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<th>TITLE:</th>
<th>15-MILLION TEST/EVALUATION LAB DUE IN YEAR (2-PG)</th>
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<tr>
<td>AUTHOR</td>
<td>BELLER, W.</td>
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<tr>
<td>Date of Pub:</td>
<td>1/15/1962</td>
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<tr>
<td>Abstract:</td>
<td>PRESENTS DETAILS PERTAINING TO THE MOST ADVANCED AND COMPLETE SPACE TEST AND EVALUATION LAB IN THE FREE WORLD WHICH WILL BE OPERATED AT GSFC WITHIN A YEAR. WITH ITS NEW FACILITY, GODDARD WILL BE ABLE TO WORK THROUGH TEST AND EVALUATION ANY PAYLOAD THAT CAN BE LAUNCHED BY AN ATLAS-AGENA.</td>
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<tr>
<td>AUTHOR</td>
<td>OAKLEY, R.B.</td>
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<td>Date of Pub:</td>
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<tr>
<td>Abstract:</td>
<td>INCLUDED ARE CHRONOLOGIES FOR JANUARY, FEBRUARY, AUGUST, SEPTEMBER, OCTOBER, NOVEMBER, AND DECEMBER.</td>
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<td>AUTHOR</td>
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<td>AUTHOR</td>
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<th>TITLE:</th>
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<td>Date of Pub:</td>
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TITLE: 1969 NASA AUTHORIZATION (PART 1)

AUTHOR

Date of Pub: 2/7/1968

Abstract:
THIS DOCUMENT IS SUPERSEDED BY H.R.#15856.

TITLE: 1969 NASA AUTHORIZATION (PART 2)

AUTHOR

Date of Pub: 2/19/1968

Abstract:
THIS DOCUMENT IS SUPERSEDED BY H.R.#15856.

TITLE: 1969 NASA AUTHORIZATION (PART 3)

AUTHOR

Date of Pub: 2/19/1968

Abstract:
THIS DOCUMENT IS SUPERSEDED BY H.R.#15856.

TITLE: 1969 NASA AUTHORIZATION (PART 4)

AUTHOR

Date of Pub: 2/19/1968

Abstract:
THIS DOCUMENT IS SUPERSEDED BY H.R.#15856.

TITLE: 1970 NASA AUTHORIZATION (PART 1)

AUTHOR

Date of Pub: 3/4/1969

Abstract:
THIS DOCUMENT IS SUPERSEDED BY H.R.#11271.

TITLE: 1970 NASA AUTHORIZATION (PART 2)

AUTHOR

Date of Pub: 2/28/1969

Abstract:
THIS DOCUMENT IS SUPERSEDED BY H.R.#11271.

TITLE: 1970 NASA AUTHORIZATION (PART 4)

AUTHOR

Date of Pub: 3/6/1969

Abstract:
THIS DOCUMENT IS SUPERSEDED BY H.R.#11271.

TITLE: 1970 NASA AUTHORIZATION (PART 3)

AUTHOR

Date of Pub: 3/11/1969

Abstract:
THIS DOCUMENT IS SUPERSEDED BY H.R.11271.
TITLE: 245 00 [LETTER]

AUTHOR 100 1 JONES, BOB 700 10 LEHMA  Date of Pub:

Abstract:
300 2 P.
500 CARBON COPIES
520 LETTER FROM LEHMAN TO JONES, WITH ANSWER.
545 LEHMAN WAS SENATOR FROM [ ]
691 NIAGARA HEARINGS

TITLE: 245 10 [SPEECH TO MISSISSIPPI STATE COLLEGE, STARKVILLE]

AUTHOR 100 1 VON BRAUN, WERNER  Date of Pub:

Abstract:
300 17 L.
520 COMMENCEMENT ADDRESS ?

TITLE: AAP EXPERIMENT ASSIGNMENTS - CASE 600-1

AUTHOR FELDMAN, M.S.  Date of Pub: 6/27/1967

Abstract:
THIS MEMO REPORTS THE RESULTS OF AN EFFORT TO ORGANIZE AND UPDATE EXPERIMENT ASSIGNMENTS FOR INCLUSION IN THE AAP FLIGHT 1 MISSION ASSIGNMENTS DOCUMENT. EXPERIMENT ASSIGNMENT LISTS ARE INCLUDED WHICH INDICATE THE FOLLOWING: (1) ORIGINAL EXPERIMENT 1 ASSIGNMENTS TO THE ORBITAL WORKSHOP AND ATM MISSIONS- AAP-1 1 THROUGH AAP-4, (2) MISSION AAP-1A EXPERIMENT ASSIGNMENTS AND THE RESULTING UNLOADING OF EXPERIMENTSSS FROM AAP-1 THROUGH AAP-4, (3) PROPOSED ASSIGNMENTS FOR INCLUSION IN THE DRAFT FMAD, AND (4) CURRENT STATUS OF AAP EXPERIMENT ASSIGNMENTS.

TITLE: ACCEPTANCE CHECKOUT EQUIPMENT-SPACECRAFT (ACE-S/C) (B&W PHOTOGRAPH)

AUTHOR  Date of Pub: 1/1/1969

Abstract:
THOUSANDS OF SYSTEM TEST POINTS ON THE APOLLO SPACECRAFT MUST BE THOROUGHLY CHECKED OUT BEFORE IT CAN BE LAUNCHED. THESE TESTS ARE MADE USING CHECKOUT EQUIPMENT DESIGNED BY NASA AND DEVELOPED AND MANUFACTURED BY GE'S APOLLO SYSTEMS ORGANIZATION. THIS SYSTEM IS CAPABLE OF TESTING ALL THE CHECKPOINTS ON THE APOLLO MODULES MANUALLY, SEMI-AUTOMATICALLY, OR FULLY AUTOMATICALLY. SHOWN HERE IS THE CONTROL ROOM OF ONE OF THE 14 ACE STATIONS MANUFACTURED BY APOLLO SYSTEMS FOR NASA.

TITLE: ACCEPTANCE TESTING LUNAR AND PLANETARY VEHICLES (A CONCEPT)

AUTHOR KRAMER, F.  Date of Pub: 12/1/1968

Abstract:
THIS REPORT PRESENTS THE LEAST KNOWN OF THE TWO CONCEPTS WHICH ALLOW US TO STUDY THE EFFECTS OF LUNAR OR PLANETARY GRAVITATION ON THE FULL-SIZE prototype vehicle WITH RESPECT TO VEHICLE DYNAMICS AND DRIVING CHARACTERISTICS, AND TO FAMILIARIZE THE ASTRONAUTS WITH THE BEHAVIOR OF SURFACE VEHICLES UNDER DIFFERENT GRAVITATIONS. THE CONCEPT IS EXPLAINED AND ILLUSTRATED FOR LUNAR APPLICATIONS BECAUSE THE MOON EXHIBITS RELATIVE TO EARTH THE SMALLEST GRAVITATIONAL ATTRACTION, AND CAUSES, THEREFORE, THE GREATEST DEVIATION OF THE VEHICLE'S BEHAVIOR FROM ITS BEHAVIOR ON EARTH. HOWEVER, THE PRINCIPLE AND ITS IMPLEMENTATION ARE APPLICABLE WITHOUT RESTRICTION OR DEGRADATION TO ANY OTHER MAGNITUDE OF GRAVITATIONAL ACCELERATION.

TITLE: ACTIVE CONTRACTS LIST OF PROPULSION AND VEHICLE ENGINEERING LABORATORY
AUTHOR: SANDFORD, J.W./FRASER, G.F.
Date of Pub: 6/1/1966

Abstract:

CONTRACT LISTING BY CONTRACTOR WITHIN THE FOLLOWING DIVISIONS: VEHICLE SYSTEMS, MATERIALS, PROPULSION, STRUCTURES, ETC.

TITLE: ADAPTATION OF THE SATURN S-II FOR GROUND LAUNCH STAGE (PAPER)

AUTHOR: SCHMIEDER, D.H.
Date of Pub: 11/22/1963

Abstract:

TITLE: ADMINISTRATIVE HISTORY OF NASA, 1958-1963 (TWO COPIES)

AUTHOR: ROSHOLT, R.L.
Date of Pub: 1/1/1966

Abstract:

TITLE: ADVANCED CONTROL SYSTEMS FOR LAUNCH VEHICLES

AUTHOR: BLAIR, J.C./LOVINGOOD, J.A./GEIS
Date of Pub: 8/1/1966

Abstract:

DISCUSSES THE PROBLEM AREAS FORESEEABLE IN LAUNCH VEHICLE CONTROL, PRESENTS CERTAIN SYSTEMS PROPOSED AS SOLUTIONS, AND INDICATES WHERE SOME OF THE WEALTH OF MODERN CONTROL THEORY THAT HAS BEEN DEVELOPED OVER THE PAST FEW YEARS MAY BE APPLIED.

TITLE: ADVANCED CONTROL SYSTEMS FOR THE SATURN V LAUNCH VEHICLE

AUTHOR: borelli, m.t./carroll, s.n.
Date of Pub: 8/14/1967

Abstract:

TITLE: ADVANCEMENTS IN TELEOPERATOR SYSTEMS

AUTHOR
Date of Pub: 1/1/1970

Abstract:

TITLE: ADVANCES IN PUMPING TECHNOLOGY AND ROCKET ENGINE TRUBOPUMP APPLICATIONS

AUTHOR: MACGREGOR, C.A.
Date of Pub: 6/2/1964

Abstract:

THIS REPORT IS DIVided INTO TWO GENERAL PARTS: (1) A DESCRIPTION OF TURBOPUMPS FOR LIQUID ROCKET ENGINES AS THEY EXIST TODAY, INCLUDING BACKGROUND INFORMATION ON HOW TURBOPUMPS HAVE EVOLVED TO THEIR PRESENT CONFIGURATIONS AND (2) PORTIONS OF THIS EFFORT THAT MAY HAVE SOME APPLICABILITY TO THE GENERAL ECONOMY.
Abstract:

THIS REPORT PRESENTS A SUMMARY OF RESULTS FROM THE AERODYNAMIC FLIGHT EVALUATION OF SATURN I BLOCK I VEHICLES (SA-1 THROUGH SA-4). THE EVALUATION OF TELEMETERED DATA INCLUDED AXIAL FORCE CALCULATIONS, STABILITY ANALYSIS, AND ENVIRONMENTAL STEADY-STATE AND FLUCTUATING PRESSURE DATA ANALYSES. COMPARISONS ARE MADE WITH WIND TUNNEL AND/OR THEORETICAL, PREDICTED VALUES.
THIS MANUAL IS THE OFFICIAL SINGLE SOURCE OF AERODYNAMIC DATA FOR PROJECT APOLLO. IT SERVES TO UNIFY ALL AERODYNAMIC DATA FOR ALL PERTINENT CONFIGURATIONS AND FLIGHT OPERATIONS CONSISTENT WITH MISSION AND ABORT ENVELOPES. THE APOLLO DATA CONTAINED HEREIN ARE BASED PRIMARILY UPON WIND TUNNEL TESTS, HOWEVER, THEORETICAL ESTIMATES ARE USED WHERE NECESSARY. SECTION ONE, GENERAL INFO, DESCRIBES THE MISSIONS AND VEHICLES COMPONENTS, contains dimension, illustrations, typical trajectory plots, and weight data; these are provided to assist in the use of the aerodynamic data. Section two, lists the nomenclature and symbols used throughout the manual, illustrates the system of coefficients and lists typical data tolerances. Section three through nine, present the aerodynamic force, moment and damping data. Data are presented for the appropriate angle of attack, roll angle, and mach number ranges as determined by mission requirements.

TITLE: AERONAUTICAL AND ASTRONOMICAL EVENTS OF 1961
AUTHOR
Date of Pub: 6/7/1962

Abstract:

TITLE: AEROSPACE PLANES BIBLIOGRAPHY
AUTHOR
Date of Pub: 9/2/1969

Abstract:

SEARCH CONTROL NO. 022101

TITLE: AEROSPACE VEHICLE SIMULATION AND CHECKOUT
AUTHOR MOORE,J.W./TRAUBOTH,H.H. Date of Pub: 4/1/1966

Abstract:
ADVANCEMENT OF THE SPACE AGE INTO INCcreasingLY COMPLEX AND AMBITIOUS MISSIONS REQUIRING DEVELOPMENT AND OPERAION OF MORE S Sophisticated and Intricate LAUNCH VEHICLES HAS GENERATED NUMEROUS PROBLEM AREAS. THE PURPOSE OF THIS PAPER IS TO DEFINE AEROSPACE VEHICLE SIMULATION, DISCUSS RELATIONSHIP OF THIS SIMULATION TO MAJOR PROBLEM AREAS OF CHECKOUT, DESCRIBE DEVELOPMENT AND IMPLEMENTATION OF THIS SIMULATION SYSTEM; AND INDICATE MULTIDISCIPLINE APPLICATIONS TO PRESENT AND FUTURE PROGRAMS.

TITLE: AEROSPACE WELDING STANDARDS FOR THE MINUTES OF THE MEETING OF AMERICAN ORDNANCE ASSOCIATION
AUTHOR
Date of Pub: 1/1/1963

Abstract:

TITLE: AFTER THE MOON - WHAT?
AUTHOR
Date of Pub: 9/25/1969

Abstract:
THE PURPOSE OF THIS SEMINAR WAS TO PROVIDE THE GOVERNMENT/INDUSTRY TEAM WITH NEW INSIGHTS INTO THE FUTURE OF MANNED SPACE FLIGHT AND ITS ATTENDANT REQUIREMENTS FOR QUALITY WORKMANSHIP IN THE PROSECUTION OF APOLLO AND FOLLOW-ON PROGRAM ACTIVITIES. GUIDELINES, OBJECTIVES, GOALS AND MOTIVATIONAL INNOVATIONS WERE DISCUSSED, AND PRESENTATIONS WERE GIVEN BY KEY MANAGEMENT PERSONNEL OF NASA AND THE AEROSPACE INDUSTRY.

TITLE: ALIGNMENT TOOL AIDS IN LARGE TANK FABRICATION
AUTHOR VARDAMAN,W.K. Date of Pub: 3/1/1963

Abstract:
DEVELOPMENT OF A TWO-PIECE MECHANICAL ALIGNMENT TOOL HAS SOLVED A MAJOR PROBLEM FOR WELDING LARGE, UNUSUAL CONTOURED SKIN SECTIONS. MASSIVE MECHANICAL, PNEUMATIC, OR HYDRAULICALLY-OPERATED DEVICES ARE NO LONGER REQUIRED FOR EFFECTIVE TANK WALL ALIGNMENT. THE TOOL, A MANUALLY ATTACHED DEVICE, CAN BE POSITIONED ALONG THE WELD LINE AT ANY INTERVAL DICTATED BY THE MATERIAL THICKNESS OR RIGIDITY OF THE PARENT METALS.

TITLE: ALL DIGITAL SIMULATION OF SATURN I, IB AND V BOOST VEHICLE AND GUIDANCE AND CONTROL SYSTEMS
AUTHOR CARSON, W.D./POUPARD, R.E./STE
Date of Pub: 6/1/1966

Abstract:
The nerve center of the Saturn is its guidance and control system. An airborne digital computer provides the link which closes both the guidance and control loops, making verification of the flight computer program of vital importance. During a powered flight this onboard digital computer program can be divided into four major parts: (1) guidance, including navigation, (2) control, (3) vehicle sequencing, and (4) computer telemetry. Each of these major computer functions must be verified and tested prior to launch, and many procedures are currently used. The all-digital simulation described here consists of a marriage between two separate simulators. The first simulator is a digital flight computer model called SIMULATIONAL INTERPRETIVE ROUTINE by Tedley, since it makes the IBM 7094 data processing system appear to be the flight computer. The second simulator is a mathematical model of the Saturn I vehicle and the remaining guidance and control hardware.

TITLE: ALMOST EVERYTHING HAS A PRICE TAG, BUT HOW HIGH THE MOON'S?
AUTHOR WILLIAMS, F.L./RUPPE, H.O./REICH
Date of Pub: 5/1/1961

Abstract:
An economical approach to lunar flight is offered by orbital (1) operation utilizing recoverable launch vehicles, rather than the (1) direct approach. This article includes a comparison of estimated (1) costs for three modes of lunar travel, with and without (1) recoverability. The least expensive method is indicated to be (1) where earth and lunar orbits are used.

TITLE: ALTITUDE SIMULATION IN SATURN S-IV STAGE TESTING
AUTHOR HOFFERTH, D.D./WILSON, E.L./POL
Date of Pub: 1/1/1965

Abstract:
Douglas has been involved in testing the Saturn S-IV stage at the Sacramento Test Center for two years. The propulsion system for (1) the S-IV stage consists of 6 P&W rocket engines which are designed specifically for high altitude start and operation. During static firing tests of this engine at sea level, a steam jet ejector in combination with a diffuser, are used to simulate (1) altitude conditions. The intent of this paper is to examine the (1) performance of this altitude simulation system, and to discuss (1) problems encountered in making it operational.

TITLE: AMERICAN AND SOVIET SPACE PROGRAMS
AUTHOR BLEY, K.B.
Date of Pub: 1/1/1966

Abstract:
Microfiche on hand

TITLE: AMERICAN PROGRESS AND GOALS IN SPACE
AUTHOR WEBB, J.E.
Date of Pub: 10/30/1964

Abstract:
Discusses some of the major achievements and plans of the national space program

TITLE: AMERICA'S SPACEPORT (BROCHURE)
TITLE: ANALOG SIMULATION OF UPRATED SATURN I STAGE PROPULSION SYSTEM DYNAMIC CHARACTERISTICS
AUTHOR: LEHNER, J.W.
Date of Pub: 11/1/1966

Abstract: THE PURPOSE OF THIS PAPER IS TO PRESENT THE TECHNIQUES AND LOGIC EMPLOYED IN DEVELOPMENT OF AN ANALOG COMPUTER MODEL TO SIMULATE UPRATED SATURN I FIRST STAGE PROPULSION SYSTEM DYNAMIC CHARACTERISTICS. RESTRAINTS, PROBLEM AREAS, AND MAJOR ASSUMPTIONS ARE INCLUDED.

TITLE: ANALYSIS AND PROJECTIONS OF SPACE VEHICLE AUTOMATIC CHECKOUT AND LAUNCH
AUTHOR: VEDANE, C.R.
Date of Pub: 10/1/1966

Abstract: THE PURPOSE OF THIS PAPER IS TO PRESENT A PROJECTION OF THE IMPROVEMENTS THAT MUST BE MADE BEFORE MAXIMUM BENEFITS CAN BE OBTAINED FROM THE AUTOMATION EFFORT. A BRIEF DESCRIPTION IS GIVEN OF TYPICAL CHECKOUT OPERATIONS AND OF THE EVOLUTION OF HARDWARE. WITH THIS AS BACKGROUND, AN ANALYSIS IS MADE OF THE IMPLEMENTATION PROBLEMS EXPERIENCED IN AUTOMATION; AND FINALLY, FROM THIS ANALYSIS PROJECTIONS ARE DERIVED AND STATED.

TITLE: ANALYSIS OF AEROSPACE FUNDING AND EMPLOYMENT (FY 1956-1966)
AUTHOR: GEORGE, R.D. / PHELAN, E.M.
Date of Pub: 9/1/1965

Abstract: MICROFICHE ON HAND

TITLE: ANALYSIS OF THERMAL STRESSES AND METAL MOVEMENT DURING WELDING
AUTHOR: MASUBUCHI, K. / SIMMONS, F.B. / MO
Date of Pub: 7/1/1968

Abstract: A LITERATURE SURVEY ON THERMAL STRESSES DURING WELDING AND BUCKLING AFTER WELDING IS DESCRIBED. FROM THE ANALYSES FOUND, A COMPUTER PROGRAM WAS DEVELOPED TO CALCULATE THERMAL STRESSES AND RESULTING RESIDUAL STRESSES DUE TO A MOVING HEAT SOURCE. THIS PROGRAM IS INCLUDED IN THE APPENDIX. MSFC STUDIES ON THREE-DIMENSIONAL MOVEMENT DURING WELDING OF FLAT PLATE SPECIMENS ARE SUMMARIZED AND INTERPRETED ON THE BASIS OF THE BATTELLE LITERATURE SURVEY AND COMPUTER ANALYSIS. IT IS CONCLUDED THAT LOCAL METAL MOVEMENT DURING WELDING APPEARS TO BE CAUSED BY BUCKLING. FUTURE PROGRAMS TO IMPROVE THE PRESENT ANALYSIS ARE RECOMMENDED.

TITLE: ANALYTICAL WEIGHT ANALYSIS OF SATURN VEHICLE SA-1
AUTHOR
Date of Pub: 4/18/1960

Abstract:

TITLE: ANALYSIS OF THE LUNAR RETURN MISSION
AUTHOR: GAPCYNSKI, J.P. / TOLSON, R.H.
Date of Pub: 8/1/1963

Abstract:
AN ANALYSIS HAS BEEN MADE OF THE LUNAR INJECTION CONDITIONS WHICH ARE REQUIRED TO ESTABLISH EARTH-RETURN TRAJECTORIES SATISFYING SPECIFIED REENTRY CONDITIONS. IT HAS BEEN ASSUMED IN THIS ANALYSIS THAT THE RETURN TRAJECTORY IS INITIATED FROM EITHER A CIRCULAR LUNAR ORBIT HAVING AN ARBITRARY INCLINATION AND NODAL POSITION WITH RESPECT TO THE EARTH-MOON PLANE, OR FROM AN ARBITRARY POSITION ON THE LUNAR SURFACE. IN THE LATTER CASE, IT IS FURTHER ASSUMED THAT A Selenocentric Parking Orbit Is Established Prior To Injection. No Consideration Is Given To Use Of Orbital-Plane Changes To Ensure Proper Earth Reentry. The Analysis Is Based On A Combination Of Two-Body Solutions, Or The "Patched-Conic" Technique.
AUTHOR

Date of Pub: 5/7/1969

Abstract:

TITLE: APOLLO 10(AS-505) TECHNICAL INFORMATION SUMMARY - APOLLO SATURN V SPACE VEHICLE

AUTHOR

Date of Pub: 5/1/1969

Abstract:

THIS DOCUMENT PRESENTS A BRIEF AND CONCISE DESCRIPTION OF THE AS-505 VEHICLE. WHERE NECESSARY FOR CLARIFICATION, ADDITIONAL RELATED INFORMATION HAS BEEN INCLUDED. THE INFORMATION PRESENTED DESCRIBES LAUNCH PREPARATION ACTIVITIES, LAUNCH FACILITIES AND THE SPACE VEHICLE.

TITLE: APOLLO 10/AS-505 MISSION

AUTHOR

Date of Pub: 5/1/1969


TITLE: APOLLO 11 (AS-506) TECHNICAL INFORMATION SUMMARY - APOLLO SATURN V SPACE VEHICLE

AUTHOR

Date of Pub: 6/25/1969

Abstract:

THIS DOCUMENT PRESENTS A BRIEF AND CONCISE DESCRIPTION OF THE AS-506 VEHICLE AND MISSION. WHERE NECESSARY FOR CLARIFICATION, ADDITIONAL RELATED INFORMATION HAS BEEN INCLUDED. THE INFORMATION DESCRIBES LAUNCH PREPARATION, GROUND SUPPORT ACTIVITIES, AND THE SPACE VEHICLE.

TITLE: APOLLO 11 DOCKING MANEUVER (BLACK AND WHITE PHOTOGRAPH WITH NEWS RELEASE)

AUTHOR

Date of Pub: 1/1/1969

Abstract:

APOLLO COMMAND AND SERVICE MODULES TURN AROUND TO APPROACH LUNAR MODULE WHICH IS TUCKED INTO THE FORWARD PORTION OF MCDONNELL DOUGLAS S-IVB ROCKET - AFFECTIONATELY DUBBED "BIG MOOSE" BY APOLLO ASTRONAUTS.

TITLE: APOLLO 11 LUNAR SURFACE OPERATIONS PLAN (FINAL)

AUTHOR WOOD, W.H.

Date of Pub: 6/27/1969

Abstract:

THIS FINAL EDITION OF THE LUNAR SURFACE OPERATIONS PLAN DEFINES EQUIPMENT REQUIREMENTS, CREWEQUIPMENT INTERFACES, AND FINAL FLIGHT PLANNING AND CREW ACTIVITIES FOR LUNAR SURFACE EVA OPERATIONS DURING THE FIRST MANNED LUNAR LANDING MISSION.

TITLE: APOLLO 11 MISSION PROFILE

AUTHOR

Date of Pub: 1/1/1969

Abstract:
TITLE: APOLLO 12 PRINCIPAL PRIME CONTRACTORS AND SUBCONTRACTORS

AUTHOR

Date of Pub: 12/1/1969

Abstract:

THIS BOOKLET LISTS THE PRINCIPAL PRIME CONTRACTORS AND SUBCONTRACTORS DIRECTLY INVOLVED IN THE FLIGHT HARDWARE, LAUNCH SUPPORT, MISSION CONTROL AND COMMUNICATIONS AND DATA ACQUISITION ASSOCIATED WITH THE APOLLO 12 LUNAR LANDING MISSION.

TITLE: APOLLO 4 PRE-LAUNCH PRESS CONFERENCE

AUTHOR

Date of Pub: 11/8/1967

Abstract:

TITLE: APOLLO 4 PRESS KIT

AUTHOR

Date of Pub: 11/2/1967

Abstract:

TITLE: APOLLO 4 SPURS LUNAR LANDING PROGRAM

AUTHOR

Date of Pub: 11/9/1967

Abstract:

APOLLO 4 LIFTED OFF FROM KSC ON 9 NOVEMBER 1967 AT 6:00:01.4 A.M. CST. THE MISSION INCLUDED SEVERAL SIGNIFICANT MILESTONES IN THE U.S. LUNAR LANDING PROGRAM: FIRST LAUNCH FROM KSC COMPLEX 19-BUILT AROUND A MOBILE CONCEPT, FIRST FLIGHT OF INTEGRATED APOLLO/SATURN SPACE VEHICLE, FIRST FLIGHT OF THE FIRST (S-IC) AND SECOND (S-II) STAGES OF THE SATURN V LAUNCH VEHICLE, FIRST ENGINE RESTART IN ORBIT OF THE UPPER (S-IVB) STAGE OF THE SATURN V VEHICLE, AND FIRST SUCCESSFUL DEMONSTRATION OF APOLLO SPACECRAFT PERFORMANCE ON ENTERING THE EARTH'S ATMOSPHERE AT SPEEDS TO BE REACHED ON RETURN FROM A LUNAR MISSION.

TITLE: APOLLO 4: PROOF POSITIVE

AUTHOR

Date of Pub: 12/1/1967

Abstract:

IT IS STARTLING TO KNOW THAT WHEN THREE AMERICAN ASTRONAUTS EMBARK ON A MISSION TO THE MOON SOME TWO YEARS HENCE EVERY ITEM OF EQUIPMENT IN THEIR MULTI-MILLION-PART VEHICLE WILL BE GOING ALOFT FOR THE FIRST TIME. A MODERN AIRPLANE MAY HAVE HUNDREDS EVEN THOUSANDS OF FLIGHT TEST HOURS BEFORE IT ENTERS OPERATIONAL SERVICE. BUT CONTEMPORARY SPACE TECHNOLOGY DICTATES A ONE-FLIGHT LIFETIME FOR SPACE VEHICLE COMPONENTS; THE PARTS RECOVERED ARE USEFUL ONLY FOR STUDY PURPOSES. THESE FACTS POINT UP THE EXTRAORDINARY TYPE RELIABILITY REQUIREMENT FOR EVERY ARTICLE OF EQUIPMENT IN THE SATURN V/APOLLO STACK, ALL ITEMS OF A GIVEN TYPE MUST BE PERFECT SINCE THEY FLY ONLY ONCE. APOLLO 4 WAS WITHOUT DOUBT THE MOST IMPORTANT UNMANNED SPACE OPERATION EVER LAUNCHED. A NEAR FLAWLESS "TESTBOOK" TEST, IT RESTORED A GREAT DEAL OF THE WANING PUBLIC CONFIDENCE IN THE APOLLO PROGRAM. IT PROVED THE SPACEWORTHINESS AND COMPATIBILITY OF THE SATURN V/APOLLO DESIGN AND IT SERVED AS THE INITIAL REHEARSAL FOR THE LUNAR LANDING.

TITLE: APOLLO 5 (AS-204/LM-1) TECHNICAL INFORMATION SUMMARY - APOLLO SATURN IB FLIGHT VEHICLE

AUTHOR

Date of Pub: 12/15/1967

Abstract:
This document presents a brief and concise description of the AS-204/LM-1 Apollo Saturn Space Vehicle. Where necessary for clarification, additional related information has been included. It describes launch preparation activities, launch facilities, and the space vehicle.

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<th>APOLLO 8 (AS-503) MISSION OPERATION REPORT</th>
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THIS DOCUMENT PROVIDES MANAGEMENT WITH TIMELY, COMPLETE, AND DEFINITIVE INFORMATION ON FLIGHT MISSION PLANS, AND ESTABLISHES OFFICIAL MISSION OBJECTIVES WHICH PROVIDE THE BASIS FOR ASSESSMENT OF MISSION ACCOMPLISHMENT.

TITLE: APOLLO 8 (AS-503) TECHNICAL INFORMATION SUMMARY - APOLLO SATURN V SPACE VEHICLE

AUTHOR

Date of Pub: 12/2/1968

Abstract:

THIS DOCUMENT PRESENTS A BRIEF AND CONCISE DESCRIPTION OF THE AS-503 VEHICLE. WHERE NECESSARY FOR CLARIFICATION, ADDITIONAL RELATED INFORMATION HAS BEEN INCLUDED. THE INFORMATION PRESENTED HEREIN DESCRIBES LAUNCH PREPARATION ACTIVITIES, LAUNCH FACILITIES, AND THE SPACE VEHICLE.

TITLE: APOLLO 9 (AS-504) TECHNICAL INFORMATION SUMMARY - APOLLO SATURN V SPACE VEHICLE

AUTHOR

Date of Pub: 2/3/1969

Abstract:

THIS DOCUMENT PRESENTS A BRIEF AND CONCISE DESCRIPTION OF THE AS-504 VEHICLE. WHERE NECESSARY FOR CLARIFICATION, ADDITIONAL RELATED INFORMATION HAS BEEN INCLUDED. THE INFORMATION PRESENTED HEREIN DESCRIBES LAUNCH PREPARATION ACTIVITIES, LAUNCH FACILITIES, AND THE SPACE VEHICLE.

TITLE: APOLLO 9 PRESS KIT

AUTHOR

Date of Pub: 2/23/1969

Abstract:

TITLE: APOLLO APPLICATIONS PROGRAM...A BIBLIOGRAPHY (MICROFICHE)

AUTHOR

Date of Pub: 4/1/1966

Abstract:

TITLE: APOLLO DOCUMENTATION ADMINISTRATION INSTRUCTION

AUTHOR

Date of Pub: 8/1/1964

Abstract:

THIS MANUAL ESTABLISHES POLICIES, ASSIGNS RESPONSIBILITIES AND PRESCRIBES MANAGEMENT PROCEDURES FOR IDENTIFICATION, PLANNING, SELECTION, ACQUISITION, CONTROL, SCHEDULING AND MINIMIZATION OF ESSENTIAL DOCUMENTS REQUIRED FOR THE MANAGEMENT OF THE APOLLO PROGRAM. PROCEDURES, METHODS, AND PRACTICES OF PAST NASA AND OTHER GOVERNMENT PROGRAMS ARE USED TO INDICATE THE MOST EFFECTIVE MANAGEMENT OF A PROGRAM DOCUMENTATION SYSTEM.

TITLE: APOLLO INTERFACE CONTROL DOCUMENT LOG

AUTHOR

Date of Pub: 7/29/1966

Abstract:

THIS LOG IS PUBLISHED FOR NASA HQ BY MSFC AND IS A LISTING IN ALPHA-NUMERIC SEQUENCE BY EFFECTIVITY OF APOLLO INTERFACE DOCUMENTS AND REVISIONS RELEASED AND SCHEDULED TO BE RELEASED FOR SATURN 1B AND SATURN V VEHICLES WITH RESPECT TO APOLLO. THIS LOG IS PUBLISHED MONTHLY.
ONE POSSIBLE CONCEPTUAL DEFINITION OF AN EARLY APOLLO LOGISTIC SUPPORT SYSTEM (ALSS) IS PRESENTED AND VARIOUS PAYLOADS FOR THE SYSTEM ARE BRIEFLY DISCUSSED. A MORE DETAILED DISCUSSION OF ONE PAYLOAD, A LUNAR MOBILE LABORATORY (MOLAB), IS GIVEN, INCLUDING A SUMMARY DISCUSSION OF MAJOR SUBSYSTEMS AND CRITICAL AND GENERAL OPERATIONS PLAN FOR MOLAB ARE DEFINED IN A MANNER SUITABLE FOR MISSION OPTIMIZATION, ONCE VALID DESIGN DATA BECOMES AVAILABLE. SOME ASPECTS OF THE MOLAB TESTING PROGRAM ARE PRESENTED. IT IS CONCLUDED THAT THIS SYSTEM APPEARS FEASIBLE AND THE PROBLEMS WHICH PRESENTLY CONFRONT ITS DESIGN AND DEVELOPMENT DO NOT SEEM INSURMOUNTABLE.

THE PAPERS PRESENTED COVERED ALL ASPECTS OF THE LUNAR LANDING MISSION, WITH PRIMARY EMPHASIS ON THE LUNAR OPERATIONS PHASES OF THE MISSION. THE PURPOSE OF THE SYMPOSIUM WAS TO PRESENT THE CURRENT LUNAR LANDING MISSION PLAN, AND TO SUBJECT THE PLAN TO A CRITICAL REVIEW BY THE BODY OF EXPERTS WHO COMPOSED THE AUDIENCE.

ORGANIZATION AND RESPONSIBILITIES OF THE MANNED SPACECRAFT CENTER ARE REVIEWED.

THIS GLOSSARY OF ACRONYMS AND ABBREVIATIONS COMMONLY FOUND IN APOLLO PROGRAM DOCUMENTATION WAS COMPILED BY MSC HISTORICAL OFFICE. THE PURPOSE OF THIS GLOSSARY IS TO PROVIDE A WORKING TOOL FOR HISTORIANS AND OTHER PERSONS PERFORMING RESEARCH ACTIVITY.

APOLLO PROGRAM FLASH REPORT, S-IC STAGE F-1 ENGINE (TELEGRAPHIC MESSAGE TO GEN. PHILLIPS, NASA HQ)

Abstract:
DISCUSSES PROBLEM OF SEPARATIONS IN THE BRAZE USED BETWEEN THE RINGS AND THE LANDS OF THE F-1 ENGINE THRUST CHAMBER INJECTOR.

PRESENTS AN ASSESSMENT OF THE PROBLEM CONCERNING RING-TO-LAND SEPARATION OF THE F-1 ENGINE THRUST CHAMBER INJECTOR.

TITLE: APOLLO PROGRAM PACE AND PROGRESS
AUTHOR
Date of Pub: 3/10/1967

Abstract:

TITLE: APOLLO QUALIFICATION TEST OF THE DOCKING SYSTEM PROBE ASSEMBLY
AUTHOR JACKOLA, A.S.
Date of Pub: 1/1/1969

Abstract:

TITLE: APOLLO SATURN LIEF OPERATIONS PLAN
AUTHOR
Date of Pub: 9/1/1968

Abstract:
THIS DOCUMENT IDENTIFIES THE SUPPORT FUNCTIONS TO BE PERFORMED BY MSFC THROUGH LIEF (LAUNCH INFORMATION EXCHANGE FACILITY) DURING APOLLO SATURN MISSION OPERATIONS AND THE FACILITIES REQUIRED TO CARRY OUT THESE FUNCTIONS.  IT ALSO IDENTIFIES SUBORDINATE MISSION SPECIFIC DOCUMENTS REQUIRED TO CARRY OUT LIEF OPERATIONS.

TITLE: APOLLO SPACECRAFT (COMMAND AND SERVICE MODULES) NEWS REFERENCE
AUTHOR
Date of Pub: 1/1/1969

Abstract:
THE BOOK IS ARRANGED IN FIVE DISTINCT PARTS: (1) GENERAL INFORMATION ABOUT THE PROGRAM, THE ELEMENTS OF THE SPACECRAFT AND LAUNCH VEHICLES, AND THE MISSIONS; (2) DETAILED DESCRIPTION OF THE APOLLO MODULES; (3) DESCRIPTIONS OF EQUIPMENT AND OPERATION OF MAJOR SUBSYSTEMS; (4) VITAL OPERATIONS AND SUPPORT; AND (5) SERIES OF REFERENCES.

TITLE: APOLLO SPACECRAFT ... A CHRONOLOGY
AUTHOR
Date of Pub: 1/1/1969

Abstract:
OTHER INFORMATION ON APOLLO IS IN SATURN FILE 03.03

TITLE: APOLLO SPACECRAFT NEWS REFERENCE
AUTHOR
Date of Pub: 1/1/1969

Abstract:
CONTENTS INCLUDE MISSION DESCRIPTION, APOLLO SPACECRAFT, CREW PERSONAL EQUIPMENT, ENVIRONMENTAL CONTROL, CONTROLS AND DISPLAYS, MAIN PROPULSION, COMMUNICATIONS, INSTRUMENTATION, LIGHTING, ETC.

TITLE: APOLLO SUPPORT PROGRAM - PHASE I: APOLLO TERMINOLOGY STANDARDS (FINAL STUDY REPORT)
AUTHOR
Date of Pub: 8/31/1962

Abstract:
THIS REPORT CONCLUDES PHASE I STUDY ACTIVITIES ON THE REQUIREMENTS FOR TERMINOLOGY STANDARDIZATION OF THE APOLLO INTEGRATION SUPPORT PROGRAM. A REVIEW IS MADE OF THE STUDIES CONDUCTED AND THE FINDINGS RESULTING FROM THESE ACTIVITIES. CONCLUSIONS ARE DRAWN AND RECOMMENDATIONS ARE MADE FOR A PROPOSED APOLLO TERMINOLOGY HANDBOOK. AN IMPLEMENTATION PLAN FOR PRODUCING AND MAINTAINING AN APOLLO TERMINOLOGY HANDBOOK IS INCLUDED. A SAMPLE OF SUCH A TERMINOLOGY HANDBOOK IS PRODUCED AS PART 2 OF THIS REPORT.

TITLE: APOLLO SYSTEM DESCRIPTIONS. VOLUME II - SATURN LAUNCH VEHICLES (NASA-MSFC)

AUTHOR

Date of Pub: 2/1/1964

Abstract:

TITLE: APOLLO TELESCOPE MOUNT (MSFC FACT SHEET)

AUTHOR

Date of Pub: 3/1/1968

Abstract:


TITLE: APOLLO VEHICLE PROPULSION SYSTEMS

AUTHOR BELEW, L.F.

Date of Pub: 7/26/1965

Abstract:


TITLE: APOLLO/SATURN CONSOLIDATED INSTRUMENTATION PLAN FOR AS-204/LM-1

AUTHOR

Date of Pub: 10/16/1967

Abstract:

THE REPORT REPRESENTS THE CONSOLIDATED INSTRUMENTATION PLAN FOR EMPLOYING OPTICAL AND ELECTRONIC DATA ACQUISITION SYSTEMS TO MONITOR THE PERFORMANCE AND TRAJECTORY OF THE APOLLO/SATURN VEHICLE, AS-204/LM-1 DURING POWERED FLIGHT. TELEMETRY AND ELECTRONIC TRACKING EQUIPMENT ON BOARD THE VEHICLE AND DATA ACQUISITION SYSTEMS MONITORING THE FLIGHT ARE DISCUSSED. FLIGHT SAFETY INSTRUMENTATION AND VEHICLE DATA TRANSMISSION ARE DESCRIBED, AND GEOPHYSICAL INFORMATION IS PROVIDED.

TITLE: APOLLO/SATURN DATA HANDBOOK
THE MANUAL PROVIDES KSC MANAGEMENT PERSONNEL WITH GENERAL INFO RELATIVE TO THE APOLLO/SATURN PROGRAM. EMPHASIS IS PLACED ON SATURN LAUNCH FACILITIES AND RELATED SUPPORT EQUIPMENT. SATURN VEHICLE PARAMETERS ARE INCLUDED WITH LAUNCH COMPLEXES 34, 37, AND 39.

TITLE: APOLLO/SATURN GUIDE FOR THE PREPARATION OF SPECIFICATION (TWO VOLUMES) VOLUME II NEW EQUIPMENT AND MAJOR MODIFICATIONS

AUTHOR

Date of Pub: 5/1/1967

Abstract:
VOLUME II PROVIDES GENERAL INSTRUCTIONS FOR UNIFORM PREPARATION OF PROJECT, SYSTEM, AND CONTRACT AND ITEMS SPECIFICATIONS FOR NEW EQUIPMENT AND MAJOR REPAIRS AT KSC.

TITLE: APOLLO/SATURN GUIDE FOR THE PREPARATION OF SPECIFICATIONS (TWO VOLUMES), VOLUME I-EXISTING EQUIPMENT

AUTHOR

Date of Pub: 5/1/1967

Abstract:
VOLUME I PROVIDES GUIDELINES FOR PREPARATION OF PROJECT, SYSTEM, AND CONTRACT END ITEMS LEVEL SPECIFICATIONS IN ACCORDANCE WITH REQUIREMENTS OF K-AM-03.}

TITLE: APOLLO/SATURN LOGISTICS SUPPORT REQUIREMENTS PLAN

AUTHOR

Date of Pub: 2/14/1967

Abstract:

TITLE: APOLLO/SATURN LUNAR LANDING PROGRAM

AUTHOR

Date of Pub: 5/1/1968

Abstract:

TITLE: APOLLO: HOW THE UNITED STATES DECIDED TO GO TO THE MOON

AUTHOR MANDELBAUM, L.

Date of Pub: 2/14/1969

Abstract:

TITLE: APOLLO-LEM DOCKING COMBINED PROBE AND DROGUE ASSEMBLIES STATIC STRUCTURAL TEST

AUTHOR MAROZICK, R.B.

Date of Pub: 3/1/1967

Abstract:
THE STATIC STRUCTURAL TESTS WERE PERFORMED TO DEMONSTRATE THAT THE APOLLO-LEM DOCKING PROBE AND DROGUE ASSEMBLIES WOULD SUSTAIN LOADS IMPOSED SUBSEQUENT TO CAPTURE LATCH. LIMIT LOADS WERE APPLIED WITHOUT YIELDING AND ULTIMATE LOADS WERE APPLIED WITHOUT FAILURE.

TITLE: APOLLO'S BUILDERS START CLOSING THE LINES
As astronauts prepare for moon landing, big manufacturing work of the Apollo program grinds toward a halt. Thousands of workers get other jobs, and contractors seek new projects.

**Title:** Application of an Iterative Guidance Mode to a Lunar Landing  
**Author:** Horn, H.J. 
**Date of Pub:** 11/1/1965

**Abstract:**
The task of a guidance system generally is to direct a vehicle from a given instantaneous state to a prescribed final state. This study will describe a special system designed to handle large disturbances with a minimum energy expenditure. This is done by calculating a new optimum trajectory from any instantaneous state to the end point.

**Title:** Application of Fluid Power for Control of Saturn Vehicles  
**Author:** Johnson, C. 
**Date of Pub:** 11/1/1962

**Abstract:**

**Title:** Application of Nuclear Propulsion to the Mars Manned Landing Mission  
**Author:** 
**Date of Pub:** 3/1/1964

**Abstract:**

**Title:** Application of Saturn Systems to Orbit Launch Operations  
**Author:** Sapp, T.P. 
**Date of Pub:** 3/28/1966

**Abstract:**
The payload velocity spectrum for existing and future missions are compared with Saturn V capabilities. Maximum system uprating is considered and the increase in the mission spectrum coverage by use of orbital assembly and launch with Saturn V systems is presented. System and operations requirements for an orbit launch vehicle are assessed and three orbital operations support modes are compared to these requirements. The permanent facility mode is selected and the necessary support elements and their functions described. Detailed orbit operations procedures are described for an orbit launch vehicle derived from the S-IVB and task-time networks of the procedures are presented. The required changes to the basic S-IVB are delineated and the Saturn V capabilities for the assembly orbit presented. An example OLO mission is examined to determine the total orbital operations and support procedures and requirements. The ground operations and support procedures and facilities requirements are assessed and compared to the presently planned ground launch complex. It is concluded that the S-IVB is adaptable as a pioneer orbit launch vehicle and that Saturn V/Apollo systems coupled with the presently envisioned orbit laboratory systems can form the basic components of an early orbital launch system for planetary reconnaissance missions in the next decade.

**Title:** Application of Saturn Systems to Orbit Launch Operations (Paper)  
**Author:** Tapp, T.P. 
**Date of Pub:** 6/1/1965

**Abstract:**

**Title:** Application of Saturn/S-IVB/Apollo Systems to Planetary Exploration
TITLE: APPLICATION OF THE SATURN V LAUNCH VEHICLE TO UNMANNED SCIENTIFIC EXPLORATION OF THE SOLAR SYSTEM
AUTHOR: ODOM, P.R.
Date of Pub: 9/1/1966
Abstract:
THIS REPORT PRESENTS THE RESULTS OF A 12-WEEK MISSION AND SYSTEMS ANALYSIS OF A COMBINED JUPITER ORBITER/SOLAR PROBE MISSION UTILIZING THE SATURN V LAUNCH VEHICLE. MISSIONS ARE CONSIDERED DURING THE 1970-80 PERIOD WITH THE CLOSE SOLAR PROBE ORBIT BASED ON JUPITER GRAVITY ASSIST.

TITLE: APPLICATION OF THE NEW STAGING PRINCIPLE TO JUNO V
AUTHOR: REICHEN, R.
Date of Pub: 9/2/1958

TITLE: APPROACH IN ACHIEVING HIGH RELIABILITY FOR SATURN CLASS VEHICLES
AUTHOR: REES, E.
Date of Pub: 3/6/1967
Abstract:
THIS PAPER CONCENTRATES ON THE LAUNCH VEHICLES FOR THE APOLLO PROGRAM; NAMELY, THE SATURN CLASS VEHICLES WITH PARTICULAR EMPHASIS ON THE NAVIGATION, GUIDANCE, AND CONTROL SYSTEMS. IN DISCUSSING APPROACH FOR ACHIEVING HIGH RELIABILITY OF THESE SYSTEMS, THIS PAPER IS FOCUSED ON THE SATURN V SINCE THIS IS THE LAUNCH VEHICLE WHICH IS TO CARRY THE THREE ASTRONAUTS TOWARD THE MOON.

TITLE: APPROACH IN ACHIEVING HIGH RELIABILITY OF THE SATURN CLASS VEHICLES
AUTHOR: REES, E.
Date of Pub: 7/1/1965

TITLE: ARDC MODEL ATMOSPHERE, 1956
AUTHOR: MINZNER, R.A./RIPLEY, W.S.
Date of Pub: 12/1/1956
Abstract:
THE 1956 ARDC MODEL ATMOSPHERE, DEFINED AND TABULATED TO 542,248 METERS OR 1,850,870 FEET IN THIS AIR FORCE SURVEY IN GEOPHYSICS, 1 HAS BEEN PREPARED IN PARTIAL FULFILLMENT OF ARDC TECHNICAL REQUIREMENT 140-56. THIS MODEL IS TO BE USED AS THE BASIS FOR ENGINEERING AND DESIGN WORK PERFORMED WITHIN ARDC AND BY ITS CONTRACTORS, IN SO FAR AS THE WORK REQUIRES THE USE OF A MODEL REPRESENTING THE AVERAGE CONDITION OF ATMOSPHERIC PROPERTIES WITHIN THE ALTITUDE LIMITS OF THIS MODEL.

TITLE: ARGMA HISTORICAL SUMMARY
AUTHOR
Date of Pub: 10/21/1958

TITLE: ARMY AND NASA COLLABORATE ON PLANS FOR A MANNED SATELLITE PROJECT
AUTHOR: CRANE, G.  
Date of Pub: 11/14/1958

Abstract:
1-PAGE DIRECTIVE ENTITLED "AGREEMENTS CONCERNING RESPONSIBILITY IN THE NASA MANNED SATELLITE PROJECT"

TITLE: ARMY LUNAR CONSTRUCTION AND MAPPING PROGRAM

AUTHOR
Date of Pub: 6/22/1960

Abstract:

TITLE: ARMY MISSILE DEVELOPMENT

AUTHOR: TOFTOY, H.N.  
Date of Pub: 12/1/1956

Abstract:
THE HISTORY OF ARMY MISSILE DEVELOPMENT IS DESCRIBED- FROM V-2 TO THE PRESENT TIME.

TITLE: ARMY PARTICIPATION IN THE NATIONAL SATELLITE AND SPACE PROGRAM

AUTHOR: STUHLINGER, E.  
Date of Pub: 6/9/1959

Abstract:
THIS DOCUMENT HAS UAH CONTROL NO. 114.

TITLE: ARTICLE ON F-1 TEST FACILITIES AT EDWARDS AFB

AUTHOR
Date of Pub: 5/1/1963

Abstract:

TITLE: AS-203 TECHNICAL INFORMATION SUMMARY

AUTHOR
Date of Pub: 6/14/1966

Abstract:
THIS REPORT OUTLINES THE GENERAL FEATURES OF THE AS-203 LAUNCH VEHICLE AND INFORMATION ON LAUNCH PREPARATION, THE LAUNCH AND MISSION PECULIAR EXPERIMENTS.

TITLE: ASSESSMENT OF RISK FOR ENGINEERING CHANGE DECISIONS (SERIES OF CHARTS, GRAPHS, TABLES, ETC.)

AUTHOR: BOMBARA, E.L.  
Date of Pub: 1/30/1968

Abstract:

TITLE: ASSURANCE AND MEASUREMENT OF SPACE VEHICLE ALIGNMENT

AUTHOR: DRYDEN, A.W.  
Date of Pub: 5/30/1967

Abstract:
DISCUSSES TECHNIQUES IMPLEMENTED AT DOUGLAS' MISSILE AND SPACE SYSTEMS DIVISION TO MEASURE AND ENSURE THAT ALIGNMENT OF SPACE VEHICLES CONFORMS TO DESIGN REQUIREMENTS. INTENT OF THIS PAPER IS TO DISSEMINATE USEFUL SPECIALIZED INFO AND KNOWLEDGE TO ENABLE THOSE INTERESTED TO KEEP ABREAST OF TECHNICAL ADVANCES. EQUIPMENT AND METHODS USED TO ALIGN LARGE SPACE VEHICLES ARE ILLUSTRATED. COMBINATIONS OF STANDARD COMMERCIAL TOOLS, OPTICAL INSTRUMENTS, SPECIALLY DESIGNED TOOLS, FIXTURES, AND EQUIPMENT ARE EMPLOYED TO PROVE VEHICLE ALIGNMENT. SPECIAL TECHNIQUES DEVELOPED TO ALIGN LARGE CYLINDRICAL, SPHERICAL, AND CONICAL STRUCTURE FOR ROTATIONAL DISPLACEMENT, RELATIONSHIP OF TRUE CENTERLINE, AND ENGINE GEOMETRY TO VEHICLE AXIS ARE DISCUSSED. CONSIDERATION IS GIVEN TO FUTURE ALIGNMENT PROBLEMS CREATED BY TECHNOLOGICAL ADVANCES AND QUALITY CONTROLS TO ENSURE HIGH STANDARDS THAT MEET TOMORROW'S REQUIREMENTS.

**TITLE:** ASTRIONICS SYSTEM HANDBOOK - SATURN LAUNCH VEHICLES

**AUTHOR**

**Date of Pub:** 8/1/1965

**Abstract:**

ADDITIONAL DOCUMUM IS X66-15610.

**TITLE:** ASTRIONICS SYSTEM OF SATURN LAUNCH VEHICLES

**AUTHOR**

**Date of Pub:** 2/1/1966

**Abstract:**

**TITLE:** ASTRIONICS SYSTEMS HANDBOOK ON SATURN LAUNCH VEHICLES (REVISED)

**AUTHOR**

**Date of Pub:** 8/15/1966

**Abstract:**

**TITLE:** ASTRODYNAMICIST'S ROLE VIS-A-VIS THE SYSTEMS ENGINEER

**AUTHOR** DUNCAN,J.R.

**Date of Pub:** 1/20/1969

**Abstract:**

THE PROBLEM OF EFFECTIVE TWO-WAY COMMUNICATIONS IS TREATED, WITH EMPHASIS PLACED UPON THE COMPILATION AND PRESENTATION OF ASTRODYNAMICAL DATA FOR USE BY THE SYSTEMS ENGINEER IN THE PRELIMINARY PHASES OF MISSION PLANNING. SUCH DATA SHOULD BE PRESENTED IN A FORM WHICH IS EASILY UNDERSTOOD AND WHICH CANNOT BE EASILY MISINTERPRETED BY PERSONS WITH LITTLE OR NO KNOWLEDGE OF ASTRODYNAMICS. WHEREVER ASTRODYNAMICAL PARAMETERS MAY IMPOSE CONSTRAINTS UPON A MISSION, A CLEAR INDICATION SHOULD BE GIVEN OF THE POSSIBLE CONSEQUENCES FOR VIOLATION OF THESE CONSTRAINTS. WHEN ALTERNATIVES ARE AVAILABLE, THEY SHOULD BE INDICATED, ALONG WITH ANY PENALTIES ASSOCIATED WITH THEIR USE. THE RESULT OF THE ASTRODYNAMICIST'S EFFORT SHOULD BE A WELL-INFORMED SYSTEMS ENGINEER WHO HAS THE OVERALL PICTURE OF THE EFFECTS OF ASTRODYNAMICAL PARAMETERS UPON A MISSION AND THUS WILL BE ABLE TO PERFORM MEANINGFUL TRADEOFF STUDIES WITH REGARDS TO SYSTEMS DESIGN AND PERFORMANCE.

**TITLE:** ASTRONAUTICAL AND AERONAUTICAL EVENTS OF 1962

**AUTHOR**

**Date of Pub:** 6/12/1963

**Abstract:**

**TITLE:** ASTRONAUTICS AND AERONAUTICS ... A CHRONOLOGY ON SCIENCE, TECHNOLOGY, AND POLICY
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<th>TITLE: ASTRONAUTICS AND AERONAUTICS ... A CHRONOLOGY ON SCIENCE, TECHNOLOGY, AND POLICY</th>
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<tr>
<td>Author:</td>
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</table>
THE ENGINE NOISE RESULTING FROM STATIC TESTING OF LARGE SPACE VEHICLES SUCH AS SATURN S-1 IS BOTH LARGE IN OUTPUT POWER LEVEL AND LOW IN FREQUENCY. THESE CHARACTERISTICS COMBINE TO ENABLE THE NOISE TO PROPAGATE FOR EXTREMELY LONG RANGES. UNDER SOME METEOROLOGICAL CONDITIONS THIS ENERGY MAY BE FOCUSED BY THE ATMOSPHERE INTO RELATIVELY SMALL AREAS ON THE EARTH'S SURFACE. TO AVOID PROBLEMS ASSOCIATED WITH SUCH FOCAL AREAS, MSFC HAS INSTITUTED A PROGRAM OF "SELECTIVE FIRINGS" BASED UPON ACOUSTIC AND ATMOSPHERIC SOUNDINGS FOR THE 36 HOURS PRIOR TO TEST. ATMOSPHERIC AND ACOUSTIC SOUNDING DATA ARE INTERPRETED IN LIGHT OF THE FORECASTS TO ANTICIPATE THE TRENDS WHICH WILL GOVERN THE METEOROLOGICAL CONDITIONS. THESE FINDINGS ARE THEN RELAYED TO THE RESPONSIBLE PROJECT OFFICER WHO DECIDES WHETHER TO FIRE OR RESCHEDULE THE TEST. ACOUSTIC MEASUREMENTS ARE MADE DURING THE FIRING TO VERIFY PREDICTED SOUND PRESSURE LEVELS. THIS REPORT DETAILS THE THEORETICAL BASIS AND OPERATIONAL PROCEDURES DEVELOPED TO COVER SELECTIVE FIRING. A PARTICULAR SATURN STATIC TEST, SA-12 ON 13 MARCH 1963, IS FOLLOWED THROUGH THE FORECASTING, MONITORING, AND MEASURING PROGRAMS TO ILLUSTRATE THE PROCESS.
THE NEED FOR AN AUTOMATED PCM DATA PROCESSOR BECAME APPARENT DURING THE GENERATION, DEBUGGING AND VERIFICATION OF AUTOMATIC CHECKOUT TEST PROGRAMS ORIGINATING WITH THE SATURN I PROGRAM. WITH THE IMPLEMENTATION OF THE SATURN I/IB SYSTEMS DEVELOPMENT BREADBOARD FACILITIES (SDBF), THE NEED FOR HIGH SPEED DIGITAL EQUIPMENT CAPABLE OF PERFORMING ON-LINE MONITORING OF INCOMING DDAS/PCM DATA BECAME A NECESSITY IN ORDER FOR TEST ENGINEERS TO VERIFY VEHICLE SYSTEM INTEGRITY AND CERTIFY TEST PROGRAMS APPROVED FOR USE AT KSC LAUNCH COMPLEXES 34 AND 37B. SUCH A SYSTEM WOULD, UNDER PROGRAM CONTROL, SCAN INCOMING DDAS/PCM DATA AND PROVIDE DATA INFO IN THE FORM OF DISPLAYS AND AS OUTPUTS TO A HIGH SPEED LINE PRINTER. THE ADVENT OF ECONOMICALLY PRICED, SMALL, GENERAL PURPOSE COMPUTERS CAPABLE OF OPERATING AT HIGH SPEEDS HAS PROVIDED THE MEANS FOR THE INITIAL DEVELOPMENT OF AN AUTOMATED PCM DATA PROCESSOR. THIS PAPER DESCRIBES THE SYSTEMS ENGINEERING LABS AUTOMATED PCM DATA PROCESSOR CURRENTLY INSTALLED AND OPERATING WITHIN THE SATURN I/IB SYSTEMS DEVELOPMENT BREADBOARD FACILITY AND ITS UTILIZATION IN THE VERIFICATION OF SATURN LAUNCH I PROGRAMS.

**TITLE:** AUTOMATIC CHECKOUT FOR SATURN STAGES  
**AUTHOR** SMITH, R.L.  
**Date of Pub:** 2/1/1962

**Abstract:**
DIGITAL DATA-HANDLING MACHINES HAVE PROGRESSED TO THE POINT THAT A LARGELY AUTOMATIC CHECKOUT OF SATURN STAGES APPEARS POSSIBLE. THIS ARTICLE DISCUSSES A PROTOTYPE SYSTEM FOR THIS PURPOSE WHICH WILL BE DELIVERED THIS SPRING.

**TITLE:** AUTOMATIC CHECKOUT IN THE SATURN PROGRAM  
**AUTHOR** BROOKS, C.O./ROSENTHAL, M.E.  
**Date of Pub:** 1/1/1968

**Abstract:**
THE MAGNITUDE AND COMPLEXITY OF SATURN LAUNCH VEHICLES HAVE DICTATED THE NEED FOR A SYSTEM OF AUTOMATIC CHECKOUT TO VERIFY ACCEPTABILITY OF EACH ASSEMBLED STAGE IN A REASONABLE PERIOD OF TIME. THIS PAPER DISCUSSES AUTOMATION TECHNIQUES WHICH HAVE BEEN APPLIED TO STAGE CHECKOUT IN THE SATURN PROGRAM. SELECTED STAGE SYSTEMS, AUTOMATIC CHECKOUT EQUIPMENT, AND CHECKOUT TECHNIQUES ARE DESCRIBED IN Detail. WITH THE STAGE UNDER TEST BEING OF PRIMARY CONCERN, AUTOMATION CHECKOUT CONSIDERATIONS GIVEN TO STAGE DESIGN ARE DESCRIBED FIRST, FOLLOWED BY DESCRIPTION OF SELECTED PORTIONS OF THE AUTOMATIC GSE USED IN THE PERFORMANCE OF CHECKOUT. THE PAPER CONCLUDES WITH A GENERAL DESCRIPTION OF CHECKOUT LANGUAGES WHICH HAVE BEEN DEVELOPED TO BRIDGE THE COMMUNICATIONS GAP BETWEEN TEST ENGINEER AND COMPUTER PROGRAMMER.

**TITLE:** AUTOMATIC CHECKOUT SYSTEMS FOR STAGES OF THE SATURN V MANNED SPACE VEHICLE  
**AUTHOR** SCHMIDT, D.M.  
**Date of Pub:** 3/22/1965

**Abstract:**

**TITLE:** AUTOMATIC PRESSURE TRANSDUCER CALIBRATION SYSTEM  
**AUTHOR** SCHULER, A.E.  
**Date of Pub:** 11/29/1967

**Abstract:**
THE DEVELOPMENT OF AN AUTOMATIC PRESSURE TRANSDUCER CALIBRATION SYSTEM IS DISCUSSED IN THIS REPORT. EVOLUTION FROM PAST PRACTICES AND SYSTEMS INTO AN AUTOMATIC CALIBRATION SYSTEM WITH COMPUTERIZED DATA HANDLING IS DESCRIBED.

**TITLE:** AUTOMATIC SATURN V PAGE TEST SYSTEM
TITLE: AUTOMATIC SATURN V PAGE TEST SYSTEM
AUTHOR: WYLIE, W.D.
Date of Pub: 5/1/1965

Abstract:
The automatic Saturn V page test system is used to evaluate microminiature unit logic device (ULD) circuits. A page is an assembly consisting of a magnesium-lithium frame, an input-output connector, test points, and multilayer printed circuit boards that interconnect the ULD's into logic circuits. The test system automatically performs tests for shorted voltages and shorted diodes, static logic function, and pulse function. The advantages of this test system include reduction of operator error, repetitive testing, error printout of test failure, and reduction of test time. The mechanical packaging design considerations include high density logic card packaging, human factored control panels, cam controlled thermal test, miniaturized test point adapter, and common page adapter design. Factors involved in design of the test system and mechanical packaging considerations are discussed.

TITLE: AUTOMATIC TELEMETRY CHECKOUT STATION FOR SATURN V (PAPER)
AUTHOR: GEORGE, W.
Date of Pub: 9/1/1965

TITLE: AUTOMATIC WELDING OF THE LOX TUNNEL WELDS ON THE S-IC STAGE OF THE SATURN V BOOSTER
AUTHOR: THOMAS, H.N./MERRICK, G.
Date of Pub: 8/1/1964

TITLE: AUTOMATION IN SATURN I FIRST STAGE CHECKOUT
AUTHOR: FUNDERBURK, B.J.
Date of Pub: 1/1/1968

Abstract:
Described are the hardware and software systems that have been used for or in support of automatic vehicle checkout at the MSCP quality and reliability assurance lab and at the Michoud assembly facility. Other sections summarize the test procedures and computer programs used in vehicle checkout and present some observations that have been made after a review of the automation effort. This document includes info on the checkout of the Saturn I block I stages SA-1 through SA-4, Saturn I block II stages SA-5 through SA-10, and the upgraded Saturn I stages SA-201 through SA-206.

TITLE: BASIC SCIENTIFIC AND ASTRONAUTIC RESEARCH IN THE DEPARTMENT OF DEFENSE
AUTHOR
Date of Pub: 9/11/1959

Abstract:

TITLE: BATTERIES FOR SPACE POWER SYSTEMS
AUTHOR: BAUER, P.
Date of Pub: 1/1/1968

Abstract:

TITLE: BEHAVIOR OF GRAINS IN EARLY SUPERNOVA ENVIRONMENTS
AUTHOR: FALK, S.W./SCALO, J.M.
Date of Pub: 5/1/1975

Abstract:
THE EFFICIENCY OF GRAIN DESTRUCTION BY COLLISIONAL AND RADIATIVE HEATING AND SPUTTERING IN A SUPERNOVA ENVIRONMENT IS EXAMINED.

TITLE: BENDING MOMENTS IMPOSED ON THE SATURN MISSILE DUE TO WIND VELOCITIES WHILE INSTALLED ON THE LAUNCHER
AUTHOR STEVENS, J.
Date of Pub: 6/11/1959

Abstract:

TITLE: BENDIX... YESTERDAY, TODAY, AND TOMORROW
AUTHOR
Date of Pub: 1/1/1966

Abstract:

TITLE: BIBLIOGRAPHIES ON AEROSPACE SCIENCE
AUTHOR
Date of Pub: 6/1/1966

Abstract:

TITLE: BIBLIOGRAPHIES ON AEROSPACE SCIENCE: A CONTINUING BIBLIOGRAPHY
AUTHOR
Date of Pub: 8/1/1964

Abstract:


TITLE: BIBLIOGRAPHIES ON AEROSPACE SCIENCE: A CONTINUING BIBLIOGRAPHY
AUTHOR
Date of Pub: 7/1/1968

Abstract:

TITLE: BIBLIOGRAPHY AND INDEX OF PROJECT HERMES PROGRAMS (1944-1954)
AUTHOR VAN HORN, M./MCCORMICK, J.M.
Date of Pub: 12/1/1954

Abstract:
LISTS ALL PROJECT HERMES REPORTS PREPARED BY GE FOR EXTERNAL DISTRIBUTION.

TITLE: BIBLIOGRAPHY OF ALL AEDC J-2 ENGINE TEST REPORTS
AUTHOR NEELY, J.
Date of Pub: 3/18/1969

Abstract:
CONSIDERABLE J-2 ENGINE START TRANSIENT TESTING WAS ACCOMPLISHED IN TEST CELL J-4 BETWEEN JULY 1966 AND OCTOBER 1968 AND HAS BEEN DOCUMENTED IN AEDC TECHNICAL REPORTS. THIS IS A BIBLIOGRAPHY OF ALL AEDC J-2 ENGINE TEST REPORTS.
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<td>TITLE: BIBLIOGRAPHY OF SOVIET PUBLICATIONS ON ROCKET AND SATELLITE INVESTIGATIONS OF THE UPPER ATMOSPHERE AND OUTER SPACE IN 1964</td>
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<td>7/2/1965</td>
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<td>TITLE: BIBLIOGRAPHY OF SPACE MEDICINE</td>
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<td>1/1/1958</td>
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<td>TITLE: BIBLIOGRAPHY OF THE SATURN SYSTEM</td>
<td>MCCLARD, T.E.</td>
<td>12/12/1962</td>
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<td>TITLE: BIG BLOCKHOUSE DOOR</td>
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TITLE: BIG ONE
AUTHOR
Date of Pub: 10/1/1961

Abstract:

TITLE: BIG WHEELS CARRY BIG BIRD
AUTHOR SHEIL, W.B.
Date of Pub: 12/1/1964

Abstract:
GIVES DETAILED DESCRIPTION OF S-IC TRANSPORTER. IT IS 38 FEET WIDE AND WEIGHS 105 TONS. THE TWO DOLLIES HAVE A TOTAL OF 24 WHEELS. WITH TRACTOR ATTACHED, THE ASSEMBLY IS 195 FEET LONG.
TITLE: BIOGRAPHICAL DATA ON IBM PERSONNEL

AUTHOR

Date of Pub: 1/1/1970

Abstract:

TITLE: BIOGRAPHICAL DATA ON NASA HEADQUARTERS PERSONNEL (CARISKI, COTTON, DAVIS, HUMPHREYS, JOHNSON, KUBAT, LINN, PICKERING, RAFEL, VECCHIETTI)

AUTHOR

Date of Pub: 1/1/1970

Abstract:

TITLE: BIOGRAPHICAL DATA ON NOTH AMERICAN ROCKWELL PERSONNEL

AUTHOR

Date of Pub: 1/1/1970

Abstract:

TITLE: BIOGRAPHICAL DATA ON P&W PERSONNEL

AUTHOR

Date of Pub: 1/1/1970

Abstract:

TITLE: BIOGRAPHIES OF NORTH AMERICAN ROCKWELL PERSONNEL: STEVEN J. DOMOKOS, AL KWAWER, JIM GRIFFIN

AUTHOR

Date of Pub: 1/1/1970

Abstract:

TITLE: BIOGRAPHIES OF VARIOUS AIR FORCE PERSONNEL

AUTHOR

Date of Pub: 1/1/1970

Abstract:

AEROSPACE RESCUE AND RECOVERY SERVICE (ARRS), SCOTT AFB, ILLINOIS
AIR FORCE WESTERN TEST RANGE (AFWTR), VANDENBERG AFB, CALIFORNIA
AIR FORCE EASTERN TEST RANGE (AFETR)
33RD AIR RESCUE AND RECOVERY SQUADRON, NAHA, OKINAWA
AIR PROVING GROUND CENTER (APGC), ELGIN AFB, FLORIDA
DOD MANNED SPACE FLIGHT SUPPORT OFFICE (DDMS)

TITLE: BIOGRAPHIES OF VARIOUS COMMUNICATIONS PERSONNEL

AUTHOR

Date of Pub: 1/1/1970

Abstract:
ORGANIZATIONS INCLUDE: LONG LINES, CHESAPEAKE & POTOMAC TEL. CO., C & P TELEPHONE COMPANY OF MD., SOUTHERN BELL CO., SOUTHWESTERN BELL TELEPHONE CO., AND SOUTH CENTRAL BELL TELEPHONE CO.

TITLE: BIOGRAPHIES OF VARIOUS GSFC PERSONNEL

AUTHOR

Date of Pub: 1/1/1970

Abstract:
DALE W. CALL
OZRO M. COVINGTON
JAMES J. DONEGAN
ROBERT J. MCCAFFERY
ROBERT L. OWEN
TECWYN ROBERTS
LAVERNE R. STELTER
HENRY F. THOMPSON
MICHAEL J. VACCARO
W. PAUL VARSON
H. WILLIAM WOOD

TITLE: BIOGRAPHIES OF VARIOUS NAVY PERSONNEL

AUTHOR

Date of Pub: 1/1/1970

Abstract:
TASK FORCE 140, NAS, NORFOLK, VA.
COMBINED TASK FORCE 130, PEARL HARBOR, HAWAII
TASK FORCE 130

TITLE: BIOGRAPHIES OF VARIOUS SUPPORT CONTRACTOR PERSONNEL:

AUTHOR

Date of Pub: 1/1/1970

Abstract:
PERSONNEL INCLUDE: AEROJET-GENERAL, AMBAC INDUSTRIES, BELL AEROSPACE, BELLCOMM, BENDIX, GENERAL DYNAMICS/ASTRONAUTICS, GENERAL MOTORS (AC ELECTRONICS), GRUMMAN, KOLLSMAN INSTRUMENT, LOCKHEED, MARTIN-MARIETTA, RAYTHEON, RCA, RYAN AERONAUTICAL, AND TRW.

TITLE: BOAT IN A BOTTLE

AUTHOR THOMAS, R.

Date of Pub: 7/1/1967

Abstract:
THOSE WHO ADMIRE THE TECHNIQUES OF GETTING A MODEL SHIP INSIDE OF A BOTTLE WOULD HAVE APPRECIATED THE PROBLEM FACED BY BOEING MEN AT MSFC. THEY BUILT A TEST FIXTURE INSIDE A LIQUID OXYGEN TANK BY PASSING TONS OF STRUCTURAL STEEL THROUGH AN OPENING ABOUT THE SIZE OF A BUSHEL BASKET. THE DOMED TANK WAS INSIDE THE SHELL OF A S-1C BOOSTER FOR THE APOLLO/SATURN 5 MOON ROCKET, AN ARRANGEMENT COMPARABLE TO THAT OF THE GLASS LINER IN A THERMOS BOTTLE. THE TANK IS 33 FEET IN DIAMETER. ABOUT 129,000 LBS OF STEEL BEAMS AND PIPES WERE USED TO BUILD A PRESSURE-TEST FIXTURE INSIDE THE OXYGEN TANK.

TITLE: BOEING AND APOLLO (BROCHURE)

AUTHOR

Date of Pub: 7/1/1969

Abstract:
THIS BOOKLET WAS DISTRIBUTED AT CAPE KENNEDY DURING THE APOLLO 11 LAUNCH. IT COVERS BOEING'S ROLE IN THE FIELDS OF DESIGN, FABRICATION, ASSEMBLY AND TEST OF THE S-1C STAGE OF THE SATURN V AT MICHOUH AND MTF, PLUS SYSTEMS ENGINEERING, VEHICLE INTEGRATION AND MISSION SUPPORT FOR THE ENTIRE SATURN V ROCKET.

TITLE: BOEING APOLLO/SATURN V MAJOR ROLES
AUTHOR

Date of Pub: 1/1/1969

Abstract:
CHART INDICATING THE ROLES OF BOEING AT MICHOU, MSFC, KSC, AND 1 MSC.

TITLE: BOEING COMPANY'S MANAGEMENT SYSTEM FOR SATURN V

AUTHOR

Date of Pub: 1/1/1968

Abstract:
THIS DOCUMENT DESCRIBES THE SYSTEM IN USE BY BOEING TO MANAGE ITS ASSIGNED PORTION OF THE SATURN V EFFORT UNDER CONTRACT TO NASA. THIS IS VOLUME 5 OF A SERIES OF 14 VOLUMES THAT DESCRIBE HOW NASA AND INDUSTRY MANAGE THEIR RESPECTIVE PORTIONS OF THE LARGE AND COMPLEX APOLLO PROGRAM.

TITLE: BOEING FACES UNIQUE FABRICATION CHALLENGE IN DEVELOPING NASA'S SATURN S-IC BOOSTER

AUTHOR ALEXANDER,G.

Date of Pub: 8/13/1962

Abstract:

TITLE: BOEING SUBCONTRACTORS ON PROJECT APOLLO (2-PAGE LISTING)

AUTHOR

Date of Pub: 1/1/1969

Abstract:

TITLE: BOOKLET DESCRIBING INSTRUMENT LABORATORY, INSTRUMENT DEVELOPMENT BRANCH, CONTROL & INSTRUMENTATION DIVISION, TEST LABORATORY

AUTHOR

Date of Pub: 1/1/1968

Abstract:
DESCRIBES (1) MISSION AND FACILITIES OF BRANCH; (2) BRIEF DESCRIPTIONS OF THE RESPONSIBILITIES, CAPABILITIES, AND MAJOR FACILITIES OF EACH SECTION; AND (3) THE ORGANIZATION OF THE BRANCH.

TITLE: BOOSTER INSTRUMENTATION FOR STATIC FIRING

AUTHOR FERRARIO,M.A.

Date of Pub: 5/4/1964

Abstract:

TITLE: BREADBOARDS AND D-BIRDS

AUTHOR SHEIL,W.B.

Date of Pub: 10/1/1965

Abstract:
NASA'S APOLLO/SATURN V PROJECT IS THE LARGEST SINGLE INDUSTRIAL PROGRAM IN AMERICA TODAY. MORE THAN 300,000 PERSONS REPRESENTING 20,000 COMPANIES IN 47 STATES ARE WORKING TOWARD A COMMON GOAL: TO LAND AMERICANS ON THE MOON IN THIS DECADE. A MAJOR Part OF OVERALL PROGRAM IS DEVELOPMENT OF LAUNCH VEHICLES, THE MAIN ONE BEING THE SATURN V S-IC BOOSTER FOR WHICH BOEING IS PRIME CONTRACTOR. BOEING IS ALSO PERFORMING CERTAIN SYSTEMS ENGINEERING AND SYSTEMS INTEGRATION FUNCTIONS IN SUPPORT OF MSFC. A SIGNIFICANT PORTION OF BOEING'S EFFORT IS DEVOTED TO ASSISTING MSFC INSTALL AND OPERATE THE SATURN V SYSTEMS BREADBOARD, A TEST FACILITY FOR DEVELOPING AUTOMATIC CHECKOUT AND LAUNCH CONTROL EQUIPMENT TO BE USED AT KSC. ANOTHER ESSENTIAL JOB PRELIMINARY TO MAN'S FIRST TRIP TO THE MOON IS TESTING OF A COMPLETE FLIGHT VEHICLE. THE SATURN V DYNAMIC TEST VEHICLE PROGRAM MARKS THE FIRST TIME THAT A ROCKET AS LARGE AS SATURN V WILL BE TESTED IN A RESTRAINED ENVIRONMENT TO PROVIDE FLIGHT CONTROL DESIGN DATA. THIS WILL BE THE FIRST ASSEMBLY OF A COMPLETE APOLLO/SATURN V.

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**TITLE:** BROOKS WATSON AND SATURN'S STEEL MOUNTAIN  
**AUTHOR:** DILL,G.  
**Date of Pub:** 12/1/1963  
**Abstract:**

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**TITLE:** BUILDING "SPACEPORT USA"  
**AUTHOR:** HALMOS,E.E.  
**Date of Pub:** 4/1/1964  
**Abstract:**

---

**TITLE:** BUILDING BLOCK APPROACH TO SATURN V UPRATING USING SOLID PROPELLANT ROCKET MOTORS  
**AUTHOR:** MONROE,J.W./CORSO,C.J.  
**Date of Pub:** 6/1/1967  
**Abstract:**

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**TITLE:** BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE  
**AUTHOR:**  
**Date of Pub:** 4/1/1954  
**Abstract:**

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**TITLE:** BUILDING THE MOON ROCKET  
**AUTHOR:** SIEBEL,M.P.  
**Date of Pub:** 11/3/1965  
**Abstract:**

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**TITLE:** C-5 DEFINITIVE CONTRACT SCHEDULES  
**AUTHOR:** HOLMES,D.B.  
**Date of Pub:** 6/4/1962  
**Abstract:**

---
TITLE: C-5 PERFORMANCE SUMMARY

Author: Date of Pub: 7/15/1962

Abstract:

TITLE: CALCULATED NOISE LEVELS OF SATURN AND SATURN SCALE MODEL ENGINES

Author: FARROW,J. Date of Pub: 8/31/1959

Abstract:

TITLE: CAPABILITIES AND LIMITATIONS OF SPACE COMMUNICATION SYSTEMS

Author: DABUL,A. Date of Pub: 7/12/1967

Abstract:

A COMPREHENSIVE SURVEY AND STUDY OF THE BASIC PARAMETERS OF INFORMATION TRANSFER SYSTEMS FOR SPACE COMMUNICATIONS IS PRESENTED TO FAMILIARIZE SYSTEMS CHECKOUT AND NON-COMMUNICATION ENGINEERS WITH THE STATE-OF-THE-ART AND TRENDS IN THIS FIELD. BECAUSE IT NOW APPEARS THAT ONBOARD SYSTEMS WILL BE DEPENDED ON FOR CHECKOUT PERFORMANCE AND CHECKOUT DATA TRANSFER, BOTH CURRENT AND ANTICIPATED REQUIREMENTS FOR COMMUNICATION SYSTEMS ARE CONSIDERED. SOME OF THE PROBLEMS THAT EXIST IN SPACE COMMUNICATION ARE PRESENTED ALONG WITH A GENERAL REVIEW OF PRESENT COMMUNICATION SYSTEMS, THEIR CAPABILITIES, AND THEIR LIMITATIONS. AS WELL AS POSSIBLE IMPROVEMENTS IN THE AREAS OF ANTENNAS, TRANSMITTER POWER, AND TELEMETRY SYSTEMS. THE INCREASED CAPABILITIES EXPECTED BY THE END OF THIS DECADE SHOULD MAKE ADEQUATE AND RELIABLE SPACE COMMUNICATION POSSIBLE FOR MOST PREDICTED COMMUNICATION NEEDS OF THE FUTURE AT LUNAR AND NEAR-PLANET RANGES.

TITLE: CAPABILITY OF SATURN V TO SUPPORT PLANETARY EXPLORATION

Author: WOODCOCK,G.R. Date of Pub: 10/1/1965

Abstract:

TITLE: CAPE CANAVERAL'S 6000-MILE SHOOTING GALLERY

Author: FISHER,A.C. Date of Pub: 10/1/1959

Abstract:

THE ATLANTIC MISSILE RANGE, A SPACE AGE PROVING GROUND STRETCHING ACROSS A QUARTER OF THE GLOBE, IS DESCRIBED. ALONG THIS FLYWAY ARE ELEVEN TRACKING STATIONS WHERE TECHNICIANS RECORD MISSILE PERFORMANCE. THE TRACKING STATIONS AND THEIR PERSONNEL ARE DISCUSSED.

TITLE: CARBON-BURNING NUCLEOSYNTHESIS AT CONSTANT TEMPERATURE

Author: ARNETT,W.D./TRURAN,J.W. Date of Pub: 8/1/1968

Abstract:

SYNTHESIS OF ELEMENTS DURING THERMONUCLEAR BURNING OF CARBON IS EXAMINED AT A SERIES OF TEMPERATURES AND FOR SEVERAL INITIAL COMPOSITIONS.

