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<td>Series VII: Military Programs and Studies, 1957-1971</td>
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</table>
Collection Overview

Repository: National Air and Space Museum Archives
Title: Bellcomm, Inc Technical Library Collection
Identifier: NASM.XXXX.0093
Date: 1959-1972
Extent: 81.71 Cubic feet (222 letter document boxes, 1 slim letter document box, 4 flatboxes)
Creator: Bellcomm, Inc.
Language: English
Summary: This collection contains the non-book portion of Bellcomm's Technical Library. The material in the collection consists of technical reports prepared by NASA subcontractors and/or NASA facilities during the first decade of space exploration (1960-1970). The collections also includes some reports issued by the California Institute of Technology's Jet Propulsion Lab (JPL) at Pasadena, CA, including Space Program and Research Summaries, as well as technical and engineering documents.

Administrative Information

Acquisition Information

Bellcomm, Inc, transfer, XXXX-0093, unknown

Processing Information Note

The collection, as it now exists, consists of engineering study reports and other documents covering all aspects of the United States space program, but relating primarily to the manned space flight program and the Apollo program in particular. Some portions of the original Bellcomm library, most notably books, were placed in the library collection of the NASM, now part of the Smithsonian Institution Libraries. The remaining material was turned over to the NASM Astronautics Department.(1)

At that time some of the material in the collection was dispersed among the departmental files and some extraneous material was interfiled. Most notably, all reports originating at the Jet Propulsion Laboratory (JPL) were removed for interfiling with a collection of JPL reports being assembled by the Astronautics department staff. During the processing of the Jet Propulsion Laboratory Publications Collection (now NASM Archives Accession XXXX-0612) in 1999, some 5½ cubic feet of material which could be positively identified as belonging to the Bellcomm Library was removed from the JPL Collection and returned to the Bellcomm Collection. During the processing of the Bellcomm Collection, items which could be determined not to have originated with Bellcomm were removed from the collection and some effort was made to retrieve Bellcomm material from several other collections of Astronautics/Space Science and Exploration/Space History materials.
The determination of whether to retain or retrieve an item was based primarily on date and markings on the document. Items postdating the transfer of the Bellcomm material to NASM (ca.1972) were automatically removed from the collection. Items bearing one of the several "Bellcomm Technical Library" stamps in use over the lifetime of the company were automatically included in the collection, while items bearing stamps from other NASM collections were removed. If no such stamps were present, a judgement was made based upon other markings. Some -- but not all -- stamped Bellcomm materials also have the report number or title hand-written on or near the spine; unstamped documents bearing similar hand-written report numbers have been retained or replevened, as appropriate. Therefore it is impossible at this date precisely to determine what documents were or were not present in the Library at the time of its transfer to the NASM; in addition a number of multi-volume reports remain incomplete.

Endnote:
1. The Astronautics Department later became the Department of Space Science and Exploration (SS&E). Currently it is the Department of Space History (DSH).

Preferred Citation

Bellcomm, Inc Technical Library Collection, Accession XXXX-0093, National Air and Space Museum, Smithsonian Institution.

Restrictions

No restrictions on access

Conditions Governing Use

Material is subject to Smithsonian Terms of Use. Should you wish to use NASM material in any medium, please submit an Application for Permission to Reproduce NASM Material, available at Permission Requests.

Historical

Bellcomm, Inc was a subsidiary of American Telephone and Telegraph (AT&T) established in 1963 for the National Aeronautics and Space Administration (NASA). Bellcomm was originally organized to provide NASA's Office of Manned Space Flight with technical and management advice for the Manned Space Flight Program. As the NASA-Bellcomm relationship evolved, the latter became directly responsible for systems engineering and analysis and assisted in the overall spacecraft integration for the Apollo program. Bellcomm's Technical Library provided company personnel with immediate access to technical reports and studies dealing with a wide variety of topics affecting the American space program. When the Apollo Program ended in 1972 the company also ceased operation and the library was transferred to the National Air and Space Museum (NASM).

Scope and Content Note

This collection contains the non-book portion of Bellcomm's Technical Library. The material in the collection consists of technical reports prepared by NASA subcontractors and/or NASA facilities during the first decade of space exploration (1960-1970). The reports cover a variety of space exploration-related
subjects, including a number of defunct programs and space medicine concerns, as well as the better-known exploration projects, such as Mercury, Gemini, Surveyor, and so forth. The library also includes some reports issued by the California Institute of Technology's Jet Propulsion Lab (JPL) at Pasadena, CA, including Space Program and Research Summaries, as well as technical and engineering documents.

Arrangement

Several attempts were made to organize the Bellcomm material before it was transferred from SS&E to the NASM Archives Division. The most thorough of these attempts left two sections of the collection independently organized by corporate author and a third unorganized section. As the proposed corporate-author organization would cause documents relating to a single program to be separated based upon which contractor submitted the report while juxtaposing completely unrelated materials, this arrangement has been discarded in favor of a subject (program or study) arrangement.

Following a series of Bibliographies and General Reports, the materials are organized into five series based upon NASA's functional organization during much of the 1960s: Launch Vehicle Programs, Manned Space Flight Programs, Space Science and Applications (Planetary Reconnaissance and Earth-Orbiting Satellites), Tracking and Data Acquisition, and Advanced Research and Technology. Materials relating to military programs follow in a separate series.

Under each series, materials are arranged by study and/or project. Materials relating to specific missions follow general material relating to the project under which the mission was launched. As no reference has surfaced to date positively linking a specific study to a specific project or program, series assignments have been made based upon the study name. The series assignments in this finding aid should not be taken to represent the actual NASA program or project under which the report was originally funded.

- Series I. Bibliographies and General Reports
- Series II. Launch Vehicle Programs
- Series III. Manned Space Flight Programs
- Series IV. Space Science and Applications
- Series V. Tracking and Data Acquisition
- Series VI. Advanced Research and Technology
- Series VII. Military Programs and Studies

Bibliography

Many of the project explanations were compiled from material within the collection itself. Additional reference sources were:


Corporate Abbreviations

ACM
   Allis-Chalmers Manufacturing Co
ACM/RD
   ACM, Research Division
Aerospace
   The Aerospace Corp
Aerospace/ETRO
   Aerospace Corp, Eastern Test Range Office
Aerospace/GLSD
   Aerospace, Gemini Launch Systems Directorate (El Segundo Technical Operations)
Aerospace/SEO
   Aerospace, Systems Engineering Operations
Aerospace/SSO
   Aerospace, Special Studies Office (System Planning Division, El Segundo Technical Operations)
AFAEDC
   United States Air Force, Arnold Engineering Development Center
AFCRL
   United States Air Force, Cambridge Research Laboratories
AFETR
   United States Air Force, Eastern Test Range (Canaveral AFS, FL)
AFMTC
   United States Air Force, Missile Test Center (Patrick AFB, FL)
AFSC
   United States Air Force, Air Force Systems Command
AFSC/ARML
   AFSC, 6570th Aerospace Medical Research Laboratory (Aerospace Medical Division)
AFSC/ESD
   AFSC, Electronic Systems Division
AFSC/FDL
   AFSC, Flight Dynamics Laboratory (Aeronautical Systems Division)
AFSC/SAM
   AFSC, School of Aerospace Medicine (Aerospace Medical Division)
AGC
   Aerojet-General Corp
AGC/LRO
   AGC, Liquid Rocket Operations
AGC/SGC
   AGC, Space-General Corp
Allison/ED
   Allison, Engineering Department
ARMc
   AiResearch Manufacturing Co.
Avco
   Avco Corp
Avco/ERL
   Avco, Everett Research Laboratories
Avco/RAD
   Avco, Research and Advanced Development Division
BBRC
Ball Brothers Research Corp
Bell
    Bell Aerospace Corp (Textron)
Bell/BAC
    Bell, Bell Aerosystems Co
Bell Labs
    Bell Telephone Laboratories
Bendix/ASD
    Bendix Corp, Aerospace Systems Division
Bendix/BPAD
    Bendix Corp, Bendix Products Aerospace Division
Bendix/BPAD/EAES
    Bendix/BPAD, Energy Absorption Equipment Section
Bendix/BPAD/SSMG
    Bendix/BPAD, Space Structure Mechanics Group
Bendix/BSD
    Bendix Corp, Bendix Systems Division
Bendix/ECD
    Bendix, Energy Controls Division
Bendix/ECD/AMD
    Bendix/ECD, Analytical Mechanics Dept
Boeing/AG
    Boeing, Aerospace Group
Boeing/AG/SD
    Boeing/AG, Space Division
Boeing/ALASG
    Boeing, Apollo Launch Availability Study Group
Boeing/ASD
    Boeing, Aero-Space Division
Boeing/ASD/LSB
    Boeing/ASD, Launch Systems Branch
Boeing/ASD/SBB
    Boeing/ASD, Saturn Booster Branch
Boeing/SSLO
    Boeing, Saturn V Launch Operations (Atlantic Test Center)
Boeing/SD
    Boeing, Space Division
Boeing/SD/LSB
    Boeing/SD, Launch Systems Branch
Boeing/SRL
    Boeing Co, Scientific Research Laboratories
Bdefitemn/RL
    Bdefitemn Engineering Co Inc, Research Laboratories
Chrysler/DSG
    Chrysler Corp, Defense-Space Group
Chrysler/SD
    Chrysler Corp, Space Division
Cornell/CRSR
    Cornell University, Center for Radiophysics and Space Research
CUA/SSAP
    Catholic University of America, Department of Space Science and Applied Physics
CVC/VA
    Chance Vought Corp, Vought Astronautics
Douglas/MSSD
<table>
<thead>
<tr>
<th>Company</th>
<th>Description</th>
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<td>Douglas Aircraft Co, Missile and Space Systems Division</td>
<td>Douglas, Space Systems Center</td>
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<td>Douglas/SSC</td>
<td>Douglas, Space Systems Center</td>
</tr>
<tr>
<td>Fairchild/SSE</td>
<td>Fairchild Stratos Inc, Spacecraft Systems Engineering</td>
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<tr>
<td>Ford</td>
<td>Ford Motor Co</td>
</tr>
<tr>
<td>Ford/Philco/AD</td>
<td>Ford, Philco Corp, Aeronutronic Division</td>
</tr>
<tr>
<td>Garrett/ARMD</td>
<td>Garrett Corp, AiResearch Manufacturing Division</td>
</tr>
<tr>
<td>GATC</td>
<td>General American Transportation Corp.</td>
</tr>
<tr>
<td>GATC/GARD</td>
<td>GATC, General American Research Division</td>
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<tr>
<td>GD</td>
<td>General Dynamics Corp.</td>
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<td>GD/Astronautics</td>
<td>GD, Astronautics Division</td>
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<tr>
<td>GD/Convair</td>
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<td>GE</td>
<td>General Electric Co</td>
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<tr>
<td>GE/AATD</td>
<td>GE, Aircraft Accessory Turbine Department</td>
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<td>GE/AP</td>
<td>GE, Accessory Power</td>
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<tr>
<td>GE/ASD</td>
<td>GE, Apollo Support Dept</td>
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<td>GE/ASD/KCE</td>
<td>GE/ASD, KSC Checkout Engineering</td>
</tr>
<tr>
<td>GE/DECO</td>
<td>GE, Direct Energy Conversion Operation</td>
</tr>
<tr>
<td>GE/DSD</td>
<td>GE, Defense Systems Department</td>
</tr>
<tr>
<td>GE/MSD</td>
<td>GE, Missile and Space Division</td>
</tr>
<tr>
<td>GE/MSD/ANSO</td>
<td>GE/MSD, Advanced Nuclear Systems Operation</td>
</tr>
<tr>
<td>GE/MSD/IPSO</td>
<td>GE/MSD, Isotope Power Systems Operation</td>
</tr>
<tr>
<td>GE/RL</td>
<td>GE, Research Laboratory</td>
</tr>
<tr>
<td>GE/SD</td>
<td>GE, Spacecraft Department</td>
</tr>
<tr>
<td>GE/SSO</td>
<td>GE, Space Systems Organization</td>
</tr>
<tr>
<td>GE/TEMPO</td>
<td>GE, Technical Military Planning Operation</td>
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<tr>
<td>GM</td>
<td>General Motors Corp</td>
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<td>GM/AC</td>
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GM, AC Electronics-Defense Research Laboratories, Lunar and Planetary Programs

GM/DRL
GM, Defense Research Laboratories

Grumman
Grumman Aircraft Engineering Corp

Grumman/ED
Grumman, Engineering Dept

Grumman/PSD
Grumman, Product Support Dept

GSFC
Goddard Space Flight Center (NASA)

GSFC/DOB
GSFC, Data Operations Branch (Manned Flight Operations Division, Tracking and Data Systems Directorate)

GSFC/MFOB
GSFC, Manned Flight Operations Branch (Manned Flight Operations Division)

GSFC/NSSDC
GSFC, National Space Science Data Center

GWU/BSCP
George Washington University, Biological Sciences Communication Project

GWU/PPS
George Washington University, Program of Policy Studies

Harvard/HCO
Harvard University, Harvard College Observatory

Hercules/CPD
Hercules Inc, Chemical Propulsion Division

Honeywell/AD
Honeywell, Aeronautical Division

Honeywell/AD/MPG
Honeywell/AD, Military Products Group

Honeywell/SAS
Honeywell, Space and Armament Systems

Hughes
Hughes Aircraft Co.

Hughes/SSD
Hughes, Space Systems Division

IAS
Institute of the Aerospace Sciences

IBM/FSD
IBM Federal Systems Division

IBM/SGC
IBM Space Guidance Center

IITRI/ASC
IIT Research Institute, Astro Sciences Center

JHU/APL/CPIA
Johns Hopkins University, Applied Physic Laboratory, Chemical Propulsion Information Agency

JPL/ALST
JPL, Advanced Lunar Studies Team

KSC
Kennedy Space Center (NASA)

KSC/DASA
KSC, Data Acquisition Systems and Analysis

KSC/ESD
MDC/DMSSD
MDC, Douglas Missile and Space Systems Division

MDC/MAC
McDonnell Douglas Corp., McDonnell Astronautics Co

MDC/MDAC
MDC, McDonnell Douglas Astronautics Co

MDC/MDAC/ED
MDC/MDAC, Eastern Division

MIT
Massachusetts Institute of Technology

MIT/CSR
MIT, Center for Space Research

MIT/IL
MIT, Instrumentation Laboratory

MIT/LL
MIT, Lincoln Laboratory

MMC/AD
Martin Marietta Corp, Aerospace Division

MMC/DD
MMC, Denver Division

MMC/ND
MMC, Nuclear Division

MSC
Manned Spacecraft Center (NASA)

MSC/AFPS
MSC, Apollo Flight Planning Section (Flight Planning Branch, Flight Crew Support Division)

MSC/AMPO
MSC, Advanced Missions Program Office

MSC/ASPO
MSC, Apollo Spacecraft Program Office

MSC/ATSO
MSC, Apollo Trajectory Support Office (Mission and Planning Analysis Division)

MSC/FCD
MSC, Flight Control Division

MSC/FES
MSC, Flight Equipment Section (Mission Operations Branch, Flight Crew Support Division)

MSC/FOD
MSC, Flight Operations Directorate

MSC/FPB
MSC, Flight Planning Branch (Crew Procedures Division)

MSC/FSD
MSC, Flight Support Division

MSC/GPB
MSC, Guidance and Performance Branch (Mission Planning and Analysis Division)

MSC/ISD
MSC, Information Systems Division,

MSC/LEPO
MSC, Lunar Experiments Project Office

MSC/LMO
MSC, Lunar Missions Office (Advanced Spacecraft Technology Division)

MSC/LSPO
MSC, Lunar Surface Project Office (Engineering and Development Directorate)
MSC/MAB
MSC, Management Analysis Branch

MSC/MATT
MSC, Mission Analysis Task Team (Saturn V Orbital Workshop Study)

MSC/MPAD
MSC, Mission Planning and Analysis Division

MSC/MSB
MSC, Mapping Sciences Branch (Earth Observations Division, Science and Applications Directorate)

MSC/MSL
MSC, Mapping Sciences Laboratory

MSC/OMSFPG
MSC, Office of Manned Space Flight Planning Group

MSC/RQAO
MSC, Reliability and Quality Assurance Office (Reliability and Certification Office)

MSC/RSB
MSC, Recovery Systems Branch (Landing and Recovery Division)

MSC/SED
MSC, Systems Engineering Division

MSC/SOB
MSC, Systems Operations Branch (Landing and Recovery Division)

MSC/TTB
MSC, Thermochemical Test Branch (Propulsion and Power Division)

MSFC
Marshall Space Flight Center (NASA)

MSFC/AESB
MSFC, Airborne Electrical Systems Branch (Astrionics Laboratory)

MSFC/ASIS
MSFC, Airborne Systems Integration Section (Astrionics Division)

MSFC/FPO
MSFC, Future Projects Office

MSFC/LVOD
MSFC, Launch Vehicle Operations Division

MSFC/MDC
MSFC, Managerial Data Center

MSFC/MDWG
MSFC, Meteoroid Damage Working Group,

MSFC/MSO
MSFC, Management Services Office

MSFC/MSS
MSFC, Manned Simulation Section (Man/System Integration Branch, Mechanical and Crew Systems Integration Division, Astronautics Laboratory, Science and Engineering Directorate)

MSFC/PVEL
MSFC, Propulsion and Vehicle Engineering Laboratory (Vehicle Systems Division, Systems Requirements Branch)

MSFC/S1BPO
MSFC, Saturn IB Program Office

MSFC/S1PCO
MSFC, Saturn I/IB Program Control Office

MSFC/S5PCO
MFSC, Saturn V Program Control Office

MSFC/S5PO
MSFC, Saturn V Program Office
MSFC/S5TMO
MSFC, Saturn V Test Management Office

MSFC/SEO
MSFC, Systems Engineering Office

MSFC/SFEWG
MSFC, Saturn Flight Evaluation Working Group

MSFC/SODS
MSFC, Systems Operations Design Section (Astrionics Division)

MSFC/SPPO
MSFC, Saturn Program Engineering Office (Mission Engineering Branch)

MSFC/SSAO
MSFC, Scientific Spacecraft Applications Office (Saturn Systems Office)

MSFC/SSO
MSFC, Saturn Systems Office

MSFC/THMS
MSFC, Technical Handbooks and Manuals Section (Engineering Documentation Branch, Vehicle Systems Division, Propulsion and Vehicle Engineering Laboratory)

MSFC/TS
MSFC, Trajectory Section (Flight Mechanics Branch, Mission Planning and Analysis Division, Aero-Astrodynamics Laboratory)

MSFC/VSIO
MSFC, Vehicle Systems Integration Office (Propulsion and Vehicle Engineering Division)

MSFC/VTS
MSFC, Vehicle Test Section (Mechanical Systems Analysis Branch, Quality Assurance Division)

NAA
North American Aviation Inc

NAA/SD
NAA, Space Division

NAA/SID
NAA, Space and Information Systems Division

NAR
North American Rockwell Corp

NAR/SD
NAR, Space Division

NASA/ANWG
NASA, Apollo Navigation Working Group (joint MSC-GSFC)

NASA/FCSD
NASA, Flight Crew Support Division (Spacecraft Systems Operations Branch)

NASA/OART
NASA, Office of Advanced Research and Technology

NASA/OART/MAD
NASA/OART, Mission Analysis Division

NASA/OCR
NASA, Office of Congressional Relations

NASA/OMSF
NASA, Office of Manned Space Flight

NASA/OP/HD
NASA, Office of Policy, Historical Division

NASA/OTU
NASA, Office of Technology Utilization

Northrop
Northrop Corp

Northrop/SL
Northrop, Space Laboratories
Northrop/VD
   Northrop, Ventura Division
NRAO
   National Radio Astronomy Observatory
OSU/MED
   Ohio State University, Mechanical Engineering Department
PWA
   Pratt & Whitney Aircraft
RAND
   RAND Corp
RAND/ED
   RAND, Engineering Division
RAND/PD
   RAND, Physics Division
Raytheon/SISD
   Raytheon Co, Space and Information Systems Division
RCA
   Radio Corp of America
RCA/AED
   RCA, Astro-Electronics Division
Rocketdyne/J2RP
   Rocketdyne Engineering, J-2 Reliability Projects
SAE
   Society of Automotive Engineers
SAO
   Smithsonian Institution Astrophysical Observatory
STL
   Space Technology Laboratories, Inc
TI/SSD
   Texas Instruments Inc, Science Services Division
TRW/SG
   TRW Systems Group
TRW/STL
   TRW, Space Technology Laboratories
UAC
   United Aircraft Corp
UAC/HS
   United Aircraft Corp, Hamilton Standard Division
UC
   Union Carbide Corp
UC/ADD
   UC, Advanced Developments Division
USACE/AMS
   United States Army Corps of Engineers, Army Map Service
USAESWES
   United States Army Engineer Waterways Experiment Station
USATEC/YPG
   United States Army Test and Evaluation Command, Yuma Proving Ground
USDC/CFSTI
USDoD
   United States Department of Defence
**Project Mercury Launches**

All launches by date:

<table>
<thead>
<tr>
<th>Mission</th>
<th>Launch Date</th>
<th>Launch vehicle</th>
<th>Payload</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>LJ-1</td>
<td>21 Aug 1959</td>
<td>Little Joe</td>
<td>Mercury boiler plate</td>
<td>unsuccessful beach test of LES</td>
</tr>
<tr>
<td>Big Joe 1</td>
<td>9 Sep 1959</td>
<td>Big Joe</td>
<td>Mercury boiler plate</td>
<td></td>
</tr>
<tr>
<td>LJ-6</td>
<td>4 Oct 1959</td>
<td>Little Joe</td>
<td>Mercury boiler plate</td>
<td></td>
</tr>
<tr>
<td>LJ-1A</td>
<td>4 Nov 1959</td>
<td>Little Joe</td>
<td>Mercury boiler plate</td>
<td>repeat of LJ-1</td>
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<tr>
<td>LJ-2</td>
<td>4 Dec 1959</td>
<td>Little Joe</td>
<td>Mercury boiler plate</td>
<td>high-altitude LES test</td>
</tr>
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<td>LJ-1B</td>
<td>21 Jan 1960</td>
<td>Little Joe</td>
<td>Mercury boiler plate</td>
<td>beach abort w/rhesus (Miss Sam)</td>
</tr>
<tr>
<td>MA-1</td>
<td>29 Jul 1960</td>
<td>Atlas</td>
<td>Mercury s/c 4</td>
<td>launch vehicle failure</td>
</tr>
<tr>
<td>LJ-5</td>
<td>8 Nov 1960</td>
<td>Little Joe</td>
<td>Mercury s/c 3</td>
<td>unsuccessful test of LES</td>
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<tr>
<td>MR-1</td>
<td>21 Nov 1960</td>
<td>Redstone</td>
<td>Mercury s/c 2</td>
<td>premature booster cut-off</td>
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<tr>
<td>MR-1A</td>
<td>19 Dec 1960</td>
<td>Redstone</td>
<td>Mercury s/c 2</td>
<td>suborbital reentry test</td>
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<td>MR-2</td>
<td>3 Jan 1961</td>
<td>Redstone</td>
<td>Mercury s/c 5</td>
<td>suborbital w/ chimp (Ham)</td>
</tr>
<tr>
<td>MA-2</td>
<td>21 Feb 1961</td>
<td>Atlas</td>
<td>Mercury s/c 6</td>
<td>suborbital test</td>
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<tr>
<td>LJ-5A</td>
<td>18 Mar 1961</td>
<td>Little Joe</td>
<td>Mercury s/c 14</td>
<td>unsuccessful test of LES</td>
</tr>
<tr>
<td>MR-BD</td>
<td>24 Mar 1961</td>
<td>Redstone</td>
<td></td>
<td>LV qualified for manned flight</td>
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<tr>
<td>MA-3</td>
<td>25 Apr 1961</td>
<td>Atlas</td>
<td>Mercury s/c 8</td>
<td>launch vehicle failure</td>
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<td>LJ-5B</td>
<td>28 Apr 1961</td>
<td>Little Joe</td>
<td>Mercury s/c 14</td>
<td>successful LES test</td>
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<tr>
<td>Mission</td>
<td>Launch Date</td>
<td>Launch vehicle</td>
<td>Payload</td>
<td>Remarks</td>
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<td>MR-3</td>
<td>5 May 1961</td>
<td>Redstone 7</td>
<td>Mercury s/c 7</td>
<td>suborbital; Shepard, &quot;Freedom 7&quot;</td>
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<td>21 Jul 1961</td>
<td>Redstone 8</td>
<td>Mercury s/c 11</td>
<td>suborbital; Grissom, &quot;Liberty Bell 7&quot;</td>
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<tr>
<td>MA-4</td>
<td>13 Sep 1961</td>
<td>Atlas</td>
<td>Mercury s/c 8</td>
<td>orbital test of tracking network</td>
</tr>
<tr>
<td>MA-5</td>
<td>2 Nov 1961</td>
<td>Atlas</td>
<td>Mercury s/c 9</td>
<td>2 orbits w/ chipm (Enos)</td>
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<td>MA-6</td>
<td>20 Feb 1962</td>
<td>Atlas 109-D</td>
<td>Mercury s/c 13</td>
<td>3 orbits; Glenn, &quot;Friendship 7&quot;</td>
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<td>MA-7</td>
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<td>Atlas 107-D</td>
<td>Mercury s/c 18</td>
<td>3 orbits; Carpenter, &quot;Aurora 7&quot;</td>
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<td>MA-8</td>
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<td>Mercury s/c 16</td>
<td>6 orbits; Schirra, &quot;Sigma 7&quot;</td>
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<td>MA-9</td>
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<td>Atlas 130-D</td>
<td>Mercury s/c 20</td>
<td>22 orbits; Cooper, &quot;Faith 7&quot;</td>
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Manned launches only, by date:

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<th>Mission</th>
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<td>Mercury s/c 7</td>
<td>suborbital; Shepard, &quot;Freedom 7&quot;</td>
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<td>MR-4</td>
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<td>Mercury s/c 11</td>
<td>suborbital; Grissom, &quot;Liberty Bell 7&quot;</td>
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<td>Mercury s/c 13</td>
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By launch vehicle: Big Joe

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<td>Mercury boiler plate</td>
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By launch vehicle: Little Joe

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<tr>
<td>LJ-1</td>
<td>21 Aug 1959</td>
<td>Little Joe</td>
<td>Mercury boiler plate</td>
<td>unsuccessful beach test of LES</td>
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<td>LJ-1A</td>
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<td>Little Joe</td>
<td>Mercury boiler plate</td>
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<td>Little Joe</td>
<td>Mercury boiler plate</td>
<td>beach abort w/ rhesus (Miss Sam)</td>
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<td>Payload</td>
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<td>high-altitude LES test</td>
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<td>Little Joe</td>
<td>Mercury s/c 3</td>
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<td>LJ-5A</td>
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<td>Little Joe</td>
<td>Mercury s/c 14</td>
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<tr>
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<td>29 Jul 1960</td>
<td>Atlas</td>
<td>Mercury s/c 4</td>
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<td>21 Feb 1961</td>
<td>Atlas</td>
<td>Mercury s/c 6</td>
<td>suborbital test</td>
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<td>MA-3</td>
<td>25 Apr 1961</td>
<td>Atlas</td>
<td>Mercury s/c 8</td>
<td>launch vehicle failure</td>
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<td>MA-4</td>
<td>13 Sep 1961</td>
<td>Atlas</td>
<td>Mercury s/c 8</td>
<td>orbit test of tracking network</td>
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<tr>
<td>MA-5</td>
<td>2 Nov 1961</td>
<td>Atlas</td>
<td>Mercury s/c 9</td>
<td>2 orbits w/chimp (Enos)</td>
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<td>MA-6</td>
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<td>Atlas 109-D</td>
<td>Mercury s/c 13</td>
<td>3 orbits; Glenn, &quot;Friendship 7&quot;</td>
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<td>MA-7</td>
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<td>Atlas 107-D</td>
<td>Mercury s/c 18</td>
<td>3 orbits; Carpenter, &quot;Aurora 7&quot;</td>
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<td>MA-8</td>
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<td>Atlas 113-D</td>
<td>Mercury s/c 16</td>
<td>6 orbits; Schirra, &quot;Sigma 7&quot;</td>
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By launch vehicle: Redstone

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<td>MR-1</td>
<td>21 Nov 1960</td>
<td>Redstone</td>
<td>Mercury s/c 2</td>
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<td>MR-1A</td>
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<td>Redstone</td>
<td>Mercury s/c 2</td>
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<td>MR-2</td>
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<td>MR-BD</td>
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<td>Mercury s/c 7</td>
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<td>Redstone 8</td>
<td>Mercury s/c 11</td>
<td>suborbital; Grissom, &quot;Liberty Bell 7&quot;</td>
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Mercury capsule listing and disposition:

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<td>9 May 1960</td>
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<td>Mercury s/c 4</td>
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<td>Little Joe</td>
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<td>MR-2</td>
<td>3 Jan 1961</td>
<td>Redstone</td>
<td>suborbital w/chimp (Ham)</td>
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<tr>
<td>Payload</td>
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<td>Launch Date</td>
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<td>Remarks</td>
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<td>Atlas</td>
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<td>Mercury s/c 8</td>
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<td>25 Apr 1961</td>
<td>Atlas</td>
<td>orbital test of tracking network</td>
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<td>Mercury s/c 9</td>
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<td>Atlas</td>
<td>2 orbits w/chimp (Enos)</td>
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<td>Mercury s/c 12</td>
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<td>Atlas 109-D</td>
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<td>Mercury s/c 15</td>
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<td>successful LES test</td>
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<td>Mercury s/c 16</td>
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### Project Gemini Launches

All launches by date:

