



Guide to the
Mars Exploration Collection, 1989-1992
ARC14.12

NASA Ames Research Center Archives

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Descriptive Summary

Title:

Mars Exploration Collection, 1989-1992

Collection Number:

ARC14.12

Creator:

Hubbard, Scott, 1948-

Dates:

Inclusive: 1975-1992

Bulk: 1989-1992

Extent:

Volume: 8 cubic feet (8 linear feet). 8 record cartons

Repository:

NASA Ames Research Center Archives

Moffett Field, California 94035

Abstract:

This collection of former Ames Research Center Director Scott Hubbard's files contains studies for designing multiple low-cost missions to the planet Mars to satisfy science objectives and the Space Exploration Initiative policy priorities under President George H. W. Bush. The bulk of the studies relate to forming a network of environmental monitoring stations on the planet and gathering data and engineering knowledge in preparation for human missions to Mars.

Administrative Information

Access: Restricted Possibly; This collection may contain information that has Controlled Unclassified Information (CUI), privacy, company proprietary, export control, or International Traffic in Arms Regulations (ITAR) restrictions.

Distribution Limits: Partly Public; NASA employees contact archivist regarding restricted materials.

Publication Rights: This collection may contain copyrighted material. The researcher assumes full responsibility for conforming with the laws of copyright. Securing permission to publish or use materials is the sole responsibility of the researcher.

Languages and Scripts:

All records are in English.

Acquisition Information:

Transferred by Mark Messersmith on August 20, 2014 (Accession 2014-012).

Custodial History

These materials were created by Scott Hubbard, then stored in the Space Projects Facility at Ames before being transferred to the ARC Archives.

Related Material

Related collections at the Ames Research Center Archives

ARC10.16: David W. Lozier Papers

ARC05.20: Mars Penetrator Collection, 1969-1990

AFS1380: Public Affairs Office Collection, 1940-2021

PP05.22-JM: John D. Mihalov Papers, 1960-1997

Scope and Content

This collection comprises Scott Hubbard's files pertaining to Mars exploration mission design work led by Ames Research Center from 1989 to 1992, when Hubbard was the center's study manager (later, he would become NASA's first Mars program director). The studies revolved around deploying a network of landers over a period of years to fulfill President George H. W. Bush's Space Exploration Initiative policy objectives and provide a solid science return. The aim was to develop approaches that were flexible and responsive to various objectives, and that minimized cost and complexity wherever possible. General mission goals included gaining an overall perspective on Mars as a planet, forming a basis for selection of landing sites for later missions, investigating habitability, conducting engineering tests, and collecting science data. Some areas of investigation for this last goal included imaging the planet, studying dust storms, weather, aeronomy, surface chemistry, water, seismology, and polar science, as well as entry science and boundary layer effects.

Much of the files pertain to phasing in a global network of landers on the planet in a series of Mars Environmental SURvey Program (MESUR) missions. These studies explored potential launch vehicles, payloads of landers, penetrators, and rovers, and associated science instrument packages. Some configurations included a payload of four simple, lightweight landers designed with bilateral symmetry (so they could land on either side and still operate) that would be equipped with airbags to provide cushioning on impact. Ultimately, only one MESUR mission was flown. It was renamed as Mars Pathfinder, employed a rover, and successfully executed the airbag concept.

Surface Lander Investigation of Mars (SLIM) files relate to this MESUR precursor mission to validate science and design issues before finalizing the definition of multiple MESUR landers. The files also include information about an Aeroassist Flight Experiment (AFE) conceived by Ames as an atmospheric entry space technology demonstration. AFE would have collected data that could be used for other missions to Mars or other locations, but the effort was canceled due to lack of funding.

Types of documentation in this collection include study and science working group files, mission design and concept reviews, strategy documents, planning documents, presentations, technical and progress reports, data, notes, meeting minutes, correspondence, memoranda, budgets, guidelines, and schedules.

System of Arrangement

This collection was left in the creator's original order.

Processing Information

This collection was rehoused from hanging file folders with periodic divider tags indicating subject areas into archival file folders that include placeholders for subject tags. To assemble the container list in the traditional structure and preserve the overarching subject categories where applicable, certain files are categorized as items, even though they are housed in a separate physical folder.

Indexing Terms

The following terms may be used to index this collection.

Corporate Name

Ames Research Center

Personal Name

Hubbard, Scott, 1948-

Subjects

Atmospheric Entry
Aeroassist Flight Experiment (AFE)
Descent Trajectories
Evolutionary Mars Global Network
Exobiology
Launch Vehicles
Mars Exploration
Mars Global Network Mission (MGNM)
Mars Pathfinder
Mars (Planet)
Mars Environment
Mars Landing
Marsnet
Penetrators (Spacecraft)
Planetary Protection
Radiative Heating and Afterbody Radiometry Experiment (RHARE)
Spacecraft Sterilization
Surface Lander Investigation of Mars (SLIM)
Thermal Control Coatings
Thermal Protection Systems

