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NASA Ames Research Center

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Descriptive Summary
Title: John D. Mihalov Papers
Date (inclusive): 1960-1997
Collection Number: PP05.22-JM
Creator: Mihalov, John D. (John Donald)
Extent: Volume: 18 cubic feet
Repository: Ames Research Center, Ames History Office
Moffett Field, California 94035

Abstract: The John D. Mihalov Papers include record books, meeting notes, project proposals, correspondence, design reviews, experiment plans, circuit diagrams, instrument descriptions, test reports, data, charts, plots, presentations for international meetings, publications, peer reviews, press kits, and reference materials documenting Mihalov’s solar physics contributions to Pioneers 6 through 11, Pioneer 12 (Pioneer Venus Orbiter), and the Galileo Probe during his career as a research scientist at the NASA Ames Research Center.

Language: English

Access
Collection is open for research.

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Preferred Citation
NASA Ames History Office, NASA Ames Research Center. Moffett Field, California. PP05.22-JM, John D. Mihalov Papers, [Container number] : [Folder number]. [Identification of item]. [Date, if available].

Abbreviated Citation
NASA ARC. PP05.22-JM, [Container number] : [Folder number]. [Identification of item]. [Date, if available].

Related Collections
Alvin Seiff Papers, 1955-2000
Pioneer Project Records, 1952-1956

Acquisition Information
Materials transferred to the History Office by Charles Sobeck in October 2005.

Biographical History
John Donald Mihalov was born in Los Angeles on December 28, 1937. His father was John Mihalov, and his mother was Alice Alma Lydia (Wagner) Mihalov. Little information is available about his early years.
In 1959, at the age of 22, he joined the technical staff of Space Technology Laboratories in El Segundo, California. In the same year, he received a B.S. in Physics from the California Institute of Technology. He moved to New York and became a Ph.D. candidate in Astronomy and Space Sciences at Cornell University. He also worked as a research assistant at Cornell’s Center for Radiophysics and Space Research.

He returned to California in 1961 and received an M.S. in Electrical Engineering from the California Institute of Technology. During that year, he was employed as a scientist at the Jet Propulsion Laboratory. Also in 1961, he joined the technical staff of the Space Physics Laboratory at the Aerospace Corporation in El Segundo, California. He stayed at Aerospace for five years, helping on contracts for NASA.

At Aerospace, Mihalov served as the Principal Investigator for the Electron Spectrometer on the KH-4 9047, which was a satellite that the United States Air Force launched into Earth’s orbit for a month in 1962. The mission studied the effects of high altitude nuclear explosions by the United States and the Soviet Union.

Also in 1962, he was the Principal Investigator for the Three Axis Fluxgate Magnetometer on the Mariner 1 mission. Mariner 1 was intended to fly by Venus, but it was purposely destroyed five minutes after launch because it was veering off course, possibly toward inhabited areas. Later, analysts learned that a missing hyphen in the computer code had caused the transmission of incorrect guidance signals to the spacecraft. Mihalov's magnetometer was demolished along with Mariner 1.

Next, Mihalov served on the OV2-1 mission, which was a research satellite that the U.S. Air Force launched in 1965. For the OV2-1, Mihalov was the Principal Investigator for two experiments: a Cerenkov Counter that measured radiation, and a study on the biological hazards of radiation. However, during the launch, the upper stage rocket didn’t separate as planned, and the mission failed. Later that year, Mihalov served as the Principal Investigator for a Low Energy Proton Spectrometer on the OV2-3 mission, but again the launch failed due to separation problems.

In all, from 1962 to 1965, Mihalov helped design, construct, calibrate, and analyze experiments for six U.S. Air Force satellites. He completed his calibrations at accelerator facilities at the University of Southern California; the University of California, Berkeley; Stanford University; and the Los Alamos National Laboratory.

