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BIBLIOGRAPHY OF THE SPACE PROCESSING PROGRAM VOLUME I A COMPILATION THROUGH JUNE 1974

Michael B. Shoultz, et al

Universities Space Research Association
Charlottesville, Virginia

October 1975

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**BIBLIOGRAPHY
of the
SPACE PROCESSING PROGRAM**

**Volume I
A Compilation
Through June 1974**

by
**Michael B. Shultz
and
Eugene W. McClurken, Jr.**

**National Aeronautics and Space Administration
Grant NGR 47-102-003
Contract NAS8-31349
October 1975**

**UNIVERSITIES SPACE RESEARCH ASSOCIATION
Charlottesville, Virginia**

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PREFACE

In studying means of improving coordination between NASA and academic research efforts in the area of space environmental effects on materials and processes (space processing), the Universities Space Research Association (USRA) recommended the compilation of a bibliographic resource to document past and present research activity. A preliminary effort to assemble a bibliography was made by Michael Schoultz in the summer of 1974, and was transmitted to NASA, Marshall Space Flight Center in December as an appendix to the final report under Grant NGR 47-102-003. A continuation of the effort was recommended and resumed in June 1975 as a task under contract NAS8-31349.

This document represents a comprehensive, but by no means complete, survey of the related literature and research contract files. The reader will, doubtless, encounter errors and omissions and is requested to forward any additional or corrective information for incorporation into future volumes.

I am grateful for the guidance provided by Dr. A. Robert Kuhlthau, Professor and currently chairman of the Department of Engineering Science and Systems at the University of Virginia and by Dr. Henry Leidheiser, Director of the Center for Surface and Coatings Research at Lehigh University, the Principal Investigator. Appreciation is also extended to Mrs. Cheryl Pearson and Mrs. Susan Warren for typing the several iterations of the bibliography.

Part I
Literature (by Subject)

PART I
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I. General Space Manufacturing

A. Survey Papers

(1) Author(s): A. D. McGuire

Title: Feasibility Studies of Promising Stability and Gravity/
Including Zero-G/Experiments for Manned Orbiting Missions
First Quarterly Report, 17 Dec. 1964 - 31 Mar. 1965

Source: Electro-Optical Systems, Inc.
14 April 1965

Date: April 15, 1964 Pages: 235 References:

Report Identification number(s): 65X14824, NASA CR-62482

Abbreviated Abstract: Zero-gravity experiments for manned orbital
flight with emphasis on materials and biological
aspects.

(2) Author(s): H. F. Wuenschel
NASA, Marshall Space Flight Center

Title: Low and Zero "G" Manufacturing in Orbit

Source: American Inst. of Aeronautics and Astronautics, Annual
Meeting and Technical Display, 4th, Oct. 23-27, 1967
Paper 67-842.

Date: October 1967 Pages: 9 References:

Report Identification number(s): 67A42980, AIAA Paper 67-842

Abbreviated Abstract: Application of low and zero gravity manufacturing
casting and blowing, surface tension casting, blow
forming, foaming. Serpenuator system for
positioning and handling.

(3.) Author(s): No individual author

Title: Research Achievements Reviews, Volume 2 - Series 1-12

Source: Marshall Space Flight Center
Huntsville, Alabama

Date: 1968 Pages: 651 References:

Report Identification number(s): 69N18059, NASA-TM-X53793-VOL-2

Abbreviated Abstract: Radiation physics, thermophysics, chemical propulsion, cryogenics, electronics, materials science, quality control, space environments, instrumentation.

(4.) Author(s): F. J. Beyerle, C. R. Cooper, R. V. Hoppes, R. Nichols, R. T. van Alier, et al.

Title: NASA, Marshall Space Flight Center
Manufacturing Engineering Research at MSFC

Source: NASA Res. Achievements Rev. VOL 2 1968

Date: 1968 Pages: 81 References:

Report Identification number(s): 69N18070 (Part of 69N18059)

Abbreviated Abstract: Electron beam welding in space.

(5) Author(s): No individual author
NASA, Marshall Space Flight Center

Title: Manufacturing Technology Unique to Zero Gravity Environment

Source: Conference Held at Huntsville, Alabama

Date: November 1, 1968 Pages: 234 References:

Report Identification number(s): 69X77390, NASA-TM-X-62504

Abbreviated Abstract: Ball bearings, glass, metal crystals;
gravitational fields, materials handling.

(6.) Author(s): H. Skeer; L. D. Sortland, A. R. Vernon
Bellcomm., Inc.

Title: Uses of Manned Space Flight for Materials Science and
Processing in Space

Source: Bellcomm, Inc., Washington, D.C.

Date: March 21, 1969 Pages: 13 References:

Report Identification number(s): 69X75273, NASA-TM-69-1015-3,
Contract NASW-417

Abbreviated Abstract: Ceramics, metallurgy, crystal growth,
refining; gravitational fields, radiation effects.

(7.) Author(s): A. R. Sorrells

Title: The Great Promise of Zero G.

Source: Skyline, VOL. 27 No. 3

Date: 1969

Pages: 9

References:

Report Identification number(s): 69A35490

Abbreviated Abstract: Containerless manufacturing of new glasses, etc., synchronous orbit manufacturing stations, computerized electric field shaping of liquid metals, bouyancy-free mixing of differing density liquid components, and crystalline materials and fibers without lattice defects.

(8.) Author(s): H. F. Wuenscher
NASA, Marshall Space Flight Center

Title: Space Manufacturing Unique to Zero Gravity Environment

Source: American Astronautical Society, American Astronautical Society and Operations Research Society of America, Joint National Meeting, Denver, Colorado

Date: June 17-20, 1969

Pages: 30

References: 11

Report Identification number(s): 69A42844

Abbreviated Abstract: Buoyancy - and thermal convection-sensitive manufacturing processes and molecular force controlled processes.

(9) Author(s): W. H. Steurer
General Dynamics Corp., Convair Div., San Diego California

Title: Processing of Materials in Space

Source: Western Periodicals Co., Society of Aerospace Materials and Process Engineering Proceedings, VOL 15, In-Materials and Processes for the 70's, Society of Aerospace Materials and Process Engineers, National Symposium and Exhibition, 15th.

Date: 1969 Pages: 21 References: 15

Report Identification number(s): 69A35588 (part of A69-35501)

Abbreviated Abstract: Detailed discussion of fundamental effects of gravity, zero gravity and induced forces on fluids, assessment of orbital processing effectiveness, cost-effectiveness and operational considerations.

(10) Author(s): L. R. McCreight
General Electric Co., Philadelphia, Pennsylvania

Title: Materials Processing in Space

Source: Western Periodicals Co. and Society of Aerospace Material and Process Engineers, Society of Aerospace Material and Process Engineers, National Symposium and Exhibition, 15th.

Date: 1969 Pages: 10 References:

Report Identification number(s): 69A35589 (part of A69-35501)

Abbreviated Abstract: Preparation of high value electronic single crystals, the melting of materials and other processes benefiting from zero gravity are discussed.

(11.) Author(s): H. F. Wuenscher
NASA, Marshall Space Flight Center

Title: Unique Manufacturing Processes in Space Environment

Source: Canaveral Council of Technical Societies, In-Technology Today and Tomorrow, Canaveral Council of Technical Societies, Space Congress, 7th, Cocoa Beach, Fla.

Date: April 22-24, 1970 Pages: 10 References: 8

Report Identification number(s): 70A33716 (part of A70-33701)

Abbreviated Abstract: Current projects and future plans in orbital manufacturing with a review of fundamental aspects of the zero gravity environment. Skylab Orbital Workshop space manufacturing experiments are briefly described.

(12.) Author(s): L. R. McCreight, GE Space Sciences Laboratory
Valley Forge, Pennsylvania

Title: The Potential of Space Processing

Source: Research/Development, VOL. 21

Date: August 1970 Pages: 2 References:

Report Identification number(s): 70A37926

Abbreviated Abstract: Float zone refining and semiconductor crystal growth; electronic crystals grown from solution; melting and casting of metals, glasses, and ceramics; slip casting of metals; centrifugation and electrophoresis of biologicals.

(13.) Author(s): No individual author

Title: Space Processing and Manufacturing Meeting

Source: MSFC, Huntsville, Alabama NASA

Date: October 21, 1969 Pages: 546 References:

Report Identification number(s): 70N14651, NASA-TM-X-62560,
N70-14652-14682

Abbreviated Abstract: Research and development work on materials manufacturing and production engineering in space, emphasizing effects of reduced gravity on crystal growth and metal working; exobiology, glasses, etc. Includes N 70-14652--N 70-14679

(14.) Author(s): H. F. Wuenscher
NASA, Marshall Space Flight Center

Title: New Development in Space Manufacturing

Source: NASA/MSFC, Huntsville, Alabama

Date: October 21, 1969 Pages: 8 References

Report Identification number(s): 70N14670 (part of N70-14651)

Abbreviated Abstract: Tabulation of unique space processes (zero and low gravity) and assessment of current technology and recommendations for future development.

(15) Author(s): W. G. Shepherd, A. R. Vernon

Title: Materials Science and Processing In Space, Appendix H

Source: NASA, Washington, D.C., Proc. of the Winter Study on
Uses of Manned Space-Flight, 1975-1985

Date: 1969

Pages: 11

References:

Report Identification number(s): 70N17034 (part of N70-17026)

Abbreviated Abstract: Properties of space environment relevant to
materials science and processing: gravitational
field, space vacuum, radiation.

(16) Author(s): H. F. Wuenschel
NASA, MSFC

Title: Manufacturing in Space

Source: New Scientist, VOL. 47

Date: Sept. 10, 1970

Pages: 4

References:

Report Identification number(s): 70A43075

Abbreviated Abstract: Skylab Orbital Workshop experiments: Metal
composites from eutectic Al-Co and monotectic
Al-In alloys, metallic whisker composites from
eutectic Al-Co with added sapphire whiskers;
spherical castings of pur Ni, Ni 12% Sn, and
alloy "Star J satellite"; single crystal growth;
electron beam welding and cutting, exothermic
brazing of stainless steel tubes.

(17) Author(s): No Individual Author

Title: Space Processing and Manufacturing

Source: NASA/MSFC, Huntsville, Alabama

Date: Feb. 5, 1970

Pages: 554

References:

Report Identification number(s): 70N20517

Abbreviated Abstract: Production engineering aspects of materials processing and industrial manufacturing with applications to orbiting laboratories and workshops, especially the effects of reduced gravity. Includes N70-20518--N70-20548

(18) Author(s): H. F. Wuenschel
NASA, Marshall Space Flight Center

Title: New Development in Space Manufacturing

Source: NASA/MSFC, Huntsville, Alabama
Space Processing and Manufacturing

Date: Feb. 5, 1970

Pages: 9

References:

Report Identification number(s): 70N20536 (part of N70-20517)

Abbreviated Abstract: Feasibility of manufacturing during weightlessness.

(19) Author(s): No Individual Author

Title: Space Processing and Manufacturing

Source: Conference Held at MSFC Huntsville, Alabama

Date: October 21-22, 1969 Pages: 544 References:

Report Identification number(s): 71N11701

Abbreviated Abstract: Space manufacturing techniques and materials developments for orbital workshops. Includes N71-11702 - N71-11732.

(20.) Author(s): H. F. Wuenscher
NASA/Marshall Space Flight Center

Title: New Development In Space Manufacturing

Source: MSFC/NASA Huntsville, Alabama
Space Processing and Manufacturing

Date: October 21, 1969 Pages: 9 References:

Report Identification number(s): 71N11720

Abbreviated Abstract: Tabulation of unique space processes (zero and low gravity). Assessment of current technology and recommendations.

(21) Author(s): No individual author

Title: Unique Manufacturing Processes in Space Environment

Source: 7th Space Congress, Cocoa Beach, Florida
NASA/MSFC

Date: April 23, 1970 Pages: 72 References:

Report Identification number(s): 71N26009, NASA-TM-X-67178

Abbreviated Abstract: Zero-G melting and solidification, space manufacturing processes, facilities and experiments, chemical and biochemical space manufacturing; positioning and handling in weightlessness.

(22.) Author(s): H. F. Wuenschel
NASA, Marshall Space Flight Center

Title: Unique Manufacturing Processes in Space Environment

Source: NASA/MSFC Huntsville, Alabama

Date: April 1970 Pages: 10 References:

Report Identification number(s): 71N26010 (part of N71-26003)

Abbreviated Abstract: Experiments in development for Skylab, NASA and industrial participation in space processing and manufacturing experiments.

(23) Author(s): A. Tegtmeier, B. Franke
Entwicklungspring Nord, Bremen (West Germany)

Title: Possibilities for Production in Space

Source: Presented at the 4th DGLR Annual Meeting, Baden-Baden,
West Germany, Abteilung fuer Astrodynamik

Date: Oct. 11-13, 1971 Pages: 89 References:

Report Identification number(s): 72N21897

Abbreviated Abstract: Survey of manufacturing, potential in orbital
workshops. Methods and processes in chemistry,
pharmaceuticals, optical components, crystal
growth, metallurgy and composite materials.
In German.

(24) Author(s): No Individual Author

Title: Reference Earth Orbital Research and Application
Investigations, VOL. 6 Materials Science and Manufacturing

Source: NASA, Washington, D.C.

Date: January 15, 1971 Pages: 102 References:

Report Identification number(s): 72N22880, NHB-7150.1 - VOL - 6

Abbreviated Abstract: Development of materials science and manufacturing
facilities for installation aboard space stations.

(25.) Author(s): D. Dooling, Jr.

Title: New Industrial Revolution in Space

Source: Spaceflight, VOL. 13

Date: Dec. 1971

Pages: 5

References: 8

Report Identification number(s): 72A11961

Abbreviated Abstract: Spherical and hollow ball bearings; special metal shapes, metal foams, intermetallics; adhesion and containerless casting of metals; special composites; high quality crystals; glasses; vaccines and drugs. Apollo 14 and 15 materials processing experiments are described (electrophoresis, composite casting, heat flow and convection, and liquid transfer). Space Shuttle and space station roles in space manufacturing.

(26.) Author(s): W. O. Armstrong, J. H. Bredt
NASA, Washington, D. C.

Title: Status and Plans of NASA's Materials Science and Manufacturing In Space/MS-MS/Program

Source: Space for Mankind's Benefit;
Proceedings of the First International Space Congress,
Preliminary Volume, Huntsville, Alabama

Date: Nov. 15-19, 1971

Pages: 22

References:

Report Identification number(s): 72A18621 (part of A72-18609)

Abbreviated Abstract: Initiation of a research and development program on the Space Shuttle missions; to prepare for possible commercial manufacturing operations on permanently orbiting space stations.

(27.) Author(s): H. F. Wuenschel
NASA, Marshall Space Flight Center

Title: Manufacturing In Space

Source: Astronautics and Aeronautics, VOL. 10

Date: Sept. 1972

Pages: 13

References: 48

Report Identification number(s): 72A40968

Abbreviated Abstract: Application of gravity control and vacuum, temperature, pressure and radiation characteristics of space to liquid-matrix preparation of composites, fine grain castings, super-saturated alloys, immiscible liquid-phase combinations, containerless free suspension, surface tension casting and drawing, adhesion casting and controlled density casting.

(28.) Author(s): J. H. Bredt
NASA, MSC Advanced Missions Program Office

Title: New Space Processing Experiments for the Skylab Missions

Source: International Astronautical Federation, International Astronautical Congress, 23rd Vienna, Austria

Date: Oct. 8-15, 1972

Pages: 25

References:

Report Identification number(s): 72A45125

Abbreviated Abstract: M512 Skylab Materials Processing Facility: electron beam welding apparatus for experiments M551 through M555 and M561 through M565. Electrophoretic separator, electromagnetic levitation system, and electronically controlled electric furnace.

(29.) Author(s): C. E. Winkler, Editor
NASA, Marshall Space Flight Center

Title: Scientific Involvement in Skylab By the Space Sciences
Laboratory of MSFC

Source: NASA/MSFC Huntsville, Alabama

Date: Feb. 28, 1973 Pages: 124 References:

Report Identification number(s): 73N20886, TM-X-64725

Abbreviated Abstract: Includes materials science/manufacturing
in space.

(30.) Author(s): V. H. Yost
NASA, Marshall Space Flight Center

Title: Experimental Studies of Manufacturing Processes Performed
in Zero-G

Source: Res. Achievements Rev., VOL 4, Report No. 7
NASA/MSFC Huntsville, Alabama

Date: Feb. 1973 Pages: 40 References:

Report Identification number(s): 73N22922 (part of N73-22915)

Abbreviated Abstract: Reduced gravity manufacturing experiments in
support of Skylab, etc. Methods to obtain short
periods of near zero gravity.

(31) Author(s): L. R. McCreight
General Electric Co.

Title: Use of Shuttle for Manufacturing and Materials Process
Experiments in Low G

Source: General Electric Co., Philadelphia, Pa.

Date: 1972

Pages:

References:

Report Identification number(s): N73-73055

Abbreviated Abstract:

(32) Author(s): A. I. Kukhtenko, V. I. Merkulov, Iu. I. Samoilenko,
Iu. P. Ladikov-Roev

Title: Distributed Automatic Control of Technological Processes
Under Weightless Conditions

Source: International Astronautical Federation, International
Astroanautical Congress, 24th Baku, Azerbaidzhan SSR

Date: Oct. 7-13, 1973

Pages: 24

References:

Report Identification number(s): 74A12839

Abbreviated Abstract: Automatic control (three dimensional resolution,
wavelength-sensitive perturbation response,
amplification capacity) techniques applied to
weightless liquid metal and plasma systems.
In Russian.

33.) Author(s): H. F. Wuenschel
NASA, MSFC

Title: Materials Processing in Zero Gravity-- Space Manufacturing--

Source: Astronautical Research 1972; Proceedings of the Twenty-third Congress, Vienna, Austria

Date: Oct. 8-15, 1972 Pages: 13 References:

Report Identification number(s): 74A24969 (part of A74-24961)

Abbreviated Abstract: Apollo 14 and Skylab experiments on electro-phoretic separation, M551 metals melting, M552 exothermic brazing, M553 sphere forming, M554 composite casting, and M555 GaAr Crystal growth.

34.) Author(s): L. R. McCreight
General Electric, Space Sciences Laboratory, Philadelphia, Pa.

Title: Use of Shuttle for Manufacturing and Materials Process Experiments in Low-G

Source: Space Shuttle Payloads; Proceedings of the Symposium Washington, D.C.

Date: Dec. 27-28 1972 Pages: 20. References: 6

Report Identification number(s): 74A14114 (part of A74-14102)

Abbreviated Abstract: Space processing without convection or sedimentation and the high intrinsic values of some biologicals and electronic materials may warrant the efforts of space transportation and processing.

(35) Author(s): K. R. Taylor; R. L. Hammel*
NASA, MSFC;* TRW Systems Group

Title: Space Processing Payloads for the Space Shuttle Era

Source: American Institute of Aeronautics and Astronautics,
Aerospace Sciences Meeting, 12th, Washington, D. C.

Date: Jan. 30- Feb. 1 '74 Pages: 13 References:

Report Identification number(s): 74A18796, AIAA Paper 74-153

Abbreviated Abstract: Definition of facilities using modular,
reusable research equipment in partial and
dedicated payloads in spacelab.

(36.) Author(s): D. J. Gorham, W. H. Steurer
General Dynamics, Convair Division

Title: Processes for Space Manufacturing - Definition
of Criteria for Process Feasibility and Effectiveness

Source:

Date: June 1970 Pages: 282 References:

Report Identification number(s): 70N39375, NASA-CR-61334
Contract NAS8-24979

Abbreviated Abstract: Potentials, limitations, and priorities of
twenty-four processes for space manufacturing.
Defines scientific and engineering criteria used
in determining feasibility.

I. General Space Manufacturing

B. Facilities

(1.) Author(s): No Individual Author

Title: The Combined Laboratory and KC-135 Aircraft Zero-G
Test Program Progress Report, March - May 1961

Source: General Dynamics/Astronautics, San Diego, California

Date: June 22, 1961

Pages: 59

References:

Report Identification number(s): 69X72370; AD-846081, GDA-AE61-0593;
AF 18/600/-1775

Abbreviated Abstract: Heat transfer, liquified gases, film boiling,
weightlessness, etc.

(2.) Author(s): P. G. Parks
NASA, Marshall Space Flight Center

Title: Facility for Space Experiments M512 and M479

Source: NASA/MSFC Huntsville, Alabama
Space Processing and Manufacturing Meeting

Date: Oct. 21, 1969

Pages: 9

References:

Report Identification number(s): 70N14664, (part of N70-14651)

Abbreviated Abstract: Integrated facility to conduct space
manufacturing engineering experiments: vacuum
chamber, 2 kw electron beam welding and heating
systems.

(3.) Author(s): W. H. Steurer
General Dynamics, Convair Div., San Diego, California

Title: Selected Examples for Space Manufacturing Processes, Facilities, and Experiments

Source: Unique Manufacturing Processes in Space Environment
NASA, Marshall Space Flight Center

Date: April 1970 Pages: 31 References:

Report Identification number(s): 71N26012, (part of N71-26009)

Abbreviated Abstract: Space manufacturing processes based on the potentials and limitations of the low gravity environment.

(4.) Author(s): J. T. Rose
McDonnell Douglas Astronautics Co., St. Louis, Missouri

Title: Facilities Planning Approach for the Space Shuttle

Source: American Inst. of Aeronautics and Astronautics, Space Shuttle Development Testing and Operations Conference
Phoenix, Arizona

Date: March 1971 Pages: 9 References:

Report Identification number(s): 71A24831; AIAA Paper #71-316

Abbreviated Abstract: Shuttle ground rules, manufacturing facilities requirements, ground requirements and verification test facilities, operations requirements, and interrelationships.

(5) Author(s): B. N. Petrov

Title: Orbital Stations and the Study of Earth From Space

Source: Joint Publications Research Service, Arlington, Virginia
From Upr. Kosmose, VOL. 1, 1972

Date: July 30, 1973 Pages: 25 References:

Report Identification number(s): 73N27754, JPRS-59650

Abbreviated Abstract: Development and employment of orbital space stations to conduct earth resources surveys and provide space manufacturing facilities.

(6) Author(s): B. E. Paton, D. A. Dudko, M. V. Bernadskii, V. F. Lapchinskii, V. V. Stesin, A. A. Zagrebil'ny, O. S. Tsygankov
Akademia Nauk Ukranskoï SSR

Title: Test Stands for Studying Technological Processes Under Simulated Space Conditions

Source: International Astronautical Congress, 24th
Baku, Azerbaïdzhan SSR

Date: Oct. 7-13, 1973 Pages: 12 References:

Report Identification number(s): 74A12844,

Abbreviated Abstract: In Russian - Review of Soviet equipment designed for technological experiments on manned space missions and description of ground bases test facilities.

(7.) Author(s): R. G. Mapes
Astro-Science Labs., Inc.

Title: Design, Develop, and Fabricate a Model of a
Serpentuator

Source:

Date: Jan. 6, 1967 Pages: References:

Report Identification number(s): ASL FR-68-3
Contract NAS8-20582

Abbreviated Abstract:

(8.) Author(s): Astro-Space Labs, Inc.

Title: Analyze, Study, Select and Define Serpentuator Systems

Source:

Date: Oct. 20, 1967 Pages: References:

Report Identification number(s): ASL FR-67-6
Contract NAS8-20707

Abbreviated Abstract:

(9.) Author(s): R. F. Pickard
Astro-Science Labs., Inc.

Title: Design and Fabricate an Engineering Model of the
Atm. Serpentuator

Source:

Date: June 30, 1968 Pages: References:

Report Identification number(s): ASL 8030036-MPR-1
Contract NAS8-30036

Abbreviated Abstract:

(10) Author(s): J. R. Lloyd
Astro-Science Labs, Inc.

Title: Design, Fabrication, Test and Delivery of an Engineering
Model, Electromechanical Space Positioning Tool

Source:

Date: March 1969 Pages: References:

Report Identification number(s): ASL FR-69-7
Contract NAS8-30036

Abbreviated Abstract:

(11) Author(s): J. R. Lloyd
Astro-Science Labs, Inc.

Title: Design, Documentation, and Test Hardware Engineering
Model of a Space Mobility System (Serpentuator)

Source:

Date: Pages: References:

Report Identification number(s): ASL 8-30166-MPR-1
Contract NAS8-30166

Abbreviated Abstract:

(12) Author(s): R. C. Martin
Astro-Science Labs., Inc.

Title: Non-Spin Platforms

Source:

Date: April 15, 1974 Pages: Reference:

Report Identification number(s): SDL 8-3-528-MPR-Apr 74
Contract NAS8-30528

Abbreviated Abstract:

(13.) Author(s): W. Faber, F. Greeb, R. Boyd
Martin Marietta Corporation

Title: Study of Tooling Concepts for Manufacturing Operations in
Space - Final Report

Source:

Date: April 26, 1969 Pages: 161 References:

Report Identification number(s): N70-34762; NASA-CR-109989
Contract NAS8-21279

Abbreviated Abstract: Serpentuator, powered mechanical linkage
device, can serve as means of transport,
guidance, stabilization and rendezvous for
space manufacturing operations.

(14) Author(s): Daniel E. Whitney
M.I.T., Cambridge, Massachusetts

Title: Design and Control of Remote Manipulators

Source:

Date: April 5-July 4, '72 Pages: 48 References:

Report Identification number(s): N72-30424; NASA-CR-123795
Contract NAS8-28055

Abbreviated Abstract: Results of vibrational modes investigations of
manipulators. Small motion compliance, natural
frequencies, simulation of components, experimental
evaluation of TV displays.

(15) Author(s): J. A. Iemenschot
M. I. T., MS Thesis

Title: Optimal Trajectory Generation for Mechanical Arms

Source: MIT, Engineering Projects Lab.

Date: Sept. 1972 Pages: 78 References:

Report Identification number(s): N73-14470, NASA-CR-123980
Contract NAS8-28055

Abbreviated Abstract: General method of generating optimal trajectories between initial and final positions of an N degree of freedom manipulator arm with non-linear equations of motion is applied to a planar three degree of freedom arm.

(16) Author(s): Daniel Whitney
M.I.T.

Title: Study of Design and Control of Remote Manipulators
Part 1 - Summary and Conclusions

Source: Massachusetts Institute of Technology
Cambridge, Massachusetts

Date: Feb. 15, 1973 Pages: 4 References:

Report Identification number(s): N73-22046 ; NASA-CR-124191
Contract NAS8-28055

Abbreviated Abstract: Static and passive dynamics, active control by man/computer, integration of sensors, sensor control and displays.

(17) Author(s): W. J. Book
M. I. T., Dept. of Mech. Engineering

Title: Part 2 - Vibration Considerations in Manipulator Design

Source:

Date: Feb. 15, 1973 Pages: 38 References:

Report Identification number(s): N73-20138; NASA-CR-124189
Contract NAS8-28055

Abbreviated Abstract: Vibration analyses of flexible manipulators using 4 x 4 transformation matrix.

(18) Author(s): Jay Mackro
M. I. T., Dept. of Mech. Engineering

Title: Part 4 - Experiments in Video Camera Positioning with Regard to Remote Manipulation

Source:

Date: Feb. 15, 1973 Pages: 22 References:

Report Identification number(s): N73-20139, NASA-CR-124190
Contract NAS8-28055

Abbreviated Abstract: Use of closed circuit television to provide task-to-operator feedback in remote manipulation.

(19) Author(s): W. J. Book
M. I. T., Dept. of Mech. Engineering

Title: Study of Design and Control of Remote Manipulators
Modeling Manipulator Arms with Distributed Flexibility
For Design and Control

Source:

Date: Jan. 31, 1974 Pages: 81 References:

Report Identification number(s): N74-29303, NASA-CR-120269; MIT-8-28055-FA
Contract NAS8-28055

Abbreviated Abstract: Interactions of control system and distributed
flexible structural dynamics for mechanical
arms. Final report.

() Author(s):

Title:

Source:

Date: Pages: References:

Report Identification number(s):

Abbreviated Abstract:

- I. General Space Manufacturing
- C. General Applications Paper

(1.) Author(s): P. A. Castruccio
IBM, Federal Systems Div., Gaithersburg, Md.
Title: Economic Justification for Manned Space Systems
Source: Practical Space Applications, American Astronautical Society National Meeting, San Diego, California

Date: Feb. 21-23, 1966 Pages: 18 References:

Report Identification number(s): 67A35650, (part of A67-35634)

Abbreviated Abstract: Economic benefits from space systems used to survey food producing areas and weather.

(2.) Author(s): B. W. Wahl
McDonnell Douglas Astronautics Co.
Title: Analysis of Selected Opportunities for Manufacturing in Space
Source: Space Technology and Society, Canaveral Council of Technical Societies, Space Congress, 6th Cocoa Beach, Fla.

Date: Mar. 17-19, 1969 Pages: 17 References: 21

Report Identification number(s): 69A35066, (part of A69-35055)

Abbreviated Abstract: Zero gravity: crystal growth and refinement, manufacture of perfectly shaped bodies, preparation of homogeneous mixtures and suspensions. Vacuum: ultrapurification of refractory metals.

(3.) Author(s): D. Kloepper, R. Witt
Grumman Aerospace Corp.

Title: Boron Filament Manufacture In Space: A Literature
Feasibility Study

Source: Grumman Aerospace Corp., Bethpage, New York
MSFC Space Processing and Manufacturing Meeting

Date: Oct. 21, 1969 Pages: 36 References:

Report Identification number(s): 70N14655, (part of N70-14651)

Abbreviated Abstract: Review of earth manufacture of boron filament
technical literature. Techniques for space
manufacture: substrate deposition, glow
discharge, and RF positioning with induction or
hot gas heating. Boron compounds, filaments.

(4.) Author(s): W. F. Libby, P. Payton
University of California at Los Angeles

Title: Industrial Chemistry In Space

Source: NASA/MSFC Space Processing and Manufacturing Meeting

Date: Feb. 5, 1970 Pages: 6 References:

Report Identification number(s): 70N20547; NGL-05-007-003
AF-AFOSR-1255-68

Abbreviated Abstract: Space environment obbess air-free chemical
preparation, improved purity. Crystal growth,
ultrapure metals, chemical reactions.

(5.) Author(s): C. L. Kober
Martin Marietta Corp., Denver, Colorado

Title: Chemical and Biochemical Space Manufacturing

Source: Technology Today and Tomorrow, Canaveral Council of
Technical Societies, Space Congress, 7th, Cocoa Beach, Fla.
Proceedings, VOL. 1.

Date: Apr. 22-24, 1970 Pages: 10 References: 9

Report Identification number(s): 70A33719

Abbreviated Abstract: Prospects for space manufacturing of glasses, crystals, filaments, solid lubricants, cements, cast composites, perfect spheres, sinters, seed materials, vaccines, enzymes, isotopes, antibiotics, and polymers. Liquid phase physical chemistry of zero-g, instrumentation, and scaling laws are reviewed.

(6.) Author(s): C. L. Kober
Martin Marietta Corp., Denver, Colorado

Title: Commercial Use of Space Station

Source: American Astronautical Society, Annual Meeting, 16th
Anaheim, California

Date: June 8-10, 1970 Pages: 9 References: 7

Report Identification number(s): 70A34791, AAS Paper #70-036

Abbreviated Abstract: Review of 100 candidate products for space production. Liquid-solid phase transformations, bubbles and droplets, polymerization, catalysis, low-energy reactions and cast effectiveness are discussed.

(7.) Author(s): H. F. Bauer
Georgia Institute of Technology, Atlanta, Georgia
Title: New Developments of Fabrication in Orbit
Source: European Space Symposium, 11th, Berlin, West Germany

Date: May 24-26, 1971 Pages: 27 References:

Report Identification number(s): 71A32856

Abbreviated Abstract: Degassing and bubble migration in liquified materials without gravity. Metal and optical lens casting, crystal growth.

(8.) Author(s): J. G. Lundholm, L. N. Werner, H. H. White
NASA, MSFC
Title: Skylab As Factory, Worksite and Observatory
Source: Astronautics and Aeronautics, VOL. 9

Date: June 1971 Pages: 11 References:

Report Identification number(s): 71A31460

Abbreviated Abstract: Discussion of experiments (in science, technology, materials science and manufacturing in space) and support facilities on Skylab.

(9.) Author(s): G. R. Woodcock
Boeing Company, Aerospace Group

Title: On the Economics of Space Utilization

Source: International Astronautical Congress, 23rd Vienna,
Austria

Date: Oct. 8-15, 1972 Pages: 26 References: 34

Report Identification number(s): 72A45216

Abbreviated Abstract: Economic analysis for assessing commercial
space applications. Some treatment of
manufacturing in space.

(10) Author(s): L. R. McCreight; R. N. Griffin
General Electric, Space Division, Philadelphia, Pa.

Title: Manufacturing in Space - Payloads for the Space Shuttle

Source: Space for Mankind's Benefit: Proceedings of the First
International Space Congress, Huntsville, Alabama

Date: Nov. 15-19, 1971 Pages: 7 References: 15

Report Identification number(s): 72A18622

Abbreviated Abstract: Float-zone refined semi-conductors, oxide
crystals, viral insecticides, vaccines, and
biological cells.

(11) Author(s): K. A. Ehricke
North American Rockwell Corp., Space Division, Downey, Calif.

Title: Extraterrestrial Imperative

Source: Bulletin of the Atomic Scientists, VOL. 27, p. 18-26

Date: Nov. 1971

Pages: 9

References:

Report Identification number(s): 72A27625

Abbreviated Abstract: Extraterrestrial environment utilization, describing space power plants, manufacturing operations in earth orbit and planetary mineral resources.

(12) Author(s): L. R. McCreight, L. Steg
General Electric Space Services Laboratory

Title: Space Processing - Projections to 2000 A.D.

Source: International Astronautical Congress, 23rd
Vienna, Austria

Date: Oct. 8-15, 1972

Pages: 15

References: 6

Report Identification number(s): 72A45157

Abbreviated Abstract: Economic zero-gravity processing of materials in liquid or molten state, single crystal electronic materials, and high-purity biologicals on space shuttle in the 1980's.

(13.) Author(s): H. C. Gatos
MIT, Center for Materials Sciences and Engineering
Title: Space Environment - A New Dimension In the Preparation of
Unique Solids

Source: MIT, Center For Materials Sciences and Engineering
Cambridge, Massachusetts
MSFC, Space for Mankind's Benefit

Date: 1972 Pages: 3 References:

Report Identification number(s): 73N13861, (part of N73-13829)

Abbreviated Abstract: Effect of nongravitational environments on the
development of homogeneous materials that
cannot be manufactured on earth.

(14.) Author(s): B. E. Paton
Akademia Nauk Ukrainsoi SSR, Kiev, Ukrainian SSR

Title: The Problems of Space Technology and Their Influence on
Science and Technics

Source: International Astronautical Congress, 24th
Baku, Azerbaïdzhan SSR

Date: Oct. 7-13, 1973 Pages: 17 References:

Report Identification number(s): 74A12843

Abbreviated Abstract: Soviet test equipment, manual and automatic
tools, program controlled plants and key factors
(weightlessness, deep vacuum, and temperature)
in their use.

(15.) Author(s):

Battelle Memorial Institute

Title: Investigation of Immiscible Systems and Potential Applications

Source:

Date: July 9, 1973

Pages:

References:

Report Identification number(s): BMI 8-29748-MPR-1
Contract NAS8-29748

Abbreviated Abstract:

(16.) Author(s):

Carnegie-Mellon University

Title: Problems and Uses of Outer Space

Source:

Date: May 8, 1970

Pages:

References:

Report Identification number(s): CMU-8-25202-FR-May 1970
Contract NAS8-25202

Abbreviated Abstract:

(17.) Author(s): W. H. Steurer, S. Kay, D. J. Gorham
General Dynamics, Convair Division

Title: Space Processes for Extended Low-G Testing
Final Report

Source:

Date: June 15, 1973 Pages: 374 References:

Report Identification number(s): N73-31752, NASA-CR-124285
Contract NAS8-28615

Abbreviated Abstract: Ground based low-g experiments verification of space process capabilities. Defines a minimum equipment inventory of modular design. Procedures for synthesis and definition of dedicated and mixed rocket payloads.

(18) Author(s): D. D. Scarff, H. L. Bloom
General Electric Co.

Title: A Business Man Views Commercial Ventures In Space

Source:

Date: Jan. 1973 Pages: References:

Report Identification number(s): 73A17640,
Contract NAS8-28179

Abbreviated Abstract: Technical, resource planning and marketing steps necessary for space research and development by industrial groups.

(19.) Author(s): Arthur D. Little, Inc.

Title: Feasibility Study for the Manufacture of
Pharmaceuticals, Immunological, and Viral Agents

Source:

Date: Sept. 15, 1973 Pages: References:

Report Identification number(s): LITTLE 8-29874-MR-Sept. 73
Contract NAS8-29874

Abbreviated Abstract:

(20.) Author(s): United Aircraft Corp., Pratt and Whitney

Title: Processing Eutectics In Space

Source:

Date: June 30, 1973 Pages: References:

Report Identification number(s): PWA 8-29669 MPR
Contract NAS8-29669

Abbreviated Abstract:

II. Space Manufacturing Management and Planning

A. General Planning

(1.) Author(s): J. R. Williams
NASA, MSFC

Title: Space Manufacturing Modules

Source: Canaveral Council of Technical Societies, Space Congress
6th, Cocoa Beach, Florida

Date: Mar. 17-19, 1969 Pages: 18 References:

Report Identification number(s): 69A35067, (part of A69-35055)

Abbreviated Abstract: Proposed program to develop space manufacturing in three phases: investigation of zero gravity effects on processes in earth orbit by package in Apollo Applications Program Orbital Workshop; improved space manufacturing chamber; and room size manufacturing module.

(2.) Author(s): W. O. Armstrong
NASA, MSFC

Title: Earth Orbital Payload Planning

Source: NASA- Space Processing and Manufacturing Meeting
Washington, D.C.

Date: Oct. 21, 1969 Pages: 31 References:

Report Identification number(s): 70N14652, (Part of N70-14651)

Abbreviated Abstract: Plans for space processing and manufacturing experiments on AAP Workshops, space station and shuttle.

(3.) Author(s): W. O. Armstrong
NASA, MSFC

Title: Earth Orbital Payload Planning

Source: NASA- Space Processing and Manufacturing Meeting
Washington, D.C.

Date: Feb. 5, 1970 Pages: 30 References:

Report Identification number(s): 70N20518 (part of N70-20517)

Abbreviated Abstract: Plans for space processing and manufacturing experiments in next decade. Procedures for soliciting and selecting industrial inputs. Policies on funding and proprietary rights.

(4) Author(s): W. O. Armstrong, J. H. Bredt
NASA, MSFC

Title: Status and Plans of NASA's Materials Science and Manufacturing in Space (MS/MS) Program

Source: NASA - Space for Mankind's Benefit
Washington, D.C.

Date: 1972 Pages: 8 References:

Report Identification number(s): 73N13860, Part of N73-13829

Abbreviated Abstract: Space Shuttle preparations for possible manufacturing operations on permanently orbiting space stations.

(5.) Author(s): D. R. Mulholland, J. O. Reller, Jr., C. B. Neel, L.C. Haughney

Title: Study of Airborne Science Experiment Management Concepts For Application to Space Shuttle, VOL. 1: Executive Summary

Source: NASA/Ames Research Center
Moffett Field, California

Date: July 1973

Pages: 23

References:

Report Identification number(s): 74N13570, NASA-TM-X 62288

Abbreviated Abstract: Management concepts and operating procedures for shuttle spacelab operations, experimenter involvement, experiment development and data handling.

(6.) Author(s): M. Levy
ESRO, Delft, Netherlands

Title: Review of European Space Projects After 1980

Source: The Second Fifteen Years In Space; Proceedings of the Eleventh Goddard Memorial Symposium, Washington, D.C.

Date: Mar. 8-9, 1973

Pages: 8

References:

Report Identification number(s): 74A14472, (Part of A74-14463)

Abbreviated Abstract: Future development is based on current efforts in aeronautics, meteorology, telecommunications. Use of Spacelab as part of the Space Shuttle.

(7.) Author(s): K. D. Berge, A. Tegtmeier
ERNO, Raumfahrttechnik GmbH, Bremen

Title: Spacelab - Europe's Participation in Manned Space Flight
and its Long-Term Aspects

Source: Oesterreichische Gesellschaft Fuer Weltraumforschung und
Elugkoerpertechnik and Deutsche Gesellschaft Fuer Luft - und
Raumfahrt, Gemeinsame Jahrestagung, 6th, Innsbruck, Austria

Date: Sept. 24-28, 1973 Pages: 26

References:

Report Identification number(s): 74A17182, DGLR Paper 73-075

Abbreviated Abstract: In German. Remote sensors, earth resources,
air pollution; space manufacturing, mission
planning, space shuttle, spacelab economic
factors.

(8.) Author(s): J. E. Meyers
Teledyne-Brown Engineering Co.

Title: Skylab Experiment Performance Evaluation Manual

Source:

Date: Jan. 1972

Pages: 29

References:

Report Identification number(s): N72-24853, NASA-CR-61386
Contract NAS8-21804

Abbreviated Abstract: Preparation analyses for evaluation performance
of Skylab corollary experiments under pre-, in-,
and post-flight conditions, with contingency plans.

(9.) Author(s): O. H. Thomas, Jr.
Teledyne-Brown Engineering Co.

Title: Skylab Experiment Performance Evaluation Manual
Appendix E: Experiment M512 Materials Processing Facility

Source:

Date: May 1973

Pages: 140

References:

Report Identification number(s): N73-23859, NASA-CR 61386-APP-E
Contract NAS8-21804

Abbreviated Abstract:

(10) Author(s): M. S. Byers
Teledyne-Brown Engineering Co.

Title: Skylab Experiment Performance Evaluation Manual
Appendix F: Experiment M551 Metals Melting (MSFC)

Source:

Date: May 1973

Pages: 119

References:

Report Identification number(s): 73N23860, NASA-CR-61386-APP-F
Contract NAS8-21804

Abbreviated Abstract:

(11) Author(s): O. H. Thomas, Jr.
Teledyne-Brown Engineering Co.

Title: Skylab Experiment Performance Evaluating Manual
Appendix G: Experiment M552 Exothermic Brazing (MSFC)

Source:

Date: May 1973 Pages: 94 References:

Report Identification number(s): 73N23861, NASA-CR-61386-APP-G
Contract: NAS8-21804

Abbreviated Abstract:

(12) Author(s): O. H. Thomas, Jr.
Teledyne-Brown Engineering Co.

Title: Skylab Experiment Performance Evaluating Manual
Appendix H: Experiment M553 Sphere Forming (MSFC)

Source:

Date: May 1973 Pages: 166 References:

Report Identification number(s): 73N23862, NASA-CR-61386-APP-H
Contract: NAS8-21804

Abbreviated Abstract:

(13) Author(s): M. S. Byers
Teledyne-Brown Engineering Co.

Title: Skylab Experiment Performance Evaluation Manual
Appendix J: Experiment M565 Gallium Arsenide Single
Crystal Growth

Source:

Date: May 1973 Pages: 87 References:

Report Identification number(s): N73-23863, NASA-CR-61386-APP-J
Contract NAS8-21804

Abbreviated Abstract:

(14) Author(s): A. R. Kuhlthau
Universities Space Research Association

Title: Review, Study, and Evaluation of Possible Flight
Experiments Relating to Materials Processing in Space
Final Report

Source:

Date: July 1974 Pages: References:

Report Identification number(s): Contract NAS8-27734

Abbreviated Abstract: Formation of study teams to provide independent
assessment of programs of analysis, measurements
and experiments. No technical information
contained in this report.

(15.) Author(s): R. G. Hatterick
URS/Matrix Company

Title: Development of Flight Experiment Work Performance and Workstation Interface Requirements, Part I. Technical Report and Appendices A through G.

Source:

Date: Aug. 31, 1973 Pages: 348 References:

Report Identification number(s): 73N32733, NASA-CR-124409, PRL-415-Pt-1
Contract NAS8-29359

Abbreviated Abstract: Final Report. Definition of Skills required of crew in support of Sortie Lab space shuttle experiments.

(16.) Author(s): J. M. Tobin
Westinghouse Electric Corporation

Title: Research Study on Materials Processing In Space Experiment Number 512 - Phase A Preparation of Ground Base Study Plan

Source:

Date: Aug. 15, 1972 Pages: 8 References:

Report Identification number(s): WANL L-792
Contract NAS8-28730

Abbreviated Abstract:

(17) Author(s): J. M. Tobin, R. Kossowsky
Westinghouse Electric Corporation

Title: Research Study on Materials Processing In Space Experiment
Number 512 - Phase B Laboratory Test Program on M552 and
M553 - Summary Report

Source:

Date: July 15, 1973 Pages: References:

Report Identification number(s): WANL L-848
Contract NAS8-28730

Abbreviated Abstract:

(18) Author(s): J. M. Tobin, R. Kossowsky
Westinghouse Electric Corporation

Title: Research Study on Materials Processing Experiment Number
M512, Final Report on M551, M552, and M553

Source:

Date: Dec. 12, 1973 Pages: 30 References:

Report Identification number(s): N74-35249, WANL L-954 Rev.,
NASA-CR-120479, Contract NAS8-28730

Abbreviated Abstract: Strength of adhesion and cohesion of melted
metals appears undiminished by zero gravity.
Brazing is practical for joining or repairing
in space and is tolerant of dimensional gap
variation.

(19) Author(s): J. M. Tobin
Westinghouse Electric Corporation, Astronuclear Lab.

Title: Research Study on Materials Processing in Space, Experiment
Number M512. Special Summary Report on M551, M552, and M553
(Adhesion - Cohesion Phenomena)

Source:

Date: March 1974 Pages: 26 References:

Report Identification number(s): N74-34880, WANL-TME-2850
NASA-CR-120480, Contract NAS8-28730

Abbreviated Abstract:

() Author(s):

Title:

Source:

Date: Pages: References:

Report Identification number(s):

Abbreviated Abstract:

II. Space Manufacturing Management and Planning

B. Skylab Program Planning

(1.) Author(s): J. H. Bredt
NASA, MSC

Title: New Space Processing Experiments for the Skylab Missions

Source: International Astronautical Congress, 23rd
Vienna, Austria

Date: Oct. 8-15, 1972 Pages: 25 References:

Report Identification number(s): 72A45125

Abbreviated Abstract: Application of gravity control and vacuum, temperature, pressure and radiation characteristics of space to liquid-matrix preparation of composites, fine grain castings, super-saturated alloys, immiscible liquid-phase combinations, containerless free suspension, surface tension casting and drawing, adhesion casting and controlled density casting.

(2.) Author(s): V. H. Yost
NASA, MSFC

Title: Experimental Studies of Manufacturing Processes
Performed in Zero-G

Source: Res. Achievements Rev. VOL. 4
NASA/MSFC Huntsville, Alabama

Date: Feb. 1973 Pages: 40 References:

Report Identification number(s): 73N22922, Part of N73-22915

Abbreviated Abstract: Summary of experiments in support of Skylab. Methods of obtaining short periods of near zero gravity are illustrated and evaluated.

(3.) Author(s): W. D. Green
NASA, Skylab Program Office, Washington, D.C.

Title: Skylab II - Seeing the Sun in a Different Light -- Mission
Equipment, Experiments and Observations

Source: Astronautics and Aeronautics, VOL. 12

Date: Feb. 1974 Pages: 10 References:

Report Identification number(s): 74A20168

Abbreviated Abstract: Space manufacturing as a minor topic.

() Author(s):

Title:

Source:

Date: Pages: References:

Report Identification number(s):

Abbreviated Abstract:

II. Space Manufacturing Management and Planning

C. Space Shuttle Design/Payload Interface

(1.) Author(s):

Title: Proceedings of the Space Shuttle Sortie Workshop, VOL. 2
Working Group Reports

Source: NASA/Goddard Space Flight Center
Greenbelt, Maryland

Date: Aug. 4, 1972 Pages: 561 References:

Report Identification number(s): 73N15867, NASA-TM-X68842

Abbreviated Abstract: Mission planning progress in many areas
including materials processing and space
manufacturing. Working group reports.

(2.) Author(s):

Aerospace Corp., Systems Engineering Operations

Title: Payload Analysis for Space Shuttle Applications (Study 2.2)
VOL. 4 Executive Summary

Source: Aerospace Corp., El Segundo, California

Date: Oct. 15, 1972 Pages: 25 References:

Report Identification number(s): 73N16872, NASA-CR-130025, ATR-73(7312)-
1-Vol-4, NASw-2031

Abbreviated Abstract: Final Report 1 October 1971 - 31 August 1972
Payload guidelines for space shuttle/tug.

(3.) Author(s):

Title: Sortie-Laboratory Preliminary Definition Study, Requirements and Concepts Report

Source: Messerschmitt-Boelkow-Blohm G. M.B.H., Ottobrunn, West Germany, Space Division

Date: Nov. 15, 1972 Pages: 707 References:

Report Identification number(s): 73N22826, MBB-LS-72-04 (E, Stec-1544/72-EL)

Abbreviated Abstract: Examination of subsystems resulting in common support system for integrated payload providing standardization and reduced turnaround time.

(4.) Author(s):

Title: Sortie Laboratory Preliminary Definition Study, Requirements and Concepts Report., VOL. 1: Requirements

Source: British Aircraft Corp., Filton, England

Date: Nov. 1972 Pages: 145 References:

Report Identification number(s): 73N26902, ESS/SS-399-VOL 1, (ESRO-CR(P)-241)

Abbreviated Abstract: Description of shuttle interface, operational analyses of experiment integration. Project and design guidelines given by ESRO are included.

