

MISSION PROFILE

Launch

Launch of Apollo 6 will be from Pad A of Launch Complex 39 at the Kennedy Space Center. Earliest liftoff is 8 a.m. EST and the latest time is 12 noon EST on the date of launch. Flight azimuth is 72 degrees from true north.

Flight Profile and Sequence of Events

Flight Profile

The first stage of the Saturn V will carry the vehicle and Apollo spacecraft to an altitude of 36.8 statute miles (194430 feet) and 47 statute miles downrange, building up speed to 6194 miles-per-hour (9084 feet per second) during its 2 1/2 minutes of powered flight. After separation from the second stage, the first stage will continue on a ballistic trajectory that will let it fall into the Atlantic Ocean some 396 statute miles downrange from Cape Kennedy (latitude 30.2 degrees North and longitude 74.3 degrees West) about nine minutes after liftoff.

The second stage, with engines running 6.1 minutes, will propel the vehicle to an altitude of about 117 statute miles (619872 feet) some 948 statute miles downrange, building velocity to 15,405 statute miles-per-hour (22595 feet-per-second space fixed velocity). The spent stage will impact the Atlantic Ocean about 20 minutes after liftoff some 2660 statute miles from KSC, at an approximate latitude of 31.8 degrees North and longitude 35.9 degrees West.

The third stage, in its 129-second initial burn period, will place itself and the Apollo spacecraft into a circular orbit 115 statute miles above the earth. Its inclination will be a 32.56 degrees and its orbital period 88.2 minutes. Apollo 6 enters orbit at 55 degrees West longitude, 32.6 degrees North latitude at a velocity of 17,434 statute miles per hour (25571 fps).

No major propulsion systems are used during the two revolutions of the Earth parking phase, but low-level ullage and venting thrust from the Saturn V third stage will cause small changes in the orbit.

Second Third-Stage Burn

When the spacecraft passes over the western coast of the United States on the second revolution, the preignition sequence will begin for the second burn of the Saturn V third-stage. Time from liftoff will be about three hours and five minutes, about five minutes before third-stage ignition.

The stage will maneuver at rates of one degree-per-second to reach a predetermined alignment for the burn. The burn is designed to achieve a translunar coast ellipse with a 32.44 degree inclination, a 279,000 nautical-mile apogee (320,000 statute miles).

The predetermined attitude for this burn is a pitch angle of 38.00 degrees and a yaw angle of -1.50 measured in the launch site inertial reference system.

Engine burn is based on nominal fuel depletion, and is estimated at 328 seconds. At engine cutoff, the spacecraft attitude is 53.7 degrees pitch and 0.25 degrees yaw.

Orbital Coast and Cold Soak

After the third-stage cutoff, the spacecraft is oriented to an attitude that approximates that for the first service propulsion system burn or pitched down about 173 degrees from the inertial velocity vector, or 26 degrees from the local horizontal.

Three minutes after third-stage engine cutoff, a programmed separation signal is fed into the Apollo guidance computer (AGC) to initiate separation of the command and service modules from the Saturn V third stage. The AGC initiates a service module reaction control system burn to achieve a forward thrust. After 1.7 seconds of thrusting, the spacecraft and the launch vehicle third stage separate. Reaction control system thrusting continues for another 8.3 seconds to separate the vehicles at a rate of about two feet-per-second.

The third-stage is expected to reach an apogee of 279,000 nautical miles (367,629 statute miles) and an orbital period of 16 days, 8 hours and 31 minutes (392 hours and 31 minutes or 1,413,033 seconds), with a projected orbital lifetime of.....

At thrust termination of the Saturn third-stage, a 90 second attitude-hold phase follows. Since there is no further thrusting during the attitude-hold phase, the mission requirement for a no-ullage start of the service propulsion system is met.

First Burn SP S

Ignition attitude for the first service propulsion system burn is pitch down of about 173 degrees from the inertial velocity vector, or 26 degrees from the local horizontal. The burn will last 4 minutes and 14 seconds (254 seconds) and will result in an apogee of 11,989 nautical miles (13,799 statute miles), a perigee of 18 nautical miles (20.7 statute miles). Inclination will be 32.48 degrees. Reentry velocity and flight path angle, in the event the second service propulsion system ignition does not occur, will be 32,813 fps and 6.01 degrees from the local horizontal with a resultant maximum load factor of 5.18g.

Insertion into this new ellipse will occur about 9.25 degrees North latitude, 24.21 degrees West longitude at service propulsion system engine cutoff three hours and 25 minutes after liftoff.

Earth Intersecting Coast

After service propulsion system cutoff, the spacecraft initiates a programmed reorientation maneuver to reestablish the cold soak attitude. This is a nominal 61-second maneuver. At this same time, the Apollo guidance computer begins calculation of the time to free fall to reentry (400,000 feet). The coast phase ends 25 minutes before reentry.

About two hours and 57 minutes after service propulsion system cutoff--six hours and 22 minutes after liftoff--the spacecraft reaches apogee and begins its descent. The coast phase will end about two hours 46 minutes after apogee. At this time Carnarvon, Australia, ground station will update the Apollo guidance computer with spacecraft position, velocity and time of free fall to reentry.

Some two minutes after this update is received the Apollo guidance computer schedules the second service propulsion system ignition for two minutes later. When time of free fall to reentry reaches 540.1 seconds, command and service module reaction control system begins a 30-second ullage maneuver, which is followed immediately by service propulsion system ignition. Time from first service propulsion system cutoff is five hours 57 minutes, from liftoff nine hours 22 minutes.

Second Service Propulsion System Burn

The second burn of the service propulsion system is designed to achieve a reentry velocity of 36,500 fps (24,886 statute miles per hour, 21,626 nautical miles per hour) and a flight path angle of 6.5 degrees below the local horizontal. The burn will last about 188 seconds. Ignition attitude is about 24.8 degrees below the inertial velocity vector, or 45.6 down from the local horizontal, in pitch.

Reentry Sequence

At service propulsion system cutoff, about 240 seconds remain until reentry begins (400,000-foot altitude). During this period the command module and service module separation and the command module reentry attitude orientation maneuvers will be performed. The maneuvers occur over the West Pacific within the Guam area of coverage.

When time of free fall to reentry equals 200 seconds, the spacecraft will reorient itself with the +X axis 60 degrees above the inertial velocity vector. The attitude is such that a crew would be heads up and facing forward. This attitude remains constant until time of free fall to reentry becomes 85 seconds. At that time, physical separation occurs with the four service module reaction control system forward-firing thrusters providing a rearward push to the service module. The thrusters fire until reaction control system propellant depletion.

Nominal splashdown for the service module (spin-stabilized, non-tumbling reentry) will be about nine hours and 46 minutes after liftoff--about 18 minutes after separation--32.81 degrees North latitude and 168.52 degrees East longitude.

Allowing about five seconds after separation from command module stabilization, the guidance and navigation system will reorient the spacecraft to the predetermined reentry attitude. This attitude is 157.5 degrees angle of attack with the relative velocity vector, with the lift vector up. A crew would be heads down, facing rearward.

Reentry, considered as beginning when the spacecraft reaches 400,000 feet altitude, will occur about nine hours and 29 minutes after liftoff at 31.9 degrees North latitude and 155.0 degrees East longitude with inertial velocity of 36,500 fps (24,886 statute miles-per-hour) and an inertial flight path angle of 6.5 degrees below the local horizontal. Applying a nominal command module lift-to-drag (L over D) ratio of .334 to the reentry profile, the splash point will be 27.33 degrees North latitude and 157.18 degrees West longitude, some 2,500 nautical (2877 statute miles) downrange from reentry.

This reentry provides the criteria for certification of the command module heat shield. Those criteria are a maximum reentry heat rate of 371 British Thermal Units (BTU) per-square-foot-second, a total heat load of 37,615 BTU per-square-foot, and a maximum reentry load factor of 5.73 g. The maximum heat rate will be encountered about 66 seconds after a normal reentry, maximum load will occur at drogue deploy 14 minutes and 11 seconds after reentry.

Communications blackout will occur some 26 seconds after reentry and will last about 108 seconds. Blackout is referenced to C-Band tracking. Drogue

parachute deployment takes place 14 minutes and 11 seconds after reentry at an altitude of 23,500 feet, main parachute deployment 50 seconds later at 10,200 feet. Splashdown for a nominal mission will be nine hours 49 minutes 45 seconds after liftoff at 27.33 degrees North latitude and 157.18 degrees West longitude, or some 339 nautical miles (390 statute miles) northwest of Kauai, Hawaii, tracking station.

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I.1 PERSONNEL AND ASSIGNMENTS:

John W. King (KSC)	Chief KSC Public Information operations and responsible for LCC commentary
Lindy B. Davis (KSC)	News Center Manager and Deputy for KSC Public Information operations
Gatha F. Cottee (KSC)	Communications support coordinator
Charles Hollinshead (KSC)	Information/Query desk
Ben McCarty (KSC)	Information/Query desk
Mel Snyder (KSC)	Interview Desk
Ed Harrison (KSC)	Audio-Visual coordinator
Wright Kerns (KSC)	Tours and industry liaison
_____ (MSFC)	MSFC mission representative
_____ (GSFC)	GSFC mission representative
_____ (MSC)	MSC mission representative
_____ (OMSF)	OMSF mission representative
Darleen Hunt (KSC)	Accreditation and badging
Candace Singletary (KSC)	Accreditation and badging
Diana Boles (KSC)	News Center secretary
Linda Williams (KSC)	Secretarial support
Rosemary Rowland (KSC)	Secretarial support
Al Vela (LTV)	News media/tour escort
Jack Brown (LTV)	News media/tour escort

	T-3 Days	T-2 Days	T-1 Day	Launch Day	Overtime
King			11 a.m.-5 p.m.	4 a.m.-4 p.m.	
Davis	7 a.m.-7 p.m.	7 a.m.-7 p.m.	11 a.m.-7 p.m.	6 a.m.-6 p.m.	
Cottee	7 a.m.-7 p.m.	7 a.m.-7 p.m.	10 a.m.-4 p.m.	12 a.m.-12 p.m.	
Hollinshead	7 a.m.-5 p.m.	7 a.m.-5 p.m.	7 a.m.-noon	12 a.m.-12 p.m.	
McCarty	8 a.m.-6 p.m.	8 a.m.-6 p.m.	10 a.m.-8 p.m.	7 a.m.-5 p.m.	
Snyder	9 a.m.-7 p.m.	9 a.m.-7 p.m.	4 p.m.-midnight	7 a.m.-4 p.m.	
Kerns	8 a.m.-5 p.m.	8 a.m.-5 p.m.	8 a.m.-2 p.m.	midnight-thru launch	
Harrison	8 a.m.-5 p.m.	8 a.m.-5 p.m.	7 a.m.-3 p.m.	4 a.m.-3 p.m.	
Hunt	7 a.m.-4 p.m.	7 a.m.-4 p.m.	7 a.m.-4 p.m.	4 a.m.-noon	
Boles	8 a.m.-5 p.m.	8 a.m.-5 p.m.	8 a.m.-6 p.m.	6 a.m.-3 p.m.	
Williams	8 a.m.-5 p.m.	8 a.m.-5 p.m.	11 a.m.-7 p.m.	8 a.m.-4 p.m.	
Singletary	10 a.m.-7 p.m.	10 a.m.-7 p.m.	8 a.m.-6 p.m.	8 a.m.-4 p.m.	
Rowland			3 p.m.-11 p.m.	3 p.m.-6 p.m.	
MSFC Rep	9 a.m.-6 p.m.	9 a.m.-6 p.m.	3 p.m.-11 p.m.	6 a.m.-noon	
MSC Rep	9 a.m.-6 p.m.	9 a.m.-6 p.m.	10 a.m.-6 p.m.	8 a.m.-6 p.m.	
HQ Rep	8 a.m.-5 p.m.	8 a.m.-5 p.m.	9 a.m.-5 p.m.	8 a.m.-5 p.m.	
Escort	8 a.m.-4 p.m.	8 a.m.-4 p.m.	8 a.m.-4 p.m.	5 a.m.-1 p.m.	
Escort	8 a.m.-4 p.m.	8 a.m.-4 p.m.	8 a.m.-4 p.m.	5 a.m.-1 p.m.	

Reduction
Room

Interview
Room

Audio Visual
Office

News Center
Manager

Info
Director

Registration

Accreditation

Secretary

Secretary

Secretary

MSC

Industry

MSFC

HQ

GFSC

Query

Query

Interview

DOD

Travel

Photo
Dist.

Kennedy Space Center
News Center

I.4 NEWS CENTER OPERATION:

The news center will open for badging at T-3 days with normal hours of operation from 7 a.m. to 7 p.m. until T-1 day when the news room will be open around the clock through launch and recovery. However, the news center manager may, if the situation dictates, change the work hours to better suit the work load. If work tasks can be accomplished during a regular 8 a.m. to 5 p.m. work day, news center hours will be so changed. If the news center is required to go into operation at T-5 days, the 8 a.m. to 5 p.m. hours will be observed until T-3.

The news center will be organized to follow the attached diagram. The front row will consist of two information query desks, an interview desk, DOD desk and commercial travel desk. Immediately to the rear of and supporting the information query desk, will be mission representatives from MSFC, MSC, Goddard and OMSF.

All accreditation and secretarial work will be isolated from the information area of the news room. In the support area will be reproduction facilities, the accreditation desk, secretarial desks and facilities for ordering telephones.

All typing or other such work requests should be submitted through the news center secretary. She in turn will assign the job to an available girl. All reproduction work must be assigned through the news center secretary in order to insure work is accomplished as fast as possible and with proper priority.

Around the inner area of the news center are located offices for the news center manager, information director and photo distribution, as well as a combination escort office and interview room.

It is desired that the intercom system on the telephones be used to the largest degree practicable. The secretarial help will receive most incoming calls and refer them to the appropriate individual via the intercom. In order to reduce the noise level in the news room all personnel are urged to use the intercom system rather than shout across the room.

All questionable accreditations will be ruled upon by the news center manager, chief of KSC public information operations or information director.

All personnel in the news room should attempt, where possible, to refer any query to the query desk. If this is not possible, the individual must first check the query file to determine the official answer. If the query has not previously been answered, the individual must prepare the query and answer on the query forms provided at the query desk.

1.5 TOURS:

Tours of the Kennedy Space Center will be conducted twice daily except on T-1 day when one tour will be offered at 9 a.m. A dependent tour will be conducted at 1 p.m. on T-1 day if interest is sufficient.

Tour Schedule

T-3	9 a.m. -- 2 p.m.
T-2	9 a.m. -- 2 p.m.
T-1	9 a.m. -- Dependent tour at 1 p.m. if applicable

If interest is not sufficient to justify twice daily tours, a 2 p.m. tour only will be conducted. If numbers do not justify use of a bus, tours will be conducted using news room station wagons or sedans.

1.6 ESCORTS:

Escort service will be provided on a need basis to both news media and tours. LTV will provide two (2) escorts daily for assignments during normal working hours. Office space will be provided for LTV escorts at the news center. Additional escorts will be available on a need basis during normal working hours. No escorts will be employed in an over-time capacity without prior approval of the news center manager. In the event of a slip in the launch schedule, escorts will be released as soon as possible.

1.7 BADGING:

Normal Apollo badges will be issued by the Kennedy Space Center. The badges will be the same as those used on Apollo 4 and will not require escort providing the wearer is enroute only to Press Site 39 via escort providing the wearer is enroute only to Press Site 39 via gate 2. The use of the badge at any other location at the KSC or CKAFC without escort will be prohibited. There will be no technician badges issued for Apollo 6 since unescorted access to the press site will be available to all news media. Badging will commence at T-3 days at the News Center and the Apollo 6 badge will be in force for all news media through plus one day. Badges will be color coded as follows:

Press -- White
Contractor -- Blue
Support -- Pink

Contractors will be authorized badges at the ratio of three badges for each prime contractor and one badge for each sub-contractor. Advanced badging procedures used on Apollo 4 will be used for this mission.

1.8 QUERY DESK PROCEDURES

The Query Desk Coordinator shall receive and record all technical information request, the time received, source, the response, time of response and source. Queries will be processed and responded to in the shortest possible time.

The Query Desk will assist in monitoring pool copy TWX transmissions, reproduction of copy and distribution.

The Query Desk will establish and maintain liaison with other mission information points for obtaining or giving summaries, status reports and other advisories.

The writing of necessary news releases will also be assigned as a rule to the Query Desk. Other Information Specialists may be made available by the News Center Manager for this purpose.

1.9 INTERVIEW PROCEDURES

Interviews with mission personnel will be arranged as requested by news media when their duties permit on non-interference basis.

All interviews will be arranged through the Interview Desk in the Apollo News Center.