Acronyms

AA	Associate Administrator
AFE	Aeroassist Flight Experiment
ARC	Ames Research Center
CDR	Critical Design Review
COMPLEX	Committee on Planetary and Lunar Exploration
EMGN	Evolutionary Mars Global Network
ESA	European Space Agency
FY	Fiscal Year
GCTI	Global Change Technology Initiative
HFIR	High Frequency Infrared Radiometer
HQ	Headquarters, NASA
JPL	Jet Propulsion Laboratory
JSC	Johnson Space Center
LeRC	Lewis Research Center
MASE	Mission Analysis and System Engineering
MESUR	Mars Environmental Survey
MFPE	Mission from Planet Earth
MGNM	Mars Global Network Mission
MMAG	Martin Marietta Astronautics Group
MPD	Magnetoplasmodynamic
NASA	National Aeronautics and Space Administration
OAET	Office of Aeronautics Exploration and Technology
OSSA	Office of Space Science and Application
POP	Program Operating Plan
RHARE	Radiative Heating and Afterbody Radiometry Experiment
RTG	Radioisotope Thermoelectric Generators
RTOP	Research and Technology Objectives and Plans
SAIC	Science Applications International Corporation
SEI	Space Exploration Initiative
SDT	Science Definition Team
SSES	Solar System Exploration Subcommittee
SFI	Space Instrumentation and Studies Branch, Ames Research Center
SSAAC	Space Science and Applications Core?
SSG	Science Steering Group
SWG	Science Working Group
SLIM	Surface Lander Investigation of Mars
TPS	Thermal Protection System
USGS	United States Geological Survey

Container List

Box	Folder	Title	Date	ID	Note
1	1	Mars Global Network Mission, an Evolutionary Approach, March 8, 1990	19900308	nasaarc_1412_0000001	File Digitized. 15 pages. Digital origin: Digitized other analog.
1	2	Mars Global Network Mission, Report to Code EL, April 6, 1990	19900406	nasaarc_1412_0000002	File Digitized. 44 pages. Digital origin: Reformatted original.
1	3	Mars Global Network Mission, NASA/ESA Coordination Meeting, May 3, 1990	19900503	nasaarc_1412_0000003	
1	4	Mars Global Network Mission, Presentation Lunar and Mars Exploration Office, May 18, 1990	19900518	nasaarc_1412_0000004	
1	5	MESUR Presentation to the Committee on Planetary and Lunar Exploration, July 10, 1990	19900710	nasaarc_1412_0000005	
1	6	MESUR Presentation to Dr. S. Hawley, July 19, 1990	19900719	nasaarc_1412_0000006	
1	7	MESUR Presentation to the Mars Science Working Group, August 23, 1990	19900823	nasaarc_1412_0000007	File Digitized. 48 pages. Digital origin: Reformatted original.
1	8	MESUR Presentation to Dale Compton, November 21, 1990	19901121	nasaarc_1412_0000008	
1	9	MESUR Presentation to ESA/NASA Coordination Meeting, December 5, 1990	19901205	nasaarc_1412_0000009	
1	10	MESUR Presentation to NASA HQ Code SL, December 13, 1990	19901213	nasaarc_1412_0000010	
1	11	MESUR Status Report to the MESUR Science Definition Team, February 22, 1991	19910222	nasaarc_1412_0000011	
1	12	MESUR Summary of the Design Concept Review Meeting, to NASA/ESA Video Con., May 8, 1991	19910508	nasaarc_1412_0000012	
1	13	MESUR Presentation to the Solar System Exploration Subcommittee, May 20, 1991	19910520	nasaarc_1412_0000013	
1	14	Presentation to Charles T. Force, May 21, 1991	19910521	nasaarc_1412_0000014	
1	15	Planetary Protection Study for MESUR, September 17, 1991	19910917	nasaarc_1412_0000015	
1	16	MESUR Advanced Studies Quarterly Review, August 29, 1991	19910829	nasaarc_1412_0000016	

1	17	Mars Exploration: Past, Present, Future, Williamsburg, Virginia, July 19, 1991	19910719	nasaarc_1412_0000017	This is the start of a file grouping labeled as "Fiscal Year 1992 RTOP."
1	18	MESUR Monthly Reports	circa 1991	nasaarc_1412_0000018	
1	19	Selection of Robotic Precursor Missions for Mars Exploration, Stanford, February 10, 1992	19920210	nasaarc_1412_0000019	
1	20	SLIM Original Presentation, October 1991	199110	nasaarc_1412_0000020	
1	21	JPL Materials	circa 1991	nasaarc_1412_0000021	
1	22	JPL 90-day Study Draft, September 1989; JPL GNM 90-day Study, December 1989	198912	nasaarc_1412_0000022	
1	23	Summary of Advisory Committee on the Future of US Space Program, December 1990	199012	nasaarc_1412_0000023	
1	24	NASA Technical Memorandum, Environment of Mars, August 1988	198808	nasaarc_1412_0000024	
1	25	Ames MGNM Material, February 1990	199002	nasaarc_1412_0000025	
1	26	Fiscal Year 1992 RTOP	1992	nasaarc_1412_0000026	
1	27	OSSA FY1992 RTOPS	1992	nasaarc_1412_0000027	This is the start of a file grouping labeled as "Fiscal Year 1992 Code SL Proposal."
1	28	FY 1992 RTOPs for SFI	1992	nasaarc_1412_0000028	
1	29	MESUR FY 1992 RTOP	1992	nasaarc_1412_0000029	
1	30	RTOP Call FY 1992	1992	nasaarc_1412_0000030	
1	31	FY 1992 OSSA RTOP Instructions	1992	nasaarc_1412_0000031	
1	32	Fiscal Year 1992 Code SL Proposal	1992	nasaarc_1412_0000032	
1	33	Code SL (HQ) Fiscal Year 1992 Proposals	1992	nasaarc_1412_0000033	
1	34	MESUR FY 1992 Study Issues, Fiscal Year 1992 Code SL (Headquarters) Proposal	1992	nasaarc_1412_0000034	
1	35	HQ Advanced Progress Review, August 29, 1991	19910829	nasaarc_1412_0000035	
1	36	Code SL Advanced Progress Review, Quarterly Review	circa 1991	nasaarc_1412_0000036	

