruments: a moderate-resolution imaging spectrometer, a laser atmospheric sounder and altimeter, and a high-resolution multifrequency microwave radiometer. Later four more panels were established to provide scientific guidance for the conceptual design of a high-resolution imaging spectrometer, a synthetic aperture radar, a laser atmospheric wind sounder, and altimetry systems.

The Eos Science Steering Committee documented the refinements and modifications that were made in the evolution of the Eos concept between 1984 and 1987. They also provided a more detailed scientific rationale for the benefits of such an extensive mission in specific areas of earth science research in a publication entitled Patter to Process, the Report of the Eos Science Steering Committee. This and the published reports of the various Eos instrument panels are available from Dixon Butler, Eos Program Scientist (address given at end of article). These reports are also part of the AO package.

The objective of Eos is to provide the data and the supporting information system necessary to develop a comprehensive understanding of the way the earth functions as a natural system, as proposed by the NASA Advisory Council's Earth System Sciences Committee (see EarthQuest, Vol. 1, No. 2). To do this, two specific elements are required:

• A comprehensive data and information system to provide the earth science research community with easy, affordable, and reliable access to the full suite of earth science data; and

• An observing system to provide the full set of essential global earth science data available from low earth orbit on a long-term, sustained basis and in a manner that maximizes the scientific utility of the data and simplifies its analysis.

To ensure that Eos fulfills its objectives, it must satisfy certain requirements de-