Transportation to points of interviews for interviewees or interviewers will be provided as desired or required by the News Center Manager.

Interviews with MSC or other NASA officials not directly involved in the mission may be arranged for news media. Provisions applicable to mission personnel interviews will also apply to those with non-mission personnel.

The Apollo News Center, on request, will assist news media in obtaining interviews with NASA prime contractors or subcontractors to the extent that the request will be relayed as soon as possible to the proper public relations representative of the firm involved for action.

The Interview and Industry Desk (NASA) Coordinator will give assistance to news media and DOD representatives, as requested, in arranging interviews with DOD officials in connection with the mission. All requests for DOD interviews, however, will be the responsibility of the DOD-PIO representative.

The Interview Desk Coordinator will be responsible for recording all interview requests and the action in response.

2.1 MISSION DESCRIPTION

Launch of Apollo 6 will occur at 7 a.m. with the total length of the mission about 10 hours. The basic objectives and mission are the same as those for Apollo 4 with the spacecraft launched into a highly elliptical orbit and rammed back into the atmosphere at lunar reentry velocity.

The S-IVB and the spacecraft will be launched into a 100nm circular orbit. After two revolutions a second burn of the S-IVB (327 sec.) will send the spacecraft into an orbit with an apogee of 279,000nm miles. After separation, there will be a secondary propulsion system burn in retrograde of 250 seconds. This will put the spacecraft into an orbit with an apogee of 18,000 nm. At about nine hours into the flight a 188 second posigrade sps burn will result in a 3,500 feet per second reentry. Reentry will occur about 9 hours, 30 minutes into the mission and splash will be at about 9 hours, 50 minutes.

2.2 LAUNCH WINDOW

The Apollo 6 launch window will open no earlier than that time which will allow sufficient lighting for photographic coverage of the launch. It will close no later than that time which will allow sufficient daylight in the planned landing area to effect a safe recovery.

2.3 WEATHER RESTRICTIONS

Cloud conditions which would preclude the attainment of certain camera requirements will be a basis for hold. Mandatory requirements in this area include a minimum of three of five long range ground cameras operating. Two of the operating long range ground cameras must have a 50 per cent probability of covering each of the following trajectory events:

MAX Q	42,000 feet
LET Jettison	300,000 feet

The vehicle will not be launched when its nominal flight path will carry it through a cumulonimbus (thunderstorm) cloud formation.

The following surface wind restrictions are referenced to 60 feet above natural grade (pad height).

<u>Condition</u>	<u>Peak Wind Velocity</u>
MSS at Vehicle	63.2 knots
MSS removed; primary damper attached	63.2 knots
LV loaded; SC loaded; primary damper released	69.0 knots

Launch release:

- (A) Wind direction from within sector
bounded by 150 degrees from true
north to 240 degrees from true north 28.0 knots
- (B) For all other azimuths 34.0 knots

The launch director will assess surface winds at T-20 minutes and again prior to initiation of automatic sequence at T-3 minutes, seven seconds, and will continue to hold the count accordingly.

In the event the space vehicle is exposed to winds exceeding the specified limits, and assessment of the peak winds observed and of the extent of possible vehicle structural damage is required to determine subsequent action (e.g., proceed, or scrub).

Range safety restrictions for weather require a visibility of five miles and a ceiling of 2,000 feet.

2.4 TURNAROUND CAPABILITY

A scrub of the launch will result in the following turnaround times. All times listed are from scrub to next T-0, excluding built-in holds. Times also are dependent upon many factors and, therefore, this list is offered as a guide only.

T-19 hours to T-11 hours	22 hours
T-11 hours to T-5 hours	33 hours
T-5 hours to T-2.75 hours	38 hours
T-2.75 hours to T-19 seconds	59 hours
T-19 seconds	61 hours

3.1 APOLLO FLIGHT CHRONOLOGY

<u>No.</u>	<u>Date</u>	<u>Site</u>		<u>Apollo Vehicle</u>	<u>Result</u>
1.	11/7/63	White Sands, New Mexico	Pad Abort: Test the launch escape system's ability to work in emergency before launch while on the pad	BP 6	Successful
2.	5/13/64	White Sands, New Mexico	Transonic abort test: Utilizing Little Joe II which simulates a Saturn V in trouble in high stress, high speed region	BP 12	Successful
3.	5/28/64	Cape Kennedy, Florida	Proved spacecraft compatibility with Saturn I space vehicle. Went into earth orbit (SA-6)	BP 13	Successful
4.	9/18/64	Cape Kennedy, Florida	Determine space vehicle launch exit environment on Saturn I (SA-7)	BP 15	Successful
5.	12/8/64	White Sands, New Mexico	High Q abort test to verify launch escape, earth landing systems and canard sub-systems (Little Joe II)	BP 23	Successful
6.	2/16/65	Cape Kennedy, Florida	Pegasus Micrometeoroid Detection Satellite--an Apollo test spacecraft housed and protected the Pegasus payload until reaching orbit where Apollo was jettisoned, permitting the satellite to deploy (SA-9)	BP 16	Successful

7. 5/19/65 White Sands, New Mexico Planned high-altitude launch escape system test to determine performance of launch escape vehicle canard subsystem, and to demonstrate orientation of launch escape vehicle (Little Joe II) BP 22 Partially successful (Boost vehicle guidance malfunctioned causing premature low-altitude abort. Apollo systems functioned perfectly, pulling command module away from debris and lowering it safely to earth).
8. 5/25/65 Cape Kennedy, Florida Second Pegasus Micrometeoroid Detection Satellite... An Apollo test spacecraft housed and protected the Pegasus payload until reaching orbit where Apollo was jettisoned, permitting the satellite to deploy (SA-8) BP 26 Successful
9. 6/29/65 White Sands, New Mexico Pad Abort: Second test of the launch escape system's ability to work in emergency before launch and while still on the pad atop a Saturn. The canards, boost protective cover, jettisonable apex cover and dual reefed drogue chutes. BP 23A Successful
10. 7/30/65 Cape Kennedy, Florida Third Pegasus Micrometeoroid Detection Satellite... An Apollo test spacecraft housed and protected the Pegasus payload until reaching orbit where Apollo was jettisoned, permitting the satellite to deploy (SA-10) BP 9A Successful

II. 1/20/66	White Sands, New Mexico	Final abort test utilizing actual spacecraft to test escape in high tumbling region. This completed the abort test phase, qualifying the astronaut escape system for manned flights (Little Joe II)	SC 002	Successful
12. 2/26/66	Cape Kennedy, Florida	First flight or unmanned Apollo spacecraft to test command module's ability to withstand reentry temperatures; determine command module adequacy for manned entry from low orbit; test command and service module's reaction control engines; test service module engine firing and restart. This was also first flight of the Saturn IB (A-201)	SC 009	Successful (Service module engine produced slightly less thrust than expected, resulting in slightly lower reentry speed and temperatures.)
13. 7/5/66	Cape Kennedy, Florida	Upgraded Saturn I development flight (A/S 203). Liquid hydrogen evaluation flight of third stage (S-IVB) vent and restart capability.		Successful
14. 8/25/66	Cape Kennedy, Florida	Second flight of unmanned Apollo spacecraft to test command module's ability to withstand reentry temperatures under high heat load.	SC 011	Successful
15. 11/9/67	Kennedy Space Center, Florida	First unmanned test of Saturn V (Apollo 4)	SC 017	Successful
16. 1/22/68	Cape Kennedy, Florida	First unmanned test of Lunar Module. (Apollo 5)	SC-LM 1	Successful

3.2 APOLLO 6 LAUNCH VEHICLE HISTORY

The first stage of the launch vehicle arrived at KSC on March 13, the second stage on May 24 and the third stage on February 21. The instrument unit arrived on March 20, the Spacecraft Lunar Module Adapter (SLA) in February, 1967 and the Launch Escape System on November 15.

3.3 APOLLO 6 SPACECRAFT HISTORY

The Command/Service Module arrived at KSC on November 24. The Service Module was mated with the SLA on November 30 and the Command Module was mated to them on December 5. The spacecraft SLA was moved from High Bay of the MSOB to the VAB on December 9 and mated to the launch vehicle on December 10. The space vehicle was electrically mated on January 12, 1968. The space vehicle was transported to Pad A on February 6.

3.4 APOLLO 4 MISSION EVENTS SUMMARY

<u>EVENT</u>	<u>PLANNED</u>	<u>ACTUAL</u>
S-1C Ignition Sequence Start Command	00:00:08.9	00:00:08.9
Liftoff	00:00:00.0	00:00:01.3
Tilt and Roll Program Start	00:00:10.5	00:00:11.7
Maximum Q	00:01:18.0	00:01:18.0
S-1C Thrust 35 Seconds After T-0	7,540,000	7,572,000
IECO (Internal Engine Cutoff)	00:02:16.0	00:02:15.5
OECO (Outer Engines Cutoff)	00:02:29.0	00:02:30.5
S-1C Separation	00:02:30.0	00:02:31.4
S-1C Impact Time	00:08:52.0	00:08:50.0
S-1C Impact West Longitude	74.26°	74.30°
S-1C Impact Latitude	30.14°	30.17°
S-II Ignition Sequence Start	00:02:32.0	00:02:33.0
S-II Vacuum Thrust	1,153,000	1,135,592
S-1C/S-II Interstage Jettison	00:03:00.0	00:03:01.4
LES Tower Jettison	00:03:05.5	00:03:07.1
S-II Engine Cutoff	00:08:30.0	00:08:49.8

<u>EVENT</u>	<u>PLANNED</u>	<u>ACTUAL</u>
S-II Separation	00:08:31.0	00:08:50.5
S-II Impact Time	00:18:50.0	00:20:10.0
S-II Impact West Longitude	37.75°	32.46°
S-II Impact Latitude	31.98°	31.21°
S-IVB First Ignition	00:08:34.5	00:08:51.0
S-IVB Vacuum Thrust	225,144	222,313
S-IVB First Cutoff	00:10:50.0	00:11:05.9
Orbital Insertion (1st Parking Orbit)		
Time from Range Zero	00:11:06.5	00:11:15.6
Geodetic Latitude, Degree North	32.64°	32.68°
Longitude, Degree West	55.12°	54.68°
Altitude, Feet	628,117	629,826
Altitude, Nautical Miles	103	104
Space-Fixed Velocity, Ft/Sec	25,570	25,565
Space-Fixed Flight-Path Angle, Degrees	0.001°	0.018°
Space-Fixed Heading Angle, Degree East of North	87.42°	87.65°
S-IVB Second Ignition	03:11:07.9	03:11:27.0
S-IVB Vacuum Thrust	225,144	224,047

<u>EVENT</u>	<u>PLANNED</u>	<u>ACTUAL</u>
Second S-IVB Stage Cutoff		
Time from Range Zero	03:16:40.0	03:16:27.0
Geodetic Latitude, Degree North	27.93°	28.04°
Longitude, Degree West	58.86°	59.33°
Altitude, Feet	1,844,882	1,769,390
Altitude, Nautical Miles	304	291
Space-Fixed Velocity, Ft/Sec	30,840	30,890
Space-Fixed Flight-Path Angle, Degree	15.03°	14.78°
Space-Fixed Heading Angle, Degree East of North	102.64°	102.39°
S-IVB/CSM Separation		
Time from Range Zero	03:26:42.0	03:26:28.0
Geodetic Latitude, Degree North	15.35°	15.45°
Longitude, Degree West	24.94°	25.08°
Altitude, Feet	8,082,316	7,954,394
Altitude, Nautical Miles	1,330	1,309
Space-Fixed Velocity, Ft/Sec	26,185	26,227
Space-Fixed Flight-Path Angle, Degree	26.74°	26.54°
Space-Fixed Heading Angle, Degree East of North	116.52°	116.46°

<u>EVENT</u>	<u>PLANNED</u>	<u>ACTUAL</u>
First SPS Ignition		
Time from Range Zero	03:28:20.0	03:28:06.0
Geodetic Latitude, Degree North	13.36°	13.46°
Longitude, Degree West	21.33°	21.44°
Altitude, Feet	9,248,199	9,116,192
Altitude, Nautical Miles	1,522	1,500
Space-Fixed Velocity, Ft/Sec	25,459	25,499
Space-Fixed Flight-Path Angle, Degree	27.99°	27.81°
Space-Fixed Heading Angle, Degree East of North	117.51°	117.46°
First SPS Cutoff		
Time from Range Zero	03:38:35.0	03:28:22.0
Geodetic Latitude, Degree North	13.06°	13.12°
Longitude, Degree West	20.82°	20.89°
Altitude, Feet	9,429,496	9,308,672
Altitude, Nautical Miles	1,552	1,532
Space-Fixed Velocity, Ft/Sec	25,507	25,543
Space-Fixed Flight-Path Angle, Degree	28.44°	28.31°
Space-Fixed Heading Angle, Degree East of North	117.64°	117.59°

<u>EVENT</u>	<u>PLANNED</u>	<u>ACTUAL</u>
Apogee		
Time from Range Zero	05:48:43.0	05:46:50.0
Geodetic Latitude, Degree South	28.69°	28.68°
Longitude, Degree East	36.39°	36.87°
Altitude, Feet	60,092,348	59,358,268
Altitude, Nautical Miles	9,890	9,767
Space-Fixed Velocity, Ft/Sec	8,405	8,469
Space-Fixed Flight-Path Angle, Degree East of North	100.38°	100.38°
Second SPS Ignition		
Time from Range Zero	08:14:43.0	08:10:54.0
Geodetic Latitude, Degree North	3.67°	3.46°
Longitude, Degree East	116.92°	117.50°
Altitude, Feet	5,303,046	5,335,399
Altitude, Nautical Miles	873	878
Space-Fixed Velocity, Ft/Sec	28,235	28,173
Space-Fixed Flight-Path Angle, Degree	-23.14°	-23.21°
Space-Fixed Heading Angle, Degree East of North	59.87°	59.86°

<u>EVENT</u>	<u>PLANNED</u>	<u>ACTUAL</u>
Second SPS Cutoff		
Time from Range Zero	08:19:11.0	08:15:25.0
Geodetic Latitude, Degree North	12.64°	12.86°
Longitude, Degree East	131.93°	133.29°
Altitude, Feet	2,279,663	2,181,143
Altitude, Nautical Miles	375	359
Space-Fixed Velocity, Ft/Sec	34,816	35,120
Space-Fixed Flight-Path Angle, Degree	-17.98°	-17.61°
Space-Fixed Heading Angle, Degree East of North	62.16°	62.22°
CM/SM Separation		
Time from Range Zero	08:21:46.0	08:18:03.0
Geodetic Latitude, Degree North	18.64°	18.67°
Longitude, Degree East	143.84°	144.86°
Altitude, Feet	900,749	876,808
Altitude, Nautical Miles	148	144
Space-Fixed Velocity, Ft/Sec	35,912	36,146
Space-Fixed Flight-Path Angle, Degree	-11.25°	-11.01°
Space-Fixed Heading Angle, Degree East of North	65.55°	65.53°

<u>EVENT</u>	<u>PLANNED</u>	<u>ACTUAL</u>
Entry Interface		
Time from Range Zero	08:23:13.0	08:19:28.0
Geodetic Latitude, Degree North	21.90°	21.86°
Longitude, Degree East	151.58°	152.42°
Altitude, Feet	400,000	400,000
Altitude, Nautical Miles	66	66
Space-Fixed Velocity, Ft/Sec	36,333	36,537
Space-Fixed Flight-Path Angle, Degree	-7.13°	-7.077°
Space-Fixed Heading Angle, Degree East of North	68.35°	68.26°
Drogue Parachute Deploy		
Time from Range Zero, Hour:Minutes:Seconds	08:35:11.0	08:31:19.0
Latitude, Degree:Minutes North	30.00°	29.97°
Longitude, Degree:Minutes West	172.40°	172.39°
Orbital Elements, High Apogee		
Apogee, Nautical Miles	9,890	9,767
Perigee, Nautical Miles	-41	-45
Period, Minutes	320	316
Inclination, Degree	30.3°	30.3°

<u>EVENT</u>	<u>PLANNED</u>	<u>ACTUAL</u>
Spacecraft Landing Coordinates		
Latitude, North	30.00°	30.06°
Longitude, West	172.24°	172.24°

Splashdown occurred at 08:37:08 from Range Zero.

Approximate mission duration was
eight hours and thirty-seven minutes.

