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M-DE 8000.005B

MANNED SPACE FLIGHT

PROGRAM DIRECTIVE

APOLLO FLIGHT MISSION ASSIGNMENTS [redacted]

CLASSIFICATION CHANGE MARCH 23 1964

TO = UNCLASSIFIED

By authority of [redacted] GDS GP-4

Changed by D. L. Smith Date 11/7/75

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WASHINGTON, D.C.

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APOLLO FLIGHT MISSION ASSIGNMENTS (U)

Date Effective:

March 23 , 1964

CLASSIFICATION CHANGE
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Manned Space Flight
National Aeronautics and Space Administration
Washington, D. C.

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MANNED SPACE FLIGHT

DIRECTIVE

M-DE 8000.005B

PROGRAM REQUIREMENT DOCUMENT

This document is an official release of Manned Space Flight and its requirements shall be implemented by all cognizant elements of the Manned Space Flight Program.

The effective date of this document is March 23, 1964

Approved: E E Mueller
Associate Administrator for
Manned Space Flight

Limit Access to:
Cognizant NASA and
NASA Contractor Activities

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INTRODUCTION

This document contains revised flight mission assignments for the Apollo/Little Joe II and Apollo/Saturn flight programs. Issue A of this document dated April 9, 1963 is superceded by this issue.

Proposed changes to this document shall be submitted to MSF for review and coordination. The Apollo Flight Mission Assignments document will be revised, as required, to reflect approved changes and to complete mission definitions.

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APOLLO FLIGHT MISSION ASSIGNMENTS - LITTLE JOE II

DEVELOPMENT FLIGHTS

MISSION TYPE		TRANSONIC LES DEVELOPMENT	TRANSONIC ABORT DEVELOPMENT		HIGH ALTITUDE ABORT DEVELOPMENT
OBJECTIVES		1. DETERMINE SEPARATION DISTANCE CAPABILITY OF LES IN PROPELLING CM AT TRANSONIC CONDITIONS. 2. DETERMINE STABILITY CHARACTERISTICS OF THE LAUNCH ESCAPE CONFIGURATION DURING THE THRUSTING PERIOD. 3. DEMONSTRATE PARACHUTE RECOVERY SYSTEM (ONE DROGUE CHUTE).	1. VERIFICATION OF LAUNCH ESCAPE AND PARACHUTE RECOVERY SYSTEM OPERATION. 2. DETERMINE STABILITY CHARACTERISTICS OF THE LAUNCH ESCAPE CONFIGURATION. 3. DETERMINE TOWER LOADS.		1. VERIFICATION OF LAUNCH ESCAPE AND PARACHUTE RECOVERY SYSTEM OPERATION. 2. DETERMINE STABILITY CHARACTERISTICS OF THE LAUNCH ESCAPE SYSTEM IN THE CRITICAL AERODYNAMIC STABILITY RANGE. 3. DETERMINE CAPABILITY OF RCS TO RATE STABILIZE THE CM. 4. DETERMINE EFFECTS OF LES PLUME IMPINGEMENT.
SPACECRAFT		BP-12 (INTERIM LAUNCH ESCAPE CONFIGURATION)	BP-23 (SIMULATED BLOCK I CSM AND LES)	BP-30 (SIMULATED BLOCK I CSM AND LES)	BP-22 (SIMULATED BLOCK I CSM AND LES)
LAUNCH VEHICLE		2	3	4 (BACK - UP)	5
LAUNCH DATE		2nd QUARTER - 1964	4th QU. - 1964	2nd QU. - 1965	1st QUARTER - 1965
TEST CONDITIONS	ALTITUDE (FEET)	20,000	20,000		70,000
	DYNAMIC PRESS. (PSF)	∽ 500	∽ 500		∽ 600
	MACH NUMBER	∽ 0.9	∽ 0.9		∽ 3.0

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APOLLO FLIGHT MISSION ASSIGNMENTS - LITTLE JOE II
QUALIFICATION FLIGHTS