1	37	Code SL Quarterly Review	circa 1991	nasaarc_1412_0000037	This is the start of a file grouping labeled as "MESUR FY 1991 Study Agreements."
1	38	Code SL Advanced Progress Review, August 29, 1991	19910829	nasaarc_1412_0000038	
1	39	MESUR FY 1991 Study Agreements	1991	nasaarc_1412_0000039	
1	40	Tauber: Code RT Phase A Study Work	circa 1991	nasaarc_1412_0000040	
1	41	DeVincenzi Planetary Project	circa 1991	nasaarc_1412_0000041	
1	42	MESUR Drop Tests, Lemke	circa 1991	nasaarc_1412_0000042	
1	43	LeRC Wind Tunnel Tests for MESUR	circa 1991	nasaarc_1412_0000043	
1	44	ESA/MESUR	circa 1991	nasaarc_1412_0000044	
1	45	Marsnet SOW (MESUR/ESA)	circa 1991	nasaarc_1412_0000045	
1	46	MESUR Status Report Originals, July 19, 1991 (MESUR/ESA)	19910719	nasaarc_1412_0000046	
1	47	SLIM	circa 1991	nasaarc_1412_0000047	File Digitized. 32 pages. Digital origin: Reformatted original.
1	48	SLIM, ESM Heatshield Materials	circa 1991	nasaarc_1412_0000048	
1	49	SLIM, A Precursor for MESUR	19911024	nasaarc_1412_0000049	
1	50	MESUR Instruments (MESUR/ESA)	circa 1991	nasaarc_1412_0000050	This is the start of a file grouping labeled as "MESUR Current."
1	51	MESUR Current	circa 1991	nasaarc_1412_0000051	
1	52	Huntress Visit, September 20, 1990	19900920	nasaarc_1412_0000052	This is the start of a file grouping labeled as "MESUR Workshops, Panels, Conferences, Meetings, Etc."
1	53	MESUR Prime	199008	nasaarc_1412_0000053	
1	54	MARS Science Working Group, August 23-24, 1990	circa 1990	nasaarc_1412_0000054	
1	55	OLD Cover, Viewgraphs	circa 1990	nasaarc_1412_0000055	
1	56	MESUR Planning	circa 1990	nasaarc_1412_0000056	
2	1	Viking Maps	circa 1975	nasaarc_1412_0000057	
2	2	MESUR Workshops, Panels, Conferences, Meetings, Etc.	1991	nasaarc_1412_0000058	
2	3	Griffin New Associate Administrator for Exploration	1991	nasaarc_1412_0000059	
2	4	Mars SWG Technical Information	1991	nasaarc_1412_0000060	

2	5	Mars Surface and Atmosphere Through Time (MSATT), Boulder, September 23-25, 1991	19910923 - 19910925	nasaarc_1412_0000061	This is the start of a file grouping labeled as "Mars Exploration Conference Williamsburg, July 17-19, 1991."
2	6	Planetary Society, September 23-24, 1991	19910923 - 19910924	nasaarc_1412_0000062	
2	7	MESUR Science Definition Team, January 30-31, 1992	19920130 - 19920131	nasaarc_1412_0000063	
2	8	MESUR "Handoff," November 26, 1991	19911126	nasaarc_1412_0000064	
2	9	Planetary Protection Workshop, June 3-4, 1991	19910603 - 19910604	nasaarc_1412_0000065	
2	10	MESUR Mission Educational Workshop, June 23-27, 1991	19910623 - 19910627	nasaarc_1412_0000066	
2	11	Mars SWG, October 29-30, 1991	19911029 - 19911030	nasaarc_1412_0000067	
2	12	HQ Status Review, May 30, 1991	19910530	nasaarc_1412_0000068	
2	13	Mars Exobiology Site Selection Workshop, September 3-4, 1991	19910903 - 19910904	nasaarc_1412_0000069	
2	14	TRW Lightsat	1991	nasaarc_1412_0000070	
2	15	Comsats	1991	nasaarc_1412_0000071	
2	16	Comsat, SAIC	1991	nasaarc_1412_0000072	
2	17	Mars Exploration Conference Williamsburg, July 17-19, 1991	19910717 - 19910719	nasaarc_1412_0000073	
2	18	Mars Exploration Conference, Williamsburg	1991	nasaarc_1412_0000074	
2	19	Paper Preparation	1991	nasaarc_1412_0000075	
2	20	MESUR Mission Concept	1991	nasaarc_1412_0000076	
2	21	SSES Workshop, February 25, 1991 - March 1, 1991	19910225 - 19910301	nasaarc_1412_0000077	
2	22	SSES, May 20, 1991	19910520	nasaarc_1412_0000078	
2	23	SSES, MESUR Current Study Status, May 20, 1991	19910520	nasaarc_1412_0000079	
2	24	SSAAC Meeting, July 29 - August 2, 1991, and Dale Compton Meeting	19910729 - 19910802	nasaarc_1412_0000080	