3.5 APOLLO 5 MISSION EVENTS SUMMARY

<u>Event</u>	<u>Mission elapsed time, hr:min:sec</u>	
	<u>Planned</u>	<u>Actual</u>
Range zero - 22:48:08 G.m.t.	00:00:00	00:00:00
Maximum dynamic pressure		00:01:17
S-IB inboard engines cutoff	00:02:19	00:02:19
S-IB outboard engines cutoff	00:02:22	00:02:22
S-IB/S-IVB separation	00:02:23	00:02:23
S-IVB ignition	00:02:25	00:02:25
LM ECS primary water valve actuate	00:02:56	00:03:15
S-IVB cutoff	00:09:39	00:09:53
Insertion	00:10:08	00:10:03
Aerodynamic shroud jettison	00:10:43	00:10:38
SLA panel deployment	00:19:43	00:19:44
LM/S-IVB separation command	00:54:00	00:53:55
Initiate DFI calibration	00:55:36	
Initiate maneuver to DPS burn attitude	03:55:31	03:55:04
First DPS burn start	03:59:44	03:59:40
DPS engine cutoff	04:06:26	03:59:44
PRA III sequence initiate		06:10:00
Second DPS burn start		06:10:43
DPS engine fixed throttle position		06:11:08
DPS engine off		06:11:15
Third DPS burn start		06:11:48
DPS engine fixed throttle position		06:12:13
Fire-in-the-hole abort		06:12:14
APS engine off		06:13:14
PRA V sequence initiate		07:44:19
Second APS burn engine on		07:44:35
APS propellant depletion		07:50:30

TRAJECTORY DATA

Lift-off of the Apollo 5 occurred at 22:48:08 G.m.t. on January 22, 1968, with subsequent insertion at 00:10:03 mission elapsed time. The following tables contain the trajectory conditions for insertion, LM/S-IVB separation, and each maneuver as applicable.

LM/S-IVB INSERTION (CUTOFF + 10 SECONDS)

<u>Condition</u>	<u>Planned</u>	<u>Actual</u>
Time from range zero, hr:min:sec	00:10:08.2	00:10:03
Geodetic latitude, deg North	31.57	31.56
Longitude, deg West	61.48	61.76
Altitude, ft	535 440	536 190
Altitude, n. mi.	88	88
Space-fixed velocity, ft/sec	25 684	25 686
Space-fixed flight-path angle, deg	0.02	0.01
Space-fixed heading angle, deg E of N	86.13	85.94

LM/S-IVB SEPARATION (END SEPARATION SEQUENCE)

<u>Condition</u>	<u>Planned</u>	<u>Actual</u>
Time from range zero, hr:min:sec	00:54:21	00:54:10
Geodetic latitude, deg South	31.61	31.58
Longitude, deg East	107.93	107.22
Altitude, ft	733 103	730 228
Altitude, n. mi.	121	120
Space-fixed velocity, ft/sec	25 458	25 460
Space-fixed flight-path angle, deg	0.0	-0.01
Space-fixed heading angle, deg E of N	93.49	93.92

DPS-1 IGNITION

<u>Condition</u>	<u>Planned</u>	<u>Actual</u>
Time from range zero, hr:min:sec	03:59:47	03:59:40
Geodetic latitude, deg South	26.77	26.85
Longitude, deg East	102.61	102.47
Altitude, ft	707 014	705 262
Altitude, n. mi.	116	116
Space-fixed velocity, ft/sec	25 484	25 485
Space-fixed flight-path angle, deg	-0.18	-0.14
Space-fixed heading angle, deg E of N	72.27	72.36

DPS-1 CUTOFF

<u>Condition</u>	<u>Planned</u>	<u>Actual</u>
Time from range zero, hr:min:sec	04:00:32	03:59:44
Geodetic latitude, deg South	25.80	26.77
Longitude, deg East	105.65	102.76
Altitude, ft	703 842	703 704
Altitude, n. mi.	116	116
Space-fixed velocity, ft/sec	25 622	25 491
Space-fixed flight-path angle, deg	-0.05	-0.14
Space-fixed heading angle, deg E of N	70.84	72.22

PRA III SEQUENCE INITIATE

<u>Condition</u>	<u>Planned</u>	<u>Actual</u>
Time from range zero, hr:min:sec		06:10:00
Geodetic latitude, deg North		28.85
Longitude, deg West		118.85
Altitude, ft		570 048
Altitude, n. mi.		94

PRA III SEQUENCE INITIATE - Concluded

<u>Condition</u>	<u>Planned</u>	<u>Actual</u>
Space-fixed velocity, ft/sec		25 650
Space-fixed flight-path angle, deg		0.12
Space-fixed heading angle, deg E of N		103.93

APS-1 CUTOFF

<u>Condition</u>	<u>Planned</u>	<u>Actual</u>
Time from range zero, hr:min:sec		06:13:14
Geodetic latitude, deg North		24.71
Longitude, deg West		104.90
Altitude, ft		571 169
Altitude, n. mi.		94
Space-fixed velocity, ft/sec		26 320
Space-fixed flight-path angle, deg		-0.33
Space-fixed heading angle, deg E of N		110.32

PRA V SEQUENCE INITIATE

<u>Condition</u>	<u>Planned</u>	<u>Actual</u>
Time from range zero, hr:min:sec		07:44:19
Geodetic latitude, deg North		30.12
Longitude, deg West		150.16
Altitude, ft		697 435
Altitude, n. mi.		115
Space-fixed velocity, ft/sec		26 177
Space-fixed flight-path angle, deg		-1.41
Space-fixed heading angle, deg E of N		100.09

The following table shows orbital elements at four significant times during the mission.

INSERTION

<u>Condition</u>	<u>Planned</u>	<u>Actual</u>
Apogee, n. mi.	123	120
Perigee, n. mi.	88	88
Period, min	88.4	88.3
Inclination, deg	31.62	31.63

LM/S-IVB SEPARATION

<u>Condition</u>	<u>Planned</u>	<u>Actual</u>
Apogee, n. mi.	121	120
Perigee, n. mi.	94	90
Period, min	88.6	88.4
Inclination, deg	31.62	31.63

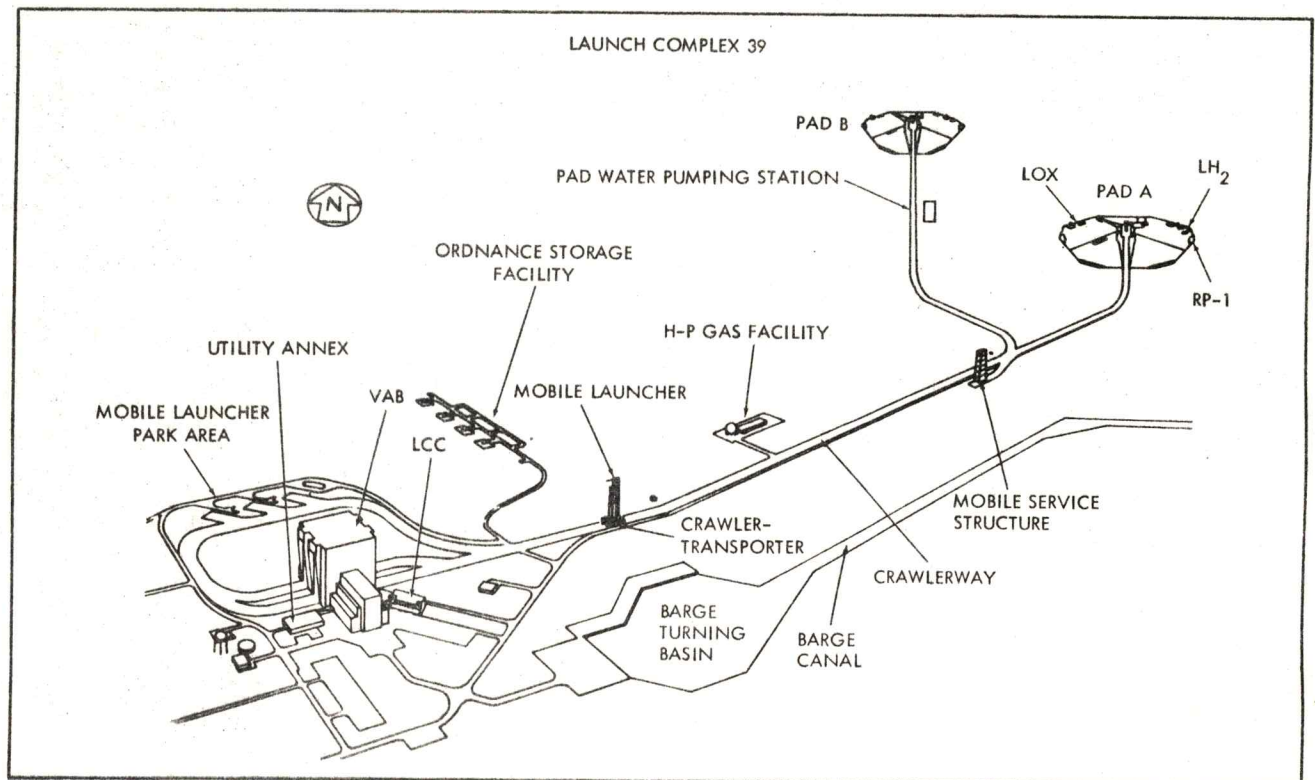
COMPLETION OF FIRST DPS BURN

<u>Condition</u>	<u>Planned</u>	<u>Actual</u>
Apogee, n. mi.	174	120
Perigee, n. mi.	116	92
Period, min	89.9	88.4
Inclination, deg	31.63	31.64

COMPLETION OF APS-1

<u>Condition</u>	<u>Planned</u>	<u>Actual</u>
Apogee, n. mi.		519
Perigee, n. mi.		93
Period, min		96.0
Inclination, deg		31.48

4.1 LAUNCH COMPLEX 39 DRAWING



4.2 VEHICLE ASSEMBLY BUILDING

CONSTRUCTION PERIOD: July 1963 through present

MAJOR CONTRACTS:

Design-Urbahn-Roberts-Seelye-Moran, New York City, N.Y.
Site preparation-Gahagan Dredging Corp., Tampa, Fla.
Pile driving and foundation work-Blount Brothers Corp., Montgomery, Ala.
General construction, including outfitting Assembly Bays 1 and 3 - Joint venture of Morrison-Knudsen Co., Inc.; Perini Corp., and Paul Hardeman, Inc., South Gate, Calif.
Steel fabrication and erection-American Bridge Division of United States Steel Corp., Atlanta, Ga. (Contract awarded separately but administered as a subcontract to the general construction contract)
Outfitting Assembly Bay 2-Akwa-Downey Construction Co., Milwaukee, Wisc.

OVERALL COST FOR BOTH VAB & LCC: \$149.7 million

OVERALL LENGTH: 716 feet 6 inches

OVERALL WIDTH: 518 feet

HEIGHT: 525 feet 10 inches (top of finished roof of High Bay)

VOLUME: 129,482,000 cubic feet

IMPRINT AREA: 343,500 square feet (approximately 7.5 acres)

DEVELOPED FLOOR AREA: 1,500,000 square feet

HIGH BAY:

Volume	117,200,000 cubic feet
Length	442 feet
Width	518 feet
Height	551 feet 10 inches (top of elevator shaft) 526 feet 9 inches (top of parapet) 525 feet 10 inches (top of finished roof)

Imprint area 225,900 square feet

Bays 4 (2 equipped initially)

Floors 26 (fully developed)

Elevators 16 to Floor 34 (level 420 feet) 1 to Roof from Floor 34

Extensible work platforms - 5 pairs in each completed bay

LOW BAY:

Volume - 12,282,000 cubic feet
Length - 274 feet 6 inches
Width - 442 feet
Height - 211 feet 3 inches (top of parapet)
 210 feet 4 inches (top of finished roof)
Imprint area - 17,600 square feet
Checkout cells - 8
Floors - 3 plus mezzanine
Elevators - 4

STEEL: 98,590 tons (60,000 tons - structural steel framework
 21,500 tons - steel pipe piles
 2,090 tons - reinforcing steel
 15,000 tons - general construction steel, including extensible
 work platforms)

CONCRETE: 65,000 cubic yards (50,000 cubic yards - pile capping and floor slab
 15,000 cubic yards - interior floors)

EXTERIOR SURFACE (excluding doors): 1,155,500 square feet
 (1,085,500 square feet - insulated aluminum panels
 70,000 square feet - plastic panels)

CRANES:

High Bay - 2 (250-ton capacity, 462-foot hook height)
Transfer Aisle - 1 (175-ton capacity, 166-foot hook height)

HIGH BAY DOORS: 4

Height of each door opening - 455 feet (ground to top)
Lower door opening - 152 feet wide, 114 feet high (inclosed with 4 leaves sliding
 horizontally)
Upper door opening - 76 feet wide, 342 feet high (inclosed with 7 leaves sliding
 vertically)

FOUNDATION: 4,225 steel pipe pilings 16-inch diameter, driven an average 160
 feet to rock.

COMPARATIVE FIGURES:

Height - VAB 525 feet 10 inches
 Empire State, NY, with TV tower - 1,472 feet
 Terminal Tower, Cleveland - 708 feet
 City Hall, Los Angeles - 454 feet
 Dade County Courthouse, Miami - 325 feet
 Statue of Liberty - 305 feet
 Washington Monument - 555 feet

VOLUME: VAB - 122,428,000 cubic feet
Boeing SST Assembly Plant, Everett, Wash. - 160,000,000
Great Pyramid of Cheops, Egypt - 90,120,000 cubic feet
Pentagon - 77,025,000 cubic feet

STEEL QUANTITY: VAB - 98,590 tons total
Empire State Building - 60,000 tons
VAB equivalent - 30,000 automobiles

PILING: VAB - 674,000 feet (128 miles)
VAB equivalent - 16-inch steel pipeline from Washington to Philadelphia
(123 miles direct distance)

AIR CONDITIONING: VAB - 10,000 tons
VAB equivalent - 3,000 homes or 9 hotels similar in size to
the Americana in Miami Beach

4.3 LAUNCH PADS A AND B

CONSTRUCTION PERIOD

Pad A - November 1963 to October 1965

Pad B - December 1964 to April 1967

MAJOR CONTRACTS

Design - Giffels and Rossetti, Detroit, Mich. (both pads)

Construction -

Pad A - Joint venture of Blount Brothers Corp. and M.M. Sundt
Construction Co., Montgomery, Ala.

Pad B - George A. Fuller Co., Los Angeles, Calif.

Cost -

Pad A - \$36.2 million

Pad B - \$28.0 million

SHAPE OF PAD - 8-sided polygon

DISTANCE ACROSS PAD - 3,000 feet

HARDSTAND AREA - 390 by 325 feet

ELEVATION OF PAD SURFACE

Pad A - 48 feet above sea level

Pad B - 55 feet above sea level

DISTANCE OF PADS FROM VAB VIA CRAWLERWAY

Pad A - 18,159 feet

Pad B - 22,400 feet

DISTANCE BETWEEN PADS - 8,716 feet

QUANTITY OF CONCRETE REQUIRED - 68,000 cubic yards (each pad)

QUANTITY OF REINFORCING STEEL REQUIRED - 5,100 tons (each pad)

FLAME TRENCH

Length - 450 feet

Width - 58 feet

Depth - 42 feet

FLAME DEFLECTOR

Height - 41 feet 6 inches

Base - 48 feet by 77 feet 6 inches

Weight - 1,300,000 pounds

ENVIRONMENTAL CONTROL SYSTEM ROOM.

Length - 115 feet 2 inches

Width - 96 feet

Height - 15 feet 7 inches

PAD TERMINAL CONNECTION ROOM.

Length - 242 feet 4 inches

Width - 68 feet 4 inches

Height - First floor, 15 feet 7 inches

Second floor, 17 feet 6 inches

HIGH PRESSURE GAS STORAGE FACILITY:

Length - 109 feet 8 inches

Width - 55 feet

Height - 32 feet 2 inches

EMERGENCY EGRESS DOME.

Diameter - 40 feet

Height - 11 feet above suspended floor

Thickness - 2 feet 6 inches (steel and concrete)

RP-1 STORAGE

Number of tanks - 2

Capacity - 86,000 gallons per tank

LIQUID OXYGEN STORAGE.

Number of tanks - 1

Capacity - 900,000 gallons

LIQUID HYDROGEN STORAGE.

Number of tanks - 1

Capacity - 850,000 gallons

4.4 MOBILE SERVICE STRUCTURE

CONSTRUCTION PERIOD - February 1965 to July 1966

MAJOR CONTRACTS

Design - Rust Engineering Co., Pittsburgh, Pa.

Construction - Morrison-Knudsen Co., Inc., Perini Corp., and Paul Hardeman, Inc., South Gate, Calif.