TITLE: CASE FOR COMPATIBILITY

Author: SMITH,R.L. Date of Pub: 4/1/1966

Abstract:
THIS PAPER EXAMINES THE QUESTION OF COMPATIBILITY FIRST BY ATTEMPTING TO ESTABLISH A DEFINITION FOR COMPATIBILITY - WHAT IT IS, AND WHAT IT IS NOT. THE FACTORS WHICH MAKE COMPATIBILITY A DESIRABLE END ARE THEN EXAMINED, FOLLOWED BY A DISCUSSION OF PROBLEMS ENCOUNTERED DUE TO LACK OF COMPATIBILITY. THE SPECIFIC CASE OF THE SATURN V LAUNCH VEHICLE AND ITS INDIVIDUAL STAGES IS THEN TREATED. DECISIONS REACHED, RATIONALE FOR THESE DECISIONS, AND RESULTS TO DATE ARE NOTED.

**TITLE:** CATALOG OF LAUNCH VEHICLE OPERATIONAL PROCEDURES, SATURN V, APOLLO/SATURN 502, VOLUME 1
**AUTHOR**

**Date of Pub:** 8/1/1966

**Abstract:**

**TITLE:** CATALOG OF LAUNCH VEHICLE TESTS - SATURN V - APOLLO/SATURN 502 (VOLUME I)
**AUTHOR**

**Date of Pub:** 8/1/1966

**Abstract:**

**TITLE:** CECLES-ELDO, 1960-1965 (REPORT TO THE COUNCIL OF EUROPE - EUROPEAN SPACE VEHICLE LAUNCHER DEVELOPMENT ORGANIZATION, PARIS, FRANCE)
**AUTHOR**

**Date of Pub:** 12/23/1965

**Abstract:** MICROFICHE ON HAND

**TITLE:** CENTAUR AS A THIRD STAGE OF THE SATURN IB
**AUTHOR**

**Date of Pub:** 10/23/1964

**Abstract:**

**TITLE:** CENTAUR LAUNCH VEHICLE DEVELOPMENT PROGRAM
**AUTHOR**

**Date of Pub:** 7/2/1962

**Abstract:**

**TITLE:** CENTAUR PRIMER ... AN INTRODUCTION TO HYDROGEN POWERED SPACE FLIGHT
**AUTHOR**

**Date of Pub:** 6/1/1962

**Abstract:**

**TITLE:** CERTAIN PROBLEMS INTHE CONQUEST OF OUTER SPACE
**AUTHOR** KOROLEV,S.P.

**Date of Pub:** 8/1/1968

**Abstract:** THE AUTHOR PREDICTS CERTAIN PROBLEMS WHICH WILL BE ENCOUNTERED WITH THE USE OF SPACECRAFT AND DISCUSES MEANS BY WHICH THEY COULD BE OVERCOME.

**TITLE:** CHALLENGE OF CHANGE VS THE CONTROL OF THE PROCESS
THIS PAPER IS DESIGNED TO PRESENT THE ROCKETDYNE ENGINE PROGRAM AS IT APPLIES TO THE SATURN LAUNCH VEHICLES AND WILL APPLY TO THE APOLLO PROGRAM OF MANNED FLIGHT TO THE MOON.

TITLE: CHARACTERISTICS OF THE SATURN SPACE BOOSTER AS A NOISE SOURCE

AUTHOR DORLAND, W.

Abstract:

BRIEFLY REVIEWS THE PRINCIPLES BY WHICH A ROCKET WORKS, THEN TAKES SOME SPECIFIC EXAMPLES OF PORTIONS OF THE SYSTEM AND EXPLAINS WHAT THE CHEMIST HAS TO DO WITH IT.

TITLE: CHECKOUT: MAN'S CHANGING ROLE

AUTHOR ALELYUNAS, P.

Abstract:

BRIEFLY REVIEWS THE PRINCIPLES BY WHICH A ROCKET WORKS, THEN TAKES SOME SPECIFIC EXAMPLES OF PORTIONS OF THE SYSTEM AND EXPLAINS WHAT THE CHEMIST HAS TO DO WITH IT.

TITLE: CHEMISTRY IN SPACE BOOSTERS

AUTHOR PERKINS, H.

Abstract:

BRIEFLY REVIEWS THE PRINCIPLES BY WHICH A ROCKET WORKS, THEN TAKES SOME SPECIFIC EXAMPLES OF PORTIONS OF THE SYSTEM AND EXPLAINS WHAT THE CHEMIST HAS TO DO WITH IT.

TITLE: CHILDOWN ELECTRICAL SYSTEM FOR S-IVB SPACE VEHICLE

AUTHOR LANAMAN, J.H./MORROW, R.J./TES

Abstract:

THIS PAPER PRESENTS THE ELECTRICAL SYSTEM USED TO DRIVE THE CHILDOWN MOTOR PUMPS ON THE S-IVB SPACE VEHICLE. THIS SYSTEM CONSISTS OF A 56 VOLT BATTERY SUPPLYING POWER TO THE TWO THREE-PHASE SOLID STATE INVERTERS WHICH IN TURN DRIVE TWO CRYOGENIC MOTOR PUMPS. INCLUDED IN THIS PAPER IS A SHORT DESCRIPTION OF THE OVERALL CHILDOWN SYSTEM REQUIREMENTS. THE ADVANTAGES OF THE A-C SYSTEM OVER THE D-C SYSTEM ARE DISCUSSED WITH EMPHASIS ON WEIGHT AND RELIABILITY. TWO FUNCTIONALLY IDENTICAL 1.5KVA INVERTERS WERE DESIGNED. ONE INVERTER USES GERMANIUM TRANSISTORS IN THE OUTPUT STAGE WHILE THE OTHER USES SILICON TRANSISTORS. BOTH INVERTERS WERE DESIGNED TO HAVE A QUASI-SQUARE WAVE OUTPUT. THE INVERTER CIRCUITRY IS DESCRIBED AND THE ADVANTAGES OF EACH IS DISCUSSED INCLUDING A COMPARISON OF WEIGHT, SIZE, OPERATING TEMPERATURE, EFFICIENCY AND VOLTAGE RATING.

TITLE: CHRONOLOGY OF EARLY AIR FORCE MAN-IN-SPACE ACTIVITY, 1955-1960

AUTHOR

Abstract:

THIS CHRONOLOGY RECORDS A SMALL PORTION OF AIR FORCE SPACE ACTIVITY - SPECIFICALLY, THE PLANNING FOR MANNED SPACE FLIGHT PRIOR TO THE ESTABLISHMENT OF PROJECT MERCURY BY NASA. IN THIS CHRONOLOGY, AIR FORCE MANNED SPACE FLIGHT ACTIVITY IS VIEWED FROM THE PERSPECTIVE OF THE BALLISTIC MISSILE DEVELOPMENT AGENCY - THE AIR RESEARCH AND DEVELOPMENT COMMAND'S WESTERN DEVELOPMENT DIVISION, LATER RENAMED THE AIR FORCE BALLISTIC MISSILE DIVISION. DUE TO RESOURCE LIMITATIONS AT THE SPACE SYSTEMS DIVISION HISTORICAL OFFICE, RESEARCH FOR THIS CHRONOLOGY HAS BEEN GENERALLY LIMITED TO MATERIALS AVAILABLE IN THE FILES OF THAT OFFICE.

TITLE: CHRONOLOGY OF SCIENCE, TECHNOLOGY, AND POLICY

AUTHOR

Abstract:
<table>
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<tr>
<td>Title: CHRONOLOGY OF THE GEORGE C. MARSHALL SPACE FLIGHT CENTER - JANUARY 1 - DECEMBER 31, 1968</td>
<td>AUTHOR: JONES,L.L.</td>
<td>Date of Pub: 2/1/1971</td>
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<tr>
<td>Title: CHRONOLOGY ON SCIENCE, TECHNOLOGY, AND POLICY</td>
<td>AUTHOR:</td>
<td>Date of Pub: 8/1/1959</td>
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<td>Title: Chrysler Corporation Pact Converted for Saturn Job</td>
<td>AUTHOR:</td>
<td>Date of Pub: 8/10/1967</td>
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**Abstract: NASA HAS CONVERTED THE SYSTEMS INTEGRATION PORTION OF CHRYSLER'S UPRA TED SATURN I CONTRACT TO A COST-PLUS-INCENTIVE-FEE AGREEMENT. WITH THIS $22 MILLION CONVERSION, THE TOTAL VALUE OF THE SYSTEMS I INTEGRATION SEGMENT OF CHRYSLER'S SIX-PART UPRA TED SATURN 11 CONTRACT IS $35.5 MILLION.
TIME: CIVIL-MILITARY RELATIONS IN THE AMERICAN SPACE PROGRAM: 1957-60 (THESIS)

AUTHOR: SMOKE, R.L.

Abstract: THE UNITED STATES' REACTION TO RUSSIA'S LAUNCHING OF SPUTNIK 1 resulted in a program for the speedup of U.S. ICBM efforts and the creation of NASA to handle U.S. space programs over the long run. The events in the domestic political process, leading to the creation of NASA, and the first formative years of the administration's existence, are an interesting and unusual chapter in the story of civil-military relations in America. The purpose of this thesis is to examine that story in some detail and, hopefully, to arrive at conclusions having value to our understanding of this general problem in political science.

TITLE: CLASSIFICATION AND DIST. OF FUNCT. FAILURES FOR SATURN I AND SATURN IB VEHICLES OBSERVED DURING PRE-STATIC, STATIC, POST-STATIC, AND PRE-LAUNCH

AUTHOR

Abstract:

TITLE: CLEAN ROOM TECHNOLOGY

AUTHOR: USELLER, J.W.

Abstract:

TITLE: CLEANING AND CONTAMINATION CONTROL

AUTHOR: FRANKLIN, D.B.

Abstract:

TITLE: CLEANING PROBLEMS ON THE SATURN COMPONENTS (PAPER)

AUTHOR: ANON

Abstract:

TITLE: CLUSTERING: SHORT CUT TO HIGH ROCKET PERFORMANCE

AUTHOR: STEHLING, K.R.

Abstract: GIVES ADVANTAGES AND DISADVANTAGES OF CLUSTERING.

TITLE: COLLECTION, PREPARATION AND SUBMISSION OF POP 65-3 (MEMO WITH ENCLOSURES)

AUTHOR: MAUS, H.H.

Abstract:
THE NEXT PROGRAM OPERATING PLAN (POP 65-3) SUBMISSION TO HEADQUARTERS WOULD INCLUDE: TIME PHASING OF THE FY-66 PROGRAM, THE FINAL FY-67 BUDGET SUBMISSION, AND RUNOUT REQUIREMENTS THROUGH PROJECT COMPLETION FOR R&D PROJECTS. THIS MEMO CONSTITUTES A REQUEST FOR ALL MSFC ELEMENTS TO PREPARE AND SUBMIT INFO AS SCHEDULED IN ENCLOSURES.

TITLE: COMBUSTION OSCILLATIONS IN THE F-1 ENGINE, MONTHLY REPORT

AUTHOR HOLMES,D.B. Date of Pub: 7/29/1963

Abstract:

TITLE: COMBUSTION OSCILLATIONS IN F-1 ENGINE, MONTHLY REPORT

AUTHOR HOLMES,D.B. Date of Pub: 5/17/1963

Abstract:

TITLE: COMMENTS ON PROBLEMS RELATING TO THE LUNAR LANDING VEHICLE


Abstract:

THIS TECHNICAL NOTE CONCERNS SOME OF THE PROBLEMS ENCOUNTERED WITH THE LANDING OF A PAYLOAD ON THE MOON. THE MAIN PROBLEM AREAS SUCH AS GUIDANCE, VELOCITY CONTROL AND IMPACT CONSIDERATIONS ARE DISCUSSED. ALTHOUGH NO FINAL CONCLUSIONS OR DESIGNS ARE INTENDED, IT IS HOPED THAT THE MATERIAL PRESENTED WILL SERVE AS A GUIDE FOR FUTURE DETAILED WORK.

TITLE: COMMITTEE ON AERONAUTICAL AND SPACE SCIENCES, UNITED STATES SENATE-TENTH ANNIVERSARY, 1958-1968

AUTHOR Date of Pub: 7/19/1968

Abstract:


TITLE: COMMITTEE STUDY OF BLAST POTENTIALS AT THE SATURN LAUNCH SITE AND A CONTRACTOR STUDY OF BLAST FORCES ON STRUCTURES

AUTHOR HALL,C. Date of Pub: 2/1/1960

Abstract:

TITLE: COMMUNICATIONS DIRECTORY

AUTHOR Date of Pub: 9/1/1968

Abstract:

TITLE: COMMUNICATIONS SATELLITE EXPERIMENTS

AUTHOR Date of Pub: 12/3/1962

Abstract:
TITLE: COMMUNICATIONS SATELLITES

Author Date of Pub: 5/8/1961

Abstract:

TITLE: COMMUNICATION-SYSTEM BLACKOUT DURING REENTRY OF LARGE VEHICLES

Author MITCHELL, F.H. Date of Pub: 7/28/1967

Abstract:

MUCH OF THE THEORETICAL RESEARCH ON REENTRY BLACKOUT IS IN A FORMAT DIFFICULT FOR THE COMMUNICATIONS ENGINEER TO USE IN HIS SYSTEM ANALYSIS. THIS PAPER DERIVES SIMPLIFIED EQUATIONS FOR THE AVERAGE SHEATH POWER LOSS THAT MAY BE ADDED (IN DB) TO THE USUAL SPACE LOSS TO OBTAIN AN APPROXIMATE TOTAL PROPAGATION LOSS. PLASMA AND SHEATH PROPERTIES ARE DISCUSSED IN DETAIL BUT LARGELY WITHOUT SUPPORTING MATHEMATICS, IN ORDER TO GIVE THE DESIGN ENGINEER A BETTER UNDERSTANDING OF THE OVERALL PROBLEM. FOR THE SAME REASON AND TO PROVIDE INSIGHT INTO FINAL RESULTS, THE AVERAGE RADIATED POWER IS FOUND, USING BOTH INTUITIVE AND RIGOROUS TECHNIQUES. SEVERAL GRAPHS OF PLASMA PROPERTIES ARE INCLUDED IN THE DEVELOPMENT AS AN AID TO NUMERICAL COMPUTATIONS, AND RESULTS ARE COMPARED WITH THE WORK OF OTHER AUTHORS.

TITLE: COMPARISON OF ADVANCED COOLING TECHNIQUES FOR ROCKET THRUST CHAMBERS

Author SUTTON, G.P./WAGNER, W.R./SEAD Date of Pub: 1/1/1965

Abstract:

IN THE EARLY DAYS OF ROCKET PROPULSION, TWO PRIMARY METHODS WERE EMPLOYED FOR COOLING THRUST CHAMBER WALLS. THESE WERE UNCOOLED METAL CHAMBERS WHERE THE HEAT SINK CAPACITY OF THE CHAMBER AND NOZZLE WALL MATERIALS LIMITED THE OPERATING DURATION, AND REGENERATIVELY COOLED CHAMBERS WHERE ONE OF THE PROPELLANTS WAS CIRCULATED IN A COOLING JACKET WHICH CONSTITUTED THE CHAMBER WALL. TODAY, THERE ARE AT LEAST 14 DIFFERENT METHODS WITH VARIATIONS FOR COOLING THE COMBUSTION DEVICES AND NOZZLES OF LIQUID, SOLID, AND/OR NUCLEAR ROCKET PROPULSION ENGINES. IT IS THE INTENT OF THIS PAPER TO EXAMINE THESE METHODS, TO DESCRIBE FOR EACH THE USEFUL RANGE OF OPERATING CONDITIONS, AS WELL AS PRESENT AND LIKELY FUTURE APPLICATIONS, TO DEFINE THEIR LIMITATIONS AND ASSOCIATED PROBLEMS. EMPHASIS IS PRIMARILY PLACED ON LIQUID ROCKET ENGINES.

TITLE: COMPARISON OF FOUR CONTROL SYSTEMS PROPOSED FOR SATURN V LAUNCH VEHICLES

Author SUMRALL, P. Date of Pub: 2/1/1967

Abstract:

PRESENTED ARE THE RESULTS OF A STUDY COMPARING FOUR PROPOSED CONTROL SYSTEMS FOR THE FIRST STAGE FLIGHT OF SATURN V LAUNCH VEHICLES. THE PRIMARY BASIS OF COMPARISON IS THE EFFECT ON STRUCTURAL LOADS, USING BENDING MOMENTS AT THREE STATIONS AS LOAD INDICATORS. TWO OF THE SYSTEMS SENSE ONLY THE VEHICLE ATTITUDE AND ATTITUDE RISE, WHILE THE OTHER TWO SYSTEMS ALSO SENSE THE LATERAL ACCELERATIONS.

TITLE: COMPARISON OF GERMAN ROCKETS A-3, A-5, A-4

Author SCHULZE, H.A. Date of Pub: 2/25/1965

Abstract:

1-PG DRAWING FROM "TECHNICAL DATA ON THE DEVELOPMENT OF A-4 V-2"

TITLE: COMPARISON OF THE VIBRATION ENVIRONMENT MEASURED ON THE SATURN FLIGHTS WITH THE PREDICTED VALUES
**TITLE:** COMPILATION OF MATERIALS ON SPACE AND ASTRONAUTICS, NO.2  
**AUTHOR:** JOHNSTON, G.  
**Date of Pub:** 12/3/1963

**Abstract:**

ADVANCED RESEARCH PROJECTS AGENCY, HEARINGS, REPORTS, MESSAGES, 1 BILLS AND RESOLUTIONS ON OUTER SPACE

**TITLE:** COMPLEX 37 WILL DWARF PREDECESSORS  
**AUTHOR:** GETLER, M.  
**Date of Pub:** 12/18/1961

**Abstract:**

SOME DETAILS ARE GIVEN OF A HUGE NEW ROCKET LAUNCH SITE (DOUBLE THE SIZE OF ANY FACILITY NOW IN OPERATION) UNDER CONSTRUCTION AT CAPE CANAVERAL. OFFICIALLY CALLED VERTICAL LAUNCH COMPLEX 37, IT WILL BE THE LAUNCHING SCENE FOR TWO-STAGE SATURN BOOSTERS BY MID-1963.

**TITLE:** COMPONENT FAILURE EFFECT ON SYSTEMS - AN ANALYTIC MODEL  
**AUTHOR:** PARKHILL, R.L./PAUPERAS, J.  
**Date of Pub:** 11/1/1963

**Abstract:**

THIS PAPER DESCRIBES THIS ANALYTICAL MODEL, DISCUSSES SOME OF THE TECHNIQUES AND GROUND RULES, AND PRESENTS EXAMPLES. A DISCUSSION OF THE APPLICATION OF THE RESULTS IS ALSO INCLUDED. THE PURPOSE OF THIS PAPER IS TO PRESENT HOW THIS "CRITICALITY RANKING" IS DETERMINED AND HOW IT MAY BE APPLIED TO OPTIMIZING THE RELIABILITY OF A SYSTEM. THIS WILL BE ACCOMPLISHED IN THREE STEPS: (1) A RELIABILITY MATHEMATICAL MODEL - FAILURE EFFECT ANALYSIS TECHNIQUE WILL BE PRESENTED, (2) AN ANALYTICAL TECHNIQUE, WHICH INCLUDES RELIABILITY PREDICTION, WILL BE DISCUSSED, AND (3) A BRIEF DISCUSSION OF THE COMBINED ANALYTICAL MODEL RESULTS WILL BE PRESENTED. IT WILL STRESS THE APPLICATION AND USE OF THE RESULTS.

**TITLE:** COMPUTER CONTROLLED POWER APPLICATION FOR THE SATURN LAUNCH VEHICLE  
**AUTHOR:** FELBER, H.D.  
**Date of Pub:** 8/1/1967

**Abstract:**

DESCRIBES A REAL-TIME DIGITAL COMPUTER PROGRAM THAT CONTROLS THE APPLICATION OF ELECTRICAL POWER TO THE S-IVB STAGE OF SATURN VEHICLE AT CAPE KENNEDY. DOUGLAS, THE S-IVB STAGE MANUFACTURER, PROVIDED NASA WITH PROGRAM REQUIREMENTS RELATIVE TO ENERGIZING SEQUENCE, VOLTAGE AND CURRENT MEASUREMENT TOLERANCES, AND VEHICLE SYSTEM OPERATIONAL TESTS. IBM PROVIDED NASA WITH COMPUTER PROGRAM TO SATISFY THE TASK REQUIREMENTS. THE PROGRAM CONJOINED THE COMPONENTS OF THE ELECTRICAL SUPPORT EQUIPMENT (TWO RCA 110A 1 COMPUTERS AND CONTROL AND INSTRUMENTATION DEVICES) INTO A CLOSED LOOP SYSTEM. THE SUPPORTING OPERATING SYSTEM PROGRAM BY IBM IS DESCRIBED.

**TITLE:** COMPUTER COST MODEL FOR SATURN LAUNCH VEHICLES  
**AUTHOR:** RUTLAND, C.H.  
**Date of Pub:** 12/1/1964

**Abstract:**

**TITLE:** COMPUTER REDUNDANCY: DESIGN, PERFORMANCE, AND FUTURE  
**AUTHOR:** KUEHN, R.E.  
**Date of Pub:** 1/1/1967

**Abstract:**

Wednesday, March 24, 2004  
Page 42 of 234
THE PURPOSE OF THIS PAPER IS TO DESCRIBE THE DESIGN OF DIGITAL EQUIPMENT UTILIZING TMR (TRIPLE MODULAR REDUNDANCY) AND QUAD REDUNDANCY. DESIGN PROBLEMS, RELIABILITY PREDICTIONS, RELIABILITY ACHIEVEMENT, AND FUTURE IMPLICATIONS ARE COVERED.

TITLE: COMPUTER-DIRECTED CHECKOUT FOR NASA'S BIGGEST BOOSTER
AUTHOR: Dahnke, J.W.
Date of Pub: 8/1/1962

Abstract:
SPECIAL PURPOSE AUTOMATIC CHECK EQUIPMENT IS FINE FOR SMALL MILITARY WEAPON SYSTEMS, BUT NASA NEEDED SOMETHING MORE VERSATILE FOR PRODUCTION TESTING OF ITS HUGE SATURN SPACE Boosters. The answer: Multiple General Purpose Computers Plus Satellite Test Stations with some novel hardware for checking everything from structural alignment to the guidance system.

TITLE: CONFERENCE ON SPACE-AGE PLANNING, CHICAGO, ILL.
AUTHOR
Date of Pub: 5/6/1963

Abstract:
Major topics were the National Space Program, the University-Industry Partnership in Space Projects, how space activities are changing the economy, consumer goods opportunities from space research, placement and management of research and development projects, opportunities and challenges in space procurement.

TITLE: CONFERENCE ON THE LAW OF SPACE AND SATELLITE COMMUNICATIONS
AUTHOR
Date of Pub: 1/1/1964

Abstract:

TITLE: CONFIGURATION MANAGEMENT
AUTHOR
Date of Pub: 1/1/1965

Abstract:
Gives definition of Configuration Management as a systematic approach to the identification, control, and accounting of the configuration of products, and their component parts, from the point of their initial definition throughout their intended life.

TITLE: CONGRESSIONAL INQUIRY REGARDING THE S-II-T ACCIDENT AT THE MISSISSIPPI TEST FACILITY
AUTHOR: Webb, J.E.
Date of Pub: 3/21/1967

Abstract:

TITLE: CONSTITUTION OF COMETARY NUCLEI
AUTHOR: Whipple, F.L.
Date of Pub: 8/1/1976

Abstract:

TITLE: CONTRACT LET FOR $8 MILLION OF WORK RELATED TO SATURN UPPER STAGES (NEWS RELEASE)
AUTHOR
Date of Pub: 7/10/1964

Abstract:
MSFC has awarded three contracts totaling more than $8 million for work related to the upper stages of Saturn rockets. NAA-Rocketdyne was awarded a $3.6 million contract for J-2 rocket engine production equipment at Canoga Park and for test support facilities at Santa Susana. The other two contracts, $2.3 million and $2.2 million, went to Douglas-Santa Monica. The former is to permit Douglas to begin purchasing certain long range items or eight additional S-IVB rocket stages ordered for the Saturn IB Program. The $2.2 million will be spent for an additional set of automatic checkout equipment to be used on 1 S-IVB stages at the Sacramento site.

TITLE: CONTRACT STATUS REPORT (SATURN FUNDED CONTRACTS IN EXCESS OF $100,000)
AUTHOR
Date of Pub: 1/31/1964

Abstract:
Listing of contracts by contract number. Also gives contractor, COR, expiration date of contract, contract value, place of performance, and scope of work.

TITLE: CONTRACTOR PROGRAM PROCEDURE
AUTHOR
Date of Pub: 1/1/1968

Abstract:
NAS8-5608

TITLE: CONTRACTOR PROGRAM PROCEDURES
AUTHOR
Date of Pub: 1/1/1966

Abstract:
CONTRACT NAS8-5608

TITLE: CONTRACTORS OVER $700,000 THAT MADE CONTRIBUTION TO SATURN PROGRAM
AUTHOR
Date of Pub: 1/1/1969

Abstract:

TITLE: CONTRIBUTION OF THE USSR TO THE EXPLORATION OF OUTER SPACE
AUTHOR SISSAKIAN, N.M.
Date of Pub: 1/1/1965

Abstract:

TITLE: CONVECTIVE ENERGY TRANSPORT IN STELLAR ATMOSPHERES-A CONVECTIVE CELL MODEL
AUTHOR ULRICH, R.K.
Date of Pub: 9/1/1968

Abstract:
The motion in a convectively unstable region is expanded into an ensemble of convective cells. Each of these cells interacts with the surrounding medium according to the semi-empirical model proposed by Turner (1963). Possible detailed models of the flow patterns within each cell are presented. The radius and velocity of these cells are given as functions of distance moved. The convective flux and RMS velocity are given as averages over the ensemble of cells. As in the standard mixing length theory, the principle uncertainty remains the average initial radius of the cells.

TITLE: CORROSION PROBLEMS ASSOCIATED WITH SPACE LAUNCH VEHICLES
AUTHOR  FRANKLIN,D.B.       Date of Pub:  2/20/1962

Abstract:

TITLE:  CORROSION PROBLEMS ASSOCIATED WITH THE SATURN VEHICLE

AUTHOR  WILLIAMSON,J.G.       Date of Pub:  3/31/1968

Abstract:
CORROSION PROBLEMS ASSOCIATED WITH SPACE VEHICLES IN GENERAL ARE DISCUSSED AS CONTRASTED TO THOSE PROBLEMS EXPERIENCED WITH STRUCTURES IN AN EARTH ATMOSPHERE. PRIMARY EMPHASIS IS PLACED ON STRUCTURAL ALLOYS IN THIS DISCUSSION. ALTHOUGH SOME CORROSION FAILURES EXPERIENCED IN VARIOUS MECHANICAL COMPONENTS ARE DESCRIBED. GENERAL CORROSION PREVENTION MEASURES ARE INDICATED, AND SOLUTIONS TO SPECIFIC CORROSION FAILURES DESCRIBED. MAJOR FAILURES EXPERIENCED HAVE BEEN ATTRIBUTED TO STRESS CORROSION CRACKING, RATHER THAN GENERAL OR GALVANIC TYPE CORROSION.

TITLE:  COUNTDOWN TO LIFTOFF

AUTHOR  SHEIL,W.B.       Date of Pub:  1/1/1966

Abstract:

TITLE:  CREW BRIEFING - IU STAGE (IBM)

AUTHOR       Date of Pub:  1/1/1968

Abstract:

TITLE:  CREW SAFETY ASPECTS OF THE SATURN APOLLO LAUNCH VEHICLE

AUTHOR  KUETTNER,J.       Date of Pub:  10/1/1963

Abstract:

TITLE:  CRYOGEN SYSTEM HARDWARE TECHNOLOGY REVIEW FOR THE SPACE SHUTTLE

AUTHOR  HUZEL,D.K.       Date of Pub:  7/1/1970

Abstract:
<table>
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<th>TITLE:</th>
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<tr>
<td>AUTHOR</td>
<td>REDMOND, J.H./BOTT, F.W.</td>
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Abstract:

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<th>TITLE:</th>
<th>CURRENT DESIGN TECHNOLOGY OF ATTITUDE CONTROL SYSTEMS FOR LARGE LAUNCH VEHICLES</th>
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<tr>
<td>AUTHOR</td>
<td>BLACKSTONE, J.H.</td>
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<tr>
<td>Date of Pub:</td>
<td>8/12/1968</td>
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Abstract:
PRESENT CONTROL SYSTEM DESIGN EFFORT FOR LARGE LAUNCH VEHICLES USES BASICALLY ITERATIVE STABILITY-RESPONSE DESIGN - ANALYSIS TECHNIQUES FOLLOWED BY IMPLEMENTATION EVALUATION AND CONTROL SIGNAL VERIFICATION ACCOMPLISHED BY SIMULATION AND SYSTEM TESTING. THIS PAPER SURVEYS CURRENT TECHNOLOGY IN DESIGN OF ATTITUDE CONTROL FOR LARGE LAUNCH VEHICLES, DISCUSSING THE ENGINEERING EFFORT DEDICATED TOWARD THE SPECIFICATION, IMPLEMENTATION, AND VERIFICATION OF THE DESIGN. VARIOUS ASPECTS OF THE PROBLEM ARE REVIEWED AND RELATED TO THE DEVELOPMENT OF THE ATTITUDE CONTROL SYSTEM FOR THE POWERED PHASES OF FLIGHT.

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<th>TITLE:</th>
<th>CURRENT TRENDS IN LARGE BOOSTER DEVELOPMENTS</th>
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<td>AUTHOR</td>
<td>HALL/ELDON, W./SCHWENK, C.</td>
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Abstract:

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<tr>
<td>AUTHOR</td>
<td>BARTEE, D.</td>
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<tr>
<td>Date of Pub:</td>
<td>11/1/1964</td>
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Abstract:
MAJOR REFINEMENTS IN THE PROCESS OF AGE-FORMING PARTS OF SPACE VEHICLES RECENTLY WERE DEVISED BY MANUFACTURING SPECIALISTS AT BOEING'S WICHITA BRANCH. TECHNIQUES FOR FORMING HIGH-STRENGTH METALS HAVE BEEN DEVELOPED, AND A PLASMA-TYPE PROTECTION FOR TOOLING HAS BEEN INTRODUCED.

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<td>Date of Pub:</td>
<td>12/12/1967</td>
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Abstract:
COVERS HISTORY, FUNCTION, THRUST, SPECIFIC IMPULSE, PROPELLANTS, COMPONENTS, DIMENSIONS, ETC.

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<th>TITLE:</th>
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<td>7/15/1968</td>
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Abstract:
COVERS HISTORY, THRUST, PROPELLANTS, COMPONENTS, DIMENSIONS, APPLICATIONS, ETC.

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Abstract:
COVERS FUNCTION, THRUST, SPECIFIC IMPULSE, PROPELLANTS, COMPONENTS, DIMENSIONS, HISTORY, ETC.
DECADE OF SPACE PROGRESS...1958 TO 1968

IN THIS ARTICLE GE OFFERS A PICTORIAL TRIBUTE TO NASA.

DECISION PROCEDURE FOR MINIMIZING COSTS OF CALIBRATING LIQUID ROCKET ENGINES

Prior to acceptance of a liquid rocket engine for use in Saturn I vehicles, average thrust of two consecutive tests without an intervening calibration must satisfy spec requirements. The contractor may recalculate after the first and subsequent tests if he so chooses. Based upon decision limits, until the above requirement is met. This paper provides a method for calculating decision limits such that the total number of tests required for acceptance is minimized. The model for calculating the decision limit takes into account operational reliability and life of the engine, ratio of cost of testing to cost of an engine, and correlation between tests as a function of engine-to-engine and run-to-run variance components.

DEEP SPACE NETWORK (JPL)

The Deep Space Network (DSN) is a precision communication system which is designed to communicate with, and permit control of, spacecraft designed for deep space exploration. DSN consists of: the Deep Space Instrumentation Facility, the Space Flight Operations Facility, and the DSN ground communication system. The DSN is a NASA facility, managed by JPL. It is the policy of JPL to continuously conduct research and development of new components and systems and to engineer them into the DSN to maintain a state-of-the-art capability.

DESCRIPTION OF THE ST-124M INERTIAL STABILIZED PLATFORM AND ITS APPLICATION TO THE SATURN V LAUNCH VEHICLE

This report is a description of the ST-124M inertial stabilized platform system and its application to the Saturn V launch vehicle. It is a summary report providing the system concept, and not a theoretical presentation. Mathematical equations were included only where necessary to describe the equipment; however, the detailed derivations supporting these equations were not presented since this was not the theme of the paper.

DESCRIPTION OF THE ST124-M INERTIAL STABILIZED PLATFORM AND ITS APPLICATION TO THE SATURN V LAUNCH VEHICLE

This report is a description of the ST124-M inertial stabilized platform system and its application to the Saturn V launch vehicle. It is a summary report providing the system concept, and not a theoretical presentation. Mathematical equations were included only where necessary to describe the equipment; however, the detailed derivations supporting these equations were not presented since this was not the theme of the paper.

Design and Development of a 1,500,000-Pound-Thrust Space Booster Engine

This report is a description of the ST124-M inertial stabilized platform system and its application to the Saturn V launch vehicle. It is a summary report providing the system concept, and not a theoretical presentation. Mathematical equations were included only where necessary to describe the equipment; however, the detailed derivations supporting these equations were not presented since this was not the theme of the paper.
THE PRINCIPAL OBJECTIVES IN DESIGN OF THE F-1 ENGINE WERE RELIABILITY, SIMPLICITY, AND THE DEGREE OF RUGGEDNESS REQUIRED TO PROVIDE A HIGH MARGIN OF SAFETY FOR THE MANNED APPLICATIONS. CAPABILITIES OF THE F-1 ENGINE ARE NOTED IN THIS PAPER.

<table>
<thead>
<tr>
<th>TITLE: DESIGN AND DEVELOPMENT OF A ZERO-G VAPOR LIQUID SEPARATOR FOR USE IN CRYOGENIC FLUID POWER SYSTEMS</th>
<th>AUTHOR: DISTEFANO, J.F./SHIOZAWA, S.</th>
<th>Date of Pub: 1/1/1965</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Abstract:</strong></td>
<td>THIS REPORT PRESENTS THE DATA OBTAINED FROM THE ANALYSIS, DESIGN AND DEVELOPMENT TESTING OF A SPECIFIC, DYNAMIC TYPE VAPOR-LIQUID SEPARATOR INTENDED FOR USE IN A HYDROGEN STORAGE TANK.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TITLE: DESIGN AND USE OF FAULT SIMULATION FOR SATURN COMPUTER DESIGN</th>
<th>AUTHOR: HARDIE, F./SUHOCKI, R.</th>
<th>Date of Pub: 6/1/1966</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Abstract:</strong></td>
<td>THE SATURN FAULT SIMULATOR IS A SYSTEM OF PROGRAMS TO BE EXECUTED ON AN IBM 7090 COMPUTER. THE OBJECTIVES OF THIS SIMULATOR WERE TO VERIFY THE LOGIC DESIGN OF THE SATURN COMPUTER, ANALYZE EFFECTS OF SOLID PLUS INTERMITTENT FAULTS, EVALUATE EFFECTIVENESS OF THE SATURN DIAGNOSTIC PROGRAMS THROUGH FAULT SIMULATION, AND EVALUATE CHANGES IN DESIGN BEFORE COMMITMENT TO HARDWARE. THIS PAPER CONSISTS OF TWO PARTS - ONE DESCRIBES THE PROGRAMS AND THE OTHER DESCRIBES THE APPLICATION OF THE SIMULATOR. THE PROGRAMS ARE DESCRIBED IN THE SAME ORDER AS THEY WOULD NORMALLY BE EXECUTED.</td>
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<thead>
<tr>
<th>TITLE: DESIGN CONCEPTS OF GROUND DDAS IN SATURN IB/V ESE</th>
<th>AUTHOR: CASBY, J.P./PATTON, F.T./PETCHER</th>
<th>Date of Pub: 1/1/1967</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Abstract:</strong></td>
<td>IN THE SATURN IB/V PROGRAMS THE SHEER QUANTITY OF DATA REQUIRED FOR COMPUTER PROCESSING AND ESE DISPLAY MAKES IT NECESSARY TO PROVIDE AN EFFICIENT DATA ACQUISITION SYSTEM. FOR MUCH OF THE DATA ORIGINATING IN THE LAUNCHER, THIS REQUIREMENT IS SATISFIED BY THE GROUND DIGITAL DATA ACQUISITION SYSTEM (DDAS). THIS PAPER PROVIDES A TECHNICAL DESCRIPTION OF THE GROUND DDAS WITH EMPHASIS PLACED ON THE UNIQUE DESIGN CONCEPTS OF THIS TELEMETRY SYSTEM.</td>
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<thead>
<tr>
<th>TITLE: DESIGN OF CRYOGENIC FLUID SYSTEMS IN THE S-IV STAGE PROPULSION SYSTEM</th>
<th>AUTHOR: REASER, W.W.</th>
<th>Date of Pub: 1/1/1965</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Abstract:</strong></td>
<td>MUCH HAS BEEN SAID IN THE PAST ABOUT RELIABILITY WITH RESPECT TO STATISTICS, THEORETICAL APPROACHES, AND GENERAL PRINCIPLES. THIS PAPER AVOIDS GENERALIZING ON THESE TOPICS AND DISCUSSES THE SPECIFIC DESIGN CONCEPTS USED BY THE S-IV DESIGNERS TO BUILD RELIABILITY INTO THE STAGE. PERFORMANCE TESTING WHICH WAS NECESSARY TO VERIFY THE DESIGN CONCEPTS AND FINALIZE THE SYSTEM DESIGN DETAILS IS ALSO DISCUSSED. THE S-IV STAGE PROPULSION SYSTEMS CONSIDERED HERE ARE THOSE THAT SUPPORT THE ENGINE OPERATION. SPECIFIC ENGINE DESIGN DETAILS ARE NOT DISCUSSED.</td>
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<tr>
<th>TITLE: DESIGN OF SPACE VEHICLE STRUCTURES FOR VIBRATION AND ACOUSTIC ENVIRONMENTS</th>
<th>AUTHOR: LIFER, C.E.</th>
<th>Date of Pub: 12/3/1963</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Abstract:</strong></td>
<td>THE ADVANCES IN DESIGN STATE-OF-THE-ART FOR SPACE VEHICLE STRUCTURAL VIBRATIONS HAVE NOT KEPT PACE WITH IMPROVEMENTS IN ENVIRONMENT DEFINITION AND TESTING. AS VEHICLES BECOME LARGER AND MORE EXPENSIVE, THE GAP MUST BE ELIMINATED. THE NEED FOR A UNIFORM DESIGN APPROACH THROUGHOUT THE AEROSPACE INDUSTRY IS PRESENTED AND A PROPOSED BASIS DERIVED BY MSFC IS EXPLAINED.</td>
<td></td>
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</tbody>
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<table>
<thead>
<tr>
<th>TITLE: DESIGN OF THE SATURN S-IV STAGE PROPELLANT UTILIZATION SYSTEM</th>
<th>---</th>
<th>---</th>
</tr>
</thead>
</table>
TITLE: DESIGN OF THE SATURN S-IVB STAGE PROPELLANT UTILIZATION SYSTEM (PAPER)

AUTHOR: ALLEN, D.J./BEKEMEYER, L.G.

Date of Pub: 3/29/1962

Abstract:

TITLE: DESIGN OF THE SATURN STATIC TEST STAND

AUTHOR: ALLEN, D.J./BEKEMEYER, L.G.

Date of Pub: 12/1/1962

Abstract:

TITLE: DESIGN, DEVELOPMENT AND FABRICATION OF A Prototype Hydraulic Transformer

AUTHOR: MORANDO, J.

Date of Pub: 9/16/1964

Abstract:

THIS PAPER DISCUSSES THE DESIGN, DEVELOPMENT AND FABRICATION OF A Prototype Hydraulic Transformer (HYDRO-AIRE Model No. 05-055). IT IS DESIGNED TO PUMP HYDRAULIC OIL AT A FLOW OF 100 GPM WITH A PRESSURE RISE OF 4000 PSI, AND DOES THIS WORK BY UTILIZING AS A POWER SOURCE THE FLOW OF RP-1 ROCKET FUEL AT A PRESSURE OF 1900 PSI. THE HYDRAULIC TRANSFORMER BUILT TO HANDLE THIS COMBINATION OF FLOWS AND PRESSURES, UNPRECEDENTED IN SUCH DEVICES, HAS A WEIGHT OF ONLY 70 POUNDS FOR THE FIRST DEVELOPMENT MODEL. THE DEVELOPMENT OF THIS UNIT IS DISCUSSED AND FUTURE DEVELOPMENT IMPROVEMENTS ARE MENTIONED.

TITLE: DETECTIVE STORY BEHIND OUT FIRST MANNED SATURN V SHOOT

AUTHOR: VON BRAUN, W.

Date of Pub: 11/1/1968

Abstract:


TITLE: DEVELOPMENT AND APPLICATION OF SEPARABLE FLUID CONNECTORS FOR LIQUID PROPELLANT ROCKET ENGINES

AUTHOR: DANIELS, C.M.

Date of Pub: 12/1/1963

Abstract:

TITLE: DEVELOPMENT AND FLIGHT TEST EVALUATION OF THE BASE HEAT SHIELDS FOR THE SATURN S-IV STAGE (PAPER)

AUTHOR: DEARING, D.L.

Date of Pub: 2/1/1965

Abstract:
| Title: DEVELOPMENT AND UTILIZATION OF COMPUTER TEST PROGRAMS FOR CHECKOUT OF SPACE VEHICLES |
| Author: ROBIN, E.A. | Date of Pub: 10/10/1966 |

**Abstract:**
A COMPUTER SYSTEM WAS DESIGNED TO ALLOW TEST ENGINEERS TO PROGRESSIVELY Employ AUTOMATION IN THE CHECKOUT OF THE UPRATED SATURN I AND SATURN V SPACE VEHICLE PROGRAMS AND STILL ALLOW MANUAL CONTROL OF THE CHECKOUT PROCESS. A TWO-COMPUTER SYSTEM WAS SELECTED BY NASA AND IBM WAS CHOSEN TO PROVIDE THE PROGRAMMING AND ENGINEERING NECESSARY TO IMPLEMENT THESE OBJECTIVES. SPACE VEHICLE CHECKOUT, PRIOR TO LAUNCH, MAY BE CHARACTERIZED BY CONTROLLING, MONITORING, AND TESTING THE VEHICLE AND ITS SUBSYSTEMS THROUGH USE OF GROUND SUPPORT EQUIPMENT.

| Title: DEVELOPMENT EFFORT TO ACHIEVE RELIABILITY |
| Author: CLARK, G.M./HAIGLER, K.B. | Date of Pub: 2/20/1965 |

**Abstract:**
DEVELOPMENT OF A LARGE LIQUID ROCKET ENGINE CAN REPRESENT EXPENDITURE OF SEVERAL HUNDRED MILLION DOLLARS OF EFFORT. BEFORE 30 PER CENT OF THE CONTRACTED DEVELOPMENT FUNDS HAVE BEEN EXPENDED, HOWEVER, THE ENGINE WILL PROBABLY HAVE OPERATED FOR THE MISSION DURATION. CAPABILITY TO OPERATE AT LEAST ONE SUCCESSFUL TEST EARLY IN A DEVELOPMENT PROGRAM IS EVIDENCE OF ACHIEVING A MINIMAL RELIABILITY LEVEL, BUT THE MAJOR OBJECTIVE OF THE DEVELOPMENT PROGRAM IS PRODUCING A DESIGN WHICH PERFORMS RELIABLY. A ROCKET ENGINE RELIABILITY PREDICTION MUST VIEW RELIABILITY AS A DYNAMIC CONCEPT, CONSTANTLY BEING ALTERED BY DEVELOPMENT EFFORT. SINCE ACHIEVING RELIABILITY CONSUMES THE MAJORITY OF ENGINE DEVELOPMENT EXPENSE, THE CONCEPT SELECTION PHASE WILL BE ACTIVELY CONCERNED WITH RELIABILITY AS A DESIGN AND PROGRAM PARAMETER. AN ADVANCE PLANNING EFFORT SHOULD NOT ONLY SELECT AN INHERENTLY RELIABLE DESIGN CONCEPT BUT ALSO ONE THAT IS EFFICIENTLY DEVELOPED.

| Title: DEVELOPMENT OF A BONDED COMMON BULKHEAD FOR SATURN |
| Author: ROBERTSON, A.C./BROWN, E.L. | Date of Pub: 3/15/1966 |

**Abstract:**

| Title: DEVELOPMENT OF A CHECKOUT LANGUAGE: ATOLL |
| Author: BALENTINE, R.C. | Date of Pub: 11/30/1966 |

**Abstract:**
ATOLL (ACCEPTANCE, TEST, OR LAUNCH LANGUAGE) WAS DEVELOPED TO FULFILL THE REQUIREMENTS FOR A COMMON COMPUTER LANGUAGE THAT COULD BE USED BY THE TEST ENGINEERS FOR LAUNCH AND FACTORY CHECKOUT.

| Title: DEVELOPMENT OF A LIGHTWEIGHT EXTERNAL INSULATION SYSTEM FOR LIQUID HYDROGEN STAGES OF THE SATURN V VEHICLE |
| Author: MIDDLETON, R.L. | Date of Pub: 4/1/1964 |

**Abstract:**

THE READI CONCEPT COMPRISSES AN ON-BOARD INSTRUMENTATION AND CONTROL SYSTEM THAT SENSES ABNORMAL OPERATION OF ROCKET ENGINE PROPULSION SYSTEMS AND INSTITUTES EMERGENCY REMEDIAL ACTIONS TO REDUCE THE CONSEQUENCES OF MALFUNCTIONS UPON MISSION SUCCESS AND CREW SAFETY. MATHEMATICAL RELATIONSHIPS RELATING MALFUNCTION AND REMEDIAL ACTIONS TO THEIR EFFECTS ON CREW SAFETY AND MISSION SUCCESS HAVE BEEN DERIVED AND ARE PRESENTED AS A SERIES OF MATHEMATICAL MODELS AND COMPUTATIONAL PROCEDURES. THE APPLICATION OF THESE TECHNIQUES TO SATURN V HAS DEMONSTRATED THAT THE LARGE VOLUME OF RELIABILITY AND FAILURE EFFECTS DATA CAN BE ASSIMILATED, PROCESSED, AND USED EFFECTIVELY TO ASSURE THAT THE READI SYSTEM DESIGN CONSIDERS THESE DATA IN A PROPER PERSPECTIVE.
During development of RL-10 and J-2 engines, many problems were encountered. Solutions to the significant problems are contained in this paper. A description of these LOX-hydrogen engines outlining the unique features of each is given. Performance parameters for both engine systems are tabulated. Specific applications to various stages are shown. Start and restart conditions at altitude are a very important adjunct to the engine development and are presented in this paper. Testing an engine designed to operate at altitude at ambient sea level conditions presented some interesting problems and required peculiar test equipment. Solution to these problems and a description of the test equipment are covered. Flight data revealed some anomalies that were later verified at the altitude test facility at AEDC. A description of these anomalies and verification testing will be made.

Title: Development of Manufacturing and Applications Techniques of Lightweight Insulation System for the Liquid Hydrogen S-II Stage Fuel on

Author: Dunnie, P.E.

Date of Pub: 12/1/1964

Abstract:

Title: Development of Nuclear Rocket Propulsion in the United States

Author: House, W.C.

Date of Pub: 10/9/1963

Abstract:

This paper presents the overall history and status of nuclear rocket developments in the United States, indicates the goals and objectives of the present development activities, and illustrates some possible mission applications for engines of the class under development.

Title: Development of Operational Maintenance Concepts and Procedures for the Thor and Atlas Rocket Engines (Draft of Proposed UCLA M.S. Thesis)

Author: Jackson, R.R.

Date of Pub: 10/1/1963

Abstract:

The whole concept of maintenance was changed with the advent of missiles and their rocket engines. As a result it was necessary to go through a new program of learning to advance the maintenance state-of-the-art for rocket engines. This report presents a detailed study of the development of the new maintenance concepts and their associated procedures for the Thor and Atlas rocket engines. The areas that are discussed are equipment design, maintenance analysis, publications, field service, unit proficiency system, logistics, training, human engineering and reliability. In the area of reliability the development of new techniques and their utilization for rocket engines is discussed.

Title: Development of Separable Connectors for the Saturn S-IV Stage

Author: Wilson, E.L.

Date of Pub: 1/1/1966

Abstract:

Delves into the philosophies, constraints and ultimate decisions of design, and the problems, methods, and practices of manufacturing. Reviews the installation process and attempts to probe into all its aspects. Finally, the checkout of the systems of the separate stages is summarized and analyzed.

Title: Development of Servovalves with Improved Reliability for Space Vehicles

Author: Kalange, M.A./Pollock, W.H./T

Date of Pub: 9/14/1964

Abstract:
CONSIDERATIONS FOR IMPROVEMENT IN THE RELIABILITY OF THE SATURN I ENGINE GIMBAL SERVOSYSTEMS ARE BRIEFLY COVERED. THE SATURN I SERVOVALVES OPERATE WITH INCREASED ELECTRICAL INPUT POWER. THE SATURN V VEHICLES WILL USE MECHANICAL FEEDBACK ACTUATORS WITH INCREASED ELECTRICAL INPUT POWER, LARGER ORIFICES AND NOZZLE SIZES, LARGER TORQUE MOTOR WIRE SIZE, AND GREATER SPOOL DRIVING FORCES. FURTHER CONSIDERATIONS FOR IMPROVEMENT IN SYSTEM RELIABILITY LED TO DEVELOPMENT OF SERVOVALVES WITH IMPROVED RELIABILITY. THE PRIMARY OBJECTIVE WAS TO DEVELOP SERVOVALVES THAT HAVE A HIGHER RELIABILITY FACTOR BY INCREASING ELECTRICAL INPUT POWER AND MINIMIZING SENSITIVITY TO FLUID CONTAMINATION. TWO DIFFERENT APPROACHES WERE TAKEN: IN THE FIRST APPROACH, A CONVENTIONAL SERVOVALVE (TWO STAGE, DOUBLE NOZZLE FLAPPER ELECTROHYDRAULIC) WITH MECHANICAL FEEDBACK FROM THE SPOOL POSITION WAS USED. METHODS FOR OPTIMIZING THE CHARACTERISTICS EFFECTING THE RELIABILITY ARE SHOWN AND TEST RESULTS ARE GIVEN FOR THE OPTIMIZED FUNCTIONAL MODEL. IN ADDITION TO BEING BUILT FOR USE ON AN ELECTRICAL FEEDBACK ACTUATOR, THE VALVE WAS MODIFIED TO SHOW THAT IT WAS DESIGNED WITH SUFFICIENT POWER FOR ITS OPERATION ON A MECHANICAL FEEDBACK ACTUATOR. THE SECOND APPROACH IS ALSO A TWO-STAGE MECHANICAL FEEDBACK SERVOVALVE; HOWEVER, THE HYDRAULIC AMPLIFIER IN THIS CASE IS THE JET PIPE AS OFFERING THE GREATEST POTENTIAL FOR HIGH RELIABILITY. THE STUDY THEN PROGRESS TO A SERIES OF TEST FIXTURES AND BREADBOARD HARDWARE TO EVALUATE THE OPTIMIZED DESIGN, WHICH THROUGH FURTHER DEVELOPMENT RESULTED IN A FUNCTIONAL MODEL. THE FUNCTIONAL MODEL CHARACTERISTICS ARE PRESENTED.

TITLE: DEVELOPMENT OF THE NASA/GRUMMAN LUNAR MODULE
AUTHOR
Date of Pub: 6/1/1969

Abstract:

TITLE: DEVELOPMENT OF THE NIKE SYSTEM
AUTHOR TOFTOY, H.N.
Date of Pub: 2/6/1962

Abstract:

TITLE: DEVELOPMENT OF THE SATURN S-IV AND S-IVB LIQUID HYDROGEN TANK INTERNAL INSULATION
AUTHOR DEARING, D.L.
Date of Pub: 8/23/1965

Abstract:
IN APRIL 1960 DOUGLAS WAS AWARDED A CONTRACT TO DEVELOP THE S-IV AND UPPERMOST STAGE FOR THE SATURN I SPACE BOOSTER. IN ORDER TO REALIZE THE HIGH SPECIFIC IMPULSE AVAILABLE, THIS STAGE, CALLED THE S-IV, WAS TO UTILIZE LIQUID HYDROGEN AND LIQUID OXYGEN AS PROPELLENTS. AFTER BURNOUT OF THE FIRST STAGE, THE S-IV WAS TO IGNITE ITS ENGINES AT AN ALTITUDE OF APPROXIMATELY 200,000 FEET, BURN FOR APPROXIMATELY 8 MINUTES, AND INJECT A 20,000 LB SPACECRAFT INTO A LOW EARTH ORBIT. THIS PROGRAM REPRESENTED DOUGLAS' FIRST MAJOR ENDEAVOR WITH LIQUID HYDROGEN. IT WAS NECESSARY TO DEVELOP AN INSULATION FOR THE S-IV THAT WAS CAPABLE OF WITHSTANDING THE THERMAL SHOCK ASSOCIATED WITH LOADING, COULD PROVIDE ADEQUATE INSULATIVE PROPERTIES TO LIMIT FLOW OF HEAT INTO THE HYDROGEN, AND WAS OF MINIMUM WEIGHT. THIS LATTER FACT CANNOT BE OVER-EMPHASIZED BECAUSE EVERY EXTRA POUND OF INSULATION IS ONE LESS POUND OF AVAILABLE PAYLOAD WEIGHT. THE DEVELOPMENT PROGRAM DESCRIBED IN THIS PAPER WAS LONG AND ARDUOUS.

TITLE: DEVELOPMENT OF THE SATURN SPACE CARRIER VEHICLE
AUTHOR LANGE, O.H.
Date of Pub: 1/1/1962

Abstract:
<table>
<thead>
<tr>
<th>Title:</th>
<th>DEVELOPMENT OF THE SATURN SPACE VEHICLE</th>
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<tbody>
<tr>
<td>Author:</td>
<td>LANGE, O.H.</td>
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</table>

**Abstract:**
TO UNDERSTAND PRESENT TRENDS IN VEHICLE DEVELOPMENT, WE MUST TURN TO THE C-1 DEVELOPMENT PROGRAM. THIS PAPER REVIEWS SOME OF THE MAJOR DECISIONS AND ACTIVITIES MADE DURING THE C-1 DEVELOPMENT. THESE LINK TOGETHER, STEP BY STEP, FROM THE CONCEPT OF A MULTISTAGE CARRIER VEHICLE TO VEHICLES THAT WILL SUPPORT ADVANCED MISSIONS IN SPACE.

<table>
<thead>
<tr>
<th>Title:</th>
<th>DEVELOPMENT OF THE SATURN SYSTEM SAFETY PROGRAM</th>
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<tbody>
<tr>
<td>Author:</td>
<td>FARISH, P.T.</td>
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</table>

**Abstract:**
THIS PAPER DESCRIBES THE MAJOR HIGHLIGHTS PASSED IN THE DEVELOPMENT OF A SYSTEM SAFETY PROGRAM AT MSFC SINCE EARLY 1967. IT DISCUSSES ACCOMPLISHMENTS, PROBLEMS RESOLVED, AND DECISIONS MADE FOR APOLLO SATURN VEHICLES AS-501 AND AS-502, AND PROJECTS THAT ARE TO BE ACCOMPLISHED ON FUTURE SATURN VEHICLES.

<table>
<thead>
<tr>
<th>Title:</th>
<th>DEVELOPMENT OF WELD FABRICATION TECHNIQUES FOR THE S-IC SATURN V VEHICLES</th>
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<tbody>
<tr>
<td>Author:</td>
<td>DALEY, D.M./JEFFERYS, D.C.</td>
</tr>
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**Abstract:**

<table>
<thead>
<tr>
<th>Title:</th>
<th>DEVELOPMENT STATUS FOR ARC GUIDANCE, WELD OBSERVATION SYSTEMS, AND REVIEW OF PROCESS CONTROL PARAMETERS</th>
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<tbody>
<tr>
<td>Author:</td>
<td>WALL, W.</td>
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</table>

**Abstract:**

<table>
<thead>
<tr>
<th>Title:</th>
<th>DICTIONARY OF TECHNICAL TERMS FOR AEROSPACE USE</th>
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</thead>
<tbody>
<tr>
<td>Author:</td>
<td>ALLEN, W.H.</td>
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</table>

**Abstract:**
THIS VOLUME ATTEMPS TO DEFINE MEANINGS OF SELECTED TERMS IN USE IN AREAS OF ACTIVITY OF NASA.

<table>
<thead>
<tr>
<th>Title:</th>
<th>DIFFERENCES OF CONFIGURATION IN SUCCESSIVE SATURN IB AND SATURN V VEHICLES - CASE 330</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author:</td>
<td>DUTY, D.M.</td>
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</table>

**Abstract:**
CONFIGURATION MATRICES REFLECTING PRESENT PROGRAM STATUS OF DIFFERENCES IN SATURN IB AND V FLIGHT HARDWARE ON A MISSION TO MISSION BASIS HAVE BEEN PREPARED. THEY ARE ARRANGED TO SHOW DIFFERENCES IN MAJOR SUBSYSTEMS FOR EACH STAGE. THE REASON FOR THE CONFIGURATION DIFFERENCE AND THE MISSION EFFECTIVITY ARE INCLUDED.

<table>
<thead>
<tr>
<th>Title:</th>
<th>DIGEST OF FY-62 FUNDED ADVANCED STUDIES</th>
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<tbody>
<tr>
<td>Author:</td>
<td></td>
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</table>

**Abstract:**
THIS PUBLICATION SUMMARIZES THE MSFC ADVANCED STUDY PROGRAM FOR FY-62. A SEPARATE REPORT WILL COVER THE STUDY PROGRAM FOR EACH FISCAL YEAR. THE PURPOSE OF THESE DOCUMENTS IS TO PROVIDE HISTORICAL REFERENCE INFORMATION WHICH SHOULD BE HELPFUL IN PLANNING FUTURE STUDY PROGRAMS. INVESTIGATIONS ARE COVERED UNDER TWO MAJOR CATEGORIES: LAUNCH VEHICLE STUDIES AND LUNAR, ORBITAL, AND PLANETARY STUDIES.

**TITLE:** DIGEST OF FY-63 FUNDED ADVANCED STUDIES  
**AUTHOR:**  
**Date of Pub:** 7/1/1966  
**Abstract:**  
THIS REPORT SUMMARIZES THE ADVANCED STUDY PROGRAM FOR FY-63. A SEPARATE REPORT WILL BE ISSUED COVERING THE STUDY PROGRAM FOR EACH FISCAL YEAR. THE PURPOSE OF THESE DOCUMENTS IS TO PROVIDE HISTORICAL REFERENCE INFORMATION WHICH SHOULD BE HELPFUL IN PLANNING FUTURE STUDY PROGRAMS. THE FUNDED STUDIES COVERED IN THIS DOCUMENT ARE COVERED UNDER THREE CATEGORIES: (1) LAUNCH VEHICLE AND SUPPORTING STUDIES, (2) ORBITAL AND LUNAR STUDIES, AND (3) PLANETARY STUDIES. THE INFORMATION PRESENTED ON EACH STUDY INCLUDES A BRIEF DESCRIPTION OF THE OBJECTIVES AND RESULTS AND PERTINENT CONTRACT DATA.

**TITLE:** DIGEST OF FY-64 FUNDED ADVANCED STUDIES  
**AUTHOR:**  
**Date of Pub:** 8/1/1966  
**Abstract:**  
THIS PUBLICATION SUMMARIZES THE ADVANCED STUDY PROGRAM FOR FY-64. A SEPARATE REPORT COVERS THE STUDY PROGRAM FOR EACH FISCAL YEAR. THE PURPOSE OF THESE DOCUMENTS IS TO PROVIDE HISTORICAL REFERENCE INFORMATION WHICH SHOULD BE HELPFUL IN PLANNING FUTURE STUDY PROGRAMS. THE FUNDED STUDIES IN THIS DOCUMENT ARE COVERED UNDER FOUR CATEGORIES: (1) LAUNCH VEHICLE AND SUPPORTING STUDIES, (2) EARTH ORBITAL STUDIES, (3) LUNAR STUDIES, AND (4) PLANETARY STUDIES. THE INFORMATION PRESENTED ON EACH STUDY INCLUDES A BRIEF DESCRIPTION OF THE OBJECTIVES AND RESULTS AND PERTINENT CONTRACT DATA.

**TITLE:** DIGEST OF FY-65 FUNDED ADVANCED STUDIES  
**AUTHOR:**  
**Date of Pub:** 7/1/1966  
**Abstract:**  
THIS PUBLICATION SUMMARIZES THE ADVANCED STUDY PROGRAM FOR FY-65. A SEPARATE REPORT WILL COVER THE STUDY PROGRAM FOR EACH FISCAL YEAR. THE PURPOSE OF THESE DOCUMENTS IS TO PROVIDE HISTORICAL REFERENCE INFORMATION WHICH SHOULD BE HELPFUL IN PLANNING FUTURE STUDY PROGRAMS. THE FUNDED STUDIES COVERED IN THIS DOCUMENT FALL UNDER FOUR MAJOR HEADINGS: (1) LAUNCH VEHICLE STUDIES, (2) EARTH ORBITAL AND LUNAR STUDIES, (3) PLANETARY/NUCLEAR STUDIES, AND (4) AAP STUDIES. THE INFORMATION PRESENTED ON EACH STUDY INCLUDES A BRIEF DESCRIPTION OF THE OBJECTIVES AND PERTINENT CONTRACT DATA.

**TITLE:** DIGEST OF FY-66 FUNDED ADVANCED STUDIES  
**AUTHOR:**  
**Date of Pub:** 11/1/1966  
**Abstract:**  
THIS PUBLICATION SUMMARIZES THE ADVANCED STUDY PROGRAM FOR FY-66. THE PURPOSE OF THIS DOCUMENT IS TO PROVIDE MANAGEMENT WITH QUICK REFERENCE INFORMATION WHICH SHOULD BE HELPFUL IN PLANNING FUTURE STUDY PROGRAMS. INVESTIGATIONS ARE COVERED UNDER FIVE MAJOR SECTIONS: (1) LAUNCH VEHICLE STUDIES, (2) EARTH ORBITAL STUDIES, (3) LUNAR STUDIES, (4) PLANETARY/NUCLEAR STUDIES, AND (5) AAP DEFINITION STUDIES. THE INFORMATION PRESENTED ON EACH STUDY INCLUDES A BRIEF STATEMENT OF THE OBJECTIVES AND PERTINENT CONTRACT DATA.

**TITLE:** DIGITAL DATA ACQUISITION SYSTEM IN SATURN V  
**AUTHOR:** ROREX, J.E./EICHELBERGER, R.P.  
**Date of Pub:** 3/1/1965  
**Abstract:**  
TH
THIS PAPER DESCRIBES THE DIGITAL DATA ACQUISITION SYSTEM (DDAS) AND EXPLAINS ITS USE IN CALIBRATION AND CHECKOUT OF THE SATURN V SPACE VEHICLE. THE SIZE AND COMPLEXITY OF THE SATURN V NECESSITATES COMPUTER CONTROLLED CHECKOUT. THE DDAS COMBINES THE 1 FUNCTIONS AND HARDWARE NORMALLY REQUIRED FOR A FLIGHT TELEMETRY 1 SYSTEM INTO A RELATIVELY LOW-BIT-RATE, HIGH CAPABILITY PCM 1 SYSTEM. THIS SYSTEM MAY BE USED IN GROUND OR AIRBORNE CHECKOUT 1 AND CALIBRATION AND AS A PCM TELEMETRY SYTEM FOR R&D AND 1 OPERATIONAL FLIGHT-CONTROL DATA. THE OVERALL DESIGN OF THIS 1 SYSTEM AND ITS RELATION TO THE SATURN V AUTOMATIC CHECKOUT SCHEME 1 IS DESCRIBED WITH EMPHASIS ON THE GROUND SUPPORT HARDWARE.

TITLE: DIGITAL SIMULATION OF AN AEROSPACE VEHICLE

AUTHOR MITCHELL,J.R./MOORE,J.W./TRAU Date of Pub: 3/9/1967

Abstract:
THE RAPID DEVELOPMENT OF COMPUTER TECHNOLOGY AND THE CREATION OF 1 NEW ENGINEERING ORIENTED LANGUAGES HAS ESTABLISHED THAT GENERAL 1 PURPOSE DIGITAL COMPUTERS ARE NOW EXTREMELY SUITABLE TO PERFORM 1 SIMULATION OF LARGE SCALE PHYSICAL SYSTEMS. WITH AEROSPACE 1 VEHICLE SIMULATION (AVS), AN EFFORT HAS BEEN UNDERTAKEN AT MSFC 1 TO SIMULATE CONTINUOUS AND DISCRETE DYNAMICS OF AN AEROSAPCE 1 VEHICLE AND ITS GSE ON A LARGE DIGITAL COMPUTER. THIS PAPER 1 DESCRIBES AVS IN TERMS OF THE BACKGROUND SIMULATION WORK AND 1 STUDIES LEADING TO ITS CONCEPTUAL DEVELOPMENT AND ITS OBJECTIVES 1 AS RELATED TO MSFC ACTIVITIES. IT ALSO OUTLINES A PILOT 1 IMPLEMENTATION OF AVS AS APPLIED TO THE NAVIGATION SYSTEM OF THE 1 SATURN V VEHICLE.

TITLE: DIGITAL TRANSDUCERS

AUTHOR SCHULER,A.E. Date of Pub: 10/27/1969

Abstract:
THIS PAPER OUTLINES THE MAJOR ADVANTAGES OF DIGITAL TRANSDUCERS 1 AND DESCRIBES THE PRINCIPLES AND FEATURES OF (1) DIRECT DIGITAL 1 TRANSDUCERS, (2) INDIRECT DIGITAL TRANSDUCERS, (3) QUASI-DIGITAL 1 TRANSDUCERS, AND (4) A TO D TRANSDUCERS. THE MUTUAL EFFECT OF 1 TRANSDUCERS AND SYSTEMS WILL BE DISCUSSED BRIEFLY, AND SOME 1 TRENDS OF TRANSDUCER RESEARCH AND DEVELOPMENT WILL BE PRESENTED.

TITLE: DIGITAL TRANSDUCERS - TYPES AND TRENDS

AUTHOR SCHULER,A.E. Date of Pub: 12/1/1969

Abstract:
PRINCIPLES, FEATURES, AND ADVANTAGES OF FOUR BASIC TYPES OF 1 DIGITAL TRANSDUCERS ARE REVIEWED. THE AUTHOR CLASSIFIES THESE 1 INSTRUMENTS AS DIRECT DIGITAL, INDIRECT DIGITAL, QUASI-DIGITAL, AND A-D TRANSDUCERS. IN ADDITION TO DISCUSSING CURRENT PROBLEMS, 1 THE AUTHOR FORECASTS TRENDS IN DIGITAL TRANSDUCER DEVELOPMENT.

TITLE: DIRECTORY OF KEY NASA PERSONNEL (ALL LOCATIONS)

AUTHOR Date of Pub: 11/25/1963

Abstract:

TITLE: DISCUSSION OF SOVIET MAN-IN-SPACE SHOT

AUTHOR Date of Pub: 4/13/1961

Abstract:

TITLE: DISCUSSION OF THE LUNAR LANDING PROBLEM

AUTHOR DIGESU,F.E. Date of Pub: 8/12/1963

Abstract:
THIS PAPER EXAMINES THE STUDIES UNDERWAY ON LUNAR LANDING MODES.

**TITLE:** DMS MARKET INTELLIGENCE REPORT ON SATURN  
**AUTHOR:**  
**Date of Pub:** 11/1/1968  
**Abstract:**

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**TITLE:** DO WE WANT A SPACE INDUSTRY?  
**AUTHOR:** VON BRAUN, W.  
**Date of Pub:** 11/15/1958  
**Abstract:**

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**TITLE:** DOCUMENTATION REPOSITORY  
**AUTHOR:**  
**Date of Pub:** 10/1/1965  
**Abstract:**  
A CENTRALIZED DOCUMENTATION REPOSITORY IS PROVIDED AT MSFC TO RECEIVE, CATALOG, STORE, REPRODUCE, AND DISTRIBUTE DRAWINGS, SPECS AND ASSOCIATED DOCUMENTS PERTAINING TO SPACE VEHICLES WHICH ARE ORIGINATED BY THIS CENTER AND ITS PRIME CONTRACTORS. THIS BROCHURE DESCRIBES THE SERVICES AND MATERIALS AVAILABLE FROM THE DOCUMENTATION REPOSITORY. THE PRESENT OPERATIONS OF THE REPOSITORY ARE ILLUSTRATED TO PROVIDE A COMPREHENSIVE PICTURE OF WORK FLOW, TIME SCHEDULING, AND PRODUCT OUTPUT.

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**TITLE:** DOUGLAS AIRCRAFT NEWS RELEASE  
**AUTHOR:**  
**Date of Pub:** 9/25/1964  
**Abstract:**  
DISCUSSES INTENSIVE GROUND QUALIFICATION TESTING PROGRAM FOR S-IV STAGE.

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**TITLE:** DR. GEORGE MUELLER: THE MAN BEHIND MANNED SPACE FLIGHT  
**AUTHOR:**  
**Date of Pub:** 9/1/1967  
**Abstract:**  
IN THIS INTERVIEW, DR. MUELLER, NASA'S ASSOCIATE DIRECTOR FOR MANNED SPACE FLIGHT, DISCUSSES THE NATIONAL SPACE PROGRAM AND THE ROLE HE HAS PLAYED IN IT.

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**TITLE:** DR. VON BRAUN'S ALL-PURPOSE SPACE MACHINE  
**AUTHOR:** BYLINSKY, G.  
**Date of Pub:** 5/1/1967  
**Abstract:**  
THE SATURN V IS AT ONCE THE MOON ROCKET OF SCIENCE FICTION COME TRUE AND THE ENGINE TO POWER THIS COUNTRY'S MULTI-FACETED ASSAULT ON THE VASTNESS OF SPACE FOR THE NEXT TWENTY YEARS. FOR AT LEAST THAT LONG, IT WILL BE AMERICA'S SPACE WORKHORSE, THE "ULTIMATE" ROCKET. BY ANY MEASURE, SATURN V'S PROPORTIONS ARE STARTLING. IT TOWERS 364 FEET HIGH, AS TALL AS A 30-STORY BUILDING. ITS FUEL TANKS ARE AS CAVERNIOUS AS CATHEDRALS. ITS PIPES AND VALVES ARE BIG ENOUGH FOR A MAN TO CRAWL THROUGH, YET IT IS PRECISION MECHANISM. IT GENERATES 8,700,000 POUNDS OF THRUST, AND WILL BE ABLE TO LIFT A 140-TON SPACESHIP INTO EARTH ORBIT, SEND A 47-TON CRAFT TO THE MOON, OR A 20-TON PAYLOAD TO MARS. JUST HOW BIG AN ADVANCE THIS IS IN THE DECADE SINCE SPUTNIK STARTLED THE WORLD IS ILLUSTRATED BY THE FACT SATURN V COULD LIFT 1,500 SPUTNIKS ON A SINGLE LAUNCH, OR 9,000 COPIES OF EXPLORER I, OR 40 TWO-MAN GEMINI SPACECRAFT.

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**TITLE:** DRAFT OF LETTER TO MR. MILTON W. ROSEN, OFFICE OF DOD & INTERAGENCY AFFAIRS
THIS LETTER PROPOSES THAT NASA'S METRICATION EFFORTS INCLUDE A DIRECTIVE FOR CORRECT USAGE OR ELIMINATION OF THE WORD WEIGHT.

DYNAMIC ENVIRONMENT OF THE S-IV STAGE DURING TRANSPORTATION

Abstract:

DYNAMIC ENVIRONMENTS OF THE S-IV AND S-IVB SATURN VEHICLES

Abstract:

DYNAMIC LOADS OF A LAUNCH VEHICLE DUE TO INFLIGHT WINDS

Abstract:
ANALYSIS OF STABILITY AND DYNAMIC LOAD ENVIRONMENT OF A LAUNCH VEHICLE RESULTING FROM ATMOSPHERIC DISTURBANCES IS A VERY COMPLEX PROBLEM. TO DETERMINE THE DYNAMIC LOAD ENVIRONMENT REQUIRES AN ADEQUATE DESCRIPTION OF WIND FIELD, VEHICLE DYNAMICS, AND CONTROL SYSTEM ESSENTIALS OF SUCH A STUDY, NAMELY METHODS OF ANALYSIS, WIND FIELD SPECIFICATION, AND REPRESENTATIVE VEHICLE RESPONSE PARAMETERS FOR EVALUATION, ARE OF EQUAL IMPORTANCE. THIS PAPER IS CONCERNED WITH THE MATHEMATICAL FOUNDATIONS OF THE VEHICLE MODEL AND METHOD OF ANALYSIS.

DYNAMIC PROBLEMS IN LAUNCH VEHICLES AND SPACECRAFT

Abstract:
AMONG THE DYNAMIC PROBLEMS LISTED ARE CRAWLER-TRANSPORT-VEHICLES' DYNAMICS, GROUND WIND DURING PRELAUNCH AND LAUNCH, ACOUSTIC ENVIRONMENT AT LAUNCH, VEHICLE RESPONSE TO ACOUSTIC ENVIRONMENT, THRUST BUILDUP STRUCTURAL TRANSIENT, ON PAD ABORT STRUCTURAL TRANSIENT, LAUNCH RELEASE STRUCTURAL TRANSIENT, ACOUSTIC AND BUFFETING ENVIRONMENT IN FLIGHT, COUPLING OF ENGINE AND VEHICLE DYNAMICS, SEPARATION OF STAGES OR SHROUDS (JETTISONING), DYNAMICS OF FLUIDS UNDER LOW-G ENVIRONMENT, RENDEZVOUS AND DOCKING, IMPACT OF SPACECRAFT IN WATER, LUNAR LANDING STRUCTURAL DYNAMICS, ETC.
TITLE: DYNAMIC TESTING OF SATURN LAUNCH VEHICLES
AUTHOR MCDONOUGH, G.F. Date of Pub: 12/1/1965
Abstract:

TITLE: EARLY YEARS-GODDARD SPACE FLIGHT CENTER HISTORICAL ORIGINS AND ACTIVITIES THROUGH DECEMBER 1962
AUTHOR Date of Pub: 1/1/1963
Abstract:

TITLE: EARTH ORBITAL WORKSHOP CAPABILITIES BROCHURE
AUTHOR Date of Pub:
Abstract:
THE SPERRY RAND SPACE SUPPORT DIVISION PRESENTS THIS BROCHURE TO DEPICT A COMPETENCE AND CAPABILITY IN THE AREA OF LARGE EARTH-ORBITAL WORKSHOPS. WORKSHOPS THAT ARE: 1) IN FABRICATION, 2) PROPOSED FOR SATURN V VEHICLES (Bo & Mx), AND 3) CONCEPTUALLY DESIGNED FOR SPECIFIC ADVANCED APPLICATIONS (NUCLEAR POWER).

TITLE: EARTH-MOON TRAJECTORIES, 1964-69
AUTHOR RICHARD, R.J./CLARKE, V.C./ROTH, Date of Pub: 5/1/1964
Abstract:
THIS REPORT GIVES KEY CHARACTERISTICS OF EARTH-TO-MOON TRAJECTORIES FOR THE PERIOD 1964-69. IT IS INTENDED TO PROVIDE TRAJECTORY ANALYSTS WITH DATA, IN VOLUME, SO THAT THEY MAY PERFORM PRELIMINARY DESIGN STUDIES AND CONDUCT INVESTIGATIONS OF THE PROPERTIES OF BALLISTIC LUNAR TRAJECTORIES. WHILE NOT EXACT, THESE TRAJECTORIES ARE SUFFICIENTLY ACCURATE TO BE QUITE USEFUL FOR THE ABOVE PURPOSE. THE DATA PRESENTED ASSUMED LAUNCH TO OCCUR AT CAPE KENNEDY, ARRIVAL TO OCCUR WHEN THE MOON IS OVER THE MERIDIAN OF THE DSIF TRACKING STATION AT GOLDSTONE, CALIFORNIA, AND THE FLIGHT TIME TO BE BETWEEN TWO AND THREE DAYS. AN EXPLANATION OF THE ANALYTICAL MODEL USED IN THE GENERATION OF THE DATA, INCLUDING DETAILED EQUATIONS, IS PRESENTED.

TITLE: EASE (E’S) OF IMPLEMENTATION OF THE SAFETY PROGRAM AT THE MARSHALL SPACE FLIGHT CENTER
AUTHOR ROBERTS, L.L. Date of Pub: 10/27/1964
Abstract:
DISCUSSES IMPORTANT ELEMENTS OF MSFC’S SAFETY PROGRAM - EASIER, EXECUTIVE INTEREST, EMPHASIS, EFFORT, EARNESTNESS, EXCELLENCE, ENGINEERING, EDUCATION, ENJOYABLE, ENTERTAINING, ENCOURAGEMENT, ENFORCEMENT, EXPERIENCE, EXPERIMENTAL, ENTHUSIASM.

TITLE: ECONOMICS IS KEY FACTOR IN BOOSTER RECOVERY
AUTHOR STEHLING, K.R. Date of Pub: 4/1/1961
Abstract:
AT FIRST GLANCE, THERE SEEMS TO BE NO DOUBT THAT IT IS GROSSLY UNECONOMICAL TO DUMP A BOOSTER INTO THE WATER EVERY TIME WE LAUNCH A TEST VEHICLE OR A SPACECRAFT, AND THAT BOOSTERS SHOULD BE MADE RECOVERABLE. BUT IF YOU TAKE A SECOND GLANCE AND LOOK CLOSER AT THE REALITIES OF THE RECOVERY PROBLEM, YOU ARE LIKELY TO CHANGE YOUR MIND. RECOVERY MAY COST EVEN MORE, IT TURNS OUT, THAN BUILDING A NEW BOOSTER FOR EVERY LAUNCHING.

TITLE: EFFECT OF BENDING DYNAMICS AND CONTROL GAIN ON THE BENDING MOMENT
A response study was made using the Saturn 504 vehicle with the MSFC synthetic wind profile as the forcing function. The effect on the bending moment of the bending dynamics and various control gains was noted. It was found that the bending dynamics contribute greatly to the bending moment near the nose end of the vehicle. Also, as the accelerometer gain increases the overall bending moment decreases.

**Title:** Effects of Atmospheric Refraction on Far-Field Sound Propagation

**Author:** Smith, O.E.

**Date of Pub:** 10/8/1968

**Abstract:**
Far-field sound intensity levels are calculated by using a theoretical model based on refraction laws. The theoretical model requires a knowledge of the sound-source characteristics and the velocity-of-sound profile. The velocity-of-sound profile is derived from virtual temperature, wind speed, and wind direction, which are either measured or predicted. The necessary simplifying assumptions used in deriving the theoretical model are discussed. The sound intensity level as derived from the theoretical model and empirical measurements from static firings of the Saturn booster are compared. Practical operation techniques used in obtaining atmospheric measurements, atmospheric predictions, and sound-intensity-level calculations for the static firing of large boosters are discussed.

**Title:** Effects of High-Pressure Hydrogen on Steels

**Author:** Chandler, W.T./Walter, R.J.

**Date of Pub:** 11/16/1967

**Abstract:** Hydrogen embrittlement of steels is hardly a new subject, but the effects of high-pressure hydrogen have been treated in detail only more recently and to a much more limited extent. Most investigations of hydrogen embrittlement have been concerned with hydrogen in metals. We are more concerned in this paper with metals in hydrogen. To help understand the possible differences in effects and because the thinking on the high-pressure hydrogen effects is influenced by the great amount of work on the effects of hydrogen in metals, this paper discusses the hydrogen-in-metals embrittlement and then looks at the effects of high-pressure hydrogen on steels and other metals.

**Title:** ELDO (European Launcher Development Organization)

**Author:** Soufflet, P.R.

**Date of Pub:** 6/1/1962

**Abstract:**

In French

**Title:** Electrical Support Equipment (ESE) (B&W Photograph)

**Author:** Aden, R.M.

**Date of Pub:** 1/1/1969

**Abstract:**

During the countdown and launch of the Saturn V rocket which will start American astronauts on their way to the moon, the giant space vehicle will be checked out and controlled during the pre-launch phase by the largest checkout system in the world - called electrical support equipment. Designed and manufactured by GE's Apollo Systems Organization, it also provides operational support to other ground systems and conducts all switching operations in the final three minutes of countdown.

**Title:** Electrical Support Equipment for the Saturn V Launch Vehicle Systems

**Author:** Aden, R.M.

**Date of Pub:** 3/1/1965

**Abstract:**
TITLE: ELECTRICAL SYSTEMS IN MISSILES AND SPACE VEHICLES

AUTHOR FICHTNER, H.J.       Date of Pub: 3/23/1962

Abstract:
SPACE ACCOMPLISHMENTS OF THE PAST ARE REVIEWED. DISCUSSES THE STEPS NECESSARY IN THE FUTURE TO INSURE THE OPERATIONAL READINESS OF OUR LARGE CARRIER VEHICLE SYSTEMS. WELL-PLANNED OVERALL SYSTEMS ENGINEERING IS THE KEY TO THIS TASK, WITH ELECTRICAL SYSTEMS ENGINEERING PLAYING A MAJOR SUBSIDIARY ROLE.

