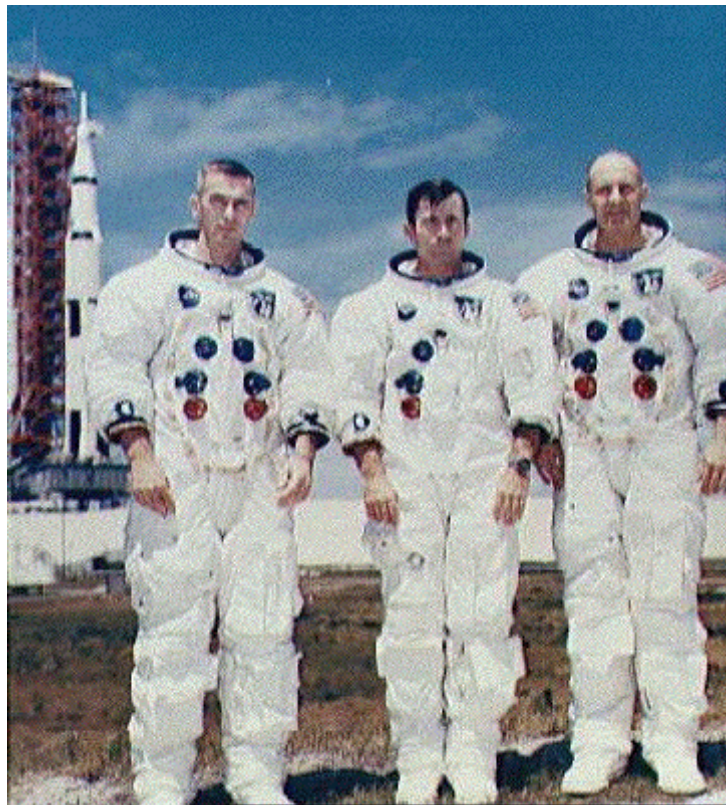


# The Apollo 10 Mission

Compiled by Daniel R. Adamo



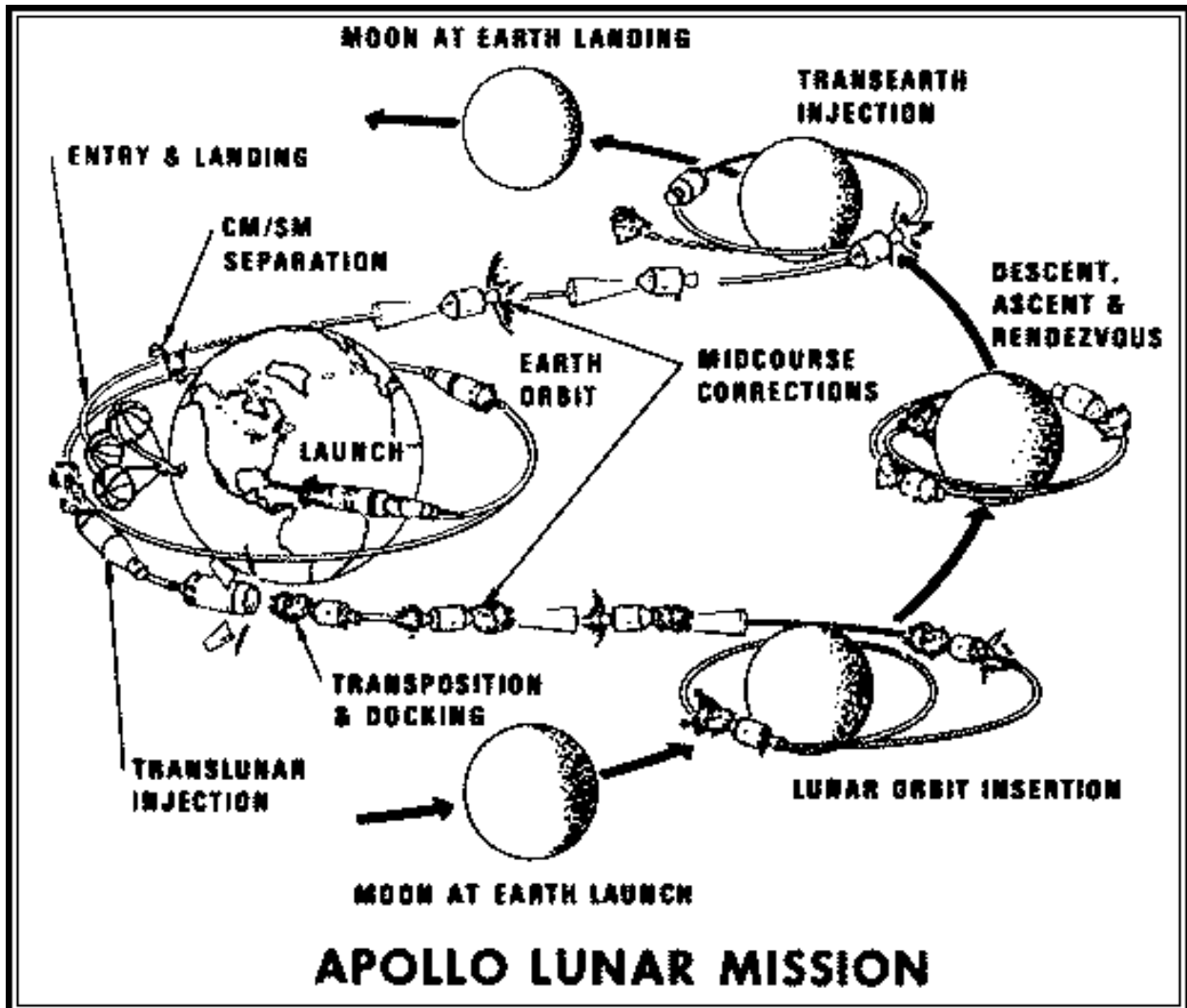
## Crew

Mission Commander Thomas Patten Stafford  
Command Module Pilot John Watts Young  
Lunar Module Pilot Eugene Andrew Cernan

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### Acknowledgements & Notes

- 1) All illustrations are published by NASA unless otherwise credited.
- 2) Supplemental information is obtained from Apollo By The Numbers, © 1996, Richard W. Orloff at URL  
<http://www.floridatoday.com/space/explore/manspace/apollo/orloff.htm>.
- 3) All distances are measured in statute miles (mi) units.
- 4) All speeds are measured in statute miles per hour (mph) units.
- 5) "Height" is distance from the earth's (assumed by default) or moon's center, minus the pertinent equatorial radius. "Altitude" is distance above an ellipsoid approximating earth's figure at mean sea level.
- 6) Apogee/perigee and apocynthion/pericyynthion are maximum/minimum heights with respect to the earth and moon, respectively.
- 7) "Speed" is magnitude of inertial velocity with respect to the earth's (assumed by default) or moon's center.
- 8) "Flight path angle" and "heading" pertain to inertial velocity referenced to true north in a local horizontal plane whose normal points from the earth's (assumed by default) or moon's center.

