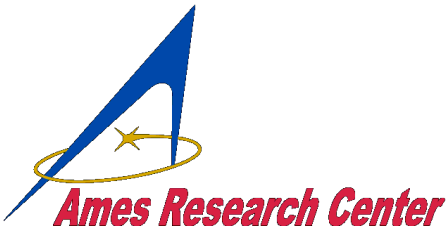

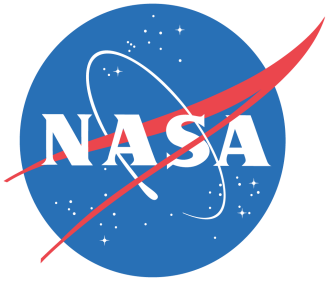

Guide to the
Elliott C. Levinthal Viking Lander Imaging Science Team Papers, 1970-1980
PP04.02

NASA Ames History Office
NASA Ames Research Center

Contact Information:
NASA Ames Research Center
NASA Ames History Office
Mail-Stop 207-1
Moffett Field, CA 94035-1000
Phone: (650) 604-1032
Email: ARC-DL-history@mail.nasa.gov
URL: http://history.arc.nasa.gov/

Collection processed by:
Kevin S. Fleming, September 2006

Table of Contents

Descriptive Summary 1
Administrative Information 1
Biographical Note 2
Scope and Content 4
Series Descriptions 4
Indexing Terms 5

Descriptive Summary

Title:
Elliott C. Levinthal Viking Lander Imaging Science Team Papers, 1970-1980

Collection Number:
PP04.02

Creator:
Levinthal, Elliott C.

Dates:
Inclusive: 1970-1980

Extent:
Volume: 22 cubic feet

Repository:
NASA Ames History Office
Moffett Field, California 94035

Abstract:
Collection consists primarily of the Viking orbiter and lander photographic materials such as prints with descriptive captions, stereo positive/negative film pairs, and 35mm presentation slides. It also includes maps, ephemera, and published materials such as newsletters, bulletins, press kits, technical reports and articles related to the imaging aspects of the Viking Mission. Additionally, there is fair amount of documentation that encompasses stereo and anaglyph imaging, including materials related to the documentary film *Mars in 3D*.

Administrative Information

Access:
Collection is open for research.

Publication Rights:
Copyright does not apply to United States government records. For non-governmental material, researcher must contact the original creator.

Preferred Citation:
[Identification of item], Elliott C. Levinthal Viking Lander Imaging Science Team Papers, [Container number]: [Folder number], NASA Ames History Office, NASA Ames Research Center

Acquisition Information:
Donated by Elliott C. Levinthal in April 2004.

Biographical Note

The Viking Mission

The Viking Mission involved two identical spacecraft, Viking 1 and Viking 2, designed to explore and observe the surface and atmosphere of Mars. Each spacecraft consisted of an orbiter and a lander. The Viking Mission was considered an extension of the Mariner Mars 1964 and 1969 flyby missions, as well as the Mariner Mars 1971 orbiter missions. As such, the Viking Mission drew heavily upon the design and hardware specifications of the Mariner 1969 and Mariner 1971 missions.

Viking 1 was launched August 20, 1975, entered Mars orbit June 19, 1976, and landed in the Chryse Planitia basin of Mars on July 20, 1976. Viking 2 was launched September 9, 1975, entered Mars orbit on August 7, 1976, and touched down September 3, 1976 on Mars' Utopia Planitia region, north of where Viking 1 touched down. After the landers touched down, the orbiters continued circling Mars and surveying the landing areas to detect any changes, such as dust storms. They also acted as radio relay stations, transmitting those signals not sent directly to Earth from the landers.

The imagery systems on the Viking spacecraft were capable of providing black and white, color, infrared, and stereoscopic photographs of the landing site. Close-up photographs from the cameras provided geologic detail of the Martian surface and soil around the lander sites, helping to determine if life existed on Mars. Panoramic photographs of the Martian horizon helped support meteorological investigations. Photographs of an identical area by cameras from both Landers were used to produce stereographic images.

The Viking 1 Lander began the Viking Extended Mission in January 1978 and continued to transmit photographs and other data periodically until November 1982. It was later named the Thomas Mutch Memorial Station on January 7, 1981 in honor of the leader of the Viking imaging team, who had also served as NASA's fourth Associate Administrator for the Office of Space Science. On November 13, 1982, a faulty command sent by ground control resulted in loss of contact. The Viking 2 Lander had settled down with one of its legs on a rock tilted 8.2 degrees. Nevertheless, it continued to operate, sending back high-resolution images until April 11, 1980, when its batteries failed and it was turned off.

Elliott C. Levinthal

Elliott C. Levinthal was born April 13, 1922 in Brooklyn, New York. He received a BA from Columbia University in 1942. In 1943, he completed his graduate studies in physics at the Massachusetts Institute of Technology then began working as an engineer at the Sperry Gyroscope Research Laboratories. In 1949, he received his PhD in Nuclear Physics at Stanford University.