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<th>Launch vehicle</th>
<th>Payload</th>
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<tr>
<td>GT-1</td>
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<td>GLV-1</td>
<td>Gemini s/c 1</td>
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<td>GLV-2</td>
<td>Gemini s/c 2</td>
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<tr>
<td>GT-3</td>
<td>23 Mar 1965</td>
<td>GLV-3</td>
<td>Gemini 3</td>
<td>Grissom &amp; Young, &quot;Molly Brown&quot;</td>
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<tr>
<td>GT-4</td>
<td>3 Jun 1965</td>
<td>GLV-4</td>
<td>Gemini 4</td>
<td>McDivitt &amp; White; first EVA</td>
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<td>GLV-5</td>
<td>Gemini 5</td>
<td>Cooper &amp; Conrad</td>
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<td>Schirra &amp; Stafford</td>
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<td>Gemini 7</td>
<td>Armstrong &amp; Scott</td>
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<td>TLV-5302</td>
<td>GATV-5003</td>
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<td>GATV-5005</td>
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<td>GLV-12</td>
<td>Gemini 12</td>
<td>Lovell &amp; Aldrin</td>
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<td>TLV-5307</td>
<td>GATV-5001</td>
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**Saturn/Apollo Program Launches**

**Saturn Program Development Launches**

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<th>Payload</th>
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<tr>
<td>SA-1</td>
<td>27 Oct 1961</td>
<td>Saturn I</td>
<td>dummy second stage</td>
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<td>SA-2</td>
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<td>Saturn I</td>
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<td>Project Highwater</td>
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<td>SA-3</td>
<td>16 Nov 1962</td>
<td>Saturn I</td>
<td>dummy second stage</td>
<td>Project Highwater</td>
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<td>SA-4</td>
<td>28 Mar 1963</td>
<td>Saturn I</td>
<td>dummy second stage</td>
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<td>SA-5</td>
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<td>Saturn I</td>
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<td>SA-6</td>
<td>28 May 1964</td>
<td>Saturn I</td>
<td>BP-3</td>
<td>Saturn I declared operational</td>
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<td>SA-7</td>
<td>18 Sep 1964</td>
<td>Saturn I</td>
<td>BP-15</td>
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<td>Saturn I</td>
<td>BP- ; Pegasus 2</td>
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<td>BP- ; Pegasus 1</td>
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<td>BP- ; Pegasus 3</td>
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Apollo Program Launches

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<td>13 May 1964</td>
<td>Little Joe II</td>
<td>BP-12</td>
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<td>A-002</td>
<td>8 Dec 1964</td>
<td>Little Joe II</td>
<td>BP-23</td>
<td>LES test</td>
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<td>A-003</td>
<td>19 May 1965</td>
<td>Little Joe II</td>
<td>BP-22</td>
<td>LES test</td>
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<td>CSM-002</td>
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<td>A-101</td>
<td>see SA-6 (Saturn development launch)</td>
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<td>A-102</td>
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<td>AS-201</td>
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<td>SA-201 (Sat IB)</td>
<td>CSM-009</td>
<td>suborbital test of Apollo heat shield</td>
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<tr>
<td>AS-202</td>
<td>25 Aug 1966</td>
<td>SA-202 (Sat IB)</td>
<td>CSM-011</td>
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<tr>
<td>AS-203</td>
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<td>AS-205</td>
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<td>SA-205 (Sat IB)</td>
<td>CSM-101</td>
<td>Apollo 7; first manned Apollo launch</td>
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<tr>
<td>AS-501</td>
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<td>SA-501 (Sat V)</td>
<td>CSM-017, LTA-10R</td>
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<td>SA-503 (Sat V)</td>
<td>CSM-103</td>
<td>Apollo 8; first lunar orbital flight</td>
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<td>SA-504 (Sat V)</td>
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<td>AS-506</td>
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<td>Apollo 11; first lunar landing</td>
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<td>SA-508 (Sat V)</td>
<td>CSM-109, LM-7</td>
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<td>AS-510</td>
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<td>AS-511</td>
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<td>CSM-113, LM-11, LRV-2</td>
<td>Apollo 16</td>
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<td>SA-512 (Sat V)</td>
<td>CSM-114, LM-12, LRV-3</td>
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By Apollo Mission Number:
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<td>Apollo 6</td>
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<td>CSM-103</td>
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<td>Sat V</td>
<td>&quot;Charlie Brown&quot;</td>
<td>&quot;Eagle&quot;</td>
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<td>Apollo 16</td>
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Names and Subject Terms

This collection is indexed in the online catalog of the Smithsonian Institution under the following terms:

- Subjects:
  - Astronautics
Types of Materials:
Photographs
Publications
Reports

Names:
American Telephone and Telegraph Company
Bellcomm, Inc.
California Institute of Technology, Jet Propulsion Lab
National Aeronautics and Space Administration
Project Gemini (U.S.)
Project Mercury (U.S.)
Project Surveyor (U.S.)
Container Listing

Series I: Bibliographies and General Reports, 1958-1972

The materials in this series are publications and reports of a general nature, not relating to any specific NASA program or functional area. The series is divided into two subseries by genre:

- Subseries I.A. Bibliographies
- Subseries I.B. General Reports


The documents in this subseries are published bibliographic works. The bulk were prepared by JPL and are organized by title and date, followed by bibliographies prepared by other organizations organized by date:

- I.A.1. Astronautics Information Index (1959)

I.A.1.: Astronautics Information Index, 1959

*Astronautics Information Index.* (JPL.)

Volume 1

Box 1, Folder 1 Part A. Abstracts 1,001 - 1,175. (March 1, 1959.)

Box 1, Folder 2 Part B. Abstracts 1,001 - 1,329. (May 15, 1959.)

Box 1, Folder 3 Part C. Abstracts 1,001 - 1,503. (September 15, 1959.)

I.A.2.: Astronautics Information Abstracts, 1959-1963

*Astronautics Information Abstracts.* (JPL.)

Volume 1

Box 1, Folder 4 Part A. Abstracts 1,001 - 1,175. (March 1, 1959.)

Box 1, Folder 5 Part B. Abstracts 1,176 - 1,329. (May 15, 1959.)

Box 1, Folder 6 Part C. Abstracts 1,330 - 1,503. (September 15, 1959.)

Volume III

Box 1, Folder 7 No.6. Abstracts 3,597 - 3,698. (June 1961.)

Volume IV
Box 1, Folder 8  No.1. Abstracts 4,001 - 4,100. (July 1961.)
Box 1, Folder 9  No.2. Abstracts 4,101 - 4,201. (August 1961.)
Box 1, Folder 10 No.3. Abstracts 4,202 - 4,321. (September 1961.)
Box 1, Folder 11 No.4. Abstracts 4,322 - 4,427. (October 1961.) [2 copies]
Box 1, Folder 12 No.5. Abstracts 4,428 - 4,521. (November 1961.)
Box 1, Folder 13 No.6. Abstracts 4,522 - 4,616. (December 1961.)

Volume V
Box 1, Folder 14 No.2. Abstracts 5,101 - 5,200. (February 1962.)
Box 1, Folder 15 No.3. Abstracts 5,201 - 5,330. (March 1962.)
Box 1, Folder 16 No.4. Abstracts 5,331 - 5,455. (April 1962.)
Box 1, Folder 17 No.5. Abstracts 5,456 - 5,566. (May 1962.)
Box 1, Folder 18 No.6. Abstracts 5,567 - 5,682. (June 1962.)

Astronautics Information Abstracts - Reports and Open Literature. (JPL.)

Volume VI
Box 2, Folder 1 No.1. Abstracts 60,001 - 60,307. (July 1962.)
Box 2, Folder 2 No.2. Abstracts 60,308 - 60,603. (August 1962.)
Box 2, Folder 3 No.3. Abstracts 60,604 - 60,929. (September 1962.)
Box 2, Folder 4 No.4. Abstracts 60,930 - 61,248. (October 1962.)
Box 2, Folder 5 No.5. Abstracts 61,249 - 61,601. (November 1962.)
Box 2, Folder 6 No.6. Abstracts 61,602 - 61,885. (December 1962.)

Volume VII
Box 2, Folder 7 No.1. Entries 70,001 - 70,344. (January 1963.)
Box 2, Folder 8 No.2. Entries 70,345 - 70,608. (February 1963.)
Box 2, Folder 9 No.3. Entries 70,609 - 70,930. (March 1963.)
Box 2, Folder 10 No.4. Entries 70,931 - 71,239. (April 1963.)
Box 2, Folder 11 No.5. Entries 71,240 - 71,645. (May 1963.)
Box 2, Folder 12  No.6. Entries 71,646 - 72,015. (June 1963.)

Volume VIII

Box 2, Folder 13  No.1. Entries 80,001 - 80,367. (July 1963.)

Box 2, Folder 14  No.2. Entries 80,368 - 80,778. (August 1963.)


published 1959 - June 1962; merged with Astronautics Information Abstracts as Astronautics Information Abstracts - Reports and Open Literature beginning July 1962

Astronautics Information Open Literature Survey. (JPL.)

Volume 1.

Box 3, Folder 1  Part D. Entries 13,166 - 13,888. (January 15, 1960.)

Volume II.

Box 3, Folder 2  No.1-2. Entries 20,001 - 20,674. (January-February 1960.)

Box 3, Folder 3  No.6. Entries 21,871 - 22,113. (June 1960.)

Box 3, Folder 4  No.7. Entries 22,114 - 22,420. (July 1960.)

Box 3, Folder 5  No.9. Entries 22,671 - 22,870. (September 1960.)

Box 3, Folder 6  No.10. Entries 22,871 - 23,094. (October 1960.)

Box 3, Folder 7  No.11. Entries 23,095 - 23,310. (November 1960.)

Box 3, Folder 8  No.12. Entries 23,311 - 23,514. (December 1960.)

Volume III

Box 3, Folder 9  No.5. Entries 30,845 - 31,145. (May 1961.)

Volume IV.

Box 3, Folder 10  No.1. Entries 40,001 - 40,202. (July 1961.)

Box 3, Folder 11  No.2. Entries 40,203 - 40,456. (August 1961.)

Box 3, Folder 12  No.3. Entries 40,454 - 40,728. (September 1961.)

Box 3, Folder 13  No.4. Entries 40,729 - 41,018. (October 1961.)

Box 3, Folder 14  No.5. Entries 41,019 - 41,268. (November 1961.)
Box 3, Folder 15  No.6. Entries 41,269 - 41,476. (December 1961.)

Volume V.

Box 3, Folder 16  No.1. Entries 50,001 - 50,205. (January 1962.)

Box 4, Folder 1  No.2. Entries 50,206 - 50,417. (February 1962.)

Box 4, Folder 2  No.3. Entries 50,418 - 50,669. (March 1962.)

Box 4, Folder 3  No.4. Entries 50,670 - 50,951. (April 1962.)

Box 4, Folder 4  No.5. Entries 50,952 - 51,270. (May 1962.)

Box 4, Folder 5  No.6. Entries 51,271 - 51,483. (June 1962.)

I.A.4.: Astronautics Information Literature Search, 1961-1965

Astronautics Information Literature Search. (JPL.)

Box 4, Folder 6  No.254 Supplement. Biological and Artificial Intelligence. (May 31, 1961.)

Box 4, Folder 7  No.260. Effects of Sterilizing Agents on Microorganisms. (August 1961.)


Box 4, Folder 9  No.345. Radiometry and Photometry of the Moon and Planets. (September 1961.)

Box 4, Folder 10  No.428. Electrically Propelled Spacecraft and Associated Subjects. (May 1962.)


Box 5, Folder 1  No.490. Television, Photogrammetry, Photometry, and Radiometry Adaptable to Space Reconnaissance. (November 1963.)

Box 5, Folder 2  No.523. Structural Modeling. (March 1963.)

Box 5, Folder 3  No.541. Interactions of Spacecraft and Other Moving Bodies with Natural Plasmas. (December 1965.)

Box 5, Folder 4  No.587. Electric Propulsion. (June 1964.)

I.A.5.: Miscellaneous Bibliographies, 1961-1968
Box 5, Folder 5  JPL Library Literature Searches 1956-1966 - Subject and Title Index. (JPL. No date.)


Box 5, Folder 7  Lunar Dimensions - Annotated Bibliography of Soviet-Bloc Literature. (LC/AID. AID Report B-63-100. 30 July 1963.)

Box 5, Folder 8  Meteoroid Impact on Space Vehicles - Bibliography of Laboratory Experiment and Theory 1962 [Draft]. (MSFC/MDWG. No date.)

Box 5, Folder 9  List of Published Technical Reports. (GCA Corp. 15 October 1966.)

Box 5, Folder 10  Radiobiology - A Selected Bibliography. (Leslie A. Kulp and Frances Hong; GWU/BSCP. August 28, 1967.)

Box 5, Folder 11  Contractual Listing of Publications Supported by the Physical Biology Program of the National Aeronautics and Space Administration. (L. A. Kulp, Frances Hong, and Sheila Rollins (compilers); GWU/BSCP. July 6, 1967.)

Box 6, Folder 1  Contractual Listing of Publications Supported by the Environmental Biology Program, Bioscience Programs Division of the National Aeronautics and Space Administration. (L. A. Kulp, Frances Hong, and Sheila Rollins (compilers); GWU/BSCP. September 1967.)

Box 6, Folder 2  Contractual Listing of Publications Supported by the Exobiology Program, Bioscience Programs Division of the National Aeronautics and Space Administration. (L. A. Kulp, Frances Hong, and Sheila Rollins (compilers); GWU/BSCP. September 29, 1967.)


I.B.: General Reports, 1958-1972

The materials in this subseries do not relate to any specific NASA program or project. Documents are grouped by general subject as follows:

- I.B.2. "An Introduction to Astronautics" (RAND Corp Lectures; 1958)

I.B.1.: Historical Reports, 1962-1972

Box 6, Folder 4  Aeronautical and Astronautical Events of 1961. (NASA. January 1962.)

Box 6, Folder 5  NASA Space Flight Record 1958-1970. (NASA. December 31, 1970.)
Box 6, Folder 6  
*NASA Space Flight Record 1958-1972.* (NASA. December 31, 1972.)

Box 6, Folder 7  

Box 6, Folder 8  

Box 6, Folder 9  

I.B.2.: *An Introduction to Astronautics,* 1958

In 1958 the RAND Corp presented a series of Secret (classified) lectures on Astronautics entitled "An Introduction to Astronautics." RAND later published unclassified sections of these lectures as a series of papers. This subseries is arranged in order of the original lectures. Some lecture numbers are not included as the material remained classified at the time RAND published the lecture series.

Box 7, Folder 1  

Box 7, Folder 2  
Lecture No.3: "Trajectory Fundamentals." (Samuel Herrick; RAND. P-1303. 7 March 1958.)

Box 7, Folder 3  
Lecture No.4: "Types of Space Flights." (R. W. Buchheim; RAND. P-1428. February 24, 1958.)

Box 7, Folder 4  
Lecture No.5: "Propulsion Fundamentals." (B. Pinkel; RAND. P-1429. February 24, 1958.)

Box 7, Folder 5  

Box 7, Folder 6  
Lecture No.10: "The Penetration of Planetary Atmospheres." (C. Gazley, Jr; RAND. P-1322. 24 February 1958.)

Box 7, Folder 7  

Box 7, Folder 8  
Lecture No.14: "Some Information-Theory Considerations in Space Communications." (P. Swerling; RAND. P-1393. 24 February 1958.)

Box 7, Folder 9  

Box 7, Folder 10  
Lecture No.16: "Internal Environment of Manned Space Vehicles." (S. H. Dole; RAND. P-1309. 24 February 1958.)
Box 7, Folder 11  Lecture No.17: "A Discussion of Energy Sources for Space-Communications." (J. H. Huth; RAND. P-1318. 10 March 1958.)


Box 7, Folder 13  Lecture No.20: "Scientific Exploration in the Fringe of Space." (W. W. Kellogg; RAND. P-1350. February 4, 1958.)


Box 7, Folder 15  Lecture No.32: "Soviet Astronautics." (F. J. Krieger; RAND. P-1437. February 24, 1958.)

I.B.3.: Management - General, 1960-1971

Box 7, Folder 16  *Cost of Alternative Programs - Philosophy and Characteristics.* (H. P. Hatry and F. S. Jackson; GE/TEMPO. SP-96. July 1960.)

Box 7, Folder 17  *Space Logistics: Technology Versus Management.* (Chauncey F. Bell; RAND. P-2613. August 1962.)

Box 7, Folder 18  *Major Factors in Aerospace Planning and Decision-Making.* (Robert G. Smith; GWU/PPS. 10 May 1966.)

Study of Scientific and Technical Data Activities in the United States.

*Final Report.* (Science Communication, Inc. December 1968.)

Box 8, Folder 1  Volume I: *Plan for Study and Implementation of National Data System Concepts.*

Volume II: *Preliminary Census of Scientific and Technical Data Activities.*

Box 8, Folder 2  Parts A and B.

Box 8, Folder 3  Part C.

Study of the Economic Impact of Stimulated Technological Activity.

*Findings.* (Midwest Research Institute. 22 November 1971.)

Box 8, Folder 4  Part I: *Overall Economic Impact of Technological Progress: Its Measurement.*


This material consists of general management documents, including policies, procedures, and specifications, for various NASA facilities, organized alphabetically by facility and by date.
• Kennedy Space Center (Cape Canaveral, FL)
• Marshall Space Flight Center (Huntsville, AL)
• Wallops Station (Wallops Island, VA)

Kennedy Space Center (Cape Canaveral, FL), 1966
Box 8, Folder 5  "Modification Instruction." (GE for KSC. K-AM-032/2. c.1966.)

Marshall Space Flight Center (Huntsville, AL), 1962-1965
Box 8, Folder 6  "Weight Notation System, Standard For." (MSFC. MSFC-STD-204A. December 6, 1962.)
Box 8, Folder 8  Michoud and Mississippi Test Operations Management Information. (MSFC/MDC. June 1964.)

Huntsville Facilities Management Information. (MSFC/MDC. July 1964.)

Box 8, Folder 9  Volume III
Box 8, Folder 10  Michoud Operations - Quality Assurance and Reliability. [presentation graphics]. (MSFC. c.1965.)

Wallops Station (Wallops Island, VA), 1964
Box 9, Folder 1-3  Wallops Station Handbook. (Wallops Station. 6 April 1964.) [3 folders]

I.B.5.: Miscellaneous Documents, 1958-1966
Box 9, Folder 4  Space Flight - Trajectories, Navigation and Maneuvers. (R. W. Buchheim; RAND. P-1387. 16 May 1958.)
Box 9, Folder 6  Appraising Soviet Astronautics. (F. J. Krieger; RAND/PD. P-2107. September 29, 1960.)
Box 9, Folder 7  Feasibility of Interstellar Travel. (Dwain F. Spencer and Leonard D. Jaffe; JPL. TR 32-233. March 15, 1962.)
Box 9, Folder 8  Programs of Graduate and Undergraduate Study in Space Science and Applied Physics. (CUA/SSAP. March 25, 1964.)
Box 9, Folder 9  Selections from the TRW Space Technology Laboratories Lecture Series, Volume Two. (TRW/STL. 1965.)
Box 9, Folder 10  Geo-Astrophysics Laboratory - Review. (Boeing/SRL. January-June 1966.)
Box 9, Folder 11

*Geo-Astrophysics Laboratory - Review.* (Boeing/SRL. July-December 1966.)

*Return to Table of Contents*
Series II: Launch Vehicle Programs, 1962-1971

This series consists of documents pertaining to the development and production of launch vehicles and associated equipment, primarily for NASA use. The materials are organized into three subseries:

- II.A. Studies (1963-1971)
- II.B. Projects (1962-1971)


The documents in this subseries relate to launch vehicle studies which cannot be linked to any specific launch vehicle project. Materials are organized chronologically by study.

- Study of Large Sea-Launched Space Vehicles
- Launch Vehicle Component Costs Study
- Study of Design Considerations of Reusable Launch Vehicles
- Study of Advanced Multipurpose Large Launch Vehicles
- [Study to Evaluate Advanced Upper Stages]
- Large Ballistic Launch Vehicles Recovery and Reuse Study
- National Space Booster Study
- Cost Studies of Multipurpose Large Launch Vehicles
- Positive Expulsion Study

**Study of Large Sea-Launched Space Vehicles**

*Final Report.* (Henry M. Hunter; STL. January 1963.)

Volume II: *Cost Program, Study Evaluation.*

Box 9, Folder 12  
Box 10, Folder 1-2

**Launch Vehicle Component Costs Study**

*Final Report.* (Lockheed/LMSC. LMSC-895429. 30 June 1965.)

Box 10, Folder 3  
Volume III: *Research and Technology Implications Report.*

**Study of Design Considerations of Reusable Launch Vehicles**

*Final Report.* (Douglas/MSSD. DAC-57916. October 1966.)

Volume V: *Launch Vehicle Cost Program.*

Box 10, Folder 4  
Book 1: Cost Program Formulation

**Study of Advanced Multipurpose Large Launch Vehicles**

Box 10, Folder 5  
*Interim Report.* (Boeing/SD/LSB. D5-13378-1. June 23, 1967.)

[Study to Evaluate Advanced Upper Stages]

This subseries consists of documents pertaining to projects intended to develop flight hardware for the United States space program. In some cases the project was cancelled before it reached flight - or even hardware - status, but the project involved design work to meet specific mission parameters. It is in this context that the Space Shuttle, normally considered a manned program, is included here. The materials
are organized into subseries by the name of the launch vehicle project in alphabetical order. Unless otherwise noted, documents are arranged chronologically under each project heading.

- II.B.4. Delta (1962)
- II.B.5. Nova (1964)
- II.B.7. Saturn (1962-1971)

II.B.1.: General, 1967

Box 12, Folder 1
"Launch Vehicle History." (C. R. James (ed.); Boeing Co. D2-24015-1. February 1, 1967) [thermofax original]


In 1959 NASA began utilizing the Atlas ICBM to orbit small blunt-bodied spacecraft, modifying the missile into the Atlas Space Launch Vehicle (SLV). Most notably, four of the manned Mercury flights used Atlas D/Atlas SLV-3 as boosters. The Atlas was also paired with smaller boosters as upper stages, giving rise to Atlas-Able, Atlas-Agena, and Atlas-Centaur boosters.

Box 12, Folder 2

Box 12, Folder 3

II.B.3.: Centaur, 1963-1970

Work on Centaur began in 1956. Planned from the start as upper stage for the Atlas launch vehicle, Centaur was the first American booster to utilize liquid hydrogen propellant. Development problems delayed its introduction until mid-1965. During 1966-1968, the Centaur vehicle was used to launch the Surveyor series of lunar probes and continued in use into the Space Shuttle era.

Box 12, Folder 4
"Centaur Nucleonic Propellant Utilization System" [proposal]. (Giannini Controls Corp. GSDP-268. 1 June 1963.)

Box 12, Folder 5-6

Box 12, Folder 7

Box 12, Folder 8
II.B.4.: Delta, 1962

Work on Delta began in 1959. Originally, Delta was to be an interim second stage for the Thor launch vehicle until the Scout and Vega boosters became available. In the end, however, Delta was the most frequently used booster in the Thor family in the 1960-1968 period, later becoming the most popular booster in the NASA stable.

Box 12, Folder 9

"Project Delta - Third Stage and Spacecraft Preparation at AMR." (Douglas. July 1962.)

II.B.5.: Nova (Post-Saturn Launch Vehicle), 1964

Nova was the largest of NASA's planned stable of launch vehicles. Nova was to be capable of launching a manned mission directly to lunar orbit. With NASA's selection of lunar rendezvous for Apollo in 1962 there was no immediate need for Nova and the project was cancelled in 1964.

Solid Motor Logistics Study


Box 12, Folder 10

Volume I: Condensed Summary Report

Post Saturn Launch Vehicle System Study.


Box 12, Folder 11

Volume I: Summary

II.B.6.: Reusable Aerospace Passenger Transport, 1966

The Reusable Aerospace Passenger Transport (RAPT) was a preliminary examination of alternatives to the disposable boosters then in use by NASA. The RAPT concept was later embodied in the Space Shuttle Program.

Launch Mode Comparison Study

Box 12, Folder 12


II.B.7.: Saturn, 1962-1971

The Saturn family of launch vehicles spanned the middle, in boost capacity, of NASA's planned stable of launch vehicles. Development of the Saturn family began in August 1958 at the Army Ballistic Missile Agency, where it was called Juno. In 1958 it was renamed Saturn and, in November, transferred to NASA control. With the decision to utilize lunar rendezvous for the Apollo program, the Saturn family became the launch vehicles for Apollo. Saturn IB and Saturn V launch vehicles were the boosters for all flights of the Apollo spacecraft, including the Skylab and Apollo-Soyuz Test Program launches.

Documents relating to the Saturn Program are organized into subseries by general topic:

II.B.7.c. Saturn C-3 (1961)
II.B.7.e. Saturn Program Development Launches (1963-1965)
II.B.7.f. Saturn Improvement Program (1965-1970)

II.B.7.a.: General Documents, 1962-1966

Box 13, Folder 1
"Saturn." (MSFC. No Date.)

Box 13, Folder 2

Box 13, Folder 3
"Saturn Illustrated Chronology (April 1957 - April 1962)." (MSFC/SSO. No date.)

Box 13, Folder 4

Box 13, Folder 5

Box 13, Folder 6

Box 13, Folder 7

Box 13, Folder 8-9

Box 13, Folder 10

"Astrionics System Handbook - Saturn Launch Vehicle." (MSFC/SEO. 1 August 1965.)

Box 13, Folder 11
[folder 1 of 2]

Box 14, Folder 1
[folder 2 of 2]

Box 224 (OS), Folder 1
"Vehicle Mechanical Systems Test Schematic." (MSFC/VTS. c.1965.)

Box 224 (OS), Folder 2
"Advanced Electrical Schematics - Ground Support Equipment." (MSFC/SODS. c.1966.)

The Saturn I (originally called the Saturn C-1) was the first of the Saturn family of launch vehicles. Two-stage Saturn I boosters (S-I first stage and S-IV second stage) were used to launch boilerplate Apollo capsules through 1965. The Saturn IB (originally Saturn C-1B and Uprated Saturn I) grew from the cancellation of the Saturn C-2 vehicle in 1961.

The Saturn IB was an upgraded Saturn I, with sufficient thrust to place a fully-configured Apollo capsule into Earth orbit. Two-stage Saturn IB boosters (S-IB first stage and S-IVB second stage) were used for the manned earth-orbital missions of the Apollo (non-Lunar Module flights), Skylab, and Apollo-Soyuz programs.

Box 14, Folder 2  
"Determination of Criticality Numbers for Saturn I, Block II Vehicle Ground Support Equipment (Launch Complex 37B)." (KSC/LSRO. TR-4-49-3-D. March 6, 1964.)

Box 14, Folder 3  
"DAC AMR Progress Report - S-IV." (Douglas. No date.)

Box 14, Folder 4  
"Saturn IB Performance Study." (Lockheed/LMSC. H-64-019. December 1964.)

Box 14, Folder 5  

Box 14, Folder 6  

Box 14, Folder 7  
"Saturn IB Project Specification Addendum (SA-202)." (MSFC. RS01W-1000002A. March 21, 1966.)

Box 14, Folder 8  
"Saturn IB Launch Vehicle Project Development Plan." (MSFC/ S1BPO. No date.)

Box 14, Folder 9-10  

Uprated Saturn I S-IB Stage

Box 15, Folder 1  

Box 224 (OS), Folder 3  
"S-I Stage Electrical Schematics." (MSFC/ASIS. No date.)

II.B.7.c.: Saturn C-3, 1961

The Saturn C-3 was originally intended as one of two boosters (with the Nova launch vehicle) to be used with the Apollo program. With the selection in 1962 of the lunar rendezvous mode for the moon landing program, NASA determined that the Saturn I/IB and Saturn V launch vehicles would be sufficient for its needs and Saturn C-3 project was cancelled.

Saturn C-3 Launch Facilities Study


The Saturn V (originally designated Saturn C-5) was the largest of the Saturn family. The three-stage Saturn V (S-IC first stage; S-II second stage; S-IVB third stage) was used to launch all fully-configured Apollo missions (CSM and LM) as well as the orbital workshop for the Skylab program.

Saturn V-related materials are organized into subseries by topic and arranged chronologically:


II.B.7.d.1.: Saturn V - General, 1964-1970

Box 15, Folder 3

"Saturn V Launch Support Equipment General Criteria and Description." (KSC/LSEED. SP-4-37-D. January 23, 1964.)

Box 15, Folder 4-6


Box 15, Folder 7


Box 15, Folder 8

"Saturn V Project Development Plan." (MSFC/S5PO. MA 001-AZD-2H. September 1965.)

Box 16, Folder 1


Box 16, Folder 2


Box 16, Folder 3


Box 16, Folder 4

Volume I.

Box 16, Folder 5-6

Volume II. [2 folders]
II.B.7.d.2.: Saturn V/S-IC (Saturn V First Stage), 1963-1965

Box 17, Folder 5  "Boeing Manufacturing Plan for S-IC Stage." (Boeing/ASD/SBB. D5-12561. December 11, 1963.) [2 folders]

Box 17, Folder 7  "S-IC Maintainability After LOX Loading." Boeing/ASD/LSB. D5-11394. July 21, 1964.)

Box 17, Folder 8  "S-IC Program Review and Assessment" [presentation graphics]. (Boeing/ASD/LSB. August 25, 1964.)

Box 18, Folder 1  "Saturn S-IC Annual Progress Report - Fiscal Year 1965." (Boeing/ASD/LSB. D5-12601-2. July 30, 1965.)


Box 18, Folder 3  CEI No. 000011A - S-IC-1 Flight Stage for Saturn V Launch Vehicle. (Boeing. CP02S00001101. November 1, 1965.)

Box 18, Folder 4  CEI No. 000011E - S-IC-5 Flight Stage for Saturn V Launch Vehicle. (Boeing. CP02S00001105. November 1, 1965.)