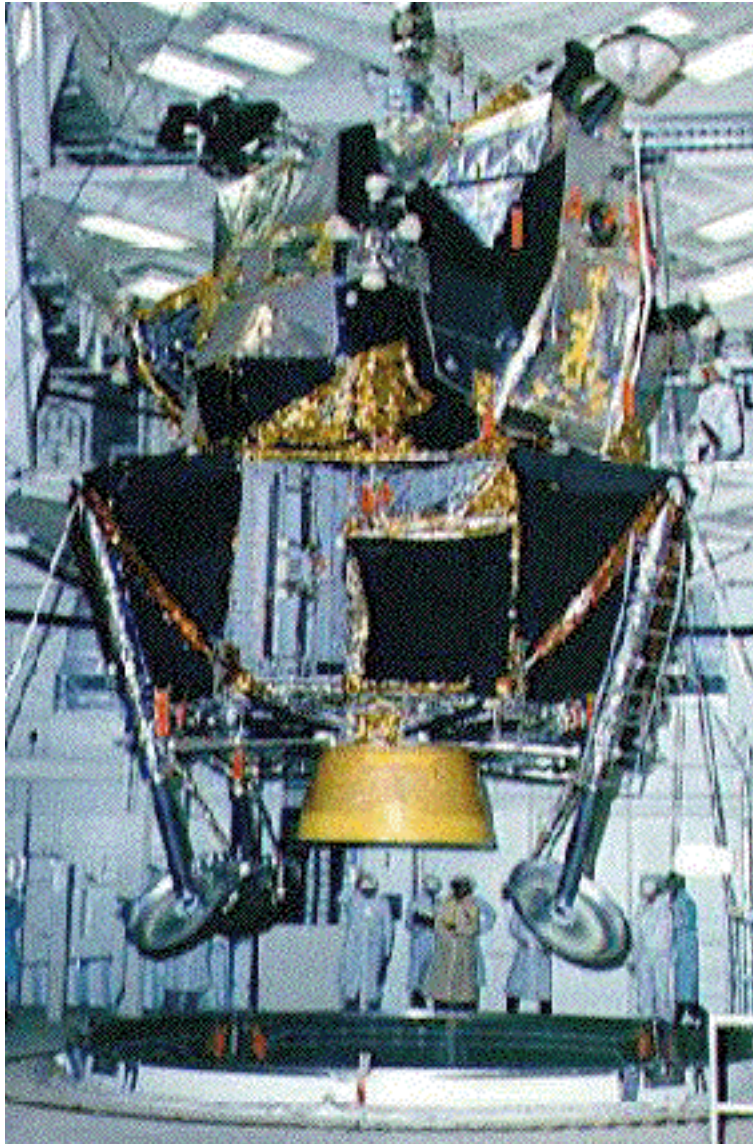


Apollo 10 Mission Summary

27 November 1968

Launch vehicle AS-505 begins arriving at KSC. Apollo 10 spacecraft are CSM-106 *Charlie Brown* and LM-4 *Snoopy*.

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**LM-4 Stowage in SLA on 13 January 1969**

**11 March 1969**

Launch vehicle and spacecraft are moved to LC-39B by MLP #3

**2 May 1969**

Saturn IC RP-1 kerosene fuel loading is completed.

**13 May 1969 EDT**

12:00 M      countdown begins.

**17 May 1969 EDT**

02:49 AM    T-028:00 final countdown begins.

03:19 AM    T-027:30 launch vehicle flight battery installation, together with LM stowage and cabin closeout, begin.

07:19 AM    T-023:30 launch vehicle flight battery installation is complete.

09:49 AM    T-021:00 LM super-critical helium top off begins.

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11:49 AM T-019:00 LM super-critical helium top off is complete.  
02:49 PM T-016:00 launch vehicle range safety checks begin.  
03:49 PM T-015:00 LM stowage and cabin closeout, together with launch vehicle range safety checks, are complete.  
07:19 PM T-011:30 installation of launch vehicle destruct devices, along with CSM pre-ingress operations, begin.  
08:04 PM T-010:45 launch vehicle destruct devices are installed.  
08:49 PM T-010:00 initiate mobile service structure move to its park site.  
09:49 PM T-009:00 6-hour built-in hold begins.

### 18 May 1969 EDT

03:49 AM T-009:00 clear LC-39B for launch vehicle propellant loading.  
04:19 AM T-008:30 backup crew arrives for prelaunch spacecraft checks.  
04:34 AM T-008:15 launch vehicle cryogenic propellant loading begins.  
07:49 AM T-005:00 crew wake-up.  
08:04 AM T-004:45 crew medical examination begins.  
08:34 AM T-004:15 crew breakfast begins.  
08:47 AM T-004:02 based on 0.25 measured winds, 18 May's launch window is closed by Range Safety at an azimuth of 95.99°. This equates to a latest permissible launch time of 4:21 PM EDT.  
09:04 AM T-003:45 crew begins donning space suits.  
09:11 AM T-003:38 launch vehicle cryogenic propellant loading is complete.  
09:19 AM T-003:30 crew departs Manned Spacecraft Operations Building.  
09:35 AM T-003:14 crew arrives at LC-39B.  
10:09 AM T-002:40 crew starts CM ingress.  
10:54 AM T-001:55 MCC performs spacecraft command checks.  
10:59 AM T-001:50 abort advisory system checks are conducted.  
11:03 AM T-001:46 Emergency Detection System test is performed.  
11:49 AM T-001:00 final systems check begins.  
12:06 PM T-000:43 Apollo access arm is retracted to its standby position at 12°.  
12:07 PM T-000:42 LES is armed.  
12:09 PM T-000:40 final launch vehicle range safety checks begin.  
12:14 PM T-000:35 final launch vehicle range safety checks are complete.  
12:19 PM T-000:30 launch vehicle power transfer test is performed, and LM is placed on internal power.  
12:29 PM T-000:20 LM operational instrumentation shutdown begins.  
12:34 PM T-000:15 spacecraft is placed on internal power.  
12:39 PM T-000:10 LM operational instrumentation shutdown is complete.  
12:43 PM T-000:06 final status checks are performed.  
12:43:30 PM T-000:05:30 destruct system is armed.  
12:44 PM T-000:05 Apollo access arm is fully retracted.  
12:45:50 PM T-000:03:10 Launch Director activates the automatic sequencer.  
12:47 PM T-000:02 launch vehicle propellant tanks begin pressurization.  
12:48:10 PM T-000:00:50 launch vehicle is placed on internal power.  
12:48:43 PM T-000:00:17 LC-39B swing arms are retracted.  
T-000:00:16.978 spacecraft is placed on internal guidance.  
12:48:51 PM T-000:00:08.9 ignition sequence begins.