2	25	MESUR Miscellaneous	1990 - 1991	nasaarc_1412_0000081	This is the start of a file grouping labeled as "MESUR Miscellaneous, 1990-1991."
2	26	Risk Analysis and Survivability with SAIC	1990 - 1991	nasaarc_1412_0000082	
2	27	Risk and Reliability	1990 - 1991	nasaarc_1412_0000083	
2	28	D. Ting Cost Plots	1990 - 1991	nasaarc_1412_0000084	
2	29	Letters	1990 - 1991	nasaarc_1412_0000085	
2	30	Sounder	1990 - 1991	nasaarc_1412_0000086	
2	31	Politics	1990 - 1991	nasaarc_1412_0000087	
2	32	Pending	1990 - 1991	nasaarc_1412_0000088	
2	33	Landing and Targeting Accuracy	1990 - 1991	nasaarc_1412_0000089	
2	34	MESUR Reports and Documents	1991 - 1992	nasaarc_1412_0000090	
2	35	MESUR Probe Aerobrake Preliminary Design Study		nasaarc_1412_0000091	
2	36	MESUR Handout		nasaarc_1412_0000092	
2	37	Mikulski Package (Senator briefing)		nasaarc_1412_0000093	
2	38	MESUR SDT, May 21-22, 1991	19910521 - 19910522	nasaarc_1412_0000094	
2	39	MESUR SDT	1991	nasaarc_1412_0000095	This is the start of a file grouping labeled as "MESUR and Related Publicity, 1991."
2	40	MESUR SDT, February 22, 1991	19919222	nasaarc_1412_0000096	
2	41	MESUR Science Definition Team	1991	nasaarc_1412_0000097	
2	42	MESUR and Related Publicity	1991	nasaarc_1412_0000098	
2	43	Press Release and Drafts, September 1991	199109	nasaarc_1412_0000099	
2	44	News Items	circa 1991	nasaarc_1412_0000100	
2	45	MESUR Study Report, New Volume for SSAAC, July 1991	199107	nasaarc_1412_0000101	
2	46	SAAC-MFPE Volume III Final Version, 1991	circa 1991	nasaarc_1412_0000102	
2	47	SAAC-MFPE Volume III, 1991	circa 1991	nasaarc_1412_0000103	
2	48	Ames Internal MESUR Charts, 1991	1991	nasaarc_1412_0000104	
2	49	ARC/JPL Negotiations	1990 - 1991	nasaarc_1412_0000105	
					This is the start of a file grouping labeled as "ARC/JPL Negotiations, 1990-1991."

2	50	Current Negotiations		nasaarc_1412_0000106	This is the start of a file grouping labeled as "JPL Evolutionary Mars Program, 1991."
2	51	Position Statements		nasaarc_1412_0000107	
2	52	Compton/Stone ARC/JPL MESUR Agreement		nasaarc_1412_0000108	
2	53	Dale Compton Meeting, MESUR/Discovery, November 21, 1990	19901121	nasaarc_1412_0000109	
2	54	ARC/JPL MESUR, Keep		nasaarc_1412_0000110	
2	55	JPL Evolutionary Mars Program	1991	nasaarc_1412_0000111	
2	56	Strategy	circa 1991	nasaarc_1412_0000112	
2	57	Carl Pilcher Tiger Team, Mars Evolutionary Strategy	circa 1991	nasaarc_1412_0000113	
2	58	JPL Mars Evolutionary Strategy	circa 1991	nasaarc_1412_0000114	
2	59	MESUR Hard Copies (Mission and design concept reviews, meeting and status reports)	1991	nasaarc_1412_0000115	
2	60	MESUR/Mars SWG Meetings, April 9-10, 1991	19910409 - 19910410	nasaarc_1412_0000116	
2	61	Office of Technology Assessment, Exploring the Moon and Mars	1991	nasaarc_1412_0000117	
2	62	MESUR Brochures	1990 - 1991	nasaarc_1412_0000118	
2	63	IAF-91-432 A Mars Environmental Survey (MESUR) Feasibility of a Low-Cost Global Approach (Hubbard et al.)	1991	nasaarc_1412_0000119	
3	1	Mars Environmental Survey (MESUR) Science Objectives and Mission Description, July 19, 1991 (2 copies)	19910719	nasaarc_1412_0000120	
3	2	The Mars Environmental Survey (MESUR) Status Report, February 25, 1991	19910225	nasaarc_1412_0000121	
3	3	Mars Environmental Survey (MESUR) Design Concept Review Meeting, May 1, 1991 (2 copies)	19910501	nasaarc_1412_0000122	
3	4	The Mars Environmental Survey: A Mars Precursor Mission, June 13, 1990 (2 copies)	19900613	nasaarc_1412_0000123	
3	5	Final Review and Presentation, Planetary Protection Study for MESUR Mission, Phase A, September 17, 1991	19910917	nasaarc_1412_0000124	