(5.) Author(s):

Title: Sortie Laboratory Preliminary Definition Study Requirements and Concepts Report. VOL. 2: Concepts

Source: British Aircraft Corp., Filton, England

Date: Nov. 1972 Pages: 316 References:

Report Identification number(s): 73N26903, ESS/SS-399-VOL-2

Abbreviated Abstract: Requirement assessment, trade-off studies and resulting preferred concept for each subsystem. Cost effectiveness and flexibility applied to arrive at a preferred configuration.

(6.) Author(s):

Title: Sortie Laboratory Preliminary Definition Study, Requirements and Concepts Report - VOL. 3: System Evaluation

Source: British Aircraft Corp., Filton, England

Date: Nov. 1972 Pages: 38 References:

Report Identification number(s): 73N26904, ESS/SS-399-VOL.3;
ESRO-CR(P)-243

Abbreviated Abstract: Technological implications, preliminary assessment of system costs, safety aspects, potential system growth (to 6 crew, 30 day mission).

(7.) Author(s): W. R. Marshall
NASA, MSFC

Title: Payloads

Source: Space Shuttle Program: Proceedings of the Short Course,
Boulder, Colorado

Date: Oct. 6-7, 1972 Pages: 58 References:

Report Identification number(s): 73A37593, Part of A73-37591

Abbreviated Abstract: Payload definition, design and planning
techniques in Space Shuttle program.

(8.) Author(s):

Title: Sortie Laboratory, Phase B. Technical Summary -- Design
and Operational Requirements

Source: NASA/MSFC Huntsville, Alabama

Date: Nov. 16, 1973 Pages: 200 References:

Report Identification number(s): 74N11697, NASA-TM-X-69442

Abbreviated Abstract: Summary of Sortie Lab (SL) analysis, source of
systems requirements and experimental support
for SL baseline. Configuration definition,
mission analysis, experiment integration, safety
and logistics.

(9.) Author(s):

Title: The Space Shuttle Payload Planning Working Groups: VOL. 9:
Materials Processing and Space Manufacturing. Final Report

Source: NASA/Goddard Space Flight Center
Greenbelt, Maryland

Date: May 1973 Pages: 73 References:

Report Identification number(s): 74N15526, NASA-TM-X69459

Abbreviated Abstract: Areas recommended for investigation: effects of weightlessness on levitation, mixture stability, control over heat and mass transport in fluids. Research and development projects: metallurgical and non-metallic materials and processes, electronic materials and biological applications. Payload allocation; experiment acceptance and flight qualification; private use of shuttle.

(10) Author(s): D. Shapland
ESRO, Delft, Netherlands

Title: Space Science Prepares to Take Off -- Skylab Configurations
For Spaceborne Experiments

Source: New Scientist, VOL. 6

Date: Feb. 28, 1974 Pages: 3 References:

Report Identification number(s): 74A24652

Abbreviated Abstract: Spacelab description and potential.

(11) Author(s): H. Tolle, A. Tegtmeier, W. Wienss
ERNO Raumfahrttechnik GmbH, Bremen, West Germany

Title: The Modular Space Lab - Results of a European Phase A Study

Source: Technology Today and Tomorrow; Proceedings of the Tenth
Space Congress, Cocoa Beach, Florida

Date: April 11-13, 1973 Pages: 16 References:

Report Identification number(s): 74A16109, Part of A74-16101

Abbreviated Abstract: Results of Sortie Lab/Pallet system study.
Sponsored by ESRO.

(12) Author(s): R. W. Johnson
NASA, Office of Manned Space Flight, Washington, D.C.

Title: The European Shuttle Payload Activity

Source: Space Shuttle Payloads; Proceedings of the Symposium
Washington, D.C.

Date: Dec. 27-28, 1972 Pages: 13 References:

Report Identification number(s): 74A14124, Part of A74-14102

Abbreviated Abstract: Description of ESRO organization for Space Shuttle
payload planning. Evaluation of Sortie Lab design
activity.

(13.) Author(s): J. C. Heberlig
NASA Johnson Space Center, Space Shuttle Program Office

Title: The Space Shuttle System Description, Operations, and
Payload Capabilities

Source: Space Shuttle Payloads, Proceedings of the Symposium
Washington, D.C.

Date: Dec. 27-28, 1972 Pages: 42 References:

Report Identification number(s): 74A14103, Part of A-74-14102

Abbreviated Abstract: Characteristics of Space Shuttle System,
mission and performance baselines, orbital
parameter/payload capability relationships,
scientific and applications operating modes.

(14) Editor(s): G. W. Morgenthaler, W. J. Bursnall
Martin Marietta Aerospace

Title: Space Shuttle Payloads; Proceedings of the Symposium
Washington, D.C.

Source: Symposium by American Association for Advancement of
Science, Operations Research Society of America; American
Astronautical Society

Date: 1973 Pages: 509 References:

Report Identification number(s): 74A14102

Abbreviated Abstract: AAS Science and Technology series. Volume 30.
Space Shuttle System, payloads and utilization
including cost effectiveness.

(15) Author(s):

General Dynamics, Convair Division

Title: Shuttle System Payload Data Activity Plan (SSPDA)

Source:

Date: Feb. 23, 1973

Pages:

References:

Report Identification number(s): NASA-CR-133277, GDCA-DDA73-001
73X78183, Contract NAS8-29462

Abbreviated Abstract:

(16.) Author(s):

Lockheed, Sunnyvale

Title: Low Cost Payload Design Concepts Study
VOL. 1 - Executive Summary

Source:

Date: June 1973

Pages:

References:

Report Identification number(s): LMSC 8-28960-D 336289
Contract NAS8-28960

Abbreviated Abstract:

(17) Author(s):

Title: Low Cost Payload Design Concepts Study, Vol. 2 - Mission Requirements Analysis and Subsystem/Spacecraft Selection

Source:

Date: June 1973

Pages:

References:

Report Identification number(s): LMSC 8-28960-D 336290
Contract NAS8-28960

Abbreviated Abstract:

(18) Author(s): R. L. Hammett
TRW Systems Group

Title: Requirements and Concepts for Materials Science and Manufacturing in Space Payload Equipment Study. Vol. 1 - Executive Summary

Source:

Date: July 1973

Pages: 16

References:

Report Identification number(s): 74X10030, NASA-CR-120115
Contract NAS8-28938

Abbreviated Abstract:

(19) Author(s): R. L. Hammel
TRW Systems Group

Title: Requirements and Concepts for Materials Science and
Manufacturing in Space Payload Equipment Study, Vol. 2A

Source:

Date: July 1973 Pages: 58 References:

Report Identification number(s): 74X10031, NASA-CR-120116
Contract NAS8-28938

Abbreviated Abstract:

(20) Author(s): A. Smith
TRW Systems Group

Title: Requirements and Concepts For Materials Science and
Manufacturing In Space Payload Equipment Study, Vol. 2B

Source:

Date: July 1973 Pages: 216 References:

Report Identification number(s): 74X10032, NASA-CR-120117,
NAS8-28938

Abbreviated Abstract:

(21.) Author(s): W. T. Anderson, Jr.
TRW Systems Group

Title: Requirements and Concepts For Materials Science and
Manufacturing in Space Equipment Study. Vol. 2C

Source:

Date: July 1973

Pages: 33

References:

Report Identification number(s): 74X10033, NASA-CR-120118
Contract NAS8-28938

Abbreviated Abstract:

(22.) Author(s): J. O. Bird
TRW Systems Group

Title: Requirements and Concepts for Materials Science and
Manufacturing In Space Equipment Study, Vol. 2D
Payload Equipment.

Source:

Date: July 1973

Pages: 112

References:

Report Identification number(s): 74X10034, NASA-CR-120119,
Contract NAS8-28938

Abbreviated Abstract:

(23.) Author(s): D. M. Waltz
TRW Systems Group

Title: Requirements and Concepts for Materials Science and
Manufacturing In Space Payload Equipment Study, Vol. 3
Operations Analysis.

Source:

Date: July 1973 Pages: 57 References:

Report Identification number(s): 74X10035, NASA-CR-120120
Contract NAS8-28938

Abbreviated Abstract:

(24.) Author(s): R. L. Hammel
TRW Systems Group

Title: Requirements and Concepts for Materials Science and
Manufacturing In Space Payload Equipment Study, Vol. 3
Programmatic.

Source:

Date: July 1973 Pages: 38 References:

Report Identification number(s): 74X10036, NASA-CR-120121
Contract NAS8-28938

Abbreviated Abstract:

II. Space Manufacturing Management and Planning

D. Space Shuttle Planning and Utilization

(1.) Author(s): W. E. Silvertson, Jr.
NASA Langley Research Center

Title: A Shuttle Compatible Advanced Technology Laboratory

Source: AIAA, ASME, and SAE Joint Space Mission Planning and Executive Meeting, Denver, Colorado

Date: July 10-12, 1973 Pages: 11 References:

Report Identification number(s): 73A36089, AIAA Paper 73-611

Abbreviated Abstract: Space can routinely be made available to the Langley researcher via the shuttle-compatible spaceborne advanced technology laboratory with sortie flight operation mode.

(2.) Author(s): P. E. Culbertson
NASA, Office of Manned Space Flight, Washington, D.C.

Title: The Space Shuttle and Its Utilization

Source: COSPAR, Plenary Meeting, 16th, Konstanz, West Germany

Date: May 23-June 5, 1973 Pages: 24 References:

Report Identification number(s): 73A35936

Abbreviated Abstract: Shuttle capabilities for satellite delivery, revisit, sortie mission, and delivery to higher orbits with the Tug.

(3.) Author(s): J. E. Naugle
NASA, Washington, D.C.

Title: Research With the Space Shuttle

Source: Physics Today, VOL. 26

Date: Nov. 1973

Pages: 7

References:

Report Identification number(s): 74A11344

Abbreviated Abstract: Space manufacturing, plasma physics,
spaceborne astronomy.

(4.) Author(s): J. P. Causse
Techtran Corp., Glen Burnie, Maryland

Title: The Spacelab Program --- Project Conceptualization and
Planning

Source: Communication Presentee au 24 eme Congres International
D'Astronautique, Bakou, October, 1973.

Date: Nov. 1973

Pages: 22

References:

Report Identification number(s): 74N12497 (NASw-2485)

Abbreviated Abstract: Spacelab users; shuttle interfaces, crew,
models and configurations. Decision to be
made by European governments.
English translation.

(5.) Author(s): K. A. Ehricke
North American Rockwell Corp., Space Division
Title: Use of Shuttle in Establishing Large Space Installations

Source: Space Shuttle Payloads; Proceedings of the Symposium
Washington, D.C.

Date: Dec. 27-28, 1972 Pages: 50 References: 23

Report Identification number(s): 74A14121

Abbreviated Abstract: Feasibility of orbiting solar reflection and
space power generation and distribution plants;
space manufacturing.

(6.) Author(s): J. Henrici
Messerschmitt-Boelkow Blohm GmbH, Munich, West Germany
Title: European Industrial Cooperation in the Space Effort

Source: Proceedings of the Eleventh Goddard Memorial Symposium
Washington, D.C.

Date: Mar. 8-9, 1973 Pages: 9 References:

Report Identification number(s): 74A14471

Abbreviated Abstract: European industrial role in European space
program definition and relationship, (via ESRO
and NASA) with U.S. firms.

(7.) Author(s):

Title: Spacelab --- NASA-ERSO Payload of Space Shuttle

Source: Flug Revue/Flugwelt International

Date: May 1974

Pages: 4

References:

Report Identification number(s): 74A29831

Abbreviated Abstract: In German. Background, research objectives and design of Spacelab.

(8.) Author(s): McDonnell-Douglas Astronautics, Co.
Huntington Beach, California

Title: Shuttle Orbital Applications/Requirements (SOAR)
Supplementary Tasks

Source: McDonnell-Douglas Astronautics, Co.
Huntington Beach, California

Date: Sept. 1973.

Pages: 365

References:

Report Identification number(s): N73-32771, NASA-CR-124431

Abbreviated Abstract:

III. Fluid Mechanics and Heat Transfer

A. General Fluid Motion Studies

(1.) Author(s): I. Brazinsky; S. Weiss

Title: A Photographic Study of Liquid Hydrogen Under Simulated Zero Gravity Conditions

Source: NASA/Lewis Research Center, Cleveland, Ohio

Date: February 1962 Pages: 16 References: 5

Report Identification number(s): 62N10095, NASA-TM-X-479

Abbreviated Abstract: During three-quarters of a second free-fall in a Dewar, adhesive forces caused liquid to "rise" into original gas space.

(2.) Author(s): B. W. Randolph

Title: Analytical Program on Zero Gravity and Near-Zero Gravity Hydrodynamics and Heat Transfer in Fluids, Quarterly Progress Report

Source: Northrop Corp., Hawthorne, California, Quarterly Progress Report

Date: 1 October - Pages: 10 References: 2
31 Dec. 1962

Report Identification number(s): 63X11153; NASr-23

Abbreviated Abstract: Some key words: camera, cylinder, Euler-Lagrange equation simulator

(3.) Author(s): V. V. Shuleykin

Title: Shape of the Surface of a Liquid in Process of Losing Its Weightiness

Source: NASA, Washington, D.C.
Doklady Akad. Nauk SSSR 1 Moscow
Vol. 147, No. 1, Nov. 1, 1962

Date: Jan. 31, 1963 Pages: 10 References: 3

Report Identification number(s): 63X11449; NASA-TT-F-8373

Abbreviated Abstract: Translated by Andre L. Brechant
Some key words: cylinder, dynamics, flask,
meniscus, pressure, rotation,
surface tension, weightlessness,
wetting

(4.) Author(s): R. J. Good; J. T. Neu

Title: Equilibrium Behavior of Fluids in Containers at Zero Gravity

Source: General Dynamics, Space Science Lab., San Diego,
California, AIAA J., vol. 1

Date: April 1963 Pages: 6 References: 6

Report Identification number(s): 63A15876, 65A19324

Abbreviated Abstract: Wall wetting fluids will distribute about the container with vapor centrally located, and can be accumulated in desired volumes by use of baffles. Based on intersurface energy configurations.

(5.) Author(s): V. V. Shuleikin

Title: Earth-Bound Experiments with Weightless Liquids

Source: Akademiya Nauk SSR, Doklady, Vol. 152

Date: Oct. 11, 1963 Pages: 4

References:

Report Identification number(s): 64A11349

Abbreviated Abstract: In Russian. Ground based experimental apparatus for filming liquid behavior in free fall for 0.9 seconds.

(6.) Author(s): L. IA. Liubin; A. S. Povitskiy

Title: Emptying and Filling Vessels in Conditions of Weightlessness

Source: Planetary and Space Science, VOL. 11

Date: Nov. 1963 Pages: 16

References:

Report Identification number(s): 64A12692

Abbreviated Abstract: Three and two dimensional analyses of gas pressure-pulse method; surface tension method of liquid transfer. Translated from Russian (A63-18195).

(7.) Author(s): V. V. Shuleikin

Title: Ground Experiments with Weightless Liquids

Source: Akademiia Nauk SSSR, Doklady, VOL. 152

Date: Oct. 11, 1963 Pages: 4 References:

Report Identification number(s): 64A17071

Abbreviated Abstract: Ground based experimental apparatus for filming liquid behavior in free fall for 0.9 seconds. Results for water and mercury. Translated from Russian (A6411349)

(8.) Author(s): V. B. Zenkevich
Nauchno--Issledovatel'skii Institut Vysokikh
Temperatur, Moskow, USSR

Title: Behavior of a Fluid in Zero-Gravity Conditions

Source: Teplofizika Vysokikh Temperatur, VOL. 2

Date: March - April 1964 Pages: 8 References: 6

Report Identification number(s): 64A21777

Abbreviated Abstract: In Russian. Processes occurring in a partially-filled spherical container during transition to zero gravity. (Translation, A65-20539.)

(9.) Author(s): E. W. Otto
NASA-Lewis Research Center

Title: Static and Dynamic Behavior of the Liquid-Vapor Interface During Weightlessness

Source: American Inst. of Chemical Engineers, National Meeting, 55th Symposium on Effects of Zero Gravity on Fluid Dynamics and Heat Transfer, Houston, Texas

Date: Feb. 7 - 11, 1965 Pages: 39 References: 29

Report Identification number(s): 65A15228

Abbreviated Abstract: Survey of liquid-vapor system problem areas and review of related research literature: interface dynamics, pool boiling heat-transfer mechanisms, and evaporation and condensation phenomena.

(10.) Author(s): R. J. Good, J. T. Neu
General Dynamics Corp., General Dynamics/Astronautics

Title: Fluid Behavior in Zero Gravity

Source: AIAA Journal, VOL. 1, April 1963
International Astronautical Congress, 13th Varna, Bulgaria, September 1962

Date: 1964 Pages: 16 References: 15

Report Identification number(s): 65A19324

Abbreviated Abstract: Investigation of equilibrium configuration of fluid in absence of gravity field based on intersurface energy considerations. See also A63-15876.

(11) Author(s): F. L. Chernousko

Title: Self-Similar Motion of Fluid Under the Action of Surface Tension

Source: NASA/Washington, D. C.
Prikl. Mat. I Mekh., Moscow, VOL. 19

Date: Sept. 1965 Pages: 16 References:

Report Identification number(s): 65N33960, NASA-TT-F-9561

Abbreviated Abstract: Effect of surface tension on weightless fluid behavior.

(12) Author(s): E. T. Benedikt; R. Halliburton; F. C. Hung; T. C. Li

Title: Propellant Behavior in Zero Gravity; Final Report

Source: North American Aviation, Inc., Downey, California

Date: Nov. 2, 1964 Pages: 63 References:

Report Identification number(s): 65X14834; NASA-CR-62508
Contract NAS8-11097

Abbreviated Abstract: Weightless liquid propellant behavior - dynamics of liquids with a free surface, heat transfer to liquids in motion.

(13) Author(s): E. W. Otto

Title: Static and Dynamic Behavior of the Liquid-Vapor Interface During Weightlessness

Source: NASA/Lewis Research Center, Cleveland, Ohio

Date: 1965 Pages: 69 References:

Report Identification number(s): 66X13032; (part of X66-13022)

Abbreviated Abstract: Part of proceedings of The Conference on Propellant Tank Pressurization and Stratification, VOL. II, 1965, NASA, MSFC.

(14) Author(s): F. L. Chernousko, N. N. Moiseyev

Title: Problems of Oscillations of a Fluid Subjected to Surface Tension Forces

Source: NASA/Washington, D. C.
Zh. Vychislitel'noi Mat. Fiz.
Moscow, VOL. 5, No. 6, 1965

Date: May 1966 Pages: 45 References:

Report Identification number(s): 66N27499, NASA-TT-F-10141

Abbreviated Abstract: Small linear oscillations of ideal fluid in the presence of surface tension in weightlessness or weak gravitational fields. English translation.

(15) Author(s): F. L. Chernousko

Title: Self-Similar Motion of a Liquid Under the Action of Surface Tension

Source: PMM-Journal of Applied Mathematics and Mechanics,
VOL. 29, No. 1

Date: 1965 Pages: 8 References:

Report Identification number(s): 66A28053, A65-23205

Abbreviated Abstract: Effect of surface tension on weightless liquid behavior.

(16) Author(s): E. W. Otto
NASA, Lewis Research Center

Title: Static and Dynamic Behavior of the Liquid-Vapor Interface During Weightlessness

Source: American Inst. of Chemical Engineers, National Meeting,
55th Symposium on Effects of Zero Gravity on Fluid
Dynamics and Heat Transfer, Houston, Texas

Date: Feb. 7 - 11, 1965 Pages: 20 References:

Report Identification number(s): 66A39886

Abbreviated Abstract: Liquid-vapor system problem areas and research literature.

(17) Author(s): E. W. Otto
NASA/Lewis Research Center, Cleveland, Ohio

Title: Hydrodynamics of Liquid Surfaces

Source: Selected Technology for the Petroleum Industry

Date: 1966 Pages: 21 References:

Report Identification number(s): 66N33669 (part of N66-33666)

Abbreviated Abstract: Research on dynamic behavior of liquids and gases in zero gravity flight: drop tower, aircraft, and rocket facilities. Interface statics in cylinders and spheres and with baffles.

(18) Author(s): W. C. Reynolds; H. M. Satterlee
Lockheed Missiles and Space Co.

Title: Liquid Propellant Behavior at Low and Zero G

Source: Stanford University, California, Department of Mechanical Engineering, Southwest Research Institute Dyn. Behavior of Liquids in Moving Containers.

Date: 1966 Pages: 53 References:

Report Identification number(s): 67N15898, (part of N67-15884)

Abbreviated Abstract: Complex hydrostatic and hydrodynamic behavior of liquids in low and zero gravity, laboratory simulation, and control of weightless liquids.

(19) Author(s): L. IA. Liubin; A. S. Povitskii
Akademiia Nauk SSSR, Moscow, USSR

Title: Certain Features of the Motion of a Fluid Under
Weightlessness Conditions

Source: International Astronautical Federation Congress 17th,
Madrid, Spain

Date: Oct. 9 - 15, 1966 Pages: 16 References: 16

Report Identification number(s): 67A12322

Abbreviated Abstract: In Russian. Effects of weak forces normally
suppressed by terrestrial gravitational
forces.

(20) Author(s): T. E. Bowman; H. L. Paynter
Martin Marietta Corp.

Title: Weightless Liquids

Source: Science Journal, VOL. 2

Date: Sept. 1966 Pages: 7 References:

Report Identification number(s): 67A13890

Abbreviated Abstract: Surface tension and equilibrium surfaces in
weightless liquids, with application to
spacecraft systems design.

(21) Author(s): .

Title: The Fluid Dynamic Aspects of Space Flight, Proceedings of the NATO-AGARD Specialists' Meeting

Source: NATO-AGARD Specialists' Meeting, Marseille, France

Date: April 20 - 24, 1964 Pages: 402 References:

Report Identification number(s): 67A14987; AGARDograph 87, VOL. 1

Abbreviated Abstract: In English and French.

(22) Author(s): L. IA. Liubin, A. S. Povitskii

Title: Certain Features of the Motion of a Fluid Under Weightlessness Conditions

Source: Scientific Translation Service, LaCanada, California International Astronautical Congress, 17th, Madrid. October 1966.

Date: April 1967 Pages: 12 References:

Report Identification number(s): 67N27521, NASA-TT-F-10868, (NASw 1496)

Abbreviated Abstract: Effects of weak forces on weightless fluid, filling and emptying vessels and tubes, bubbles in a fluid, absence of convection. English translation.

(23) Author(s): L. IA. Liubin, A. S. Povitskii
Akademiia Nauk SSR, Moscow

Title: Some Features of Liquid Motion at Zero Gravity

Source: Symposium by the United Nations Educational, Scientific
and Cultural Organ., International Astronautical
Congress, Madrid, Spain

Date: October 13, 1966 Pages: 15 References:

Report Identification number(s): 68A26676 (part of A68-26667)

Abbreviated Abstract: Effects of weak forces on weightless fluids.

(24) Author(s): L. IA. Liubin; A. S. Povitskii

Title: Certain Features of the Motion of a Fluid Under
Weightlessness Conditions

Source: Problems of Propulsion and Re-Entry, International
Astronautical Federation Congress, 17th, Madrid, Spain

Date: October 9 - 15, 1966 Pages: 14 References:

Report Identification number(s): 68A42650 (part of A68-42639)

Abbreviated Abstract: In Russian. Effects of weak forces on
weightless fluids.

(25) Author(s): H. R. Velkoff
Air Force Systems Command

Title: A New View of Electric Effects on Fluid Dynamics

Source: Air Force Systems Command, Brooks AFB, Texas
1962 Compendium of Symp. Papers, VOL. 1

Date: Sept. 1962 Pages: 53 References:

Report Identification number(s): 68X81604 (part of X68-81601)

Abbreviated Abstract: Some key words: boundary layers, electrical discharges, electrical fields, electrophoresis, fluid dynamics, heat transfer, weightlessness.

(26) Author(s): D. A. Clayton
Royal Aircraft Establishment

Title: Passive Control of a Liquid In A Zero Gravity Environment

Source: Royal Aircraft Establishment, Farnborough, England

Date: August 1967 Pages: 39 References:

Report Identification number(s): 68N27747, RAE-TR-67207

Abbreviated Abstract: Hydrostatic and hydrodynamic parameters important to liquid propellant altitude control system designers. Preliminary treatment of zero gravity heat transfer.

(27) Author(s): R. H. Knoll; R. R. Nunamaker; G. R. Smolak
NASA, Lewis Research Center

Title: Weightlessness Experiments with Liquid Hydrogen in
Aerobee Sounding Rockets, Uniform Radiant Heat
Addition - Flight I

Source: NASA/Lewis Research Center, Cleveland, Ohio

Date: June 1962 Pages: 63 References:

Report Identification number(s): 68N83450, NASA-TM-X-484

Abbreviated Abstract: Some key words: heat transfer, radiant
heating, saturation, temperature
distribution, weightlessness

(28) Author(s): N. D. Kopachevskii

Title: Small Oscillations of an Ideal Liquid in a Vessel Under
Close-to-Weightlessness Conditions

Source: Introduction to the Dynamics of Fluid-Containing Bodies
Under Conditions of Weightlessness, Vychislitel'nyi
Tsentr AN SSR

Date: 1968 Pages: 37 References:

Report Identification number(s): 69A13811

Abbreviated Abstract: In Russian. Ideal liquid small oscillations,
surface tension, equilibrium conditions and
solution by decomposing vector function space.

(29) Author(s): F. E. Swalley; C. C. Wood
NASA, Marshall Space Flight Center

Title: Research in Support of Zero and Reduced Gravity
Fluid Mechanics and Heat Transfer

Source: Zero Gravity Fluid Behavior
NASA/Marshall Space Flight Center, Huntsville, Alabama

Date: Oct. 1963 Pages: 6 References:

Report Identification number(s): 71X82420 (part of X71-82402)

Abbreviated Abstract: Some key words: Drop tests

(30) Author(s): K. L. Abdalla; E. W. Otto; E. P. Symons; D. A. Petrash
NASA/Lewis Research Center

Title: Liquid Transfer Demonstration on Board Apollo 14 During
Transearth Coast

Source: NASA/Lewis Research Center, Cleveland, Ohio

Date: Nov. 1971 Pages: 31 References:

Report Identification number(s): 72N11285; NASA-TM-X-2410; E-6481

Abbreviated Abstract: Hand pump transferred liquids between
surface tension baffled tanks within two
percent of liquid residual design value
without gas ingestion.

(31) Author(s): L. E. Wallner; S. Nakanishi
NASA/Lewis Research Center

Title: A Study of Liquid Hydrogen in Zero Gravity

Source: NASA/Lewis Research Center, Cleveland, Ohio

Date: Aug. 1963 Pages: 65 References:

Report Identification number(s): 72N71527; NASA-TM-X-723; E-1893

Abbreviated Abstract: Some key words: Heat transfer, liquid sloshing, liquid-vapor interfaces.

(32) Author(s): Staff and Consultants
Electro-Optical Systems, Inc.

Title: Zero-G Liquid Studies - Critical State and Drop Dynamics

Source:

Date: Aug. 15, 1967 Pages: 29 References:

Report Identification number(s): 67N37923; NASA-CR-88747; EOS-7170-Q-2
Contract NAS8-21012

Abbreviated Abstract: Temperature control, pressure measurement, dynamic behavior, induction in a liquid drop, behavior in electrical and acoustical fields.

(33) Author(s): V. Hudson; R. C. Mitchell; J. A. Stark; R. C. White
General Dynamics, Convair Division

Title: Study of Zero-Gravity, Vapor/Liquid Separators

Source:

Date: Jan. 1966 Pages: 146 References:

Report Identification number(s): 66N22825, NASA-CR-71624, GDC-DD865-009
Contract NAS8-20146

Abbreviated Abstract: Study of heat exchange, mechanical,
dielectrophoresis, surface tension, and rotation
methods of separation.

(34) Author(s): Georgia Institute of Technology

Title: Theoretical Investigation of Gas Management in Zero
Gravity Space Manufacturing

Source:

Date: Nov. 6, 1969 Pages: References:

Report Identification number(s): GIT/EES 8-25179-MPR-1
Contract NAS8-25179

Abbreviated Abstract:

(35) Author(s): H. F. Bauer
Georgia Institute of Technology

Title: Theoretical Investigation of Gas Management in Zero Gravity Space Manufacturing

Source:

Date: Oct. 30, 1970 Pages:

References:

Report Identification number(s): GIT/EES B-910
Contract NAS8-25179

Abbreviated Abstract:

() Author(s):

Title:

Source:

Date:

Pages:

References:

Report Identification number(s):

Abbreviated Abstract:

III. Fluid Mechanics and Heat Transfer

B. General Heat Transfer Studies

(1.) Author(s): S. S. Papell
NASA/Lewis Research Center, Cleveland, Ohio

Title: An Instability Effect on Two-Phase Heat Transfer for
Subcooled Water Flowing Under Conditions of Zero
Gravity

Source: American Rocket Society
Space Power Systems Conference, Santa Monica, California

Date: Sept. 25 - 28, 1962 Pages: 10 References:

Report Identification number(s): 63A11725, ARS Paper #62-2548

Abbreviated Abstract:

(2.) Author(s): B. Gebhart
Cornell University

Title: Random Convection Under Conditions of Weightlessness

Source: AIAA Journal, VOL. 1

Date: Feb. 1963 Pages: 4 References:

Report Identification number(s): 63A13735; NSF G-10169, NSF CP-127

Abbreviated Abstract: Analysis of the heat conduction and vapor
condensation between a fluid and its enclosing
surface under conditions of weightlessness.

(3.) Author(s): M. Adelberg
Arthur D. Little, Inc.

Title: Zero Gravity Heat Transfer

Source: Institute of Environmental Sciences, Annual Technical Meeting Proceedings, Mt. Prospect, Illinois

Date: 1963 Pages: 8 References: 32

Report Identification number(s): 63A18340, see also A63-23694

Abbreviated Abstract: Basic forces that influence nucleate-boiling heat transfer at zero gravity.

(4.) Author(s): H. F. Steinle
General Dynamics Corporation

Title: Review of Zero-G Studies Performed at General Dynamics/
Astronautics

Source: American Astronautical Society, Proceedings of the 2nd Symposium on Physical and Biological Phenomena under zero gravity conditions, Los Angeles.

Date: Jan. 18, 1963 Pages: 21 References: 25

Report Identification number(s): 63A23689

Abbreviated Abstract: Review of zero gravity research, specializing in cryogenic liquid behavior, including venting, heat transfer and instrumentation performance.

(5.) Author(s): M. Adelberg
Arthur D Little, Inc., Santa Monica, California

Title: Effect of Gravity Upon Nucleate Boiling

Source: American Astronautical Society Symposium, 2nd
Proceedings, Los Angeles, California

Date: Jan. 18, 1963 Pages: 27 References: 18

Report Identification number(s): 63A23694, A63-18340

Abbreviated Abstract: Basic forces that influence nucleate-boiling
heat transfer at zero gravity, with brief
literature survey.

(6.) Author(s): R. V. Bailey; J. L. McGrew; D. W. Murphy
Martin Marietta Corp., Denver

Title: Boiling Heat Transfer in a Zero Gravity Environment

Source: Society of Automotive Engineers, Inc., New York
Air Transport and Space Meeting

Date: April 27 - 30, 1964 Pages: 32 References: 31

Report Identification number(s): 64A20299 ; SAE Paper 862C

Abbreviated Abstract: Bubble migration in zero and normal gravity.
Drop tower study of surface tension effects.

(7.) Author(s): L. M. Hedgepeth; E. A. Zara
Aeronautical Systems Div., Wright-Patterson AFB, Ohio

Title: Zero Gravity Pool Boiling

Source: Aeronautical Systems Div., Wright-Patterson AFB, Ohio
Science and Engineering Symposium, Sept. 18 - 19, 1963

Date: Sept. 1963 Pages: 36 References:

Report Identification number(s): 64X16087, ASD-TDR-63-706
AD-431810

Abbreviated Abstract: Nucleate pool boiling in near Zero gravity environment.

(8.) Author(s): K. R. Mecklenburg
Midwest Research Institute, Kansas City, Missouri

Title: Materials Research for Heat Transfer Fluids. Technical
Documentary Report, January - December 1964

Source: Wright-Patterson AFB
Air Force Materials Laboratory

Date: April 1965 Pages: 51 References:

Report Identification number(s): 65X17210, AD-462524, AF 33/657/-10295
ML-TDR-64-16, (part II)

Abbreviated Abstract: Magnitude of heat transfer coefficient of
sodium condensation and electrophoresis
for lubricant coatings on complex shapes.

(9.) Author(s): C. J. Feldmanis
Air Force Flight Dynamics Laboratory
Title: Pressure and Temperature Changes in Closed Loop Forced
Convection Boiling and Condensing Processes Under Zero
Gravity Conditions
Source: Air Force Systems Command, Wright-Patterson AFB, Ohio

Date: October 1965 Pages: 22 References:
Report Identification number(s): 66X12353; AFFDL-65-TM-45, AD-472381

Abbreviated Abstract:

(10.) Author(s): D. K. Edwards
UCLA
Title: Rotation-Induced, Free-Convection Heat Transfer in a
Zero-Gravity Field
Source: AIAA Journal, VOL. 5

Date: Feb. 1967 Pages: 2 References: 1

Report Identification number(s): 67A18864

Abbreviated Abstract: Free convective heat transfer between hot
and cold rotating disks in laminar steady
azimuthally symmetric flow in a zero-gravity
field.

(11) Editors: I. G. Gurevich; N. G. Kondrashov; I. P. Zhuk

Title: Non-Stationary Heat and Mass Transfer

Source: Israel Program for Scientific Translations, Ltd.,
Jerusalem

Date: 1967 Pages: 163 References:

Report Identification number(s): 67N22041, NASA-TT-F-432, TT-67-51368

Abbreviated Abstract: Nineteen articles. Experimental and numerical analyses of unsteady state heat and mass transfer. Soret coefficient.

(12) Author(s): R. Siegel
NASA, Lewis Research Center, Cleveland, Ohio

Title: Effects of Reduced Gravity on Heat Transfer

Source: Advances in Heat Transfer, Volume 4, Academic Press, Inc.

Date: 1967 Pages: 92 References:

Report Identification number(s): 68A11371

Abbreviated Abstract: Free and forced convection, boiling, condensation, forced flow and fuel combustion.

(13) Author(s): L. IA. Liubin; S. A. Povitskii

Title: Effect of Oscillations on Transfer Processes Under
Conditions of Weightlessness

Source: Kosmicheskie Issledovaniaa, VOL. 5

Date: Dec. 1967 Pages: 9 References:

Report Identification number(s): 68A16833

Abbreviated Abstract: In Russian. Vibrations in absence of
forced circulation produce higher heat
and mass transfer than molecular transfer
mechanism under conditions of weightlessness.

(14) Author(s): B. K. Larkin
Martin Marietta Corp., Aerospace Group, Denver, Colorado

Title: Heat Flow to a Confined Fluid in Zero Gravity

Source: Thermophysics of Spacecraft and Planetary Bodies -
Radiation Properties of Solids and the Electromagnetic
Radiation Environment in Space/Progress in Astronautics
and Aeronautics, Vol. 20/ AIAA, Thermophysics Specialist
Conference

Date: April 17 - 20, 1967 Pages: 14 References: 8

Report Identification number(s): 68A21373, AIAA 67-337, A67-26051

Abbreviated Abstract: Momentum, continuity, and energy equations
for one dimensional heat flow to a confined
ideal gas are solved numerically. Thermal
gradients induced acoustical fluid motion.

(15) Author(s): J. L. Boulay
University of Paris
Title: Heat Transfer in Liquid Nitrogen in a Zero-Gravity Field
Source: La Recherche Aerospatiale

Date: Feb. 1968 Pages: 16 References:

Report Identification number(s): 68A26171, ONERA-TP-564

Abbreviated Abstract: In French. Heat flux variation laws from boiling processes analysis.

(16) Author(s): I. T. Aladev; A. F. Ulianov

Title: Experimental Study of Heat Transfer During Boiling in Conduits During Weightlessness

Source: Cosmic Research, Vol. 6

Date: Mar. - Apr. 1968 Pages: 6 References: 9

Report Identification number(s): 69A11313, A68-30297

Abbreviated Abstract: Translation from Russian. Equipment and procedure for studying heat transfer during boiling under short term weightlessness. Water boiling on flat plates in a cylindrical channel at 0.02 to 0.34 m/sec.

(17) Author(s): A. Surak

Title: Zero-Gravity Effects on Boiling Heat Transfer and the Critical Heat Flux

Source: Library of Congress, Washington, D. C.
(Aerospace Technology Div.)

Date: Oct. 1968 Pages: 14 References:

Report Identification number(s): 69N10921, See N69-10920

Abbreviated Abstract: Experimental apparatus and results of boiling heat transfer and critical heat flux in forced upward flow of water in tubes under zero gravity conditions.

(18) Author(s): G. B. de Lancey

Title: An Analysis of Nonisothermal Multicomponent Diffusion in the Liquid Phase

Source: University of Pittsburgh, Pa. (AA/Ph.D. Thesis)

Date: 1967 Pages: 276 References:

Report Identification number(s): 69N20900

Abbreviated Abstract: Coupled heat and mass transfer equations for non-reactive chemical systems are analyzed.

(19) Author(s): J. L. McGrew

Title: An Investigation of the Effect of Temperature Induced Surface Tension Gradients on Bubble Mechanics and Boiling Heat Transfer

Source: Ph.D. Thesis, Denver University, Colorado

Date: 1968 Pages: 104 References:

Report Identification number(s): 69N22032

Abbreviated Abstract: Surface tension gradient effect is important in bubble motion and boiling in zero gravity.

(20) Author(s): J. L. Boulay

Title: Heat Transfer in Liquid Nitrogen in a Zero-Gravity Field

Source: (AA/Ph.D. Thesis - Paris University)

Date: 1968 Pages: 56 References:

Report Identification number(s): 69N22879, ONERA-P-122

Abbreviated Abstract: In French. Heat flux variation in boiling processes is a function of gravity. Experimental results from three second exposures are compared to theoretical predictions.

(21) Author(s): J. W. Little; H. Merte, Jr.*
NASA/Marshall Space Flight Center; *Univ. of Mich., Ann Arbor

Title: Zero Gravity Incipient Boiling Heat Transfer

Source: NASA/Marshall Space Flight Center, Huntsville, Alabama
Space Transportation System Propulsion Technology Conference, VOL. 4

Date: April 28, 1971 Pages: 38 References:

Report Identification number(s): 71N29612; (part of N71-29609)

Abbreviated Abstract: Procedure for computing pressure rise in a closed cylindrical container due to side wall heat flux.

(22) Author(s): J. L. Margrave,
Rice University, Houston, Texas

Title: Thermodynamic Properties of Liquid Metals:
A Review.

Source: High Temperatures - High Pressures, VOL. 2, No. 6,
1970

Date: 1970 Pages: 4 References: 17

Report Identification number(s): 72A34000, NSG-659

Abbreviated Abstract: Summary of Thermodynamic properties of liquid metals, heats of fusion and heat capacities.

(23) Author(s): A. S. Povitskii; L. IA. Liubin

Title: Fundamentals of the Dynamics and Heat and Mass
Transfer of Fluids Under Conditions of Weightlessness

Source: Moscow, Izdatel' Stvo Mashinostroenie

Date: 1972 Pages: 252 References:

Report Identification number(s): 73A35868

Abbreviated Abstract: In Russian. Blow gas extraction of
fluids from tanks, vibration enhanced
transport, analysis of bubble and droplet
motion, steady and unsteady viscous flows
in slots with non-parallel walls.

(24) Author(s): A. Khamadov
Akademija Nauk Turkmenskoj SSR

Title: Investigation of Heat and Mass Transfer in
Evaporation Under Conditions of Free Convection --
In Solar Heat Engine

Source: Fiziko-Tekhnicheskij Institute, Ashkhabad, Turkmen SSR

Date: 1974 Pages: 4 References:

Report Identification number(s): 74A29420, Print 56/2/1-10

Abbreviated Abstract: Simplified expressions neglecting
Soret coefficient, the Dufour effect and
friction.

(25) Author(s): K. D. Williamson, Jr.; F. J. Edeskuty; J. F. Taylor
Los Alamos Corp., Scientific Lab., New Mexico

Title: Rocket-Borne, Low Gravity Cryogenic Heat Transfer
Experiment

Source: AIAA/NSA/ASTM/IES 7th Space Simulation Conference
Los Angeles, California

Date: Nov. 12 - 14, 1973 Pages: 9 References:

Report Identification number(s): 74N18559; LA-UR-73-1067, CONF-731108-1
Contract W-7405-eng-36

Abbreviated Abstract: Steady state data on nucleate boiling heat
transfer in nearly zero gravity liquid
helium.

(26) Author(s): H. R. Henry, J. R. McDonald
University of Alabama, Tuscaloosa

Title: Two Phase Flow and Heat Transfer in Porous Beds
Under Variable Body Forces - Final Report

Source: Bureau of Engineering Research

Date: May 1970 Pages: 117 References:

Report Identification number(s): 70N37387; NASA-CR-102822;
FR-113-30-PT-6
Contract NAS8-21143

Abbreviated Abstract: Breadboard development of channels (liquid-
vapor and liquid-foreign gas), pumps,
instrumentation, power and data recording
systems.

(27) Author(s): H. R. Henry
University of Alabama, Tuscaloosa

Title: Two Phase Flow and Heat Transfer in Porous Beds
Under Variable Body Forces, part 7, Final Report

Source:

Date: May 1970 Pages: 72 References:

Report Identification number(s): 72N12227, NASA-CR-121056;
REPT-113-30-PT-7, REPT-22-6560-PT-7
Contract NAS8-21143

Abbreviated Abstract: Experiment design, materials selection, and
identification of system elements requiring
further development.

() Author(s):

Title:

Source:

Date: Pages: References:

Report Identification number(s):

Abbreviated Abstract:

III. Fluid Mechanics and Heat Transfer
C. Convective Studies in Reduced Gravity
1. General Studies

(1.) Author(s): D. K. Edwards
U.C.L.A.

Title: Rotation-Induced, Free-Convection Heat Transfer in a
Zero-Gravity Field

Source: AIAA Journal, VOL. 5

Date: Feb. 1967 Pages: 2 References: 5

Report Identification number(s): 67A18864

Abbreviated Abstract: Mass, momentum, and energy conservation
in steady (laminar) azimuthally symmetric
flow. Free convective heat transfer be-
tween hot and cold rotating disks.

(2.) Author(s): A. Faessler

Title: The Behavior of a Burning Candle in Gravitationless
Space

Source: Translation Consultants, Ltd., Arlington, Virginia
(Naturwissenschaften, W. Berlin, VOL. 51, No. 23,
1964.)

Date: Sept. 1971 Pages: 10 References:

Report Identification number(s): 71N36356, NASA-TT-F-13940
Contract NASw-2038

Abbreviated Abstract: Two experimental arrangements eliminate
the effect of continued air circulation due
to inertia. A procedure is proposed for a
wickless flame experiment.

(3.) Author(s): No Personal Author

Title: Apollo 14 Mission Report, Supplement 7: Inflight Demonstrations

Source: NASA Manned Spacecraft Center, Houston, Texas

Date: Jan. 1972 Pages: 284 References:

Report Identification number(s): 72N28818; NASA-TM-X 68691; NASA-TM-X-6410, NASA-TM-X-64611, NASA-TM-X-64347, MSC-04112-Suppl-7

Abbreviated Abstract: Liquid transfer, electrophoresis, composite casting and heat flow and convection experiments are reviewed.

(4.) Author(s): J. F. Lands, Jr.; R. C. Ried, Jr.

Title: Zero-Gravity Transient Thermal Mixing Simulation

Source: NASA Lyndon B. Johnson Space Center, Houston, Texas
MSC Cryogenic Symposium Papers

Date: May 1971 Pages: 26 References:

Report Identification number(s): 72N23798, part of N72-23795

Abbreviated Abstract: Experimental simulation via analogy between unsteady heat conduction and species diffusion, extended also to include cubical tank geometry. Thermal mixing in Apollo Service Module cryogenic oxygen storage system.

(5.) Author(s): T. C. Bannister
Marshall Space Flight Center
Title: Heat Flow and Convection Demonstration (Apollo 14)
Source: NASA Marshall Space Flight Center, Huntsville, Alabama

Date: March 29, 1973 Pages: 139 References:

Report Identification number(s): 73N27797; NASA-TM-X-64735

Abbreviated Abstract: In less than 0.000001 g, data indicate
1) surface tension gradients produce convective motion; 2) heat flow in fluids is mainly by diffusive conduction; and 3) some convection (characteristics unknown) increase heat transfer.

(6.) Author(s): C. Fan, P. G. Grodzka
Lockheed, Huntsville
Title: Natural Convection in Space Manufacturing Processes

Source:

Date: Pages: References:

Report Identification number(s): 71X79257, NASA-CR-119440,
LMSC-HREC-D162926, HREC-5577-2
Contract NAS8-25577

Abbreviated Abstract:

(7.) Author(s): John W. Benefield
Lockheed, Huntsville

Title: Heat Flow and Convection Demonstration

Source:

Date: August 1971 Pages: References:

Report Identification number(s): X71-10976, NASA-CR-119948
Contract NAS8-25577

Abbreviated Abstract:

(8.) Author(s): P. G. Grodzka; C. Fan; R. O. Hedden
Lockheed, Huntsville

Title: The Apollo 14 Heat Flow and Convection Demonstration
Experiments: Final Results of Data Analysis

Source:

Date: Pages: References:

Report Identification number(s): X71-10971, NASA-CR-119960
Contract NAS8-25577

Abbreviated Abstract:

(9.) Author(s): P. G. Grodzka; T. C. Bannister*
Lockheed, Huntsville; *NASA/Marshall Space Flight Center

Title: Heat Flow and Convection Demonstration Experiments
Aboard Apollo 14

Source: Science, VOL. 176

Date: May 5, 1972 Pages: 3 References: 13

Report Identification number(s): 72A28614
Contract NAS8-25577

Abbreviated Abstract:

(10) Author(s): P. G. Grodzka
Lockheed Missiles and Space Co., Huntsville, Alabama

Title: Types of Natural Convection in Space Manufacturing
Processes

Source:

Date: January 1973 Pages: References:

Report Identification number(s): 73X10208, NASA-CR-124184,
HREC-5577-4, LMSC-HREC-TR-D306350
Contract NAS8-25577

Abbreviated Abstract:

(11) Author(s): T. C. Bannister, P. G. Grodzka, L. W. Spradley,
S. V. Bourgeois, R. O. Hedden, B. R. Facemire
Marshall Space Flight Center; Lockheed Missiles & Space Co.
Title: Apollo 17 Heat Flow and Convection Experiments: Final
Results of Data Analysis

Source:

Date: July 16, 1973 Pages: 164 References:

Report Identification number(s): N73-31840, NASA-TM-X-64772
NAS8-25577

Abbreviated Abstract: Cellular, surface tension-driven convection
and convection in confined fluids caused by
spacecraft and astronaut movements.

(12) Author(s): S. V. Bourgeois, Jr.; P. G. Grodzka
Lockheed Missiles & Space Co., Huntsville, Alabama
Title: Convection in Space Processing (M512); Phase A Report

Source:

Date: July 1972 Pages: References:

Report Identification number(s): 72X79297, NASA-CR-127909, HREC-7015-1;
LMSC-HREC-D306065
Contract NAS8-27013

Abbreviated Abstract:

(13) Author(s): C. Fan
Lockheed Missiles & Space Co., Huntsville, Alabama

Title: Convection Phenomena in Electrophoresis Separation

Source:

Date: Dec. 1972 Pages: References:

Report Identification number(s): 73X10120, NASA-CR-124058, HREC-7015-3
LMSC-HREC-TR-D3063

Abbreviated Abstract:

(14) Author(s): P. G. Grodzka; S. V. Bourgeois
Lockheed Missiles & Space Co., Huntsville, Alabama

Title: Fluid and Particle Dynamic Effects in Low-G Composite Casting

Source:

Date: Jan. 1973 Pages: 46 References:

Report Identification number(s): 73X10283, NASA-CR-124216; HREC-7015-4,
LMSC-HREC-TR-D306402
Contract NAS8-27015

Abbreviated Abstract: Reexamination of Apollo 14 composite casting to explain unusual results: phase change and surface tension convection, Marangoni flow bubble and droplet migration.

(15) Author(s): L. W. Spradley; S. V. Bourgeois; C. F. Fan; P. G. Grodzka
Lockheed Missiles and Space Co., Huntsville, Alabama

Title: A Numerical Solution for Thermacoustic Convection of
Fluids in Low Gravity

Source:

Date: May 1973 Pages: 90 References:

Report Identification number(s): N73-26289, NASA-CR-2269
NAS8-27015

Abbreviated Abstract: A finite difference technique for solving the
differential equations for thermal convection
of compressible fluids in low gravity. One-
dimensional radial model of Apollo 14 heat
flow and convection experiment.

(16) Author(s): S. V. Bourgeois
Lockheed Missiles & Space Co., Huntsville, Alabama

Title: Convection in Skylab M512 Experiments: M551, M552, and
M553. Phase B Report

Source:

Date: July 15, 1973 Pages: 75 References:

Report Identification number(s): N73-28852, NASA-CR-124329
NAS8-27015

Abbreviated Abstract: Convection of molten metals and their
solidification in reduced gravity.

(17) Author(s): S. V. Bourgeois
Lockheed Missiles & Space Co., Huntsville, Alabama
Title: Convection Effects on Skylab Experiments, M551, M552,
M553 Phase C Report

Source:

Date: Dec. 1, 1973 Pages: References:
Report Identification number(s): LMSC/HREC-TR-D306955
Contract NAS8-27015

Abbreviated Abstract:

(18) Author(s): S. V. Bourgeois; M. R. Brashears
Lockheed Missiles and Space Co., Huntsville, Alabama
Title: Fluid Dynamics and Kinematics of Molten Metal in the
Low-Gravity Environment of Skylab
Source: AIAA Aerospace Sciences Meeting, 12th, Washington, D. C.
January 30 - February 1, 1974

Date: Jan. 1974 Pages: 20 References: 34

Report Identification number(s): 74A18860, AIAA Paper 74-205
Contract NAS8-27015 and NAS8-28729

Abbreviated Abstract: Theoretical and experimental response of molten
metals to nominal and microgravity.
Dimensional analysis of governing equations.
Evaluation of specimens from ground based, KC-135,
and skylab tests.