Box 18, Folder 5  CEI No. 000011F - S-IC-6 Flight Stage for Saturn V Launch Vehicle. (Boeing. CP02S00001106. November 1, 1965.)
Box 18, Folder 6

CEI No. 000011G - S-IC-7 Flight Stage for Saturn V Launch Vehicle. (Boeing. CP02S00001107. November 1, 1965.)

Box 18, Folder 7

CEI No. 000011H - S-IC-8 Flight Stage for Saturn V Launch Vehicle. (Boeing. CP02S00001108. November 1, 1965.)

Box 18, Folder 8

CEI No. 000011I - S-IC-9 Flight Stage for Saturn V Launch Vehicle. (Boeing. CP02S00001109. November 1, 1965.)

Box 18, Folder 9

CEI No. 000011J - S-IC-10 Flight Stage for Saturn V Launch Vehicle. (Boeing. CP02S00001110. November 1, 1965.)

II.B.7.d.3.: Saturn V/S-II (Saturn V Second Stage), 1968-1971

Box 18, Folder 10


Box 19, Folder 1

"S-II-4 Static Firing Final Test Report." (NAR/SD. SD 68-104. 26 April 1968.)

II.B.7.d.4.: Saturn V/S-IVB (Saturn V Third Stage), 1964-1971

Box 19, Folder 2

"Orbital Checkout of S-IVB." (Douglas/MSSD. SM-46695. 27 May 1964.)

Box 19, Folder 3


Box 19, Folder 4

"Saturn S-IVB Quarterly Review" [presentation graphics]. (Douglas/MSSD. March 10, 11, 1965.)

Box 19, Folder 5

"Saturn S-IVB Stage Quarterly Weight and Balance Status Report, Model No. DSV-4B." (MDC/MDAC. MDC G0868. December 1970.)

Box 19, Folder 6

"Saturn S-IVB Stage Quarterly Weight and Balance Status Report, Model No. DSV-4B." (MDC/MDAC. MDC G0971. March 1971.)

II.B.7.d.5.: Saturn V Launch Vehicles (Flight Hardware), 1967-1969

"Saturn V Program Specification." (MSFC.)

Box 19, Folder 7

SA-501. (RS02W-1000001A. November 15, 1965, revision B. September 13, 1967.)
II.B.7.e.: Saturn Program Development Launches, 1963-1965

This subseries consists of documents pertaining to specific launches with "SA-" (Saturn) mission designations. Launches of Saturn vehicles mated to Apollo spacecraft, which received "AS-" (Apollo-Saturn) mission designations are listed under subseries III.D.3 (Manned Space Flight Programs - Apollo Program). Documents are arranged chronologically by launch number. For a full listing of Saturn (SA-), Apollo (A-) and Apollo-Saturn (AS-) launches, see Appendix 4.

- Saturn Development Launches - SA-4 (1963)
- Saturn Development Launches - SA-5
- Saturn Development Launches - SA-6 (1964)
- Saturn Development Launches - SA-7 (1964)
- Saturn Development Launches - SA-8 (1964-1965)
- Saturn Development Launches - SA-9 (1964-1965)
- Saturn Development Launches - SA-10 (1965)

Saturn Development Launches (SA-4), 1963

Box 20, Folder 8  "Countdown Manual for Saturn I, Vehicle Serial SA-4." (MSFC/LVOD. March 14, 1963.)

Saturn Development Launches (SA-5), undated

Box 20, Folder 9  "Complex 37 Safety Plan for SA-5." (KSC/SO. No date.)

Saturn Development Launches (SA-6), 1964
Box 20, Folder 10  "SA-6 Ground Instrumentation Profile." (R. J. Bush and L. R. Pollman; GE/ASD. SP-83-E. 22 May 1964.)


**Saturn Development Launches (SA-7), 1964**

Box 20, Folder 12  "Saturn I Countdown Manual (Vol. II) - SA-7 - Test Number 7-LSVI-300 Launch Countdown." (KSC. September 5, 1964.)

Box 20, Folder 13  "Computing Notes on the Saturn Mission (SA-7)." (GSFC/DOB. X-550-64-269. September 23, 1964.)

Box 20, Folder 14  "Failure Reporting Summary, SA-7 - Pre-Launch, Test and Checkout at KSC." (GE/ASD for KSC. SP-152. October 14, 1964.)


**Saturn Development Launches (SA-8), 1964-1965**


Box 20, Folder 16  Volume I of 4.

Box 21, Folder 1  Volume II of 4.

Box 21, Folder 2-3  Volume III of 4. [2 folders]

Box 21, Folder 4  Volume IV of 4.


**Saturn Development Launches (SA-9), 1964-1965**

"SA-9 Vehicle and Launch Complex Functional Description." (Chrysler/SD. HEC-D042. May 1964.)

Box 21, Folder 6  Volume VI: *Environmental Control System.*


Box 22, Folder 1  Volume I of 4.
II.B.7.f.: Saturn Improvement Program, 1965-1970

By the mid 1960s NASA had initiated several studies to extend the capabilities of the Saturn family. The studies examined a number of Modified Launch Vehicle (MLV) configurations based on the Saturn IB and Saturn V launch vehicles as well as Intermediate Payload (INT) launch vehicles based on modified Saturn stages (MS-IB, MS-IC, MS-II, and MS-IVB). Documents are organized into subseries by improved booster type; unless otherwise noted documents within each subseries are arranged chronologically by study.

- II.B.7.f.2. MLV Saturn IB (1965-1967)
- II.B.7.f.3. MLV Saturn V (1966-1967)
- II.B.7.f.4. MLV Saturn INT-20 (1969)
- II.B.7.f.5. MLV Saturn INT-21 (1969)

II.B.7.f.1.: General Studies, 1966-1970

Study of Launch Facilities for Improved Satellites.

Phase III

II.B.7.f.2.: MLV Saturn IB, 1965-1967

Saturn IB Improvement Study

Liquid First Stage and Boost Assist.


Saturn IB/Zero Stage Preliminary Study


II.B.7.f.3.: MLV Saturn V, 1965-1967

Saturn V and Intermediate Payload Saturn Vehicles Improvement Studies.

Box 25, Folder 6


Box 25, Folder 7

First Quarterly Review [presentation graphics]. (Douglas/MSSD. SM-51889-P. 28 February 1966.)

Studies of Improved Saturn V Vehicles and Intermediate Saturn Vehicles.

Box 25, Folder 8

Volume 7: Presentation Charts [presentation graphics]. (NAA/SID. SID 66-1326-7. No date.)

Box 25, Folder 9


Box 25, Folder 10


MS-IC Stage for Modified Launch Vehicle (MLV) Saturn V.

Box 25, Folder 11

Volume 1 of 8: Summary Report. (Boeing/ASD/LSB Co. D5-11420-0. April 15, 1965.)

Design Study of the MS-II Stage for the Modified Launch Vehicle (MLV) Saturn V.

Final Report. (NAA/SID. SID 65-244-6. 29 March 1965, revised April 1965.)

Box 25, Folder 12

Volume VI: Design Study Summary Briefing [presentation graphics].

Saturn V Vehicle with 260-Inch Diameter Solid Motor Study.

Final Report. (Boeing/SD. December 18, 1967.)

Box 26, Folder 1-3

Vehicle Description. (D5-13408-2.) [3 folders]

Box 26, Folder 4

Research and Technology Implications. (D5-13408-3.)

Box 26, Folder 5

Cost Plan. (D5-13408-4.)
II.B.7.f.4.: MLV Saturn INT-20, 1969


Box 26, Folder 7  Executive Summary Report.  (Boeing. D5-16785-1. May 23, 1969.)

Saturn V Derivative (S-IC, S-IVB, I.U.) Launch Vehicle System Study.

Box 26, Folder 8  Final Presentation.  (Boeing. August 28, 1969.)


Box 26, Folder 9  [folder 1 of 4]

Box 27, Folder 1-3  [folders 2-4 of 4]

II.B.7.f.5.: MLV Saturn INT-21, 1969

"Intermediate -21 Launch Vehicle Preliminary Description for a Phase B Space Station Design."  (Boeing/SD/LSB. D5-15583. August 15, 1969.)


Launch Facilities and Operations for Large Solid Motors Study.

Final Report.  (Douglas/MSSD.)

Box 27, Folder 5  Volume I: Technical.  (DAC-58078. 28 December 1967.)

Box 27, Folder 6  Volume III: Self-Eject Launch Technique, 260-in. SRM/S-IVB Application.  (DAC-58115. 27 June 1968.)

II.B.8.: Space Shuttle, 1969-1970

The Space Transportation System, or "Space Shuttle," was designed as a reusable launch system to ferry personnel and equipment from the surface to low-earth orbit in conjunction with a permanent space station. Although the space station was never funded, shuttle development continued throughout the 1970s with the first launch occurring in 1981. Document are arranged chronologically.

II.B.9.: Space Tug, 1971

The Space Tug was a proposal for an orbit-to-orbit vehicle to move personnel and equipment from low-earth (Space Shuttle) orbit to high-earth (space station) orbit or to lunar orbit.

**Space Tug Study**

*Summary.* (NAR/SD. PD 69-167. c.1971.)

II.B.10.: Titan, 1968-1970

The Titan family of launch vehicles originated as a ballistic missile for the United States Air Force. NASA modified the Titan II into the Gemini Launch Vehicle (GLV) and utilized the Titan III for unmanned launches beginning in the 1970s due to budget cuts and delays in the Space Shuttle program. Documents are arranged chronologically. See also subseries VII.A.2. (USAF - Launch Vehicles)

Box 29, Folder 3  
"Titan III Family Review." (MMC. January 1968.)

Box 29, Folder 4  

Box 29, Folder 5  

Box 29, Folder 6  
"Manned Spaceflight for the 1970's - Program Concerns and Titan Launch Vehicle Implications" [presentation graphics]. (MMC/DD. 15 April 1970.)

This subseries consists of documents relating to spacecraft engine, propulsion, and power systems. Materials are organized by topic. Unless otherwise noted, documents are arranged chronologically by study within each subseries:

- II.C.2. Aerospike Engine Program (1971)
- II.C.3. F-1 Engine Program (1965-1968)
- II.C.4. H-1 Engine Program (1965)

II.C.1.: General Documents, 1965-1970

The documents in this subseries do not relate to any specific hardware program.

**Chamber Technology for Space-Storable Propellants.**

*Task II Interim Report* (Rocketdyne. October 13, 1965.)

Box 29, Folder 7-8  Volume 2 [Thrust Chamber Fabrication and Testing]. [2 folders]

Box 29, Folder 9  "Design Criteria for Space Propulsion Systems" [presentation graphics]. (AGC. SG P-1069-1. c.1967.)

Box 30, Folder 1  "Cryogenic Auxiliary Propulsion System" [presentation graphics]. (Rocketdyne. BCI 67-26. c.1967.)

Box 30, Folder 2  "Space Storable Propulsion System" [presentation graphics]. (PWA. GP 67-252. 16 October 1967.)

**Propellant Selection for Spacecraft Propulsion Systems.**


**Large Hydrogen-Oxygen Ablative Chamber Test Program.**


**High Energy Upper Stage Motor Program**

*Phase II Final Report.* (Hercules/CPD. H250-12-6-7. July 1970.)
II.C.2.: Aerospike Engine Program, 1971

Cast Segment Evaluation

Box 31, Folder 3 Final Report. *(Rocketdyne. R-8416. February 1971.)*

II.C.3.: F-1 Engine Program, 1965-1968

The Rocketdyne F-1 engine was NASA's largest rocket engine, developing 6,672,000 newtons of thrust from liquid oxygen and RP-1 fuel. NASA originally planned to install eight to twelve F-1 engines in the first stage of its proposed Nova launch vehicle, but instead utilized five F-1s in the S-IC stage of the Saturn V.

**F-1 Uprating Study**

Box 31, Folder 4 *Final Report. (Rocketdyne. R-5910. 26 January 1965.)*

Box 31, Folder 5 "F-1 Rocket Engine - Illustrated Parts Breakdown" [Technical Manual]: *(Rocketdyne. R-3896-4. 12 December 1967, rev. 3 May 1968 (change no.1.).] [revised pages only]*

II.C.4.: H-1 Engine Program, 1965

The Rocketdyne H-1 engine was the smallest rocket engine used in the Saturn launch vehicle family, developing 889,600 newtons of thrust from liquid oxygen and RP-1 fuel. Eight H-1 engines powered the S-I and S-IB stages of NASA's Saturn I and Saturn IB launch vehicles (respectively).

**H-1 Uprating Study**


Box 32, Folder 1 Volume 1: *Summary*


The Rocketdyne J-2 engine was an intermediate engine between the F-1 and H-1, developing 1,000,800 newtons of thrust from liquid oxygen and liquid hydrogen. Five J-2s powered the S-II stage
of NASA’s Saturn V launch vehicle while a single J-2 was installed in the S-IVB stage of the Saturn IB and Saturn V. Initially NASA had also planned to install J-2s in the upper stages of the Nova launch vehicle.


Box 32, Folder 3  "Quarterly Failure Effects Analysis for Period Ending 31 December 1963." (Rocketdyne. R-5499-2. 20 January 1964.)

Box 32, Folder 4-6  "Quarterly Progress Report for Period Ending 31 August 1964." (Rocketdyne. R-2600-16. 29 September 1964.) [3 folders]

Box 32, Folder 7  "J-2 Engine Data Manual." (Rocketdyne. R-3825-1. No date.) [Sections X, XI, and XII only]

Box 32, Folder 8  "Reliability Plan for the J-2 Propulsion System." (Rocketdyne/J2RP. R-5406-2. 31 January 1966.)


Box 33, Folder 5  "The Impact of the J-2S Engine on the NASA Space Program" [presentation graphics]. (Rocketdyne. BCI 68-74. No date.)


The material in this subseries relates to general programs for spacecraft nuclear propulsion and nuclear power systems. For documents relating to planned utilization of specific designs, see relevant entries under Series III. (Manned Space Flight Programs) and Series IV. (Space Science and Applications). Documents in this subseries are organized by program or study. Unless otherwise noted documents are arranged chronologically by study within each subseries.

- II.C.6.b. Space Nuclear Auxiliary Power (SNAP) Program (1968)


Box 33, Folder 6  "A Study of Nuclear Electric and Nuclear Rocket Space Propulsion." (T. N. Edelbaum; UAC. B-110053-3. June 1963.)


[Report.]

Box 33, Folder 7

**Book 2.**

**Nuclear Stage Design Study**


Box 33, Folder 8

[folder 1 of 2]

Box 34, Folder 1

[folder 2 of 2]

Box 34, Folder 2


II.C.6.b.: Space Nuclear Auxiliary Power (SNAP) Program, 1968

Documents in this subseries are organized by program.

**SNAP 19.**

*Phase III Final Report.* (MMC/ND. May 1968.)

Box 34, Folder 3

Volume I: *Power Supply System.* (MND-3607-239-1.)

Box 34, Folder 4

Volume III: *Generator Developmental Aspects.* (MND-3607-239-3.)

**SNAP-27**

Box 34, Folder 5


(GE/MSD/IPSO. GEMS 400. No date.)

II.C.6.c.: Modular Nuclear Vehicle Study (MNVS), 1966-1969

**Modular Nuclear Vehicle Study**

*Phase II Report.* (Lockheed/LMSC/CSP.)

Box 34, Folder 6

Volume I: *Summary.* (LMSC-A830244. 29 February 1968.)

Box 34, Folder 7

Volume II: *Nuclear Propulsion Module Systems Analysis.* (LMSC-A830245. 1 March 1967.)

Box 34, Folder 8

Volume III: *Nuclear Propulsion Module - Vehicle Design.* (LMSC-A830246. 1 March 1967.)

Box 34, Folder 9

Volume IV: *Nuclear Propulsion Module - Performance.* (LMSC-A830247. 31 March 1967.)
Box 34, Folder 10  Volume V: *Flight Safety Studies*. (LMSC-A830248. 31 March 1967.)

Box 35, Folder 1  Volume VI: *Integrated Test Plan*. (LMSC-A830250. 30 November 1966.)

Box 35, Folder 2  Volume VIII: *NRSD Operating Plan and Facilities Requirements*. (LMSC-A830251. 30 November 1966.)

Box 35, Folder 3  Volume X: *Research and Technology Implications*. (LMSC-A830253. 1 November 1967.)

Box 35, Folder 4  Volume XI: *Nuclear Radiation Environment*. (LMSC-A848446. 16 October 1967.)

*Phase III Report*. (Lockheed/LMSC/CSP)


Box 35, Folder 6  NGTM Calculational Model and Test Facility Support. (K-05-68-1. 29 February 1968.)

*Phase IV and V Report*. (Lockheed/LMSC/CSP)

Box 35, Folder 7  Summary and SRT Requirements. (LMSC-A965497. 31 December 1969.)


**Nuclear Flight System Definition Study**

**Outer-Planet Exploration Missions**


Volume III: *Mission Analysis*. (SD 70-32-3.)

Box 35, Folder 8  [Sections 1 through 3]

Box 35, Folder 9  [Sections 4 through Appendix]

Volume IV: *Conceptual Design*. (SD 70-32-4.)

Box 36, Folder 1  [Sections 1.0 through 3.0]

Box 36, Folder 2  [Sections 4.0 through Appendixes]

Box 36, Folder 3  Volume VI: *Technology Development*. (SD 70-32-6.)

*Phase III*. [North American-Rockwell contract].
Final Report. (NAR/SD. April 1971.)

Volume I: Executive Summary. (SD 71-466-1.)

Volume II: Concept and Feasibility Analysis.

Part A: System Evaluation and Capability. (SD 71-466-2.)

Box 36, Folder 5-6 [folder 1-2 of 3]

Volume II: Concept and Feasibility Analysis.

Part B: Baseline System Definition. (SD 71-466-3.)

Box 37, Folder 1 [folder 3 of 3].

Part C: System Engineering Documentation. (SD 71-466-4.)

Box 37, Folder 2 Part B: Baseline System Definition. (SD 71-466-3.)

Box 37, Folder 3 Part C: System Engineering Documentation. (SD 71-466-4.)

Box 37, Folder 4 Volume III: Program Support Requirements. (SD 71-466-5.)

Box 37, Folder 5 Volume V: Schedules, Milestones and Networks. (SD 71-466-7.)

Box 37, Folder 6 Volume VI: Reliability and Safety Analysis. (SD 71-466-8.)

Phase III. (McDonnell-Douglas contract).


Volume II: Concept and Feasibility Analysis.

Part A: Class 1 Hybrid RNS.

Box 38, Folder 1-2 Book 1: System Analysis and Operations. [2 folders]

Box 38, Folder 3-4 Book 2: System Definition. [2 folders]

Part B: Class 3 RNS.

Box 38, Folder 5-6 Book 1: System Analysis and Operations. [2 folders]

Box 38, Folder 7 Book 2: System Definition. [folder 1 of 2]

Box 39, Folder 1 [folder 2 of 2]

Volume III: Program Support Requirements.
Box 39, Folder 2  
Part A: *Class 1 Hybrid RNS.*

Box 39, Folder 3  
Part B: *Class 3 RNS.*

Box 39, Folder 4  
Part C: *Test Program Analyses and SRT Requirements.*

Box 39, Folder 5  
Volume V: *Schedules, Milestones, and Networks.*

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Series III: Manned Space Flight Programs, 1959-1971

This series consists of documents pertaining to NASA manned space flight programs. Materials not relating to a specific program are grouped into subseries by topic and within subseries by date. Materials relating to specific manned programs are organized by program in order of launch (Mercury-Gemini-Apollo).

- Subseries III.A. General (1961-1970)
- Subseries III.C. Human Factors (1963-1967)
- Subseries III.D. Programs (1959-1972)


Documents are arranged chronologically.

Box 39, Folder 6  "Anyone for the Moon?" (J. D. Williams; RAND. P-2383. September 1961.)


This subseries consist of material which pertains to the general principles and equipment for the creation and maintenance of spacecraft cabin environment for manned flight. For documents pertaining to specific program requirements or specific spacecraft, see the relevant subseries under subseries III.D. (Programs.). Documents in this subseries are arranged chronologically by study.


Selection of Space Cabin Atmospheres

[Report.]

Box 40, Folder 1  Part II: Fire and Blast Hazards in Space Cabins. (Emanuel M. Roth; Dept of Aeronautics Medicine and Bioastronautics, Lovelace Foundation for Medical Education and Research. c.1964-1966.)


Phase II Report
Box 40, Folder 5  
**Biotechnology.** (T. M. Olcott and W. J. Conner; Lockheed/LMSC. LMSC-A914650. 6 December 1967.)

*A Space Station Life Support System for Use in an Altitude Chamber.*


*Design Study and Implementation Program.*

Volume I

Box 40, Folder 6  
Part 1.

Box 40, Folder 7-8  
Part 2. [2 folders]

Box 41, Folder 1  
**Environmental Control/Life Support Systems for Manned Spacecraft.**

*Maintainability and Reliability Program* [presentation graphic]. (Boeing/SD. April 1968.)

Box 41, Folder 2  

Box 41, Folder 3  
"Synthesis of Formaldehyde from CO₂ and H₂." (P. Budininkas and G. A. Remus; GATC/GARD; and J. Shapira; NASA Ames. SAE Aeronautic and Space Engineering and Manufacturing Meeting. 680715. October 7-11, 1968.)

Box 41, Folder 4  
"Waste Utilization for Propulsion on Manned Space Missions." (C. David Good, James E. Mars, and Eckart W. Schimidt; Rocket Research Corp. SAE Aeronautic and Space Engineering and Manufacturing Meeting. 680717. October 7-11, 1968.)

Box 41, Folder 5  

Box 41, Folder 6  
"Reliability and Maintainability Problems Confronting Environmental Control/Life Support Systems for Long Duration Space Flight." (J. R. Burnett and C. D. King; GDC/Convair. SAE Aeronautic and Space Engineering and Manufacturing Meeting. 680744. October 7-11, 1968.)

Box 41, Folder 7  
"Maintainability and Reliability of Environmental Control/Life Support Systems." (Hugh A. Jennings; Boeing/SD. SAE Aeronautic and Space Engineering and Manufacturing Meeting. 680745. October 7-11, 1968.)

Box 41, Folder 8  

This subseries consists of general materials relating to design considerations required to allow human beings to operate successfully during space missions. Documents in this subseries are organized chronologically. For materials relating to specific programs or missions, see subseries III.D. (Programs). For materials relating to USAF Human Factors studies, see subseries VII.A.3. (USAF - Manned Programs)

Box 41, Folder 9  "Visual Capability of Pilots as Applied to Rendezvous Operations." (Jack E. Pennington and Roy F. Brisendon; Langley. IAS. January 21-23, 1963.)

Box 41, Folder 10-11  "Bioenergetic Considerations in the Design of Space Suits for Lunar Exploration." (Emanuel M. Roth. Dept of Aeronautics Medicine and Bioastronautics, Lovelace Foundation for Medical Education and Research. July 12, 1963.) [2 folders]

Box 41, Folder 12-14  "Human Factors Systems Program (July 1962 - February 1964)" [Preliminary draft]. (Eugene B. Konecci; NASA/OART. c.1964.) [3 folders]


**Full Pressure Suit Heat Balance Studies.**


Box 42, Folder 4  "Space Systems Biotechnology." (Douglas/MSSD. April 1965.)

Box 42, Folder 5  "Man-Machine Simulation Experience." (Murray A. Geisler and Allen S. Ginsberg; RAND. P-3214. August 1965.)

Box 42, Folder 6  "Biotechnology - 1967." (Douglas/MSSD. No date.)

**Study for the Collection of Human Engineering Data for Maintenance and Repair of Advanced Space Systems.**

*Final Study Report.* (GE/MSD. 67SD4441. 31 December 1967.)

Box 42, Folder 7  Volume I: *Summary Technical Report*

III.D.: Programs, 1959-1971

This subseries consists of materials pertaining to specific manned spaceflight programs, including programs which reached flight status and those which were cancelled during the planning stages. Documents are grouped into subseries by program in chronological order:

- III.D.2. Gemini Program (1964-1968)
- III.D.3. Apollo Program (1962-1972)
- III.D.5. Space Station Programs (1964-1972)

III.D.1.: Mercury Program, 1959-1963

In 1958, Project Mercury was selected as the first American manned space program. Responsibility for
the project was assigned to the NACA (later NASA), including vehicle design and astronaut selection.
Mercury’s primary objective was to place a manned vehicle safely in Earth orbit and safely recover
both the man and vehicle. A secondary objective was to study human capabilities in the launch, orbit,
and recovery environments. Delays in qualifying flight hardware pushed the initial manned mission
back from 1960 to 1961, after which six manned missions were launched successfully through 1963.
For a listing of Mercury launches, see Appendix 2 (page 106). Documents within this subseries are
arranged chronologically.

Box 42, Folder 8  "Project Mercury Background Material." (Langley/STG. March 23, 1959.)

Box 42, Folder 9  "Project Mercury Status Report No.2 for Period Ending April 2,
1959." (Langley/STG. No date.)

Box 42, Folder 10 "Project Mercury Status Report No.3 for Period Ending July 31,
1959." (Langley/STG. No date.)

Box 42, Folder 11 "Project Mercury Status Report No.4 for Period Ending October 31,
1959." (Langley/STG. No date.)

Box 42, Folder 12 "Project Mercury Status Report No.5 for Period Ending January 31,
1960." (Langley/STG. No date.)

Box 42, Folder 13 "Project Mercury Status Report No.6 for Period Ending April 30,
1960." (Langley/STG. No date.)

Box 42, Folder 14 "Project Mercury Status Report No.8 for Period Ending October 31,
1960." (Langley/STG. No date.)

Box 42, Folder 15 "Project Mercury Status Report No.9 for Period Ending January 31,
1961." (Langley/STG. No date.)

Box 42, Folder 16 "Project Mercury Status Report No.10 for Period Ending April 30,
1961." (Langley/STG. No date.)

Box 42, Folder 17 "Project Mercury Status Report No.11 for Period Ending July 31,
1961." (Langley/STG. No date.)

Box 43, Folder 1 "Mercury-Redstone III Sub-Orbital Manned Flight." (NASA/OCR. April 28,
1961.)

Box 43, Folder 2 "Proceedings of the Mercury-Atlas Booster Reliability Workshop." (GD/
Astronautics. 12 July 1963.)


Originally proposed in 1961 as a follow-on to Project Mercury, President Kennedy’s call for a manned
lunar landing before 1970 converted Project Gemini (originally Mercury Mark II) into a testbed for
Project Apollo, the lunar landing program. The two-man Gemini crews practiced all the major elements
necessary for the Apollo program, including long-duration space flight, orbital rendezvous and extravehicular activity. Development problems with the modified Titan ICBM launch vehicle (called the Gemini Launch Vehicle or GLV) delayed the first manned launch until 1965. Ten manned missions accomplished all of the project goals. For a listing of Project Gemini launches, see Appendix 3 (page 108). Documents relating to the program in general are arranged chronologically followed by materials relating to specific Gemini missions organized by mission designation.

Box 43, Folder 3  "Final Report on the Flight Test of the Gemini Rendezvous Radar and Transponder, Held at the White Sands Missile Range, August - December 1964." (Richard G. Fenner and Douglas A. LaPoint; MSC; and Kevin McCabe; Lockheed/LEC. MSC. No date.)


"Gemini Mid-Program Conference, February 23-25, 1966" [preprint] (MSC. No date.)

Box 43, Folder 5-6  Part I. [2 folders]

Box 43, Folder 7  Part II: Experiments

Box 44, Folder 1  "Gemini Mid-Program Conference Including Experiment Results, February 23-25, 1966. (MSC. SP-121. 1966.)


"Project Gemini Familiarization Manual." (McDonnell. SEDR 300)

Box 44, Folder 6  Volume I: Long Range and Modified Configurations. (15 March 1964)


Box 45, Folder 3-8  Volume II: Rendezvous and Docking Configurations. (1 July 1966, changed 22 August 1966.) [2 copies, 6 folders]

Box 46, Folder 1  Supplement. (1 July 1966.)

Box 46, Folder 2  "Gemini Program Mission Report - Gemini-Titan 1 (GT-1)." (MSC. MSC-R-G-64-1. May 1964.)


Box 47, Folder 1  [folder 2 of 2]


**Manned Space-Flight Experiments**

Box 47, Folder 3  Interim Report: *Gemini V Mission*. (NASA. January 6, 1966.)


Box 47, Folder 8  [folder 1 of 2]

Box 48, Folder 1  [folder 2 of 2]

Box 48, Folder 2  "Ready Reference Handbook - The U. S. Air Force Astronaut Maneuvering Unit." (LTV/AD. No date.)


Box 48, Folder 7  [folder 1 of 2]

Box 49, Folder 1  [folder 2 of 2]

Box 49, Folder 2  "History of Gemini/Titan Launch Vehicle 12 at ETR." (Aerospace/ETRO. TOR-1001(A2126-10)-3. 11 November 1966.) [preservation photocopy]
III.D.3.: Apollo Program, 1962-1972

The Apollo Program was NASA's plan for manned lunar exploration, with landing scheduled to commence in the 1970s. With President Kennedy's call for a manned lunar landing before 1970 the program was accelerated. Despite setbacks in systems development and the loss of three astronauts due to a fire during ground testing, on 20 July 1969 Neil Armstrong, the Commander of Apollo 11, became the first human to set foot on the Moon. Although budget cuts forced the cancellation of several planned landings and an ambitious post-Apollo lunar exploration program, six missions followed Apollo 11 and five landed successfully. For a complete listing of Apollo Program launches, see Appendix 4 (page 109). Materials in this subseries are grouped by topic. Unless otherwise noted, within each subseries documents are arranged chronologically by study.

- III.D.3.b. Lunar Landing Research Vehicle (1964)
- III.D.3.g. Apollo Missions (1962-1970)
- III.D.3.h. Apollo Launches (1964-1972)


This subseries consists of reports and studies relevant to the Apollo Program as a whole, rather than to any specific topic.

