



Guide to the
Pioneer Project Collection, 1952-1996
AFS8100.15A

NASA Ames History Archives
NASA Ames Research Center

Contact Information:

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

Guide prepared by:
Leilani Marshal, November 2006

Table of Contents

Descriptive Summary	1
Administrative Information	1
Administrative History	2
Scope and Content	3
Indexing Terms	4
Container List	4

Descriptive Summary

Title:

Pioneer Project Collection, 1952-1996

Collection Number:

AFS8100.15A

Creator:

Ames Research Center

Dates:

Inclusive: 1952-1996

Bulk: 1970-1979

Extent: Number of containers: 24 filing cabinets

Volume: Approximately 200 cubic feet

Repository:

NASA Ames History Archives

Moffett Field, California 94035

Abstract:

The NASA Pioneer Program ultimately sent into outer space eight craft to explore the nearby and far away reaches of the solar system. This collection is made up of records maintained by the Pioneer Program Management Office, which was located at the NASA Ames Research Center. Materials in the collection include contractor records, proposals, reviews, reports, drawings, specifications, and correspondence related to the construction and design of the Pioneer 10, 11 and 12 spacecraft.

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.

Languages and Scripts:

All records are in English.

Preferred Citation:

Expanded:

NASA Ames History Archives, NASA Ames Research Center. Moffett Field, California.
AFS8100.15A, Pioneer Project Collection 1952-1996, [Container number] : [Folder number]. [Identification of item]. [Date, if available].

Abbreviated:

NASA ARC. AFS8100.15A, [Container number] : [Folder number]. [Identification of item]. [Date, if available].

Acquisition Information:

Materials transferred to the History Archives by the Pioneer Program Management Office in October 2005.

Administrative History

(Drawn from "The Pioneer Missions"

<http://www.nasa.gov/centers/ames/missions/archive/pioneer.html>)

Launched on 2 March 1972, Pioneer 10 was the first spacecraft to travel through the Asteroid belt, and the first spacecraft to make direct observations and obtain close-up images of Jupiter. Famed as the most remote object ever made by man through most of its mission, Pioneer 10 is now over 8 billion miles away.

Pioneer 10 made its closest encounter to Jupiter some thirty years ago on 3 December 1973, passing within 81,000 miles of the cloudtops. This historic event marked humans' first approach to Jupiter and opened the way for exploration of the outer solar system: for Voyager to tour the outer planets, for Ulysses to

out of the ecliptic, for Galileo to investigate Jupiter and its satellites, and for Cassini to go to Saturn and probe Titan. During its Jupiter encounter, Pioneer 10 imaged the planet and its moons, and took measurements of Jupiter's magnetosphere, radiation belts, magnetic field, atmosphere, and interior. These measurements of the intense radiation environment near Jupiter were crucial in designing the Voyager and Galileo spacecraft.

Pioneer 10 made valuable scientific investigations in the outer regions of our solar system until the end of its science mission on 31 March 1997. The Pioneer 10 weak signal continued to be tracked by the DSN as part of an advanced concept study of communication technology in support of NASA's future interstellar probe mission. The power source on Pioneer 10 finally degraded to the point where the signal to Earth dropped below the threshold for detection in its latest contact attempt on 7 February 2003. Pioneer 10 will continue to coast silently as a ghost ship through deep space into interstellar space, heading generally for the red star Aldebaran, which forms the eye of Taurus (the constellation The Bull). Aldebaran is about 68 light years away and it will take Pioneer over 2 million years to reach it.

Launched on 5 April 1973, Pioneer 11 followed its sister ship to Jupiter (1974), made the first direct observations of Saturn (1979) and studied energetic particles in the outer

heliosphere. The Pioneer 11 Mission ended on 30 September 1995, when the last transmission from the spacecraft was received. There have been no communications with Pioneer 11 since. The Earth's motion has carried it out of the view of the spacecraft antenna. The spacecraft cannot be maneuvered to point back at the Earth. It is not known whether the spacecraft is still transmitting a signal. No further tracks of Pioneer 11 are scheduled. The spacecraft is headed toward the constellation of Aquila (The Eagle), Northwest of the constellation of Sagittarius. Pioneer 11 will pass near one of the stars in the constellation in about 4 million years.

