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OFFICE OF MANNED SPACE FLIGHT  
PROGRAM DIRECTIVE

M-D MA 1400.011  
(Project)

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FROM:

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SUBJECT: Apollo Program Flight Mission Directive for Apollo-Saturn  
202 Mission

- REFERENCES:
- a) Apollo Program Development Plan, MA001.000-1, Chapter 14
  - b) MSFC Flight Mission Directive/Apollo-Saturn 202 Mission dated June 22, 1965
  - c) MSC Program Apollo Flight Mission Directive/Apollo-Saturn 202 (CSM 011), NASA Program Apollo Working Paper No. 1185 dated July 30, 1965

1.0 MISSION PURPOSE

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1.1 Purpose: The purpose of Apollo-Saturn 202 Mission is to develop the Saturn IB launch vehicle and the Apollo Command and Service Modules for manned flight.

1.2 Primary Objectives: Primary objectives of the Apollo-Saturn 202 Mission are tabulated below. The primary objectives of the mission shall be those identified in the Apollo Flight Mission Assignments, SE010-000-1. When appearing in the mission directive they may be amplified, but not modified, as required by the Centers. The primary objectives are those which are mandatory. Malfunctions of spacecraft or launch vehicle systems, ground equipment, or instrumentation which would result in failure to achieve these objectives will be cause to hold or cancel the mission until the malfunction has been eliminated.

- a. Demonstration of structural integrity and compatibility of the launch vehicle and spacecraft and confirmation of launch loads.
- b. Demonstration of separation of S-IVB/IU/SC from S-IB, LES and Boost Protective Cover from CSM/Launch Vehicle, CSM from S-IVB/IU/SLA, and CM from SM.

- c. Verifications of the following subsystem operation:
- (1) Launch Vehicle: Propulsion, guidance and control, and electrical systems.
  - (2) Spacecraft: CM heat shield (adequacy for entry from low earth orbit); SPS (including multiple restart); G&N; ECS; communications (partial); CM RCS; SM RCS; SCS; ELS; EPS.
- d. Evaluation of performance of the space vehicle EDS in closed loop configuration.
- e. Evaluation of the CM heat shield at high heat load during entry at approximately 28,000 ft/sec.
- f. Demonstration of the mission support facilities and operations required for launch, mission conduct and CM recovery.

## 2.0 GENERAL FLIGHT PLAN

The Apollo-Saturn 202 Mission will be a non-orbital, unmanned, super-circular entry, "lob-type" flight.

The following summarizes the general flight plan requirements for this mission:

- 2.1 Launch Vehicle Powered Flight: SA-202 will be launched from launch complex 34 at Cape Kennedy at a launch azimuth of 100° E of N. Vehicle roll will result in a flight azimuth of 105° E of N. The first stage trajectory will closely simulate that defined for the nominal manned earth orbital Saturn IB. The LES will normally be jettisoned approximately 25 seconds after S-IB/S-IVB separation to guide the S-IVB/IU/CSM to the prescribed cutoff conditions. Prior to CSM separation, the S-IVB auxiliary propulsion system will place the S-IVB/CSM in the required attitude orientation.
- 2.2 Spacecraft Flight Profile: S-IVB/CSM separation will be accomplished using the RCS. The S/C will execute the required ullage, service module burns (two primary to effect entry conditions and two additional for demonstration of restart capability) and command-service module separation and orientation maneuvers necessary to obtain the high heat load of approximately 20,000 BTU/sq.ft.

- 2.3 Recovery: This mission will exercise, for the first time, a two-ocean recovery force. This force includes the Atlantic Recovery Control Center located at Cape Kennedy and the Pacific Control Center at Kunia in the Hawaiian Islands. Normal recovery of the Command Module is planned in the vicinity of Wake Island.
- 2.4 Payload Requirement: The weight of the CSM and adapter at launch vehicle/spacecraft separation will be approximately 47,000 pounds. The launch vehicle payload capability will exceed the CSM and adapter separation weight requirement by at least the amount required to carry the LES until jettisoned after S-IB/S-IVB separation.
- 2.5 Mission Support Requirements: These requirements to be supplied in "Program Support Requirements" document to be issued by the Operations Support Requirements Office, Mission Operations, OMSF, approximately 6 months prior to launch.

3.0 CONFIGURATION

- 3.1 Launch Vehicle: The SA-202 launch vehicle will be the standard operational Saturn IB design with the following major exceptions:
  - a. R&D instrumentation in S-IB, S-IVB stages and IU.
  - b. Thrust of both S-IB and S-IVB stages not updated.
  - c. R&D structure for S-IB stage.