COST - \$24.5 million

HEIGHT

Above ground - 402 feet

Above base deck - 355 feet

WEIGHT - 9,800,000 pounds (7,690,933 pounds of structural steel)

BASE DIMENSIONS - 135 feet by 132 feet

TOP DIMENSIONS - 113 feet square

PLATFORMS - 5

Self-propelled - 2 (lower platforms for serving Saturn V rocket and Instrumentation Unit)

Fixed-relocatable - 3 (upper platforms for Apollo spacecraft and Launch Escape System)

HIGH-RISE ELEVATORS - 2 (for access to work platforms and tower catwalks)

Load capacity - 5,000 pounds (equipment); 12 to 16 passengers

Speed - 600 feet per minute (Maximum)

BASE WORK ELEVATOR - 1 (access to base work areas and high-rise elevators from ground)

Load capacity - 5,000 pounds (equipment); 12 to 16 passengers

MANLIFT ELEVATOR - 1 (access to base work area from ground)

BOOMS AND HOISTS - 2

BASE BUILDINGS

Mechanical equipment room - 1,800 square feet

Operations Support Room - 460 square feet

Sanitary facility - 180 square feet

Elevator equipment room - 1,695 square feet

Communications and television equipment room - 430 square feet
Electrical equipment room - 1,500 square feet

SUPPORT COLUMNS: 4 each at pad and park position

OPERATIONAL WINDS:

Free standing - 63 miles per hour

Pad position with holddown clamps - 65 miles per hour

Park position with holddown clamps - 125 miles per hour

4.5 TRANSPORTERS

NUMBER CONSTRUCTED - 2

CONSTRUCTION PERIOD - March 1963 to early 1966

MAJOR CONTRACTS

Design - Marion Power Shovel Co., Marion, Ohio

Construction - Marion Power Shovel Co., Marion Ohio

COST - \$14.9 million

HEIGHT

Minimum (cylinders retracted) - 20 feet

Maximum (cylinders extended) - 26 feet

LENGTH - 131 feet 4 inches

WIDTH - 114 feet

WEIGHT - 6,000,000 pounds (approx.)

SPEED

Loaded - 1 mile per hour maximum

Unloaded - 2 miles per hour maximum

LOAD CAPACITY - 12,000,000 pounds

HYDRAULIC SYSTEM

Operating pressure - 2,780 pounds per square inch

Maximum pressure - 5,000 pounds per square inch

POWER SYSTEM (DC)

Diesel engines - 2 (2,750 horse power each)

Generators - 4 (1,000 kilowatts each)

AUXILIARY POWER SYSTEM - (Electrical power for Mobile Launcher during transit)

Generators - 2 (150 kilowatts each)

4.6 CRAWLERWAY

CONSTRUCTION PERIOD

VAB - Pad A - November 1963 to September 1965
Extension to Pad B - April 1965 to February 1966
VAB area - March 1964 to January 1965

MAJOR CONTRACTS

Design - U.S. Army Corps of Engineers

Construction -

VAB - Pad A - Joint venture of Blount Brothers Corp, and
M. M. Sundt Construction Co., Montgomery, Ala.
Extension to Pad B - George A. Fuller Co., Los Angeles, Calif.
VAB area - Joint venture of Morrison - Kundsens Co., Inc.,
Perini Corp., and Paul Hardeman, Inc., South Gate,
Calif.

OVERALL CONSTRUCTION COST - \$7,500,000

LENGTH

VAB - Pad A - 18,159 feet
Extension to Pad B - 11,300 feet
VAB to Pad B - 22,400 feet

WIDTH - 130 feet (overall)

Each lane - 40 feet
Median - 50 feet
Depth (thickness) - 7 feet average

4.7 MOBILE LAUNCHERS

NUMBER CONSTRUCTED - 3

CONSTRUCTION PERIOD

Structural steel - July 1963 to March 1965
Mechanical and electrical systems - December 1963 to May 1966
Swing arms, ground support and miscellaneous equipment - June 1965
to present

MAJOR CONTRACTS

Mobile Launcher Design - Reynolds, Smith and Hills, Jacksonville, Fla.
Engineering development of swing arms - Brown Engineering Co.,
Huntsville, Ala.

Construction

Steel erection - Ingalls Iron Works Co., Inc., Birmingham, Ala.
Mechanical, electrical installation - Smith-Ernst, Orlando, Fla.
Ground support equipment - Pacific Crane and Rigging Co.,
Paramount, Calif.
Swing arms - Hayes International Corp., Birmingham, Ala.

DESIGN AND CONSTRUCTION SUPERVISION - John F. Kennedy Space
Center, National Aeronautics and Space Administration

OVERALL COST - \$100.3 million (including swing arms and GSE)

HEIGHT

At erection area, pad or VAB - 445 feet 9 inches (not including 42-foot
lightening rod)

On Transporter - 451 feet maximum (cylinders extended)

WEIGHT - 10,500,000 pounds

LAUNCH PLATFORM

Height - 25 feet

Width - 135 feet

Length - 160 feet

Mount mechanisms - 6 (extending 22 feet above ground)

Exhaust opening - 45 feet square

Floor space - Level A (upper) - 12,131 feet

Level B (lower) - 18,553 square feet

UMBILICAL TOWER

Height above platform - 380 feet (not including crane)

398 feet 9 inches (including crane)

Base dimensions - Level 0 - 60 feet by 111 feet (tapers to level 80)

Level 80 to 380 - 40 feet square

Platforms - 17

Elevators - 2

Capacity: 2,500 pounds

Speed: 600 feet per minute maximum

Crane - 1

Capacity: 25 tons 50 feet from swivel

10 tons 85 feet from swivel

Beam rotation: 360 degrees

SWING ARMS: 9

Length - 45 to 60 feet

Weight - 35,000 to 52,000 pounds

Location - S-1C stage: 2

S-2 stage: 3

S-4B stage (including Instrument Unit and Lunar Module): 2

Spacecraft Service and Command Modules: 2

HOLD-DOWN SUPPORT ARMS: 4

Base dimensions - 9 feet 9 inches by 6 feet 4 inches

Height - 10 feet 5 inches

Weight - 40,000 pounds each (approx.)

LAUNCH CONTROL CENTER

CONSTRUCTION PERIOD - March 1964 to December 1965

MAJOR CONTRACTS

Design - Urbahn - Roberts - Seelye - Moran, New York City
Construction - Joint venture of Morrison-Knudsen Co., Perini Corp
and Paul Hardeman, Inc., South Gate, Calif.

DESIGN AND CONSTRUCTION SUPERVISION - Canaveral District, U.S. Army
Corps of Engineers

COST - (included in total VAB)

DIMENSIONS

Length - 378 feet
Width - 181 feet 6 inches
Height - 77 feet 2 inches

ELEVATORS - 4

FLOORS - 4

TOTAL FLOOR AREA - 213,900 square feet

5.1 SATURN V

PHYSICAL CHARACTERISTICS

OVERALL VEHICLE	DIAMETER	HEIGHT	WEIGHT
	33 ft.	363 ft.*	6,220,025 lb. (total liftoff)
FIRST STAGE	33 ft.	138 ft.	300,000 lb. (dry)
SECOND STAGE	33 ft.	81 ft. 7 in.	95,000 lb. (dry)**
THIRD STAGE	21 ft. 8 in.	58 ft. 7 in.	34,000 lb. (dry)**
INSTRUMENT UNIT	21 ft. 8 in.	3 ft.	4,500 lb.
APOLLO SPACECRAFT		80 ft.	95,000 lb.

*SINCE INDIVIDUAL STAGE DIMENSIONS OVERLAP IN SOME CASES, OVERALL VEHICLE LENGTH IS NOT THE SUM OF INDIVIDUAL STAGE LENGTHS

** INCLUDES AFT INTERSTAGE WEIGHT

PROPULSION SYSTEMS

FIRST STAGE	-Five bipropellant F-1 engines developing 7,500,000 lb. thrust RP-1 Fuel-- 203,000 gal. (1,359,000 lb.), LOX-- 331,000 gal. (3,133,000 lb.)
SECOND STAGE	-Five bipropellant J-2 engines developing more than 1,000,000 lb. thrust LH ₂ --260,000 gal. (153,000 lb.), LOX--83,000 gal. (789,000 lb.)
THIRD STAGE	-One bipropellant J-2 engine developing up to 225,000 lb. thrust LH ₂ --63,000 gal. (37,000 lb.), LOX--20,000 gal. (191,000 lb.)

CAPABILITY

FIRST STAGE	-Operates about 2.5 minutes to reach an altitude of about 200,000 feet (38 miles) at burnout
SECOND STAGE	-Operates about 6 minutes from an altitude of about 200,000 feet to an altitude of 606,000 feet (114.5 miles)
THIRD STAGE	-Operates about 2.75 minutes to an altitude of about 608,000 feet (115 miles) before second firing and 5.2 minutes to translunar injection
PAYLOAD	-250,000 lb. into a 115 statute-mile orbit

5.2 FIRST STAGE

WEIGHT: 300,000 lb. (dry)
4,792,000 lb. (loaded)
DIAMETER: 33 ft.
HEIGHT: 138 ft
BURN TIME: About 2.5 min.
VELOCITY: 6,000 miles per hour at burnout (Approx.)
ALTITUDE AT BURNOUT: About 38 miles

MAJOR STRUCTURAL COMPONENTS

THRUST STRUCTURE
FUEL TANK
INTERTANK
LOX TANK
FORWARD SKIRT

MAJOR SYSTEMS

PROPULSION: Five bipropellant F-1 engines
Total thrust: 7.5 million lb
Propellant: RP-1--203,000 gal. or 1,359,000 lb.
LOX--331,000 gal. or 3,133,000 lb.
Pressure: Control--1.27 cubic feet of gaseous nitrogen at 3,250 psig
Fuel pressurization--124 cubic feet or 636 lb. of gaseous helium at
3,100 psig
LOX pressurization--gaseous oxygen converted from 6,340 pounds
of LOX by the engines
HYDRAULIC: Power primarily for engine start and for gimbaling four outboard engines
ELECTRICAL: Two 28 VDC batteries, basic power for all electrical functions
INSTRUMENTATION: Handles approx. 900 measurements
TRACKING: ODOP Transponder

5.3 SECOND STAGE

WEIGHT: 95,000 lb (dry)
1,037,000 lb (loaded)
DIAMETER: 33 ft
HEIGHT: 81 ft 7 in
BURN TIME: 6 min approx (actually 395 sec)
VELOCITY: 15,300 miles per hour at burnout (approx)
ALTITUDE AT BURNOUT: 114.5 miles

MAJOR STRUCTURAL COMPONENTS

AFT INTERSTAGE	THRUST STRUCTURE	COMMON BULKHEAD
AFT SKIRT	AFT LOX BULKHEAD	LH ₂ CYLINDER WALLS
FORWARD SKIRT	LH ₂ FORWARD BULKHEAD	

MAJOR SYSTEMS

PROPULSION: Five J-2 engines

Thrust: More than 1,000,000 lb. (225,000 maximum each engine)

Propellant: LH₂--260,000 gal. (153,000 lb.)

LOX--83,000 gal. (789,000 lb.)

ELECTRICAL: 6 electrical bus systems, four 28-volt DC flight batteries, and motor-operated power transfer switches

ORDNANCE: Provides, in operational sequence, ignition of eight ullage motors before ignition of five main engines, explosive separation of second interstage skirt, explosive separation of second stage from third stage, and ignition of four retrorockets to decelerate second stage for complete separation

MEASUREMENT: Instrumentation, telemetry, and radio frequency subsystems

THERMAL CONTROL: A ground-operated system that provides proper temperature control for equipment containers in the forward and aft skirt

FLIGHT CONTROL: Gimballing of the four outboard J-2 engines as required for thrust vector control, accomplished by hydraulic-powered actuators which are electrically controlled from signals initiated in the flight control computer of the instrument unit (atop the Saturn V third stage)

5.4 THIRD STAGE

WEIGHT: 34,000 lb. (dry) including 7,700-lb. aft interstage
262,000 lb. (loaded)
DIAMETER: 21 ft. 8 in.
HEIGHT: 58 ft. 7 in.
BURN TIME: 1st burn - 2.75 min.
2nd burn - 5.2 min.
VELOCITY: 1st burn - 17,500 miles per hour at burnout (approx.)
2nd burn - 24,500 miles per hour (approx. typical lunar mission
escape velocity)
ALTITUDE AT BURNOUT: 115 miles after 1st burn and into a translunar injection
on 2nd burn

MAJOR STRUCTURAL COMPONENTS

AFT INTERSTAGE
AFT SKIRT

THRUST STRUCTURE
PROPELLANT TANK

COMMON BULKHEAD
FORWARD SKIRT

MAJOR SYSTEMS

PROPULSION: One bipropellant J-2 engine
Total Thrust: 225,000 lb. (maximum)
Propellants: LH₂ - 63,000 gal. (37,000 lb.)
LOX - 20,000 gal. (191,000 lb.)
HYDRAULIC: Power for gimbaling J-2 engine
ELECTRICAL: One 56 VDC and three 28 VDC batteries, providing basic power
for all electrical functions
TELEMETRY AND INSTRUMENTATION: Five modulation subsystems, providing
transmission of flight data to ground
stations
ENVIRONMENTAL CONTROL: Provides temperature-controlled environment for
components in aft skirt, aft interstage, and
forward skirt
ORDNANCE: Provides explosive power for stage separation, retrorocket
ignition, ullage rocket ignition and jettison, and range safety
requirements
FLIGHT CONTROL: Provides stage attitude control and propellant ullage control

5.5 INSTRUMENT UNIT

DIAMETER: 260 in.
HEIGHT: 36 in.
WEIGHT: 4,500 lb. (approx.)

MAJOR SYSTEMS

ENVIRONMENTAL CONTROL SYSTEM: Provides cooling for electronic modules and components within the IU and forward compartments of third stage

GUIDANCE AND CONTROL SYSTEM: Determines course of Saturn V through space and adapts that course to fulfill mission requirements

INSTRUMENTATION SYSTEM: Measures vehicle conditions and reactions during mission and transmits this information to ground for subsequent analysis, as well as providing for ground station-to-vehicle communication

ELECTRICAL SYSTEM: Provides basic operating power for all electronic and electrical equipment in the IU; also monitors vehicle performance any may initiate automatic mission abort if an emergency arises

STRUCTURAL SYSTEM: Serves as a load bearing part of the launch vehicle, supporting both the components within the IU and the spacecraft; composed of three 120-degree segments of thin-wall aluminum alloy face sheets bonded over a core of aluminum honeycomb about an inch thick

5.6 F-1 ENGINE

LENGTH	19 ft.
WIDTH	12 ft. 4 in.
THRUST (sea level)	1,500,000 lb.
SPECIFIC IMPULSE (minimum)	260 sec.
RATED RUN DURATION	150 sec.
FLOW RATE: Oxidizer	3,945 lb./sec. (24,811 gpm)
Fuel	1,738 lb./sec. (15,471 gpm)
MIXTURE RATIO	2.27:1 oxidizer to fuel
CHAMBER PRESSURE	965 psia
WEIGHT FLIGHT CONFIGURATION	18,500 lb. maximum
EXPANSION AREA RATIO	16:1 with nozzle extension 10:1 without nozzle extension
COMBUSTION TEMPERATURE:	
Thrust Chamber	5,970° F
Gas Generator	1,465° F
MAXIMUM NOZZLE EXIT DIAMETER	11 ft. 7 in.

NOTE: F-1 engine will be uprated to 1,522,000 lb. thrust for Vehicle 504 and all subsequent operational vehicles.

5.7 J-2 ENGINE

LENGTH	11 ft. 1 in.
WIDTH	6 ft. 8-1/2 in.
NOZZLE EXIT DIAMETER	6 ft. 5 in.
THRUST (altitude)	225,000 lb. maximum
SPECIFIC IMPULSE (nominal)	424 sec. (426 at 5:1 mixture ratio)
RATED RUN DURATION	500 sec.
FLOW RATE: Oxidizer	449 lb./sec. (2,847 gpm)
Fuel	81.7 lb./sec. (8,365 gpm)
MIXTURE RATIO	5.5:1 oxidizer to fuel
NOMINAL CHAMBER PRESSURE (P_c)	763 psia
WEIGHT, DRY, FLIGHT CONFIGURATION	3,480 lb.
EXPANSION AREA RATIO	27.5:1
COMBUSTION TEMPERATURE	5,750° F

NOTE: J-2 engines will be uprated to a maximum of 230,000 pounds of thrust for later vehicles.

6.1 SPACECRAFT DESCRIPTION

Spacecraft 017, for Mission AS-501 is composed of a Launch Escape Tower, Command Module, Service Module, Lunar Module Adapter and a Lunar Module test article.

Command Module (CM)

The CM is made up of an inner structure, or pressure vessel, and an outer structure. A layer of insulation separates the inner and outer structures. The heat shield (outer structure) consists of: A forward heat shield, a crew compartment heat shield and an aft heat shield. Ablative material is bonded to the heat shield stainless-steel honeycomb structure.