MISSION TYPE		MAX. Q ABORT QUALIFICATION	HIGH ALT. ABORT QUALIFICATION	ABORT QUALIFICATION	
OBJECTIVES		1. QUALIFICATION OF BLOCK I CM LAUNCH ESCAPE AND PARACHUTE RECOVERY SYSTEMS. 2. QUALIFICATION OF STRUCTURAL INTEGRITY OF BLOCK I ESCAPE CONFIGURATION AT SIMULATED SATURN MAX. Q CONDITIONS. 3. DEMONSTRATE CM-SM SEPARATION SYSTEM. 4. DETERMINE STABILITY OF LAUNCH ESCAPE CONFIGURATION.	1. QUALIFICATION OF BLOCK I CM LAUNCH ESCAPE AND PARACHUTE RECOVERY SYSTEMS. 2. DETERMINE HIGH ALTITUDE EFFECTIVENESS OF LAUNCH TOWER FORWARD FINS. 3. DETERMINE STABILITY OF LAUNCH ESCAPE CONFIGURATION.	1. QUALIFICATION OF BLOCK II CM LAUNCH ESCAPE AND PARACHUTE RECOVERY SYSTEMS.	
SPACECRAFT		002 (BLOCK I CSM)	010 (BLOCK I CSM)	024 (BLOCK II CSM)	026
LAUNCH VEHICLE		6	7	8	9
LAUNCH DATE		3rd QUARTER - 1965	4th QUARTER - 1965	1967	1967
TEST CONDITIONS	ALTITUDE (FEET)	35,000	100,000 - 120,000	TO BE DETERMINED	
	DYNAMIC PRESS. (PSF)	∽ 700	∽ 200	TO BE DETERMINED	
	MACH NUMBER	∽ 1.4	∽ 3.5	TO BE DETERMINED	

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APOLLO FLIGHT MISSION ASSIGNMENTS – SATURN I

MISSION TYPE		APOLLO DEVELOPMENT				MICROMETEOROID EXP. AND APOLLO DEVEL.					
OBJECTIVES		1. L/V TECHNOLOGY DEVELOPMENT. (LH_2 PROPULSION AND STAGE SEPARATION) 2. L/V GUIDANCE. 3. LAUNCH ENVIRONMENT. 4. DEMONSTRATE LES UNDER FLIGHT CONDITIONS.				1. MICROMETEOROID DATA. [redacted] 2. L/V TECHNOLOGY DEVELOPMENT. (LH_2 PROPULSION AND STAGE SEPARATION) 3. L/V GUIDANCE. 4. LAUNCH ENVIRONMENT.					
SPACECRAFT		ITEM	WEIGHT	ITEM	WEIGHT	ITEM	WEIGHT	ITEM	WEIGHT	ITEM	WEIGHT
	CSM & ADAPTER	BP-13	17,000 LBS	BP-15	18,600 LBS. (NOTE 2)	BP-16	12,000 LBS.	BP-26	12,000 LBS.	BP - 9	12,000 LBS.
	OTHER					MICROMET. EXP.	4,000 LBS.	MICROMET. EXP.	4,000 LBS.	MICROMET. EXP.	4,000 LBS
PAYLOAD REQUIREMENT (NOTE 1)		17,000 LBS.		18,600 LBS. (NOTE 2)		16,000 LBS.		16,000 LBS.		16,000 LBS	
LAUNCH VEHICLE		SA-6		SA-7		SA-9		SA-8		SA-10	
LAUNCH DATE		2nd QUARTER - 1964		3rd QUARTER - 1964		4th QUARTER - 1964		1st QUARTER - 1965		2nd QUARTER - 1965	
PROFILE		INSERT INTO ELLIPTICAL ORBIT OF APPROX. 100/115 N.MI. NO RECOVERY.				INSERT INTO ELLIPTICAL ORBIT OF APPROX. 215/625 N.MI. NO RECOVERY.					
FLIGHT DATA	LAUNCH AZIMUTH	105 DEGREES				105 DEGREES					
	DURATION	> 3 ORBITS				> 1 YEAR					
	TRACKING NETWORK	AMR				AMR					

NOTE 1: REQUIREMENT IN ORBIT. THE L/V SHALL HAVE A PAYLOAD CAPABILITY WHICH EXCEEDS THE PAYLOAD REQUIREMENT BY AT LEAST THE AMOUNT REQUIRED TO CARRY A LES UNTIL JETTISONED.