(19) Author(s): Lockheed Missiles and Space Co., Huntsville, Alabama

Title: Study of MS/MS Convection Analysis

Source:

Date: August 31, 1973 Pages: References:

Report Identification number(s): LMSC/HREC 8-29610-B1 MPR Aug 73
Contract NAS8-29610

Abbreviated Abstract:

(20) Author(s): K. Masubuchi; T. Muraki
Massachusetts Institute of Technology, Cambridge

Title: Phase A of Thermal Analysis of M551 Through M554
Experiments for Materials Processing in Space

Source:

Date: July 25, 1972 Pages: References:

Report Identification number(s): MIT 8-28732-FR-Ph. A
Contract NAS8-28732

Abbreviated Abstract:

(21) Author(s): K. Masubuchi; T. Muraki
Massachusetts Institute of Technology, Cambridge

Title: Phase B of Thermal Analysis of M551 Experiment for
Materials Processing in Space

Source:

Date: January 15, 1973 Pages: References:

Report Identification number(s): MIT 8-28732-IR-1-(1)
Contract NAS8-28732

Abbreviated Abstract:

(22) Author(s): J. W. Spearman; T. Muraki
Massachusetts Institute of Technology, Cambridge

Title: Phase B of Thermal Analysis of M552 Experiment for
Materials Processing in Space

Source:

Date: January 15, 1973 Pages: References:

Report Identification number(s): MIT 8-28732-IR-2-(2)
Contract NAS8-28732

Abbreviated Abstract:

III. Fluid Mechanics and Heat Transfer
C. Convective Studies in Reduced Gravity
2. Thermodiffusion

(1.) Author(s): R. Ito; T. Mizushima

Title: Analysis of the Unsteady State in the Thermal Diffusion Cell

Source: Mound Lab., Miamisburg, Ohio,
(Kagaku Kogaku, Japan, VOL. 25, No. 1, 1961)

Date: Oct. 23, 1963 Pages: 17 References:

Report Identification number(s): 64N13343; AT/33-1/GEN-53; MLM-1167

Abbreviated Abstract: Translated into English. Exact solution for measuring the coefficient of ordinary diffusion and the Soret coefficient in experiments of short duration.

() Author(s):

Title:

Source:

Date: Pages: References:

Report Identification number(s):

Abbreviated Abstract:

III. Fluid Mechanics and Heat Transfer
C. Convective Studies in Reduced Gravity
3. Marangoni Convection

(1.) Author(s): A. L. Drago; R. C. Paule
National Bureau of Standards, Institute for Materials
Research
Title: Ultrapure Materials - Containerless Evaporation and the
Roles of Diffusion and Marangoni Convection
Source: AIAA, Aerospace Sciences Meeting, 12th, Washington, D. C.

Date: Jan. 30 - Feb. 1, 1974 Pages: 9 References: 15

Report Identification number(s): 74A18861; AIAA Paper 74-209
NASA Order W-13475

Abbreviated Abstract: Thermodynamic calculations including complex
chemical equilibria of impurity evaporation.
Estimations of effect of diffusion and
convection on mass transfer rates. Calculations
for evaporative purification of molten
alumina.

() Author(s):

Title:

Source:

Date: Pages: References:

Report Identification number(s):

Abbreviated Abstract:

III. Fluid Mechanics and Heat Transfer

D. Convection Effects Studies

1. Crystal Growth

(1.) Author(s): P. G. Grodzka

Title: Gravity-Driven and Surface Tension-Driven Convection
In Single Crystal Growth

Source: Lockheed Missiles and Space Co., Huntsville, Alabama
Marshall Space Flight Center Space Process. and Manuf.
Meeting

Date: Oct. 21, 1969 Pages: 14 References:

Report Identification number(s): 70N14678; part of N70-14651

Abbreviated Abstract: Analytical and mathematical studies of
floating zone and Czochralski techniques of
single crystal growth.

(2.) Author(s): P. G. Grodzka

Title: Gravity-Driven and Surface Tension-Driven Convection in
Single Crystal Growth

Source: Lockheed Missiles and Space Co., Huntsville, Alabama
Marshall Space Flight Center Space Process. and Manuf.
Meeting

Date: Feb. 5, 1970 Pages: 15 References:

Report Identification number(s): 70N20544; part of N70-20517

Abbreviated Abstract: Analytical and mathematical studies of
floating zone and Czochralski techniques of
single crystal growth.

III. Fluid Mechanics and Heat Transfer
E. Applications Studies

(1.) Author(s): C. C. Wood
NASA, Marshall Space Flight Center

Title: Evaluation of Experimental and Analytical Data for
Orbital Refueling Systems

Source: AIAA, Propulsion Joint Specialist Conference, 5th
U. S. Air Force Academy, Colorado Springs, Colorado

Date: June 9 - 13, 1969 Pages: 12 References: 26

Report Identification number(s): 69A32755, AIAA Paper 69-566

Abbreviated Abstract: Validity and limitations of applying transient
data to low-gravity fluid behavior. Proposes
an orbital fluid transfer experiment.

(2.) Author(s): H. F. Bauer; J. Siekmann
Georgia Institute of Technology, Atlanta

Title: Theoretical Investigation of Gas Management in Zero-
Gravity Space Manufacturing

Source: NASA/Marshall Space Flight Center Space Process. and
Manuf. Meeting

Date: Oct. 21, 1969 Pages: 5 References:

Report Identification number(s): 70N14671; part of N70-14651

Abbreviated Abstract: Degassing and gas distribution in liquified
materials in zero-gravity manufacturing.

(3.) Author(s): H. F. Bauer; J. Siekmann
Georgia Institute for Research, Atlanta, Georgia

Title: Theoretical Investigation of Gas Management in Zero-Gravity Space Manufacturing

Source: NASA/Marshall Space Flight Center Space Process. and Manuf. Meeting

Date: Feb. 5, 1970 Pages: 4 References:

Report Identification number(s): 70N20537; part of N70-20517

Abbreviated Abstract: Degassing and gas-liquid interactions in zero-gravity manufacturing.

() Author(s):

Title:

Source:

Date: Pages: References:

Report Identification number(s):

Abbreviated Abstract:

IV. Solidification Processes

A. General Studies

(1.) Author(s): J. T. A. Pollock; F. Wald
Tyco Labs., Inc., Waltham, Mass.
Title: Directional Solidification of Multicomponent
Superconducting Systems Under Zero G. Conditions
Source: NASA Marshall Space Flight Center Space Process. and
Manuf. Meeting

Date: Oct. 21, 1969 Pages: 11 References:

Report Identification number(s): 70N14657; part of N70-14651

Abbreviated Abstract: Preparation of stable superconducting cables comprising a filamentary phase of one superconducting in a matrix of another, achieved by directional solidification under zero gravity.

(2.) Author(s): R. L. Hammel; M. E. Kirkpatrick; J. L. Reger

Title: Reduced Gravity Processing of Homogenized Immiscible
Metal Alloys

Source: TRW Systems, Redondo Beach, California
NASA/MSFC Space Process. and Manuf. Meeting

Date: October 21, 1969 Pages: 12 References:

Report Identification number(s): 70N14660

Abbreviated Abstract: The effects of low gravity on immiscibility limits of two phase liquid melts, base solidification processes. Experiment performance limitations, requirements, interface criteria.

(3.) Author(s): R. Abbott; R. Fabiniak; T. Fabiniak; E. McKannan*
Cornell Aeronautical Labs.; *NASA/MSFC

Title: Theoretical Considerations for Liquid Phase Sintering
and Solidification in the Space Environment

Source: NASA/MSFC Space Process. and Manuf. Meeting

Date: October 21, 1969 Pages: 21 References:

Report Identification number(s): 70N14679 ; part of N70-14651
Contract NAS8-24592

Abbreviated Abstract: Solid-solid phase depends on diffusion coefficients, vacancy concentrations in the bulk, surface energy, contact geometry, time, and temperature. Liquid-solid phase depends on surface adsorption controlled by crystal faceting, grain boundary, grooving and thermal etching.

(4.) Author(s): J. T. A. Pollock; F. Wald
Tyco Labs., Inc., Waltham, Mass.

Title: Directional Solidification of Multicomponent Superconducting Systems Under Zero G Conditions

Source: NASA/MSFC Space Process. and Manuf.

Date: Feb. 5, 1970 Pages: 11 References:

Report Identification number(s): 70N20523; part of N70-20517

Abbreviated Abstract: Preparation of stable superconducting cables comprising a filamentary phase of one superconducting in a matrix of another, achieved by directional solidification in zero gravity.

(5.) Author(s): R. Abbott; R. Fabiniak; T. Fabiniak; E. McKannan
Cornell Aeronautical Lab., Buffalo, New York

Title: Theoretical Considerations for Liquid Phase Sintering
and Solidification in the Space Environment

Source: NASA/Marshall Space Flight Center Spacing Processing
and Manufacturing

Date: Feb. 5, 1970 Pages: 23 References:

Report Identification number(s): 70N20545; part of N70-20517

Abbreviated Abstract: Solid-solid phase depends on diffusion
coefficients, vacancy concentrations in the
bulk, surface energy, contact geometry, time
and temperature. Liquid-solid phase depends
on surface adsorption controlled by crystal
faceting, grain boundary, grooving and thermal
etching.

(6.) Author(s): R. T. Frost
General Electric Co., Valley Forge, Pa.

Title: Techniques and Examples for Zero-G Melting and
Solidification Processes

Source: Technology Today and Tomorrow, Canaveral Council of
Technical Societies, Space Congress, 7th, Cocoa Beach,
Fla. Proceedings

Date: April 22 - 24, 1970 Pages: 11 References: 35

Report Identification number(s): 70A37717

Abbreviated Abstract: New processes or improved methods of
processing exploiting weightlessness:
elimination of melt phase density separation,
and thermal convection; moldless solidification;
surface tension and electromagnetic forming.
General requirements for space environment
facilities.

(7.) Author(s): R. T. Frost
General Electric Co., Philadelphia, Pa.
Title: Techniques and Examples for Zero-G Melting and Solidification Processes
Source: NASA/Marshall Space Flight Center, Unique Manufacturing Processes in Space Environment

Date: April 1970 Pages: 12 References:

Report Identification number(s): 71N26011; part of N71-26009

Abbreviated Abstract: The processes or improved methods of processing exploiting weightlessness: elimination of melt phase density separation and thermal convection; moldless solidification; surface tension and electromagnetic forming. General requirements for space environment facilities.

(8.) Author(s): J. L. Cook; F. Lambdin
Union Carbide Corp., Nuclear Div., Oak Ridge, Tenn.

Title: Fabrication of Carbon-Carbon Composites Using Electrostatic Fiber Deposition (Flecking)

Source: SAMPE Quarterly, VOL. 2

Date: July 1971 Pages: 10 References: 8

Report Identification number(s): 71A40140

Abbreviated Abstract: Densification using coal tar pitch impregnation-carbonization cycles. Isotropy control by fiber orientation.

(9.) Author(s): L. L. Lacy; G. H. Otto*
NASA, Marshall Space Flight Center; *University of
Alabama at Huntsville
Title: The Electrical Properties of Zero-Gravity Processed
Immiscibles
Source: AIAA Aerospace Sciences Meeting, 12th, Washington, D. C.

Date: Jan. 30 - Feb. 1, 1974 Pages: 6 References: 12

Report Identification number(s): 74A18853; AIAA Paper 74-208

Abbreviated Abstract: Electrical properties of zero gravity
processed Ga-Bi samples differ significantly
from properties of individual components and
ground control samples, and possibly form a
new class of electronic material.

(10) Author(s): University of Alabama, Huntsville
Title: Evaluation of Semiconductor Specimens by X-Ray Analysis

Source:

Date: May 1973 Pages: References:

Report Identification number(s): ALA. U. RI-8-29650-MTR-1/
Contract NAS8-29650

Abbreviated Abstract:

(11) Author(s): H. U. Walter
University of Alabama at Huntsville

Title: Evaluation of Semiconductor Specimens by X-Ray
Analysis - Interim Report

Source:

Date: Nov. 1973 Pages: References:

Report Identification number(s): ALA. U. RI-8-29650-IR-Nov. 73
Contract NAS8-29650

Abbreviated Abstract:

(12) Author(s): N. M. Griesenauer
Battelle Memorial Institute

Title: Undercooling of Materials During Solidification in
Space - Interim Status Report

Source:

Date: October 31, 1972 Pages: References:

Report Identification number(s): BMIT 8-28749-ISR-1
NAS8-28749

Abbreviated Abstract:

(13) Author(s): S. H. Gelles
Battelle Memorial Institute
Title: Process Development for Producing Fine Grain Castings in
Space
Source:

Date: July 1973 Pages: References:

Report Identification number(s): BMI-8-29626-MPR-1/
Contract NAS8-29626

Abbreviated Abstract:

(14) Author(s): R. I. Miller
Boeing Aerospace Company, Huntsville
Title: Study of Liquid-Solid Transition for Materials
Processing in Space

Source:

Date: May 9, 1973 Pages: 47 References:

Report Identification number(s): 73N27596, NASA-CR-124294
Contract NAS8-28664

Abbreviated Abstract: Influence of magnetic fields and near zero
gravity conditions on the behavior of dense
liquid near the solidification point.

(15) Author(s): R. I. Miller
Boeing Aerospace Company, Huntsville
Title: A Summary of Liquid State Models for Materials Processing
in Space - Interim Report

Source:

Date: Aug. 1972 Pages: References:

Report Identification number(s): D5-17268
Contract NAS8-28664

Abbreviated Abstract:

(16) Author(s): University of California at Los Angeles
Title: Directional Solidification of Eutectic Composites in
Space

Source:

Date: Sept. 30, 1973 Pages: References:

Report Identification number(s): Cal. U. 8-29854-MR-Sept. 73
Contract NAS8-29854

Abbreviated Abstract:

(17) Author(s): T. Z. Kattamis
University of Connecticut, Storrs

Title: Investigation of Solidification in Zero-Gravity Environment; M553 Sphere Forming Experiment and M554 Composite Casting Experiment

Source:

Date: August 10, 1972 Pages: References:

Report Identification number(s): 73N70935
Contract NAS8-28734

Abbreviated Abstract:

(18) Author(s): T. Z. Kattamis
University of Connecticut

Title: Investigation of Solidification in Zero-Gravity Environment; M553 Sphere Forming Experiment. Phase C: Evaluation of Skylab Specimens

Source:

Date: Dec. 4, 1973 Pages: 43 References:

Report Identification number(s): 74N20126
NAS8-28734

Abbreviated Abstract: Evaluation of specimens SL-1.6, SL-2.8, SL-2.4, SL-1.10, and SL-1.11; comparison with ground processed specimens; sphericity, density, microporosity.

(19) Author(s): T. J. Fabiniak
Cornell Aeronautical Laboratory

Title: Investigation of Zero Gravity Effects on Material Properties - Final Report

Source:

Date: April 1970 Pages: 61 References:

Report Identification number(s): 70N42189; NASA-CR-102874; CAL-KC-2862-P-1
Contract NAS8-24592

Abbreviated Abstract: Combinations of Al, Ag, Zn, and Sn with carbon or boron-carbide powders subjected to liquid phase sintering in vacuum to determine effects of dissimilar densities and surface tensions. Wetting, absorption, and defect migration.

(20) Author(s): Chou Li
Grumman Aerospace Corp., Bethpage, New York

Title: Segregation Effects During Solidification in Weightless Melts; Final Report, 1 Jan. 1972 - 29 June 1973

Source: Grumman Aerospace Corp.

Date: June 1973 Pages: 350 References:

Report Identification number(s): N73-30510, NASA-CR-124358
Contract NAS8-27891

Abbreviated Abstract: Study of evaporative melt segregation and freezing segregation, development of normal evaporation equations, and correlation with experimental data reported in the literature.

(21) Author(s): J. L. Mukherjee, K. P. Gupta, Chou L1
State University of New York, Stony Brook; Grumman
Aerospace Corp.
Title: Purification Kinetics of Beryllium During Vacuum
Induction Melting
Source: Grumman Aerospace Corp.

Date: Oct. 1972 Pages: 22 References:
Report Identification number(s): N73-13512, NASA-CR-123946
NAS8-27891

Abbreviated Abstract: Quantitative treatment of binary alloy
evaporation kinetics.

(22) Author(s): J. L. Mukherjee, K. P. Gupta, Chou L1
SUNY, Stony Brook, Grumman Aerospace Corp.
Title: Evaporation Segregation in 80% Ni-20% Cr and 60% Fe
40% Ni Alloys
Source: Grumman Aerospace Corp., Bethpage, New York

Date: Oct. 1972 Pages: 15 References:
Report Identification number(s): N73-14562, NASA-CR-123993
Contract NAS8-27891

Abbreviated Abstract: Solutions of evaporation equation are compared
with experimental data. Neglecting the
non-logarithmic term may introduce considerable
errors in the analysis.

(23) Author(s): C. H. Li
Grumman Aerospace Corp.

Title: Normal Freezing of Ideal Ternary Systems of the Pseudobinary Type

Source: Grumman Aerospace Corp., Bethpage, New York

Date: Nov. 1972 Pages: 21 References:

Report Identification number(s): N73-14563, NASA-CR-129935
Contract NAS8-27891

Abbreviated Abstract: The equation of normal freezing for ideal ternary liquid solutions solidified into ideal solid solutions of the pseudobinary type is given. Sample calculations for the Ga-Al-As system are given.

(24) Author(s): Chou Li
Grumman Aerospace Corp.

Title: Normal Evaporation of Binary Alloys

Source: Grumman Aerospace Corp., Bethpage, New York

Date: Nov. 1972 Pages: 29 References:

Report Identification number(s): N73-16558, NASA-CR-124040
NAS8-27891

Abbreviated Abstract: The differential equation of normal evaporation is solved for special cases, applied to a Ni-Al alloy and several binary iron alloys. Accuracy of prediction is checked against experimental data (Fe-Ni, Ni-Cr, and vacuum purification of benzilium).

(25) Author(s): W. M. Aubin; D. Larson, Jr.; G. I. Geschwind
Grumman Aerospace Corp.

Title: Research of Metal Solidification in Zero-G State
Test Apparatus and Instrumentation - Final Report

Source: Grumman Aerospace Corp., Bethpage, New York

Date: Sept. 1973 Pages: 74 References:

Report Identification number(s): 74N10527, NASA-CR-124464
Contract NAS8-28604

Abbreviated Abstract: Drop tower experiment of metal melting and
resolidifying in three second free fall,
measuring temperature-time histories of
0.05 cm Ni and 1090 steel droplets. Results
of metalurgical analysis.

(26) Author(s): D. J. Larson, Jr.
Grumman Aerospace Corp.

Title: Investigation of Ground Based Simulation Skylab Samples
- Final Report on Phase B

Source:

Date: Aug. 1973 Pages: References:

Report Identification number(s): Grumman RM-576 Ph. B
Contract NAS8-28728

Abbreviated Abstract: Ground based simulation Skylab samples.

(27) Author(s): D. J. Larson, Jr.; C. Li
Grumman Aerospace Corp.

Title: Specimen Analysis of the Skylab M553 Metals Melting
and Solidification Experiment

Source:

Date: Feb. 1974 Pages: . References:

Report Identification number(s): Contract NAS8-28728

Abbreviated Abstract: Specimen Analysis of Skylab M553 Metals.

(28) Author(s): D. Larson, Jr.; G. Busch
Grumman Aerospace Corp.

Title: Investigation of KC-135 Flight Samples Solidified in
Near-Zero Gravity

Source: Grumman Aerospace Corp., Bethpage, New York

Date: Jan. 1973 Pages: 36 References:

Report Identification number(s): 73N20610, NASA-CR-134179 RM-356
Contract NAS8-28728

Abbreviated Abstract: KC-135 tests of M553 Skylab hardware and analysis
of Star-I Satellite (cobalt base alloy)
samples by optical microscopy, scanning electron
microscopy, electron microprobe, X-ray diffraction
differential scanning calorimetry and microhardness

(29) Author(s): D. Larson, Jr.; G. Busch
Grumman Aerospace Corp., Bethpage, New York
Title: Investigation of KC-135 Flight Samples Solidified in
Near-Zero Gravity
Source:

Date: Jan. 1, 1975 Pages: References:
Report Identification number(s): 74X73561, NASA-CR-138168; AD-916869L;
GIDEP-347, 95.00-K4-38; RM-566
Contract NAS8-28728
Abbreviated Abstract: Some key words: cobalt alloys; electron
microscope, microstructure,
metallography.

(30) Author(s): Grumman Aerospace Corp.
Title: Segregation Effects During Solidification in Weightless
Melts
Source:

Date: Aug. 4, 1973 Pages: References:
Report Identification number(s): Grumman 8-29662-MPR-1
Contract NAS8-29662
Abbreviated Abstract:

(31) Author(s): P. C. Johnson; E. T. Peters
Arthur D. Little, Inc.

Title: M553 Sphere Forming Experiment - Interim Report

Source:

Date:

Pages:

References:

Report Identification number(s): LITTLE 8-28723-IR Ph.B
Contract NAS8-28723

Abbreviated Abstract:

(32) Author(s): P. C. Johnson; E. T. Peters
Arthur D. Little, Inc.

Title: M553 Sphere Forming Experiment - Pure Nickel Specimen
Evaluation

Source:

Date:

Pages:

References:

Report Identification number(s): LITTLE 8-28723-SR-Ph.C
Contract NAS8-28723

Abbreviated Abstract:

(33) Author(s): P. C. Johnson; E. T. Peters
Arthur D. Little, Inc.

Title: M553 Research Study on Materials Processing in Space
Skylab Experiment M553 - Sphere Forming - Final Report

Source:

Date:

Pages:

References:

Report Identification number(s): LITTLE 74671
Contract NAS8-28723

Abbreviated Abstract:

(34) Author(s): P. C. Johnson
Arthur D. Little, Inc:

Title: Development of Techniques for Processing Metal - Metal
Oxide Systems

Source:

Date: Nov. 30, 1972

Pages:

References:

Report Identification number(s): LITTLE 8-29145-MPR-1
Contract NAS8-29145

Abbreviated Abstract:

(35) Author(s): A. A. Fowle; J. S. Haggerty
Arthur D. Little, Inc.

Title: Float-Zone Processing in a Weightless Environment

Source:

Date: March 18, 1974 Pages: References:

Report Identification number(s): LITTLE 8-29877-B1MPR-1/
Contract NAS8-29877

Abbreviated Abstract:

(36) Author(s): M. R. Brashears; S. J. Robertson
Lockheed Missiles and Space Co., Huntsville, Alabama

Title: Research Study on Materials Processing in Space
Experiment M512 - Final Report

Source:

Date: Dec. 1, 1973 Pages: 140 Reference: :

Report Identification number(s): 74N21068; NASA-CR-120185;
LMSC-HREC-TR-D30695/
Contract NAS8-28729

Abbreviated Abstract: Study of gravity effect on fluid mechanics of
certain molten metal processes. Analyses of
M551 metals Melting Experiment and M553.
Sphere Forming Experiment. Comparison with
ground based and KC-135 experimental results.

(37) Author(s):

TRW Systems Group

Title:

Apollo Experiment Definition Study - Phase II

Source:

Date:

Nov. 1971

Pages:

References:

Report Identification number(s): TRW 18677-6008-R0-00
Contract NAS8-27085

Abbreviated Abstract:

(38) Author(s):

J. L. Reger
TRW Systems Group

Title:

Experimental Development of Processes to Produce
Homogenized Alloys of Immiscible Metals - Phase III

Source:

Date:

April 6, 1972

Pages:

References:

Report Identification number(s): TRW-18677-6011-R0-00
Contract NAS8-27085

Abbreviated Abstract:

(39) Author(s):

TRW Systems Group

Title:

Experiment Development of Processes to Produce Homogenized Alloys of Immiscible Metals - Phase III

Source:

Date: Sept. 29, 1972

Pages:

References:

Report Identification number(s): TRW-18677-6018-R0-00
Contract NAS8-27085

Abbreviated Abstract:

(40) Author(s):

J. L. Reger
TRW Systems Group

Title:

Low Gravity Processing of Immiscible Materials

Source:

International Astronautical Federation, International Astronautical Congress, 23rd, Vienna, Austria, October 8-15, 1972

Date:

Oct. 1972

Pages: 9

References:

Report Identification number(s): 72A45155
Contract NAS8-27085 and NAS8-28237

Abbreviated Abstract:

Procedures and results of Apollo 14 composite casting demonstration, MSFC drop tower tests, and KC-135/M512 Facility tests.

(41) Author(s): J. L. Reger
TRW Systems Group

Title: Test and Evaluation of Apollo 14 Composite Casting
Demonstration Specimens 6, 9, and 12, Phase 1

Source: TRW Systems Group, Redondo Beach, California

Date: Sept. 1971 Pages: 90 References:

Report Identification number(s): N72-15542, NASA-CR-61367
Contract NAS8-27085

Abbreviated Abstract: Evaluation of dispersion for mixtures of paraffin and sodium acetate; paraffin, sodium acetate and argon; and paraffin, sodium acetate, and 100 micrometer diameter tungsten spheres. Photographic and microstructure examinations, density, droplet size and distribution were measured.

(42) Author(s): TRW Systems Group

Title: Experimental Development of Processes to Produce
Homogenized Alloys of Immiscible Metals - Final Report

Source:

Date: Pages: References:

Report Identification number(s): TRW-16877-6019-R0-00
Contract NAS8-27085

Abbreviated Abstract:

(43) Author(s): J. L. Reger; I. C. Yates, Jr.*
TRW Systems Group; *Marshall Space Flight Center

Title: Preparation and Metallurgical Properties of Low Gravity
Processed Immiscible Materials

Source: AIAA, Aerospace Sciences Meeting, 12th, Washington, D. C.
January 30 - February 1, 1974

Date: Jan. 1974 Pages: 11 References: 24

Report Identification number(s): 74A18826; AIAA Paper 74-207
Contracts NAS8-27085, NAS8-28267 &
NAS8-28309

Abbreviated Abstract: Seven metallic systems processed in low
gravity tests: drop tower at Marshall Space
Flight Center, M-512 aboard KC-135 aircraft
and the M518 aboard Skylab exhibit more
uniform dispersion and microstructure than
the gravity samples.

(44) Author(s): J. L. Reger; I. C. Yates, Jr.*
TRW Systems Group; *NASA/MSFC

Title: Preparation and Metallurgical Properties of Low Gravity
Processed Immiscible Materials

Source: AIAA, Aerospace Sciences Meeting, 12th, Washington, D. C.
January 30 - February 1, 1974

Date: Jan. 1974 Pages: References:

Report Identification number(s): 74A18826, AIAA Paper 74-207
Contracts NAS8-28267 NA 80-27085
NAS8-28309

Abbreviated Abstract:

(45) Author(s): J. L. Reger
TRW Systems Group

Title: Study on Processing Immiscible Materials in Zero Gravity - Interim Report

Source:

Date: May 1973 Pages: References:

Report Identification number(s): TRW 14725-6010-RU-00
Contracts NAS8-28267, NAS8-27085 &
NAS8-28309

Abbreviated Abstract:

(46) Author(s): F. C. Douglas
United Aircraft Corp., Pratt and Whitney

Title: Research Study on Materials Processing in Space M554 Experiment

Source:

Date: June 30, 1972 Pages: References:

Report Identification number(s): UAC 8-28724-Mr-1
Contract NAS8-28724

Abbreviated Abstract:

(47) Author(s): F. C. Douglas; F. S. Galasso
United Aircraft Corp., Pratt and Whitney
Title: Research Study on Materials Processing in Space Phase A
Report

Source:

Date: Pages: References:

Report Identification number(s): UAC L911360-2
Contract NAS8-28724

Abbreviated Abstract:

(48) Author(s): F. D. George
United Aircraft Corp., Pratt and Whitney
Title: Preparation of Single Grain Eutectics for the M266
Experiment - Modification 2 Report

Source:

Date: Dec. 15, 1972 Pages: References:

Report Identification number(s): UAC L911515-1
Contract NAS8-28724

Abbreviated Abstract:

(49) Author(s):

Washington State University

Title: The Solidification Under Zero Gravity Conditions of
Binary Alloys Exhibiting Solid State Miscibility

Source:

Date: May 1, 1973 Pages: References:

Report Identification number(s): Washington SU 8-29725-MPR-1/
Contract NAS8-29725

Abbreviated Abstract:

(50) Author(s):

University of Wisconsin

Title: Materials Processing in Space, Experiment M512

Source:

Date: Aug. 1972 Pages: References:

Report Identification number(s): WISCONSIN U. 8-28733, Ph. A.
Contract NAS8-28733

Abbreviated Abstract:

IV. Solidification Processes

**B. Studies of Phenomena Influencing
Solidification Processes**

(1.) Author(s): T. C. Bannister
NASA/Marshall Space Flight Center
Title: Studies of Zero-Gravity Effects on Solidification
Source: NASA/MSFC Space Processing and Manufacturing Meeting

Date: Oct. 21, 1969 Pages: 13 References:

Report Identification number(s): 70N14675, (part of N70-14651)

Abbreviated Abstract: Activities aimed at defining the role of gravity in solidification processes.

(2.) Author(s): T. C. Bannister
NASA/Marshall Space Flight Center
Title: Studies of Zero Gravity Effects on Solidification
Source: NASA/MSFC Space Processing and Manufacturing Meeting

Date: Oct. 21, 1969 Pages: References:

Report Identification number(s): 71N11725 (part of N71-11701)

Abbreviated Abstract: Major activities initiated in support of space manufacturing, aimed primarily at defining the role of gravity in solidification processes.

(3.) Author(s): P. G. Grodzka
Lockheed Missiles and Space Co., Huntsville, Alabama

Title: Space Environmental Effects on Solidification Study
- Zero-Gravity Solidification - Final Report

Source: Lockheed Missiles and Space Co.

Date: Mar. 1970 Pages: 57 References:

Report Identification number(s): 70N36665, NASA-CR-102696;
HREC-1123-2; LMSC/HREC-D148619
Contract NAS8-21123

Abbreviated Abstract: Theoretical analysis of zero gravity effects
on solidification. Fine single crystal
candidates for space manufacturing: silicon,
germanium, KTN, BANANAS (barium, sodium niobate),
and CuCl.

() Author(s):

Title:

Source:

Date: Pages: References:

Report Identification number(s):

Abbreviated Abstract:

IV. Solidification Processes

C. Composite Casting Studies

(1.) Author(s): W. H. Steurer
General Dynamics Corporation, San Diego, California

Title: Composite Casting Superior Structural Materials
Through the Combined Application of Unique Zero-G
Effects

Source: NASA/Marshall Space Flight Center, Space Process. &
Manuf. Meeting

Date: Oct. 21, 1969 Pages: 24 References:

Report Identification number(s): 70N14672; (part of N70-14651)

Abbreviated Abstract: Proposes specific casting experiments and
assesses modifications to basic process.

(2.) Author(s): J. Berkowitz-Mattuck; L. B. Griffiths; P. C. Johnson;
A. E. Wechsler
Arthur D. Little, Inc., Cambridge, Mass.

Title: Spherical Forming and Composite Casting in Zero G

Source: NASA/Marshall Space Flight Center Space Processing &
Manufacturing Meeting

Date: Feb. 5, 1970 Pages: 26 References:

Report Identification number(s): 70N20532; (part of N70-20517)
Contract NAS8-21402

Abbreviated Abstract: Description of program for identification and
selection of materials and methods for
spherical forming and composite casting
experiments of the AAP Workshop.

(3.) Author(s): W. H. Steurer
General Dynamics Corp., San Diego, California

Title: Composite Casting Superior Structural Materials through
the Combined Application of Unique Zero G Effects

Source: NASA/Marshall Space Flight Center, Process. and Manuf.
Meeting

Date: Feb. 5, 1970 Pages: 24 References:

Report Identification number(s): 70N20538; (part of N70-20517)

Abbreviated Abstract: Experimental program is proposed, specifying:
materials, batch size, and mold shape; design,
vehicle arrangement, and support requirements;
controls, astronaut assistance and expected
results.

(4.) Author(s): I. C. Yates, Jr.
NASA, Marshall Space Flight Center

Title: Apollo 14 Composite Casting Demonstration

Source: NASA/Marshall Space Flight Center, Huntsville, Alabama

Date: Oct. 1971 Pages: 78 References:

Report Identification number(s): 72N23498; NASA-TM-X-64641

Abbreviated Abstract: Final Report. Dispersions of particles, fibers,
and gases in liquid metal matrices were
maintained during translunar and transearth
melting and solidification. Evaluation was made
by comparison with ground-processed control samples.

(5.) Author(s): R. Sicka; S. Rose; T. Harkulich
Horizons Research Inc., Cleveland, Ohio

Title: Whisker Reinforced Composite Materials
Final Report - 23 Jan. - 22 Jul., 1967

Source: Horizons Research Inc., Cleveland, Ohio

Date: Aug. 11, 1967 Pages: 56 References:

Report Identification number(s): 73N73763; AD-760562
Contract DAAF07-67-C-0281

Abbreviated Abstract: Investigation of electrophoretic deposition with whisker alignment. Secondary reinforcement of boron-epoxy system, copper-alumina whisker composites, and silicon carbide or alumina whisker reinforced epoxy composites.

(6.) Author(s): University of Alabama at Huntsville

Title: Refractory Composites

Source:

Date: April 30, 1971 Pages: References:

Report Identification number(s): Ala. U. RI-8-26991-MPR-Apr71
Contract NAS8-26991

Abbreviated Abstract:

(7.) Author(s): University of Alabama at Huntsville

Title: Refractory Composites

Source:

Date: Jan. 31, 1972

Pages:

References:

Report Identification number(s): Ala. U. RI-8-26991-QR-Jan. 72
Contract NAS8-26991

Abbreviated Abstract:

(8.) Author(s): University of Alabama at Huntsville

Title: Metallurgical Evaluation of Wire Reinforced Refractory
Composites for Space Shuttle Reuse

Source:

Date: Aug. 1972

Pages:

References:

Report Identification number(s): UARI RR-125 /
Contract NAS8-26991

Abbreviated Abstract:

(9.) Author(s): A. S. Yue
University of California at Los Angeles

Title: Directional Solidification of Eutectic Composites in
Space Environment

Source:

Date: Jan. 25, 1971 Pages: References:

Report Identification number(s): California U. 8-26402-QR-Jan. 71
Contract NAS8-26402

Abbreviated Abstract:

(10) Author(s): R. C. Fabiniak; T. J. Fabiniak
Cornell Aeronautical Lab., Inc., Buffalo, New York

Title: Test and Evaluation of Apollo 14 Composite Casting
Demonstration Specimens and Flight and Control Samples
Final Report, 28 Dec. 1970 - 31 Aug. 1971

Source:

Date: Sept. 1971 Pages: 195 References:

Report Identification number(s): 72N16331; NASA-CR-67365; KE-3101-D-1
Contract NAS8-27106

Abbreviated Abstract: Results of liquid phase sintering (experiments 1
and 2) and dispersion of dense particles on a
metal matrix rising shaking modes or forces in
the system. Qualitative and quantitative
interpretation of results.

(11) Author(s): W. H. Steurer; S. Kaye
General Dynamics/Convair, San Diego, California
Aerospace Div.
Title: Preparation of Composite Materials in Space - Vol. 1,
Executive Summary
Source: General Dynamics, Convair Division

Date: Jan. 1973 Pages: 25 References:

Report Identification number(s): 73N30542; NASA-CR-124365;
GDCA-DBG73-001-Vol-1
Contract NAS8-27806

Abbreviated Abstract: Definition of materials, processing criteria,
techniques, and apparatus for preparation of
composites in space: metal-base fiber and
particle composites (including cemented compacts);
plain and reinforced metal foams; and unidirectionally
solidified eutectic alloys.

(12) Author(s): W. H. Steurer; S. Kaye
General Dynamics/Convair, San Diego, California
Title: Preparation of Composite Materials in Space - Volume 2,
Technical Report

Source:

Date: Jan. 1973 Pages: 192 References:

Report Identification number(s): 73N20609; NAS-CR-124172;
GDCA-DBG73-001-Vol-2
Contract NAS8-27806

Abbreviated Abstract: A program of sub-orbital and orbital experiments
for 1972-1978 to identify materials, processes
and experimental equipment for metal-base fiber
and particle composites, controlled density metal
foams, and eutectic alloys.

(13) Author(s):

General Dynamics, Convair Div.

Title: Space Processing of Composite Materials

Source:

Date: April 30, 1973

Pages:

References:

Report Identification number(s): GD/C 8-29620-PR-1/
Contract NAS8-29620

Abbreviated Abstract:

(14) Author(s):

J. L. Brown; J. W. Johnson
Georgia Institute of Technology

Title: M553 Sphere Forming and M554 Composite Casting
Experiments - Summary Report - Phase A

Source:

Date: July 31, 1972

Pages:

References:

Report Identification number(s): GIT/EES A-1428
Contract NAS6-28735

Abbreviated Abstract:

(15) Author(s): J. L. Hubbard; J. W. Johnson
Georgia Institute of Technology

Title: Characterization of Five Spheres Formed During Ground Test
of the M553 Experiment at MSFC - Summary Report - Phase B

Source:

Date: Pages: References:

Report Identification number(s): GIT/EES A-1428-1, Phase B
Contract NAS8-28735

Abbreviated Abstract:

(16) Author(s): J. L. Hubbard; J. W. Johnson
Georgia Institute of Technology

Title: Characterization of Four Spheres Processed as a Part of
the M553 Sphere Forming Experiment Performed During the
Skylab 1/2 Flight

Source:

Date: Dec. 1973 Pages: References:

Report Identification number(s): GIT/EES A-1428-1, Phase C
Contract NAS8-28735

Abbreviated Abstract:

(17) Author(s): J. L. Hubbard; J. W. Johnson
Georgia Institute of Technology
Title: Characterization of Ground Base Specimen No. A72-962B
Processed as a Part of the M566 Composite Casting
Experiment - Summary Report
Source:

Date: Feb. 1974 Pages: References:

Report Identification number(s): GIT/EES A-1428-2, Phase B
Contract NAS8-28735

Abbreviated Abstract:

(18) Author(s): A. E. Wechsler, J. Berkowitz-Mattuck, P. C. Johnson,
L. B. Griffiths
Arthur D. Little, Inc., Cambridge, Mass.
Title: Spherical Forming and Composite Casting in Zero G

Source: NASA/Marshall Space Flight Center, Space Research &
Manuf. Meeting

Date: Oct. 21, 1969 Pages: 26 References:

Report Identification number(s): 70N14666(part of N70-14651)
Contract NAS8-21402

Abbreviated Abstract: Describes a program to assist in identifying
and selecting materials and methods for spherical
forming and composite casting experiments of the
AAP workshop.

(19) Author(s):

Arthur D. Little, Inc., Cambridge, Mass.

Title: Sphere Forming and Composite Casting in Zero-G - Final Report

Source:

Date: Jan. 7, 1970

Pages: 128

References:

Report Identification number(s): 70N21873; NASA-CR-61317; REPT-70538
Contract NAS8-21402

Abbreviated Abstract: Guidelines for hardware weight, volume, power, sample heating and solidification methods, etc. Candidate materials screening and selection was verified by ground based experiment. Engineering drawings included.

(20) Author(s):

Arthur D. Little, Inc.

Title: Research Study on Composite Castings

Source:

Date: June 17, 1970

Pages:

References:

Report Identification number(s): LITTLE 8-25709-MPR-Jun 1970
Contract NAS8-25709

Abbreviated Abstract:

(21) Author(s):

Arthur D. Little, Inc.

Title:

Research Study on Composite Castings

Source:

Date: May 26, 1971

Pages:

References:

Report Identification number(s): LITTLE 8-25709-FR-May 1971
Contract NAS8-25709

Abbreviated Abstract:

(22) Author(s):

H. C. Gatos; A. F. Witt
Massachusetts Institute of Technology, Cambridge

Title:

Apollo Indium Antimonide Remelt Experiment

Source:

Date: Oct. 1972

Pages:

References:

Report Identification number(s): MIT 8-28280-FR
Contract NAS8-28189

Abbreviated Abstract:

IV. Solidification Processes

D. Crystal Growth Studies

(1.) Author(s): E. C. Henry; L. R. McCreight

Title: Space Processing of Electronic Crystals

Source: General Electric Co., Philadelphia, Pa.
NASA/Marshall Space Flight Center Space Process. and
Manuf. Meeting

Date: Oct. 21, 1969 Pages: 20 References:

Report Identification number(s): 70N14654 (part of N70-14651)

Abbreviated Abstract: To overcome gravitational effects and reduce vacancies and dislocations, crystal growth from constituents in a glass solvent in zero gravity is proposed. Potassium sodium niobate is recommended.

(2.) Author(s): R. Mazelsky

Title: Zero Gravity Crystal Growth

Source: Westinghouse Electric Corp., Pittsburgh, Pa.
NASA/Marshall Space Flight Center Space Process. and
Manuf. Meeting

Date: Oct. 21, 1969 Pages: 9 References:

Report Identification number(s): 70N14667 (part of N70-14651)

Abbreviated Abstract: Brief review of principles and techniques of crystal growth. Solution growth requires less operator time and lower temperatures; and a zero gravity experiment is outlined.

(3.) Author(s): G. M. Arnett; A. P. Kulshreshtha; T. Mookherji

Title: Techniques for Characterization and Evaluation of
Zero-Gravity Grown Gallium Arsenide

Source: NASA/Marshall Space Flight Center Space Proces. and
Manuf. Meeting

Date: Oct. 21, 1969 Pages: 17 References:

Report Identification number(s): 70N14668 (part of N70-14651)

Abbreviated Abstract: Brief discussion of modern techniques to detect ultratrace impurities and dislocation-type imperfections influencing electronic properties of gallium arsenide.

(4.) Author(s): L. D. Fullmer; R. M. Housley

Title: Crystal Growth from Melts in 0-G Environment

Source: North American Rockwell Corp., Thousand Oaks, California
NASA/Marshall Space Flight Center Space Processing and
Manuf. Meeting

Date: Oct. 21, 1969 Pages: 7 References:

Report Identification number(s): 70N14674 (part of N70-14651)

Abbreviated Abstract: Value of perfect single crystals, factors limiting perfection, and a crystal pulling apparatus are discussed.

(5.) Author(s): E. C. Henry; L. R. McCreight

Title: Space Processing of Electronic Crystals

Source: General Electric Co., Philadelphia, Pa.
NASA/Marshall Space Flight Center Space Processing and
Manufacturing Meeting

Date: Feb. 5, 1970 Pages: 20 References:

Report Identification number(s): 70N20520 (part of N70-20517)

Abbreviated Abstract: Glass solvent method of growing high temperature
oxidic crystals. Zero gravity processing should
reduce convection produced vacancies and
dislocations as well as prevent rapid settling
of the solutes.

(6.) Author(s): R. Mazelsky

Title: Zero Gravity Crystal Growth

Source: Westinghouse Electric Corp., Pittsburgh, Pa.
NASA/Marshall Space Flight Center Space Process. &
Manuf. Meetings

Date: Feb. 5, 1970 Pages: 9 References:

Report Identification number(s): 70N20533 (part of N70-20517)

Abbreviated Abstract: Principles and techniques of crystal growth.
Outline of projected solution growth experiments.

(7.) Author(s): G. M. Arnett; A. P. Kulshreshtha; T. Mookherji

Title: Techniques for Characterization and Evaluation of Zero Gravity Grown Gallium Arsenide

Source: NASA/Marshall Space Flight Center, Huntsville, Alabama
Space Processing and Manufacturing Meeting

Date: Feb. 5, 1970 Pages: 17 References:

Report Identification number(s): 70N20534 (part of N70-20517)

Abbreviated Abstract: Brief discussion of modern techniques to detect ultratrace impurities and dislocation-type imperfections influencing electronic properties of gallium arsenide.

(8.) Author(s): L. D. Fullmer; R. M. Housley

Title: Crystal Growth from Melts in Zero G Environment

Source: North American Rockwell Corp., Thousand Oaks, California
NASA/Marshall Space Flight Center Space Process. and
Manuf. Meeting

Date: Feb. 5, 1970 Pages: 7 References:

Report Identification number(s): 70N20540 (part of N70-20517)

Abbreviated Abstract: Value of perfect single crystals, factors limiting perfection, and a crystal pulling apparatus are discussed.

(9.) Author(s): T. C. Bannister
NASA/Marshall Space Flight Center
Title: Studies of Zero-Gravity Effects on Solidification
Source: NASA/MSFC Space Processing and Manufacturing Meeting

Date: Feb. 5, 1970 Pages: 13 References:

Report Identification number(s): 70N20541 (part of N70-20517)

Abbreviated Abstract: Discussion of activities aimed at defining the role of gravity in solidification processes.

(10) Author(s): U. Roy
Title: Single Crystal Growth from Melt Under Space Environment
Source: Alabama University, Huntsville, Alabama
NASA/Marshall Space Flight Center Space Process. & Manuf. Meeting

Date: Feb. 5, 1970 Pages: 20 References:

Report Identification number(s): 70N20542 (part of N70-20517)

Abbreviated Abstract: Brief outline of normal gravity single crystal growth from melts. Review effects of interface shape, high-g, gamma-ray, and electromagnetic body forces. Proposed experiment to study growth kinetics in equivalent gravity fields.

(11) Author(s): E. C. Henry; L. R. McCreight

Title: Space Processing of Electronic Crystals

Source: General Electric Co., Philadelphia, Pa.
NASA/Marshall Space Flight Center Space Processing and
Manufacturing Meeting

Date: Oct. 21, 1969 Pages: 20 References:

Report Identification number(s): 71N11704 (part of N71-11701)

Abbreviated Abstract: To overcome gravitational effects and reduce vacancies and dislocations crystal growth from constituents in a glass solvent in zero gravity is proposed. Potassium sodium niobate is recommended.

(12) Author(s): R. Mazelsky

Title: Zero Gravity Crystal Growth

Source: Westinghouse Electric Corp., Pittsburgh, Pa.
NASA/Marshall Space Flight Center Space Process. &
Manuf. Meeting

Date: Oct. 21, 1969 Pages: 9 References:

Report Identification number(s): 71N11717 (part of N71-11701)

Abbreviated Abstract: Brief review of principles and techniques of crystal growth. Solution growth requires less operator time and lower temperatures, and a zero gravity experiment is outlined.

(13) Author(s): G. M. Arnett; A. P. Kulshreshtha; T. Mookherji

Title: Techniques for Characterization and Evaluation of Zero Gravity Grown Gallium Arsenide

Source: NASA/Marshall Space Flight Center Huntsville, Alabama
Space Processing and Manufacturing Meeting

Date: Oct. 21, 1969 Pages: References:

Report Identification number(s): 71N11718 (part of N71-11701)

Abbreviated Abstract: Brief discussion of modern techniques to detect ultratrace impurities and dislocation-type imperfections influencing electronic properties of gallium arsenide.

(14) Author(s): L. D. Fullmer; R. M. Housley

Title: Crystal Growth from Melts in Zero G Environment

Source: North American Rockwell Corp., Thousand Oaks, Calif.
NASA/Marshall Space Flight Center Space Process. & Manuf. Meeting

Date: Oct. 21, 1969 Pages: 7 References:

Report Identification number(s): 71N11724 (part of N71-11701)

Abbreviated Abstract: Value of perfect single crystals, factors limiting perfection, and a crystal pulling apparatus are discussed.

(15) Author(s): P. G. Grodzka

Title: Gravity-Driven and Surface Tension-Driven Convection
in Single Crystal Growth

Source: Lockheed Missiles and Space Co., Huntsville, Alabama
NASA/Marshall Space Flight Center Space Process. &
Manuf. Meeting

Date: Oct. 21, 1969

Pages: 14

References:

Report Identification number(s): 71N11728 (part of N71-11701)

Abbreviated Abstract: Analytical and mathematical studies of floating-
zone and Czochralski single crystal growth
techniques to determine the role of convection.

(16) Author(s): V. K. Jain

Title: Utilization of Space Environment for Preparing Highly
Perfect Crystals

Source: NASA/Marshall Space Flight Center, Huntsville, Alabama

Date: Dec. 11, 1970

Pages: 39

References:

Report Identification number(s): 71X78072; NASA-TM-X-64564

Abbreviated Abstract:

(17) Author(s): M. H. Johnson

Title: Preliminary Terrestrial Based Experiments on Gravity-Affected Crystal Growth

Source: NASA/Marshall Space Flight Center, Huntsville, Alabama

Date: March 13, 1970 Pages: 19 References:

Report Identification number(s): 72N25693; NASA-TM-X-53999

Abbreviated Abstract: Tin melted in a furnace on a centrifuge was cooled during rotation to grow single crystals. Visual analyses were made with a scanning electron microscope.

(18) Author(s): R. L. Kroes; J. H. Davis
Marshall Space Flight Center; University of Alabama, Huntsville

Title: Investigation of Crystal Growth in Zero Gravity Environment

Source:

Date: June 18, 1969/ Pages: References:
June 1, 1972

Report Identification number(s): 74K10306
Contract NAS8-24612

Abbreviated Abstract:

(19) Author(s):

University of Alabama at Huntsville

Title: Investigation of Crystal Growth in Zero Gravity Environment
Monthly Progress Report, February 1-28, 1970

Source:

Date: Feb. 1 - 28, 1970

Pages: 6

References:

Report Identification number(s): 70X74976; NASA-CR-112877
Contract NAS8-24612

Abbreviated Abstract: Some key words: Whiskers (single crystals),
convection currents, convective
flow, electric fields.