Service Module (SM)

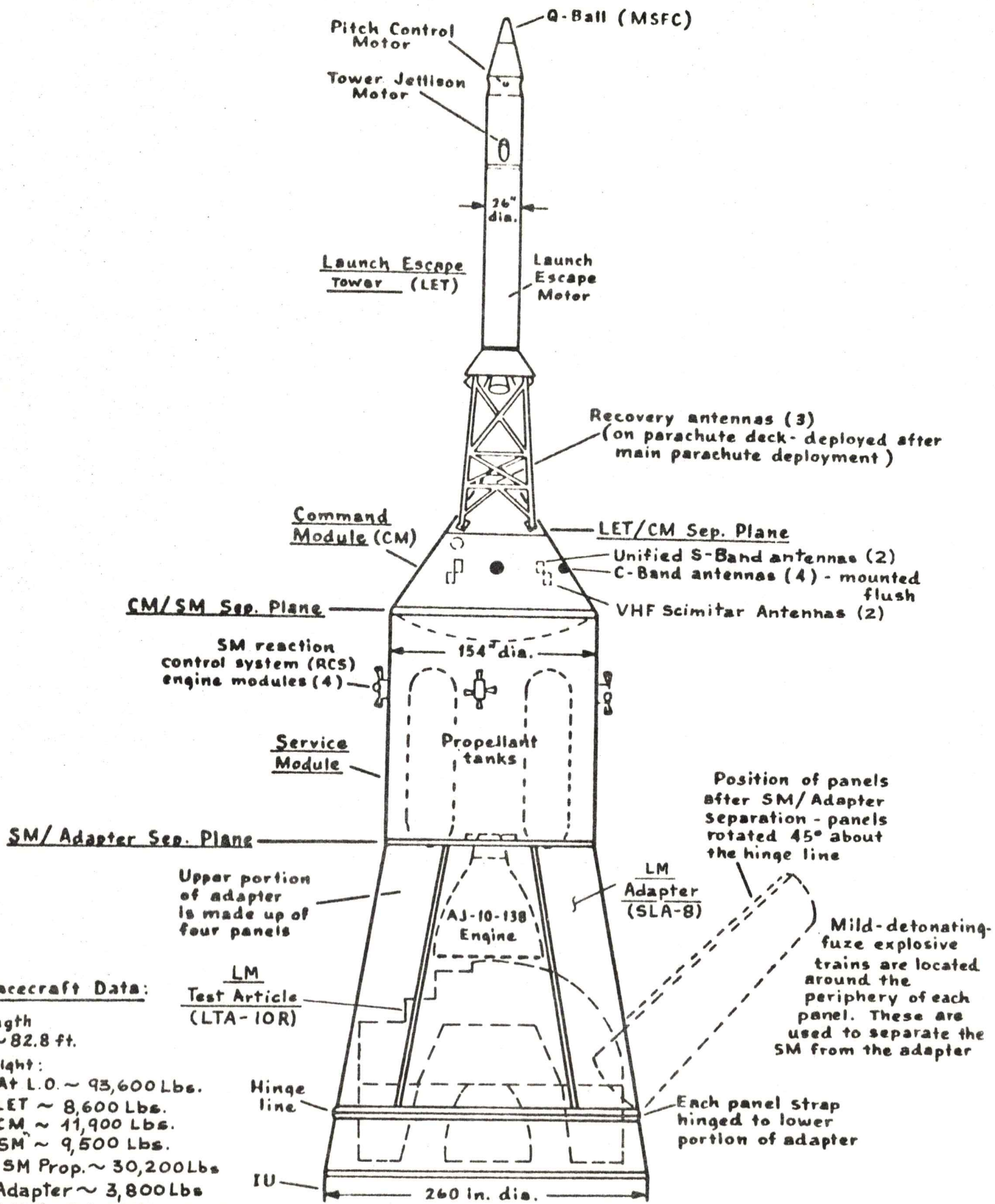
The SM is a cylindrical shell made up of aluminum honeycomb-sandwich panels and forward and aft bulkheads. The SM propulsion engine gimbal is attached to the aft bulkhead. Below the SM gimbal, the engine nozzle extends into the adapter area.

Lunar Module Adapter

The Lunar Module Adapter joins the SM to the S-IVB/IU and encloses the Lunar Module test article.

Spacecraft subsystems include the following:

- a. Launch escape system
- b. Emergency detection subsystem
- c. Electrical power subsystem
- d. Master event sequence controller
- e. Environmental control subsystem
- f. Communication subsystem
- g. Instrumentation subsystem
- h. Stabilization and control subsystem
- i. Service propulsion subsystem
- j. Reaction control subsystem
- k. Earth landing
- l. Mission Control Programmer
- m. Impact and recovery subsystem
- n. Structure subsystem
- o. Heat shield



Spacecraft Data:

Length
~82.8 ft.

Weight:

- At L.O. ~ 93,600 Lbs.
- LET ~ 8,600 Lbs.
- CM ~ 11,900 Lbs.
- SM ~ 9,500 Lbs.

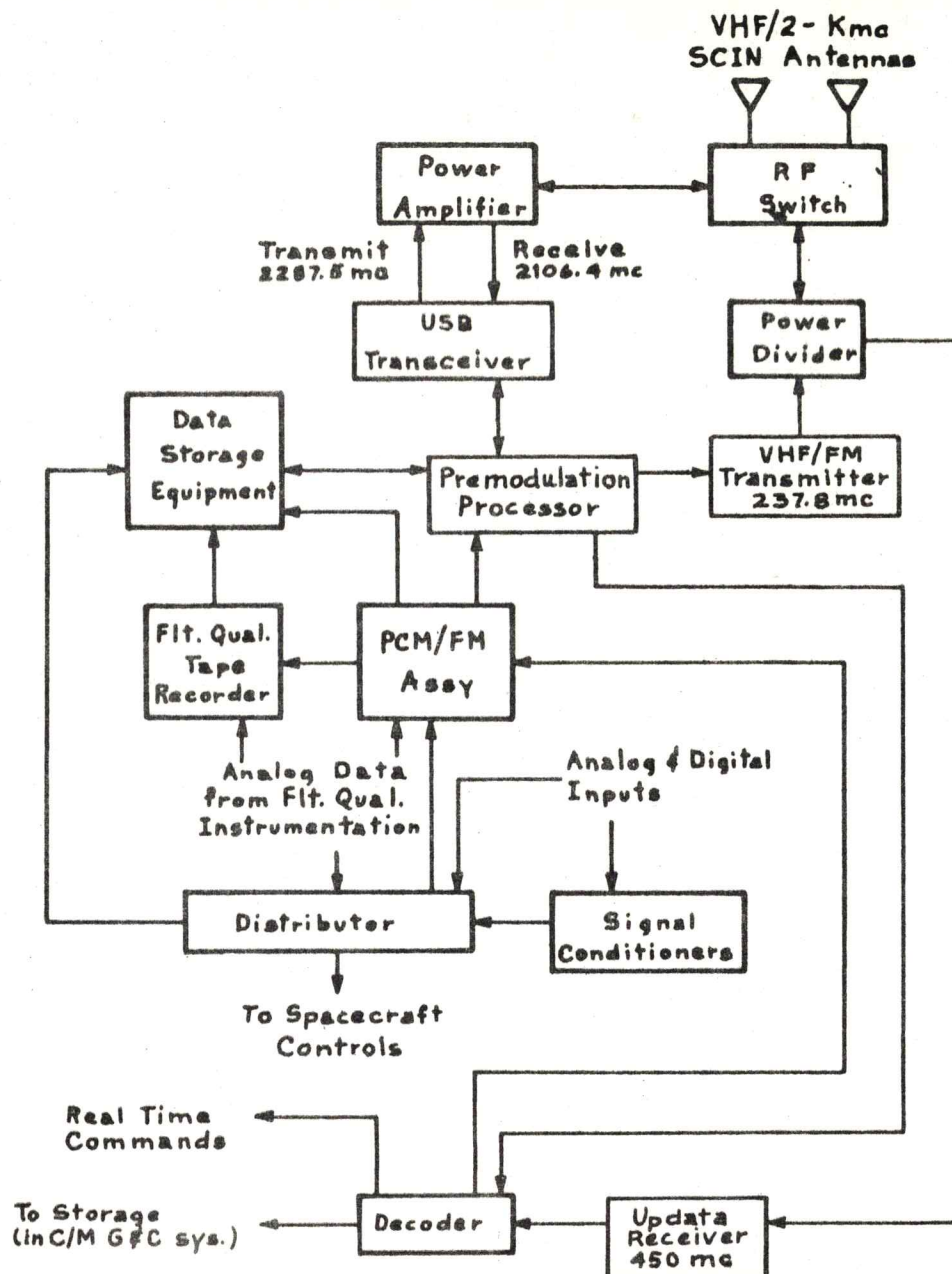
SM Prop. ~ 30,200 Lbs

• Adapter ~ 3,800 Lbs

• LM Test Article ~ 29,500 Lbs.

LM
Test Article
(LTA-10R)

Spacecraft
Configuration



Summary of Measurements	C M	S M	SLA	LET
Pressure	48	40	—	—
Temperature	207	33	30	—
Strain	16	—	32	—
Discrete Event	315	40	—	—
Voltage, Current & Freq.	384	14	—	—
Misc.	137	26	—	2
Totals ~	1107	153	62	2
Grand Total ~ 1324				

Note:

- All Telecommunication systems are located in the C/M.

SC 017 Telemetry, USB &
Update Systems

APPENDIX A - APOLLO 6 SUMMARY OPERATIONS PLAN (KSC)

I. Viewing Sites

Viewing sites will be located in the following areas:

1. Distinguished Visitors Site--West of bridge on NASA Causeway.
 - a. Bleacher type seating for 1000 guests.
 - b. Public address system with sufficient speakers to cover ten sets of bleachers. Public address system will include microphone and also provide prelaunch and launch commentaries.
 - c. Electricity and lighting.
 - d. Ten sanolets placed in separate groups to the right of the bleachers. (7 for men; 3 for women)
 - e. Site will be roped off to assist Security in precluding entry of unauthorized persons. KSC will provide necessary patrolmen.
 - f. Four telephones located at the Protocol Information Desk.
 - g. One hot line connecting Viewing Site with Launch Complex 39 Press Site Building.
 - h. Ambulance and emergency first aid service.
 - i. Food service (2 snack stands).
 - j. The area will be sprayed and the bleachers will be wiped down prior to arrival of distinguished visitors.
2. Dependents Viewing Site--East of bridge on NASA Causeway.

The area east of the bridge, which provides visual access of Pad A Complex 39, will be reserved exclusively for NASA and

contractor dependents who will drive their own automobiles to the site. AFETR dependents will be brought to the site via bus. Badges, car passes, and instructions prepared by KSC CRB will be issued to the dependents at T-5 days. Mobile food service vans and portable sanolets sufficient for 2000 dependents will be provided. Security will handle parking of vehicles and control traffic. Emergency first aid and ambulance service will be provided. Public address system speakers will be installed to provide prelaunch and launch commentaries. Dependents may view the launch from their parked automobiles or bring with them folding chairs and other comfort items as desired.

An alternate site for the dependents viewing area will be located north of the VAB, where the VIP Site was established for the Apollo 4 mission. If this site is selected, facilities and support outlined above will be provided.

3. Firing Room #3--The access list for Firing Room #3 will be provided and controlled by OMSF. Protocol will provide transportation and escort for guests invited to Firing Room #3.
4. Contractor-Employee Site--NASA and contractor employees resident in the Kennedy Space Center may view the launch of the Apollo 6 mission from convenient areas near their place of duty as long as these areas are outside the impact limit line.

Employees will not be permitted to view the launch from the NASA Causeway.

II. LC 39 Press Site

The Press Site at LC 39 will be used for the Apollo 6 mission. A representative of KSC PIO will act as Press Site Manager, who will coordinate all support activity for the media at this location beginning with the arrival of TV pool technicians prior to the launch.

Arrangements will be made for TV pool technicians to gain access to the Press Site without escort. The remainder of the media may visit the Press Site, up to T-24 hours, by using shuttle bus service from Cocoa Beach. From T-72 hours through mission completion, news media representatives may drive to the Press Site unescorted where arrangements have been made for parking approximately 350 cars. All automobiles will carry windshield stickers for access to the parking area. Shuttle bus service from the Cape Royal to the Press Site will augment these parking arrangements.

When registering at the News Center, media representatives will select a seat in the Press Box at the LC 39 Press Site. Seats in the Press Box will be assigned on a first-come, first-served basis.

Three public relations representatives from each prime contractor, and one from each subcontractor, will be issued badges for access to the LC 39 Press Site.

III. Transportation

KSC Transportation Section will provide KSC Public Affairs Office with 8 vehicles at T-5 days for use during the mission. These vehicles will be available to PIO or Protocol as required. Mr. Arnold Richman will coordinate transportation requests.

KSC Transportation Section will provide the following additional transportation beginning at T-2 days:

1. For KSC PIO:

- a. One bus for media tours of KSC. These tours will be scheduled at 10 a.m. and 2 p.m. daily. Mr. Wright Kerns will be the tour coordinator.
- b. Two buses for shuttle service between the News Center and LC 39 Press Site. The shuttle buses will operate constantly from 8 a.m. to 6 p.m. daily from T-2 days to T-12 hours, making each round trip every 2 hours. From T-12 hours, three NASA buses will operate a shuttle service between the Cape Royal News Center and LC 39 Press Site every 30 minutes. The last bus will depart the Cape Royal at T-1 hour.

2. For Protocol:

The KSC Transportation Section will coordinate all NASA Protocol Center (NPC) transportation requirements and establish a small vehicle motor pool at NPC in Cocoa Beach. The NPC will be

located at the Quality Courts motel and will open at T-2 days.

- a. All 37 and 45-passenger buses should be serviced and ready for immediate use on the days indicated below:

(1) T-2 days: 3 -- 45 passenger buses
 8 -- Sedans
 2 -- Stretchouts

(2) T-12 hours: 22 -- 45 passenger buses
 10 -- Sedans
 6 -- Stretchouts

- b. All buses to report to the NPC (including standby buses) 4 hours prior to established launch time.
- c. Buses and drivers will be under direct control of NPC after reporting. Each escort will issue instructions to the driver of the bus to which he is assigned.
- d. Guests will be advised of the numbered bus to which he/she is assigned, and requested to return to that bus during the day's activities. To insure that each guest knows his vehicle the escort will announce from time to time the number of the bus and will be standing at the door of the vehicle when departing from any location.
- e. Special guests transported to Firing Room #3 will be escorted directly to the LCC from Cocoa Beach, and buses will stand by on the east side of the building.

- f. Guests and the vehicle in which they ride will be predesignated on the master list. Guests will be advised regarding their assigned transportation when obtaining badges.

IV. Communications Requirements

The following is an outline of communications support required for the Apollo 6 mission:

- 1. Distinguished Visitors Site:
 - a. Public address system to include microphone and enough speakers for ten sets of bleachers. Public address system linked with launch commentary.
 - b. Four telephones.
 - c. Direct line connecting Distinguished Visitor Site to LC-39 Press Site Building.
- 2. Dependents Viewing Site:
 - a. Public address system with enough speakers for 2000 dependents.
 - b. One unlisted telephone.
- 3. NASA Facilities: Public address system in KSC facilities will carry prelaunch and launch commentaries for all employees from T-30 minutes through the launch phase.

V. Transcripts

The MSC News Center will handle all press transcripts.

The prelaunch and postlaunch briefings will be transcribed for KSC management under the direction of the KSC PAO Contract Technical

Representative. Arrangements will be made to secure transcript typists, recording and transcribing equipment, and necessary space at KSC. Transcript typists will be Civil Service personnel furnished by KSC.

VI. Food Services and Sanitary Facilities

Food services will be provided as follows:

1. LC 39 Press Site: A semi-mobile food service unit will provide food service at the Press Site from T-2 days through mission completion.
2. Distinguished Visitors Site: Two snack stands will be located at the Distinguished Visitors Site at T-1 day and operated through the launch.
3. Dependents Viewing Site: Two mobile food service vans will provide snacks to the dependents beginning at T-4 hours through the launch.

Portable sanolets will be established at the Distinguished Visitors Site and the Dependents Viewing Site the day preceding launch.

VII. Briefings and Tours

Because of the early scheduled launch of the Apollo mission (7 a. m. EST) there will be no formal mission briefing for distinguished guests.

Where holds are expected to last 60-90 minutes, Viewing Site guests will be escorted on tours of certain KSC facilities in predesignated buses.