NOTE 2: SA-7 PAYLOAD REQUIREMENT MAY BE CHANGED TO BE IDENTICAL TO SA-6.

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DISCUSSION OF SATURN IB AND SATURN V PROGRAM

Saturn IB and Saturn V Apollo test flights provide for launch vehicle and spacecraft development and for demonstration of crew performance. These test flights and the lunar missions are summarized on the following three charts which describe flight missions and flight mission assignments.

APOLLO FLIGHT MISSIONS

The two Apollo Flight Mission charts cover the five test mission types and the lunar mission. The three mission types shown on page 8 use the Saturn IB launch vehicle to demonstrate operation of the complete spacecraft with limited propellant loading. The first Saturn V mission summarized on page 9 verifies entry at lunar return velocity. The second Saturn V mission covers the lunar mission simulation and the lunar missions. Launch vehicle development objectives are included in the first mission type for each vehicle.

The charts indicate the launch vehicles and spacecraft that shall be configured for performance of each mission type. In addition to the spacecraft listed on the charts, dummy (boilerplate) spacecraft are being considered for use in the event of major space vehicle problems. Consideration is also being given to the use of Block I CSM's on the first two Saturn V vehicles.

At least two flights each of the "L/V-CSM Development" (Saturn IB) and the "L/V and Heat Shield Development" (Saturn V) missions are required for launch vehicle development objectives. Also, two flights of the "CSM-LEM Operations" mission are planned. Additional launch vehicles and spacecraft identified under

each mission type provide for contingency and/or repeated flights. The objectives of the contingency flights may be altered to focus on the problems being encountered. Repeat flights of the "CSM-LEM Operations" mission con provide crew training opportunities using the Saturn IB vehicle if required.

The "L/V-CSM Development" (Saturn IB) and the "L/V and Heat Shield Development" (Saturn V) missions require a mission programmer located in the CSM to achieve flight objectives. A mission programmer for the LEM shall be available for flights of the "CSM-LEM Operations" mission.

APOLLO FLIGHT MISSION ASSIGNMENTS

The Apollo Flight Mission Assignments chart on page 10 shows the allocation of launch vehicles to the five mission types. The spacecraft available for assigned flight missions in the Saturn IB and Saturn V programs are also shown. The launch dates are those in the Manned Space Flight Schedules of January, 1964.

The requirement for two development flights of the Saturn IB and Saturn V launch vehicles establishes flights 203 and 503, respectively, as the first opportunities for the manned "CSM Long Duration Operation" (Saturn IB) and the manned "Lunar Mission Simulation" (Saturn V) missions. Availability of the LEM and a CSM with docking facilities sets flight 206 as the first opportunity for a manned "CSM-LEM Operations" (Saturn IB) mission. If LEM's and CSM's with docking structures become available for use on flights prior to 206, consideration will be given to combining unattained objectives of the "CSM Long Duration

Operations" mission with the "CSM-LEM Operations" mission.

It is planned that spacecraft test flights on the Saturn IB will be transferred to the Saturn V as soon as that vehicle is capable of being manned. As a result, Saturn IB launch vehicles may become available for other uses. Consideration is being given to alternate payloads for Saturn IB vehicles 207 through 212.

Launch schedules during the period of overlap between the Saturn IB and the Saturn V programs will be adjusted, where required, to conform to the availability for launch of six complete spacecraft per year.

Where alternate missions have been assigned to the same launch vehicle, the spacecraft and the launch vehicle shall be capable of performing either mission. In addition, all spacecraft shall be capable of flight missions on either the Saturn IB or Saturn V launch vehicle without significant modification.

In succeeding issues of this document the missions will be defined further. In addition, requirements for major program decisions, including lead times, will be identified.