3	6	AFE/RHARE Files	1990 - 1991	nasaarc_1412_0000125	This is the start of a file grouping labeled as "AFE/RHARE Files."
3	7	AFE Current Notes	1990 - 1991	nasaarc_1412_0000126	
3	8	AFE Miscellaneous	1991	nasaarc_1412_0000127	
3	9	AFE Current Notes, etc.	1990	nasaarc_1412_0000128	
3	10	Office Memos	1991	nasaarc_1412_0000129	
3	11	AFE Financial 1991, Costing	1991	nasaarc_1412_0000130	
3	12	AFE HFR Proposal	1990	nasaarc_1412_0000131	
3	13	AFE Contracts	1990	nasaarc_1412_0000132	
3	14	RHARE Hardware, Engineering Models, Flight Prototype (Photographs)	circa 1990	nasaarc_1412_0000133	
3	15	RHARE Window	1990 - 1991	nasaarc_1412_0000134	
3	16	RHARE CDR Meeting, January 22-25, 1990	19900122 - 19900125	nasaarc_1412_0000135	
3	17	RHARE CDR	1990 - 1991	nasaarc_1412_0000136	
3	18	Project RHARE	1990	nasaarc_1412_0000137	
3	19	RHARE Program, 1991 (1 of 2)	1991	nasaarc_1412_0000138	
3	20	RHARE Program, 1991 (2 of 2)	1991	nasaarc_1412_0000139	
3	21	Financial Plan	1990	nasaarc_1412_0000140	
3	22	Organization	1990	nasaarc_1412_0000141	
3	23	Travel, AFE Review	1990	nasaarc_1412_0000142	
3	24	Test Engineering and Analysis Brochure: Capabilities Summary	1990	nasaarc_1412_0000143	
3	25	Correspondence from Project Area Manager	1990	nasaarc_1412_0000144	
3	26	ATPM Reflective Coatings	1990	nasaarc_1412_0000145	
3	27	AFE TPS CDR	1990	nasaarc_1412_0000146	
4	1	Space Nuclear Power, August 1990	199008	nasaarc_1412_0000147	
4	2	Air Bag, Communications Orbiter, Communications Telemetry, Power, August 1990	199008	nasaarc_1412_0000148	
4	3	Planetary Quarantine Probe Design, August 1990	199008	nasaarc_1412_0000149	
4	4	NASA Mail, Faxes	1990	nasaarc_1412_0000150	
4	5	MESUR Current Fiscal Year 1991 Plans, Correspondence	1991	nasaarc_1412_0000151	

4	6	Mars Rover Sample Return, Martin Marietta, August 1990	199008	nasaarc_1412_0000152	This is the start of a file grouping labeled as "AFE Reports and Reviews, 1990-1991."
4	7	Mars Global Network Mission Science, August 1990	199008	nasaarc_1412_0000153	
4	8	RHARE Critical Design Review, Martin Marietta, January 1991	199101	nasaarc_1412_0000154	
4	9	Ames MGNM Material, September 1990	199009	nasaarc_1412_0000155	
4	10	AFE Reviews, 1990 (1 of 2)	1990	nasaarc_1412_0000156	
4	11	AFE Reviews, 1990 (2 of 2)	1990	nasaarc_1412_0000157	
4	12	AFE Non-advocate Review, June 9, 1990	19900609	nasaarc_1412_0000158	
4	13	AFE Technical Status Report, 1990-1991	1990 - 1991	nasaarc_1412_0000159	
4	14	AFE Monthly Report	1991	nasaarc_1412_0000160	
4	15	AFE Code S Reports, 1990-1991 (1 of 2)	1990 - 1991	nasaarc_1412_0000161	
4	16	AFE Code S Reports, 1990-1991 (2 of 2)	1990 - 1991	nasaarc_1412_0000162	
4	17	AFE Memoranda	1990	nasaarc_1412_0000163	
4	18	AFE Spacecraft Review	circa 1990	nasaarc_1412_0000164	
4	19	AFE Quarterly Review, Project Status for AA, October 26, 1990	1990	nasaarc_1412_0000165	
4	20	AFE Project Status Overview		nasaarc_1412_0000166	
4	21	AFE Projects, 1990 - HFIR	circa 1990	nasaarc_1412_0000167	
4	22	AFE Projects, 1990 - HFR Science Steering Group, Tabak	circa 1990	nasaarc_1412_0000168	
4	23	AFE Reports and Reviews, 1990-1991	1990 - 1991	nasaarc_1412_0000169	
4	24	AFE Configuration Management Reviews	circa 1990	nasaarc_1412_0000170	
4	25	AFE Monthly Status Reports	circa 1990	nasaarc_1412_0000171	
4	26	AFE Project Review	circa 1990	nasaarc_1412_0000172	
5	1	MMAG	circa 1990	nasaarc_1412_0000173	
5	2	AFE Background Materials	circa 1990	nasaarc_1412_0000174	
5	3	TPS	circa 1990	nasaarc_1412_0000175	
5	4	JSC Viewgraphs, May 16, 1990	19900516	nasaarc_1412_0000176	
5	5	Small Spacecraft, Launch Vehicle	circa 1990	nasaarc_1412_0000177	
5	6	MESUR Mars Network Viewgraphs	circa 1990	nasaarc_1412_0000178	