(20) Author(s):

U. Roy
University of Alabama at Huntsville

Title: Investigation of Crystal Growth in Zero Gravity Environment

Source:

Date: June 1969, April 1970

Pages:

References:

Report Identification number(s): 71X10165; NASA-CR-102986 IR-1
Contract NAS8-24612

Abbreviated Abstract:

(21) Author(s): J. H. Davis, R. B. Lal, H. U. Walter, J. G. Castle, Jr.
University of Alabama at Huntsville

Title: Investigation of Crystal Growth in Zero Gravity
Environment and Investigation of Metallic Whiskers

Source:

Date: Dec. 1972 Pages: 255 References:

Report Identification number(s): 73N17778; NASA-CR-124065
Contracts NAS8-24612 & NAS8-26793

Abbreviated Abstract: Theoretical and experimental work on near-zero gravity effects on crystal and metallic whisker growth during Skylab and Apollo experiments. Indium-bismuth compounds, bismuth single crystals, gallium arsenide films and single crystals and cadmium whiskers.

(22) Author(s): U. Roy
University of Alabama at Huntsville

Title: Investigation of Crystal Growth

Source:

Date: Jan. 1970 - Dec. 1971 Pages: References:

Report Identification number(s): 72X10284; NASA-CR-122553
Contract NAS8-25120

Abbreviated Abstract:

(23) Author(s): I. Miyagawa
University of Alabama at Huntsville
Title: Investigation of Crystal Growth from Solutions

Source:

Date: Jan. 21, 1972 Pages: References:

Report Identification number(s): ALA-U-BER-8-28098-PR-Jan 72
NAS8-28098

Abbreviated Abstract:

(24) Author(s): I. Miyagawa
University of Alabama at Huntsville
Title: Investigation of Crystal Growth From Solutions-Technical
Summary Report

Source:

Date: Feb. 28, 1973 Pages: References:

Report Identification number(s): ALA-U-BER-8-28098-TSR-Jan 73
NAS8-28098

Abbreviated Abstract:

(25) Author(s): I. Miyagawa
University of Alabama at Huntsville
Title: Investigation of Crystal Growth from Solutions - Technical
Summary Report

Source:

Date: Jan. 1974 Pages: References:

Report Identification number(s): ALA-U-BER-8-28098-TSR-Jan 74
Contract NAS8-28098

Abbreviated Abstract:

(26) Author(s): A. Boese
Marshall Space Flight Center
Title: Design, Construct, Test and Evaluate a Zero Gravity
Experiment

Source:

Date: Nov. 1, 1971/
Apr. 31, 1973 Pages: References:

Report Identification number(s): 72K0212
Contract NAS8-28112

Abbreviated Abstract:

(27) Author(s):

University of Alabama at Huntsville

Title: Ellipsometric Measurements of Epitaxial GaAs Layers
on a GaAs Substrate

Source:

Date: April 29, 1973

Pages:

References:

Report Identification number(s): ALA-U-BER-8-29494-PR-April 73
Contract NAS8-29494

Abbreviated Abstract:

(28) Author(s):

Title: Electrical Characterization of GaAs Single Crystal in
Direct Support of M555 Flight Experiment

Source:

Date:

Pages:

References:

Report Identification number(s): ALA-U-RI-8-29542-MPR
Contract NAS8-29542

Abbreviated Abstract:

(29) Author(s): J. H. Davis; R. B. Lal; H. U. Walters; *J. G. Castle, Jr.
University of Alabama at Huntsville; *Marshall Space
Flight Center
Title: Investigation of Crystal Growth in Zero Gravity Environment
and Investigation of Metallic Whiskers

Source:

Date: Pages: References:

Report Identification number(s): ALA-U-8-29542-FR

Abbreviated Abstract:

(30) Author(s): H. E. Patee, R. L. Rotham
Battelle Memorial Institute
Title: Materials Processing in Space M512 - Phase A

Source:

Date: Aug. 15, 1972 Pages: References:

Report Identification number(s): BMI-8-28725-PH A Aug 72
Contract NAS8-28725

Abbreviated Abstract:

(31) Author(s): H. E. Patee; R. E. Monroe
Battelle Memorial Institute
Title: Materials Processing in Space M512 Skylab M551 Samples -
Skylab M552 Samples - Study Report
Source:

Date: July 1973 Pages: References:

Report Identification number(s): BMI 8-28725-SR, Ph.B.
Contract NAS8-28725

Abbreviated Abstract:

(32) Author(s): R. E. Monroe
Battelle Memorial Institute
Title: Characterization of Metals Melting Discs
Skylab Experiment M551 - Final Report
Source:

Date: Dec. 4, 1973 Pages: References:

Report Identification number(s): BMI 8-28725-FR-DEC 73(a)
Contract NAS8-28725

Abbreviated Abstract:

(33) Author(s): R. E. Monroe, H. E. Pattee
Battelle Memorial Institute

Title: Characterization of Exothermic Brazing Components
Skylab Experiment M552 - Final Report

Source:

Date: Dec. 4, 1973

Pages:

References:

Report Identification number(s): BMI-8-28725-FR-DEC 73(b)
Contract NAS8-28725

Abbreviated Abstract:

(34) Author(s): N. M. Griesenauer; J. F. Miller
Battelle Memorial Institute

Title: Single Crystals of Metal Solid Solutions

Source:

Date: Nov. 9, 1973

Pages:

References:

Report Identification number(s): BMI-8-29875-MLPR-NOV 73
Contract NAS8-29875

Abbreviated Abstract:

(35) Author(s): J. P. Doty; J. A. Reising
Fabric Research Labs, Inc., Dedham, Mass.
Eagle-Picher Industries, Inc.
Title: Study of Single Crystals of Metal Solid Solutions
Final Report.

Source:

Date: May 21, 1973 Pages: 86 References:

Report Identification number(s): 73N29532; NASA-CR-124354
Contract NAS8-29077

Abbreviated Abstract: Silver, copper, gold and their alloys
investigation to develop background information
to support space flight experiment and generate
ground based data for comparison.

(36) Author(s): J. P. Doty; J. A. Reising
Eagle-Picher Industries, Inc., Joplin Mo.
Research Labs
Title: Study of Single Crystals of Metal Solid Solutions

Source:

Date: March 21, 1973 Pages: 45 References:

Report Identification number(s): 73N22476; NASA-CR-124212
Contract NAS8-29077

Abbreviated Abstract: Parameters and requirements for growing single
crystals melting at 900-1100 C, such as
silver, copper, gold and alloys in zero gravity.

(37) Author(s): R. N. Griffin; E. C. Henry; L. R. McCreight; B. A. Rubin*
General Electric Co., Space Sciences Laboratory,
Wyeth Labs*
Title: Investigation of the Preparation of Materials in Space -
Final Report

Source:

Date: March 1970 Pages: 90 References:

Report Identification number(s): 70N31862; NASA-CR-102749
Contract NAS8-24683

Abbreviated Abstract: Emphasizing electronic crystals grown from
solution, and developing a solution type
process to demonstrate the growth of potassium
sodium niobate crystals from potassium sodium
silicate glass solution.

(38) Author(s): D. R. Ulrich; L. R. McCreight
General Electric Co.

Title: Economic Analysis of Crystal Growth in Space

Source:

Date: Sept. 1971 Pages: References:

Report Identification number(s): GE 8-27942-MPR-1
Contract NAS8-27942

Abbreviated Abstract:

(39) Author(s): D. R. Ulrich; A. M. Chung; C. S. Yan; L. R. McCreight
General Electric Co., Space Sciences Lab.

Title: Economic Analysis of Crystal Growth in Space

Source:

Date: July 1972 Pages: 178 References:

Report Identification number(s): N73-12806; NASA-CR-12395
Contract NAS8-27942

Abbreviated Abstract: Space processing of sophisticated compound
single crystals for electronics in 1980's
(ceramic oxides and compound semi-conductors)
with maximum perfection, purity, and size is
suggested.

(40) Author(s): D. R. Ulrich; M. J. Noone; K. E. Spear; W. B. White;
E. C. Henry
General Electric Co., Space Div.

Title: Crystal Growth in Fused Solvent Systems
Final Report

Source:

Date: June 1973 Pages: 178 References:

Report Identification number(s): 73N32587; NASA-CR-124443
Contract NAS8-28114

Abbreviated Abstract: Growth of electronic ceramic single crystals
from solutions including fused or glass solvents
and aqueous solutions, growth and characterization
of triglycine sulphate.

(41) Author(s): D. G. Burkhard; H. Sexl; R. Sexl
P.E.C. Research Associates, Inc., Louisville, Colo.

Title: Study of Interfacial Conductivity - Final Report

Source:

Date: 1970 Pages: 149 References:

Report Identification number(s): 71N15601; NASA-CR-102989
Contract NAS8-30171

Abbreviated Abstract: Results of literature survey on the theory of crystal growth in zero gravity. Expansion of statistical theory of interfacial thermal conductivity.

(42) Author(s): H. Wiedemeier
Rensselaer Polytechnic Institute, Troy, New York

Title: Growth of Single Crystals by Vapor Transport in Zero Gravity Environment, Ground Based Experiments - Final Report; June 4, 1970 - July 3, 1971

Source:

Date: Sept. 1971 Pages: 35 References:

Report Identification number(s): 72X76522; NASA-CR-126511
NAS8-26146

Abbreviated Abstract: Some key words: Germanium compounds, selenides, telluride.

(43) Author(s): W. R. Wilcox
University of Southern California, Los Angeles
Title: Analytics of Crystal Growth in Space
Bimonthly Progress Report, No. 1, 5 June-4 Aug. 1973

Source:

Date: Aug. 6, 1973 Pages: References:

Report Identification number(s): 73X8659; NASA-CR-133895
Contract NAS8-29847

Abbreviated Abstract:

(44) Author(s): W. R. Wilcox
University of Southern California, Los Angeles
Title: Analytics of Crystal Growth in Space
Bimonthly Progress Report, 5 Aug. - 4 Oct. 1973

Source:

Date: Oct. 6, 1973 Pages: 27 References:

Report Identification number(s): 73X81304; NASA-CR-136056
Contract NAS8-29847

Abbreviated Abstract: Some key words: Zone melting, mathematical
models, mechanical properties.

(45) Author(s): F. A. Padovani; F. W. Voltmer
Texas Instruments, Inc., Dallas, Texas, Semi-conductor
Research and Development Labs
Title: Growth of a Single Crystal Ribbon in Space - Final Report
29 June 1971 - 13 April 1973

Source:

Date: May 1973 Pages: 45 References:

Report Identification number(s): 73N32588; NASA-CR-124439
Contract NAS8-27807

Abbreviated Abstract: Design of a ribbon puller. Attempt to grow
a conventional float zone crystal in an
external static magnetic field.

(46) Author(s): C. S. Duncan; R. Mazelsky; M. Rubenstein
Westinghouse Research Laboratory, Pittsburgh, Pa.

Title: Zero Gravity Crystal Growth - Final Report

Source:

Date: April 29, 1970 Pages: 90 References:

Report Identification number(s): 70N30092; NASA-CR-102731
Contract NAS8-24509

Abbreviated Abstract: Operational unit for growing crystals in zero
gravity, specifically gallium arsenide.

(47) Author(s): R. G. Seidensticker; C. S. Duncan; R. A. Johnson
Westinghouse Research Lab., Pittsburgh, Pa.
Title: Feasibility Study of a Multipurpose Electric Furnace
System for Space Experiments
Addendum to Final Report
Source:

Date: 1971 Pages: 63 References:

Report Identification number(s): 71X10881; NASA-CR-119793
NAS8-26122

Abbreviated Abstract:

(48) Author(s): C. S. Duncan; M. Rubenstein; R. G. Seidensticker
Westinghouse Research Laboratory
Title: Optimization of a Solution Growth Experiment for Zero
Gravity and Development of Apparatus for a Melt Growth
Experiment - Final Report
Source:

Date: 1971 Pages: References:-

Report Identification number(s): NASA-CR-119792
NAS8-26122

Abbreviated Abstract:

(49) Author(s): C. S. Duncan; M. Rubenstein
Westinghouse Research Lab.

Title: Single Crystal Growth Flight Rated Experiment Packages

Source:

Date: July 31, 1970 Pages: References:

Report Identification number(s): WRL-8-25158-MR-July 70
Contract NAS8-26158

Abbreviated Abstract:

() Author(s):

Title:

Source:

Date: Pages: References:

Report Identification number(s):

Abbreviated Abstract:

V. Containerless Processing

A. General Studies

(1.) Author(s): R. F. Bunshah; R. S. Juntz
University of California, Livermore
Title: Levitation Melting of Beryllium and Aluminum
Source: California Univ. Livermore. Lawrence Radiation Lab.
Am. Vacuum Soc., Vacuum Met. Meeting, New York

Date: June 29 - Pages: 13 References:
July 1, 1964
Report Identification number(s): 66N20533; UCRL-7913; CONF-603-11

Abbreviated Abstract:

(2.) Author(s): J. W. Downey
Metallurgy Division
Title: Levitation Melting of Metals and Alloys
Source: Argonne National Lab., Illinois

Date: Dec. 1967 Pages: 15 References:
Report Identification number(s): 68N27205; ANL-7398; W-31-109-ENG-38

Abbreviated Abstract: Qualitative evaluation of two levitation coil designs.

(3.) Author(s): R. T. Frost
General Electric Co.

Title: Weightless, Containerless Melting and Solidification of
Potential New Metal and Ceramic Products

Source: General Electric Co., Philadelphia, Pa.
NASA/Marshall Space Flight Center Space Process. &
Manuf.

Date: Feb. 5, 1970 Pages: 20 References:

Report Identification number(s): 70N20522 (part of N70-20517)

Abbreviated Abstract: Super alloy castings with rare earth oxides,
metal emulsions casting, ultrapure materials
preparation, and solidification with extreme
subcooling.

(4.) Author(s): R. T. Frost
General Electric Co.

Title: Weightless, Containerless Melting and Solidification
of Potential New Metal and Ceramic Products

Source: General Electric Co., Philadelphia, Pa.
NASA/Marshall Space Flight Center Space Processing and
Manufacturing

Date: Oct. 21, 1969 Pages: 20 References:

Report Identification number(s): 71N11706 (part of N71-11701)

Abbreviated Abstract: Super alloy castings with rare earth oxides,
metal emulsions casting, ultrapure materials
preparation, and solidification with extreme
subcooling.

(5.) Author(s): A. L. Dragoo; R. C. Paule
National Bureau of Standards, Institute for Materials
Research, Washington, D. C.
Title: Ultrapure Materials - Containerless Evaporation and
the Roles of Diffusion and Marangoni Convection
Source: AIAA, Aerospace Sciences Meeting, 12th
Washington, D. C.

Date: Jan. 30 - Pages: 9 References: 15
Feb. 1, 1974
Report Identification number(s): 74A18861, AIAA Paper 74-209
NASA Order W-13475

Abbreviated Abstract: Modified thermodynamic calculations to describe
the complex chemical equilibria encountered
in the evaporation of impurities from a melt
into a vacuum. Calculations for evaporative
purification of alumina.

(6.) Author(s): T. B. Jones
Colorado State University
Title: Electrohydrodynamic Space Processing Technology
Source:

Date: Feb. 1974 Pages: References:
Report Identification number(s): Colorado SU 9-30/250-49L-1/
Contract NAS8-30250

Abbreviated Abstract:

(7.) Author(s): R. T. Frost; L. J. Napaluch; T. D. Wise; E. Stockhoff;
G. Wouch
Title: General Electric Company, Space Sciences Laboratory
Free Suspension Processing Systems for Space Manufacturing

Source:

Date: June 15, 1971 Pages: 79 References:

Report Identification number(s): 71X10896; NASA-CR-119954;
DCN-1-065-27017
Contract NAS8-26157

Abbreviated Abstract: Melt solidification, crystal growth from melt,
microstructure formation.

() Author(s):

Title:

Source:

Date: Pages: References:

Report Identification number(s):

Abbreviated Abstract:

- V. Containerless Processing
- B. Position Control Techniques
- 1. General Techniques

(1.) Author(s): L. H. Berge

Title: Positioning and Handling in Weightless Environment

Source: NASA/Marshall Space Flight Center Huntsville, Alabama
Unique Manufacturing Processes in Space Environment

Date: April 1970 Pages: 8 References:

Report Identification number(s): 71N26014; (part of N71-26009)

Abbreviated Abstract: Description and application of electro-mechanical transfer, positioning and retrieving devices for an orbiting manufacturing facility.

() Author(s):

Title:

Source:

Date: Pages: References:

Report Identification number(s):

Abbreviated Abstract:

V. Containerless Processing
B. Position Control Techniques
2. Acoustic Fields

(1.) Author(s): T. G. Wang; M. M. Saffren; D. D. Elleman

Title: Material Suspension within an Acoustically Excited Resonant Chamber

Source: Jet Propulsion Lab., Calif. Inst. of Technology
Pasadena, California

Date: Aug. 31, 1973

Pages: 27

References:

Report Identification number(s): 73N31443; NASA-CASE-NPO-13263-1;
US-PATENT-APPL-SN-393523; NAS7-100

Abbreviated Abstract: Patent application. Acoustic transducers establish a standing wave pattern in a rectangular furnace chamber to position an object under low gravity conditions.

(2.) Author(s): T. G. Wang; M. M. Saffren; D. D. Elleman
California Institute of Technology, Jet Propulsion Lab,
Pasadena, California

Title: Acoustic Chamber for Weightless Positioning

Source: AIAA, Aerospace Sciences Meeting, 12th Washington, D. C.

Date: Jan. 30 -
Feb. 1, 1974

Pages: 6

References:

Report Identification number(s): 74A20769; AIAA Paper 74-155

Abbreviated Abstract: Design of a resonator to position molten materials in an extreme temperature gradient and a servo loop to maintain position as temperature varies

(3.) Author(s): R. R. Whymark
Interand Corporation

Title: Design, Development, Fabrication and Test of Acoustic
Processors

Source:

Date: July 14, 1972 Pages: References:

Report Identification number(s): Interand 8-28762-MR-July, 1972
Contract NAS8-28762

Abbreviated Abstract:

(4.) Author(s): R. R. Whymark
Interand Corporation

Title: Operating Instructions for the Acoustic Processors

Source:

Date: Jan. 26, 1973 Pages: References:

Report Identification number(s): Interand 8-28762-OI-Jan. 1973

Abbreviated Abstract:

(5.) Author(s): R. R. Whymark
Interand Corporation

Title: Acoustic Processing Method for MS/MS Experiments

Source:

Date: June 1973 Pages: 46 References:

Report Identification number(s): NASA-CR-124300; IC-726; 73N28671
Contract NAS8-29030

Abbreviated Abstract: Single sound beam positioning control: description
and experimental results.

(6.) Author(s): R. R. Whymark
Interand Corporation

Title: Acoustic Positioning for Space Processing Experiments

Source:

Date: Dec. 1973 Pages: References:

Report Identification number(s): Intersonics 8-30471-MPR-1
Contract NAS8-30471

Abbreviated Abstract:

- V. Containerless Processing
- B. Position Control Techniques
- 3. Electromagnetic Fields

(1.) Author(s): A. J. Hatch
Argonne National Lab., Argonne, Ill.
Title: Potential-Well Description of Electromagnetic Levitation
Source: Journal of Applied Physics, Vol. 36

Date: Jan. 1965 Pages: 9 References: 22

Report Identification number(s): 65A15820

Abbreviated Abstract: Derivation of levitation forces exerted by spatially non-uniform arc magnetic fields on nonmagnetic conducting spheres as the negative gradient of a potential function.

(2.) Author(s): G. F. Nix; L. S. Piggott
University of Manchester, Electrical Engineering Labs., Eng.
Title: Electromagnetic Levitation of a Conducting Cylinder
Source: Institution of Electrical Engineers, Proceedings,
VOL. 113

Date: July 1966 Pages: 7 References:

Report Identification number(s): 66A35729

Abbreviated Abstract: Long circular cylinder supported by a c. field produced by two conductors parallel to the cylinder axis. Boundaries for the stable float region were determined for 2 cm diameter aluminum bar with wires 2, 4 and 6 cm apart with ac frequency at 50,400 and 2,000 Hz.

(3.) Author(s): H. P. Furth
Princeton University, Princeton, New Jersey.
Title: Some Engineering Applications of High Magnetic Fields
Source: Society of Engineering Science, 6th Annual Meeting,
Princeton University, Princeton, New Jersey, Proceedings,
Part 1

Date: Nov. 11 - 13, 1968 Pages: 9 References:

Report Identification number(s): 70A37948 (part of A70-37940)

Abbreviated Abstract: Brief review of high magnetic pressure application, particularly metal forming by pulsed 100 kilogauss magnetic fields and levitation of superconducting rings by 10 kG static magnetic fields.

(4.) Author(s): D. N. Cornish
Atomic Energy Research Establishment, Culham Lab.,
Abingdon, Berkshire, England
Title: A Report on the Culham Superconducting Levitron

Source: International Symposium on Electro-Magnetic Suspension,
2nd, University of Southampton, Southampton, England,
Proceedings

Date: July 12 - 14, 1971 Pages: 12 References:

Report Identification number(s): 72A24758 (part of A72-24756)

Abbreviated Abstract: Discussion of machine for trapped hot plasma stability and confinement studies in vacuum, emphasizing superconducting aspects and coil performance.

(5.) Author(s): M. F. Clark
General Electric Company, Space Science Div.

Title: Design, Development, Fabrication, Assembly, and Testing
Support for a Free Suspension Processing System for Space
Manufacturing Utilizing Electromagnetic Force Field

Source:

Date: Dec. 31, 1971 Pages: References:

Report Identification number(s): GE 8-27228-SR-Dec. 1971
Contract NAS8-27228

Abbreviated Abstract:

(6.) Author(s): E. H. Buerger; R. T. Frost; R. H. Lambert; M. F. O'Connor;
E. L. G. O'Dell; L. J. Napaluch; E. H. Stockhoff & G. Wouch
General Electric Company, Space Science Div.

Title: Electromagnetic Free Suspension System for Space
Manufacturing - VOL. 1: Technology Department - Final
Report

Source:

Date: Dec. 22, 1972 Pages: 158 References:

Report Identification number(s): N73-20522; NASA-CR-124134
Contract NAS8-27228

Abbreviated Abstract: Four coil optimization, four vs. six coil
comparison; four coil position servocontrol and
breadboard; position sensing servosystem; two
color pyrometer, and specimen rotation mode
analysis.

(7.) Author(s): R. T. Frost
General Electric Co., Space Science Div.

Title: Study of a Free Suspension System for Space Manufacturing -
Phase B

Source:

Date: Sept. 2, 1973 Pages: References:

Report Identification number(s): GE 8-29680-MPR-1/
Contract NAS8-29680

Abbreviated Abstract:

(8.) Author(s): R. T. Frost; H. L. Bloom; L. J. Napaluch; E. H. Stockhoff;
G. Wouch
General Electric Co., Space Science Div.

Title: Electromagnetic Containerless Processing Requirements and
Recommended Facility Concept and Capabilities for SpaceLab

Source:

Date: May 13, 1974 Pages: References:

Report Identification number(s): GE 8-29680-FR-May 74
Contract NAS8-29680

Abbreviated Abstract:

V. Containerless Processing

C. Heating and Cooling Techniques

1. General Techniques

(1.) Author(s): J. R. Rasquin
NASA/Marshall Space Flight Center
Title: Heat Sources for Space Manufacturing Processes
Source: NASA/Marshall Space Flight Center, Huntsville, Alabama
Space Processing and Manufacturing Meeting

Date: Oct. 21, 1969 Pages: 8 References:

Report Identification number(s): 70N14673 (part of N70-14651)

Abbreviated Abstract: Assessment of available heat sources for zero-gravity processing: weight, bulk, power, reliability, safety, and cost.

(2.) Author(s): J. R. Rasquin
NASA/Marshall Space Flight Center
Title: Heat Sources for Space Manufacturing Processes
Source: NASA/Marshall Space Flight Center, Huntsville, Alabama
Space Processing and Manufacturing

Date: Feb. 5, 1970 Pages: 8 References:

Report Identification number(s): 70N20539 (part of N70-20517).

Abbreviated Abstract: Assessment of available heat sources for zero-gravity processing: weight, bulk, power, reliability, safety, and cost.

V. Containerless Processing
C. Heating and Cooling Techniques
2. Induction Heating

(1.) Author(s): G. F. Golovin, Editor

Title: Application of Induction Heating in Micro-Metallurgy

Source: Joint Publications Research Service, Washington, D. C.

Date: March 22, 1965 Pages: 50 References:

Report Identification number(s): 65N19539; JPR 5-29213; TT-65-30533

Abbreviated Abstract: Translated from Russian. Crucible-less electromagnetic levitation and heating.

() Author(s):

Title:

Source:

Date: Pages: References:

Report Identification number(s):

Abbreviated Abstract:

V. Containerless Processing

C. Heating and Cooling Techniques

3. Electron Beam

(1.) Author(s):

Title: Studies in Electron-Beam Melting of Metals

Source: Joint Publications Research Service
Washington, D. C.

Date: Feb. 17, 1966 Pages: 26 References:

Report Identification number(s): 66N19021; JPRS-34181; TT-66-30622

Abbreviated Abstract: Translation from Russian.
Electron beam melting of ball bearing steel
(Yu. M. Yebimenko).
Preferential growth in molybdenum single crystals
from electron beam, levitation zone recrystaliza-
tion (A. L. Pekerov et al).
Single crystals of refractory metals (Ye. M.
Savitsky, et al).

(2.) Author(s): J. W. Thornhill
Westinghouse Electric Corp., Research Labs., Pittsburgh,
Pa.

Title: Material Processing and Phenomena Investigations for
Functional Electronic Blocks - Second Interim Technical
Report; 16 September - 15 December, 1965

Source: Wright-Patterson AFB, Ohio, AF Avionics Lab.

Date: January 10, 1966 Pages: 92 References:

Report Identification number(s): 66X15268; AD-676728; AF 33/615/-3095

Abbreviated Abstract: Electrochemical and electron beam techniques
in material processing. Some key words:
Boron, electrophoresis, etching, silicon.

(3.) Author(s): C. B. Hassan; H. G. Lienau*; J. F. Lowry
Westinghouse Electric Corp., Research Labs; *NASA, Marshall
Space Flight Center
Title: Electron-Beam Welder for Use in Space

Source: Westinghouse Engineer, Vol. 28/Inst. of Electrical and
Electronics Engineers, Annual Symposium on Electron Ion,
and Laser Beam Technology, 9th, Berkeley, California

Date: May 9 - 11, 1967 Pages: 5 References:

Report Identification number(s): 68A23700

Abbreviated Abstract: Description of battery operated laboratory and
second generation flight models

(4.) Author(s): C. B. Hassan; H. Lienau; *J. F. Lowry,
Westinghouse Electric Corp.; *NASA/Marshall Space Flight
Center
Title: Adaptation of a Battery-Powered Electron Beam Device to
Perform an In-Orbit Welding Experiment

Source: Inst. of Electrical and Electronic Engineers, Annual
Symposium on Electron Ion, and Laser Beam Technology
Berkeley, California

Date: May 9 - 11, 1967 Pages: 15 References:

Report Identification number(s): 68A27477 (part of A68-27473)

Abbreviated Abstract: A 60 lb., 2-kw, 20 kv electron beam device
is discussed.

(5.) Author(s): B. YE. Paton, et al
Akademia Nauk Ukrainskoi SSR

Title: Electron Beam Welder for Space

Source: Joint Publications Research Service
Washington, D. C.

Date: May 12, 1971 Pages: 11 References:

Report Identification number(s): 71N25239

Abbreviated Abstract: Translated from Russian. Comparison of results of laboratory and Soyuz 6 operations of maneuverable thin sheet metal cutter/welder.

(6.) Author(s): B. YE. Paton; O. K. Nazarenko; V. I. Chalov; I. V. Neporozhni; V. K. Lebedev; I. I. Zaruba; V. D. Sheliagin; D. A. Dubko; V. N. Bernadskii; G. V. Asoiants

Title: The Special Features of the Procedure and Equipment for Electron Beam Welding and Cutting Under Space-Conditions

Source: Institute Elektrovarki, Kiev, Ukrainian SSR
Avtomaticheskaja Svarka, VOL. 3, No. 3

Date: Feb. 1962 Pages: 6 References: 10

Report Identification number(s): 72A25809

Abbreviated Abstract: In Hungarian. Equipment design features and performance. Results of use with alloy steels and aluminum alloys in zero and normal gravity.

(7.) Author(s): Georgia Institute of Technology
Title: Develop a High Intensity Electron Gun

Source:

Date: July 31, 1973 Pages: References:
Report Identification number(s): Contract NAS8-29860

Abbreviated Abstract:

() Author(s):

Title:

Source:

Date: Pages: References:

Report Identification number(s):

Abbreviated Abstract:

V. Containerless Processing
C. Heating and Cooling Techniques
4. Solar Energy

(1.) Author(s): M. Hoes; M. Foex
CNRS, Laboratoire des Ultra-Refractaires, France

Title: Remarks Concerning Solar Furnaces in Space

Source: Solar Energy, VOL. 13

Date: July 1972 Pages: 4 References: 6

Report Identification number(s): 72A37675

Abbreviated Abstract: Orbital or lunar high temperature processing opportunities and problems with refractory metals (tungsten, tantalum, iridium)

(2.) Author(s): I. N. Frantsevich; V. S. Dverniakov; V. V. Pasichnyi;
N. A. Shigahov; IU. I. Korunov
Akademia Nauk Ukrainskoi SSR, Kiev

Title: Investigation of the Possibility of Using Radiant Solar Energy for Welding and Soldering of Materials

Source: International Astronautical Federation, International Astronautical Congress, 23rd, Vienna, Austria

Date: Oct. 8 - 15, 1972 Pages: 10 References:

Report Identification number(s): 72A45126

Abbreviated Abstract: In Russian. Description of equipment used for solar energy welding, soldering and heat treating. Parabolic 2 meter reflector produced 20 k cal/sq. cm./min. Test data for tubular steel and titanium alloy.

(3.) Author(s):

Lockheed Missiles and Space Corp., Huntsville, Alabama

Title: Solar Energy Concentrator System for Crystal Growth
and Zone Refining in Space

Source:

Date:

Pages:

References:

Report Identification number(s): LMSC/HREC 8-30268-MPR-1/
Contract NAS8-30268

Abbreviated Abstract:

() Author(s):

Title:

Source:

Date:

Pages:

References:

Report Identification number(s):

Abbreviated Abstract:

V. Containerless Processing
C. Heating and Cooling Techniques
5. Laser

(1.) Author(s): W. R. Downs

Title: Chemical Laser

Source: NASA/Lyndon B. Johnson Space Center, Houston, Texas

Date: Jan. 3, 1972

Pages: 27

References:

Report Identification number(s): 72N25489; NASA-CASE-MSC-10986-2;
US-PATENT-APPL-SN-215076

Abbreviated Abstract: Patent Application. High intensity chemical lasers for continuous use in zero or low gravity applications.

() Author(s):

Title:

Source:

Date:

Pages:

References:

Report Identification number(s):

Abbreviated Abstract:

V. Containerless Processing
C. Heating and Cooling Techniques
6. Welding Studies

(1.) Author(s): B. S. Paton; et al

Title: Experiment on the Welding of Metals in Space

Source: Visn. Akad. Nauk Ukrainsoi SSR, Kiev, No. 6, 1970
Joint Publications Research Service
Washington, D. C.

Date: Aug. 12, 1970 Pages: 6 References:

Report Identification number(s): 70N35553; JPRS-51149

Abbreviated Abstract: Electron beam welding and cutting, low pressure plasma arc welding and cutting, and arc welding with fused electrode were investigated in weightlessness. Translated into English.

(2.) Author(s): P. Wiesner

Title: Spacecraft Soyuz 6 and the Welding Process

Source: Zis - Mit., Halle, East Germ., Vol. 12, No. 1, 1970
AIR FORCE SYSTEMS COMMAND, Wright Patterson AFB, Ohio

Date: July 13, 1972 Pages: 8 References:

Report Identification number(s): 73N14496; AD-749745; FTD-HC-23-1089-72

Abbreviated Abstract: Plasma arc, electron-beam, and consumable electrode arc welding. Translated into English.

(3.) Author(s): Koichi Masubuchi
M.I.T., Department of Ocean Engineering
Title: Integration of NASA-Sponsored Studies on Aluminum Welding

Source:

Date: June 1972 Pages: 321 References:

Report Identification number(s): N72-26376, NASA-CR-2064
Contract NAS8-24364

Abbreviated Abstract: Effects of porosity on weld joint performance, sources of porosity, weld thermal effects, residual stresses and distortions, and manufacturing process system control.

(4.) Author(s): J. B. Andrews; M. Arita; K. Masubuchi
M.I.T.

Title: Analysis of Thermal Stress and Metal Movement During
Welding - Final Report

Source:

Date: Dec. 15, 1970 Pages: 279 References:

Report Identification number(s): NASA-CR-61351; N71-26143
Contract NAS8-24365

Abbreviated Abstract: Analysis and control of distortion during welding. Theoretical background for calculation of temperature and stress distribution. Materials studies include aluminum, steel, columbium, and tantalum.

V. Containerless Processing

D. Hardware

1. Furnaces

(1.) Author(s): J. M. Feret; R. Mazelsky*
Westinghouse Astronuclear Lab.; *Westinghouse Research Lab.

Title: Skylab Furnace System Provides Precise Thermal
Environment for Materials Experiments

Source: Westinghouse Engineer, VOL. 33

Date: Nov. 1973 Pages: 6 References:

Report Identification number(s): 74A11345

Abbreviated Abstract: Electric furnace and test program demonstrating
adaptability of equipment to multiple
experiments.

(2.) Author(s): C. R. Halbach; R. J. Page; P. D. Arthur*
Artcor Corporation; *University of California at Irvine

Title: 2200 C Oxidizing Atmosphere Furnace for Space
Manufacturing

Source: AIAA, Aerospace Sciences Meeting, 12th, Washington D.C.

Date: Jan. 30 - Feb. 1, 1974 Pages: References:

Report Identification number(s): 74A18866; AIAA Paper 74-154
Contract NAS8-29769

Abbreviated Abstract: Electrically conducting ceramic oxide heating
elements of thoria or stabilized zirconia.
Working cavity can be isothermal (within 11 C)
or provide axial gradient of up to 200 C
per cm.

(3.) Author(s): V. W. Sparks
Lockheed Missiles & Space Corporation, Huntsville, Alabama

Title: Preliminary Design of a High Temperature Space
Manufacturing Furnace

Source:

Date: Jan. 1970 Pages: 60 References:

Report Identification number(s): N70-23933; NASA-CR-102604
Contract NAS8-21347

Abbreviated Abstract: Properties and limitations of types of
insulation considered for use in the 150 watt,
2600 F glass melting furnace.

(4.) Author(s): A. Eiss; B. Dussan; W. Shadis; L. Frank
Weiner Associates, Inc., Cockeysville, Md.

Title: Feasibility Study of a High Temperature Radiation
Furnace for Space Applications - Final Report

Source:

Date: April 1973 Pages: 82 References:

Report Identification number(s): N73-33905; NASA-CR-124458, WAI-101
NAS8-28059

Abbreviated Abstract: New furnace design is presented. No commercial
units met goals of temperature, power, weight,
volume and versatility specified in contract
statement of work.

(5.) Author(s): R. Mazelsky, C. S. Duncan
Westinghouse Research Laboratories

Title: Multipurpose Electric Furnace System

Source:

Date: July 31, 1973

Pages:

References:

Report Identification number(s): WRL 8-30289-MPR-1
Contract NAS8-30289

Abbreviated Abstract:

() Author(s):

Title:

Source:

Date:

Pages:

References:

Report Identification number(s):

Abbreviated Abstract:

V. Containerless Processing

E. Application Studies

1. General Studies

(1.) Author(s): J. A. Treverton; J. L. Margrave
Rice University, Houston, Texas

Title: Levitation Calorimetry, IV - The Thermodynamic Properties
of Liquid Cobalt and Palladium

Source: Journal of Physical Chemistry, VOL. 75

Date: Nov. 25, 1975 Pages: 4 References: 13

Report Identification number(s): 72A34025; NSG-659

Abbreviated Abstract: Specific heats, heats of fusion, and surface
emissivities.

(2.) Author(s): General Electric Co., Space Sciences Laboratory

Title: Development of Containerless Process for Preparation
of Tungsten with Improved Service Characteristics

Source:

Date: March 31, 1974 Pages: References:

Report Identification number(s): GE 8-29879-MPR-1/
Contract NAS8-29879

Abbreviated Abstract:

V. Containerless Processing

E. Application Studies

2. Single Crystal Processes

(1) Author(s): A. I. Pekarev; Yu. D. Chistyakov; G. N. Schirenko

Title: Statistical Analysis of the Directions of Preferential Growth in Molybdenum Single Crystals Obtained by Electron Beam, Levitation Zone Recrystallization

Source: Joint Publications Research Service
Washington, D. C. - Studies in Electron-Beam Melting of Metals

Date: Feb. 17, 1966

Pages: 8

References:

Report Identification number(s): 66N19023

Abbreviated Abstract: Translated into English. Based on 67 single crystals of molybdenum.

() Author(s):

Title:

Source:

Date:

Pages:

References:

Report Identification number(s):

Abbreviated Abstract:

VI. Glass and Ceramic Material Processing

A. General Studies

(1.) Author(s): R. A. Happe
North American Rockwell Corp.
Title: Possibilities for Producing New Glasses in Space
Source: NASA/Marshall Space Flight Center Space Processing
and Manufacturing Meeting

Date: Oct. 21, 1969 Pages: 10 References:
Report Identification number(s): 70N14658 (part of N70-14651)

Abbreviated Abstract: Superheating and cooling without normal nucleation sites (i.e. container walls) may permit glass production from normally crystalline materials such as Al_2O_3 , HfO_2 , ZrO_2 , etc.

(2.) Author(s): E. C. Henry; L. R. McCreight
General Electric Co.
Title: Space Processing of Electronic Crystals
Source: NASA/Marshall Space Flight Center Space Processing
and Manufacturing Meeting

Date: Oct. 21, 1969 Pages: 36 References:

Report Identification number(s): 70N14654 (part of N70-14651)

Abbreviated Abstract: Potassium sodium niobate is recommended for zero gravity experiment in high temperature crystal growth from glass solvent.

(3.) Author(s): R. T. Frost
General Electric Co.

Title: Weightless, Containerless Melting and Solidification
of Potential New Metal and Ceramic Products

Source: NASA/Marshall Space Flight Center Space Processing and
Manufacturing

Date: Oct. 21, 1969 Pages: 20 References:

Report Identification number(s): 70N14656 (part of N70-14651)

Abbreviated Abstract: Super alloy castings with rare earth oxides,
metal emulsions casting, ultrapure materials
preparation, and solidification with extreme
subcooling.

(4.) Author(s): E. W. Deeg
American Optical Co., Southbridge, Massachusetts

Title: Glass Preparation in Space

Source: NASA/Marshall Space Flight Center Space Processing
and Manufacturing

Date: Feb. 5, 1970 Pages: 18 References:

Report Identification number(s): 70N20519 (part of N70-20517)

Abbreviated Abstract: Crucible free melting, glasses sensitive to
thermal convection, lenses and mirror blanks
with fire polished surfaces direct from melt,
dispersion filters, nucleation control through
solid powder dispersion.

(5.) Author(s): R. A. Happe
North American Rockwell Corp.
Title: Possibilities for Producing New Glasses in Space
Source: NASA/Marshall Space Flight Center Space Processing
and Manufacturing Meeting

Date: Feb. 5, 1970 Pages: 30 References:
Report Identification number(s): 70N20524 (part of N70-20517)

Abbreviated Abstract: Superheating and cooling without normal nucleation sites (i.e. container walls) may permit glass production from normally crystalline materials such as Al_2O_3 , HfO_2 , ZrO_2 , et.

(6.) Author(s): E. W. Deeg
American Optical Co.
Title: Glass Preparation in Space
Source: NASA/Marshall Space Flight Center Space Processing and
Manufacturing Meeting

Date: Oct. 21, 1969 Pages: 18 References:
Report Identification number(s): 71N11703 (part of N71-11701)

Abbreviated Abstract: Crucible free melting, glasses sensitive to thermal convection, lenses and mirror blanks with fire polished surfaces direct from melt, dispersion filters, nucleation control through solid powder dispersion.

(7.) Author(s): R. C. Bradt; M. D. Dennis
Pennsylvania State University, University Park, Pa.

Title: Microstructure and Reflectance of $PbO-B_2O_3-SiO_2$ Glass
with Crystalline Opacifier Additions

Source: American Ceramic Society Journal, VOL. 54

Date: May 1971 Pages: 4 References: 26

Report Identification number(s): 71A28990

Abbreviated Abstract: Maintenance of two-phase immiscibility is
essential to opacity.

(8.) Author(s): D. C. Larson; W. B. Crandall
ITT Research Institute

Title: Space Processing of Chalcogenide Glasses

Source:

Date: March 19, 1974 Pages: 11 References: 3

Report Identification number(s): ITTRI 8-30627-MPR-1/1
Contract NAS8-30627

Abbreviated Abstract:

(9.) Author(s): R. A. Happe
North American Rockwell Corp.

Title: Study of the Production of Unique New Glasses

Source:

Date: June 13, 1972 Pages: 153 References:

Report Identification number(s): 72N28564; NASA-CR-123740; SD-72-SA-0083
Contract NAS8-28014

Abbreviated Abstract: Preliminary study of processing equipment for new glass production in zero gravity. Induction and laser melting are preferred. Calculation of power for melting and calculation of cooling rates.

(10) Author(s): R. A. Happe; L. E. Topol
Rockwell International Corp., Downey, California

Title: Experiments Leading to the Production of New Glasses in Space

Source: AIAA, Aerospace Sciences Meeting, 12th, Washington, D.C.

Date: Jan. 1974 Pages: 7 References:

Report Identification number(s): 74A18862; AIAA Paper 74-159

Abbreviated Abstract: Free-fall cooled spherules of previously unreported glassy-state composition were produced from laser melted spinning ceramic-oxide rods.

(11) Author(s): R. A. Happe
Rockwell International Corp.
Title: Manufacturing Unique Glasses in Space

Source:

Date: Pages: References:

Report Identification number(s): Rockwell 8-28991-MPR-1
Contract NAS8-28991

Abbreviated Abstract:

() Author(s):

Title:

Source:

Date: Pages: References:

Report Identification number(s):

Abbreviated Abstract:

VI. Glass and Ceramic Material Processing

B. Methods of Preparation Studies

1. General

(1.) Author(s): D. J. Bowers
Battelle Memorial Institute, Columbus, Ohio

Title: A Critical Compilation of Ceramic Forming Methods
V - Miscellaneous Forming Methods

Source: American Ceramic Society Bulletin, VOL. 44

Date: Feb. 1965 Pages: 6 References:

Report Identification number(s): 65A16831;
Contract AF 33(657) - 10574

Abbreviated Abstract: Forming from vapors, foamed ceramics, fibers, bulk placement and molding, impregnation, reaction sintering, high-energy-rate forming, electrophoretic forming, and machining and grinding.

(2.) Author(s): D. C. Larsen
ITT Research Institute

Title: Theoretical Study of Producing Glasses in Space

Source:

Date: July 31, 1973 Pages: References:

Report Identification number(s): ITT-RI-D5087/
Contract NAS8-29850

Abbreviated Abstract:

VI. Glass and Ceramic Material Processing

B. Methods of Preparation Studies

2. Slip Casting

(1.) Author(s): E. F. Adams
Corning Glass Works, Corning, New York

Title: Slip-Cast Ceramics

Source: High Temperature Oxides, Part 4
New York, Academic Press, Inc.

Date: 1971 Pages: 40 References: 39

Report Identification number(s): 72A24733 (part of A72-24726)

Abbreviated Abstract: To consolidate ceramic, cermet, and metal powders to high density; slurry process, chemistry of deflocculation, particle size distributions, rheology, binders, mixing, molding and the casting process.

() Author(s):

Title:

Source:

Date: Pages: References:

Report Identification number(s):

Abbreviated Abstract:

**VII. Electrophoretic, Chemical and
Biochemical Processes**

A. General Separation Studies

(1.) Author(s): T. B. Taylor
International Research and Technology Corp., Washington D.C.

Title: On the Production and Separation of Industrially Useful
Isotopes in Space

Source: NASA/Marshall Space Flight Center Space Processing and
Manufacturing Meeting

Date: Feb. 5, 1970 Pages: 10 References:

Report Identification number(s): 70N20548 (part of N70-20517)

Abbreviated Abstract: Orbital facility with solar powered electrical
generator and partial accelerator emphasizing
production of plutonium or U-235.

(2.) Author(s): R. N. Griffin; L. R. McCreight
General Electric Co.

Title: Unit Separation Processes in Space

Source: NASA/Marshall Space Flight Center Space Processing and
Manufacturing Meeting

Date: Oct. 21, 1969 Pages: 22 References:

Report Identification number(s): 70N14662 (part of N70-14651)
Contract NAS8-24683

Abbreviated Abstract: Centrifugation and electrophoresis, freeze
drying and ultraviolet sterilization.

(3.) Author(s): D. L. Marshall
Battelle Memorial Institute

Title: Sample Detection and Analysis Techniques for Electro-
phoretic Separation

Source:

Date: May 21, 1974 Pages: References:

Report Identification number(s): BMI 8-29629-MR-1
Contract NAS8-29629

Abbreviated Abstract:

(4.) Author(s): Lockheed Missiles and Space Corporation, Huntsville, Ala.

Title: Soret Separation in Zero Gravity

Source:

Date: July 31, 1973 Pages: References:

Report Identification number(s): LMSC/HREC 8-29609-BIMPR-Jul 31

Abbreviated Abstract:

**VII. Electrophoretic, Chemical and
Biochemical Processes**

B. Electrophoretic Methods

1. General Studies

(1.) Author(s): B. K. Hankins

Title: Orientation of Dielectric Liquids in Low Gravity Fields by Electric Phenomena

Source: Boeing Company, Seattle, Washington

Date: Feb. 3, 1967

Pages: 122

References:

Report Identification number(s): 67X16767; D2-84161-1; AD-807546L

Abbreviated Abstract:

(2.) Author(s): B. K. Hankins

Title: Orientation of Dielectric Liquids in Low Gravity Fields by Electric Phenomena

Source: Boeing Company, Seattle, Washington

Date: Jan. 1966

Pages: 106

References:

Report Identification number(s): 67X80498; D2-84161-1; AD-477869

Abbreviated Abstract:

(3.) Author(s): E. C. McKannan; A. C. Krupnick; R. N. Griffin;*
L. R. McCreight*
Title: NASA/Marshall Space Flight Center; *General Electric
Electrophoresis Separation in Space-Apollo 14

Source: NASA/Marshall Space Flight Center, Huntsville, Alabama

Date: Aug. 29, 1971 Pages: 21 References:

Report Identification number(s): 71N36506; NASA-TM-X-64611

Abbreviated Abstract: Experiment to demonstrate principle and possible problems. Color photographs of separation.

(4.) Author(s): R. S. Snyder

Title: Electrophoresis Demonstration on Apollo 16

Source: NASA/Marshall Space Flight Center, Huntsville, Alabama

Date: Nov. 1972 Pages: 47 References:

Report Identification number(s): 73N18157; NASA-TM-X-64724

Abbreviated Abstract: Free fluid electrophoresis to separate particulate species by surface charge, size or shape. Dye separation was photographed, biological separation was simulated using polystyrene latex.

(5.) Author(s): A. C. Krupnick

Title: Development of Coatings to Control Electroosmosis in Zero Gravity Electrophoresis

Source: NASA/Marshall Space Flight Center, Huntsville, Alabama

Date: Feb. 14, 1974 Pages: 18 References:

Report Identification number(s): 74N18196; NASA-TM-X-64807

Abbreviated Abstract: Gamma amino propyl trihydroxysilane provides low potential coating (-3.86 mv.) as surface of shear between mobile and stationary layers to control electrokinetic effects.

(6.) Author(s): M. Bier; R. S. Snyder*
University of Arizona; *Marshall Space Flight Center

Title: Electrophoresis in Space at Zero Gravity

Source: AIAA, Aerospace Sciences Meeting, 12th, Washington D.C.

Date: Jan. 30 - Pages: 6 References: 12
Feb. 1, 1974

Report Identification number(s): 74A18854; AIAA Paper 74-210
Contract NAS8-29566

Abbreviated Abstract: Value of space electrophoresis is enhanced by isoelectric focusing and isotochophoresis to increase resolution.

(7.) Author(s):

Title: Role of Gravity in Preparative Electrophoresis

Source:

Date: Feb. 1, 1973/

Pages:

References:

Feb. 1, 1974

Report Identification number(s): 74K10443

Contract NAS8-29566

Abbreviated Abstract:

(8.) Author(s):

A. Thiehler

Beckman Instruments, Inc., Anaheim, California

Title:

Preparative Electrophoresis Experiment Design
Final Report

Source:

Date:

Oct. 1972

Pages: 26

References:

Report Identification number(s): 73N14090; NASA-CR-123972; FR-2631-101

Contract NAS8-28474

Abbreviated Abstract: Critical review of electrophoresis, study of new techniques for enhancing resolution and stability, and construction and testing of a high resolution cell.