Box 49, Folder 5
"Design Study for Lunar Survival Cache" [proposal]. (Goodyear. GAP-1204S1. 25 July 1962.)

Box 49, Folder 6
"Survey of the Physical and Environmental Parameters of the Moon." (GE/ASD. NASw-410-20-13-10. February 1963.)

Box 50, Folder 1

Box 50, Folder 2

Box 50, Folder 3

Apollo Specification Project

Box 50, Folder 4

Apollo Check-Out Systems Study
Box 50, Folder 5  
*Astronaut-Crew Requirements for Apollo In-Flight Operations.*  
(N. F. Kristy and H. P. Roth; RAND. RM-4311-NASA. September 1964.)

Box 50, Folder 6  
*Integration of Man and Computer in Prelaunch Checkout of Advanced Space Vehicles.*  
(R. D. Pepler and J. G. Wohl; Dunlap and Associates, Inc. RAND. RM-4506-NASA. April 1965.)

Box 50, Folder 7  
"Apollo Logistics Requirements Plan." (NASA/OMSF. NHB 7500.1. November 1965.)

Box 50, Folder 8  
"Apollo Program Development Plan." (NASA/OMSF. M-D MA 500; MA 001.000-1. January 1966.)

"Apollo Program Management System."

Box 50, Folder 9  
Volume 1: *NASA-Apollo Program Management.* (NASA/OMSF. December 1967.)

Box 50, Folder 10  
Volume 2: *MSC/Apollo Program Management.* (MSC/MAB. November 26, 1967.)

Box 50, Folder 11  
Volume 3: *MSFC Apollo Program Management.* (MSFC. December 1967.)

Box 51, Folder 1  

**Apollo Launch Availability Study, Phase I**

Box 51, Folder 2-3  

Box 51, Folder 4-5  
*Apollo Spacecraft Configuration Weight and Performance Summary.* (Boeing. D2-118078-U. December 15, 1969.) [2 folders]

"Apollo Engineering and Technology Index."

Volume I: *Corporate Author Index.* (MSC. MSC-APOLLO-4T. April 1970.)

Box 51, Folder 6-7  
Part 1 - A to M. [2 folders]

Box 52, Folder 1-2  
Part 2 - N to Z [2 folders]

Box 52, Folder 3  
Volume II: *Systems Index.* (MSC. MSC-APOLLO-3. April 1968.)

Box 52, Folder 4  
Volume III: *Configuration Index.* (MSC. MSC-APOLLO-3T. January 1969.)
III.D.3.b.: Lunar Landing Research Vehicle (LLRV), 1964

The Lunar Landing Research Vehicle (LLRV) was designed by Bell Aerospace as a free-flight simulator to investigate piloting and operational problems involved in lunar landing approach and takeoff. To simulate lunar atmosphere and gravity the LLRV compensated for aerodynamic drag and the higher gravity of earth by vectoring the thrust from the single turbofan engine and using rockets to balance five-sixths of the weight of the vehicle.

Box 52, Folder 5
"Lunar Landing Research Vehicle Flight Manual." (Bell/BAC. 7161-954005. 1 April 1964.)


This subseries consists of documents pertaining to the guidance and navigation subsystems onboard the Apollo spacecraft (both the Apollo Command-Service Module (CSM) and Apollo Lunar Excursion Module/Lunar Module (LEM/LM)). For material relating to the Apollo CSM and LEM/LM in general, see subseries III.D.3.f. (Apollo Program Spacecraft).

Box 52, Folder 6

"Apollo Guidance and Navigation - Equipment Familiarization Manual."

C/M System. (GM/AC. ND-1021037. 1 March 1964.)

Box 52, Folder 7
[folder 1 of 2]

Box 53, Folder 1
[folder 2 of 2]

Box 53, Folder 2

Box 53, Folder 3
"Apollo Navigation - Ground and Onboard Capabilities." (NASA/ANWG. ANWG 65-AN-2.0. September 1, 1965.)

"Apollo Guidance and Navigation System - Study Guide."

Block I (Series 100) G&N System Course

Box 53, Folder 4
Functions and Operations. (GM/AC. 1 August 1965.)
[photocopy]

LEM PGNCS [Primary Guidance, Navigation and Control System] Course

Box 53, Folder 5
Functions and Operations. (GM/AC. 1 November 1965.)

Box 53, Folder 6-7
PGNCS Hardware. (GM/AC. 15 November 1965.) [2 folders]

Box 54, Folder 1
"Apollo Missions and Navigation Systems Characteristics." (NASA/ANWG. ANWG AN-1.1. April 4, 1966.)

This subseries consists of material pertaining to the tracking, telemetry, and communications considerations for Apollo missions. For documents relating to space tracking, telemetry, and communications in general, see Series V. (Tracking and Data Acquisition).


Box 54, Folder 6 "A System for Re-Entry Tracking of the Apollo Spacecraft." (GSFC. X-523-63-56. April 2, 1963.)

Study of Abort Procedures, Lunar Landing and Lunar Reconnaissance for the Apollo Mission

*Interim Report.* (The Bisset-Berman Corp. C60-6. 31 May 1963.)

Box 54, Folder 7 Part II: *Summary of Task Status.*

Box 54, Folder 8-9 *Final Report.* (The Bisset-Berman Corp. C60-10. 6 September 1963.) [2 folders]

Box 54, Folder 10 "Re-Entry Tracking for Apollo." (F. O. Vonbun; GSFC. X-513-64-85. March 6, 1964.)

Box 55, Folder 1 "Apollo Re-Entry Infrared Support." (F. O. Vonbun; GSFC. X-513-65-4. December 5, 1964.)

Box 55, Folder 2-3 *Project Apollo Radio Blackout Investigation*

*Final Report.* (Raytheon/SISD. U67-4072A. September 1967.) [2 folders]


This subseries consists of documents pertaining to individual scientific experiments proposed or designed to be conducted during Apollo missions. Materials are organized into two subseries by topic. Within each subseries documents are arranged chronologically.


III.D.3.e.1.: General Experiments, 1968-1970

Box 55, Folder 4

"Experiment Proposal for Manned Space Flight."

Box 55, Folder 5
Surface Electrical Properties. (Gene Simmons; MIT/CSR. October 23, 1969.)

Box 55, Folder 6

III.D.3.e.2.: Apollo Lunar Surface Experiments Package (ALSEP), 1966-1970

The Apollo Lunar Surface Experiments Package (ALSEP) was a self-contained experiment package to be placed on the lunar surface by the Apollo astronauts. Each ALSEP package contained a number of scientific instruments, a power supply, and telemetry equipment to allow the package to function after the astronauts had left the surface. In order to reduce the astronaut workload on the first lunar landing mission, Apollo 11 carried a simplified ALSEP called the Early Apollo Scientific Experiments Package (EASEP), which contained only two experiment packages. Subsequent missions carried ALSEP units consisting of four individual experiment packages drawn from the eight Apollo lunar surface experiments.

This subseries consists of general documentation for the ALSEP/EASEP equipment. For documents relating to ALSEP/EASEP as equipment for a specific Apollo mission, see subseries III.D.3.h.3. (Apollo/Saturn V Launches) under the specific mission designation. Following the general material, arranged chronologically, documents pertaining to specific ALSEP units are arranged by unit number.

Box 55, Folder 7
"ALSEP Data Subsystem - Preliminary Design Review" [presentation graphics]. (Bendix/BSD. June 29, 1966.)

"ALSEP Flight System Familiarization Manual." (Bendix/ASD for MSC/LSPO. ALSEP-MT-03. 1 August 1967.)

Box 55, Folder 8-9
[photocopy; copy 1; 2 folders]

Box 56, Folder 1-2
[photocopy; copy 2; 2 folders]

Box 56, Folder 3
"ALSEP Familiarization Course Handout (For Training Purposes Only)." (Bendix/ASD. 15 January 1968.)

Box 56, Folder 4
"ALSEP Familiarization Course Handout." (Bendix/ASD. 15 January 1968.)

Box 56, Folder 5
"EASEP Familiarization Course Handout." (Bendix/ASD. BSR 2601. 15 February 1969.)

The Apollo program utilized two manned spacecraft: the Apollo Command-Service Module (CSM), which was the main spacecraft during the earth-orbital and earth-moon/moon-earth transfer phases of the mission, and the Lunar Excursion Module (LEM, later simplified to "Lunar Module," LM), which was utilized during the lunar descent/ascent phases of the mission.

This subseries consists of documentation for both the Apollo CSM and LM except for materials relating to the guidance and navigation subsystems, for which see subseries III.D.3.c. (Guidance and Navigation), above. The materials in this subseries are organized by topic. Unless otherwise noted documents are arranged chronologically by study within each subseries.


This subseries consists of documentation for the Apollo spacecraft in general or to both the CSM and LEM/LM spacecraft.

Box 57, Folder 6


Box 57, Folder 7


"The Apollo Spacecraft - A Chronology."

Box 57, Folder 8

Volume I: Through November 7, 1962. (MSC. No date.)

"Apollo Systems Descriptions."
Box 58, Folder 1
Volume I. (MSC. TM X-880. 30 September 1963.)

Box 58, Folder 2-4

Box 58, Folder 5

Box 58, Folder 6

Box 58, Folder 7

Box 59, Folder 1-2

Box 59, Folder 3

Box 59, Folder 4

Box 59, Folder 5

Box 59, Folder 6
"Entry Monitor Scroll Assembly Design Verification Tests." (NAR/SD. SD 69-467. 20 August 1969.)

"CSM/LM Spacecraft Operational Data Book."
Volume V: ALSEP Data Book. (MSC. November 1970.)

Box 59, Folder 7
Appendix C: ALSEP Array 'C'.

III.D.3.f.2.: Command-Service Module (CSM), 1962-1970
This subseries consists of documentation specifically for the Apollo Command-Service Module. Documents are organized into subseries by manufacturing block and within each subseries by date.


III.D.3.f.2.a.: General, 1962-1968

Box 59, Folder 8
Volume I: Spacecraft. (SID 62-431-1.)
Volume II: Ground Support. (SID 62-431-2.)

Box 59, Folder 9
[folder 1 of 3]

Box 60, Folder 1-2
[folders 2-3 of 3]

Apollo Spacecraft - Command Module Inner Structure

Structural Analysis Report. (NAA/SID. SID 64-60. 30 April 1966.)

Box 60, Folder 3-4
Volume IV, Appendix F. [2 folders]

Pressurization System for Use in the Apollo Service Propulsion System

Box 60, Folder 5

Box 60, Folder 6

Box 60, Folder 7

"Apollo Operations Handbook - CSM, Preliminary."

Box 60, Folder 8
Subsection 2.13: Docking and Crew Transfer. (26 June 1968.)

III.D.3.f.2.b.: Block I Spacecraft, 1965-1966

"Program Apollo Test Directive."

Box 60, Folder 9

Box 60, Folder 10
"Integrated Verification and Operational Plan - S/C 012." (GE/ASD. August 26, 1966.)

III.D.3.f.2.c.: Block II Spacecraft, 1964-1970
Box 61, Folder 1  "NASA Inspection and Review of Block II Command and Service Module Mock-Ups." (NAA/SID. SID 64-1685. 30 September 1964.)

Box 61, Folder 2  "Apollo Command Module/Service Module Measurement Requirements - Spacecraft 2TV-1, Block II." (NAR/SD. SD 68-266. 1 April 1968.) [Block II Test Vehicle]

Box 61, Folder 3  "Apollo CSM 101 Delta Vibration Qualification Test, Battery Circuit Breaker Panel." (NAR/SD. SD 68-252. February 1968.) [Apollo 7 CSM]

Box 61, Folder 4  "Apollo Engineering Analysis Report - Block II SPS Flight-Readiness Firing, Service Module 102." (NAR/SD. SD 68-253. 20 March 1968.)

Box 61, Folder 5  "Apollo Command Module/Service Module Measurement Requirements - CSM 104, Block II." (NAR/SD. SD 68-269. 2 September 1968.) [Apollo 9 CSM]

Box 61, Folder 6  "Apollo Command Module/Service Module Measurement Requirements - CSM 106, Block II." (NAR/SD. SD 68-270. 1 October 1968.) [Apollo 10 CSM]

Box 61, Folder 7  "Apollo Delta Qualification Test of the Docking System-Probe Assembly." (R. H. Prowett; NAR/SD. March 1969.)

Box 61, Folder 8  "Apollo Block II Waste-Management System Zero-Gravity Development Test Program." (E. J. Byrne; NAR/SD. SD 69-137. April 1969.)


"Apollo Operations Handbook - Block II Spacecraft." (NASA/SSOB/FCSD. SM2A-03-BLOCK II-(1).)

Box 62, Folder 2  Volume 1: Spacecraft Description. (15 April 1969 rev. 16 July 1969.) [revised pages only]

Box 62, Folder 3-6  Volume 1: Spacecraft Description. (15 April 1969 rev. 15 June 1970.) [4 folders]
III.D.3.f.3.: Lunar Excursion Module (LEM)/Lunar Module (LM), 1963-1971

Box 63, Folder 1

**Lunar Landing Abort Procedures Study**

Box 63, Folder 2
[Report.] (Honeywell/AD. 2B-B-20(G). 24 June 1963.)

Box 63, Folder 3
"The LEM Guidance System." (Honeywell/AD/MPG. R-ED 24060. 4 September 1963.)

Box 63, Folder 4

**Lunar Landing Dynamics Study**

*Technical Proposal*

Box 63, Folder 5

Box 63, Folder 6
"Analog Simulation of the Pilot Controlled Rendezvous Maneuvers for LEM." (MSC. Program Apollo Working Paper 1109. March 12, 1964.)

Box 63, Folder 7

Box 63, Folder 8

Box 63, Folder 9
"LM Range Safety Package." (S. Epstein; Grumman. LED-540-44. 30 September 1966.)

**Lunar Module (LM) Soil Mechanics Study**

Box 63, Folder 10

**LM Descent Engine Progress and Status Reports**

Box 63, Folder 11
*Monthly Progress Report.* (TRW/SG. 01827-6114-T000. 10 September 1967.)
Box 63, Folder 12

*Monthly Progress Report.* (TRW/SG. 01827-6151-T000. 10 February 1968.)

Box 63, Folder 13

*Monthly Progress Report.* (TRW/SG. 01827-6154-T000. 10 March 1968.)

Box 64, Folder 1

*Monthly Progress Report.* (TRW/SG. 01827-6156-T000. 10 April 1968.)

Box 64, Folder 2

*Monthly Progress Report.* (TRW/SG. 01827-6164-T000. 10 May 1968.)

Box 64, Folder 3

*Monthly Progress Report.* (TRW/SG. 01827-6167-T000. 10 June 1968.)

"Universal Lunar Module Systems Handbook."

Box 64, Folder 4-6

*LM-4 and Subsequent.* (MSC/FCD. FCO27. January 17, 1969.) [3 folders]


Volume I: *Subsystems Data.* (NASA/SSB/FCSD. LMA790-3-LM 7 and Subsequent. 1 February 1970.)

Box 64, Folder 7-8

[folder 1-2 of 4]

Box 65, Folder 1-2

[folder 3-4 of 4]


Box 65, Folder 3-5

Volume II: *Operational Procedures.* (NASA/SSB/FCSD. LMA790-3-LM 10 and Subsequent. 1 September 1970.) [3 folders]

"Lunar Module 7, 8, and 9 - Elementary Functional Diagrams." (Grumman/PSD. LED-267-37C. 1 November 1970.)

Box 65, Folder 6-7

[folder 1-2 of 4]

Box 66, Folder 1-2

[folder 3-4 of 4]

Box 66, Folder 3-6

III.D.3.g.: Apollo Missions, 1962-1970

This subseries consists of documentation on the general development of the missions in the Apollo program. For documentation on the actual flight of any given mission plan, see subseries III.D.3.h. (Apollo Missions - Launches). Materials are organized by topic. Unless otherwise noted documents within each subseries are arranged chronologically by study.

- III.D.3.g.2. Landing Sites (1962-1970)

III.D.3.g.1.: General, 1962-1970

The material in this subseries consists of documentation on the development of Apollo mission plans in general. For documentation on specific mission plans, see subseries III.D.3.g.3. (Mission Plans).

Box 66, Folder 7

Box 67, Folder 1-2

Box 67, Folder 3

Box 67, Folder 4

Box 67, Folder 5
"Preliminary Apollo Reference Trajectory." (MSC. February 1964.)

Box 67, Folder 6

Box 67, Folder 7

"Mission Modular Data Book."

Box 67, Folder 8-9
Block II Lunar Mission. (NAA/SID. SID 66-1245. 1 January 1967.) [2 folders]

Block II Earth Orbital Mission
Block II Earth Orbital Mission. (NAA/SID. SID 66-1501A. Reprinted October 1967.)

"Science and Technology Advisory Committee Briefing - Lunar Landing Mission."


"Apollo Program (Phase I Lunar Exploration)."


III.D.3.g.2.: Landing Sites, 1962-1970


Study of Quantitative Methods for LEM Landing-Site Selection


"Mapping Sciences Laboratory Data Bank. Site Data Coverage Index." (MSC. 5 August 1970.)

III.D.3.g.3.: Mission Plans, 1968-1970
Documents in this subseries are organized by mission plan designation and date.

"Medical Requirements - Apollo Mission C Prime." (MSC. November 1, 1968.)

"Medical Requirements - Apollo Mission D." (MSC. January 1969.)

"Mission Requirements for First Apollo Lunar Landing Mission." (TRW/SG. 05952-H152-R0-00. 11 April 1967 (Revision 3.) [Apollo Mission G]

"Apollo Mission Techniques, Mission G." [Apollo 11]


Vol 1: Techniques Description

"Medical Requirements - H Type Mission - Lunar Landing." (MSC. October 1969.)


"Apollo Mission Techniques, Mission H-1."

Lunar Surface Phase. (MSC/ASPO. Internal Note MSC-00178. October 15, 1969.)

Lunar Orbit Activities. (MSC/ASPO. Internal Note MSC-01212. October 30, 1969.)

Techniques Description

Techniques Description
III.D.3.h.: Apollo Launches, 1964-1972

Apollo missions were designated primarily by launch vehicle. A-series launches (A-001 through A-004) were test launches of boiler plate Apollo capsules on Little Joe II boosters to test the Apollo Launch Escape System (LES). Two A-series launches (A-101 and A-102) were also Saturn I vehicle development launches SA-6 and SA-7, respectively; information relating to these launches is filed under Launch Vehicle Programs - Saturn Program Development Launches - SA-6 or -SA-7 (subseries II.B.7.e.3. or II.B.7.e.4., respectively). All Apollo/Saturn IB launches were designated in the AS-200 series (AS-201 through AS-205), while all Apollo/Saturn V launches were designated in the AS-500 series (AS-501 through AS-512). In both cases the launch numbers were identical to the vehicle number of the Saturn launch vehicle used (SA-201 through SA-205 and SA-501 through SA-512). Beginning with AS-204, launches also received Apollo mission numbers. For a complete listing of all SA- (Saturn development) and AS- (Apollo/Saturn) launches, as well as a listing of launch designations and Apollo mission designations, see Appendix 4 (page 109). This subseries consists of documentation for the various Apollo program missions as actually flown. For documentation on the missions as planned, see subseries III.D.3.g.3. (Mission Plans).

• III.D.3.h.3. Apollo/Saturn V Launches (AS-500 series) (1964-1972)

III.D.3.h.1.: Boiler Plate Launches (A-series), 1964-1966

Box 70, Folder 13 "Reporting Plan for Apollo Mission A-001 (BP-12)." (MSC. Program Apollo Working Paper 1121. April 21, 1964.)


Box 71, Folder 1 "Postlaunch Report for Apollo Mission 004 (Spacecraft 002)." (MSC. MSC-A-R-66-3. April 15, 1966.)

III.D.3.h.2.: Apollo Launches, AS-200 series [Apollo/Saturn IB Launches], 1965-1969

This subseries consists of documentation on the launch vehicles and mission activities for Apollo/Saturn IB launches. For documents on Apollo/Saturn V launches, including all lunar missions, see subseries III.D.3.h.3. (Apollo/Saturn V Launches). Materials in this subseries are grouped by launch designation. Unless otherwise noted, documents within each subseries are arranged chronologically.

• III.D.3.h.2.a. AS-200 series (1965-1968)
• III.D.3.h.2.b. AS-201 (1965-1966)
• III.D.3.h.2.c. AS-202 (1965-1966)
• III.D.3.h.2.d. AS-203 (1966)
• III.D.3.h.2.e. AS-204 (Apollo 1) (1965-1967)
• III.D.3.h.2.f. AS-204 (Apollo 5) (1967-1968)
• III.D.3.h.2.g. AS-205 (Apollo 7) (1966-1969)
• III.D.3.h.2.h. AS-206 (1966)

III.D.3.h.2.a.: Apollo Launches - AS-200 series (General), 1965-1968

Documents in this subseries are general procedural documents for all Apollo/Saturn IB launches. Materials are arranged by Kennedy Space Center (KSC) document number and USAF Eastern Test Range (AFETR) Operations Directive number.

Box 71, Folder 2  "Data Flow Plan - Apollo 200." (MSC/FCD. June 1965.)


Box 71, Folder 6  "Apollo-Saturn IB Over-all Test." (AFETR. Operations Directive 4231. 14 October 1965.)

Box 71, Folder 7  "Apollo-Saturn IB Spacecraft Hypergolic Loading Test." (AFETR. Operations Directive 4236. 3 January 1966.)

Box 71, Folder 8  "Apollo-Saturn IB RP-1 Loading." (AFETR. Operations Directive 4237. 3 January 1966.)


Box 71, Folder 11  "Apollo-Saturn IB Command/Telemetry Test with NASA Instrumented Aircraft." (AFETR. Operations Directive 4243. 4 August 1967.)

Box 71, Folder 12  "Apollo-Saturn IB Complex 16 Systems Tests." (AFMTC. Operations Directive 4253. 1 November 1965.)

III.D.3.h.2.b.: Apollo Launches - AS-201, 1965-1966
"Saturn-Apollo Space Vehicle Summary." (MSFC/MSO. No date.)

Box 71, Folder 13
AS-201/SC-009 Contributions to Saturn LOR.


Box 71, Folder 14
Volume I.

Box 72, Folder 1
Volume II.

Box 72, Folder 2
Volume III

Box 72, Folder 3
Volume IV.

Box 72, Folder 4

Box 72, Folder 5
"Apollo-Saturn IB AS-201 Launch." (AFETR. Operations Direction 4201. 10 December 1965.)

Box 72, Folder 6

Box 72, Folder 7

III.3.h.2.c.: Apollo Launches - AS-202, 1965-1966


Box 73, Folder 1
Volume I.

Box 73, Folder 2
Volume II.

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III.D.3.h.2.d.: Apollo Launches - AS-203, 1966


Box 74, Folder 2 Volume I.

Box 74, Folder 3 Volume II.

Box 74, Folder 4 Volume III

Box 74, Folder 5 Volume IV.

Box 74, Folder 6 "Apollo-Saturn IB AS-203 Launch." (AFETR. Operations Directive 4203. 28 March 1966.)


III.D.3.h.2.e.: Apollo Launches - AS-204 (Apollo 1), 1965-1967

AS-204, later designated Apollo 1, was to be the first manned Apollo/Saturn launch in early 1967. A fire started in the command module during a simulated countdown on 27 January 1967, killing astronauts Virgil I. Grisson, Edward H. White, and Roger B. Chaffee. The investigation of the accident and resulting design changes to the Apollo Command Module forced delays in the program launch schedule. Following the post-accident investigation the launch vehicle from AS-204 (Saturn IB SA-204) was reused to launch the unmanned Apollo 5 mission, which received the same launch designation (AS-204). Documents pertaining to both AS-204 launches or specifically to the cancelled AS-204/Apollo 1 mission are filed under subseries III.D.3.h.2.e. (AS-204 (Apollo 1)); documents which pertain only to the subsequent AS-204/Apollo 5 mission are filed under subseries III.D.3.h.2.f. (AS-204 (Apollo 5)).
Box 75, Folder 5

"Apollo Data Flow Plan - AS-204." (MSC/FCD. September 1965.)


Box 75, Folder 6

Volume I.

Box 75, Folder 7

Volume II.

Box 75, Folder 8

Volume III.

Box 76, Folder 1


Apollo/Saturn-204 Design Certification Review.

Box 76, Folder 2

Launch Vehicle Report - S-IVB Stage [presentation graphics]. (DAC/MSSD. September 1966.)

Box 76, Folder 3-5


Design Certification Review Report (KSC)

Box 76, Folder 6-7

Volume I. (September 7, 1966) [2 folders]

Box 76, Folder 8

Volume I Addenda. (September 13, 1966)

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Volume II. (September 7, 1966)

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Launch Vehicle Report

Box 77, Folder 3


Volume 5: GSE

Box 77, Folder 4

Part 1. (GE/ASD. ESE-TP-020. No date)

Design Certification Review Oral Report. (KSC)

Box 77, Folder 5

Launch Complex 34 Mechanical Systems. (September 23, 1966)
Box 77, Folder 6-7

Box 78, Folder 1

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III.D.3.h.2.f.: Apollo Launches - AS-204 (Apollo 5), 1967-1968
Following the post-accident investigation into the AS-204 (Apollo 1) fire of 27 January 1967, the launch vehicle from that mission (Saturn IB SA-204) was used to launch the unmanned Apollo 5 mission, also designated AS-204, on 22 January 1968. This mission was the first launch of a Saturn launch vehicle carrying a Lunar Module (LM-1), with an aerodynamic fairing replacing the normal Apollo Command/Service Module atop the booster. Documents pertaining to both AS-204 launches or specifically to the cancelled Apollo 1 mission are filed under subseries III.D.3.h.2.e. (AS-204 (Apollo 1)); documents pertaining only to the subsequent Apollo 5 mission are filed under subseries III.D.3.h.2.f. (AS-204 (Apollo 5)).

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III.D.3.h.2.g.: Apollo Launches - AS-205 (Apollo 7), 1966-1969
AS-205/Apollo 7 (Apollo mission C), launched on 11 October 1968, was the first manned launch of the Apollo spacecraft and Saturn IB launch vehicle. The three man crew
(Walter M. Schirra, Donn F. Eisele, and R. Walter Cunningham) spent over ten days in earth orbit testing the performance of the Apollo spacecraft.

Box 78, Folder 9

"Apollo Operational Support Plan AS-205A." (MSC/FCD. FCO43-205A. 7 June 1966.)

Box 79, Folder 1


Box 79, Folder 2-6

"Apollo Deactivation Procedures for Landing Safing Team (Apollo 7; 205/101)." (NAR/SD (SD 68-138) for MSC/RSB. SM2A-08-SC101-1. 3 September 1968, rev.27 September 1968.) [5 folders]

Box 79, Folder 7


Box 80, Folder 1


"Apollo 7 Mission Report." (MSC. MSC-PA-R-68-15.)

Box 80, Folder 2

Supplement 4: Reaction Control System Performance. (July 1969)

III.D.3.h.2.h.: Apollo Launches - AS-206, 1966

The AS-206 launch was originally planned as an unmanned Saturn IB/LM test flight. Following the AS-204/Apollo 1 accident, these tests were performed during the AS-501/Apollo 4 and AS-204/Apollo 5 missions so that AS-206 was never launched. The SA-206 (Saturn IB) launch vehicle was eventually used to launch the Skylab 2 mission in 1973.

Box 80, Folder 3

"Apollo Operational Support Plan, AS-206A." (MSC/FCD. FCO43-206A. 1 April 1966.)

Box 80, Folder 4


Box 80, Folder 5


III.D.3.h.3.: Apollo Launches, AS-500 series [Saturn V] Launches, 1964-1972
This subseries consists of documentation on the launch vehicles and mission activities for Apollo/Saturn V launches. For documents on Apollo/Saturn IB launches, see subseries III.D.3.h.2. Materials in this subseries are grouped by launch designation. Unless otherwise noted, documents within each subseries are arranged chronologically.

- III.D.3.h.3.a. AS-500 series (1964-1970)
- III.D.3.h.3.b. AS-501 (Apollo 4) (1965-1968)
- III.D.3.h.3.c. AS-502 (Apollo 6) (1968)
- III.D.3.h.3.e. AS-504 (Apollo 9) (1968-1969)
- III.D.3.h.3.f. AS-505 (Apollo 10) (1969)
- III.D.3.h.3.g. AS-506 (Apollo 11) (1969)
- III.D.3.h.3.h. AS-507 (Apollo 12) (1969-1970)
- III.D.3.h.3.i. AS-508 (Apollo 13) (1970)
- III.D.3.h.3.j. AS-509 (Apollo 14) (1970-1971)
- III.D.3.h.3.k. AS-510 (Apollo 15) (1971-1972)
- III.D.3.h.3.l. AS-511 (Apollo 16) (1971-1972)
- III.D.3.h.3.m. AS-512 (Apollo 17) (1972)

III.D.3.h.3.a.: Apollo Launches - AS-500 series (General), 1964-1970

Documents in this subseries are general procedural documents for all Apollo/Saturn V launches.

"KSC Operations Plan." (GE/ASD/KCE. July 1, 1964.)

Box 80, Folder 6-7 Volume III: Vehicle Operations [Preliminary]. [2 folders]

"KSC Apollo/Saturn Program Development/Operations Plan." (KSC. 100-39-0001 (K-PM-0).)

Box 80, Folder 8 Volume II: Saturn V Operations Plan. (October 1, 1965.)

Box 81, Folder 1 Volume II: Saturn V Operations Plan. (October 1, 1965 changed August 15, 1966.)

"Apollo/Saturn V Ground Safety Plan." (KSC. K-V-053.)

Box 81, Folder 2 Volume I: General Requirements and Industrial Safety Operating Procedures. (March 1, 1970.)

Box 81, Folder 3 Volume II: Launch Complex 39 Ground Safety Plan. (October 15, 1970.)