Tours may include a walk-in and briefing in the Astronauts' Training Facility, the VAB, and/or the VIC, time permitting.

Where holds are expected to exceed 90 minutes or more all Viewing Site visitors who desire to participate will be escorted in their assigned buses on a tour of KSC. Film showings and/or a science lecture may be included during these tours. Film showings will be held in the Training Auditorium and in the VIC.

If there have been few holds in the countdown and no complete tour of the Center conducted for guests, following the launch or in the event of the scrub, all guests who desire to participate will be provided a complete tour of CKAFS and KSC. However, those guests who wish to return to Cocoa Beach will be provided necessary escort and transportation.

VIII. Alternate Plans During Holds or Postponement

In the event of a postponement, scrub, or hold, the schedule for invited guests will be as follows:

1. If it is necessary to reschedule a launch, guests will automatically have a valid invitation for the rescheduled date.
2. If a distinguished visitor arrives at KSC and unforeseen operational difficulties slip the launch, the guest will be provided a tour of the Center if desired, and given the option of staying or returning for the launch.

3. Distinguished visitors encountering extended holds at the Viewing Site will be afforded tours of KSC until launch time.
4. Guests escorted to KSC who have received a tour but failed to view a launch will be given the option of staying or returning to witness that particular launch.
5. Guests who decline an invitation or terminate their visit for reasons other than indicated above normally will not be reinvited.

IX. Plans During Holds

1. Holds of less than one hour:

Guests will remain at the Distinguished Visitors Site during holds of less than one hour.

2. Holds of two hours or less:

Guests will be transported to the VIC (which will be closed to the public on launch day) or to the Training Auditorium for a film showing or science lecture, and a drive-by of the Kennedy Space Center industrial area will follow.

3. Holds of three hours or less:

Guests will be transported to the VIC for film showing or science lecture, drive-by of the KSC Industrial Area, a stop at the Astronauts' Training Facility, and a stop at the VAB.

4. Postponement of launch or post launch:

A drive-by of KSC and CKAFS will be provided on an optional basis. Remainder of transportation will return guests to Cocoa Beach.

In event of a scrub, the VIC will be opened to the public two hours later and public tours of the Center will be resumed as soon as tour buses are available.

5. Catastrophic blowup of vehicle:

All distinguished guests will be escorted to Cocoa Beach at the discretion of the Apollo Information Director or the KSC Public Affairs Office. Gate #3 will be used for emergency egress.

Dependents will egress in the event of an emergency at the direction of the KSC patrol.

X. Photography

Photographic coverage of Apollo 6 at KSC, identified in the PSRD and the KSC Photographic Test Plan, will be accomplished by Technicolor.

Technicolor will be responsible for retrieving still and motion picture news release and unprocessed pool items from Pad A as soon as Pad Safety considers the complex safe.

Technicolor will deliver all unprocessed pool items to Les Gaver or his representative at Press Site 39. All other PIO news release film will be delivered to Technicolor Film Library for processing. Contact prints will be made available for the PIO photo coordinator (Ed Harrison) who will make final selections. Technicolor will print 50 each B&W 8x10 prints and 10 each 4x5 color transparencies of selected photographs.

The PIO photo coordinator will be responsible for written captions for all release prints. He will also arrange for film courier service for delivery of release prints to the News Center where the KSC News Center Manager or his representation will distribute photos to the news media.

XI. Personnel Assignments:

Gordon L. Harris - Deputy Information Director.

John W. King - Chief, KSC PIO operations and responsible for Launch Control Center commentary.

Lindy B. Davis - News Center Manager and deputy for KSC PIO operations.

Gatha Cottee - Communications support and press site support manager.

Charles T. Hollinshead - Technical information/query desk.

Ben McCarthy - Mission status.

Mel Snyder - Interview and contractor interface.

Ed Harrison - KSC PIO photo desk.

Wright Kerns - Briefings and tours.

Leo Davis - Photo support.

Bud McLearn - Reproduction support - News Center and press site.

George Killmer - Planning.

Arnold Richman - Logistics support.

Al Lavender - Contractor support.

Jim Loy - TWA/VIC interface.

Ed Johnson - Supervise protocol activities.

Bob Johnson - Assist supervision of NPC and protocol activities.

Henry Decker - Meet and escort special VIPs.

Bill Taylor - Protocol assistance at Firing Room #3.

Jay Viehman - Meet and escort special VIPs.

Paul Siebeneichen - Meet VIPs and escort duties.

Jay Wortman - Meet VIPs and escort duties.

John Donovan - Meet VIPs and escort duties.

Hal Mehrens - Meet VIPs and escort duties.

Bill Nixon - Meet VIPs and escort duties.

John Nelson - Visual Aids.

Mrs. Rowland - PAO secretarial duties.

Mrs. Williams - NPC secretarial duties.

Mrs. Sanders - NPC secretarial duties.

Mrs. Geron - NPC secretarial duties.

Mrs. Boles - PIO secretarial duties.

Mrs. Hunt - PIO secretarial duties.

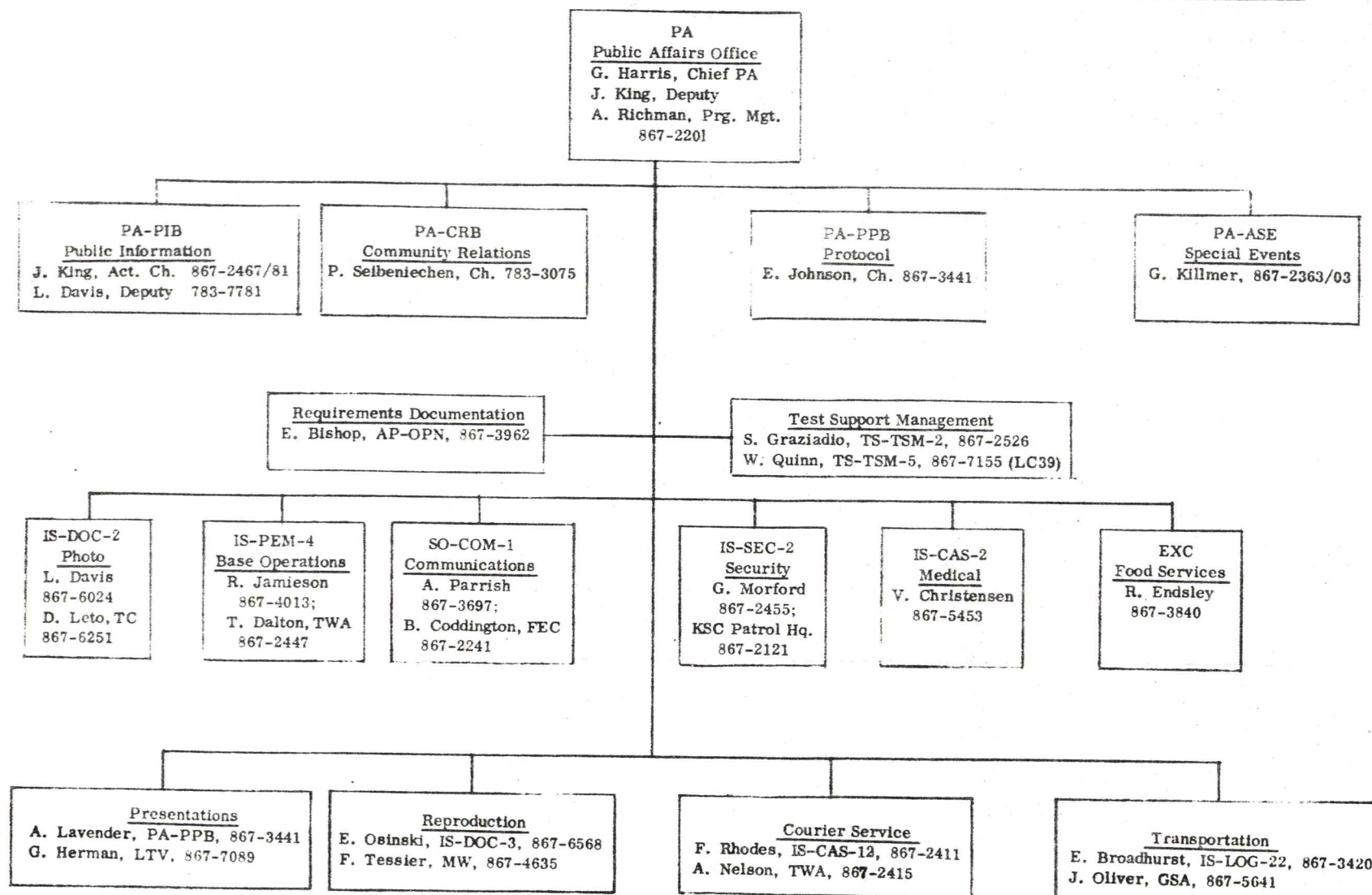
Mrs. Singletary - PIO secretarial duties.

XII. Contact List:

See Attached.

PUBLIC AFFAIRS OFFICE AND SUPPORT CONTACTS

Attachment



APPENDIX B
APOLLO QUERIES

QUERY SHEET		DATE	TIME
SOURCE OF QUERY (NAME & AFFILIATION):			
All			
RECEIVED BY	SOURCE	ANSWERED DATE	TIME
Davis			
QUERY			
Who are 2nd and 3rd Apollo crews?			
RESPONSE			
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><u>2nd</u></p> <p>McDivitt</p> <p>Scott</p> <p>Rusty</p> <p style="margin-left: 40px;">Conrad</p> <p style="margin-left: 40px;">Gordon</p> <p style="margin-left: 40px;">Bean</p> <p>Mitchell</p> <p>Haisc</p> <p>Worden</p> </div> <div style="width: 45%;"> <p><u>3rd</u></p> <p>Borman</p> <p>Collins</p> <p>Anders</p> <p style="margin-left: 40px;">Armstrong</p> <p style="margin-left: 40px;">Lovell</p> <p style="margin-left: 40px;">Aldrin</p> <p>Mattingly</p> <p>Carr</p> <p>Bull</p> </div> </div>			

QUERY SHEET		DATE June 22	TIME
SOURCE OF QUERY (NAME & AFFILIATION): Doug Dederer			
RECEIVED BY Davis	SOURCE Davis and others	ANSWERED DATE June 26	TIME
<p>QUERY</p> <p>What is the TNT equivalent on the three stages of the Saturn V?</p> <p>Does the safety radius diminish because of the larger quantities of fuel or what is the ratio used to determine limits?</p>			
<p>RESPONSE</p> <p>first stage----512,830 lbs TNT second stage- 564,480 " " third stage----143,520 " "</p> <p>Safety limit (outer) is established at the point 4 per cent psi overpressure is reached. Inward from that point the pressure increases.</p>			

QUERY SHEET		DATE	TIME
SOURCE OF QUERY (NAME & AFFILIATION):			
Ed Delong, UPI			
RECEIVED BY	SOURCE	ANSWERED DATE	TIME
Davis	MSC		
QUERY			
<p>I understand there have been corrosion and contamination problems from freon on spacecraft 101. Would you comment please?</p>			
RESPONSE			
<p>The 101 spacecraft ECS system was found free of contamination during an inspection at the NAA Downey facility. This inspection was brought about by the discovery of contaminants in the SC 103 ECS water glycol lines during operations in early January. A mixture of freon and water was introduced into the system when only freon would have been used. Corrosion resulted. We are now in the process of developing detailed plans for removal of contaminants with chemical solutions. Prior to introducing the cleaning solutions into the ECS, the system will be placed in a vacuum to assure a complete fill with no remaining air pockets. Following the cleansing operation, the system will undergo a proof pressure test as a means of verifying integrity. The maximum operating pressure for the system under normal conditions is 60 psi. Regular glycol with an inhibitor will then be placed into the system to verify removal of contaminants and corrosion. A cold plate and ECS lines have been removed from the 103 spacecraft and NAA is continuing with work not related to the ECS. No significant impact on the delivery schedule is expected.</p>			

QUERY SHEET		DATE	TIME
SOURCE OF QUERY (NAME & AFFILIATION):			
All			
RECEIVED BY	SOURCE	ANSWERED DATE	TIME
Davis			
<p>QUERY</p> <p>Do the first and second stages of the Saturn V have engine out capability?</p>			
<p>RESPONSE</p> <p>Yes, theoretically, either stage could operate with one engine out.</p> <p>How successfully the stage would function, or whether the mission would flight abort, depends on altitudes and the amount of propellants consumed (thus reducing weight) when the engine out occurred.</p>			

QUERY SHEET		DATE	TIME
SOURCE OF QUERY (NAME & AFFILIATION): All			
RECEIVED BY Davis	SOURCE	ANSWERED DATE	TIME
QUERY What sound levels can be expected at Press Site 39 during the Apollo 6 launch?			
RESPONSE Based on information recorded during the Apollo 4 mission (liftoff) the sound pressure level at the 39 press site is determined to be between 122 and 128 db. The recordings indicated that the energy was in the low frequency range as expected.			

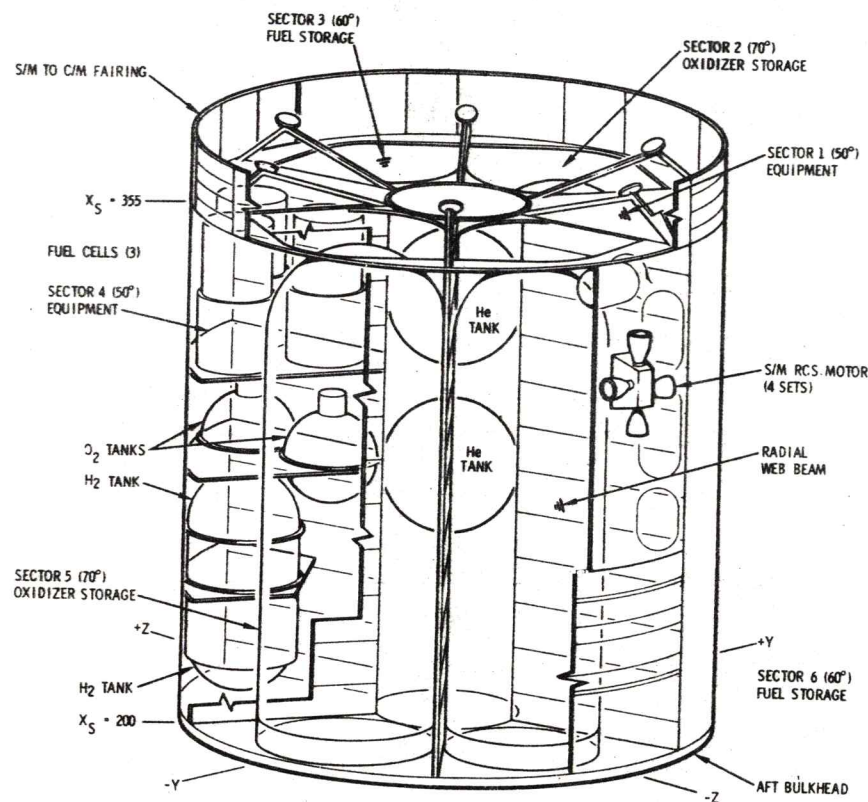
QUERY SHEET		DATE	TIME
SOURCE OF QUERY (NAME & AFFILIATION): All			
RECEIVED BY	SOURCE	ANSWERED DATE	TIME
QUERY How many civil servants on hand at KSC?			
RESPONSE 2,931 by year's end			

QUERY SHEET		DATE	TIME
SOURCE OF QUERY (NAME & AFFILIATION):		Nov. 6	
Doug Dederer - New York Times			
RECEIVED BY	SOURCE	ANSWERED DATE	TIME
Strickland-Grine-Ulf	Ulf-Rocketdyne	Nov. 6	
QUERY			
What is thrust of J-2 engine on S-IVB ?			
RESPONSE			
Variable--from 175,000lbs. to 225,000 lbs.			