The Pioneer Venus Orbiter (Pioneer 12) was launched on 20 May 1978 on an Atlas-Centaur launch vehicle. On 4 December 1978, the orbiter was injected into a highly elliptical orbit around Venus. The periapsis, or low orbital point, of the orbit was about 150 km (93 miles) above the surface of the planet. The apoapsis, or highest orbital point, was 66,000 km (41,000 miles) from the planet. The orbital period was 23 hours 11 minutes.

The orbit of Pioneer 12 permitted global mapping of the clouds, atmosphere and ionosphere; measurement of upper atmosphere, ionosphere, and solar wind-ionosphere interaction; and mapping of the planet's surface by radar. For the first 19 months of the mission, the periapsis was maintained at about 150 km by periodic maneuvers. As propellant began to run low, the maneuvers were discontinued, and Solar gravitational effects caused the periapsis to rise to about 2,300 km. By 1986, the solar gravitational effects caused the periapsis to start falling again, and the orbiter instruments could again make direct measurement within the main ionosphere.

During the Orbiter's mission, opportunities arose to make systematic observations of several comets with the Ultraviolet Spectrometer (OUVS). The comets and their date of observation were: Encke April 13 through April 16, 1984; Giacobini-Zinner, September 8 through 15, 1985; Halley, December 27, 1985 to March 9, 1986; Wilson, March 13 to May 2, 1987; NTT, April 8, 1987; and McNaught, November 19 through 24, 1987. For Halley, the results showed that, near perihelion, the water evaporation rate was about 40 tons per second.

Starting in September 1992, controllers used the remaining fuel in a series of maneuvers to keep raising periapsis altitude for as long as possible. The fuel supply was exhausted on 8 October 1992, and the Orbiter ended its mission as a meteor flaming through the dense atmosphere of Venus.

Scope and Content

The Pioneer Project Collection consists of documents relating to the design, construction, and engineering of the Pioneer 10 and 11 space probes and the Pioneer 12 spacecraft. While there are some photographs, slides, and videos, most of the materials in the collection are documents. Spanning the lives of the three spacecraft, the collection includes contractor and investigator grants, equipment and instrument proposals, notes from meetings such as the Science Steering Group, correspondence from main contractors such as the Hughes Aircraft Company and TRW, and drawings of the assembly of equipment. Program and quarterly reviews, operations manuals, descriptions and drawings of equipment and instrumentation, and design reviews can also be found in the collection. General descriptive materials about

the spacecraft and their missions are also represented in the collection, such as press releases, news and magazine articles, official NASA press kits, and newsletters. Records of the early years of the Pioneer Program can be found among the papers of Richard O. Fimmel, the second project manager for the Pioneer Program.

This finding aid presents only an overview of the types of materials found in the Pioneer Project Collection, but you can view the complete inventory on the NASA Ames History Archives Web site.

Indexing Terms

The following terms may be used to index this collection.

Corporate Name

Ames Research Center

Geographic Name

Moffett Field (Calif.)