(9.) Author(s):

General Electric Co., Space Sciences Laboratory

Title: Fluid Flow Electrophoresis in Space

Source:

Date: March 31, 1974

Pages:

References:

Report Identification number(s): GE 8-29878-MR-1
Contract NAS8-29878

Abbreviated Abstract:

() Author(s):

Title:

Source:

Date:

Pages:

References:

Report Identification number(s):

Abbreviated Abstract:

**VII. Electrophoretic, Chemical and
Biochemical Methods**

B. Electrophoretic Methods

6. Immunoelectrophoresis

(1.) Author(s): W. J. Russel

Title: Some Influences of Antigen Concentration and Nonreacting Additives on Mobility and Diffusion in Immuno-electrophoresis

Source: School of Aerospace Medicine, Brooks AFB, Texas
Reprinted from J. Immunol. VOL. 95

Date: Feb. 1966 Pages: References:

Report Identification number(s): 68N87844; SAM-TR-66-219 °

Abbreviated Abstract:

(2.) Author(s):
Georgetown University

Title: Differential Electrophoretic Separation of Cells and its Effect on Cell Viability

Source:

Date: May 1973 Pages: References:

Report Identification number(s): Georgetown U. 8-29778-MPR-May 73
Contract NAS8-29778

Abbreviated Abstract:

(3.) Author(s): R. K. Brown
Wayne State University

Title: Electrophoretic Separation of Proteins in Space

Source:

Date: Sept. 15, 1973 Pages: References:

Report Identification number(s): Wayne SU 8-29823-PR-Sept. 73
Contract NAS8-29823

Abbreviated Abstract:

(4.) Author(s): C. J. Van Oss; P. E. Bigazzi; C. F. Gillman; R. Allen*
State University of New York, Buffalo; *NASA/Marshall Space
Flight Center

Title: Preparation Liquid Column Electrophoresis of T and B
Lymphocytes at Gravity = 1

Source: AIAA, Aerospace Sciences Meeting, 12th, Washington, D. C.

Date: Jan. 30 - Feb. 1, 1974 Pages: 4 References:

Report Identification number(s): 74A18863; AIAA Paper 74-211
Contract NAS8-29745

Abbreviated Abstract: Vertical liquid columns with density gradients to simulate zero gravity, and upward electrophoresis in vertical columns are hampered by convection and sedimentation problems which can be eliminated by a zero gravity environment.

**VII. Electrophoretic, Chemical and
Biochemical Processes**

B. Electrophoretic Methods

9. Electrophoretic Deposition

(1.) Author(s): A. C. Krupnick

Title: Development of Coatings to Control Electroosmosis in Zero Gravity Electrophoresis

Source: AIAA, Aerospace Sciences Meeting, 12th, Washington, D. C.

Date: Jan. 1974 Pages: 6 References: 20

Report Identification number(s): 74A18844; AIAA Paper 74-157

Abbreviated Abstract:

() Author(s):

Title:

Source:

Date: Pages: References:

Report Identification number(s):

Abbreviated Abstract:

**VII. Electrophoretic, Chemical and
Biochemical Processes**

B. Electrophoretic Methods

12. Dielectrophoresis

(1.) Author(s): M. Hurwitz; B. T. Lubin

Title: Research and Design of a Practical and Economical Dielectrophoretic System for the Control of Liquid Fuels under Low Gravity Environmental Conditions

Source: Dynatech Corp., Cambridge, Massachusetts

Date: March 1966 Pages: References:

Report Identification number(s): 68X80371; NAS8-20553; NASA-CR-91144PR-3

Abbreviated Abstract:

(2.) Author(s): I. M. Kirko; T. V. Kuznetsova; V. D. Mikhailov et al

Title: Observation of Dielectrophoresis Phenomena under Conditions of Weightlessness

Source: Akademiya Nauk SSSR, Doklady, VOL. 198

Date: June 11, 1971 Pages: 3 References:

Report Identification number(s): 71A37278

Abbreviated Abstract: In Russian. Dielectrophoresis force measurements and wedge shaped capacitor separation properties in satellite zero gravity conditions.

(3.) Author(s): I. M. Kirko; T. V. Kuznetsova; V. D. Mikhailov, et al-

Title: Observation of Dielectrophoresis under the Conditions of Weightlessness

Source: Soviet Physics Reports, VOL. 16

Date: Dec. 1971 Pages: 2 References:

Report Identification number(s): 72A14988

Abbreviated Abstract: English translation.

(4.) Author(s): E. J. Fahimian; M. Hurwitz; B. T. Lubin
Dynatech Corp., Cambridge, Mass.

Title: Research and Design of a Practical and Economical Dielectrophoretic System for the Control of Liquid Fuels Under Low Gravity Environmental Conditions

Source:

Date: July 1966 Pages: References:

Report Identification number(s): 67X88474; NASA-CR-89847 PR-7
Contract NAS8-20553

Abbreviated Abstract:

(5.) Author(s): E. J. Fahimian; M. Hurwitz; J. R. Melcher
Dynatech Corp., Cambridge, Mass.

Title: Research and Design of a Practical and Economical
Dielectrophoretic System for the Control of Liquid
Fuels Under Low Gravity Environmental Conditions

Source:

Date: June 30, 1966 Pages: References:

Report Identification number(s): 67X88607; NASA-CR-89850 PR-1-6-52-01028
PR-6
Contract NAS8-20553

Abbreviated Abstract:

(6.) Author(s): E. J. Fahimian
Dynatech Corp., Cambridge, Mass.

Title: Research and Design of a Practical and Economical
Dielectrophoretic System for the Control of Liquid
Fuels Under Low Gravity Environmental Conditions

Source:

Date: Dec. 31, 1966 Pages: References:

Report Identification number(s): 67X88608; NASA-CR-89851 PR-1-6-52-01028
PR-12
Contract NAS8-20553

Abbreviated Abstract:

(7.) Author(s): E. J. Fahimian; M. Hurwitz; J. R. Melcher
Dynatech Corp., Cambridge, Mass.

Title: Research and Design of a Practical and Economical
Dielectrophoretic System for the Control of Liquid
Fuels Under Low Gravity Environmental Conditions

Source:

Date: Oct. 1966 Pages: References:

Report Identification number(s): 67X88811; NASA-CR-88728 PR-1-6-52-01028
PR-10
Contract NAS8-20553

Abbreviated Abstract:

(8.) Author(s): M. Hurwitz
Dynatech Corp., Cambridge, Mass.

Title: Research and Design of a Practical and Economical
Dielectrophoretic System for the Control of Liquid
Fuels Under Low Gravity Environmental Conditions

Source:

Date: Feb. 1966 Pages: References:

Report Identification number(s): 67X8813; NASA-CR-88766 PR-1-6-52-01028
PR-2
Contract NAS8-20553

Abbreviated Abstract:

(9.) Author(s): E. J. Fahimian; M. Hurwitz
Dynatech Corp., Cambridge, Mass.

Title: Research and Design of a Practical and Economical
Dielectrophoretic System for the Control of Liquid
Fuels Under Low Gravity Environmental Conditions

Source:

Date: May 1967 Pages: References:

Report Identification number(s): 69X10084; NASA-CR-98008 REPT-723
Contract NAS8-20553

Abbreviated Abstract:

(10) Author(s): J. R. Blutt
Dynatech Corp., Cambridge, Mass.

Title: Operating Safety of Dielectrophoretic Propellant
Management Systems - Final Report

Source:

Date: March 31, 1968 Pages: 55 References:

Report Identification number(s): 69N28118; NASA-CR-101422;
DYNATECH-768
Contract NAS8-20553

Abbreviated Abstract: Small and full scale electrode system experiments
indicate full scale performance predictability
from small scale breakdown tests. Aluminum
and stainless steel electrodes with Teflon
supports were compatible with oxygen and
hydrogen.

(11) Author(s): E. J. Fahimian; M. Hurwitz; J. R. Melcher

Title: Research and Design of a Practical and Economical Dielectrophoretic System for the Control of Liquid Fuels Under Low Gravity Environmental Conditions

Source:

Date: May 31, 1966 Pages: References:

Report Identification number(s): 67X88098; NASA-CR-88767 MPR-5
Contract NAS8-20228

Abbreviated Abstract:

(12) Author(s): E. Oker; H. Merte, Jr.

Title: Transient Boiling Heat Transfer in Saturated Liquid Nitrogen and F113 at Standard and Zero Gravity

Source:

Date: Oct. 1966 Pages: References:

Report Identification number(s): 74N21585; NASA-CR-120202;
REPT. -074610-52-F
Contract NAS8-20228

Abbreviated Abstract: Transient and steady state nucleate boiling for heating surface horizontal up, vertical and horizontal down orientations, observing conduction and convection regimes.

**VII. Electrophoretic, Chemical and
Biochemical Processes**

C. General Chemical Process Studies

(1.) Author(s): M. Ensanian
Bell Aerospace Corp., Bell Aerosystems Co., Buffalo, N. Y.

Title: The Influence of Gravitational Variations on the Rates
of Chemical Processes

Source: Canaveral Council of Technical Societies, Space Congress
on the Challenge of the 1970's, 4th, Cocoa Beach, Florida

Date: April 3 - 6, 1967 Pages: 20 References: 58

Report Identification number(s): 67A36546

Abbreviated Abstract: Quadrant Mechanical Hypothesis (QMH) on
gravitation, gravitational chemistry and effects
of zero gravity on various chemical processes.
Some key words: chemical kinetics, diffusion,
reaction theory.

(2.) Author(s): S. Butner; J. Fogarty
Grumman Aerospace Corp., Bethpage, New York

Title: Chemical Reaction in Low and Zero Gravity - A Feasibility
Study

Source: NASA/Marshall Space Flight Center Space Process. and
Manuf. Meeting

Date: Oct. 21, 1969 Pages: 23 References:

Report Identification number(s): 70N14680; (part of N70-14651)

Abbreviated Abstract: Effects of reduced gravity and weightlessness
on catalytic polymerization of ethylene with
transition metals.

(3.) Author(s): S. Butne; J. Fogarty
Grumman Aerospace Corp., Bethpage, New York

Title: Chemical Reaction in Low and Zero Gravity - A Feasibility Study

Source: NASA/Marshall Space Flight Center Space Process. and Manuf. Meeting

Date: Feb. 5, 1970 Pages: References:

Report Identification number(s): 70N20546 (part of N70-20517)

Abbreviated Abstract: Effects of reduced gravity and weightlessness on fluidized bed polymerization reaction.

(4.) Author(s): H. F. Wuenschel, Inventor

Title: Method of Making Foamed Materials in Zero Gravity

Source: NASA/Marshall Space Flight Center, Huntsville, Alabama

Date: July 13, 1971 Pages: 4 References:

Report Identification number(s): N72-11387; NASA-CASE-XMF-09902

U.S. Patent - 3,592,628

U.S. Patent - Appl. - SN-769665

Abbreviated Abstract: Method of manufacturing homogeneous foamed materials in weightless environment from constituents having different physical properties.

**VII. Electrophoretic, Chemical and
Biochemical Processes**

D. General Biochemical Process Studies

(1.) Author(s): R. T. Jordan
Martin Marietta Corp., Denver Colorado

Title: Industrial Microbiological Applications in Zero Gravity -
A Vaccine Satellite Program (VAC SAT)

Source: NASA/Marshall Space Flight Center Space Process. and
Manuf. Meeting

Date: Oct. 21, 1969 Pages: 14 References:

Report Identification number(s): 70N14663 (part of N70-14651)

Abbreviated Abstract: Method for industrial fermentation dialysis
of bacterial culture in vaccine preparation
during weightlessness aboard biosatellite.

(2.) Author(s): R. T. Jordan
Martin Marietta Corp., Denver, Colorado

Title: Industrial Microbiological Applications in Zero Gravity -
A Vaccine Satellite Program (VAC SAT)

Source: NASA/Marshall Space Flight Center Space Process. and
Manuf. Meeting

Date: Feb. 5, 1970 Pages: 14 References:

Report Identification number(s): 70N20529 (part of N70-20517)

Abbreviated Abstract: Manufacturing of pharmaceuticals in weightlessness
aboard biosatellites and orbital workshop.

(3.) Author(s): C. L. Kober
Martin Marietta Corp., Denver, Colorado
Title: Chemical and Biochemical Space Manufacturing

Source: NASA/Marshall Space Flight Center Unique Manufacturing
Processes in Space Environment

Date: April 1970 Pages: 10 References:

Report Identification number(s): 71N26013 (part of N71-26009)

Abbreviated Abstract: Use of scaling laws and Gibbs phenomenon in
weightless chemical and biochemical manufacturing.

(4.) Author(s): R. T. Jordan
Charles F. Kettering Research Labs., Yellow Springs, Ohio
Title: Earth Orbital Systems and Biomedical Research

Source: Space Shuttle Payloads; Proceedings of the Symposium,
Washington, D.C.

Date: Dec. 27 - 28, 1972 Pages: 32 References:

Report Identification number(s): A74-14109 (part of A74-14102)

Abbreviated Abstract: Some key words: Biological effects, dialysis,
fermentation, metabolic wastes,
microorganisms; buoyancy, reduced
gravity; liquid-gas mixtures;
space shuttle.

(5.) Author(s): J. F. Foster; A. J. Cutain
Battelle Memorial Institute
Title: Study on Biogrowth Processing in Space

Source:

Date: May 16, 1972 Pages: References:

Report Identification number(s): BMI-8-28085-MPR-1
Contract NAS8-28085

Abbreviated Abstract:

(6.) Author(s): Fairchild Hiller Corporation
Title: Preliminary Design, with Design Parameters of a
Miniaturized Microbiology Laboratory

Source:

Date: Jan. 13, 1971 Pages: References:

Report Identification number(s): FCH-FHR-3979-1
Contract NAS8-26652

Abbreviated Abstract:

(7.) Author(s): R. N. Griffin; L. R. McCreight
General Electric Co., Space Sciences Laboratory
Title: Convectionless Electrophoretic Separation of Biological Preparations

Source:

Date: June 24, 1972 Pages: References:

Report Identification number(s): 73N11055; NASA-CR-123920
Contract NAS8-27797

Abbreviated Abstract:

() Author(s):

Title:

Source:

Date: Pages: References:

Report Identification number(s):

Abbreviated Abstract:

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A. Survey Papers

Contracts: 8-24979 General Dynamics, Convair

B. Facilities

Contracts: 8-20582 Astro-Space Labs, Inc.

8-20707 Astro-Space Labs, Inc.

8-21279 Martin Marietta Corp.

8-27718 Hewlett-Packard

8-28055 Massachusetts Institute of Technology

8-30036 Astro-Space Labs, Inc.

8-30166 Astro-Space Labs, Inc.

8-30528 Astro-Space Labs, Inc.

C. General Application Papers

Contracts: 8-29748 Battelle Memorial Institute

8-25202 Carnegie-Mellon University

8-28615 General Dynamics, Convair

8-28179 General Electric Company, Scpace Science Div.

8-29874 Arthur D. Little, Inc.

8-29669 United Aircraft Corp., Pratt and Whitney

8-29881 Auburn University

II. Space Manufacturing Management and Planning

A. General Planning

**Contracts: 8-21804 Teledyne-Brown Engineering Co.
8-27734 Universities Space Research Association
8-28359 URS/MATRIX Co., Man Systems Div.
8-28730 Westinghouse Electric Corporation**

B. Skylab Program Planning

Contracts:

C. Space Shuttle Design/Payload Interface

**Contracts: 8-29462 General Dynamics, Convair
8-28960 Lockheed Missiles and Space Co.
8-28938 TRW Systems Group, Redondo Beach**

D. Space Shuttle Planning and Utilization

Contracts: 8-28583 McDonnell Douglas Astronautics Co.

III. Fluid Mechanics and Heat Transfer

A. General Fluid Motion Studies

**Contracts: 8-21012 Electro-Optical Systems, Inc.
8-20146 General Dynamics, Convair
8-25179 Georgia Institute of Technology**

B. General Heat Transfer Studies

Contracts: 8-21143 University of Alabama - Tuscaloosa

C. Convective Studies in Reduced Gravity

1. General Studies

**Contracts: 8-25577 Lockheed Missiles and Space Co.
8-27015 Lockheed Missiles and Space Co.
8-29610 Lockheed Missiles and Space Co.
8-28732 Massachusetts Institute of Technology**

2. Thermodiffusion

Contracts: 8-29033 H. E. Cramer, Inc.

3. Marangoni Convection

D. Convection Effect Studies

1. Crystal Growth

E. Application Studies

IV. Solidification Processes

A. General Studies

Contracts: 8-24592 Cornell Aeronautical Laboratory
8-27085 TRW Systems Group, Redondo Beach
8-27809 University of Alabama, Huntsville
8-27891 Grumman Aerospace Corp.
8-28267 TRW Systems Group, Redondo Beach
8-28309 TRW Systems Group, Redondo Beach
8-28604 Grumman Aerospace Corp.
8-28664 Boeing Aerospace Company, Huntsville
8-28723 Arthur D. Little, Inc.
8-28724 United Aircraft Corp., Pratt and Whitney
8-28728 Grumman Aerospace Corp.
8-28729 Lockheed Missiles and Space Co.
8-28733 University of Wisconsin
8-28734 University of Connecticut
8-28749 Battelle Memorial Institute
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8-29650 University of Alabama, Huntsville
8-29662 Grumman Aerospace Corp.
8-29725 Washington State University
8-29851 Texas A & M University
8-29854 University of California, Los Angeles
8-29877 Arthur D. Little, Inc.
8-29951 Brown Engineering Company.

B. Studies of Phenomena Influencing Solidification Processes

Contracts: 8-21123 Lockheed Missiles and Space Co.

IV. Solidification Processes (Cont.)

C. Composite Casting Studies

Contracts: 8-21402 Arthur D. Little, Inc.
8-25709 Arthur D. Little, Inc.
8-26402 University of California, Los Angeles
8-26991 University of Alabama, Huntsville
8-27106 Cornell Aeronautical Laboratory
8-27806 General Dynamics, Convair
8-28189 Massachusetts Institute of Technology
8-28735 Georgia Institute of Technology
8-29620 General Dynamics, Convair

IV. Solidification Processes (Cont.)

D. Crystal Growth Studies

Contracts: 8-24509 Westinghouse Research Laboratories
8-24612 University of Alabama, Huntsville
8-24683 General Electric Co., Space Science Lab.
8-25120 University of Alabama, Huntsville
8-26122 Westinghouse Research Laboratories
8-26146 Rensselaer Polytechnic Institute
8-26158 Westinghouse Research Laboratories
8-26793 University of Alabama, Huntsville
8-27807 Texas Instruments, Inc.
8-27942 General Electric Company
8-28098 University of Alabama, Tuscaloosa
8-28112 University of Alabama, Huntsville
8-28114 General Electric Company, Space Div.
8-28304 University of Alabama, Huntsville
8-28725 Battelle Memorial Institute
8-29077 Eagle-Picher Industries, Inc.
8-29494 University of Alabama, Tuscaloosa
8-29542 University of Alabama, Huntsville
8-29847 University of Southern California
8-29875 Battelle Memorial Institute
8-30171 P.E.C. Research Associates, Inc.
8-30537 Massachusetts Institute of Technology

V. Containerless Processing

A. General Studies

**Contracts: 8-26157 General Electric Co., Space Sciences Lab.
8-30250 Colorado State University**

B. Position Control Techniques

1. General Techniques

2. Acoustic Fields

**Contracts: 8-28762 Interand Corp.
8-29030 Interand Corp.
8-30471 Intersonics, Inc.**

3. Electromagnetic Fields

**Contracts: 8-27228 General Electric Company, Space Science Div.
8-29680 General Electric Company, Space Sciences Lab.**

C. Heating and Cooling Techniques

1. General Techniques

2. Induction Heating

3. Electron Beam

Contracts: 8-29860 Georgia Institute of Technology

4. Solar Energy

Contracts: 8-30268 Lockheed Missiles and Space Co.

5. Laser

6. Welding Studies

**Contracts: 8-24364 Massachusetts Institute of Technology
8-24365 Massachusetts Institute of Technology**

V. Containerless Processing (Cont.)

D. Hardware

1. Furnaces

**Contracts: 8-21347 Lockheed Missiles and Space Co.
8-28059 Weiner Associates, Inc.
8-29769 Artcor Corp.
8-30289 Westinghouse Research Laboratories**

E. Application Studies

1. General Studies

Contracts: 8-29879 General Electric Company, Space Sciences Lab.

2. Single Crystal Processes

VI. Glass and Ceramic Material Processing

A. General Studies

**Contracts: 8-28014 North American Rockwell
8-28991 Rockwell International Corp.
8-30627 ITT Research Institute
8-30656 Vanderbilt University**

B. Methods of Preparation Studies

Contracts: 8-29850 ITT Research Institute

1. General

2. Slip Casting

VII. Electrophoretic, Chemical and Biochemical Processes

A. General Separation Studies

Contracts: 8-29609 Lockheed Missiles and Space Co.
8-29629 Battelle Memorial Institute
8-30252 Howard University

B. Electrophoretic Methods

Contracts: 8-28654 Lehigh University
8-29878 General Electric Co., Space Sciences Lab.

1. General Studies

Contracts: 8-28474 Beckman Instruments, Inc.
8-29566 University of Arizona

2. Particle Electrophoresis

3. Electromagnetophoresis

4. Continuous Free Flow Electrophoresis

5. Gel Electrophoresis

6. Immunoelectrophoresis

Contracts: 8-29745 State University of New York, Buffalo
8-29778 Georgetown University
8-29823 Wayne State University

7. Disc Electrophoresis

8. Paper Electrophoresis

9. Electrophoretic Deposition

10. Electrophoretic Equipment

11. Application Studies

VII. Electrophoretic, Chemical and Biochemical Processes (Cont.)

B. Electrophoretic Methods

12. Dielectrophoresis

**Contracts: 8-20229 University of Michigan
8-20553 Dynatech Corp.**

C. General Chemical Process Studies

D. General Biochemical Process Studies

**Contracts: 8-26552 Fairchild Hiller Corporation
8-27797 General Electric Company, Space Sciences Lab.
8-28085 Battelle Memorial Institute
8-28411 Massachusetts Institute of Technology**

Part III
Author Citation Guide

AUTHOR CITATION GUIDE

<u>AUTHOR</u>	<u>PART ONE CITATIONS</u>	<u>PART TWO CITATIONS</u>
ABBOTT, R. Cornell Aeronautical Lab Buffalo, New York	IV.A(3)(5)	8-24592 (2)
ABDALLA, K. L.	III.A(30)	
ADAMS, E. F. Corning Glass Works Corning, New York	VI.B.2(1)	
ADELBERG, M. Arthur D. Little, Inc. Santa Monica, Calif.	III.B(3)(5)	
ALADEV, I. T.	III.B(16)	
ALLEN, R. E. NASA/MSFC	VII.B.6(4)	8-29745
ANDERSON, W. T., JR. TRW Systems Group Redondo Beach, Calif.	V.C(21)	8-28938 (4)
ANDREWS, J. B. M.I.T. Cambridge, Mass.	V.C.6(4)	8-24365 (1)
ARITA, M. M.I.T. Cambridge, Mass.	V.C.6(4)	8-24365 (1)
ARMSTRONG, W. O.	I.A(26) II.A(2)(3)(4)	
ARNETT, G. M. NASA/MSFC	IV.D(3)(7)(13)	
ARTHUR, P. D. Univ. of Calif. Irvine, Calif.	V.D.1(2)	8-29769 (1)
ASOIANIS, G. V.	V.C.3(6)	
AUBIN, W. M. Grumman Aerospace Corp. Bethpage, New York	IV.A(25)	8-28604 (1)

<u>AUTHOR</u>	<u>PART ONE CITATIONS</u>	<u>PART TWO CITATIONS</u>
BAILEY, R. V.	III.B(6)	
BANNISTER, T. C. NASA/MSFC	III.C(5), III.C.1(9)(11), IV.B(1)(2), IV.D(9)	8-25577 (4) (6)
BAUER, H. F. Georgia Inst. of Tech. Atlanta, Georgia	I.C(7), III.A(35) III.E(2)(3)	8-25179 (2)
BENEDIKT, E. T. North American Avia. Inc. Downey, Calif.	III.A(12)	
BENEFIELD, J. W. Lockheed Missiles and Space Company Huntsville, Alabama	III.C.1(7)	8-25577 (2)
BERGE, K. D.	II.A(7)	
BERGE, L. H. NASA/MSFC	V.B.1 (1)	
BERKOWITZ-MATTUCK, J. Arthur D. Little, Inc. Cambridge, Mass.	IV.C(2)(18)	8-21402 (1)
BERNADSKII, V. M.	I.B(6), V.C.3(6)	
BEYERLE, F. J.	I.A(4)	
BIER, M. Univ. of Arizona Tucson, Arizona	VII.B.1(6)	8-29566 (1)
BIGAZZI, P. E. State University of N.Y. Buffalo, New York	VII.B.6(4)	8-29745
BIRN, J. O. TRW Systems Group Redondo Beach, Calif.	II.C(22)	8-28932 (5)
BLUTT, J. R. Dynatech Corp. Cambridge, Mass.	VII.B.12(10)	8-20553 (7)

<u>AUTHOR</u>	<u>PART ONE CITATIONS</u>	<u>PART TWO CITATIONS</u>
BLOOM, H. L. General Electric Co. Space Science Div. Philadelphia, Pa.	I.C.(18) V.B.3(8)	8-28179 (1) 8-29680 (2)
BOESE, A. NASA/MSFC	IV.D(26)	8-28112 (1)
BOOK, W. J. M.I.T. Cambridge, Mass.	I.B(17)(19)	8-28055 (4) (6)
BOULAY, J. L. Paris University	III.B(15) III.B(20)	
BOURGEOIS, S. V. Lockheed Missiles & Space Company Huntsville, Alabama	III.C.1(11)(12)(14)(15) (16)(17)(18)	8-25577 (6) 8-27015 (1) (3) (4) (5) (6) (7)
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BOYD, ROBERT Martin Marietta Corp. Denver, Colorado	I.B(13)	8-21279 (1)
BRADT, R. C. Pennsylvania State Univ. University Park, Pa.	VI.A(7)	
BRASHFARS, M. R. Lockheed Missiles & Space Company Huntsville, Alabama	III.C.1(18) IV.A(36)	8-27015 (7) 8-28729 (1)
BRAZINSKY, I.	III.A(1)	
BREDT, J. H. NASA/MSFC	I.A(26)(28) II.A(4) II.B(1)	
PRILLER, J. R. NASA/MSFC	II.A(5)	

<u>AUTHOR</u>	<u>PART ONE CITATIONS</u>	<u>PART TWO CITATIONS</u>
BROWN, J. L. Georgia Inst. of Tech. Atlanta, Georgia	IV.C(14)	8-28735 (1)
BROWN, R. K. Wayne State University Detroit, Michigan	VII.B.6(3)	8-29823 (1)
BUERGER, E. H. General Electric Co. Space Science Div. Philadelphia, Pa.	V.B.3(6)	8-27228 (2)
BUNSHAH, R. F. Univ. of Calif. at Livermore Lawrence Radiation Lab	V.A(1)	
BURKHARD, D. G. P.E.C. Res. Assoc., Inc. Louisville, Colorado	IV.D(41)	8-30171 (1)
BURSNALL, W. J.	II.C(14)	
BUSCH, G. Grumman Aerospace Corp. Bethpage, New York	IV.A(28)(29)	8-28728 (3) (4)
BUTNER, S.	VII.D(2)(3)	
BYERS, M. S. Teledyne-Brown Engineering Co. Huntsville, Alabama	II.A(10)(13)	8-21804 (3) (6)

<u>AUTHOR</u>	<u>PART ONE CITATIONS</u>	<u>PART TWO CITATIONS</u>
CASTLE, J. G. Univ. of Alabama at Huntsville	IV.D(21)(29)	8-24612 (4) 8-29542 (2)
CASTRUCCIO, P. A. IBM, Federal Syst. Div. Gaithersburg, Md.	I.C(1)	
CAUSSE, J. P. Techtran Corp. Glen Burnie, Md.	II.D(4)	
CHALOV, V. I.	V.C.3(6)	
CHERNOUSKO, F. L.	III.A(11)(14)(15)	
CHISTYAKOV, YU. D.	V.E.2(1)	
CHUNG, A. M. General Electric Co. Philadelphia, Pa.	IV.D(39)	8-27942 (2)
CLARK, D. A.	VII.B.5(1)	
CLARK, M. F. General Electric Co. Space Science Div. Philadelphia, Pa.	V.B.3(5)	8-27228 (1)
CLAYTON, D. A. Royal Aircraft Estbl. Farnborough, England	III.A(26)	
COOK, J. L.	IV.A(8)	
COOPER, C. R. NASA/MSFC ET 44	I.A(4)	
CORNISH, D. N. Atomic Energy Research Establishment Culham Lab., Abington Berkshire, England	V.B.3(4)	
CRANDALL, W. B. ITT Research Inst. Chicago, Illinois	VI.A(8)	8-30627 (1)

AUTHOR

PART ONE CITATIONS

PART TWO CITATIONS

CULBERTSON, P. E.

II.D(2)

CUTAIN, A. J.
Battelle Memorial Inst.
Columbus, Ohio

VII.E(5)

8-28085 (1)

<u>AUTHOR</u>	<u>PART ONE CITATIONS</u>	<u>PART TWO CITATIONS</u>
DAVIS, J. H. Univ. of Alabama Huntsville, Alabama	IV.D(18)(21)(29)	8-24612 (1) (4) 8-29542 (2)
DEEG, E. W. American Optical Co. Southbridge, Mass.	VI.A(4)(6)	
DELANCEY, G. B. University of Pittsburgh Pittsburgh, Pa.	III.B(18)	
DENNIS, M. D. Pennsylvania State Univ. University Park, Pa.	VI.A(7)	
DOOLING, D., JR.	I.A.(25)	
DOTY, J. P. Eagle-Picher Indus., Inc. Miami, Oklahoma	IV.D(35)(36)	8-29077 (1) (2)
DOUGLAS, F. C. United Aircraft Corp. Pratt and Whitney East Hartford, Conn.	IV.A(46)(47)	8-28724 (1) (2)
DOWNEY, J. W. Metallurgy Div. Argonne National Labs Illinois	V.A(2)	
DOWNS, W. R. NASA/LBJSC Houston, Texas	V.C.5(1)	
DRAGOO, A. L. Inst. for Materials Res. National Bureau of Standards Washington, D. C.	III.C.3(1) V.A(5)	
DURKO, D. A.	I.B(6) V.C.3(6)	
DUNCAN, C. S. Westinghouse Res. Labs. Pittsburgh, Pa.	IV.D(46)(47)(48)(49) V.D.1(5)	8-24509 (1) 8-26122 (1) (2) 8-26158 (1) 8-30289 (1)

AUTHOR

PART ONE CITATIONS

PART TWO CITATIONS

DUSSAN, B.
Weiner Assoc., Inc.
Cockeysville, Md.

V.D.1(4)

8-28059 (1)

DVERNIAKOV, V. S.
Akademiia Nauk
Ukrainskoi SSR
Kiev

V.C.4(2)

<u>AUTHOR</u>	<u>PART ONE CITATIONS</u>	<u>PART TWO CITATIONS</u>
EDESKUTY, F. J.	III.B(25)	
EDWARDS, D. K. Univ. of Calif. at Los Angeles	III.B(10) III.C(1)	
EHRICKE, K. A.	I.C(11) II.D(5)	
EISS, A. Weiner Assoc., Inc. Cockeysville, Md.	V.D.1(4)	8-28059 (1)
ELLEMAN, D. D. JPL, California Inst. of Technology Pasadena, California	V.B.2(1)(2)	
ENSANIAN, M.	VII.D(2)	

<u>AUTHOR</u>	<u>PART ONE CITATIONS</u>	<u>PART TWO CITATIONS</u>
FABER, WAYNE Martin Marietta Corp. Denver, Colorado	I.B(13)	8-21279 (1)
FABINIAK, R. Cornell Aeronautical Lab. Buffalo, New York	IV.A(3) IV.A(5) IV.C(10)	8-24592 (2) 8-27106 (1)
FABINIAK, T. J. Cornell Aeronautical Lab. Buffalo, New York	IV.A(3)(5)(19) IV.C(10)	8-24592 (1) (2) 8-27106 (1)
FACEMIRE, B. R. Lockheed Missiles & Space Company Huntsville, Alabama	III.C.1(11)	8-25577 (6)
FAESSLER, A.	III.C(2)	
FAHIMIAN, E. J. Dynatech Corp. Cambridge, Mass. & Univ. of Michigan Ann Arbor, Mich.	V.B.12(14) VII.B.12(4)(5)(6)(7)(9)	8-20228 (1) 8-20553 (1) (2) (3) (4) (6)
FAN, C. Lockheed Missiles and Space Company Huntsville, Alabama	III.C.1(6)(8)(13)(15)	8-25577 (1) (3) 8-27015 (2) (4)
FELDMANIS, C. J.	III.B(9)	
FERET, J. M. Westinghouse Astro- nuclear Lab.	V.D.1(1)	
FOEX, M. CNRS, Laboratoire des Ultra-Refractaires France	V.C.4(1)	
FAGARTY, J.	VII.D(2)(3)	
FOSTER, J. F. Battelle Memorial Inst. Columbus, Ohio	VII.E(5)	8-28085 (1)

<u>AUTHOR</u>	<u>PART ONE CITATIONS</u>	<u>PART TWO CITATIONS</u>
FOWLE, A. A. Arthur D. Little, Inc. Cambridge, Mass.	IV.A(35)	8-29877 (1)
FRANK, L. Weiner Associates, Inc. Cockeysville, Md.	V.D.1(4)	8-28059 (1)
FRANKE, B.	I.A(23)	
FRANTSEVICH, I. N. Akademiia Nauk Ukrainskoi SSR Kiev	V.C.4(2)	
FROST, R. T. General Electric Co. Space Sciences Lab. Philadelphia, Pa.	IV.A(6)(7) V.A(3)(4)(7) V.B.3(6)(7)(8) VI.A(3)	8-26157 (1) 8-27228 (2) 8-29680 (1) (2)
FULLMER, L. D. North American Rockwell Corp.	IV.D(4)(8)(14)	
FURTH, H. P. Princeton, University Princeton, New Jersey	V.B.3(3)	

<u>AUTHOR</u>	<u>PART ONE CITATIONS</u>	<u>PART TWO CITATIONS</u>
GALASSO, F. S. United Aircraft Corp. Pratt and Whitney East Hartford, Conn.	IV.A(47)	8-28724 (2)
GATOS, H. C. M.I.T. Cambridge, Mass.	I.C(13) IV.C(22)	8-28189 (1)
GEBHART, B. Cornell University College of Engineering Ithaca, New York	III.B(2)	
GELLES, S. H. Battelle Memorial Inst.	IV.A(13)	8-29626 (1)
GEORGE, F. D. United Aircraft Corp. Pratt and Whitney East Hartford, Conn.	IV.A(48)	8-28724 (3)
GESCHWIND, G. I. Crumman Aerospace Corp., Bethpage, New York	IV.A(25)	8-28604 (1)
GILLMAN, C. F. State University of N Y Buffalo, New York	VII.B.6(4)	8-29745
GOLOVIN, G. F.	V.C.2(1)	
GOOD, R. J. General Dynamics Space Science Labs. San Diego, Calif.	III.A(4)(10)	
SORHAM, D. J. General Dynamics Convair Div. San Diego, Calif.	I.A(36) I.C(17)	8-24979 (1) 8-28615 (1)
GREEB, F. Martin Marietta Corp. Denver, Colorado	I.B(13)	8-21279 (1)
GREEN, W. D.	II.B(3)	

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<u>AUTHOR</u>	<u>PART ONE CITATIONS</u>	<u>PART TWO CITATIONS</u>
GRIESENAUER, N. D. Battelle Memorial Inst. Columbus, Ohio	IV.A(12) IV.D(34)	8-28749 (1) 8-29875 (1)
GRIFFIN, R. N. General Electric Co. Space Sciences Lab. Philadelphia, Pa.	I.C(10), IV.D(37), VII.A(2), VII.B.1(3), VII.E(7)	8-24683 (1) 8-27797 (1)
GRIFFITHS, L. B. Arthur D. Little, Inc. Cambridge, Mass.	IV.C(2)(18)	8-21402 (1)
GRODZKA, P. G. Lockheed Missiles & Space Co. Huntsville, Alabama	III.C.1(6)(8)(9)(10), (11)(12)(14)(15) III.D.1(1)(2) IV.B(3), IV.D(15)	8-21123 (1) 8-25577 (1) (3) (4) (5) (6) 8-27015 (1) (3) (4)
GUPTA, K. Grumman Aerospace Corp. Bethpage, New York	IV.A(21)(22)	8-27891 (2) (3)
GUREVICH, I. G.	III.B(11)	

<u>AUTHOR</u>	<u>PART ONE CITATIONS</u>	<u>PART TWO CITATIONS</u>
HAGGERTY, J. S. Arthur D. Little, Inc. Cambridge, Mass.	IV.A(35)	8-29877 (1)
HALBACH, C. R. Artcor Corp. Irvine, Calif.	V.D.1(2)	8-29769 (1)
HALLIBURTON, R. North American Aviation Downey, California	III.A(12)	
HAMMEL, R. L. TRW Systems Group Redondo Beach, Calif.	I.A(35) II.C(18)(19)(24) IV.A(2)	8-28938 (1) (2) (7)
HANKINS, B. K. Boeing Co. Seattle, Washington	VII.B.1(7)(8)	
HAPPE, R. A. North American Rockwell Corp. Space Div. Rockwell International Corp. Downey, California	VI.A(1)(5)(9)(10)(11)	8-28014 (1) (2) 8-28991 (1)
HARKULICH, T. Horizons Res., Inc. Cleveland, Ohio	IV.C(5)	
HASSAN, C. B. Westinghouse Elect. Corp. Research Labs. Pittsburgh, Pa.	V.C.3(3)(4)	
HATCH, A. J. Argonne National Labs. Argonne, Illinois	V.B.3(1)	
HATTERICK, R. G. URS/MATRIX Co.	II.A(15)	8-28359
HAUGHNEY, L. C. NASA/Ames	II.A(5)	
HEBLRLIG, J. G.	II.C(13)	

<u>AUTHOR</u>	<u>PART ONE CITATIONS</u>	<u>PART TWO CITATIONS</u>
HEDDEN, R. O. Lockheed Missiles & Space Co. Huntsville, Alabama	III.C.1(8)(11)	8-25677 (3) (6)
HEDGEPEETH, L. M.	III.B(7)	
HENRICI, J.	II.B(6)	
HENRY, E. C. General Electric Co. Space Sciences Lab. Philadelphia, Pa.	IV.D(1)(5)(11)(39)(40) VI.A(2)	8-24683 (1) 8-28114 (1)
HENRY, H. R. Univ. of Alabama Tuscaloosa, Ala.	III.B(26)(27)	8-21143 (1) (2)
HOEZ, M. CNRS, Laboratoire des Ultra-Refractaires France	V.C.4(1)	
HOPPES, R. V. NASA/MSFC	I.A.(4)	
HOUSLEY, R. M. North American Rockwell Corp. Thousand Oaks, Calif.	IV.D(4)(8)(14)	
HUBBARD, J. L. Georgia Inst. of Tech. Atlanta, Georgia	IV.C(15)(16)(17)	8-28735 (2) (3) (4)
HUDSON, V. General Dynamics, Convair Div. San Diego, Calif.	III.A(33)	8-20146 (1)
HUNG, F. C. North American Aviation, Inc. Downey, Calif.	III.A(12)	
HURWITZ, M. Dynatech Corp. Cambridge, Mass. & Univ. of Mich.	VII.B.12(1)(4)(5)(7) (8)(9)(11)	8-20228 (1) 8-20553 (1) (2) (4) (5) (6)

AUTHOR

IEMENSCHOT, J. A.
M.I.T.
Cambridge, Mass.

ITO, R.
Mound Lab.
Miamisburg, Ohio

PART ONE CITATIONS

I.B(15)

III.C.2(1)

PART TWO CITATIONS

8-28055 (2)

<u>AUTHOR</u>	<u>PART ONE CITATIONS</u>	<u>PART TWO CITATIONS</u>
JAIN, V. K.	IV.D(16)	
JOHNSON, J. W. Georgia Inst. of Tech. Atlanta, Georgia	IV.C(14)(15)(16)(17)	8-28735 (1) (2) (3) (4)
JOHNSON, P. C. Arthur D. Little, Inc. Cambridge, Mass.	IV.A(31)(32)(33)(34) IV.C(2)(18)	8-21402 (1) 8-28723 (1) (2) (3) 8-29145 (1)
JOHNSON, R. A. Westinghouse Res. Labs. Pittsburgh, Pa.	II.C(12) IV.D(47)	8-26122 (1) 8-30289 ()
JOHNSTON, M. H. NASA/MSFC EH 12	IV.D(17)	
JONES, T. B. Colorado State Univ. Fort Collins, Colorado	V.A(6)	8-30250 (1)
JORDAN, R. T. Martin Marietta Corp. Denver, Colorado & Charles F. Kettering Res. Lab. Yellow Springs, Ohio	VII.E(1)(2)(4)	
JUNTZ, R. S. University of Calif. at Livermore Lawrence Radiation Lab.	V.A.(1)	

<u>AUTHOR</u>	<u>PART ONE CITATIONS</u>	<u>PART TWO CITATIONS</u>
KATTAMIS, T. Z. University of Connecticut Storrs, Connecticut	IV.A(17)(18)	8-28734 (1) (2)
KAYE, S. General Dynamics, Convair San Diego, California	I.C(17) IV.C(11)(12)	8-27806 (1) (2) 8-28615 (1)
KHAMADOV, A. Fiziko Tekhnicheskij Institute Ashkhabad, Turkmen SSR	III.B(24)	
KIRKO, I. M.	VII.B.12(2)(3)	
KIRKPATRICK, M. E. TRW Systems Redondo Beach, Calif.	IV.A(2)	
KLOEPPER, D. Grumman Aerospace Corp. Bethpage, New York	I.C(3)	
KNOLL, R. H.	III.A(27)	
KOBER, C. L.	I.C(5)(6) VII.E(3)	
KONDRASHOV, N. G.	III.B(11)	
KOPACHEVSKII, N. D.	III.A(28)	
KORUNOV, IU. I.	V.C.4(2)	
KOSSOWSKY, R. Westinghouse Res. Labs. Pittsburgh, Pa.	II.A(17)(18)	8-28730 (2) (3)
KROES, R. L. NASA/MSFC	IV.D(18)	8-24612 (1)
KRUPNICK, A. C. NASA/MSFC EH 31	VII.B.1(3)(5) VII.B.9(1)	
KUHLTHAU, A. R. Univ. Space Res. Assoc.	II.A(14)	

<u>AUTHOR</u>	<u>PART ONE CITATIONS</u>	<u>PART TWO CITATIONS</u>
KUKHTENKO, A. I.	I.A.(32)	
KULSHRESHTHA, A. P.	IV.D(3)(7)(13)	
KUZNETSOVA, T. V.	VII.B.12(2)(3)	

<u>AUTHOR</u>	<u>PART ONE CITATIONS</u>	<u>PART TWO CITATIONS</u>
LACY, L. L. NASA/MSFC ES 24	IV.A(9)	
LADIKOV-ROEV, I.	I.A(32)	
LAL, R. B. Univ. of Alabama Huntsville, Alabama	IV.D(21)(29)	8-24612 (4) 8-29542 (2)
LAMBERT, R. H. General Electric Co. Space Science Div. Philadelphia, Pa.	V.B.3(6)	8-27228 (2)
LAMBDIN, F	IV.A(8)	
LANDS, J. F. NASA/MSFC ET 32	III.C(4)	
LAPCHINSKII, V. F. Akademiia Nauk Ukranskoii SSR	I.B(6)	
LARKIN, B. K. Martin, Marietta Corp. Aerospace Group Denver, Colorado	III.B(14)	
LARSON, D. C. Grumman Aerospace Corp. Bethpage, New York & ITT Research Inst. Chicago, Ill.	IV.A(25)(26)(27)(28)(29) VI.A(8) VI.B.1(2)	8-28604 (1) 8-28728 (1) (2) (3) {4} 8-29850 (1) 8-30627 (1)
LEBEDEV, V. K.	V.C.3(6)	
LEVY, M.	II.A(6)	
LI, CHOU Grumman Aerospace Corp. Bethpage, New York	IV.A(20)(21)(22)(23)(24) (27)	8-27891 (1) (2) (3) (4) (5) 8-28728
LI, T. C. North American Aviation, Inc. Downey, Calif.	III.A(12)	

<u>AUTHOR</u>	<u>PART ONE CITATIONS</u>	<u>PART TWO CITATIONS</u>
LIBBY, W. F. UCLA	I.C(4)	
LIENAU, H. G. NASA/MSFC ET 32	V.C.3(3)(4)	
LITTLES, J. W. NASA/MSFC EP 45	III.B(21)	
LIUBIN, L. I.	III.A(6)(19)(22)(23)(24) III.B(13)(23)	
LLOYD, J. R. Astro-Space Labs., Inc. Huntsville, Alabama	I.B(10)(11)	8-30036 (2) 8-30166 (1)
LOWRY, J. F. Westinghouse Elec. Corp. Res. Labs. Pittsburgh, Pa.	V.C.3(3)(4)	
LUBIN, B. T. Dynatech Corp. Cambridge, Mass.	VII.B.12(1)(4)	8-20553 (1)
LUNDHOLM, J. G.	I.C(8)	

<u>AUTHOR</u>	<u>PART ONE CITATIONS</u>	<u>PART TWO CITATIONS</u>
MACKRO, JAY M.I.T. Cambridge, Mass.	I.B(18)	8-28055 (5)
MAPES, R. G. Astro-Science Labs., Inc. Huntsville, Alabama	I.B(7)	8-20582 (1)
MARGRAVE, J. L. Rice University Houston, Texas	III.B(22) V.E.1(1)	
MARSHALL, D. L. Battelle Memorial Inst. Columbus, Ohio	VII.A(3)	8-29629 (1)
MARSHALL, W. R. NASA/MSFC	II.C(7)	
MARTIN, R. C. Astro-Space Labs., Inc. Huntsville, Alabama	I.B(12)	8-30528 (1)
MASUBUCHI, K. M.I.T. Dept. of Ocean Engr. Cambridge, Mass.	III.C.1(20)(21) V.C.6(3)(4)	8-24364 (1) 8-24365 (1) 8-28732 (1)
MAZELSKY, R. Westinghouse Res. Inst. Pittsburgh, Pa.	IV.D(2)(6)(12)(46) V.D.1(1)(5)	8-24509 (1) 8-30289 (1)
MECKLENBURG, K. R. Midwest Res. Inst. Kansas City, Missouri	III.B(8)	
MELCHER, J. R. Dytech Corp. Cambridge, Mass. & Univ. of Michigan Ann Arbor, Mich.	VII.B.12(5)(7)(11)	8-20228 (1) 8-20553 (2) (4)
MERKULOV, I.	I.A(32)	
MERTE, H., JR. Univ. of Michigan Ann Arbor, Mich.	III.B(21) VII.B.12(12)	8-20228 (2)

<u>AUTHOR</u>	<u>PART ONE CITATIONS</u>	<u>PART TWO CITATIONS</u>
MEYERS, J. E. Teledyne-Brown Engineering Co. Huntsville, Alabama	II.A(8)	8-21804 (1)
MIKHAILOV, V. D.	VII.B.12(5)(6)	
MILLER, J. F. Battelle Memorial Inst. Columbus, Ohio	IV.D(34) *	8-29875 (1)
MILLER, R. I. Boeing Aerospace Co. Huntsville, Alabama	IV.A(14)(15)	8-28664 (1) (2)
MITCHELL, R. C. General Dynamics, Convair Division San Diego, Calif.	III.A(33)	8-20146 (1)
MIYAGAWA, I. Univ. of Alabama at Huntsville	IV.D(23)(24)(25)	8-28098 (1) (2) (3)
MIZUSHINA, T. Mound Lab Miamisburg, Ohio	III.C.2(1)	
MOISEYEV, M., N.	III.A(14)	
MONROE, R. E. Battelle Memorial Inst. Columbus, Ohio	IV.D(31)(32)(33)	8-28725 (2) (3) (4)
MOOKHERJI, T.	IV.D(3)(7)(13)	
MORGENTHALER, G. W.	II.C(14)	
MOSSER, E. L.	VII.B.5(1)	
MUKHERJEE, J. L. Grumman Aerospace Corp. Bethpage, New York	IV.A(21)(22)	8-27897 (2) (3)
MULHOLLAND, D. R. NASA/Ames	II.A(5)	

AUTHOR

MURAKI, T.
M.I.T.
Cambridge, Mass.

MURPHY, D. W.