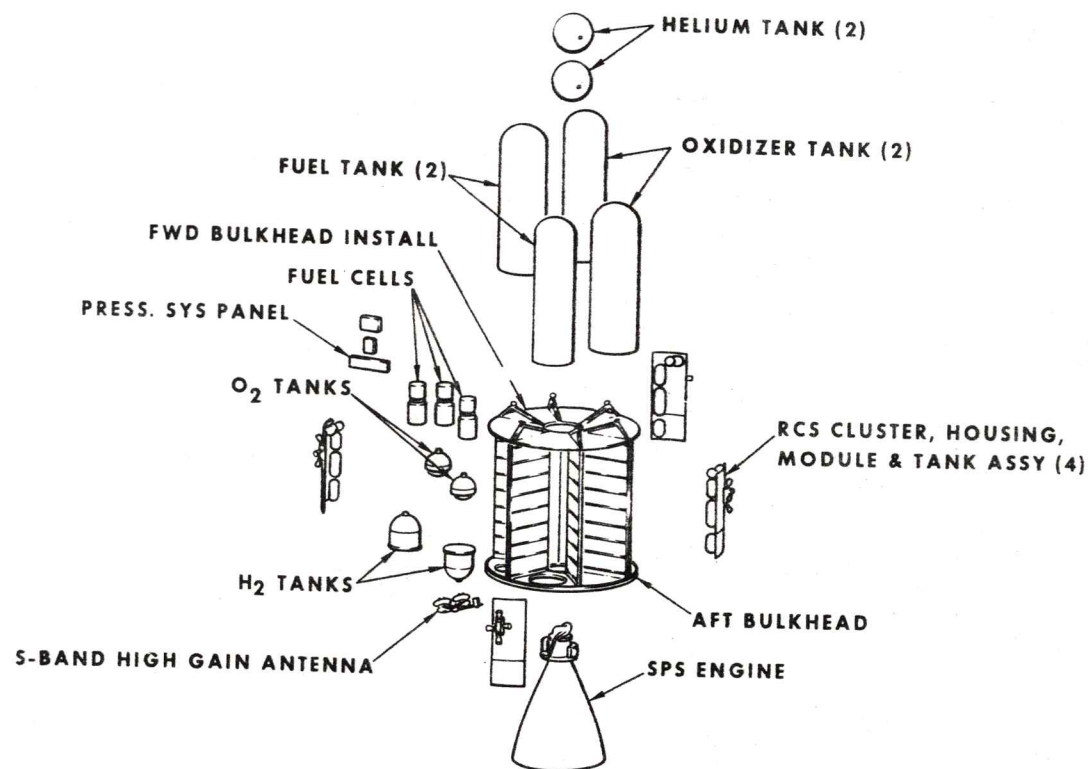
QUERY SHEET		DATE	TIME
		Nov. 6, 67	1200
SOURCE OF QUERY (NAME & AFFILIATION): Dick Lewis Chicago Sun Times			
RECEIVED BY	SOURCE	ANSWERED DATE	TIME
Hollinshead	(1) King (2) Davis	Nov. 6, 67	1205
QUERY (1) How many people involved in checkout & launch at KSC? (2) How many in control center at launch?			
RESPONSE (1) 5,000 (2) 450			

QUERY SHEET		DATE Jan. 11	TIME
SOURCE OF QUERY (NAME & AFFILIATION): Al Rossiter, UPI			
RECEIVED BY Davis	SOURCE	ANSWERED DATE Jan. 11	TIME
QUERY What are details on static firing of SM 102? When will it be fired? Why is it being fired? How long will it be fired? Will SM 101 also be static fired, when?			
RESPONSE SM 102 will be static fired Jan. 19. Three firings are scheduled, the first for a 10 second duration at 9 a.m., the last two for 60 seconds duration at 11 a.m. and 2 p.m. It is being test fired to check out the configuration of the SM 101 or first manned service module. A decision on static firing SM 101 has not been made pending results of the 102 test. Since both service modules are the same configuration, it would not be necessary to static fire 101 if no problems resulted from the 102 test.			

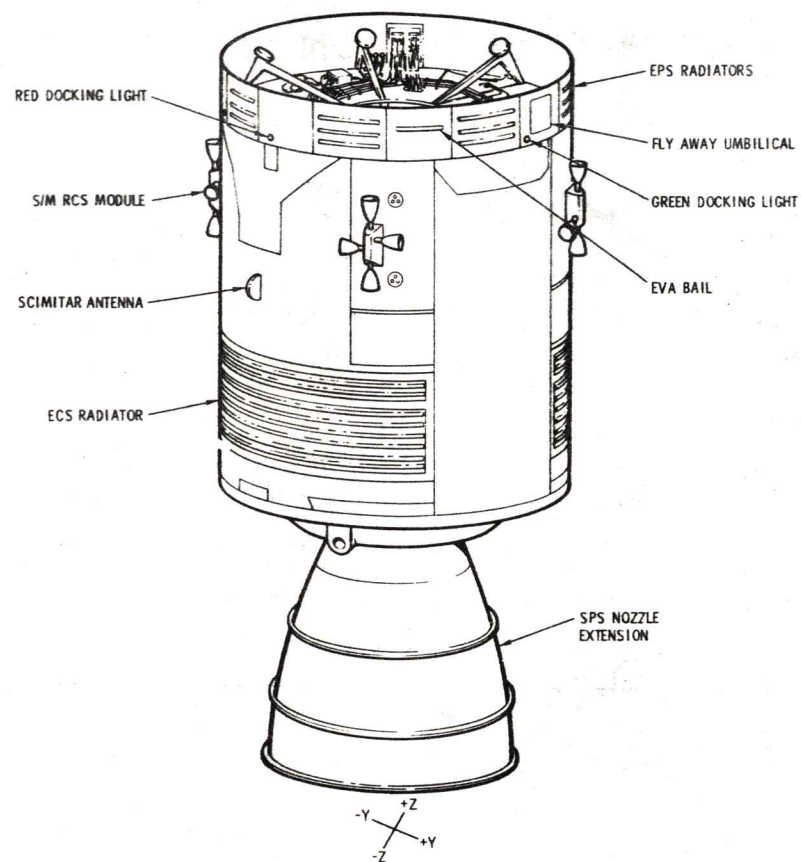
APOLLO S/M GENERAL CONFIGURATION BLOCK II