TITLE: ENGINEERING CAPABILITIES PRESENTATION

AUTHOR       Date of Pub: 1/1/1967

Abstract:
THIS ENGINEERING CAPABILITIES PRESENTATION LISTS THE COMPETENCE AND CAPABILITY THAT HAS BEEN DEMONSTRATED BY THE SPACE SUPPORT DIVISION OF SPERRY RAND CORPORATION WHILE FULFILLING CONTRACTUAL COMMITMENTS IN THE AEROSPACE INDUSTRY. THIS IS A PRELIMINARY PRESENTATION; THE PREPARATION OF A COMPLETE CAPABILITIES HISTORY OF THE DIVISION IS CURRENTLY IN THE DEVELOPMENTAL STAGE.

TITLE: ENGINEERING SAFETY INTO MISSILE - SPACE SYSTEMS

AUTHOR GORDON, R.B.       Date of Pub: 6/29/1964

Abstract:
SAFETY ENGINEERING, AS APPLIED TO COMPLEX MISSILE AND SPACE SYSTEMS, HAS DEVELOPED A NEW METHODOLOGY REFERRED TO AS "SYSTEM SAFETY ENGINEERING." THE REQUIREMENT FOR A COMPREHENSIVE APPROACH TO SAFETY WHICH IS INCLUDED AS A CONTRACTUALLY COVERED ADJUNCT TO THE DESIGN, DEVELOPMENT, AND OPERATIONAL PHASES OF A SYSTEMS LIFE CYCLE HAS BECOME APPARENT FROM COSTLY MISSILE MISHAP EXPERIENCE. GENERAL CONCEPTS AND ACCOMPLISHMENTS OF THIS NEW ENGINEERING DISCIPLINE ARE DESCRIBED ALONG WITH POSSIBLE BENEFICIAL RELATIONSHIPS WITH RELIABILITY AND OTHER RECOGNIZED ORGANIZATIONAL ELEMENTS ENGAGED IN SAFETY RELATED ACTIVITIES.

TITLE: ENTRANCE-THE U.S. LUNAR PROGRAM

AUTHOR SIMMONS, H.       Date of Pub: 7/1/1961

Abstract:
DISCUSSED ARE THE PROJECTS AND PROBLEMS INVOLVED IN A MANNED LUNAR LANDING.

TITLE: EPILOGUE

AUTHOR DORNBERGER, W.R.       Date of Pub: 3/23/1962

Abstract:
A BRIEF BIOGRAPHY OF DR. VON BRAUN IS PRESENTED.
THIS DOCUMENT IS THE ANNUAL REPORT FOR 1964 OF CONTRACT NAS8-11125. OBJECTIVES WERE TO CHARACTERIZE THOSE FASTENERS AND MATERIALS MOST SUITABLE AT TEMPERATURES FROM -423 DEGREES F TO 1600 DEGREES F. THE EFFORT WAS ACCOMPLISHED IN THE FOLLOWING FOUR PHASES: (I) SURVEY, (II) FASTENER EVALUATION, (III) STANDARD FASTENER TESTS, (IV) POTENTIAL HIGH STRENGTH FASTENER MATERIALS. PHASE I DETERMINED THE SPACE VEHICLE INDUSTRY'S PRESENT AND FUTURE FASTENER REQUIREMENTS. AS A RESULT OF THE SURVEY, 21 DIFFERENT CLASSES OF FASTENERS WERE SELECTED FOR EVALUATION IN PHASE II. PHASE III IS CONTINUING TO DETERMINE THE UNIQUE TESTS REQUIRED TO CHARACTERIZE FASTENERS SPECIFICALLY FOR SPACE VEHICLE APPLICATIONS. FIVE ALLOYS OF IRON, NICKEL, AND TITANIUM BASE WERE EVALUATED IN PHASE IV.
Abstract:

THE INJECTION STAGE OF A MULTISTAGE LAUNCH VEHICLE MUST BE PARTIALLY A VELOCITY STAGE AND PARTIALLY A SPACECRAFT; IT MUST NOT ONLY BOOST THE PAYLOAD, IT MUST ALSO PERFORM COOPERATIVE MISSION OPERATIONS WITH THE PAYLOAD AFTER ORBITAL INSERTION. THESE HYBRID REQUIREMENTS RESULT IN INTRINSIC STAGE VERSATILITY WHICH PERMITS CONSIDERATION OF NEW AND CHALLENGING MISSIONS FOR THE STAGE WHICH WERE UNANTICIPATED DURING INITIAL DESIGN. BASICALLY, THE S-IVB CAN EVOLVE IN TWO DIRECTIONS: STAGE PROPULSIVE APPLICATIONS AND SPENT-STAGE APPLICATIONS. PROPULSIVE APPLICATIONS ARE ENVISIONED IN WHICH S-IVBS, MODIFIED FOR MULTIPLE STARTS, CAN BE UTILIZED TO ACCOMPLISH HOHMANN-ORBIT TRANSFERS, SYNCHRONOUS-ORBIT INJECTION, AND PLANETARY-ESCAPE MISSIONS. SPENT STAGE USES ARE CURRENTLY BEING STUDIED IN GREAT DETAIL; OF IMMEDIATE INTEREST IS THE ORBITAL WORKSHOP APPLICATION IN WHICH A SPECIALY MODIFIED S-IVB, INJECTED INTO ORBIT UNMANNED, IS LATER OCCUPIED BY ASTRONAUTS WHO WILL PERFORM EXPERIMENTS IN THE ENVIRONMENTALLY CONTROLLED STAGE FOR 28 DAYS. THE EXPERIENCE GAINED IN THE EARLY WORKSHOP MISSIONS CAN BE USED IN LATER, MORE DEMANDING SPACE STATION MISSIONS LASTING FOR A YEAR, WITH 6- TO 9-MAN CREWS AND WITH A POTENTIAL REQUIREMENT FOR ARTIFICIAL GRAVITY. THE BASIC MISSION OF THE 1-YEAR STATIONS WILL BE TO PROVIDE PRECURSOR INFO FOR THE OPERATIONAL SPACE STATION AND INTERPLANETARY MISSIONS WHICH WILL FOLLOW IN THE LAST 1/2 OF THE NEXT DECADE. THE S-IVB CAN BE USED TO SUPPORT LUNAR OPERATIONS. WITH SOME MODIFICATIONS, THE S-IVB CAN DELIVER CARGO TO THE SURFACE OF THE MOON AND, ONCE HAVING LANDED, PROVIDE SHELTER ON THE SURFACE IN A MANNER SIMILAR TO THE USE OF THE SPENT STAGE IN ORBIT. AN S-IVB CAN BE PLACED (WITH CARGO) INTO LUNAR ORBIT TO SUPPORT OPERATIONS ON THE LUNAR SURFACE OR TO CONDUCT SPACE-STATION TYPE EXPERIMENTS FROM LUNAR ORBIT WHERE THE STAGE COULD SERVE AS A WORKSHOP. THIS TYPE OF EVOLUTION IS OF HIGHEST IMPORTANCE TO OUR NATIONAL SPACE PROGRAM BECAUSE IT PERMITS ATTAINMENT OF HIGHER RELIABILITIES THROUGH USE OF MORE MATURE EQUIPMENT AND OPERATIONAL PROCEDURES, CONTINUITY OF INDUSTRIAL TEAMS, AND REALIZATION OF COST BENEFITS AS A RESULT OF MULTIPLE PRODUCTIONS OF VARIOUS ELEMENTS OF HARDWARE. THE S-IVB, A STAGE DESIGNED FOR A PARTICULAR MISSION, HAS UTILITY FAR BEYOND THAT INITIALLY REQUIRED. THERE SEEM TO BE IMPORTANT REASONS TO CAPITALIZE ON THAT UTILITY IN THE ACCOMPLISHMENT OF THE NATION'S OBJECTIVES.

EXTENSIONS OF SATURN

THIS PAPER DISCUSSES THE POSSIBLE APPLICATIONS OF SATURN VEHICLES TO FUTURE SPACE EXPLORATION. POTENTIAL MISSIONS UTILIZING APOLLO-DERIVED HARDWARE ARE EXAMINED. RESEARCH, DEVELOPMENT, AND OPERATIONS IN EARTH ORBIT AS WELL AS LUNAR EXPLORATION, UNMANNED AND MANNED INTERPLANETARY EXPLORATION ARE REVIEWED. HYPOTHETICAL MISSIONS ARE DISCUSSED IN THE CONTEXT OF THE PRESENT AND POTENTIAL CAPABILITY OF THREE CONFIGURATIONS OF THE SATURN I VEHICLE: AN UPRATED SATURN I, A THREE-STAGE SATURN V, AND A FOUR-STAGE SATURN V.

F-1 ENGINE

DISCUSSES THE INITIAL EFFORT AT NAA-ROCKETDYNE ON THE F-1 DEVELOPMENT. THE PRINCIPAL OBJECTIVES IN THE DESIGN OF THE F-1 ENGINE ARE RELIABILITY, SIMPLICITY, AND A DEGREE OF RUGGEDNESS REQUIRED TO PROVIDE A GREATER MARGIN OF SAFETY FOR COMING MANNED VEHICLES. THE BASIC COMPONENTS OF THE F-1 ARE A TUBULAR-WALL THRUST CHAMBER, A DIRECT-DRIVE TURBOPUMP, A GAS GENERATOR, AND THEIR CONTROLS. THE ENGINE WEIGHS APPROXIMATELY 20,000 POUNDS.

F-1 ENGINE COMBUSTION INSTABILITY PROBLEMS

DISCUSSES THE INITIAL EFFORT AT NAA-ROCKETDYNE ON THE F-1 DEVELOPMENT. THE PRINCIPAL OBJECTIVES IN THE DESIGN OF THE F-1 ENGINE ARE RELIABILITY, SIMPLICITY, AND A DEGREE OF RUGGEDNESS REQUIRED TO PROVIDE A GREATER MARGIN OF SAFETY FOR COMING MANNED VEHICLES. THE BASIC COMPONENTS OF THE F-1 ARE A TUBULAR-WALL THRUST CHAMBER, A DIRECT-DRIVE TURBOPUMP, A GAS GENERATOR, AND THEIR CONTROLS. THE ENGINE WEIGHS APPROXIMATELY 20,000 POUNDS.

F-1 ENGINE DEVELOPMENT

LOOMING LARGE IN THE U.S. SPACE PROGRAM, THE TREMENDOUS F-1 ENGINE HAS MOVED WITH SURPRISING SPEED TO THE TESTING STAGE. THIS ARTICLE DISCUSSES F-1 BACKGROUND.

F-1 MAJOR CONFIGURATION CHANGE POINTS (MEMO TO L.R. DIETRICH)

THERE HAVE BEEN SIX F-1 MAJOR CONFIGURATIONS STARTING WITH THE PRE-PRODUCTION R&D ENGINES. THIS MEMO GIVES THE MAJOR FEATURES FOR EACH CONFIGURATION, THE CHANGES, AND THE REASON FOR SUCH CHANGES.

FABRICATION OF PLENUM TANKS BY EXPLOSIVE FORMING AND ELECTRON BEAM WELDING

THERE HAVE BEEN SIX F-1 MAJOR CONFIGURATIONS STARTING WITH THE PRE-PRODUCTION R&D ENGINES. THIS MEMO GIVES THE MAJOR FEATURES FOR EACH CONFIGURATION, THE CHANGES, AND THE REASON FOR SUCH CHANGES.
**Title:** Facilities Engineering for the National Aeronautics and Space Administration  
**Author:** Shofner, G.E.  
**Date of Pub:** 9/1/1968

**Abstract:**
Discusses the missions and facilities of MSFC, KSC, and MSC. Facility evolution is broken down into four different stages: 1) Function Requirements and Concept Phase, 2) Budgeting, Funding and Design Phase, 3) Construction and Shakedown Phase, and 4) Operational Phase.

**Title:** Facilities for Space Vehicle Test and Launch  
**Author:** Webb, C.L.  
**Date of Pub:** 4/1/1962

**Title:** Facility Design for Handling Liquid Hydrogen for Space Vehicle Applications  
**Author:** Smith, T.D./Wilson, E.J./Scully  
**Date of Pub:** 6/20/1962

**Abstract:**
The purpose of this paper is to present the philosophies used by Douglas in designing static and flight test facilities for handling large quantities of liquid hydrogen at high flow rates as applied in the development of large space vehicles. These philosophies have been applied in the design, construction and operation of a test facility which has been safely and successfully operated in support of the Saturn space program for the last year.

**Title:** Factors Relating to Reliability Achievement in Saturn Vehicle SA-5 (Volume 1 - Final Report)  
**Author:** Green, A.W.  
**Date of Pub:** 3/31/1964

**Abstract:**

**Title:** Failure Investigations of Large Liquid Propelled Rocket Engine Components  
**Author:** Basl, G.J.  
**Date of Pub:** 3/15/1967

**Abstract:**
Case histories of seven typical failures in large liquid propelled rocket engine components have been prepared. Quite simple to complex investigations are presented covering a variety of failure modes in a variety of materials. Included are successful solutions to the failure problems investigated.

**Title:** Fair-Field Acoustic Effects on the Launch of the Saturn Space Flight Vehicle  
**Author:** Tedrick, R.N.  
**Date of Pub:** 5/1/1963

**Abstract:**

**Title:** Fast Start on Road to Moon  
**Author:**  
**Date of Pub:** 5/5/1962

**Abstract:**
THE SATURN S-1 BOOSTER, WITH ITS 1.2 MILLION LB THRUST HAS JUST COMPLETED ITS SECOND SUCCESSFUL BALLISTIC TEST DOWN THE AMTR. THE S-1 BOOSTER IS THE FIRST STAGE OF THE SATURN C-1, WHICH IN TURN IS THE FIRST IN THE SATURN FAMILY OF ROCKET SYSTEMS. THE FAMILY HAS ITS WORK CUT OUT FOR IT IN THE PROGRAM THAT IS EVENTUALLY SCHEDULED TO TAKE A THREE-MAN APOLLO CAPSULE TO THE MOON. IN A NUMBER OF OTHER RESPECTS, THE SATURN C-1 IS A REAL FIRST. NOT ONLY IS IT THE FIRST MULTI-MILLION LB THRUST ROCKET THE U.S. HAS BEEN ABLE TO GET ALOFT, IT IS THE FIRST ATTEMPT TO USE A CLUSTER OF BIG ROCKETS TO TAKE THE PLACE OF A SINGLE HUGE ENGINE. AND IT IS THE FIRST TIME ENGINEERS HAVE TRIED TO GET DIRECTIONAL STABILITY IN A BIG BOOSTER BY SWIVELING CERTAIN ENGINES IN THE CLUSTER. INCLUDED IS TIMETABLE FOR THE BIG BOOSTERS.

TITLE: FAULT ISOLATION TECHNIQUES IN SATURN S-II AUTOMATIC CHECKOUT EQUIPMENT (PAPER)
AUTHOR BUIS,R.E./WHITE,D.D.
Date of Pub: 4/1/1965

Abstract:

TITLE: FERTILE CRESCENT: THE SOUTH'S ROLE IN THE NATIONAL SPACE PROGRAM
AUTHOR SWENSON,L.S.
Date of Pub: 1/1/1968

Abstract:

TITLE: FIFTH ANNUAL NASA ISSUE OF MISSILES AND ROCKETS
AUTHOR
Date of Pub: 11/29/1965

Abstract:

CONTENT INCLUDE PART I - BUDGETS AND PROCUREMENT; PART II - PROGRAMS; PART III - THE MANAGEMENT STRUCTURE; AND PART IV - NUCLEAR POWER, COMMUNICATIONS SATILITES.

TITLE: FIFTH NATIONAL CONFERENCE ON THE PEACEFUL USES OF SPACE - ST. LOUIS,MO.
AUTHOR
Date of Pub: 5/26/1965

Abstract:


TITLE: FIFTH SATURN 5 MIGHT LAUNCH MEN TO MOON
AUTHOR ALEXANDER,G.
Date of Pub: 3/2/1964

Abstract:

FIRST U.S. ATTEMPT TO LAND A TWO-MAN CREW ON THE MOON IS NOW LISTED AS THE MISSION OF THE FIFTH OR SIXTH APOLLO/SATURN 5 VEHICLE, ACCORDING TO NASA'S CURRENT SCHEDULE. MSC HAS ORDERED 26 APOLLOS FROM NAA-17 ARE BOILERPLATE GROUND AND FLIGHT TEST ARTICLES AND 9 ARE TAGGED FOR MANNED FLIGHT MISSIONS. THE CENTER ALSO HAS ORDERED 11 LUNAR EXCURSION FLIGHT MODULES (LEMS) FROM GRUMMAN AND 7 OF THESE ARE PROGRAMED FOR MANNED MISSIONS. TWO UNMANNED SATURN IB LAUNCH VEHICLES WILL BE FLOWN ON BALLISTIC TRAJECTORIES DOWN THE ATLANTIC MISSILE RANGE. PRIMARY GOAL OF THESE FLIGHTS WILL BE TO MAN-RATE THE DOUGLAS S-4B SECOND STAGE OF THE VEHICLE. THIRD AND FOURTH SATURN IB VEHICLES MAY BE FURTHER UNMANNED VEHICLE QUALIFICATION TESTS, BUT THEY MIGHT BE FLOWN INTO EARTH ORBIT. THREE, AND POSSIBLY FOUR, MANNED APOLLO SPACECRAFT WILL FOLLOW THE FIRST MANNED MISSION AND, LIKE THE FIRST FLIGHT, WILL BE BOOSTED BY SATURN IB VEHICLES. OF THE NINE SPACECRAFT NOW EARMARKED FOR MANNED MISSIONS, NASA PLANS TO FLY ONE FOUR ON SATURN IB'S INTO EARTH ORBIT, WITH A FIFTH SPACECRAFT AND ONE BOOSTER HELD AS A BACKUP TO ANY OF THE PRIMARY FOUR.

TITLE: FILMS LIST
TITLE: FIRST ANNUAL LOGISTICS MANAGEMENT SYMPOSIUM (13-14 SEPTEMBER 1966 AT NASA-MSFC)

AUTHOR

Date of Pub: 11/1/1965

Abstract:


TITLE: FIRST ANNUAL NASA ISSUE

AUTHOR

Date of Pub: 11/27/1961

Abstract:

ALMOST THE ENTIRE ISSUE IS DEVOTED TO A PREVIEW OF PROGRESS BY FIELDS OF INTEREST AND A GUIDE TO SPACE AGENCY INSTALLATIONS. HOW NASA INTENDS TO MOBILIZE THE MISSILE/SPACE INDUSTRY FOR MANNED EXPLORATION OF THE MOON. HERE IN ITS PREMIER ANNUAL NASA ISSUE, M/R PRESENTS THE FIRST REPORT ON HOW THE MOBILIZATION PLAN IS TO BE EXECUTED. THERE IS PRESENTED AN INDUSTRY GUIDE TO ALL THE KEY PROGRAMS AND CRITICAL HURDLES INVOLVED IN THE MULTIBILLION-DOLLAR UNDERTAKING. FURTHER, THERE ARE REPORTS IN CONTRACTING AND ON EACH ONE OF THE 13 NASA INSTALLATIONS ACROSS THE NATION - HOW THEY ARE ORGANIZED AND THE IMPORTANT ROLES THEY WILL PLAY IN THE TOTAL SPACE PROGRAM OVER THE NEXT EIGHT YEARS.

TITLE: FIRST APOLLO ROLLOUT SET FOR AUGUST 19

AUTHOR

Date of Pub: 8/11/1967

Abstract:


TITLE: FIRST COMPILATION OF PAPERS ON TRAJECTORY ANALYSIS AND GUIDANCE THEORY

AUTHOR

Date of Pub: 1/1/1967

Abstract:

THIS VOLUME CONTAINS TECHNICAL PAPERS ON NASA-SPONSORED STUDIES IN THE AREAS OF TRAJECTORY ANALYSIS AND GUIDANCE THEORY. THE STUDIES ARE BEING CARRIED ON BY SEVERAL UNIVERSITIES AND INDUSTRIAL COMPANIES. THESE PAPERS COVER A PERIOD ENDING OCTOBER 1, 1966. THE TECHNICAL SUPERVISION OF THE CONTRACTS IS UNDER THE PERSONNEL OF THE GUIDANCE LABORATORY.

TITLE: FIRST DECADE OF SPACE FLIGHT

AUTHOR

Date of Pub: 10/1/1967

Abstract:
<table>
<thead>
<tr>
<th>Title:</th>
<th>FIRST HUNDRED SECONDS</th>
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<tbody>
<tr>
<td>Author:</td>
<td>RHODE, R.V.</td>
</tr>
<tr>
<td>Date of Pub:</td>
<td>4/3/1962</td>
</tr>
<tr>
<td>Abstract:</td>
<td>THE CHOICE OF TITLE FOR THIS PAPER SPRINGS FROM THE SOMEWHAT BREATHTAKING DRAMA OF THE FIRST ONE TO TWO MINUTES OF FLIGHT, DURING WHICH THE MAJOR FORCES ON THE SPACE VEHICLE ARE BROUGHT INTO PLAY AND THE POTENTIALITY FOR STRUCTURAL FAILURE IS GREATEST. A FEW ASPECTS OF LAUNCH VEHICLE STRUCTURES AND MATERIALS ARE DISCUSSED.</td>
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<thead>
<tr>
<th>Title:</th>
<th>FIRST INTERIM REPORT ON PROJECT HINDSIGHT</th>
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</thead>
<tbody>
<tr>
<td>Author:</td>
<td>SHERWIN, C.W./ISENSON, R.S.</td>
</tr>
<tr>
<td>Date of Pub:</td>
<td>6/30/1966</td>
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<tr>
<td>Abstract:</td>
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<table>
<thead>
<tr>
<th>Title:</th>
<th>FIRST SOVIET MOON ROCKET</th>
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<tbody>
<tr>
<td>Author:</td>
<td></td>
</tr>
<tr>
<td>Date of Pub:</td>
<td>8/31/1959</td>
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<td>Abstract:</td>
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<thead>
<tr>
<th>Title:</th>
<th>FLAT CABLE ENGINEERING STUDIES FOR SATURN S-IVB VEHICLES</th>
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<tbody>
<tr>
<td>Author:</td>
<td>KLOTZ, R.A.</td>
</tr>
<tr>
<td>Date of Pub:</td>
<td>6/20/1967</td>
</tr>
<tr>
<td>Abstract:</td>
<td>THIS PAPER DESCRIBES THE ENGINEERING APPROACHES, INVESTIGATIONS, RESULTS AND CONCLUSIONS OF TWO NASA FLAT CABLE CONTRACTS FROM MSFC TO DOUGLAS FOR FEASIBILITY STUDIES ON THE S-IVB STAGE OF THE SATURN VEHICLE. IN ADDITION, THE OBJECTIVES AND APPROACHES FOR A THIRD CONTRACT (FLAT CABLE ENGINEERING STUDY) ARE DISCUSSED. A SISTER DOUGLAS PAPER NO. 4186, TO BE PRESENTED BY DR. P.L. HILL, COVERS IN DETAIL THE MANUFACTURING ASPECTS OF THE FLAT CABLE DEVELOPMENT PROGRAM.</td>
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<table>
<thead>
<tr>
<th>Title:</th>
<th>FLEXIBLE COMMUTATION SYSTEM FOR SATURN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author:</td>
<td>DAVIS, D./BRUM, D.J.</td>
</tr>
<tr>
<td>Date of Pub:</td>
<td>2/1/1965</td>
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<tr>
<td>Abstract:</td>
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<table>
<thead>
<tr>
<th>Title:</th>
<th>FLIGHT CONTROL COMPUTERS FOR SATURN SPACE VEHICLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author:</td>
<td>CAUDLE, J.M./COLBERT, D.C.</td>
</tr>
<tr>
<td>Date of Pub:</td>
<td>10/1/1962</td>
</tr>
<tr>
<td>Abstract:</td>
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</table>
THE FLIGHT CONTROL COMPUTER FOR SATURN RECEIVES ATTITUDE SIGNALS FROM THE STABLE PLATFORM, RATE SIGNALS FROM RATE GYROS OR LEAD NETWORKS, AND ANGLE-OF-ATTACK INFORMATION FROM BODY-FIXED ACCELEROMETERS OR OTHER SENSORS. THESE SIGNALS ARE A RESULT OF SEVERAL FORCES ACTING ON THE VEHICLE SUCH AS ENGINE THRUST, WIND, GRAVITY, AND INTERNAL VEHICLE FLEXING AND BENDING. THE SIGNALS ARE SHAPED, GIVEN A WEIGHTING FUNCTION, AND COMBINED WITH PROGRAM DATA IN SEVERAL SERVO AMPLIFIERS. THE RESULTANT AMPLIFIED OUTPUTS DRIVE SERVO ACTUATORS WHICH GIMBAL THE ENGINES TO PROVIDE THRUST VECTOR CONTROL FOR THE S-I AND S-IV STAGES. FEEDBACK SIGNALS FROM THE ACTUATORS CLOSE THE SERVO LOOP. PROVISIONS ARE MADE TO PROGRAM OR SWITCH GAINS IN ANY CHANNEL FOR THE VARYING NEEDS OF THE FLIGHT PROGRAM AS IT PROGRESSES.

TITLE: FLIGHT EVALUATION OF THE COMMAND AND COMMUNICATION SYSTEM ABOARD AS-501
AUTHOR ELY,O.P./KERR,J.H. Date of Pub: 5/3/1968

Abstract:
THE FIRST TEST OF THE COMMAND AND COMMUNICATIONS SYSTEM, A UNIFIED FREQUENCY S-BAND SYSTEM, ABOARD AS-501 WAS SUCCESSFUL. COMPATIBILITY OF THIS SYSTEM WITH THE MSFN/USB SITES WERE ESTABLISHED. THE ONBOARD TRANSPONDER AND ANTENNA SYSTEM PERFORMED AS PREDICTED. COMMAND PERFORMANCE WAS EXCELLENT. DATA REDUCTION PROBLEMS PREVENTED A COMPLETE ANALYSIS OF THE TRACKING DATA. THIS FLIGHT PROVIDED VALUABLE DATA WHICH CAN BE USED TO DEFINE VEHICLE-TO-GROUND STATION INTERFACES, TO ESTABLISH ATTITUDE CONSTRAINTS DURING TRANSLUNAR INJECTION, AND TO IMPROVE OPERATIONAL PROCEDURES.

TITLE: FLIGHT PLAN FOR TOMORROW (THE DOUGLAS STORY - A CONDENSED HISTORY)
AUTHOR Date of Pub: 1/1/1962

Abstract:

TITLE: FLIGHT RESULTS AND EXPERIENCES WITH THE S-IV STAGE OF THE SATURN I
AUTHOR ROTH,L. Date of Pub: 7/17/1965

Abstract:

TITLE: FLIGHT SOFTWARE DEVELOPMENT LABORATORY
AUTHOR WITZEL,T.H./HUGHES,J.S. Date of Pub: 3/10/1969

Abstract:
A MAN-IN-THE-LOOP COMPUTER FACILITY HAS BEEN CREATED USING A DIGITAL COMPUTER, DISPLAY TERMINAL, AND SPACE VEHICLE FLIGHT COMPUTER TO ENABLE PROGRAMMERS TO CHECK OUT FLIGHT PROGRAMS IN A SIMULATED SPACE FLIGHT ENVIRONMENT. THE SIMULATION REQUIRES A REAL TIME MULTIPROGRAMMED ENVIRONMENT, WHICH IS SUPPLIED BY A CONTROL SYSTEM CAPABLE OF SCHEDULING PROGRAMS ON 32 LEVELS OF PRIORITY INTERRUPT AS WELL AS ANSWERING DEMANDS FOR SERVICE AT THE DISPLAY TERMINAL. A SPECIAL INTERFACE DEVICE PERMITS VISIBILITY AND CONTROL OF THE FLIGHT PROGRAM AS IT EXECUTES IN THE FLIGHT COMPUTER. ON-LINE INPUTS FROM THE PROGRAMMER AT THE DISPLAY TERMINAL AND OUTPUTS FROM DATA COLLECTION AND REDUCTION ROUTINES TO THE DISPLAY SCREEN ARE EXECUTED IN REAL TIME. THE FLIGHT SOFTWARE DEVELOPMENT LABORATORY HAS PROVED TO BE VERY USEFUL IN REDUCING PROGRAM PREPARATION TIME AND INCREASING FLIGHT PROGRAM CONFIDENCE.

TITLE: FOOTPRINTS ON THE FRONTIER
AUTHOR Date of Pub: 3/1/1967

Abstract:
THIS ARTICLE DISCUSSES THE ROLE OF DR. KURT DEBUS, DIRECTOR OF KSC, IN THE NATIONAL SPACE PROGRAM.
<table>
<thead>
<tr>
<th>TITLE: FOOTPRINTS ON THE MOON</th>
<th>AUTHOR DRYDEN, H.L.O.</th>
<th>Date of Pub: 3/1/1964</th>
</tr>
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<table>
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<tr>
<th>TITLE: FOR LAUNCH VEHICLES: A RECORD $855.2 MILLION</th>
<th>AUTHOR</th>
<th>Date of Pub: 4/9/1962</th>
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<tbody>
<tr>
<td><strong>Abstract:</strong></td>
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<tr>
<th>TITLE: FORECASTING FUTURE MILITARY MISSIONS AND THEIR TECHNOLOGICAL DEMANDS</th>
<th>AUTHOR MACARTHUR D.M.</th>
<th>Date of Pub: 10/1/1969</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Abstract:</strong></td>
<td>THIS ARTICLE COVERS THREE AREAS: (1) INTERACTIONS BETWEEN CHOICES OF NATIONAL GOALS AND CHOICES OF MILITARY MISSIONS, (2) FRAMEWORK FOR THINKING ABOUT THE EMPHASIS AMONG POSSIBLE FUTURE MISSIONS, AND (3) RANGE OF FORECASTING TECHNIQUES AND ACTIVITIES WHICH DOD HAS EMPLOYED AND AN INDICATION OF WHAT THEY SUGGEST ABOUT TECHNOLOGICAL GROWTH AREAS.</td>
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<table>
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<tr>
<th>TITLE: FOUNDATIONS OF SOVIET COSMONAUTICS</th>
<th>AUTHOR TOKATY, G.A.</th>
<th>Date of Pub: 10/1/1968</th>
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<tr>
<td><strong>Abstract:</strong></td>
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<tr>
<th>TITLE: FOURTH NATIONAL CONFERENCE ON THE PEACEFUL USES OF SPACE - BOSTON, MASS.</th>
<th>AUTHOR</th>
<th>Date of Pub: 4/29/1964</th>
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<tr>
<td><strong>Abstract:</strong></td>
<td>AMONG THE PAPERS PRESENTED WERE MEN IN SPACE BY BRAINERD HOLMES, MAN'S SPACE ADVENTURE BY ROBERT GILRUTH, MAN'S EXPLORATION OF SPACE BY GEORGE MUELLER, THE FUTURE OF SPACE BY WERNHER VON BRAUN, EXPLORATION OF THE MOON AND PLANETS, EXPLORING THE SOLAR SYSTEM, LIVING IN SPACE, AND SPACE TECHNOLOGY'S POTENTIAL FOR INDUSTRY.</td>
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<tr>
<th>TITLE: FROM MICHOUD TO THE MOON</th>
<th>AUTHOR</th>
<th>Date of Pub: 1/1/1966</th>
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<td><strong>Abstract:</strong></td>
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<tr>
<th>TITLE: FROM NOW ON</th>
<th>AUTHOR VON BRAUN, W.</th>
<th>Date of Pub: 12/1/1962</th>
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<tr>
<td><strong>Abstract:</strong></td>
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</table>
DR. VON BRAUN, ONE OF AMERICA'S FOREMOST AUTHORITIES ON SPACE, INSPECTS THE VALLEY FORGE SPACE TECHNOLOGY CENTER AND OFFERS SOME PERSONAL VIEWS ABOUT THIS COUNTRY'S PROGRESS TOWARD THE MOON AND BEYOND. ANSWERS ARE GIVEN TO SEVERAL QUESTIONS REGARDING THE SPACE RACE, MONIES INVOLVED, ETC.

**TITLE:** FULFILLING THE AEROSPACE ENGINEER'S RESPONSIBILITY FOR PRODUCT RELIABILITY  
**AUTHOR** WILSON, R.B./HILMAN, J.  
**Date of Pub:** 11/12/1967

**Abstract:**  
THE AEROSPACE ENGINEER HAS RESPONSIBILITIES FOR PRODUCT RELIABILITY TO HIS MANAGEMENT, TO THE IMMEDIATE CUSTOMER, AND TO THE TaxPAYERS, WHO ARE THE ULTIMATE CUSTOMERS FOR LARGE, INTERNATIONALLY PROMINENT AEROSPACE PROGRAMS. HIS RESPONSIBILITY IS TO PROVIDE THE BEST POSSIBLE PRODUCT, CONCOMITANT WITH HIS RESPONSIBILITIES TO COST AND SCHEDULE LIMITATIONS. A VARIETY OF PROGRAM MANAGEMENT TECHNIQUES IS EXERCISED AT THE AUTHORS' COMPANY TO FULFILL THESE RESPONSIBILITIES, AND TO EVALUATE THE ENGINEER'S PERFORMANCE OF THESE RESPONSIBILITIES. SEVERAL OF THESE TECHNIQUES, WHICH ARE DESCRIBED HERE, ARE THE VEHICLE FLIGHT READINESS MAINTENANCE REVIEW, THE FORMAL DESIGN REVIEW, SYSTEM ANALYSES, THE MANAGEMENT FAILURE REVIEW, AND THE QUALITY MAINTENANCE PROGRAM. THESE TECHNIQUES HAVE ENABLED THE ENGINEER AND HIS MANAGEMENT TO FULFILL THEIR RESPONSIBILITIES ON THE SATURN S-IVB PROGRAM.

**TITLE:** FUNCTIONAL MANAGEMENT IN NASA  
**AUTHOR** CASPER, J.D.  
**Date of Pub:** 8/1/1965

**Abstract:**  
THIS PAPER WAS CONCEIVED AS A STUDY OF A PARTICULAR MANAGEMENT CONCEPT USED BY NASA. THE SYSTEM OF FUNCTIONAL MANAGEMENT. THIS PAPER ATTEMPTS TO FIND OUT SOMETHING ABOUT THE HISTORY NASA FUNCTIONAL MANAGEMENT AND TO EXAMINE THE PROCESSES BY WHICH IT OPERATES WITHIN THE AGENCY. IT IS DIVIDED INTO SEVERAL SECTIONS. THE INTRODUCTION ATTEMPTS TO SKETCH BRIEFLY THE DEVELOPMENT OF THE CONCEPT OF FUNCTIONAL MANAGEMENT IN THE LITERATURE OF MANAGEMENT AND TO DISCUSS SOME OF THE OTHER THEORETICAL CONCEPTS INVOLVED. CHAPTER II DISCUSSES DEVELOPMENT OF THIS CONCEPT WITHIN NASA ITSELF. CHAPTER III DISCUSSES TWO PARTICULAR CASE STUDIES OF THE OPERATION OF FUNCTIONAL MANAGEMENT IN NASA, THE FUNCTIONS OF PERSONNEL AND PROCUREMENT. CHAPTER IV CONTAINS A SUMMARY AND SOME GENERAL CONCLUSIONS.

**TITLE:** FURNACE BRAZING OF LIQUID ROCKET THRUST CHAMBERS  
**AUTHOR** HUSCHKE, E.G.  
**Date of Pub:** 3/1/1963

**Abstract:**  
BRAZING AS A TECHNIQUE FOR JOINING METAL PARTS HAS BEEN UTILIZED FOR CENTURIES. HOWEVER, INDUSTRY HAS ONLY BEGUN TO USE IT ON A WIDE SCALE IN THE LAST TWENTY YEARS. TODAY, BRAZING IS ONE OF THE MOST WIDELY USED FABRICATION TECHNIQUES IN THE PRODUCTION OF LIQUID ROCKETS, GAS TURBINES, REFRIGERATOR AND OTHER TYPES OF HEAT EXCHANGERS, AUTOMOBILE PARTS, VACUUM TUBES, AND MANY NUCLEAR PRODUCTS. THIS PAPER COVERS FOUR OF THE MANY CATEGORIES INTO WHICH THE FURNACE BRAZING OF LIQUID ROCKET THRUST CHAMBERS CAN BE DIVIDED: (1) FACTORS AFFECTING THE BRAZE BAND, (2) JOINT REQUIREMENTS, (3) BRAZING PREPARATION PROCESS AND EQUIPMENT, AND (4) RESULTING PRODUCT.

**TITLE:** FURNACE BRAZING THE F-1 THRUST CHAMBER FOR APOLLO  
**AUTHOR** DE CARLO, F.X.  
**Date of Pub:** 11/1/1965

**Abstract:**  
DISCUSSES THE EVOLUTION OF FURNACE BRAZING, SELECTION OF A THRUST CHAMBER BRAZING ALLOY SYSTEM, DETAIL PART PREPARATION, ASSEMBLY AND ALLOYING FOR FURNACE BRAZING, THE BRAZING RETORT AND HIGH TEMPERATURE PRESSURE BAG TOOLING, FURNACE BRAZING INSTRUMENTATION, ETC.

**TITLE:** FURTHER UPRATING OF SATURN I FOR MISSIONS OF THE FUTURE  
**AUTHOR** BUELL, D.N./SCHNYDER, A.S.  
**Date of Pub:** 6/28/1966

**Abstract:**  

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Wednesday, March 24, 2004 Page 71 of 234
THE UPRATED SATURN I (SATURN IB) LAUNCH VEHICLE IS DISCUSSED, ITS MISSION CAPABILITY DESCRIBED, AND IT IS SHOWN TO BE SUITABLE FOR ADDITIONAL MISSIONS REQUIRING INCREASED PAYLOAD WEIGHTS FALLING WITHIN THE PAYLOAD GAP BETWEEN UPRATED SATURN I AND V LAUNCH VEHICLES. SEVERAL ATTRACTION METHODS OF RPOVIDING INCREASED PAYLOAD TOGETHER WITH VARIOUS METHODS OF VEHICLE UPRATING THAT HAVE BEEN STUDIED BY CHRYSLER AND NASA ARE PRESENTED. THESE INCLUDE PROPELLANT SUBSTITUTION, S-IB STAGE PROPELLANT TANK EXTENSIONS, AND ADDITION OF STRAP-ON SOLID PROPELLANT ROCKET MOTORS FOR THRUST AUGMENTATION. ADDITIONAL UPPER STAGES ARE DISCUSSED AS POTENTIAL UPRATING TECHNIQUES. COMBINATIONS OF SOLID ROCKET MOTORS AND ADDITIONAL UPPER STAGES ARE REVIEWED. THE PAPER CONCLUDES WITH A DISCUSSION OF THE CAPABILITY OF THE VARIOUS UPRATED CONFIGURATIONS. CHRYSLER'S ANALYSIS SHOWS THAT UPRATING IS FEASIBLE UP TO 106,000 LBS PAYLOAD INTO LOW EARTH ORBIT AND UP TO 25,000 LBS ON A MARS MISSION.

TITLE: FUTURE PROJECTS OFFICE
AUTHOR
Date of Pub: 4/27/1962

Abstract:
THIS BROCHURE GIVES INTERESTED READERS INFORMATION ON THE MISSION AND ACTIVITIES OF THE MSFC FUTURE PROJECTS OFFICE. A SHORT STATUS REPORT IS GIVEN IN THE AREA OF LAUNCH VEHICLES AND SPACE TRANSPORTATION SYSTEMS WITH PARTICULAR EMPHASIS ON ORBITAL SYSTEMS, LUNAR SYSTEMS, AND PLANETARY SYSTEMS. ORGANIZATIONAL CHARTS ARE INCLUDED. A LIST OF REPORTS, PAPERS, ETC. CONCLUDES THIS BROCHURE.

TITLE: GENERAL DESCRIPTION OF THE ST124-M INERTIAL PLATFORM SYSTEM
AUTHOR THOMASON,H.E.
Date of Pub: 9/1/1965

Abstract:

TITLE: GENERAL ELECTRIC/MTSD'S FIRST FIVE YEARS AS PRIME NASA SUPPORT CONTRACTOR AT MISSISSIPPI TEST FACILITY
AUTHOR
Date of Pub: 1/1/1967

Abstract:
A GENERAL DESCRIPTION OF THE ST124-M INERTIAL PLATFORM SYSTEM IS PRESENTED. THE MAJOR SUBSYSTEMS ARE DISCUSSED AND A BRIEF EXPLANATION OF THE LAUNCH ELECTRICAL SUPPORT EQUIPMENT IS PROVIDED. SERVOLOOP DESIGN THEORY FOR USE WITH GAS BEARING COMPONENTS AND AN EXTENSION OF THIS THEORY INTO THE THREE-AXIS PLATFORM SERVOSYSTEM IS PRESENTED. EFFECTS OF GYRO CROSS-COUPLING AND THREE-AXIS STABILIZATION PROBLEMS ARE DISCUSSED. EACH OF THE PLATFORM'S SUBSYSTEMS IS DISCUSSED TO THE EXTENT THAT A GENERAL UNDERSTANDING OF ITS FUNCTION IS POSSIBLE. REFERENCES ARE PROVIDED TO FACILITATE FURTHER INVESTIGATION.

TITLE: GENERAL PROGRAM FOR THE CALCULATION OF RADIATION FROM AN INHOMOGENEOUS, NONISOBARIC, NONISOTHERMAL ROCKET EXHAUST PLUME
AUTHOR HUFFAKER,R.M./MARCUS,J.D.
Date of Pub: 6/19/1967

Abstract:
THIS REPORT DESCRIBES A COMPUTER PROGRAM FOR EVALUATING RADIATION FROM AN AXISYMMETRIC GAS BODY WITH WATER VAPOR, CARBON DIOXIDE, CARBON MONOXIDE, AND SOLID CARBON PARTICLES AS RADIATING CONSTITUENTS, AND HYDROGEN AS A NON-RADIATING CONSTITUENT. THE PROGRAM USES BAND-AVERAGED ABSORPTION COEFFICIENTS WITH THE CURTIS-GODSON METHOD OF APPROXIMATING INHOMOGENEOUS GAS PROPERTIES. THIS PROGRAM PROVIDES A CONVENIENT METHOD OF EVALUATING A GREAT MANY PROBLEMS OF RADIATION FROM ROCKET EXHAUST PLUMES, BUT AVAILABLE THEORY IS SOMEWHAT LIMITED BY SIMPLIFICATIONS IN THE GEOMETRY AND INPUT OF THE PROGRAM. A MORE ADVANCED PROGRAM IS BEING FORMULATED TO REMOVE THESE RESTRICTIONS.
TITLE: GENERAL PROGRAM FOR THE CALCULATION OF RADIATION FROM AN INHOMOGENEOUS, NONISOBARIC, NONISOHERMAL ROCKET EXHAUST PLUME
AUTHOR: HUFFAKER, R.M./DASH, M.J.  Date of Pub: 6/19/1967

Abstract:

TITLE: GERMAN A-10 ROCKET
AUTHOR: SCHULZE, H.A.  Date of Pub: 2/25/1965

Abstract:

1-PG DRAWING FROM "TECHNICAL DATA ON THE DEVELOPMENT OF THE A-4 \ V-2"

TITLE: GIVING FORM TO OUR SPACE GOALS - RECENT LESSONS AND NEW DIRECTIONS
AUTHOR: SEAMANS, R.C.  Date of Pub: 10/1/1966

Abstract:

THIS ARTICLE PRESENTS A REVIEW OF THE DUAL DEMANDS OF SPACE PROJECTS - INCREASED DETAILED KNOWLEDGE AND BETTER CORRELATION OF MANY DISCIPLINES. PROJECT PLANNING FROM CONCEPT THROUGH DETAILED STUDY AND ANALYSIS TO THE DESIGN, BUILDING, AND TESTING OF EXPERIMENTAL EQUIPMENT IS DISCUSSED. THE ROLES OF UNIVERSITIES, INDUSTRY, AND GOVERNMENT IN IMPLEMENTING PROJECTS RECEIVE ATTENTION.

TITLE: GOVERNMENT GRANTS AND CONTRACTS
AUTHOR:  Date of Pub: 10/10/1960

Abstract:

TITLE: GOVERNMENT, INDUSTRY, AND UNIVERSITY CONTACTS IN MANAGEMENT RESEARCH AND ENGINEERING
AUTHOR: SMITH, R.A.  Date of Pub: 7/1/1969

Abstract:

THIS IS A DIRECTORY OF INDUSTRY, UNIVERSITY, AND FEDERAL CONTACTS WHO ARE INVOLVED IN THE AREAS OF MANAGEMENT SCIENCE, BEHAVIORAL SCIENCE, OPERATIONS RESEARCH, CYBERNETICS, AND ORGANIZATIONAL STRUCTURE AND BEHAVIOR. THE LISTING REPRESENTS A VARIETY OF DISCIPLINES--SOCIOLOGY, PSYCHOLOGY, SOCIAL PSYCHOLOGY, PSYCHIATRY, ANTHROPOLOGY, STATISTICS, HISTORY, PUBLIC ADMINISTRATION, POLITICAL SCIENCE, ECONOMICS, SYSTEMS ANALYSIS, ECOLOGY, AND GENERAL SYSTEMS THEORY.

TITLE: GROUND TESTING A MOON BIRD
AUTHOR: SHEIL, W.B.  Date of Pub: 7/1/1965

Abstract:

IN ONE SECTION OF THE SPRAWLING TEST AREAS THE S-IC IS CRADLED IN A GIANT STEEL TEST STAND ATOP FOUR MASSIVE CONCRETE LEGS, WHERE IT IS BEING STATIC FIRED TO PROVE THE DESIGN OF THE BOOSTER'S PROPULSION SYSTEM. FIVE FULL-THrust TESTS HAVE BEEN CONDUCTED. THE LONGEST WAS FOR 90 SECONDS. A TEST FOR 2.5 MINUTES, APPROXIMATELY FULL-FLIGHT BURNING TIME, IS SCHEDULED FOR JULY 1965.

TITLE: GROUND VERSUS ON-BOARD TRACKING FOR SPACE NAVIGATION

Abstract:
IT IS THE PURPOSE OF THIS PAPER TO ASSESS THE RELATIVE MERITS OF THE TWO EXTREME POSSIBILITIES--EXCLUSIVE GROUND TRACKING VS. ON-BOARD TRACKING--FOR A SPECTRUM OF SPACE MISSIONS INCLUDING ORBITAL, LUNAR, AND ESCAPE. THIS COMPARISON MAY BE MADE FROM A GENERAL OPERATIONAL VIEWPOINT OR FROM THE VIEWPOINT OF TRACKING ACCURACY AND TRACKING SPEED. BOTH ASPECTS ARE PRESENTED.

TITLE: GUIDANCE AND CONTROL OF SATURN LAUNCH VEHICLES
AUTHOR: HAEUSSERMANN, W.
Date of Pub: 7/26/1965

Abstract:
THE NAVIGATION, GUIDANCE, AND CONTROL MODES AND PROBLEMS OF SATURN LAUNCH VEHICLES ARE GIVEN AS REQUIREMENTS FOR THE GUIDANCE AND CONTROL METHODS. TWO PATH ADAPTIVE GUIDANCE MODES, FEATURING FLIGHT PATH OPTIMIZATION, IN THE FORM OF A POLYNOMIAL MODE AND AN ITERATIVE MODE ARE GIVEN IN THEIR COMPUTATION FORM AND COMPARED WITH RESPECT TO MISSION FLEXIBILITY, IMPLEMENTATION REQUIREMENTS, AND PERFORMANCE. ATTITUDE CONTROL DURING THE PROPELLED FLIGHT PHASES REQUIRES CONSIDERATION OF VARIOUS BENDING AND SLOSHING MODES; STABILITY OF THE CONTROL SYSTEM IS OBTAINED BY PHASE STABILIZATION OF THE LOW FREQUENCIES AND BY ATTENUATION OF THE HIGHER FREQUENCIES. TYPICAL SHAPING NETWORKS AND THEIR TRANSFER FUNCTIONS ARE GIVEN. THE ATTITUDE CONTROL SYSTEM DURING COASTING PERIODS IS BRIEFLY DESCRIBED. THE FUNCTIONAL BEHAVIOR AND CHARACTERISTIC DATA OF THE MAIN GUIDANCE AND CONTROL HARDWARE SUCH AS THE INERTIAL SENSORS, STABILIZED PLATFORM, DIGITAL COMPUTER, DATA ADAPTER, CONTROL COMPUTER, AND ACTUATION SYSTEM ARE DESCRIBED. RELIABILITY REQUIREMENTS ARE EMPHASIZED. THE PRINCIPLE OF REDUNDANCY IS EXTENSIVELY USED TO OBTAIN HIGHEST RELIABILITY FOR LONG OPERATING TIMES. DATA AND RESULTS FROM RECENT SATURN 1 FLIGHTS SUMMARIZE THE PERFORMANCE OF THE GUIDANCE SCHEMES.

TITLE: GUIDE TO NASA DATA HANDBOOKS
AUTHOR: Date of Pub: 6/1/1967

Abstract:
THIS IS A COMPREHENSIVE LISTING OF NASA-SPONSORED TECHNICAL DATA HANDBOOKS IN THE NASA CENTRAL INFORMATION SYSTEM.

TITLE: GUIDED MISSILES
AUTHOR: KUCHEROV, I.K./MARISOV, V.I.
Date of Pub: 1/31/1964

Abstract:
MICROFICHE ON HAND

TITLE: GUIDED MISSILES BIBLIOGRAPHY (3 VOLUMES)
AUTHOR: Date of Pub: 6/9/1969

Abstract:
SEARCH CONTROL NO. 015410

TITLE: GUIDELINES FOR ADMINISTRATORS
AUTHOR: SHEIL, W.B.
Date of Pub: 1/1/1966

Abstract:
ONE OF THE MORE DIFFICULT TASKS OF THE SPACE AGE IS THE BUSINESS \textit{of maintaining current status on the many sets of facts related to Apollo/Saturn V program progress. At MSFC management executives have a unique Saturn V moon mission program control center which provides maximum visibility for thousands of bits \textit{of info which reflect the daily pulse of the multi-million-dollar project. It permits program officials to maintain pinpoint control of activities of more than 100,000 persons representing 13,500 companies in 47 states working toward the national goal of landing American astronauts on the moon in this decade. Boeing} \textit{assisted MSFC in establishing the center last year. The center features the latest data-display techniques, including rear-projection equipment for two screens, for slides and motion pictures. A closed-circuit TV system is being installed to provide a direct audio/visual link with KSC launch operations. It is a working center used entirely as a Saturn V management tool.}

\begin{table}
\begin{tabular}{|l|l|l|l|}
\hline
\textbf{TITLE:} & \textbf{H-1 ENGINE} & & \\
\hline
\textbf{AUTHOR} & STRAUB,E.E. & \textbf{Date of Pub:} & 2/1/1962 \\
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\textbf{Abstract:} & PRESENTS TECHNICAL MILESTONES IN HISTORY OF H-1 ENGINES. & & \\
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\hline
\textbf{TITLE:} & \textbf{H-1 ROCKET ENGINE-DATA - TECHNICAL MANUAL (MODELS H-1C AND H-1D)} & & \\
\hline
\textbf{AUTHOR} & & \textbf{Date of Pub:} & 9/9/1968 \\
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\textbf{Abstract:} & THE ORIGINAL MANUAL DATED 6 JUNE 1966; LATEST REVISION DATED 9 SEPTEMBER 1968. & & \\
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\textbf{TITLE:} & \textbf{HAMILTON STANDARD NEWS} & & \\
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\textbf{AUTHOR} & & \textbf{Date of Pub:} & 1/1/1969 \\
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\textbf{Abstract:} & & & \\
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\textbf{TITLE:} & \textbf{HARDWARE FOR SATURN} & & \\
\hline
\textbf{AUTHOR} & BARTEE,D. & \textbf{Date of Pub:} & 1/1/1963 \\
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\textbf{Abstract:} & & & \\
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\textbf{TITLE:} & \textbf{HELIUM FACE SEAL APPLICATION IN A LIQUID OXYGEN PUMP} & & \\
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\textbf{AUTHOR} & CIESLIK,W.J. & \textbf{Date of Pub:} & 5/5/1969 \\
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\textbf{Abstract:} & & & \\
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\textbf{TITLE:} & \textbf{HELIUM UTILIZATION IN THE APOLLO/SATURN V VEHICLE} & & \\
\hline
\textbf{AUTHOR} & NUNNELLEY,J.R. & \textbf{Date of Pub:} & 10/24/1968 \\
\hline
\textbf{Abstract:} & HELIUM IS USED EXTENSIVELY THROUGHOUT THE APOLLO/SATURN V SPACE VEHICLE FOR A NUMBER OF APPLICATIONS. THE WELDING USE IS NOT DISCUSSED SINCE IT IS A SPECIAL TOPIC. HELIUM IS USED IN THE FIRST STAGE FOR LIQUID OXYGEN TANK PRESSURIZATION DURING VEHICLE CHECKOUT AND LAUNCH. THE SECOND STAGE REQUIRES IT FOR LIQUID HYDROGEN TANK SIDEWALL INSULATION PURGE. THE MAJOR USE OF HELIUM IN THE THIRD STAGE IS FOR FUEL TANK PRESSURIZATION. HELIUM IS USED EXTENSIVELY FOR A NUMBER OF OTHER CHECKOUT AND PRELAUNCH PRESSURIZATIONS OF THE S-IVB. OTHER REQUIREMENTS ARE FOR OPERATION CHECKOUT SUCH AS DETANKING AND ENGINE PURGE. IT IS USED IN PRESURIZATION OF THE FUEL AND OXIDIZER SYSTEMS OF THE AUXILIARY PROPULSION SYSTEM (APS). & & \\
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<tr>
<th>TITLE: HISTORICAL NOTES ON ORAL HISTORY IN NASA</th>
<th>AUTHOR</th>
<th>Date of Pub:</th>
<th>11/1/1967</th>
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<tbody>
<tr>
<td>Abstract: CONTENTS INCLUDE SUMMARY OF PROJECT MERCURY EXPERIENCE, REFLECTIONS ON NASA ORAL HISTORY, LIST OF NASA HISTORICAL PUBLICATIONS, AND LIST OF NASA HISTORIANS AND MONITORS.</td>
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<th>TITLE: HISTORICAL ORIGINS OF THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION</th>
<th>AUTHOR</th>
<th>Date of Pub:</th>
<th>1/1/1963</th>
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<tr>
<td>Abstract: CONTAINS GENERAL HISTORICAL INFORMATION CONCERNING THE CREATION, MISSION, AND EARLY EFFORTS OF NASA.</td>
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<tr>
<th>TITLE: HISTORICAL PERSPECTIVES ON APOLLO</th>
<th>AUTHOR</th>
<th>Date of Pub:</th>
<th>4/1/1968</th>
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<th>TITLE: HISTORICAL PROFILE OF NORTH AMERICAN AVIATION, INC. (1910-1962)</th>
<th>AUTHOR</th>
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<th>TITLE: HISTORICAL SKETCH OF MSFC</th>
<th>AUTHOR</th>
<th>Date of Pub:</th>
<th>6/16/1966</th>
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<tr>
<td>Abstract: COVERS THE MOVE FROM TEXAS TO ALABAMA, ABMA, FORMATION OF MSFC, FIRST SIX YEARS OF MSFC, AND THE CURRENT ORGANIZATION</td>
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<tr>
<th>TITLE: HISTORICAL SKETCH OF NASA (BROCHURE)</th>
<th>AUTHOR</th>
<th>Date of Pub:</th>
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<tr>
<th>TITLE: HISTORICAL SUMMARY OF S&amp;ID APOLLO PROGRAM</th>
<th>AUTHOR</th>
<th>Date of Pub:</th>
<th>1/20/1966</th>
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</table>
A BRIEF SUMMARY OF THE DEVELOPMENT OF SPACE LAUNCH VEHICLES IN THE USA IS PRESENTED. EARLY HISTORIES OF VERY LARGE BALLISTIC ROCKETS ARE PRESENTED. PREHISTORY OF SOVIET GLIDING IS PRESENTED, AND WORKS ON THE HISTORY OF AVIATION AND COSMONAUTICS IN THE UKRAINIAN DIVISION ARE NOTED.


THIS REPORT DEALS WITH DEVELOPMENT OF INERTIAL GUIDANCE SYSTEMS FOR BALLISTIC MISSILES. IT COVERS THE EVOLUTION OF GUIDANCE DEVICES FROM EARLY DAYS OF EXPERIMENTATION DURING THE 1930'S, THROUGH THE OPERATIONAL USE OF THE WORKHORSE LEV-3 SYSTEM ON THE GERMAN V-2 ROCKETS, TO THE RELIABLE AND ACCURATE GUIDANCE MECHANISMS OF TODAY.

TITLE: HISTORY OF MSFC RELIABILITY PHILOSOPHY
THE HISTORY OF MSFC RELIABILITY PHILOSOPHY IS DISCUSSED BEGINNING WITH THE REDSTONE MISSILE.

THE ESSENTIAL PURPOSE OF THIS REPORT IS TO PRESENT ONE PLAN FOR THE ROCKET DEVELOPMENT DIVISION TO ACCOMPLISH THE MISSION ASSIGNED TO REDSTONE ARSENAL IN THE FIELD OF R&D RELATED TO FREE FLIGHT ROCKETS, JATOS, ROCKET LAUNCHERS AND THEIR NECESSARY AUXILIARY EQUIPMENT. SINCE THIS COMPLETE PLAN IS NOT PRESENTLY CONTAINED IN A SINGLE SET OF INDEXED DOCUMENTS, AN ESSENTIAL PORTION OF THIS REPORT IS DEVOTED TO THE COMPIATION AND PRESENTATION OF INFO AVAILABLE BUT SCATTERED THROUGH MANY FILES. A LARGER PART OF THE REPORT IS DEVOTED TO THE REASONING WHICH LED TO THE FORMULATION OF THE PLAN PRESENTED: THIS OF NECESSITY BECOMES HISTORICAL AND THEREFORE CONTROVERSIAL.
TITLE: HOW AN IDEA NO ONE WANTED GREW UP TO BE THE LEM

AUTHOR
Date of Pub: 3/14/1969

Abstract:
THIS DOCUMENT DISCUSSES THE DISPUTE BETWEEN DR. JOHN C. HOUBOULT (NASA) AND GOVERNMENT REPRESENTATIVES OVER THE CONCEPT THAT GAVE BIRTH TO THE LUNAR MODULE.

TITLE: HUMAN FACTOR

AUTHOR
Date of Pub: 9/21/1966

Abstract:
ENCELOSURE 1 - STATEMENT OF WORK, MAN/MACHINE ACTIVITIES - ATM; 1 ENCLOSURE 2 - ATM PROBLEM AREAS.

TITLE: HUNTSVILLE - SPACE CITY, U.S.A.

AUTHOR
Date of Pub: 3/1/1968

Abstract:
THIS DOCUMENT PROVIDES A BRIEF HISTORY OF HUNTSVILLE, HOME OF RSA AND MSFC. THE SPACE AGE TRANSFORMATION OF THIS ONCE SMALL COMMUNITY TO ITS PRESENT DAY PROGRESSIVENESS IS DISCUSSED.

TITLE: HUNTSVILLE "BOOM" MAY BE ENDING WITH APOLLO

AUTHOR FALK, L.C.
Date of Pub: 10/24/1968

Abstract:
HUNTSVILLE GREW FROM A SMALL TOWN OF 16,000 TO AN ESTIMATED 148,000 TODAY LARGELY BECAUSE OF THE IMPACT OF THE NATION’S SPACE PROGRAM. NOW WITH THE END OF THE APOLLO PROGRAM IN SIGHT, THE BOOM MAY BE ENDING.

TITLE: HYBRID SIMULATION FOR DYNAMIC VERIFICATION OF SATURN GUIDANCE AND CONTROL SUBSYSTEMS

AUTHOR PATRAY, R.T.
Date of Pub: 5/15/1968

Abstract:
THIS PAPER PRESENTS A DISCUSSION OF A HYBRID SIMULATION USED TO DYNAMICALLY VERIFY THE SATURN GUIDANCE AND CONTROL SUBSYSTEMS. THE SATURN VEHICLE IS BRIEFLY DESCRIBED TO PROVIDE BACKGROUND INFO. THE IU IS CONSIDERED IN MORE DETAIL TO GIVE A PROPER SETTING FOR THE GUIDANCE AND FLIGHT CONTROL DISCUSSION THAT FOLLOWS. A BRIEF DESCRIPTION IS GIVEN OF THE ACTUAL GUIDANCE AND FLIGHT CONTROL SYSTEM OPERATION, AND SIMULATION MODELS OF THE G&FC COMPONENTS ARE CONSIDERED IN DETAIL. THIS IS FOLLOWED BY A DISCUSSION OF THE MODEL ASSIGNMENT TO A PARTICULAR COMPUTER (DIGITAL OR ANALOG) AND JUSTIFICATION FOR MAKING THAT ASSIGNMENT. FINALLY, RESULTS OF THE AS-204/LM1 HYBRID SIMULATION STUDIES ARE BRIEFLY CONSIDERED WITH MENTION OF THE ACTUAL FLIGHT DATA.

TITLE: HYDRAULIC FLUID INTERACTION SERVOVALVE

AUTHOR PHILLIPS, T.A./BLATTER, A.
Date of Pub: 1/1/1968

Abstract:
### HYPersonic Static Longitudinal Stability and Axial Force Characteristics of Three Saturn IB Upper-Stage Models

**Author:** Carlson, D.R.  
**Date of Pub:** 4/27/1964

**Abstract:**
Results of hypersonic wind tunnel tests are reported and analyzed for three Saturn IB second-stage configurations which differ in length and frustum half-angle. Tests were performed at the AEDC Von Karman facility and spanned a nominal Mach number range of 5 to 8. Three purposes directed the test program: (1) establishment of static aerodynamic characteristics of second stage; (2) separation of effects of strakes, launch escape system, change in frustum angle, and mission abort; and (3) qualitative determination of flow fields about these multiple-cone-frustum-cylinder shapes for application to future vehicles.

### IBM Apollo/Saturn Press Information

**Author**
**Date of Pub:** 1/1/1968

**Abstract:**
These are the facts about IBM's role as a NASA prime contractor in the Apollo/Saturn program. They are organized for quick reference. Computer terms are defined in a glossary. Glossy prints of photographs and illustrations are available from IBM information offices listed on the following page.

### IBM Clean Room Comes of Age

**Author:** Heuring, H./Davis, E.W.  
**Date of Pub:** 12/1/1968

**Abstract:**

### IBM Mobile Room Lends Flexibility to Apollo Saturn Unit Fabrication

**Author:** Heuring, H.  
**Date of Pub:** 7/28/1967

**Abstract:**

### Immovable Object

**Author:** Clarke, W.  
**Date of Pub:** 1/1/1966

**Abstract:**
This spring or sooner a Saturn 5 first-stage booster will burst into life -- a 160-million horsepower surge which will mark the first S-IC firing at NASA's new MTF. The S-IC is the first or bottom stage of the three-stage Saturn 5. Its five engines develop 7.5 million pounds of thrust -- an irresistible force. Soon an S-IC will be locked to a 400-foot steel and concrete tower bolted to a 40-foot-thick slab of 80,000 cubic yards of concrete anchored to sixteen hundred 90-foot steel piling driven into the floor of the dried-out bog. This is an immovable object.

### Impact of Manufacturing on Design as Related to Accessibility

**Author:** Franklin, W.J.  
**Date of Pub:** 10/7/1968

**Abstract:**
The purpose of this paper is to emphasize the need for accessibility in the assembly and maintenance of spacecraft. This is especially pertinent because accessibility to subsystems for replacement, repair, and maintenance has proven to be one of the more costly phases of preflight preparation. It is shown that in order to overcome the difficulties, designers should adapt a hard, fast ground rule that each unit must be accessible and individually removable without disturbing the other units.
IMPLEMENTATION OF ADVANCED SIMULATION TECHNIQUES FOR PREDICTING THE SATURN V LAUNCH VEHICLE (PAPER)

SNYDER, J.F.

Date of Pub: 11/1/1966

Abstract:

IMPROVED SATURN V VEHICLES, THEIR AVAILABILITY AND COST CONSIDERATIONS

WAISS, R.D.

Date of Pub: 3/1/1967

Abstract:

IMPROVING THE UPRATED SATURN I

THARRATT, C.E.

Date of Pub: 12/1/1967

Abstract:

DISCUSSES FIVE IMPROVED VERSIONS OF THE UPRATED SATURN I STUDIED BY CHRYSLER, SUPPORTED BY DOUGLAS. CONFIGURATIONS EVALUATED ALL EMPLOYED SOLID ROCKET MOTOR STRAP-ONS IN EITHER ZERO STAGE OR BOOST ASSIST APPLICATIONS. OBJECTIVE OF STUDY WAS TO INVESTIGATE SEVERAL METHODS BY WHICH THE PERFORMANCE CAPABILITY OF THE UPRATED SATURN I CAN BE INCREASED, AND TO DETERMINE DESIGN CHANGES AND IMPACT UPON FACILITIES, GSE, SCHEDULE AND COSTS. STUDY WAS ALSO SUPPORTED BY THIOKOL, UNITED TECHNOLOGY AND ROCKETFYNE. THE STUDY WAS DIRECTED FOR NASA THROUGH MSFC. A PARALLEL STUDY OF THE LAUNCH FACILITY REQUIREMENTS WAS SEPARATELY CONDUCTED BY MARTIN COMPANY FOR KSC.

INCREASING SATURN PAYLOAD CAPACITY

COBB, W.A.

Date of Pub: 3/1/1965

Abstract:

THE CONTINUING DEMANDS OF OUR SPACE PROGRAM FOR INCREASED PAYLOAD CAPACITY CAN BE MET ON THE ONE HAND BY DESIGNING AND BUILDING NEW VEHICLES OR, ON THE OTHER, BY IMPROVING EXISTING DESIGNS. THIS ARTICLE SHOWS HOW DESIGN MODIFICATIONS AND NEW MATERIALS FOR SATURN IB PRODUCE MORE POWER AT LESS WEIGHT, RAISING THE PAYLOAD CAPACITY OVER SATURN I BY 6,000 TO 11,000 LBS.

INDEX OF NASA TECHNICAL PUBLICATIONS

Date of Pub: 11/1/1959

Abstract:


INDEX TO NASA NEWS RELEASES AND SPEECHES - JANUARY-JUNE 1965

Date of Pub: 9/1/1965

Abstract:

THIS INDEX IS ARRANGED BY SIX SECTIONS: (1) SUBJECT INDEX, (2) PERSONAL NAMES INDEX, (3) NEWS RELEASE NUMBER INDEX, (4) ACCESSION NUMBER INDEX, (5) SPEECHES, AND (6) NEWS RELEASES.

INDEX TO NASA NEWS RELEASES AND SPEECHES (1967 SUPPLEMENT)

Date of Pub: 4/1/1968

Abstract:
THE INDEX IS ARRANGED BY SIX SECTIONS: (1) SUBJECT INDEX, (2) PERSONAL NAMES INDEX, (3) NEWS RELEASE NUMBER INDEX, (4) ACCESSION NUMBER INDEX, (5) SPEECHES, AND (6) NEWS RELEASES.

**TITLE:** INDEX TO NASA NEWS RELEASES AND SPEECHES-1963-1966  
**AUTHOR**  
**Date of Pub:** 3/1/1967

**Abstract:**
THE INDEX IS ARRANGED IN SIX SECTIONS: (1) SUBJECT INDEX, (2) PERSONAL NAMES INDEX, (3) NEWS RELEASE NUMBER INDEX, (4) ACCESSION NUMBER INDEX, (5) LISTING OF SPEECHES COVERING HEADQUARTERS AND CENTER SPEECHES, AND (6) LISTING OF NEWS RELEASES.

**TITLE:** INDICES TO MSFC CIRCULARS AND MSFC ADMINISTRATIVE REGULATIONS AND PROCEDURES  
**AUTHOR** SORENSEN, V.C.  
**Date of Pub:** 9/27/1966

**Title:** INFLATABLE STRUCTURES IN SPACE  
**Author**  
**Date of Pub:** 5/19/1961

**Title:** INFLUENCE OF APOLLO/SATURN V LAUNCH OPERATIONS ON LUNAR SITE SELECTION - CASE 330  
**Author** ELEY, C.H./STEPHENS, H.E.  
**Date of Pub:** 4/28/1966

**Abstract:**
THIS PAPER PRESENTS SOME RELATIONSHIPS BETWEEN APOLLO/SATURN V LAUNCH OPERATIONS AND MULTIPLE LUNAR LANDING SITES, INCLUDING THE MEANS BY WHICH SITE SELECTION COULD FACILITATE LAUNCH OPERATIONS. A BRIEF SUMMARY OF THE DISCUSSION IS AS FOLLOWS: (1) A CHANGE IN THE LIGHTING CONSTRAINT TO 7 TO -20 DEGREES FOR A LUNAR LANDING REDUCES THE EARTH LAUNCH OPPORTUNITY TO ABOUT ONE LAUNCH WINDOW PER MONTH PER SITE, (2) THE HIGHEST PROBABILITY FOR A SUCCESSFUL COUNTDOWN AND LAUNCH OCCURS WITH LAUNCH WINDOWS SPACED TO DAYS APT. INCLUDED IN THIS ARE THE OPERATIONAL CONSTRAINTS PRESENTED IN REFERENCE 1, (3) FROM (2) ABOVE, IT IS APPARENT THAT LUNAR SITE SELECTION COULD GREATLY FACILITATE EARTH LAUNCH OPERATIONS IF LUNAR SITES WERE SITUATED SUCH THAT LAUNCH WINDOWS FELL TWO DAYS APART.

**Title:** INFLUENTIAL ASPECTS OF ATMOSPHERIC DISTURBANCES ON SPACE VEHICLE DESIGN USING STATISTICAL APPROACHES FOR ANALYSIS.  
**Author** RYAN, R.S./KING, A.W.  
**Date of Pub:** 1/1/1969

**Abstract:**
THE INFLUENTIAL ASPECTS OF VARIOUS WIND PROFILE DISTURBANCES ON THE DYNAMIC RESPONSE OF THE VEHICLE ARE CONSIDERED. PARTICULARLY, AN EMPHASIS IS GIVEN TO SEPARATING THE INFLUENCE OF WIND SHEARS, TURBULENCE AND QUASI-STEADY WIND SPEED ON THE DYNAMIC RESPONSE DURING THE BOOST PHASE OF FLIGHT. 407 INDIVIDUAL DETAILED JIMSPHERE WIND PROFILES ARE THE PRIMARY WIND INPUTS, ALTHOUGH THE MSFC SYNTHETIC PROFILE IS ALSO DISCUSSED. THE TIME RESPONSE TO EACH PROFILE IS RUN AND A STATISTICAL ANALYSIS MADE. SEVERE PROFILES ARE RANKED IN TERMS OF THE BENDING MOMENT AT TWO VEHICLE STATIONS FOR THE SATURN V VEHICLE. THE INFLUENCE OF RESULTS ON VEHICLE DESIGN AND FLIGHT OPERATIONAL PROCEDURES IS DETERMINED.

**Title:** INFORMAL HANDWRITTEN LETTER TO MR. AKENS (NASA-MSFC) REGARDING CALIPS PRESSURE SWITCH, WITH ATTACHMENT  
**Author** MELTON, D.  
**Date of Pub:** 9/10/1969

**Abstract:**
ATTACHMENT IS "NEW PRESSURE SWITCHES HELP CUT SATURN V CHECKOUT TIME," AEROSPACE TECHNOLOGY, 6 MAY 1968.
TITLE: INFORMATION ABOUT PRATT & WHITNEY AIRCRAFT, FLORIDA RESEARCH AND DEVELOPMENT CENTER

AUTHOR

Date of Pub: 9/1/1965

Abstract:
INCLUDES DESCRIPTION, MILESTONES, LAUNCH RECORD, AND STATISTICS OF THE RL-10 LIQUID HYDROGEN ROCKET ENGINE.

AMONG OTHER THINGS, INCLUDE DESCRIPTION AND LAUNCH HISTORY OF THE RL-10 LIQUID HYDROGEN ROCKET ENGINE.

TITLE: INHOMOGENEOUS RADIANT HEAT TRANSFER FROM SATURN ROCKET EXHAUST PLUMES

AUTHOR HUFFAKER, R.M.

Date of Pub: 6/30/1967

Abstract:
A RADIANT HEAT TRANSFER COMPUTER PROGRAM HAS BEEN DEVELOPED TO CALCULATE RADIATION FROM INHOMOGENEOUS GASES PREVALENT IN ROCKET EXHAUST PLUMES FROM CLUSTERED ENGINES. THE INFRARED SPECTRAL ABSORPTION CHARACTERISTICS OF THE RADIATING SPECIES CONSIDERED IN THIS COMPUTER PROGRAM - WATER VAPOR, CARBON DIOXIDE, CARBON MONOXIDE AND CARBON PARTICLES - HAVE BEEN DETERMINED. BAND MODEL PARAMETERS HAVE BEEN USED TO REPRESENT THE INFRARED SPECTRAL ABSORPTION COEFFICIENTS OVER 25 CM^{-1} INCREMENTS. A MODIFIED CURTIS-GODSON APPROXIMATION, USED IN THE INHOMOGENEOUS HEAT TRANSFER CALCULATION, HAS BEEN SHOWN TO GIVE SATISFACTORY RESULTS OVER THE TEMPERATURE AND PRESSURE RANGE OF INTEREST IN SATURN EXHAUST PLUMES. RESULTS ARE SHOWN FOR THE SATURN-TYPE ENGINES FOR SPECIFIC FLOW FIELD ASSUMPTIONS. SOME COMPARISON WITH EXPERIMENTAL SPECTROSCOPIC DATA WILL ALSO BE PRESENTED. EFFECTS OF WAVELENGTH INCREMENT, FIELD OF VIEW, AND DISTANCE INCREMENT ALONG THE LINE OF SIGHT ON THE HEAT TRANSFER, AS WELL AS THE COMPUTER TECHNIQUES FOR MINIMUM COMPUTER TIME IN CALCULATING RADIATION FROM A THREE-DIMENSIONAL FLOW FIELD, ARE DISCUSSED.

TITLE: INNER TEST FOR OUTER SPACE

AUTHOR BARTEE, D.

Date of Pub: 11/1/1963

Abstract:

TITLE: INSPECTION OF WELDS ON S-II-1

AUTHOR PHILLIPS, S.C.

Date of Pub: 5/25/1967

Abstract:

TITLE: INSPECTION REQUIREMENTS FOR S-II-1 AND S-II-2 AT KSC

AUTHOR

Date of Pub: 5/24/1967

Abstract:

TITLE: INSPECTION SYSTEM PROVISIONS FOR SUPPLIERS OF SPACE MATERIALS, PARTS, COMPONENTS, AND SERVICES

AUTHOR

Date of Pub: 4/1/1962

Abstract:
THIS DOCUMENT SETS FORTH THE MINIMUM REQUIREMENTS FOR SUPPLIER'S INSPECTION SYSTEMS NECESSARY TO INSURE THAT MATERIALS, PARTS, COMPONENTS, AND SERVICES FOR LAUNCH VEHICLES, SPACECRAFT, AND ASSOCIATED GSE MEET THE REQUIREMENTS OF THE CONTRACT.

TITLE: INSTRUCTION MANUAL - SATURN DISPLAY SET 2110559-501 THROUGH 2110559-505
(VOLUME 1 OF 3)

AUTHOR: Date of Pub: 10/1/1965

Abstract:
THIS DOCUMENT REPLACES TP-1203 DATED JANUARY 1965. COVERS INSTALLATION, OPERATION AND MAINTENANCE PROCEDURES FOR DISPLAY EQUIPMENT USED IN TESTING SATURN ASSEMBLIES AND SUBASSEMBLIES. EQUIPMENT DESCRIBED IS COMPRISSED OF DISPLAY CABINETS AND CONSOLES, AND ONE OR MORE CAMERA ASSEMBLIES. IT FUNCTIONS AS AN INPUT-OUTPUT DEVICE FOR THE GROUND COMPUTER SYSTEM AND DISPLAYS DATA IN TABULAR AND GRAPHIC FORMAT. THE MANUAL ALSO INCLUDES EMERGENCY OPERATING INSTRUCTIONS AND PRINCIPLES OF OPERATIONS FOR THE EQUIPMENT.

TITLE: INSTRUMENT UNIT PROGRAM REVIEW - SATURN INSTRUMENT UNIT (IBM)

AUTHOR: Date of Pub: 7/26/1966

Abstract:

TITLE: INSTRUMENT UNIT TO NAVIGATE SATURN IB'S FIRST FLIGHT (IBM NEWS RELEASE)

AUTHOR: Date of Pub: 2/17/1966

Abstract:
WITHIN THE FIRST TEN MINUTES OF NASA'S INITIAL SATURN IB FLIGHT, THE IU - NERVE CENTER OF AMERICA'S MIGHTIEST LAUNCH VEHICLE - IS DESIGNED TO MAKE MORE THAN 7 MILLION CALCULATIONS, SAMPLE VEHICLE ACCELERATION 100 TIMES A MINUTE, TELEMETER 3 MILLION NUMBERS BACK TO EARTH, AND MEASURE THE PERFORMANCE OF 300 PIECES OF EQUIPMENT IN THE IU, S-1B, AND S-IVB STAGES. CONTAINING THE ADVANCED ELECTRONIC AND ELECTRICAL EQUIPMENT, THE IU WILL NAVIGATE THE VEHICLE TO ITS SUBORBITAL TARGET, SOME 5,000 MILES DOWN RANGE IN THE SOUTH ATLANTIC, AT A SPEED OF MORE THAN 26,000 FPS (ABOUT 17,000 MPH).

TITLE: INSTRUMENTATION OF SPACE VEHICLE IN CONNECTION WITH THE SUCCESSFUL SATURN FLIGHTS TESTS

AUTHOR: Hoberg, O.T. Date of Pub: 9/21/1962

Abstract:
THIS PAPER REVIEWS THE SATURN INSTRUMENTATION PHILOSOPHY AND DESCRIBES THE INSTRUMENTATION SYSTEM USED ON THE FIRST TWO FLIGHT TESTS. BASED ON FLIGHT TESTS OF SA-1 AND SA-2, THE ACTUAL PERFORMANCE OF THE INSTRUMENTATION SYSTEM AND THE QUALITY OF RECOVERED DATA WITH RESPECT TO ACCURACY AND RELIABILITY ARE EXAMINED.

TITLE: INSTRUMENTATION PROGRAMMING FOR COMPUTER CONTROLLED DIGITAL DATA PROCESSING

AUTHOR: Anderson, P.N. Date of Pub: 10/4/1965

Abstract:
A NUMBER OF CONSIDERATIONS ARE NECESSARY IN INSTRUMENTATION PROGRAMMING, MANY OF WHICH ARE EITHER NOT APPLICABLE OR APPLICABLE TO A LESSER DEGREE IN OTHER TYPES OF PROGRAMMING. THIS PAPER DISCUSSES THESE PROBLEMS IN GENERAL TERMS AND ILLUSTRATES HOW THEY HAVE BEEN DEALT WITH SPECIFICALLY. THE LATTER IS DONE BY DESCRIBING THE PROGRAMMING AND OPERATION OF A DATA REDUCTION SYSTEM.

TITLE: INSTRUMENTATION RESEARCH FOR GROUND TESTING AT MSFC - RESEARCH ACHIEVEMENTS REVIEW, VOLUME II, REPORT NO. 12

AUTHOR: Date of Pub: 1/1/1968

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<thead>
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<th>Title</th>
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<th>Date of Pub.</th>
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<tr>
<td>INTEGRATED OPERATING MODE OF THE APOLLO MISSION SIMULATOR</td>
<td>NASSIFF, S.H. / MARTIKAN, F.O.</td>
<td>1/1/1965</td>
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<td>INTEGRATED POWER AMPLIFIER FOR THE SATURN VEHICLE INERTIAL PLATFORM GIMBAL TORQUES</td>
<td>ROWE, O.</td>
<td>6/1/1966</td>
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<td>INTERACTIVE FLIGHT DATA ANALYSIS SYSTEM FOR SATURN V POST-FLIGHT EVALUATION (PAPER)</td>
<td>LIDDELL, A.G. / PERESICH, E.A.</td>
<td>1/1/1968</td>
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<td>INTERFACE CONTROL DOCUMENT - DEFINITION OF SATURN SA-507 FLIGHT SEQUENCE PROGRAM</td>
<td></td>
<td>12/5/1967</td>
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<tr>
<td>INTERFACE PROBLEMS IN SPACE EXPERIMENTATION</td>
<td>FILIPOWSKY, R.F. / GREEN, P.C.</td>
<td>6/1/1966</td>
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<td>INTERSTELLAR GRAINS</td>
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<td>1/1/1967</td>
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**Abstract:**

THE PURPOSE OF THIS DOCUMENT IS TO DEFINE THE FLIGHT SEQUENCE EVENTS, TIME BASES, STAGE SWITCH SELECTOR CHANNEL ASSIGNMENTS, LVDA DISCRETE OUTPUTS, INPUTS AND INTERRUPTS FOR THE SATURN SA-507 AND SUB VEHICLES. SPECIAL REQUIREMENTS AND RESTRICTIONS DEFINED IN THIS DOCUMENT WILL BE IMPOSED ON THE MSFC AND ITS CONTRACTORS AS APPLICABLE TO INSURE THE PROPER FUNCTIONING OF THE EQUIPMENT IN THE VARIOUS STAGES FOR REQUIRED VEHICLE TIMING AND SEQUENCING TO OCCUR AS OUTLINED IN THIS INTERFACE CONTROL DOCUMENT.