In 1966, Mihalov became a research scientist in the Space Science Division at the NASA Ames Research Center. He started in the Electrodynamics Branch (Code SSE) under the direction of John Wolfe. Later, Mihalov moved to the Space Physics Branch (Code SSS), of which John Wolfe had become the Chief.

Mihalov married Winifred Koch in 1967. Around that time, he was working on the Explorer 33 mission for NASA. Explorer 33 was a spacecraft that was designed to study interplanetary plasma, energetic charged particles, solar X rays, and magnetic fields. An onboard magnetometer measured magnetic field vectors, and Mihalov served as a Co-Investigator for the Explorer 33 magnetometer data.

He also became involved with the Pioneer series satellites and was responsible for data analysis for the plasma analyzers on Pioneers 6 through 11. Pioneers 6 through 9 were launched into solar orbit to gather information about solar events. Pioneers 10 and 11 were launched toward Jupiter and were the first spacecraft to leave our solar system. Mihalov received the NASA Public Service Group Achievement Award for his work on the Pioneer 10 Plasma Analyzer.

During these years, his marriage foundered, and he and his wife divorced in 1973. That year, he started a graduate program at Stanford University, taking classes part-time as he continued his work at NASA. He completed his advanced degree in Space Science Engineering in 1981.

By 1977, Mihalov had moved to the Theoretical and Planetary Studies Branch (Code SST) of the Space Science Division, where he worked on the Pioneer Venus Orbiter (Pioneer 12). His role on the project was to study the solar wind in the vicinity of Venus. The solar wind constantly sweeps out into space from the Sun, affecting electrical and communication systems on Earth. On the Pioneer Venus Orbiter mission, Mihalov was a Co-Investigator for the Solar Wind Plasma Analyzer (OPA), which measured how the solar wind behaves at far distances from the sun.

The next large project for Mihalov was the Galileo Probe, which was launched toward Jupiter in 1995. He was a Co-Investigator for the Atmospheric Structure Instrument (ASI), which measured the temperature, pressure, and density of Jupiter’s atmosphere while the Probe descended closer and closer to Jupiter's surface. For the Probe mission, Mihalov also served as a Co-Investigator for the Lightning and Radio Emission Detector (LRD), which measured the characteristics of lightning on Jupiter, as well as the planet’s radio frequency noise levels. The LRD experiment shared a common set of electronics with another Probe experiment called the Energetic Particles Investigation (EPI).

Meanwhile, Mihalov's interest in Mars was growing. The Mars Observer mission was slated to study the geoscience and climate of Mars, and Mihalov submitted a proposal to study and interpret the Observer's gamma-ray spectrometer data. Not only was his proposal rejected, but the ill-fated Observer never reached Mars. Undaunted, Mihalov became involved with the Mars Pathfinder mission, which evaluated the Martian environment for further explorations. He assisted Alvin Seiff with a paper about the Pathfinder's Atmospheric Structure Instrument/Meteorology Package (ASI/MET), which recorded data about the atmospheric structure of Mars and the meteorological conditions on the planet's surface. In addition to this paper...
with Seiff, Mihalov published several other papers about the Mars Pathfinder mission.

In 2001, he received a Length of Service Award to commemorate his 35 years at NASA. He died on January 15, 2002.

John D. Mihalov was a member of the American Physical Society, the American Geophysical Union, the American Astronomical Society, and the American Association for the Advancement of Science. His considerable achievements include service on numerous NASA missions plus the publication of over 100 scientific papers. He contributed to the studies of Earth's trapped radiation, Earth's radiation belts, the interplanetary medium, solar wind interaction with the moon and with Venus, solar wind in the outer heliosphere, shock propagation in the outer heliosphere, the atmosphere of Jupiter, and the magnetospheres of Jupiter and Saturn.

**Sources Consulted:**


**Indexing Terms**

The following terms may be used to index this collection.

**Corporate Name**

Ames Research Center

Max Planck Institute for Aeronomy

University of Kiel

**Geographic Name**

Moffett Field (Calif.)

**Personal Name**

Mihalov, John D.