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SECURITY INFORMATION

APOLLO FLIGHT MISSIONS - SATURN IB

MISSION TYPE	L/V - CSM DEVELOPMENT				CSM LONG DURATION OPERATIONS		CSM-LEM OPERATIONS	
OBJECTIVES	1. L/V DEVELOPMENT. 2. S-IVB AND INSTRUMENT UNIT CHECKOUT IN ORBIT. 3. COMPATIBILITY AND STRUCTURAL INTEGRITY OF CSM-SATURN IB. 4. VERIFICATION OF CSM SYSTEMS OPERATION (RCS, SCS, SPS, ECS, EPS, COMMUNICATIONS, AND G & N SYSTEMS). 5. HEAT SHIELD VERIFICATION AT APPROXIMATELY 29,000 FPS: (A) MAX. HEAT RATE. (B) MAX. HEAT LOAD.				1. MAN/SYSTEM INTERFACES. 2. DEMONSTRATE CREW/CSM/GROUND SYSTEMS PERFORMANCE FOR EXTENDED MISSION.		1. TRANSPOSITION AND DOCK. 2. CREW TRANSFER. 3. VERIFICATION OF LEM SYSTEMS OPERATION. 4. RENDEZVOUS AND DOCK. 5. CREW/LEM/GROUND SYSTEMS OPERATION VERIFICATION. 6. MAN/SYSTEM INTERFACES.	
SPACECRAFT	ITEM	WT. (LESS PROP.)	ITEM	WT. (LESS PROP.)	ITEM	WT. (LESS PROP.)	ITEM	WT. (LESS PROP.)
CSM & ADAPTER	009	22,700 LBS.	011, 012, 014, 015	23,900 LBS.	012, 014, 015	23,900 LBS.	021, 025, 032, 030, 034	22,500 LBS.
LEM							1, 2, 3, 4, 5	8,000 LBS.
PAYLOAD REQUIREMENT (NOTE 1)	36,000 LBS. (NON ORBITAL) (NOTE 2)		32,000 LBS.		32,500 LBS.		33,500 LBS.	
LAUNCH VEHICLES	201		202 THROUGH 205 (NOTE 3)		203 THROUGH 205 (NOTE 3)		206 THROUGH 210	
PROFILE TYPES	I LOB POWERED FLIGHT OF L/V ON NON-ORBITAL SUPER-CIRCULAR ENTRY "LOB-TYPE" TRAJECTORY CSM/S-IV B SEPARATION. USE SPS TO ACHIEVE DESIRED ENTRY CONDITIONS FOR MAX. HEAT RATE. (PLANNED FOR FIRST FLIGHT ONLY.)		II ORBITAL INSERT INTO 105 N. MI. CIRCULAR ORBIT. CSM/S-IVB SEPARATION AFTER 1 TO 3 ORBITS. USE SPS TO ACHIEVE DESIRED ENTRY CONDITIONS FROM CIRCULAR ORBIT. ALTERNATE PROFILE: USE SPS TO ACHIEVE ELLIPTICAL ORBIT AND TO ACHIEVE DESIRED ENTRY CONDITIONS.		INSERT INTO 105 N. MI. CIRCULAR ORBIT. CSM/S-IVB SEPARATION. USE SPS TO ACHIEVE HIGHER ORBIT REQUIRED FOR LONG DURATION MISSION. DE-ORBIT WITH SPS. ENTRY.		INSERT INTO 105 N. MI. CIRCULAR ORBIT. TRANSPOSITION AND DOCK. SPACECRAFT/S-IVB SEPARATION. I: DOCKING OPERATIONS. RENDEZVOUS AND DOCK. (CSM ACTIVE) LEM PROPULSION OPERATIONS. II: RENDEZVOUS AND DOCK OPERATIONS. (LEM ACTIVE) DE-ORBIT WITH SPS. ENTRY.	
FLIGHT DATA — LAUNCH AZIMUTH	105 DEGREES		72 DEGREES		72 DEGREES		72 DEGREES	
FLIGHT DATA — DURATION	——		3 - 6 ORBITS		10-14 DAYS		3 DAYS	
FLIGHT DATA — TRACKING NETWORK	AMR		MSFN		MSFN		MSFN	

NOTE 1: WEIGHT OF SPACECRAFT AND ADAPTER AT LV/SC SEPARATION. THE L/V SHALL HAVE A PAYLOAD CAPABILITY WHICH EXCEEDS THE PAYLOAD REQUIREMENT BY AT LEAST THE AMOUNT REQUIRED TO CARRY A 6600 LB. LES UNTIL JETTISONED.