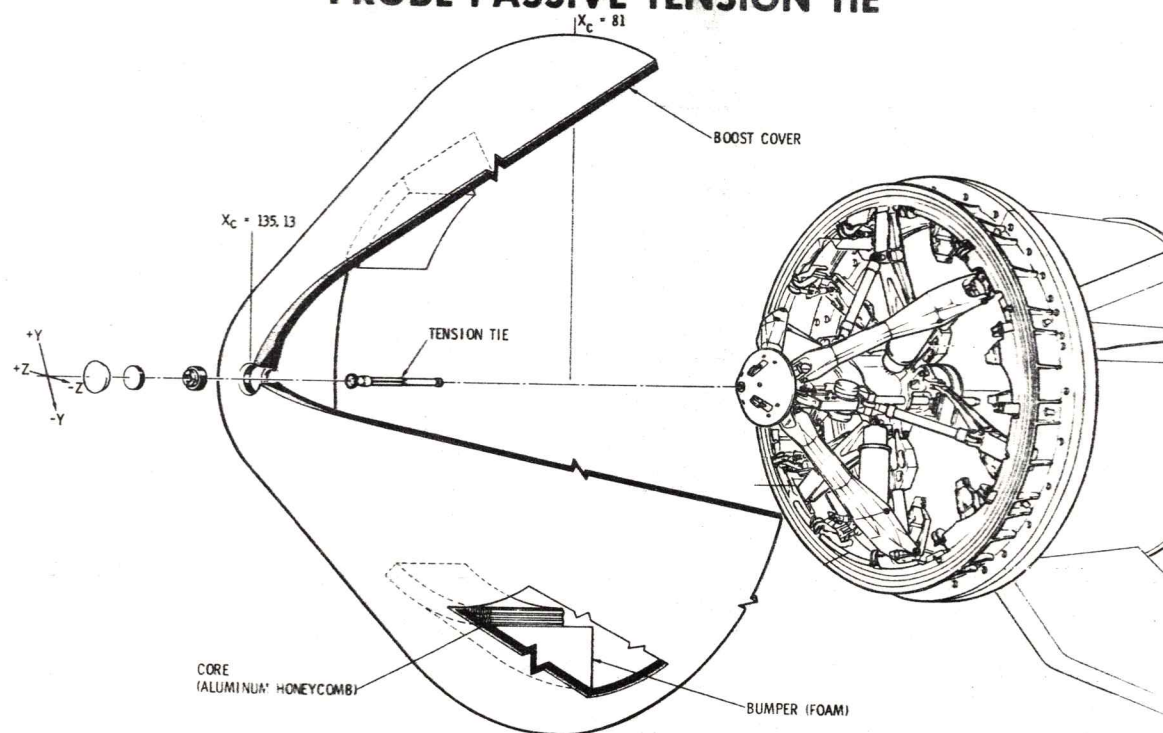
APOLLO SM SYSTEMS EQUIPMENT BLOCK II



SERVICE MODULE BLOCK II

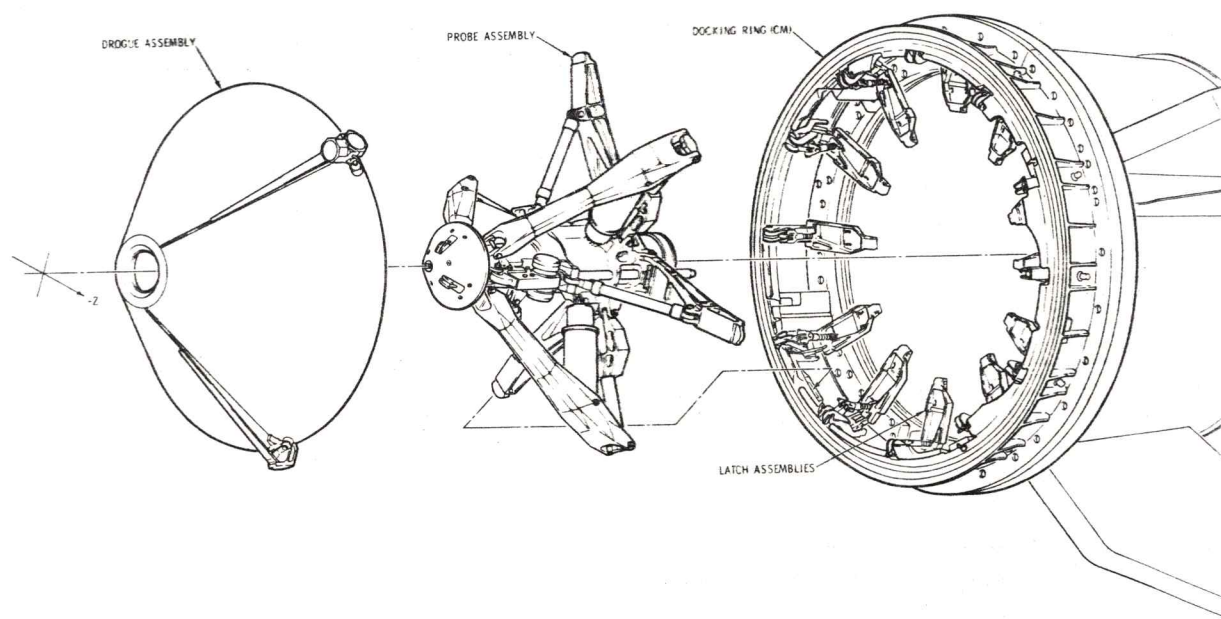


PROBE PASSIVE TENSION TIE

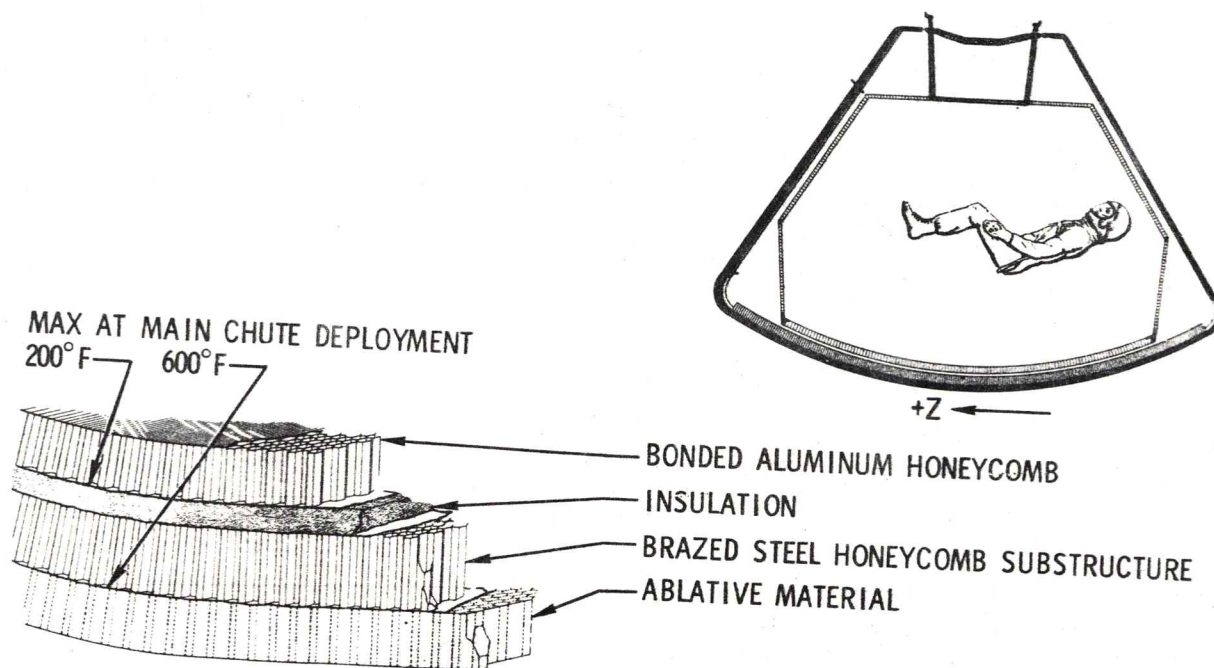


PROBE INSTALLATION-DOCKING SYSTEM

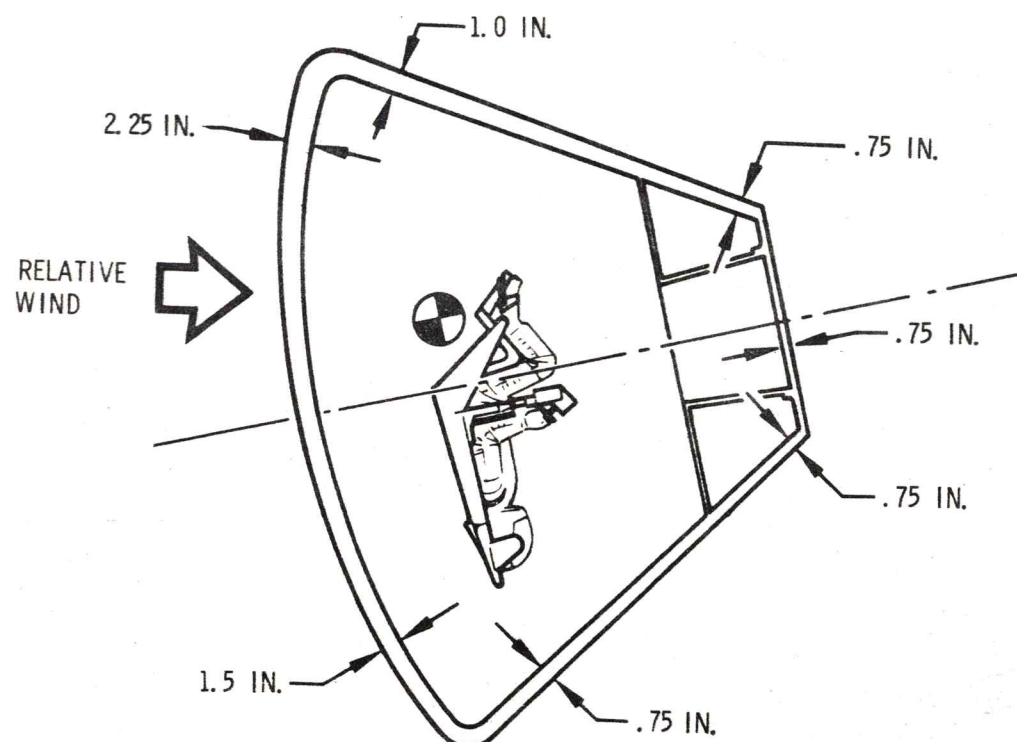
APPENDIX G



APOLLO SKIN CONFIGURATION

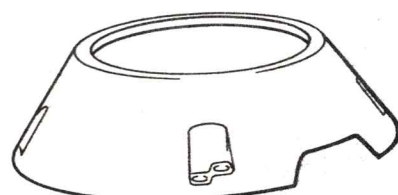


COMMAND MODULE ABLATIVE MATERIAL THICKNESS BLOCK II

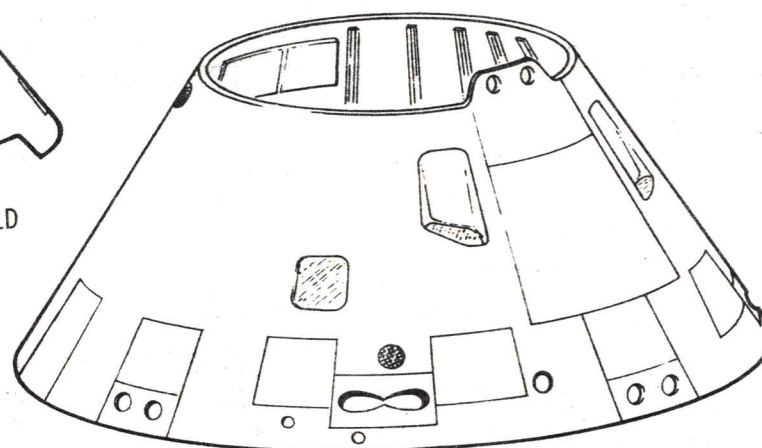


COMMAND MODULE HEAT SHIELDS

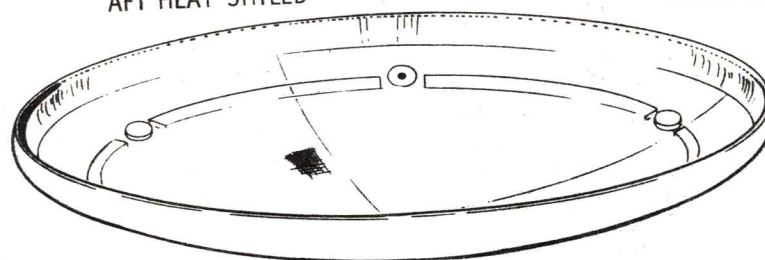
BLOCK II



FORWARD HEAT SHIELD

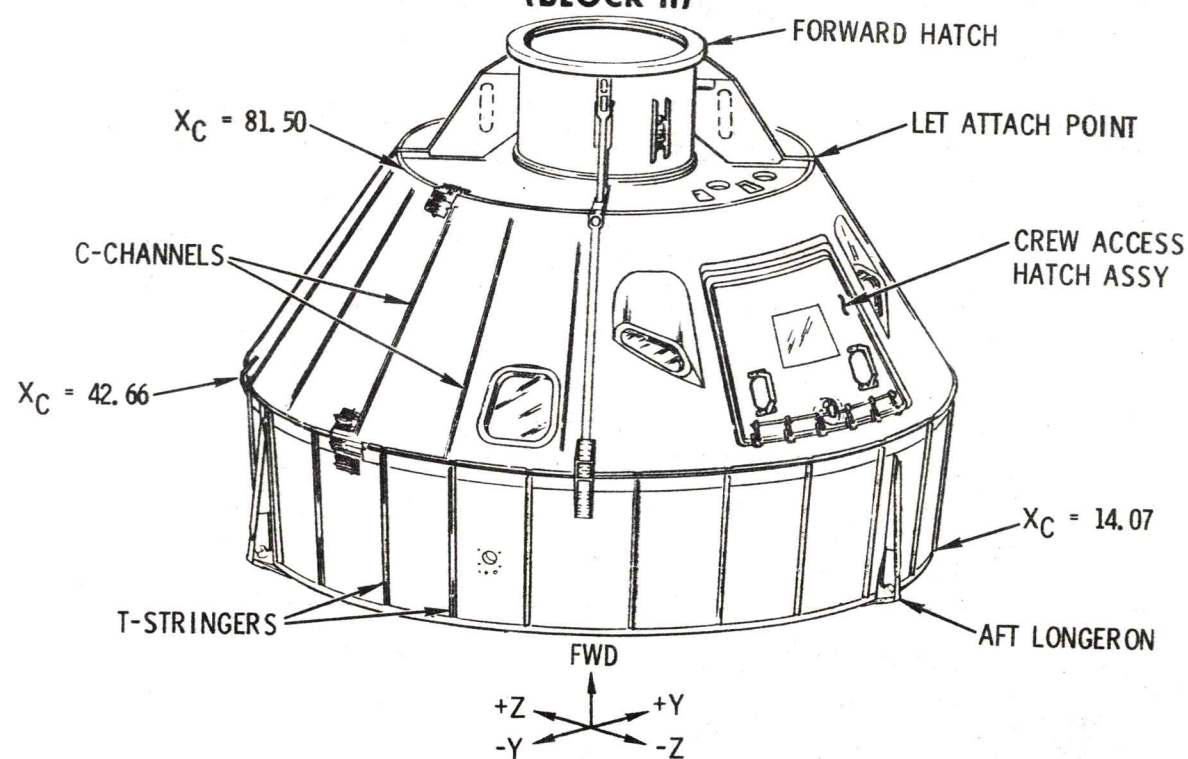


CREW COMPARTMENT
HEAT SHIELD

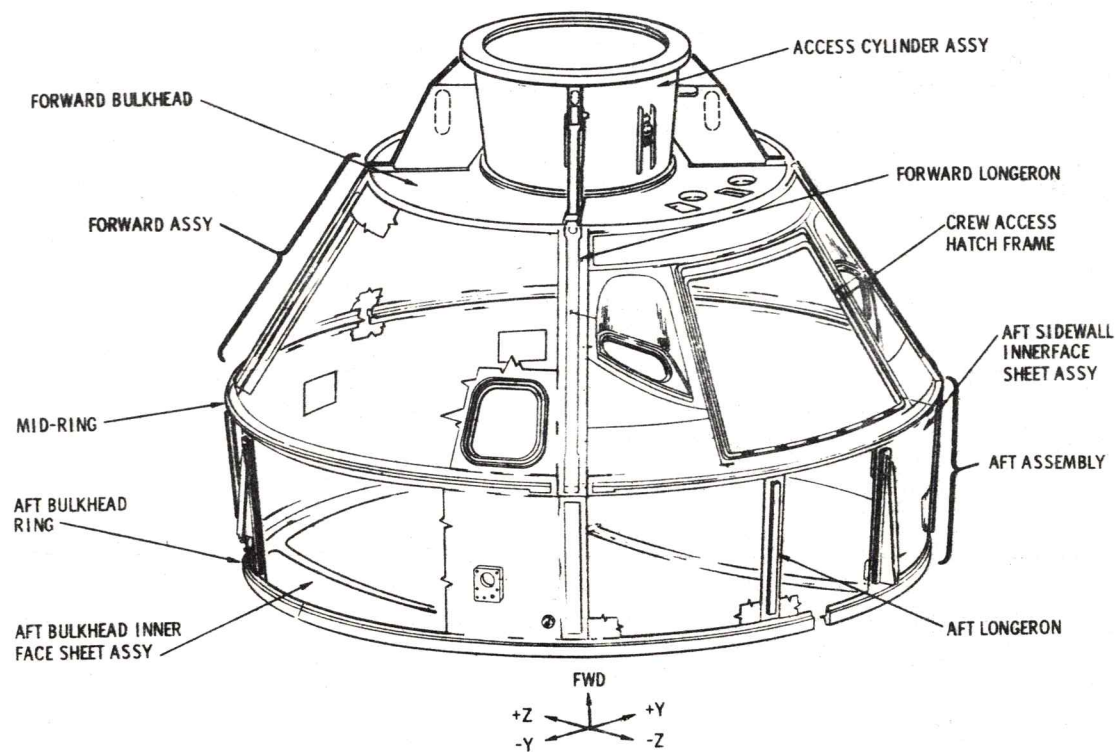


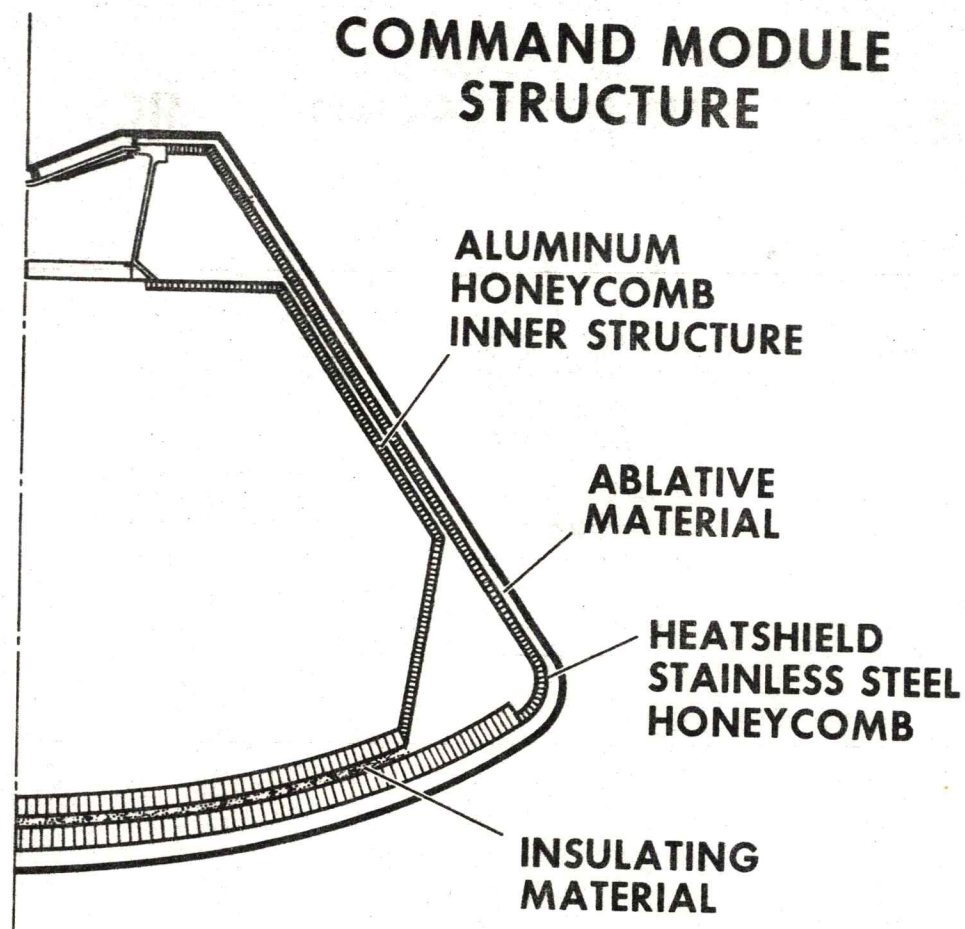
AFT HEAT SHIELD

COMMAND MODULE INNER STRUCTURE (BLOCK II)

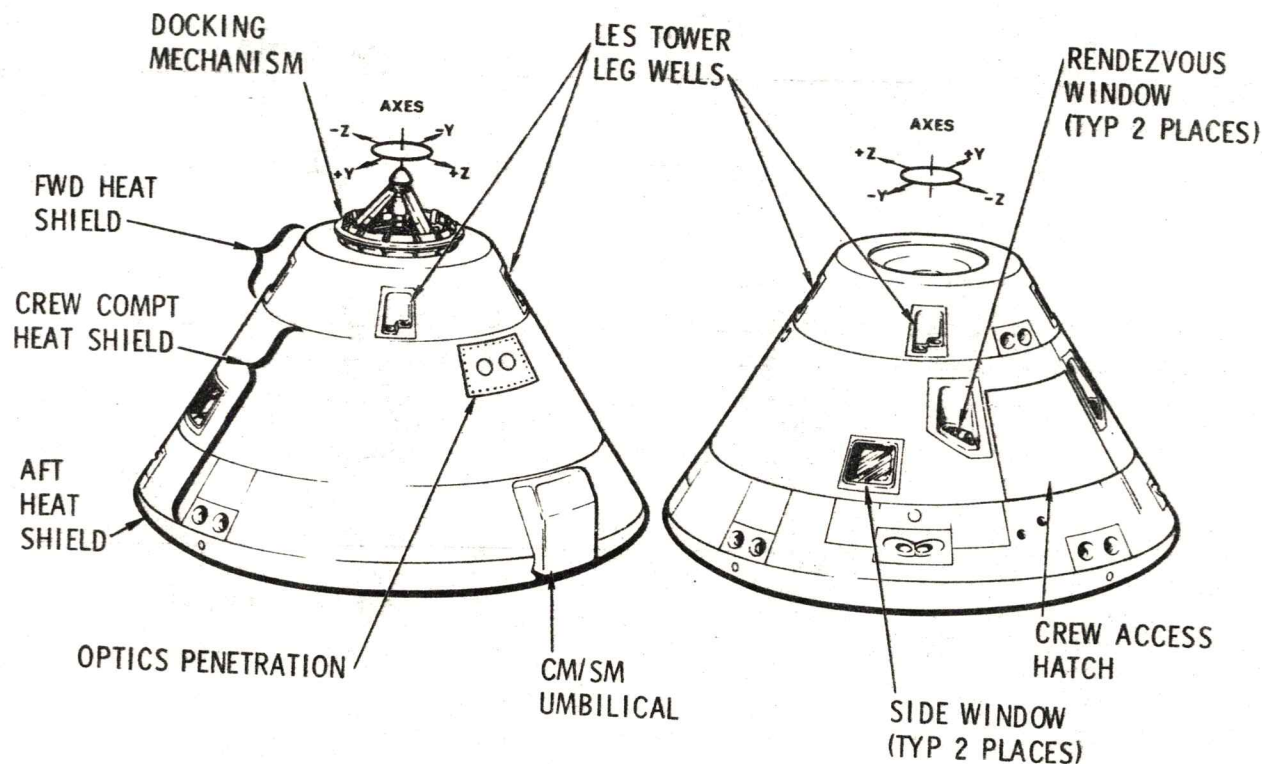


INNER STRUCTURE INNER SHELL (BLOCK II)

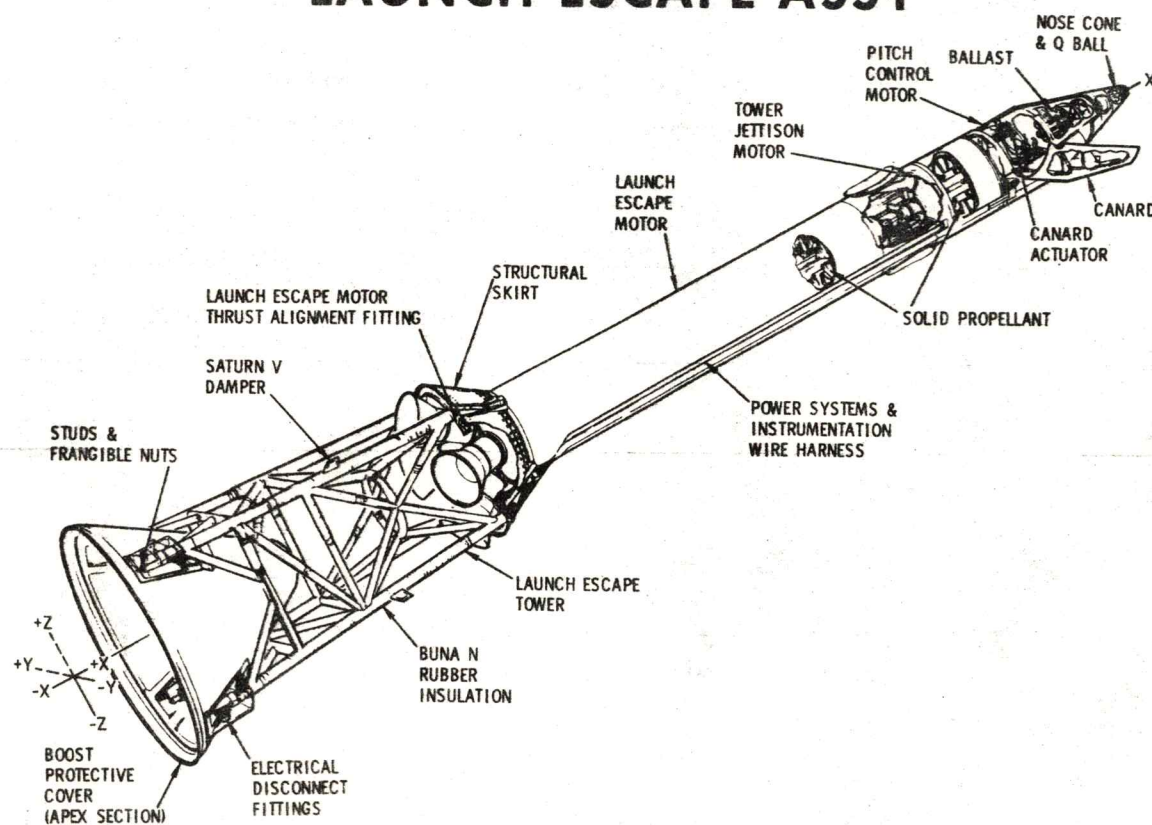




COMMAND MODULE EXTERIOR (BLOCK II)



LAUNCH ESCAPE ASSY



BOOST PROTECTIVE COVER

BLOCK II CSM