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12:48:54 PM T-000:00:06.4 Saturn IC inboard engine ignition.

12:48:58 PM T-000:00:01.6 all 5 Saturn IC engines running at full thrust.

12:49:00 PM T-000:00:00.25 weight = 6412918 lbs. Hold-down arms are released.  
T+000:00:00.58 latitude 28.4658° N, longitude = 80.6209° W, altitude = 0.040 mi, flight path angle = 0.06°, heading = 90°, speed = 913.9 mph. Soft release mechanism is deactivated. Saturn V liftoff.

12:49:01 PM T+000:00:01.6 tower clearance yaw maneuver is initiated.

12:49:10 PM T+000:00:10.0 tower clearance yaw maneuver is completed.

12:49:13 PM T+000:00:13.05 Saturn IC engines clear LC-39B tower. Control is switched from KSC to MSC. Launch vehicle begins pitch maneuver and roll from 90° azimuth.

12:49:32 PM T+000:00:32.3 launch vehicle attains flight azimuth = 72.03°. Roll maneuver complete.

12:50:06 PM T+000:01:06.8 altitude = 4.884 mi, range = 1.193 mi, speed = 1383.1 mph. Launch vehicle attains local sonic speed.

12:50:22 PM T+000:01:22.6 altitude = 8.213 mi, range = 3.329 mi, speed = 1804.0 mph. Maximum dynamic pressure = 694.232 lbs/ft<sup>2</sup>.

12:51:15 PM T+000:02:15.16 altitude = 26.963 mi, range = 28.780 mi, speed = 4413.55 mph, weight = 2434985 lbs. Saturn IC center engine shutdown.

12:51:38 PM T+000:02:38.7 pitch maneuver complete.

12:51:41 PM T+000:02:41.63 altitude = 40.562 mi, range = 58.021 mi, speed = 6155.85 mph, weight = 1842997 lbs. Saturn IC outboard engines shutdown.

12:51:42 PM T+000:02:42.31 altitude = 40.945 mi, range = 58.946 mi, speed = 6172.36 mph, weight = 1465702 lbs. Saturn IC jettison.

12:51:44 PM T+000:02:44.05 weight = 1465123 lbs. Saturn II ignition.

12:52:12 PM T+000:03:12.3 altitude = 56 mi, speed = 6423 mph. Saturn II aft interstage jettison.

12:52:17 PM T+000:03:17.8 altitude = 59 mi, speed = 6493 mph. LES jettison.

12:52:22 PM T+000:03:22.9 altitude = 61 mi, speed = 6561 mph. Initiate IGM.

12:53:26 PM T+000:04:26.87 maximum Saturn IC altitude.

12:56:40 PM T+000:07:40.61 altitude = 111.292 mi, range = 689.408 mi, speed = 12702.38 mph, weight = 644128 lbs. Saturn II center engine shutdown.

12:57:59 PM T+000:08:59.12 latitude = 30.188° N, longitude = 74.207° W, distance downrange = 401.39 mi. Estimated Saturn IC splashdown.

12:58:12 PM T+000:09:12.64 altitude = 116.463 mi, range = 1016.909 mi, speed = 15430.92 mph, weight = 471494 lbs. Saturn II outboard engines shutdown.