Box 81, Folder 4 Volume III: Operations and Checkout Building. (February 1, 1968.)
III.D.3.h.3.b.: Apollo Launches - AS-501 (Apollo 4), 1965-1968
The AS-501/Apollo 4 launch on November 9, 1967 was the first development launch of the Saturn V launch vehicle and was intended to qualify the Saturn V for operational status. The Apollo 4 mission placed an unmanned command-service module and boilerplate lunar module into earth orbit. The reentry of the command module was used to test various aspects of the spacecraft, telemetry, and ground tracking systems during simulated reentry from a lunar mission.


Box 82, Folder 2 "Apollo 4. Spacecraft 017/Saturn 501 Flight Plan." (MSC. October 27, 1967.)


III.D.3.h.3.c.: Apollo Launches - AS-502 (Apollo 6), 1968
The AS-502/Apollo 6 launch on April 4, 1968 was the second development launch of the Saturn V launch vehicle. As in Apollo 4, the Apollo 6 mission placed an unmanned command-service module and boilerplate lunar module into earth orbit to test the CSM emergency detection systems. Once again the reentry of the command module was used to test aspects of the spacecraft, telemetry, ground tracking, and recovery systems.

Box 82, Folder 4 "Reentry Test Plan for Apollo 6 (AS-502)." (John Marini and William Rice; GSFC. X-551-68-64. February 20, 1968.)

Box 82, Folder 5 "Apollo 6 Spacecraft. Headquarters Flight Readiness Review" [presentation graphics]. (MSC. March 11, 1968.)
III.D.3.h.3.d.: Apollo Launches - AS-503 (Apollo 8), 1968-1969

AS-503/Apollo 8 (Apollo mission C) was the first manned launch of the Apollo/Saturn V launch vehicle. Launched on December 21, 1968, Apollo 8 was the first attempt to send a manned spacecraft to the moon. On December 24/25, 1968 Apollo 8 orbited the moon and the three-man crew (Frank Borman, James A. Lovell, and William A. Anders) became the first humans to see its far side. The mission demonstrated the capabilities of the Apollo command-service module and the status of NASA facilities relative to manned lunar missions.

III.D.3.h.3.e.: Apollo Launches - AS-504 (Apollo 9), 1968-1969

AS-504/Apollo 9 (Apollo mission D) was the first launch of an Apollo/Saturn V launch vehicle with a functional Lunar Module (LM). Launched on March 3, 1969, Apollo 9 was an earth orbital mission to demonstrate LM capability and practice CSM-LM orbital
rendezvous procedures. The three-man crew (James A. McDivitt, David R. Scott, and Russell L. Schweikart) spent ten days in orbit.

Box 84, Folder 5

Box 84, Folder 6

"Apollo Deactivation Procedures for Landing Safing Team (Apollo 9; 504/104/LM3)." (NAR/SD (SD 68-1014) for MSC/RSB. SM2A-08-SC104-1. January 20, 1969.)

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Box 85, Folder 3-4
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Box 85, Folder 3-5

Box 85, Folder 6

Box 86, Folder 1

Box 86, Folder 2-3

Box 86, Folder 4

III.D.3.h.3.f.: Apollo Launches - AS-505 (Apollo 10), 1969

AS-505/Apollo 10 (Apollo mission F) was a lunar orbital mission to test LM operations in the lunar environment. Launched on May 18, 1969, the three-man crew (Thomas P. Stafford, John W. Young, and Eugene A. Cernan) undertook the full range of activities required for a lunar landing including lunar orbit rendezvous and docking, lunar descent, and a low pass to within 50,000 feet of the lunar surface, demonstrating the range of LM capabilities excepting only final approach and lunar landing.

Box 86, Folder 5
III.D.3.h.3.g.: Apollo Launches - AS-506 (Apollo 11), 1969

AS-506/Apollo 11 (Apollo mission G) was the first lunar landing mission planned in the Apollo program. Following launch on July 16, 1969, the three-man crew (Neil Armstrong, Michael Collins, and Edwin E. Aldrin, Jr.) traveled to the moon and established lunar orbit. On July 20, 1969, Armstrong and Aldrin descended to the lunar surface in the Sea of Tranquility to become the first humans to set foot on the moon. While on the surface they gathered 21 kg of rock and soil samples, activated the Early Apollo Scientific Experiments Package (EASEP, see also subseries III.D.3.e.2.), and took numerous photographs. Collins remained in lunar orbit in the command module and conducted a series of orbital experiments. Armstrong and Aldrin remained on the surface for just over 21 hours before lifting off to rendezvous with Collins in orbit. The three men returned safely to earth on July 24.
III.D.3.h.3.h.: Apollo Launches - AS-507 (Apollo 12), 1969-1970

AS-507/Apollo 12 (Apollo mission H-1) was the second lunar landing mission planned in the Apollo program. Launched on 14 November 1969, the three-man crew (Charles Conrad, Jr, Richard F. Gordon, and Alan L. Bean) followed a mission plan similar to that of Apollo 11, although extra emphasis was placed on insuring spacecraft systems operations following a lightning strike on the vehicle during the launch from Kennedy Space Center. On 19 November 1969, Conrad and Bean descended to the lunar surface in the Ocean of Storms, achieving a precision landing 535 feet from Surveyor III, which had landed 2½ years earlier. The astronauts conducted two extravehicular activities (EVAs) on the lunar surface, totaling nearly eight hours outside of the LM, during which they activated the Apollo Lunar Surface Experiments Package (ALSEP, see also subseries III.D.3.e.2.), collected 34kg of lunar surface samples, and retrieved parts from the nearby Surveyor III spacecraft (one landing leg of the Surveyor spacecraft is now in the collection of the National Air and Space Museum). Gordon remained in lunar
orbit in the command module and conducted a series of orbital experiments. Conrad and Bean remained on the surface for just over 31 hours before lifting off to rendezvous with Gordon in orbit. The three men returned safely to earth on 24 November.

Box 89, Folder 5  

Box 89, Folder 6  
"Apollo/Saturn V Flight Safety Plan, Vehicle AS-507." (KSC. K-V-05.13/7. no date.)

Box 89, Folder 7  

"Apollo Deactivation Procedures for Landing Safing Team (Apollo 12; 507/108/LM6)." (NAR/SD (SD 69-446) for MSC/RSB. SM2A-08-SC108-1. 20 October 1969.)

Box 89, Folder 8  
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Box 90, Folder 1-2  
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Box 90, Folder 3  
"Apollo Mission 12 Photography Indexes." (Aeronautical Chart and Information Center, USAF for NASA. March 1970.)

Box 90, Folder 4  

III.D.3.h.3.i.: Apollo Launches - AS-508 (Apollo 13), 1970

AS-508/Apollo 13 (Apollo mission H-2) was the third lunar landing mission planned in the Apollo program. Launched on 11 April 1970, the three-man crew (James A. Lovell Jr., John L. Swigert Jr., and Fred W. Haise) were to follow a mission plan similar to those of Apollo 11 and 12, with Lovell and Haise landing in the Fra Mauro region of the moon. However, on 13 April 1970, with the spacecraft on its way to the moon some 56 hours after launch, a cryogenic oxygen tank in the service module exploded causing a loss of power, depleting the supply of breathing oxygen, and placing the crew in jeopardy. The lunar landing was aborted and sole aim of the mission became the safe return of the three astronauts. With the assistance of ground controllers the crew utilized the lunar module as a life boat until 17 April, when the three men returned safely to earth.

Box 90, Folder 5  
[Briefing on LM Descent, Ascent, and Aborts for Apollo 13 Crew]. [presentation graphics]. (MSC/MPAD. January 17, 1970.)

Box 90, Folder 6-7  
Box 91, Folder 1-3

"Apollo Deactivation Procedures for Landing Safing Team (Apollo 13; 508/109/LM7)." (NAR/SD (SD 69-647) for MSC/RSB. SM2A-08-SC109-1. 15 January 1970.) [3 folders]

"Apollo Deactivation Procedures for Landing Safing Team (Apollo 13; 508/109/LM7)." (NAR/SD (SD 69-647) for MSC/RSB. SM2A-08-SC109-1. 2 March 1970.)

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Apollo 13 Review Board

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Appendix B-E [2 folders]

• Appendix B: Report of Mission Events Panel.
• Appendix C: Report of Manufacturing and Test Panel.
• Appendix D: Report of Design Panel
• Appendix E: Report of Project Management Panel.

Box 93, Folder 1

Appendix F-H

• Appendix F: Special Tests and Analyses
• Appendix G: Board Administrative Procedures.
• Appendix H: Board Releases and Press Statements.

MSC Apollo 13 Investigation Team

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III.D.3.h.3.j.: Apollo Launches - AS-509 (Apollo 14), 1970-1971

AS-509/Apollo 14 (Apollo mission H-3) was the fourth lunar landing mission planned in the Apollo program and the third to land on the moon. Launched on 31 January 1971, the three-man crew (Alan B. Shepard Jr., Stuart A. Roosa, and Edgar D. Mitchell) followed a normal Apollo trajectory to the moon, entering lunar orbit on 4 February 1971. While Roosa remained in lunar orbit conducting research, Shepard and Mitchell landed in the Fra Mauro region originally planned as the landing site for Apollo 13 to carry out various experiments, including the deployment of an ALSEP (see also subseries III.D.3.e.2.), during nine hours of EVA. After 33 hours on the surface, Shepard and Mitchell rejoined Roosa with 43kg of lunar samples. The three men returned safely to Earth on 9 February.

Box 94, Folder 9

Box 94, Folder 10
"Apollo 14 Lunar Surface Procedures (Preliminary), Revision A" (MSC. October 31, 1970.)

Box 94, Folder 11

Box 94, Folder 12

Box 95, Folder 1
"Apollo Postretrieval Procedures - Command Module (Apollo 14; 509/110/LM8)." (NAR/SD (SD 70-240) for MSC/RSB. SM2A-08-SC110. 28 December 1970.) [revisions only]

Box 95, Folder 2
"Apollo Deactivation Procedures for Landing Safing Team (Apollo 14; 509/110/LM8)." (NAR/SD (SD 70-241) for MSC/RSB. SM2A-08-SC110-1. 28 December 1970.) [4 folders]

Box 95, Folder 6
"Apollo Deactivation Procedures for Landing Safing Team." (NAR/SD (SD 70-241) for NASA MSC/RSB. SM2A-08-SC110-1. 28 December 1970
III.D.3.h.3.k.: Apollo Launches - AS-510 (Apollo 15), 1971-1972

AS-510/Apollo 15 (Apollo mission J-1) was the fifth lunar landing mission planned in the Apollo program and the fourth to land on the moon. Launched on 26 July 1971, the three-man crew (David R. Scott, Alfred M. Worden Jr., and James B. Irwin) entered lunar orbit on 29 July 1971. While Worden remained in orbit conducting research, Scott and Irwin landed in the Hadley-Apenine region to carry out various experiments, including the deployment of an ALSEP (see also subseries III.D.3.e.2.) and the first use of the Lunar Roving Vehicle (LRV), during eighteen hours of EVA. After 67 hours on the surface, Scott and Irwin rejoined Worden with 77kg of lunar samples. After releasing a satellite into lunar orbit on 4 August, the three men returned safely to Earth on 7 August.
III.D.3.h.3.i.: Apollo Launches - AS-511 (Apollo 16), 1971-1972

AS-511/Apollo 16 was the sixth lunar landing mission planned in the Apollo program and the fifth to land on the moon. Launched on 16 April 1972, the three-man crew (John W. Young, Thomas K. Mattingly II, and Charles M. Duke, Jr.) entered lunar orbit on 19 April 1972. While Mattingly remained in orbit conducting research, Young and Duke landed in the Descartes region to carry out various experiments, including the deployment of an ALSEP (see also subseries III.D.3.e.2.) and exploration via Lunar Roving Vehicle (LRV), during twenty hours of EVA. After 71 hours on the surface, Young and Duke rejoined Mattingly with 95kg of lunar samples. The three men returned safely to Earth on 27 April.

Box 98, Folder 4

Box 98, Folder 5
"Apollo Postretrieval Procedures for NASA Recovery Team (Apollo 16, 511/113/LM11)." (NAR/SD (SD 71-666) for MSC/SOB. SM2A-08-SC113. 15 December 1971.)

Box 98, Folder 6

Box 98, Folder 7
"Apollo 16 Index of Mapping Camera and Panoramic Camera Photographs." (MSC/MSB. MSC-07251. August 1972.)

Box 98, Folder 8
"Apollo 16 Index of 70mm Photographs and 16mm Film Strips." (MSC/MSB. MSC-07252. November 1972.)
III.D.3.h.3.m.: Apollo Launches - AS-512 (Apollo 17), 1972

AS-512/Apollo 17 was the sixth and final lunar landing mission in the Apollo program. Launched on 7 December 1972, the three-man crew (Eugene A. Cernan, Ronald E. Evans, and Harrison H. Schmitt) entered lunar orbit on 10 December 1972. While Evans remained in orbit conducting research, Cernan and Schmitt landed in the Taurus-Littrow region of the moon to carry out various experiments, including the deployment of an ALSEP (see also subseries III.D.3.e.2.) and exploration via Lunar Roving Vehicle (LRV), during 22 hours of EVA. After 75 hours on the surface, Cernan and Schmitt rejoined Evans with 117kg of lunar samples. The three men returned safely to Earth on 19 December.

Box 99, Folder 1-2
"Apollo 17 Final Flight Plan." (MSC/FPB. October 23, 1972.) [2 folders]

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"Apollo 17 Final Flight Plan." [Revision B]. (MSC/FPB. November 29, 1972.) [revisions only]

Box 99, Folder 4
"Lunar Surface Scientific Equipment for Apollo 17." (MSC/LEPO. November 1972.)

III.D.4.: Apollo Follow-On Programs, 1961-1971

As originally planned the Apollo Program was an initial reconnaissance of the lunar surface to be followed by more intensive exploration of the moon and experimentation in lunar and Earth orbit. This second phase was to use the Apollo spacecraft system as its basis, with added capability provided by additional vehicles and technology. NASA initiated a series of studies in 1962 examining various aspects of the Apollo follow-on exploration/experimentation regime to be instituted in the late-1960s/early-1970s time frame. By late 1964 the various studies had been organized as the Apollo Extension System (AES).

AES still envisioned a combination of lunar surface, lunar orbit, and earth orbit missions lasting up to 120 days (six months). Geared toward utilizing Apollo-era hardware as much as possible, it examined the possibilities of using spent Saturn stages as orbital workshops (OWS) or lunar surface bases. In August 1965 AES was placed under the control of the Saturn/Apollo Applications Office and a month later was renamed the Apollo Applications Program (AAP).

Over the next several years AAP was progressively reduced in response to budget cuts. The lunar surface missions, as immediate follow-on to the Apollo landings, were the first missions to be cut. The earth orbital missions (OWS) were also pared back. In mid-1969 NASA inherited the food/diet and spacesuit contracts and the astronauts from the Defense Department's cancelled Manned Orbital Laboratory (MOL) program. Despite this addition, in July 1969 AAP was cut to a single OWS launch and three manned missions. In February 1970 the AAP program was renamed Skylab.

The material in this subseries relates to NASA studies conducted under AAP and its predecessors, both as an organized program and as separately-funded study contracts. Materials relating to early development work on Skylab systems and operations as well as materials relating to Skylab as named, are included with materials on earth orbital projects as subseries III.D.4.g. (Earth Orbital Program Studies/Skylab). For documents relating to NASA's post-Apollo programs, including the Manned Orbital Research Laboratory (MORL) and space station programs, see subseries III.D.5. (Space Station Programs). For documents relating to NASA's planned manned interplanetary program, including studies involving the use of Apollo and Saturn hardware for interplanetary missions, see subseries III.D.6. (Manned Interplanetary Concepts) The materials in this subseries are grouped into
subseries by topic. Unless otherwise noted, documents are arranged chronologically by study within each subseries.

- III.D.4.g. Earth Orbital Program Studies/Skylab (1961-1971)

III.D.4.a.: General, 1962-1970

This subseries consists of documents pertaining to space exploration in the general context of Apollo follow-on exploration.

"Astronautics Information."

Box 99, Folder 5  Utilization of Extraterrestrial Resources [Seminar Proceedings].
(JPL. September 25-26, 1962.)


Manned Space Flight Network Augmentation Study for the Apollo Extension System.
[Report.]

Box 99, Folder 7  Part I. Tracking and Data Systems Directorate. (GSFC. September 1, 1965.)

Box 99, Folder 8-10  "Apollo Applications Program - A Bibliography." (Extraterrestrial Research Center. April 1966.) [3 folders]


Box 100, Folder 1  "America's Next Decades in Space - A Report for the Space Task Group." (NASA. September 1969.)

Box 100, Folder 2  "The Post-Apollo Space Program: Directions for the Future." (Space Task Group Report to the President. September 1969.)

Box 100, Folder 3  "Apollo Lunar Exploration Program Science Objectives and Mission Plans" [presentation graphics and outline]. (Bellcomm, Inc. September 1969.)

Box 100, Folder 4  "The Next Decade in Space - A Report of the Space Science and Technology Panel of the President's Science Advisory
Committee." (Office of Science and Technology, Executive Office of the President. March 1970.)

III.D.4.b.: Apollo Spacecraft Design Modifications, 1965-1968

The documents in this subseries relate to modifications suggested to the Apollo Command/Service Module (CSM) or other Apollo system spacecraft for the various Apollo follow-on missions.

**Preliminary Definition Study for Utilization of CSM for AES.**

*Experiment Identification Descriptions.* (NAA/SID. December 1965.)

Box 100, Folder 5  
Volume 2: Behavioral Experiments (SID 65-1537-2.)

Box 100, Folder 6-7  
Volume 3: Physical Science Experiments (SID 65-1537-3.) [2 folders]

*Land Landing System.* (NAA/SID. 18 February 1966.)

Box 100, Folder 8-9  
Technical Summary (SID 65-1544-1.) [2 folders]

**CSM Study for Apollo Applications.**

*Bimonthly Summary Report.* (NAA/SID. 13 March 1967.)

Box 101, Folder 1  
Volume 3: Task 4.1: Mission Analysis (SID 67-54-3.)

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Box 101, Folder 3-4  
"Selected Discussion on Manned Spacecraft Advanced Hardware Development Current Status and Plans." (MSC. April 25, 1968.) [2 copies]

III.D.4.c.: Experiment Design, 1965-1967

The materials in this subseries relate to the design and selection of experiments for Apollo follow-on exploration.

**Apollo Logistics Support System Scientific Mission Support Study.** (Study of Sample Experiments for Engineering Design Purposes).

*Final Report.* (Bendix/BSR. BSR-1112. March 1965.)

Box 101, Folder 5  
Summary

Box 101, Folder 6-7  
[Part I]. [2 folders]

[Part II]
Scientific Mission Support Study - Apollo Extension System.

*Final Report.* (Bendix/BSD. BSR-1207. November 1965.)

Research Program on Radio Astronomy and Plasma for AAP Lunar Surface Missions.

*Final Report.* (NAA/SID. SID 66-381. 31 May 1966.)

Applications A and B Phase B Integration Study Document.

The materials in this subseries relate to the transportation and/or storage of astronauts, equipment, and supplies to and from earth and lunar orbit and the lunar surface.

Box 104, Folder 3  "Supply Truck to the Moon." (D. H. Dickson, GE/MSD. [c.1962])


**Minimum Cost Launch-of-Opportunity Module Study.**

Box 104, Folder 7  *Apollo Extension System 1400 Cubic Foot Module* [presentation graphics]. (Boeing. D2-84051-1. [c.1966])

**Cryogenic Storage System Study (AES Payloads) Program.**

Box 104, Folder 8  Summary Technical Report Covering Period February 1 through August 1, 1966. (Boeing/AG/SD. D2-113345-1. No date.)

Box 104, Folder 9  Detailed Technical Final Report Covering Period February 1 through August 1, 1966. (Boeing/AG/SD D2-113345-2. No date.)

**Advanced Logistics Spacecraft System Study.**

*Final Report.* (MDC/MAC. F738. 31 October 1967.)

Box 105, Folder 1  Volume II: Spacecraft Design and Performance Summary.

Box 105, Folder 2  Volume III: Mission and Spacecraft Performance Analysis.

Box 105, Folder 3  Volume IV: Spacecraft Design Analysis and Spacecraft Selection.

Box 105, Folder 4-6  Volume V: Subsystems and Weight Analyses. [3 folders]

Box 106, Folder 1  Volume VI: Mission Reliability, Crew Safety and Rescue.

Box 106, Folder 2  Volume VII: Operational Support

Box 106, Folder 3  Volume VIII: Program Development and Costs, and Study Results.

Box 106, Folder 4  Volume IX: Mars Return Analysis


**Improved Lunar Cargo and Personnel Delivery System Study.**

Box 106, Folder 7

*First Interim Presentation* [presentation graphics]. (LAC/LMSC. LMSC-A848420. 19 September 1967.)

Box 106, Folder 8

*Second Interim Presentation* [presentation graphics]. (LAC/LMSC. LMSC-A848420. 13 December 1967.)

Box 106, Folder 9

*Final Presentation* [presentation graphics]. (LAC/LMSC. LMSC-A922814. 20 March 1968.)

*Final Report.* (LAC/LMSC. T-28-68-4. 28 June 1968.)

Box 106, Folder 10

Volume I: Management Summary

Box 106, Folder 11

Volume II: Study Summary

Box 107, Folder 1-2

Volume IIIA: Conceptual Designs and Subsystem Analyses. [2 folders]

Box 107, Folder 3

Volume IV: Design Evolution and Performance Studies.

Box 107, Folder 4

Volume V: Evolutionary Development Plan.

Box 107, Folder 5

Volume VI: Supporting Research and Technology Requirements.

**Study of Integral Launch and Reentry Vehicle System.**

Box 107, Folder 6


Box 107, Folder 7

Technical Report - First Phase


The materials in this subseries relate to projects and studies for manned exploration of the lunar surface. For items relating to unmanned projects, see subseries IV.E.2.a. (Planetary Reconnaissance - Moon) and IV.E.3. (Planetary Reconnaissance - by Project). The materials in this subseries are organized by the general area of activity. Within each subseries documents are arranged chronologically by study unless otherwise noted.

III.D.4.e.1.: General, 1965-1968

This subseries consists of documents relating to lunar surface exploration but not specifically involved with base or vehicle concepts.

**Initial Concept of Lunar Exploration Systems for Apollo.**

*Final Report*. (Boeing/ASD for NASA. CR-55765. No date.)

Box 108, Folder 1  
Volume II: System Considerations

Volume III

Box 108, Folder 2  
Part 1: Subsystem Analysis and Module Configuration. (CR-55763.)

Box 108, Folder 3  
Part 2: Subsystem Analysis and Module Configuration. (CR-55764.)

**Communications and Control - Lunar Exploration Systems for Apollo.**

*Final Study Report*. (Westinghouse/DSC/SOD. March 1965.)

Box 108, Folder 4  
Volume 1: Report Summary. (SO-113.)

Box 108, Folder 5  

Box 108, Folder 6  
Volume 3: Research and Technology Implications. (SO-115.)

**LEM Utilization Study**

Box 108, Folder 7  
*Final Presentation* [presentation graphics]. (15 July 1965.)

**Study of Emplaced Lunar Scientific Station for Apollo Extension Systems.**

Box 108, Folder 8  
*Phase II Presentation - Preliminary Design* [presentation graphics]. (Westinghouse/DSC/SOD. SO-218. April 1966.)

*Final Report*

Volume 1: Final Technical Report

Box 109, Folder 1-2  
Part 1 (SO-240.) [2 folders]
Box 109, Folder 3-4 Part 2 (SO-241.) [2 folders]

Box 109, Folder 5 Volume 2: Summary Report (SO-242.)

Box 109, Folder 6 Volume 3 Research and Technology Implications (SO-243.)

MIMOSA [Study of Mission Modes and Systems Analysis for Lunar Exploration].

[Interim Report]. (LAC/LMSC. LMSC-A820749. 30 June 1968.)


Box 109, Folder 7 Addendum 2, Part 3.


Final Report. (LAC/LMSC. 30 April 1967.)

Box 110, Folder 1 MIMOSA Summary Digest. (LMSC-A847940.)

Box 110, Folder 2 MIMOSA Summary Technical Report. (LMSC-A847941.)

MIMOSA Technical Report. (LMSC-A847942.)

Box 110, Folder 3 Volume I: Lunar Exploration Equipment and Mode Definition.

Box 110, Folder 4 Volume II: Candidate Lunar Exploration Programs.

Box 110, Folder 5 Volume III: Recommended Lunar Exploration Plan.

MIMOSA Planning Methodology. (LMSC-A847943.)

Box 110, Folder 6 Volume I: Planners Handbook (Except Appendices K and L).

Box 110, Folder 7 Volume III: Scientific Programs.

Box 110, Folder 8 "Development of a Subsurface Drill System for Post-Apollo Missions." (Westinghouse/DSC. March 1967.)

Box 111, Folder 1 "Lunar Mission Planning Data Book." (MSC/LMO. July 1967.)

The materials in subseries relate to manned shelters on the lunar surface other than the Apollo Lunar Module.

**Initial Concept for a Lunar Base**

Box 111, Folder 2-3  

**Lunar Applications of a Spent S-IVB/IU Stage (LASS).**

Box 111, Folder 4  
[presentation graphics]. (DAC/MSSD. PP158. September 1966.)

Box 111, Folder 5-6  

Box 111, Folder 7  

**Early Lunar Shelter Design and Comparison Study.**


Box 112, Folder 1  
Volume 1: Summary. (67-1964-1, Part 1.)
  - Book 1: Management Summary

Box 112, Folder 2  
Volume 1: Summary. (67-1964-1, Part 2.)
  - Book 2: Technical Summary

Box 112, Folder 3  
Volume 2: Mission Timelines and Requirements. (67-1964-2.)

Box 112, Folder 4  
  - Book 1: Electrical Power
  - Book 2: Environmental Control/Life Support

Box 112, Folder 5  
  - Book 3: Fluid Containment
  - Book 4: Thermal Control
  - Book 5: Astrionics

Box 112, Folder 6  
Volume 4: System Integration and Configuration Design. (67-1964-4.)

Box 112, Folder 7  

Volume 6: Supporting Studies. (67-1964-6.)

The materials in this subseries relate to the design of surface vehicles for use in lunar exploration.
"Manned Lunar Auxiliary Vehicle." (Chrysler/DSG. 6 December 1963.)

**Lunar Surface Vehicles as Part of LESA**

*Final Report* [presentation graphics]. (Boeing/ASD. June 1964.)

**Analysis of Lunar Surface Vehicles for Lunar Exploration Systems for Apollo.**

*Final Report.* (Boeing/ASD. D2-100134-1. July 15, 1964.)

Volume I: Technical Study

**Apollo Logistics Support System Payloads - Preliminary Design Study.**


Condensed Summary Report

Volume I: Program Summary

**Apollo Logistics Support System Payloads.**

*Interim Report* [presentation graphics]. (Boeing/ASD. D2-36072-1. September 1964.) [2 folders]

*Final Presentation.* (Boeing/ASD. D2-36072-3. April 1965.)

Volume 2 [presentation graphics]. [2 folders]

*Summary Report.* (Boeing/ASD. D2-36072-3. June 1965.)

**MOLAB Astronomic Systems - Navigation and Guidance.** (Boeing/ASD. D2-83205-1. June 1965.)

[folders 1-2 of 3]

[folder 3 of 3]

**MOLAB Astronomic Systems - Communications, Command and Control.** (Boeing/ASD. D2-83205-2. June 1965.)
Lunar Surface Mobility Systems Comparison and Evaluation (MOBEV) Study

Box 116, Folder 2-4 Volume 1. [3 folders]

Box 116, Folder 5-7 Volume 2. [3 folders]

Lunar Surface Mobility Systems Comparison and Evaluation (MOBEV) Study

Box 117, Folder 1 [Proposal]. (Bendix/BSD. BSD 1034. October 1965.)

Box 117, Folder 2 Preliminary Design Study of a Lunar Local Scientific Survey Module (LSSM). [Boeing contract]

Final Summary Report. (Boeing/SD. D2-83010-1. June 1966.)


Box 117, Folder 7 [folder 1 of 3]

Box 118, Folder 1-2 [folders 2-3 of 3]


Box 118, Folder 6 System Functional Specification. (Boeing/SD. D2-83016-1. June 1966.)

Box 118, Folder 7 Research and Advanced Technology. (Boeing/SD. D2-83017-1. June 1966.)

Box 118, Folder 8 Program Plan. (Boeing/SD. D2-83018-1. June 1966.)

Box 119, Folder 1-2 Program Cost. (Boeing/SD. D2-83018-2. June 1966.) [2 folders]


Volume II.

Box 119, Folder 3  Book 9: Systems Analysis

Preliminary Design Study of a Lunar Gravity Simulator.

Box 119, Folder 4  First Interim Report. (LAC/LMSC/HREC. LMSC/HREC A783082. 29 July 1966.)

Box 119, Folder 5  Second Interim Report. (LAC/LMSC/HREC. LMSC/HREC A783245. 6 September 1966.)

Box 119, Folder 6  Third Interim Report. (LAC/LMSC/HREC. LMSC/HREC A783335. 25 October 1966.)

Box 119, Folder 7  Final Report. (LAC/LMSC/HREC. LMSC/HREC A783336, HREC 0351-1. November 1966.)


Engineering Design Test of Mobility Test Articles (MTAs).

Box 119, Folder 9  Block I Test Plan. (F. E. Northon; USATEC/YPG. July 1966.)

Engineer Design Test of Mobility Test Articles - Models BX-1 and GM-1.


Engineer Design Test (Block I) of Mobility Test Article, Model BX-1.


Engineer Design Test of Mobility Test Article, Model GM-1.


**Specified Local Scientific Survey Module (LSSM) Design Study.** [Boeing contract]


Box 120, Folder 1-4  Volume 1: LSSM Vehicle and Subsystems Analysis and Design. [4 folders]

Box 120, Folder 5  Volume 2: LSSM Vehicle Performance Improvement Analysis.