5	7	MESUR Workshop, Sand and Dust on Mars, Arizona State, February 4-5, 1990	19900204 - 19900205	nasaarc_1412_0000179	This is the start of a file grouping labeled as "MESUR Background."
5	8	Stanford University Space Systems Engineering, Mars Mission Studies Presentation, June 1991	199106	nasaarc_1412_0000180	
5	9	JSC/Mars Net, May 17-18, 1990	19900517 - 19900518	nasaarc_1412_0000181	
5	10	HQ Meeting with ESA, May 3, 1990	19900503	nasaarc_1412_0000182	
5	11	Mars Polar Penetrator Mission and System Concept Summary, March 1-2, 1990	19900301 - 19900302	nasaarc_1412_0000183	
5	12	Mission Concept and Development for Mars Global Network Mission, September 15, 1989	19890915	nasaarc_1412_0000184	
5	13	Journal of the British Interplanetary Society, Exploration of Mars, Volume 42, Number 4, April 1989	198904	nasaarc_1412_0000185	
5	14	MGNM Study with SAIC and JPL, February 1990	199002	nasaarc_1412_0000186	
5	15	Mars Penetrator Subsystem Studies, Bendix July 1978	197807	nasaarc_1412_0000187	
5	16	Complex Planetary Surface Exploration, July 1975	197507	nasaarc_1412_0000188	
5	17	MESUR Background	circa 1990	nasaarc_1412_0000189	
5	18	Mars Polar Penetrator Evaluation Group Memorandum; Alternate Concept from Ames	circa 1990	nasaarc_1412_0000190	
5	19	RTOP, June 1990	199006	nasaarc_1412_0000191	
5	20	Airbag	circa 1990	nasaarc_1412_0000192	
5	21	SAIC Penetrator Study, March 9, 1990	19900309	nasaarc_1412_0000193	
5	22	MGNM Volatiles Workshop, March 11, 1990	19900311	nasaarc_1412_0000194	
5	23	MGNM MPP, HQ, April 6, 1990	19900406	nasaarc_1412_0000195	
5	24	S Number Workshop, 1990	1990	nasaarc_1412_0000196	
5	25	Code R	circa 1990	nasaarc_1412_0000197	
5	26	Pioneer Venus	circa 1978	nasaarc_1412_0000198	
5	27	Lunar and Planetary Institute, Global Seismic Network on Mars, May 1990	199005	nasaarc_1412_0000199	
5	28	Lockheed/MESUR	1991	nasaarc_1412_0000200	

5	29	ESA, August 1990	199008	nasaarc_1412_0000201	
5	30	Marsnet, Scientific Exploration of Mars, Sand and Dust on Mars, Strategy (Mars Exploration Science documents, Future science projects presentation about Marsnet 5/6/91; paper about the effects of communications errors on images compressed with Vector Quantization technique undated; Workshop on Sand and Dust on Mars, Ronald Greeley, editor 1991; Mars Science Working Group report JPL D-8211 titled A Strategy for the Scientific Exploration of Mars, February 1991)	199008	nasaarc_1412_0000202	
5	31	MESUR Design Review, May 1, 1991	19910501	nasaarc_1412_0000203	
5	32	ESA Marsnet, November 1990, March 1991	1990 - 1991	nasaarc_1412_0000204	
5	33	ESA Marsnet	circa 1990	nasaarc_1412_0000205	
5	34	ESA Marsnet Assessment Study Report	circa 1990	nasaarc_1412_0000206	
5	35	Marsnet Reports (1991 and 1996)	1991 - 1996	nasaarc_1412_0000207	
5	36	SSES Handouts (1 of 2)	circa 1990	nasaarc_1412_0000208	
5	37	SSES Handouts (2 of 2)	circa 1990	nasaarc_1412_0000209	
6	1	Space Exploration Initiative, 1991 (1 of 2)	1991	nasaarc_1412_0000210	
6	2	Space Exploration Initiative, 1991 (2 of 2)	1991	nasaarc_1412_0000211	
6	3	ESA Marsnet, November 1990	1990	nasaarc_1412_0000212	
6	4	Exobiology Report Soviet Mars, 1991/1996, February 1989, May 1991	1989 - 1989	nasaarc_1412_0000213	
6	5	ESA Marsnet, June 5, 1991	19910605	nasaarc_1412_0000214	
6	6	ESA Marsnet, January 1991	199101	nasaarc_1412_0000215	
6	7	Mars SWGs and Workshops, 1990 (1 of 2)	1990	nasaarc_1412_0000216	
6	8	Mars SWGs and Workshops, 1990 (2 of 2)	1990	nasaarc_1412_0000217	
6	9	RTG, Current	circa 1990	nasaarc_1412_0000218	
6	10	Mars SWG	circa 1990	nasaarc_1412_0000219	
6	11	RTG (1 of 2)	circa 1990	nasaarc_1412_0000220	
6	12	RTG (2 of 2)	circa 1990	nasaarc_1412_0000221	
6	13	MESUR-Related Studies	circa 1990	nasaarc_1412_0000222	
6	14	Mars Global Network Mission Science	circa 1990	nasaarc_1412_0000223	