**Subjects**

Energetic Particles Investigation

Galileo probe

Lightning and Radio Emission Detector

Pioneer 6-9 (Spacecraft)

Pioneer 10 (Spacecraft)

Pioneer 11 (Spacecraft)

Pioneer 12 (Spacecraft)

Pioneer Venus spacecraft

Plasmas (physics)

Solar physics

Solar planetary interactions

Solar wind

**Scope and Content**

The John D. Mihalov Papers (18 cubic feet) include technical documents, correspondence, reports, data, conference documentation, and publications detailing Mihalov's contributions to Pioneers 6 through 11 (Pioneers A-G), Pioneer 12 (Pioneer Venus Orbiter, Pioneer Venus 1), and the Galileo Probe (Jupiter Orbiter Probe).

The first series, Record Books, contains technical diaries that Mihalov kept from 1968 to 1992. He filled them with ideas, calculations, and meticulous meeting notes. The notebooks focus on the Interplanetary Monitoring Platform, the Planetary Explorer, Jupiter exploration, scientific instruments on the Galileo Probe, and Pioneer 10 detector data.
The second series, NASA Mission Files, documents Mihalov's involvement with Pioneers 6 through 11, Pioneer 12 (Pioneer Venus Orbiter), and the Galileo Probe. The files contain project management details, correspondence, scientific experiments, and informational materials.

The third series, Project Proposals, consists of proposals that Mihalov produced for scientific experiments.

The fourth series, Scientific Publications, records the development of his publications. It also includes research from his early years, as well as drafts of some of his writings that may not have reached publication.

The fifth series, Meeting Materials, contains information about the international meetings he attended. Also, it records the development of the papers that he authored or co-authored for the meetings.

The sixth series, Peer Reviews, consists of works where Mihalov was not the author or co-author, but he provided feedback to his peers.

The seventh series, Reference Materials, contains books and papers that Mihalov used for research. Some of the items have marginalia in his handwriting. This series is largely unprocessed.

**Arrangement of the John D. Mihalov Papers**

The records are arranged in an order that reflects their technical and historical significance. At the top of the arrangement are Mihalov's record books and mission files, which he wrote and collected from the vantage point of a research scientist who participated in the decision-making processes of several remarkable NASA missions. His project proposals are presented next, revealing his creative ideas for mission experiments, sometimes before the missions were even established. During and after each mission, Mihalov wrote papers about his findings, and these are presented in the next two series, which are his scientific publications and meeting materials. Throughout his long career, Mihalov also helped other scientists with their research, and those contributions show up in the peer review series. The final series in the arrangement contains materials that Mihalov used for reference.

The records of the collection are arranged in seven series, three of which are further arranged in subseries. Contents are in alphabetical order, with two exceptions. The record books are in chronological order, and the NASA missions are presented chronologically at the subseries level.

1. I. Record Books
2. II. NASA Mission Files
   3. 1. Pioneers 6 through 11
   4. 2. Pioneer 12 (Pioneer Venus Orbiter)
   5. 3. Galileo Probe
   6. A. Project Management
   7. B. Correspondence
   8. C. Experiments
   9. D. Informational Materials
10. III. Project Proposals
11. IV. Scientific Publications
   12. 1. Publications
   13. 2. Early Research
   14. 3. Unfinished Works
15. V. Meeting Materials
16. VI. Peer Reviews
17. VII. Reference Materials

Where possible, Mihalov's original order was maintained at the box level, and his folder titles were preserved. However, the bulk of the collection consisted of loose material in no discernable order, so it was necessary to impose an arrangement.
I Record Books, 1968-1992,

Physical Description: 5 folders.