*Resources Plans.* (Boeing/SD. D2-113471-3. November 1966.)

Box 120, Folder 6  Volume 1: Resources Plan  [folder 1 of 2]

Box 121, Folder 1  [folder 2 of 2]

Box 121, Folder 2  Volume 2: Test Plan

**Specified LSSM Supplemental Studies**

Box 121, Folder 3  *Condensed Summary Report.* (Boeing/SD. D2-114082-3. October 1967.)

**Specified Local Scientific Survey Module (LSSM) Design Study.** [Bendix contract]

*Final Report.* (Bendix/ASD and LAC/LMSC. BSR 1495. February 1967.)

Box 121, Folder 4  Volume I: Program Summary  Volume II: Technical Report

Box 121, Folder 5-8  Book 1: Specified LSSM Detailed Design. [4 folders]

Box 121, Folder 9  Book 2: Appendix A (Thermal Analysis)

Box 122, Folder 1  Book 3: Appendix B (Specified LSSM Interfaces).

Box 122, Folder 2  Book 4: Appendix C (Operations Analysis).
Box 122, Folder 3  
Book 5: Appendix D (Vehicle Analysis)

Box 122, Folder 4  
Book 6: Appendix E (Human Factors Analysis).

Box 122, Folder 5  
Book 7: Appendix F (Communications Analysis).

Box 122, Folder 6  
Book 8: Appendix G (Navigation Analysis).

Volume III: Resources Plan

Box 122, Folder 7  
Book 1: Summary Program Plan

Box 122, Folder 8-10  
Book 2: Development and Production Plans. [3 folders]

Box 123, Folder 1  
Book 4: Development Plan for Performance Improvement Items.

Box 123, Folder 2  
Additional Tasks Final Presentation Brochure  
[presentation graphics]. (Bendix/ASD. BSR 2195.  
September 1967.)

Additional Tasks Final Report. (Bendix/ASD. BSR 2162.  
October 1967.

Box 123, Folder 3  
Volume I: Condensed Summary. [2 copies]

Volume II:

Box 123, Folder 4  
Book 1: Interface Analysis and Integration Support Study.

Box 123, Folder 5  
Book 2: Test and Simulation Program Study.

Box 123, Folder 6  
Book 3: Mobility Performance Enhancement Study.

Nutator Drive Experimental Test Program Final Report.  
(Bendix/ASD. BSR 2192. October 1967.)

Box 123, Folder 7  
Volume I: Condensed Summary

Box 123, Folder 8  
Volume II.

Human Factors Visual Simulation Study

Box 123, Folder 9  

Lunar Wheel and Drive Experimental Test Program.

Box 124, Folder 1    Volume I: Summary Technical Report
Box 124, Folder  2-6    Volume II: Detailed Technical Report. [5 folders]
Box 124, Folder 7    Volume III: Task 7.0 - Lunar Roving Vehicle Drive System Analysis.
Box 125, Folder 1    [Graphics for Presentation on Lunar Surface Vehicle Design]. (GM/AC. [c.1968].)
Box 125, Folder 2    "Lunar Surface Mobility Systems Technology Summary" [presentation graphics]. (Bendix/ASD. BSR 2313. 28 May 1968.)
Box 125, Folder 3    "Investigation of a Hopping Transporter Concept for Lunar Exploration." (Marshall H. Kaplan and Howard W. Seifert; Dept of Aeronautics and Astronautics, Stanford University. SUDAAR 348. June 1968.)

**Dual-Mode (Manned/Automated) Lunar Roving Vehicle Design Definition Study.**

Box 125, Folder 4    *First Monthly Program Progress Review* [presentation graphics]. (Bendix/ASD. BSR 2708. May 1969.)


Volume II: Vehicle Design and Systems Integration.

Box 125, Folder 5-7    Book 1: DLRV System Design and Analysis. [3 folders]
Box 125, Folder 8    Book 2: DLRV Tiedown, Off-Loading, and Checkout.
Box 126, Folder 1    Book 3: Ground Support Equipment
Box 126, Folder 2    Book 4: Systems Safety Analysis


Box 126, Folder 3    Book 1: Navigation Subsystem Design and Analysis.
Box 126, Folder 4    Book 2: Communications Subsystem Design and Analysis.
Box 126, Folder 5


Box 126, Folder 6

Book 4: Control Subsystem Design and Analysis.

Box 126, Folder 7

Book 5: Power Subsystem Design and Analysis.

Box 126, Folder 8


Box 127, Folder 1-2

Volume V: Mission Operations. [2 folders]

Box 127, Folder 3

Volume VI: Growth Capability of DLRV

Box 127, Folder 4

Volume VII: DLRV Systems Specification

Box 127, Folder 5


Performance Evaluation of Wheels for Lunar Vehicles.

Box 127, Folder 6


The materials in this subseries relate to the theory and design of flying vehicle for use in lunar exploration beyond the ascent/descent operations capable by the Lunar Module.


Box 127, Folder 7

Proposal for. (Bell/BAC. D7190-953001. April 1963.)

Box 127, Folder 8

[Report]. (Bell/BAC. D7190-950001. July 1963.)


Box 127, Folder 9

Proposal. (Bell/BAC. D7195-953001. July 1963.)

An Engineering Study and Preliminary Design of a One Man Propulsion Device for Lunar and Free-Space Environments.
A Study of Lunar Flying Vehicles

Box 128, Folder 3  
Lunar Flying Vehicle Optimization Study. (Bell/BAC. 7217-902002. June 1965.)

Box 128, Folder 4  
Final Report. (Bell/BAC. 7217-928001. June 1965.)

Box 128, Folder 5  
Summary. (Bell/BAC. 7217-950001. June 1965.)

Study of Manned Flying Systems.

Mid-Term Report. (Bell/BAC. 7243-950001. November 1965.)

Box 128, Folder 6  
Volume I: [Vehicle and Subsystem Studies]

Box 128, Folder 7  
Volume II: [Mission Analysis]

Final Report. (Bell/BAC. 7243-950002. June 1966.)

Box 129, Folder 1  
Volume I: Vehicle and Subsystem Analysis.

Box 129, Folder 2  
Volume II: Mission Analysis

Box 129, Folder 3  
Summary. (Bell/BAC. 7243-950003. June 1966.)

Box 129, Folder 4  
Research and Technology. (Bell/BAC. 7243-920001. June 1966.)

Low Thrust Throttleable Engine for the Lunar Manned Flying System.

Box 129, Folder 5-6  
Resources Plan. (TRW/SG. 9990-7222-R0000. 28 February 1966.) [2 folders]

Lunar Manned Flying System Radar Altimeter.

Box 129, Folder 7  
Resources Plan. (Westinghouse/DSC. 30 April 1966.)

Box 129, Folder 8  
"Presentation on Lunar Surface Rescue and Escape" [presentation graphics]. (Bell/BAC. 7296-953001. c.1967.)

Flight Test of a One Man Flying Vehicle.

Box 129, Folder 9  


The materials in this subseries concern experiments to be conducted in lunar orbit.

Lunar Reconnaissance Mission

[Report]. (AGC/SGC. SGC P-3505. March 1963.)

Lunar Orbital Survey Missions (LOSM) Study.

Final Report. (Lockheed/LMSC. LMSC-A842063. 16 January 1967.)

III.D.4.g.: Earth Orbital Program Studies/Skylab, 1961-1971

The material in this subseries relates to studies intended to lead to Earth orbital missions utilizing Apollo hardware. Included in this material are documents pertaining to Saturn Orbital Workshop development, which became the Skylab program in February 1970. Documents pertaining to other space station development, including the Manned Orbital Research Laboratory (MORL) are filed under subseries III.D.5. (Space Station Program).

Study of Orbital Launch Operations

Interim Progress Report. (CVC/VA. TP 64003. 11 June 1961.)

Study of a Manned Orbital Laboratory, Saturn V Class.
Planning Analysis

Box 131, Folder 5-6
[2 folders]

Extended Apollo Systems Utilization Study.

Final Report. (NAA/SID.)

Box 131, Folder 7
Volume 13: The Adaptation of the Apollo Reaction Control
System Propellant Tanks for Apollo X Missions. (Bell/BAC
(D8404-953001) for NAA/SID. SID 64-1860-13. 16 November
1964.)
Addendum 1 (NAA/SID.)
Volume 2: Experiment Analysis and Requirements.
Appendix A: NASA Experiments. (SID 65-500-2D. No
date.)

Box 132, Folder 1-3
Book 2. [3 folders]
Volume 3: Configuration Analysis and Experiment
Accommodation.

Box 132, Folder 4-7
Appendix A: Engineering Drawings. (SID 65-500-3B.)
[4 folders]

Systems Study of a Manned Orbital Telescope.

Box 133, Folder 1
Midterm Report [presentation graphics]. (Boeing/ASD.
D2-90747-1. May 1965.)

Advanced Orbital Launch Operations Study.

Phase B Final Report. (LTV/AD. 00.676. 1 November 1965.)

Box 133, Folder 2
Volume I: Summary Technical Report

ORL [Orbital Research Laboratories] Experiment Program
Study.

Contractor Report. (IBM/FSD. 21 February 1966.)

Box 133, Folder 3
Volume A: Framework for Synthesis
Volume B.

Box 133, Folder 4
Part I: Agriculture/Forestry

Box 133, Folder 5
Part II: Geology/Hydrology
Box 133, Folder 6  Part III: Oceanography/Marine Technology.
Box 133, Folder 7  Part IV: Geography
Box 134, Folder 1  Part V: Atmospheric Science and Technology.
Box 134, Folder 2  Part VI: Communications and Navigation/Traffic Control.
Box 134, Folder 3  Part VII: Biomedicine/Behavior
Box 134, Folder 4  Part VIII: Advanced Technology and Supporting Research.
Box 134, Folder 5  Part IX: Operations Techniques and Advanced Missions Spacecraft Subsystems.
Box 134, Folder 6  Part X: Extravehicular Engineering Activities.
Box 135, Folder 1  Part XI: Astronomy/Astrophysics
Box 135, Folder 2  Part XII: Bioscience
Box 135, Folder 3  Part XIII: Physical Sciences
Box 135, Folder 4  Volume C: Guidelines for Comprehensive Flight Program.
Box 135, Folder 5  Annex 1.
Box 135, Folder 6  Annex 2.
Box 136, Folder 1  Volume D: Summary of Results
Box 136, Folder 2  Volume E: Bibliographical References for Illustrations and Tables. (15 May 1966.)
Box 136, Folder 3  "S-IVB Role in the Saturn V Synchronous Mission" [presentation graphics]. (Douglas/SSC. PP 156. August 1966.)

**Optical Technology Apollo Extension System Study.**

*Phase A Final Technical Report.* (Chrysler/SD. [c.1967].)

Box 136, Folder 4  Summary Report

**Experiments for Satellite and Material Recovery from Orbit Study Program.**

*Final Report.* (BBRC. F67-05. 1 March 1967.)

Box 136, Folder 5  Volume I: Summary
Box 136, Folder 6  Volume II: Technical

Box 136, Folder 8  "Radiation Characteristics of Photographic Film for Use in Apollo Application Experiments." (Lockheed/LMSC. LMSC 4,900,226. 30 June 1967.)


S-IVB Station Module Study


Box 137, Folder 1  Experiments Program Report. (Douglas/MSSD. DAC-56556. November 1967.) [photocopy]

-Advanced Workshop in Low Orbit C. (Douglas/MSSD. November 1967.)

Box 137, Folder 2  Technical Report. (DAC-56548.) [photocopy]

Box 137, Folder 3  Development Plan, Final Report. (DAC-56549.) [photocopy]

-Early Orbital Space Station (EOSS). (Douglas/MSSD. November 1967.)

Box 137, Folder 4-5  Technical Report. (DAC-56550.) [photocopy; 2 folders]

Box 137, Folder 6  Resources Analysis. (DAC-56553.) [blueprint copy]

Box 138, Folder 1  Research and Technology Report. (DAC-56555.) [blueprint copy]


Box 138, Folder 2  Volume I: Executive Summary Report. (DAC-58120.)


Saturn V Workshop Study

Box 138, Folder 7  Volume II: Task Team Analysis. (April 1, 1968.)

**Saturn V Orbital Workshop Study**

[Report]. (MSC/MATT.)

Appendices. (July 1, 1968.)

Box 138, Folder 8  [folder 1 of 2]

Box 139, Folder 1  [folder 2 of 2]

**Habitability Study - Earth Orbital Space Stations [AAP Habitability Report].**

Box 139, Folder 2  *Final Report.* (Raymond Loewy/William Snaith Inc. 31 December 1968.)

Box 139, Folder 3  "Apollo Telescope Mount Extravehicular Activities - Astronaut Review Outline." (MSFC/MSS. July 1, 1969.) [preliminary unchecked data]

Box 139, Folder 4  "Apollo Telescope Mount Extravehicular Activities - Crew Station Review." (MSFC/MSS. July 1, 1969, Revision A).

Box 139, Folder 5  "Airlock Design Data Book." (MDC/MDAC/ED. 15 November 1969.) [photocopy]

Box 139, Folder 6  "Skylab Program - Technical Summary." (NASA/OMSF. June 1970.)

Box 139, Folder 7  "Skylab Command Module (CM) Uprighting Bag Pack Assembly Verification Test." (NAR/SD. SD 70-299. October 1970.)

**Skylab B - Earth Resources, Artificial Gravity, Bioscience Experiments.**

[Report]

Box 139, Folder 8  Volume II: Artificial Gravity Experiment Crew Deck Design. (MSC. MSC-EA-R-71-1. February 1971.)

Box 139, Folder 9  "Skylab Program - Failure Mode and Effects Analysis for Sleep Monitoring System (M133)." (MMC/DD for MSC. MSC-02942. April 22, 1971.)

Box 139, Folder 10  "Skylab Program - Skylab In-Flight Experiments - Summary Descriptions" [presentation graphics]. (MSFC. June 1971.)
III.D.5.: Space Station Program, 1964-1971

The material in this subseries relate to studies and development work on earth-orbital space stations as part of a post-Apollo space program. Documents pertaining to Apollo follow-on space station development, including the Saturn Orbital Workshop/Skylab program are filed under subseries III.D.4.g. (Earth Orbital Program Studies/Skylab). Documents are arranged chronologically by study.

**Study of a Rotating Manned Orbital Space Station.**

*Final Report.* (Lockheed/LCO/SO. LR 17502. March 1964.)

Box 139, Folder 11 Volume I

- Report Contents
- Section 1 - Introduction
- Section 2 - Technical Summary

Box 140, Folder 1 Volume II

- Section 3 - Preliminary Investigations

Box 140, Folder 2-3 Volume III [2 folders]

- Section 4 - Configuration Studies
- Section 5.1 - Structures Subsystem

Box 140, Folder 4 Volume IV

- Section 5.2 - Navigation and Guidance Subsystem.
- Section 5.3 - Stabilization and Attitude Control Subsystem.
- Section 5.4 - Propulsion Subsystem
- Appendix A - Guidance Accuracies
- Appendix B - Stabilization and Control

Box 140, Folder 5 Volume V

- Section 5.5 - Data Management Subsystem.
- Section 5.6 - Displays and Controls Subsystem.
- Section 5.7 - Communications, Command, and Tracking Subsystems.

Box 140, Folder 6 Volume VI

- Section 5.8 - Electrical Power Subsystem.

Box 141, Folder 1-2 Volume VII [2 folders]

- Section 5.9 - Environmental Control and Life Support Subsystems.
- Section 5.10 - Miscellaneous Sensors and Equipment.
- Section 5.11 - Reliability and Maintainability.

Box 141, Folder 3-5 Volume VIII [3 folders]

- Section 6 - Human Factors.

Box 141, Folder 6 Volume IX

- Section 7 - Ground Support.
• Section 8 - Program Definition.

Box 141, Folder 7

Volume XI

• Summary.

Box 141, Folder 8


Box 142, Folder 1

"Radiation Protection for Manned Orbiting Space Stations." (Douglas/MSSD. SM-46257. September 1964.)

Manned Orbital Research Laboratory (MORL) Studies

-Optimization of the Manned Orbital Research Laboratory (MORL) System Concept.

Report. (Douglas/MSSD. September 1964)

Box 142, Folder 2

Volume III: Systems Analysis - Experimental Program. (SM-46074.)

Box 142, Folder 3-4


Box 142, Folder 5

Volume V: Operations - Systems Analysis. (SM-46076.)

Box 142, Folder 6-7


Box 143, Folder 1

Volume XIII: Laboratory Mechanical Systems - Artificial Gravity Systems. (SM-46084.)

Box 143, Folder 2

Volume XIV: Laboratory Mechanical Systems - Environmental Control/Life Support. (SM-46085.)

Box 143, Folder 3-4

Volume XV: Laboratory Mechanical Systems - Stabilization and Control. (SM-46086.) [2 folders]

Box 143, Folder 5

Volume XVII: Laboratory Electrical/Electronic Systems - Electrical Power. (SM-46088.)

Box 143, Folder 6

Volume XIX: Laboratory Electrical/Electronic Systems - Communications and Telemetry. (SM-46090.)

Volume XXII: Experiment Briefs, Part I. (SM-46093.)

Box 143, Folder 7

[folder 1 of 2]

Box 144, Folder 1

[folder 2 of 2]

Box 144, Folder 2-3

Volume XXII: Experiment Briefs, Part II. (SM-46094.) [2 folders]
-Development of the Manned Orbital Research Laboratory (MORL) System Utilization Potential.

Report. (Douglas/MSSD.)

Task Area III: MORL Concept Responsiveness Analysis. (November 1965.)

Book 1. (SM-48813.) [2 folders]

Book 2. (SM-48814.) [2 folders]

Task Area IV: MORL System Improvement Study. (January 1966.)

Book 5 [Propulsion Subsystem Analysis]

[Part 1]. (SM-48819A.) [2 folders]

[Part 2]. (SM-48819B.) [2 folders]

-Definition of a Resistojet Control System for the Manned Orbital Research Laboratory.


 • Volume III: Systems.

Orbital Astronomy Support Facility (OASF) Study.

Progress Report


Final Briefing [presentation graphics]. (Douglas/MSSD. DAC-58088. February 1968.)
[Report]. (MDC/DMSSD. 28 June 1968.)

Box 147, Folder 2
Volume I: Technical Summary. (DAC-58141.)

Box 147, Folder 3-5
Volume II: Task A - Orbital Astronomy Research Requirements. (DAC-58142.)

Box 147, Folder 6
Part 1: Baseline Astronomy Research Program. [3 folders]


Volume III: Task B - Instruments for Orbital Astronomy. (DAC-58143.)

Book 1 of 2.

Box 147, Folder 7-8
[folder 1-2 of 3]

Box 148, Folder 1
[folder 3 of 3]

Box 148, Folder 2-3
Book 2 of 2. [2 folders]

Volume IV: Task C - Orbital Astronomy Support Facility Concepts. (DAC-58144.)

Box 148, Folder 4-5
Book 1 of 3. [2 folders]

Box 148, Folder 6
Book 2 of 3.

Box 149, Folder 1
[folder 1 of 2]

Box 149, Folder 1
[folder 2 of 2]

Box 149, Folder 2-5
Book 3 of 3. [4 folders]

Box 149, Folder 6
Volume V: Research and Technology Implications for Orbital Astronomy. (DAC-58145.)

Saturn V Single Launch Space Station and Observatory Facility Study.

Box 149, Folder 7

Study for Basic Subsystem Module Preliminary Definition.

Box 150, Folder 1
Mid-Term Report [presentation graphics]. (GD/Convair. 13 June 1967.)


Box 150, Folder 2
Volume I: Condensed Summary
Box 150, Folder 3  Volume II: Technical Summary
Box 150, Folder 4  Addendum A: Supporting Research Technology.
Box 150, Folder 5  Volume III: '71 Configuration
Box 150, Folder 6  Volume IV: '73 Configurations and Structural Arrangements.
Box 150, Folder 7  Volume V: Reliability and Failure Modes and Effects Analysis.
Box 150, Folder 8  Volume VI: Environmental Control and Life Support.
Box 151, Folder 1  Volume VIII: Electrical Power Systems.
Box 151, Folder 2  Volume IX: Stabilization and Control
Box 151, Folder 3  Volume X: Program Definition
Box 151, Folder 4  "Study of the Astronaut's Capabilities to Maintain Life Support Systems and Cabin Habitability in Weightless Conditions." (Environmental Research Associates. ERA 68-1. c.1968.)


-Emergency Deorbit Systems for Apollo Type Spacecraft.

Box 151, Folder 5-6  [Report]. (Aerospace/SSO. ATR-68(7080)-1. 12 February 1968.) [2 folders]

- [Main Study]

Box 151, Folder 7  Summary Report. (Aerospace/SSO. ATR-68(7080)-2. April 1968.)
Box 151, Folder 8  Technical Discussions. (Aerospace/SSO. ATR-68(7080)-2.VOL I. April 1968.)

  Appendices. (Aerospace/SSO. ATR-68(7080)-2.VOL II. April 1968.)

Box 151, Folder 9  [folder 1 of 2]
Box 152, Folder 1  [folder 2 of 2]

Intermediate Orbital Workshop

Box 152, Folder 2  Project Plan. (MSFC. June 28, 1968.)

Intermediate Workshop Study

[Report]

  Modular Approach. (MSC. MSC-EA-R-68-1. October 1968.)
Box 152, Folder 3

Study of Separately Launched Multi-Use Space Electrical Power System (SLPM).

[Report]. (GE/MSD/IPSO. GESP-7007-1. October 1968.)

Box 152, Folder 4

Volume 1: Summary Volume

Joint NASA-AEC Study for Integration of Reactor TE System and Space Station.

Box 152, Folder 5

Mid Term Review [presentation graphics]. (MSFC. December 11, 1968.)

Emergency Earth Orbital Escape Device Study.


Box 152, Folder 6

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Box 152, Folder 7

Volume 2: General Technical Summary

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Volume 2E: Additional Study Tasks

Box 152, Folder 13

Volume 3: Preliminary Program Definition Plan.

Box 153, Folder 1

Volume 4: Apollo Applications Program; Emergency Escape System; Preliminary Program Definition Plan.

Box 153, Folder 2

"Space Station Experiment Analysis Activity" [presentation graphics]. (NAR/SD. PD 69-27. February 1969.)

Requirements Study for a Biotechnology Laboratory for Manned Earth Orbiting Missions.

Final Report. (MCD/MDAC. February 1969.)

Box 153, Folder 3

Volume I. (DAC-58155.)

Box 153, Folder 4

Volume II. (DAC-58156.)
Study of Application of Remote Manipulation to Satellite Maintenance.

*Final Report.* (GE/SSO. 69SD4286. June 1969.)

Box 153, Folder 5  Volume I: Summary Report

Box 153, Folder 6-7  Volume II: Technical Report. [2 folders]


Study of Space Station Propulsion System Resupply and Repair.

Box 153, Folder 10  *Presentation Material Used at NASA Headquarters* [presentation graphics]. (MMC/DD. July 1970.)

Space Station Prototype Environmental/Thermal Control and Life Support System.

Box 153, Folder 11  *System Summary.* (UAC/HS. August 1970.)

Box 154, Folder 1  *System Configuration Definition; System Installation Data.* (UAC/HS.) [folder includes loose material found in binder with report]

Box 154, Folder 2  *System Performance Specification; Reliability Report.* (UAC/HS.) [folder includes loose material found in binder with report]

Box 154, Folder 3  [presentation graphics]. (MSC. December 1970.)

Commercial Instrumentation for Space Station Application.


Box 154, Folder 4  Volume 1.

Space Station Study of Resupply/Repair of Monopropellant Subsystems.

Box 154, Folder 5-6  *Final Report.* (UAC/HS. SP06R70-F. February 1971.) [2 folders]

Earth Orbital Experiment Program and Requirements Study.

Box 154, Folder 7  *Summary Report.* (MDC/MDAC. MDC G0788. April 1971.)
Space Station Program (Phase B) Definition Study [McDonnell Douglas contract].

Box 155, Folder 1  
Program Requirements Document (PRD) - Preliminary Draft. (MDC/MDAC. MDC G0243. 7 November 1969 rev. 7 January 1970.)  
Analysis of Space Station Impact on KSC. (MDC/MDAC. MDC G0749. December 1970.)

Box 155, Folder 2-3  
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Option Period Study

Monthly Progress Report. (MDC/MDAC.)

Box 155, Folder 4  

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Executive Summary. (MDC/MDAC. MDC G0786. March 1971.) [2 copies]

Preliminary Performance Specifications. (MDC/MDAC. MDC G0771.)

Volume I: Preliminary Crew Cargo Module for Space Station Project.

Box 155, Folder 8  
(January 1971.)

Box 156, Folder 1  
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Volume II: Space Station Module for Space Station Project. (January 1971.)

Box 156, Folder 3  
Volume III: Artificial-Gravity System for Space Station Project. (January 1971.)

Box 156, Folder 4-6  
Selected Experiment Definition. (MDC/MDAC. MDC G0764. January 1971.) [3 folders]

Space Station Program Development Definition. (MDC/MDAC. MDC G2150. March 1971.)

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**Space Station Program (Phase B) Definition Study** [North American Rockwell contract].

*Solar-Powered Space Station Preliminary Design.* (NAR/SD. (MSC-00720). July 1970.)

Box 159, Folder 1  
Volume IV: Special Studies, Engineering Analysis. (SD 70-159-4.)

*Nuclear Reactor-Powered Space Station Definition and Preliminary Design.* (NAR/SD. (MSC-00741). January 1971.)

Box 159, Folder 2  
Volume I: Summary. (SD 70-168-1.)

Box 159, Folder 3  
Volume II: Operations. (SD 70-168-2.)

Box 159, Folder 4-5  
Volume III: Electrical Power Subsystem. (SD 70-168-3.) [2 folders]

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Box 160, Folder 2  
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**-Options Period Study**

Box 160, Folder 4  
*Space Station Mockup Brochure.* (NAR/SD. SD 70-536 (MSC-02455). November 1970.) [2 copies]

Box 160, Folder 5  
*Nuclear Reactor-Powered Space Station Mass Properties.* (NAR/SD. SD 70-503 (MSC-00748). November 1970.)

*Nuclear Reactor-Powered Space Station Development Definition.* (NAR/SD. (MSC-00749). December 1970.)

Box 160, Folder 6  
Volume I: Program Element Specification. (SD 70-505-1.)

Box 160, Folder 7  
Volume II: Program Element Master Plan. (SD 70-505-2.)

33 Foot Diameter Space Station, Kennedy Space Center Launch Site Support Definition. (NAR/SD. (MSC-02463). December 1970.)

Box 163, Folder 7 Volume 1. (SD 70-545-1.)
Box 164, Folder 1 Volume 2. (SD 70-545-2.)

Shuttle-Launched Modular Space Station. (NAR/SD. (MSC-02464). January 1971.)

Box 164, Folder 2 Volume I: Concept Definition. (SD 70-546-1.)
Box 164, Folder 3 Volume II: System Development Requirements. (SD 70-546-2.)
Box 164, Folder 4 Volume III: 22-Foot Diameter Core Module Comparison. (SD 70-546-3.)

Modular Space Station Program (Extension Period Study).

Box 165, Folder 2 First Quarterly Report. (SD 71-213. 20 May 1971.)
Box 165, Folder 3 Second Quarterly Report. (SD 71-235. 2 September 1971.)
Box 226 (OS), Folder 2 Drawings. (NAR/SD. SD 71-216 (MSC-02470). January 1972.)


This subseries consists of documents and studies relating to planning for the manned exploration of space beyond the Earth-Moon system. Materials are filed chronologically by study. Where the material includes parallel or competing studies (such as the "Early Manned Interplanetary Mission Study" (below), contracts for which were awarded to both General Dynamics and Lockheed), such studies are filed in their normal chronological place but the name of the relevant contractor is appended to the study title in brackets.

Box 165, Folder 5 "A Possible Approach to the Scientific Exploration of the Planet Mars." (E. A. Steinhoff; RAND. P-2515. January 12, 1962.)

A Study of Early Manned Interplanetary Missions [General Dynamics contract].

Early Manned Interplanetary Mission Study [Lockheed contract].


A Study of Manned Locomotion and Protection Systems for Moon, Mars, and Venus.


Final Study Report. (Douglas/MSSD. February 1964.)

Study of Subsystems Required for a Mars Mission Module.
Final Report. (NAA/SID.)

Box 168, Folder 1  Volume 1: Condensed Summary. (SID 64-1-1. 2 February 1964.)

Box 168, Folder 2-3 Volume 4: Aerobraking. (SID 64-1-4. 2 January 1964.) [blueprint copy; 2 folders]

**Evaluation of Advanced Integrated Display and Control Systems.**

Box 168, Folder 4  Space Mission Definition. (LTV/AD. 00.307. April 1964.)

**Manned Mars Landing and Return Mission Study.**

Final Report. (NAA/SID. April 1964.)

Box 168, Folder 5  Volume 1: Condensed Summary. (SID 64-619-1.)

Box 168, Folder 6  Volume 2: Operational Considerations. (SID 64-619-2.)

**Mars Surface Operations Studies**


Box 168, Folder 7  Volume 1: Technical Proposal

Box 168, Folder 8  "Technical Synopsis - Manned Mars Mission." (K. Scott Foster; Honeywell/SAS. SD-232. 15 May 1964.)

**Retrorocket-Parachute Landing System Study for Earth and Martian Entry Vehicles.**


Box 168, Folder 9  [folder 1 of 2]

Box 169, Folder 1  [folder 2 of 2]

**Manned Mars/Venus Flyby Vehicle Systems Study** [Honeywell contract].

Box 169, Folder 2  Program [proposal]. (Honeywell/SAS. 4B-E-66. 5 June 1964.)

Box 169, Folder 3  "A Program for Manned Interplanetary Missions" [presentation graphics]. (NAA/SID. SID 64-1198. July 1964.)