6	15	Monthly Reports	circa 1990	nasaarc_1412_0000224	
6	16	Planetary Protection Studies (1 of 2)	circa 1990	nasaarc_1412_0000225	
6	17	Planetary Protection Studies (2 of 2)	circa 1990	nasaarc_1412_0000226	
6	18	MESUR	circa 1990	nasaarc_1412_0000227	
6	19	EMGN, HQ Presentation, April 6, 1990	circa 1990	nasaarc_1412_0000228	
6	20	Thursday Meeting Agendas	circa 1990	nasaarc_1412_0000229	
6	21	Launch Vehicle Performance Data	circa 1990	nasaarc_1412_0000230	
6	22	Mars Research	circa 1990	nasaarc_1412_0000231	
6	23	Mars Mission Strategy	circa 1990	nasaarc_1412_0000232	
6	24	MESUR Technology	circa 1990	nasaarc_1412_0000233	
6	25	Phase A Study	circa 1990	nasaarc_1412_0000234	
6	26	SAIC (Buoni)	circa 1990	nasaarc_1412_0000235	
6	27	NASA/ESA General, MESUR, JPL, December 5, 1990	19901205	nasaarc_1412_0000236	
6	28	Mars SWG, November 29-30, 1990	19901129 - 19901130	nasaarc_1412_0000237	
6	29	Fisk EMGN Briefing, June 13, 1990	19900613	nasaarc_1412_0000238	
6	30	Mars SWG, August 23-24, 1990	19900823 - 19900824	nasaarc_1412_0000239	
6	31	ESA/NASA Coordination Meeting, January 31, 1991	19910131	nasaarc_1412_0000240	
6	32	Mars Atmosphere Video Conferences	circa 1990	nasaarc_1412_0000241	
6	33	MESUR Videoconference Backup, HQ Code SL, December 12, 1990	19901212	nasaarc_1412_0000242	
6	34	Fourth Mars SWG Minutes, November 1990	199011	nasaarc_1412_0000243	
6	35	GNM Coordination, March 29, 1990	19900329	nasaarc_1412_0000244	
6	36	Mars Network, JPL, February 6-7, 1990	19900206 - 19900207	nasaarc_1412_0000245	
7	1	ARC MGNM Study, FY 1990	1990	nasaarc_1412_0000246	
7	2	MGNM, SAIC Coordination Meeting, March 22-23, 1990	19900322 - 19900323	nasaarc_1412_0000247	
7	3	EMGN, Extra Figures	circa 1990	nasaarc_1412_0000248	
7	4	HQ Figures, April 6, 1990	19900406	nasaarc_1412_0000249	
7	5	David Morrison and EMGN Science	circa 1990	nasaarc_1412_0000250	
7	6	MGNM Steering Meeting at JPL, February 22, 1990	19900222	nasaarc_1412_0000251	

7	7	Mars Network, 1990	1990	nasaarc_1412_0000252	This is the start of a file grouping labeled as "MESUR Meetings."
7	8	MESUR Meetings	1991	nasaarc_1412_0000253	
7	9	MESUR Minutes, March 1991	199103	nasaarc_1412_0000254	This is the start of a file grouping labeled as "MESUR Instrumentation."
7	10	SDT Meeting, March 5, 1989	19890305	nasaarc_1412_0000255	
7	11	SDT Meeting Notes, February 2, 1991	19910202	nasaarc_1412_0000256	
7	12	Communications	circa 1991	nasaarc_1412_0000257	
7	13	Costing	circa 1991	nasaarc_1412_0000258	
7	14	TRW, Aerobrake Lander, April 1991	199104	nasaarc_1412_0000259	
7	15	MESUR Instrumentation	1990 - 1991	nasaarc_1412_0000260	
7	16	Correspondence		nasaarc_1412_0000261	
7	17	Economou, Alpha, Proton, X-ray	circa 1991	nasaarc_1412_0000262	
7	18	Industrial Material	circa 1991	nasaarc_1412_0000263	
7	19	Mars Penetrator	circa 1991	nasaarc_1412_0000264	
7	20	Mars 90 Phase II Rover, Science, and Orbiter Group Presentations, 1990	1990	nasaarc_1412_0000265	
7	21	NASA HQ/ESA Coordination, May 3, 1990	19900503	nasaarc_1412_0000266	
7	22	Martin Marietta (Instruments)	circa 1991	nasaarc_1412_0000267	
7	23	Science Instruments, USGS, New Mexico	1989	nasaarc_1412_0000268	
7	24	Fairchild Space, June 1991	199106	nasaarc_1412_0000269	
7	25	MESUR, Geodynamics Corporation	circa 1991	nasaarc_1412_0000270	
7	26	COMPLEX, July 9-13, 1990	19900709 - 19900713	nasaarc_1412_0000271	
7	27	Roger Bourke Mars Atmosphere Videoconference, June 25, 1990	19900625	nasaarc_1412_0000272	
7	28	EMGN, Names Videoconference, June 26	circa 19900626	nasaarc_1412_0000273	
7	29	MESUR Presentations, ARC, JSC, NASA/ESA, May-July 1990	199005 - 199007	nasaarc_1412_0000274	
7	30	MESUR Presentations, NASA HQ, COMPLEX, June-July 1990	199006 - 199007	nasaarc_1412_0000275	
7	31	Mars Imaging, Atmospheric Structure	circa 1990	nasaarc_1412_0000276	