PART ONE CITATIONS

III.C.1(20)(21)(22)

III.B(6)

PART TWO CITATIONS

8-28732 (1) (2) (3)

<u>AUTHOR</u>	<u>PART ONE CITATIONS</u>	<u>PART TWO CITATIONS</u>
MCCREIGHT, L. R. General Electric Co. Space Sciences Labs.	I.A(10)(12)(31)(34) I.C(10)(12) IV.D(1)(5)(11)(37)(38)(39) VI.A(2), VII.A(2), VII.B.1(3) VII.E(7)	8-24683 (1) 8-27797 (1) 8-27942 (1) (2)
MCDONALD, J. R. Univ. of Alabama Tuscaloosa, Alabama	III.B(26)	8-21143
MCGREW, J. L.	III.B(6)(19)	
MCGUIRE, A. D. Electro-Optical Systems, Inc.	I.A(1)	
MCKANNAN, E. C. NASA/MSFC EH 21	IV.A(3)(5) VII.B.1(3)	8-24592 (2)

<u>AUTHOR</u>	<u>PART ONE CITATIONS</u>	<u>PART TWO CITATIONS</u>
NAKANISHI, S.	III.A(31)	
NAPALUCH, L. J. General Electric Co. Space Sciences Lab. Philadelphia, Pa.	V.A(7), V.B.3(6)(8)	8-26157 (1) 8-27228 (2) 8-29680 (2)
NAUGLE, J. E.	II.D(3)	
NAZARENKO, O. K.	V.C.3(6)	
NEEL, C. B.	II.A(5)	
NEPOROZHNI, I. V.	V.C.3(6)	
NEU, J. T. General Dynamics Space Science Lab. San Diego, Calif.	III.A(4)(10)	
NICHOLS, R. L. NASA/MSFC EH 34	I.A(4)	
NIX, G. F. University of Manchester Electrical Engr. Labs. Manchester, England	V.B.3(2)	
NOONE, M. J. General Electric Co. Space Science Div. Philadelphia, Pa.	IV.D(40)	8-28114 (1)
NUAMAKER, R. R.	III.A(27)	

<u>AUTHOR</u>	<u>PART ONE CITATIONS</u>	<u>PART TWO CITATIONS</u>
O'CONNER, M. F. General Electric Co. Space Science Div. Philadelphia, Pa.	V.B.3(6)	8-27228 (2)
O'DELL, E. L. G. General Electric Co. Space Science Div. Philadelphia, Pa.	V.B.3(6)	8-27228 (2)
OKER, E. Univ. of Michigan Ann Arbor, Mich.	VII.B.12(12)	8-20228 (2)
OTTO, E. W. NASA, Lewis Research Center Cleveland, Ohio	III.A(9)(13)(16)(17)(30)	
OTTO, G. H.	IV.A(9)	

<u>AUTHOR</u>	<u>PART ONE CITATIONS</u>	<u>PART TWO CITATIONS</u>
PADOVANI, F. W. Texas Instruments, Inc: Dallas, Texas	IV.D(45)	8-27807 (1)
PAGE, R. J. Artcor Corp. Irvin, California	V.D.1(2)	8-29769 (1)
PAPELL, S. S.	III.B(1)	
PARKS, P. G.	I.B(2)	
PASICHNYI, V. V.	V.C.4(2)	
PATON, B.	I.B(6), I.C(14) V.C.3(5)(6) V.C.6(1)	
PATTEE, H. E. Battelle Memorial Inst. Columbus, Ohio	IV.D(30)(31)(33)	8-28725 (1) (2) (4)
PAULE, R. C. Inst. for Materials Res. National Bureau of Standards Washington, D. C.	III.C.3(1) V.A(5)	
PAYNTER, H. L. Martin, Co. Denver, Colorado	III.A(20)	
PAYTON, P. Univ. of Calif. at Los Angeles	I.C(4)	
PEKAREV, A. I.	V.E.2(1)	
PETERS, E. T. Arthur D. Little, Inc. Cambridge, Mass.	IV.A(31)(32)(33)	8-28723 (1) (2) (3)
PETRASH, D.	III.A(30)	
PETROV, B. H.	I.B(5)	
PICKARD, R. F. Astro-Space Labs, Inc. Huntsville, Alabama	I.B(9)	8-30036 (1)

AUTHOR

PART ONE CITATIONS

PART TWO CITATIONS

PIGGOTT, L. S.
Univ. of Manchester
Electrical Engr. Labs.
Manchester, England

V.B.3(2)

POLLOCK, J. T. A.
Tyco Labs, Inc.
Waltham, Mass.

IV.A(1)(4)

POVITSKII, A. S.

III.A(6)(19)(22)(23)(24)
III.B(13)(23)

<u>AUTHOR</u>	<u>PART ONE CITATIONS</u>	<u>PART TWO CITATIONS</u>
RANDOLPH, B. W. Northrop Corp. Hawthorne, Calif.	III.A(2)	
RASQUIN, J. R. NASA/MSFC EH 15	V.C.1(1)(2)	
REGER, J. L. TRW Systems Group Redondo Beach, Calif.	IV.A(2)(38)(40)(41) (43)(44)(45)	8-27085 (2) (4) (5) (6) 8-28267 (1) (2)
REISING, J. A. Eagle-Picher Indust., Inc. Miami, Oklahoma	IV.D(35)(36)	8-29077 (1) (2)
REYNOLDS, W. C. Stanford Univ. California	III.A(18)	
RIED, R. C., JR.	III.C(4)	
ROBERTSON, S. J. Lockheed Missiles & Space Co. Huntsville, Ala.	IV.A(36)	8-28729 (1)
ROSE, S. Horizons Res., Inc. Cleveland, Ohio	IV.C(5)	
ROSE, J. T. McDonnell Douglas Astronautics Co. St. Louis, Missouri	I.B(4)	
ROTHMAN, R. L. Battelle Memorial Inst. Columbus, Ohio	IV.D(30)	8-28725 (1)
ROY, U. Univ. of Alabama Huntsville, Alabama	IV.D(10)(20)(22)	8-24612 (3) 8-25120 (1)

AUTHOR

PART ONE CITATIONS

PART TWO CITATIONS

RUBENSTEIN, M.
Westinghouse Electric Corp.
Westinghouse Res. Labs.
Pittsburgh, Pa.

IV.D(46)(48)(49)

8-24509 (1)
8-26122 (2)
8-26158 (1)

RUBIN, B. A.
General Electric Co.
Space Sciences Lab.
Philadelphia, Pa.

IV.D(37)

8-24683 (1)

RUSSEL, W. J.
School of Aerospace
Medicine
Brooks AFB, Texas

VII.B.6(1)

<u>AUTHOR</u>	<u>PART ONE CITATIONS</u>	<u>PART TWO CITATIONS</u>
SAFFREN, M. M. JPL, Calif. Inst. of Tech. Pasadena, Calif.	V.B.2(1)(2)	
SAMOILENKO, I.	I.A(32)	
SATTERLEE, H. M. Lockheed Missiles & Space Co.	III.A(18)	
SCARFF, D. D. General Electric Co. Space Science Div. Philadelphia, Pa.	I.C(18)	8-28179 (1)
SCHIRENKO, G. N.	V.E.2(1)	
SEIDENSTICKER, R. G. Westinghouse Res. Labs. Pittsburgh, Pa.	IV.D(47)(48)	8-30289 8-26122 (1) (2)
SEXL, H. P.E.C. Res. Assoc., Inc. Louisville, Colorado	IV.D(41)	8-30171 (1)
SEXL, R. P.E.C. Res. Assoc., Inc. Louisville, Colorado	IV.D(41)	8-30171 (1)
SHADIS, W. Weiner Assoc., Inc. Cockeysville, Md.	V.D.1(4)	8-28059 (1)
SHAPLAND, D. ESRO Delft, Netherlands	II.C(10)	
SHELIAGIN, V. D.	V.C.3(6)	
SHEPHERD, W. G.	I.A(15)	
SHIGANOV, N. A. Akademii Nauk Ukrainskoj SSR Kiev	V.C.4(2)	
SHILEYKIN, V. V.	III.A(3)(5)(7)	

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SICKA, R.	IV.C(5)	
SIEGEL, R.	III.B(12)	
SIEKMANN, J.	III.E(2)(3)	
SILVERSTON, W. E., JR.	II.D(1)	
SKEER, H. Bellcomm, Inc. Washington, D. C.	I.A(6)	
SMITH, A. TRW Systems Group Redondo Beach, Calif.	II.C(20)	8-28938 (3)
SMOLAK, G. R.	III.A(27)	
SNYDER, R. S. NASA/MSFC EH 12	VII.B-1(4)(6)	8-29566 (1)
SORRELLS, A. R.	I.A(7)	
SORTLAND, L. D. Bellcomm, Inc. Washington, D. C.	I.A(6)	
SPARKS, V. W. Lockheed Missiles and Space Company Huntsville, Alabama	V.D.1(3)	8-21347 (1)
SPEAR, K. E. General Electric Co. Space Division Philadelphia, Pa.	IV.D(40)	8-28114 (1)
SPEARMAN, J. W. M.I.T. Cambridge, Mass.	III.C.1(22)	8-28732 (3)
SPRADLEY, L. W. Lockheed Missiles & Space Company Huntsville, Alabama	III.C.1(11)(15)	8-25577 (6) 8-27015 (4)
STARK, J. A. General Dynamics, Aircraft Div	III.A(33)	8-20746 (1)

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TAYLOR, J. F.	III.B(25)	
TAYLOR, K. R. NASA/MSFC PS 06	I.A(35)	
TAYLOR, T. B. International Res. & Tech. Corp. Washington, D. C.	VII.A(1)	
TEGTMEIER, A. ERNO Raumfahrttechnik GmbH Bremen, West Germany	I.A(23) II.A(7) II.C(11)	
THIEHLER, A. Beckman Instruments, Inc. Anaheim, Calif.	VII.B.1(8)	8-28474 (1)
THOMAS, O. H. JR. Teledyne-Brown Engr. Co.	II.A(9)(11)(12)	8-21804 (2) (4) (5)
THORNHILL, J. W. Westinghouse Electric Corp. Res. Laboratories Pittsburgh, Pa.	V.C.3(2)	
TOBIN, J. M. Westinghouse Res. Labs. Pittsburgh, Pa	I.A(16) (17) (18) (19)	8-28730 (1) (2) (3) (4)
TOLLE, H.	II.C(11)	
TOPOL, L. E. North Am. Rockwell Corp. Space Div. Downey, Calif.	IV.A(10)	8-28014 (2)
WERTON, J. A. Rice University Houston, Texas	V.E.1(1)	
TSYGANKOV, O. S.	I.B(6)	

AUTHOR

PART ONE CITATIONS

PART TWO CITATIONS

ULIANOV, A. F.

III.B(16)

ULRICH, D. R.
General Electric Co.
Philadelphia, Pa.

IV.D(38)(39)(40)

8-27942 (1) (2)
8-28114 (1)

<u>AUTHOR</u>	<u>PART ONE CITATIONS</u>	<u>PART TWO CITATIONS</u>
VAN ALLER, R. T.	I:A(4)	
VAN OSS, C. J. State Univ. of N.Y. Buffalo, New York	VII.B.6(4)	8-29745 (1)
VELKOFF, H. R.	III.A(25)	
VERNON, A. R. Bellcomm, Inc. Washington, D. C.	I.A(6)(15)	
VOLTMER, F. W. Texas Instruments, Inc. Dallas, Texas	IV.D(45)	8-27807 (1)

<u>AUTHOR</u>	<u>PART ONE CITATIONS</u>	<u>PART TWO CITATIONS</u>
WAHL, B. W.	I.C(2)	
WALD, F. Tyco Labs., Inc. Waltham, Mass.	IV.A(1)(4)	
WALLNER, L. E.	III.A(31)	
WALTER, H. U. Univ. of Alabama at Huntsville	IV.A(11) IV.D(21)(29)	8-24612 (4) 8-29542 (2) 8-29650 (2)
WALTZ, D. M. TRW Systems Group Redondo Beach, Calif.	II.C(23)	8-28938 (6)
WANG, T. G. JPL, Calif. Inst. of Tech. Pasadena, Calif.	V.B.2(1)(2)	
WECHSLER, A. E. Arthur D. Little, Inc. Cambridge, Mass.	IV.C(2)(18)	8-21402 (1)
WEISS, S.	III.A(1)	
WERNER, L. M.	I.C(8)	
WHITE, J. H.	I.C(8)	
WHITE, R. C. General Dynamics Convair Div. San Diego, Calif.	III.A(33)	8-20146 (1)
WHITE, W. B. General Electric Co. Space Div. Philadelphia, Pa.	IV.D(40)	8-28114 (1)
WHITNEY, D. E. M.I.T. Cambridge, Mass.	I.B(14)(16)	8-28055 (1) (3)

<u>AUTHOR</u>	<u>PART ONE CITATIONS</u>	<u>PART TWO CITATIONS</u>
WHYMARK, R. R. Interand Corp. Intersonics, Inc. Chicago, Illinois	V.B.2(3)(4)(5)(6)	8-28762 (1)(2) 8-29030 (1) 8-30471 (1)
WIEDEMEIER, H. Rensselaer Polytechnic Inst. Troy, New York	IV.D(42)	8-26146 (1)
WIENSS, W.	II.C(11)	
WIESNER, P.	V.C.6(2)	
WILCOX, W. R. Univ. of Southern Calif. Chemical Engr. Dept. Los Angeles, Calif.	IV.D(43)(44)	8-29847 (1) (2)
WILLIAMS, J. R. NASA/MSFC EH 42	II.A(1)	
WILLIAMSON, K. D.	III.B(25)	
WINKLER, C. E. NASA/MSFC ES 21	I.A(29)	
WISE, T. D. General Electric Co. Space Sciences Lab Philadelphia, Pa.	V.A(7)	8-26157 (1)
WITT, A. F. M. I. T. Cambridge, Mass.	IV.C(22)	8-28189 (1)
WITT, R. Grumman Aerospace Corp. Bethpage, New York	I.C(3)	
WOOD, C. C. NASA/MSFC EE 11	III.A(29) III.E(1)	

AUTHOR

PART ONE CITATIONS

PART TWO CITATIONS

WOODCOCK, G. R.

I.C(9)

WOUGH, G.
General Electric Co.
Space Sciences Lab.
Philadelphia, Pa.

V.A(7)
V.B.3(6)(8)

8-26157 (1)
8-27228 (2)
8-29680 (2)

WUENSCHER, H. F.
NASA/MSFC

I.A(2)(8)(11)(14)(16)
(18)(20)(22)(27)(33)
VII.D(4)

<u>AUTHOR</u>	<u>PART ONE CITATIONS</u>	<u>PART TWO CITATIONS</u>
YAN, C. S. General Electric Co. Philadelphia, Pa.	IV.D(39)	8-27942 (2)
YATES, I. C. NASA/MSFC ES 24	IV.A(43)(45) IV.C(4)	8-28267 (1) 8-27085 (7)
YOST, V. H. NASA/MSFC EH 11	I.A(30) II.B(2)	
YUE, A. S. UCLA Los Angeles, Calif.	IV.C(9)	8-26402 (1)

<u>AUTHOR</u>	<u>PART ONE CITATIONS</u>	<u>PART TWO CITATIONS</u>
ZAGREBEL, A. A.	I.B(6)	
ZARA, E. A.	III.B(7)	
ZARUBA, I. I.	V.C.3(6)	
ZENKEVICH, V. B. Nauchno-Issledovatel'skii Inst. Vysokikh Temperatur Moscow, USSR	III.A(8)	
ZHUK, I. P.	III.B(11)	

Part IV
Corporate Citation Guide

Contractor	Contract No.	Principal Investigator	Principal Author	Part One Citation
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	NAS8 - 25120	J. H. Davis	U. Roy	IV.D(22)
	NAS8 - 26793	J. H. Davis J. G. Castle, Jr.		
	NAS8 - 26991	U. Roy		IV.C(6) IV.C(7) IV.C(8)
Univ. of Alabama Tuscaloosa, Ala.	NAS8 - 27809	G. H. Otto		
	NAS8-28112	H. U. Walter	A. Boese	IV.D(26)
	NAS8 - 28304	H. U. Walter		
	NAS8 - 29542	J. G. Castle	J. H. Davis et al	IV.D(28) IV.D(29)
	NAS8 - 29650	H. U. Walter	H. U. Walter	IV.A(10) IV.A(11)
	NAS8 - 21143		H. R. Henry et al H. R. Henry	III.B(26) III.B(27)
	NAS8 - 28098	I. Miyagawa	I. Miyagawa I. Miyagawa I. Miyagawa	IV.D(23) IV.D(24) IV.D(25)
	NAS8-29494	D. J. DeSmet		IV.D(27)

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Contractor	Contract No.	Principal Investigator	Principal Author	Part one citation
Univ. of Arizona Tucson, Ariz.	NAS8-29566	M. Bier	M. Bier; R.S. Snyder	VII.B.1(6) VII.B.1(7)
Artcor Corp. Irvine, Cal.	NAS8-29769		Halbach, Page Arthur	V.D.1(2)
Astro-Space Labs, Inc. Huntsville, Ala.	NAS8-20582 NAS8-20707 NAS8-30036		R.G. Mapes R.F. Pickard J.R. Lloyd J.R. Lloyd R.C. Martin	I.B(7) I.B(8) I.B(9) I.B(10) I.B(11) I.B(12)
Auburn Univ. Auburn, Alabama	NAS8-29881 NSR-1-003-025			
Battelle Memorial Institute Columbus, Ohio	NAS8-28085 NAS8-28725	Cutain, Schneider	Foster; Cutain Pattee; Rothman Pattee; Monroe R. E. Monroe Monroe; Pattee N. M. Griesenauer S. H. Gelles D. L. Marshall	VII.E(5) IV.D(30) IV.D(31) IV.D(32) IV.D(33) IV.A(12) IV.A(13) VII.A(3) I.C(15) IV.D(34)
	NAS8-28749 NAS8-29626 NAS8-29629 NAS8-29748 NAS8-29876	N. M. Griesenauer S. H. Gelles S. H. Gelles N. M. Griesenauer J. F. Miller		
	NAS8-31445		Griesenauer; Miller	

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Beckman Instruments, Inc. Anaheim, Calif.	NAS8-28474		A. Theiehler	VII.B.1(8)
Bendix Corp.	NAS8-30889			
Brown Engr. Co. Huntsville, Ala.	NAS8-29951			No report found
Boeing Aero. Co. Huntsville, Ala.	NAS8-28664	Henderson		IV.A(14) IV.A(15)
Univ. of Calif. at Los Angeles Los Angeles, Cal.	NAS8-26402 NAS8-28370 NAS8-29854	A. S. Yue A. S. Yue A. S. Yue	A. S. Yue	IV.C(9) IV.A(16)
Carnegie-Mellon Univ. Pittsburgh, Pa.	NAS8-25202 NAS8-25203			I.C(16)
Colorado State Univ.	NAS8-30250	Winder	T. B. Jones	V.A(6)
Univ. of Conn. Inst. of Materials Science Storrs, Conn.	NAS8-28734	T. Z. Kattamis	T. Z. Kattamis T. Z. Kattamis	IV.A(17) IV.A(18)

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Cornell Aero. Lab. Buffalo, New York	NAS8-24592 NAS8-27106	T. J. Fabiniak	T. J. Fabiniak Abbot et al R. C. Fabiniak et al	IV.A(19) IV.A(3)(5) IV.C(10)
H. E. Cramer Co., Inc. Salt Lake City, Utah	NAS8-29033			
Dynatech Corp. Cambridge, Mass.	NAS8-20553		Fahimian et al Fahimian et al E. J. Fahimian Fahimian et al M. Hurwitz Fahimian et al J. R. Blutt	VII.B.12(4) VII.B.12(5) VII.B.12(6) VII.B.12(7) VII.B.12(8) VII.B.12(9) VII.B.12(10)
Eagle-Picher Indust., Inc. Miami, Oklahoma	NAS8-29077	Doty, Reising	J. P. Doty J. A. Reising J. P. Doty J. A. Reising	IV.D(35) IV.D(36)
Electro-Optical Systems, Inc	NAS8-21012			III.A(32)
Fairchild-Hiller Corp.	NAS8-26552			VII.E(6)

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Contractor	Contract No.	Principal Investigator	Principal Author	Part one citation
General Dynamics Convair Division San Diego, Calif.	NAS8-20146		Hudson, et al	III.A(33)
	NAS8-24952			
	NAS8-24979	D.J. Gorham, W.H. Steurer	Gorham, Steurer	I.A(35)
	NAS8-25051			
	NAS8-27806	W. H. Steurer	Steurer, Kaye	IV.C(11) IV.C(12)
	NAS8-28056	Steurer, Wood	Steurer, Kaye, Kaye	
	NAS8-28615	W. H. Steurer	Steurer, Kaye, Gorham	I.C(17)
General Electric Co., Space Sciences Lab. (Space Science Div.) Philadelphia, Pa.	NAS8-29462			II.C(15) IV.C(13)
	NAS8-29620	W.H. Steurer, S. Kaye		
	NAS8-24683		R. N. Griffin, et al	IV.D(37)
	NAS8-26157	R. T. Frost	R. T. Frost, et al	V.A(7)
	NAS8-27228	R. T. Frost	M. F. Clark	V.B.3(5) V.B.3(6)
	NAS8-27797	L. R. McCreight	E. H. Buerger, et al	VII.E(7)
	NAS8-27942		R. N. Griffin, McCreight	IV.D(38)
	NAS8-28114		D. R. Ulrich, McCreight	IV.D(39)
	NAS8-28179	D. R. Ulrich	D. R. Ulrich, et al	IV.D(40)
	NAS8-29680	H. L. Bloom	D. D. Scarff, H. L. Bloom	I.C(18)
Georgetown Univ.	NAS8-29878	R. T. Frost	R. T. Frost	V.B.3(7)
	NAS8-29879		R. T. Frost	V.B.3(8)
	NAS8-30797		R. T. Frost, et al	VII.B.1(9)
	NAS8-31152			V.E.1(2)
	NAS8-29778	E. M. Leise		VII.B.6(2)

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Contractor	Contract No.	Principal Investigator	Principal Author	Part one citation
Gruman Aerospace Corp. Bethpage, New York	NAS8-27891	C. Li	Chou Li	IV.A(20)
			J.L. Mukherjee, et al	IV.A(21)
	NAS8-28604 NAS8-28728	D. Larson	J.L. Mukherjee, et al	IV.A(22)
			Chou Li	IV.A(23)
			Chou Li	IV.A(24)
			W. M. Aubin, et al	IV.A(25)
			D. J. Larson, Jr.	IV.A(26)
			D. J. Larson, C. Li	IV.A(27)
			D. J. Larson,	IV.A(28)
			G. Busch	
NAS8-29662	C. Li	D. J. Larson,	IV.A(29)	
		G. Busch	IV.A(30)	

Contractor	Contract No.	Principal Investigator	Principal Author	Part one citation
Georgia Inst. of Tech. Atlanta, Georgia	NAS8-25179	H.F. Bauer	H. F. Bauer	III.A(34)
	NAS8-28735	J.L. Brown	J. L. Brown,	III.A(35)
			Johnson	IV.C(14)
	NAS8-29860	R. K. Hart	J. L. Hubbard	IV.C(15)
			Johnson	
			Hubbard, Johnson	IV.C(16)
			Hubbard, Johnson	IV.C(17)
				V.C.3(7)
Grumman Aerospace Corp. Bethpage, New York	NAS8-27891	C. Li	Chou Li	IV.A(20)
			J.L. Mukherjee et al	IV.A(21)
			J.L. Mukherjee et al	IV.A(22)
			Chou Li	IV.A(23)
			Chou Li	IV.A(24)
			M.M. Aubin, et al	IV.A(25)
			D.J. Larson, Jr.	IV.A(26)
			D. J. Larson, C. Li	IV.A(27)
			D.J. Larson	IV.A(28)
			G. Busch	
			D.J. Larson	IV.A(29)
			G. Busch	
				IV.A(30)
Hewlett-Packard	NAS8-29662	C. Li		
	NAS8-27718			
Howard Univ. Washington, D.C.	NAS8-30252	A. D. Ukamwa		

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Interand Corp. Chicago, Ill.	NAS8-28762	R. R. Whymark	R. R. Whymark	V.B.2(3)
	NAS8-29030	R. R. Whymark	R. R. Whymark	V.B.2(4)
	NAS8-30471	R. R. Whymark	R. R. Whymark	V.B.2(5) V.B.2(6)
Intersonics, Inc. Chicago, Ill.				
ITT Res. Inst. Chicago, Ill.	NAS8-29850	D. C. Larsen	D. C. Larsen	VI.B.1(2)
	NAS8-30627	D. C. Larsen	D. C. Larsen W. B. Crandall	VI.A(8)
Lehigh Univ. Bethlehem, Pa.	NAS8-28654			
Arthur D. Little, Inc. Cambridge, Mass.	NAS8-21402		J. Berkowitz-Mattuck et al	IV.C(2), IV.C(18)
	NAS8-25709			IV.C(19) IV.C(20) IV.C(21)
	NAS8-26637 NAS8-28723		P. C. Johnson, E. T. Peters P. C. Johnson E. T. Peters P. C. Johnson E. T. Peters P. C. Johnson	IV.A(31) IV.A(32) IV.A(33)
	NAS8-29145 NAS8-29874 NAS8-29877	P. C. Johnson	A. A. Fowle, J. S. Haggerty	IV.A(34) I.C(18) IV.A(35)

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Lockheed Missiles and Space Co. Huntsville, Ala.	NAS8-21123	P. G. Grodzka	P. G. Grodzka	IV.B(3)
	NAS8-21347	V. W. Sparks	V. W. Sparks	V.D.1(3)
	NAS8-25577	C. Fan, P. G. Grodzka	C. Fan, P. G. Grodzka	III.C.1(6)
			J. W. Benefield	III.C.1(7)
			P. G. Grodzka et al	III.C.1(8)
			P. G. Grodzka,	III.C.1(9)
			T. C. Bannister	
			P. G. Grodzka	III.C.1(10)
			T. C. Bannister,	III.C.1(11)
			et al	
	NAS8-27015	C. Fan	S. V. Bourgeois, Jr.,	III.C.1(12)
			et al	
			C. Fan	III.C.1(13)
			P. G. Grodzka et al	III.C.1(14)
			P. G. Grodzka et al	III.C.1(15)
			S. V. Bourgeois, Jr.	III.C.1(16)
			S. V. Bourgeois, Jr.	III.C.1(17)
			S. V. Bourgeois,	III.C.1(18)
			et al	
	NAS8-28170		M. R. Brashears,	IV.A(36)
	NAS8-28729		et al	
	NAS8-29609	P. G. Grodzka		VII.A(4)
	NAS8-29610	S. V. Bourgeois		III.C.1(19)
	NAS8-30268	McDermitt		V.C.4(3)
Lockheed Missiles and Space Co. Sunnyvale, Cal.	NAS8-28960			II.C(16)
				II.C(17)
Martin Marietta Corp. Denver, Colorado	NAS8-21279		W. Faber et al	I.B(13)

Contractor	Contract No.	Principal Investigator	Principal Author	Part one citation
M. I. T. Cambridge, Mass.	NAS8-24364	K. Masubuchi	K. Masubuchi	V.C.6(3)
	NAS8-24365	K. Masubuchi	J. B. Andrews et al	V.C.6(4)
	NAS8-28055	Sheridan, Whitney	D. E. Whitney	I.B(14)
	NAS8-28189	H. C. Gatos	J. A. Iemenschut	I.B(15)
	NAS8-28411		D. Whitney	I.B(16)
	NAS8-28732		W. J. Book	I.B(17)
			J. Mackro	I.B(19)
			H. C. Gatos,	IV.C(22)
			A. F. Witt	
			K. Masubuchi,	III.C.1(20)
			T. Muraki	
			K. Masubuchi,	III.C.1(21)
			T. Muraki	
			J. W. Spearman,	III.C.1(22)
			T. Muraki	
	NAS8-30537	H. C. Gatos, A. F. Witt		
	NGR-22-009-517			
McDonnell Douglas Astronautics Co. Huntington Beach, California	NAS8-28583			II.D(8)
National Bureau of Standards	H-84832A W-13475	Kuriyama Passaglia		
National Research Corporation	NAS8-27877			

Contractor	Contract No.	Principal Investigator	Principal Author	Part one citation
Univ. of Michigan Dept. of Mech. Engr. Ann Arbor, Mich.	NAS8-20228		E. J. Fahimian et al E. Oker, H. Merke, Jr.	VII.B.12(11) VII.B.12(12)
State Univ. of New York Buffalo, New York	NAS8-29745	P. E. Bigazzi	C. J. VanOss et al	VII.B.6(4)
North American Rockwell Corp. Downey, Calif. SEE ALSO Rockwell Inter- national Corp. Downey, Calif.	NAS8-28014	R. A. Happe	R. A. Happe R. A. Happe, L. E. Topol	VI.A(9) VI.A(10)
Univ. of Oregon	NAS8-30887 NAS8-31386			
Owens-Illinois	NAS8-31381			
P.E.C. Res. Assoc. Inc. Louisville, Col.	NAS8-30171		D. G. Burkhard et al	IV.D(41)
Raff Assoc.	NAS2-5073	Johnson		

Contractor	Contract No.	Principal Investigator	Principal Author	Part one citation
Rensselaer Polytechnic Inst. Troy, New York	NAS8-26146	H. Wiedemeier	H. Wiedemeier	IV.D(42)
Rockwell International Corp. SEE ALSO North American Rockwell Corp.	NAS8-28991	R. A. Happe	R. A. Happe	VI.A(11)
Rogosin Kidney Center Cornell Medical Center New York, N.Y.	NAS8-31513			
Univ. of Southern Calif. Chemical Engr. Dept. Los Angeles, Cal.	NAS8-29847	W. R. Wilcox	W. R. Wilcox W. R. Wilcox	IV.D(43) IV.D(44)
Southern Methodist University	NAS1-11869	Chu		

Contractor	Contract No.	Principal Investigator	Principal Author	Part one citation
Teledyne-Brown Engr. Co. Huntsville, Ala.	NAS8-21804		J. E. Meyers O. H. Thomas, Jr. M. S. Byers O. H. Thomas, Jr. O. H. Thomas, Jr. M. S. Byers	II.A(8) II.A(9) II.A(10) II.A(11) II.A(12) II.A(13)
	NAS8-29951			
Texas A&M Univ. College Station, Texas	NAS8-29851			
Texas Instruments Inc. Dallas, Texas	NAS8-26403 NAS8-27807	Einspruch	F. A. Padovani F. W. Voltmer	IV.D(45)

Contractor	Contract No.	Principal Investigator	Principal Author	Part one citation
TKM Systems Group Redondo Beach, California	NAS8-27085	J. L. Reger	J. L. Reger	IV.A(37)
			J. L. Reger	IV.A(38)
			J. L. Reger	IV.A(39)
			J. L. Reger	IV.A(40)
			J. L. Reger	IV.A(41)
			J. L. Reger	IV.A(42)
			J. L. Reger	IV.A(43)
			J. L. Reger,	IV.A(44)
			I. C. Yates	IV.A(45)
			J. L. Reger,	
I. C. Yates			II.C(18)	
J. L. Reger			II.C(19)	
J. L. Reger			II.C(20)	
R. L. Hamme1			II.C(21)	
R. L. Hamme1			II.C(22)	
A. Smith			II.C(23)	
W. T. Anderson, Jr.			II.C(24)	
J. O. Bird				
D. M. Maltz				
R. L. Hamme1				
United Aircraft Corp. Pratt & Whitney East Hartford, Connecticut	NAS8-28724		F. C. Douglas	IV.A(46)
			F. C. Douglas	IV.A(47)
			F. S. Galasso	IV.A(48)
F. D. George			I.C(19)	
Universities Space Res. Assoc. Charlottesville, Virginia	NAS8-27734 NGR47-102-003 NAS8-31349	H. Leidheiser H. Leidheiser H. Leidheiser	A. R. Kuhlthau	II.A(14)

Contractor	Contract No.	Principal Investigator	Principal Author	Part one citation
UPS/Matrix Co. Man Systems Div.	NAS8-28359		R. G. Hatterick	II.A(15)
University of Utah	NAS8-30253			
Vanderbilt Univ. Knoxville, Tenn.	NAS8-30656	Kinser		
Washington State University Pullman, Wash.	NAS8-29725	Johnson		IV.A(49)
Wayne State Univ. Detroit, Mich.	NAS8-29823	R. K. Brown	R. K. Brown	VII.B.6(3)
Weiner Assoc., Inc. Cockeysville, Md.	NAS8-28050 NAS8-28059	Eiss, Dussan Shadis, Frank	A. Eiss et al	V.D.1(4)

Contractor	Contract No.	Principal Investigator	Principal Author	Part one citation
Westinghouse Electric Corp. Westinghouse Res. Labs. Pittsburgh, Pa.	NAS8-24509 NAS8-26122	R. G. Seidensticker C. S. Duncan R. A. Johnson	C. S. Duncan et al R. G. Seidensticker, et al	IV.D(46) IV.D(47)
	NAS8-26158	C. S. Duncan M. Rubenstein R. G. Seidensticker	C. S. Duncan et al C. S. Duncan, M. Rubenstein	IV.D(48) IV.D(49)
	NAS8-28271 NAS8-28730		J. M. Tobin J. M. Tobin, R. Kossowsky J. M. Tobin, R. Kossowsky	II.A(16) II.A(17) II.A(18)
	NAS8-30289		J. M. Tobin R. Mazelsky, C. S. Duncan	II.A(19) V.D.1(5)
Univ. of Wisconsin	NAS8-28733	C. M. Adams		IV.A(50)
Wyle Labs.	NAS8-39747			

Part II
Contract Activity

350

• CONTRACT NUMBER

H-84832A

SUBJECT

Characterization of Thermal Convection and
Crystal Convection in Metals Grown from Melt

CONTRACTOR

National Bureau of Standards

PRINCIPAL INVESTIGATOR

Kuriyama

Contract Dates

6/30/71 -

NASA TECHNICAL MONITOR

351

CONTRACT NUMBER

NAS1-11869

SUBJECT

Physical Phenomena Related to Crystal Growth
in the Space Environment

CONTRACTOR

Southern Methodist University

PRINCIPAL INVESTIGATOR

Chu

CONTRACT DATES

NASA TECHNICAL MONITOR

352

CONTRACT NUMBER

NAS2-5073

SUBJECT

NASA List of Potential Space Tools and Equipment

CONTRACTOR

Raff Associates, Inc.

PRINCIPAL INVESTIGATOR

Johnson

CONTRACT DATES

NASA TECHNICAL MONITOR

353

CONTRACT NUMBER

NAS8-20146

SUBJECT

Zero-Gravity, Vapor/Liquid Separators

CONTRACTOR

General Dynamics, Convair Division
San Diego, California

PRINCIPAL INVESTIGATOR

CONTRACT DATES

NASA TECHNICAL MONITOR

C. D. Arneidt

354

REPORTS ON CONTRACT WORK:

(1.) Authors: V. Hudson, R. C. Mitchell, J. A. Stark, R. C. White

Study of Zero-Gravity, Vapor/Liquid Separators

Date: January 1966

Contractor Report Number: NASA-CR-71624, GDC-DDB65-009

Report Identification Number: 66N22825

III.A(33)

355

CONTRACT NUMBER

NAS8-20228

SUBJECT

Dielectrophoretic System Design

CONTRACTOR

Department of Mechanical Engineering
University of Michigan
Ann Arbor, Michigan

PRINCIPAL INVESTIGATOR

CONTRACT DATES

NASA TECHNICAL MONITOR

356

REPORTS ON CONTRACT WORK:

(1) Authors: E. J. Fahimian, M. Hurwitz, J. R. Melcher

Research and Design of a Practical and Economical
Dielectrophoretic System for the Control of
Liquid Fuels Under Low Gravity Environmental Conditions

Date: May 31, 1966

Contractor Report Number: NASA-CR-88767 MPR-5

Report Identification Number: 67X88098*

VII.B.12(11)

(2.) Authors: E. Oker, H. Merte, Jr.

Transient Boiling Heat Transfer in Sturated
Liquid Nitrogen and F113 At Standard and Zero Gravity

Date: October 1966

Contractor Report Number: NASA-CR-120202, REPT.-074610-52-F

Report Identification Number: 74N21585

VII.B.12(12)

357

CONTRACT NUMBER

NAS8-20553

SUBJECT

Dielectrophoretic System

CONTRACTOR

Dynatech Corporation
Cambridge, Massachusetts

PRINCIPAL INVESTIGATOR

CONTRACT DATES

NASA TECHNICAL MONITOR

358

REPORTS ON CONTRACT WORK:

(1.) Authors: E. J. Fahimian, M. Hurwitz, B. T. Lubin

Research and Design of a Practical and
Economical Dielectrophoretic System for the
Control of Liquid Fuels Under Low Gravity Environmental Conditions

Date: July 1966

Contractor Report Number: NASA-CR-89847 PR-7

Report Identification Number: 67X88474

VII.B.12(4)

(2.) Authors: E. J. Fahimian, M. Hurwitz, J. R. Melcher

Research and Design of a Practical and Economical
Dielectrophoretic System for the Control of Liquid
Fuels Under Low Gravity Environmental Conditions

Date: June 30, 1966

Contractor Report Number: NASA-CR-89850 PR-1-6-52-01028 PR-6

Report Identification Number: 67X88607

VII.B.12(5)

359

REPORTS ON CONTRACT WORK:

(3.) Authors: E. J. Fahimian

Research and Design of a Practical and Economical
Dielectrophoretic System for the Control of Liquid
Fuels Under Low Gravity Environmental Conditions

Date: December 31, 1966

Contractor Report Number: NASA-CR-89851 PR-1-6-52-01028 PR-12

Report Identification Number: 67X88608

VII.B.12(6)

(4.) Authors: E. J. Fahimian, M. Hurwitz, J. R. Melcher

Research and Design of a Practical and Economical
Dielectrophoretic System for the Control of Liquid
Fuels Under Low Gravity Environmental Conditions

Date: October 1966

Contractor Report Number: NASA-CR-88728 PR-1-6-52-01028 PR-10

Report Identification Number: 67X88811

VII.B.12(7)

360

REPORTS ON CONTRACT WORK:

(5.) Authors: M. Hurwitz

Research and Design of a Practical and Economical
Dielectrophoretic System for the Control of Liquid
Fuels Under Low Gravity Environmental Conditions

Date: February 1966

Contractor Report Number: NASA-CR-88766 PR-1-6-52-01028 PR-2

Report Identification Number: 67X88813

VII.B.12(8)

(6.) Authors: E. J. Fahimian, M. Hurwitz

Research and Design of a Practical and Economical
Dielectrophoretic System for the Control of Liquid
Fuels Under Low Gravity Environmental Conditions

Date: May 1967

Contractor Report Number: NASA-CR-98008 REPT-723

Report Identification Number: 69X10084

VII.B.12(9)

361

REPORTS ON CONTRACT WORK:

(7.) Authors: J. R. Blutt

Operating Safety of Dielectrophoretic
Propellant Management Systems - Final Report

Date: March 31, 1968

Contractor Report Number: NASA-CR-101422; DYNATECH-768

Report Identification Number: 69N28118

VII.B.12(10)

362

CONTRACT NUMBER

NAS8- 20582

SUBJECT

Serpentuator Model Design

CONTRACTOR

Astro-Space Labs, Inc.
Huntsville, Alabama

PRINCIPAL INVESTIGATOR

CONTRACT DATES

NASA TECHNICAL MONITOR

363

REPORTS ON CONTRACT WORK:

(1.) Authors: R. G. Mapes

Design, Develop, and Fabricate
A Model of A Serpentuator

Date: January 6, 1967

Contractor Report Number: ASL FR-68-3

Report Identification Number:

J.B(7)

364

CONTRACT NUMBER

NAS8-20707

SUBJECT

Serpentuator Systems

CONTRACTOR

Astro-Space Labs, Inc.
Huntsville, Alabama

PRINCIPAL INVESTIGATOR

CONTRACT DATES

NASA TECHNICAL MONITOR

Carl Maroney

365

REPORTS ON CONTRACT WORK:

(1.) Authors: Astro Space Labs, Inc.

Analyze, Study, Select and
Define Serpentiator Systems

Date: October 20, 1967

Contractor Report Number: ASL FR 67 -6

Report Identification Number:

I.B(8)

366

CONTRACT NUMBER

NAS8-21012

SUBJECT

Zero-G Liquid Studies

CONTRACTOR

Electro-Optical Systems, Inc.
Pasadena, California

PRINCIPAL INVESTIGATOR

CONTRACT DATES

NASA TECHNICAL MONITOR

367

REPORTS ON CONTRACT WORK:

(1.) Authors:

Zero-G Liquid Studies - Critical State and Drop Dynamics

Date: August 15, 1967

Contractor Report Number: NASA-CR-88747; EOS-7170-Q-2

Report Identification Number: 67N37923

III.A(32)

368

CONTRACT NUMBER

NAS8-21123

SUBJECT

Zero-Gravity Solidification

CONTRACTOR

Lockheed Missiles and Space Company
Huntsville, Alabama

PRINCIPAL INVESTIGATOR

P. G. Grodzka

CONTRACT DATES

6/30/67 - 12/31/69

NASA TECHNICAL MONITOR

T. C. Bannister

369

REPORTS ON CONTRACT WORK:

(1.) Authors: P. G. Grodzka

Space Environmental Effects on Solidification Study
- Zero-Gravity Solidification - Final Report

Date: March 1970

Contractor Report Number: NASA-CR-102696; HREC-1123-2 LMSC/HREC-D148619

Report Identification Number: 70N36665

IV.B(3)

370

CONTRACT NUMBER

NAS8-21143

SUBJECT

Heat Transfer

CONTRACTOR

Bureau of Engineering Research
University of Alabama
Tuscaloosa, Alabama

PRINCIPAL INVESTIGATOR

CONTRACT DATES

NASA TECHNICAL MONITOR

371

REPORTS ON CONTRACT WORK:

(1.) Authors: H. R. Henry, J. R. McDonald

Two Phase Flow and Heat Transfer in Porous Beds
Under Variable Body Forces - Final Report

Date: May 70

Contractor Report Number: NASA-CR-102822; FR-113-30-PT-6

Report Identification Number: 70N37387

III.B(26)

(2.) Authors: H. R. Henry

Two Phase Flow and Heat Transfer in Porous
Beds Under Variable Body Forces

Date: May 1970

Contractor Report Number: NASA-CR-121056; REPT-113-30-PT-7;
REPT-22-6560-PT-7

Report Identification Number: 72 N 12227

III.B(27)

372

CONTRACT NUMBER

NAS8-21279

SUBJECT

Manufacturing Tooling

CONTRACTOR

Martin Marietta Corporation
Denver, Colorado

PRINCIPAL INVESTIGATOR

CONTRACT DATES

NASA TECHNICAL MONITOR

373

REPORTS ON CONTRACT WORK:

(1.) Authors: Wayne Faber, Frederick Greeb, Robert Boyd

Study of Tooling Concepts For
Manufacturing Operations in Space
Final Report

Date: April 26, 1969

Contractor Report Number: NASA-CR-109989

Report Identification Number: N70-34762

I.B(13)

374

CONTRACT NUMBER

NAS8-21347

SUBJECT

Preliminary Design of a
High Temperature Space Manufacturing Furnace

CONTRACTOR

Lockheed Missles and Space Company
Huntsville, Alabama

PRINCIPAL INVESTIGATOR

V. W. Sparks

CONTRACT DATES

2/6/68 - 1/18/72

NASA TECHNICAL MONITOR

375

REPORTS ON CONTRACT WORK:

(1.) Authors: V. W. Sparks

Preliminary Design of a High
Temperature Space Manufacturing Furnace

Date: January 1970

Contractor Report Number: NASA-CR-102604

Report Identification Number: N70-23933

V.D.1(3)

376

CONTRACT NUMBER

NAS8-21402

SUBJECT

Sphere Forming and
Composite Casting
In Zero-G

CONTRACTOR

Arthur D. Little, Inc.
Cambridge, Massachusetts

PRINCIPAL INVESTIGATOR

CONTRACT DATES

6/26/68 - 1/7/70

NASA TECHNICAL MONITOR

377

REPORTS ON CONTRACT WORK:

(1.) Authors: J. Berkowitz-Mattuck, L. B. Griffiths, P. C. Johnson,
A. E. Wechsler

Spherical Forming and Composite Casting in Zero-G

Date: October 21, 1969

Contractor Report Number:

Report Identification Number: 70N14666

IV.C(2)(18)

(2.) Authors:

Sphere Forming and Composite Casting in Zero-G - Final Report

Date: January 7, 1970

Contractor Report Number: NASA-CR-61317; REPT-70538

Report Identification Number: 70N21873

IV.C(19)

378

CONTRACT NUMBER

NAS8-21804

SUBJECT

Experiment Performance Evaluation

CONTRACTOR

Teledyne-Brown Engineering Company
Huntsville, Alabama

PRINCIPAL INVESTIGATOR

CONTRACT DATES

NASA TECHNICAL MONITOR

379

REPORTS ON CONTRACT WORK:

(1.) Authors: J. E. Meyers

Skylab Experiment Performance Evaluation Manual

Date: January 1972

Contractor Report Number: NASA-CR-61386

Report Identification Number: N72-24853

II.A(8)

(2.) Authors: O. H. Thomas, Jr.

Skylab Experiment Performance Evaluation Manual
Appendix E: Experiment M512 Materials Processing Facility

Date: May 1973

Contractor Report Number: NASA-CR 61386-APP-E

Report Identification Number: N72-24853

II.A(9)

380

REPORTS ON CONTRACT WORK:

(3) Authors: M. S. Byers

Skylab Experiment Performance Evaluation Manual
Appendix F: Experiment M551 Metals Melting (MSFC)

Date: May 1973

Contractor Report Number: NASA-CR-61386-APP-F

Report Identification Number: 73N23860

II.A(10)

(4.) Authors: O. H. Thomas, Jr.

Skylab Experiment Performance Evaluation Manual
Appendix G: Experiment M552 Exothermic Brazing (MSFC)

Date: May 1973

Contractor Report Number: NASA-CR-61386-APP-G

Report Identification Number: 72N23861

II.A(11)

381

REPORTS ON CONTRACT WORK:

(5) Authors: O. H. Thomas, Jr.

Skylab Experiment Performance Evaluation Manual
Appendix H: Experiment M553 Sphere Forming (MSFC)

Date: May 1973

Contractor Report Number: NASA-CR-61386-APP-H

Report Identification Number: 73N23862

II.A(12)

(6.) Authors: M. S. Byers

Skylab Experiment Performance Evaluation Manual
Appendix J: Experiment M555 Gallium Arsenide Single Crystal Growth

Date: May 1973

Contractor Report Number: NASA-CR-61386-APP-J

Report Identification Number: N73-23863

II.A(13)

382

CONTRACT NUMBER

NAS8-24364

SUBJECT

Integration of NASA - Sponsored Studies on Aluminium Welding

CONTRACTOR

Massachusetts Institute of Technology
Department of Ocean Engineering
Cambridge, Massachusetts

PRINCIPAL INVESTIGATOR

K. Masubuchi

CONTRACT DATES

5/21/69 - 9/30/73

NASA TECHNICAL MONITOR

E. A. Hasemyer
P. G. Parks

383

REPORTS ON CONTRACT WORK:

(1.) Authors: Koichi Masubuchi

Integration of NASA-Sponsored Studies on Aluminum Welding

Date: June 1972

Contractor Report Number: NASA-CR-2064

Report Identification Number: N72-26376

V.C.6(3)

384

CONTRACT NUMBER

NAS 8-24365

SUBJECT

Study of Thermal Stress During Welding

CONTRACTOR

Massachusetts Institute of Technology
Cambridge, Massachusetts

PRINCIPAL INVESTIGATOR

K. Masubuchi

CONTRACT DATES

5/15/69 - 6/30/74

NASA TECHNICAL MONITOR

R. M. Poorman
H. L. Siler

385

REPORTS ON CONTRACT WORK:

(1.) Authors: J. B. Andrews, M. Arita, K. Masubuchi

Analysis of Thermal Stress and Metal Movement During Welding
Final Report

Date:

Contractor Report Number: NASA-CR-61351

Report Identification Number: N71-26143

V.C.6(4)

386

CONTRACT NUMBER

NAS8-24509

SUBJECT

Zero Gravity Crystal Growth

CONTRACTOR

Westinghouse Research Laboratories
Pittsburgh, Pennsylvania

PRINCIPAL INVESTIGATOR

CONTRACT DATES

NASA TECHNICAL MONITOR

387

REPORTS ON CONTRACT WORK:

(1.) Authors: C. S. Duncan, R. Mazelsky, M. Rubenstein

Zero Gravity Crystal Growth - Final Report

Date: April 29, 1970

Contractor Report Number: NASA-CR-102731

Report Identification Number: 70N30092

IV.D(46)

388

CONTRACT NUMBER

NAS8-24592

SUBJECT

Liquid Phase Sintering/Solidification

CONTRACTOR

Cornell Aeronautical Laboratory
Buffalo, New York

PRINCIPAL INVESTIGATOR

J. J. Fabiniak

CONTRACT DATES

8/5/69 - 3/5/70

NASA TECHNICAL MONITOR

E.C. Mc Kannan

389

REPORTS ON CONTRACT WORK:

(1) Authors: T. J. Fabiniak

Investigation of Zero Gravity Effects
On Material Properties - Final Report

Date: April 1970

Contractor Report Number: NASA-CR-102874; CAL-KC-2862-P-1

Report Identification Number: 70N42189

IV.A(19)

(2.) Authors: R. Abbott, R. Fabiniak, T. Fabiniak, E. McKannan

Theoretical Considerations For Liquid Phase Sintering
and Solidification in the Space Environment

Date: October 21, 1969

Contractor Report Number:

Report Identification Number: 70N14679

IV.A(3)(5)

390

CONTRACT NUMBER

NAS8-24612

SUBJECT

Zero Gravity Crystal Growth

CONTRACTOR

University of Alabama at Huntsville
Huntsville, Alabama

PRINCIPAL INVESTIGATOR

J. H. Davis
U. Roy

CONTRACT DATES

6/18/69 - 6/30/72

NASA TECHNICAL MONITOR

T. C. Bannister
R. Kroes

391

REPORTS ON CONTRACT WORK:

(1.) Authors: R. L. Kroes, J. H. Davis

Investigation of Crystal Growth in Zero Gravity Environment

Date: June 18, 1969/June 1, 1972

Contractor Report Number:

Report Identification Number: 74K10306

IV.D(18)

(2) Authors:

Investigation of Crystal Growth in Zero Gravity Environment

Date: February 1-28, 1970

Contractor Report Number: NASA-CR-112877

Report Identification Number: 70X74976

IV.D(19)

392

REPORTS ON CONTRACT WORK:

(3.) Authors: U. Roy

Investigation of Crystal Growth in Zero Gravity Environment

Date: June 1969, April 1970

Contractor Report Number: NASA-CR-102986 IR-1

Report Identification Number: 71X10165

IV.D(20)

(4.) Authors: J. H. Davis, R. B. Lal, H. U. Walter, J. G. Castle, Jr.