Subjects

Pioneer 10 space probe

Pioneer 11 space probe

Pioneer Venus spacecraft

Container List

File #1

Drawer 1

Pioneer 10/11 Investigator Reports and Publications

Drawer 2

Pioneer 10/11 Investigator Grant and Letters of Agreement Files

Drawer 3

Pioneer 10/11 Investigators Miscellaneous

Drawer 4

Pioneer 10/11 Meetings 1988-1996

Drawer 5

Pioneer 10/11 Proposals

File #2

Drawer 1

Pioneer 12 Investigator Reports and Publications, and Program Reviews

Drawer 2

Pioneer 12 Investigator Grants and Letters of Agreement Files, A-Kli

Drawer 3

Pioneer 12 Investigator Grants and Letters of Agreement Files, Knu-Rus

Drawer 4

Pioneer 12 Investigator Grants and Letters of Agreement Files, Rus-Z

Drawer 5

Pioneer 12 Proposals

File #3

Drawer 1

Pioneer Venus Guest Investigators A-E

Drawer 2

Pioneer Venus Guest Investigators F-L

Drawer 3

Pioneer Venus Guest Investigators M-S

Drawer 4

Pioneer Venus Guest Investigators T-Z

Drawer 5

Pioneer Venus Science Steering Group Meetings 1977-1993

File #4

Drawer 1

Propellant Supply Assembly and Line Heater Assembly 1970-1972

Drawer 2

1977 Hughes Aircraft Company Correspondence, Changes to Documents 1977

Drawer 3

1977 Hughes Aircraft Company Correspondence, Changes to Documents 1977

Drawer 4

1978 Hughes Aircraft Company Correspondence, Changes to Documents 1978

Drawer 5

Thruster Cluster Assembly

File #5

Drawer 1

Pioneer Venus Specifications, PC-454 to PC-496

Drawer 2
Pioneer Venus Specifications, PC-400 to PC-453

Drawer 3
Pioneer Venus Specifications and Procurement Specifications, Development Specifications, and Specification Changes and Other Data 1975-1978

Drawer 4
Pioneer Venus Test Specifications and Specifications Change Notices 1975-1978

Drawer 5
Pioneer Venus Various Materials 1975-1989

File #6

Drawer 1
Quarterly Reports, Deviations and Waivers, Mass Property Reports, Schedule Status Reports 1975-1978

Drawer 2
Readiness Reviews, Launch Vehicle, Atlas SLV 3D, Centaur D-A1 1976-1979

Drawer 3
Hughes Aircraft Company, General Electric Subcontract Test Program Plan 1974-1977

Drawer 4
Ames Research Center, Hughes Aircraft Company Management Meetings, NAS2-8300 Contract, Negotiations 1973-1992

Drawer 5
Pioneer Venus NFRs, CFRs, EMIs 1976-1979

File #7

Drawer 1
Reviews, Closeout Documents, Data Packages, etc. 1975-1978

Drawer 2
Reviews, Closeout Documents, Data Packages, etc. 1976

Drawer 3
Pre-Ship Reviews, Final Design Reviews, etc. 1973-1975

Drawer 4
Pioneer Venus Proposals, Design and Development 1973

Drawer 5
Pioneer Venus Proposals, Design and Development and SEB 1972-1974

File #8

Drawer 1
Pioneer Venus Assorted Files 1979-1991

Drawer 2
Pioneer Venus Assorted Files 1970-1978

Drawer 3
Pioneer Venus Assorted Files 1975-1979

Drawer 4
ORAD V-34 and Long Eclipse Seasons and Assorted Files 1976-1986

Drawer 5
Pioneer Venus Hughes Aircraft Company Specifications Control Documents and Assorted Files
1973-1991

File #9

Drawer 1
Pioneer Photos, Videos, Film, Slides

Drawer 2
Pioneer Photos, Videos, Film, Slides

Drawer 3
Pioneer Photos, Videos, Film, Slides

Drawer 4
Pioneer Photos, Videos, Film, Slides

Drawer 5
Pioneer Photos, Videos, Film, Slides

File #10

Drawer 1
Pioneer F/G (10/11) Assorted Data 1969-1982

Drawer 2
Pioneer F/G (10/11) Specifications

Drawer 3
Pioneer F/G (10/11) Specifications

Drawer 4
Pioneer F/G (10/11) Specifications

File #11

Drawer 1
Spacecraft Attitudes, Science Instruments and Miscellaneous 1964-1981

Drawer 2
Program Reviews, Quarterly Reviews 1969-1976

Drawer 3
Encounters, Pioneer F/G, 10/11 1964-1976

Drawer 4
Encounters, Experiments and Experimenters 1969-1981

File #12

Drawer 1
Experiments, Experimenters, Instruments 1967-1979

Drawer 2
Experiments, Experimenters, Instruments 1968-1994

Drawer 3
Pioneer Venus, Assorted Data 1974-1979

Drawer 4
Pioneer Venus, Assorted Data 1974-1991

File #13

Drawer 1
Press Kits and Informational Articles 1972-1993

Drawer 2
R.O. Fimmel, Records 1964-1970 1964-1970

Drawer 3
Deep Space Network, Pioneer Project, Pioneer Program 1964-1995

Drawer 4
Pioneer 6-11, Assorted Data 1973-1994

File #14

Drawer 1
NAS2-8300 Change Proposals 1975-1977

Drawer 2
Data Printouts, Sigma-S On-Line and IBM Information 1970-1974

Drawer 3
Pioneer F/G (10/11) Design Audits, Closeout Docs, Reviews, etc. 1970-1975