**A Study of Manned Interplanetary Missions.**

Final Report. (GD/Astronautics. 1 July 1964.)

Box 169, Folder 4  Volume III: Mission Oriented Studies. (GD|A-AOK 64-006-3.)
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Box 169, Folder 6-7  Volume V: Crew, Payload, Weights and Parametric Analyses. (GD|A-AOK 64-006-5.) [2 folders, including folded diagram]

Box 169, Folder 8  Volume V Supplement: Crew, Payload, Weights and Parametric Analyses. (GD|A-AOK 64-006-5S.)

Manned Planetary Reconnaissance Mission Study.

-Venus/Mars Flyby

Box 170, Folder 1  Technical Summary Report. (MSFC/FPO. FPO Internal Note 1-64. November 1964.)

Manned Mars and Venus Exploration Studies.

Box 170, Folder 2  Mid-Term Presentation [presentation graphics]. (GD/A. 1 December 1964.)


Box 170, Folder 3  Presentation of 30 January 1964 [presentation graphics]. (K. A. Ehricke; GD/A. GD|A-AOK 64-003. 28 January 1964.)

Final Report. (GD/A. c.1965.)

Box 170, Folder 4  Volume I: Summary. (GD|A-AOK 65-001-1.)

Planetary Transportation Systems Model Study / Space Technology Analysis and Mission Planning (STAMP) [Martin contract].


Study of Conjunction Class Manned Mars Trips

Box 170, Folder 7  Midterm Progress Briefing [presentation graphics]. (Douglas/MSSD. SM-47779. December 1964.)

Box 170, Folder 8  [presentation graphics.] (Douglas/MSSD. SM-48658. April 1965.)
**Technical Details.** (Douglas/MSSD. SM-48662. June 1965.)

Box 170, Folder 9  
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**S-IVB/Saturn V for Planetary Reconnaissance**


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Box 171, Folder 1-2  
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"Cryogenic Space Vehicles Orbital Rendezvous Program." (Douglas/ MSSD. PP151. c.1965.)

**Study of Interplanetary Mission Support Requirements** [Boeing contract].

Box 172, Folder 3  
Summary Report. (Boeing/ASD. D2-23588-4. May 1965.)

Box 172, Folder 4-6  

Box 172, Folder 7  
General Technical Summary. (Boeing/ASD. D2-23588-6. May 1965.)

**Interplanetary Mission Support Requirements Study** [Douglas contract].

*Final Report.* (Douglas/MSSD. June 1965.)

Box 172, Folder 8  
Volume I: Summary. (SM-48715.)

Box 173, Folder 1  
Volume III: Appendix. (SM-48717.)

**Manned Mars and/or Venus Flyby Vehicle Systems Study** [North American contract].

*Final Report.* (NAA/SID. June 1965.)

Box 173, Folder 2  
Volume 3: Spacecraft Configurations and Subsystems Design. (SID 65-761-3.)

Box 173, Folder 3-6  
Part 2. (SID 65-761-3A.) [blueprint copy; 4 folders]

Volume 4: System Evaluation. (SID 65-761-4.)
Manned Mars Surface Operations Study


Detailed Technical Report

A Study of Manned Planetary Flyby Missions Based on Saturn/Apollo Systems

*Six-Month Briefing.* (NAA/SID. 1 February 1967.)

*Final Report.* (NAA/SD. August 1967.)
Part I: Design Integration. (SID 67-549-5-1.)

Box 176, Folder 5  [folder 1 of 2]

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Box 177, Folder 2  Part II: Radiation Protection. (SID 67-549-5-2.)

Box 177, Folder 3  Part III: Meteoroid Protection, Structures, Weights. (SID 67-549-5-3.)

Volume 6: Subsystems Analysis

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Box 177, Folder 5  Part II: Electrical Power. (SID 67-549-6-2.)

Box 178, Folder 1  Part III: Guidance and Control, Propulsion, Hyperbolic Earth Entry. (SID 67-549-6-3.)

Box 178, Folder 2  Part IV: Telecommunications. (SID 67-549-6-4.)

Volume 7: Scientific and Engineering Data.

Box 178, Folder 3  Part I. (SID 67-549-7-1.)

Box 178, Folder 4-5  Part II. (SID 67-549-7-2.) [2 folders]

Box 179, Folder 1  Volume 8: Probe Designs. (SID 67-549-8.)

Box 179, Folder 2  Volume 9: Resource Analysis and Evaluation. (SID 67-549-9.)

**Feasibility Study of Modifying the S-II Stage as an Injection Stage for Manned Planetary Flyby Missions**

Box 179, Folder 3  Second Midterm Review [presentation graphics]. (NAA/SID. SID 66-1630-5-1. February 1967.)

Final Report. (NAA/SID.)


Box 179, Folder 5  Part 1.

Box 179, Folder 6-8  Part 2. [3 folders]


**Definition Study of Experimental Tests for a Manned Mars Excursion Module**

*Phase I Report.* (NAA/SID. February 1967.)

Summary Briefing [presentation graphics]. (SID 67-216.)

[additional presentation graphics.] (SID 67-216-1.)

*Phase II Report.* (NAA/SD. June 1967.)

Summary Briefing [presentation graphics]. (SID 67-588-1.)

[additional presentation graphics]. (SID 67-588-2.)

*Final Report.* (NAA/SD. 12 January 1968.)

Volume III: Test Program. (SD 67-755-3.)


**Feasibility Study of Modifying the Instrument Unit for Manned Planetary Flyby Mission**

*Presentation.* (IBM/FSD. 5 April 1967.)

**Feasibility Study of Modifying the S-IVB Stage as an Injection Stage for Manned Planetary Flyby Missions**

*Report.* (Douglas/MSSD. May 1967.)

Volume I: Summary Report. (SM-57996.)


Volume III: Cost. (SM-58022.)

*Tradeoff Study of a New Cryogenic Stage for Manned Planetary Exploration* [extension to basic study]
Study of Technology Requirements for Atmosphere Braking to Orbit About Mars and Venus

Mission Engineering Study of Electrically Propelled Manned Planetary Vehicles

Alternative Mission Modes Study

This series consists of documents pertaining to NASA's unmanned space exploration (planetary reconnaissance) and satellite programs. Materials are divided into subseries by topic:

- IV.A. General (1958-1971)
- IV.B. JPL Program Summaries (1961-1969)
- IV.C. Spacecraft Power Supplies (1960-1971)
- IV.E. Planetary Reconnaissance (1957-1971)

IV.A.: General, 1958-1971

This subseries consists of documents which do not relate specifically to any particular program nor to the broad subject areas of the other subseries. Materials are arranged chronologically.

Box 182, Folder 3


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"Space Vehicle Attitude Control." (Norri Sirri; JPL. Technical Release 34-121. October 2, 1960.)

Box 182, Folder 6


Box 182, Folder 7


Box 182, Folder 8


Box 182, Folder 9

"TRW Spacecraft Stabilization Activities" [brochure]. (TRW. c.1967.)

Box 182, Folder 10

"Power Systems Division - TRW Systems" [presentation graphics]. (TRW/SG. c.1968.)

Box 182, Folder 11


Box 182, Folder 12

"Spacecraft Adhesives for Long Life and Extreme Environments." (W. D. Roper; JPL. TR 32-1537. August 1, 1971.)

Box 182, Folder 13

"A Reduced Star Catalog Containing 537 Names Stars." (Jack W. Rhoads; JPL. TM 33-507. November 15, 1971.)


The Jet Propulsion Laboratory's 37- series Space Program Summary publications summarized JPL's activities in support of NASA operations. Issues 37-1 through 37-14 were organized in two volumes: Volume I contained unclassified material while Volume II contain material classified "Confidential." Issues
37-15 through 37-46 were organized into six volumes: Volumes I, II, and V contained material classified "Confidential," Volume II covered the Deep Space Instrumentation Facility/Deep Space Network, Volume IV contained unclassified material on Supporting Research and Advanced Development, and Volume VI covered Space Exploration Programs and Space Sciences. Issue 37-47 and later were organized into four volumes: Volume I covered Flight Projects, Volume II the Deep Space Network, Volume III covered Support Research and Advanced Development, and Volume IV contained any classified material. This subseries contains volumes specifically covering spaceflight projects - Volume I from issue 37-1 through 37-14, Volume VI for issue 37-15 through 37-46, and Volume I for issue 37-47 and subsequent. For summary volumes covering the Deep Space Network, see subseries V.B. (Tracking and Data Acquisition). For summary volumes covering other JPL development activities, see subseries VI.B. (Advanced Research and Technology). For issues which are not part of this collection, see also the Jet Propulsion Laboratory Publications Collection (NASM Accession XXXX-0612), Series X.

"Space Programs Summary." (JPL.)

Volume I [Unclassified Activities]

Box 182, Folder 14 for the period March 1, 1961 to May 1, 1961. (SPS 37-9. June 1, 1961.)

Volume VI: Space Exploration Programs and Space Sciences.


Box 183, Folder 1 for the period May 1, 1962 to August 1, 1962. (SPS 37-16. August 31, 1962.)

Box 183, Folder 2 for the period July 1, 1962 to October 1, 1962. (SPS 37-17. October 31, 1962.)

Box 183, Folder 3 for the period September 1, 1962 to December 1, 1962. (SPS 37-18. December 31, 1962.)


Box 183, Folder 7 for the period May 1, 1963 to July 31, 1963. (SPS 37-22. August 31, 1963.)

Box 183, Folder 8 for the period July 1, 1963 to September 30, 1963. (SPS 37-23. October 31, 1963.)


Box 183, Folder 14 for the period July 1, 1964 to August 31, 1964. (SPS 37-29. September 30, 1964.)


Box 183, Folder 18 for the period March 1, 1965 to April 30, 1965. (SPS 37-33. May 31, 1965.)

Box 184, Folder 1 for the period May 1, 1965 to June 30, 1965. (SPS 37-34. July 31, 1965.)

Box 184, Folder 2 for the period July 1, 1965 to August 31, 1965. (SPS 37-35. September 30, 1965.)

Box 184, Folder 3 for the period September 1, 1965 to October 31, 1965. (SPS 37-36. November 30, 1965.)


Box 184, Folder 7 for the period May 1, 1966 to June 30, 1966. (SPS 37-40. July 31, 1966.)

Box 184, Folder 8 for the period July 1 to August 31, 1966. (SPS 37-41. September 30, 1966.)

The material in this subseries relates to power sources for unmanned spacecraft in general. Documents relating to the power supply for a specific spacecraft or mission are filed under that specific program. Materials are arranged chronologically.

Allison Research and Development of Solar Reflectors

[Report]. (Allison/ED. 1826. 15 August 1960.)

Box 184, Folder 17      Volume I. [blueprint copy]
Box 184, Folder 18      Volume II. [blueprint copy]

Box 185, Folder 1      "Capabilities and Facilities." (GE/DECO. DE-21A. No date.)

Box 185, Folder 2      General Electric - Fuel Cells (miscellaneous)
                       [material from binder; documents listed in order of placement in binder]

                       • "Fuel Cell Development at General Electric." (GE/DECO. GEA-7540. c.1962.)
                       • "Failure Mode and Effect Analysis" [loose pages from binder].
                       • "A New Type of Fuel Cell." (GE/RL. May 1963.) [photocopy]


• "Fuel Cells" [brochure]. (GE/DECO. DE-85. No date.)


• [loose clippings on fuel cells, 1961-1964]


• "Attributes of the Union Carbide Fuel Cell System." (UC. January 17, 1964.)

• "Hydrazine Fuel Cell System." (Scott S. Tomter and A. Peter Antony; ACM/RD. July 3, 1963.)

• "Fuel Cells: The Role of a Designer in a New Art." (Will Mitchell, Jr. and J. B. Calkins; ACM. No date.)


1971 NASA/Goddard-Aerospace Industry Battery Workshop

Transcript of Proceedings. (ACE Federal Reporters Inc.)

Box 185, Folder 5-6  [First Day]. (17 November 1971.) [2 folders]

Box 185, Folder 7  Second Day. (18 November 1971.)


The material in this subseries are related to earth orbital satellites in general and some NASA satellite programs. Materials are arranged chronologically.
1958 NASA/USAF Space Probes (ABLE-1)

*Final Report.* (NASA. Memo 5-25-59W. June 1959.)

Box 185, Folder 8  
Volume 1: Summary

Box 186, Folder 1  
"Satellite Charge-Up as a Means of Maintaining the Shape of Echo-Type Satellites in the Outer Van Allen Belt." (R. O. Hundley; RAND. RM-2921-NASA. December 1961.)

Box 186, Folder 2  

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Orbiting Solar Observatory (S-17)

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Box 186, Folder 9  

TOS [Tiros Operational System]

Box 186, Folder 10  

Delta-42, Intelsat II F-1

Box 186, Folder 11  
*Operations Summary.* (KSC. TR-467. October 21, 1966.)

Box 186, Folder 12  
Box 186, Folder 13  "Balloon Observations of the Radiance of the Earth Between 2100 cm\(^{-1}\) and 2700 cm\(^{-1}\)." (J. H. Shaw, R. A. McClatchey, and P. W. Schaper; JPL. TR 32-1080; reprinted from Applied Optics, Vol.6 No.2. February 1967.)


Orbiting Solar Observatory (OSO-G)


IV.E.: Planetary Reconnaissance, 1957-1971

The material in this subseries relates to the unmanned exploration of the solar system. The materials are organized into three subseries:

- IV.E.2. General by Planet (1957-1970)

IV.E.1.: General, 1961-1970

This subseries consists of documents pertaining to planetary reconnaissance, but not to any specific planet or project. Materials are arranged chronologically by study.

Box 187, Folder 3  "The Performance Analysis of Ballistic Missile or Space Vehicle Guidance Systems." (A. N. Drucker; TRW/STL. May 1961.)

Studies of the Physical Properties of the Moon and Planets


Research Study to Determine Propulsion Requirements and Systems for Space Missions

[Report.] (AGC.2150. December 1961.)

Box 187, Folder 5  Volume Ila. [photocopy]

Box 187, Folder 6  "A Method of Interplanetary Trip Selection." (J. W. Cottrell and C. E. Olson; Lockheed/LMSC. January 23, 1963.)

[Study of Advanced Planetary Missions and Spacecraft Systems.]

[Report.] (JPL. EPD-139.)

Box 187, Folder 7  Volume II: Study of Mar and Venus Orbiter Missions Launched by the 3-Stage Saturn C-1B Vehicle. (1 March 1963.)
Box 187, Folder 8  "Accuracy and Capabilities of the ASC/IITRI Conic Section Trajectory System." (P. M. Pierce and F. Narin; IITRI/ASC. T-5. c.1964).


Box 188, Folder 1  "Perturbation, Sighting and Trajectory Analysis for Periodic Comets: 1965-1975." (F. Narin and P. M. Pierce; IITRI/ASC. T-7. October 6, 1964.).

Box 188, Folder 2  "A Review of Lunar and Planetary Magnetic Field Measurements Using Space Probes." (Edward J. Smith; JPL. TR 32-1059; reprinted from Magnetism and the Cosmos, a collection of papers presented at the NATO Advanced Study Institute on Planetary and Stellar Magnetism, School of Physics, the University, Newcastle-upon-Tyne, England, 1965.)


Box 188, Folder 4  "Trajectory and Sighting Analysis for First-Apparition Comets." (P. M. Pierce; IITRI/ASC. T-13. June 1965.)


Box 188, Folder 6  "Low-Thrust Trajectory Capabilities for Exploration of the Solar System Using Nuclear Electric Propulsion." (A. L. Friedlander; IITRI/ASC. T-17. October 1966.)

Box 188, Folder 7  "Optical Material Problems of Interplanetary Space." (Randolph A. Becker; JPL. TR 32-1098; reprinted from Applied Optics, Vol.6 No.5. May 1967.)


**Planetary Programs**

Box 188, Folder 11  *Launch Vehicles Appendix.* (MMC/DD. PR 22-10-64-2. c.1968.)

- **Sterilizable Liquid Propulsion System**

Box 188, Folder 12  *Final Contract Briefing* [presentation graphics]. (MMC/DD. ED22-15-14. 7 March 1968.)

Box 188, Folder 14  "Orbital Imagery for Planetary Exploration - Condensed Summary." (IITRI/ASC. January 1970.)

**Planetary Orbital Imaging Sensor Support Requirements Study**

Box 188, Folder 15  *Final Oral Presentation [presentation graphics].* (IITRI/ASC. January 15, 1970.)


**IV.E.2.: General by Planet, 1957-1970**

Documents in this subseries relate to specific planets or groups of planets but not to any specific exploration project. The materials are organized by planet beginning with the moon and proceeding in order outward from the sun. Unless otherwise noted, documents within each subseries are arranged chronologically by study.


**IV.E.2.a.: Moon, 1957-1963**

Box 189, Folder 1  "Accuracy Requirements for Trajectories in the Earth-Moon System." (H. A. Lieske; RAND. P-1022; presented at the Astronautics Symposium, San Diego, CA). February 19, 1957.)

Box 189, Folder 2  "Lunar Flight." (R. W. Buchheim; RAND. P-1248, class notes, Space Technology, UCLA Extension. 7 January 1958.)

Box 189, Folder 3  "Lunar Flight Trajectories." (R. W. Buchheim; RAND. P-1268, one of a series of lectures in a "Space Technology" course offered by the Extension Division of the University of California. January 30, 1958.)

Box 189, Folder 4  "Lunar Trajectory Studies." (H. A. Lieske; RAND. P-1293, to be presented at ARDC Symposium on Guidance of Ballistic Missiles and Space Vehicles, March 11-13, 1958. 26 February 1958.)


Box 189, Folder 6  "Vehicle Design for Lunar Landings." (Robert L. Sohn; STL. STL/TR-060-0000-09169. 20 May 1960.)
Box 189, Folder 7  "Design of a Power System for a Lunar Mobile Surface Vehicle." (R. H. Brody; GE/DSD. 61SPC-3. 2 October 1961.)


Box 189, Folder 9  "Unmanned Mobile Vehicles for Lunar Surface Exploration." (M. E. Myton; GE/SSO. 61SPC-8. 13 November 1961.)

Box 189, Folder 10  "Summary of Lunar Roving Vehicle Studies." (L. M. Hughes and N. W. Jetta; GE/SSO. 61SPC-9. 20 November 1961.)


"Lunar Surface Materials Conference - Boston, Massachusetts - May 21, 22, 23, 1963."

Volume I: Preprints. (JPL. c.1963.)

Box 189, Folder 13-14 [folders 1-2 of 4]

Box 190, Folder 1-2 [folders 3-4 of 4]

Evaluation of Lunar Gravity Needs and Gravity Meter Capabilities

Box 190, Folder 3  Final Report. (TI/SSD. 5 July 1963.)

Box 190, Folder 4  "The Interaction of a Rocket Exhaust with the Lunar Surface." (Leonard Roberts; LRC. presented at a Specialists’ Meeting on "The Fluid Dynamic Aspect of Space Flight" under the sponsorship of the Fluid Dynamics Panel of the Advisory Group for Aeronautic Research and Development, Marseille, France. April 20-24, 1964.)

Study of the Feasibility of an Early Lunar Flare

Box 190, Folder 5  Final Report. (Douglas/MSSD. SM-47954. July 1964.)

Continuing Feasibility Study for Early Lunar Flare (ELF)


Box 190, Folder 6  Volume I: Summary

Box 190, Folder 7  Volume II: Technical Discussion


Box 191, Folder 1  "The Scientific Utility of Unmanned Lunar Surface Analysis Probes." (JPL. March 1967.)

**Scientific Instruments for Lunar Exploration**


**Lunar Survey Probe Utilization Study**

Box 191, Folder 3  *Summary Report.* (JPL. 760-12. October 13, 1967.)


Box 191, Folder 5-6  "A Study of Lunar Traverse Missions." (JPL Advanced Lunar Studies Team. 760-26. 16 September 1968.) [2 folders]

**Science Systems for Mobile Lunar Surface Exploration**

Box 191, Folder 7  *Preliminary Phase A Study Results.* (JPL. 760-36. June 2, 1969.)

**Science Ground Data System and Science Operations Organization for Remotely Controlled Lunar Traverses**


Box 191, Folder 9  "Jet Propulsion Laboratory Lunar Studies." (JPL. 760-43. October 15, 1969.)


**Radar Studies of the Moon**

Box 191, Folder 11  *Final Report.* (MIT/LL. 28 February 1970.)

Box 191, Folder 12  "Crater Deflection Studies." (Ritchie B. Coryell and Larry Durr; JPL. 760-44. March 20, 1970.)

Box 191, Folder 13  "Lunar Landmark Study." (Richard Strelitz; JPL. 760-45. March 20, 1970.)

IV.E.2.b.: Venus, 1962-1968

Box 191, Folder 15  "Radar Exploration of Venus." (Richard M. Goldstein; JPL. TR 32-280. May 25, 1962.)


Box 192, Folder 2  "The Water Content of Venus Inferred from Her Microwave Brightness." (D. Deirmendjian; RAND. P-2794. September 1963.)


IV.E.2.c.: Mars, 1962-1967

A Study of the Optical System for a Mars Probe


Box 192, Folder 5  "Optical Ellipticity and Internal Structure of Mars." (D. L. Lamar; RAND. RM-3127-JPL. June 1962.)

Box 192, Folder 6  "Limiting Model Atmospheres of Mars." (G. F. Schilling; RAND. R-402-JPL. August 1962.)

Box 192, Folder 7  "Some Geologic Problems of Mars." (Alden A. Loomis; JPL.)

- (TR 32-400. March 4, 1963.) [2 copies]


Box 192, Folder 9  "A Preliminary Analysis of the Geology of Mars." (George P. Zebal; Ford/Philco/AD. U-3065. 19 March 1965.)

Box 192, Folder 10  "Thermal Ecology, Surface Moisture, Permafrost, and Ground Water on Mars." (George P. Zebal; Ford/Philco/AD. U-3072. 2 April 1965.)
Box 192, Folder 11  "High-Dispersion Spectroscopic Observations of Mars." (JPL. TR 32-1048.)


Advanced Planetary Probe Study

Box 192, Folder  15-16  Jupiter Flyby Application. (JPL. EPD-358. 2 May 1966.) [2 folders]

Box 193, Folder 1-3  Jupiter Flyby Application. (JPL. EPD-358 Revision 1. 12 August 1966.) [blueprint copy] [3 folders]


IV.E.3.: Planetary Reconnaissance Projects, 1960-1971

This subseries consists of material relating to specific unmanned exploration projects, including projects that did not reach hardware or flight status. Documents are organized into subseries by project. Unless otherwise noted, documents within each subseries are arranged chronologically by study.

- IV.E.3.a. IMP (Interplanetary Monitoring Probe) (1963)
- IV.E.3.c. Lunar Survey Probe (1965)
- IV.E.3.g. Solar Probe (1963)
- IV.E.3.h. Starlet/Starlite (1967)
- IV.E.3.i. STL Orbiter (1963)
- IV.E.3.k. Venus Probe (1968)
- IV.E.3.m. Voyager (Mars) (1963-1967)

IV.E.3.a.: IMP (Interplanetary Monitoring Probe), 1963

The Interplanetary Monitoring Probe was a proposal by Goddard Space Flight Center to establish a network of satellites to provide continuous monitoring of space radiation in support of the Apollo program.

Project IMP Interplanetary Monitoring Probe

Box 193, Folder 9

Project Development Plan. (GSFC. June 4, 1963, rev. 2.)

IV.E.3.b.: Lunar Orbiter, 1965-1971

The Lunar Orbiter project began as an alternative to a planned Surveyor (see subseries IV.E.3.j. below) orbital vehicle when launch vehicle development failures and the failures of the early Ranger probes (see subseries IV.E.3.f. below) placed both of those programs in doubt. Lunar Orbiter was intended to provide photographic data on possible Surveyor and Apollo landing sites as well as other data of interest to lunar scientists and Apollo program planners. All five Orbiters were successful and returned high-quality data in sufficient quantities that the project goals were met after three missions.

Box 193, Folder 10

"Lunar Orbiter Project: Summary of Photographic Data System Calibration." (Langley. No date.) [photocopy]

Box 194, Folder 1

Study of Applicability of Lunar Orbiter Subsystems in Planetary Orbiters

Box 194, Folder 2  
*Interim Oral Presentation* [presentation graphics]. (Boeing/SD. D2-100710-1. November 29, 1966.)

Box 194, Folder 3  

Lunar Orbiter Project

Box 194, Folder 4-5  

Box 194, Folder 6  
*Mission B Description.* (Langley/LOPO. LOTD-107-0. June 1, 1966.)

Box 194, Folder 7  

Box 194, Folder 8  
*Mission IV Description.* (Langley/LOPO. LOTD-118-0. April 26, 1967.)

Box 194, Folder 9  

Box 194, Folder 10  

IV.E.3.c.: Lunar Survey Probe Sensor, 1965

The Lunar Survey Probe Sensor was intended to determine whether the lunar surface at a planned Apollo landing site was capable of supporting the Lunar Module and transmitting that information to a spacecraft in orbit.

Lunar Survey Probe Sensor Study

Box 195, Folder 1-2  


Lunar Viking was a plan to utilize the technology being developed for the Viking missions to Mars (see subseries IV.E.3.l. below) to conduct a similar orbiter/lander mission to the Moon.

Lunar Viking Feasibility Study

Box 195, Folder 3  
*First Oral Presentation* [presentation graphics]. (MMC/DD. November 1970.)
IV.E.3.e.: Mariner, 1962-1971

The Mariner program was planned to explore Mars and Venus, the nearest planets to earth, by conducting a planetary flyby or by placing a spacecraft in orbit. The Mariner team developed a series of launch projects based upon the target planet and launch timeframe, resulting in similar but different spacecraft for each mission. Six of the first nine missions were successful. Material on the Mariner series of space probes is organized by project, each of which resulted in one or more probe launches. Unless otherwise noted, documents within each subseries are arranged chronologically.

- IV.E.3.e.3. Mariner Venus 1967 (Mariner 5) (1968)

IV.E.3.e.1.: Mariner Venus 1962 (Mariner 1, Mariner 2), 1962-1967

Box 195, Folder 5

Box 195, Folder 6

Box 195, Folder 7

Box 195, Folder 8

Box 195, Folder 9

IV.E.3.e.2.: Mariner Mars 1964 (Mariner 3, Mariner 4), 1965-1967


Box 195, Folder 10
Volume II: Appendices

Box 195, Folder 11
"Mariner IV Measurements Near Mars: Initial Results." (Hugh R. Anderson, et al.; JPL. TR 32-833, reprinted from Science,
Box 195, Folder 12  

Box 196, Folder 1  

Box 196, Folder 2  

Box 196, Folder 3  
"Mariner IV Mechanical Operations." (Richard J. Spehalski; JPL. TR 32-954. December 1, 1966.)

Box 196, Folder 4  
"Failure Rate Computations Based on Mariner Mars 1964 Spacecraft Data." (Frank H. Wright; JPL. TR 32-1036. January 15, 1967.)

Box 196, Folder 5  

IV.E.3.e.3.: Mariner Venus 1967 (Mariner 5), 1968

Box 196, Folder 6  
"Design, Test, and Performance of the Mariner V Temperature Control Reference." (W. F. Carroll; JPL. TR 32-1250. April 1, 1968.)

IV.E.3.e.4.: Mariner Mars 1969 (Mariner 6, Mariner 7), 1969-1971

Box 196, Folder 7  

Box 196, Folder 8  

Box 196, Folder 9  

Box 196, Folder 10  
"Observational Patrol of Mars in Support of Mariners VI and VII." (C. F. Capen; JPL. TR 32-1492. June 15, 1970.)

IV.E.3.e.5.: Mariner Mars 1971 (Mariner 8, Mariner 9), 1966-1971

Box 196, Folder 12  "Mars '71 Technical Study." (JPL. EPD-427. 15 August 1966.)

Box 196, Folder 13  Addendum 1. (EPD-427 Add.1. 12 December 1966.)


Box 196, Folder 14  Volume II: Baseline Operations Plan. (M. J. Alazard; JPL. October 9, 1970.)


IV.E.3.f.: Ranger, 1960-1966

The Ranger program was intended to return data on the earth-moon environment by launching a spacecraft on a lunar intercept course, gathering data during the flight, and obtaining close-up television images of the lunar surface before spacecraft impact. Ranger Block I (Ranger 1 and 2) were planned as earth-orbital missions to test the spacecraft while Block II (Ranger 3, 4, and 5) were to be full lunar missions. Follow-on missions in Block III (Ranger 6 through 9), Block IV (Ranger 10+), and Block V (Ranger lander missions) were in planning stages when the failure of the missions in Blocks I and II caused NASA to cancel Blocks IV and V and drastically simplify Block III to include only TV imaging. Eventually Ranger 7, 8, and 9 succeeding in returning useful images. The material on the Ranger program is organized by block. Unless otherwise noted, documents within each subseries are arranged chronologically by study.

- IV.E.3.f.2. Block II (Ranger 3 through 5) (1961-1963)

IV.E.3.f.1.: General, 1960-1966

This subseries consists of documents pertain to the Ranger program or spacecraft in general, rather than to any specific mission.

Box 196, Folder 16  "Materials in Space." (Ralph A. Happe; JPL. Technical Release 34-143. October 18, 1960.)

Box 196, Folder 17  "The Ranger Program." (JPL. TR 32-141, reprinted from Astronautics, September 1961.)

Lunar Orbiter Capsule Study

Box 196, Folder 18  Final Report. (RCA/AED. AED-1542. 31 July 1962 rev. 3 August 1962.)
Box 197, Folder 1
"Development of the Midcourse Trajectory-Correction Propulsion System for the Ranger Spacecraft." (Donald H. Lee; JPL. TR 32-335. March 15, 1963.)

Box 197, Folder 2
"The Design of the Ranger Television System to Obtain High-Resolution Photographs of the Lunar Surface." (Donald H. Kindt and Joseph R. Staniszewski; JPL. TR 32-717. March 1, 1965.)

