



Guide to the  
Larry A. Manning Papers, 1967-1988  
PP05.04

NASA Ames History Office  
NASA Ames Research Center

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## **Descriptive Summary**

**Title:**

Larry A. Manning Papers, 1967-1988

**Collection Number:**

PP05.04

**Creator:**

Larry A. Manning

**Dates:**

Inclusive: 1967-1988

Bulk: 1967-1978

**Extent:**

Volume: .70 cubic feet

**Repository:**

NASA Ames History Office

Moffett Field, California 94035

## **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], Larry A. Manning Papers, 1967-1988, [Container number]:  
[Folder number], NASA Ames History Office, NASA Ames Research Center

**Acquisition Information:**

Donated by Larry A. Manning in February 2005.

## **Biography**

Larry A. Manning entered the aerospace industry during the 1960s and spent most of the ensuing four decades at the NASA Ames Research Center, working on some of the most exciting areas of America's space exploration. He started as an aerospace engineer doing mission analysis for planetary probes, and spent his later years in operations management of the space life sciences. Throughout his long and distinguished career, Manning earned many honors and awards, including a NASA Exceptional Service Medal, NASA Group Achievement Awards, Ames Honor Awards, and letters of commendation.

### *Education and Early Career*

In 1960, Manning earned a bachelor of science degree in mechanical engineering (aeronautical option) from the University of Utah. He then accepted a job with the Lockheed Missiles and Space Company (LMSC) in Sunnyvale, California, where he worked four years as senior engineer. Manning conducted aerodynamic analyses for missiles and lifting entry vehicles, developed a control system for expanding the entry corridor of lifting entry vehicles, performed aerodynamic design studies in support of the LMSC proposal for the Apollo mission, and conducted studies on the nuclear vulnerability of missiles in the upper atmosphere. While with Lockheed, Manning also attended Stanford University, and in 1962 earned a master of science degree in aeronautics and astronautics.

From July 1964 until August 1965, Manning joined the technical staff at the Aerospace Corporation in southern California. While there, he provided technical monitoring of Air Force contracts dealing with nuclear vulnerability issues and defenses, and developed a computer program for predicting the survivability and impact dispersion of missiles subject to a nuclear explosion in the upper atmosphere.

### *Career with NASA*

In August 1965, Manning accepted a position as mission analyst with NASA Headquarters, although he was based at the NASA Ames Research Center. As mission analyst, Manning developed software which he used to conduct numerous studies: trajectories and payloads for interplanetary flyby and for orbital and/or probe missions to the planets Mercury, Venus, Mars, Jupiter, Saturn, and to comets. He also developed the mission plan that was adopted by NASA and the European Space Agency (ESA) for the out-of-the-ecliptic mission that was launched by ESA (Ulysses). During this period, Manning published more than 20 peer reviewed technical papers.

In October 1975, Manning began working directly for the NASA Ames Research Center as an aerospace engineer. Over the next fourteen years, Manning wrote five technical papers and several project documents. He provided system engineering support for the study of the Venus Orbiting Imaging Radar Mission, and led the study team that performed a complete design study for a Mars Penetrator Mission. Manning also supported the Pioneer Jupiter Probe Mission by developing the deflected probe concept

for the mission and proving that the achievable guidance accuracy was sufficient to meet the targeting requirements. This concept was adopted for the mission. In addition, Manning researched planetary quarantine restrictions and showed that the Pioneer Venus spacecraft could meet them without having to resort to the imposition of heat soaking.

As deputy chief for Pioneer Venus maneuver operations, Manning helped develop the final command system for the Pioneer Venus Orbiter and Probe spacecraft. He was responsible for final review of all maneuver commands and for recovery of the spacecraft whenever the communication link was lost during the mission. He was also responsible for the probe separation commands.

Manning was a major contributor to the Shuttle Infrared Telescope Facility (SIRTF). As SIRTF systems engineer, he developed the operational concept for SIRTF, and provided the systems engineering support for the study on the conversion of SIRTF from a Shuttle-attached mission to a low Earth orbit free-flyer, which was subsequently renamed the Space Infrared Telescope Facility. As Deputy SIRTF Project Manager, Manning lead the study team that recommended that SIRTF be converted to a high-altitude elliptical orbit free-flyer in order to reduce the effects of the earth's radiation belts and the thermal load from the earth. This recommendation was accepted and became the reference orbit for SIRTF. Manning also provided technical monitoring of SIRTF support contracts and cost assessments.

From April 1989 until April 1990, Manning once again worked directly for NASA Headquarters, this time as a program manager for the SIRTF and the Stratospheric Observatory for Infrared Astronomy (SOFIA) projects. He also worked with the NASA Headquarters astrophysics division to support the development of the Great Observatories Program. This program was fully implemented with the launches of the Hubble in 1990, then the Compton (1991), Chandra (1999) and Spitzer (2003) space telescopes.

For the next seven years, until the end of 1997, Manning again worked for the NASA Ames Research Center as technical assistant for the space research directorate. In this role, he was responsible for the daily administration of the directorate office. Manning provided technical review of on-going small projects, such as the Small Business Innovative Research (SBIR) proposals and the Director's Discretionary Fund proposal review.