SPACE EXPERIMENTATION IS EXPANDING RAPIDLY. UNMANNED SATELLITES ARE BEING EQUIPPED WITH PRECISION INSTRUMENTS OF GREATER POWER, AND MANNED SPACE STATIONS ACCOMMODATING LARGE CREWS ARE IN THE DRAWING BOARD STAGE. INTERFACE PROBLEMS BETWEEN THESE SOPHISTICATED INSTRUMENTS AND BETWEEN MAN, THE SPACECRAFT, AND THE SUPPORTING GROUND STATIONS ARE MULTIDIMENSIONAL. THIS PAPER ANALYZES THE SCIENTIFIC/TECHNICAL AREAS OF SPACE EXPERIMENTATION, AND CONTINUES WITH A REVIEW OF THE SUBSYSTEMS AND SUPPORT SYSTEMS REQUIRED TO SUPPLY AND OPERATE THE LARGE VARIETY OF INSTRUMENTS. AREAS OF MAJOR INTEGRATION EFFORTS ARE IDENTIFIED AND THE REQUIREMENTS FOR FURTHER DEVELOPMENTS AND IMPROVEMENTS ARE LISTED. A BIBLIOGRAPHY OF 95 REFERENCES IS ENCLOSED TO ASSIST IN IDENTIFICATION OF MORE DETAILED REPORTS ON ALL VITAL ASPECTS OF SPACE EXPLORATION.
This report presents a basic orientation to the task of evaluating the effectiveness of a reliability program. Although evaluation methodology is treated to some extent, primary emphasis is devoted to discussing the assurance task as it relates to project requirements and resources and to describing the factors which determine effectiveness in program implementation. The objective is to present an efficient general approach on which reliability assurance personnel can superimpose their own knowledge and initiative to adapt it for making timely and perceptive evaluations in their specific project situations.

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<td></td>
<td>Date of Pub: 4/27/1964</td>
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| Title:                        | INVESTIGATION OF S-IV ALL SYSTEMS VEHICLE EXPLOSION                 |
|------------------------------|                                                                      |
| Author Date of Pub:          |                                                                      |
| GAYLE, J.B. Date of Pub:     | 9/1/1964                                                            |

| Title:                        | INVESTIGATION OF THEORETICAL TIME AND FREQUENCY RESPONSE ANALYSES ON |
| Author Date of Pub:          | THE SATURN V VEHICLE (PAPER)                                        |
| HARCROW, H.W. Date of Pub:   | 10/1/1963                                                           |

| Title:                        | ITERATIVE GUIDANCE LAW FOR SATURN                                   |
|------------------------------|                                                                      |

Wednesday, March 24, 2004
ITERATIVE GUIDANCE SCHEME AND ITS APPLICATION TO LUNAR LANDING

HORN, H. J./MARTIN, D. T./CHANDLER

Date of Pub: 7/1/1965

Abstract:
A GUIDANCE SCHEME FOR VEHICLE FLIGHT FROM LUNAR ORBIT TO A PRESCRIBED POINT ON A SPHERICAL, NONROTATING MOON IS PRESENTED. EQUATIONS OF MOTION HAVE BEEN SIMPLIFIED ONLY TO PERMIT A CLOSED SOLUTION FOR THE THRUST MAGNITUDE AND THRUST DIRECTION. THE TRAJECTORY COMPUTATIONS THEMSELVES ARE MADE UNDER MORE REALISTIC AND ACCURATE ASSUMPTIONS AND NOT INCLUDED. THIS SCHEME IS ANOTHER APPROACH TO THE PROBLEM OF ADAPTIVE GUIDANCE MECHANIZATION FOR VACUUM FLIGHT. EFFECTIVENESS OF THE SCHEME AND THE REQUIRED THRUST VARIATIONS ARE DISPLAYED IN TABLE I AND II.

IU PRESENTATION AND DEDICATION

SLATTERY, B. J.

Date of Pub: 10/6/1965

Abstract:

IU/S-IVB FORWARD SKIRT ORBITAL AND TRANSLUNAR THERMAL ANALYSES

HUNEIDI, F.

Date of Pub: 1/13/1966

Abstract:

J-2 ENGINE SIGNIFICANT CONFIGURATION CHANGE POINTS (INTERNAL LETTER TO L. R. DIETRICH)

OSTERLOH, R.

Date of Pub: 3/9/1971

Abstract:

J-2 LIQUID HYDROGEN ROCKET ENGINE

STUDHALTER, W. R.

Date of Pub: 4/8/1963

Abstract:

J-2 ROCKET ENGINE BACKGROUND INFORMATION (NAA-ROCKETDYNE NEWS RELEASE)

Date of Pub: 11/6/1967

Abstract:
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<th>Title</th>
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<tr>
<td>JET PROPULSION LABORATORY: ITS ORIGINS AND FIRST DECADE OF WORK</td>
<td>MALINA, F.J.</td>
<td>1/1/1964</td>
<td>THE OUTSTANDING CONTRIBUTIONS TO ROCKET TECHNOLOGY AND THE SPACE SCIENCES BY JPL ARE DISCUSSED.</td>
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<tr>
<td>JUNO V - VERSION B PERFORMANCE CONSIDERATIONS</td>
<td>SCHMIEDER, D.</td>
<td>12/5/1958</td>
<td></td>
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<tr>
<td>JUNO V MISSILE (SATURN): PRELIMINARY FIRST STAGE CONTROL ANALYSIS FOR MISSILE SA-3 AND SA-4</td>
<td>MCNAIR, L./LISLE, D.</td>
<td>3/10/1959</td>
<td></td>
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<tr>
<td>JUNO V TRANSPORTATION FEASIBILITY STUDY</td>
<td>HAMILTON, J.S./FULLER, J.L./KEYE</td>
<td>1/5/1959</td>
<td>THE PURPOSE OF THIS REPORT IS TO PRESENT AN INVESTIGATION TO DETERMINE THE MOST FEASIBLE, PRACTICAL, AND ECONOMICAL METHOD OF TRANSPORTING THE JUNO V THRUST UNIT. THIS INCLUDES THE FIRST PHASE OF TRANSPORTING BETWEEN FABRICATION LAB, SYSTEMS ANALYSIS, AND RELIABILITY LAB, AND TO THE TEST STAND, AS WELL AS THE LATER PHASES, ONTO THE RSA LOADING DOCKS AND FROM THERE DOWN THE TENNESSEE, OHIO, AND MISSISSIPPI RIVERS TO THE ATLANTIC MISSILE RANGE, FLORIDA.</td>
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<td>JUPITER ... A REPORT BIBLIOGRAPHY</td>
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<td>6/9/1969</td>
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<td>KENNEDY EFFECT</td>
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AUTHOR    LEWIS,R.S.    Date of Pub:    3/1/1968

Abstract:
Discusses constraints of space program due to lunar landing priority.

TITLE:    KENNEDY SPACE CENTER STORY

AUTHOR    Date of Pub:    1/1/1969

Abstract:
Discusses the beginning, growth, and future plans for KSC.

TITLE:    KENNEDY SPACE CENTER: SPRINGBOARD TO THE MOON

AUTHOR    Date of Pub:    6/20/1966

Abstract:
Discusses capabilities, responsibilities, and activities of KSC.

TITLE:    KEY EVENTS IN THE MANNED LUNAR LANDING PROGRAM

AUTHOR    Date of Pub:    7/31/1968

Abstract:
1-PG chart indicating key events from 1955 through June 1968.

TITLE:    KEY MSFC PERSONNEL FOR POTENTIAL INTERVIEW EFFORTS (BIOGRAPHICAL DATA)

AUTHOR    Date of Pub:    12/1/1969

Abstract:

TITLE:    KEYS TO "ECONOMICAL" SPACE FLIGHT: SATURN HARDWARE AND REUSABLE BOOSTERS

AUTHOR    GORDON,T.J./SIEGRIED,W.H.    Date of Pub:    3/1/1963

Abstract:
The cost of space flight can be brought down sharply, the authors argue, if we make full use of the hardware we are planning and if we develop reusable booster. To bolster their case, they review the growth potential of Saturn, which could be used for boosters to succeed Atlas-Centaur, for simple and complex space stations to be used for test flights in preparation for manned planetary flight, and for planetary missions themselves. In their analysis of reusability, they examine the possibility of recovery by inflatable drag cones and point up the advantages of nuclear boosters.

TITLE:    KINEMATIC ANALYSIS OF THE ENGINE AND PUMP INLET DUCT GIMBAL JOINT SYSTEM IN THE S-1C STAGE OF THE SATURN V VEHICLE

AUTHOR    GARCIA,F.F.    Date of Pub:    10/1/1964

Abstract:
A mathematical simulator of the engine and pump inlet duct gimbal joint system in the S-1C stage was developed as a result of the kinematic analysis conducted. The intent of this report is to describe, in detail, the kinematic analysis conducted, the mathematical simulator developed, and the results obtained.

A mathematical simulator of the engine and pump inlet duct gimbal joint system in the S-1C stage was developed as a result of the kinematic analysis conducted. The intent of this report is to describe, in detail, the kinematic analysis conducted, the mathematical simulator developed, and the results obtained.
THIS DOCUMENT REPRESENTS THE KSC SCOPE OF APOLLO PROGRAM MANAGEMENT AND ADDRESSES ITSELF TO THE KSC ORGANIZATIONAL CONCEPTS, MANAGEMENT PHILOSOPHY, AND APPLICATION OF MANAGEMENT SYSTEM ELEMENTS TO RESPOND TO THE IMPACT OF THE APOLLO PROGRAM AND THE SUCCESSFUL ACCOMPLISHMENTS AT THE CENTER.

THE MTP PROVIDES NASA AND NASA CONTRACTORS WITH A COMMON DEFINITION OF (1) THE DEVELOPMENT, QUALIFICATION, AND ACCEPTANCE TEST PROGRAM FOR KSC-PROVIDED GSE AND (2) THE SATURN SA-500F TEST REQUIREMENTS FOR WHICH KSC IS RESPONSIBLE IN SUPPORT OF THE SATURN V PROGRAM. THIS DOCUMENT PROVIDES THE AUTHORITY AND RESPONSIBILITIES FOR DETAILED TEST PLANNING AND DESCRIBES THE INTERFACES AND OTHER RELATIONSHIPS ESTABLISHED TO ACCOMPLISH THE TEST TASK.

VOLUME I - BOEING, SE&I, VOLUME II - BOEING, VOLUME III - NORTH AMERICAN ROCKWELL, VOLUME IV - DOUGLAS AIRCRAFT, VOLUME V - IBM CORPORATION, VOLUME VI - BOEING, SE&I

LAUNCH COMPLEX 34 FACILITIES - FACT SHEET 05

LAUNCH COMPLEX 37 FACILITIES - FACT SHEET

LAUNCH COMPLEX 39 FACILITIES - FACT SHEET 03

LAUNCH CONTROL AND CHECKOUT EQUIPMENT (LCCE) (B&W PHOTOGRAPH)
GE'S APOLLO SYSTEMS ORGANIZATION HAS PROVIDED A BROAD RANGE OF EQUIPMENT USED TO CONTROL AND CHECK OUT THE FACILITIES USED IN LAUNCHING AMERICA'S APOLLO ASTRONAUTS. THIS HARDWARE IS KNOWN AS LCCE AND INCLUDES SYSTEMS WHICH SPREAD OVER THE ENTIRE CAPE KENNEDY COMPLEX. SHOWN HERE IS A TEST OF THE WATER CONTROL SYSTEM USED FOR COOLING AND QUENCHING THE LAUNCH SITE AND STORAGE AREAS BEFORE, DURING, AND AFTER A LAUNCH.

TITLE: LAUNCH INFORMATION - SATURN S-IV AND THE RL 10 ENGINE

AUTHOR

Date of Pub: 1/1/1964

Abstract:
INCLUDES DESCRIPTION, MILESTONES, AND STATISTICS OF THE RL-1 LIQUID HYDROGEN ROCKET ENGINE.

TITLE: LAUNCH OPERATIONS CENTER-DMS MARKET INTELLIGENCE REPORT

AUTHOR

Date of Pub: 4/1/1963

Abstract:
STATES MISSION OF LOC, GIVES DESCRIPTION OF LAUNCH FACILITIES, ETC.

TITLE: LAUNCH OPERATIONS CHALLENGE

AUTHOR FLEMING, W.A.

Date of Pub: 6/1/1961

Abstract:
OBJECTIVES OF NASA'S SPACE EXPLORATION PROGRAM ARE REVIEWED. IT IS FELT THAT NASA MUST ADOPT AN ENTIRELY NEW PHILOSOPHY OF HOW TO DESIGN, MANUFACTURE, TEST, AND LAUNCH VEHICLES IF THEY ARE TO ABOLISH THE COSTLY AND WASTEFUL TECHNIQUES PRESENTLY EMPLOYED.

TITLE: LAUNCH SYSTEMS BRANCH DOCUMENT CONTROL REPORT (BOEING COMPANY), VOLUME 1 OF 1

AUTHOR

Date of Pub: 11/1/1965

Abstract:
The document control report provides management accountability of existing documents, documents in preparation, and documents cancelled. It furnishes items of data for reviewing, identifying, and monitoring documents and updating the master document record.

TITLE: LAUNCH VEHICLE ENGINES PROJECT DEVELOPMENT PLAN

AUTHOR

Date of Pub: 7/1/1965

Abstract:
Gives the mission objective of the RL-10 engine project and provides a description of the various test stands. This is an incomplete document.

TITLE: LAUNCH VEHICLE PROGRAMS

AUTHOR VON BRAUN, W.

Date of Pub: 5/26/1961

Abstract:

TITLE: LAUNCH VEHICLE RECOVERY SYSTEM REQUIREMENTS
PRIMARY CONSIDERATIONS IN DESIGN AND DEVELOPMENT OF A RECOVERY SYSTEM APPLICABLE TO PRESENT EXPENDABLE FIRST STAGE LAUNCH VEHICLES ARE DISCUSSED. GENERAL REQUIREMENTS THAT DEFINE ESSENTIAL CHARACTERISTICS OF A FEASIBLE RECOVERY SYSTEM ARE DERIVED FROM THREE CRITICAL PHASES DURING FLIGHT: (1) CONDITIONS AND REQUIREMENTS BETWEEN STAGE SEPARATION TO REENTRY, (2) REENTRY, AND (3) TERMINAL DESCENT AND LANDING. THIS PAPER PRESENTS VEHICLE CONSIDERATIONS THAT MUST BE INVESTIGATED IN ESTABLISHING REQUIREMENTS OF A RECOVERY SYSTEM APPLICABLE TO FIRST STAGE EXPENDABLE LAUNCH VEHICLES IN THE SATURN CLASS. IN ADDITION, TWO PROGRAMS INITIATED AT MSFC TO SUBSTANTIATE A RECOVERY PROGRAM FOR LAUNCH VEHICLES ARE REVIEWED. THE TWO PROGRAMS ARE THE H-1 ENGINE SALT WATER IMMERSION TESTS AND THE BOOSTER RETRIEVAL EXERCISES AT SEA.

THIS PAPER DISCUSSES LARGE SPACE CARRIER VEHICLES - THE ONES WE ARE USING NOW AND WILL USE IN THE FUTURE TO UNDERTAKE INTERPLANETARY INVESTIGATIONS AND TO ACCOMPLISH THE MANNED SPACE FLIGHT PROGRAMS. THIS REVIEW IS LIMITED TO DESCRIPTIONS AND CAPABILITIES AND WILL NOT INCLUDE OPERATIONAL EMPLOYMENT.

DEVELOPMENT IS BEING COMPLETED ON TRANSDUCERS CAPABLE OF AEROSPACE FLIGHT DETECTION OF SMALL GAS FLOW RATES. PRIMARILY INTENDED FOR MONITORING OF POSSIBLE LEAKS FROM CRITICAL JOINTS IN THE SATURN ENGINE SYSTEMS, THE TRANSDUCERS COULD FIND APPLICATION IN OTHER SITUATIONS INVOLVING SIMILAR FLOW RATES. DETAILS OF METHODS USED ON THE J-2 AND F-1 ENGINES FOR LEAK MONITORING ARE GIVEN. PRINCIPLES OF OPERATION ARE GIVEN. LEAKAGE RATES UP TO ABOUT 25 CUBIC CENTIMETERS PER SECOND (STANDARD TEMPERATURE AND PRESSURE) CAN BE MEASURED. BASIC TYPES INCLUDE UNITS FOR GASEOUS OXYGEN, GASEOUS HYDROGEN, HOT EXHAUST GASES, AND RP-1 FUEL.

A STANDARD SYSTEM OF UNITS FOR MASS, WEIGHT, FORCE, PRESSURE, AND ACCELERATION IS PRESENTED.

LET'S QUIT CONFUSING MASS WITH WEIGHT

A STANDARD SYSTEM OF UNITS FOR MASS, WEIGHT, FORCE, PRESSURE, AND ACCELERATION IS PRESENTED.
TITLE: LETTER FROM GEORGE MUELLER TO J.L. ATWOOD CONCERNING THE S-II STAGE
AUTHOR MUELLER, G.E.
Date of Pub: 1/1/1967

Abstract:

ENCLOSURE IS "A SUGGESTED POLICY AND COURSE OF ACTION FOR NACA ON SPACE FLIGHT" FROM PROPULSION CHEMISTRY, 2 DECEMBER 1957.

TITLE: LETTER TO MR. JOHN L. SLOOP, ASSISTANT ASSOCIATE ADMINISTRATOR, OFFICE OF ADVANCED RESEARCH AND TECHNOLOGY, NASA HEADQUARTERS, WITH ENCLOSURE
AUTHOR OLSON, W.T.
Date of Pub: 1/21/1972

Abstract:

ENCLOSURE IS "A SUGGESTED POLICY AND COURSE OF ACTION FOR NACA ON SPACE FLIGHT" FROM PROPULSION CHEMISTRY, 2 DECEMBER 1957.

TITLE: LETTER TO DR. ROGER E. BILSTEIN ENCLOSING BACKGROUND MATERIAL ON LINDE'S OPERATIONS AND INVOLVEMENT IN THE SATURN PROGRAM
AUTHOR DONEGAN, T.A.
Date of Pub: 1/18/1972

TITLE: LETTER TO MR. DAVID L. CHRISTENSEN CONCERNING CRYOGENIC ACTIVITIES OF PESCO IN PUMP AND MOTOR DEVELOPMENT WITH TWO ENCLOSURES
AUTHOR PERKINS, C.A.
Date of Pub: 8/8/1969

Abstract:


TITLE: LETTER TO MR. DAVID L. CHRISTENSEN REGARDING PRATT & WHITNEY AIRCRAFT DIVISION'S ACTIVITIES IN CONNECTION WITH THE SATURN S-IV STAGE
AUTHOR VILLERS, R.I.
Date of Pub: 7/30/1969

Abstract:


TITLE: LIFE SCIENCES AND SPACE
AUTHOR
Date of Pub: 8/15/1960

Abstract:

TITLE: LINE DRAWING OF L-UT/ARM TOWER IN PAD POSITION
AUTHOR
Date of Pub: 1/1/1969

Abstract:
The authors had the good fortune to participate in one of the earliest programs in the United States to systematically investigate hydrogen/oxygen propellants for high energy rocket engine application. From late in 1944 to the cessation of tests in 1949, the hydrogen/oxygen programs at Aerojet, under the sponsorship of the Navy Bureau of Aeronautics, advanced these propellants from the category of theoretical performance studies to that of practical sources of high specific impulse. These developments are documented in the nine sections of this paper; however, for this presentation, it proved possible only to obtain release of Part III, “Large Scale Production and Handling of Liquid Hydrogen.”
MATERIAL-PROPELLANT COMPATIBILITY AS RELATED TO LIQUID ROCKET PROPULSION SYSTEM DESIGN CRITERIA IS DISCUSSED AND APPLICABLE TEST METHODS TO DERIVE USABLE DESIGN DATA ARE PRESENTED. TEST METHODS, WITH EMPHASIS ON METALLIC MATERIALS, ARE DISCUSSED AND THE SHORTCOMINGS OF A NUMBER OF THESE TEST METHODS ARE POINTED OUT. THESE TESTS INCLUDE STATIC IMMERSION TESTS, STRESS-CORROSION TESTS, FLOW TESTS, IMPACT TESTS, AND TESTS TO DETERMINE EFFECT OF CRACKS AND NOTCHES IN METALS ON COMPATIBILITY. A GENERAL OUTLINE FOR EVALUATION OF METALLIC AND NONMETALLIC MATERIALS WITH RESPECT TO PROPELLANT COMPATIBILITY IS PRESENTED.

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<td>BRENNAN,W.J.</td>
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<td>Abstract:</td>
<td>THIS REVIEW INDICATES RECENT DEVELOPMENTS WHICH HAVE OCCURRED IN THE LIQUID ROCKET ENGINE FIELD, SPECIAL DEVELOPMENT AREAS ASSOCIATED WITH LIQUID ENGINES IN CURRENT USAGE, AND SEVERAL TRENDS WHICH MAY BE EXPECTED IN DESIGN OF FUTURE ADVANCED ROCKET ENGINES.</td>
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<th>LIQUID-PROPELLANT ROCKET ENGINES: THEIR STATUS AND FUTURE</th>
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<td>AUTHOR</td>
<td>IACOBELLIS,S.F./LARSON,V.R./BU</td>
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<td>Abstract:</td>
<td>THIS REVIEW IS LIMITED TO THE LARGE ENGINE SYSTEMS - PRINCIPALLY TO THOSE ENGINES USED TO POWER THE BOOSTER AND UPPER STAGES OF LAUNCH VEHICLES. STATUS OF TODAY'S LIQUID PROPELLANT ROCKET ENGINES IS REVIEWED. BASIC U.S. SPACE MISSION GOALS, ROCKET ENGINE REQUIREMENTS, AND NEW ROCKET ENGINE CONCEPTS AND TECHNOLOGY ARE DESCRIBED. MAJOR EMPHASIS IS PLACED ON SELECTED, HIGH-THRUST ENGINE SYSTEMS THAT ARE TYPICAL OF THE BROAD SPECTRUM OF FUTURE DESIGNS.</td>
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<tr>
<td>AUTHOR</td>
<td>ATKINS,C.M.</td>
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<td>Abstract:</td>
<td>THIS LISTING REPRESENTS A FIRST ATTEMPT TO COMPILE ACADEMIC THESES OF RELEVANCE TO THE HISTORY OF AERONAUTICS AND ASTRONAUTICS. SELECTED THESES ARE GROUPED INTO FOUR MAJOR CATEGORIES: (1) HISTORY, (2) SOCIAL SCIENCE, (3) NATURAL SCIENCE, AND (4) ENGINEERING.</td>
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<td>COVERS LIQUID AND SOLID PROPELLANT ROCKET MOTORS, SOLID PROPELLANT GAS GENERATORS, ETC.</td>
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<td>Abstract:</td>
<td>THIS IS A LIST OF SELECTED PUBLICATIONS AND RELEASES OF NASA ISSUED DURING THE THREE YEARS FOLLOWING THE AGENCY'S ESTABLISHMENT IN OCTOBER 1958. SECTION I CONTAINS ALL NASA TECHNICAL REPORTS, TECHNICAL NOTES AND TECHNICAL TRANSLATIONS; SECTION II SELECTED NASA RELEASES, SPEECHES, AND GENERAL INFORMATIONAL AND EDUCATIONAL PUBLICATIONS; AND SECTION III CONTAINS CONGRESSIONAL DOCUMENTS RELATING TO NASA ACTIVITIES.</td>
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TITLE: LIST OF TECHNICAL DOCUMENTS PUBLISHED DURING THE YEARS 1958 THROUGH 1962

AUTHOR

Date of Pub: 11/30/1899

Abstract:

TITLE: LIST OF TECHNICAL DOCUMENTS, PAPERS, AND ARTICLES PUBLISHED IN 1967 BY THE RESEARCH AND DEVELOPMENT DIRECTORATE (SPECIAL REPORT)

AUTHOR

Date of Pub: 3/1/1968

Abstract:

TITLE: LIST OF TECHNICAL PAPERS AND ARTICLES-1958 THROUGH 1962

AUTHOR

Date of Pub: 11/30/1899

Abstract:

THIS REPORT CONTAINS INFO ON TECHNICAL WRITINGS BY AMC PERSONNEL OTHER THAN THE FORMAL REPORTS COMPILED IN "LIST OF TECHNICAL DOCUMENTS PUBLISHED DURING 1958 THROUGH 1962," DATED 1 JUNE 1963. COVERED HEREIN ARE PAPERS PRESENTED TO PROFESSIONAL AND TECHNICAL SOCIETIES, ARTICLES PUBLISHED IN SCIENTIFIC AND TECHNICAL JOURNALS, AND TECHNICAL PAPERS PRODUCED BY PRESENT COMMAND EMPLOYEES FOR PREVIOUS EMPLOYERS.

TITLE: LISTING OF AIR FORCE PERSONNEL AT NAA-ROCKETDYNE

AUTHOR

Date of Pub: 7/1/1967

Abstract:

TITLE: LISTING OF HISTORICAL DOCUMENTS AND INTERVIEW TAPES (NASA HQ HISTORICAL OFFICE)

AUTHOR

Date of Pub: 10/25/1967

Abstract:

TITLE: LISTING OF TECHNICAL REPORTS PUBLISHED BY RECORDER AND ELECTRONICS LABORATORY, INSTRUMENT DEVELOPMENT SECTION, TEST DIVISION, NASA-MSFC

AUTHOR Greenwood, T.L.

Date of Pub: 6/21/1963

Abstract:
<table>
<thead>
<tr>
<th>TITLE: LITTLE-KNOWN ENGINEER IS FATHER OF &quot;MOON BUG&quot; IDEA</th>
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</thead>
<tbody>
<tr>
<td>AUTHOR: SILCOCK, B.</td>
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<tr>
<td>Date of Pub: 5/22/1969</td>
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<tr>
<td>Abstract: PRESENTS ARGUMENTS ON WHICH HOUBOULT BASED HIS CAMPAIGN FOR THE LUNAR MODULE CONCEPT.</td>
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<thead>
<tr>
<th>TITLE: LM SYSTEM DESCRIPTION</th>
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<tbody>
<tr>
<td>AUTHOR:</td>
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<tr>
<td>Date of Pub: 6/1/1969</td>
</tr>
<tr>
<td>Abstract: DESCRIBES THE MAJOR SYSTEMS OF THE LM, I.E. COMMUNICATIONS SECTION; PROPULSION SYSTEM; GUIDANCE, NAVIGATION AND CONTROL SYSTEM; REACTION CONTROL SYSTEM; ELECTRICAL POWER SYSTEM; ENVIRONMENTAL CONTROL SYSTEM; EXPLOSIVE DEVICES SYSTEM; AND INSTRUMENTATION SECTION.</td>
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<table>
<thead>
<tr>
<th>TITLE: LOAD-REDUCING FLIGHT CONTROL SYSTEMS FOR THE SATURN V WITH VARIOUS PAYLOADS</th>
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</thead>
<tbody>
<tr>
<td>AUTHOR: LIVINGSTON, J.M./REDUS, J.R.</td>
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<tr>
<td>Date of Pub: 8/12/1968</td>
</tr>
<tr>
<td>Abstract: WHEN A BASIC LAUNCH VEHICLE IS EMPLOYED FOR DISPARATE MISSIONS AND PAYLOADS, A WIDE RANGE OF STRUCTURAL LOADING WILL OCCUR. IF EXCESSIVE WIND-INDUCED LOADING IS ENCOUNTERED FOR A PARTICULAR VEHICLE/PAYLOAD/MISSION COMBINATION, MODIFICATION OF THE FLIGHT CONTROL SYSTEM MAY BE THE MOST ATTRACTIVE AMONG THE ALTERNATIVE SOLUTIONS. FACTORS INVOLVED IN THE RESPONSIBLE DESIGN OF A LOAD RELIEF FLIGHT CONTROLLER ARE EXAMINED IN DETAIL, AND IT IS SHOWN BY DISCUSSION AND EXAMPLE THAT THERE EXISTS NO BEST SYSTEM FOR ALL SITUATIONS. UTILITY AND BENEFITS OF THE DESIGN APPROACH DISCUSSED IN THIS PAPER ARE ILLUSTRATED BY THE ANALYSIS OF LOAD RELIEF CONTROLLERS FOR TWO WIDELY DIFFERENT APPLICATIONS OF THE SATURN V, NAMELY THE SATURN V/APOLLO MISSION AND THE SATURN V/Voyager MISSION, NOW DEFUNCT.</td>
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<thead>
<tr>
<th>TITLE: LONG RANGE PLANNING FOR SPACE TRANSPORTATION SYSTEMS</th>
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<tr>
<td>AUTHOR: KOELLE, H.H.</td>
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<tr>
<td>Date of Pub: 1/1/1961</td>
</tr>
<tr>
<td>Abstract: THIS REPORT PRESENTS CURRENT THINKING IN THE AREA OF LONG RANGE PLANNING OF THE FUTURE PROJECTS OFFICE. IT ALSO PRESENTS THE MAJOR SYSTEM PARAMETERS THAT ARE IMPORTANT TO FUTURE LAUNCH OPERATIONS.</td>
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<thead>
<tr>
<th>TITLE: LONG-LIVED CORONAL X-RAY ARCADE</th>
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<tbody>
<tr>
<td>AUTHOR: MCGUIRE, J.P./TANDBERG-HANSS</td>
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<tr>
<td>Date of Pub: 1/1/1977</td>
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<tr>
<td>Abstract: A LARGE, LONG-LIVED, SOFT X-RAY EMITTING ARCH SYSTEM WAS OBSERVED DURING THE LAST SKYLAB MISSION. THIS ARCADE OF ARCHES Stayed IN THE SAME APPROXIMATE POSITION FOR SEVERAL SOLAR ROTATIONS. THIS REPORT SUGGESTS THAT THESE LONG-LIVED ARCHES OWE THEIR STABILITY TO THE STABLE CORONAL MAGNETIC-FIELD CONFIGURATION. A GLOBAL CONSTANT ALPHA FORCE-FREE MAGNETIC FIELD ANALYSIS, AS DEVELOPED BY NAKAGAWA ET AL., IS USED TO DESCRIBE THE ARCHES, AND A MARKED SIMILARITY IS NOTED BETWEEN THE THEORETICAL MAGNETIC-FIELD CONFIGURATION AND THE OBSERVED X-RAY EMITTING FEATURE.</td>
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<tr>
<th>TITLE: LOW FREQUENCY STRUCTURAL DYNAMICS OF THE SATURN VEHICLE</th>
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<tr>
<td>AUTHOR: CHRISTIAN, D.C.</td>
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<td>Date of Pub: 9/1/1964</td>
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<tr>
<td>Abstract:</td>
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</table>
SUPPORT OF LUNAR EXPLORATION MISSIONS IS A MAJOR CONSIDERATION IN FUTURE SPACE PROGRAM PLANNING. THE SPENT SATURN V/S-IVB/IU CAN SUPPORT BOTH LUNAR ORBIT AND LUNAR LANDING OPERATION. THIS PAPER INVESTIGATES LUNAR APPLICATIONS OF THE SPENT STAGE AND INCORPORATES DATA GENERATED DURING COMPANY-FUNDED STUDIES. INVESTIGATED HERE IS THE FEASIBILITY OF USING A LAUNCH VEHICLE EMPLOYING STANDARD S-IC AND S-II BOOST STAGES TO DELIVER A MODIFIED S-IVB/IU AND LARGE DISCRETIONARY PAYLOADS TO A LUNAR ORBIT (LASSO) AND/OR THE LUNAR SURFACE (LASS). OPERATIONS IN EARTH ORBIT AND DIRECT-ASCENT TRAJECTORIES ARE EXAMINED, AND CONSIDERATION IS GIVEN TO THE USE OF THE SPENT STAGE AS A SHELTER IN A MANNER SIMILAR TO THE PRESENTLY PLANNED EARTH ORBITAL WORKSHOP OPERATIONS. BOTH THE LASSO AND LASS CONCEPTS ARE RECOMMENDED FOR CONSIDERATION IN FUTURE LUNAR EXPLORATION PLANS. THESE CONCEPTS ARE CAPABLE OF PLACING A GROSS NET WEIGHT OF 101,400 LB IN LUNAR ORBIT OR LANDING 63,580 LB ON THE LUNAR SURFACE RESPECTIVELY. THE EFFECTIVE PAYLOAD CAPABILITY CAN BE ENHANCED BY PROPER INTEGRATION OF TRANSLUNAR MISSION SUBSYSTEMS WITH THE SUBSYSTEMS REQUIRED FOR LUNAR ORBIT OR SURFACE OPERATIONS. THE VEHICLES CAN BE AVAILABLE WITHIN 3 YEARS, WITH CURRENT-TECHNOLOGY HARDWARE SUFFICIENT FOR PERFORMING THE MISSIONS DESCRIBED.
FABRICATION OF GIANT TOOLS AND TEST COMPONENTS FOR THE SATURN V "FIRST STAGE BOOSTER IS ADDING A MOONSTRUCK LOOK TO MANY MANUFACTURING AREAS IN BOEING'S WICHITA PLANTS. A REVIEW IN LATE MAY SHOWED THAT THE KANSAS CENTER HAS MORE THAN 900 TOOL FABRICATION ORDERS AND MORE THAN 300 TOOL DESIGN ORDERS IN THE 1 SHOPS TO BE WORKED. MANY OF THE TOOLS AND PARTS HAVE "UNEARTHLY DIMENSIONS." FOR EXAMPLE, A HEAT-TREAT FEATURE FOR A SATURN "Y" RING, WHEN COMPLETED, REQUIRED A 60-FOOT RAILWAY FLAT CAR FOR SHIPMENT, AND WEIGHED 15 TONS. TOOLS AND COMPONENTS FABRICATED AT WICHITA WILL BE USED IN FIVE DIFFERENT PRELIMINARY TESTS, IN ADDITION TO EVENTUAL USE ON THE FINAL SERIES OF TEN FLIGHT BOOSTERS AND ONE GROUND VERSION. THE TESTS ARE PROGRAMMED AS (1) BULKHEAD, (2) STATIC, (3) STRUCTURAL, (4) DYNAMIC, AND (5) FACILITIES.)

THE LUNAR ORBIT DESIGN IS DEVELOPED IN TERMS OF MISSION REQUIREMENTS AND PREDICTED EFFECTS DUE TO EARTH AND LUNAR GRAVITATIONAL FIELDS. ERRORS EXPERIENCED IN PREDICTING THE SPACECRAFT TRAJECTORY DURING THE FLIGHT ARE INDICATED TO BE DUE TO LARGE IRREGULARITIES IN THE LUNAR GRAVITATIONAL FIELD.

WHEN PROJECT APOLLO ASTRONAUTS REACH THE MOON IN A FEW YEARS, THEY WILL LAND ON A SITE PRESELECTED BY THE SCANNING EYES OF LUNAR-ORBITING CAMERAS.
THIS CHAPTER ON THE UTILIZATION OF LUNAR RESOURCES IS CONCERNED WITH BASIC CONSIDERATIONS OF THE POSSIBLE VARIATIONS IN GEOLOGICAL AND GEOCHEMICAL CONDITIONS OF THE MOON, WITH ANY PROBLEMS WHICH ARISE AS A RESULT OF THE ENVIRONMENT IN "MINING" AND EXTRACTING PROCESSES, AND WITH THE PROBLEMS OF UTILIZATION OF THESE RESOURCES IN THE LUNAR BASE. EMphasis IS PlACED ON THE READILY USABLE (OR PROCESSABLE) LIFE SUPPORT AND PROPELLANT SUBSTANCES THAT MAY BE FOUND ON OR NEAR PLANETARY OR LUNAR SURFACES.

TITLE: LUNAR SURFACE STUDIES: A CONTINUING BIBLIOGRAPHY

AUTHOR

Abstract:

THIS BIBLIOGRAPHY CONTAINS REFERENCES TO A VARIETY OF SPECIFIC TOPICS INCLUDING THE THEORY OF LUNAR ORIGIN, THE LUNAR ATMOSPHERE, AND THE PHYSICAL CHARACTERISTICS OF THE BODY SUCH AS ITS TOPOGRAPHY, GEOLOGY, CARTOGRAPHY, AND STRATIGRAPHY. TECHNIQUES OF LUNAR OBSERVATION, MEASUREMENT, AND ANALYSIS, E.G., PHOTOGRAPHY, PHOTOMETRY, AND SPECTROPHOTOMETRY, ARE AMPLY COVERED, AND PERTINENT REFERENCES TO THE INSTRUMENTATION AND EQUIPMENT USED IN LUNAR INVESTIGATION HAVE ALSO BEEN INCLUDED.

REFERENCES ARE INCLUDED FOR LUNAR SURFACE STUDIES OF VARIOUS FACTORS. EXAMPLES OF TOPICS COVERED ARE THEORY OF LUNAR ORIGIN, THE LUNAR ATMOSPHERE, AND THE PHYSICAL CHARACTERISTICS OF THE LUNAR SURFACE, SUCH AS TOPOGRAPHY, GEOLOGY, AND STRATIGRAPHY. ALSO INCLUDED ARE REFERENCES TO TECHNIQUES OF LUNAR OBSERVATION, PHOTOGRAPHY, PHOTOMETRY, AND SPECTROPHOTOMETRY, AS WELL AS TO THE INSTRUMENTATION AND EQUIPMENT USED IN LUNAR INVESTIGATION.

TITLE: MAINTENANCE AND MAINTAINABILITY OF LARGE BOOSTER SYSTEMS

AUTHOR LANGE, O.H.

Abstract:

TITLE: MAINTENANCE DATA - HOW AND WHAT

AUTHOR

Abstract:

TITLE: MAN, MACHINE, AND AUTOMATIC TEST OPERATIONS

AUTHOR MEISTER, G.F.

Abstract:

PRESENTS CONCEPTS FOR AUTOMATIC CHECKOUT OPERATIONS INVOLVING MAN. SEE REVISED PAPER DATED 7-9 NOVEMBER 1966 WHICH PRESENTS MORE DETAILED INFORMATION.

TITLE: MANAGEMENT IN ROCKET RESEARCH
MANAGERS OF RESEARCH CAN APPRECIATE THE DIFFICULTY OF KEEPING ANY RESEARCH OR ENGINEERING GROUP FULLY CHALLENGED AND PRODUCTIVE FOR A PERIOD OF SEVERAL DECADES. WHAT ARE THE PRINCIPLES OF OPERATION THAT HAVE CONTRIBUTED TO THE SUCCESS OF TODAY'S RESEARCH AND ENGINEERING TEAM AT MSFC? WHAT ARE THE CHANGES IN ACCOMMODATIONS, TACTICS, AND ORGANIZATIONAL ARRANGEMENTS THAT HAVE EVOLVED OVER THE YEARS IN THE PROCESS OF MAINTAINING SATISFACTORY WORKING RELATIONSHIPS AMONG MEMBERS OF THE RESEARCH TEAM AND BETWEEN THE TEAM AND HEADQUARTERS? AN ATTEMPT IS MADE IN THIS ARTICLE TO ANSWER THESE QUESTIONS.

TITLE: MANAGEMENT INFORMATION - VOLUME IV, THIRD EDITION

Abstract:

THIS DOCUMENT CONTAINS COPIES OF MANAGEMENT CHARTS AND PHOTOS MAINTAINED IN THE MANAGEMENT INFORMATION OFFICE ON ADVANCED PROGRAMS AND RESEARCH AND TECHNOLOGY.

TITLE: MANAGEMENT OF SATURN/APOLLO MANUFACTURING EFFORTS

Abstract:

TITLE: MANAGEMENT OF SYSTEMS EFFECTIVENESS ASPECTS OF SATURN V CONTRACTING AND PROCUREMENT (PAPER)

Abstract:

TITLE: MANAGEMENT PROBLEMS FACED IN MAKING FUTURE MANNED SPACE EXPLORATION DECISIONS

Abstract:

TITLE: MANAGING MAN'S GREATEST ADVENTURE

Abstract:

TITLE: MANNED LAUNCH VEHICLE DEVELOPMENT

Abstract:
TITLE: MANNED LUNAR LANDING VIA RENDEZVOUS

AUTHOR DIGESU,F.  
Date of Pub: 4/30/1962

Abstract:
THIS PAPER IS CONCERNED WITH THOSE OPERATIONS LEADING TO INJECTION OF THE SPACECRAFT INTO THE LUNAR TRANSFER TRAJECTORY.

TITLE: MANNED PLANETARY FLYBY MISSIONS (BASED ON SATURN/APOLLO SYSTEMS) - EXECUTIVE SUMMARY REPORT

AUTHOR NOBLITT,B.G.  
Date of Pub: 8/31/1968

Abstract:
THIS REPORT SUMMARIZES A STUDY BY NAA-SPACE DIVISION OF MANNED INTERPLANETARY FLYBY MISSIONS TO VENUS AND MARS DURING 1975-1982. THE RESULTS, ALONG WITH PREVIOUSLY KNOWN ASPECTS OF MANNED MARS AND VENUS FLYBY MISSIONS, VEHICLES, AND SYSTEMS, WERE INTEGRATED INTO TOTAL MISSION-SYSTEM CAPABLE OF PERFORMING A REALISTIC AND MEANINGFUL PLANETARY EXPLORATION PROGRAM. MANNED PLANETARY MISSIONS ARE FEASIBLE. ATTRACTIVE MULTIPLANET FLYBY MISSIONS CAN BE PERFORMED BY SATURN/APOLLO SYSTEMS.

TITLE: MANNED SPACE AND LUNAR EXPLORATION

AUTHOR MRAZEK,W.A.  
Date of Pub: 7/1/1966

Abstract:
SUMMARIZES THE STEPS TAKEN IN PREPARATION FOR THE EVENTUAL MANNED EXPLORATION OF THE MOON AND PLANETS. ELABORATES ON SATURN'S CAPABILITIES AND FUTURE MISSION POTENTIAL.

TITLE: MANNED SPACE FLIGHT PROGRAMS EXPANDED

AUTHOR KOLCUM,E.H.  
Date of Pub: 12/18/1961

Abstract:
NASA IS MOVING QUICKLY TO ITS ADVANCED MANNED SPACE FLIGHT PROGRAM WITH TIGHT PRODUCTION AND FLIGHT SCHEDULES CALLING FOR EXTENDED ONE-MAN EARTH-ORBITING MISSIONS WITH A YEAR AND TWO-MAN MISSIONS WITHIN TWO YEARS. FINAL NASA APPROVAL HAS BEEN GIVEN FOR TWO NEW CONCEPTS TO FILL THE GAP BETWEEN THE COMPLETION OF THREE-ORBIT MERCURY FLIGHTS AND THE START OF PROJECT APOLLO QUALIFICATION MISSIONS. THE APPROVED INTERIM PROGRAM, UNDER CONSIDERATION FOR THE PAST SIX MONTHS, CONSISTS OF MODIFICATION OF FOUR STANDARD-SIZE MERCURY CAPSULES FOR 18-ORBIT MANNED MISSIONS AND CONSIDERATION OF TWELVE TWO-MAN SPACECRAFT.

TITLE: MAN-RATING THE F-1

AUTHOR TJULANDER,R.V.  
Date of Pub: 7/17/1967

Abstract:
THIS DOCUMENT IS ON MICROFICHE.

TITLE: MANUFACTURING DEVELOPMENT INFORMATION REPORT (SPACE DIVISION ANNUAL CIDMDI REPORT - CFY 1968)

AUTHOR  
Date of Pub: 1/1/1968

Abstract:
INCLUDED IN THIS REPORT ARE RESEARCH PROJECTS CONDUCTED BY CENTRAL MANUFACTURING, AS WELL AS PERTINENT ITEMS SUBMITTED BY THE APOLLO AND SATURN PROJECTS.

TITLE: MANUFACTURING ENGINEER IN THE SPACE PROGRAM
THE UNIQUE PROBLEMS ENCOUNTERED IN MANUFACTURE OF SPACE VEHICLES ARE REVIEWED. THE ROLE OF THE MANUFACTURING ENGINEER IN THE PRODUCTION OF SPACE VEHICLES IS DESCRIBED BY USING EXAMPLES FROM THE S-IC STAGE AND BY DISCUSSING THE MISSIONS OF THE MANUFACTURING ENGINEERING LAB AT MSFC. A CONCLUSION IS DRAWN THAT THE MANUFACTURING ENGINEER IS TRULY A PROFESSIONAL BY VIRTUE OF HIS TRAINING IN ENGINEERING FUNDAMENTALS, HIS EXPERIENCE, AND HIS DEVOTION TO THE PUBLIC INTEREST. FINALLY, THE TRAINING, RECRUITMENT, AND GROWTH OF THE PROFESSIONAL MANUFACTURING ENGINEER ARE REVIEWED. SOME MISSIONARY ZEAL BY THE PROFESSION IS ADVOCATED.

THE LM-5, SCHEDULED TO LAND THE FIRST MAN ON THE MOON, BEGAN ITS MANUFACTURING LIFE AT GRUMMAN ON 16 JUNE 1966 WHEN WELDING BEGAN ON THE ASCENT STAGE STRUCTURE. OTHER MILESTONES IN ITS CONSTRUCTION WAS ASSEMBLY IN MID-FEBRUARY 1967, COLD FLOW TESTING, FINAL ASSEMBLY AND TEST, CLEAN AND INSPECT, AND DELIVERY ABOARD A SUPER GUPPY AIRCRAFT ON 8 JANUARY 1969 TO NASA-KSC.

THE MANUFACTURING PLAN PRESENTED IN THIS REPORT CONTAINS INSTRUCTIONS AND PROCEDURES FOR FABRICATION, ASSEMBLY, AND TESTING OF THE SATURN S-II STAGE (S-II-16 THROUGH S-II-25). THE S-II STAGE WILL CONSIST OF A FORWARD SKIRT, LIQUID HYDROGEN (LH-2) TANK, LIQUID OXYGEN (LOX) TANK, THRUST STRUCTURES, HEAT SHIELD, INTERSTAGE, AND ENGINE AND SYSTEM COMPONENTS. A LIST OF THE S-II STAGES AND ALL DELIVERABLE CONTRACT ITEMS IS PROVIDED IN THE SATURN S-II PROGRAM PLAN.

LOW TEMPERATURE EXPOSURE AND SPECIFICALLY THERMOCYCLING OF COMPLETED PRINTED CIRCUIT BOARDS OFTEN PRODUCE BROKEN SOLDER JOINTS WHICH ARE ELECTRICALLY EITHER CIRCUIT INTERRUPTIONS OR NOISY JOINTS. GLASS-SEALED COMPONENTS FREQUENTLY CRACK OR START TO LEAK AND FINALLY FAIL. PRINTED CIRCUIT BOARD AND COMPONENT MATERIALS WITH DRASTICALLY DIFFERENT TEMPERATURE BEHAVIOR, COMPACTLY ASSEMBLED WITHOUT ELASTIC MEDIA, ARE RECOGNIZED AS THE MAJOR CAUSE OF FAILURE. STRESS RELIEF LOOPS, STRONG SOLDER JOINTS, AND SOFT CONFORMAL COATING PLASTIC ARE SUGGESTED TO PREVENT THERMAL STRESS AND VIBRATION FAILURES.

TITLE: MARS NONSTOP ROUND-TRIP TRAJECTORIES
AUTHOR: LUIDENS, R.W./KAPPRAFF, J.M.
Date of Pub: 7/2/1962
Abstract: MAP COVERS ALL CENTERS, TRACKING STATIONS, ETC.

TITLE: MARSHALL ANALYSIS - MARKET INTELLIGENCE REPORT
AUTHOR
Date of Pub: 1/1/1969

TITLE: MARSHALL DIRECTING VEHICLE DEVELOPMENT
AUTHOR
Date of Pub: 7/2/1962
Abstract:

TITLE: MARSHALL IN THE SPACE EFFORT
AUTHOR: WESSON, R.L.
Date of Pub: 1/10/1966
Abstract: DESCRIBES SOME OF NASA'S EFFORTS AND INDICATES THE COMPLEXITY OF THE SCIENTIFIC AND ENGINEERING ENDEAVOR NOW BEING UNDERTAKEN BY THIS AGENCY.

TITLE: MASSIVE CHEM-MILLING FACILITY FOR SATURN S-IVB COMPONENTS (PAPER)
AUTHOR: HAMILTON, R.
Date of Pub: 9/1/1963
Abstract:

TITLE: MASTER LIST OF PROJECTS OF NASA HISTORICAL STAFF (EH)
AUTHOR
Date of Pub: 10/25/1967
Abstract: LISTS HISTORICAL MONOGRAPHS (HHM), HISTORICAL REPORTS (HHR), 1 HISTORICAL NOTES (HHN), AND CENTER HISTORIES.

TITLE: MASTER PLAN FOR DOCUMENTATION MANAGEMENT AND USE (RCA COMPANY)
AUTHOR
Date of Pub: 8/1/1966
Abstract:
THE OBJECTIVE OF THIS STUDY IS TO DESCRIBE A COMPREHENSIVE PLAN FOR DEVELOPMENT AND FULL UTILIZATION OF METHODS AND MEANS TO BE EMPLOYED IN THE YEARS PRIOR TO 1976 FOR EFFECTIVE ACQUISITION, COLLECTION, STORAGE, RETRIEVAL, DISTRIBUTION, AND USE OF ENGINEERING DOCUMENTATION.

TITLE: MASTER PLANNING OF NASA INSTALLATIONS

AUTHOR

Date of Pub: 3/15/1965

Abstract:

TITLE: MASTER PLANNING OF NASA INSTALLATIONS-FIRST INTERIM REPORT

AUTHOR

Date of Pub: 1/24/1966

Abstract:

TITLE: MATERIALS ENGINEERING FOR LARGE LAUNCH VEHICLES

AUTHOR LUCAS,W.R.

Date of Pub: 9/1/1965

Abstract:

IMPORTANT ENVIRONMENTAL FACTORS ARE DISCUSSED IN TERMS OF THEIR IMPACT ON MATERIALS ENGINEERING FOR LARGE LAUNCH VEHICLES. TO FACILITATE OPERATION IN THE UNIQUE ENVIRONMENTS TO WHICH THESE VEHICLES ARE EXPOSED, ADDITIONAL RESEARCH IS REQUIRED ON LIGHTWEIGHT METALS WHICH ARE WELDABLE AND TOUGH AT CRYOGENIC TEMPERATURES; INSULATION FOR LIQUID HYDROGEN CONTAINERS; ADHESIVES WHICH ARE ROOM TEMPERATURE CURING, COMPATIBLE WITH LIQUID OXYGEN, AND HAVE USEFUL PROPERTIES AT CRYOGENIC TEMPERATURES; ADHESIVES FOR HIGH TEMPERATURE APPLICATIONS; LUBRICANTS OF LOW COEFFICIENTS OF FRICTION WHICH HAVE LOW VAPOR PRESSURES AND ARE RESISTANT TO IONIZING RADIATION; ELECTRICAL CONTACT MATERIALS FOR USE IN VACUUM; AND SOFT GOODS SUCH AS SEALS AND GASKETS WHICH ARE COMPATIBLE WITH LIQUID OXYGEN AND WHICH ARE NOT DETERIORATED BY LONG-TIME EXPOSURE TO THE EARTH ENVIRONMENT OR SHORT-TIME EXPOSURE TO THE SPACE ENVIRONMENT.

TITLE: MATERIALS IN SPACE EXPLORATION

AUTHOR CATALDO,C.E.

Date of Pub: 10/21/1965

Abstract:

THIS PAPER PRESENTS A GENERAL REVIEW OF MAJOR STRUCTURAL ALLOYS THAT HAVE BEEN USED IN LIQUID ROCKETS AND SPACE VEHICLES, THE CURRENT STATE-OF-THE-ART AS APPLIED TO THE APOLLO LAUNCH VEHICLE SYSTEM, AND DISCUSSES SOME MATERIALS CURRENTLY UNDER DEVELOPMENT FOR FUTURE REQUIREMENTS IN VEHICLES FOR SPACE EXPLORATION. SOME ASPECTS OF THE IMPORTANCE OF CORROSION RESISTANT MATERIALS AND SUITABLE PROTECTIVE MEASURES ARE DISCUSSED, AS APPLIED TO BOTH FLIGHT HARDWARE AND ASSOCIATED GSE.

TITLE: MCDONNELL DOUGLAS S-IVB ROCKET FOR NASA'S SATURN LAUNCH VEHICLE - BACKGROUND INFO

AUTHOR

Date of Pub: 7/1/1969

Abstract:


TITLE: MEASUREMENTS ON THE SATURN SPACE VEHICLE
THE HISTORY OF MAN MIGHT BE CONSIDERED AS AN EVER INCREASING QUANTITY AND QUALITY OF MEASUREMENTS. MEASUREMENTS RELATED TO SPACE HAVE BEEN MADE BY EARLY ASTRONOMERS, MODERN ASTRONOMERS, AND NOW BY AEROSPACE TECHNOLOGISTS. THE MANNED LUNAR LANDING, A MAJOR NATIONAL GOAL, HAS GIVEN US THE MEANS TO MEASURE IN SPACE. THE SPACE VEHICLE DEVELOPMENT ITSELF HAS MADE HEAVY DEMANDS ON INSTRUMENTATION; THIS IS DISCUSSED IN SOME DETAIL IN THIS PAPER. THE ADVANTAGES OF THE INTERNATIONAL SYSTEM OF UNITS ARE MENTIONED. SOME EXAMPLES ARE USED TO ILLUSTRATE THE FUTURE OF SPACE MEASUREMENT.

TITLE: MEASURING INSTRUMENTATION SUPPORT

AUTHOR

Date of Pub: 1/1/1968

Abstract:
GIVES A BRIEF EXPLANATION OF CAPABILITIES OF THE INSTRUMENT DEVELOPMENT BRANCH OF NASA-MSFC.

TITLE: MEETING HELD DECEMBER 1, 1966 TO REVIEW PROBLEMS WITH THE H-1 ENGINES ON S-IB-7 AND S-IB-8 (MEMORANDUM FOR THE RECORD)

AUTHOR

Date of Pub: 12/6/1966

Abstract:

TITLE: MEMBERSHIP DIRECTORY 1960-1961

AUTHOR

Date of Pub: 12/1/1960

Abstract:

TITLE: MEMORANDUM FOR DR. THOMAS O. PAINE REGARDING DR. MUELLER

AUTHOR

Date of Pub: 11/11/1968

Abstract:
MEMORANDUM FOR DR. PAINE, ACTING ADMINISTRATOR, NASA, REGARDING DR. MUELLER’S BELIEF THAT NASA SHOULD UNDERTAKE A LUNAR ORBIT MISSION AS ITS NEXT STEP TOWARD THE MANNED LUNAR LANDING, WITH ATTACHMENT: MEMORANDUM FROM LT. GEN. SAM C. PHILLIPS, USAF, TO ASSOCIATE ADMINISTRATOR FOR MANNED SPACE FLIGHT, 11 NOVEMBER 1968, SUBJECT: APOLLO 8 MISSION SELECTION.

TITLE: MEMORANDUM TO ACTING ADMINISTRATOR OF NASA, SUBJECT: REQUEST FOR APPROVAL TO MAN THE APOLLO SATURN V LAUNCH VEHICLE

AUTHOR

Date of Pub: 11/5/1968

Abstract:

TITLE: MEMORANDUM TO ASSOCIATE ADMINISTRATOR FOR MANNED SPACE FLIGHT, SUBJECT: S-II STAGE PROGRAM REPORT - WEEK OF JANUARY 23, 1967

AUTHOR

Date of Pub: 1/27/1967

Abstract:

TITLE: MEMORANDUM TO ASSOCIATE ADMINISTRATOR FOR MANNEDSPACE FLIGHT REGARDING DR. PAINE

Abstract:
<table>
<thead>
<tr>
<th>Title</th>
<th>Author</th>
<th>Date of Pub</th>
<th>Abstract</th>
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<tbody>
<tr>
<td>The Memorandum Regards Dr. Paine's Approval of the Apollo 8 Mission</td>
<td>Paine, T.O.</td>
<td>11/18/1968</td>
<td>THE MEMORANDUM REGARDS DR. PAINE'S APPROVAL OF THE APOLLO 8 MISSION BEING CONDUCTED AS A MANNED LUNAR ORBIT MISSION WITH CSM 103 ON SATURN 503 PENDING SUCCESSFUL ACCOMPLISHMENT OF ALL NECESSARY PREPARATION AND CHECKOUT ACTIVITIES FOR THE MISSION.</td>
</tr>
<tr>
<td>Metal and Materials for the Saturn Booster Vehicles</td>
<td>Dawson, J.K.</td>
<td>7/1/1962</td>
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<tr>
<td>Meteorites and Ballistics</td>
<td>Rinehart, J.S.</td>
<td>4/21/1958</td>
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<tr>
<td>Methods for Cleaning Electronic Components and Subassemblies</td>
<td>Heuring, H.</td>
<td>1/1/1967</td>
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</tbody>
</table>
IN DESCRIBING THE CLEANING OF ELECTRONIC COMPONENTS AND SUBASSEMBLIES, IT MUST BE TAKEN INTO CONSIDERATION THAT EACH PART TO BE CLEANED PRESENTS AN INDIVIDUAL PROBLEM. THE METHOD OF CLEANING MUST BE TAILORED TO THE TYPE OF PART TO BE CLEANED AS WELL AS TO THE TYPE OF SOIL TO BE REMOVED. THIS PAPER REVIEWS SOME OF THE METHODS USED IN CLEANING ELECTRONIC PARTS, PARTICULARLY PRINTED CIRCUITS, AS WELL AS OTHER CRITICAL HARDWARE WHICH IS USED IN SUPPORT OF ELECTRONIC ASSEMBLIES. SOME OF THE METHODS COVERED INCLUDE THE USE OF ABRASIVES, ACIDS, SOLVENTS AND ALKALIES, AND THE EMPLOYMENT OF THESE IN COMBINATION WITH ULTRASONIC AND OTHER AUTOMATIC SYSTEMS. THE CLEAN ROOM IN USE AT IBM HUNTSVILLE IS DESCRIBED BRIEFLY, ALONG WITH SOLUTIONS AND SOLVENTS USED IN CLEANING ELECTRONIC AND SUPPORTING PARTS. CLEANLINESS REQUIREMENTS FOR THE AREA AND THE MATERIALS, TOGETHER WITH PROCEDURES FOR MEETING THEM, HAVE ADDED EMPHASIS TO THE CRITICAL NATURE OF TODAY'S CONTAMINATION CONTROL PROGRAMS. THE PAPER CONCLUDES WITH A SUMMARY OF CLEANING PROCEDURES AND CLEAN ROOM BENEFITS TO BE OBTAINED BY USING PRESENT-DAY TECHNOLOGIES TO IMPROVE THEM.

**TITLE:** METICULOUS ENGINEERING  
**AUTHOR:** DAVENPORT, C.C.  
**Date of Pub:** 6/19/1967  

**Abstract:**  
THE NEED FOR HIGH RELIABILITY AND GREAT CARE IN MODERN ENGINEERING IS STRESSED. DISCIPLINES TO ELIMINATE OR DECREASE ERRORS ARE DESCRIBED. COLLEGE COURSES SHOULD INTERWEAVE THIS APPROACH INTO STUDY PROJECTS.

**TITLE:** MICHOUD AND MISSISSIPPI TEST OPERATIONS (VOLUME II, 3RD EDITION - MANAGEMENT INFORMATION)  
**AUTHOR**  
**Date of Pub:** 5/1/1965  

**Abstract:**  
THIS DOCUMENT CONTAINS COPIES OF MANAGEMENT CHARTS AND PHOTOGRAPHS MAINTAINED IN THE MANAGEMENT INFORMATION OFFICE OF THE EXECUTIVE STAFF ON MICHOUD AND MISSISSIPPI TEST OPERATIONS. THIS DOCUMENT IS REPUBLISHED EVERY SIX MONTHS.

**TITLE:** MICHOUD ASSEMBLY FACILITY AND MISSISSIPPI TEST FACILITY (VOLUME II, 4TH EDITION - MANAGEMENT INFORMATION)  
**AUTHOR**  
**Date of Pub:** 12/1/1965  

**Abstract:**  
THIS DOCUMENT CONTAINS COPIES OF MANAGEMENT CHARTS AND PHOTOGRAPHS MAINTAINED IN THE MSFC MANAGEMENT INFORMATION OFFICE OF THE EXECUTIVE STAFF ON MICHOUD ASSEMBLY FACILITY AND MISSISSIPPI TEST FACILITY.

**TITLE:** MICHOUD ASSEMBLY FACILITY HISTORICAL REPORT  
**AUTHOR**  
**Date of Pub:** 1/1/1967  

**Abstract:**

**TITLE:** MICHOUD OPERATIONS HISTORICAL REPORT (JULY 1, 1963 - DECEMBER 31, 1963)  
**AUTHOR**  
**Date of Pub:** 1/1/1963  

**Abstract:**

**TITLE:** MILESTONES IN CRYOGENIC LIQUID PROPELLANT ROCKET ENGINES  
**AUTHOR:** BRENNAN, W.J.  
**Date of Pub:** 10/23/1967  

**Abstract:**
This paper reviews the milestones achieved with cryogenic liquid propellant rocket engines, discusses current technology improvement programs, and projects future engine designs. Advanced concepts for cryogenic liquid propellant rocket engines now under investigation are reviewed. These efforts are leading to further improvements in performance, versatility, and packaging for future cryogenic rocket engines.

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<tr>
<th>TITLE:</th>
<th>MILITARY ROCKETS IN THE 19TH CENTURY</th>
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<tr>
<td>AUTHOR</td>
<td>GUTIERREZ, J.B.</td>
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<tr>
<td>Date of Pub:</td>
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<tr>
<th>TITLE:</th>
<th>MINIMAX CONTROL OF LARGE LAUNCH BOOSTERS</th>
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<tr>
<td>AUTHOR</td>
<td>GRAHAM, K.</td>
</tr>
<tr>
<td>Date of Pub:</td>
<td>1/1/1966</td>
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<tr>
<td>Abstract:</td>
<td>A METHOD OF SPECIFYING THE GAINS OF A LINEAR CONTROLLER FOR A LARGE LAUNCH BOOSTER USING A NEW APPLICATION OF OPTIMAL CONTROL THEORY IS DESCRIBED IN THIS PAPER. RESULTS FOR A SPECIFIC EXAMPLE ARE INCLUDED.</td>
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<tr>
<th>TITLE:</th>
<th>MISCELLANEOUS CORRESPONDENCE BETWEEN DR. VON BRAUN AND NASA HEADQUARTERS (1961-1968)</th>
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<td>AUTHOR</td>
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<tr>
<td>Date of Pub:</td>
<td>7/1/1968</td>
</tr>
<tr>
<td>Abstract:</td>
<td>CONTENTS INCLUDE MEMORANDA ON GODDARD PATENTS, SA-5 MISSION, JFK MEMORIAL LIBRARY, COMMUNICATION AND METEOROLOGICAL SATELLITES, NATIONAL SPACE PROGRAM, THE NATIONAL GOAL FOR LANDING AN AMERICAN ON THE MOON BEFORE 1970, ETC.</td>
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<td>AUTHOR</td>
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<tr>
<td>AUTHOR</td>
<td></td>
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<tr>
<td>Date of Pub:</td>
<td>1/1/1958</td>
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<tr>
<td>Abstract:</td>
<td>A BIBLIOGRAPHIC SURVEY LISTING 1,500 ANNOTATED REFERENCES TO BOOKS, AND PERIODICAL ARTICLES AND COVERING THE PERIOD 1957 THROUGH MARCH 1958. CONTENTS COMprise: VOLUME 1 - USSR, VOLUME 2 - UNITED STATES, VOLUME 3 - GREAT BRITAIN, FRANCE AND OTHER FREE COUNTRIES, VOLUME 4 - TECHNOLOGY: MEANS AND METHODS, AND VOLUME 5 - EARTH SATELLITES AND SPACE EXPLORATION.</td>
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<th>TITLE:</th>
<th>MISSILES, ROCKETS, AND SPACE IN WAR AND PEACE</th>
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<td>AUTHOR</td>
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<td>8/1/1959</td>
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<td>MISSION DIRECTIVE LUNAR LANDING - MISSIONS (SATURN V)</td>
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<td>MISSISSIPPI TEST - TORRENTS OF FLAME (BLACK AND WHITE PHOTOGRAPH)</td>
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<tr>
<td>MISSISSIPPI TEST OPERATIONS</td>
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<td>MODEL SPECIFICATION FOR PROJECT CENTAUR SPACE VEHICLE CONVAIR MODEL 55</td>
<td>JOINER, R.O.</td>
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<td>MONOGRAPH ON DYNAMIC TESTING OF FULL-SCALE SATURN LAUNCH VEHICLES</td>
<td>JACOBS, B.R.</td>
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<td>MONTHLY PROGRESS REPORT</td>
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<td>MONTHLY PROGRESS REPORT - ADVANCED STUDIES OFFICE, MATERIALS DIVISION, VEHICLE SYSTEMS DIVISION, PROPULSION DIVISION, AND STRUCTURES DIVISION</td>
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<td>TITLE: MONTHLY PROGRESS REPORT - SYSTEMS TEST DIVISION, TECHNICAL SUPPORT DIVISION, ADVANCED FACILITIES PLANNING OFFICE</td>
<td>AUTHOR</td>
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<td>Title: MONTHLY PROGRESS REPORT - MATERIALS DIVISION, ADVANCED STUDIES OFFICE, STRUCTURES DIVISION, PROPULSION DIVISION, AND VEHICLE SYSTEMS DIVISION</td>
<td>AUTHOR</td>
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<tr>
<td>Title: MONTHLY PROGRESS REPORT - SPERRY RAND CORPORATION</td>
<td>AUTHOR</td>
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<tr>
<td>Title: MOON-BOUND (BLACK AND WHITE PHOTOGRAPH WITH NEWS RELEASE)</td>
<td>AUTHOR</td>
</tr>
<tr>
<td>Title: MSC APOLLO PROGRAM MANAGEMENT - VOLUME 2</td>
<td>AUTHOR</td>
</tr>
<tr>
<td>Title: MSFC APOLLO PROGRAM MANAGEMENT - VOLUME 3</td>
<td>AUTHOR</td>
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**Abstract:**

THIS DOCUMENT DESCRIBES THE STRUCTURE OF THE SPACECRAFT 1 MANAGEMENT SYSTEM, EXPLAINS WHY IT IS STRUCTURED AS IT IS, 1 DESCRIBES AND EXPLAINS THE ORGANIZATIONAL INTERRELATIONSHIPS 1 INVOLVED IN THE SYSTEM, AND DEMONSTRATES HOW THE SYSTEM OPERATES 1 IN PRACTICE. IT OUTLINES THE MISSION, ORGANIZATION, AND 1 RESOURCES OF MSC. IT DETAILS THE FUNCTIONS, RESPONSIBILITIES, 1 AND AUTHORITIES ASSIGNED TO THE APOLLO SPACECRAFT PROGRAM OFFICE 1 AND THE FUNCTIONAL RELATIONSHIPS ASP0 HAS WITH OTHER MSC 1 ELEMENTS, OTHER NASA CENTERS, NASA HQ, AND OTHER GOVERNMENT 1 AGENCIES. THE HEART OF THE DOCUMENT IS A DISCUSSION OF MSCS 1 MANAGEMENT PHILOSOPHY AND A DESCRIPTION OF THE PROGRAM 1 MANAGEMENT PROCESSES EmployED. VARIOUS EXAMPLES OF PROGRAM 1 MANAGEMENT ARE DISCUSSED. THE DOCUMENT CONCLUDES WITH A 1 DISCUSSION OF FUTURE MANAGEMENT PLANS.
TITLE: MSFC AWARDS (MAJOR AWARDS TO MSFC EMPLOYEES FROM 1 MAY 1970-30 APRIL 1971)

AUTHOR

Date of Pub: 7/17/1971

Abstract:

TITLE: MSFC CONTRACTS REPORT

AUTHOR CHRISTENSEN,D.L.

Date of Pub: 11/16/1967

Abstract:

BROKEN DOWN INTO THE FOLLOWING CATEGORIES: NUCLEAR ELECTRIC SYSTEMS, NUCLEAR ROCKET SYSTEMS, SPACE POWER, SPACE VEHICLE SYSTEMS, ELECTRONICS SYSTEMS, CHEMICAL PROPULSION, RESEARCH PROGRAMS, TRACKING AND DATA ACQUISITION, METEOROLOGICAL SYSTEMS, LUNAR AND PLANETARY EXPLORATION, ETC.

TITLE: MSFC INSTITUTIONAL REPORT - MANNED SPACE FLIGHT PROGRAM REVIEW

AUTHOR

Date of Pub: 10/19/1965

Abstract:

COVERS R&D, ADMINISTRATION OPERATIONS, STAFFING, FACILITIES FUNDING, ETC.

TITLE: MSFC MANNED SPACE FLIGHT PROGRAM STATUS FOR 26 MARCH 1963 MANAGEMENT COUNCIL MEETING

AUTHOR

Date of Pub: 3/26/1963

Abstract:

TITLE: MSFC MANNED SPACE FLIGHT PROGRAM STATUS FOR 18 DECEMBER 1962 MANAGEMENT COUNCIL MEETING

AUTHOR

Date of Pub: 12/18/1962

Abstract:

THIS IS MATERIAL PRESENTED IN SUPPORT OF DR. VON BRAUN'S PRESENTATION FOR THE 18 DECEMBER 1962 MANAGEMENT COUNCIL MEETING - AGENDA ITEM 2, "MSFC STATUS REPORT."

TITLE: MSFC MANNED SPACE FLIGHT PROGRAM STATUS FOR 27 AUGUST 1963 MANAGEMENT COUNCIL MEETING

AUTHOR

Date of Pub: 8/27/1963

Abstract:

THIS IS MATERIAL PREPARED IN SUPPORT OF DR. VON BRAUN'S PRESENTATION FOR THE 27 AUGUST 1963 MANAGEMENT COUNCIL MEETING - AGENDA ITEM 2, "MSFC STATUS REPORT."

TITLE: MSFC MANNED SPACE FLIGHT PROGRAM STATUS FOR 29 JANUARY 1963 MANAGEMENT COUNCIL MEETING

AUTHOR

Date of Pub: 1/29/1963

Abstract:

THIS IS MATERIAL PREPARED IN SUPPORT OF DR. VON BRAUN'S PRESENTATION FOR THE 29 JANUARY 1963 MANAGEMENT COUNCIL MEETING - AGENDA ITEM 1, "MSFC STATUS REPORT."

TITLE: MSFC PERSONNEL FOR POTENTIAL INTERVIEWS (BIOGRAPHICAL DATA)
TITLE: MSFC PROJECT DESCRIPTIONS - 1967
AUTHOR
Date of Pub: 11/16/1967
Abstract:
A LISTING WHICH GIVES PROJECT NAME, TECHNICAL CONTACT, AND LOCATION OF CONTACT. MAJOR BREAKDOWN INCLUDE ELECTRIC PROPULSION, NUCLEAR POWER SYSTEMS, SOLAR POWER GENERATION, CHEMICAL POWER GENERATION, NUCLEAR ROCKET SYSTEM - SRT, NUCLEAR ROCKET PROPULSION - SRT, SAFETY R&D, SPACE VEHICLE SYSTEMS - SRT, SPACECRAFT STRUCTURES, ETC.

TITLE: MSFC PROJECTS INDEX BY LABORATORY - 1967
AUTHOR
Date of Pub: 11/16/1967

TITLE: MSFC SATURN STAGE TRANSPORTATION PLAN
AUTHOR
Date of Pub: 3/1/1964

TITLE: MSFC SPECIFICATIONS, STANDARDS AND PROCEDURES - MICROFICHE REFERENCE FILE INDEX
AUTHOR
Date of Pub: 4/15/1968
Abstract:
THIS REFERENCE FILE HAS BEEN PREPARED IN ORDER TO IDENTIFY DATA CONTAINED ON MICROFICHE IN THE MS-D REPOSITORY. IT IS DIVIDED INTO THREE SECTIONS: (1) MSFC SPECIFICATIONS, (2) MSFC STANDARDS, AND (3) MSFC PROCEDURES. PUBLISHED MONTHLY.

TITLE: MSFC SYSTEMS ENGINEERING CAPABILITIES (ABSTRACTS OF REPORTS)
AUTHOR
Date of Pub: 11/1/1961
Abstract:
THIS VOLUME CONSISTS OF ABSTRACTS OF A GROUP OF 150 TYPICAL REPORTS ISSUED BY MSFC PERSONNEL DURING THE PAST FOUR YEARS. THE PURPOSE OF THIS ABSTRACT VOLUME IS TO DEMONSTRATE THE BROAD EXPERIENCE, CAPABILITIES AND TALENTS AVAILABLE AT MSFC IN THE AREA OF SPACE TRANSPORTATION SYSTEMS ENGINEERING. EXCELLENT BACKGROUND MATERIAL FOR "STATE-OF-THE ART" OF SATURN VEHICLE PROGRAM IN 1961. (ADDITIONAL DOC NUMBERS ARE MTP-FPO-61-6 AND X64-91335.)

TITLE: MSFC TECHNICAL FACILITIES HISTORY AND DESCRIPTION
AUTHOR
Date of Pub: 6/30/1968
Abstract:
INCLUDES HISTORICAL DATA ON MSFC FACILITIES, MICHOUD FACILITIES, SLIDELL FACILITIES, MTF FACILITIES, TECHNICAL FACILITIES FOR MSFC R&D LABS, ETC. PRESENTS A DETAILED BREAKDOWN OF PROPERTY AND FACILITY VALUES FOR VARIOUS MSFC FACILITIES OVER A PERIOD OF TIME.

TITLE: MUSKRATS TO MOONSHIPS
HISTORY OF MICHOUD ASSEMBLY FACILITY.

TITLE: NACA HIGH ENERGY ROCKET PROPELLANT RESEARCH IN THE FIFTIES
AUTHOR: SLOOP, J.L.
Date of Pub: 10/28/1971

Abstract:

NASA ANNOUNCES REPHASING OF MANNED FLIGHT MISSIONS AMONG THE THREE SATURN CLASS VEHICLES: THE SATURN I, IB, AND V. PRINCIPAL CHANGES IN PLANNED MANNED FLIGHT MISSIONS INCLUDE ACCELERATION OF THE CRITICAL SATURN IB/APOLLO SPACECRAFT PHASE AND DELETION OF FOUR PREVIOUSLY SCHEDULED SATURN I/APOLLO SPACECRAFT FLIGHTS. ENGINEERING DESIGN AND DEVELOPMENT EFFORT RELATED TO SATURN I MANNED FLIGHT PROGRAM WILL BE REDIRECTED TO THE SATURN IB AND V I PROGRAMS.

TITLE: NASA ANNOUNCES CHANGES IN SATURN MISSIONS

AUTHOR: 
Date of Pub: 10/30/1963

Abstract:

NASA AUTHORIZATION FOR FISCAL YEAR 1968

AUTHOR: 
Date of Pub: 6/23/1967

Abstract:

NASA BUILDING FLEXIBLE FACILITIES

AUTHOR: 
Date of Pub: 7/2/1962

Abstract:

NASA BUILDING SPACE STATION TECHNOLOGY

AUTHOR: 
Date of Pub: 7/22/1963

Abstract:

NASA CENTRALIZES LAUNCH MANAGEMENT

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<table>
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<tr>
<th>TITLE:</th>
<th>NASA FUND REQUESTS TOTAL $3.9 BILLION</th>
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<td>AUTHOR</td>
<td>KOLCUM,E.H.</td>
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<td>1/22/1962</td>
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<tr>
<th>TITLE:</th>
<th>NASA GAINS ARMY MISSILE TEAM, SATURN</th>
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<tr>
<td>AUTHOR</td>
<td>CLARK,E.</td>
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<tr>
<td>Date of Pub:</td>
<td>10/26/1959</td>
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<tr>
<td>Abstract:</td>
<td>RESOLUTION OF RESPONSIBILITY FOR SPACE VEHICLE AND SATURN PROGRAM DEVELOPMENT WAS MADE BY PRESIDENT EISENHOWER IN HIS PROPOSED TRANSFER OF THE VON BRAUN TEAM TO NASA. &quot;THE CONTEMPLATED TRANSFER PROVIDES NEW OPPORTUNITY FOR THEM, (THE VON BRAUN TEAM) TO CONTRIBUTE...TO THE EXPANDING CIVILIAN SPACE PROGRAM.&quot; THE ARTICLE CONTAINS COMMENTS FROM DR. VON BRAUN AND GEN. MEDARIS AND GIVES REASONS FOR THE PRESIDENT'S DECISION.</td>
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<th>TITLE:</th>
<th>NASA HEADQUARTERS MEMORANDA ON LUNAR ORBIT RENDEZVOUS (1962-1969)</th>
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<tr>
<td>AUTHOR</td>
<td></td>
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<tr>
<td>Date of Pub:</td>
<td>11/1/1969</td>
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<tr>
<td>Abstract:</td>
<td>CONTENTS INCLUDE &quot;A SHORT HISTORY OF THE DEVELOPMENT OF THE LUNAR ORBIT RENDEZVOUS PLAN AT THE LANGLEY RESEARCH CENTER&quot; BY JOHN D. BIRD WITH VARIOUS ATTACHMENTS, MINUTES OF LUNAR ORBIT RENDEZVOUS MEETING ON 2-3 APRIL 1962, SUMMARY OF NEWS CONFERENCE ON 11 JULY 1962 ON LUNAR ORBIT RENDEZVOUS, ETC.</td>
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<td>8/1/1968</td>
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<tr>
<td>Abstract:</td>
<td>CONTENTS INCLUDE MEMORANDA ON ABMA ACTIVITIES, ABMA TRANSFER, CHRONOLOGY OF EVENTS PERTAINING TO ABMA-NASA TRANSFER, SATURN PROGRAM, MANNED LUNAR LANDING PROGRAM, ESTABLISHMENT OF A SUPPORTING RESEARCH FUND FOR THE HUNTSVILLE CENTER, POGO SENSOR, APOLLO AND AAP MISSION DESIGNATION, ETC.</td>
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<td>AUTHOR</td>
<td>EMME,E.M.</td>
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<td>4/1/1966</td>
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TITLE: NASA LIST OF FY 1966 TOP 100 PRIME CONTRACTORS (1 PAGE)

AUTHOR

Date of Pub: 10/24/1966

Abstract:

TITLE: NASA LONG RANGE GOALS USING SATURN AND LARGER VEHICLES

AUTHOR SLOOP, J.L.

Date of Pub: 2/10/1961

Abstract:

A DESCRIPTION OF THE SATURN LAUNCH VEHICLES IS GIVEN AS WELL AS HOW THEY WILL BE USED IN FUTURE MISSIONS. INCLUDED ALSO IS A DISCUSSION OF THE STEPS LEADING TO THE DEVELOPMENT OF A LARGER VEHICLE THAN SATURN, THE NOVA. THE MATERIAL PRESENTED IN THIS PAPER HAS BEEN CONDENSED FROM A NASA PRESENTATION TO AN AD HOC GROUP OF THE PRESIDENT'S SCIENCE ADVISORY COMMITTEE.

TITLE: NASA LOOKS AHEAD

AUTHOR STOLLER, M.J.

Date of Pub: 5/1/1961

Abstract:

A REVIEW OF AMERICA'S PLANS FOR EXTENDING SPACE RESEARCH AND TECHNOLOGY OVER THE NEXT TEN YEARS. DISCUSSES SOLAR SATELLITE, RANGER, MARINER, SATELLITE METEOROLOGY, ETC.

TITLE: NASA MANAGEMENT PROGRAMS

AUTHOR MUELLER, G.E.