Box 197, Folder 3
"Eyes on the Moon." (Gerald M. Smith, Thomas Vrebalovich, and Donald E. Willingham; JPL. TR 32-937, reprinted from Astronautics and Aeronautics, March 1966. April 15, 1966.)

Experimental Mapping from Ranger Photography.

Box 197, Folder 4
Final Report. (USACE/AMS. August 1966.)

IV.E.3.f.2.: Block II (Ranger 3 through 5), 1961-1963

Box 197, Folder 5
"Scientific Experiments for Ranger 3, 4, and 5." (JPL. TR 32-199. December 5, 1961.)

Box 197, Folder 6
"The Lunar Seismograph Experiment: Ranger 3, 4, 5." (D. F. Adamski; JPL. TR 32-272. June 1, 1962.)

Box 197, Folder 7

IV.E.3.f.3.: Block III (Ranger 6 through 9), 1962-1966
Documents in this subseries are arranged by mission.

Box 197, Folder 8-11

Box 197, Folder 12
"Ranger 6-9 Television System Science Capability and Impact Point Determination." (D. E. Willingham and J. N. Fisher; JPL. c.1964.)

Box 198, Folder 1

Box 198, Folder 2

Box 198, Folder 3-4

IV.E.3.g.: Solar Probe, 1963
The Solar Probe program was planned to gather data on the sun and the effect of solar phenomena on the earth by placing spacecraft in solar orbit.

**Solar Probe Study**


Box 198, Folder 5  
Volume I: Study Summary

Box 198, Folder 6  
Volume III: Experiments

### IV.E.3.h.: Starlet/Starlite, 1967

Lockheed's Starlet/Starlite system was intended to open the entire solar system to unmanned exploration by the combination of a high-energy booster (Starlet) and an lightweight inflatable instrument section (Starlite).

**Starlet/Starlite System**

Box 198, Folder 7  
[presentation graphics]. (Lockheed/LMSC. LMSC-A847996. 15 April 1967.)

Box 198, Folder 8-9  

### IV.E.3.i.: STL Orbiter, circa 1963

The STL Orbiter was a proposal by the Space Technology Laboratories (STL) for a lunar orbiter spacecraft. (see also subseries IV.E.3.b. Lunar Orbiter, above).

**STL Orbiter Study**

Box 198, Folder 10  
[mid-study presentation graphics]. (STL. c.1963.)

### IV.E.3.j.: Surveyor, 1960-1965

The Surveyor program was planned to explore the lunar surface by soft-landing a spacecraft on the moon and conducting a variety of experiments. NASA planned several possible follow-on programs, including a Surveyor orbital vehicle and a surface rover, but delays in the program caused by booster development failures and the success of the Lunar Orbiter program eventually caused these plans to be shelved. Five of the seven Surveyor landers were highly successful. The material on the Surveyor program is organized by topic. Unless otherwise noted, documents within each subseries are arranged chronologically.

- IV.E.3.j.2. Surveyor Project Status Reports (1965)

**IV.E.3.j.1.: General, 1960-1965**

This subseries consists of documents relating to the planning and design for the Surveyor project in general or to specific missions as flown.
Box 199, Folder 1  "Design Study Requirements for a Lunar Soft Landing Spacecraft (Scientific Mission: Surveyor)." (JPL. TM 33-13 Vol. 3 Rev. 2. November 25, 1960.)

Box 199, Folder 2  "Surveyor Spacecraft System Design Specification." (JPL. Spec No 30240C. 3 December 1962.)


Box 199, Folder 4-5  "Portfolio on Surveyor Television Subsystem." (Hughes. April 1963.) [2 folders]

Box 199, Folder 6  "Surveyor Basic Bus (2100 Pound) - Payload Interface Requirements and Spacecraft System Description." (Hughes/SSD. SSD 239503. June 21, 1963.)

Box 199, Folder 7  "Surveyor Mission Required Velocity Program." (GD/ Astronautics. GD|A 63-0598. 1 July 1963.)

Box 199, Folder 8  "Lunar Surface Hardness Experiment for Surveyor" [presentation graphics]. (Ford/Philco/AD. c.1964.)

Box 199, Folder 9  "Surveyor Direct Ascent Trajectory Characteristics." (Hughes/SSD. SSD 4234 R. April 1964.) [photocopy]

Box 199, Folder 10  "Surveyor Spacecraft System Specification." (JPL. Spec No 30240D. 10 June 1964.)


Box 199, Folder 12-13  "Surveyor Spacecraft Performance Seminar" [presentation graphics]. (Hughes. SSD 4415 B. 8-9 September 1964.) [2 folders]

Box 200, Folder 1-3  "Space Flight Operations Test Plan - Surveyor Mission A." (JPL. EPD-234. 21 December 1964.) [3 folders]

Box 200, Folder 4-6  [folders 1-3 of 4]

Box 201, Folder 1  [folder 4 of 4]

Box 201, Folder 2  "Surveyor Landing Site Recommendations." (August 20, 1965.) [photocopy]
Box 201, Folder 3  "Surveyor Spacecraft Monthly Performance Assessment Report." (Hughes/SSD. SSD 50088 R. 21 October 1965.)

Box 201, Folder 4  "Surveyor Lunar Landing Conditions (February 1967 through February 1968)." (JPL. TM 312-752. November 15, 1966.)

Box 201, Folder 5  "Surveyor Landing Site Recommendations - Missions C, D, E, F, and G" [presentation graphics]. (15 December 1966.)

Box 201, Folder 6  "Surveyor III - Preliminary Science Results." (Surveyor Experimenter Teams and Working Groups; JPL. PD 125. May 15, 1967.)

Box 201, Folder 7  "Surveyor Landing Site Recommendations - Missions D and E" [presentation graphics]. (14 June 1967.)

Box 201, Folder 8  "Surveyor Landing Site Recommendations - Missions F and G" [presentation graphics]. (10 October 1967.)


Box 201, Folder 9  Part II: Science Results. (Surveyor Investigator Teams, Scientific Evaluation Advisory Team, and Working Groups.)


Box 201, Folder 10  Part III: Television Data. (Thomas H. Bird, M. I. Smokler, and D. L. Smyth.)


Box 202, Folder 1  "Testing of the Surveyor Spacecraft at the JPL Environmental Test Laboratory." (Frank W. Orlik; JPL. TR 32-1323. June 1, 1969.)


IV.E.3.j.2.: Surveyor Project Status Reports, 1965

"Surveyor Project Status Report."

Box 202, Folder 5  As of 22 January 1965. (JPL. SPSR 68. 27 January 1965.)

Box 202, Folder 6  As of 5 March 1965. (JPL. SPSR 71. 10 March 1965.)

Box 202, Folder 7  As of 19 March 1965. (JPL. SPSR 72. 25 March 1965.)

Box 202, Folder 8  As of 16 April 1965. (JPL. SPSR 73. 26 April 1965.)

Box 202, Folder 9  As of 14 May 1965. (JPL. SPSR 75. 20 May 1965.)

Box 202, Folder 10 As of 28 May 1965. (JPL. SPSR 76. 3 June 1965.)

Box 202, Folder 11 As of 11 June 1965. (JPL. SPSR 77. 23 June 1965.)

Box 202, Folder 12 As of 23 July 1965. (JPL. SPSR 80. 30 July 1965.)

Box 202, Folder 13 As of 6 Aug 1965. (JPL. SPSR 81. 16 August 1965.)

Box 202, Folder 14 As of 20 Aug 1965. (JPL. SPSR 82. 30 August 1965.)

Box 202, Folder 15 As of 17 Sep 1965. (JPL. SPSR 83. 27 September 1965.)

Box 202, Folder 16 As of 1 Oct 1965. (JPL. SPSR 84. 8 October 1965.)

Box 202, Folder 17 As of 15 Oct 1965. (JPL. SPSR 85. 20 October 1965.)


This subseries consists of documentation on the planned successor to Surveyor, variously termed "Advanced Surveyor," "Surveyor Block II," or "Surveyor Follow-On." Materials are arranged chronologically by study; parallel competing studies are shown with the contractor's name appended to the study name for clarity.

Box 202, Folder 18 "Requirements for a Roving Vehicle for the Surveyor Spacecraft." (JPL. EPD-98. 17 June 1963.)

Surveyor Lunar Roving Vehicle, Phase I [Bendix contract]

Proposal. (Bendix. c.1963.)

Box 202, Folder 19 Proposal Summary


Part I: Technical Presentation
Box 203, Folder 1-3

Book II: Supporting Data. (Bendix. BSC-39529. August 1963.) [3 folders]

Box 203, Folder 4

First Bimonthly Technical Progress Report. (Bendix/BSD. BSR-844. 15 January 1964.)

Box 203, Folder 5-6


Box 204, Folder 1

Functional Specifications. (Bendix/BSD. BSR-923. 23 April 1964.)

Surveyor Lunar Roving Vehicle, Phase I [General Motors contract]


Part 1: Technical Presentation

Box 204, Folder 2

Section I: Technical Approach Summary.

Box 204, Folder 3

Section II: GM DRL Basic LRV Program Status.

Box 204, Folder 4

Section III: Detailed Technical Specification (Book 1 of 2).

Box 204, Folder 5-6

Section III: Detailed Technical Specification (Book 2 of 2). [2 folders]

Box 204, Folder 7

Appendix.

Box 204, Folder 8

Engineering Test Model Demonstration. (GM/DRL. TR64-15 Rev. 23 March 1964.)

Functional Specifications. (GM/DRL. TR64-25. April 1964.)

Box 204, Folder 9

Part 1: SLRV System; Mechanisms, Subsystems & Assemblies; Operational Ground Equipment.

Box 205, Folder 1-2

Part 2: Electronic Subsystems. [2 folders]


Box 205, Folder 3

Volume I: Summary Technical Description.

Volume II: Appendixes
IV.E.3.k.: Venus Probe, 1968
The Venus Probe was a plan to gather data on the atmosphere and surface of Venus by dropping a probe capsule from a Mariner-type spacecraft through the planet's atmosphere.
Venus Probe Study

Final Report.

Box 207, Folder 4-6  Appendices. (MMC/DD. PR-33-1-3. 6 June 1968.) [3 folders]


The Viking Program was a large-scale reconnaissance program involving combined orbital and surface-lander missions to Mars. Two missions eventually reached Mars in 1976. Some planning also occurred regarding the use of Viking technology for a lunar exploration mission; see subseries IV.E.3.d. (Lunar Viking), above.

Direct Versus Orbital Entry for Mars Mission. [Titan-Mars ’71]

Final Report. (GE/MSD. 68SD4293. 1 August 1968.)

Box 207, Folder 7  Volume I: Summary

Volume II: Analytical Studies

Box 208, Folder 1  Book 1.

Box 208, Folder 2  Book 2.

Box 208, Folder 3-5  Volume III: Conceptual Designs. [3 folders]

Box 208, Folder 6  Final Oral Presentation [presentation graphics]. (GE/MSD. August 1, 1968.)

Viking Project


Box 208, Folder 8  Viking Mission Definition No.2. (Langley/VPO. M73-101-5. August 11, 1969.)

Box 209, Folder 1  Viking Description Presentation at Viking Preproposal Briefing [presentation graphics]. (Langley/VPO. M73-115-0. September 12, 1969.)

Viking 75 Project

Box 209, Folder 2  Mars Engineering Model. (Langley/VPO. M75-125-0. March 13, 1970.)

IV.E.3.m.: Voyager (Mars), 1963-1967

This subseries consists of material pertaining to a Mars exploration program planned in the early 1960s under the title Voyager. This program was cancelled and the name reused for the unrelated Outer Planets exploration program of the 1970s.
Voyager Design Study

[Final Report.] (GE/MSD. 63SD801. 15 October 1963.)

Volume III: Subsystem Design

Part I. [2 folders]

Voyager Project


Voyager 1971 Mission Guidelines. (JPL. PD 46 (V-MA-004-002-14-03.). May 1, 1965.)

Study of Unmanned Systems to Evaluate the Martian Environment


Planetary Vehicle Thermal Insulation Systems

Phase I Summary Report. (GE/MSD. 67SD4289. 3 March 1967.)

"Data Book for TRW Voyager/Spacecraft Engine." (TRW/SG. 09133-6006-R000. 26 December 1967.) [photocopy]
Series V: Tracking and Data Acquisition, 1957-1968

This series consists of documents pertaining to deep space communications, spacecraft trajectory determination and tracking, and telemetry/data acquisition. Materials are organized into two subseries:

- V.A. General (1957-1970)
- V.B. JPL Program Summaries (1962-1968)

V.A.: General, 1957-1967

Documents are arranged chronologically.

Box 210, Folder 3
"Tracking and Communication for a Moon Rocket." (R. T. Gabler and H. R. O'Mara; RAND. P-1021. 22 April 1957.)

Box 210, Folder 4
"Tracking Programs and Orbit Determination [Seminar Proceedings]." (JPL. February 23-26, 1960.)

Box 210, Folder 5

Box 210, Folder 6

Box 210, Folder 7
"A Lunar Base to Earth Communications System." (GE/DSD. 62SPC-6. 1 May 1962.)

Box 210, Folder 8

Box 210, Folder 9
"Space Communications by Means of a Reflected Laser Beam." (T. Gold and M. M. Nieto; Cornell/CRSR. CRSR 158. December 1963.)

Box 210, Folder 10

Box 211, Folder 1
"Manned Space Flight Network Instruction Manuals - Index." (GSFC/MFOB. September 20, 1964.)


Box 211, Folder 2
Volume II: Systems Design

**Deep Space Communication and Navigation Study**

*Final Report.* (Bell Labs. May 1, 1968.)

Box 211, Folder 3
Volume 1: Summary. [photocopy]

Box 211, Folder 4
Volume 2: Communication Technology. [photocopy]
Box 211, Folder 5  "Development of an Optical Tracker for a Laser Ranging Telescope." (Edward Devine; GFSC. X-723-69-119. March 1969.)


The Jet Propulsion Laboratory's 37- series Space Program Summary publications summarized JPL's activities in support of NASA operations. Issues 37-1 through 37-14 were organized in two volumes: Volume I contained unclassified material while Volume II contain material classified "Confidential." Issues 37-15 through 37-46 were organized into six volumes: Volumes I, II, and V contained material classified "Confidential," Volume III covered the Deep Space Instrumentation Facility (DSIF; later renamed Deep Space Network, DSN), Volume IV contained unclassified material on Supporting Research and Advanced Development, and Volume VI covered Space Exploration Programs and Space Sciences. Issue 37-47 and later were organized into four volumes: Volume I covered Flight Projects, Volume II the Deep Space Network, Volume III covered Support Research and Advanced Development, and Volume IV contained any classified material. This subseries contains volumes specifically covering the DSIF/DSN - Volume III for issue 37-15 through 37-46 and Volume II for issue 37-47 and subsequent. For summary volumes covering spaceflight projects, see subseries IV.B. (Space Science and Applications - JPL Program Summaries). For summary volumes covering other JPL development activities, see subseries VI.B.

"Space Programs Summary." (JPL)

Volume III [Deep Space Instrumentation Facility]

Box 211, Folder 7  for the period May 1, 1962 to July 1, 1962. (SPS 37-16. July 31, 1962.)

Box 211, Folder 8  for the period July 1, 1962 to September 1, 1962. (SPS 37-17. October 1, 1962.)


Volume III [The Deep Space Network]

Box 211, Folder 12  for the period November 1, 1964 to December 1, 1964. (SPS 37-31. January 31, 1965.)

Box 212, Folder 1  for the period July 1, 1965 to August 31, 1965. (SPS 37-35. September 30, 1965.)
Box 212, Folder 2 for the period May 1, 1966 to June 30, 1966. (SPS 37-40. July 31, 1966.)

Box 212, Folder 3 for the period September 1 to October 31, 1966. (SPS 37-42. November 30, 1966.)

Box 212, Folder 4 for the period November 1 to December 31, 1966. (SPS 37-43. January 31, 1967.)

Box 212, Folder 5 for the period March 1 to April 30, 1967. (SPS 37-45. May 31, 1967.)

Box 212, Folder 6 for the period May 1 to June 30, 1967. (SPS 37-46. July 31, 1967.)

Volume II [The Deep Space Network]

Box 212, Folder 7 for the period July 1 to August 31, 1967. (SPS 37-47. September 30, 1967.)

Box 212, Folder 8 for the period September 1 to October 31, 1967. (SPS 37-48. November 30, 1967.)

Box 212, Folder 9 for the period November 1 to December 31, 1967. (SPS 37-49. January 31, 1968.)

Box 212, Folder 10 for the period January 1 to February 29, 1968. (SPS 37-50. March 31, 1968.)

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Series VI: Advanced Research and Technology, 1958-1970

This series consists of documents pertaining to NASA's basic and applied research program into the problems associated with aviation and space flight, but not directly related to specific programs. Materials are organized into two subseries:

- VI.A. General (1958-1970)
- VI.B. JPL Program Summaries (1962-1966)


Documents are arranged chronologically.

Box 213, Folder 1


Box 213, Folder 2

"Effects of a Meteroid Impact on Steel and Aluminum in Space." (R. L. Bjork; RAND. P-1662. December 16, 1958.)

Box 213, Folder 3


[incorrect title page identifies this document as "The Moon" by Gordon J. F. MacDonald, University of California, Institute of Physics.]

Project FIRE [Flight Investigation Reentry Environment].

Box 213, Folder 4

Project Development Plan. (Project No.714-00-00). (Langley/FRPO. March 1964.)

Box 213, Folder 5


Box 213, Folder 6


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Box 213, Folder 8

"NASA Nonmetallic Materials Development Program." (MSC. c.1969.)

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Box 213, Folder 10


The Jet Propulsion Laboratory's 37-series Space Program Summary publications summarized JPL’s activities in support of NASA operations. Issues 37-1 through 37-14 were organized in two volumes: Volume I contained unclassified material while Volume II contained material classified "Confidential." Issues 37-15 through 37-46 were organized into six volumes: Volumes I, II, and V contained material classified "Confidential," Volume III covered the Deep Space Instrumentation Facility (DSIF; later renamed Deep Space Network, DSN), Volume IV contained unclassified material on Supporting Research and Advanced Development, and Volume VI covered Space Exploration Programs and Space Sciences. Issue 37-47 and later were organized into four volumes: Volume I covered Flight Projects, Volume II the Deep Space Network, Volume III covered Supporting Research and Advanced Development, and Volume IV contained any classified material. This subseries contains volumes specifically covering JPL’s basic and applied research program - Volume IV for issue 37-15 through 37-46. For summary volumes covering spaceflight project, see subseries IV.B. (Space Science and Applications - JPL Program Summaries). For summary volumes covering the DSIF/DSN, see subseries V.B. (Tracking and Data Acquisition - JPL Program Summaries). For other issues, see also the Jet Propulsion Laboratory Publications Collection (NASM Accession XXXX-0612), Series X. Documents in this subseries are arranged chronologically.

"Space Programs Summary." (JPL)

Volume IV [Supporting Research and Advanced Development]

Box 214, Folder 1 for the period August 1, 1962 to October 1, 1962. (SPS 37-17. October 30, 1962.)

Box 214, Folder 2 for the period October 1, 1962 to December 1, 1962. (SPS 37-18. December 31, 1962.)


Box 214, Folder 5 for the period June 1, 1963 to July 31, 1963. (SPS 37-22. August 31, 1963.)

Box 214, Folder 6 for the period August 1, 1963 to September 30, 1963. (SPS 37-23. October 31, 1963.)


Box 215, Folder 4 for the period August 1, 1964 to September 30, 1964. (SPS 37-29. October 31, 1964.)

Box 216, Folder 1  for the period December 1, 1964 to January 31, 1965. (SPS 37-31. February 28, 1965.)

Box 216, Folder 2  for the period February 1, 1965 to March 31, 1965. (SPS 37-32. April 30, 1965.)


Box 216, Folder 4  for the period August 1, 1965 to September 30, 1965. (SPS 37-35. October 31, 1965.)

Box 216, Folder 5  for the period October 1, 1965 to November 30, 1965. (SPS 37-36. December 31, 1965.)

Box 217, Folder 1  for the period December 1, 1965 to January 31, 1966. (SPS 37-37. February 28, 1966.)

Box 217, Folder 2  for the period February 1, 1966 to March 31, 1966. (SPS 37-38. April 30, 1966.)

Box 217, Folder 3  for the period June 1, 1966 to July 31, 1966. (SPS 37-40. August 31, 1966.)

Box 217, Folder 4  for the period August 1 to September 30, 1966. (SPS 37-41. October 31, 1966.)

Box 217, Folder 5  for the period October 1 to November 30, 1966. (SPS 37-42. December 31, 1966.)

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Series VII: Military Programs and Studies, 1957-1971

This series consists of documents pertaining to programs, projects, and studies conducted by or for elements of the United States National Defense Establishment. Materials are organized into subseries by branch or agency:

- VII.A. United States Air Force (1957-1971)
- VII.B. Advanced Research Projects Agency (1963-1966)
- VII.C. United States Navy (1963-1966)


This subseries consists of documentation for programs developed by or research conducted by or for the United States Air Force. Materials are organized into subseries by topic. Unless otherwise noted, documents within each subseries are arranged chronologically.

- VII.A.2. Launch Vehicles (1962-1968)
- VII.A.5. Research (1957-1965)

VII.A.1.: General, 1962-1963

This subseries consists of general documentation on USAF procedures and policies related to spaceflight or launch operations.

*General Range Safety Plan.* (AFMTC. AFMTCP 80-2.)

Box 217, Folder 6 Volume I: Pre-launch Safety Procedures. (1 October 1963.)

Box 217, Folder 7 Volume II: Operations Requirements. (4 September 1962.)

Box 217, Folder 8 *Range Safety Officers Handbook.* (AFMTC. No date.)

Box 227 (OS), Folder 1 *Organization and Functions.* (AFMTC. AFMTCP 20-1. January 1963.)

*Test Facilities Handbook.* (AFAEDC. July 1963.)

Box 218, Folder 1 Volume 1: Policies and Procedures

VII.A.2.: Launch Vehicles, 1962-1968

This subseries consists of documentation on launch vehicles used by the USAF or studies pertaining to launch vehicles conducted for the USAF.


Box 218, Folder 3 "WS 107A-2 Titan I Exhibit and Specification Status Report." (STL. 6450.28-256. 31 July 1963.)
Near-Term Launch Vehicle Concepts Study

Proposal. (Douglas/MSSD. January 1966.)

Box 218, Folder 4  Volume I: Engineering Proposal. (SM-51938-P)

Box 218, Folder 5  "Titan III Vehicle Family at ETR" [presentation graphics]. (MMC/DD. MCR-68-12. c.1968.)


Minimum Cost Design (MCD) Booster Study

Box 218, Folder 7  [presentation graphics]. (NAR/SD. SP 68-24. October 1968.).

VII.A.3.: Manned Programs, 1961-1970

This subseries consists of documentation on the USAF’s plans for and the considerations involved in manned spaceflight. Materials are organized into two subseries by topic. Unless otherwise noted, documents within each subseries are arranged chronologically.

• VII.A.3.b. School of Aerospace Medicine Reports (1962-1968)

VII.A.3.a.: Human Factors, 1961-1970

Box 218, Folder 8  "Proposal for a Manned Lunar Vehicle Concept Study. (GE/DSD. G40-703. 24 November 1961.)


Box 219, Folder 3  Part II: Solid Propellant Boosters. (ASD-TDR-62-276, Part II.)

Box 219, Folder 4  "The Handling and Storage of Liquid Propellants." (USAF/Medical Service. AFM 160-39. 1 April 1964.)

Box 219, Folder 5  "Ferry Vehicle Docking System for MOL/Gemini B Vehicles." (All American Engineering Co. Q-354. 7 April 1964.)

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**VII.A.3.b.: School of Aerospace Medicine Reports, 1962-1968**

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"Physiologic Response to Increased Oxygen Partial Pressure." (James E. Herlocher, David G. Quigley, Victor S. Behar, E. G. Shaw, and B. E. Welch; AFSC/SAM. c.1964.)

- I. Clinical Observations
- II. Respiratory Studies
- III. Hematopoiesis

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"Biochemical Laboratory Apparatus for Use in Space Cabins." (Dale A. Clark, Ph.D; AFSC/SAM. SAM-TDR-64-65. December 1964.)

"The Radiations of Space."

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"Normal Human Serum Parameters for Simulated Altitude and Aerospace Flights."

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III. Estimation of Change in Serum Potassium, Sodium, and Chloride. (William G. Glenn, Ph.D. and Ira L. Shannon; AFSC/SAM. SAM TR 65-218. October 1966.)

Box 220, Folder 12  

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"Protons and Space Travel - An Introduction." (Glenn V. Dalrymple and Ian R. Lindsay; AFSC/SAM. SAM TR 65-254. June 1966.)

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"Verbal Communication Intelligibility in Oxygen-Helium, and Other Breathing Mixtures, at Low Atmospheric Pressures." (Julian P. Cooke, Ph.D. and Sarah E. Beard; AFSC/SAM. SAM TR 65-269. December 1965.)

Box 220, Folder 16  
"Low Doses of Acetazolamide to Aid Accommodation of Men to Altitude." (Stephen M. Cain and James E. Dunn II; AFSC/SAM. SAM TR 65-323. July 1966.)

Box 220, Folder 17  

Box 220, Folder 18  

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"Some Cardiovascular Responses in Anesthetized Dogs During Repeated Decompressions to a Near-Vacuum." (Julian P. Cooke, Ph.D. and Richard W. Bancroft, Ph.D.; AFSC/SAM. SAM TR 66-88. October 1966.)

"The Study of Man During a 56-Day Exposure to an Oxygen-Helium Atmosphere at 258mm Hg Total Pressure."

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"Observations on Man in an Oxygen-Helium Environment at 380mm Hg Total Pressure."


Box 220, Folder 38  "Tissue Oxygenation During Hemorrhage in Dogs Breathing 1 and 3 Atmospheres of Oxygen." (Stephen M. Cain, Ph.D. and John M. Connolly, MD; AFSC/SAM. SAM TR 66-258. February 1967.)


Box 220, Folder 40  "The Effect of Space Cabin Environment on Viral Infection." (David J. Giron, Frank F. Pindak, and Jerome P. Schmidt; AFSC/SAM. SAM TR 66-323. August 1967.)


VII.A.4.: Satellite Programs, 1959-1960

A Recoverable Interplanetary Space Probe.


Box 220, Folder 44  Volume I: General Discussion

Box 220, Folder 45  Volume II: Engineering Analyses

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Box 221, Folder 2  Volume IV: Appendices

Study of a Drag Brake Satellite Recovery System

Box 221, Folder 3-4  Results of Phase I. (Avco/ERL. WADD TR 60-775. July 1960.) [2 folders]

VII.A.5.: Research, 1957-1965

This subseries consists of documents on various research programs funded by the USAF, but not related to launch vehicles, manned flight considerations, or satellite operations. Materials are organized into two subseries by topic. Unless otherwise noted, documents within each subseries are arranged chronologically.
VII.A.5.a. General, 1960-1965

This subseries consists documents pertaining to research conducted under USAF contract, including materials originated by the RAND Corp which are not explicitly identified part of Project RAND.

**Weapons Systems Planning and Control Study**

**Box 221, Folder 5**
*The Broad Time-Cost-Probability-Value Characteristics of Aerospace Development Programs.* (John B Lathrop; Lockheed. LAC-1. 12 July 1960.)

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*Geophysics and Space Data Bulletin, Volume II, Number 1.* (Anne L. Carrigan and Norman J. Oliver, ed.; AFCRL. First Quarter 1965.)

VII.A.5.b. Project RAND, 1957-1962

This subseries consists of documentation for research conducted under USAF contract as part of Project RAND (Research and Development). For reports originated by the RAND Corp, but which are not explicitly part of Project RAND, see subseries VII.A.5.a. (General). Documents are arranged by report number.

**Box 222, Folder 3**
"Outline of a Study of Manned Space Flight (U)." (R. W. Buchheim; RAND. RM-2005. September 27, 1957.)

**Box 222, Folder 4**
"A Photographic System for Close-Up Lunar Exploration." (M. E. Davies; RAND. RM-2183. 23 May 1958.)
Box 222, Folder 5  "Summary of Orbital and Physical Data for the Planet Mars." (Donna Scott Kirby; RAND. RM-2567. August 1, 1960.)

Box 222, Folder 6  "Design Criteria for Rotating Space Vehicles." (S. H. Dole; RAND. RM-2668. October 18, 1960.)

Box 222, Folder 7  "Solar-Flare Radiation and Manned Space Flight." (D. J. Dugas; RAND. RM-2825-PR. November 1961.)

Box 222, Folder 8  "Space Geomagnetism, Radiation Belts, and Auroral Zones." (E. H. Vestine; RAND. RM-3144-PR. July 1962.)


VII.A.6.: Communications, 1968-1971

**Space Communications Program**

Box 222, Folder 10  *Bibliography of Space Communications Reports.* (MIT/LL. SC-8. 1 April 1968.)

*Division 6 Quarterly Technical Summary.* (MIT/LL for AFSC/ESD.)

Box 222, Folder 11  (ESD-TR-69-48. 15 March 1969.)

Box 222, Folder 12  (ESD-TR-69-137. 15 June 1969.)

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VII.B.: Advanced Research Projects Agency (ARPA), 1963-1966

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Box 227 (OS), Folder 2  "Data for ICBM Re-entry Trajectories." (Dean N. Morris and P. Benson; RAND. RM-3475-ARPA. April 1963.)

Box 222, Folder 16  "Earth Coverages from Satellites at 20,000 and 50,000 N Mi." (G. E. Modesitt; RAND. RM-5095-ARPA. December 1966.)


Materials are organized chronologically.

Spacecraft Oceanography Project

Annual Report

Box 223, Folder 2-3  1 October 1965 - 1 September 1966. (USN/0O. No date.) [2 folders]

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