7	32	Center for Mars Exploration	circa 1990	nasaarc_1412_0000277	
7	33	Space Exploration Initiative	circa 1990	nasaarc_1412_0000278	
7	34	Penetrators	circa 1990	nasaarc_1412_0000279	
7	35	Communication Orbiter	circa 1990	nasaarc_1412_0000280	
7	36	USGS	circa 1990	nasaarc_1412_0000281	
7	37	Mars Exobiology	circa 1990	nasaarc_1412_0000282	
7	38	Instrumentation	circa 1990	nasaarc_1412_0000283	
7	39	SAIC	circa 1990	nasaarc_1412_0000284	
7	40	Industry	circa 1990	nasaarc_1412_0000285	
7	41	McDonnell Douglas Space Systems Company	circa 1990	nasaarc_1412_0000286	
7	42	MESUR Systems Overview	circa 1990	nasaarc_1412_0000287	
7	43	Planetary Protection Study for MESUR Mission, Phase A (1 of 2)	circa 1990	nasaarc_1412_0000288	
7	44	Planetary Protection Study for MESUR Mission, Phase A (2 of 2)	circa 1990	nasaarc_1412_0000289	
7	45	MESUR Mission Analysis	circa 1990	nasaarc_1412_0000290	
7	46	Correspondence	circa 1990	nasaarc_1412_0000291	
7	47	NASA Mail, Faxes, QM, March 1990	1990	nasaarc_1412_0000292	
7	48	Coordination Meeting, JPL Study Output, March 1990 (1 of 2)	1990	nasaarc_1412_0000293	
7	49	Coordination Meeting, JPL Study Output, March 1990 (2 of 2)	1990	nasaarc_1412_0000294	
7	50	Thermal Protection: Penetrators, Parachutes, Payload Instruments, May 1990	199005	nasaarc_1412_0000295	
7	51	Mars Network SAIC Materials, May 1990	199005	nasaarc_1412_0000296	
7	52	Re-entry Descent Imaging, May 1990	199005	nasaarc_1412_0000297	
8	1	Alternative Launch Vehicles, Trajectories, Launch Operations, April 1990	199004	nasaarc_1412_0000298	
8	2	Ball-Martin Mars Polar Penetrator Mission, March 1990	199003	nasaarc_1412_0000299	
8	3	COMPLEX Viewgraphs, July 10, 1990	19900710	nasaarc_1412_0000300	
8	4	McDonnell Douglas Delta II Planetary Missions Presentation, June 1990	199006	nasaarc_1412_0000301	

8	5	OAET POP (1 of 2)	circa 1990	nasaarc_1412_0000302	
8	6	OAET POP (2 of 2)	circa 1990	nasaarc_1412_0000303	
8	7	MESUR Reprint Requests	circa 1990	nasaarc_1412_0000304	
8	8	Descent Imaging, Langford, Geodynamics	circa 1990	nasaarc_1412_0000305	
8	9	Alpha, Proton, X-ray Instrument	circa 1990	nasaarc_1412_0000306	
8	10	News, Media	circa 1990	nasaarc_1412_0000307	
8	11	GCTI, Background 1 (1 of 3)	undated	nasaarc_1412_0000308	
8	12	GCTI, Background 1 (2 of 3)	undated	nasaarc_1412_0000309	
8	13	GCTI, Background 1 (3 of 3)	undated	nasaarc_1412_0000310	
8	14	GCTI, Background 2 (1 of 3)	undated	nasaarc_1412_0000311	
8	15	GCTI, Background 2 (2 of 3)	undated	nasaarc_1412_0000312	
8	16	GCTI, Background 2 (3 of 3)	undated	nasaarc_1412_0000313	
8	17	Robert Mah, Code Z Documents, 1989 (1 of 2)	1989	nasaarc_1412_0000314	
8	18	Robert Mah, Code Z Documents, 1989 (2 of 2)	1989	nasaarc_1412_0000315	
8	19	MASE Documents, 1989 (1 of 2)	1989	nasaarc_1412_0000316	
8	20	MASE Documents, 1989 (2 of 2)	1989	nasaarc_1412_0000317	
8	21	GCTI Quad Summary, June 1989 (1 of 2)	1989	nasaarc_1412_0000318	
8	22	GCTI Quad Summary, June 1989 (2 of 2)	1989	nasaarc_1412_0000319	
8	23	Code Z Technical Needs Database (1 of 4)	circa 1989	nasaarc_1412_0000320	
8	24	Code Z Technical Needs Database (2 of 4)	circa 1989	nasaarc_1412_0000321	
8	25	Code Z Technical Needs Database (3 of 4)	circa 1989	nasaarc_1412_0000322	
8	26	Code Z Technical Needs Database (4 of 4)	circa 1989	nasaarc_1412_0000323	
8	27	MASE/PSS Review	circa 1989	nasaarc_1412_0000324	