Date of Pub: 7/8/1968

Abstract:

MANAGEMENT OF MAJOR R&D PROGRAMS BY NASA IS DISCUSSED IN DETAIL. THE PRIMARY OBJECTIVE IN THE MANAGEMENT OF THE MANNED SPACE FLIGHT EFFORT IS TO INSURE THAT WE EMPLOY RESOURCES IN THE BEST WAY TO ACCOMPLISH OUR OBJECTIVES-TO DELIVER PERFORMANCE ON SCHEDULE AND WITHIN COST. THREE ELEMENTS IN THE MANAGEMENT SYSTEM ARE ESSENTIAL TO SUCCESS; (1) PROGRAM BASELINE, (2) PERFORMANCE MEASUREMENT, (3) CONTROL AND DIRECTION OF PROGRAM.

AUTHOR MUELLER, G.E.

Date of Pub: 10/8/1968

Abstract:

DISCUSSES PAST ACHIEVEMENTS IN SPACE AND GIVES DETAILED DESCRIPTION OF THE APOLLO FLIGHT SYSTEM. DESCRIBES SOME OF THE VAST OPPORTUNITIES OPEN TO THE UNITED STATES AS A SPACEFARING NATION.

TITLE: NASA ORGANIZATION CHART

AUTHOR

Date of Pub: 7/2/1962

Abstract:

ORGANIZATION CHART SHOWS JAMES E. WEBB AS ADMINISTRATOR AND IS BROKEN DOWN TO CENTER LEVELS.

TITLE: NASA PLANS TO LAUNCH ITS FIRST ORBITAL WORKSHOP IN 1972 USING FIRST TWO STAGES OF SATURN V AS LAUNCH VEHICLE

AUTHOR

Date of Pub: 7/22/1969

Abstract:

TITLE: NASA PROBLEMS AND CHEMICAL RESEARCH
AUTHOR: HIPSHER, H.F.
Date of Pub: 7/1/1961

Abstract:
NASA'S RESPONSIBILITY IS TO PLAN, DIRECT, AND CONDUCT AERONAUTICAL AND SPACE ACTIVITIES. IN MANY ASPECTS OF THESE UNDERTAKINGS, CHEMICALS, CHEMISTRY AND CHEMICAL RESEARCH PLAY IMPORTANT ROLES. A FEW OF THE PROBLEMS AND PROBLEM AREAS ARE DESCRIBED BRIEFLY.

TITLE: NASA PROJECT NAMES: A LISTING OF NAMES AND CODE WORDS ASSOCIATED WITH NASA PROGRAMS
AUTHOR
Date of Pub: 3/1/1962

Abstract:
THIS PAMPHLET LISTS THOSE PRINCIPAL NASA PROJECTS THAT HAVE BEEN ASSIGNED SPECIAL NAMES OR CODES. IT INCLUDES ROCKETS, LAUNCH VEHICLES, AND ROCKET ENGINES USED IN THE PAST AS WELL AS THOSE CURRENTLY UNDER DEVELOPMENT. JOINT UNDERTAKINGS WITH OTHER AGENCIES ARE INCLUDED, AS ARE MAJOR ROCKETS AND LAUNCH VEHICLES USED BY NASA BUT DEVELOPED BY DOD. PROJECTS ARE LISTED ALPHABETICALLY BY THEIR CODE NAMES WITH A SHORT DESCRIPTION, WHICH INCLUDES THE APPLICABLE ROCKET ENGINE OR LAUNCH VEHICLES. THE NASA FACILITY HAVING A PRIME RESPONSIBILITY FOR A PROJECT IS LISTED AS A COGNIZANT CENTER.

TITLE: NASA QUALITY REQUIREMENTS - PROGRESS, PROBLEMS AND PROBABILITIES
AUTHOR: DYER, M.K.
Date of Pub: 3/17/1967

Abstract:
THIS PAPER COVERS: (1) INSIGHT INTO NASA CONCEPTS FOR QUALITY ACHIEVEMENT, (2) HOW CONCEPTS ARE ARRIVED AT, (3) SOME OF THE KEY POINTS EXPRESSED IN NASA REQUIREMENTS DOCUMENTS, (4) PROGRESS MADE TO DATE, (5) SOME OF THE BROAD PROBLEMS AREAS BEING ENCOUNTERED, AND (6) SOME OF THE AREAS OF FUTURE EMPHASIS.

TITLE: NASA SCIENCE AND TECHNOLOGY COMMITTEE FOR MANNED SPACE FLIGHT PROCEEDINGS OF THE WINTER STUDY ON USES OF MANNED SPACE FLIGHT, 1975-1985
AUTHOR
Date of Pub: 1/1/1969

Abstract:

TITLE: NASA SEeks TO ENLARGE SPACE BENEFITS
AUTHOR
Date of Pub: 7/2/1962

Abstract:
NASA HAS MOVED BEYOND ITS COMMUNICATION AND METEOROLOGICAL SATELLITE RESEARCH TO BEGIN A MODEST PROGRAM OF EXPLORING LESS TANGIBLE WAYS TO APPLY THE BENEFITS OF SPACE TECHNOLOGY TO THE NATIONAL ECONOMY. PRESIDENT KENNEDY TOLD THE CONGRESS LAST JANUARY THAT "ALL OF US IN THE U.S. AND IN ALL NATIONS CAN DERIVE MANY BENEFITS FROM THE PEACEFUL APPLICATION OF SPACE TECHNOLOGY." THE ARTICLE DISCUSSES POSSIBLE APPLICATIONS.

TITLE: NASA SPECIAL PUBLICATIONS

Wednesday, March 24, 2004 Page 122 of 234
### NASA Specifications and Standards (Preliminary Edition)

**Author**

**Date of Pub:** 12/1/1965

**Abstract:**

This is an effort to assemble in one publication the specs and standards originated by NASA Research Center and JPL. This publication has been compiled from listings submitted by staff members of research centers who cooperated in developing lists or who maintained them on a regular basis. This publication is intended to help determine what specs and standards have been generated, where they were developed, and from which specific organizational components they are available. It is arranged in three sections: listing of specs and standards, subject index, and originator index.

### NASA Spurs International Space Effort

**Author**

**Date of Pub:** 7/2/1962

**Abstract:**

A broad but highly selective program of international cooperation involving more than 55 nations that is rapidly and quietly spreading the scientific benefits of space research and proving the openness of the U.S. civilian space program to the free world is discussed.

### NASA Tactics in Solving Quality Problems

**Author**

STEINBERG, A.

**Date of Pub:** 5/16/1968

**Abstract:**

Material flow through some of the major quality areas is discussed. Supplier controls, in-process controls, acceptance testing, field quality control, etc., are discussed briefly.

### NASA to Buy Eight More S-IVB Stages

**Author**

**Date of Pub:** 5/28/1964

**Abstract:**

Abstract:

THE TITLES LISTED IN THIS SPECIAL PUBLICATIONS CATALOG REPRESENT A DIVERSE COLLECTION OF SCIENTIFIC AND TECHNICAL INFORMATION, REFLECTING THE MANIFOLD ACTIVITIES OF NASA. INCLUDED ARE REPORTS ON RECENT RESULTS IN SPACE EXPLORATION, DETAILED ACCOUNTS OF SIGNIFICANT CONFERENCES, AND STATE-OF-THE-ART REVIEWS IN VARIOUS SCIENTIFIC AND TECHNICAL FIELDS.

THE SPECIAL PUBLICATIONS LISTED IN THIS CATALOG REFLECT THE MANIFOLD ACTIVITIES OF NASA. AMONG THESE PUBLICATIONS ARE REPORTS ON RECENT RESULTS IN SPACE EXPLORATION, DETAILED ACCOUNTS OF SIGNIFICANT CONFERENCES, AND STATE-OF-THE-ART REVIEWS IN VARIOUS SCIENTIFIC AND TECHNICAL FIELDS.

THE SPECIAL PUBLICATIONS DESCRIBED IN THIS CATALOG REFLECT THE MANIFOLD ACTIVITIES OF NASA. MANY OF THEM REPORT SCIENTIFIC FINDINGS. INCLUDED ARE RECENT PHOTOS OF EARTH, ITS MOON, AND OTHER PLANETS; DATA OBTAINED FROM INSTRUMENTS IN INTERSTELLAR SPACE; HISTORIES OF SIGNIFICANT FLIGHTS; AND PROCEEDINGS OF CONFERENCES.

NASA SPECIAL PUBLICATIONS REPORT ADVANCES IN SCIENCE, ENGINEERING, TECHNOLOGY, AND MANAGEMENT THAT HAVE BEEN IMPORTANT FACTORS IN THE EXPLORATION OF SPACE. THESE PUBLICATIONS CONTAIN NEW PHOTOGRAPHIC AND OTHER INFORMATION REGARDING THE EARTH, ITS MOON, INTERSTELLAR SPACE, AND OTHER PLANETS; HISTORIES OF SIGNIFICANT PROGRAMS, EXPERIMENTS, AND FLIGHTS; DESCRIPTIONS OF A GREAT VARIETY OF SYSTEMS AND DEVICES, AND THE PROCEEDINGS OF CONFERENCES AND SYMPOSIA PARTICIPATED IN BY LEADERS IN MANY DISCIPLINES.

NASA SPECIAL PUBLICATIONS CATALOGS REPORT ADVANCES IN SCIENCE, ENGINEERING, TECHNOLOGY, AND MANAGEMENT IN THE COURSE OF THE EXPLORATION OF SPACE. THESE PUBLICATIONS CONTAIN NEW INFORMATION AND DATA REGARDING THE EARTH, THE MOON, OTHER PLANETS, AND INTERSTELLAR PHENOMENA, HISTORIES OF SIGNIFICANT PROGRAMS, EXPERIMENTS, AND FLIGHTS, DESCRIPTIONS OF MANY DEVICES, CONCEPTS, AND SYSTEMS; AND PROCEEDINGS OF CONFERENCES.
NASA ANNOUNCED THAT IT WILL NEGOTIATE WITH DOUGLAS FOR THE PURCHASE OF EIGHT ADDITIONAL S-IVB STAGES FOR THE SATURN IB LAUNCH VEHICLE PROGRAM. THE WORK IS ESTIMATED TO COST IN EXCESS OF $110 MILLION.

TITLE: NASA VIEWS OUR NATIONAL SPACE GOALS

AUTHOR: HAWTHORNE, R.

Date of Pub: 10/1/1961

Abstract:
MOST NASA LEADERS BELIEVE THAT THE SCIENTIFIC AND TECHNICAL BENEFITS FROM OUR SPACE PROGRAM ARE ITS MOST IMPORTANT ASPECT AND THAT THESE BENEFITS WILL EXTEND WELL BEYOND THE AEROSPACE FIELD. A MINORITY, HOWEVER, CONSIDERS VICTORY IN THE RACE TO THE MOON MORE IMPORTANT THAN ANYTHING ELSE.

TITLE: NASA, INDUSTRY FACING APOLLO CHALLENGE

AUTHOR: HAWTHORNE, R.

Date of Pub: 7/2/1962

Abstract:
AWESOME TASK OF LANDING A MAN ON THE MOON AND RETURNING HIM TO EARTH IS THE MOST CHALLENGING PEACETIME UNDERTAKING IN THE HISTORY OF THE U.S. PROJECT IS COMPLICATED BY PRESSURES OF A TIGHT TIMETABLE THAT WILL TAX THE INGENUITY AND RESOURCEFULNESS OF MUCH OF THE NATION. AT THIS POINT IN ITS DEVELOPMENT, ORGANIZING TO MANAGE THE PROGRAM IS AS DIFFICULT AS THE TECHNICAL COMPLEXITIES WHICH THE PROGRAM ITSELF FACES.

TITLE: NASA/GRUMMAN APOLLO LUNAR MODULE

AUTHOR: HAWTHORNE, R.

Date of Pub: 6/1/1969

Abstract:
GIVES DETAILED DESCRIPTION OF THE LM. THE ASCENT STAGE CONSISTS OF A PRESSURIZED CREW COMPARTMENT, EQUIPMENT AREAS, AND AN ASCENT ROCKET ENGINE. THE DESCENT STAGE, TO WHICH THE LANDING GEAR IS ATTACHED, CONTAINS A GIMBALLED, THROTTLEABLE DESCENT ROCKET ENGINE, AND THE SCIENTIFIC EXPERIMENT PACKAGE.

TITLE: NASA-APOLLO PROGRAM MANAGEMENT - VOLUME 1

AUTHOR: HAWTHORNE, R.

Date of Pub: 12/1/1967

Abstract:
DISCUSSES OVER-ALL APOLLO PROGRAM MANAGEMENT SYSTEM IN FIVE SECTIONS: (1) DESCRIBES PROGRAM AND ITS SCOPE IN TERMS OF COMPLEXITY, SCHEDULES, REQUIREMENTS, DEMANDS ON RESOURCES, AND NUMBER OF PEOPLE INVOLVED; (2) OUTLINES PROGRAM MANAGEMENT PHILOSOPHY, CONCEPTS, AND CONSIDERATIONS WHICH FORM THE BASIS FOR ORGANIZATION STRUCTURE, WORKING RELATIONSHIPS OF PEOPLE INVOLVED, AND HARDWARE REQUIRED FOR PROGRAM; (3) DESCRIBES HOW VARIOUS ELEMENTS OF NASA HAVE BEEN ORGANIZED TO MANAGE THE PROGRAM AND INTERRELATIONSHIPS BETWEEN ALL PARTICIPANTS INCLUDING GOVERNMENT AND INDUSTRY; (4) DEVELOPS SYSTEM BY DISCUSSING MANAGEMENT SYSTEM ELEMENTS, THEIR MEANING, AND IMPLICATION IN THE TOTAL MANAGEMENT PROCESS; AND (5) DESCRIBES HOW THE MANAGEMENT SYSTEM IS CONTINUALLY BEING ASSESSED AND HOW CHANGES ARE MADE AS CHANGING REQUIREMENTS DICTATE.

TITLE: NASA-DOD RELATIONSHIP

AUTHOR: HAWTHORNE, R.

Date of Pub: 4/18/1962

Abstract:

TITLE: NASA-INDUSTRY APOLLO TECHNICAL CONFERENCE

AUTHOR: HAWTHORNE, R.

Date of Pub: 7/18/1961

Abstract:
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<td>Abstract: A listing of contracts by contractor which appeared in the R&amp;D directory for 1962.</td>
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<tr>
<th>TITLE: NASA'S 10TH SEMIANNUAL REPORT TO CONGRESS (JULY 1-DEC.1963)</th>
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<th>TITLE: NASA'S 16TH SEMIANNUAL REPORT TO CONGRESS (1JULY-31DEC.1966)</th>
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<th>TITLE: NASA'S 20TH SEMIANNUAL REPORT TO CONGRESS (JULY 1-DEC.31,1968)</th>
<th>Date of Pub:</th>
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<td>Abstract:</td>
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TITLE: NASA'S 21ST SEMIANNUAL REPORT TO CONGRESS (JAN.1-JUNE 30,1969)  
AUTHOR  
Date of Pub: 10/3/1969  
Abstract:  

TITLE: NASA'S APOLLO 4...THIS IS THE FIRST OF THE BIG SHOTS  
AUTHOR  
Date of Pub: 1/1/1967  
Abstract: DISCUSSES HISTORIC SIGNIFICANCE OF APOLLO 4, PHYSICAL SIZE, ETC. 1 CONTAINS A SPACE AGE GLOSSARY.  

TITLE: NASA'S IMPLEMENTATION OF THE LUNAR LANDING DECISION (COMMENT EDITION)  
AUTHOR LOGSDON,J.M.  
Date of Pub: 8/1/1969  
Abstract: DEALS WITH TWO PIVOTAL DECISIONS: (1)DEVELOPMENT OF THE MISSION PLAN FOR THE MANNED LUNAR LANDING AND (2)SELECTION OF A LAUNCH VEHICLE TO ACCOMPLISH IT.  

TITLE: NASA'S MAJOR CHALLENGES FOR THE SEVENTIES  
AUTHOR  
Date of Pub: 1/1/1970  
Abstract:  

TITLE: NASA'S PRIME CONTRACTORS & PRIME CONTRACT AWARDS AS OF JANUARY 31,1970 (2 VOLUMES-SECTION I-BY STATE AND CITY-SECTION II-ALPHABETICALLY BY AUTHOR  
Date of Pub: 1/31/1970  
Abstract: THIS REPORT LISTS ALL NASA CONTRACTORS HAVING ACTIVE CONTRACTS (THOSE NOT FICASSALLY COMPLETE) OF THE FOLLOWING MAGNITUDE: (A)R&D CONTRACTS OF $10,000 AND OVER; (B)CONTRACTS WITH AND I GRANTS TO EDUCATIONAL INSTITUTIONS AND OTHER NONPROFIT ORGANIZATIONS OF $10,000 AND OVER; AND (C)OTHER CONTRACTS OF $25,000 AND OVER.  

TITLE: NASA'S SPEARHEAD TO SPACE CREATES NEW CAPABILITIES, MARKETS  
AUTHOR  
Date of Pub: 7/2/1962  
Abstract: THIS EDITORIAL OUTLINES WHAT THE U.S. CITIZEN WHO IS SUPPORTING NASA'S EFFORT WITH HIS TAX DOLLAR CAN EVENTUALLY EXPECT FROM HIS INVESTMENT.  

TITLE: NATION GOES TO THE MOON  
AUTHOR MUELLER,G.E.  
Date of Pub: 9/1/1966  
Abstract:  

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<thead>
<tr>
<th>Title</th>
<th>Author</th>
<th>Date of Pub.</th>
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<td>WITH THE 1970 LUNAR TOUCHDOWN ALREADY IN ITS SIGHTS, NASA’S OFFICE OF MANNED SPACE FLIGHT SEeks TO MAKE THE UNITED STATES PRE-EMINENT IN SPACE. DISCUSES PAST ACHIEVEMENTS IN SPACE AND FUTURE PLANS.</td>
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<td><strong>Title:</strong> NATIONAL BUREAU OF STANDARDS AND THE SPACE PROGRAM</td>
<td><strong>Author</strong></td>
<td><strong>Date of Pub.:</strong> 5/11/1961</td>
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<td><strong>Abstract:</strong></td>
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<td><strong>Title:</strong> NATIONAL COMMITMENT TO APOLLO</td>
<td><strong>Author:</strong> SEAMANS,R.C.</td>
<td><strong>Date of Pub.:</strong> 8/1/1969</td>
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<tr>
<td><strong>Abstract:</strong> IN A BRIEF INTERVAL BETWEEN DR. SEAMANS BEING NASA DEPUTY ADMINISTRATOR AND SECRETARY OF THE AIR FORCE, THE GENERAL MANAGER OF THE SPACE PROGRAM PAUSES AND SET DOWN HIS INSIDE VIEW OF HOW THE ARCHITECTS OF THE PROGRAM GOT IT STARTED AND ITS MANAGER DROVE IT TOWARD THE GOAL.</td>
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<td><strong>Title:</strong> NATIONAL METEOROLOGICAL SATELLITE PROGRAM</td>
<td><strong>Author</strong></td>
<td><strong>Date of Pub.:</strong> 7/25/1961</td>
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<td><strong>Abstract:</strong></td>
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<td><strong>Title:</strong> NATIONAL SPACE PROGRAM - PHASE I: PASSAGE OF THE NATIONAL AERONAUTICS AND SPACE ACT OF 1958 (PHASE II IS DATED AUG.1961)</td>
<td><strong>Author:</strong> AMBROSE,M.S.</td>
<td><strong>Date of Pub.:</strong> 7/1/1960</td>
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<td><strong>Abstract:</strong> HISTORY WILL PROBABLY RECORD THE ENACTMENT OF THE SPACE ACT AS THE MOST SIGNIFICANT LEGISLATIVE ACTION OF THE 85TH CONGRESS. THE SPACE ACT ENUNCIATES BASIC POLICY FOR OUR NATIONAL SPACE EFFORT AND PRESCRIBES THE ORGANIZATIONAL MACHINERY TO IMPLEMENT THE POLICY. IT PROVIDES THE AUTHORITY NEEDED FOR AN EFFECTIVE PROGRAM OF AERONAUTICAL AND SPACE EXPLORATION IN THE INTEREST OF OUR GENERAL WELFARE AND SECURITY. IT CREATES A NEW INDEPENDENT CIVILIAN AGENCY, NASA, WITH BROAD POWERS TO PLAN, DIRECT AND CONDUCT THE NATION'S AERONAUTICAL AND SPACE ACTIVITIES, APART FROM MILITARY SPACE PROJECTS. THE SCOPE OF THIS STUDY IS CONFINED PRIMARILY TO THE CIVILIAN SIDE OF THE NATIONAL SPACE EFFORT. IT IS DIVIDED INTO TWO BROAD COMPONENTS - PHASE I IS DEVOTED TO LEGISLATIVE HISTORY AND ENACTMENT OF THE SPACE ACT AND PHASE II COVERS IMPLEMENTATION OF THE ACT.</td>
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<td><strong>Title:</strong> NATIONAL SPACE PROGRAM: HIGHLIGHTS OF THE PAST YEAR AND PROJECTS FOR THE FUTURE</td>
<td><strong>Author:</strong> WEBB,J.E.</td>
<td><strong>Date of Pub.:</strong> 2/23/1965</td>
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<td><strong>Abstract:</strong> NASA'S PLANS AND PROGRAMS ARE PRESENTED OVER A BROAD SPECTRUM. HIGHLIGHTS FROM LAST YEAR'S ACHIEVEMENTS ARE POINTED OUT WITH EMPHASIS ON THE METEOROLOGICAL SATELLITE PROGRAM AND THE COMMUNICATIONS SATELLITE PROGRAM. SOME AREAS OF FUTURE RESEARCH ARE OUTLINED AND NASA'S PARTICIPATION AND SPONSORSHIP IN SPACE-RELATED RESEARCH AND DEVELOPMENT IS DISCUSSED.</td>
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<td><strong>Title:</strong> NATIONAL SPACE PROGRAM-PHASE II: IMPLEMENTATION OF THE NATIONAL AERONAUTICS AND SPACE ACT OF 1958 (PHASE I VOLUME IS DATED JULY 1960)</td>
<td><strong>Author:</strong> AMBROSE,M.S.</td>
<td><strong>Date of Pub.:</strong> 8/1/1961</td>
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TITLE: NEW APOLLO SCHEDULE/ARMS CONTROL IN WASHINGTON

AUTHOR

Date of Pub: 9/1/1968

Abstract:
IN THE SEVEN YEARS SINCE PRESIDENT KENNEDY PLEDGED THE NATION TO A LUNAR LANDING IN THIS DECADE, THE APOLLO PROGRAM HAS PROCEEDED ALONG THE SAME BASIC COURSE. ONLY ONCE, WHEN FIRE DESTROYED THE LIVES OF THREE ASTRONAUTS IN A GROUND TEST, DID THE LUNAR GOAL SEEM FOR A TIME TO BE IN JEOPARDY. NOW A REAL CHANGE HAS BEEN MADE, DEEP AND PERHAPS FUNDAMENTAL, AND NOT YET FULLY EXPLAINED. COMING THIS FAR ALONG THE APOLLO TRAIL HAS TAKEN VAST AMOUNTS OF MONEY, TREMENDOUS ENERGY AND SHREWD MANAGEMENT. NOT A SMALL PART OF THAT MANAGEMENT WAS FLEXIBILITY. IN THE MIDSUMMER OF 1968, WITH ONLY A YEAR AND HALF LEFT IN THE 1960'S, A LANDING BEFORE 1970 HAS BECOME MORE ELUSIVE AND THAT FLEXIBILITY HAS COME INTO PLAY ONCE AGAIN. LAST MONTH, NASA SHOOK UP ITS APOLLO LAUNCHING SCHEDULES TO "WORK AROUND" DELAYS CAUSED BY TECHNICAL TROUBLES IN GRUMMAN'S LUNAR MODULE. BUT IN DEVELOPING THIS WORK-AROUND PLAN IT INJECTED AN ENTIRELY NEW ELEMENT INTO THE APOLLO SCHEME. AS EARLY AS THIS COMING DECEMBER, IT NOW APPEARS THAT OUR ASTRONAUTS COULD TRY TO LOOP OUT PAST THE MOON AND RETURN TO EARTH ON A SO-CALLED CIRCUMLUNAR FLIGHT.

TITLE: NEW FUNDS TO MAINTAIN SATURN 1B LINE

AUTHOR

Date of Pub: 5/9/1966

Abstract:
NASA PLANS TO CONTINUE SATURN 1B PRODUCTION WITH NEW FUNDING OF $41 MILLION. FY 1967 FUNDS WILL BE USED TO INSURE THAT THE PRODUCTION LINE FOR THE LAUNCH VEHICLE'S STAGES AND ENGINES IS MAINTAINED PAST THE LATE 1966 CUTOFF FOR PROJECT APOLLO PRODUCTION.

TITLE: NEW METHODS FOR EVALUATION OF PERFORMANCE RELIABILITY

AUTHOR BURROWS,D.L.

Date of Pub: 12/1/1963

Abstract:
IN THE DESIGN OF SPACE VEHICLES THERE IS A GREAT NEED FOR METHODS TO SOLVE COMPLEX TIME-VARIANT PERFORMANCE PROBLEMS IN COMBINATION WITH STATISTICAL INFLUENCES. A SIMPLIFIED VERSION OF AN IN-FLIGHT STAGE SEPARATION PROBLEM IS CONSIDERED AND A MATH MODEL IS DEVISED FOR INTEGRATING THE PERFORMANCE PARAMETERS WITH THEIR INTERACTING STATISTICAL CONTENT IN SUCH A WAY AS TO ARRIVE AT THE PROBABILITY OF SUCCESS. LOWER STAGE WEIGHT, RETROROCKET THRUST, LOWER STAGE CUTOFF THRUST AND SEPARATION DISTANCE BETWEEN STAGES NEEDED TO AVOID EXPLOSION AT UPPER STAGE IGNITION WERE THE ASSUMED CONTROLLING PARAMETERS. THE PRIMARY PURPOSE OF THIS PAPER WAS TO REVIEW THE PROBLEM AND PROPOSE A METHODOLOGY. NO MEANINGFUL RESULTS WERE OBTAINED BECAUSE OF LACK OF SENSIBLE STATISTICAL INPUT.

TITLE: NEW NASA CENTER EXPANDS CAPE MISSION

AUTHOR

Date of Pub: 7/2/1962

Abstract:
NEWLY-ESTABLISHED LAUNCH OPERATIONS CENTER WILL JOIN MSFC AND MSC THIS YEAR AS A FULL PARTNER IN THE MANNED LUNAR LANDING PROGRAM AND ALSO WILL HAVE AN INCREASINGLY GREATER VOICE IN DESIGN AND USE OF NEW LAUNCH VEHICLES. STARTING WITH THE PRESENT SATURN C-1 PROGRAM, FACILITIES ARE BECOMING ESSENTIAL AN ELEMENT IN A LAUNCH SYSTEM AS THE FLIGHT VEHICLE ITSELF. AS FUTURE VEHICLES, SUCH AS SATURN C-5 OR NOVA, GROW IN SIZE AND COMPLEXITY, SO WILL THE FACILITIES AND THE REQUIREMENT TO EXTRACT THE MAXIMUM USE FROM EACH LAUNCH COMPLEX. THESE CONSIDERATIONS OF VEHICLE SIZE, LAUNCH FREQUENCY, NUMBER OF LAUNCH STANDS, TIME AND MONEY AND CONDUCTING THE LAUNCHINGS THEMSELVES ARE THE COMPONENTS OF THE MISSION ASSIGNED TO THE CENTER AND ITS DIRECTOR, DR. KURT H. DEBUS.

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<th>TITLE: NEW PROPELLANT VENTING SYSTEM FOR S-IV STAGE</th>
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<td>AUTHOR</td>
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<th>TITLE: NEXT DECADE IN SPACE - SPECIAL REPORT ON NASA PROGRAMS</th>
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<th>TITLE: NEXT DECADE IN SPACE (THE POST-APOLLO SPACE PROGRAM: DIRECTIONS FOR THE FUTURE)</th>
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<th>TITLE: NEXT FIVE YEARS</th>
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<th>TITLE: NEXT STOP: THE MOON (BLACK AND WHITE PHOTOGRAPH)</th>
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<tr>
<th>TITLE: NEXUS - CONCEPT OF A LARGE REUSABLE EARTH LAUNCH VEHICLE</th>
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ASPECTS OF EARTH-TO-ORBIT DELIVERY ARE DISCUSSED AND A COST ANALYSIS IS PRESENTED OF LOGISTIC OPERATION AND COST OF ORBITAL OPERATIONS. PROBABILITIES OF SUCCESS OF ORBITAL DELIVERY AND THE OPERATIONAL AND ECONOMIC ASPECTS OF ESTABLISHING LARGE ORBITAL INSTALLATIONS AND MAINTAINING A LARGE TRANSPORTATION VOLUME IN THE 1975/85 TIME PERIOD ARE COMPARED FOR THE TWO CASES OF USING A LARGE NUMBER OF SATURN V VS A SMALLER NUMBER OF ONE-STAGE CHEMICAL POST-SATURN LAUNCH VEHICLES. PERFORMANCE PARAMETERS OF CHEMICAL, CHEMONUCLEAR AND NUCLEAR LAUNCH VEHICLES ARE COMPARED. CONCEPT OF A BLUNT LAUNCH VEHICLE CONFIGURATION, REFERRED TO AS NEXUS, IS PRESENTED IN DETAIL. APPLICATIONS OF THIS CONFIGURATION TO CHEMONUCLEAR PROPULSION AND TO A 50 FT DIAMETER VERSION OF SATURN V WITH RECOVERABLE FIRST STAGE ARE DISCUSSED.

TITLE: NOISE REDUCTION STUDY IN A SCALED MODEL ACOUSTIC TEST FACILITY
AUTHOR: TOMREN, R.H.
Date of Pub: 5/21/1968

Abstract:
THE ACOUSTIC PROPERTIES OF FIVE INSULATION MATERIALS WERE INVESTIGATED IN A 1/10-SCALE MODEL ACOUSTIC FACILITY. MATERIALS WERE DESIGNED FOR APPLICATIONS IN SPACE VEHICLES. THE MODEL FACILITY, CONSISTING OF A REVERBERATION CHAMBER COUPLED TO AN ANECHOIC CHAMBER, WAS EVALUATED FOR ITS USE IN NOISE REDUCTION TESTING. IT WAS FOUND THAT A REASONABLY DIFFUSE SOUND FIELD EXISTED ABOVE 900 HERTZ. MODEL DENSITY GRAPHS OF THE REVERBERATION CHAMBER AND SPATIAL ACOUSTIC GRADIENTS MEASURED WITHIN THE CHAMBER AND ACROSS THE TEST PANEL OPENING ARE COMPARED TO AN IDEALIZED FACILITY.

TITLE: NON-DESTRUCTIVE TESTING OF APOLLO AND SATURN S-II BONDED HONEYCOMB STRUCTURES (PAPER)
AUTHOR: Date of Pub: 10/1/1963

Abstract:

TITLE: NONDESTRUCTIVE TESTING OF SPACE VEHICLE LIQUID PROPELLANT ROCKET ENGINES
AUTHOR: HAGEMAIER, D.
Date of Pub: 3/15/1967

Abstract:
THIS REPORT DESCRIBES THE VARIOUS NONDESTRUCTIVE TEST METHODS EMPLOYED TO EVALUATE MATERIALS AND PROCESSES USED IN THE MANUFACTURE OF LARGE LIQUID PROPELLANT ROCKET ENGINES AT ROCKETDYNE. CONTENTS OF THIS PAPER WERE PURPOSELY ORIENTED FOR AN AUDIENCE OF AEROSPACE, DESIGN, AND MATERIALS ENGINEERS. A BRIEF DESCRIPTION OF LIQUID PROPELLANT ROCKET ENGINE RELIABILITY IS PRESENTED. THE RELATIONSHIP OF STANDARDS AND SPECIFICATIONS TO NONDESTRUCTIVE TESTING IS DISCUSSED AND VARIOUS TEST METHODS ARE DESCRIBED ALONG WITH A DISCUSSION OF APPLICATIONS AND LIMITATIONS. THE SEQUENCE OF EVENTS LEADING UP TO USE OF NONDESTRUCTIVE TESTING IN PRODUCTION INSPECTION IS PRESENTED. FINALLY, ORGANIZATION OF LABOR DIRECTLY RELATED TO NONDESTRUCTIVE TESTING IS GIVEN.

TITLE: NORTH AMERICAN TRIES TO ADVANCE UNDER FIRE
AUTHOR: Date of Pub: 6/3/1967

Abstract:

TITLE: NOTES ON SATURN PCM TELEMETRY
AUTHOR: STROOP, F.J.
Date of Pub: 9/1/1966

Abstract:
HERE IS A FUNDAMENTAL APPROACH TO DATA HANDLING TECHNIQUES USED FOR THE NUMEROUS ANALOG MEASUREMENTS MADE ON THE SATURN MISSILE. THE AUTHOR'S INTENT IS TO GIVE THE READER AN OVERALL PICTURE OF THE SYSTEM AND AN INSIGHT TO PCM TECHNIQUES IN GENERAL. (THIS ARTICLE APPEARED IN TELEMETRY MAGAZINE.)
TITLE: NOVA-A MANNED LUNAR ROCKET

AUTHOR ROSEN,M.W./SCHWENK,F.C. Date of Pub: 9/1/1959

Abstract: THIS ARTICLE GIVES THE FIRST EXTENSIVE ANALYSIS OF HOW THE NOVA PROJECT MIGHT DEVELOP IN TERMS OF A COMPLETE VEHICLE FOR SPACE EXPLORATION.

TITLE: NUCLEAR ENGINE DESIGN CONSIDERATIONS

AUTHOR GUNN,S.V./FLORMAN,I. Date of Pub: 1/1/1963

Abstract: DESCRIBES A TYPICAL NUCLEAR ROCKET ENGINE AND DEFINES ITS CHARACTERISTICS SO THAT AN APPRECIATION OF THE OVERALL DESIGN PROBLEM MAY BE REALIZED.

TITLE: NUCLEAR EXPLOSIONS IN SPACE

AUTHOR Date of Pub: 4/10/1959

Abstract:

TITLE: NUCLEAR PROPULSION-CHEMICAL PROPULSION

AUTHOR Date of Pub: 3/18/1964

Abstract:

TITLE: NUCLEAR ROCKET STAGES INCREASE SATURN'S PAYLOAD CAPABILITY

AUTHOR JORDAN,W.Y./SAXTON,D.R./THO Date of Pub: 5/1/1961

Abstract: EARLY GENERATION NUCLEAR ROCKETS, IF USED IN CONJUNCTION WITH THE SATURN SYSTEM, WOULD SUBSTANTIALLY INCREASE THE DIRECT ORBITAL AND ESCAPE PAYLOADS AND, THROUGH THE USE OF ORBITAL REFUELING TECHNIQUES, OPEN THE DOOR TO MANNED LUNAR OPERATIONS AND EVEN MORE AMBITIOUS MISSIONS BEYOND.

TITLE: OMSF PROGRAM STATUS REVIEW - MANNED SPACE FLIGHT SCHEDULES (VOLUME III - LAUNCH VEHICLES, BOOK 1 - SATURN 1), EDITION "A"

AUTHOR Date of Pub: 8/1/1965

Abstract:

TITLE: OMSF PROGRAM STATUS REVIEW - MANNED SPACE FLIGHT SCHEDULES (VOLUME III - LAUNCH VEHICLES, BOOK 2 - SATURN IB), EDITION "A"

AUTHOR Date of Pub: 8/1/1965

Abstract:

TITLE: OMSF PROGRAM STATUS REVIEW - MANNED SPACE FLIGHT SCHEDULES (VOLUME III - LAUNCH VEHICLES, BOOK 3 - SATURN V), EDITION "A"
SEVERAL METHODS OF VEHICLE OPTIMIZATION ARE DISCUSSED. IT IS SHOWN THAT UNDER CERTAIN CONDITIONS AN OPTIMUM NUMBER OF STEPS DOES EXIST. A SHORT DISCUSSION IS INCLUDED ON THE INFLUENCE OF THE TRAJECTORY UPON OPTIMIZATION AND ON A DIFFERENT CRITERION OF OPTIMIZATION. FINALLY, SOME CRITICAL REMARKS ARE GIVEN CONCERNING PRACTICAL ASPECTS OF VEHICLE DESIGN.

TITLE: OPERATIONAL EXPERIENCES ON THE SATURN V S-IVB STAGE

AUTHOR BAUER, H.E. Date of Pub: 10/7/1968

Abstract:

TITLE: OPPORTUNITIES FOR EUROPEAN PAYLOADS ON THE SATURN VEHICLE

AUTHOR GORDON, T.J. Date of Pub: 5/6/1965

Abstract:
THE TWO-STAGE VERSION OF THE SATURN I HAS FLOWN FOUR TIMES AND PLACED A TOTAL OF APPROXIMATELY 100,000 LBS. INTO ORBIT. THESE INITIAL FLIGHTS HAVE BEEN DESIGNED TO TEST THE VEHICLE PERFORMANCE AND, EXCEPT FOR THE LAST FLIGHT, HAVE NOT BEEN FOR THE PURPOSE OF PLACING SCIENTIFIC PAYLOADS INTO SPACE ENVIRONMENT.

THE TREMENDOUS WEIGHT-CARRYING CAPABILITY OF THIS VEHICLE AND THE VEHICLES TO FOLLOW HAS LED US TO CONSIDER THE CONCEPT OF AUXILIARY OR PIGGYBACK ACCOMMODATIONS ON SATURN. IN THIS SENSE, THE AUXILIARY PAYLOAD WOULD BE FURNISHED BY AN INDEPENDENT EXPERIMENTER, MOUNTED ON THE VEHICLE OR PAYLOAD ITSELF WITH MINIMUM INTERFERENCE, AND FLOWN AS A PASSENGER TO THE INTENDED ORBIT. BECAUSE THE VEHICLE WILL BE FLOWN FOR ANOTHER PRIMARY PURPOSE, THE COST OF THESE ACCOMMODATIONS WILL BE LOW. THE HIGH WEIGHT CARRYING CAPABILITY, LOW COST, AND HIGH VOLUME AVAILABILITIES MAY MAKE THIS TYPE OF SPACE CARRIER ATTRACTIVE TO EUROPEAN EXPERIMENTERS.

TITLE: OPPORTUNITIES FOR PARTICIPATION IN SPACE FLIGHT INVESTIGATIONS

AUTHOR Date of Pub: 4/1/1967

Abstract:
DESCRIBES BRIEFLY ALL NASA FLIGHT PROGRAMS NOW UNDERWAY, IDENTIFIES THOSE PROGRAMS IN WHICH OPPORTUNITIES CURRENTLY EXIST, AND CONTAINS BASIC INFORMATION OF VALUE TO THOSE INTERESTED IN SUBMITTING SPACE FLIGHT PROPOSALS TO NASA.

TITLE: ORBITAL NAVIGATION FOR SATURN V MISSIONS (PAPER)

AUTHOR O'BRIEN, R.M. Date of Pub: 1/1/1966

Abstract:

TITLE: ORBITING RESEARCH LABORATORY/LOGISTICS SPACECRAFT CHECKOUT REQUIREMENTS STUDY

AUTHOR Date of Pub: 3/1/1965

Abstract:

TITLE: ORDNANCE ENGINEERING DESIGN HANDBOOK-BALLISTIC MISSILE SERIES-PROPULSION AND PROPELLANTS
THIS HANDBOOK HAS BEEN PREPARED AS ONE OF A SERIES ON BALLISTIC MISSILES. IT PRESENTS INFORMATION ON THE FUNDAMENTAL OPERATING PRINCIPLES OF PROPULSION SYSTEMS AS FOUND IN BALLISTIC MISSILES, WITH DISCUSSIONS OF PROPELLANTS WHICH HAVE BEEN FOUND PRACTICABLE OR WHICH HAVE THEORETICALLY ATTRACTIVE POSSIBILITIES. CRITERIA ARE PRESENTED WHEREBY THE PERFORMANCE OF PROPULSION SYSTEMS CAN BE JUDGED.
TITLE: ORGANIZATIONAL CHART OF NASA

AUTHOR: HU, S.S.

Date of Pub: 5/1/1968

Abstract:

COVERS NEW ORGANIZATION WHICH WENT INTO EFFECT 1 NOVEMBER 1961 WITH JAMES E. WEBB AS ADMINISTRATOR AND HUGH L. DRYDEN AS DEPUTY ADMINISTRATOR.

TITLE: ORGANIZATIONAL DEVELOPMENTS AT MSFC

AUTHOR: O'CONNOR, E.F.

Date of Pub: 6/15/1965

Abstract:

MAJOR DEVELOPMENTS OF THE PAST TWO YEARS ARE COVERED. THE VARIOUS PROBLEMS ENCOUNTERED IN THE MANAGEMENT OF THE VEHICLE PROGRAMS ARE DISCUSSED. THE STAFF OFFICES OF THE INDUSTRIAL OPERATIONS ARE DISCUSSED IN DETAIL.

TITLE: ORGANIZATIONAL STRUCTURE AND MISSION OF AEROSPACE ENVIRONMENT DIVISION

AUTHOR: VAUGHAN, W.W.

Date of Pub: 6/11/1968

Abstract:

CHARTS ARE INCLUDED COVERING BASIC MISSION OF THE DIVISION, KEY PERSONNEL, RESPONSIBILITIES OF ENVIRONMENT RESEARCH OFFICE, RESPONSIBILITIES OF ATMOSPHERIC DYNAMICS BRANCH, RESPONSIBILITIES OF TERRESTRIAL ENVIRONMENT BRANCH, AND RESPONSIBILITIES OF SPACE ENVIRONMENT BRANCH.

TITLE: ORIGINAL DRAWING NUMBER ASSIGNMENT BOOK-ARMY GUIDED MISSILE DEVELOPMENT PROGRAM AUGUST 1947 TO MAY 1953

AUTHOR: PARKS, P.G./SEMAN, F.D.

Date of Pub: 5/1/1953

Abstract:


TITLE: OUT OF VACUUM ELECTRONIC BEAM WELDING DEVELOPMENT AND THE SATURN V SYSTEMS

AUTHOR: PARKS, P.G./SEMAN, F.D.

Date of Pub: 4/1/1966

Abstract:


TITLE: OUTLINE OF THE CAPABILITY OF TECHNICAL FACILITIES AND EQUIPMENT AT THE GEORGE C. MARSHALL SPACE FLIGHT CENTER

AUTHOR: 

Date of Pub: 1/1/1968

Abstract:


TITLE: PACING SYSTEMS OF THE APOLLO PROGRAM

AUTHOR: 

Date of Pub: 10/15/1965

Abstract:
TITLE: PART ANALYSIS PROGRAM

AUTHOR: LANGE, E.

Abstract:
MSFC MAKES MAXIMUM USE OF PARTS TEST AND EXPERIENCE DATA AVAILABLE FROM THE NATION-WIDE PARTS DATA CENTERS FOR DEVELOPMENT OF THE SATURN VEHICLE AND ITS ASSOCIATED GSE. THIS EFFORT, KNOWN AS THE PART ANALYSIS PROGRAM, HAS ACCELERATED THE SATURN PARTS QUALIFICATION CONSIDERABLY. THE PART ANALYSIS PROGRAM SERVES AS A SUBSTITUTE FOR THE ACTUAL QUALIFICATION TESTING.

TITLE: PAST, PRESENT, AND FUTURE OF METALS FOR LIQUID ROCKETS

AUTHOR: LUCAS, W.R.

Abstract:
THE UTILIZATION OF METALS IN LIQUID PROPELLED ROCKET SYSTEMS IS DISCUSSED IN TERMS OF THE UNIQUE ENVIRONMENTS IN WHICH PERFORMANCE IS REQUIRED. WE RELIABILITY, TOUGHNESS AT CRYOGENIC TEMPERATURE, STRESS-CORROSION RESISTANCE, AND CHEMICAL COMpatibility WITH PROPELLANTS ARE IDENTIFIED AS IMPORTANT CRITERIA IN THE SELECTION OF METALS FOR THESE APPLICATIONS. ALUMINUM HAS BEEN THE PREDOMINANT METAL IN LIQUID ROCKET STRUCTURES, AND ITS USE HAS PARALLELLED ALUMINUM ALLOY DEVELOPMENT IN THIS COUNTRY. RECENT ACHIEVEMENTS IN THE DEVELOPMENT OF NEW WROUGHT ALUMINUM ALLOYS, A NEW ALUMINUM CASTING ALLOY, AND OTHER LIGHTWEIGHT MATERIALS ARE DISCUSSED.

TITLE: PAYLOAD INTEGRATION FOR SPACE EXPERIMENTATION

AUTHOR: GREEN, P.C./FILIPOWSKY, R.F.

Abstract:
SPACE EXPERIMENTATION REQUIRES AN INCREASINGLY COMPLEX PLANNING AND SYSTEMS ENGINEERING EFFORT TO MEET THE DEMAND FOR HIGHEST PRECISION AND RELIABILITY OF ALL MEASUREMENTS AND OBSERVATIONS. A COMPANION PAPER (INTERFACE PROBLEMS IN SPACE EXPERIMENTATION) DISCUSSES THE INTERFACES BETWEEN THE SCIENTIFIC/TECHNICAL AREAS OF SPACE EXPERIMENTATION AND THE INSTRUMENTS, SUBSYSTEMS AND SUPPORT SYSTEMS WITHIN THE SPACECRAFT. THIS PAPER DEALS WITH ORGANIZATION AND PROCEDURES WHICH ARE NEEDED TO PERFORM DIFFICULT PAYLOAD INTEGRATION PROCESS FOR SPACE EXPERIMENTATION. IN THE COURSE OF THIS PROCESS IT IS NECESSARY TO DEFINE THE EXPERIMENTS COMPLETELY, TO DESCRIBE ALL INSTRUMENTS IN TERMS OF ENGINEERING SPECS, TO INVESTIGATE THE COMMONALITY OF EQUIPMENT, TO GROUP EXPERIMENTS INTO MISSION COMPATIBLE PAYLOADS, TO SPECIFY ACCEPTABLE LOADS ON ALL SUBSYSTEMS AND ASTRONAUTS (WHEN PRESENT) AND TO PLAN FOR ALL CONTINGENCIES DURING THE FLIGHT.

TITLE: PEENEMUENDE ROCKET CENTER, PART 1

AUTHOR: EHRICKE, K.A.

Abstract:
THIS ARTICLE PRESENTS AN OVERALL SURVEY OF THE DEVELOPMENT WORK CARRIED OUT BY THE GERMAN ROCKET RESEARCH CENTER AT PEENEMUENDE, AND THE PROGRESS ACHIEVED DURING THE PERIOD OF ITS EXISTENCE UNDER GERMAN CONTROL.
TITLE: PERSONNEL ADMINISTRATION

AUTHOR: O'CONNOR, E.F.

Abstract: DISCUSSES THE PROBLEMS OF PERSONNEL ADMINISTRATORS AND THE FIVE KEY FACTORS THAT ORGANIZE A STABLE WORK FORCE.

TITLE: PERSONNEL STRENGTH OF ORDNANCE MISSLE LABORATORIES AS OF JAN. 31, 1953

AUTHOR

Abstract:

TITLE: PHASING OUT THE LONG-RANGE MISSILES

AUTHOR

Abstract: THE $15.5-BILLION AEROSPACE INDUSTRY IS ON THE BRINK OF ITS SECOND MAJOR READJUSTMENT IN A DECade. The first change came when companies that had been concentrating on aircraft had to switch to augmenting planes with missiles. Among many things, it was a switch from the mass production of huge numbers of planes with a relatively low unit cost, to turning out a much smaller number of quite high-cost missiles. The second evolution, its outline still somewhat uncertain, will be toward a much greater element of space production - the tailoring of a very small number of immensely expensive units. These jobs will be woven into the existing aircraft-missile mix. Graphic indicating time span of defense projects and NASA projects is included.

TITLE: PHILOSOPHY OF SIMULATION IN A MAN-MACHINE SPACE MISSION SYSTEM

AUTHOR: FRASER, T.M.

Abstract:

TITLE: PHOTOGRAPHY FROM THE VIKING 11 ROCKET AT ALTITUDES RANGING UP TO 158 MILES

AUTHOR: BAUMANN, R.C./WINKLER, L.

Abstract:

TITLE: PHYSICAL PROCESSES IN COMETS

AUTHOR: WHIPPLE, F.L./HUEBNER, W.F.

Abstract:

TITLE: PILOTED GUIDANCE AND CONTROL OF THE SATURN V LAUNCH VEHICLE
IN PLANNING FOR A NUCLEAR DETERRENCE, WE MUST BEGIN BY CONSIDERING THE STRATEGIC THREAT. SOME SAY THAT WE CANNOT PROTECT OUR PEOPLE FROM THE EFFECTS OF NUCLEAR WAR, BUT IN A LARGER SENSE THAT IS NOT CORRECT. IF WE PROVIDE FOR DETERRENCE BY MAINTAINING AND PROTECTING OUR FORCES, WE REDUCE THE PROBABILITY OF AN ENEMY ATTACK AND INCREASE THE PROBABILITY THAT OUR PEOPLE WILL BE SAFE. THIS UNDERLINES THE PRESIDENT'S DECISION TO PROCEED WITH THE SAFEGUARD ABM SYSTEM. THERE WERE THREE NEW FACTORS THAT CAUSED PRESIDENT NIXON TO PROPOSE SAFEGUARD- A SYSTEM TO PROVIDE DEFENSE FOR CERTAIN OF OUR MISSILE FIELDS. THE FIRST FACTOR WAS THE SOVIET BUILDUP IN MISSILE PAYLOAD, THE SECOND WAS THE IMPROVEMENT IN MISSILE ACCURACY AND THE THIRD WAS THE SLOWDOWN IN CHINESE MISSILE DEVELOPMENT WHICH PERMITTED US TO DEFER A LIGHT ABM DEFENSE OF OUR CITIES. THE ABM PROGRAM PROPOSED BY THE PRESIDENT PROVIDES AN ORDERLY STEP BY STEP PLAN THAT CAN BE HALTED AT AN EARLY LEVEL OF DEVELOPMENT, IF FURTHER EXPANSION IS NOT REQUIRED FOR OUR SECURITY. THERE IS A NEED FOR AN IMPROVED MANNED BOMBER. IF OUR BOMBERS ARE TO CONTINUE TO PROVIDE DETERRENCE, THEY MUST BE ABLE TO SURVIVE AN ATTACK AND THEN PENETRATE THE EVER-IMPROVING SOVIET DEFENSES.

COVERAGE OF PLASTICS IN THIS PAPER IS LIMITED TO THE NASA MANNED SPACE PROGRAM. THIS COVERAGE IS DESIGNED TO SHOW YOU HOW AND WHY THE MANNED SPACE FLIGHT PROGRAM DEPENDS ON PLASTICS FOR ITS LIFE'S BLOOD. WITHOUT PLASTICS THE APOLLO SATURN PROGRAM COULD NOT SUCCEED. WITH BETTER PLASTICS IT COULD BE MORE EFFECTIVE.

A HARDWARE DEVELOPMENT PROGRAM TO FABRICATE AND TEST A FLUIDIC BREADBOARD VERSION OF A ROCKET ENGINE SEQUENCE CONTROL IS BRIEFLY DESCRIBED. THE DESIRED ENGINE START AND SHUTDOWN SEQUENCE AND THE NECESSARY COMPONENT AND INTERFACE ITEMS ARE DISCUSSED. DESCRIBED ARE THE DEVELOPMENT OF THE PNEUMATIC TIME DELAYS, INCLUDING A WIDE RANGE TEMPERATURE COMPENSATION TECHNIQUE; FABRICATION OF A POWER AMPLIFIER TO ENABLE LOW PRESSURE LOGIC TO ACTIVATE THE HIGH PRESSURE ENGINE CONTROL VALVES; AND FABRICATION OF THE PNEUMATIC LOGIC CIRCUITRY REQUIRED FOR THE CONTROLLER. SOME REQUIREMENTS FOR A FLIGHT SYSTEM ARE PROPOSED AND DISCUSSED. EXPECTED DEVELOPMENT PROBLEM AREAS, AND ADVANTAGES AND LIMITATIONS OF SUCH A SYSTEM ARE COVERED.
A TELEMETRY SYSTEM IS A DEVICE TO TRANSFER INFO FROM AN INACCESSIBLE TO AN ACCESSIBLE LOCATION. A CONSTANT INPUT TO A TELEMETRY SYSTEM YIELDS OUTPUTS THAT ARE DISTRIBUTED ACCORDING TO SOME DENSITY FUNCTION. A LINEAR CHANGE IN THIS CONSTANT INPUT MAY YIELD A NONLINEAR CHANGE IN OUTPUT. THE THEORY OF STATISTICS AND EXPERIMENTAL DESIGN MAY BE APPLIED TO THE DATA RECEIVED FROM A FLIGHT TO EVALUATE THE INFLIGHT ACCURACY, LINEARITY, AND PRECISION OF VARIOUS TELEMETRY SYSTEMS. THIS PAPER EXPLAINS THE ANALYTICAL CONCEPTS USED IN POST FLIGHT ANALYSIS OF IU TELEMETRY SYSTEMS. IT ALSO PRESENTS THE METHOD FOR INTERPRETING RESULTS OF THESE ANALYTICAL TECHNIQUES.
EQUATIONS FOR THE BENDING MOMENT OF A LAUNCH VEHICLE ARE WRITTEN INCLUDING EFFECTS OF BENDING AND SLOSHING DYNAMICS. BY MAKING CERTAIN SIMPLIFYING ASSUMPTIONS, THE BENDING MOMENT EQUATION IS TRANSFORMED TO BE A FUNCTION OF RIGID VEHICLE ANGLE OF ATTACK, ENGINE DEFLECTION, BENDING MODE ACCELERATION AND SLOSHING MODE ACCELERATION. THIS FORM IS PARTICULARLY ADVANTAGEOUS FOR USE IN OPTIMIZATION TECHNIQUES BY THE CONTROL ENGINEER. THE RESPONSE OF A SATURN V CLASS VEHICLE WAS SOLVED AND THE CONTROL SYSTEM OPTIMIZED TO BENDING MOMENTS USING DATA COVERING A PERIOD OF SIX YEARS, AMOUNTING TO 4,384 MEASURED WIND PROFILES, AND THE GPS HIGH SPEED REPETITIVE ANALOG COMPUTER. A COMPARISON BETWEEN THE BENDING MOMENT RESPONSE ENVELOPE OF THE MEASURED WINDS AND THE BENDING MOMENT RESPONSE OF THE MSFC SYNTHETIC WIND PROFILE IS MADE.

TITLE: PRACTICAL APPROACH TO THE OPTIMIZATION OF THE SATURN V SPACE VEHICLE CONTROL SYSTEM UNDER AERODYNAMIC LOADS
AUTHOR RYAN, R.S./TEUBER, D.
Date of Pub: 7/21/1965

Abstract:

TITLE: PRACTICALITIES IN AUTOMATED MANUFACTURING CHECKOUT
AUTHOR SMITH, R.L.
Date of Pub: 10/1/1963

Abstract:
MSFC DECIDED OVER TWO YEARS AGO THAT THE SATURN SPACE VEHICLE CHECKOUT AND LAUNCH PROGRAMS SHOULD BE AUTOMATED BY USING DIGITAL COMPUTERS FOR REMOTE CONTROL AND EVALUATION. THIS WAS A LOGICAL FOLLOW-ON TO PROGRAMS WHICH HAD BEEN IN EXISTENCE ABOUT A YEAR AND A HALF AT THAT TIME. ONE OF THESE PROGRAMS WAS DEVELOPMENT OF A COMPUTER CONTROLLED SYSTEM FOR LAUNCH OF SATURN I AND THE OTHER WAS THE DEVELOPMENT OF A SYSTEM FOR AUTOMATED MANUFACTURING CHECKOUT OF THE SATURN I FIRST STAGE AT MARSHALL. THESE TWO PROGRAMS HAD INDICATED THAT ALTHOUGH THERE WERE MANY UNANSWERED QUESTIONS, IT WAS BOTH FEASIBLE AND DESIRABLE TO ESTABLISH AN AUTOMATED CHECKOUT AND LAUNCH FOR ALL SATURN VEHICLES. TODAY, THERE ARE STILL UNANSWERED QUESTIONS. HOWEVER, THROUGH EFFORTS OF FOUR MAJOR STAGE CONTRACTORS IN THE SATURN PROGRAM AND THE OVERALL COORDINATION OF MSFC, MANY ANSWERS HAVE BEEN FOUND AND MANY STANDARDIZATIONS HAVE BEEN SET FORTH. THIS PAPER PRESENTS A NUMBER OF THESE SOLUTIONS AND STANDARDIZATIONS AND POINTS TO SOME OTHERS THAT ARE YET TO BE ESTABLISHED.

TITLE: PREDICTION AND CORRELATION OF RADIO INTERFERENCE EFFECTS ON SATURN V VEHICLES (PAPER)
AUTHOR BROWER, E.M.
Date of Pub: 4/1/1966

Abstract:

TITLE: PRELIMINARY ESTIMATION OF ACOUSTIC CONDITIONS AT THE SATURN LAUNCH COMPLEX DURING THE INITIAL PART OF A FLIGHT OF THE SATURN BOOSTER
AUTHOR DORLAND, W.
Date of Pub: 1/20/1960

Abstract:

TITLE: PRELIMINARY EVALUATION OF THE BLOCK I SATURN S-I STAGE PERFORMANCE CHARACTERISTICS
AUTHOR BLACK, P./IGOU, J.
Date of Pub: 6/8/1960

Abstract:

AUTHOR
Date of Pub: 1/15/1969

Abstract:

\begin{tabular}{ll}
\textbf{TITLE:} & PRELIMINARY OPTIMIZATION OF SATURN  \\
\textbf{AUTHOR} & CALLAWAY,R.  \\
\textbf{Date of Pub:} & 8/1/1959  \\
\textbf{Abstract:} &  \\
\end{tabular}

\begin{tabular}{ll}
\textbf{TITLE:} & PRELIMINARY PERFORMANCE DATAOF SATURN SPACE VEHICLES  \\
\textbf{AUTHOR} &  \\
\textbf{Date of Pub:} & 5/1/1959  \\
\textbf{Abstract:} &  \\
\end{tabular}

\begin{tabular}{ll}
\textbf{TITLE:} & PRELIMINARY SATURN SHOCK AND VIBRATION SPECIFICATIONS  \\
\textbf{AUTHOR} & FARROW,J.  \\
\textbf{Date of Pub:} & 5/27/1959  \\
\textbf{Abstract:} &  \\
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\begin{tabular}{ll}
\textbf{TITLE:} & PRELIMINARY SKELETAL OPERATIONS PLAN FOR APOLLO  \\
\textbf{AUTHOR} &  \\
\textbf{Date of Pub:} & 1/31/1964  \\
\textbf{Abstract:} & THE PRELIMINARY SKELETAL OPERATIONS PLAN IS A STATEMENT OF THE OPERATIONAL CONCEPT FOR APOLLO. THIS DRAFT CONTAINS A DESCRIPTION OF THE CONDUCT OF THE APOLLO LUNAR ORBIT RENDEZVOUS LANDING MISSION AND A MISSION PROFILE. IT PROVIDES THE BASIS FOR MORE DETAILED MISSION PLANNING, FOR GENERATING FUNCTIONAL CRITERIA FOR EQUIPMENT DESIGN, AND FOR MEASURING THE ADEQUACY OF THE CURRENT APOLLO HARDWARE FOR SATISFYING OPERATIONAL NEEDS.  \\
\end{tabular}

\begin{tabular}{ll}
\textbf{TITLE:} & PRELIMINARY STUDY OF AN UNMANNED LUNAR SOFT LANDING VEHICLE (SCIENTIFIC APPLICATION)(REP. TO THE NASA WORKING GROUP ON LUNAR AND PLANETARY  \\
\textbf{AUTHOR} &  \\
\textbf{Date of Pub:} & 5/1/1959  \\
\textbf{Abstract:} &  \\
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\begin{tabular}{ll}
\textbf{TITLE:} & PRESENTATION ADVANCED ASTRIONICS PROJECT REVIEW  \\
\textbf{AUTHOR} & PUGH,F.L./CALDWELL  \\
\textbf{Date of Pub:} & 1/30/1968  \\
\textbf{Abstract:} &  \\
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\begin{tabular}{ll}
\textbf{TITLE:} & PRESERVATION, SHIPMENT AND RECOVERY OF THE SATURN BOOSTER  \\
\textbf{AUTHOR} & DIGESU,F.  \\
\textbf{Date of Pub:} & 6/7/1960  \\
\textbf{Abstract:} &  \\
\end{tabular}
SIMULTANEOUSLY WITH EACH PHASE OF SATURN DESIGN, STUDIES WERE MADE TO DETERMINE THE MOST PRACTICAL PROCEDURES FOR SHIPPING AND RECOVERING THE SATURN BOOSTER. THESE PROCEDURES ARE, IN EFFECT, NOW ESTABLISHED AND THE REQUIRED EQUIPMENT AND FACILITIES ARE BEING PROCURED AS SCHEDULED. THE PURPOSE OF THIS REPORT IS TO PRESENT THE SHIPPING AND RECOVERY PROCEDURES FOR THE SATURN BOOSTER AS ESTABLISHED BY THE PARTICIPATING BRANCHES AND LABORATORIES.

TITLE: PRESIDENT TRANSFERS ELEMENTS OF ARMY ROCKET CENTER TO SPACE AGENCY
AUTHOR
Date of Pub: 10/30/1959

Abstract:
THE PRESIDENT'S PLAN FOR TRANSFER WITH COMMENTS BY DR. VON BRAUN, GENERAL MEDARIS, AND SENATOR JOHNSON

TITLE: PRIME CONTRACTOR'S RELIABILITY PROGRAM FOR COMPONENTS/PARTS FOR THE DOUGLAS S-IVB STAGE PROJECT
AUTHOR WILSON, R.B./HUG, N.L.
Date of Pub: 7/18/1966

Abstract:
DOUGLAS CONDUCTS PARALLEL RELIABILITY PROGRAM ACTIVITIES: 1) SUPPLIER SURVEILLANCE FOR SPECIAL PURCHASED COMPONENTS, AND 1) STANDARD PARTS PROGRAM. HARDWARE ITEMS, WHOSE SINGLE FAILURE CAN CAUSE LOSS OF THE MISSION, ARE IDENTIFIED BY ANALYSIS AND DESIGNATED "FLIGHT CRITICAL." FOR THE SUPPLIER SURVEILLANCE ACTIVITY, SPECIAL FLIGHT CRITICAL ITEMS DEVELOPED BY SUPPLIERS HAVE A COMPLEMENTARY RELIABILITY ENGINEERING PROGRAM PLAN STRUCTURED TO DOUGLAS RELIABILITY REQUIREMENTS SPECs THAT ARE A PART OF THE CONTRACTUAL OBLIGATIONS EXTANT BETWEEN DOUGLAS AND NASA. THE PLAN BECOMES A CONTRACTUAL INSTRUMENT BETWEEN DOUGLAS AND THE SUPPLIER. PROGRESS ON THE PLAN IS MONITORED AND FOSTERED BY DOUGLAS RELIABILITY ENGINEERING PROGRAMS DEPARTMENTS. PERIODICALLY, STATUS OF THE SPECIAL HARDWARE DEVELOPMENT AND ITS COMPLEMENTARY RELIABILITY ENGINEERING PLAN IS RECAPITULATED. THE 1) STANDARD PARTS PROGRAM ACTIVITY DEVELOPS AND MAINTAINS APPROVED PARTS LISTS, WITH A SUPPORTING LIST OF QUALIFIED PARTS SUPPLIERS. MANAGEMENT CONTROL FORMS AND CHARTS FOR THE ABOVE ARE DESCRIBED IN THE PAPER.

TITLE: PRIMER OF THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION'S CENTAUR
AUTHOR
Date of Pub: 2/1/1964

Abstract:

TITLE: PRIMER: THE U.S. MANNED SPACE FLIGHT PROGRAM - MERCURY, GEMINI, APOLLO
AUTHOR
Date of Pub: 4/14/1969

Abstract:
TABLE OF CONTENTS INCLUDES: WHY EXPLORE THE MOON, APOLLO 1) HISTORICAL SUMMARY, APOLLO LUNAR LANDING, ESTIMATED COSTS OF 1) APOLLO PROGRAM, APOLLO PROGRAM FLIGHT SUMMARY, AAP, LUNAR 1) DESCRIPTION, LUNAR LANDING SITE SELECTION, APOLLO FLIGHT CREWS, 1) U.S. MANNED SPACE FLIGHTS, U.S. ASTRONAUTS, ASTRONAUT STATUS, 1) 1958 SPACE ACT, APOLLO MANAGEMENT, APOLLO CONTRACTORS, NASA 1) ORGANIZATIONAL CHART, NASA PUBLIC AFFAIRS DIRECTORY, AND MANNED SPACESHIP CENTERS.

TITLE: PRINCIPLES OF GUIDED MISSILES AND NUCLEAR WEAPONS
AUTHOR
Date of Pub: 1/1/1959

Abstract:
THIS IS THE SECOND VOLUME OF A THREE-VOLUME SERIES OF TEXTS DEALING WITH NAVAL WEAPONS. THE SERIES IS INTENDED FOR USE IN THE NAVAL SCIENCE CURRICULUM OF NROTC UNIVERSITIES, AND IN OTHER NAVAL TRAINING PROGRAMS. THE PRESENT VOLUME DESCRIBES THE PRINCIPLES OF GUIDED MISSILES AND NUCLEAR WEAPONS, INSOFAST THEY CAN BE DISCUSSED IN AN UNCLASSIFIED TEXT. THE TREATMENT IS NECESSARILY OF A GENERAL NATURE, WITH MINIMUM REFERENCE TO ACTUAL WEAPONS IN CURRENT USE.
TITLE: PROBLEMS ASSOCIATED WITH LARGE SCALE HIGH PRESSURE TESTING

AUTHOR: GARRETT, S.W.

Date of Pub: 2/2/1964

Abstract:

TITLE: PROBLEMS IN CRYOGENNIC PUMP DESIGN FOR SPACE APPLICATION

AUTHOR: ROTHE, D.

Date of Pub: 1/6/1967

Abstract:

THIS REPORT IDENTIFIES AND DISCUSSES PROBLEMS WHICH ARE UNIQUE IN CRYOGENIC PUMPS USED FOR SPACE TRAVEL. RECOMMENDATIONS CONCERNING THE STEADY FORCES ARE INCLUDED. EFFECT OF INDUCER AND IMPELLER DESIGN ON THE FLOW OSCILLATIONS IS PRESENTED.

TITLE: PROBLEMS OF ATMOSPHERIC WIND INPUTS FOR MISSILE AND SPACE VEHICLE DESIGN

AUTHOR: SCOGGINS, J.R. / VAUGHAN, W.W.

Date of Pub: 3/1/1964

Abstract:

THE PURPOSE OF THIS ARTICLE IS TO OUTLINE THE SIGNIFICANCE OF WIND INPUTS, REVIEW CURRENT HIGH-RESOLUTION WIND MEASURING PROGRAMS, AND PRESENT SOME RESULTS OF CURRENT INVESTIGATIONS OF HIGH-RESOLUTION, WIND-PROFILE MEASUREMENTS. THIS PAPER WILL BE CONCERNED WITH THE IN-FLIGHT OR MID-ALTITUDE WIND INPUT PROBLEMS. A BRIEF REVIEW WILL BE MADE OF THE OVERALL INFLUENCE OF DESIGN PHILOSOPHY ON WIND INPUTS PLUS EXAMPLES OF INFLUENCE FROM THE IN-FLIGHT OR MID-ALTITUDE AREAS.

TITLE: PROCEEDINGS OF FIRST NATIONAL CONFERENCE ON THE PEACEFUL USES OF SPACE (TULSA, OKLAHOMA)

AUTHOR

Date of Pub: 5/26/1961

Abstract:

MAJOR TOPICS CONSISTED OF NASA SPACE FLIGHT PROGRAMS, OPPORTUNITIES FOR INDUSTRY AND EDUCATION IN THE SPACE AGE, PRESENT AND FUTURE OF MANNED SPACE FLIGHT, SCIENCE IN SPACE, AND APPLYING SPACE SCIENCE TO COMMUNICATIONS, WEATHER, AND NAVIGATION.

TITLE: PROCEEDINGS OF THE FIRST NASA-INDUSTRY PROGRAM PLANS CONFERENCE

AUTHOR

Date of Pub: 7/28/1960

Abstract:

THE BASIC PURPOSE OF THIS CONFERENCE WAS TO PROVIDE FOR INDUSTRIAL MANAGEMENT AN OVERALL PICTURE OF THE NASA PROGRAM AND TO ESTABLISH AN ADEQUATE BASIS FOR SUBSEQUENT CONFERENCES TO BE HELD AT VARIOUS NASA CENTERS.

TITLE: PROCEEDINGS OF THE SECOND NASA-INDUSTRY PROGRAM PLANS CONFERENCE

AUTHOR

Date of Pub: 2/11/1963

Abstract:

DISCUSS NASA PROJECTS WHICH ARE UNDERWAY AND POSSIBLE NEW PROJECTS.

TITLE: PROCEEDINGS OF THE SECOND NATIONAL CONFERENCE ON THE PEACEFUL USES OF SPACE (SEATTLE, WASHINGTON)

AUTHOR

Date of Pub: 5/8/1962

Abstract:
TITLE: PROCEEDINGS OF THE THIRD NASA INTRACENTER MICROELECTRONICS CONFERENCE (BOSTON, MASSACHUSETTS)  
AUTHOR  
Date of Pub: 2/6/1968  
Abstract:  
MAJOR TOPICS INCLUDE CENTER SUMMARIES, INTEGRATED CIRCUIT APPLICATIONS, INTEGRATED CIRCUITS AND ANALYSIS, RELIABILITY, FILM FORMATION AND DEVICES, AND COMPUTER AIDED TECHNIQUES.

TITLE: PROCUREMENT PROGRAMS OF MSFC AS RELATED TO DOD PROCUREMENT AND CONTRACT ADMINISTRATION SUPPORT BY DOD ACTIVITIES  
AUTHOR MCCOMBS,J.R.  
Date of Pub: 10/1/1968  
Abstract:  
DISCUSSES IN GREAT DETAIL THE ADMINISTRATION OF R&D CONTRACTS. SIMILARITIES AND DIFFERENCES BETWEEN NASA AND DOD PROCUREMENT AND CONTRACT ADMINISTRATION ARE NOTED.

TITLE: PRODUCTION AND DISPOSITION OF GERMAN A-4 (V-2) ROCKETS (PROJECT NO. XT-1)  
AUTHOR BILEK,V.H./MCPHILIMY J.D.  
Date of Pub: 3/1/1948  
Abstract:

TITLE: PRODUCTION OF LARGE TANKS FOR CRYOGENIC FUELS  
AUTHOR HARPOOTHIAN,E.  
Date of Pub: 11/12/1964  
Abstract:  
TANKS FOR CRYOGENIC Fluids, AS USED IN SATURN SPACE VEHICLES, HAVE REACHED AN ADVANCED STAGE OF DESIGN AND DEVELOPMENT. MANY STRUCTURAL FEATURES OF THE NASA/DOUGLAS SATURN TANKS, FABRICATED OF 2014-T6 ALUMINUM ALLOY, WERE FIRST DEVELOPED FOR THE BOOSTER OF THE THOR BALLISTIC MISSILE, WHICH LATER FOUND EXTENSIVE USE IN PUTTING SPACE VEHICLES INTO ORBIT. THERE IS A MUTUAL DEPENDENCE OF IMPORTANT FACTORS RELATED TO DESIGN CONCEPTS, SELECTION OF MATERIALS, PROCESSING TECHNIQUES, AND FABRICATION METHODS. IT IS SHOWN THAT THIS MUTUAL DEPENDENCE MUST BE CONSIDERED IF A SUCCESSFUL VEHICLE IS TO EMERGE FROM DESIGN AND DEVELOPMENT. DETAILS OF VEHICLE STRUCTURE, PROVISION FOR INSULATION, AND MANUFACTURING METHODS ARE PRESENTED. CRITERIA FOR THE SELECTION OF MATERIALS IS SHOWN TO BE DEPENDENT ON STRENGTH, DUCTILITY, WELDABILITY, TOUGHNESS, FABRICABILITY, BEHAVIOR AT CRYOGENIC TEMPERATURES, AND ON MANUFACTURING METHODS AND INSPECTION TECHNIQUES.

TITLE: PROGRAM MANAGERS' PROBLEM  
AUTHOR RUDOLPH,A.  
Date of Pub: 1/16/1967  
Abstract:  
THIS DOCUMENT REVIEWS THE DEMANDS PLACED ON LOGISTICS MANAGEMENT IN A PROGRAM WITH THE MAGNITUDE AND COMPLEXITY OF THE SATURN/APOLLO PROGRAM.

TITLE: PROGRAM PLAN FOR EARTH ORBITAL SPACE ASTRONOMY  
AUTHOR OLIVIER,J.R./WOLBERS,H.L.  
Date of Pub: 11/1/1968  
Abstract:

TITLE: PROGRAM SCHEDULING MANUAL  
AUTHOR Date of Pub: 9/1/1963  
Abstract: 
THE PURPOSE OF THIS DOCUMENT IS TO ESTABLISH THE OPERATING POLICY, SCOPE OF EFFORT, AND ASSIGNMENT OF RESPONSIBILITIES AS REQUIRED FOR SCHEDULING AND REVIEW OF OMSF PROGRAMS.

TITLE: PROGRAM SUBMISSION FY-1968 (3 VOLUMES)  
AUTHOR Date of Pub: 3/15/1967  
Abstract: 
CONTAINS: CODE 124-OART/SPACE VEHICLE SYSTEMS, SRT, CODE 125 - OART/ELECTRONICS SYSTEMS, SRT, CODE 127 - OART/HUMAN FACTORS 1 SYSTEMS, SRT

TITLE: PROGRESS IN SPACE FLIGHT  
AUTHOR SILVERSTEIN,A. Date of Pub: 11/1/1960  
Abstract: 

TITLE: PROGRESS REPORT ON THE SATURN PROGRAM  
AUTHOR LANGE,O.H. Date of Pub: 1/1/1962  
Abstract: 

TITLE: PROJECT ADVENT--MILITARY COMMUNICATIONS SATELLITE PROGRAM  
AUTHOR Date of Pub: 8/15/1962  
Abstract: 

TITLE: PROJECT APOLLO  
AUTHOR LOW,G.M. Date of Pub: 5/8/1962  
Abstract: 
OUTLINES THE ACCOMPLISHMENTS OF THE LAST YEAR AND PRESENTS A REPORT ON THE CURRENT STATUS OF PROJECT APOLLO.

TITLE: PROJECT ATLAS (MX-1593)...A REPORT BIBLIOGRAPHY  
AUTHOR Date of Pub: 6/9/1969  
Abstract: 
SEARCH CONTROL NO. 105413
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<td>PROJECT MANAGERS REPORT (BOEING COMPANYD)</td>
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<td>1/27/1966</td>
<td>CONTRACT NAS8-5608, INCLUDES FINANCIAL DATA, I.E. SUMMARY OF FUND REQUIRED, MANPOWER AND COST STATUS, ETC.</td>
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<td>PROJECT MERCURY ... A CHRONOLOGY</td>
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<td>PROJECT NAVAHO ... A REPORT BIBLIOGRAPHY</td>
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<td>PROJECT RANGER</td>
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PROJECT SATURN (NEWS RELEASE)

AUTHOR

Date of Pub: 3/6/1964

Abstract:
DISCUSSES EVOLUTION OF THE SATURN PROJECT; THE THREE MAJOR LAUNCH VEHICLES - SATURN 1, 1B AND V; THE A-3, H-1,F-1 AND J-2 ROCKET ENGINES, ETC.

PROJECT THOR ... A REPORT BIBLIOGRAPHY

AUTHOR

Date of Pub: 6/9/1969

Abstract:
SEARCH CONTROL NO.015415

PROJECTION OF THE U.S. SPACE FLIGHT CAPABILITIES FOR THE NEXT FIFTEEN YEARS

AUTHOR

Date of Pub: 8/15/1959

Abstract:
UAH CONTROL NO. 109

PROJECTS ALBERT AND BUMPER ... A REPORT BIBLIOGRAPHY

AUTHOR

Date of Pub: 6/6/1969

Abstract:
SEARCH CONTROL NO. 015411

PROPELLANT BEHAVIOR DURING VENTING IN AN ORBITING SATURN S-IVB STAGE

AUTHOR NAVICKAS, J./MADSEN, R.A.

Date of Pub: 8/21/1967

Abstract:
A SATURN S-IVB STAGE, PARTIALLY FILLED WITH LIQUID HYDROGEN, WAS PLACED IN ORBIT TO VERIFY THE LOW-GRAVITY PERFORMANCE OF CERTAIN S-IVB SYSTEMS. DURING THE COURSE OF THE FLIGHT, SEVERAL EXPERIMENTS OF A RATHER GENERAL NATURE WERE ALSO PERFORMED TO PROVIDE DATA APPLICABLE TO DESIGN OF PROPELLANT STORAGE SYSTEMS IN A LOW-GRAVITY FIELD. THIS PAPER PRESENTS THE RESULTS OF ONE GROUP OF EXPERIMENTS CONDUCTED TO DETERMINE THE DYNAMIC AND THERMODYNAMIC RESPONSE OF LIQUID HYDROGEN TO A DECREASING TANK PRESSURE. THREE TANK-VENTING SEQUENCES WERE PERFORMED. PRESSURE DECREASE RATE, TOTAL PRESSURE DECREASE, AND SETTLING ACCELERATION WERE VARIED. LIQUID HYDROGEN TEMPERATURE, ULLAGE TEMPERATURE, 1 AND PRESSURE WERE MONITORED DURING EACH VENT. TELEVISION COVERAGE WAS PROVIDED TO OBSERVE THE FLUID BEHAVIOR IN THE TANK.

PROPELLANT MANAGEMENT FIELD

AUTHOR ZOIKE, H.

Date of Pub: 3/23/1962

Abstract:
THIS PAPER DETAILS THE DEVELOPMENT AND EVOLUTION OF THE FIELD OF PROPELLANT MANAGEMENT. IT DEALS WITH DEFINING SUBSYSTEMS THAT MAKE FOR PROPELLANT MANAGEMENT, PROBLEM AND DESIGN CONSIDERATIONS FOR THESE SUBSYSTEMS, AND EVOLUTION OF THESE SUBSYSTEMS.

PROPOSED STUDIES ON THE IMPLICATIONS OF PEACEFUL SPACE ACTIVITIES FOR HUMAN AFFAIRS

AUTHOR MICHAEL, D.N.

Date of Pub: 12/1/1960

Abstract:
TITLE: PROPULSION

AUTHOR: MRAZEK, W.A.  

Date of Pub: 6/1/1966

Abstract:
DISCUSSES THE HISTORY OF PROPULSION -- THE CHINESE ROCKETS, ROBERT H. GODDARD'S WORK, OBERTH, ETC. CHEMICAL TYPES (MONOPROPELLANT, BI-PROPELLANT, SOLID PROPELLANT) OF ROCKET ENGINES ARE DISCUSSED AS WELL AS NON-CHEMICAL TYPES (NUCLEAR, ARC-HEATED, PLASMA JET, ION, PHOTON, PULSE DRIVE).

TITLE: PROPULSION DEVELOPMENT PROBLEMS ASSOCIATED WITH LARGE LIQUID ROCKETS

AUTHOR: MCCOOL, A.A./MCKAY, G.H.  

Date of Pub: 8/12/1963

Abstract:
PROPULSION DEVELOPMENT PROBLEMS OF THE SATURN I AND V VEHICLES ARE REVIEWED. THESE TWO VEHICLES ARE TYPICAL OF LARGE MULTISTAGE VEHICLES CONTAINING MANY INTERFACES, PRODUCING A MULTITUDE OF INTEGRATION PROBLEMS THAT MUST BE SOLVED DURING DEVELOPMENT. OF THE MANY PROBLEMS ENCOUNTERED IN THE SATURN I PROGRAM, ONLY THE MOST SIGNIFICANT ONES ARE PRESENTED. THE SATURN V PROGRAM HAS NOT PROGRESSED TO THE TEST PHASE; THEREFORE, ONLY DESIGN PROBLEMS ARE CONSIDERED.

TITLE: PROPULSION FOR SPACE FLIGHT

AUTHOR: HOFFMAN, S.K.  

Date of Pub: 4/14/1966

Abstract:
THIS ADDRESS CONCENTRATES ON THE DEVELOPMENT OF ROCKET PROPULSION FOR THE UNITED STATES SPACE FLIGHT PROGRAM, DIVIDED INTO FOUR SEPARATE PHASES: (1) UNMANNED SPACE EXPLORATION, (2) MANNED FLIGHT, (3) LARGE MANNED SPACE FLIGHT PROGRAM, AND (4) FUTURE ROCKET ENGINE REQUIREMENTS.

TITLE: PROPULSION IMPROVEMENTS ACHIEVED DURING FLIGHT TESTING OF SATURN VEHICLES

AUTHOR: HEUSINGER  

Date of Pub: 3/1/1964

Abstract:

TITLE: PROPULSION: THE KEY TO MOON TRAVEL

AUTHOR: CASTENHOLZ, P.D./GRIGGS, H.K.  