NOTE 2: SUBJECT TO CONFIRMATION OF LV STRUCTURAL CAPABILITY. INJECTION CONDITIONS TO BE DEFINED LATER.

NOTE 3: PAYLOAD CAPABILITY OF 204 AND 205 IS APPROXIMATELY 1000 LBS. HIGHER THAN PAYLOAD REQUIREMENT AND LES REQUIREMENT.

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APOLLO FLIGHT MISSIONS — SATURN V

MISSION TYPE	L/V & HEAT SHIELD DEVELOPMENT		LUNAR MISSION SIMULATION AND LUNAR MISSIONS		
OBJECTIVES	1. L/V DEVELOPMENT. 2. COMPATIBILITY AND STRUCTURAL INTEGRITY OF SPACECRAFT - SATURN V. 3. HEAT SHIELD VERIFICATION AT 36,000 FPS. 4. VERIFICATION OF LAUNCH AND GROUND SUPPORT EQUIPMENT.		1. CREW/SPACE VEHICLE/GROUND SYSTEMS VERIFICATION DURING SIMULATED LUNAR MISSION. 2. LUNAR EXPLORATION.		
SPACECRAFT	ITEM	WT. (LESS PROP.)	ITEM		WT. (LESS PROP.)
CSM & ADAPTER	(NOTE 3) 018,023, ___, ___, ___, ___	LBS.	025,032,030,034,036,037,038, ___, ___, ___, ___, ___, ___, ___		23,400 LBS.
LEM	STRUCTURE, STRUCTURE, ___, ___, ___, ___	LBS.	2,3,4,5,6,7,8, ___, ___, ___, ___, ___, ___		8,400 LBS.
PAYLOAD REQUIREMENT (NOTE 1)	TO BE DETERMINED		TO BE DETERMINED (NOTE 2)		
LAUNCH VEHICLES	501 THROUGH 506		503 THROUGH 515		
PROFILE TYPES	INSERT INTO 100 N. MI. CIRCULAR ORBIT. AFTER ORBITAL CHECKOUT FOR 1-3 ORBITS, INJECT INTO ELLIPTICAL TRAJECTORY. CSM/S-IVB SEPARATION. USE SPS TO ACHIEVE DESIRED ENTRY CONDITIONS.		I SIMULATION PROFILE TO BE DEVELOPED	II LUNAR MISSION INSERT INTO 100 N. MI. CIRCULAR ORBIT. AFTER ORBITAL CHECKOUT OF 1 - 3 ORBITS, INJECT INTO TRANSLUNAR TRAJECTORY. TRANSPOSITION AND DOCK. SPACECRAFT/S-IVB SEPARATION. MIDCOURSE CORRECTIONS AND DEBOOST INTO LUNAR ORBIT BY SPS. LEM SEPARATION, DESCENT AND TOUCHDOWN. LUNAR LAUNCH, RENDEZVOUS AND DOCK. AFTER LEM SEPARATION, USE SPS FOR BOOST OUT OF LUNAR ORBIT AND MIDCOURSE CORRECTIONS. ENTRY.
FLIGHT DATA LAUNCH AZIMUTH	72 DEGREES		72 DEGREES		
FLIGHT DATA DURATION	1 - 3 ORBITS		10 DAYS		
FLIGHT DATA TRACKING NETWORK	MSFN		MSFN		

NOTE 1: WEIGHT OF SPACECRAFT AND ADAPTER AT LV/SC SEPARATION. THE L/V SHALL HAVE A PAYLOAD CAPABILITY WHICH EXCEEDS THE PAYLOAD REQUIREMENT BY AT LEAST THE AMOUNT REQUIRED TO CARRY A 6600 LB. LES UNTIL JETTISONED.

NOTE 2: 90,000 LB. PAYLOAD CAPABILITY REQUIRED FOR LUNAR MISSION.