Investigation Of Crystal Growth in Zero Gravity
Environment and Investigation of Metallic Whiskers

Date: December 1972

Contractor Report Number: NASA-CR-124065

Report Identification Number: 73N17778

IV.D(21)

393

CONTRACT NUMBER

NAS8-24683

SUBJECT

Investigation of the Preparation of
Materials in Space: Crystal Growth

CONTRACTOR

General Electric Company
Space Sciences Laboratory
Philadelphia, Pennsylvania

PRINCIPAL INVESTIGATOR

CONTRACT DATES

6/18/69 - 8/22/71

NASA TECHNICAL MONITOR

E. C. McKannan
L. Berge

394

REPORTS ON CONTRACT WORK:

(1.) Authors: R. N. Griffin, E. C. Henry, L. R. McCreight, B. A. Rubin

Investigation of the Preparation of Materials in Space

Date: March 70 General Motors Research Division

Contractor Report Number: NASA-CR-102749

Report Identification Number: 70N31862

IV.D(37)

395

CONTRACT NUMBER

NAS8-24952

SUBJECT

Processes for Space Manufacturing

CONTRACTOR

General Dynamics, Convair

PRINCIPAL INVESTIGATOR

CONTRACT DATES

8/5/69 - 3/5/70

NASA TECHNICAL MONITOR

396

CONTRACT NUMBER

NAS8-24979

SUBJECT

Investigation of Processes for
Space Manufacturing

CONTRACTOR

General Dynamics, Convair Division
San Diego, California

PRINCIPAL INVESTIGATOR

D. J. Gorham
W. H. Steurer

CONTRACT DATES

6/30/69 - 10/15/71

NASA TECHNICAL MONITOR

I.C. Yates

397

REPORTS ON CONTRACT WORK:

(1.) Authors: D. J. Gorham, W. H. Steurer

Processes For Space Manufacturing - Definition
of Criteria For Process Feasibility and Effectiveness

Date: June 1970

Contractor Report Number: NASA-CR-61334

Report Identification Number: 70N39375

I.A(35)

398

CONTRACT NUMBER

NAS8-25051

SUBJECT

Blue Book Update: Reference Earth Orbital Research
and Applications Investigations

CONTRACTOR

General Dynamics
Convair Division

PRINCIPAL INVESTIGATORS

CONTRACT DATES

7/29/70 - 3/10/71

NASA TECHNICAL MONITOR

399

CONTRACT NUMBER

NAS8-25120

SUBJECT

Investigation of Thallium Whiskers Study

CONTRACTOR

University of Alabama at Huntsville
Huntsville, Alabama

PRINCIPAL INVESTIGATOR

J. H. Davis

CONTRACT DATES

1/1/70 - 12/1/71

NASA TECHNICAL MONITOR

R. Kroes

400

REPORTS ON CONTRACT WORK:

(1.) Authors: U. Roy

Investigation of Crystal Growth

Date: January 1970 - December 1971

Contractor Report Number: NASA-CR-122553

Report Identification Number: 72X10284

IV.D(22)

401

CONTRACT NUMBER

NAS8-25179

SUBJECT

Zero Gravity Gas Management

CONTRACTOR

Georgia Institute of Technology
Atlanta, Georgia

PRINCIPAL INVESTIGATOR

H. F. Bauer

CONTRACT DATES

NASA TECHNICAL MONITOR

402

REPORTS ON CONTRACT WORK:

(1) Authors:

Theoretical Investigation of Gas Management
In Zero Gravity Space Manufacturing

Date: November 6, 1969

Contractor Report Number: GIT/EES 8-25179-MPR-1

Report Identification Number:

III.A(34)

(2) Authors: H. F. Bauer

Theoretical Investigation of Gas Management
In Zero Gravity Space Manufacturing

Date: October 30, 1970

Contractor Report Number: GIT/EES B-910

Report Identification Number:

III.A(35)

403

CONTRACT NUMBER

NAS8-25202

SUBJECT

Feasibility Study of Uses of Outer Space

CONTRACTOR

Carnegie-Mellon University
Pittsburgh, Pennsylvania

PRINCIPAL INVESTIGATOR

CONTRACT DATES

NASA TECHNICAL MONITOR

404

REPORTS ON CONTRACT WORK:

(1.) Authors:

Problems and Uses of Outer Space

Date: May 8, 1970

Contractor Report Number: CMU-8-25202-FR-May 1970

Report Identification Number:

I.C(16)

405

CONTRACT NUMBER

NAS8-25203

SUBJECT

Problems and Uses of Outer Space

CONTRACTOR

Carnegie Mellon University

PRINCIPAL INVESTIGATOR

CONTRACT DATES

NASA TECHNICAL MONITOR

406

CONTRACT NUMBER

NAS8-25577

SUBJECT

Natural Convection in Space

CONTRACTOR

Lockheed Missiles and Space Company
Huntsville, Alabama

PRINCIPAL INVESTIGATOR

C. Fan
P. G. Grodzka

CONTRACT DATES

4/22/70 - 11/30/74

NASA TECHNICAL MONITOR

T. C. Bannister

407

REPORTS ON CONTRACT WORK:

(1.) Authors: C. Fan , P. G. Grodzka

Natural Convection in Space Manufacturing Processes

Date:

Contractor Report Number: NASA-CR-119440, LMSC-HREC-D162926,
HREC-5577-2

Report Identification Number: 71X79257

III.C.1(6)

(2.) Authors: John W. Benefield

Heat Flow and Convection Demonstration

Date: August 1971

Contractor Report Number: NASA-CR-119948

Report Identification Number: X71-10976

III.C.1(7)

408

REPORTS ON CONTRACT WORK:

(3) Authors: P. G. Grodzka, C. Fan , R. O. Hedden

The Apollo 14 Heat Flow and Convection Demonstration
Experiments: Final Results of Data Analysis

Date:

Contractor Report Number: NASA-CR-119960

Report Identification Number: X71-10971

III.C.1(8)

(4.) Authors: P.G. Grodzka, T. C. Bannister

Heat Flow and Convection Demonstration Experiments Aboard Apollo 14

Date: May 5, 1972

Contractor Report Number:

Report Identification Number: 72A28614

III.C.1(9)

409

REPORTS ON CONTRACT WORK:

(5.) Authors: P. G. Grodzka

Types of Natural Convection In Space Manufacturing Processes

Date: January 1973

Contractor Report Number: NASA-CR-124184, HREC-5577-4, LMSC-HREC-TR-0306

Report Identification Number: 73X10208

III.C.1(10)

(6.) Authors: T. C. Bannister, P.G. Grodzka, L.W. Spradley, S. V. Bourgeois,
R. O. Hedden, B. R. Facemire

Apollo 17 Heat Flow and Convection
Experiments: Final Results of Data Analysis

Date: July 1973

Contractor Report Number: NASA-TM-X-64772

Report Identification Number: N73-31840

III.C.1(11)

410.

CONTRACT NUMBER

NAS8-25709

SUBJECT

Research Study on Composite Casting

CONTRACTOR

Arthur D. Little, Inc.
Cambridge, Massachusetts

PRINCIPAL INVESTIGATORS

CONTRACT DATES

4/17/70 - 5/17/71

NASA TECHNICAL MONITOR

411

REPORTS ON CONTRACT WORK:

(1.) Authors:

Research Study on Composite Castings

Date: June 17, 1970

Contractor Report Number: LITTLE8-25709-MPR-Jun 1970

Report Identification Number:

IV.C(20)

(2.) Authors:

Research Study on Composite Castings

Date: May 26, 1971

Contractor Report Number: LITTLE-8-25709-FR-May 1971

Report Identification Number:

IV.C(21)

4/2

CONTRACT NUMBER

NAS8-25907

SUBJECT

Sphere Forming and Composite Casting

CONTRACTOR

Arthur D. Little, Inc.
Cambridge, Massachusetts

PRINCIPAL INVESTIGATORS

CONTRACT DATES

3/18/70 - 6/10/70

NASA TECHNICAL MONITOR

413

CONTRACT NUMBER

NAS8-26122

SUBJECT

Zero Gravity Crystal Growth

CONTRACTOR

Westinghouse Research Laboratory
Pittsburgh, Pennsylvania

PRINCIPAL INVESTIGATOR

R. G. Seidensticker
C. S. Duncan
R. A. Johnson

CONTRACT DATES

6/29/70 - 4/30/71

NASA TECHNICAL MONITOR

4/4

REPORTS ON CONTRACT WORK:

(1.) Authors: R. G. Seidensticker, C. S. Duncan, R. A. Johnson'

Feasibility Study of a Multipurpose Electric
Furnace System For Space Experiments

Date: 1971

Contractor Report Number: NASA-CR-119793

Report Identification Number: 71X10881

IV.D(47)

(2.) Authors: C. S. Duncan, M. Rubenstein, R. G. Seidensticker

Optimization of A Solution Growth Experiment For Zero Gravity
and Development of Apparatus For a Melt Growth Experiment
Final Report

Date: 1971

Contractor Report Number: NASA-CR-119792

Report Identification Number: 71N17926

IV.D(48)

4/15

CONTRACT NUMBER

NAS8-26146

SUBJECT

Growth of Single Crystals By
Vapor Transport In Zero Gravity Environment

CONTRACTOR

Rensselaer Polytechnic Institute
Troy, New York

PRINCIPAL INVESTIGATOR

H. Wiedemeier

CONTRACT DATES

6/4/70 - 9/6/75

NASA TECHNICAL MONITOR

M. C. Davidson
G. M. Arnett

4/6

REPORTS ON CONTRACT WORK:

(1.) Authors: H. Wiedemeier

Growth of Single Crystals By Vapor Transport in Zero Gravity
Environment, Ground Based Experiments - Final Report

Date: September 1971

Contractor Report Number: NASA-CR-126611

Report Identification Number: 72X76522

IV.D(42)

417

CONTRACT NUMBER

NAS8-26157

SUBJECT

Free Suspension Processing System
for Space Manufacturing

CONTRACTOR

General Electric Company
Space Sciences Laboratory
Philadelphia, Pennsylvania

PRINCIPAL INVESTIGATOR

R. T. Frost

CONTRACT DATES

6/15/70 - 9/15/71

NASA TECHNICAL MONITOR

4/8

REPORTS ON CONTRACT WORK:

(1.) Authors: R. T. Frost; L. J. Napaluch; T. D. Wise; E. Stockhoff;
G. Wouch

Free Suspension Processing Systems For Space Manufacturing

Date: June 15, 1971

Contractor Report Number: NASA-CR-119954; DCN-1-065-27017

Report Identification Number: 71X10896

V.A(7)

419

CONTRACT NUMBER

NAS8-26158

SUBJECT

Zero Gravity Crystal Growth

CONTRACTOR

Westinghouse Research Laboratory
Pittsburgh, Pennsylvania

PRINCIPAL INVESTIGATOR

C. S. Duncan
M. Rubenstein

CONTRACT DATES

NASA TECHNICAL MONITOR

420

REPORTS ON CONTRACT WORK:

(1.) Authors: C. S. Duncan; M. Rubenstein

Single Crystal Growth Flight Rated Experiment Packages

Date: July 31, 1970

Contractor Report Number: WRL-8-25158-MR-July 70

Report Identification Number:

IV.D.49

421

CONTRACT NUMBER

NAS8-26402

SUBJECT

Directional Solidification of Eutectic Composites

CONTRACTOR

University of California at Los Angeles
Los Angeles, California

PRINCIPAL INVESTIGATOR

A. S. Yue

CONTRACT DATES

10/8/70 - 4/15/72

NASA TECHNICAL MONITOR

W. Mc Pherson

422

Contract # NAS8-26402

REPORTS ON CONTRACT WORK:

(1.) Authors: A. S. Yue

Directional Solidification of Eutectic
Composites In Space Environment

Date: January 25, 1971

Contractor Report Number: California U. 8-26402-QR-Jan.71

Report Identification Number:

IV.C(9)

423

CONTRACT NUMBER

NAS8-26403

SUBJECT

Growing Silicon Crystals in Space Environment

CONTRACTOR

Texas Instrument

PRINCIPAL INVESTIGATOR

Einspruch

CONTRACT DATES

11/5/70 - 5/5/71

NASA TECHNICAL MONITOR

424

CONTRACT NUMBER

NAS8-26552

SUBJECT

Miniaturized Microbiology Laboratory

CONTRACTOR

Fairchild Hiller Corporation
Farmingdale, New York

PRINCIPAL INVESTIGATOR

CONTRACT DATES

10/13/70 -

NASA TECHNICAL MONITOR

425

REPORTS ON CONTRACT WORK:

(1.) Authors:

Preliminary Design, with Design Parameters of A
Miniaturized Microbiology Laboratory

Date: January 13, 1971

Contractor Report Number: FCH-FHR-3978-1

Report Identification Number:

VII.E(6)

426

CONTRACT NUMBER

NAS8-26637

SUBJECT

Apollo 14 Composite Casting Demonstration, Define Zero-G Test

CONTRACTOR

Arthur D. Little, Inc.
Cambridge, Massachusetts

PRINCIPAL INVESTIGATOR

CONTRACT DATES

10/29/70 - 9/30/71

NASA TECHNICAL MONITOR

427

CONTRACT NUMBER

NAS8-26793

SUBJECT

Crystal Growth in Zero Gravity
and Study of Metallic Whiskers

CONTRACTOR

University of Alabama at Huntsville
Huntsville, Alabama

PRINCIPAL INVESTIGATOR

J. G. Castle, Jr.
J. H. Davis

CONTRACT DATES

3/15/71 - 9/30/72

NASA TECHNICAL MONITOR

R. L. Kroes
L. L. Lacy

428

CONTRACT NUMBER

NAS8-26991

SUBJECT

Metallurgical Evaluation of Wire Reinforced Refractory Composites

CONTRACTOR

University of Alabama at Huntsville
Huntsville, Alabama

PRINCIPAL INVESTIGATOR

U. Roy

CONTRACT DATES

4/30/71 - 8/31/72

NASA TECHNICAL MONITOR

O. Y. Reese

429

REPORTS ON CONTRACT WORK:

(1.) Authors:

REFRACTORY COMPOSITES

Date: April 30, 1971

Contractor Report Number: Ala. U. RI-8-26991-MPR-Apr71

Report Identification Number:

IV.C(6)

(2) Authors:

REFRACTORY COMPOSITES

Date: January 31, 1972

Contractor Report Number: Ala. U. RI-8-26991-QR-Jan. 72

Report Identification Number:

IV.C(7)

430

REPORTS ON CONTRACT WORK:

(3.) Authors:

Metallurgical Evaluation of Wire Reinforced Refractory
Composites for Space Shuttle Reuse

Date: August 1972

Contractor Report Number: UARI RR-125

Report Identification Number:

IV.C(8)

431

CONTRACT NUMBER

NAS8-27015

SUBJECT

Convection Phenomena in Electrophoresis Separation
Thermacoustic Convection of Fluids in Low Gravity

CONTRACTOR

Lockheed Missiles and Space Company
Huntsville, Alabama

PRINCIPAL INVESTIGATOR

C. Fan

CONTRACT DATES

6/22/71 - 6/30/75

NASA TECHNICAL MONITOR

T. C. Bannister

432

REPORTS ON CONTRACT WORK:

(1.) Authors: S. V. Bourgeois, Jr.; P. G. Grodzka

Convection In Space Processing (M512), Phase A Report

Date: July 1972

Contractor Report Number: NASA-CR-127909; HREC-7015-1; LMSC-HREC-D306065

Report Identification Number: 72X79297

III.C.1(12)

(2) Authors: C. Fan

Convection Phenomena In Electrophoresis Separation

Date: December 1972

Contractor Report Number: NASA-CR-124058, LMSC-HREC-TR-D3063-HREC-7015-3

Report Identification Number: 73X10120

III.C.1(13)

433

REPORTS ON CONTRACT WORK:

(3.) Authors: P. G. Grodzka; S. V. Bourgeois

Fluid And Particle Dynamic Effects In Low-G Composite Casting

Date: January 1973

Contractor Report Number: NASA-CR-124216; LMSC-HREC-TR--D306402;
HREC-7015-4

Report Identification Number: 73X10283

III.C.1(14)

(4) Authors: P. G. Grodzka; L.W. Spradley, S. V. Bourgeois, C. F. Fan

A Numerical Solution For Thermoacoustic Convection
Of Fluids In Low Gravity

Date:

Contractor Report Number: NASA-CR-2269

Report Identification Number: N73-26289

III.C.1(15)

434

REPORTS ON CONTRACT WORK:

(5.) Authors: S. V. Bourgeois

Convection In Skylab M512 Experiments: M551, M552, and M553 Phase B Report

Date: July 15, 1973

Contractor Report Number: NASA-CR-124329

Report Identification Number: N73-28852

III.C.1(16)

(6.) Authors: S. V. Bourgeois

Convection Effects on Skylab Experiments, M551, M552, M553 Phase C Report

Date: December 1, 1973

Contractor Report Number: LMSC/HREC-TR-D306955

Report Identification Number:

III.C.1(17)

435

REPORTS ON CONTRACT WORK:

(7.) Authors: S. V. Bourgeois; M. R. Brashears

Fluid Dynamics and Kinematics Of Molten Metals
In The Low-Gravity Environment of Skylab

Date: January 1974

Contractor Report Number:

Report Identification Number: 74A18860

III.C.1(18)

4/36

CONTRACT NUMBER

NAS8-27085

SUBJECT

Low Gravity Processing of Immiscible Materials

CONTRACTOR

T R W
Systems Group
Redondo Beach, California

PRINCIPAL INVESTIGATOR

J. L. Reger

CONTRACT DATES

4/16/71 - 3/15/73

NASA TECHNICAL MONITOR

I. C. Yates

437

REPORTS ON CONTRACT WORK:

(1.) Authors:

Apollo Experiment Definition Study - Phase II

Date: November 1971

Contractor Report Number: TRW 18677-6008-R0-00

Report Identification Number:
IV.A(37)

(2.) Authors: J. L. Reger

Experimental Development of Processes to Produce
Homogenized Alloys Of Immiscible Metals - Phase III

Date: April 6, 1972

Contractor Report Number: TRW-18677-6011-R0-00

Report Identification Number:
IV.A(38)

438

REPORTS ON CONTRACT WORK:

(3) Authors:

Experiment Development of Processes to Produce
Homogenized Alloys of Immiscible Metals - Phase III

Date: September 29, 1972

Contractor Report Number: TRW-18677-6018-R0-00

Report Identification Number:

IV.A(39)

(4) Authors: J. L. Reger

Low Gravity Processing Of Immiscible Materials

Date: October 1972

Contractor Report Number:

Report Identification Number: 72A45155

IV.A(40)

439

REPORTS ON CONTRACT WORK:

(5.) Authors: J. L. Reger

Test and Evaluation of Apollo 14 Composite
Casting Demonstration Specimens 6, 9, and 12, Phase 1

Date: September 1971

Contractor Report Number: NASA-CR-61367

Report Identification Number: N72-15542

IV.A(41)

(6.) Authors:

Experimental Development of Processes to Produce
Homogenized Alloys of Immiscible Metals - Final Report

Date:

Contractor Report Number: TRW-16877-6019-R0-00

Report Identification Number:

IV.A(42)

440

REPORTS ON CONTRACT WORK:

(7.) Authors: J. L. Reger; I. C. Yates, Jr.

Preparation and Metallurgical Properties of Low Gravity
Processed Immiscible Materials

Date: January 1974

Contractor Report Number:

Report Identification Number: 74A18826

IV.A(43)

441

CONTRACT NUMBER

NAS8-27106

SUBJECT

Test and Evaluation of Apollo 14 Composite
Casting Demonstration Samples
and Flight and Control Samples

CONTRACTOR

Cornell Aeronautical Laboratories
Buffalo, New York

PRINCIPAL INVESTIGATOR

Fabiniak

CONTRACT DATES

12/28/70 - 11/20/74

NASA TECHNICAL MONITOR

I. C. Yates

442

REPORTS ON CONTRACT WORK:

(1.) Authors: R. C. Fabiniak; T. J. Fabiniak

Test And Evaluation of Apollo 14 Composite Casting
Demonstration Specimens and Flight and Control Samples

Date: September 1971

Contractor Report Number: NASA-CR-61366; KE-3101-D-1

Report Identification Number: 72N16331

IV.C(10)

443

CONTRACT NUMBER

NAS8-27228

SUBJECT

Electromagnetic Levitation System

CONTRACTOR

General Electric Company
Space Science Division
Philadelphia, Pennsylvania

PRINCIPAL INVESTIGATOR

R. T. Frost

CONTRACT DATES

8/25/71 - 1/30/73

NASA TECHNICAL MONITOR

L. H. Berge

LHB

REPORTS ON CONTRACT WORK:

(1.) Authors: M. F. Clark

Design, Development, Fabrication, Assembly, and Testing
Support For a Free Suspension Processing System For Space Manufacturing
Utilizing Electromagnetic Force Field

Date: December 31, 1971

Contractor Report Number: GE 8-27228-SR-Dec. 1971

Report Identification Number:

V.B.3(5)

(2.) Authors: E. H. Buerger; R. T. Frost; R. H. Lambert; M. F. O'Connor;
E. L. G. O'Dell; L. J. Napaluch; E. H. Stockhoff, and G. Wouch

Electromagnetic Free Suspension System
For Space Manufacturing Vol. 1: Technology Final Report

Date: December 22, 1972

Contractor Report Number: NASA-CR-124134

Report Identification Number: N73-20522

V.B.3(6)

445

CONTRACT NUMBER

NAS8-27718

SUBJECT

Vacuum System Design and Characterization

CONTRACTOR

Hewlett - Packard

PRINCIPAL INVESTIGATOR

CONTRACT DATES

NASA TECHNICAL MONITOR

R. C. Ruff

Handwritten signature or initials, possibly '446' or similar, in black ink.

CONTRACT NUMBER

NAS8-27734

SUBJECT

Evaluation of Possible Flight
Experiments in Space Processing

CONTRACTOR

Universities Space Research Association
Charlottesville, Virginia

PRINCIPAL INVESTIGATOR

H. Leidheiser

CONTRACT DATES

6/22/71 - 11/21/73

NASA TECHNICAL MONITOR

R. Lake

447

REPORTS ON CONTRACT WORK:

(1.) Authors: A. R. Kuhlthau

Review, Study, and Evaluation of Possible Flight
Experiments Relating to Materials Processing In Space
Final Report

Date:

Contractor Report Number:

Report Identification Number:

II.A(14)

448

CONTRACT NUMBER

NAS8-27797

SUBJECT

Convectionless Electrophoretic Separation of
Biological Preparations

CONTRACTOR

General Electric Company
Space Sciences Laboratory
Philadelphia, Pennsylvania

PRINCIPAL INVESTIGATOR

L. R. McCreight

CONTRACT DATES

6/25/71 - 6/24/72

NASA TECHNICAL MONITOR

R. Snyder

449

REPORTS ON CONTRACT WORK:

(1.) Authors: R. N. Griffin; L. R. McCreight

Convectionless Electrophoretic Separation of Biological Preparations

Date: June 24, 1972

Contractor Report Number: NASA-CR-123920

Report Identification Number: 73N11055

VII.E.7

450

CONTRACT NUMBER

NAS8-27806

SUBJECT

Preparation of Composite Materials in Space

CONTRACTOR

General Dynamics
Convair Division
San Diego, California

PRINCIPAL INVESTIGATOR

W. H. Steurer

CONTRACT DATES

10/27/71 - 4/12/74

NASA TECHNICAL MONITOR

I. C. Yates

451

REPORTS ON CONTRACT WORK:

(1.) Authors: W. H. Steurer; S. Kaye

Preparation of Composite Materials In Space
Volume 1, Executive Summary

Date: January 1973

Contractor Report Number: NASA-CR-124365; GDCA-DBG73-001-Vol-1

Report Identification Number: 73N30542

IV.C(11)

(2.) Authors: W. H. Steurer; S. Kaye

Preparation of Composite Materials In Space
Volume 2, Technical Report

Date: January 1973

Contractor Report Number: NASA-CR-124172; GDCA-DBG73-001-Vol-2

Report Identification Number: 73N20609

IV.C(12)

452

CONTRACT NUMBER

NAS8-27807

SUBJECT

Single Crystal Growth in Space

CONTRACTOR

Texas Instruments Incorporated
Dallas, Texas

PRINCIPAL INVESTIGATOR

CONTRACT DATES

6/29/71 - 4/6/74

NASA TECHNICAL MONITOR

R. C. Ruff

453

REPORTS ON CONTRACT WORK:

(1.) Authors: F. A. Padovani; F. W. Voltmer

Growth of A Single Crystal Ribbon In Space - Final Report

Date: May 1973

Contractor Report Number: NASA-CR-124439

Report Identification Number: 73N32588

IV.D(45)

457

CONTRACT NUMBER

NAS8-27809

SUBJECT

Super-Conducting Compounds and Alloys

CONTRACTOR

University of Alabama at Huntsville
Huntsville, Alabama

PRINCIPAL INVESTIGATOR

G. H. Otto

CONTRACT DATES

6/29/71 - 8/31/75

NASA TECHNICAL MONITOR

L. L. Lacy
E. W. Urban

455

CONTRACT NUMBER

NAS8 - 27877

SUBJECT

Residual Gas Analyzer

CONTRACTOR

National Research Corp.

PRINCIPAL INVESTIGATOR

CONTRACT DATES

11/2/71 - 7/5/73

NASA TECHNICAL MONITOR

456

CONTRACT NUMBER

NAS8-27891

SUBJECT

Segregation Effects During Solidification,
Purification and Evaporation

CONTRACTOR

Grumman Aerospace Corporation
Bethpage, New York

PRINCIPAL INVESTIGATOR

C. Li

CONTRACT DATES

12/15/71 - 1/30/73

NASA TECHNICAL MONITOR

R. C. Ruff

457

REPORTS ON CONTRACT WORK:

(1.) Authors: Chou Li

Segregation Effects During Solidification In Weightless Melts

Date: June 1973

Contractor Report Number: NASA-CR-124358

Report Identification Number: N73-30510

IV.A(20)

(2.) Authors: J. L. Mukherjee, K. P. Gupta, Chou Li

Purification Kinetics of Beryllium During Vacuum Induction Melting

Date: October 1972

Contractor Report Number: NASA-CR-123946

Report Identification Number: N73-13512

IV.A(21)

458

REPORTS ON CONTRACT WORK:

(3.) Authors: J. L. Mukherjee, K. P. Gupta, Chou Li

Evaporation Segregation in 80% Ni-20% Cr and 60% Fe 40% Ni Alloys

Date: October 1972

Contractor Report Number: NASA-CR-123993

Report Identification Number: N73-14562

IV.A(22)

(4) Authors: Chou Li

Normal Freezing of Ideal Ternary Systems of the Pseudobinary Type

Date: November 1972

Contractor Report Number: NASA-CR-129935

Report Identification Number: N73-14563

IV.A(23)

REPORTS ON CONTRACT WORK:

(5.) Authors: Chou Li

Normal Evaporation of Binary Alloys

Date: November 1972

Contractor Report Number: NASA-CR-124040

Report Identification Number: N73-16558

IV.A(24)

460

CONTRACT NUMBER

NAS8-27942

SUBJECT

Economic Analysis of Crystal Growth In Space

Contractor

**General Electric Company
Philadelphia, Pennsylvania**

PRINCIPAL INVESTIGATOR

CONTRACT DATES

9/21/71 - 7/31/72

NASA TECHNICAL MONITOR

E. C. McKannan

461

REPORTS ON CONTRACT WORK:

(1.) Authors: D. R. Ulrich; L. R. McCreight

Economic Analysis of Crystal Growth In Space

Date: September 1971

Contractor Report Number: GE 8-27942-MPR-1

Report Identification Number:

IV.D(38)

(2.) Authors: D. R. Ulrich, A. M. Chung, C. S. Yan, L. R. McCreight

Economic Analysis of Crystal Growth In Space

Date: July 1972

Contractor Report Number: NASA-CR-12395

Report Identification Number: N73-12806

IV.D(39)



CONTRACT NUMBER

NAS8-28014

SUBJECT

Study of the Production of Unique New Glasses

CONTRACTOR

North American Rockwell Corporation
Space Division
Downey, California

PRINCIPAL INVESTIGATORS

R. A. Happe

CONTRACT DATES

10/13/71 - 11/30/74

NASA TECHNICAL MONITOR

R. L. Nichols

463

REPORTS ON CONTRACT WORK:

(1.) Authors: R. A. Happe

Study of the Production of Unique New Glasses

Date: June 13, 1972

Contractor Report Number: NASA-CR-123740; SD-72-SA-0083

Report Identification Number: 72N28564

VI.A(9)

(2.) Authors: R. A. Happe, L. E. Topol

Experiments Leading to the Production of New Glasses In Space

Date: January 1974

Contractor Report Number:

Report Identification Number: 74A18862

VI.A(10)

464

CONTRACT NUMBER

NAS8 - 28050

SUBJECT

High Temperature Radiation Furnace

CONTRACTOR

Weiner Assoc.

PRINCIPAL INVESTIGATOR

CONTRACT DATES

10/5/71 - 11/5/71

NASA TECHNICAL MONITOR

465

CONTRACT NUMBER

NAS8-28055

SUBJECT

Research Study on the Design and
Control of Remote Manipulators

CONTRACTOR

Massachusetts Institute of Technology
Cambridge, Massachusetts

PRINCIPAL INVESTIGATOR

T. B. Sheridan
D. E. Whitney

CONTRACT DATES

1/5/72 - 12/31/73

NASA TECHNICAL MONITOR

D. N. Counter
D. P. Valley

466

REPORTS ON CONTRACT WORK:

(1.) Authors: Daniel E. Whitney

Design and Control of Remote Manipulators

Date: April 5 - July 4, 1972

Contractor Report Number: NASA-CR-123795

Report Identification Number: N72-30424

I.B(14)

(2.) Authors: Johannes A. Lemenschot

Optimal Trajectory Generation For Mechanical Arms

Date: September 1972

Contractor Report Number:

Report Identification Number: N73-14470

I.B(15)

467

REPORTS ON CONTRACT WORK:

(3.) Authors: Daniel Whitney

Study of Design and Control of Remote Manipulators
Part 1 - Summary and Conclusions

Date: February 15, 1973

Contractor Report Number: NASA-CR-124191

Report Identification Number: N73-22046

I.B(16)

(4.) Authors: Wayne J. Book

Part 2 - Vibration Considerations In Manipulator Design

Date:

Contractor Report Number: NASA-CR-124189

Report Identification Number: N73-20138

I.B(17)

468

REPORTS ON CONTRACT WORK:

(5.) Authors: Jay Mackro

Part 4 - Experiments In Video Camera Positioning
with Regard to Remote Manipulation

Date:

Contractor Report Number:

Report Identification Number: N73-20139

I.B(18)

(6.) Authors: W. J. Book

Study of Design and Control of Remote Manipulators Modeling
Manipulator Arms with Distributed Flexibility For Design and Control

Date: January 31, 1974

Contractor Report Number: MIT-8-28055-FR

Report Identification Number:

I.B(19)

469

CONTRACT NUMBER

NAS8 - 28056

SUBJECT

Presentation and Evaluation of Free Fall Experiments

CONTRACTOR

General Dynamics, Convair

PRINCIPAL INVESTIGATOR

W.H. Steurer
Wood

CONTRACT DATES

2/7/72 - 5/31/75

NASA TECHNICAL MONITOR

L. Berge

470

CONTRACT NUMBER

NAS8-28059

SUBJECT

High Temperature Radiation
Furnace Feasibility Study

CONTRACTOR

Weiner Associates, Inc.
Cockeysville, Maryland

PRINCIPAL INVESTIGATORS

A. Eiss
B. Dussan
W. Shadis
L. Frank

CONTRACT DATES

11/12/71 - 4/20/73

NASA TECHNICAL MONITOR

Schuerer

2471

REPORTS ON CONTRACT WORK:

(1.) Authors: A. Eiss, B. Dussan, W. Shadis, L. Frank

Feasibility Study of a High Temperature Radiation
Furnace For Space Applications - Final Report

Date:

Contractor Report Number: NASA-CR-124458

Report Identification Number: N73-33905

V.D.1(4)

472

CONTRACT NUMBER

NAS8-28085

SUBJECT

Study of Biogrowth Processing in Space

CONTRACTOR

Battelle Memorial Institute
Columbus, Ohio

PRINCIPAL INVESTIGATORS

A. J. Curtain
Schneider

CONTRACT DATES

4/7/72 - 12/7/72

NASA TECHNICAL MONITOR

A. C. Krupnick

473

REPORTS ON CONTRACT WORK:

(1.) Authors: J. F. Foster; A. J. Cutain

Study on Biogrowth Processing In Space

Date: May 16, 1972

Contractor Report Number: BMI-8-28085-MPR-1

Report Identification Number:

VII.E(5)

474

CONTRACT NUMBER

NAS8-28098

SUBJECT

Crystal Growth from Solutions

CONTRACTOR

University of Alabama at Tuscaloosa
Tuscaloosa, Alabama

PRINCIPAL INVESTIGATOR

I. Miyagawa

CONTRACT DATES

12/20/71 - 01/21/75

NASA TECHNICAL MONITOR

T. C. Bannister
G. M. Arnett
C. F. Schafer

475

REPORTS ON CONTRACT WORK:

(1.) Authors: I. Miyagawa

Investigation of Crystal Growth From Solutions

Date: January 21, 1972

Contractor Report Number: ALA-U-BER-8-28098-PR-Jan 72

Report Identification Number:
IV.D(23)

(2.) Authors: I. Miyagawa

Investigation of Crystal Growth From Solutions
Technical Summary Report

Date: February 28, 1973

Contractor Report Number: ALA-U-BER-8-28098-TSR-JAN 73

Report Identification Number:
IV.D(24)

476

REPORTS ON CONTRACT WORK:

(3.) Authors: I. Miyagawa

Investigation of Crystal Growth From Solutions
Technical Summary Report

Date: January 1974

Contractor Report Number: ALA-U-BER-8-28098-TSR-Jan 74

Report Identification Number:

IV.0(25)

477

CONTRACT NUMBER

NAS8-28112

SUBJECT

Experiment Design of Spherical Crystal
Growth in Zero Gravity

CONTRACTOR

University of Alabama at Huntsville
Huntsville, Alabama

PRINCIPAL INVESTIGATOR

H. U. Walter

CONTRACT DATES

11/1/71 - 8/28/74

NASA TECHNICAL MONITOR

A. Boese
B.R. Aldrich

478

Contract # NAS8-28112

REPORTS ON CONTRACT WORK:

(1.) Authors: A. Boese

Design, Construct, Test and Evaluate A Zero Gravity Experiment

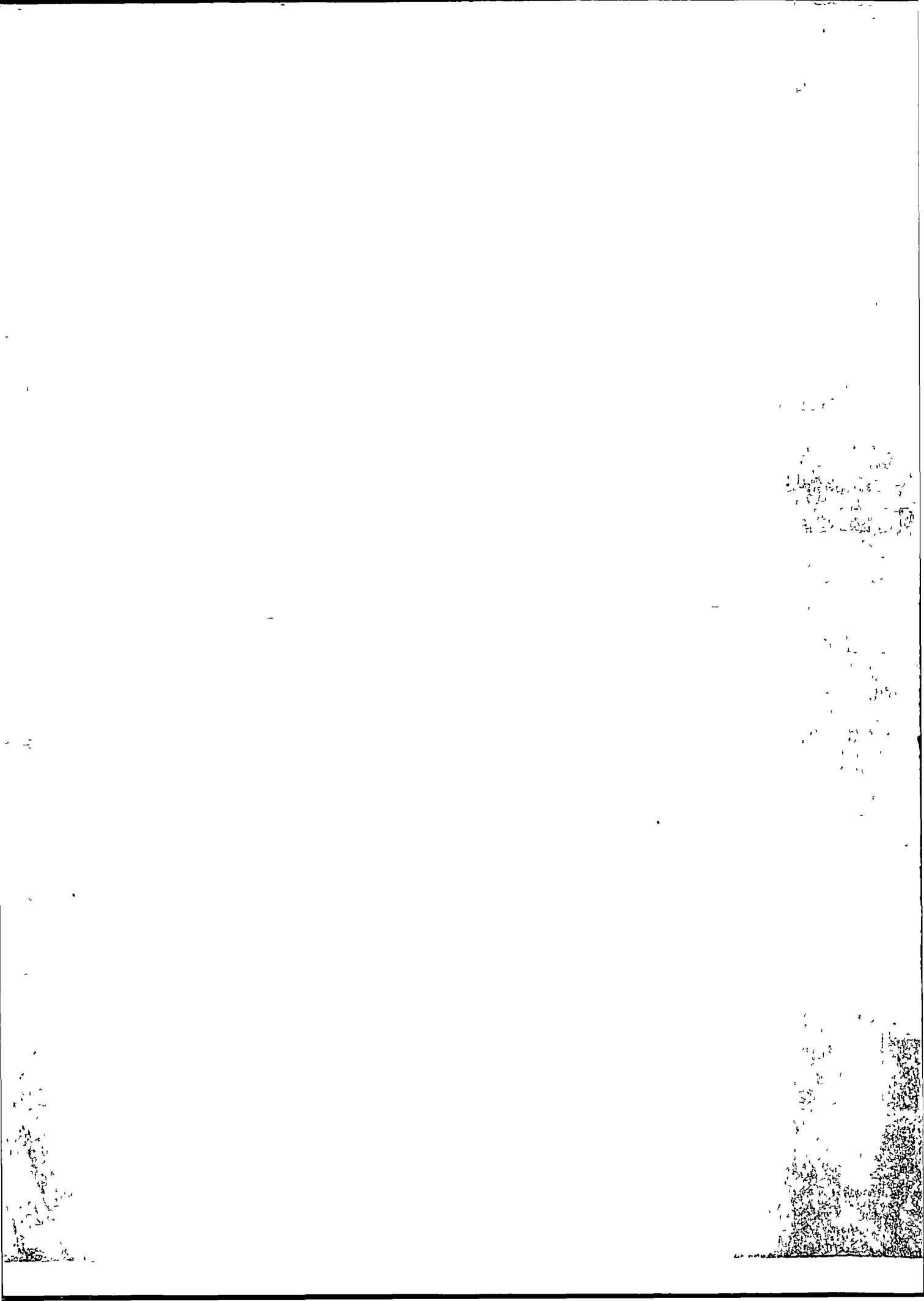
Date: November 1, 1971 / April 31, 1973

Contractor Report Number:

Report Identification Number: 72K10212

IV.D(26)

478-a



CONTRACT NUMBER

NAS8-28114

SUBJECT

Crystal Growth in Fused Solvent Systems

CONTRACTOR

General Electric Company
Space Division
Philadelphia, Pennsylvania

PRINCIPAL INVESTIGATOR

D. R. Ulrich

CONTRACT DATES

12/20/71 - 10/30/74

NASA TECHNICAL MONITOR

R. C. Ruff

479

REPORTS ON CONTRACT WORK:

(1.) Authors: D. R. Ulrich; M. J. Noone; K. E. Spear; W. B. White; E. C. Henry

Crystal Growth In Fused Solvent Systems

Date: June 1973

Contractor Report Number: NASA-CR-124443

Report Identification Number: 73N32587

IV.D(40)

480

CONTRACT NUMBER

NAS8 - 28170

SUBJECT

Methods of Structural Design for Space

CONTRACTOR

Lockheed Missiles and Space Co.

PRINCIPAL INVESTIGATOR

CONTRACT DATES

3/16/72 - 4/16/73

NASA TECHNICAL MONITOR

481

CONTRACT NUMBER

NAS8-28179

SUBJECT

Identification of Beneficial Uses of Space

CONTRACTOR

General Electric Company
Space Science Division
Philadelphia, Pennsylvania

PRINCIPAL INVESTIGATOR

H. L. Bloom

CONTRACT DATES

12/1/71 - 5/29/75

NASA TECHNICAL MONITOR

A handwritten signature in black ink, appearing to be 'H. L. Bloom', is written over the 'NASA TECHNICAL MONITOR' section.

REPORTS ON CONTRACT WORK:

(1.) Authors: D. D. Scarff, H. L. Bloom

A Business Man Views Commercial Ventures In Space

Date: January 1973

Contractor Report Number:

Report Identification Number: 73A17640

I.C(18)

483

CONTRACT NUMBER

NAS8-28189

SUBJECT

Apollo Indium Antimonide Remelt Experiment

CONTRACTOR

Massachusetts Institute of Technology
Cambridge, Massachusetts

PRINCIPAL INVESTIGATOR

H. C. Gatos

CONTRACT DATES

12/9/71 - 8/14/72

NASA TECHNICAL MONITOR

R. S. Snyder

484

REPORTS ON CONTRACT WORK:

(1.) Authors: H. C. Gatos; A. F. Witt

Apollo Indium Antimonide Remelt Experiment

Date: October 1972

Contractor Report Number: MIT 8-28280-FR

Report Identification Number:

IV.C(22)

485

CONTRACT NUMBER

NAS8-28267

SUBJECT

Processing Immiscible Materials in Zero Gravity

CONTRACTOR

T R W
Systems Group
Redondo Beach, California

PRINCIPAL INVESTIGATOR

J. Reger

CONTRACT DATES

4/27/72 - 7/15/75

NASA TECHNICAL MONITOR

I. C. Yates, Jr.

486

REPORTS ON CONTRACT WORK:

(1.) Authors: J. Reger; I. C. Yates, Jr.

Preparation and Metallurgical Properties of Low Gravity
Processed Immiscible Materials

Date: January 1974

Contractor Report Number:

Report Identification Number: 74A18826

IV.A(44)

(2.) Authors: J. Reger

Study On Processing Immiscible Materials In Zero
Gravity - Interim Report

Date: May 1973

Contractor Report Number: TRW 14725-6010-RU-00

Report Identification Number:

IV.A(45)

487

CONTRACT NUMBER

NAS8 - 28271

SUBJECT

Proposed Experiments for the Multipurpose
Electric Furnace System

CONTRACTOR

Westinghouse Research Laboratory
Pittsburgh, Pennsylvania

PRINCIPAL INVESTIGATOR

R.G. Seidensticker

CONTRACT DATES

NASA TECHNICAL MONITOR

488

CONTRACT NUMBER

NAS8-28304

SUBJECT

SkyLab Experiment on Growth of Spherical Crystals

CONTRACTOR

University of Alabama at Huntsville
Huntsville, Alabama

PRINCIPAL INVESTIGATOR

H. U. Walter

CONTRACT DATES

9/19/72 - 6/30/76

NASA TECHNICAL MONITOR

W. R. Adams
T. C. Bannister

489

CONTRACT NUMBER

NAS8-28309

SUBJECT

Preparation and Metallurgical Properties of
Low Gravity Processed Immiscible Materials

CONTRACTOR

T R W
Systems Group
Redondo Beach, California

PRINCIPAL INVESTIGATOR

CONTRACT DATES

NASA TECHNICAL MONITOR

490

CONTRACT NUMBER

NAS8-28359

SUBJECT

Flight Experiment Work Performance and Work Station Interface Requirements

CONTRACTOR

URS/MATRIX Company
Man Systems Division
Huntsville, Alabama

PRINCIPAL INVESTIGATOR

CONTRACT DATES

NASA TECHNICAL MONITOR

Arthur Galzerano

491

REPORTS ON CONTRACT WORK:

(1.) Authors: R. G. Hatterick,

Development of Flight Experiment Work Performance
And Workstation Interface Requirements, Part 1, Technical
Report and Appendices A through G

Date: August 31, 1973

Contractor Report Number: NASA-CR-124409

Report Identification Number: 73N32733

II.A(15)

492

CONTRACT NUMBER

NAS8-28411

SUBJECT

Biogrowth Process Feasibility Study

CONTRACTOR

Massachusetts Institute of Technology
Cambridge, Massachusetts

PRINCIPAL INVESTIGATOR

CONTRACT DATES

1/21/72 - 1/20/73

NASA TECHNICAL MONITOR

A. C. Krupnick

493

CONTRACT NUMBER

NAS8-28474

SUBJECT

Preparative Electrophoresis Experiment Design

CONTRACTOR

Beckman Instruments, Inc.
Anaheim, California

PRINCIPAL INVESTIGATORS

CONTRACT DATES

2/22/72 - 9/30/75

NASA TECHNICAL MONITOR

R. Snyder

494

REPORTS ON CONTRACT WORK:

(1.) Authors: A. Theihler

Preparative Electrophoresis Experiment Design

Date: October 1972

Contractor Report Number: NASA-CR-123972

Report Identification Number: 73N14090

VII.B.1(8)

495

CONTRACT NUMBER

NAS8-28583

SUBJECT

Shuttle Orbital Applications/Requirements

CONTRACTOR

McDonnell Douglas Astronautics Company
Huntington Beach, California

PRINCIPAL INVESTIGATOR

CONTRACT DATES

5/1/73 - 9/30/73

NASA TECHNICAL MONITOR

Thompson

496

Shuttle Orbital Applications/Requirements (SOAR)
Final Report - April 1973

X73-10400	Volume 1 - Executive Summary
X73-10401	Volume 2 - Systems Analysis and Requirements
X73-10402	Volume 2, Book 2 - Automated Payload and Stage Requirements Data
X73-10403	Volume 3 - Payload Shuttle Interfaces
X73-10404	Volume 4 - Mission Support Equipment
X73-10405	Volume 5 - Operations
X73-10406	Volume 6 - Payload Design Criteria Spacecraft and Stages
X73-10407	Volume 7 - Selected Mission Description
X73-10408	Volume 8 - Special Emphasis Analysis
X73-10409	Volume 9 - Special Emphasis Analysis For Standard Earth
N73-32771	Shuttle Orbital Applications/Requirements (SOAR) Supplementary Tasks

497

CONTRACT NUMBER

NAS8-28604

SUBJECT

Metal Drop Solidification in Zero Gravity

CONTRACTOR

Grumman Aerospace Corporation
Bethpage, New York

PRINCIPAL INVESTIGATOR

D. Larson

CONTRACT DATES

6/14/72 - 5/29/75

NASA TECHNICAL MONITOR

L. H. Berge

498

REPORTS ON CONTRACT WORK:

(1.) Authors: W. M. Aubin; D. Larson, Jr.; G. I. Geschwind

Research Of Metal Solidification In Zero-G State
Test Apparatus and Instrumentation - Final Report

Date: September 1973

Contractor Report Number: NASA-CR-124464

Report Identification Number: 74N10527

IV.A(25)

499

CONTRACT NUMBER

NAS8-28615

SUBJECT

Space Processes for Extended Low-G Testing

CONTRACTOR

General Dynamics
Convair Aerospace Division
San Diego, California

PRINCIPAL INVESTIGATOR

W. H. Steurer

CONTRACT DATES

6/20/72 - 3/20/73

NASA TECHNICAL MONITOR

L. H. Berge

500

Contract # NAS8-28615

REPORTS ON CONTRACT WORK:

(1.) Authors: W. H. Steurer; S. Kaye; D. J. Gorham

Space Processes For Extended Low-G Testing - Final Report

Date: June 15, 1973

Contractor Report Number: NASA-CR-124285

Report Identification Number: N73-31752

I.C(17)

501

CONTRACT NUMBER

NAS8-28654

SUBJECT

Advanced Fluid Electrophoresis for Space

CONTRACTOR

Lehigh University
Bethlehem, Pennsylvania

PRINCIPAL INVESTIGATOR

CONTRACT DATES

3/15/72 - 11/14/75

NASA TECHNICAL MONITOR

R. Snyder

502

CONTRACT NUMBER

NAS8-28664

SUBJECT

Liquid-Solid Transition Study for Materials Processing In Space

CONTRACTOR

Boeing Aerospace Company
Huntsville, Alabama

PRINCIPAL INVESTIGATOR

Henderson

CONTRACT DATES

5/9/72 - 1/2/75

NASA TECHNICAL MONITOR

R. C. Ruff

503

REPORTS ON CONTRACT WORK:

(1) Authors: R. I. Miller

Study of Liquid-Solid Transition For Materials Processing In Space

Date: May 9, 1973

Contractor Report Number: NASA-CR-124294

Report Identification Number: 73N27596

IV.A(14)

(2.) Authors: R. I. Miller

"A Summary of Liquid State Models for
Materials Processing In Space"
Interim Report

Date: August 1972

Contractor Report Number:

Report Identification Number: D5-17268

IV.A(15)

504

CONTRACT NUMBER

SUBJECT

Proposed Experiments for the Multipurpose Electric Furnace

CONTRACTOR

Westinghouse

PRINCIPAL INVESTIGATOR

CONTRACT DATES

12/6/71 - 3/15/74

NASA TECHNICAL MONITOR

505

CONTRACT NUMBER

NAS8-28723

SUBJECT

Sphere Forming Experiment - M553

CONTRACTOR

Arthur D. Little, Inc.
Cambridge, Massachusetts

PRINCIPAL INVESTIGATOR

CONTRACT DATES

NASA TECHNICAL MONITOR

506

REPORTS ON CONTRACT WORK:

(1) Authors: P. C. Johnson; E. T. Peters

M553 Sphere Forming Experiment - Interim Report

Date:

Contractor Report Number: LITTLE 8-28723-IR Ph.B

Report Identification Number:

IV.A(31)

(2.) Authors: P. C. Johnson; E. T. Peters

M553 Sphere Forming Experiment - Pure Nickel
Specimen Evaluation

Date:

Contractor Report Number: LITTLE 8-28723-SR-Ph. C

Report Identification Number:

IV.A(32)

507

REPORTS ON CONTRACT WORK:

(3.) Authors: P. C. Johnson, E. T. Peters

M553 Research Study on Materials Processing In Space
Skylab Experiment M553 - Sphere Forming
Final Report

Date:

Contractor Report Number: LITTLE 74671

Report Identification Number:

IV.A(33)

508

CONTRACT NUMBER

NAS8-28724

SUBJECT

Materials Processing In Space - Experiment M554

CONTRACTOR

United Aircraft Corporation
Pratt and Whitney
East Hartford, Connecticut

PRINCIPAL INVESTIGATOR

CONTRACT DATES

NASA TECHNICAL MONITOR

509

REPORTS ON CONTRACT WORK:

(1.) Authors: F. C. Douglas

Research Study on Materials Processing In Space
M554 Experiment

Date: June 30, 1972

Contractor Report Number: UAC 8-28724-Mr-1

Report Identification Number:

IV.A(46)

(2.) Authors: F. C. Douglas; F. S. Galasso

Research Study on Materials Processing In Space
Phase A Report

Date:

Contractor Report Number: UAC L911360-2

Report Identification Number:

IV.A(47)

510

Contract # NAS8-28724

REPORTS ON CONTRACT WORK:

(3.) Authors: F. D. George

Preparation of Single Grain Eutectics For the M566
Experiment - Modification 2 Report

Date: December 15, 1972

Contractor Report Number: UAC L911515-1

Report Identification Number:
IV.A(48)

511

CONTRACT NUMBER

NAS8-28725

SUBJECT

Materials Processing In Space Experiments
M551, M552, M512

CONTRACTOR

Battelle Memorial Institute
Columbus, Ohio

PRINCIPAL INVESTIGATOR

CONTRACT DATES

NASA TECHNICAL MONITOR

512

REPORTS ON CONTRACT WORK:

(1) Authors: H. E. Pattee, R. L. Rothman

Materials Processing In Space M512 - Phase A

Date: August 15, 1972

Contractor Report Number: BMI 8-28725 - PH A Aug 72

Report Identification Number:

IV.D(30)

(2.) Authors: H. E. Pattee, R. E. Monroe

Materials Processing In Space M512 Skylab M551 Samples -
Skylab M552 Samples - Study Report

Date: July 1973

Contractor Report Number: BMI 8-28725 - SR, Ph. B

Report Identification Number:

IV.D(31)

513

REPORTS ON CONTRACT WORK:

(3.) Authors: R. E. Monroe

Characterization of Metals Melting Discs
Skylab Experiment M551 - Final Report

Date: December 4, 1973

Contractor Report Number: BMI 8-28725 - FR - Dec. 73(a)

Report Identification Number:

IV.D(32)

(4.) Authors: R. E. Monroe, H. E. Pattee

Characterization of Exothermic Brazing
Components Skylab Experiment M552 - Final Report

Date: December 4, 1973

Contractor Report Number: BMI 8-28725 - FR- Dec. 73 (b)

Report Identification Number:

IV.D(33)

514

CONTRACT NUMBER

NAS8-28728

SUBJECT

Metals Melting - Skylab Experiment M553

CONTRACTOR

Grumman Aerospace Corporation
Bethpage, New York

PRINCIPAL INVESTIGATOR

CONTRACT DATES

NASA TECHNICAL MONITOR

5/5

REPORTS ON CONTRACT WORK:

(1.) Authors: D. J. Larson, Jr.