Scope and Content Note
This series contains technical diaries that Mihalov kept from 1968 to 1992. He filled them with ideas, calculations, and meticulous meeting notes. The notebooks focus on the Interplanetary Monitoring Platform, the Planetary Explorer, Jupiter exploration, Pioneer 10 Trapped Radiation Experiment Detector data, and the scientific instruments on the Galileo Probe. Mihalov was the Co-Investigator for two of the probe’s instruments (the Atmospheric Structure Instrument plus the Lightning and Radio Emission Detector). However, the record books reveal that he participated in meetings where all the probe’s instruments were discussed. Some of the Galileo meetings that are recorded here were also attended by James B. Pollack, James Van Allen, and Carl Sagan.

Funding was discussed in the meetings, and questions were occasionally raised about the progress of the Russians in the space race. The record book about the Interplanetary Monitoring Platform holds a 1987 timeline of “Humans in Space,” which predicted that manned ships would reach Mars in 2015.

II NASA Mission Files,

Physical Description: 154 folders.

Scope and Content Note
This series is arranged in three subseries, documenting Mihalov’s involvement with Pioneers 6 through 11, Pioneer 12 (Pioneer Venus Orbiter), and the Galileo Probe.

The first subseries, Pioneers 6 through 11, contains reports, data, and meeting notes for the missions of Pioneers 6 through 11. Some of the meeting notes mention funding problems and morale. It is worth noting that the Pioneer missions had alternate (alphabetic) names, and it is not unusual to see Pioneer 10 called Pioneer F in this subseries. Similarly, Pioneer 11 equates to Pioneer G.

The second subseries, Pioneer 12 (Pioneer Venus Orbiter), includes meeting notes, correspondence, design reviews, tests, and data related to Pioneer 12.

The third subseries, Galileo Probe, represents Mihalov’s work on the Galileo mission. This subseries is further arranged into sub-subseries of Project Management, Correspondence, Experiments, and Informational Materials. A detailed picture of the Galileo Probe project emerges, touching on attempts to open the high gain antenna and management’s efforts to improve team harmony. Most of the series is scientific and professional, but there is also a fair amount of personal correspondence between Mihalov and Rolf Behrends, who worked on the Probe project from Germany. Mihalov and Behrends discuss topics such as international politics, their travels, and the books that they were reading.

III Project Proposals,

Physical Description: 18 folders.

Scope and Content Note
This series consists of proposals that Mihalov made for scientific experiments. He produced numerous diagrams, calculations, and price estimates. Some of his early proposals were rejected, and the files reveal that he contemplated leaving NASA. He persevered on proposals for many years, and his documents provide a glimpse into the political climate of the era, with memos from NASA Headquarters and news from Congress.
IV Scientific Publications,

Physical Description: 62 folders.

Scope and Content Note

This series is arranged in three subseries, which are Mihalov's publications, his early research, and some of his unfinished works.

The first subseries, Publications, records the development of Mihalov's publications, which were primarily for scientific periodicals. He was the author or co-author of over 100 journal publications that dealt with Earth's trapped radiation, Earth's radiation belts, the interplanetary medium, solar wind interaction with the moon and with Venus, solar wind in the outer heliosphere, shock propagation in the outer heliosphere, the atmosphere of Jupiter, and the magnetospheres of Jupiter and Saturn.

In the first subseries, the "Galileo Science Book" folder holds Mihalov's contributions to *Galileo: Exploration of Jupiter's System*, Yeates et al., NASA SP-479, Washington, D.C., 1985

Also in the first subseries, the "Magnetopause" folders include correspondence with Charles P. Sonnett, where Mihalov provides rare comments about his wife and family events, and where he also expresses dissatisfaction with his NASA managers at the time.

The second subseries, Early Research, shows his earliest work in areas that became the foundation of his career.

The third subseries, Unfinished Works, includes some of his writings that may not have reached publication.

V Meeting Materials, 1972-1993,

Physical Description: 44 folders.

Scope and Content Note

This series contains information about the international meetings that Mihalov attended. It also records the development of papers that he authored or co-authored for the meetings. Frequently, his meeting papers ended up as publications in scientific journals. In this series, there are occasional letters from scientists around the world. They wrote to Mihalov saying they had met him at meetings, and they wondered if they could use his data, or work with him on future papers.