Date of Pub: 1/1/1964

Abstract:
DISCUSSES SPACE MISSIONS, SATURN CONFIGURATIONS, APOLLO MISSION, ROCKETDYNE BOOSTED LAUNCH VEHICLES, LIQUID PROPELLANT ROCKET ENGINES, ROCKETDYNE LARGE ENGINE PROGRAM, SOLID PROPELLANT ROCKET MOTORS, THOR DELTA, ATLAS, MERCURY-ATLAS, H-1, F-1, J-2, NUCLEAR ROCKET ENGINE, ETC. CONTAINS NUMEROUS PHOTOS.

TITLE: PROPULSION: THE KEY TO SPACE TRAVEL

AUTHOR: CASTENHOLZ, P.D./GRIGGS, H.K.  

Date of Pub: 5/1/1963

Abstract:
THE ROCKET ENGINE, THE MOST POWERFUL METHODS OF PROPULSION DEVELOPED BY MAN, OPERATES ON THE PRINCIPLE OF REACTION - FOR EVERY REACTION, THERE IS AN EQUAL AND OPPOSITE REACTION (NEWTON'S THIRD LAW). THIS REACTION PRINCIPLE HAS BEEN APPLIED IN CONJUNCTION WITH VARIOUS CHEMICAL, NUCLEAR, AND ELECTRICAL SYSTEMS TO PROVIDE HIGH-VELOCITY EXHAUST GASES THROUGH A ROCKET ENGINE NOZZLE. THUS FAR, ONLY THE CHEMICAL SYSTEMS HAVE BEEN DEVELOPED TO ANY SUBSTANTIAL DEGREE OF THEIR MAXIMUM POTENTIALS. THE NUCLEAR AND ELECTRICAL SYSTEMS ARE UNDER DEVELOPMENT TODAY. FUTURE SYSTEMS WILL INCLUDE MHD, PHOTON, AND SOLAR SAIL PROPULSION SYSTEMS. EVEN THROUGH MUCH EFFORT REMAINS TO PERFECT THESE SYSTEMS OF THE FUTURE, PRESENT TECHNOLOGY CAN PROVIDE THE MEANS FOR MAN'S DEPARTURE ON HIS SPACE VOYAGE WITH THE LARGE CHEMICALLY FUELED BOOSTERS PRESENTLY DEVELOPED. AS THE NUCLEAR AND ELECTRICAL CONCEPTS ARE FURTHER DEVELOPED, THESE SYSTEMS CAN ASSUME THEIR ROLES IN THE MORE AMBITIOUS PROPULSION APPLICATIONS OF THE FUTURE.

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<table>
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<tr>
<th>TITLE: PURCHASING AND CONTRACTING AT THE GEORGE C. MARSHALL SPACE FLIGHT CENTER</th>
<th>Author: WOOD, A.J.</th>
<th>Date of Pub: 1/20/1964</th>
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<th>TITLE: QUALITY APPROACH AT MSFC</th>
<th>Author: LUCAS, K.</th>
<th>Date of Pub: 9/1/1962</th>
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<tr>
<th>TITLE: QUALITY ASSURANCE PROVISIONS FOR GOVERNMENT AGENCIES</th>
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Abstract:
THIS DOCUMENT DESCRIBES REQUIREMENTS FOR AGENCIES PERFORMING QUALITY ASSURANCE (INCLUDING INSPECTION) FUNCTIONS FOR NASA CONTRACTS FOR SPACE SYSTEMS, LAUNCH VEHICLES, SPACECRAFT, GSE AND MATERIALS, PARTS, COMPONENTS AND SERVICES THEREOF. THE OBJECTIVE OF THIS PUBLICATION IS TO ASSIST AGENCIES IN PROVIDING THE ABOVE SERVICES IN A UNIFORMED, COORDINATED MANNER.

TITLE: QUALITY PROGRAM EVALUATION PROCEDURES - OFFICE OF MANNED SPACE FLIGHT PROGRAM STANDARDS
AUTHOR
Date of Pub: 9/1/1963

Abstract:
THESE PROCEDURES AND RELATED SURVEY CHECKLISTS ARE ESTABLISHED AS A STANDARD TO INSURE CONSISTENT EVALUATIONS OF QUALITY PROCEDURES AND CONTROLS BEING APPLIED TO MANNED SPACE FLIGHT PROGRAMS. IT IS DESIGNED TO IDENTIFY PROBLEM AND IMPROVEMENT AREAS CONSISTENT WITH THE SEVERE RELIABILITY AND SAFETY REQUIREMENTS OF MANNED SPACE FLIGHT SYSTEMS.

TITLE: QUALITY PROGRAM PROVISIONS FOR SPACE SYSTEM CONTRACTORS
AUTHOR
Date of Pub: 4/1/1962

Abstract:
THESE PROVISIONS SET FORTH GENERAL REQUIREMENTS FOR CONTRACTOR QUALITY PROGRAMS TO INSURE THE REQUIRED QUALITY OF NASA SPACE SYSTEMS AND ELEMENTS. THESE REQUIREMENTS INCLUDE ESTABLISHMENT AND MAINTENANCE OF AN EFFECTIVE QUALITY PROGRAM FROM THE DESIGN CONCEPTION TO THE DELIVERY OF ARTICLES OF SATISFACTORY QUALITY LEVEL MEETING THE INTENDED DESIGN.

TITLE: RADIO SYSTEMS INTERFACE FROM SATURN V EXHAUSTS (PAPER)
AUTHOR BROWER, E.M.
Date of Pub: 11/1/1966

Abstract:

TITLE: READOUT ON SATURN LOGISTICS
AUTHOR
Date of Pub: 10/29/1968

Abstract:

TITLE: REAL TIME OPERATING SYSTEM FOR THE SATURN V LAUNCH COMPUTER COMPLEX
AUTHOR PALM, F.R.
Date of Pub: 7/1/1966

Abstract:
THE FIRST SATURN V LAUNCH WILL MARK A SIGNIFICANT MILESTONE IN THE US EFFORT TO PLACE MAN ON THE MOON. TO ENSURE A SAFE MISSION, EXTENSIVE PRELAUNCH VEHICLE CHECKOUT OF VARIOUS VEHICLE SYSTEMS IS REQUIRED. ON MOST PREVIOUS MISSILE SYSTEMS, CHECKOUT WAS ACCOMPLISHED MANUALLY WITH THE VEHICLE ON THE PAD MANY MONTHS PRIOR TO LAUNCH. AS VEHICLE SYSTEMS BECAME MORE COMPLEX, AUTOMATION WAS NECESSARY TO ENSURE SAFE, ACCURATE, AND EFFICIENT VEHICLE CHECKOUT. ON THE UPRATED SATURN I, IB, SOME AUTOMATIC CHECKOUT HAS BEEN ACCOMPLISHED, AND WILL BE FURTHER EXTENDED ON THE SATURN V. PERSONNEL INVOLVED WITH CHECKOUT OFTEN HAVE MANY YEARS OF EXPERIENCE IN CHECKING OUT MISSILE SYSTEMS; THEREFORE, THEIR FORMULATED IDEAS IN REGARD TO ACCOMPLISHING CHECKOUT - ESPECIALLY IN THE EARLY STAGES - LEAVES LITTLE ROOM FOR RELIANCE ON A COMPUTER SYSTEM. CONSEQUENTLY, AUTOMATION IS DONE IN STEPS. IN EACH STEP THE TEST ENGINEER IS ALLOWED ABSOLUTE CONTROL AT ANY TIME OVER THE SYSTEM. THE CHECKOUT SYSTEM HAS THE CAPABILITY TO ANALYZE AND.React TO VARIOUS VEHICLE CONDITIONS AND ALSO Allows THE OPERATOR TO OVERRIDE THESE DECISIONS. TO PERFORM SATURN VEHICLE AUTOMATIC CHECKOUT, NASA SELECTED A THREE-COMPUTER COMPLEX CONSISTING OF TWO RCA 110A COMPUTERS AND A DDP 224 COMPUTER. THE THREE COMPUTERS IN THE SYSTEM ARE CONNECTED IN SERIES BY DATA LINKS.

TITLE: RECENT NASA EXPERIENCE WITH HYDROGEN ENGINES
AUTHOR BELEW,L.F./DRUMMOND,F.M./STE Date of Pub: 6/29/1964

Abstract:
THIS PAPER PRESENTS A REVIEW OF EXPERIENCE WHICH HAS ACCUMULATED IN DEVELOPMENT OF LIQUID HYDROGEN J-2 AND RL10 ROCKET ENGINES (DEVELOPED BY NAA-ROCKETDYNE AND P&W RESPECTIVELY). A BRIEF DESCRIPTION OF THE CONFIGURATION, PERFORMANCE, AND OPERATION OF EACH ENGINE IS PRESENTED, FOLLOWED BY DESCRIPTION OF RECENT PROGRESS IN AREAS WHICH ARE UNIQUE TO LIQUID HYDROGEN BURNING ENGINES AND, IN PARTICULAR, TO ENGINES WHICH MUST OPERATE IN ENVIRONMENTAL CONDITIONS ENCOUNTERED IN THE SECOND OR THIRD STAGE OF A SPACE VEHICLE.

TITLE: RECOVERABLE S-IB
AUTHOR RUHLAND,W.E./LIPP,R.H. Date of Pub: 6/1/1964

Abstract:
THIS PAPER DEALS WITH SELECTION OF A SIMPLE RECOVERY SYSTEM FOR THE SATURN IB FIRST STAGE. AS AN INTRODUCTION TO THE DISCUSSION ON RECOVERY SYSTEM OBJECTIVES, A PLOT OF THE EXPECTED TRAJECTORY IS PRESENTED. THIS IS FOLLOWED BY A STATEMENT WHICH LISTS THE NECESSARY STEPS WHICH MUST BE FOLLOWED TO DEVELOP A RECOVERY PROGRAM. AN ATTEMPT IS MADE TO MAINTAIN SIMPLICITY OF SYSTEM CONCEPT, MINIMUM DEVELOPMENT TIME, MINIMUM CHANGES TO THE EXISTING S-IB STAGE, MINIMUM ADDED WEIGHT, EASE OF STORAGE AND PACKAGING, ADVANCED STATE OF THE ART, MINIMUM DAMAGE TO THE BOOSTER INTEGRITY IN LANDING, AND MINIMUM OF TURN AROUND (REFURBISHMENT) TIME. A BRIEF DESCRIPTION OF THE VEHICLE IS INCLUDED SO THAT THE RECOVERY PROBLEMS MAY BE MORE FULLY APPRECIATED. SEVEN RECOVERY SYSTEM STUDIES ARE EVALUATED IN TERMS OF WEIGHT AND INCLUDE: (1) STABILIZATION DEVICES, (2) RE-ENTRY, (3) RECOVERY AND RETRIEVAL, INCLUDED ARE DISCUSSIONS OF DRAG CONES, DRAG BALLOONS, DROGUE-CHUTES, PARACHUTES, RETROROCKETS, IMPACT PROBLEMS, AND LARGE BALLOONS. MATERIAL PROBLEMS PRESENTED BY THE FLIGHT ENVIRONMENT ARE DISCUSSED. A POTENTIAL SCHEDULE FOR DEVELOPMENT OF A RECOVERY SYSTEM IS SHOWN IN TERMS OF THE S-IB PROGRAM.

TITLE: REDSTONE ... A REPORT BIBLIOGRAPHY
AUTHOR Date of Pub: 6/9/1969

Abstract:
SEARCH CONTROL NO. 015420

TITLE: REDSTONE ARSENAL COMPLEX IN THE PRE-MISSILE ERA (A HISTORY OF HUNTSVILLE ARSENAL, GULF CHEMICAL WARFARE DEPOT, AND REDSTONE ARSENAL) 1941-1949
AUTHOR JOINER,H.B. Date of Pub: 6/22/1966

Abstract:

TITLE: REDSTONE, JUPITER, AND JUNO
COVERS BACKGROUND AND CONTRIBUTIONS OF THESE ROCKET SYSTEMS.

TITLE: REDUNDANCY EMPLOYING MAJORITY VOTING FOR A SATURN SERVOACTUATOR
AUTHOR: KALANGE, M.A./SMITH, J.D./MART
Abstract: THE SERVOACTUATOR WAS DEVELOPED TO IMPROVE RELIABILITY OF THE SATURN S-IVB THRUST VECTOR CONTROL SYSTEM BY INSURING CONTINUED SYSTEM OPERATION IF SINGLE POINT FAILURES OCCUR. SELECTION OF THE MAJORITY VOTING TECHNIQUE IS DISCUSSED. ITS SIMPLICITY IS CITED ALONG WITH ADVANTAGES OF MINIMUM WEIGHT, SIZE, AND POWER CONSUMPTION, AND COMPATIBILITY WITH EXISTING CONTROL ELECTRONICS. OPERATIONAL FEATURES, DESIGN MECHANIZATION, AND ANALYSIS OF TEST RESULTS ARE COVERED.

TITLE: REGENERATIVE COOLING OF ROCKET ENGINES
AUTHOR: SEADER, J.D./WAGNER, W.R.
Abstract: THIS PAPER SURVEYS THE VARIOUS APPROACHES AND THE ACCOMPLISHMENTS TO DATE IN THE FIELD OF REGENERATIVE COOLING OF ROCKET ENGINES AND POINTS THE WAY TO FUTURE IMPROVEMENTS CONSIDERING ALL THE PROPELLANT COMBINATIONS OF MAJOR INTEREST. A CRITICAL EVALUATION IS MADE OF THE ANALYTICAL TOOLS AVAILABLE TO THE ROCKET DESIGNERS.

TITLE: RELIABILITY - INTRODUCTION
AUTHOR: DAVENPORT, C.
Abstract: 

TITLE: RELIABILITY AND QUALITY MANAGEMENT
AUTHOR: STEINBERG, A.
Abstract: THE ROLE OF RELIABILITY AND QUALITY IN NASA PROGRAM MANAGEMENT IS WELL DEFINED BY THE NPC 200 SERIES SPECIFICATIONS AND COMPLEMENTARY PROCUREMENT REGULATIONS. THIS PAPER Examines THE FLOW OF RELIABILITY AND QUALITY DATA. THE BULK OF THE RELIABILITY TASKS ARE PRIMARILY INFLUENTIAL DURING HARDWARE DEVELOPMENT AND CAN BE CATEGORIZED INTO MANAGEMENT, MODELING, DESIGN CONTROLS, AND TEST. THE QUALITY CONTROL INFLUENCE IS SLANTED TOWARD DEVELOPMENT HARDWARE IDENTIFICATION, ACCURACY OF TEST EQUIPMENT, AND ADEQUACY OF SPECIFICATIONS.

TITLE: RELIABILITY ASSESSMENT AND PREDICTION
AUTHOR: DAVENPORT, C.C.
Abstract: 

TITLE: RELIABILITY ASSESSMENT OF LIQUID ROCKET ENGINES
AUTHOR: STEINBERG, A.
Abstract: 
THE EXTREMELY HIGH RELIABILITY REQUIREMENTS OF NASA SPACE FLIGHT Vehicles PRESENT A CHALLENGE TO THOSE INTERESTED IN RELIABILITY ASSESSMENT. RELIABILITY DEMONSTRATION VIA FLIGHT TESTS ARE OUT OF THE QUESTION. GROUND TESTS ARE NOT REPRESENTATIVE OF FLIGHT CONDITIONS. THE CHALLENGE THEN IS ONE OF USING GROUND TEST TO ESTABLISH A CONFIDENCE RELATED TO FLIGHT RELIABILITY. A FURTHER RESTRICTION IS THAT OF THE CONTRACT REQUIREMENTS NASA IMPOSES FOR A DETERMINATION OF RELIABILITY THROUGH ASSESSMENT. ALTHOUGH DEMONSTRATION OF PROPULSION SYSTEM RELIABILITY IS LESS OF A PROBLEM THAN THAT OF THE VEHICLE AS AN ENTITY, THE MECHANISM FOR ASSESSMENT IS FAR FROM SIMPLE. OUR TECHNIQUE IS ONE OF EVALUATING STATIC FIRING TEST DATA. THIS PAPER WILL DEAL WITH VARIOUS TECHNIQUES OF TREATMENT OF SUCH DATA AND ASSOCIATED GRAPHIC DISPLAYS.

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<th>TITLE:</th>
<th>RELIABILITY ENGINEERING PROGRAM PROVISIONS FOR SPACE SYSTEM CONTRACTORS</th>
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<td>AUTHOR</td>
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Abstract:
SETS FORTH COMMON, GENERAL REQUIREMENTS FOR MSFC CONTRACTOR RELIABILITY PROGRAMS NECESSARY TO INSURE THAT COMPLETE LAUNCH VEHICLE SYSTEMS, STAGES, SUBSYSTEMS, COMPONENTS, AND ASSOCIATED GSE SHALL MEET RELIABILITY REQUIREMENTS OF THE CONTRACT. REQUIREMENTS INCLUDE ESTABLISHMENT, CONTROL AND MAINTENANCE OF AN EFFECTIVE RELIABILITY ENGINEERING PROGRAM FROM DESIGN CONCEPTION TO DELIVERY OF ARTICLES THAT MEET THE INTENDED DESIGN WITH A SATISFACTORY RELIABILITY LEVEL.

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<td>AUTHOR</td>
<td>ORR, J.P.</td>
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<td>Date of Pub:</td>
<td>11/1/1963</td>
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Abstract:
ELEMENTS OF RELIABILITY ARE DISCUSSED, DETAILS GIVEN OF THE DEVELOPMENT OF MANUFACTURING PROCESSES PERFECTED FOR THE SATURN V, ETC.

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<th>TITLE:</th>
<th>RELIABILITY OF THE ALL-UP CONCEPT</th>
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<tr>
<td>AUTHOR</td>
<td>JACKSON, T.T./TINKELENBERG, A.</td>
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<tr>
<td>Date of Pub:</td>
<td>6/15/1964</td>
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Abstract:

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<th>TITLE:</th>
<th>RELIABILITY PICTURE AT MARSHALL SPACE FLIGHT CENTER - PHILOSOPHY, STAFFING AND MANAGEMENT</th>
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<tr>
<td>AUTHOR</td>
<td>STEINBERG, A.</td>
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<tr>
<td>Date of Pub:</td>
<td>11/15/1962</td>
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Abstract:
DISCUSSES RELIABILITY ACTIVITIES, MSFC PHILOSOPHY, MSFC ORGANIZATION, AND CONTRACT MANAGEMENT. SOME OF THE IMPORTANT TECHNIQUES DEVELOPED AND IN USE IN RELIABILITY ENGINEERING ARE REVIEWED.

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<td>AUTHOR</td>
<td>LEVINSON, J.R.</td>
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<td>Date of Pub:</td>
<td>1/7/1964</td>
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</table>

Abstract:
DEVELOPING LARGE, COMPLEX LIQUID-FUEL ROCKETS SUCH AS SATURN I AND V REQUIRES INTENSIVE COORDINATION TO RESOLVE DESIGN PROBLEMS THAT AFFECT MANY DESIGN AND MANUFACTURING GROUPS AT MSFC. MANY PROBLEMS WHICH ARISE WITHIN THE DESIGN LABS REQUIRE STUDY AND ANALYSIS BY OTHER BRANCHES AND LABS OR THE STAGE CONTRACTORS. A METHOD WHICH HAS PROVED EFFECTIVE AT MSFC IS TO DISCUSS THE PROPOSED SOLUTIONS, THE IMPACT OF THE PROPOSED SOLUTIONS UPON A PARTICULAR ENGINEERING DISCIPLINE OR STAGE SUBSYSTEM AT WEEKLY OR SPECIAL MEETINGS. REPRESENTATIVES FROM DESIGN AND OTHER GROUPS DESCRIBE THE PROBLEM AND MAKE RECOMMENDATIONS FOR THE SOLUTION. THIS PAPER PRESENTS SOME CASE HISTORIES IN WHICH RELIABILITY PREDICTION HAS PLAYED AN IMPORTANT ROLE.

| TITLE:          | RELIABILITY PROGRAM EVALUATION PROCEDURES                                               |

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AUTHOR

Abstract:
RELIABILITY PROGRAM EVALUATION PROCEDURES AND RELATED SURVEY CHECKLISTS ARE ESTABLISHED AS A STANDARD TO ASSURE CONSISTENT EVALUATIONS OF RELIABILITY PROCEDURES AND CONTROLS BEING APPLIED TO MANNED SPACE FLIGHT PROGRAMS. MORE SPECIFICALLY, THE OBJECTIVES ARE THREEFOLD: (1) TO ESTABLISH UNIFORM STANDARDS FOR EVALUATING THE DEGREE AND EFFECTIVENESS OF RELIABILITY PRACTICES AND CONTROLS; (2) TO IDENTIFY RELIABILITY TYPE PROBLEMS FOR EVALUATION AND CORRECTION; AND (3) TO PERMIT EVALUATION OF THE VARIOUS METHODS OF CONTROLLING A SPECIFIC AREA LEADING TO IMPROVED RELIABILITY AND SAFETY LEVELS. THIS STANDARD IS DESIGNED TO IDENTIFY PROBLEM AND IMPROVEMENT AREAS CONSISTENT WITH THE SEVERE RELIABILITY AND SAFETY REQUIREMENTS OF MANNED SPACE FLIGHT.

TITLE: RELIABILITY TESTING IN THE S-II STAGE (PAPER)

AUTHOR ROELANDS,D.

Abstract:

TITLE: RELIABILITY, FACT OR FICTION IN THE SPACE PROGRAM

AUTHOR DAVIS,B.K.

Abstract:

TITLE: RENDEZVOUS TO SLASH APOLLO TARGET TIME

AUTHOR

Abstract:
RENDEZVOUS IN SPACE, WHICH WAS NOT EVEN AN ELEMENT OF U.S. SPACE PROGRAM A YEAR AGO, NOW IS BEING COUNTED ON TO HELP ACCOMPLISH THE APOLLO LUNAR LANDING MISSION AT LEAST ONE YEAR EARLIER THAN IT COULD BE DONE BY DIRECT ASCENT. RENDEZVOUS IS CONSIDERED AN ESSENTIAL TECHNIQUE FOR THE MANNED EXPLORATION OF SPACE. EVEN IF A DIRECT ASCENT VEHICLE WERE AVAILABLE FOR THE FIRST LUNAR LANDING, IT WAS FIRST EXAMINED IN GREAT DETAIL AND ADVOCATED STRONGLY FOR PRACTICAL USE IN NASA PROGRAMS BY MSFC. MARSHALL FIRST ADVOCATED AND STILL PREFERS RENDEZVOUS IN AN ORBIT A FEW HUNDRED MILES ABOVE THE EARTH FOR THE APOLLO MISSION. EARTH ORBIT RENDEZVOUS, LUNAR-ORBIT METHOD, LUNAR DESCENT VEHICLES, ETC. ARE DISCUSSED.

TITLE: REPORT FROM MISSISSIPPI

AUTHOR

Abstract:
NASA'S MTF, A $300 MILLION ROCKET PROVING GROUND, IS VERY MUCH IN BUSINESS TODAY. MISSISSIPPI TEST SUPPORT DEPARTMENT OF GE PLAYS A VITAL SUPPORTING ROLE IN THAT BUSINESS...THE BUSINESS OF TESTING THE GARGANTUAN STAGES OF THE APOLLO-SATURN MOON ROCKET.

TITLE: REPORT ON APOLLO

AUTHOR

Abstract:
CONTENTS INCLUDE (1) APOLLO ACTIONS IN PREPARATION FOR THE NEXT MANNED FLIGHT BY DR. MUELLER; (2) COLLECTING AND PROCESSING SAMPLES OF THE MOON; (3) AERONAUTICS IN THE AIAA; ETC.

TITLE: REPORT ON DIGITAL COMPUTERS USED IN AUTOMATIC CHECKOUT
THE USES FOR DIGITAL COMPUTERS ARE MANY AND VARIED. THE MOST COMMON APPLICATIONS HAVE BEEN IN THE BUSINESS AND SCIENTIFIC COMPUTATION WORLD, BUT IT IS NOT UNCOMMON TO FIND THEM BEING USED IN APPAREL DESIGN, NEWSPAPER PUBLICATION, AND MEDICAL RESEARCH. ANOTHER APPLICATION WHICH HAS EVOLVED IN THE PAST FEW YEARS IS THAT OF TESTING LARGE SPACE VEHICLES. THIS REPORT DESCRIBES 12 COMPUTER SYSTEMS AND THEIR USE IN THE VARIOUS PHASES OF SPACE VEHICLE CHECKOUT.
TITLE: REPORT TO THE CONGRESS FROM THE PRESIDENT OF THE UNITED STATES ON UNITED STATES AERONAUTICS AND SPACE ACTIVITIES DURING 1966  
AUTHOR:  
Date of Pub: 1/31/1966  
Abstract:  

TITLE: REPORT TO THE CONGRESS FROM THE PRESIDENT OF THE UNITED STATES ON UNITED STATES AERONAUTICS AND SPACE ACTIVITIES DURING 1967  
AUTHOR:  
Date of Pub: 1/1/1968  
Abstract:  

TITLE: REPORT TO THE SPACE SCIENCE BOARD ON THE SPACE SCIENCE AND APPLICATIONS PROGRAMS  
AUTHOR: NEWELL,H.E.  
Date of Pub: 12/1/1963  
Abstract:  
TABLE OF CONTENTS INCLUDES: PAST ACCOMPLISHMENTS, PLANNED FLIGHT SCHEDULE, INSTRUMENTS AND INVESTIGATORS FOR FORTHCOMING MISSIONS, MANNED SPACE SCIENCE, UNIVERSITY PROGRAMS, SATELLITE APPLICATIONS, AND SUMMARY OF NASA LAUNCH VEHICLES.  

TITLE: REPOSITORY INDEX OF ENGINEERING REPORT AND PROCEDURES (NASA-MSFC)  
AUTHOR:  
Date of Pub: 9/1/1968  
Abstract:  
THIS INDEX IS AN INVENTORY OF ENGINEERING REPORTS AND PROCEDURES AVAILABLE IN REPOSITORY FILES. THE PRIME PURPOSE OF THIS INDEX IS TO REFLECT THE AVAILABILITY OF ENGINEERING REPORTS AND PROCEDURES. THE CONTENTS OF THIS INDEX DO NOT REPRESENT OR INCLUDE THE TOTAL DOCUMENTATION AVAILABLE IN THE REPOSITORY.  

TITLE: REPOSITORY INDEX OF ENGINEERING REPORTS AND PROCEDURES (NASA,MSFC)  
AUTHOR:  
Date of Pub: 11/1/1968  
Abstract:  
THIS SUPPLEMENTS INDEX #001 DATED SEPTEMBER 1968 WHICH IS AN INVENTORY OF ENGINEERING REPORTS AND PROCEDURES AVAILABLE IN REPOSITORY FILES. THE PRIME PURPOSE OF THE INDEX IS TO REFLECT THE AVAILABILITY OF ENGINEERING REPORTS AND PROCEDURES. THE CONTENTS OF THIS INDEX DO NOT REPRESENT OR INCLUDE THE TOTAL DOCUMENTATION AVAILABLE IN THE REPOSITORY.  

TITLE: REPOSITORY INDEX OF SATURN AND APOLLO ENGINEERING REPORTS AND PROCEDURES  
AUTHOR:  
Date of Pub: 6/1/1976  
Abstract:  

TITLE: RESEARCH AND DEVELOPMENT IN INSTRUMENTATION FOR STATIC TESTING  
AUTHOR: SCHULER,A.E.  
Date of Pub: 1/1/1965  
Abstract:  

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THE VARIED MSFC RESEARCH AND DEVELOPMENT PROGRAMS IN INSTRUMENTATION FOR STATIC TESTING ARE SUMMARIZED IN THIS REPORT. THE WORK, DONE IN-HOUSE AND THROUGH CONTRACTS, IS DESCRIBED UNDER THE CATEGORIES OF CRYOGENIC FUEL DENSITY MEASUREMENTS, MASS FLOWMETERS, LIQUID-LEVEL SENSORS, TEMPERATURE-MEASURING INSTRUMENTATION, DAMPED ACCELEROMETERS, DIGITAL TRANSDUCERS, AND CALIBRATION SYSTEMS.

### RESEARCH GRANTS AND CONTRACTS AWARDED TO 25

**AUTHOR**

**Date of Pub:** 2/2/1965

**Abstract:**

NASA HAS AWARDED 27 SUPPLEMENTARY OR NEW RESEARCH GRANTS AND CONTRACTS TOTALING $2,267,284 TO 25 UNIVERSITIES, COLLEGES, AND PRIVATE RESEARCH INSTITUTIONS.

### RESEARCH ON MECHANICAL TRANSLATION

**AUTHOR**

**Date of Pub:** 6/28/1960

**Abstract:**

### RESOURCES FOR FREEDOM - THE OUTLOOK FOR ENERGY SOURCES

**AUTHOR**

**Date of Pub:** 6/1/1952

**Abstract:**

### RESPONSE TO ANY NEWS MEDIA QUERIES CONCERNING MSFC S-II STAGE PEOPLE BEING DETAILED TO SEAL BEACH

**AUTHOR**

**Date of Pub:** 1/6/1967

**Abstract:**

### RESULTS OF OBSERVATIONS OF MARS IN THE USSR DURING THE GREAT OPPOSITION OF 1956

**AUTHOR**

**Date of Pub:** 12/1/1962

**Abstract:**

TRANSLATION OF "REZULTATY NABLYUDENII MARSA VO VREMYA VELIKOGO PROTIVOSTOYANIYA 1956 G. V SSSR." IZDATEL'STVO AKADEMII NAUK V SSSR, 1959

### RESULTS OF SATURN I BLOCK I LAUNCH VEHICLE FLIGHT TESTS

**AUTHOR** LINDLE, C.A./MARTIN, J.R.

**Date of Pub:** 6/26/1963

**Abstract:**

ADDITIONAL DOCNUM IS X64-11133.

### RESULTS OF THE FOURTH SATURN IB LAUNCH VEHICLE TEST FLIGHT AS-204

**AUTHOR**

**Date of Pub:** 5/29/1968

**Abstract:**

### RESULTS OF THE SATURN I LAUNCH VEHICLE TEST FLIGHTS
AUTHOR: CLARK, F.  Date of Pub: 12/9/1966

Abstract:
AN ADDITIONAL DOCNUM IS X67-21924.

TITLE: RESUME OF WERNER K. GENGELBACH, MSFC RESIDENT MANAGER AT NORTH AMERICAN ROCKWELL, SPACE DIVISION

AUTHOR:  Date of Pub: 1/1/1967

Abstract:

TITLE: REVIEW OF CRYOGENIC TECHNOLOGY ASPECTS OF SPACE FLIGHT


Abstract:
CRYOGEN USAGE IN ROCKET PROPULSION CREATED MANY NEW TECHNIQUES AND DEEPLY STIMULATED MANY FIELDS OF CRYOGENIC TECHNOLOGY. THIS PAPER EMPHASIZES CRYOGENIC TECHNOLOGY IN STAGE DEVELOPMENT. THE PRINCIPAL SYSTEMS AND SUBSYSTEMS RELATED TO CRYOGEN USAGE IN ROCKETRY ARE ILLUSTRATED.

TITLE: REVIEW OF THE RESEARCH ORIGINS OF THE LANCE WEAPON SYSTEM-PROJECT HINDSIGHT- TASK 1 SUPPLEMENT

AUTHOR: BROWN, J.H.  Date of Pub: 1/1/1967

Abstract:
INCLUDES A DISCUSSION OF 57 RESEARCH AND EXPLORATORY DEVELOPMENT EVENTS THAT HAVE BEEN IDENTIFIED AS CONTRIBUTING SIGNIFICANTLY TO LANCE. THE PRINCIPAL CONCERN OF THIS STUDY HAS BEEN THE IDENTIFICATION OF FURTHER RESEARCH ORIGINS OF LANCE. A FURTHER CONCERN AND OBLIGATION OF THIS STUDY HAS BEEN TO PROVIDE HINDSIGHT WITH SOME ADDITIONAL DATA ON THE RESEARCH PHENOMENON INCLUDING SOME FURTHER OBSERVATIONS ON THE NATURE AND ROUTE OF RESEARCH UTILIZATION.

TITLE: REVIEW OF THE RESEARCH ORIGINS OF THE LANCE WEAPON SYSTEM-PROJECT HINDSIGHT-TASK 1 SUPPLEMENT


Abstract:

TITLE: RIFT

AUTHOR: FELLOWS, W.S.  Date of Pub: 12/1/1962

Abstract:
AMBITIOUS MANNED MISSIONS IN SPACE WILL REQUIRE VEHICLES UTILIZING ENGINES HAVING A GREATER SPECIFIC IMPULSE THAN CHEMICAL ROCKETS GIVE. THE APPLICATION OF NUCLEAR-ROCKET STAGE TO LARGE LAUNCH VEHICLES WILL INCREASE PAYLOAD CAPABILITY BY A FACTOR OF TWO OR THREE FOR NEAR-EARTH MISSIONS AND EVEN MORE FOR DEEP-SPACE MISSIONS. CONVERSELY, A NUCLEAR ROCKET STAGE ALLOWS A LIGHTER LAUNCH VEHICLE FOR A GIVEN PAYLOAD. PROJECT RIFT (REACTOR-IN-FLIGHT-TEST) WILL FURNISH THE VEHICLES FOR THE FIRST FLIGHT TESTS OF NUCLEAR ROCKET ENGINES AND WILL DEMONSTRATE THE PRACTICABILITY OF NUCLEAR ROCKET PROPULSION FOR SPACE VEHICLE APPLICATION.

TITLE: RL-10 ENGINE MANAGEMENT ARRANGEMENTS (OFFICE MEMORANDUM TO MR. HYATT)

AUTHOR: HEATON, D.H.  Date of Pub: 1/14/1960

Abstract:
TITLE:  ROAR FOR PEARL RIVER

AUTHOR

Date of Pub:  12/1/1965

Abstract:

COVERS INSTALLATION OF MISSISSIPPI TEST FACILITY FOR TESTING OF FIRST AND SECOND STAGES OF SATURN V.

TITLE:  ROCKET ENGINE BIBLIOGRAPHY (3 VOLUMES)

AUTHOR

Date of Pub:  6/9/1969

Abstract:

SEARCH CONTROL NO. 015090

TITLE:  ROCKET ENGINE SELECTION CRITERIA

AUTHOR  SUTTON,G.P.

Date of Pub:  10/1/1967

Abstract:

THIS PAPER CONSIDERS MANY OF THE FACTORS AND CRITERIA WHICH HAVE TO BE CONSIDERED AND EVALUATED WHEN SELECTING A SPECIFIC ROCKET ENGINE FOR A GIVEN VEHICLE APPLICATION. THE LISTS OF CRITERIA CAN BE HELPFUL AS CHECKLISTS IN DESIGN AND SYSTEMS ENGINEERING OF A ROCKET PROPULSION DEVICE. ABOUT TEN DIFFERENT APPLICATIONS ARE EXAMINED TO ILLUSTRATE THE RELATIVE IMPORTANCE OF SOME OF THESE SELECTION CRITERIA. THERE WILL BE GROUPINGS OF FOUR MAJOR TYPES OF CRITERIA: PERFORMANCE, OPERATIONAL, ECONOMIC, AND SO-CALLED JUDGMENT CRITERIA. IN MANY CASES THE LAST THREE CATEGORIES ARE EQUALY OR MORE IMPORTANT THAN THE PERFORMANCE CRITERIA IN SELECTING ONE OF SEVERAL ROCKET ENGINES FOR A SPECIFIC APPLICATION. THE ACTUAL SELECTION USUALLY IS A COMPROMISE TO MAKE THE ROCKET ENGINE RESPONSIVE TO SEVERAL IMPORTANT CRITERIA.

TITLE:  ROCKET ENGINE TURBOPUMPS FOR SPACE TRAVEL

AUTHOR

Date of Pub:  5/1/1966

Abstract:

FINDING THE TURBOPUMP ARRANGEMENT WHICH IS BEST SUITED FOR A GIVEN ROCKET ENGINE - SPACE TRAVEL APPLICATIONS - CONSTITUTES AN IMPORTANT TASK. THE ARRANGEMENT DEPENDS UPON A LARGE VARIETY OF DIFFERENT FACTORS, SUCH AS THE ENGINE CYCLE, WEIGHT, LIQUID TO BE PUMPED, CAVITATION PERFORMANCE, BEARINGS AND THEIR LUBRICATION, SEALS AND THE TURBINE. IN THIS REPORT THESE FACTORS AND THEIR INFLUENCE ON THE TURBOPUMP CONFIGURATION ARE DISCUSSED. IT IS SHOWN THAT THREE OF THEM - WEIGHT, PROPELLANTS TO BE PUMPED AND OBTAINABLE SUCTION PERFORMANCE - HAVE THE LARGEST INFLUENCE ON THE SELECTION OF THE TURBOPUMP. A SYSTEMATIC APPROACH IS OUTLINED FOR THE DESIGN PROCESS, WHICH ALLOWS TO ARRIVE AT A TURBOPUMP ARRANGEMENT BEST SUITED FOR A GIVEN APPLICATION.

TITLE:  ROCKET ENGINES IN THE 50'S

AUTHOR  HOFFMAN,S.K.

Date of Pub:  1/1/1971

Abstract:

TITLE:  ROCKET EXHAUST EFFECTS ON RADIO FREQUENCY TRANSMISSION

AUTHOR  ELY,O.P./HOCKENBERGER,R.W.

Date of Pub:  2/1/1965

Abstract:
SIGNAL STRENGTH DATA TAKEN FROM GROUND STATION AUTOMATIC GAIN CONTROL RECORDS AND VANS INSTRUMENTED FOR TRUE SIGNAL STRENGTH RECORDING ARE ANALYZED TO DETERMINE EFFECTS OF TRANSMITTING THROUGH THE PLASMAS CREATED BY ROCKET EXHAUSTS OF THE SATURN V1 VEHICLE. EFFECTS FROM DIFFERENT MISSIONS ARE COMPARED AS A FUNCTION OF ALTITUDE, ASPECT ANGLE, AND FREQUENCY OF TRANSMISSION. IT IS CONCLUDED THAT EFFECTS OF PLASMAS CREATED BY I LOX/RP-1 ENGINES ARE NEGLIGIBLE ABOVE AN ALTITUDE OF 60 KM. A PRELIMINARY FREQUENCY SPECTRAL ANALYSIS OF THE TRUE SIGNAL STRENGTH DATA SHOWS THAT ENERGY CONCENTRATION CAUSED BY MODULATION OF THE SIGNAL BY THE FLAME IS RESTRICTED TO FREQUENCIES LESS THAN 3 KHZ, WITH VERY LITTLE ENERGY ABOVE 1 KHZ. EFFECT OF THE SOLID I FUEL RETOROCKETS IS MORE SEVERE THAN THAT OF LIQUID FUEL I ENGINES. HOWEVER, THE SOLID FUEL ULLAGE ROCKETS CAUSE NO APPRECIABLE ATTENUATION. THIS DIFFERENCE IN ATTENUATION BETWEEN I THE TWO SOLID FUELS IS BELIEVED TO BE CAUSED BY DIFFERENCE IN THE I POTASSIUM CONTENT. TO CONFIRM THIS ANALYSIS, GROUND TESTS ARE I BEING CONDUCTED TO MEASURE THE RELATIVE ATTENUATION OF THESE AND I OTHER FUELS.

TITLE: ROCKET SERVICE STATION
AUTHOR CLARKE, W.
Date of Pub: 8/1/1966

Abstract:
FILLING THE TWO HUGE FUEL TANKS ON THE FIRST STAGE OF SATURN V1 PROMISES TO BE ALMOST AS COMPLEX AS THE LAUNCH ITSELF. IT WILL INVOLVE THE USE OF A COMPUTER, A SPECIAL, BUILT-IN MEASUREMENT SYSTEM IN THE ROCKET, AND A LARGE CALIBRATION EFFORT IN ADVANCE OF LOADING.

TITLE: ROCKETDYNE LIQUID ROCKET ENGINE FLIGHT RELIABILITY REPORT - OCTOBER, NOVEMBER, DECEMBER 1970
AUTHOR LESTER, M.M.
Date of Pub: 1/1/1971

Abstract:

TITLE: ROCKETS
AUTHOR SUTTON, G.P.
Date of Pub: 3/1/1965

Abstract:
GIVES DEFINITION OF ROCKETS, THEIR USES AND APPLICATIONS, VARIOUS Kinds OF ROCKETS, HOW THEY WORK, HOW THEY ARE LAUNCHED, ETC.

TITLE: ROLE OF ELECTRICAL SYSTEMS IN THE SATURN CAPE OPERATIONS
AUTHOR ADEN, R.M./BAGGS, E.T./BARR, G.P.
Date of Pub: 10/1/1963

Abstract:

TITLE: ROLE OF SIMULATION IN THE DEVELOPMENT OF AN AUTOMATIC CHECKOUT SYSTEM
AUTHOR MEISTER, G.F.
Date of Pub: 8/1/1966

Abstract:
THIS PAPER DESCRIBES THE APPLICATION OF SIMULATION IN THE DEVELOPMENT OF AN AUTOMATIC CHECKOUT SYSTEM AND, IN PARTICULAR, THE OPERATING PROCEDURES USED FOR TESTING OF A COMPLEX SPACE VEHICLE WITH THAT SYSTEM. DISCUSSION IS DIVIDED INTO FOUR MAJOR PARTS: (1) VARIOUS ASPECTS OF DEVELOPMENT OF AN AUTOMATIC CHECKOUT SYSTEM, (2) TYPE OF MISSILE OR STAGE SIMULATORS USED IN PREVIOUS, NON-AUTOMATIC CHECKOUT SYSTEMS AND THEIR SHORTCOMINGS FOR CURRENT AUTOMATIC SYSTEMS, (3) S-IVB STAGE SIMULATOR AND SYSTEMS INTEGRATION LABORATORY AND THE ROLE THEY PLAYED IN DEVELOPMENT OF THE S-IVB AUTOMATIC CHECKOUT SYSTEM, AND (4) SOFTWARE SIMULATORS AND THEIR PRESENT AND FUTURE ROLE IN CONNECTION WITH AUTOMATIC CHECKOUT SYSTEMS.

TITLE: ROLE OF THE ENGINEER AND SCIENTIST IN SATURN S-II DEVELOPMENT

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FOR MANY MEASUREMENTS THE USE OF SCALES HAS BEEN THE ONLY REASONABLE SOLUTION AND FOR MANY CALIBRATION SCALES HAVE BEEN THE WORKING STANDARD, WHICH IS THE BACKBONE OF MEASUREMENTS. THE USE OF SCALES FOR DEVELOPMENT AND FIRING OF ROCKETS RANGES FROM WEIGHING A FEW MICROGRAMS FOR MATERIAL RESEARCH TO MEASUREMENT OF 12 MILLION LBS LOAD AT THE SATURN V LAUNCHING SITE. SOME SCALE APPLICATIONS WHICH REQUIRED MOST EFFORTS AND IMPROVEMENTS AND SOME NEW OR UNUSUAL SYSTEMS ARE DISCUSSED IN THIS PAPER.

**TITLE:** SAA (SATURN APOLLO APPLICATIONS) PROGRAM SPECIFICATION - CASE 218  
**AUTHOR:** HAVENSTEIN, P.L.  
**Date of Pub:** 6/27/1966

**Abstract:**
THIS SPEC DELINEATES PERFORMANCE, DESIGN AND TEST REQUIREMENTS FOR THE SYSTEM ELEMENTS TO BE PROCURED FOR THE SATURN AAP AS DEFINED BY THE CURRENT ISSUE OF THE SATURN AAP DEVELOPMENT PLAN. THE BODY OF THE SPEC APPLIES TO THE FLIGHT VEHICLES AND GROUND SYSTEMS ASSOCIATED WITH THE SEVERAL TYPES OF MISSIONS TO BE FLOWN IN THE PROGRAM. THESE MISSIONS ARE DESCRIBED IN THE CURRENT ISSUE OF THE SATURN APOLLO APPLICATIONS FLIGHT MISSION ASSIGNMENT DIRECTIVE. THE APPENDICES TO THE SPEC DELINEATE THE SPECIAL PERFORMANCE, DESIGN AND TEST REQUIREMENT OF INDIVIDUAL MISSIONS.

**TITLE:** SAFETY ENGINEERING FOR THE MAN  
**AUTHOR:** GALLANT, E.B.  
**Date of Pub:** 6/19/1963

**Abstract:**
A SYSTEM SAFETY ENGINEERING EFFORT WHICH WE CONSIDER TO BE EFFECTIVE IS EMPHASIZED AT ROCKETDYNE. DURING THE PAST FEW YEARS, WE HAVE BEEN CONDUCTING SYSTEMATIC FIELD EVALUATIONS TO IDENTIFY AND RESOLVE ALL SYSTEM SAFETY PROBLEMS WHICH COULD DEVELOP AS A RESULT OF THE OPERATIONAL USE OF OUR ENGINE AND GSE. WE BELIEVE THAT WE HAVE DEVELOPED AN EFFECTIVE AND ECONOMICAL MEANS OF IMPLEMENTING THE SYSTEM SAFETY ENGINEERING REQUIREMENTS BY FOCUSING THE TALENTS AND ENERGIES OF VARIOUS TECHNICAL DISCIPLINES ON THIS HIGHLY IMPORTANT SYSTEM DEVELOPMENT OBJECTIVE. OUR SYSTEM SAFETY ENGINEERING EFFORT IS SO INTEGRATED INTO THE MATRIX OF OUR IN-PLANT PROCEDURES THAT WE ARE ASSURED OF THE FULL ATTAINMENT OF THE SYSTEM SAFETY OBJECTIVES THAT HAVE BEEN ESTABLISHED.

**TITLE:** SATELLITE RECOVERY SYSTEM  
**AUTHOR:** GARDNER, J.P.  
**Date of Pub:** 7/11/1958

**Abstract:**
A SATELLITE RECOVERY SYSTEM COMPOSED OF A RECOVERY CONE AND A RETROROCKET SYSTEM IS PRESENTED. THIS RECOVERY NOSE CONE WAS ORIGINALLY DESIGNED FOR A JUNO III TYPE OF ORBITAL CARRIER. THE PRIMARY PURPOSE OF THIS REPORT IS TO PRESENT AN APPROACH TO THE DESIGN PROBLEMS INVOLVED WITH SOME ATTENTION GIVEN TO BASIC PERFORMANCE. FURTHER INVESTIGATION IS NECESSARY, ESPECIALLY IN THE CATEGORIES OF AEROBALLISTICS AND GUIDANCE AND CONTROL.

**TITLE:** SATELLITES FOR WORLD COMMUNICATION  
**AUTHOR:**  
**Date of Pub:** 3/3/1959

**Abstract:**

**TITLE:** SATURN  
**AUTHOR:**  
**Date of Pub:** 1/1/1962

**Abstract:**
MSFC BROCHURE DESCRIBING SATURN BACKGROUND, SATURN SERIES OF VEHICLES, TEST PROCEDURES, SUPPORT EQUIPMENT, ETC.

**TITLE:** SATURN - A REPORT BIBLIOGRAPHY
THE FIRST HINT OF THE BIG BIRD'S HATCHING WAS A LITTLE ROCKET\(^1\) DEVELOPMENT PROGRAM TENTATIVELY LABELED JUNO 5 BY ARPA SOME THREE YEARS BEFORE PRESIDENT KENNEDY ANNOUNCED IN 1961 THAT AMERICA WAS GOING TO THE MOON. BECAUSE IT FOLLOWED DEVELOPMENT OF THE JUPITER MISSILE, THE BOOSTER'S NAME WAS CHANGED TO SATURN, THE NEXT PLANET OUT FROM THE SUN. THE LATEST MEMBER OF THE SATURN FAMILY HAS BEEN ON LAUNCH PAD 39 AT CAPE KENNEDY, READY FOR THIS MONTH'S FIRST OF SEVERAL PRACTICE SHOTS BEFORE LAUNCHING THREE MEN TOWARD THE MOON. THE SATURN 5, ALL 363 FEET AND 3,000 TONS OF IT, SO FAR IS THE MOST POWERFUL ROCKET EVER FLOWN, AND THE BIGGEST MAN-MADE OBJECT EVER LIFTED OFF THE GROUND. THERE ARE FIVE BASIC MUSCLE-BUILDING, OR UPRATING, TECHNIQUES FOR BIG SPACE BOOSTERS: (1) ENGINE UPRATING, (2) PROPELLANT ADDITIVES, (3) THRUST AUGMENTATION, (4) ADDITIONAL STAGES, AND (5) RECONFIGURATION. THE TWO MOST IMPORTANT QUANTITIES IN UPRATING AN ENGINE ARE THRUST AND IMPULSE.
THIS PAPER PROVIDES A NONTECHNICAL DISCUSSION OF SATURN'S BACKGROUND, SATURN'S PRESENT STATUS, AND SOME OF NASA'S FUTURE PLANS.

**TITLE:** SATURN AND LUNAR FLIGHT  
**AUTHOR** DANNENBERG, K.K.  
**Date of Pub:** 11/2/1962  

**Abstract:**
A REVIEW OF A FEW OF THE HEAVY LAUNCH VEHICLES REQUIRED TO SUPPORT THE NASA ADVANCED MISSION IS PRESENTED. SOME OF NASA'S PRESENT ACTIVITIES AND PLANS ARE OUTLINED.

**TITLE:** SATURN AND THE COMING OF SPACE PROGRAMS  
**AUTHOR** LANGE, O.H.  
**Date of Pub:** 5/1/1962  

**Abstract:**

**TITLE:** SATURN AND THE EXPLORATION OF SPACE  
**AUTHOR** PISANI, R.  
**Date of Pub:** 1/17/1963  

**Abstract:**
DISCUSSES SATURN'S ROLE IN MANNED SPACE EXPLORATION AND THE CONTRIBUTIONS THE MICHOUD AREA WILL MAKE TO THE PROGRAM.

**TITLE:** SATURN AND THE FUTURE  
**AUTHOR** VON BRAUN, W.  
**Date of Pub:** 2/1/1962  

**Abstract:**
THE COMING FAMILY OF SATURN SPACE VEHICLES, INCLUDING THE NEW C-5, WILL BRING SCOPE AND FLEXIBILITY TO OUR MANNED AND UNMANNED MISSIONS NEAR EARTH, TO THE MOON, AND BEYOND.

**AUTHOR** WITTENSTEIN, G.  
**Date of Pub:** 6/7/1963  

**Abstract:**

**TITLE:** SATURN AND THE GULF COAST  
**AUTHOR** PISANI, R.  
**Date of Pub:** 11/24/1962  

**Abstract:**
THE GULF COAST AREA NOW OCCUPIES A UNIQUE POSITION IN THE U.S. A POSITION AS UNIQUE, IN ITS OWN WAY, AS THAT OF HUNTSVILLE. FOR IN THIS AREA, ACTIVITY IS NOW UNDERWAY TO DIRECTLY SUPPORT ADVANCED EXPLORATIONS INTO SPACE. THIS REVIEW COVERS THE BEGINNING OF SPACE EXPLORATION IN 1958 AND DISCUSSES THE MAJOR PARTS OF NASA'S SPACE PROGRAM — USEFUL SATELLITES, MANNED SPACE FLIGHT, ADVANCED RESEARCH AND TECHNOLOGY.

**TITLE:** SATURN AND THE NASA SPACE PROGRAM  
**AUTHOR** CHANDLER, K.B.  
**Date of Pub:** 4/29/1963  

**Abstract:**
THIS DISCUSSION OF THE SATURN CENTERS PRIMARILY ON THE VARIOUS ENGINES USED IN THE VEHICLE. A MOON MISSION VIA THE LUNAR ORBITAL RENDEZVOUS METHOD IS DESCRIBED.

**TITLE:** SATURN APOLLO GUIDANCE ERROR ESTIMATION
A brief sketch of the development of equations for a weighted least squares estimator is given, the equations for both collective and recursive estimators being included. Four possible problem areas that may be encountered in the application of the estimator are identified. Various “success” parameters are defined in an attempt to predict the success with which the method has been applied. The application of the estimation technique to the problem of computing various error parameters associated with the ST-124M guidance platform is described and the numerical results obtained using a manufactured data case are presented.

Abstract:

The early engineering evaluation of the AS-501 indicated that all primary and secondary mission objectives were accomplished. 1 launch occurred at 7:00 a.m. EST on 9 November 1967. All systems and subsystems appear to have performed near nominal. The findings reported herein are the results of combined evaluation efforts of the various R&D labs at MSFC, Boeing, NAR, Douglas, IBM, and Rocketdyne. The results quoted are preliminary and are subject to change.

Abstract:

The Saturn guidance and control concept must be sufficiently broad to accommodate a variety of vehicle configurations and engine specs coupled with a large assortment of mission objectives and flight paths. The guidance concept under development at MSFC meets these requirements and is termed the Adaptive Guidance Mode. This mode functions by accepting present vehicle flight variables and engine parameters as initial conditions and defining the optimum path ahead which meets the mission requirements. This info is supplied in the form of attitude and cutoff commands. This optimum path is generally that requiring minimum fuel consumption. The control mode orients and stabilizes the vehicle along this optimum path even under perturbing influences. The guidance and control system for implementing the Adaptive Guidance Mode is also designed for use in any Saturn vehicle and mission complex.

Abstract:

Considerable effort has been expended in studying the application of solid propulsion systems to the Saturn launch vehicles as primary boosters and many reports have been published on the subject. In contrast to this effort, very little has been said about the very effective role that solids are playing in an auxiliary capacity on the Saturn vehicles. This paper presents a comprehensive report on those systems including a description of the motors selected, the criteria for selection, the development and qualification test programs and their results, available flight test data and a discussion of the ignition systems.
THE SATURN I BOOSTER WHICH IS POWERED BY A CLUSTER OF EIGHT ROCKET ENGINES HAS BEEN SUCCESSFULLY FLOWN ON FOUR SUCCESSIVE FLIGHTS. THIS PAPER SUMMARIZES THE THINKING THAT WENT INTO THE DESIGN OF OUR BASE CONFIGURATION. FLIGHT TEST RESULTS INDICATE THAT PRESSURES, TEMPERATURES, AND HEATING RATES WERE GENERALLY AS EXPECTED.

**Title:** SATURN BASE PLATE THERMAL RADIATIVE CALCULATION PROCEDURES

**Author:** FITZPATRICK, E.

**Date of Pub:** 12/28/1959

**Abstract:**

**Title:** SATURN BIBLIOGRAPHY (RSIC PRINTOUT)

**Author:**

**Date of Pub:** 1/1/1969

**Abstract:**

**Title:** SATURN BLOCK I: PARAMETRIC PERFORMANCE SURVEY FOR SINGLE STAGE SATURN FLIGHTS

**Author:** WINCH, J.

**Date of Pub:** 3/21/1960

**Abstract:**

**Title:** SATURN C-1 CONTROL STUDY FOR FOUR CONTROL MOTORS OPERATIVE

**Author:** SULLIVAN, E./JEAN, O.

**Date of Pub:** 4/14/1960

**Abstract:**

**Title:** SATURN C-1 CONTROL STUDY FOR THREE CONTROL MOTORS OPERATIVE AND POSSIBLE IMPROVEMENT MEASURES

**Author:** SULLIVAN, E./JEAN, O.

**Date of Pub:** 6/8/1960

**Abstract:**

**Title:** SATURN C-1 PROJECT DEVELOPMENT PLAN

**Author:**

**Date of Pub:** 6/1/1962

**Abstract:**

**Title:** SATURN C-1 VEHICLE PROJECT DEVELOPMENT

**Author:** LANGE, O.H.

**Date of Pub:** 8/10/1961

**Abstract:**
IT IS ESSENTIAL THAT GROUND TEST BUILD MAXIMUM ASSURANCE OF SUCCESS FOR EACH LAUNCH. MAJOR PROBLEMS HAVE BEEN SOLVED THROUGH STATIC TESTING WITH THE FIRST SATURN BOOSTER SYSTEM. SATURN DEVELOPMENTAL TESTING FACILITIES ARE DESCRIBED.

FOUR DIFFERENT ENGINE SYSTEMS ARE CURRENTLY BEING USED OR CONSIDERED FOR THE SATURN VEHICLE OR SUCCEEDING VERSIONS OF IT. THEY ARE (1)H-1, IN A CLUSTER OF EIGHT, WHICH FORMS THE FIRST STAGE OF THE PRESENT SATURN; (2)F-1, IN CLUSTERS OF FIVE, WHICH WILL POWER THE FIRST STAGE OF THE SUCCESSOR TO THE PRESENT SATURN; (3)J-2, AN UPPER STAGE ENGINE, WHICH WILL BE CLUSTERED FOR USE IN THE FOLLOW-ON SATURN; AND (4)RL10A-3, WHICH IS CLUSTERED FOR PROPULSION OF THE SECOND STAGE OF THE CURRENT SATURN.

THIS ARTICLE DISCUSSES THE BASIC PROBLEMS CONFRONTING THE CONTROL DESIGNER AND ILLUSTRATES THE VARIOUS CONTROL SCHEMES USED IN SOLVING THEM.
THE SATURN GUIDANCE AND CONTROL SYSTEM IS BEING DESIGNED TO ACCOMMODATE THE MULTISTAGE VEHICLE IN A VARIETY OF MISSIONS, SUCH AS INJECTION INTO ORBIT, ESCAPE TRAJECTORIES, AND REENTRY FLIGHTS. IT IS DESIGNED AS ONE CENTRAL SYSTEM FOR ALL SATURN STAGES AND MISSION AREAS AND FOR POSSIBLE INTEGRATION WITH THE SPACECRAFT.

SATURN GUIDANCE AND CONTROL DEVELOPMENT REPORT

SATURN I - THE FIRST GENERATION OF HEAVY LAUNCH VEHICLES DESIGNED FOR PEACEFUL EXPLORATION OF SPACE

SATURN I ENGINE GIMBAL AND THRUST VECTOR CONTROL SYSTEMS

SATURN I FLIGHT TEST EVALUATION

SATURN I ENGINE GIMBAL AND THRUST VECTOR CONTROL SYSTEMS

SATURN I FLIGHT TEST EVALUATION

SATURN I SUMMARY
TITLE: SATURN I WORKSHOP (MSFC NEWS RELEASE)

AUTHOR

Date of Pub: 3/15/1968

Abstract:

NASA PROPOSES TO PLACE ITS EMBRYONIC SPACE STATION --THE SATURN I WORKSHOP--INTO ORBIT IN 1970 TO GAIN A BETTER UNDERSTANDING OF THE REQUIREMENTS FOR A PERMANENT MAN-MADE ISLAND IN SPACE. THE ORBITAL WORKSHOP OR SATURN S-IVB SPENT STAGE EXPERIMENT CALLS FOR CHANGING A PROPULSION STAGE INTO A LIVING AREA AFTER IT HAS PROPELLED ITSELF INTO SPACE. IN THIS PROJECT, SATURN S-IVB STAGE'S HUGE LIQUID HYDROGEN TANK IS TO BE FIRST MODIFIED ON THE GROUND. THESE MODIFICATIONS WILL ALLOW ASTRONAUTS TO CHANGE THE TANK AREA INTO SPACIOUS LIVING AND WORKING QUARTERS ONCE IN SPACE. THE FIRST ORBITAL WORKSHOP MISSION WILL BE 28 DAYS. NASA WILL LAUNCH THE ORBITAL WORKSHOP AS THE FIRST OF THE AAP MISSIONS. SATURN IB LAUNCH VEHICLES WILL LOFT THE WORKSHOP AND SUBSEQUENT MANNED APOLLO SPACECRAFT.

DISCUSSED IN THIS NEWS RELEASE ARE: AAP MISSION SEQUENCE, SATURN I WORKSHOP DESCRIPTION, S-IVB STAGE, AIRLOCK, MULTIPLE DOCKING ADAPTER, SOLAR ARRAY, ORBITAL WORKSHOP EXPERIMENTS, ORBITAL WORKSHOP PASSIVATION AND ACTIVATION, ORBITAL WORKSHOP MANUFACTURING AND TESTING; THE ORGANIZATIONS RESPONSIBLE FOR DIRECTING THE ORBITAL WORKSHOP PROJECT ARE LISTED ALONG WITH THEIR RESPONSIBILITIES. (SEE NEWS RELEASES DATED 5 DECEMBER 1968, 10 APRIL 1969, AND 22 JULY 1969 FOR MORE RECENT INFORMATION ON THE SATURN I WORKSHOP.)

NASA PROPOSES TO PLACE ITS EMBRYONIC SPACE STATION --THE SATURN I WORKSHOP--INTO ORBIT IN 1971 TO GAIN A BETTER UNDERSTANDING OF THE REQUIREMENTS FOR A PERMANENT MAN-MADE ISLAND IN SPACE. (NOTE: PLEASE REFER TO NEWS RELEASE ON THIS SAME SUBJECT DATED 15 MARCH 1968 FOR ADDITIONAL INFORMATION.)

NASA PROPOSES TO PLACE ITS EMBRYONIC SPACE STATION --THE SATURN I WORKSHOP--INTO ORBIT IN 1971 TO GAIN A BETTER UNDERSTANDING OF THE REQUIREMENTS FOR A PERMANENT MAN-MADE ISLAND IN SPACE. (NOTE: THIS NEWS RELEASE IS A SLIGHT REVISION OF THE ONE ISSUED 5 DECEMBER 1968; PLEASE REFER TO THE 15 MARCH 1968 RELEASE FOR ADDITIONAL INFORMATION.)

TITLE: SATURN I WORKSHOP EXPERIMENTS (MSFC NEWS RELEASE)

AUTHOR

Date of Pub: 4/1/1968

Abstract:

THE SATURN I WORKSHOP, FIRST OF THE AAP MISSIONS, WILL OFFER NASA THE LARGEST VOLUME EVER PLACED INTO EARTH ORBIT IN WHICH TO CARRY OUT EXPERIMENTS. EXPERIMENTS WILL FALL IN FIVE MAJOR GROUPS: 1. SCIENTIFIC, TECHNOLOGICAL, DOD, ENGINEERING, AND MEDICAL 1 CONTAINS LIST OF PRINCIPAL EXPERIMENTS AND SOME ALTERNATE CHOICES. THREE NASA HQ PROGRAM OFFICES, SPACE SCIENCES AND 1 APPLICATIONS, OART, OMSF, PLUS DOD ARE CONTRIBUTING TO THE EXPERIMENT POOL OMSF HAS OVERALL EXPERIMENT MANAGEMENT CHORE. 1 MSFC IS INTEGRATING CENTER FOR SATURN I WORKSHOP EXPERIMENTS.

TITLE: SATURN I/APOLLO SPACE VEHICLE SA-8 TECHNICAL INFORMATION SUMMARY

AUTHOR

Date of Pub: 5/10/1965

Abstract:

THIS REPORT OUTLINES THE GENERAL FEATURES OF SATURN I/APOLLO SPACE VEHICLE SA-8. THE SKETCHES ARE DEVOTED PRIMARILY TO THE LAUNCH VEHICLE BUT ALSO PRESENT LIMITED INFORMATION ON THE LAUNCH PREPARATIONS, THE LAUNCH FACILITY, AND PAYLOAD (PEGASUS SATELLITE PLUS APOLLO CONFIGURATION "SHROUD").

TITLE: SATURN I/IB LAUNCH VEHICLE OPERATIONAL STATUS AND EXPERIENCE

AUTHOR DURAN, B.E.

Date of Pub: 10/7/1968

Abstract:


NASA'S SATURN I/IB LAUNCH VEHICLE PROGRAM HAS BEEN A REMARKABLE SUCCESS STORY IN TERMS OF FLIGHT ACCOMPLISHMENTS. 14 LAUNCH VEHICLES HAVE FLOWN WITHOUT A SINGLE SIGNIFICANT LAUNCH VEHICLE FAILURE; THAT IS, A FAILURE THAT AFFECTED THE MISSION OBJECTIVE. 1 THE PRESENT IB LAUNCH VEHICLE COMPRIS ES AN S-IB STAGE, S-IVB 1 STAGE, AND AN AU STAGE. THE S-IB AND S-IVB STAGES ARE 1 PROPULSION OR BOOSTER STAGES. THE IU HOUSES THE NAVIGATION, GUIDANCE, AND CONTROL EQUIPMENT. A VARIETY OF PAYLOADS HAVE BEEN FLOWN ON THE LAUNCH VEHICLE AND DIFFERENT TYPES OF PAYLOADS ARE PLANNED FOR FUTURE FLIGHTS; HOWEVER, THE PRIMARY PAYLOADS FOR WHICH THE LAUNCH VEHICLE WAS DESIGNED ARE THE COMMAND SERVICE MODULE AND THE LUNAR MODULE. THIS PAPER DISCUSSES THE OPERATIONAL CHARACTERISTICS OF THE 14 SUCCESSFUL FLIGHTS IN TERMS OF THE LAUNCH VEHICLE DESCRIPTION, LAUNCH VEHICLE AND PAYLOAD INTEGRATION AND INTERFACE CONSIDERATIONS; CHECKOUT, LAUNCH, AND FLIGHT OPERATIONS INCLUDING EQUIPMENT, FACILITIES, PROCEDURES, TIME, AND ORGANIZATION; AND POST-FLIGHT ACTIVITIES. THIS PAPER CONCLUDES WITH A DISCUSSION ON PROBLEM RESOLUTION, FEEDBACK, AND FLIGHT ACCOMPLISHMENTS.

TITLE: SATURN IB (SPEECH MADE TO LITTLE ROCK GROUP AND GOVERNOR OF TENNESSEE)
AUTHOR: BUELL, D.N.
Date of Pub: 6/1/1965
Abstract:
DISCUSS WORK OF CHRYSLER AT MICHOUD ON FIRST STAGE OF THE LAUNCH SYSTEM.

TITLE: SATURN IB ESE INTERLOCK SYSTEM
AUTHOR: ELEY, C.H.
Date of Pub: 4/26/1966
Abstract:
INTERLOCKS ARE SYSTEM ELEMENTS UTILIZED TO PROVIDE ASSURANCE TH AT EACH STEP IN THE COUNTDOWN SEQUENCE WILL PROCEED IF, AND ONLY IF, ALL ESSENTIAL READINESS CRITERIA ARE MET. IN ESSENCE, THIS COMBINATION OF RELAYS IS A SPECIAL PURPOSE DIGITAL COMPUTER USED TO CONTROL THE TRANSITION OF THE SATURN IB FROM ONE STATE TO ANOTHER AND TO REPORT ON THE VEHICLE'S STATE OR CHANGE OF STATE I BY ACTIVATING DISCRETE INDICATIONS TO OPERATIONAL PERSONNEL AND THE LAUNCH CONTROL COMPUTER. THIS PAPER PRIMARILY DISCUSSES INTERLOCKS USED FROM INITIATION OF THE AUTOMATIC LAUNCH SEQUENCER (ALS) TO ISSUANCE OF THE ENGINE IGNITION COMMAND AND INTERLOCKS USED FROM THE ISSUANCE OF THE ENGINE IGNITION COMMAND THROUGH THE LAUNCH COMMIT SIGNAL AND VEHICLE LIFTOFF. THE FIRST PART OF THE MANUAL SUMMARIZES THE GENERAL SEQUENCE OF FUNCTIONS AND OPERATIONS AND THE SECOND PART, CONSISTING OF SEVEN APPENDICES, PRESENTS THE SYSTEM IN DETAIL.

TITLE: SATURN IB IMPROVEMENT STUDY - PHASE III (EXECUTIVE SUMMARY REPORT)
AUTHOR: PAGE, M.A.
Date of Pub: 7/17/1968
Abstract:
THE SATURN IB LAUNCH VEHICLE HAS BEEN DEVELOPED TO SUPPORT THE APOLLO PROGRAM. FOR MISSIONS BEYOND APOLLO, INCREASED PAYLOAD CAPABILITY MAY BE NECESSARY OR HIGHLY DESIRED. VEHICLE IMPROVEMENT STUDIES HAVE BEEN CONDUCTED TO DEFINE THE PERFORMANCE GROWTH POTENTIAL OF THE SATURN IB LAUNCH VEHICLE AND TO PROVIDE DATA TO AID THE PLANNING FOR FUTURE MISSIONS.

TITLE: SATURN IB INFLIGHT PHOTOGRAPHIC INSTRUMENTATION SYSTEM
AUTHOR: DAVIS, A.J./HASSLER, P.L.
Date of Pub: 9/1/1966
Abstract:
PRESENTS DEVELOPMENT OF SATURN INFLIGHT PHOTOGRAPHIC INSTRUMENTATION PROGRAM FROM ITS ORIGINAL DEVELOPMENT REQUIREMENT CONCEPT TO THE FLIGHT HARDWARE APPLICATION ON SATURN VEHICLES. A COMPREHENSIVE DESCRIPTION OF THE INFLIGHT PHOTOGRAPHIC INSTRUMENTATION SYSTEM IS GIVEN ALONG WITH DATA CONCERNING TESTING, OPERATION, APPLICATION, AND EVALUATION OF THE SYSTEM AFTER RECOVERY. THIS REPORT SHOWS THAT THE SYSTEM HAS BEEN SUCCESSFULLY DEVELOPED, THAT VALUABLE INFORMATION HAS BEEN OBTAINED FROM FILM RETRIEVED FROM RECOVERED CAPSULES, AND THAT THE SYSTEM CAN BE USED WITH A HIGH DEGREE OF RELIABILITY.

TITLE: SATURN IB LAUNCH VEHICLE PROJECT DEVELOPMENT PLAN
SATURN IB LAUNCH VEHICLE SYSTEM

Title: SATURN IB MISSION PLAN AND TECHNICAL INFORMATION CHECKLIST, VOLUME II

Title: SATURN IB MODIFICATIONS REQUIRED TO SUPPORT THE ORBITAL WORKSHOP MISSION

Title: SATURN IB PAYLOAD PLANNER'S GUIDE

Title: SATURN IB SA-217 REFERENCE LAUNCH VEHICLE

Title: SATURN IB VEHICLE HANDBOOK - VOLUME I: VEHICLE DESCRIPTION (CHRYSLER CORPORATION)

Title: SATURN IB VEHICLE HANDBOOK - VOLUME II: S-IB STAGE (CHRYSLER CORPORATION)
THE SATURN IB VEHICLE HANDBOOK PROVIDES UP-TO-DATE REFERENCE MATERIAL TO BOTH MANAGEMENT AND TECHNICAL PERSONNEL IN ACCORDANCE WITH CONTRACT NAS8-4016, MODIFICATION 281, PARAGRAPH 4.3.4.6.

THIS 4-VOLUME HANDBOOK PROVIDES FUNCTIONAL DESCRIPTIONS AND INSTALLATION INFO FOR MANAGEMENT AND TECHNICAL PERSONNEL ACTIVELY ENGAGED IN THE SATURN IB PROGRAM. THE CONFIDENTIAL SUPPLEMENT CONTAINS ALL CLASSIFIED INFO NECESSARY TO COMPLETE THE SCOPE OF THIS DOCUMENT. THE FOREWORD DELINEATES THE APPLICABILITY OF INFO IN THE HANDBOOK. VOLUME IV CONTAINS IU COMPONENT DESCRIPTIONS AND INSTALLATION ILLUSTRATIONS, APPENDICES, AND THE ALPHABETICAL INDEX.

MICROFICHE ON HAND.

AN ADDITIONAL DOCNUM IS N65-35311.

AN ADDITIONAL DOCNUM IS N65-35311.

AN ADDITIONAL DOCNUM IS N65-35311.
| TITLE: SATURN ILLUSTRATED CHRONOLOGY - SATURN'S FIRST TEN YEARS, APRIL 1957 - APRIL 1967 |
| AUTHOR: AKENS, D.S. | Date of Pub: 8/1/1968 |
| Abstract: |

| TITLE: SATURN ILLUSTRATED CHRONOLOGY (APRIL 1957 - AUGUST 1963) |
| AUTHOR: | Date of Pub: 8/15/1963 |
| Abstract: |

| TITLE: SATURN ILLUSTRATED CHRONOLOGY (APRIL 1957 - NOVEMBER 1962) |
| AUTHOR: | Date of Pub: 2/15/1963 |
| Abstract: |

| TITLE: SATURN IMPROVEMENT STUDIES - A SUMMARY |
| AUTHOR: CRAFT, G.W. | Date of Pub: 10/28/1966 |
| Abstract: |

| TITLE: SATURN INSTRUMENT UNIT COMMAND SYSTEM |
| AUTHOR: LOWERY, H.R. | Date of Pub: 10/22/1965 |
| Abstract: |

| TITLE: SATURN INSULATION: HEAT SHIELDING AND CRYOGENIC INSULATION (PAPER) |
| AUTHOR: LEMONS, C.R. | Date of Pub: 6/1/1966 |
| Abstract: |

| TITLE: SATURN IV CRYOGENIC WEIGHT SYSTEM - PART III (PAPER) |
| AUTHOR: ROSS, E.C. | Date of Pub: 12/1/1964 |
| Abstract: |

| TITLE: SATURN IV/B INSTRUMENT UNIT SYSTEM DESCRIPTION AND COMPONENT DATA |
| AUTHOR: | Date of Pub: 6/1/1966 |
| Abstract: |
THIS MANUAL CONTAINS A BRIEF DESCRIPTION OF EACH INSTRUMENT UNIT (IU) SYSTEM AND THEIR RESPECTIVE COMPONENTS FOR S-IU-201 THROUGH 212 AND S-IU-501 THROUGH 515. ALL COMPONENTS WITHIN A PARTICULAR IU SYSTEM ARE RESTRICTED TO ONE SECTION OF THE MANUAL AND ARE IN ALPHABETICAL ORDER. RELATED REFERENCE MATERIAL FOLLOWS EACH IU COMPONENT DESCRIPTION, SUCH AS, SPECIFICATION NUMBERS, EFFECTIVITY AND LOCATION.

TITLE: SATURN LAUNCH COMPLEX 34

AUTHOR: BRADSHAW, C.L.

Date of Pub: 11/1/1961

Abstract:

CONSTRUCTION HAS BEEN COMPLETED OF A MASSIVE ROCKET LAUNCHING SITE AT CAPE CANAVERAL FROM WHICH EARLY SATURN SPACE VEHICLES WILL BE FIRED. BRIEF DESCRIPTION IS GIVEN OF THE SITE, SALIENT FEATURES OF THE MAJOR ELEMENTS OF THE COMPLEX ARE NOTED, TEST PROCEDURES ARE GIVEN, ETC.

TITLE: SATURN LAUNCH VEHICLE

AUTHOR: BRADSHAW, C.L.

Date of Pub: 4/28/1961

Abstract:

THIS PAPER DISCUSSES SOME OF THE REASONS WHY THE EXPLORATION OF SPACE IS DESIRABLE. THE SATURN LAUNCH VEHICLE AND ITS CAPABILITIES ARE OUTLINED.

AUTHOR: HUBER, W.G.

Date of Pub: 6/29/1963

Abstract:

TITLE: SATURN LAUNCH VEHICLE FAMILY

AUTHOR: MRAZEK, W.A.

Date of Pub: 6/1/1966

Abstract:

DISCUSSES SPUTNIK, EXPLORER, ARPA, SATURN VEHICLES, ETC.

TITLE: SATURN LAUNCH VEHICLE LOGISTICS SUPPORT SYSTEM

AUTHOR: GOODRUM, J.C./SMOLENSKY, S.M.

Date of Pub: 4/1/1965

Abstract:

SIMILARITIES AND DIFFERENCES BETWEEN SATURN LAUNCH VEHICLES AND MILITARY MISSILE SYSTEMS LOGISTIC SUPPORT ARE DISCUSSED. THE UNIQUE AND COMPLEX FEATURES OF LARGE VEHICLE SUPPORT ARE EXEMPLIFIED. LOGISTICS MANAGEMENT WITHIN NASA IS REVIEWED WITH PARTICULAR STRESS ON THE TIE-IN WITH DESIGN LABORATORIES EARLY IN THE PROGRAM. THE ELEMENTS OF LOGISTICS PLANNING AND REQUIREMENTS ARE DISCUSSED TOGETHER WITH THE PERTINENT DOCUMENTATION TREE.

TITLE: SATURN LAUNCH VEHICLES

AUTHOR: O'CONNOR, E.F.

Date of Pub: 7/26/1965

Abstract:

DISCUSSED ARE THE SATURN VEHICLES, ACCOMPLISHMENTS OF SATURN 11 LAUNCHES, SATURN 1B AND V CHARACTERISTICS AND MISSIONS, STURN 1B AND V HARDWARE STATUS, SATURN 1B AND V IMPROVEMENTS STUDIES, SATURN 1B/CENTAUR CHARACTERISTICS, ETC.

TITLE: SATURN MISSILE #8: FLIGHT PERFORMANCE FOR IGNITION FAILURE OF ONE ENGINE OF ATLAS-SECOND STAGE

AUTHOR: SCHMIEDER, D.

Date of Pub: 4/7/1959

Abstract:
TITLE: SATURN MISSILE: OPTIMUM CUTOFF ANGLE FOR LUNAR AND ESCAPE MISSIONS

AUTHOR: SCHMIEDER,D.  Date of Pub: 10/6/1959

Abstract:

TITLE: SATURN PAYLOAD TO A 24-HOUR ORBIT

AUTHOR: HAEUSSERMANN,W.  Date of Pub: 6/1/1961

Abstract:
DISCUSSES THE IMPORTANT CONSIDERATIONS FOR GUIDANCE AND CONTROL IN PLACING A COMMUNICATIONS SATELLITE IN A 24-HOUR EARTH-PERIOD ORBIT WITH THE SATURN VEHICLE. TOUCHES ON SATELLITE POSITIONING, FINAL CORRECTIONS, REACTION-JET CONTROL, ETC.

TITLE: SATURN PROGRAM - TODAY AND TOMORROW

AUTHOR: LANGE,O.H.  Date of Pub: 5/1/1962

Abstract:

TITLE: SATURN PROJECT

AUTHOR: MRAZek,W.A.  Date of Pub: 7/1/1960

Abstract:
THE GIANT ROCKETS ENTAILED IN THIS PROJECT BID FOR U.S. PRE-EMINENCE IN SPACE-PAYLOAD CAPABILITY. A BRIEF HISTORY OF THE SATURN PROJECT IS GIVEN.

TITLE: SATURN PROJECT: MISSILES SA-3 AND SA-4 WITH ATLAS SECOND CHANGE: CONTROL ANALYSIS OF FIRST STAGE FLIGHT

AUTHOR: MCNAIR,L.  Date of Pub: 5/26/1959

Abstract:

TITLE: SATURN RADAR ALTIMETER

AUTHOR: DUGGAN,O.T.  Date of Pub: 8/12/1963

Abstract:
A HIGH ALTITUDE RADAR ALTIMETER DESIGNED FOR USE ON THE SATURN VEHICLE IS DESCRIBED. OPERATIONAL CHARACTERISTICS OF THE ALTIMETER WERE DICTATED BY THE MISSION IT WAS TO PERFORM. IT WAS DESIGNED TO OPERATE AT ALTITUDES BETWEEN 50 KILOMETERS AND 400 KILOMETERS OVER WATER AND TO SUPPLY ALTITUDE INFORMATION IN DATA INCREMENTS OF LESS THAN 8 METERS WITH AN ACCURACY OF ±30 METERS. ALTITUDE READINGS WERE REQUIRED AT A RATE OF NO LESS THAN 10 PER SECOND TO BE TELEMETERED OR RECORDED ON TAPE FOR PLAYBACK ON COMMAND. SYSTEM OPERATION AND SUBASSEMBLY OPERATIONS ARE PRESENTED WITH EMPHASIS ON THE AUTOMATIC TRACKING CIRCUITS AND THE DATA TRANSMISSION SYSTEM. PROBLEMS ASSOCIATED WITH THE DESIGN OF THE ALTIMETER AND THE RESULTS OF THE FIRST EXPERIMENTAL FLIGHT ON SATURN VEHICLE SA-4 ARE DISCUSSED.