Later in 1949, he joined Varian Associates as a research physicist, and later became the research director, as well as a member of the board of directors. He left this company in 1952 and worked as the Chief Engineer of Century Electronics for a short period. In 1953, he started his own company, Levinthal Electronic Products, which primary business was in designing and building very specialized modulators and large transmitters, as well as medical instrumentation. In 1961, following a merger with Radiation, Inc., he dissolved his involvement with industrial technical enterprises and returned to Stanford University. For over three decades, he held numerous positions at Stanford University including Professor of Genetics in the Stanford School of Medicine, Director of the Stanford Instrumentation Research Laboratory, Director of the Defense Science Office of the Defense Advanced Research Agency, Research Professor of Mechanical Engineering and Associate Dean for Research at Stanford University, as well as Director of the Stanford Institute for Manufacturing and Automation.

His interest in exobiology, the possibilities of experiments to discover whether or not life exists elsewhere, led him to his involvement with NASA. It began with his participation in the development of the Multivator, which was intended to be a miniature multipurpose biochemical laboratory in which a series of simple measurements could be made on samples of atmospheric dust. It was created by Joshua Lederberg and worked out in prototype form by Levinthal and his assistants in the Instrumentation Research Laboratory at the Stanford University School of Medicine. This eventually led him to serving as a member of the Mariner Mars 1971 Photo Interpretation Team, in which he headed the data processing task group. This group represented the science team in the conceptualization of the computer processing techniques and their design and implementation. He later was appointed the role of Deputy Team Leader on the Viking Lander Imaging Science Team. Following this he severed for several years as a consultant to NASA and served as a member of the Planetary Biology Subcommittee. Additionally, he served as a member of the Steering Committee responsible for the Space Science Board study entitled "Biology and the Exploration of Mars." He also was an active participant in the deliberations of the COSPAR Planetary Quarantine Panel and various Space Science Board reviews of planetary quarantine and sterilization parameters. In 1977, he was awarded the Public Service Medal for his many contributions to the Viking Project.

Sources Consulted:

Ezell, E. & Ezell, L. (1984). *On Mars: Exploration of the Red Planet 1958-1978* [Electronic Version]. Washington D.C.: Scientific and Technical Information Branch, National Aeronautics and Space Administration. Retrieved November 1, 2006 from http://history.nasa.gov/SP-4212/contents.html

Jet Propulsion Laboratory Archives. (n.d.). *JPL210 Viking Lander Camera Test Collection, 1973-1975 Langley Research Center.* Retrieved November 1, 2006 from http://jpla.sirsi.net/uhtbin/cgisirsi/N6EDQ5I6DD/ARCHIVES/0/49

Jet Propulsion Laboratory Archives. (n.d.). *JPL266 Viking Orbiter Final Mission Profile Meetings Collection, 1976 Boline, Ken (Kenneth G.)* Retrieved November 1, 2006 from http://jpla.sirsi.net/uhtbin/cgisirsi/N6EDQ5I6DD/ARCHIVES/0/49

Scope and Content

The Viking Lander Imaging Science Team: Elliott C. Levinthal Papers is a minimally processed collection. The collection has been surveyed and inventoried, but it has not been physically processed, re-housed, and arranged. However, it has been intellectually arranged into series based on the inventory record. It consists primarily of the Viking orbiter and lander photographic materials such as prints with descriptive captions, stereo positive/negative film pairs, and 35mm presentation slides. It also includes maps, ephemera, and published materials such as newsletters, bulletins, press kits, technical reports and articles related to the imaging aspects of the Viking Mission. Additionally, there is fair amount of documentation that encompasses stereo and anaglyph imaging, including materials related to the documentary film *Mars in 3D*. For a complete inventory of this collection, please contact the NASA Ames History Office.

Series Descriptions

Series I: Photographic Images

This series contains images taken from both the Viking 1 and 2 orbiters and landers. It includes color and black/white 8 x 10 prints with descriptive captions, 12 x 6 positive/negative film pairs of lander images, circular projection images, panoramic mosaics, and 35mm slides that were utilized for presentation purposes.

Series II: Maps

This series contains maps of the Martian surface. It includes shaded relief maps, topographic and geologic maps, as well as rectified photomosaic maps.

Series III: Anaglyph and Stereo Imaging

This series contains materials related to the documentary film *Mars in 3D* film and equipment utilized for stereo and anaglyph viewing. It includes film prints, audio reel-to-reel soundtracks, scripts, and technical descriptions of the documentary film.

Series IV: Publications

This series contains published materials such as books, newsletters, bulletins, press kits, technical reports and articles related to the imaging aspects of the Viking Mission. A sampling of the reports includes Instrumentation Research Laboratory Reports (Stanford University), Multispectral and Stereo Imaging on Mars, Exploring the Surface of Mars with the Viking Camera, Stanford's Trip to Mars, Lander Imaging as a Detector of Life on Mars, and Topography from the Lander Camera. Professional journals and commercial magazines include Icarus: International Journal of Solar System Studies, Journal of Geophysical Research, Science, Aviation Week and Space Technology, Astronomy, and National Geographic. In addition to these there are substantial series of Viking Mission Status Bulletins and Science Activities (Viking) Newsletters.

Series V: Ephemera

This series contains ephemera items such as bumper stickers, buttons and brochures pertaining to the Viking Mission to Mars.

Indexing Terms

The following terms may be used to index this collection.

Corporate Name
Ames Research Center

Geographic Name
Moffett Field (Calif.)

Personal Name
Levinthal, Elliott C.

Subjects
Space flight to Mars
Viking spacecraft
Viking orbiter spacecraft
Viking lander spacecraft
Cameras
Photographs
Electro-optical photography