From December 1997 until early 2001, Manning served as the associate director for management operations for the astrobiology and space research directorate. He performed zero-based reviews of Center infrastructure requirements, helped define Center-wide technical objectives for annual reports, served on source selection boards, allocated manpower across directorates, and implemented International Organization for Standardization (ISO) and Voluntary Protection Program (VPP) safety programs.

Manning retired in March 2001, but soon returned to the NASA Ames Research Center under contract as senior business manager for the Space Station Biological Research Project (SSBRP) until it was terminated in 2006. At present, he is assisting the systems

management office of the project management and engineering directorate in the development of procedures for project management.

### **Scope and Content**

The Larry A. Manning Papers collection (.70 linear feet) includes technical publications, project reports and proposals that Manning produced, collaborated on or referenced during his career as a scientist and science administrator. The bulk of the collection reflects his career as a mission analyst and aerospace engineer for NASA during the late 1960s and 1970s. The collection is divided into two series: technical works authored by Manning and documentation supporting his research and administrative activities.

The first series, *Works Authored by Manning*, contains technical publications, reports and memoranda related to mission research projects. Specific issues focused on in these documents include spacecraft propulsion and power, trajectories, and guidance, predominantly for space probe and orbiter maneuvers. Papers about the Space Infrared Telescope Facility (SIRTF) are also included.

The second series, *Reference and Research Materials*, includes technical reference material relating to Manning's research, as well as project documents and proposals, and a small amount of related correspondence.

## Series Descriptions

### **Series I: Works Authored by Manning, 1967-1981. 17 folders.**

This series is arranged into two subseries that contain research publications, reports, project documents and proposals, for which Manning is directly attributed as author, co-author or editor.

The first subseries, *Planetary Missions: Planning and Scenario Analysis*, includes documents correlating to his research into scenarios for launching and guiding manned and unmanned spacecraft. Of note in this subseries is a memo (Box 1, folder 13) commending Manning for his "outstanding" contribution to the joint ESA/NASA study on the Out of the Ecliptic Mission, even though NASA's Jet Propulsion Laboratory would end up securing responsibility for Phase B of the effort, which ultimately became the ESA Ulysses mission launched in 1990. This memo reflects Manning's opinion that many scientists at Ames authored project proposals that made significant intellectual contributions to projects that were ultimately managed by other NASA centers.

The second subseries, *Other Advanced Research and Technology Projects*, contains reports about the future of planetary exploration and examining the future of space research at Ames. Also included are technical papers about the Space Infrared Telescope Facility (SITRF).

### **Series II: Reference and Research Materials, 1971-1988. 8 folders.**

This series contains reports, presentations, journal articles and other publications that are primarily associated with planetary probe technology research projects in which Manning participated.

## Indexing Terms

The following terms may be used to index this collection.

### Corporate Name

Ames Research Center

### Personal Name

Manning, Larry A.

### Subjects

Launch vehicles (Astronautics)  
Navigation (Astronautics)  
Pioneer 10 space probe  
Pioneer project  
Pioneer Venus spacecraft  
Space Infrared Telescope Facility (U.S.)  
Space probes

## Container List

### Series I: Works Authored by Manning

Box Folder Folder Title

#### 1. Planetary Missions: Planning and Scenario Analysis

##### A. Manned and Unmanned

- 1 1 Nuclear Engine Thrust Levels for Manned Interplanetary Missions, 1967
- 2 Mode Comparisons of Manned Planetary Missions in the Late 1970s, 1967
- 3 Launch Vehicle Performance Comparisons, March 1968

##### B. Inner Planets

###### i. Mercury

- 4 Trajectory Modes, 1967
- 5 Flyby Illumination Conditions, 1968-1969

###### ii. Venus

- 6 Atmosphere Model from Russian Venus 4 Probe Data, 1967
- 7 Radar Mapping, 1973

###### iii. Mars

- 8 Launch Window Analysis, 1967-1970
- 9 1973 Mars Lander Mission, Payload Capability/Operations Analysis, 1968
- 10 Contamination of Earth, Possibility of, October 1973
- 11 Surface Penetrator System (1984 Mission), 1977

##### C. Outer Planets

- 12 Guidance and Navigation, 1970-1971
- 13 Jupiter Atmosphere-Entry Probe and Orbiter Missions, 1971-1976
- 14 Saturn/Uranus Probe and Swingby Technical Memorandum, 1973

#### 2. Other Advanced Research and Technology Projects

- 2 1 Project Columbus, Final Report, December 1976
- 2 Advanced Missions Advisory Team, Final Report, July 1981
- 3 Space Infrared Telescope Facility [n.d.]



## **Series II: Reference and Research Materials**

- 2        4 Pioneer Project, [n.d.]
- 5 Pioneer 10, 1971-1975
- 6 Pioneer Venus, 1970-1978
- 7 Guidance and Navigation for Missions to Outer Planets, 1971
- 8 Deep Probe, (1 of 2) 1977
- 9 Deep Probe, (2 of 2) 1977
- 10 Saturn Orbiter/Dual Probe (SPO2), 1976-1978
- 11 Astrophysics Data System Study: Final Report (March 1988)

End of the Larry A. Manning Papers Collection Guide