TITLE: SATURN REAL TIME ANALYSIS

AUTHOR: PEDDYCOART,J.N./STEVENS,R.L.  Date of Pub: 6/1/1964

Abstract:
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<th>Title</th>
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<td>SATURN ROCKET</td>
<td>VON BRAUN, W.</td>
<td>2/1/1962</td>
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<td>SATURN SA-1 FLIGHT AND ITS INSTRUMENTATION</td>
<td>HOBERT, O.</td>
<td>4/1/1962</td>
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<td><strong>Abstract:</strong></td>
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<td>THE IMPORTANCE OF INSTRUMENTATION ASSOCIATED WITH A SPACE VEHICLE DEVELOPMENT PROJECT SUCH AS SATURN IS DISCUSSED. DESCRIBES HOW SATURN SA-1 WAS INSTRUMENTED AND HOW THE INSTRUMENTATION SYSTEM PERFORMED DURING THE FIRST FLIGHT TEST.</td>
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<tr>
<td>SATURN SEPARATION TECHNIQUES (BASED ON B-1 CONFIGURATION)</td>
<td>DOBBINS, E. / WELLS, H.</td>
<td>12/23/1959</td>
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<td>SATURN SEPARATION TECHNIQUES C-2 CONFIGURATION</td>
<td>IFSHIN, D.</td>
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<td><strong>Abstract:</strong></td>
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<td>SATURN S-IC FISCAL YEAR 1964 ANNUAL PROGRESS REPORT (BOEING COMPANY)</td>
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<td>THIS REPORT ENCOMPASSES THE PROGRESS MADE BY BOEING ON THE SATURN S-IC PROGRAM FOR FY 1964 (JULY 1, 1963 THRU JULY 2, 1964). THE MAIN OBJECTIVE OF THIS REPORT IS TO SERVE AS AN HISTORICAL PRESENTATION STRESSING BOEING ACCOMPLISHMENTS AND PRESENT CAPABILITIES UNDER CONTRACT NAS8-5608.</td>
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<td>SATURN S-IC GROUND SUPPORT EQUIPMENT</td>
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<td>SATURN S-II CHRONOLOGY OF EVENTS</td>
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<td>AUTHOR</td>
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<td>PARKER, W.F.</td>
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THE MAJOR FACTOR GOVERNING DESIGN OF ROCKET-VEHICLE SECONDARY STRUCTURE AND COMPONENT PARTS IS THE LOW- AND MID-RANGE FREQUENCY RESPONSE OF THE PRIMARY STRUCTURE SHELL TO ACOUSTIC EXCITATION ASSOCIATED WITH ENGINE AND AERODYNAMIC NOISE. UNTIL RECENTLY, LAB SIMULATION OF THESE IMPOSED ACOUSTIC ENVIRONMENTS HAS BEEN IMPOSSIBLE BECAUSE OF FACILITY SIZE AND POWER LIMITATIONS. HOWEVER, RECENT ADVANCES IN FACILITY CAPABILITY HAVE PROVIDED MEANS BY WHICH FULL-SIZED ASSEMBLIES CAN BE EXPOSED, IN GROUND TEST, TO SIMULATION OF VEHICLE BOOST VIBRATION AND ACOUSTIC ENVIRONMENTS. MSFC HAS MADE EXTENSIVE USE OF THESE CAPABILITIES IN GROUND-TEST DEVELOPMENTAL PROGRAMS ON S-II, S-IVB, AND IU ASSEMBLIES AND SUBASSEMBLIES. PRESENTED ARE (A) A SUMMARY OF THESE TESTS; (B) THE PHILOSOPHY OF THE UTILIZATION OF ASSEMBLY TESTS; (C) METHODS OF ESTABLISHING TEST ENVIRONMENTS; (D) ADVANTAGES AND LIMITATIONS OF THIS TYPE OF TESTING; (E) A COMPARISON OF TEST RESULTS TO OTHER TYPES OF GROUND TESTS AND FLIGHT ENVIRONMENTS; AND (F) CONCLUSIONS, DERIVED FROM THESE COMPARISONS, ON THE USEFULNESS AND VALIDITY OF THIS TYPE OF GROUND TEST.

### SATURN S-IV AND S-IVB OPERATIONS DEVELOPMENT PROGRESS

**Author:** SHEMPP, W.M.  
**Date of Pub:** 2/15/1965

**Abstract:**

### SATURN S-IV CRYOGENIC WEIGH SYSTEM - PART I: PROPELLANT UTILIZATION

**Author:** NICHOLS, R.H./HENDEE, E.A.  
**Date of Pub:** 6/20/1965

**Abstract:**

IN ORDER TO ACHIEVE MAXIMUM VEHICLE EFFICIENCY, IT IS ESSENTIAL THAT THE VEHICLE PROPELLANTS BE LOADED TO DESIRED VALUES AND THAT THESE PROPELLANTS APPROACH SIMULTANEOUS DEPLETION AT THE END OF A POWERED FLIGHT. TO ACCOMPLISH PRECISE LOADING AND ASSURE MINIMUM RESIDUALS, A HIGHLY ACCURATE AND REPEATABLE, VEHICLE LOCATED, PROPELLANT MANAGEMENT (PM) OR PROPELLANT UTILIZATION (PU) SYSTEM, MUST BE USED. AS THE ABILITY TO LOAD PROPELLANTS TO PREDETERMINED VALUES DEPENDS DIRECTLY ON THE ABILITY OF THE SYSTEM TO ACCURATELY SENSE THE PROPELLANT MASSES, IT IS ESSENTIAL THAT THE SYSTEM BE CALIBRATED WITH RESPECT TO PROPELLANT MASS UNDER CONDITIONS RESEMBLING THOSE TO BE EXPERIENCED DURING FINAL LOADING AND POWERED FLIGHT. THE USE OF A CRYOGENIC WEIGH SYSTEM WILL REDUCE THE UNKNOWN FACTORS IN CAPACITANCE SENSOR ELEMENT SHAPING, TANK GEOMETRY, AND PROPELLANT PROPERTIES TO A DEGREE WHICH WILL PERMIT THE DETERMINATION OF PROPELLANT MASSES TO WITHIN 0.25%. THIS PAPER DESCRIBES THE BASIC PURPOSE FOR A CRYOGENIC WEIGH SYSTEM IN CONNECTION WITH THE CALIBRATION OF THE SATURN PROPELLANT UTILIZATION SYSTEM USED ON THE S-IV STAGE.

### SATURN S-IV CRYOGENIC WEIGH SYSTEM - PART II: WEIGH OPERATIONS

**Author:** MATSUMOTO, G.A.  
**Date of Pub:** 6/20/1965

**Abstract:**

TWO BASIC METHODS FOR MASS DETERMINATION ARE (1) DIRECT MEASUREMENT AND (2) VOLUME AND DENSITY DETERMINATION. BOTH METHODS OF VARIATIONS HAVE BEEN USED TO DETERMINE SPACE VEHICLE PROPELLANT MASS WITH VARYING DEGREES OF SUCCESS. STRINGENT PROPELLANT LOADING ACCURACY REQUIREMENTS OF ± OR - 0.5% FOR THE S-IV STAGE HAVE LED TO DEVELOPMENT OF A CRYOGENIC CALIBRATION WEIGH SYSTEM. THE METHOD EMPLOYS ACCURATE ELECTRONIC FORCE TRANSDUCERS AND MEASURING SYSTEMS AS THE STANDARD AND EXPERIMENTAL WEIGHINGS HAVE VERIFIED ACHIEVEMENT OF BETTER THAN THE REQUIRED ACCURACY.

### SATURN S-IV CRYOGENIC WEIGH SYSTEM - PART IV: SAFETY

**Author:** CORCORAN, E.G.  
**Date of Pub:** 6/20/1965

**Abstract:**

DURING CRYOGENIC WEIGH SYSTEM OPERATION, HYDROGEN WHEN COMBINED WITH OXYGEN CAN CREATE AN UNSAFE CONDITION. THEREFORE, CONCENTRATION OF THE RESIDUAL OXYGEN AND HYDROGEN FROM LEAKS IN THE CRYOGENIC WEIGH ENVIRONMENTAL BAGS MUST BE KNOWN AT ALL TIMES DURING THE CRYOGENIC WEIGH. HYDROGEN AND OXYGEN DETECTORS WILL PROVIDE THE OPTIMUM METHOD FOR MAINTAINING SAFE CONDITIONS. HYDROGEN PROPERTIES AND SAFE MIXTURES ARE REVIEWED. THE METHOD SELECTED TO ANALYZE THE OXYGEN CONTENT IS DISCUSSED. SELECTION, DEVELOPMENT, AND TESTING OF A HYDROGEN DETECTOR SYSTEM IS EXAMINED.
SATURN S-IV HINTS AT FUTURE PROBLEMS IN TRANSPORT, HANDLING, ETC.

AUTHOR

Date of Pub: 10/16/1961

Abstract:
TRANSPORTATION AND HANDLING TECHNIQUES ARE BECOMING A MAJOR INFLUENCE IN THE DESIGN OF MASSIVE U.S. ROCKETS - THrust, MISSION 1 AND OTHER MORE FAMILIAR CRITERIA WILL SOON TAKE A BACK SEAT IN COMPARISON WITH THE LESS GLAMOROUS TASKS OF PACKING AND SHIPPING. FOR EXAMPLE, THE SATURN S-IV STAGE WILL HAVE TRANSPORTATION AND SUPPORT PROBLEMS PECULIAR TO ITSELF - EVEN THROUGH IT IS BUT ONE SECTION OF THE COMPLETE SATURN VEHICLE. IN ADDITION, SPECIAL TRANSPORT EQUIPMENT AND PACKAGING ARE NECESSARY. CHECKOUT AND HANDLING APPARATUS WILL HAVE TO BE BUILT ESPECIALLY FOR THE S-IV.

SATURN S-IVB QUARTERLY TECHNICAL PROGRESS REPORT

AUTHOR RAINWATER,B.J.

Date of Pub: 9/1/1966

Abstract:


SATURN STAGE S-II

AUTHOR

Date of Pub: 7/7/1961

Abstract:

SATURN STANDS UP

AUTHOR SHEIL,W.B.

Date of Pub: 4/1/1964

Abstract:
DETERMINING THE BEST WAY TO ASSEMBLE THE SATURN V/APOLLO MOON ROCKET REQUIRED STUDY OF A NUMBER OF POSSIBLE METHODS. A DECISION FINALY WAS MADE TO PUT THE S-IC TOGETHER IN A VERTICAL POSITION, WITH GRAVITY SUPPLYING THE FORCE TO HOLD THE PARTS IN PLACE WHILE THEY ARE BEING FASTENED. A SPECIALLY BUILT 215-FOOT-TALL VERTICAL ASSEMBLY, HYDROSTATIC TESTING AND CLEANING BUILDING IS NEARING COMPLETION AT MICHOUD. AFTER THE FIVE S-IC SECTIONS HAVE BEEN ASSEMBLED IN THE BUILDING, THE BOOSTER WILL BE LAID DOWN HORIZONTALLY ON A GIGANTIC CART AND MOVED TO ANOTHER BUILDING, WHERE ENGINES AND MISCELLANEOUS EQUIPMENT WILL BE INSTALLED. FOLLOWING CHECKOUT AND TEST AT MICHOUD, THE BOOSTER WILL BE BARGED, IN A HORIZONTAL POSITION, TO HUNTSVILLE, ALABAMA OR THE MISSISSIPPI TEST OPERATION FOR STATIC FIRING. WHEN STATIC FIRINGS ARE COMPLETED, THE BOOSTER WILL BE RETUNED TO MICHOUD FOR REFRUSHING AND THEN BARGED TO CAPE KENNEDY, WHERE IT WILL BE STOOD UPRIGHT AGAIN AND JOINED WITH THE OTHER BOOSTER STAGES AND THE SPACECRAFT, TO MAKE AN ENTIRE VEHICLE.

SATURN SYSTEM STUDY II

AUTHOR

Date of Pub: 11/13/1959

Abstract:

SATURN SYSTEMS MANAGEMENT
AUTHOR  LANGE,O.H.  Date of Pub:  6/1/1963

Abstract:

TITLE:  SATURN TECHNICAL INFORMATION HANDBOOK - VOLUME III

AUTHOR  Date of Pub:  4/1/1966

Abstract: MICROFICHE ON HAND.

TITLE:  SATURN TELEMETRY AND TRACKING

AUTHOR  HOBERG,O.A.  Date of Pub:  2/1/1962

Abstract: TYPICAL TELEMETRY SYSTEM FOR SA-1 AND SA-III SATURNS IS NOTED ALONG WITH SS-FM TELEMETRY SYSTEM FOR VIBRATION AND OTHER WIDEBAND DATA. TYPICAL SATURN STATIC TESTING INSTRUMENTATION SETUP, CONTROL SYSTEMS PLAN FOR SATURN STATIC TEST TOWER.

TITLE:  SATURN TELEVISION SYSTEM FOR SA-6

AUTHOR  HUGGINS,C.T.  Date of Pub:  2/25/1963

Abstract: THE SATURN TELEVISION SYSTEM IS AN INSTRUMENTATION DEVICE INTENDED TO PROVIDE VISUAL INFORMATION ON VEHICLE PERFORMANCE IN REAL TIME. THE SYSTEM COVERS THE ENTIRE PROBLEM FROM THE ORIGINAL IMAGE PRESENTED TO THE TELEVISION CAMERA TO THE PRESENTATION OF THE FINISHED PHOTOGRAPHS FOR ANALYSES. A BRIEF HISTORY OF THE TELEVISION INSTRUMENTATION SYSTEM IS PRESENTED TO CHRONICLE THE EVOLUTION OF THE SYSTEM CONCEPTS AND DESIGNS. THE INFLIGHT TELEVISION SYSTEM AND THE GROUND RECEIVING STATION ARE DESCRIBED, AS USED IN THE INSTRUMENTATION OF THE SATURN SA-6 INFLIGHT VEHICLE TEST FLIGHT. THIS MODULAR SYSTEM IS HIGHLY ADAPTABLE TO MANY VARIOUS APPLICATIONS. IT IS AVAILABLE WITHOUT ADDITIONAL R&D FUNDING TO OTHER GOVERNMENT AGENCIES.

TITLE:  SATURN THIRD STAGE, S-IVB - MANUFACTURING

AUTHOR  BOUCHER,K.H.  Date of Pub:  10/4/1965


TITLE:  SATURN V - AMERICA'S MOON ROCKET

AUTHOR  Date of Pub:  1/1/1967

Abstract: GIVES MISSION, STAGE DESCRIPTION, INFORMATION PERTAINING TO APOLLO SPACECRAFT, AND CONFIGURATION INFORMATION.

TITLE:  SATURN V - APOLLO ROCKET, A SUMMARY OF HER FUNCTIONS AND APPLICATIONS

AUTHOR  HAEUSSEMANN,W.  Date of Pub:  7/1/1966

Abstract:

TITLE:  SATURN V PROGRAM MANAGEMENT PRESENTATION
**TITLE:** SATURN V APOLLO FLIGHT CONFIGURATION  
**AUTHOR:** PYLE, L.D.  
**Date of Pub:** 11/1/1967  
**Abstract:**

INDICATES SPECIFICATIONS OF SATURN V, CONFIGURATION OF THE COMMAND MODULE CONTROLS AND DISPLAYS, AND CONFIGURATION OF THE A6L APOLLO BLOCK II PRESSURE SUITS AND PORTABLE LIFE SUPPORT SYSTEM.

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**TITLE:** SATURN V APOLLO-LUNAR ORBIT RENDEZVOUS MISSION  
**AUTHOR:**  
**Date of Pub:** 9/1/1963  
**Abstract:**

THE SATURN V IS BEING DEVELOPED ESPECIALLY FOR PROJECT APOLLO. USING THE LUNAR ORBITAL RENDEZVOUS MODE, TWO OF A THREE-MAN CREW WILL LAND ON THE MOON, EXPLORE IT FOR AT LEAST ONE DAY, REJOIN THE THIRD CREW MEMBER WHO REMAINED IN LUNAR ORBIT, AND RETURN SAFELY TO EARTH. THIS ILLUSTRATED BOOKLET DESCRIBES THE SATURN V LAUNCH VEHICLE, THE APOLLO SPACECRAFT, AND THE LUNAR ORBITAL RENDEZVOUS MODE CHOSEN FOR OUR FIRST MANNED LUNAR LANDING ATTEMPT.

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**TITLE:** SATURN V BOOSTER - THE F-1 ENGINE  
**AUTHOR:** ALDRICH, D.E.  
**Date of Pub:** 3/1/1965  
**Abstract:**

DESCRIPTION AND CAPABILITIES GIVEN OF THE F-1 ROCKET ENGINE.

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**TITLE:** SATURN V COMPONENT QUALIFICATION ASSURANCE PROGRAM  
**AUTHOR:** HALE, F.L.  
**Date of Pub:** 5/1/1967  
**Abstract:**

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**TITLE:** SATURN V COMPONENT VIBRATION TESTS USING SEGMENTED SHELL SPECIMENS  
**AUTHOR:** HWANG, C./LIFER, C.E.  
**Date of Pub:** 8/1/1968  
**Abstract:**

TITLE: SATURN V COMPOSITE MECHANICAL SCHEMATIC

AUTHOR

Date of Pub: 2/15/1969

Abstract:

ORIGINAL DOCUMENT DATED 23 DECEMBER 1964; LATEST REVISION DATED 15 FEBRUARY 1969.

TITLE: SATURN V CONFIGURATION MANAGEMENT MANUAL

AUTHOR

Date of Pub: 1/1/1966

Abstract:

THE SATURN V CONFIGURATION MANAGEMENT PROGRAM ELEMENT PLAN ESTABLISHES THE SATURN V CONFIGURATION MANAGEMENT PROGRAM AND ASSIGNS AUTHORITIES AND RESPONSIBILITIES FOR ITS EFFECTIVE IMPLEMENTATION AND OPERATION. IT ALSO ESTABLISHES THE SATURN V CONFIGURATION MANAGEMENT MANUAL AS THE SOLE AUTHORITATIVE SOURCE FOR SATURN V CONFIGURATION MANAGEMENT REQUIREMENTS AND PROCEDURES.

TITLE: SATURN V DERIVATIVE (S-IC/S-IVB/IU) LAUNCH VEHICLE SYSTEM STUDY

AUTHOR

Date of Pub: 9/15/1969

Abstract:

VOLUME I - FINAL TECHNICAL REPORT
VOLUME II - APPENDICES
CONTRACT NAS8-30506

THIS DOCUMENT CONTAINS THE RESULTS OF A STUDY TO DEFINE IN DETAIL A SATURN V DERIVATIVE 9S-IC/S-IVB/IU LAUNCH VEHICLE AND TO DETERMINE ITS IMPLEMENTATION AND PRODUCTION COSTS AND SCHEDULES. THE S-IC/S-IVB/IU, OR INT-20, HAS PAYLOAD CAPABILITIES IN THE INTERMEDIATE RANGE BETWEEN SATURN IB AND SATURN V. THE STUDY WAS CONDUCTED UNDER MSFC CONTRACT NAS8-30506.

TITLE: SATURN V DERIVATIVES

AUTHOR SCOTT, R.D./CORCORAN, W.L.

Date of Pub: 1/1/1968

Abstract:

THIS PAPER DESCRIBES AN EVOLUTIONARY FAMILY CONCEPT OF SATURN V DERIVATIVE LAUNCH VEHICLE SYSTEMS, DISCUSSES THEIR PERFORMANCE CAPABILITIES, AND OUTLINES THEIR ABILITY TO PERFORM ORBITAL AND HIGH-ENERGY MISSIONS AT MINIMUM TOTAL PROGRAM COST. THE VERSATILITY AND UTILITY OF THE SATURN V LAUNCH VEHICLE SYSTEM HAVE BEEN WELL PUBLICIZED WITH RESPECT TO ITS ABILITY TO INJECT SIZEABLE EXPLORATORY PAYLOADS THROUGHOUT THE SOLAR SYSTEM AND WITH RESPECT TO ITS EARTH ORBITAL AND CAPABILITY TO EXPLOIT NEAR EARTH BY UTILIZING A MANNED SPACE STATION DERIVED FROM THE THIRD STAGE. THE COMPLETE FLEXIBILITY OF THE EVOLUTIONARY SATURN V SYSTEM IS IDENTIFIED THROUGH DERIVATIVE LAUNCH VEHICLE CONCEPT WHICH UTILIZE A "COMMON CORE" DESIGN. THESE VEHICLES DEMONSTRATE POTENTIAL ABILITY TO SPAN THE EARTH ORBITAL AND PLANETARY PAYLOAD SPECTRUM. THE VALIDITY OF THIS EVOLUTIONARY CONCEPT IS ANALYZED AND DERIVATIVE CANDIDATES ARE EVALUATED IN TERMS OF DESIGN COMMONALITY AND TRAFFIC LEVELS. RESOURCES AND SCHEDULE INFORMATION IS PROVIDED FOR AN EVOLUTIONARY DEVELOPMENT PLAN THAT COULD SATISFY CIVILIAN SPACE EXPLOITATION REQUIREMENTS FOR THE FORESEEABLE FUTURE. THE THEME IS MAXIMUM UTILIZATION OF PRESENT EQUIPMENT, FACILITIES, SATURN V HARDWARE ITEMS AND ENGINEERING TECHNIQUES TO INSURE COMPATIBILITY OF PRESENT AND FUTURE DESIGNS.

TITLE: SATURN V DYNAMIC TEST PROGRAM

AUTHOR COVINGTON, W.R./SEAHOLM, N.A.

Date of Pub: 5/1/1967

Abstract:
TITLE: SATURN V DYNAMIC TEST VEHICLE INSTRUMENTATION AND DATA ACQUISITION SYSTEM
AUTHOR: EDELBERG, A.Y.
Date of Pub: 2/1/1967

Abstract:

TITLE: SATURN V FIRST STAGE (S-IC) FISCAL YEAR 1966 ANNUAL PROGRESS REPORT (BOEING COMPANY)
AUTHOR:
Date of Pub: 7/1/1966

Abstract:
THIS DOCUMENT REPORTS PROGRESS MADE BY BOEING ON THE SATURN S-IC PROGRAM FOR FY 1966 (JULY 2, 1965 THROUGH JUNE 30, 1966), PERTAINING TO SCHEDULE 1 OF CONTRACT NAS8-5608. THIS REPORT INCLUDES THE FOLLOWING SUBJECTS: PROJECT MANAGEMENT, CONTRACT AND ITEMS AND SERVICES, FACILITIES PLANNING AND ACTIVATION, LOGISTICS, STAGE SYSTEM STUDIES, LAUNCH OPERATIONS, AND ADVANCED STUDIES.

TITLE: SATURN V FIRST STAGE (S-IC) FISCAL YEAR 1967 ANNUAL PROGRESS REPORT (BOEING COMPANY)
AUTHOR:
Date of Pub: 7/28/1967

Abstract:
THIS DOCUMENT REPORTS PROGRESS MADE BY BOEING ON THE SATURN S-IC PROGRAM FOR FY 1967 (JULY 1, 1966 THROUGH JUNE 29, 1967), PERTAINING TO SCHEDULES 1 AND IA OF CONTRACT NAS8-5608. THIS REPORT INCLUDES THE FOLLOWING SUBJECTS: PROJECT MANAGEMENT, CONTRACT AND ITEMS AND SERVICES, FACILITIES PLANNING AND ACTIVATION, LOGISTICS, STAGE SYSTEM STUDIES, LAUNCH OPERATIONS, AND ADVANCED STUDIES.

TITLE: SATURN V FIRST STAGE (S-IC) FISCAL YEAR 1968 ANNUAL PROGRESS REPORT (BOEING COMPANY)
AUTHOR:
Date of Pub: 7/27/1968

Abstract:
THIS DOCUMENT REPORTS PROGRESS MADE BY BOEING ON THE SATURN S-IC PROGRAM FOR FY 1968 (JUNE 30, 1967 THROUGH JUNE 27, 1968), PERTAINING TO SCHEDULES 1 AND IA OF THE CONTRACT. THIS REPORT INCLUDES THE FOLLOWING SUBJECTS: PROJECT MANAGEMENT, CONTRACT AND ITEMS AND SERVICES, FACILITIES PLANNING AND ACTIVATION, LOGISTICS, STAGE SYSTEM STUDIES, LAUNCH OPERATIONS, AND ADVANCED STUDIES.

TITLE: SATURN V FLIGHT EVALUATION TREND REPORT, AS-501 THROUGH AS-506
AUTHOR:
Date of Pub: 9/30/1969

Abstract:
THIS DOCUMENT PROVIDES A SUMMARY OF PROPULSION PERFORMANCE, CONFIGURATION DIFFERENCES, AND MALFUNCTION INFO FOR SATURN V LAUNCH VEHICLES AS-501 THROUGH AS-506. TRENDS IN PERFORMANCE AND FLIGHT PREDICTION ACCURACY ARE INCLUDED. COMPARISONS BETWEEN ONE VEHICLE AND ANOTHER ARE FACILITATED BY PRESENTING DATA IN TABULAR AND GRAPHIC FORM.

TITLE: SATURN V FLIGHT MANUAL - SA-503
AUTHOR:
Date of Pub: 11/1/1968

Abstract:
THIS MANUAL WAS PREPARED TO PROVIDE THE ASTRONAUT WITH A SINGLE SOURCE REFERENCE AS TO THE CHARACTERISTICS AND FUNCTIONS OF THE 1 SA-503 LAUNCH VEHICLE AND AS-503 MANNED FLIGHT MISSION. A REVISION TO THIS MANUAL WILL BE RELEASED APPROXIMATELY THIRTY DAYS PRIOR TO THE SCHEDULED LAUNCH DATE. THE MANUAL PROVIDES GENERAL MISSION AND PERFORMANCE DATA, EMERGENCY DETECTION SYSTEM INFO, DESCRIPTION OF EACH STAGE AND IU, AND A GENERAL DISCUSSION OF GROUND SUPPORT FACILITIES, EQUIPMENT, AND MISSION CONTROL. A BIBLIOGRAPHY IDENTIFIES ADDITIONAL REFERENCES IF A MORE COMPREHENSIVE STUDY IS DESIRED. THIS MANUAL IS FOR INFORMATION ONLY AND IS NOT A CONTROL DOCUMENT.

Title: SATURN V FLIGHT MANUAL - SA-504
Author: Date of Pub: 1/25/1969
Abstract:
THIS MANUAL WAS PREPARED TO PROVIDE THE ASTRONAUT WITH A SINGLE SOURCE REFERENCE AS TO THE CHARACTERISTICS AND FUNCTIONS OF THE 1 SA-504 LAUNCH VEHICLE AND AS-504 FLIGHT MISSION. THE MANUAL PROVIDES GENERAL MISSION AND PERFORMANCE DATA, EMERGENCY DETECTION SYSTEM INFORMATION, DESCRIPTION OF EACH STAGE AND IU, AND A GENERAL DISCUSSION OF GROUND SUPPORT FACILITIES, EQUIPMENT, AND MISSION CONTROL. A BIBLIOGRAPHY IDENTIFIES ADDITIONAL REFERENCES IF A MORE COMPREHENSIVE STUDY IS DESIRED. THIS MANUAL IS FOR INFORMATION ONLY AND IS NOT A CONTROL DOCUMENT.

Title: SATURN V FLIGHT MANUAL - SA-505
Author: Date of Pub: 10/15/1968
Abstract:
THIS MANUAL WAS PREPARED TO PROVIDE THE ASTRONAUT WITH A SINGLE SOURCE REFERENCE AS TO THE CHARACTERISTICS AND FUNCTIONS OF THE 1 SA-505 LAUNCH VEHICLE AND AS-505 FLIGHT MISSION. THE MANUAL PROVIDES GENERAL MISSION AND PERFORMANCE DATA, EMERGENCY DETECTION SYSTEM INFORMATION, DESCRIPTION OF EACH STAGE AND IU, AND A GENERAL DISCUSSION OF GROUND SUPPORT FACILITIES, EQUIPMENT, AND MISSION CONTROL. A BIBLIOGRAPHY IDENTIFIES ADDITIONAL REFERENCES IF A MORE COMPREHENSIVE STUDY IS DESIRED. THIS MANUAL IS FOR INFORMATION ONLY AND IS NOT A CONTROL DOCUMENT.

Title: SATURN V FLIGHT MANUAL - SA-506
Author: Date of Pub: 2/25/1969
Abstract:
THIS MANUAL WAS PREPARED TO PROVIDE THE ASTRONAUT WITH A SINGLE SOURCE REFERENCE AS TO THE CHARACTERISTICS AND FUNCTIONS OF THE 1 SA-506 LAUNCH VEHICLE AND AS-506 FLIGHT MISSION. THE MANUAL PROVIDES GENERAL MISSION AND PERFORMANCE DATA, EMERGENCY DETECTION SYSTEM INFORMATION, DESCRIPTION OF EACH STAGE AND IU, AND A GENERAL DISCUSSION OF GROUND SUPPORT FACILITIES, EQUIPMENT, AND MISSION CONTROL. A BIBLIOGRAPHY IDENTIFIES ADDITIONAL REFERENCES IF A MORE COMPREHENSIVE STUDY IS DESIRED. THIS MANUAL IS FOR INFORMATION ONLY AND IS NOT A CONTROL DOCUMENT.

Title: SATURN V FLIGHT MANUAL - SA-507
Author: Date of Pub: 5/20/1969
Abstract:
THE CONCEPT ON SATURN V WAS TO BUDGET AN AMOUNT FOR THE DYNAMIC PORTION OF THE WIND LOAD AS A FACTOR ON THE STEADY STATE DRAG. WIND TUNNEL TESTS PARALLELED THE DEVELOPMENT AND FABRICATION PHASES. THE RESULTS INDICATED THAT THE SYSTEM WAS UNABLE TO WITHSTAND DESIGN WINDS; THUS, A DECISION WAS MADE TO IMPLEMENT A VISCOUS DAMPER "FIX" ON THE FACILITY VEHICLE AT KSC. DAMPING TEST IN THE VAB WILL HAVE BEEN COMPLETED AND RESPONSE TESTS ON THE PAD WILL BE IN PROGRESS AT THE TIME OF THIS SYMPOSIUM. THIS PAPER WILL PRESENT THE HISTORY AND STATUS OF THIS PROGRAM.

TITLE: SATURN V GROWTH AND FLEXIBILITY
AUTHOR MARTIN,J.E. Date of Pub: 2/1/1967
Abstract:

TITLE: SATURN V GUIDANCE, NAVIGATION, AND TARGETING
AUTHOR MARTIN,D.T. Date of Pub: 8/15/1966
Abstract:

TITLE: SATURN V GUIDANCE, NAVIGATION, AND TARGETING (PAPER)
AUTHOR MARTIN,D.T. Date of Pub: 8/1/1966
Abstract:

TITLE: SATURN V INBOARD PROFILE
AUTHOR Date of Pub: 3/12/1962
Abstract:

TITLE: SATURN V LAUNCH SUPPORT EQUIPMENT, GENERAL CRITERIA AND DESCRIPTION
AUTHOR POPPEL,T.A. Date of Pub: 1/23/1964
Abstract:

TITLE: SATURN V LAUNCH VEHICLE
AUTHOR MRAZEK,W.A. Date of Pub: 7/1/1964
Abstract:

TITLE: SATURN V LAUNCH VEHICLE FAMILY, ITS APPLICATIONS AND ECONOMIC CONSIDERATIONS
AUTHOR LANE,L.G. Date of Pub: 1/1/1967
Abstract:
TITLE: SATURN V LAUNCH VEHICLE FLIGHT EVALUATION REPORT AS-501 - APOLLO 4 MISSION

AUTHOR

Date of Pub: 1/15/1968

Abstract:
SATURN V AS-501 (APOLLO 4 MISSION) WAS LAUNCHED AT 0700:01 EST ON NOVEMBER 9, 1967 FROM KSC LC39, PAD A. THE VEHICLE LIFTED OFF ON SCHEDULE, ON A LAUNCH AZIMUTH OF 90 DEGREES EAST OF NORTH AND ROLLED TO A FLIGHT AZIMUTH OF 72 DEGREES EAST OF NORTH. THE ACTUAL TRAJECTORY WAS NEAR NOMINAL. ALL MAJOR SYSTEMS PERFORMED WITHIN DESIGN LIMITS AND CLOSE TO PREDICTED VALUES THROUGHOUT FLIGHT. ALTHOUGH NO MALFUNCTIONS OR DEVIATIONS OCCURRED THAT ADVERSELY AFFECTED FLIGHT OR MISSION, CERTAIN REFINEMENTS FOR FUTURE FLIGHTS ARE INDICATED IN CAMERA COVERAGE, S-IVB CVS INSTRUMENTATION, S-IC PROPULSION, S-II PROPULSION, AND S-IVB PROPULSION.

TITLE: SATURN V LAUNCH VEHICLE FLIGHT EVALUATION REPORT AS-502 - APOLLO 6 MISSION

AUTHOR

Date of Pub: 6/25/1968

Abstract:

TITLE: SATURN V LAUNCH VEHICLE FLIGHT EVALUATION REPORT AS-503 - APOLLO 8 MISSION

AUTHOR

Date of Pub: 2/20/1969

Abstract:
SATURN V AS-503 (APOLLO 8 MISSION) WAS LAUNCHED AT 07:51:00 EST ON DECEMBER 21, 1968 FROM KSC COMPLEX 39, PAD A. THE VEHICLE LIFTED OFF ON SCHEDULE, ON A LAUNCH AZIMUTH OF 90 DEGREES EAST OF NORTH AND ROLLED TO A FLIGHT AZIMUTH OF 72.12 DEGREES EAST OF NORTH. THE ACTUAL TRAJECTORY PARAMETERS OF THE AS-503 WERE CLOSE TO NOMINAL. THE TRANSLUNAR INJECTION TARGETING PARAMETERS WERE ALSO VERY CLOSE TO NOMINAL. A COMBINATION OF CONTINUOUS LH-2 VENT, A LOX DUMP AND APS ULLAGE BURN WAS SUCCESSFUL IN DECREASING THE S-IVB/IU/LTA-B VELOCITY TO INSURE THAT THE EXPENDED STAGE PASS THE TRAILING EDGE OF THE MOON AND OBTAIN SUFFICIENT ENERGY TO CONTINUE TO A SOLAR ORBIT. THE S-IVB/IU/LTA-B ENTERED A SOLAR ORBIT WITH A PERIOD OF 340.8 DAYS. THE NINE PRINCIPAL AND ONE SECONDARY DETAILED TEST OBJECTIVES OF THIS MISSION WERE COMPLETELY ACCOMPLISHED. ALL MAJOR SYSTEMS PERFORMED WITHIN DESIGN LIMITS AND CLOSE TO PREDICTED VALUES THROUGHOUT FLIGHT. NO MALFUNCTIONS OR DEVIATIONS OCCURRED THAT ADVERSELY AFFECTED THE FLIGHT OR MISSION.

TITLE: SATURN V LAUNCH VEHICLE FLIGHT EVALUATION REPORT AS-504, APOLLO 9 MISSION

AUTHOR

Date of Pub: 5/5/1969

Abstract:
SATURN V AS-504 (APOLLO 9 MISSION) WAS LAUNCHED AT 11:00:00 EST ON MARCH 3, 1969 FROM KSC COMPLEX 39, PAD A. THE VEHICLE LIFTED OFF ON SCHEDULE, ON A LAUNCH AZIMUTH OF 90 DEGREES EAST OF NORTH AND ROLLED TO A FLIGHT AZIMUTH OF 72 DEGREES EAST OF NORTH. THE S-IVB THIRD BURN TEST UNDER CONTINGENCY START CONDITIONS WAS NOT COMPLETELY NORMAL; HOWEVER, IT WAS SUCCESSFUL IN INCREASING THE S-IVB/IU ENERGY TO ATTAIN ESCAPE VELOCITY. THE S-IVB/IU ENTERED A SOLAR ORBIT WITH A PERIOD OF 325.8 DAYS. THE PRINCIPAL DETAILED TEST OBJECTIVE (DTO) OF THIS MISSION WAS COMPLETELY ACCOMPLISHED. NINE OF THE ELEVEN SECONDARY DTO'S WERE COMPLETELY ACCOMPLISHED, AND TWO PARTIALLY ACCOMPLISHED. NO FAILURES, ANOMALIES OR DEVIATIONS OCCURRED THAT SERIOUSLY AFFECTED THE FLIGHT THE FLIGHT OR MISSION.

TITLE: SATURN V LAUNCH VEHICLE FLIGHT EVALUATION REPORT AS-505 - APOLLO 10 MISSION
SATURN V AS-505 (APOLLO 10 MISSION) WAS LAUNCHED AT 12:49:00 EST ON MAY 18, 1969 FROM KSC, COMPLEX 39, PAD B. THE VEHICLE LIFTED OFF ON SCHEDULE ON A LAUNCH AZIMUTH OF 90 DEGREES EAST OF NORTH AND ROLLED TO A FLIGHT AZIMUTH OF 72.028 DEGREES EAST OF NORTH. THE LAUNCH VEHICLE SUCCESSFULLY PLACED THE MANNED SPACECRAFT IN THE PLANNED TRANSLUNAR INJECTION COAST MODE. THE S-IVB/IU WAS PLACED IN A SOLAR ORBIT WITH A PERIOD OF 344.9 DAYS BY A COMBINATION OF CONTINUOUS LH-2 VENT, THE CONTINGENCY EXPERIMENT OF PROPELLANT LEAD, A LOX DUMP AND APS ULLAGE BURN. THE MAJOR FLIGHT OBJECTIVES AND THE DETAILED TEST OBJECTIVES OF THIS MISSION WERE COMPLETELY ACCOMPLISHED. NO FAILURES, ANOMALIES, OR DEVIATIONS OCCURRED THAT SERIOUSLY AFFECTED THE FLIGHT OR MISSION.

SATURN V AS-506 (APOLLO 11 MISSION) WAS LAUNCHED AT 09:32:00 EST ON JULY 16, 1969 FROM KSC, COMPLEX 39, PAD A. THE VEHICLE LIFTED OFF ON SCHEDULE ON A LAUNCH AZIMUTH OF 90 DEGREES EAST OF NORTH AND ROLLED TO A FLIGHT AZIMUTH OF 72.058 DEGREES EAST OF NORTH. THE LAUNCH VEHICLE SUCCESSFULLY PLACED THE MANNED SPACECRAFT IN THE PLANNED TRANSLUNAR INJECTION COAST MODE. THE S-IVB/IU WAS PLACED IN A SOLAR ORBIT WITH A PERIOD OF 342 DAYS BY A COMBINATION OF CONTINUOUS LH-2 VENT, A LOX DUMP AND APS ULLAGE BURN. THE PRINCIPAL AND SECONDARY DETAILED OBJECTIVES OF THIS MISSION WERE COMPLETELY ACCOMPLISHED. NO FAILURES, ANOMALIES, OR DEVIATIONS OCCURRED THAT SERIOUSLY AFFECTED THE FLIGHT OR MISSION.

SATURN V AS-507 (APOLLO 12 MISSION) WAS LAUNCHED AT 11:22:00.00 EST ON NOVEMBER 14, 1969 FROM KSC, COMPLEX 39, PAD A. THE VEHICLE LIFTED OFF ON SCHEDULE ON A LAUNCH AZIMUTH OF 90 DEGREES EAST OF NORTH AND ROLLED TO A FLIGHT AZIMUTH OF 72.029 DEGREES EAST OF NORTH. THE LAUNCH VEHICLE SUCCESSFULLY PLACED THE MANNED SPACECRAFT IN THE PLANNED TRANSLUNAR INJECTION COAST MODE. THE MANDATORY AND DESIRABLE OBJECTIVES OF THIS MISSION WERE ACCOMPLISHED WITH THE EXCEPTION OF INSERTING THE S-IVB/IU INTO A SLINGSHOT TRAJECTORY ON THE FIRST PASS OF THE MOON. NO FAILURES, ANOMALIES, OR DEVIATIONS OCCURRED THAT SERIOUSLY AFFECTED THE FLIGHT OR MISSION.

THIS DOCUMENT CONTAINS COPIES OF MANAGEMENT CHARTS MAINTAINED IN THE MANAGERIAL DATA CENTER OF THE EXECUTIVE STAFF ON THE SATURN V PROJECT AT MSFC. TO FACILITATE USE OF THIS DOCUMENT, ALL SATURN V CLASSIFIED DATA HAVE BEEN REMOVED AND WILL BE PUBLISHED IN VOLUME XI. INFORMATION ON OTHER MSFC ACTIVITIES WILL BE PUBLISHED IN SEPARATE VOLUMES.

THIS DOCUMENT PRESENTS A GENERAL DISCUSSION OF THE SATURN V LUNAR MISSION AND THE IMPACT OF IT ON THE NATION AND ALABAMA.

THIS DOCUMENT PRESENTS A GENERAL DISCUSSION OF THE SATURN V LUNAR MISSION AND THE IMPACT OF IT ON THE NATION AND ALABAMA.
<table>
<thead>
<tr>
<th>TITLE: SATURN V NON-STAGE PROCURED LAUNCH VEHICLE GROUND SUPPORT EQUIPMENT (LVGSE)</th>
<th>AUTHOR</th>
<th>Date of Pub: 8/1/1967</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Abstract:</strong></td>
<td></td>
<td>THE FUNCTIONS, AUTHORITY, MANAGEMENT RELATIONSHIPS, AND RESPONSIBILITIES OF THE LAUNCH VEHICLE GROUND SUPPORT EQUIPMENT (LVGSE) PROJECT OFFICE ARE DESCRIBED. FUNCTIONS AND EXAMPLES OF NON-STAGE PROCURED LAUNCH VEHICLE GROUND SUPPORT EQUIPMENT (LVGSE) ARE DESCRIBED AND ILLUSTRATED.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TITLE: SATURN V PAYLOAD PLANNERS GUIDE</th>
<th>AUTHOR SCHULTZ, L.O.</th>
<th>Date of Pub: 11/1/1965</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Abstract:</strong></td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>TITLE: SATURN V PERFORMANCE STUDIES</th>
<th>AUTHOR DEATON, T.</th>
<th>Date of Pub: 10/11/1963</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Abstract:</strong></td>
<td></td>
<td>ADDITIONAL DOCUMENT IS MTP-AERO-63-71.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TITLE: SATURN V PROGRAM INTERFACE MANAGEMENT</th>
<th>AUTHOR BOWDEN, D.R.</th>
<th>Date of Pub: 1/1/1967</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Abstract:</strong></td>
<td></td>
<td>THE SATURN V INTERFACE MANAGEMENT SYSTEM ESTABLISHES AND MAINTAINS INTERFACE DESIGN COMPATIBILITY BETWEEN INTERFACING ITEMS UNDER THE DESIGN RESPONSIBILITY OF DIFFERENT AGENCIES. IT PROVIDES THE MANAGEMENT TOOLS FOR EFFECTIVE CHANGE CONTROL OVER THE DESIGN OF DESIGNATED SYSTEMS AND EQUIPMENT THAT HAVE BEEN CRITICAL INTERFACE DESIGN REQUIREMENTS. INTERFACE MANAGEMENT IS ACCOMPLISHED THROUGH IDENTIFICATION, DOCUMENTATION, IMPLEMENTATION, AND CONTROL.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TITLE: SATURN V PROJECT DEVELOPMENT PLAN</th>
<th>AUTHOR</th>
<th>Date of Pub: 11/1/1967</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Abstract:</strong></td>
<td></td>
<td>THIS PLAN DESCRIBES THE TECHNICAL, FINANCIAL, PROCUREMENT, AND MANAGEMENT ARRANGEMENTS FOR THE PROGRAM. IT ESTABLISHES MSFC'S RESPONSIBILITY FOR OVERALL SATURN V PROJECT ACCOMPLISHMENT, AND AUTHORIZES THE FUNCTIONS WHICH THE CENTER IS TO PERFORM.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TITLE: SATURN V PROPUSION SYSTEMS (PAPER)</th>
<th>AUTHOR BROWER, E.M.</th>
<th>Date of Pub: 7/1/1968</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Abstract:</strong></td>
<td></td>
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</tbody>
</table>

| TITLE: SATURN V QUARTERLY FILM REPORTS AND RELATED MATERIAL (DECEMBER 1965 - FEBRUARY 1968) | | |

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Wednesday, March 24, 2004 Page 190 of 234
THE MASSIVE SATURN V ROCKET BOOSTER TEST STAND IS THE CENTER OF A NEW TESTING COMPLEX AT MSFC. SEVERAL SHORT DURATION TESTS HAVE BEEN CONDUCTED HERE LEADING TO TODAY’S SCHEDULED 2-1/2 MINUTE FULL DURATION TEST OF THE S-IC-T – STATIC TEST VERSION OF SATURN V ROCKET. CONSTRUCTION FOR THE GIGANTIC TEST STAND WAS BEGUN IN NOVEMBER 1962 BY ETS-HOKIN AND GALCIN, INC., OF SAN FRANCISCO. IT HAS BEEN DESIGNED TO TAKE UP TO 12 MILLION POUNDS THRUST. BOOSTERS 410 INCHES IN DIAMETER AND 170 FEET LONG CAN BE FIRED ON THIS STAND. THE $37 MILLION COMPLEX INCLUDES AN F-1 ENGINE TEST STAND, A HIGH PRESSURE INDUSTRIAL WATER SYSTEM, A THREE-STORY BLOCKHOUSE AND EXTENSIVE PROPELLANT STORAGE AND HANDLING FACILITIES.
AUTHOR FROSCH,J.A. 
Date of Pub: 1/1/1966 

Abstract: 

AUTHOR KALANGE,M.A./ALCOTT,R.J. 
Date of Pub: 5/18/1965 

Abstract: 


AUTHOR CLARK,A. 
Date of Pub: 12/1/1965 

Abstract: 

AUTHOR HOPPES,R.V. 
Date of Pub: 1/1/1967 

Abstract: 

FRINGE BENEFITS FOR INDUSTRY IN THE AREA OF WELDING TECHNOLOGY ARE DISCUSSED. THE WELDING OF CERTAIN ALUMINUM ALLOYS IS REFERRED TO. THE WELDING DILEMMA, A RESULTING WELD DEVELOPMENT COMPLEX, AND THE GROWING DATA IN WELDING TECHNOLOGY ARE DISCUSSED.

AUTHOR 
Date of Pub: 11/1/1968 

Abstract:
THE PURPOSE OF THIS DOCUMENT IS TO SUPPLEMENT THE SATURN V SPECIFICATION INDEX. IT IS INTENDED TO PROVIDE A CONVENIENT MEANS OF FINDING THE SPECS BY SPEC NUMBER WHICH IS CROSS REFERENCED TO SPECIFICATION MATRIX NUMBER AND CONTRACT AND ITEM NUMBER.

**TITLE:** SATURN V SPECIFICATION INDEX  
**AUTHOR:**  
**Date of Pub:** 11/1/1968

**Abstract:**  
THIS INDEX CONTAINS A COMPLETE LISTING OF ALL SPECS AND SPEC CHANGES REQUIRED FOR SATURN V CONFIGURATION MANAGEMENT FROM PROGRAM LEVEL THROUGH PROJECT, SYSTEM, CONTRACT END ITEM, AND CRITICAL COMPONENT LEVELS. CHARTS ARE INCLUDED WHICH SHOW ACCOMPLISHMENT STATUS OF SPECS REQUIRED BY EACH STAGE AND LVGSE.

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**TITLE:** SATURN V SPECIFICATION TREE  
**AUTHOR:**  
**Date of Pub:** 8/1/1965

**Abstract:**  
INDICATES SPECIFICATIONS FOR S-IC, S-II, S-IVB, IU AND VEHICLE GSE.

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**TITLE:** SATURN V STAGE STATUS  
**AUTHOR:**  
**Date of Pub:** 6/21/1966

**Abstract:**  
SATURN V IS ABOUT 90% READY FOR ITS MAIDEN VOYAGE SCHEDULED NEXT YEAR. STAGE STATUS IS AS FOLLOWS: S-IC - 95% FLIGHT READY; S-II-75% FLIGHT READY; S-IVB - 95% FLIGHT READY; AND IU - 100% FLIGHT READY.

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**TITLE:** SATURN V STRUCTURAL DYNAMIC CHARACTERISTIC MATHEMATICAL MODEL DEVELOPMENT AND TEST VERIFICATION  
**AUTHOR:** RILEY,G.F./MCTIGUE,L.D.  
**Date of Pub:** 9/1/1967

**Abstract:**

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**TITLE:** SATURN V SYSTEM PHILOSOPHIES  
**AUTHOR:** RICHARD,L.G.  
**Date of Pub:** 4/5/1965

**Abstract:**

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**TITLE:** SATURN V VEHICLE ELECTRONICS  
**AUTHOR:** FICHTNER,H.J.  
**Date of Pub:** 8/7/1964

**Abstract:**  

---

**TITLE:** SATURN V/S-IC BOOSTER CAN BE REUSED (PAPER)
TITLE: SATURN VEHICLE CRYOGENIC PROGRAMS
AUTHOR WALKER, R.D./HERMAN, B.J. Date of Pub: 8/23/1965

Abstract:
This paper covers the cryogenic propellant and gaseous application to the MSFC Saturn programs. Emphasis is placed on the overall application and the resultant logistic considerations. The planning of facilities, storage, and transportation required to ensure an adequate supply of cryogenic fluids when needed is traced from the engine and stage requirements. The entire cycle of technical requirements, estimating the quantities required from production and management of the program is developed. Spacecraft application and other trends that affect cryogenic production are reviewed.

TITLE: SATURN VEHICLE: COMPARATIVE STUDY OF PERFORMANCE AND CONTROLLABILITY OF TWO-STAGE AND THREE-STAGE VERSIONS FOR LOW ALTITUDE
AUTHOR HOELKER, R./JEAN, O. Date of Pub: 5/25/1960

Abstract:

TITLE: SATURN V-FUTURE DEVELOPMENTS AND S-II APPLICATIONS
AUTHOR Date of Pub: 11/1/1964

Abstract:

TITLE: SATURN...OUR BEST HOPE
AUTHOR VON BRAUN, W. Date of Pub: 6/1/1961

Abstract:

TITLE: SATURN/APOLLO CONTRACT CHANGE - APFF TO CPIF (LETTER TO MR. MORTON E. HENIG, ASSISTANT DIRECTOR, CIVIL DIVISION, U.S. GENERAL ACCOUNTING OFFICE)
AUTHOR MUELLER, G.E. Date of Pub: 5/23/1968

Abstract:
Outlines reasons behind decisions to emphasize schedule in the conversion of major Apollo contracts from cost-plus-fixed-fee to cost-plus-incentive-fee.

TITLE: SATURN/APOLLO PROJECT
AUTHOR ABERG, J. Date of Pub: 7/1/1965

Abstract:

TITLE: SATURN: 24-HOUR SATELLITE FOR ULTRAVIOLET ASTRONOMY
AUTHOR SWANSON, C./FESTA, R. Date of Pub: 2/10/1960

Abstract:
BOOSTERS DEVELOPED TO LAUNCH WARHEADS HAVE BEEN THE BACKBONE OF OUR SPACE EFFORT UNTIL NOW. BUT THE HEAVIER PAYLOADS AND LONGER DISTANCES OF TOMORROW'S MISSIONS CALL FOR MORE POWERFUL VEHICLES. NASA'S ANSWER IS THE SATURN FAMILY - AN ORDERLY PROGRESSION FROM THE PRESENT SATURN I TEST VEHICLE TO THE SATURN IB IN 1966, THEN TO THE MANY-TIMES-MORE-POWERFUL SATURN 5 IN TIME TO LAUNCH THE APOLLO MOON TRIP. THIS ARTICLE DISCUSSES FUNDING FOR THE BIG LAUNCH VEHICLES, MAJOR CONTRACTORS IN THE SATURN PROGRAM, LAUNCH VEHICLES TECHNOLOGY, ETC.
TITLE: SCIENCE AND TECHNOLOGY-KEYS TO ECONOMIC PROGRESS

AUTHOR WEBB, J.E.

Date of Pub: 6/17/1962

Abstract:

TITLE: SCIENTIFIC RESULTS OF PROJECT PEGASUS - INTERIM REPORT

AUTHOR

Date of Pub: 7/3/1967

Abstract:

PROJECT PEGASUS, WHICH HAS THE PRIMARY OBJECTIVE OF MEASURING THE NEAR-EARTH METEOROID ENVIRONMENT, HAS PROVIDED OBSERVATIONAL RESULTS FAR BEYOND THE MISSION FOR WHICH IT WAS ORIGINALLY CONCEIVED. IT HAS PROVIDED NOT ONLY OBSERVATIONAL DATA ON METEOROID PUNCTURES BUT ALSO ON VAN ALLEN BELT RADIATIONS, ON EARTH ALBEDO, ON THE SOLAR CONSTANT, ON ORBITAL AND GYROSCOPIC MOTIONS OF RIGID BODIES, ON DEGRADATION OF SURFACE COATINGS UNDER SPACE ENVIRONMENTAL CONDITIONS, ON THERMAL CONTROL SYSTEMS, AND ON THE LIFETIMES OF ELECTRONIC COMPONENTS IN SPACE OPERATIONS.

TITLE: SEARCH FOR S-RAY EMISSION FROM GLOBULAR CLUSTERS USING UHURU DATA

AUTHOR ULMER, M.P./MURRAY, S.S./GURSK

Date of Pub: 12/12/1975

Abstract:


TITLE: SECOND LOOK AT MAN, MACHINE, AND AUTOMATIC TEST OPERATIONS

AUTHOR MEISTER, G.F.

Date of Pub: 11/7/1966

Abstract:

THIS PAPER PRESENTS A SECOND LOOK AT THE SUBJECT OF THE MAN-MACHINE RELATIONSHIP IN AUTOMATIC TEST OPERATIONS. "MAN, MACHINE, AND AUTOMATIC TEST OPERATIONS" WAS PRESENTED AT Battelle Memorial Institute in November 1963. AT THAT TIME VERY LITTLE AUTOMATIC CHECKOUT HAD TAKEN PLACE; THE FIRST S-IVB AUTOMATIC CHECKOUT SYSTEM WAS BEING ASSEMBLED AND CHECKED OUT BY ROY E. GODFREY. SINCE THAT TIME SIX FLIGHT STAGES HAVE BEEN OR ARE IN CHECKOUT, AND THREE FLIGHT STAGES HAVE BEEN STATIC FIRED. ALL OF THESE OPERATIONS HAVE INVOLVED THE AUTOMATIC CHECKOUT SYSTEM AND THE MAN. MANY OF THE CONCEPTS OUTLINED IN THE ORIGINAL PAPER HAVE HELD UP WELL WITH THE TEST OF TIME. OTHERS HAVE CHANGED TO VARYING DEGREES DEPENDENT UPON PRESSURES OF REALITY AND EXPEDIENCY. IN SOME AREAS NEW CONCEPTS HAVE BEEN CREATED AND IMPLEMENTED TO FILL Voids MADE OBVIOUS BY EXPERIENCE. IT IS THE PURPOSE OF THIS SECOND LOOK TO PINPOINT THOSE CONCEPTS WHICH HAVE PROVEN THEIR WORTH WITH TIME AND THOSE WHICH HAVE PROVEN TO BE WEAK, AND AS A RESULT MODIFIED WITH TIME.

TITLE: SECOND NASA-WIDE RELIABILITY AND QUALITY ASSURANCE MEETING PROCEEDINGS (HELD AT NASA HEADQUARTERS)

AUTHOR

Date of Pub: 11/29/1966

Abstract:
TITLE: SECURITY CLASSIFICATION GUIDE FOR SATURN LAUNCH VEHICLES

AUTHOR

Abstract:

THIS IS A COMPILATION OF PREVIOUS INDIVIDUAL CLASSIFICATION ASSIGNMENTS. THE SECURITY CLASSIFICATION REQUIREMENTS OUTLINED IN THIS GUIDE ARE AUTHORIZED FOR APPLICATION TO ALL INFORMATION AND MATERIAL CONCERNING ALL SATURN VEHICLES.

TITLE: SELECTED METHODS FOR UPRATING SATURN VEHICLES

AUTHOR ORILLION, A.G./SCOTT, R.D.

Abstract:

THIS PAPER DISCUSSES SELECTED METHODS FOR INCREASING THE SATURN LAUNCH VEHICLE PAYLOAD CAPABILITIES. THESE METHODS INVOLVE SYSTEM CHANGES OR ADDITIONS THAT GIVE LARGE STEP PERFORMANCE INCREASES OVER THOSE WHICH CAN BE OBTAINED BY PRODUCT IMPROVEMENTS. THE SELECTED PHILOSOPHY OF APPROACH AND THE ESTABLISHED DESIGNED SYSTEMS WILL BE DESCRIBED, AS WELL AS ANTICIPATED SYSTEM CONCEPTS THAT MAY BE USED TO INCREASE THE SATURN VEHICLE'S CAPABILITIES.

TITLE: SEVENTH ANNUAL NASA ISSUE OF AEROSPACE TECHNOLOGY

AUTHOR

Abstract:

CONTENTS INCLUDE: PART I-PLANS AND PROGRAMS; PART II-ADVANCED RESEARCH AND TECHNOLOGY; PART III-NASA MANAGEMENT.

TITLE: SHAKE WELL BEFORE USING
The Apollo/Saturn 5 dynamic test tower houses control centers, electronic and machine shops, and an elevator which rises so high above the countryside that you can see company coming for three days. Here and in a nearby instrumentation center, Boeing and NASA engineers are dynamic testing the entire moon rocket to determine how it will behave in flight. Basic to the tower is a Martin-designed four point "wet-foot" suspension system which virtually "floats" the Apollo/Saturn 5 on cushions of oil to simulate the freedom of flight. Once afloat and free of upper level restraints, the vehicle is subjected to a shaker system which induces pitch, yaw and roll motions - forces that rocket stages and spacecraft will encounter in actual flight.

Title: Short-title Catalog of the History of Science Collections in University of Oklahoma Libraries
Author: Thomas, R.
Date of Pub: 3/1/1967
Abstract:

Title: S-IC Hydraulic System
Author: Arthur
Date of Pub: 5/1/1963
Abstract:

Title: S-IC Stage Electrical Electronics Systems Write-up (Paper)
Author: Lopez, J.L.
Date of Pub: 8/1/1966
Abstract:

Title: Signal Distribution in Automatic Checkout Systems
Author: Meister, G.F.
Date of Pub: 6/20/1965
Abstract:

Title: Significance of Parameters Affecting the Heat Transfer to the Liquid Hydrogen in the Saturn S-IVB Stage for the Lunar Orbit Rendezvous Mission
Author: Dearing, D.L./Steffy, R.J.
Date of Pub: 6/9/1965
Abstract:

The S-IVB stage has a requirement for orbiting around the earth for up to 4.5 hours with approximately 60% of its initial propellant remaining at the end of the coast (prior to restart). Extensive analyses must be performed to insure that this requirement is met. Both maximum and minimum heat transfer rates are important because the maximum rates affect the hydrogen boiloff losses and thus the initial propellant loading requirements. The minimum rates are important because the boiloff gases are used to maintain a minimum axial thrust level by venting the gases continuously through aft facing nozzles. This provides for a settling of the propellant throughout the orbital coast and alleviates the need for periodic venting. The tank under zero gravity. Described are the significance of the following parameters on the heat transfer rates to the liquid hydrogen: thermal conductivity, specific heat, density, surface emissivity and absorptivity, launch date and time, stage orientation and structural "heat leaks." Tank surface radiative property effects are shown where changes in solar absorptivity are six times more significant than equal changes in emissivity.
TITLE: S-II FAILURE CORRECTION ACTION
AUTHOR PHILLIPS, S.G. Date of Pub: 1/9/1967
Abstract:

TITLE: S-II INSTRUMENTATION (PAPER)
AUTHOR KNOWLEDEN, F.H. Date of Pub: 5/1/1964
Abstract:

TITLE: SIMULATION OF THE SATURN V VEHICLE ON THE ELECTRONIC ANALOG COMPUTER
AUTHOR TEUBER, D.L. Date of Pub: 6/1/1964
Abstract:

TITLE: S-IVB AUTOMATIC CHECKOUT SYSTEM
AUTHOR MEISTER, G.F. Date of Pub: 10/4/1965
Abstract: DESCRIBES THE AUTOMATIC CHECKOUT SYSTEM (DEVELOPED BY DOUGLAS) WHICH IS USED FOR THE FACTORY CHECKOUT, ACCEPTANCE FIRING AND POST-FIRE CHECKOUT OF THE S-IVB STAGE. THREE ASPECTS OF THE SYSTEM ARE DISCUSSED: (1) CONCEPTUAL DESIGN PHILOSOPHY, (2) ACTUAL IMPLEMENTATION OF THE SYSTEM, AND (3) THE OPERATION OF THE SYSTEM ITSELF.

TITLE: S-IVB CHECKOUT EQUIPMENT OPERATING CONCEPT (PAPER)
AUTHOR Date of Pub: 4/1/1964
Abstract:

TITLE: S-IVB PROPULSION SYSTEM
AUTHOR Date of Pub: 3/1/1962
Abstract:

TITLE: S-IVB SATURN HIGH ENERGY UPPER STAGE AND ITS DEVELOPMENT
AUTHOR ROTH, L./SHEMPP, W.M. Date of Pub: 1/1/1967
Abstract:
DEVELOPMENT OF CARRIER ROCKETS FOR MANNED SPACE MISSIONS HAS BEEN ONE OF THE MAJOR ACTIVITIES IN THE AEROSPACE FIELD DURING THE PAST DECADE. EARLY SPACE EFFORTS WERE MADE POSSIBLE BY THE EXISTENCE OF LARGE BALLISTIC MISSILES. IT SOON BECAME OBVIOUS THAT THE DELIVERY OF WEAPONS AND THE LAUNCH OF LARGE SPACECRAFT COULD NOT BE COMBINED INTO ONE OPERATIONAL SYSTEM IN AN EFFICIENT WAY; THEREFORE, A FAMILY OF SPACECRAFT BOOSTER HAD TO BE CREATED. THE SATURN SYSTEM IS A SIGNIFICANT DEVELOPMENT OF SUCH A CARRIER ROCKET FOR SPACE OPERATIONS, AND WILL DEVELOP, IN ITS FINAL VERSION, THE SATURN V, THE MOST POWERFUL CARRIER AT THE PRESENT TIME THE LH2/LOX TECHNOLOGY DEVELOPED BY DOUGLAS FOR NASA REPRESENTED BY SATURN S-IV AND S-IVB STAGES COULD ALSO BE APPLIED TO SMALLER LOX/LH2 VEHICLES. LARGER ROCKETS GENERALLY CAN ACHIEVE HIGHER MASS FRACTIONS DUE TO STRUCTURAL AND EQUIPMENT WEIGHT EFFICIENCIES. SMALLER STAGES REQUIRE INCREASED SOPHISTICATION TO ACHIEVE SIMILAR DESIGN MASS FRACTION OBJECTIVES. TECHNIQUES USED ON S-IV AND S-IVB ARE APPLICABLE SPECIFICALLY IN AREAS OF ALUMINUM TANKAGE, GROUND EQUIPMENT, PRESSURIZATION TECHNIQUES, PROPELLANT MANAGEMENT, PROPELLANT UTILIZATION, AND INSTRUMENTATION DISCIPLINES. SATURN S-IV/S-IVB TECHNOLOGY WILL SIGNIFICANTLY CONTRIBUTE TO SPACE FLIGHTS IN THE FUTURE.

TITLE: S-IVB STAGE MISSIONS (PAPER)
AUTHOR SCHEMP, W.M.
Date of Pub: 4/1/1966
Abstract:

TITLE: SIXTH ANNUAL NASA ISSUE OF TECHNOLOGY WEEK
AUTHOR
Date of Pub: 11/28/1966
Abstract:
CONTENTS INCLUDE PART I-BUDGET OUTLOOK; PART II-THE NASA CENTERS; PART III-SPECIAL REPORT-THE NEW PROGRAMS; PART IV-SPECIAL REPORT-AERONAUTICAL RESEARCH; AND PART V-SPECIAL REPORT-PROJECT APOLLO.

TITLE: SIX-YEAR GASP
AUTHOR CLARKE, W.
Date of Pub: 1/1/1968
Abstract:
BOEING WAS GIVEN THE JOB IN 1962 TO PERFORM THE DETAIL ENGINEERING AND ASSEMBLY OF THE BIGGEST ROCKET STAGE IN THE WORLD, THE FIRST STAGE OF THE SATURN 5. WHEN THE FIRST LAUNCH OF A SATURN 5 BOOSTER MATED TO AN APOLLO CAPSULE LIFTED OFF IN NOVEMBER, IT RELEASED AN EMOTIONAL FLOW ALMOST AS VOLUMINOUS AS SATURN'S OWN 7.5 MILLION POUNDS OF THRUST. MORE THAN ONE BOEING MAN STOOD AT THE LAUNCH SITE WITH TEARS RUNNING DOWN HIS CHEEKS. APOLLO 4 - THE NAME GIVEN TO BOTH LAUNCH AND MISSION - WENT BEAUTIFULLY. NOT ONLY WAS IT A SUCCESS, BUT IN THE WORDS OF DR. VON BRAUN, IT WAS A "TEXTBOOK FLIGHT" - PERFECT IN ALMOST EVERY DETAIL.

TITLE: SIZING UP SATURN
AUTHOR
Date of Pub: 10/1/1963
Abstract:
DISCUSSES SIZE OF THE SATURN V. HEIGHT: 362 FEET. WEIGHT: 3001 TONS.

TITLE: SKYWRITER
AUTHOR
Date of Pub: 11/15/1968
Abstract:
TITLE: SMALL BUSINESS PARTICIPATION IN THE NASA RESEARCH AND DEVELOPMENT PROGRAMS
AUTHOR
Date of Pub: 9/25/1961

Abstract:

TITLE: SOFT SPLASH
AUTHOR CLOTHIER, W.
Date of Pub: 11/1/1965

Abstract:

TITLE: SOLID BOOSTED SATURN S-IVB STAGE AS A LOW COST EXPENDABLE SYSTEM
AUTHOR DAWSON, R.R./SIEGFRIED, W.H.
Date of Pub: 4/1/1967

Abstract:

TITLE: SOLVING THE V-2 MYSTERY IN 1944
AUTHOR DIXON, T.F.
Date of Pub: 1/1/1962

Abstract:

TITLE: SOME COMPUTER APPLICATIONS IN SATURN STAGE CHECKOUT
AUTHOR ROSENTHAL, M.E.
Date of Pub: 4/1/1967

Abstract:
This paper discusses a number of interesting applications of digital computers in checkout of individual Saturn stages and in the prelaunch checkout of the complete Saturn vehicle. It discusses concepts of automation in Saturn checkout, the unique two-computer mode of operation at the launch site and the operation of the high speed data link connecting the two computers. Also discussed are functions of the computer while propellants are loaded automatically on one of the stages; functions of the display computer in the newest and largest Saturn display system; and operations and utilization of the digital events evaluator, the main recording device utilized during stage checkout.

TITLE: SOME EFFECTS OF UNCERTAINTIES IN ATMOSPHERE STRUCTURE AND CHEMICAL COMPOSITION ON ENTRY INTO MARS
AUTHOR MCKENZIE, R.L.
Date of Pub: 1/1/1965

Abstract:
The purpose of this study is to provide examples of the degree to which uncertainties in the structure and composition of the martian atmosphere affect various aspects of entry. The discussion contains the effects on manned-vehicle entry corridors, aerodynamic heating, including shock-layer radiation for an unmanned probe-type entry, and vehicle design requirements for an unmanned probe soft landing.

TITLE: SOME SELECT PHYSIOLOGICAL, ANTHROPOMETRIC, AND HUMAN ENGINEERING DATA USEFUL IN VEHICLE DESIGN AND LOGISTIC PROBLEMS OF SPACE FLIGHT OPERATIONS
AUTHOR CARTER,J.W.  Date of Pub: 2/24/1960

Abstract:
TECHNICAL INVESTIGATIONS INTO THE MANY FACETS OF SPACE FLIGHT, PARTICULARLY WHERE MAN IS CONCERNED, HAVE PROMPTED QUERIES REGARDING MAN'S TOLERANCES, MEASUREMENTS, VOLUME REQUIREMENTS, AND METABOLIC PROCESSES. THIS REPORT MERELY TABULATES SPECIFIC DATA THAT ARE USEFUL TO ENGINEERS IN ADVANCED DESIGN OF SPACE VEHICLES, SPACE STATIONS, AND THE ASSOCIATED LOGISTICS PROBLEMS.

TITLE: SOURCE CREDIBILITY AND PERSONAL INFLUENCE IN THREE CONTEXTS: A STUDY OF DYADIC COMMUNICATION IN A COMPLEX AEROSPACE ORGANIZATION
AUTHOR RICHERTO,G.M.  Date of Pub: 1/1/1969

Abstract:
NOTE: ABSTRACT ONLY IS FILED IN SATURN HISTORY FILES. COMPLETE DOCUMENT AVAILABLE FROM WALT WIESMAN.
THIS STUDY INVESTIGATED THE APPLICABILITY OF A THEORETICAL MODEL OF COMMUNICATION TO AN ONGOING COMPLEX ORGANIZATION. THE MODEL COMBINED TWO CONCEPTS: THE ESSENTIALLY SOCIOLOGICAL CONCEPT OF THE "TWO-STEP-FLOW" AND THE PSYCHOLOGICAL-RHETORICAL CONCEPT OF "ETHOS" (OR SOURCE CREDIBILITY). PERSONAL INFLUENCE WAS INVESTIGATED WITHIN THREE SEPARATE SPHERES OF INFLUENCE: (1) TASK-RELATED, (2) POLITICAL OR GRAPEVINE, AND (3) SOCIAL-EMOTIONAL OR NON-JOB-RELATED. SUBJECTS WERE ASKED TO RATE THEIR SOURCES ON FOUR CREDIBILITY SCALES: (1) EXPERTISE, (2) SOCIABILITY, (3) GOOD INTENT, AND (4) TRUSTWORTHINESS. CONCLUSIONS OF STUDY ARE GIVEN.

TITLE: SOVIET ASTRONAUTICS
AUTHOR KRIEGER,F.J.  Date of Pub: 2/24/1958

Abstract:
MICROFICHE ON HAND

TITLE: SOVIET SPACE PROGRAM: A SELECTIVE BIBLIOGRAPHY
AUTHOR MAGNOLIA,L.R.  Date of Pub: 3/9/1966

Abstract:
MICROFICHE ON HAND

TITLE: SOVIET SPACE RESEARCH
AUTHOR  Date of Pub: 10/1/1968

Abstract:
MICROFICHE ON HAND

TITLE: SOVIET SPACE RESEARCH IN 1966
AUTHOR SCHMIDT,H.  Date of Pub: 11/1/1968

Abstract:
MICROFICHE ON HAND

TITLE: SOVIET SPACE TECHNOLOGY
AUTHOR  Date of Pub: 5/11/1959

Abstract:
TITLE: SOVIETS IN SPACE - AN HISTORICAL SURVEY

AUTHOR: GOVORCHIN, G.G.  
Date of Pub: 5/1/1965

Abstract:
WITH THE SOVIET SPACE PROGRAM ENTERING A NEW PHASE WITH THE EXTRAVEHICULAR EXPERIMENT PERFORMED BY LT. COL. ALEXEI LEONOV IN VOSKHOD 2, A SPECIALIST IN SOVIET AFFAIRS EXAMINES PROGRESS TO DATE AND SPECULATES ON POSSIBLE FUTURE TRENDS.

TITLE: SPACE AGE MANAGEMENT OR MAINTENANCE OF TECHNICAL CAPABILITY DURING A PERIOD OF RETRENCHMENT

AUTHOR: BROWN, W.D./BROWN, R.L.  
Date of Pub: 1/1/1968

Abstract:
AS THE APOLLO PROGRAM DECLINES IN PERSONNEL AND EXPENDITURES, GOVERNMENT AND INDUSTRY MANAGERS MUST TAILOR THE REDUCTIONS IN ACCORDANCE WITH MANY INFLUENCE FACTORS--THE MOST FORMIDABLE OF THESE IS THE BUDGET. IN THE LIGHT OF THE OVERALL BUDGET PRESSURE, WHAT PRIORITY SHOULD BE GIVEN TO SUSTAINING ENGINEERING? ON THE ONE HAND THE PROGRAM DictATES A NEED FOR A COMPETENT ENGINEERING STAFF TO KEEP COMPLEX, HAND-BUILT VEHICLES FLYING, WHILE ON THE OTHER HAND THE EVER-PRESENT BUDGET PRESSURE AND THE INTERVALTEN NATURE OF THE DEMAND FOR THIS SKILL MAKE IT DIFFICULT AND EXPENSIVE TO PROVIDE. AN EFFECTIVE ANSWER TO THIS PARADOX PRESENTS A REAL CHALLENGE TO NASA MANAGEMENT TODAY. THE EXPERIENCE OF MSFC'S ENGINES AND THE APPROACH USED TO BUFFER AN OTHERWISE RAPID DECAY IN ENGINEERING CAPABILITY PROVIDE A RELEVANT CASE STUDY IN THE MANAGEMENT OF ENGINEERING CAPABILITY IN A DECLINING PROGRAM.

TITLE: SPACE AGE VISION (B&W PHOTOGRAPH)

AUTHOR
Date of Pub: 1/1/1969

Abstract:
COMPUTERS AND SPACE SHIPS AT THE NASA LAUNCH SITE PRESENTED THIS UNUSUAL VIEW TO A FISH EYE CAMERA DURING FINAL COUNTDOWN OF AN APOLLO MOON MISSION.

TITLE: SPACE AND THE WORKING WOMAN

AUTHOR: WYSS, G.L.  
Date of Pub: 1/18/1968

Abstract:
NOTES CHANGES ON EARTH BROUGHT ABOUT BY SPACE EXPLORATION. A LISTING INCLUDED OF QUALIFIED WOMEN IN NASA AND THEIR ROLES IN THE SPACE PROGRAM.

TITLE: SPACE CARRIER VEHICLE FIRING HISTORIES

AUTHOR: ORDWAY, F.I.  
Date of Pub: 3/23/1962

Abstract:
WITHIN THE CONTEXT OF THIS PAPER A SPACE CARRIER IS DEFINED AS A ROCKET-PROPELLED VEHICLE DESIGNED TO PLACE PAYLOADS IN ORBIT AROUND THE EARTH, ALONG ESCAPE TRAJECTORIES, OR TO VERTICAL ALTITUDES OF AT LEAST 300 MILES. VEHICLES LIFTING PAYLOADS TO LOWER ALTITUDES ARE CONSIDERED ATMOSPHERIC SOUNDING ROCKETS AND ARE NOT DISCUSSED HEREIN. CHARACTERISTICS AND SPECIFICATIONS OF ALL KNOWN SPACE CARRIERS ARE GIVEN. CARRIERS ARE CLASSIFIED INTO FOUR CATEGORIES: (1) SMALL CARRIERS, (2) ICBM-BASED CARRIERS, (3) ICBM-BASED CARRIERS, AND (4) CARRIERS BASED ON FIRST STAGES DEVELOPING IN EXCESS OF A MILLION POUNDS OF THRUST. FIRING HISTORIES THROUGH THE END OF 1961 FOR ALL MAJOR CARRIERS ARE TABULATED AND ARRANGED IN ALPHABETICAL ORDER FOR EASE OF REFERENCE.

TITLE: SPACE ENVIRONMENT CRITERIA FOR USE IN SPACE VEHICLE DEVELOPMENT (1968 REVISION)

AUTHOR: SMITH, R.E./WEIDNER, D.K.  
Date of Pub: 10/31/1968

Abstract:
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<tr>
<th align="left">TITLE:</th>
<th align="left">SPACE FLIGHT</th>
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<tr>
<td align="left"><strong>AUTHOR</strong></td>
<td align="left"><strong>Date of Pub:</strong> 4/1/1965</td>
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<tr>
<td align="left"><strong>Abstract:</strong></td>
<td align="left">SECTIONS INCLUDE (1) DEFINITIONS AND INTRODUCTION, (2) MILITARY USE OF SPACE, (3) COMMERCIAL USE OF SPACE, ETC.</td>
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<tr>
<th align="left">TITLE:</th>
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<tr>
<td align="left"><strong>AUTHOR</strong></td>
<td align="left">VON BRAUN, W.</td>
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<tr>
<td align="left"><strong>Date of Pub:</strong></td>
<td align="left">5/15/1968</td>
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<tr>
<td align="left"><strong>Abstract:</strong></td>
<td align="left">THIS PAPER OUTLINES THE HISTORY OF AIR AND SPACE FLIGHT. UNMANNED SPACE PROBES FOR SCIENTIFIC OBJECTIVES, UNMANNED SATELLITES FOR PRACTICAL, EARTH-RELATED PURPOSES, AND MANNED SPACE FLIGHT ARE DISCUSSED AS THE THREE BASIC CATEGORIES OF NON-MILITARY SPACE OBJECTIVES.</td>
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<tr>
<td align="left"><strong>AUTHOR</strong></td>
<td align="left">STUHLINGER, E.</td>
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<tr>
<td align="left"><strong>Date of Pub:</strong></td>
<td align="left">5/2/1963</td>
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<td align="left"><strong>Date of Pub:</strong></td>
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<th align="left">SPACE INVESTIGATION IN THE USSR - PAST, PRESENT, AND FUTURE</th>
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<tr>
<td align="left"><strong>AUTHOR</strong></td>
<td align="left">KRIEGER, F.J.</td>
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<td align="left"><strong>Date of Pub:</strong></td>
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<th align="left">TITLE:</th>
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<td align="left"><strong>AUTHOR</strong></td>
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<td align="left"><strong>Date of Pub:</strong></td>
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<tr>
<th align="left">TITLE:</th>
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</table>
>Title: Space Programme for Europe?
Author: Cleaver, A.V.
Date of Pub: 6/1/1964
Abstract: Presentation of views to support the case for a European space program. Three broad arguments are considered: philosophical, direct applications, and indirect applications.

>Title: Space Programs of the Soviet Union
Author: Krieger, F.J.
Date of Pub: 7/1/1967
Abstract: Microfiche on hand

>Title: Space Research Activities in the United Kingdom
Author: Manders, C.R.S.
Date of Pub: 8/27/1962
Abstract: 

>Title: Space Shuttle Bibliography
Author: 
Date of Pub: 8/1/1969
Abstract: Search Control No. 690742

>Title: Space Sparks a Renaissance in Education
Author: 
Date of Pub: 9/1/1968
Abstract: The impact of space exploits of the last decade on educational institutions is reviewed.

>Title: Space Station Operations Analysis Using Gemini-Titan II-Agena
Author: Romick, D.C./Smith, R.A./Belfig
Date of Pub: 10/31/1962
Abstract: 

>Title: Space Stations Bibliography
Author: 
Date of Pub: 8/1/1969
Abstract: Search Control No. T90741

>Title: Space Stations/Platforms/Workshop Bibliography
TITLE: SPACE TASK GROUP REPORT TO THE PRESIDENT (THE POST-APOLLO SPACE PROGRAM: DIRECTIONS FOR THE FUTURE)  
AUTHOR  
Date of Pub: 9/1/1969  
Abstract: 
TABLE OF CONTENTS INCLUDES: CONCLUSIONS AND RECOMMENDATIONS, INTRODUCTION, BACKGROUND, GOALS AND OBJECTIVES, AND PROGRAM AND BUDGET OPTIONS.

TITLE: SPACE VEHICLE IS BORN. HISTORY OF PROJECT CENTAUR (PART II)  
AUTHOR  
Date of Pub: 1/1/1960  
Abstract: 
MICROFICHE ON HAND.

TITLE: SPACE VEHICLE NAVIGATION, GUIDANCE AND CONTROL  
AUTHOR LANGSTON, R.  
Date of Pub: 1/10/1967  
Abstract: 
THIS REPORT CONTAINS A SUMMARY OF SPACE VEHICLE GUIDANCE AND CONTROL PLUS AN EXTENSIVE BIBLIOGRAPHY OF THE SUBJECT AREA. THIS REPORT IS INTENDED TO ENCOMPASS ONLY THE INTERPLANETARY PORTION OF THE SPACE VEHICLE FLIGHT. HOWEVER, SOME FRINGE INFO IN THE AREA OF ORBITAL FLIGHT IS INCLUDED IN THE BIBLIOGRAPHY WHICH MAY BE APPLICABLE TO INTERPLANETARY FLIGHT.

TITLE: SPACE VEHICLE RESEARCH  
AUTHOR AMES, M.B.  
Date of Pub: 5/8/1962  
Abstract: 
IN THIS PAPER AN OUTLINE IS PRESENTED OF SOME OF OUR RESEARCH AND ADVANCED TECHNOLOGICAL ACTIVITIES RELATED TO PROBLEMS WHICH MUST BE SOLVED IF OUR NATION IS TO CONTINUE AS A LEADER IN THE MASTERY OF SPACE. IN DISCUSSING TECHNICAL PROGRAMS IT IS HELPFUL TO RELATE THEM TO VARIOUS PHASES OF SPACE FLIGHT. A TYPICAL SPACE FLIGHT MISSION MIGHT DEAL WITH: (1) LAUNCH AND EXIT FROM THE ATMOSPHERE, (2) FLIGHT IN SPACE, AND (3) ATMOSPHERIC ENTRY AND RECOVERY.

TITLE: SPACE VEHICLE TEST STANDS  
AUTHOR RAMSEY, R.D.  
Date of Pub: 11/2/1962  
Abstract: 
DISCUSSES FACILITIES IN NASA-MSFCS TEST DIVISION USED TO PERFORM EXPERIMENTAL AND DEVELOPMENT TESTING OF ROCKET ENGINES, LAUNCH VEHICLE STAGES, AND THEIR COMPONENTS.