VI Peer Reviews, 1972-1992,

Physical Description: 13 folders.

Scope and Content Note

This series consists of works where Mihalov was not the author or co-author, but he provided feedback to other scientists.

VII Reference Materials,

Physical Description: 5 boxes.

Scope and Content Note

This series is largely unprocessed, and it contains papers and books that Mihalov used for research. Some of the items have marginalia in his handwriting.

I. Record Books

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<tr>
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</tbody>
</table>
## I. Record Books

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## II. NASA Mission Files

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| Box 2, Folder 28 | Pioneer 10 and 11, Project Science Group |
| Box 2, Folder 29 | Pioneer 10 and 11, Trajectory Data User Requirements |
| Box 2, Folder 30 | Pioneer 10/G Quarterly Review |
| Box 2, Folder 31 | Pioneer 11, Data |
| Box 2, Folder 32 | Pioneer 11, Data and Miscellaneous Papers |
| Box 2, Folder 33 | Pioneer 11, Failure Mode and Effects Analysis of Plasma Analyzer Instrument |
| Box 2, Folder 34 | Pioneer 11, Fred Scarf’s Shock |
| Box 2, Folder 35 | Pioneer 11, Jupiter Encounter |
| Box 2, Folder 36 | Pioneer 11, Magnetic Coordinates for the Second Jupiter Flyby |
| Box 2, Folder 37 | Pioneer 11, Solar Wind Speed Data |
| Box 2, Folder 38 | Pioneer 11, Van Allen, James A., Correspondence |
| Box 2, Folder 39 | Pioneer Block I and III Era Archive Tape Formats, 1967 |
| Box 2, Folder 40 | Pioneer, Recent Block I Business |
| Box 2, Folder 41 | Pioneer Weekly Reports |

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| Box 3, Folder 1 | Brace, Larry H., Correspondence |
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### II. NASA Mission Files

#### 2. Pioneer 12 (Pioneer Venus Orbiter)

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<td>Box 3, Folder 16</td>
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<td>Pioneer Venus Project Real-Time Data Processing System Software Specification (PC 454), Volume II (1 of 3)</td>
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Box 4, Folder 28: System Preliminary Design Review, Book 1, 1979
Box 4, Folder 29: System Preliminary Design Review, Book 2, 1979
Box 4, Folder 30: Untitled (Mission Profile Change)

B. Correspondence

Chin, Benny
Harvard Cyclotron Laboratory
Lanzerotti, Louis J.
Lanzerotti, Louis J., Email
Lawrence Livermore National Laboratory
Max Planck Institute for Aeronomy
Schaupp, R. William
Tischler, Edward A.
University of Kiel

C. Experiments

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Data Printouts (2 of 3)
Data Printouts (3 of 3)
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Energetic Particles Instrument Experiment SDM Tape Data
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- Box 5, Folder 37: Galileo Cosmic Ray Symposium
- Box 5, Folder 38: Galileo Messenger, The
- Box 6, Folder 1: Galileo Press Kits and Informational Material
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IV: Scientific Publications

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- Box 7, Folder 5: Cliver Paper, 1986 (1 of 2)
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- Box 7, Folder 7: Comparison of Gas Dynamic Model with Steady Solar Wind Flow around Venus
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- Box 7, Folder 10: Factors Controlling the Location of the Venus Bow Shock
- Box 7, Folder 11: Far Reaches of the Solar Wind: Pioneer 10 and Pioneer 11 Plasma Results, The (1 of 2)
- Box 7, Folder 12: Far Reaches of the Solar Wind: Pioneer 10 and Pioneer 11 Plasma Results, The (2 of 2)
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| Box 9, Folder 3 | Smith, E.J., 10 AU Transient Interaction Region Paper |
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| Box 9, Folder 6 | Thermal Structure of Jupiter’s Atmosphere Near the Edge of a 5-Micron Hot Spot in the North Equatorial Belt |
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