Drawer 4
Pioneer 10/11 Reviews, Closeout Docs, Data Packages, etc. 1970-1973

File #15

Drawer 1
Pioneer F/G (10/11) Reviews, Review Meetings, Test Data Packages, etc. 1969-1971

Drawer 2
Pioneer F/G (10/11) Reviews, Review Meetings, Test Data Packages, etc. 1970-1972

Drawer 3
Library Information, Information Systems Management, Computer, Communications System and Data Processing 1964-1966

Drawer 4
Library, General 1952-1980

File #16

Drawer 1
Pioneer Venus Electrical Systems Tests

Drawer 2
1976 Hughes Aircraft Company Correspondence, Changes to Documents, etc. 1976

Drawer 3
Pioneer Publications

Drawer 4
Pioneer 10/11 Propulsion Drawings 1966-1969

File #17

Drawer 1
Pioneer Venus Microfiche

Drawer 2
Pioneer Venus Microfiche

Drawer 3
Pioneer Venus Microfiche

Drawer 4
Pioneer Venus Microfiche

Drawer 5
Empty

Drawer 6
Pioneer F/G Microfiche

Drawer 7
Pioneer F/G Microfiche

Drawer 8
Unidentified Microfiche

Drawer 9
Unidentified Microfiche

Drawer 10
Unidentified Microfiche

File #18

Drawer 1
1974 Hughes Aircraft Company Correspondence 1974

Drawer 2
M.A. Smith Pioneer 10/11/12, Headquarters, PSG and SSG Meetings

Drawer 3
M.A. Smith Pioneer Venus Engineering

Drawer 4
M.A. Smith Pioneer Venus Engineering

Drawer 5
M.A. Smith Pioneer Venus Engineering

File #19

Drawer 1
Pioneer Venus Spacecraft System Design Study 1973

Drawer 2
Pioneer Venus Star Sensor/Sun Sensor

Drawer 3
Pioneer Venus Awards and Bibliography, Eclipse Seasons, UADS 1981-1985

Drawer 4
Pioneer Venus ACS, DCE, ADP, BAPTA, Propulsion, etc. 1971-1978

Drawer 5
Empty

File #20

Drawer 1
Pioneer 6-9 1966-1971

Drawer 2
TRW 1965 Black Box Test, Acceptance, Qualification Reports 1965-1967

Drawer 3
Hughes Aircraft Company 1975 Correspondence, Documents, etc. 1975

Drawer 4
Hughes Aircraft Company 1975 Correspondence, Documents, etc. 1975

File #21

Drawer 1
Pioneer F/G Project Management Reports and POP 79-2 Cost Analysis 1969-1974

Drawer 2
1975 Hughes Aircraft Company Correspondence, Changes to Documents, etc. 1975

Drawer 3
Pioneer, Mixed 1973-1975

Drawer 4
Pioneer, Mixed 1973-1977

Drawer 5
Pioneer, Mixed 1962-1978

File #22

Drawer 1
1975 Hughes Aircraft Company Correspondence, Changes to Documents, etc. 1975

Drawer 2
1975 Hughes Aircraft Company Correspondence, Changes to Documents, etc. 1975

Drawer 3
1975 Hughes Aircraft Company Correspondence, Changes to Documents, etc. 1975

Drawer 4
1975 Hughes Aircraft Company Correspondence, Changes to Documents, etc. 1975

File #23

Drawer 1
G/E Pioneer Venus 1974-1975

Drawer 2

Pioneer Venus, Monthly Progress Reports and Miscellaneous 1971-1983

Drawer 3

Pioneer Venus Assorted Data 1973-1979

Drawer 4

Pioneer Venus, Large and Small Probe Communications Systems Documents 1975-1978

Drawer 5

B. Jackson, Pioneer Venus Orbiter and Multiprobe Journals 1977-1992

File #24

Drawer 1

Pioneer Miscellaneous

Drawer 2

Pioneer Awards, Graphs