NOTE 3: CSM 029 IS A BACK-UP FOR HEAT SHIELD TESTS.

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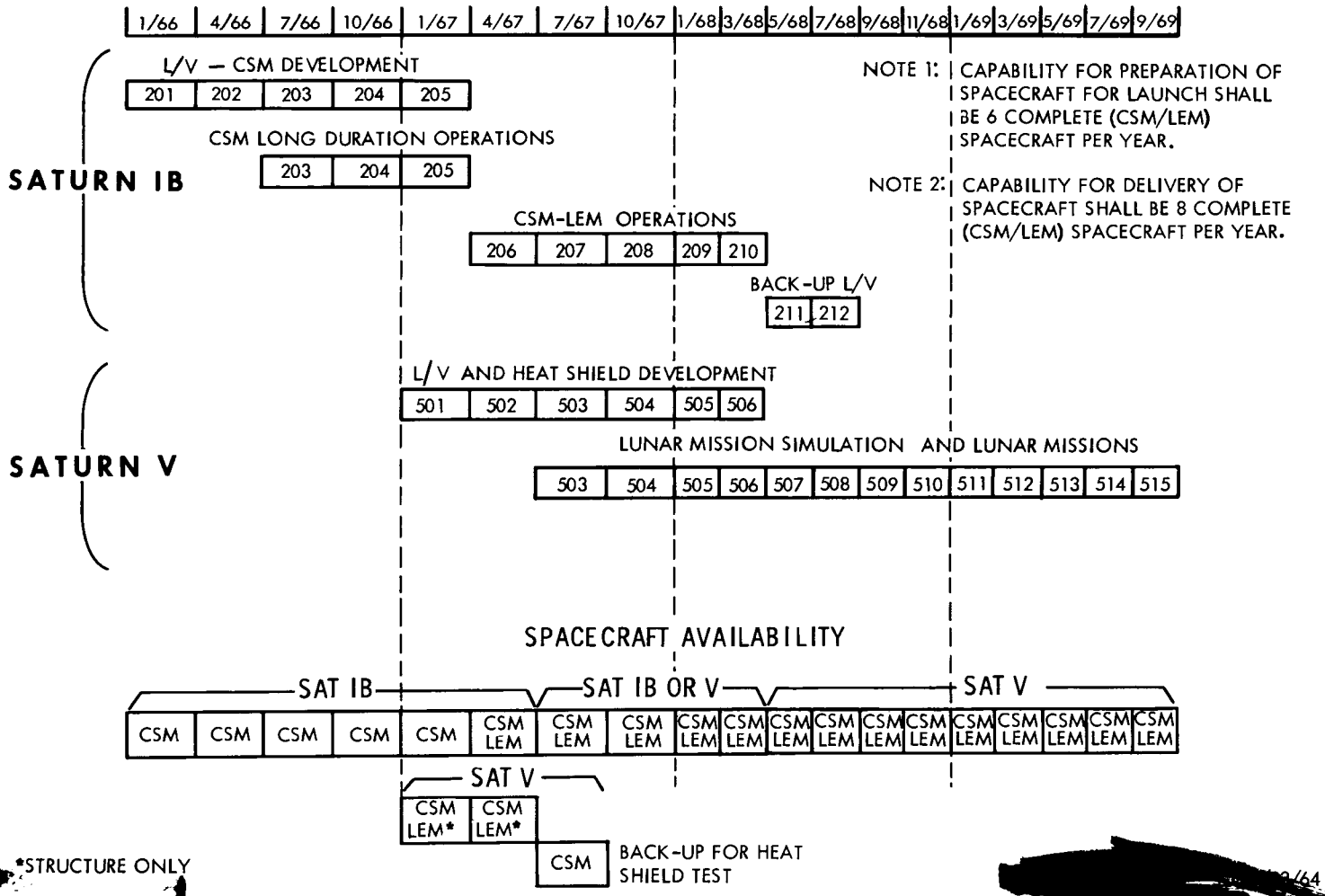
APOLLO FLIGHT MISSION ASSIGNMENTS



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