Investigation of Ground Based Simulation Skylab Samples
- Final Report on Phase B

Date: August 1973

Contractor Report Number: Grumman RM-576 Ph. B

Report Identification Number:

IV:A(26)

(2.) Authors: D. J. Larson, Jr., C. Li

Specimen Analysis of the Skylab M553 Metals
Melting and Solidification Experiment

Date: February 1974

Contractor Report Number:

Report Identification Number:

IV.A(27)

5/6

REPORTS ON CONTRACT WORK:

(3) Authors: D. Larson, Jr.; G. Busch

Investigation of KC-135 Flight Samples Solidified In
Near-Zero Gravity

Date: January 1973

Contractor Report Number: NASA-CR-124179 RM-566

Report Identification Number: 73N20610

IV.A(28)

(4) Authors: D. Larson, Jr.; G. Busch

Investigation of KC-135 Flight Samples Solidified
In Near-Zero Gravity

Date: January 1, 1973

Contractor Report Number: NASA-CR-138168; AD-916869L; GIDEP-347.95.00-K4-38;
RM-566

Report Identification Number: 74X73561

IV.A(29)

517

CONTRACT NUMBER

NAS8-28729

SUBJECT

Materials Processing in Space - Experiment M512

CONTRACTOR

Lockheed Missiles and Space Company
Huntsville, Alabama

PRINCIPAL INVESTIGATOR

CONTRACT DATES

NASA TECHNICAL MONITOR

E. Hasemeyer

5/8

REPORTS ON CONTRACT WORK:

(1.) Authors: M. R. Brashears; S. J. Robertson

Research Study On Materials Processing In
Space Experiment M512 - Final Report

Date: December 1, 1973

Contractor Report Number: NASA-CR- 120185

Report Identification Number: 74N21068

IV.A(36)

519.

CONTRACT NUMBER

NAS8-28730

SUBJECT

Ground Based Study Plan For Materials Processing Experiments

CONTRACTOR

Westinghouse Electric Corporation
Pittsburgh, Pennsylvania

PRINCIPAL INVESTIGATOR

CONTRACT DATES

NASA TECHNICAL MONITOR

520

REPORTS ON CONTRACT WORK:

(1.) Authors: J. M. Tobin

Research Study on Materials Processing in Space Experiment
Number 512 - Phase A Preparation of Ground Base Study Plan

Date: August 15, 1972

Contractor Report Number: WANL L-792

Report Identification Number:

II.A(16)

(2.) Authors: J. M. Tobin; R. Kossowsky

Research Study on Materials Processing In Space Experiment
Number 512 - Phase B Laboratory Test Program on M552 and M553
Summary Report

Date: July 15, 1973

Contractor Report Number: WANL L-848

Report Identification Number:

II.A(17)

521

REPORTS ON CONTRACT WORK:

(3) Authors: J. M. Tobin; R. Kossowsky

Final Report on M551, M552, and M553

Date: December 12, 1973

Contractor Report Number: WANL L-954 - Rev.

Report Identification Number:

II.A(18)

(4) Authors: J. M. Tobin

Special Summary Report on M551, M552, and M553

Date: March 1974

Contractor Report Number: WANL-TME-2850

Report Identification Number:

II.A(19)

522

CONTRACT NUMBER

NAS8-28732

SUBJECT

Thermal Analysis of Skylab Experiments M551 and M552

CONTRACTOR

Massachusetts Institute of Technology
Cambridge, Massachusetts

PRINCIPAL INVESTIGATOR

K. Masubuchi

CONTRACT DATES

6/6/72 - 2/15/74

NASA TECHNICAL MONITOR

R. V. Hoppes
R. M. Poorman

523

REPORTS ON CONTRACT WORK:

(1.) Authors: K. Masubuchi; T. Muraki

Phase A of Thermal Analysis of M551 Through M554
Experiments For Materials Processing In Space

Date: July 25, 1972

Contractor Report Number: MIT 8-28732-FR-Ph. A

Report Identification Number:

II.C.1(20)

(2.) Authors: K. Masubuchi; T. Muraki

Phase B of Thermal Analysis of M551 Experiment
For Materials Processing In Space

Date: January 15, 1973

Contractor Report Number: MIT 8-28732-IR-1-(1)

Report Identification Number:

III.C.1(21)

524

REPORTS ON CONTRACT WORK:

(3.) Authors: J. W. Spearman; T. Muraki

Phase B of Thermal Analysis of M552 Experiment
For Materials Processing in Space

Date: January 15, 1973

Contractor Report Number: MIT 8-28732-IR-2-(2)

Report Identification Number:

III.C.1(22)

525

CONTRACT NUMBER

NAS8-28733

SUBJECT

Metals Melting and Exothermic Brazing

CONTRACTOR

University of Wisconsin
Madison, Wisconsin

PRINCIPAL INVESTIGATOR

C. M. Adams

CONTRACT DATES

5/25/72 - 12/24/73

NASA TECHNICAL MONITOR

R. V. Hoppes
R. M. Poorman

526

REPORTS ON CONTRACT WORK:

(1.) Authors:

Materials Processing In Space, Experiment M512

Date: August 1972

Contractor Report Number: WISCONSIN U. 8-28733, Ph. A

Report Identification Number:

IV.A(50)

527

CONTRACT NUMBER

NAS8-28734

SUBJECT

Experiment M553 - Sphere Forming

CONTRACTOR

University of Connecticut
Institute of Materials Science
Storrs, Connecticut

PRINCIPAL INVESTIGATOR

T. Z. Kattamis

CONTRACT DATES

5/24/72 - 6/18/74

NASA TECHNICAL MONITOR

E. A. Hasemeyer

528

REPORTS ON CONTRACT WORK:

(1.) Authors: T. Z. Kattamis

Investigation of Solidification in Zero-Gravity Environment
M553 Sphere Forming Experiment and M554 Composite Casting Experiment.

Date: August 10, 1972

Contractor Report Number:

Report Identification Number: 73N70935

IV.A(17)

(2.) Authors: T. Z. Kattamis

Investigation of Solidification In Zero-Gravity
Environment; M553 Sphere Forming Experiment

Date: December 4, 1973

Contractor Report Number:

Report Identification Number: 74N20126

IV.A(18)

529

CONTRACT NUMBER

NAS8-28735

SUBJECT

Experiment M553 Sphere Forming and M554 Composite Casting

CONTRACTOR

Georgia Institute of Technology
Atlanta, Georgia

PRINCIPAL INVESTIGATOR

J. L. Brown

CONTRACT DATES

6/8/73 - 12/31/73

NASA TECHNICAL MONITOR

J. H. Kerr
E. H. Pitts

530

REPORTS ON CONTRACT WORK:

(1.) Authors: J. L. Brown; J. W. Johnson

M553 Sphere Forming and M554 Composite Casting
Experiments - Summary Report - Phase A

Date: July 31, 1972

Contractor Report Number: GIT/EES A-1428

Report Identification Number:

IV.C(14)

(2.) Authors: J. L. Hubbard; J. W. Johnson

Characterization of Five Sphere Formed During Ground Test of
the M553 Experiment at MSFC - Summary Report - Phase B

Date:

Contractor Report Number: GIT/EES A-1428-1, Phase B

Report Identification Number:

IV.C(15)

531

REPORTS ON CONTRACT WORK:

(3) Authors: J. L. Hubbard; J. W. Johnson

Characterization of Four Spheres Processed as a Part of
the M553 Sphere Forming Experiment Performed During the Skylab 1/2 Flight

Date: December 1973

Contractor Report Number: GIT/EES A-1428-1, Phase C

Report Identification Number:

IV.C(16)

(4) Authors: J. L. Hubbard; J.W. Johnson

Characterization of Ground Base Specimen No. A72-962B Processed as a
Part of the M566 Composite Casting Experiment - Summary Report

Date: February 1974

Contractor Report Number: GIT/EES A-1428-2, Phase B.

Report Identification Number:

IV.C(17)

532

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Pages 533 - 534

487. - 262 upst

CONTRACT NUMBER

NAS8-28762

SUBJECT

Design, Fabrication and Test of Acoustic Processors

CONTRACTOR

Interand Corporation
Chicago, Illinois

PRINCIPAL INVESTIGATOR

R. R. Whymark

CONTRACT DATES

6/15/72 - 1/4/73

NASA TECHNICAL MONITOR

L. H. Berge

535

REPORTS ON CONTRACT WORK:

(1.) Authors: R. R. Whymark

Design, Development, Fabrication and
Test of Acoustic Processors

Date: July 14, 1972

Contractor Report Number: Interand 8-28762-MR-July 1972

Report Identification Number:

V.B.2(3)

(2.) Authors: R. R. Whymark

Operating Instructions For the Acoustic Processors

Date: January 26, 1973

Contractor Report Number: Interand 8-28762-)I-Jan. 1973

Report Identification Number:

V.B.2(4)

536

CONTRACT NUMBER

NAS8-28938

SUBJECT

Payload Equipment - Requirements for Manufacturing in Space

CONTRACTOR

T R W
Systems Group
Redondo Beach, California

PRINCIPAL INVESTIGATOR

R. L. Hamme

CONTRACT DATES

6/26/72 - 8/15/74

NASA TECHNICAL MONITOR

537

REPORTS ON CONTRACT WORK:

(1.) Authors: R. L. Hammel

Requirements and Concepts for Materials Science and
Manufacturing In Space Payload Equipment Study. Volume 1 - Executive Summary

Date: July 1973

Contractor Report Number: NASA-CR-120115

Report Identification Number: 74N10030

II.C(18)

(2) Authors: R. L. Hammel

Requirements and Concepts For Materials Science and
Manufacturing In Space Payload Equipment Study. Volume 2A

Date: July 1973

Contractor Report Number: NASA-CR-120116

Report Identification Number: 74X10031

II.C(19)

538

REPORTS ON CONTRACT WORK:

(3) Authors: A. Smith

Requirements and Concepts For Materials Science and
Manufacturing In Space Payload Equipment Study. Volume 2B

Date: July 1973

Contractor Report Number: NASA-CR-120117

Report Identification Number: 74X10032

II.C.(20)

(4) Authors: W. T. Anderson, Jr.

Requirements and Concepts For Materials Science and
Manufacturing In Space Equipment Study. Volume 2C

Date: July 1973

Contractor Report Number: NASA-CR-120118

Report Identification Number: 74X10033

II.C(21)

539

REPORTS ON CONTRACT WORK:

(5) Authors: J. O. Bird

Requirements and Concepts for Materials Science and Manufacturing
In Space Equipment Study. Volume 2D

Date: July 1973

Contractor Report Number: NASA-CR-120119

Report Identification Number: 74X10034

II.C(22)

(6) Authors: D. M. Waltz

Requirements and Concepts for Materials Science
and Manufacturing In Space Payload Equipment Study. Volume 3

Date: July 1973

Contractor Report Number: NASA-CR-120120

Report Identification Number: 74X10035

II.C(23)

540

REPORTS ON CONTRACT WORK:

(7.) Authors: R. L. Hammel

Requirements and Concepts For Materials Science and
Manufacturing In Space Payload Equipment Study. Volume 3

Date: July 1973

Contractor Report Number: NASA-CR-120121

Report Identification Number: 74X10036

II.C(24)

541

CONTRACT NUMBER

NAS8-28960

SUBJECT

Low Cost Payload Design Concepts

CONTRACTOR

Lockheed Missiles and Space Company
Sunnyvale, California

PRINCIPAL INVESTIGATOR

CONTRACT DATES

6/22/72 - 8/15/74

NASA TECHNICAL MONITOR

542

REPORTS ON CONTRACT WORK:

(1.) Authors:

Low Cost Payload Design Concepts Study
Vol. 1 Executive Summary

Date: June 1973

Contractor Report Number: LMSC 8-28960-D 336289

Report Identification Number:

II.C(16)

(2.) Authors:

Low Cost Payload Design Concepts Study
Volume 2 - Mission Requirements Analysis
and Subsystem/Spacecraft Selection

Date: June 1973

Contractor Report Number: LMSC 8-28960-D 336290

Report Identification Number:

II.C(17)

543

CONTRACT NUMBER

NAS8-28991

SUBJECT

Manufacturing Unique Glasses in Space

CONTRACTOR

Rockwell International Corporation
Downey, California

PRINCIPAL INVESTIGATOR

R. A. Happe

CONTRACT DATES

4/30/73 - 9/30/75

NASA TECHNICAL MONITOR

R. L. Nichols

544

Contract # NAS8-28991

REPORTS ON CONTRACT WORK:

(1.) Authors: R. A. Happe

Manufacturing Unique Glasses In Space

Date:

Contractor Report Number: Rockwell 8-28991-MPR-1

Report Identification Number:

VI.A(11)

545

CONTRACT NUMBER

NAS8-29030

SUBJECT

Acoustic Processing Methods

CONTRACTOR

Interand Corporation
Chicago, Illinois

PRINCIPAL INVESTIGATOR

R. R. Whymark

CONTRACT DATES

9/11/72 - 3/11/73

NASA TECHNICAL MONITOR

L. H. Berge

546

REPORTS ON CONTRACT WORK:

(1.) Authors: R. R. Whymark

Acoustic Processing Method For MS/MS Experiments

Date: June 1973

Contractor Report Number: NASA-CR-124300; IC-726

Report Identification Number: 73N28671

V.B.2(5)

547

CONTRACT NUMBER

NAS8-29033

SUBJECT

Multilayer Diffusion Models

CONTRACTOR

H. E. Cramer Company, Inc.
Salt Lake City, Utah

PRINCIPAL INVESTIGATOR

CONTRACT DATES

NASA TECHNICAL MONITOR

Geissler

548

CONTRACT NUMBER

NAS8-29077

SUBJECT

Study of Single Crystals of Metal Solid Solutions

CONTRACTOR

Eagle-Picher Industries, Inc.
Miami, Oklahoma

PRINCIPAL INVESTIGATORS

Doty
Reising

CONTRACT DATES

6/23/72 - 6/23/73

NASA TECHNICAL MONITOR

R. C. Ruff

549

REPORTS ON CONTRACT WORK:

(1) Authors: J. P. Doty; J. A. Reising

Study of Single Crystals of Metal Solid Solutions

Date: May 21, 1973

Contractor Report Number: NASA-CR-124354

Report Identification Number: 73N29532

IV.D(35)

(2.) Authors: J. P. Doty; J. A. Reising

Study of Single Crystals of Metal Solid Solutions

Date: March 21, 1973

Contractor Report Number: NASA-CR-124212

Report Identification Number: 73N22476

IV.D(36)

550

CONTRACT NUMBER

NAS8-29145

SUBJECT

Techniques For Processing Metal - Metal Oxide Systems

CONTRACTOR

Arthur D. Little, Inc.
Cambridge, Massachusetts

PRINCIPAL INVESTIGATOR

P. C. Johnson

CONTRACT DATES

10/2/72 - 4/15/74

NASA TECHNICAL MONITOR

I. C. Yates

551

REPORTS ON CONTRACT WORK:

(1.) Authors: P. C. Johnson

Development of Techniques For Processing Metal - Metal Oxide Systems

Date: November 30, 1972

Contractor Report Number: LITTLE 8-29145-MPR-1

Report Identification Number:

IV.A(34)

552

CONTRACT NUMBER

NAS8-29462

SUBJECT

Space Shuttle Payload Planning

CONTRACTOR

General Dynamics
Convair Division
San Diego, California

PRINCIPAL INVESTIGATOR

CONTRACT DATES

NASA TECHNICAL MONITOR

553

REPORTS ON CONTRACT WORK:

(1.) Authors:

Shuttle System Payload Data Activity Plan
(SSPDA)

Date: February 23, 1973

Contractor Report Number: NASA-CR-133277; GDCA-DDA73-001

Report Identification Number: 73X78183

II.C(15)

554

CONTRACT NUMBER

NAS8-29494

SUBJECT

Study - Experiment Analysis and Ground Base Test
Programs for a Single Crystal Growth Project

CONTRACTOR

University of Alabama at Tuscaloosa

PRINCIPAL INVESTIGATOR

D. J. De'Smet

CONTRACT DATES

1/20/73 - 9/30/74

NASA TECHNICAL MONITOR

C. F. Schafer
M. C. Davidson

555

REPORTS ON CONTRACT WORK:

(1.) Authors:

Ellipsometric Measurements of Epitaxial
GaAs Layers on a GaAs Substrate

Date: April 29, 1973

Contractor Report Number: ALA. U. BER-8-29494-PR-April 73

Report Identification Number:

IV.D(27)

556

CONTRACT NUMBER

NAS8-29542

SUBJECT

Electrical Characterization of Single Crystals

CONTRACTOR

University of Alabama at Huntsville
Huntsville, Alabama

PRINCIPAL INVESTIGATOR

J. G. Castle

CONTRACT DATES

1/2/72 - 2/28/75

NASA TECHNICAL MONITOR

M. Davidson
J. Ziener

557

REPORTS ON CONTRACT WORK:

(1.) Authors:

Electrical Characterization of GaAs Single
Crystal In Direct Support of M555 Flight Experiment

Date:

Contractor Report Number: ALA. U. RI-8-29542-MPR-

Report Identification Number:

IV.D(28)

(2.) Authors: J. H. Davis; R. B. Lal; H. U. Walters; J. G. Castle, Jr.

Investigation of Crystal Growth in Zero Gravity
Environment and Investigation of Metallic Whiskers

Date:

Contractor Report Number: Ala. U. 8-29542-FR

Report Identification Number:

IV.D(29)

558

CONTRACT NUMBER

NAS8-29566

SUBJECT

Role of Gravity in Preparative Electrophoresis

CONTRACTOR

University of Arizona
Tucson, Arizona

PRINCIPAL INVESTIGATOR

M. Bier

CONTRACT DATES

2/1/73 - 7/19/75

NASA TECHNICAL MONITOR

R. S. Snyder

559

REPORTS ON CONTRACT WORK:

(1.) Authors: M. Bier; R. S. Snyder

Electrophoresis In Space At Zero Gravity

Date: January 1974

Contractor Report Number:

Report Identification Number: 74A18854

VII.B.1(26)

(2.) Authors:

Role of Gravity in Preparative Electrophoresis

Date: February 1, 1973/February 1, 1974

Contractor Report Number:

Report Identification Number: 74K10443

VII.B.1(27)

560

CONTRACT NUMBER

NAS8-29609

SUBJECT

Soret Separation in Low-G

CONTRACTOR

Lockheed Missiles and Space Company
Huntsville, Alabama

PRINCIPAL INVESTIGATOR

P.G. Grodzka

CONTRACT DATES

6/18/73 - 6/30/75

NASA TECHNICAL MONITOR

B. Facemire

561

REPORTS ON CONTRACT WORK:

(1.) Authors:

Soret Separation In Zero Gravity

Date: July 31, 1973

Contractor Report Number: LMSC/HREC 8-29609-BIMPR-Jul 31

Report Identification Number:

VII.A(4)

562

CONTRACT NUMBER

NAS8-29610

SUBJECT

Study of MS/MS Convection Analysis

CONTRACTOR

Lockheed Missiles and Space Company
Huntsville, Alabama

PRINCIPAL INVESTIGATOR

S. V. Bourgeois

CONTRACT DATES

6/28/73 - 5/30/75

NASA TECHNICAL MONITOR

T. C. Bannister

563

REPORTS ON CONTRACT WORK:

(1.) Authors:

Study of MS/MS Convection Analysis

Date: August 31, 1973

Contractor Report Number: LMSC/HREC 8-29610-B1 MPR Aug 73

Report Identification Number:

III.C.1(19)

564

CONTRACT NUMBER

NAS8-29620

SUBJECT

Space Processing of Composite Materials

CONTRACTOR

General Dynamics
Convair Division
San Diego, California

PRINCIPAL INVESTIGATOR

W. H. Steurer
S. Kaye

CONTRACT DATES

4/12/73 - 2/28/75

NASA TECHNICAL MONITOR

I. C. Yates

565

REPORTS ON CONTRACT WORK:

(1.) Authors:

Space Processing of Composite Materials

Date: April 30, 1973

Contractor Report Number: GD/C 8-29620-PR-1/

Report Identification Number:

IV.C(13)

566

CONTRACT NUMBER

NAS8-29626

SUBJECT

Process Development for Producing Fine Grain Castings in Space

CONTRACTOR

Battelle Memorial Institute
Columbus, Ohio

PRINCIPAL INVESTIGATOR

S. H. Gelles

CONTRACT DATES

6/29/73 - 4/10/75

NASA TECHNICAL MONITOR

I. C. Yates, Jr.

567

REPORTS ON CONTRACT WORK:

(1.) Authors: S. H. Gelles

Process Development For Producing Fine Grain Castings In Space

Date: July 1973

Contractor Report Number: BMI-8-29626-MPR-1/

Report Identification Number:

IV.A(13)

568

CONTRACT NUMBER

NAS8-29629

SUBJECT

Sample Detection and Analysis Techniques
For Electrophoretic Separation

CONTRACTOR

Battelle Memorial Institute
Columbus, Ohio

PRINCIPAL INVESTIGATOR

CONTRACT DATES

4/16/74 - 4/16/75

NASA TECHNICAL MONITOR

Allen

569

REPORTS ON CONTRACT WORK:

(1.) Authors: D. L. Marshall

Sample Detection and Analysis Techniques
For Electrophoretic Separation

Date: May 21, 1974

Contractor Report Number: BMI 8-29629-MR-1

Report Identification Number:

VII.A(3)

570

CONTRACT NUMBER

NAS8-29650

SUBJECT

Evaluation and Comparison of Semiconductor
Specimens by X-ray Techniques

CONTRACTOR

University of Alabama at Huntsville
Huntsville, Alabama

PRINCIPAL INVESTIGATOR

H. U. Walter

CONTRACT DATES

3/20/73 - 12/31/74

NASA TECHNICAL MONITOR

M. Davidson
Z. M. Zweiner

571

REPORTS ON CONTRACT WORK:

(1.) Authors:

Evaluation of Semiconductor Specimens
by X-Ray Analysis

Date: May 1973

Contractor Report Number: ALA. U. RI-8-29650-MTR-1/

Report Identification Number:

IV.A(10)

(2.) Authors: H. U. Walter

Evaluation of Semiconductor Specimens
By X-Ray Analysis - Interim Report

Date: November 1973

Contractor Report Number: ALA. U. RI-8-29650-IR-Nov. 73

Report Identification Number:

IV.A(11)

572

CONTRACT NUMBER

NAS8-29662

SUBJECT

Segregation Effects During Solidification in Weightless Melts

CONTRACTOR

Grumman Aerospace Corporation
Bethpage, New York

PRINCIPAL INVESTIGATOR

C. Li

CONTRACT DATES

7/5/73 - 12/4/74

NASA TECHNICAL MONITOR

R. C. Ruff

573

REPORTS ON CONTRACT WORK:

(1.) Authors:

Segregation Effects During Solidification
In Weightless Melts

Date: August 4, 1973

Contractor Report Number: Grumman 8-29662-MPR-1

Report Identification Number:

IV.A(30)

574

CONTRACT NUMBER

NAS8-29669

SUBJECT

Processing Eutectics in Space

CONTRACTOR

United Aircraft Corporation
Pratt and Whitney
East Hartford, Connecticut

PRINCIPAL INVESTIGATOR

CONTRACT DATES

6/8/73 - 11/23/75

NASA TECHNICAL MONITOR

Hess

575

REPORTS ON CONTRACT WORK:

(1.) Authors:

Processing Eutectics In Space

Date: June 30, 1973

Contractor Report Number: PWA 8-29669 MPR

Report Identification Number:

I.C(19)

576

CONTRACT NUMBER

NAS8-29680

SUBJECT

Electromagnetic Free Suspension System

CONTRACTOR

General Electric Company
Space Sciences Laboratory
Philadelphia, Pennsylvania

PRINCIPAL INVESTIGATOR

R. T. Frost

CONTRACT DATES

8/2/73 - 10/4/74

NASA TECHNICAL MONITOR

L. H. Berge

577

REPORTS ON CONTRACT WORK:

(1.) Authors: R. T. Frost

Study of a Free Suspension System For
Space Manufacturing - Phase B

Date: September 2, 1973

Contractor Report Number: GE 8-29680-MPR#1/

Report Identification Number:

V.B.3(7)

(2) Authors: R. T. Frost; H. L. Bloom; L. J. Nepaluch; E. H. Stankhoff;
G. Wouch

Electromagnetic Containerless Processing Requirements and
Recommended Facility Concept and Capabilities For Space Lab

Date: May 18, 1974

Contractor Report Number: GE 8-29680-FR-May 74

Report Identification Number:

V.B.3(8)

578

CONTRACT NUMBER

NAS8-29725

SUBJECT

Low Gravity Solidification of Binary Alloys
Exhibiting Solid State Immiscibility

CONTRACTOR

Washington State University
Pullman, Washington

PRINCIPAL INVESTIGATOR

Johnson

CONTRACT DATES

4/17/73 - 10/31/75

NASA TECHNICAL MONITOR

I. C. Yates, Jr.

579

REPORTS ON CONTRACT WORK:

(1.) Authors:

The Solidification Under Zero Gravity Conditions of
Binary Alloys Exhibiting Solid State Miscibility

Date: May 1, 1973

Contractor Report Number: Washington SU 8-2975-MPR-1/

Report Identification Number:

IV.A(49)

580

CONTRACT NUMBER

NAS8-29745

SUBJECT

Electrophoretic Separation of Cells in Space

CONTRACTOR

State University of New York
Buffalo, New York

PRINCIPAL INVESTIGATOR

P. E. Bigazzi

CONTRACT DATES

4/16/73 - 9/16/74

NASA TECHNICAL MONITOR

R. E. Allen
A. C. Krupnick

581

REPORTS ON CONTRACT WORK:

(1.) Authors: C. J. Van Oss; P. E. Bigazzi; C. F. Gillman; R. Allen

Preparative Liquid Column Electrophoresis
of T and B Lymphocytes At Gravity = 1

Date: January 1974

Contractor Report Number:

Report Identification Number: 74A18863

VII.B.6(4)

582

CONTRACT NUMBER

NAS8-29748

SUBJECT

Investigation of Immiscible Systems and Potential Applications

CONTRACTOR

Battelle Memorial Institute
Columbus, Ohio

PRINCIPAL INVESTIGATOR

S. H. Gelles

CONTRACT DATES

6/28/73 - 3/30/75

NASA TECHNICAL MONITOR

I. C. Yates, Jr.

583

REPORTS ON CONTRACT WORK:

(1.) Authors:

Investigation of Immiscible Systems and Potential Applications

Date: July 9, 1973

Contractor Report Number: BMI 8-29748-MPR-1/

Report Identification Number:

I.C(15)

584

CONTRACT NUMBER

NAS8-29769

SUBJECT

Space Processing Furnace Systems Development

CONTRACTOR

Artcor Corporation
Irvine, California

University of California, Irvine, California

PRINCIPAL INVESTIGATOR

CONTRACT DATES

4/25/73 - 5/30/75

NASA TECHNICAL MONITOR

B. R. Aldrich

585

REPORTS ON CONTRACT WORK:

(1.) Authors: C. R. Halbach; R. J. Page; P. D. Arthur

2200 C. Oxidizing Atmosphere Furnace For Space Manufacturing

Date: . January 1974

Contractor Report Number:

Report Identification Number: 74A18866

V.D.1(2)

586

CONTRACT NUMBER

NAS8-29778

SUBJECT

Differential Electrophoretic Separation of Cells
and its Effect on Cell Viability

CONTRACTOR

Georgetown University
Washington, D. C.

PRINCIPAL INVESTIGATOR

E. M. Leise

CONTRACT DATES

4/24/73 - 11/25/74

NASA TECHNICAL MONITOR

A. C. Krupnick
R. E. Allen

587

REPORTS ON CONTRACT WORK:

(1.) Authors:

Differential Electrophoretic Separation of Cells
and its Effect on Cell Viability

Date: May 1973

Contractor Report Number: Georgetown U. 8-29778-MPR-May 73

Report Identification Number:

VII.B.6(2)

588

CONTRACT NUMBER

NAS8-29823

SUBJECT

Electrophoretic Separation of Proteins in Space

CONTRACTOR

Wayne State University
Detroit, Michigan

PRINCIPAL INVESTIGATOR

R. K. Brown

CONTRACT DATES

4/24/73 - 9/15/75

NASA TECHNICAL MONITOR

A. C. Krupnick
R. E. Allen

589

REPORTS ON CONTRACT WORK:

(1.) Authors: R. K. Brown

Electrophoretic Separation of Proteins In Space

Date: September 15, 1973

Contractor Report Number: Wayne SU 8-29823-PR-Sept. 73

Report Identification Number:

VII.B.6(3)

590

CONTRACT NUMBER

NAS8-29847

SUBJECT

Analytcs of Crystal Growth in Space

CONTRACTOR

University of Southern California
Chemical Engineering Department
Los Angeles, California

PRINCIPAL INVESTIGATOR

W. R. Wilcox

CONTRACT DATES

6/5/73 - 12/17/74

NASA TECHNICAL MONITOR

T. C. Bannister
B. E. Facemire

591

REPORTS ON CONTRACT WORK:

(1.) Authors: W. R. Wilcox

Analytics of Crystal Growth In Space.
Bimonthly Progress Report, No. 1,5 Jun.-4 Aug. 1973.

Date: August 6, 1973

Contractor Report Number: NASA-CR-133895

Report Identification Number: 73X8659

IV.D(43)

(2.) Authors: W. R. Wilcox

Analytics of Crystal Growth In Space
Bimonthly Progress Report, 5 Aug. - 4 Oct., 1973

Date: October 6, 1973

Contractor Report Number: NASA-CR-136056

Report Identification Number: 73X81304

IV.D(44)

592

CONTRACT NUMBER

NAS8-29850

SUBJECT

Theoretical Study of Producing Unique Glasses in Space

CONTRACTOR

ITT Research Institute
Chicago, Illinois

PRINCIPAL INVESTIGATOR

D. C. Larsen

CONTRACT DATES

7/1/73 - 3/31/75

NASA TECHNICAL MONITOR

R. L. Nichols

593.

REPORTS ON CONTRACT WORK:

(1.) Authors: D. C. Larsen

Theoretical Study of Producing Glasses In Space

Date: July 31, 1973

Contractor Report Number: ITT-RI D6087/

Report Identification Number:

VI.B.1(2)

594

CONTRACT NUMBER

NAS8-29851

SUBJECT

Gravitational Effects on Processed - Induced Dislocations In Silicon

CONTRACTOR

Texas A & M University
College Station, Texas

PRINCIPAL INVESTIGATOR

CONTRACT DATES

7/1/73 - 9/1/74;

NASA TECHNICAL MONITOR

M. Davidson

595

CONTRACT NUMBER

NAS8-29854

SUBJECT

Directional Solidification of Eutectic Composites in Space

CONTRACTOR

University of California at Los Angeles
Los Angeles, California

PRINCIPAL INVESTIGATOR

A. S. Yu

CONTRACT DATES

8/7/73 - 4/30/75

NASA TECHNICAL MONITOR

W. B. McPherson

596

REPORTS ON CONTRACT WORK:

(1.) Authors:

Directional Solidification of Eutectic Composites in Space

Date: September 30, 1973

Contractor Report Number: Cal. U. 8-29854-MR-Sept. 73

Report Identification Number:

IV.A(16)

597

CONTRACT NUMBER

NAS8-29860

SUBJECT

Design, Fabrication, Testing and Delivery of Electron Gun.

CONTRACTOR

Georgia Institute of Technology
Atlanta, Georgia

PRINCIPAL INVESTIGATOR

R. K. Hart

CONTRACT DATES

6/8/73 - 2/28/74

NASA TECHNICAL MONITOR

J. H. Kerr
E.H. Pitts

598

REPORTS ON CONTRACT WORK:

(1.) Authors:

Develop a High Intensity Electron Gun

Date: July 31, 1973

Contractor Report Number:

Report Identification Number:

V.C.3(7)

599

CONTRACT NUMBER

NAS8-29874

SUBJECT

Feasibility Study for the Manufacture of
Pharmaceutical, Immunological and Viral Agents

CONTRACTOR

Arthur D. Little, Inc.
Cambridge, Massachusetts

PRINCIPAL INVESTIGATOR

CONTRACT DATES

6/26/73 - 8/30/74

NASA TECHNICAL MONITOR

A. C. Krupnick

600

REPORTS ON CONTRACT WORK:

(1.) Authors:

Feasibility Study For the Manufacture of
Pharmaceuticals, Immunological, and Viral Agents

Date: September 15, 1973

Contractor Report Number: LITTLE 8-29874-MR-Sept. 73

Report Identification Number:

I.C(18)

601

CONTRACT NUMBER

NAS8-29875

SUBJECT

Single Crystals of Metal Solid Solutions

CONTRACTOR

Battelle Memorial Institute
Columbus, Ohio

PRINCIPAL INVESTIGATOR

N. M. Griesenaur
J. F. Miller

CONTRACT DATES

10/9/73 - 11/29/75

NASA TECHNICAL MONITOR

R. C. Ruff

602

REPORTS ON CONTRACT WORK:

(1.) Authors: N. M. Griesenauer; J. F. Miller

Single Crystals of Metal Solid Solutions

Date: November 9, 1973

Contractor Report Number: BMI-8-29875-MLPR-Nov, 73

Report Identification Number:

IV.D(34)

603

CONTRACT NUMBER

NAS8-29877

SUBJECT

Float-Zone Processing in a Weightless Environment

CONTRACTOR

Arthur D. Little, Inc.
Cambridge, Massachusetts

PRINCIPAL INVESTIGATOR

CONTRACT DATES

1/18/74 - 5/1/75

NASA TECHNICAL MONITOR

M. Davidson

604

REPORTS ON CONTRACT WORK:

(1.) Authors: A. A. Fowle; J. S. Haggerty

Float-Zone Processing In a Weightless Environment

Date: March 18, 1974

Contractor Report Number: Little 8-29877-BIMPR-1/

Report Identification Number:

IV.A(35)

605

CONTRACT NUMBER

NAS8-29878

SUBJECT

Fluid Flow Electrophoresis In Space

CONTRACTOR

General Electric Company
Space Sciences Laboratory
Philadelphia, Pennsylvania

PRINCIPAL INVESTIGATOR

CONTRACT DATES

2/25/74 - 2/25/75

NASA TECHNICAL MONITOR

Rhodes

606

REPORTS ON CONTRACT WORK:

(1.) Authors:

Fluid Flow Electrophoresis In Space

Date: March 31, 1974

Contractor Report Number: GE 8-29878-MR-1

Report Identification Number:

VII.B.1(9)

607

CONTRACT NUMBER

NAS8-29879

SUBJECT

Containerless Purification of Tungsten

CONTRACTOR

General Electric Company
Space Sciences Laboratory
Philadelphia, Pennsylvania

PRINCIPAL INVESTIGATOR

CONTRACT DATES

3/12/74 - 9/31/75

NASA TECHNICAL MONITOR

L. H. Berge

608

REPORTS ON CONTRACT WORK:

(1.) Authors:

Development of Containerless Process For
Preparation of Tungsten with Improved Service Characteristics

Date: March 31, 1974

Contractor Report Number: GE 8-29879-MPR-1/

Report Identification Number:

V.E.1(2)

609

CONTRACT NUMBER

NAS8-29881

SUBJECT

Econometric Analysis of Potential Space Processed Products

CONTRACTOR

Auburn University
Auburn, Alabama

PRINCIPAL INVESTIGATOR

CONTRACT DATES

3/12/74 - 3/12/75

NASA TECHNICAL MONITOR

E. C. McKannan

610

CONTRACT NUMBER

NAS8-29951

SUBJECT

Teledyne
Liquid-Phase Sintered Compacts In Space

CONTRACTOR

Brown Engineering Company
Huntsville, Alabama

PRINCIPAL INVESTIGATOR

CONTRACT DATES

6/18/73 - 8/18/74

NASA TECHNICAL MONITOR

Hess

6/1

CONTRACT NUMBER

NAS8-30036

SUBJECT

Model Serpentiator Design

CONTRACTOR

Astro-Space Labs, Inc.
Huntsville, Alabama

PRINCIPAL INVESTIGATOR

CONTRACT DATES

NASA TECHNICAL MONITOR

62

REPORTS ON CONTRACT WORK:

1.) Authors: R. F. Pickard

Design and Fabricate an Engineering Model of the Atm. Serpentuator

Date: June 30, 1968

Contractor Report Number: ASL 8030036-MPR-1

Report Identification Number:

I.B(9)

2) Authors: J. R. Lloyd

Design, Fabrication, Test and Delivery of An
Engineering Model, Electromechanical Space Positioning Tool

Date: March 1969

Contractor Report Number: ASL FR-69-7

Report Identification Number:

I.B(10)

613

CONTRACT NUMBER

NAS8-30166

SUBJECT

Serpentuator Design and Test

CONTRACTOR

Astro-Space Labs, Inc.
Huntsville, Alabama

PRINCIPAL INVESTIGATOR

CONTRACT DATES

NASA TECHNICAL MONITOR

614

REPORTS ON CONTRACT WORK:

(1.) Authors: J. R. Lloyd

Design, Documentation, and Test Hardware
Engineering Model of a Space Mobility System (Serpentuator)

Date:

Contractor Report Number: ASL 8-30166-MPR-1

Report Identification Number:

I.B(11)

615

CONTRACT NUMBER

NAS8-30171

SUBJECT

Statistical Theory of Interfacial Thermal Conductivity
and Crystal Growth Under Weightlessness

CONTRACTOR

P. E. C. Research Associates, Inc.
Louisville, Colorado

PRINCIPAL INVESTIGATOR

CONTRACT DATES

NASA TECHNICAL MONITOR

6/6

REPORTS ON CONTRACT WORK:

(1.) Authors: D. G. Burkhard, H. Sexl, R. Sexl

Study of Interfacial Conductivity - Final Report

Date:

Contractor Report Number: NASA-CR-102989

Report Identification Number: 71N15601

IV.D(41)

617

CONTRACT NUMBER

NAS8-30250

SUBJECT

Electrohydrodynamic Space Processes

CONTRACTOR

Colorado State University
Fort Collins, Colorado

PRINCIPAL INVESTIGATOR

Winder

CONTRACT DATES

11/26/73 - 2/28/75

NASA TECHNICAL MONITOR

G. D. Adams

618

REPORTS ON CONTRACT WORK:

(1.) Authors: T. B. Jones

Electrohydrodynamic Space Processing Technology

Date: February 1974

• Contractor Report Number: Colorado SU 9-3-250-MPL-1/

Report Identification Number:

V.A(6)

619

CONTRACT NUMBER

NAS8-30252

SUBJECT

Diffusion Analysis in Low Gravity

CONTRACTOR

Howard University
Washington, D. C.

PRINCIPAL INVESTIGATOR

A. D. Ukanwa

CONTRACT DATES

12/1/73 - 11/30/74

NASA TECHNICAL MONITOR

C. F. Schafer
T. C. Bannister

620

CONTRACT NUMBER

NAS8-30253

SUBJECT

Investigation of Hydrogels for Data Potential Control

CONTRACTOR

University of Utah

PRINCIPAL INVESTIGATOR

CONTRACT DATES

11/5/73 - 12/14/75

NASA TECHNICAL MONITOR

621

CONTRACT NUMBER

NAS8-30268

SUBJECT

Solar Energy Concentrator System
for Crystal Growth and Zone Refining in Space

CONTRACTOR

Lockheed Missiles and Space Company
Huntsville, Alabama

PRINCIPAL INVESTIGATOR

McDermitt

CONTRACT DATES

12/5/73 - 2/5/75

NASA TECHNICAL MONITOR

R. C. Ruff

622

REPORTS ON CONTRACT WORK:

(1.) Authors:

Solar Energy Concentrator System For Crystal Growth
and Zone Refining In Space

Date:

Contractor Report Number: LMSC/HREC 8-30268-MPR-1/

Report Identification Number:

V.C.4(3)

623

CONTRACT NUMBER

NAS8-30289

SUBJECT

Multipurpose Electric Furnace Redesign, Fabrication and Test

CONTRACTOR

Westinghouse Research Laboratories
Pittsburgh, Pennsylvania

PRINCIPAL INVESTIGATOR

CONTRACT DATES

8/17/73 - 8/16/75

NASA TECHNICAL MONITOR

A. Boese

624

REPORTS ON CONTRACT WORK:

(1.) Authors: R. Mazelsky, C. S. Duncan

Multipurpose Electric Furnace System

Date: July 31, 1973

Contractor Report Number: WRL 8030289-MPR-1

Report Identification Number:

V.D.1(5)

625

CONTRACT NUMBER

NAS8-30471

SUBJECT

Acoustic Positioning System

CONTRACTOR

Intersonics, Incorporated
Chicago, Illinois

PRINCIPAL INVESTIGATOR

R. R. Whymark

CONTRACT DATES

11/20/73 - 3/7/75

NASA TECHNICAL MONITOR

L. H. Berge

626

REPORTS ON CONTRACT WORK:

(1.) Authors: R. R. Whymark

Acoustic Positioning For Space Processing Experiments

Date: December 1973

Contractor Report Number: Intersonics 8-30471-MPR-1

Report Identification Number:

V.B.2(6)

627

CONTRACT NUMBER

NAS8-30528

SUBJECT

Rocket Payload Non-Spin System

CONTRACTOR

Astro-Space Labs, Inc.
Huntsville, Alabama

PRINCIPAL INVESTIGATOR

CONTRACT DATES

3/15/74 - 9/15/74

NASA TECHNICAL MONITOR

V. H. Yost

628

REPORTS ON CONTRACT WORK:

(1.) Authors: R. C. Martin

Non-Spin Platforms

Date: April 15, 1974

Contractor Report Number: SDL 8-3-528-MPR-Apr 74

Report Identification Number:

I.B(12)

629

CONTRACT NUMBER

NAS8-30537

SUBJECT

Crystal Solidification in Space

CONTRACTOR

Massachusetts Institute of Technology
Cambridge, Massachusetts

PRINCIPAL INVESTIGATOR

H. C. Gatos
A. F. Witt

CONTRACT DATES

12/3/73 - 11/30/75

NASA TECHNICAL MONITOR

M. C. Davidson
C. F. Schafer

630

CONTRACT NUMBER

NAS8-30627

SUBJECT

Space Processing of Chalcogenide Glasses

CONTRACTOR

ITT Research Institute
Chicago, Illinois

PRINCIPAL INVESTIGATOR

D. C. Larsen

CONTRACT DATES

2/20/74 - 2/20/76

NASA TECHNICAL MONITOR

R. L. Nichols

631

REPORTS ON CONTRACT WORK:

(1.) Authors: D. C. Larsen; W. B. Crandall

Space Processing of Chalcogenide Glasses

Date: March 19, 1974

Contractor Report Number: ITTRI 8-30627-MPR-1/

Report Identification Number:

VI.A(8)

632

CONTRACT NUMBER

NAS8-30656

SUBJECT

Study of Diffusion Coefficient of Glasses under Zero-G

CONTRACTOR

Vanderbilt University
Knoxville, Tennessee

PRINCIPAL INVESTIGATOR

Kinser

CONTRACT DATES

4/26/74 - 11/30/75

NASA TECHNICAL MONITOR

R. L. Nichols

633

CONTRACT NUMBER

NAS8 - 30747

SUBJECT

Containerless Processing for Rocket Flight

CONTRACTOR

Wyle Labs

PRINCIPAL INVESTIGATOR

CONTRACT DATES

6/20/74 - 6/20/75

NASA TECHNICAL MONITOR

634

CONTRACT NUMBER

NAS8 - 30797

SUBJECT

Containerless Processing Systems for Space Processing

CONTRACTOR

General Electric Co.

PRINCIPAL INVESTIGATOR

CONTRACT DATES

7/2/74 - 1/31/76

NASA TECHNICAL MONITOR

635

CONTRACT NUMBER

NAS8-30887

SUBJECT

Automated Analytical Electrophoresis Facility

CONTRACTOR

University of Oregon

PRINCIPAL INVESTIGATOR

CONTRACT DATES

7/13/74 - 12/31/75

NASA TECHNICAL MONITOR

636

CONTRACT NUMBER

NAS8 - 30889

SUBJECT

M-518 Multipurpose Electric Furnace Modification

CONTRACTOR

Bendix Corp.

PRINCIPAL INVESTIGATOR

CONTRACT DATES

5/13/74 - 5/15/75

NASA TECHNICAL MONITOR

637

CONTRACT NUMBER

NAS8 - 31152

SUBJECT

Solution Crystal Growth

CONTRACTOR

General Electric Co.

PRINCIPAL INVESTIGATOR

CONTRACT DATES

2/11/75 - 8/11/75

NASA TECHNICAL MONITORS

638

CONTRACT NUMBER

NAS8 - 31381

SUBJECT

Processing of Glass Ceramics in Space

CONTRACTOR

Owens - Illinois

PRINCIPAL INVESTIGATOR

CONTRACT DATES

6/25/75 - 4/24/76

NASA TECHNICAL MONITOR

639

CONTRACT NUMBER

NAS8 - 31386

SUBJECT

Automated Analytical Electrophoretic Facility

CONTRACTOR

University of Oregon

PRINCIPAL INVESTIGATOR

CONTRACT DATES

4/7/75 - 2/6/76

NASA TECHNICAL MONITOR

640

CONTRACT NUMBER

NAS8 - 31445

SUBJECT

Space Processing of Immiscible Materials for Superconductors

CONTRACTOR

Battelle Memorial Institute

PRINCIPAL INVESTIGATOR

CONTRACT DATES

5/28/75 - 5/27/76

NASA TECHNICAL MONITOR

641

CONTRACT NUMBER

SUBJECT

Electrophoretic Separation of Lymphocytes
Under Normal and Zero-G

CONTRACTOR

Rogosin

PRINCIPAL INVESTIGATOR

CONTRACT DATES

6/5/75 - 1/5/76

NASA TECHNICAL MONITOR

642

CONTRACT NUMBER

NGR-22-009-517

SUBJECT

Solidification (Crystal Growth) in Space

CONTRACTOR

Massachusetts Institute of Technology

PRINCIPAL INVESTIGATOR

CONTRACT DATES

3/27/70 - 11/30/73

NASA TECHNICAL MONITOR

643

CONTRACT NUMBER

NGR 47-102-003

SUBJECT

Scientific Support

CONTRACTOR

Universities Space Research Association

PRINCIPAL INVESTIGATOR

H. Leidheiser

CONTRACT DATES

11/12/73 - 12/1/75

NASA TECHNICAL MONITOR

R. Snyder

644

CONTRACT NUMBER

NSR 01-003-02B

SUBJECT

An Orbiting Space Technology Applications
and Research Laboratory

CONTRACTOR

Auburn University
Auburn, Alabama

PRINCIPAL INVESTIGATOR

CONTRACT DATES

NASA TECHNICAL MONITOR

645

CONTRACT NUMBER

W-13475

SUBJECT

Investigation of Convection and Crystal Growth

CONTRACTOR

National Bureau of Standards

PRINCIPAL INVESTIGATOR

Passaglia

CONTRACT DATES

NASA TECHNICAL MONITOR

646