- 3.2 Spacecraft: The Airframe 011 CSM and adapter for Mission 202 will be the Block I CSM design including operational Block I subsystems with the following major exceptions:

<u>Subsystem</u>	<u>Deviation</u>
CM Mechanical	No crew couches Crew hatch cover permanently secured
Electrical Power	Three additional batteries
Crew Equipment	All related equipment deleted
Guidance & Navigation	Block I, Series 50 modified for MCP/SCS interface (Delete Star Tracker, photometer)
Stabilization and Control	Modified for operation with MCP

<u>Subsystem</u>	<u>Deviation</u>
Launch Escape	Provide for ground command abort initiation
Communications	Delete high-gain antenna Delete HF orbital antenna

#### 4.0 SUPPORTING GROUND TEST CONSTRAINTS

- 4.1 Qualification: Major components of the spacecraft and launch vehicle critical to the accomplishment of the Apollo-Saturn 202 Mission objectives will be ground qualified and acceptance tested prior to launch.
- 4.2 Launch Vehicle: The following major stage and vehicle ground tests will be performed to the extent required to support the Apollo-Saturn 202 Mission:
- a. Saturn IB dynamic and pre-launch checkout tests
  - b. S-IB structural, systems, and acceptance tests
  - c. S-IVB battleship, structural and acceptance tests
  - d. Instrument unit vibration, shock and acoustic tests, structural tests, and acceptance tests
  - e. GSE pre-use acceptance tests and interface compatibility tests
- 4.3 Spacecraft: The following major spacecraft ground tests will be performed to the extent required to support the Apollo-Saturn 202 Mission:
- a. Boilerplate tests including recovery tests, dynamic tests, and house spacecraft procedural and integration tests
  - b. Full scale Service Module Propulsion System and Reaction Control System firing tests
  - c. Spacecraft airframe tests including static structural loading, vibration, acoustic, flotation, impact and recovery tests
  - d. GSE pre-use acceptance tests and interface compatibility tests
- 4.4 Certification: A Certificate of Flight Worthiness (COFW as outlined in NPC 500-10) for each stage, IU, and module is required prior to shipment from the factory or static firing site as appropriate. MSFC Program Directive Number T-1-1 dated June 30, 1965, outlines procedures which are acceptable to fulfill this requirement. Since MSC procedures are being developed, a requirement exists for the identification of interim COFW procedures to be used on AFM-011.

## 5.0 RESPONSIBILITIES

### 5.1 MSF:

- a. The Apollo Program Director is responsible for overall management of the space vehicle development including definition of mission objectives, the flight hardware configuration, and supporting ground test constraints as well as the integration and checkout of the space vehicle prior to launch.
- b. The Mission Operations Director is responsible for coordination of all mission operations planning activity and for insuring that all requirements, plans, schedules, procedures and directives required to conduct the mission are generated. Overall organizational responsibilities and relations are given in reference (a).
- c. During the mission period, the Mission Director is responsible for the overall direction of each Apollo-Saturn mission.

### 5.2 MSFC:

- a. MSFC is responsible for the development of the SA-202 launch vehicle and engines and for the associated ground support equipment.
- b. MSFC is responsible for the stages and stage associated GSE checkout and acceptance, and delivery of the stages and GSE to KSC.
- c. MSFC is to provide the technical support to KSC as required during the acceptance, pre-launch checkout and the launch phase of the mission.

### 5.3 MSC:

- a. MSC is responsible for the development of the spacecraft for the 202 Mission and for the associated spacecraft GSE.
- b. MSC is responsible for the factory checkout and delivery of spacecraft modules and associated GSE.
- c. MSC is to provide the technical support to KSC as required during the acceptance, checkout, pre-launch and launch phases of the Mission.

5.4 KSC:

- a. KSC is responsible for the development and activation of the launch and checkout facilities.
- b. KSC is responsible for GSE preparation and pre-launch checkout of the launch vehicle and spacecraft as delegated by the Centers.
- c. KSC is responsible for the task of physically integrating and checking out the total space vehicle with technical support from MSFC and MSC as required.

6.0 IMPLEMENTATION

The MSFC and MSC Mission Directives (references b and c) which provide the specific detailed requirements necessary to carry out the mission are considered an integral part of this Mission Directive and are hereby approved.

Subsequent changes and future revisions to the Center Directives which conflict with the requirements stated herein will require coordination between the Centers and the review and approval of the Apollo Program Director. Other revisions to Center Directives will be coordinated between Centers as required, with copies submitted to the Apollo Program Director for information.

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