TITLE: SPACE VEHICLES FOR THE PEACEFUL EXPLORATION OF THE INNER SOLAR SYSTEM  
AUTHOR DANNENBERG, K.K.  
Date of Pub: 7/1/1962  
Abstract: 
THIS PAPER REVIEWS THE MOST ACTIVE PROJECTS OF NASA TO EXPLORE THE MOON, MARS, AND VENUS, AND THEN DESCRIBES THE LAUNCH VEHICLES REQUIRED TO ACCOMPLISH THESE TASKS.

TITLE: SPACE: PROGRESS AND POSTERITY
Abstract:

THIS IS THE FIRST OF A SERIES OF PUBLICATIONS PREPARED AS NOTES FOR A COURSE IN SPACE TECHNOLOGY, GIVEN BY THE CALIFORNIA INSTITUTE OF TECHNOLOGY IN COOPERATION WITH THE JET PROPULSION LABORATORY FROM JUNE 19 TO JULY 31, 1964.

Abstract:
SEARCH CONTROL NO. 015423

Abstract:

THE LAUNCH COMPLEX DESIGNED FOR THE SATURN ROCKET WAS BUILT BY THE CORPS OF ENGINEERS AT CAPE CANAVERAL. DETAILS ARE GIVEN ON LAUNCH PEDESTAL, SERVICE TOWER, ESCAPE MECHANISM, AND THE TEAM EFFORT REQUIRED FOR THE DESIGN AND CONSTRUCTION OF THE COMPLEX.

Abstract:

THE GIANT SATURN, A MULTISTAGE SPACE VEHICLE STANDING 180 FEET TALL, IS TO BECOME AMERICA'S WORKHORSE FOR SPACE PROBING. THE FIRST VERSION, C-1, IS A THREE STAGE, LIQUID-POWERED VEHICLE CAPABLE OF ORBITING 19,000 LBS OF INSTRUMENTATION INTO A 300-MILE EARTH ORBIT. THE C-2 WILL PERMIT ORBITING A PAYLOAD OF 45,000 LBS. THIS ARTICLE DISCUSSES STATIC TESTS, TRIP-TO-THE-MOON PROBLEMS, ETC.

Abstract:

SPECIFICATIONS FOR PREWELD PREPARATION OF JOINT COMPONENTS OF SATURN TYPE BOOSTERS

Abstract:

SPEECH MADE TO HUNTSVILLE COMMUNITY IN MORRIS AUDITORIUM
DISCUSSED APOLLO 12 MISSION AND THE FUTURE OF THE NATIONAL SPACE PROGRAM.

**TITLE:** SPOUT OF THE FUNNEL  
**AUTHOR:** REYNOLDS, G.M.  
**Date of Pub:** 6/1/1966

**Abstract:**

**TITLE:** SS-FM: A NEW TELEMETRY TECHNIQUE  
**AUTHOR:** FROST, W.O.  
**Date of Pub:** 10/16/1961

**Abstract:**
A TECHNIQUE NEW TO TELEMETRY IS DISCUSSED WHICH PROMISES TO ALLEVIATE AN ENIGMA FACING THE TELEMETRY ENGINEER: HOW TO ADEQUATELY TRANSMIT THE AVALANCHE OF VIBRATION AND OTHER WIDEBAND DATA DESIRED IN THE DEVELOPMENT PHASE OF LARGE MISSILES AND LAUNCH VEHICLES. THE DATA CHANNELS ARE STACKED IN THE FREQUENCY SPECTRUM AS SINGLE SIDEBAND SUBCARRIERS WHICH FREQUENCY MODULATE THE RF CARRIER. THE SYSTEM DESIGN UTILIZES TO ADVANTAGE THE STATISTICAL PROPERTIES OF VIBRATION DATA TO ACHIEVE MAXIMUM DATA TRANSMISSION EFFICIENCY FROM THE AVAILABLE RF CARRIER DEVIATION. HOWEVER, IN CONTRAST TO PROPOSED STATISTICAL PREDIGESTION TECHNIQUES, THE DATA IS TRANSMITTED IN RAW FORM. THE BACKGROUND AND PHILOSOPHY OF THE TECHNIQUE IS GIVEN FOLLOWED BY A GENERAL DESCRIPTION OF THE SS-FM VEHICLE AND GROUND TELEMETRY EQUIPMENT TO BE UTILIZED IN THE SATURN VEHICLE PROGRAM AND A SUMMARY OF SYSTEM CHARACTERISTICS AND PERFORMANCE.

**TITLE:** STABILITY ANALYSIS OF APOLLO-SATURN V PROPULSION AND STRUCTURE FEEDBACK LOOP  
**AUTHOR:** VON PRAGENAU, G.L.  
**Date of Pub:** 8/18/1969

**Abstract:**

**TITLE:** STABILITY PROBLEMS IN CONTROL OF SATURN LAUNCH VEHICLES  
**AUTHOR:** MCDONOUGH, G.F.  
**Date of Pub:** 9/1/1965

**Abstract:**

**TITLE:** STAGES TO SATURN... A TECHNOLOGICAL HISTORY OF THE APOLLO/SATURN LAUNCH VEHICLES  
**AUTHOR:** BILSTEIN, R.E.  
**Date of Pub:** 1/1/1980

**Abstract:**

**TITLE:** STANDARD AND POOR'S REGISTER OF CORPORATIONS, DIRECTORS AND EXECUTIVES  
**AUTHOR:**  
**Date of Pub:** 4/1/1976

**Abstract:**
TITLE: STANDARD PROCEDURE FOR USING UNITS OF MASS, WEIGHT, FORCE, PRESSURE AND ACCELERATION
AUTHOR: SCHULER, A.E.
Date of Pub: 3/1/1960

Abstract:

TITLE: STANDARDS OF CONDUCT FOR NASA EMPLOYEES
AUTHOR:
Date of Pub: 6/1/1966

Abstract:
THIS HANDBOOK SETS FORTH NASA'S REGULATIONS FOR THE MAINTENANCE OF THE HIGH ETHICAL STANDARDS OF CONDUCT REQUIRED OF NASA EMPLOYEES, INCLUDING SPECIAL GOVERNMENT EMPLOYEES AS THEY ARE COVERED BY SUCH REGULATIONS, IN CARRYING OUT THEIR DUTIES AND RESPONSIBILITIES.

TITLE: STATEMENT OF GEORGE E. MUELLER, ASSOCIATE ADMINISTRATOR FOR MANNED SPACE FLIGHT, NASA, BEFORE THE COMM. ON AERONAUTICAL AND SPACE SCIENCE,
AUTHOR: MUELLER, G.E.
Date of Pub: 7/1/1966

Abstract:

TITLE: STATEMENT OF GEORGE E. MUELLER, ASSOCIATE ADMINISTRATOR FOR MANNED SPACE FLIGHT, NASA, BEFORE THE COMMITTEE ON AERONAUTICAL & SPACE SCIENCES
AUTHOR: MUELLER, G.E.
Date of Pub: 7/1/1966

Abstract:

TITLE: STATEMENT OF GEORGE E. MUELLER, ASSOCIATE ADMINISTRATOR FOR MANNED SPACE FLIGHT, NASA, BEFORE THE COMMITTEE ON AERONAUTICAL AND SPACE
AUTHOR: MUELLER, G.E.
Date of Pub: 1/1/1969

Abstract:
VOLUME I (TEXT) AND VOLUME II (ILLUSTRATIONS) BOUND TOGETHER

TITLE: STATE-OF-THE-ART RELIABILITY ESTIMATE OF SATURN V PROPULSION SYSTEMS
AUTHOR: BROWN, N.
Date of Pub: 6/1/1963

Abstract:

TITLE: STATIC TEST OF S-IC STAGE OF SATURN V
AUTHOR:
Date of Pub: 6/8/1966

Abstract:
MSFC CONDUCTED A 125-SECOND STATIC TEST OF ITS SECOND FLIGHT SATURN V LAUNCH VEHICLE BOOSTER HERE TUESDAY. TEST WAS A COMPLETE SUCCESS. THE BIG BOOSTER IS 138 FEET LONG AND 33 FEET IN DIAMETER. IT WILL BE THE FIRST STAGE OF THE SECOND APOLLO/SATURN V SPACE VEHICLE TO BE LAUNCHED FROM KSC.

TITLE: STATISTICAL MODEL FOR SATURN ELECTRICAL SUPPORT EQUIPMENT MISSION AVAILABILITY
<table>
<thead>
<tr>
<th>Title</th>
<th>Author</th>
<th>Date of Pub</th>
<th>Abstract</th>
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<tr>
<td>THIS REPORT PRESENTS THE LOGIC LEADING TO A MATHEMATICAL EXPRESSION FOR MISSION AVAILABILITY. MISSION AVAILABILITY IS TREATED AS THE PROBABILITY THAT THE CUMULATIVE DOWNTIME OCCURRING DURING A MISSION OF GIVEN LENGTH WILL BE LESS THAN THE TIME CONSTRAINT. THIS IS OPPOSED TO MORE GENERAL APPROACHES SUCH AS STEADY STATE OR INSTANTANEOUS AVAILABILITY OR OPERATING TIME VS REAL TIME. WE INTEND TO PRESENT A PRACTICAL AND USABLE MATHEMATICAL MODEL BY DEDUCTION AND DEMONSTRATION. DEVELOPMENT IS BASED ON EXPONENTIALLY DISTRIBUTED DOWNTIMES. EXPERIENCE SHOWS THAT CERTAIN SYSTEMS FOLLOW EXPONENTIAL DOWNTIME DISTRIBUTIONS EXCEPT NEAR ZERO. THIS ERROR IS OFTEN SO SMALL THAT IT MAY BE NEGLECTED. A FUTURE REPORT WILL PRESENT A DOWNTIME DISTRIBUTION WHICH WILL ACCOUNT FOR THIS SMALL ERROR.</td>
<td>STANZEL, A.K.</td>
<td>2/21/1967</td>
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<td>STATUS OF CREW SAFETY IMPACT OF CERTAIN SATURN V FAILURES DURING S-IC FLIGHT</td>
<td>LLEWELLYN, J.A.</td>
<td>7/20/1967</td>
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<td>STATUS OF GUIDANCE AND CONTROL METHODS, INSTRUMENTATION, AND TECHNIQUES AS APPLIED IN THE APOLLO PROJECT</td>
<td>HAEUSSERMANN, W./DUNCAN, R.C</td>
<td>10/21/1964</td>
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<td>STATUS REPORT ON THE SATURN 1750 LB THRUST ULLAGE ROCKET ENGINE (MARQUARDT MODEL NO. MA 118-XAB)</td>
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<td>7/9/1964</td>
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<td>STEERING MECHANISM FOR SATURN TRANSPORTER</td>
<td>CARLSON, J.</td>
<td>1/1/1964</td>
<td>THE UNIQUE HARMONIC DRIVE STEERING ACTUATORS FOR THE SATURN APOLLO LAND TRANSPORTER IS DESCRIBED AND THE ADVANTAGES OF UTILIZING THIS EXTREMELY COMPACT UNIT ARE DISCUSSED.</td>
</tr>
<tr>
<td>STEP BY STEP...TO THE MOON</td>
<td>HEATON, D.H.</td>
<td>5/1/1961</td>
<td>MANY STEPS WILL PAVE THE WAY FOR MANNED FLIGHT TO THE MOON, WHICH IS ITSELF AN INTERMEDIATE, BUT MAJOR STEP, TOWARDS MANNED PLANETARY FLIGHT. THE INITIAL EFFORT IS PROJECT MERCURY-DESIGNED TO LOFT A MAN INTO AN EARTH ORBIT, AND BRING HIM BACK ALIVE. SIMULTANEOUS DEVELOPMENT OF UNMANNED LUNAR VEHICLES WILL ALLOW TESTING OF DESIGN APPROACHES AND SUBSYSTEMS WHICH MAY LATER BE INCORPORATED IN MANNED SYSTEMS. THE PRIMARY SCIENTIFIC OBJECTIVE IN EXPLORING THE MOON IS FOR THE INFORMATION IT CAN PROVIDE ON THE HISTORY OF THE SOLAR SYSTEM, NO AMOUNT OF INSTRUMENTATION WILL TELL AS MUCH ABOUT THE UNEXPECTED, WHICH OF COURSE IS THE MOST INTERESTING.</td>
</tr>
</tbody>
</table>
STRUCTURAL PROBLEMS OF LARGE SPACE BOOSTERS

AUTHOR: HELLEBRAND, E.A.  
Date of Pub: 10/19/1964

Abstract: 
THE SHEER SIZE OF TODAY'S SPACE VEHICLES AND THE COST SENSITIVITY OF $/LB PAYLOAD IN ORBIT NECESSITATE CAREFUL ANALYSIS AND TESTING OF STRUCTURES TO A DEGREE UNHEARD OF A FEW YEARS AGO. OUR BIGGEST PROBLEMS LIE IN THE AREA OF STRUCTURAL DYNAMICS, CONTROL AND FEEDBACK AND COUPLING OF PROPULSION, THAT IS PUMP INDUCED FLOW PULSATION, WITH ENGINE THRUST OUTPUT AND STRUCTURAL MODES. TWO EXAMPLES OF PAST AND CURRENT STUDIES AT MSCF THAT INSURE THE STRUCTURAL SOUNDNESS, STABILITY, AND EFFICIENCY OF THE SATURN SPACE VEHICLES ARE (1) SPACE VEHICLES CONFIGURATION OPTIMIZATION AND (2) DYNAMIC GROUND TESTING OF COMPLETE SPACE VEHICLES.

STRUCTURE OF THE NASA/GRUMMAN LUNAR MODULE

AUTHOR: HELLEBRAND, E.A.  
Date of Pub: 6/1/1969

Abstract: 

STRUCTURES TECHNOLOGY IN SUPPORT OF LARGE SPACE BOOSTERS

AUTHOR: HELLEBRAND, E.A.  
Date of Pub: 7/26/1965

Abstract: 
IN RECENT YEARS FOUR AREAS OF STRUCTURAL ANALYSIS, TESTING AND FABRICATION DEVELOPMENT HAVE ASSUMED MAJOR IMPORTANCE TO THE ADVANCEMENT OF THE TECHNOLOGY NEEDED TO PRODUCE EFFICIENT AND RELIABLE SPACE VEHICLES FOR THE APOLLO AND FOLLOW-ON PROGRAMS. THESE ARE (1) VEHICLE CONFIGURATION OPTIMIZATION, (2) FULL SCALE DYNAMIC GROUND TESTING OF COMPLETE SPACE VEHICLES, (3) INVESTIGATION OF THE "POGO PROBLEM," AND (4) HIGH EFFICIENCY ALUMINUM WELDING OF BULKHEADS FOR SATURN V VEHICLE TANKS. THESE ARE DISCUSSED IN DETAIL IN THIS PAPER.

STUDIES OF EVOLVED STARS V.-NUCLEOSYNTHESIS IN HOT-BOTTOM CONVECTIVE ENVELOPES

AUTHOR: SCALO,J.M./DESPAIN,K.H./ULRICH  
Date of Pub: 7/1/1974

Abstract: 
CONVECTIVE ENVELOPES FIT TO THE CORES OF LUMINOUS DOUBLE-SHELL MODELS HAVE BEEN FOUND TO DEVELOP HIGH BASE TEMPERATURE DURING THE PERIOD BETWEEN SHELL FLASHES.

STUDY ATLAS CLUSTER SPACE VEHICLE CAPABILITIES

AUTHOR:  
Date of Pub: 1/1/1959

Abstract: 
MICROFICHE ON HAND.
THIS STUDY IS BASED ON THE ANALYSIS OF INFORMATION GATHERED THROUGHOUT NASA AND THE UNIVERSITY COMMUNITY COVERING MANY DIFFERENT GRANTS, CONTRACTS, DISCIPLINES, PROGRAMS, AND PROJECTS WHEREIN NASA AND UNIVERSITIES HAVE INTERACTED. THIS IS AN ASSESSMENT OF THE TOTAL NASA UNIVERSITY PROGRAM BASED ON GOALS PUBLICLY EXPRESSED BY NASA MANAGERS AS RECORDED IN THE LITERATURE AND CORRESPONDENCE WITH UNIVERSITIES.

TITLE: STUDY OF SATURN V AND INTERMEDIATE VEHICLE IMPROVEMENT PROGRAMS - EXECUTIVE SUMMARY REPORT
AUTHOR: DAVIES, R.
Date of Pub: 4/16/1968

THE PURPOSE OF THIS REPORT IS TO SUMMARIZE THE RESULTS OF THREE COMPANION STUDIES DESIGNED TO INVESTIGATE BOTH THE PERFORMANCE GROWTH POTENTIAL OF SATURN V AND UTILIZATION OF SATURN V EQUIPMENT TO FILL THE PERFORMANCE GAP IN THE INTERMEDIATE PAYLOAD RANGE BETWEEN SATURN IB AND V. THIS REPORT INCLUDES SIGNIFICANT DATA WHICH IS INTENDED TO AID THE PLANNING OF FUTURE MISSIONS. THIS DATA REFLECTS SOME OF THE VARIOUS VEHICLE CONFIGURATIONS WHICH CAN BE USED BY MISSION PLANNERS TO SATISFY PAYLOAD DESIRES IN EXCESS OF SATURNS IB AND V.

TITLE: SUMMARY OF APOLLO-SATURN SPACE VEHICLE TELEMETRY SYSTEMS AND TELEMETRY SUPPORT FROM STATIONS LOCATED IN THE MILA/CAPE AREA FOR
AUTHOR: WEYGAND, A.G.
Date of Pub: 2/14/1967

TITLE: SUMMARY OF HEAT FLUX AND PRESSURE INSTRUMENTATION USED IN RECENT SATURN ROCKET EXHAUST TESTS
AUTHOR: ROCHELLE, W.C.
Date of Pub: 5/1/1967

TITLE: SUMMARY OF MAJOR NASA LAUNCHINGS NASA 10TH ANNIVERSARY (OCT.1,1958 - SEPT.30,1968)
AUTHOR
Date of Pub: 10/1/1968

TITLE: SUMMARY OF MAJOR NASA LAUNCHINGS - QUARTERLY SUPPLEMENT #1 TO GP-381
AUTHOR
Date of Pub: 10/1/1968

TITLE: SUMMARY OF SATURN I BASE THERMAL ENVIRONMENT
AUTHOR: PAYNE, R.G./JONES, I.P.
Date of Pub: 12/1/1964
Flight data from the Saturn I have established the base thermal environment of eight-engine LOX/RP-1 rockets. Plume radiation levels, total heating rates, and base gas temperatures have been measured on the first stage of the Block I and II vehicles. Some heating data also were obtained for the six-engine LOX/LH-2, S-IV second-stage base. Flight instrumentation, data reduction techniques, and evaluation problems are discussed along with a correlation of flight results to both long and short duration model tests. Maximum base heating rates occurred at liftoff for both total and radiation heating, with a lower secondary peak occurring when the reverse flow from the inboard engines became choked. Maximum total heating rates on the flame shield were approximately three times (75-100 W/cm²) those on the heat shield for the S-1 base. Base gas temperatures varied widely, with maximum values of 1300 degrees K for the heat shield and 2100 degrees K for the flame shield. Block II flight data for the S-1 were generally lower than the Block I results. S-IV stage base heat rates varied with radial distance from center and flight time from 2 to 0.5 W/cm² and agreed well with short-duration model test results.

Title: Summary Report of NASA’s Facilities Conference at the Michoud Assembly Facility, 4-6 December 1968
Author: Curtin, R.H.
Date of Pub: 2/14/1969

Abstract:
The purpose of the conference was twofold: to bring into focus and perspective management and technical problem areas needing improvement and to discuss planned and other possible actions for such improvement using the agency wide visibility of the problems represented by the attendees. As a byproduct of the conference, it was felt that improved understanding would be established of what can be done and must be done to insure that NASA has the very best possible facilities support.

Title: Summary Report-Future Programs Task Group
Author: Date of Pub: 4/1/1965

Abstract:
A report by NASA to the President

Title: Supersonic/Hypersonic Aerodynamic Investigation of the Saturn IB/Apollo Upper Stage
Author: Carlson, D.R./Walters, W.P.
Date of Pub: 1/1/1966

Abstract:
The static stability and axial force characteristics of an upper stage IB/Apollo model were investigated in a series of wind tunnel tests at Mach numbers between 1.93 and 8.05. This report presents and analyzes the results of these small-scale studies. Test procedures and models are described, and consideration of boundary layer characteristics and violated modeling rules yields an assessment of the validity of the data.

Title: Supplement to Monthly Progress Report - Propulsion Division
Author: Date of Pub: 4/1/1966

Abstract:

Title: Support Equipment for Saturn and Nova
Author: Poppe, T.A.
Date of Pub: 10/1/1961

Abstract:
A staff interview under the direction of Erik Bergaust. Covers questions regarding the kind of support equipment being developed, special efforts to reduce the complexity and cost of support equipment, how much Saturn development money is earmarked for support equipment, etc.

Title: Support Net for Manned Space Flight
TITLE: SURVEY OF AUTOMATIC CHECKOUT SYSTEMS FOR SATURN V STAGES

AUTHOR SCHMIDT,D.M.  Date of Pub: 7/10/1968

Abstract:
THE FOUR CHECKOUT SYSTEMS DEVELOPED AND UTILIZED BY NASA FOR ACCEPTANCE CHECKOUT OF SATURN V LAUNCH VEHICLE STAGES AND IIF ARE DESCRIBED. VEHICLE CHARACTERISTICS, TEST POLICIES, EQUIPMENT DESIGN CRITERIA, AND OPERATIONAL FACTORS ARE REVIEWED. FOLLOWING A GENERAL DESCRIPTION OF EACH CHECKOUT SYSTEM, A BRIEF DEFINITIVE DESCRIPTION IS GIVEN OF EACH MAJOR SUBSYSTEM TEST STATION. THESE TEST SYSTEMS ARE USED FOR POST-MANUFACTURING AND POST-STATIC Firing ACCEPTANCE CHECKOUT. THE SECTION RELATED TO THE S-II STAGE INCLUDES SEVERAL REPRESENTATIVE FLOW DIAGRAMS AND DESCRIPTIONS OF AUTOMATIC TESTS.

TITLE: SURVEY OF FREE RETURN TRANSITS IN EARTH-MOON SPACE

AUTHOR SCHWANIGER,A.J.  Date of Pub: 8/1/1964

Abstract:
THIS PAPER PRESENTS RESULTS OF AN EXTENSIVE SURVEY OF FREE RETURN TRANSITS WHICH HAVE PROPERTIES THAT MAKE THEM SUITABLE FOR APPLICATION TO LUNAR EXPLORATION MISSIONS. IT SHOWS THAT THERE IS A CONTINUOUS REGION OF SUCH TRANSITS AND NOTED THAT THERE RE traverse OTHER TRANSITS SATISFYING THE DEFINITION OF FREE RETURN, BUT NOT IN THE REGION OF TRANSITS OF IMMEDIATE INTEREST FOR APPLICATION. THE METHOD OF CONDUCTING THE SURVEY WAS NUMERICAL AND EXPERIMENTAL. THE MATHEMATICAL MODEL OF THE RESTRICTED THREE-BODY PROBLEM WAS EMPLOYED, AND THE TRAJECTORY CALCULATIONS WERE DONE BY COWELL'S METHOD. GEOMETRIC NOTIONS AND SYSTEMATIC MANAGEMENT OF THE TRANSIT PARAMETERS ARE USED TO MAKE THE RESULTS OF THE SURVEY MORE EASILY UNDERSTOOD AND REMEMBERED. FOR THE PURPOSES OF THIS PAPER, A FREE RETURN TRANSIT IS DEFINED AS ONE WHICH STARTS AT A PERIGEE OF CHOSEN RADIUS FROM THE EARTH'S CENTER, PASSES ARBITRARILY NEAR THE MOON AND TERMINATES AT ANOTHER PERIGEE OF RADIUS EQUAL TO THE FIRST. TRAJECTORIES ARE CHARACTERIZED BY THEIR POSITION AND VELOCITY COMPONENTS AT THE CLOSE APPROACH POINTS TO BOTH EARTH AND MOON. THE TRANSITS ARE CLASSIFIED BY DIRECTION OF DEPARTURE FROM EARTH AND THE DISTANCE OF CLOSE APPROACH TO THE MOON.

TITLE: SURVEY OF PROPULSION PROBLEMS AS RELATED TO SPACE VEHICLE DESIGN

AUTHOR GORDON,T.J.  Date of Pub: 1/1/1963

Abstract:
DISCUSSED ARE THE PROBLEMS WHICH THE SPACE VEHICLE CREATES FOR THE ENGINE AND THE PROBLEMS WHICH ENGINE PECULIARITIES CREATE FOR THE SPACE VEHICLE. SOLUTIONS THAT WERE FOUND TO SOME OF THESE PROBLEMS, AND HOW THESE SOLUTIONS HAVE SHAPED THE PROPULSIVE SYSTEMS OF TODAY.

TITLE: SURVEY OF SATURN STAGE TEST AND CHECKOUT COMPUTER PROGRAM DEVELOPMENT

AUTHOR WEIDNER,H.K.  Date of Pub: 6/1/1966

Abstract:
THIS SURVEY CONTAINS A SUMMARY DESCRIPTION OF SYSTEMS DEVELOPED FOR FACTORY AND STATIC TEST OF STAGES OF SATURN IB AND V. RESPONSIBILITIES OF MSFC AND STAGE CONTRACTOR ORGANIZATIONS INVOLVED IN TEST AND CHECKOUT COMPUTER PROGRAM DEVELOPMENT ARE BRIEFLY DESCRIBED. TEST AND CHECKOUT HARDWARE AND SOFTWARE SYSTEMS ARE GIVEN FOR EACH STAGE AND FOR EACH SITE WHERE TESTS ARE CONDUCTED. SYSTEMS AND PROCEDURES USED FOR PROGRAM PRODUCTION VERIFICATION, DOCUMENTATION, AND CHANGE CONTROL ARE INCLUDED.
<table>
<thead>
<tr>
<th>TITLE:</th>
<th>SURVEY OF THE EUROPEAN SPACE PROGRAM</th>
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<tbody>
<tr>
<td>AUTHOR</td>
<td>GARDNER, J.P.</td>
</tr>
<tr>
<td>Date of Pub:</td>
<td>4/14/1962</td>
</tr>
<tr>
<td>Abstract:</td>
<td>THIS REPORT PRESENTS THE HISTORY AND RECENT PROGRESS OF A UNIFIED EFFORT OF SEVERAL MAJOR EUROPEAN NATIONS TO UNDERTAKE EXPLORATION OF SPACE. EMPHASIS IS PLACED ON DEVELOPMENT OF A BLUE STREAK-BASED CARRIER VEHICLE THAT PROBABLY WILL PLAY THE LEADING ROLE IN THE EUROPEAN SPACE PROGRAM. IT IS EVIDENT THAT THIS PROGRAM IS RAPIDLY GATHERING MOMENTUM AND SHOULD THE TREND CONTINUE, WILL PROVIDE THE WORLD COMMUNITY WITH MANY VALUABLE CONTRIBUTIONS.</td>
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<thead>
<tr>
<th>TITLE:</th>
<th>SYSTEM DESCRIPTION FOR SATURN VEHICLE (SA-1 THROUGH SA-4)</th>
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<tbody>
<tr>
<td>AUTHOR</td>
<td>UHERKA, M.</td>
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<tr>
<td>Date of Pub:</td>
<td>4/2/1959</td>
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<tr>
<td>Abstract:</td>
<td>UAH CONTROL NO. 115</td>
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<thead>
<tr>
<th>TITLE:</th>
<th>SYSTEM ENGINEERING PROPULSION</th>
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<tr>
<td>AUTHOR</td>
<td>BODEN, R.H.</td>
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<tr>
<td>Date of Pub:</td>
<td>6/1/1963</td>
</tr>
<tr>
<td>Abstract:</td>
<td>PROPULSION IS FORMALLY DEFINED AS THE ACT OF PROPELLING A BODY. AS AN ALTERNATIVE DEFINITION FOR THE SYSTEMS ORIENTED ENGINEER, PROPULSION IS APPLICATION OF THE BASIC SCIENCES TO GENERATE, ASSESS, AND ESTIMATE THE EFFECTIVENESS OF METHODS TO ACHIEVE CONTROLLED MOTION OF A VEHICLE. PROPULSION, CONSIDERING THE ALTERNATIVE DEFINITION, HAS SEVERAL POINTS OF VIEW. THE OBJECTIVE MAY BE TO ESTABLISH PRINCIPLES WHICH UNDERLIE THE DESIGN, APPLICATION AND OPERATION OF THE DEVICES; TO ORGANIZE INFORMATION ABOUT THE HOST OF DETAILS WHICH THE PRACTICING PROPULSION ENGINEER MUST HAVE AT CALL; OR TO PRESENT THOSE SIGNIFICANT DATA WHICH PERMIT ORGANIZATION OF A FEASIBLE PROPULSION SYSTEM FOR A VEHICLE. THE OBJECTIVE IN THIS PAPER IS TO PRESENT SYSTEM DATA.</td>
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<thead>
<tr>
<th>TITLE:</th>
<th>SYSTEM SAFETY HANDBOOK (BOEING)</th>
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<tbody>
<tr>
<td>AUTHOR</td>
<td></td>
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<tr>
<td>Date of Pub:</td>
<td>1/6/1967</td>
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<tr>
<td>Abstract:</td>
<td>THIS HANDBOOK HAS BEEN PREPARED TO DESCRIBE THE TYPICAL PROBLEM AREAS AND EQUIPMENT WITHIN THE SATURN SYSTEM THAT EXPERIENCE HAS SHOWN TO REQUIRE SPECIAL ATTENTION IF HAZARDS ARE TO BE AVOIDED OR ELIMINATED DURING TEST, MAINTENANCE, AND OPERATION.</td>
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<tr>
<th>TITLE:</th>
<th>SYSTEM SAFETY PLAN (NASA-MSFC-10)</th>
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<tr>
<td>AUTHOR</td>
<td></td>
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<tr>
<td>Date of Pub:</td>
<td>3/12/1968</td>
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<tr>
<td>Abstract:</td>
<td>PROVIDES GUIDELINES FOR IMPLEMENTATION OF THE PROGRAM-ORIENTED SYSTEM SAFETY EFFORT FOR ALL MSFC PROGRAMS MANAGED BY INDUSTRIAL OPERATIONS. IT INCLUDES IDENTIFICATION OF RESPONSIVE ORGANIZATIONAL ELEMENTS THAT WILL DEVELOP THE EFFORT LEADING TO DETECTION AND IDENTIFICATION OF HAZARDOUS SITUATIONS.</td>
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<tr>
<th>TITLE:</th>
<th>SYSTEMS APPLICATIONS IN ORBITAL LAUNCH OPERATIONS</th>
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<tr>
<td>AUTHOR</td>
<td>SAPP, T.P.</td>
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<tr>
<td>Date of Pub:</td>
<td>11/29/1966</td>
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<tr>
<td>Abstract:</td>
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</table>
THE OBJECTIVE IS TO EXAMINE THE TECHNICAL REQUIREMENTS AND FEASIBILITY OF CONDUCTING ORBITAL LAUNCH OPERATIONS WITH SYSTEMS NOW IN THE DEVELOPMENT PHASE. IN ORDER TO MAINTAIN REALISTIC CONSTRAINTS ON THE ANALYSIS, THE S-IVB STAGE HAS BEEN USED AS AN EXAMPLE OF PRESENT STAGE TECHNOLOGY. REQUIREMENTS, PROCEDURES AND COMPLEXITY OF OPERATIONS FOR ORBITAL ASSEMBLY AND LAUNCH ARE DISCUSSED. PRIMARY DESIGN REQUIREMENT FOR ORBITAL ASSEMBLY AND 1 LAUNCH OPERATIONS IS INCREASED ORBITAL STAY TIME (FROM HOURS TO DAYS OR WEEKS). THE SS-IVB STAGE WAS EXAMINED TO DETERMINE THE DESIGN CHANGES, WEIGHT INCREASE, AND PERFORMANCE PENALTIES OF ADAPTING IT TO A 30 DAY ORBIT STAY TIME LOADED WITH PROPELLANTS. THE TRADEOFFS IN WEIGHT AND PERFORMANCE PENALTIES BETWEEN AN INDEPENDENT STAGE AND THE REMOVAL OF CERTAIN STAGE SUPPORT SYSTEMS TO A SEPARATE JETTISONABLE SUPPORT EQUIPMENT STAGE IS CONSIDERED.

TITLE: SYSTEMS EFFECTIVENESS ANALYSIS TECHNIQUE AS USED ON SATURN
AUTHOR CHRISTIANSIN, H.J.
Date of Pub: 5/1/1967
Abstract:

TITLE: SYSTEMS EFFECTIVENESS MANAGEMENT OF SATURN V FAILURE DATA ACQUISITION AND UTILIZATION (PAPER)
AUTHOR HALE, F.L.
Date of Pub: 10/1/1966
Abstract:

TITLE: SYSTEMS ENGINEERING MANAGEMENT PROCEDURES (AIR FORCE SYSTEMS COMMAND)
AUTHOR
Date of Pub: 3/10/1966
Abstract:

TITLE: SYSTEMS TRAINING MANUAL, SATURN IB ORIENTATION (CHRYSLER CORPORATION)
AUTHOR
Date of Pub: 2/15/1965
Abstract:

TITLE: TANKS FOR SATURN
AUTHOR CLARKE, W.
Date of Pub: 5/1/1965
Abstract:

TITLE: TARGETING THE SATURN V (PAPER)

AUTHOR RICE, A.F. Date of Pub: 1/1/1966

Abstract:

TITLE: TECHNICAL ADVANTAGES OF FLUID POWER

AUTHOR NEILAND, V.R./KALANGE, M.A. Date of Pub: 10/8/1962

Abstract:
THE EVOLUTION OF ATTITUDE CONTROL SYSTEMS RELATED TO NASA SPACE VEHICLES IS COVERED. SUCCESSFUL EMPLOYMENT OF ELECTRIC THRUST VECTOR CONTROL ON THE MERCURY-REDSTONE WAS FOLLOWED BY EMPLOYMENT OF FLUID POWER FOR JUNO II, SATURN, AND ADVANCED SATURN. A COMPARISON IS MADE OF ELECTRIC AND HYDRAULIC SYSTEMS AS EXEMPLIFIED BY PERSHING AND MERCURY-REDSTONE. OTHER ILLUSTRATED APPLICATIONS OF FLUID POWER RELATED TO SPACE VEHICLES ARE PRESENTED. ADVANTAGES OF FLUID POWER ARE PRESENTED IN KEEPING WITH THE REQUIREMENTS AND PERSPECTIVES OF MSFC.

TITLE: TECHNICAL DEVELOPMENT OF THE S-IVB STAGE - SATURN V LAUNCH VEHICLE (PAPER)

AUTHOR Date of Pub: 4/1/1964

Abstract:

TITLE: TECHNICAL FACILITIES AND CAPABILITIES OF AMC

AUTHOR Date of Pub: 4/1/1969

Abstract:
THIS BROCHURE IS BEING DISTRIBUTED TO COLLEGES AND UNIVERSITIES TO ACQUAINT AND INTEREST STUDENTS WITH THE VARIETY OF PROFESSIONAL AND TECHNICAL SKILLS ESSENTIAL TO ACCOMPLISH THE COMPLEX MISSION OF AMC.

TITLE: TECHNICAL FACILITIES AND EQUIPMENT DIGEST

AUTHOR Date of Pub: 1/1/1967

Abstract:
THIS DOCUMENT PORTRAYS THE CAPABILITY OF TECHNICAL FACILITIES AND EQUIPMENT AT MSFC, ONE OF THREE BASIC FIELD CENTERS UNDER THE NASA OFFICE OF MANNED SPACE FLIGHT. IT IS INTENDED IN THIS DOCUMENT TO GIVE THE READER A PHYSICAL CONCEPT OF THE TECHNICAL FACILITIES OF MSFC AT HUNTSVILLE AND TO ACQUAINT HIM WITH THEIR GENERAL CAPABILITY AND POTENTIAL. THEREFORE, THE TEXT IS A DIGEST OF THE TECHNICAL FACILITIES AND EQUIPMENT ONLY. DATA ON SUPPORT FACILITIES SUCH AS OFFICE BUILDINGS, WAREHOUSES AND UTILITIES ARE NOT INCLUDED. TECHNICAL OPERATIONS ARE THE RESPONSIBILITY OF EIGHT BASIC LABS AND THE DATA HEREIN ARE GROUPED IN ACCORDANCE WITH THIS OPERATIONAL DIVISION OF RESPONSIBILITY (AERO-ASTRODYNAMICS, RESEARCH PROJECTS, COMPUTATION, ASTRONICS, P&VE, MANUFACTURING ENGINEERING, QUALITY AND RELIABILITY ASSURANCE, AND TEST). A REFERENCE INDEX IS INCLUDED AS AN AID IN REFERRING TO SPECIFIC CATEGORIES OF EQUIPMENT.

TITLE: TECHNICAL INFORMATION CONCERNING SATURN I VEHICLE SA-6

AUTHOR Date of Pub: 5/12/1964

Abstract:
THIS REPORT OUTLINES THE GENERAL FEATURES OF THE SIXTH SATURN I LAUNCH VEHICLE. SKETCHES ARE DEVOTED PRIMARILY TO THE LAUNCH VEHICLE BUT ALSO PRESENT LIMITED INFORMATION ON THE SPACECRAFT, THE LAUNCH FACILITY AND LAUNCH PREPARATIONS.
TITLE: TECHNICAL INFORMATION SUMMARY CONCERNING MERCURY-REDSTONE MISSION MR-4
AUTHOR: JONES, C.B.  
Date of Pub: 6/29/1961

Abstract: 
THIS REPORT GIVES A BRIEF DESCRIPTION OF THE MAIN FEATURES OF THE 1 MERCURY-REDSTONE FLIGHT MR-4, WHICH IS TO BE THE SECOND OF A SERIES OF MR MANNED BALLISTIC SPACE FLIGHTS. GENERAL INFORMATION 1 IS GIVEN IN THE INTRODUCTION CONCERNING MISSION OBJECTIVES. A SHORT SUMMARY OF EXPERIENCE ON PAST MR FLIGHTS IS GIVEN.

TITLE: TECHNICAL INFORMATION SUMMARY CONCERNING SATURN VEHICLE SA-3
AUTHOR:  
Date of Pub: 11/2/1962

Abstract: 
THIS REPORT OUTLINES, THROUGH A SERIES OF SKETCHES, SOME OF THE IMPORTANT FEATURES AND SEQUENCES CONCERNING THE THIRD SATURN 1 FLIGHT VEHICLE. THE SKETCHES ARE DEVOTED PRIMARILY TO THE CONTROL AND INSTRUMENTATION ASPECTS OF THE VEHICLE BUT ALSO TOUCH ON THE LAUNCH FACILITY AND COUNTDOWN SCHEDULE.

TITLE: TECHNICAL PROBLEMS IN ON-BOARD CHECKOUT SYSTEMS
AUTHOR: SMITH, R.L.  
Date of Pub: 1/1/1968

Abstract: 
THIS PAPER IS AN ATTEMPT TO DEAL WITH MOST OF THE MAJOR TECHNICAL DIRECTION AND PROBLEM AREAS ASSOCIATED WITH AN ONBOARD CHECKOUT 1 SYSTEM. IT DISCUSSES BOTH PROBLEMS, AND LIKELY OR POSSIBLE SOLUTIONS, AND TRADEOFF CONSIDERATIONS. MOST OF THE PROPOSED SOLUTIONS ARE DISCUSSED IN DEPTH IN OTHER PUBLICATIONS. THE INTENT HERE IS TO TOUCH UPON BOTH THE PROBLEM AND TRADEOFF AREAS, AND THE POSSIBLE SOLUTIONS, IN ONE DOCUMENT.

TITLE: TECHNIQUE FOR ANALYZING CONTROL GAINS USING FREQUENCY RESPONSE METHODS
AUTHOR: RYAN, R.S./HARCROW, H.  
Date of Pub: 3/1/1967

Abstract: 
MANY APPROACHES HAVE BEEN USED FOR COMPUTING SPACE VEHICLE RESPONSES TO WINDS. IN THE PAST, THESE STUDIES HAVE BEEN CONDUCTED WITHOUT including EFFECTS OF ATMOSPHERIC TURBULANCE. WHEN THE INCLUSION OF TURBULENCE WAS ATTEMPTED, IT WAS GENERALLY CONSIDERED AS DISCRETE GUST. A BASIC PROBLEM FACING AEROSPACE ENGINEERS TODAY IS THAT OF DETERMINING ACCURATE AND ECONOMICAL MEANS FOR UTILIZING TURBULENCE FOUND IN DETAILED WIND PROFILES SUCH AS THOSE OBTAINED BY THE FPS-16 RADAR/JIMSPHERE METHOD. IN GENERAL, THIS CAN BE ACCOMPLISHED BY SYNTHetically FLYING THE VEHICLE THROUGH ALL OF AVAILABLE WIND PROFILES AND RECORDING THE VARIABLES OF INTEREST STATISTICALLY. IN THIS WAY, THE PROBABILITY OF EXCEEDING A GIVEN VALUE MAY BE OBTAINED. BY ANALYZING AN ENSEMBLE OF WINDS IN THIS FASHION FOR EACH CONTROL SETTING, AN OPTIMAL GAIN SETTING IS ACHIEVED. HOWEVER, THIS PROCEDURE REQUIRES NUMEROUS RUNS, AND SOME OF THE VARIOUS EFFECTS ARE HIDDEN. THIS PAPER PRESENTS A MORE EFFICIENT APPROACH FOR OBTAINING OPTIMAL GAIN SETTINGS FOR THE ATMOSPHERIC TURBULANCE FOUND IN 407 JIMSPHERE WIND PROFILES AND COMPARES RESULTS WITH THOSE OBTAINED FROM VEHICLE SIMULATION ON ANALOG COMPUTERS.

TITLE: TECHNIQUE FOR RELIABILITY CIRCUIT DESIGN REVIEW IN SPACE ELECTRONICS
AUTHOR: FRANCISCOVICH, P.J.  
Date of Pub: 4/1/1967

Abstract: 

DESIGN REVIEW IS BECOMING A BASIC REQUIREMENT DURING THE DESIGN AND DEVELOPMENT OF MILITARY SYSTEMS. THE MAIN PURPOSE OF THE DESIGN REVIEW IS TO INCREASE THE SYSTEM'S INHERENT AND OPERATIONAL RELIABILITY. THE MAJOR PORTION OF THIS PAPER IS THE RESULT OF RELIABILITY'S EFFORT TO COMPLY WITH PARAGRAPH 3.6 OF NPC 250-1 RELIABILITY PROGRAM PROVISIONS FOR SPACE CONTRACTORS. THE DESIGN REVIEW TO BE DISCUSSED IS A RELIABILITY CIRCUIT DESIGN REVIEW WITH EMPHASIS PLACED ON WHAT SHOULD BE REVIEWED AND REVIEW TECHNIQUES EMPLOYED. THE BASIC CIRCUIT DESIGN REVIEW PREREQUISITES, COMPONENT PARTS AND THEIR RATINGS, ARE DISCUSSED AT THE BEGINNING OF THIS PAPER. THE REMAINDER DEALS WITH ORGANIZATION AND REVIEWING OF CIRCUITS. THE REVIEW ITEMS INCLUDE WORST-CASE CIRCUIT PERFORMANCE, COMPONENT APPLICATIONS, FAILURE MODE ANALYSIS, NOISE REJECTION, ELECTRICAL STRESS, AND THE DETERMINATION OF COMPONENT TEMPERATURES. MANY EXAMPLES ARE INCLUDED TO ILLUSTRATE HOW EACH ITEM WAS ACCOMPLISHED. THIS PAPER IS INTENDED NOT ONLY TO GIVE THE RELIABILITY ANALYST CONIZANCE OF BASIC DESIGN PROBLEMS AND TROUBLESOME CIRCUITS, BUT ALSO, TO AID HIM IN FORMULATING A DESIGN REVIEW PROGRAM.

TITLE: TECHNIQUES AND RESULTS OF THE MAINTENANCE ANALYSIS PROGRAM FOR THE SATURN V SYSTEM
AUTHOR GRALOW, F.H.
Date of Pub: 10/1/1967

Abstract:

TITLE: TECHNIQUES OF IMPLEMENTING LAUNCH AUTOMATION PROGRAMS (SATURN IB SPACE VEHICLE SYSTEM)
AUTHOR BODIE, W.G.
Date of Pub: 7/30/1965

Abstract:

THIS PAPER IDENTIFIES METHODS AND EQUIPMENT THROUGH WHICH AUTOMATION IS BECOMING A MAJOR FACTOR IN TESTING AND LAUNCHING SATURN IB SPACE VEHICLES. MERITS OF A DIGITAL GUIDANCE COMPUTER AND ITS IMPACT IN EXTENDING AUTOMATED CHECKOUT ARE STRESSED; ALSO A LOGICAL BASIS IS ESTABLISHED FOR COMPUTER AND MANUAL TEST CONTROL. HARDWARE AND SOFTWARE ELEMENTS OF THE AUTOMATED SYSTEM ARE DESCRIBED AND DETAILS PERTAINING TO RELIABILITY ARE EMPHASIZED. A CONCLUDING APPRAISAL SUGGESTS THAT AUTOMATION WILL PLAY AN EXPANDING ROLE IN FUTURE TEST AND LAUNCH OPERATIONS.

TITLE: TECHNOLOGICAL PROBLEMS OF THE SATURN CLASS V VEHICLE
AUTHOR MRAZEK, W.A.
Date of Pub: 6/1/1966

Abstract:

DISCUSSES SOME OF THE PROBLEMS ENCOUNTERED IN THE DEVELOPMENT OF A LUNAR LAUNCH VEHICLE.

TITLE: TECHNOLOGICAL PROBLEMS OF THE SATURN CLASS V VEHICLE
AUTHOR MRAZEK, W.
Date of Pub: 6/1/1966

Abstract:

TITLE: TELEMETRY DATA CONFIRMS SATURN SUCCESS
AUTHOR ALEXANDER, G.
Date of Pub: 11/6/1961

Abstract:

DETAILED ANALYSIS OF FLIGHT DATA FROM 510 ON-BOARD TELEMETRY CHANNELS HAS Confirmed that the SATURN Booster Which Will TEST APOLLO CONFIGURATIONS AND SYSTEMS IN EARTH ORBIT MADE A FLAWLESS FIRST FLIGHT. SA-1 WAS LAUNCHED 27 OCTOBER AND A FIRST-RUN ANALYSIS OF FLIGHT DATA WAS COMPLETED 31 OCTOBER AT MSFC. DETAILS OF PREPARATIONS FOR LAUNCH, COUNTDOWN PROCEDURE, TRACKING, AND POST LAUNCH CONFERENCE ARE PRESENTED.

TITLE: TELEMETRY SYSTEM DESIGN FOR SATURN VEHICLES
THIS PAPER DISCUSSES THE DATA SYSTEM REQUIREMENTS FOR LARGE SPACE VEHICLES AND DESCRIBES A FLEXIBLE TELEMETRY SYSTEM DESIGN WHICH IS USED ON ALL STAGES OF SATURN IB AND V VEHICLES. THE BASIC VEHICLE TELEMETRY DESIGN PROVIDES STANDARD ASSEMBLY BUILDING BLOCKS FORMING A VERSATILE CATALOGUE OF PARTS FROM WHICH A STAGE TELEMETRY SUBSYSTEM MAY BE ASSEMBLED TO MEET ALMOST ANY CONCEIVABLE MONITORING REQUIREMENT. IN ADDITION TO ITS INFLIGHT MONITORING FUNCTION, THE TELEMETRY SUBSYSTEM ALSO PROVIDES REAL TIME DATA ACQUISITION FOR AUTOMATIC VEHICLE CHECKOUT.

Abstract:


Abstract:

DIVERSE DATA REQUIREMENTS FOR DEVELOPING THE EIGHT-ENGINE LIQUID-FUELED STAGE NECESSITATED USE OF A COMBINATION OF SEVERAL MODULATION TECHNIQUES TO EFFICIENTLY HANDLE THE DATA. A CURSORY COMPARISON IS MADE OF THE MERITS OF EACH TECHNIQUE. PHYSICAL AND ELECTRICAL REQUIREMENTS AND CHARACTERISTICS OF THE SYSTEM ARE OUTLINED.

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DIVERSE DATA REQUIREMENTS FOR DEVELOPING THE EIGHT-ENGINE LIQUID-FUELED STAGE NECESSITATED USE OF A COMBINATION OF SEVERAL MODULATION TECHNIQUES TO EFFICIENTLY HANDLE THE DATA. A CURSORY COMPARISON IS MADE OF THE MERITS OF EACH TECHNIQUE. PHYSICAL AND ELECTRICAL REQUIREMENTS AND CHARACTERISTICS OF THE SYSTEM ARE OUTLINED.

Abstract:

DIVERSE DATA REQUIREMENTS FOR DEVELOPING THE EIGHT-ENGINE LIQUID-FUELED STAGE NECESSITATED USE OF A COMBINATION OF SEVERAL MODULATION TECHNIQUES TO EFFICIENTLY HANDLE THE DATA. A CURSORY COMPARISON IS MADE OF THE MERITS OF EACH TECHNIQUE. PHYSICAL AND ELECTRICAL REQUIREMENTS AND CHARACTERISTICS OF THE SYSTEM ARE OUTLINED.
TEMPERATURE CONTROL OF A SPACE VEHICLE INSTRUMENT UNIT

AUTHOR: HUNEIDI, FAROUK

Abstract:
 Failures of some past space missions have been attributed to failures in temperature control of the IU which accommodates guidance and control instruments. The allowable operating temperature limits on most instruments aboard present vehicles ranges from a maximum of 65 to a minimum of 0°C. Due to the weight restrictions and the unusual temperature and vacuum conditions prevailing in space (approximately 4K and 10^-8 mm Hg at an Earth orbit of 300 mile altitude), new and different cooling techniques have to be developed to keep the equipment at its operating temperature.

TEN YEARS OF SPACE RESEARCH IN THE USSR

AUTHOR: TIKHONRAVOV, M.K.

Abstract:
MICROFICHE ON HAND

TERRESTRIAL ENVIRONMENT (CLIMATIC) CRITERIA GUIDELINES FOR USE IN SPACE VEHICLE DEVELOPMENT, 1966 REVISION

AUTHOR: DANIELS, G.E./SCOGGINS, J.R./SMI

Abstract:
This document provides guidelines on probable climatic extremes and probabilities-of-occurrence of terrestrial environment data specifically applicable for NASA space vehicles and associated equipment development. The geographic areas encompassed are the Eastern test range (Wallops Island); White Sands Missile Range; and Intermediate transportation areas. A section has been included to provide information on general distribution of natural environment extremes in the U.S. (excluding Alaska and Hawaii) that may be useful to specify design criteria in transportation of space vehicle components from subcontractors. This document omits climatic extremes for worldwide operational conditions.
TITLE: TEST AND MEASUREMENTS - THE HEART OF ROCKET DEVELOPMENT
Author: Driscoll, D.H./Schuler, A.E.
Date of Pub: 12/1/1968
Abstract:
This article is a digest from the book "From Peenemunde to Outer Space," commemorating the 50th birthday of Dr. von Braun, 23 March 1962.

TITLE: TEST LABORATORY PROGRESS REPORT
Author: Date of Pub: 2/12/1966

TITLE: TEST PROCEDURE VALIDATION BY COMPUTER SIMULATION
Author: Jaegly, R.L.
Date of Pub: 3/25/1968
Abstract:
Digital computer simulation of the Saturn I IU electrical networks was accomplished using the discrete network simulation programs. Schematics were analyzed and a logic model prepared, which consisted of a series of boolean equations. The test procedures, which are written in the acceptance, test, or launch language (Atoll), consist of a sequential set of computer instructions for the RCA 110A checkout computer to control the operation of the electrical networks. The procedures also contain the predicted results for each operation. The driving functions for the simulation of the model are generated from the Atoll test tape by the input generator program. The time sequenced operation of the networks is indicated by the output from the simulation program in addition to the number of times each component in the system changes state. The results of the simulation are compared to the test procedure predictions on the Atoll tape by the comparator program and any differences are listed. The comparator program also lists any component which did not change state at least once.

TITLE: THEORETICAL AND EXPERIMENTAL INVESTIGATION OF HEATING FROM SATURN SOLID PROPELLANT ROCKET EXHAUSTS
Author: Rochelle, W.C.
Date of Pub: 1/1/1966
Abstract:

TITLE: THEORETICAL LIQUID PROPELLANT PERFORMANCE CALCULATIONS
Author: Misko, G.
Date of Pub: 3/1/1967
Abstract:
The purpose of this document is to compile in one volume the basic elements of thermodynamics and gas dynamics which are useful in evaluation of thrust chamber performance. It is presumed that the reader will have had an elementary course in thermodynamics and gas dynamics. The discussion of topics useful in evaluating thrust chamber performance is limited to these physical effects amenable to numerical analysis.

TITLE: THERMAL MODELS OF JUPITER AND SATURN
MODELS CORRESPONDING TO COMPLETELY CONVECTIVE STRUCTURE ARE CALCULATED FOR JUPITER AND SATURN.

**Abstract:**

THIS PAPER OUTLINES STEPS INVOLVED IN PREPARING AND PRESENTING AN INSTRUCTION COURSE ON CLEAN ROOMS. THE TRAINING AREA, PERSONNEL, EQUIPMENT, AND PROGRAM OUTLINE ARE DESCRIBED. A SUMMARY OF THE RESULTS OBTAINED OVER THE FIRST YEAR OF OPERATION IS PRESENTED.

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- Chrysler and Saturn
- Saturn at Michoud
- The Voyage of Saturn
- Saturn firings
- Saturn's missions

**Abstract:**

A summary of the results obtained over the first year of operation is presented.

**Abstract:**

BRIEFLY STATES THE DEVELOPMENT OF THOR, SUMMARIZES AND CHRONICLES THOR MISSILE AND BOOSTER LAUNCHINGS, PROVIDES ILLUSTRATIONS AND DESCRIPTIONS OF VEHICLE SYSTEMS, RELATES THEIR GENEALOGY, EXPLAINS SOME OF THE PERFORMANCE CAPABILITIES OF THE THOR AND THOR-BASED VEHICLES USED, AND FOCUSES ATTENTION TO THE EXPLORATION OF SPACE BY DOUGLAS AIRCRAFT.

**Abstract:**

THREE-PART SPEECH, "THE DEV. OF LAUNCH VEHICLE OP. DIV., "THE PRESENT STATUS OF ACTIVITIES IN LAUNCH VEHICLE OP. DIV., "FUTURE OF LAUNCH VEH. OP."

**Abstract:**

THIS HANDBOOK PRESENTS THE KSC TIMING AND COUNTDOWN SYSTEMS OPERATION PLAN, PROVIDES DESCRIPTION OF SYSTEMS IN USE, FAMILIARIZES PERSONNEL ENGAGED IN SPACE VEHICLE CHECKOUT AND LAUNCH OPERATIONS WITH AVAILABLE KSC TIMING AND COUNTDOWN SERVICES, AND SHOWS HOW THESE SERVICES MAY BE OBTAINED.
AUTHOR

DATE OF PUB: 6/9/1969

Abstract:

SEARCH CONTROL NO. 015417

TITLE: TRACKING A SATURN V LAUNCH VEHICLE FROM LIFT-OFF THROUGH INSERTION - CASE 215

AUTHOR WEGAND,A.G.  

DATE OF PUB: 10/13/1964

Abstract:

TITLE: TRAJECTORY OPTIMIZATION FOR SATURN SPACE VEHICLES

AUTHOR SCHMIEDER,D.H.  

DATE OF PUB: 11/1/1963

Abstract:

TITLE: TRANSATEL (B&W PHOTOGRAPH)

AUTHOR  

DATE OF PUB: 1/1/1969

Abstract:

SHOWN IS A 15-FOOT DIAMETER ANTENNA THAT HELPS PROVIDE LIVE COLOR TV COVERAGE OF APOLLO SPLASHDOWNS. THE ANTENNA IS PART OF A PORTABLE TELEVISION TRANSMISSION SYSTEM BUILT BY GE'S SPACE SYSTEMS ORGANIZATION FOR WESTERN UNION INTERNATIONAL, INC. THE SYSTEM TRANSMITS LIVE PICTURES OF THE RECOVERY OPERATIONS FROM THE DECK OF THE RECOVERY CARRIER TO TV VIEWERS ACROSS THE GLOBE VIA SATELLITE HIGH ABOVE THE PACIFIC.

TITLE: TRANSFER OF THE DEVELOPMENT OPERATIONS DIVISION OF THE ARMY BALLISTIC MISSILE AGENCY TO THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

AUTHOR  

DATE OF PUB: 2/3/1960

Abstract:

TITLE: TRANSONIC STATIC AND DYNAMIC STABILITY CHARACTERISTICS OF SEVERAL SATURN IB AND V UPPER STAGE CONFIGURATIONS

AUTHOR LOWNDES,R.I./SHADOW,T.O.  

DATE OF PUB: 8/26/1965

Abstract:

ADDITIONAL DOCNUMBERS ARE AD 484822, X67-10375

TITLE: TRANSPORTATION OF DOUGLAS SATURN S-IVB STAGES

AUTHOR PRENTICE,R.W.  

DATE OF PUB: 11/1/1965

Abstract:

DEscribes significant events and equipment associated with transporting the douglas-built saturn s-ivb stage from stage center at huntington beach to the sacramento test center and to ksc. descriptions and illustrations of the transportation vehicles and major ground support and instrumentation equipment are presented for a more comprehensive understanding of the transportation problem.

TITLE: TRENDS IN PROCUREMENT
DISCUSSES THE COST-PLUS-AWARD-FEE (CPAF) CONTRACT. WEAKNESSES AND STRENGTHS OF THIS CONCEPT ARE POINTED OUT.

TITLE: TRENDS IN SPACE - VEHICLE TEST RANGES
AUTHOR: SPEER, F.A.
Date of Pub: 7/1/1964

Abstract:
THIS ARTICLE SURVEYS THE NATURE OF RANGE REQUIREMENTS, VARIOUS OBJECTIVES FOR GROUND INSTRUMENTATION, THE ROLE OF IMPLEMENTATION IN ESTABLISHING RANGE REQUIREMENTS, AND THE CONSEQUENCE OF RECENT WORK FOR THE FUTURE.

TITLE: TRENDS IN THE DESIGN OF CRYOGENIC PROPELLANT-TANK STRUCTURES (PAPER)
AUTHOR: Date of Pub: 5/13/1963

Abstract:

TITLE: TRY THIS ON FOR SIZE
AUTHOR: CLARKE, W.
Date of Pub: 2/1/1965

Abstract:
PROBABLY THE BIGGEST MOCKUP IN THE WORLD, A FULL-SCALE MODEL OF THE SATURN BOOSTER ROCKET, ALSO CALLED THE S-IC, HAS REACHED COMPLETION IN NEW ORLEANS. THE GIANT STRUCTURE IS IN THE MICHOUD FACTORY. OVERALL LENGTH IS 138 FEET AND DIAMETER IS 33 FEET. PRIMARY FUNCTIONS OF THE MOCKUP ARE TO HELP FIX THE SHAPES AND SIZES OF PRODUCTION PARTS, TO DETERMINE THE LENGTHS AND ANGLES OF TUBES AND TO SOLVE SUCH PROBLEMS AS HOW WIRE BUNDLES ARE TO BE FORMED AND WHERE THEY WILL RUN.

TITLE: TV SYSTEM FOR THE APOLLO TELESCOPE MOUNT
AUTHOR: Date of Pub: 1/1/1967

Abstract:

TITLE: U.S. AEROSPACE PROGRAM - MISSIONS AND PROJECTS AS OF 1 JANUARY 1966 (1-PG CHART)
AUTHOR: Date of Pub: 1/1/1966

Abstract:

TITLE: U.S. FACING DECISIONS ON MANNED FLIGHT
AUTHOR: Date of Pub: 6/22/1963

Abstract:
The U.S. is rapidly reaching the time when it must make hard, basic decisions on what major manned space programs it will undertake beyond Apollo. It must do so at a time when space goals to which the nation is already committed are under the most severe attack since the space age began. NASA’s primary interests for future manned projects lie in three basic areas: (1) a space station, (2) a voyage to the vicinity of Mars, and (3) a more or less permanent base for lunar exploration.
TITLE: U.S.'S FIRST STEP TOWARD THE MOON

AUTHOR: JOHNSON, R.W.

Date of Pub: 3/27/1958

Abstract:
THIS DOCUMENT AUTHORIZED ABMA TO LAUNCH A LUNAR PROBE -- FIRST STEP TOWARD A MOON LANDING.

TITLE: UNCOMMON WELDER

AUTHOR: CLARKE, W.

Date of Pub: 3/1/1965

Abstract:
ASSEMBLING TANKS TO BE USED IN THE SATURN V BOOSTER HAS TAUGHT 1 BOEING WELDING EXPERTS UNCOMMON ANSWERS TO UNCOMMON QUESTIONS. 1 BOEING IS CONTRACTOR FOR THE FIRST STAGE BOOSTER AT NASA'S 1 MICHoud OPERATIONS. AS PART OF THE JOB THEY ARE ASSEMBLING AT NUMBER OF MAMMOTH FUEL TANKS AND LIQUID OXYGEN TANKS. SOME OF 1 THE WELDING PROBLEMS STEM FROM SIZE. THE TANKS, WHICH MUST BE 1 LIGHTWEIGHT BUT CAPABLE OF SUPPORTING MORE THAN 4 MILLION POUNDS 1 OF LIQUID, ARE MADE OF CURVED SEGMENTS WELDED TOGETHER.

TITLE: UNITED STATES AIR FORCE INTERCONTINENTAL BALLISTIC MISSILE PROGRAM, 1954-1959: TECHNOLOGICAL CHANGE AND ORGANIZATIONAL INNOVATION (ABSTRACT)

AUTHOR: JOHNS, C.J. (JR.)

Date of Pub: 1/1/1965

Abstract:
THE ICBM IS THE LARGEST SINGLE R&D PROGRAM IN THE HISTORY OF 1 WEAPONRY, EXCEEDING IN SCOPE THE MANHATTAN DISTRICT PROJECT WHICH 1 PRODUCED THE ATOM BOMB. ARMED WITH NUCLEAR WARHEADS, THE ICBM HAS 1 REVOLUTIONIZED WARFARE AND ALL CONCEPTS OF DEFENSE. DISCUSSES 1 PROBLEMS OF ORGANIZATIONAL AND MANAGERIAL CHANGE IN RESPONSE TO 1 TECHNOLOGICAL CHANGE IN THE MILITARY.


AUTHOR: WHITE, P.Y.

Date of Pub: 1/1/1969

Abstract:
CONTENTS INCLUDE (1) THE TRUMAN ERA, (2) THE EISENHOWER YEARS - I: PRELUDE TO SPACE, (3) THE EISENHOWER YEARS - II: THE SATELLITE PROJECTS, AND (4) SPUTNIK AND AFTERWARD.

TITLE: UNIVERSITY AND RESEARCH INSTITUTE CONTRACTS AWARDED BY MSFC

AUTHOR

Date of Pub: 1/21/1964

Abstract:
A LISTING BY CONTRACT NUMBER WHICH GIVES NAME OF CONTRACTORS AND 1 CONTRACT SUBJECT.

TITLE: UP THE RIVER TO THE MOON

AUTHOR: SHEIL, W.B.

Date of Pub: 9/1/1964

Abstract:
BECAUSE OF THE TREMENDOUS SIZE OF THE S-1C FIRST STAGE BOOSTER 1 FOR THE SATURN 5/APOLLO MOON ROCKET, IT IS IMPOSSIBLE TO SHIP 1 MOST OF ITS PARTS BY AIR, HIGHWAY, OR RAIL. IT IS SENT INSTEAD 1 ON BARGES LIKE THE IGERT TOWING COMPANY'S BILL DYER. DURING AN AVERAGE MONTH THIS STURDY VESSEL LOGS MORE THAN 5,000 MILES ON 1 AMERICA'S INLAND WATERWAYS. MUCH OF ITS TIME IS SPENT ON THE TENNESSEE, ONE OF THREE RIVERS TRAVELED BY THE MOON BARGE. ON A RECENT TRIP THE MOON BARGE CARRIED A DECK LOAD OF SATURN PARTS - 1 TWO 33-FOOT Y-RING SUPPORTS, WEIGHING 15,359 POUNDS EACH, AND A 1 33-FOOT INTER-TANK WEIGHING 14,660 POUNDS.

TITLE: UPRATED SATURN I - ITS GROWTH POTENTIAL AND FUTURE ROLE IN SPACE
AUTHOR: CHICHESTER, D.E.  
Date of Pub: 1/1/1967

Abstract:

TITLE: USE OF TANK MOUNTED BOOSTER PUMPS FOR PROVIDING NPSH TO TURBOPUMPS OPERATING IN A RADIATION ENVIRONMENT

AUTHOR: DISTEFANO, J.  
Date of Pub: 1/1/1962

Abstract:

TITLE: USE OF WIND SHEAR IN THE DESIGN OF AEROSPACE VEHICLES

AUTHOR: RYAN, R.S./SCOGGINS, J.R.  
Date of Pub: 10/4/1966

Abstract:


TITLE: USE OF WIND SHEARS IN THE DESIGN OF AEROSPACE VEHICLES

AUTHOR: RYAN, R.S./SCOGGINS, J.R./KING, A.  
Date of Pub: 11/1/1967

Abstract:

THE RELATIVE INFLUENCE OF VARIOUS WIND PROFILE PROPERTIES ON LAUNCH VEHICLES DESIGNS AND OPERATION IS STUDIED. PARTICULAR EMPHASIS IS PLACED ON THE INFLUENCE OF WIND SHEARS AND TURBULENCE ON DYNAMIC RESPONSE DURING THE BOOST PHASE OF THE FLIGHT. 407 INDIVIDUAL DETAILED (JIMSPHERE) WIND PROFILES ARE THE PRIMARY WIND INPUTS FOR THIS ANALYSIS. TIME RESPONSE OF THE VEHICLE TO EACH PROFILE IS COMPUTED AND A STATISTICAL EVALUATION OF THE RESULTS MADE. IT WAS FOUND THAT SMALL-SCALE WIND-SHEAR EFFECTS SHOULD BE INCLUDED IN STRUCTURAL DESIGN, ESPECIALLY FOR FORWARD VEHICLE STATIONS, AND THAT PROFILES WITH HIGH WIND SPEEDS AND MODERATE WIND SHEARS CREATE HIGH STRUCTURAL LOADS AT ALL STATIONS.

TITLE: USES OF SATURN

AUTHOR: GORDON, T.J.  
Date of Pub: 4/14/1965

Abstract:
SATURN AND APOLLO HARDWARE WILL NOT HAVE REALIZED THEIR ULTIMATE POTENTIAL FOR SPACE EXPLORATION AFTER THE PROJECT LUNAR LANDING IS COMPLETE. TO ACCOMPLISH THE APOLLO LUNAR LANDING PROGRAM, AN IMMENSE BACKLOG OF TECHNOLOGY, FACILITIES AND BOOSTER CAPABILITY WILL HAVE BEEN BUILT UP, AND WE BELIEVE PROPER UTILIZATION OF THIS RESOURCE WILL FILL THE NEEDS FOR PLANETARY, LUNAR AND EARTH ORBITAL SPACE EXPLORATION FOR YEARS TO COME. IN ACHIEVING THE APOLLO LUNAR OBJECTIVE, LARGE INVESTMENTS WILL HAVE BEEN MADE IN LAUNCH FACILITIES, TRACKING SYSTEMS, PROPULSION TECHNOLOGY, RE-ENTRY SYSTEMS, LUNAR LANDING SYSTEMS, AND RENDEZVOUS TECHNOLOGY, TO NAME ONLY A FEW. ALTHOUGH THESE SPECIALIZED AREAS HAVE BEEN POINTED TOWARD THE LUNAR EXPLORATION MISSION, NUMEROUS STUDIES BY NASA AND INDUSTRY HAVE DEMONSTRATED THE FEASIBILITY OF USING THE SPACECRAFT, VEHICLES, AND OPERATING TECHNIQUES FOR MISSIONS FAR BEYOND THE LUNAR LANDING. IN THIS PAPER SOME OF THE SATURN/APOLLO MISSIONS WHICH LIE BEYOND THE APOLLO LUNAR LANDING PROGRAM ARE DISCUSSED. BY IDENTIFYING THESE ADVANCED USES OF SATURN/APOLLO HARDWARE TO MEET IMPORTANT NATIONAL GOALS, WE CAN AMORTIZE THE LARGE COST OF THE SATURN/APOLLO PROGRAM ACROSS A MUCH WIDER SPECTRUM OF MISSIONS. SATURN, THE VEHICLE DESIGNED FOR ONE MISSION, WILL MEET THE NEEDS OF THE COUNTRY IN SPACE EXPLORATION FOR MANY YEARS TO COME. SINCE BOTH THE SATURN 1B AND V VERSIONS WERE DESIGNED FOR MANNED APPLICATION FROM THE OUTSET, WE CAN EXPECT THE CONTINUATION OF THE OUTSTANDING RELIABILITY RECORD ALREADY BEGUN BY THE SATURN 11 VEHICLE. BY USING SATURN OVER THE WIDEST BASE OF MISSIONS, COST PER UNIT WILL DECREASE AND THE NATION'S INVESTMENT IN THE FUTURE WILL PAY DIVIDENDS IN NEW KNOWLEDGE, PRESTIGE, AND WORLD LEADERSHIP. SATURN HAS A FUTURE IN SPACE.
VEHICLE AND STAGE NUMBERING SYSTEMS FOR SATURN VEHICLES (PALARO)

VENDOR ALPHABETICAL LISTING

VENTURE INTO SPACE: EARLY YEARS OF GODDARD SPACE FLIGHT CENTER

VIBRATION AND ACOUSTIC ENVIRONMENT CHARACTERISTICS OF THE SATURN V LAUNCH VEHICLE

VISUAL AIDS LIBRARY SLIDE GUIDE

VOLUMETRIC WATER CALIBRATION OF THE SATURN S-IV STAGE PROPELLANT TANKS
PRESENTS A DESCRIPTION OF THE SATURN S-IV STAGE VOLUMETRIC WATER CALIBRATION SYSTEM. THIS SYSTEM IS USED TO PROVIDE A CONTINUOUS VOLUME VS HEIGHT RELATIONSHIP THROUGHOUT EACH PROPELLANT TANK. THE DATA ARE USED FOR PROPELLANT TANK MASS SENSOR CALIBRATION, AND STATIC AND FLIGHT TEST EVALUATION. SPECIAL EMPHASIS IS GIVEN TO THE DETAIL DESIGN CONSIDERATIONS REQUIRED TO OBTAIN OPTIMUM SYSTEM ACCURACY. THESE AREAS INCLUDE THE PROPELLANT TANK WATER LEVEL MEASUREMENT SYSTEM, PROPELLANT TANK WATER LEVEL MEASUREMENT REFERENCE AND ENGINE FEED LINE DEFLECTIONS, VOLUMETRIC PROVER TANKS, PLUMBING SYSTEM, AND TEMPERATURE MEASUREMENT SYSTEM. THE DATA REDUCTION PROCEDURE IS EXPLAINED IN SOME DETAIL ALONG WITH THE NECESSARY COMPUTATIONS TO CONVEY THE BASIC PHILOSOPHY. THE ROLE OF THE COMPUTER FOR DATA REDUCTION AND ANALYSIS IS ALSO MENTIONED. IN CONCLUSION, ACTUAL TEST DATA FROM TEN PROPELLANT TANK CALIBRATIONS IS PRESENTED. EACH PROPELLANT TANK WAS CALIBRATED THREE TIMES TO DEMONSTRATE THE SYSTEM REPEATABILITY. THE SYSTEM HAS PROVEN TO BE REPEATABLE TO WITHIN \(+\) OR \(-0.026\%)\). PERHAPS MORE SIGNIFICANT IS THE HIGH CONFIDENCE THAT THE SYSTEM IS ACCURATE TO WITHIN \(+\) OR \(-0.05\%)\) OF THE NOMINAL 100\% LOADED PROPELLANT VOLUME.

TITLE: VON BRAUN'S MOVE ENDED MOON-BUG NASA DISPUTE
AUTHOR SILCOCK, B.
Date of Pub: 5/23/1969


TITLE: WAYS AND MEANS OF EFFECTING ECONOMICS IN THE NATIONAL SPACE PROGRAM
AUTHOR
Date of Pub: 7/24/1962

Abstract:

TITLE: WE SHOULD GO TO THE MOON: SPACE POLICY AND NATIONAL DECISION-MAKING (THESIS)
AUTHOR LOGSDON, J.
Date of Pub: 5/1/1969

Abstract: THERE HAS BEEN AN INCREASING AMOUNT OF ATTENTION PAID IN THE LAST FEW YEARS TO THE IMPACT OF SCIENTIFIC AND TECHNOLOGICAL DEVELOPMENTS ON THE AMERICAN POLITICAL SYSTEM. THIS STUDY IS A REFLECTION OF THAT ATTENTION; IT IS CONCERNED WITH HOW THE U.S. HAS EMPLOYED AN EMERGING TECHNOLOGY AS AN INSTRUMENT OF ITS NATIONAL POLICY. IT IS THUS A STUDY OF SCIENCE FOR POLICY -- HOW DEVELOPMENTS IN SCIENCE AND TECHNOLOGY PROVIDE NEW MEANS FOR ACHIEVING NATIONAL PURPOSES.

TITLE: WELD FABRICATION TECHNIQUE FOR S-IC STAGE OF THE APOLLO/SATURN SPACE VEHICLE
AUTHOR DALY, D.M.
Date of Pub: 9/1/1965

Abstract: CRYOGENIC PROPELLANT ROCKET ENGINE HARDWARE AND THE RELATED TEST FACILITIES WILL BE DESCRIBED. METHODS USED FOR SELECTION OF ALLOYS FOR LIQUID OXYGEN AND LIQUID HYDROGEN SERVICE WILL BE DISCUSSED. UNIQUE EQUIPMENT AND WELDING PROCEDURES ARE REVIEWED WITH EMPHASIS ON WELDING PROBLEMS AND THEIR SOLUTIONS TO ASSURE RELIABLE HARDWARE AND FACILITIES. EXAMPLES OF SPECIFIC WELDING PROCEDURES AND METHODS OF QUALITY ASSURANCE WILL BE GIVEN FOR JOINING APPLICATION RANGING IN SIZE FROM .001 IN. TO 11 IN. THICK SECTIONS.
WE'RE WINNING THE RACE WITH RUSSIA...SENATOR KERR TALKS ABOUT SPACE

KERR, R.S.

Abstract:
AS CHAIRMAN OF THE AERONAUTICAL AND SPACE SCIENCES COMMITTEE OF THE SENATE, SENATOR KERR MAINTAINS A CLOSE WATCH ON THE NATION'S SPACE PROGRAM. "WE'RE WINNING THE RACE WITH RUSSIA—SPACE-WISE, DEFENSE-WISE, PRODUCTION-WISE, AND IN EVERY OTHER DECISIVE ELEMENT," KERR DECLARED. "AND IF WE'RE BEHIND IN DEVELOPING BOOSTERS, WE WON'T STAY BEHIND FOR LONG."

WHAT FUTURE PROPULSION DEVELOPMENTS FOR SPACE EXPLORATION?

GOLOVIN, N.E.

Abstract:
IN ADDITION TO IDENTIFIED DEVELOPMENTS, CAREFUL THOUGHT SHOULD BE GIVEN TO A NEW BOOSTER INTERMEDIATE BETWEEN THE SATURN IB AND V I AND TO NUCLEAR-ELECTRIC SYSTEMS FOR THE 1980S. THE EMPHASIS HERE IS LARGELY ON THE TECHNICAL ASPECTS OF FUTURE DEVELOPMENTS. IT IS NECESSARY TO MAKE ASSUMPTIONS ABOUT THE PERTINENT ECONOMIC AND POLITICAL CONDITIONS IN WHICH THE SPACE PROGRAM IS EXPECTED TO DEVELOP DURING THE PERIOD OF INTEREST. THE ASSUMPTIONS ARE: (1) THE INTERNATIONAL ENVIRONMENT WILL NOT OFFER DIMINISHED INCENTIVES TO THE U.S. TO SEEK AND HOLD LEADERSHIP IN SCIENTIFIC AND TECHNOLOGICAL SPACE ACCOMPLISHMENTS AND (2) THE SPACE PROGRAM WILL BE SUPPORTED SO THAT ITS TOTAL COST TO THE NATION DOES NOT BECOME A SIGNIFICANTLY SMALLER FRACTION OF THE GNP THAT IT HAS BEEN DURING THE LAST FEW YEARS.

WHAT WE HAVE LEARNED FROM V-2 FIRINGS

Author: REED, J.H.

Abstract:
(1) FAILURES AND SUCCESSES GIVE VALUABLE INFORMATION, (2) MAIN LESSON IS THAT SIMPLICITY IS THE KEY TO MISSLE RESEARCH, (3) SIMPLICITY EQUALS RELIABILITY, (4) RELIABILITY OF THE WHOLE IS LESS THAN THAT OF ANY PART, AND (5) THERE IS NO MAGIC - FUNDAMENTAL PRINCIPLES STILL APPLY. A SUMMARY OF POSITIVE AND NEGATIVE RESULTS OF THE V-2 TEST FIRINGS WAS GIVEN BY DR. RICHARD W. PORTER AT THE RECENT MEETING OF THE NEW YORK SECTION OF THE AMERICAN ROCKET SOCIETY. HE SAID THAT 45 ROCKETS PERFORMED SUCCESSFULLY - THAT IS, THEY ACCOMPLISHED THE TEST PURPOSES FOR WHICH THEY WERE INTENDED. THIRTY-TWO OF THOSE 45 ROCKETS SHOWED ABSOLUTELY NO MALFUNCTION OF THE ROCKET. THE REMAINING 13 ROCKETS PERFOMED USEFUL TEST DATA ALTHOUGH ROCKET PERFORMANCE WAS INFERIOR.

WHERE ARE WE GOING IN SPACE MANAGEMENT?

Author: REED, J.H.

Abstract:

WHY INTERNAL INSULATION FOR THE SATURN S-IV LIQUID HYDROGEN TANK?

Author: HERSTINE, G.L.

Abstract:
DURING DEVELOPMENT OF THE S-IV STAGE, THE QUESTION HAS OFTEN BEEN ASKED, "WHY WAS INTERNAL INSULATION SELECTED FOR THE LIQUID HYDROGEN TANK RATHER THAN EXTERNAL INSULATION?" INTERNALLY INSULATING LARGE LIQUID HYDROGEN TANKS WITH LIGHTWEIGHT MATERIALS WAS A NEW TECHNOLOGY SINCE NO SUCCESSFUL INTERNAL INSULATION HAD BEEN DEVELOPED PRIOR TO THE START OF THE SATURN PROGRAM. DOUGLAS HAS NOW SUCCESSFULLY DEVELOPED MATERIALS AND TECHNIQUES THAT CAN BE USED TO INSULATE SPACE VEHICLE LIQUID HYDROGEN TANKS. A REVIEW OF THE BASIC REASONS AND PHILOSOPHY WHICH LED TO THE SELECTION OF INTERNAL INSULATION RATHER THAN EXTERNAL WILL BE GIVEN SO THAT ONE WILL FULLY UNDERSTAND WHY THIS SELECTION WAS MADE.

WORKING PAPERS: TECHNICAL HISTORY OF SATURN
FEW AIR FORCE OR DOD ELEMENTS HAVE AS CLOSE AND VITAL A WORKING PARTNERSHIP WITH INDUSTRY AS THE AIR FORCE SYSTEMS COMMAND'S SPACE AND MISSILE SYSTEMS ORGANIZATION (SAMSO). ITS BEGINNING DATES BACK TO THE MID-1950'S WHEN THE AIR FORCE AND INDUSTRY WERE POOLING BRAINPOWER, EXPERIENCE AND ENERGIES IN A TOP PRIORITY RACE TO DEVELOP THE FIRST U.S. BALLISTIC MISSILE CAPABILITY. AS PRESENTLY CONSTITUTED, SAMSO WAS ESTABLISHED ON JULY 1, 1967 FROM ELEMENTS OF THE FORMER SPACE AND BALLISTIC SYSTEMS DIVISIONS OF THE AIR FORCE SYSTEMS COMMAND. IT IS THE DIRECT DESCENDENT OF THE ORIGINAL WESTERN DEVELOPMENT DIVISION. SAMSO IS THE MANAGEMENT AGENCY FOR PLANNING, DEVELOPMENT, TESTING AND ACQUISITION OF ALL AIR FORCE SPACE AND BALLISTIC MISSILE SYSTEMS. IT IS HEADQUARTERED AT THE LOS ANGELES AIR FORCE STATION. ANNUAL BUDGET IS MORE THAN $2.5 BILLION. ABOUT HALF OF THE BUDGET IS APPLIED TO STRATEGIC MISSILE PROGRAMS.

MICROFICHE ON HAND