12:58:13 PM T+000:09:13.50 altitude = 116.513 mi, range = 1020.320 mi, speed = 15436.32 mph, weight = 364429 lbs. Saturn II jettison.

12:58:16 PM T+000:09:16.81 weight = 364343 lbs. Saturn IVB ignition.

12:58:25 PM T+000:09:25.4 Saturn IVB ullage case jettison.

12:58:57 PM T+000:09:57.21 maximum Saturn II altitude.

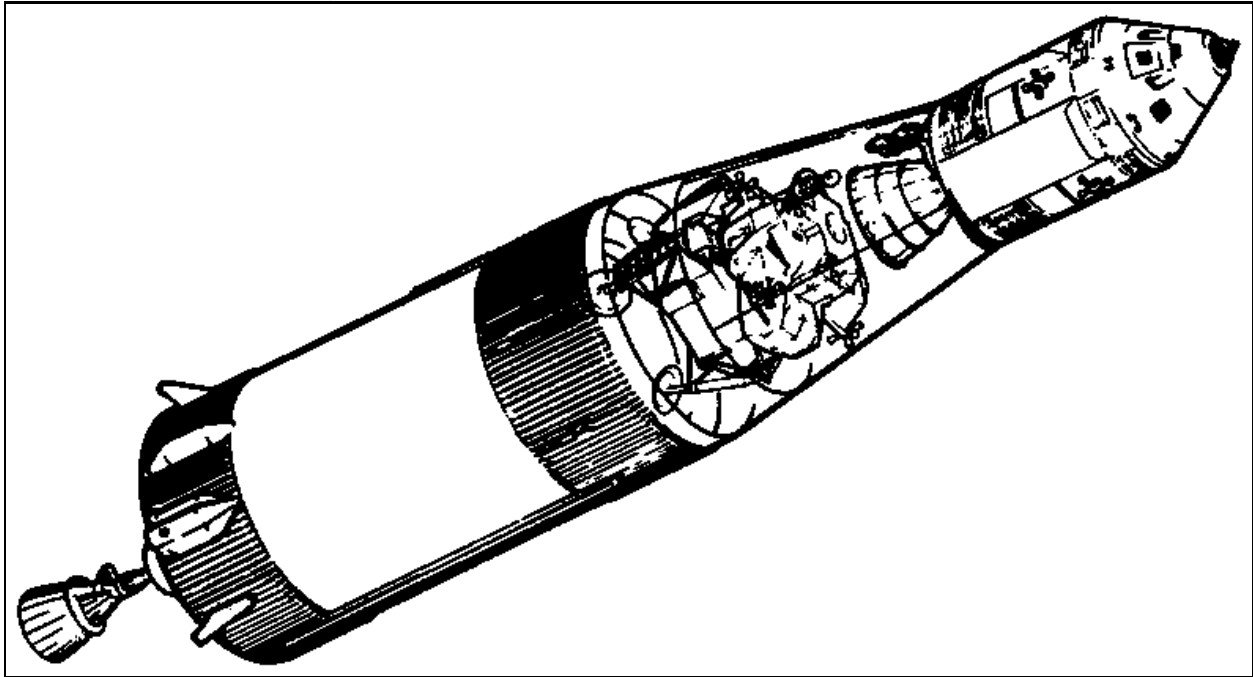
01:00:43 PM T+000:11:43.76 altitude = 118.973 mi, range = 1646.739 mi, speed = 17428.91 mph, weight = 295153 lbs. Saturn IVB shutdown.

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01:00:53 PM T+000:11:53.76 latitude = 32.5303° N, longitude = 52.5360° W, altitude = 118.915 mi, range = 1691.404 mi, flight path angle = -0.0049°, heading = 89.933°, speed = 17432.65 mph, weight = 295008 lbs, apogee = 115.45 mi, perigee = 114.74 mi, period = 88.20 min. Earth parking orbit insertion at 32.546° inclination.

01:01:04 PM T+000:12:04.1 maneuver to local horizontal attitude is initiated.

01:09:17 PM T+000:20:17.89 latitude = 31.522° N, longitude = 34.512° W, distance downrange = 2749.55 mi. Estimated Saturn II splashdown.



### Saturn IVB and Apollo Spacecraft In Earth Parking Orbit

03:22:27 PM T+002:33:27.52 speed = 17428.2 mph. Saturn IVB ignition over Australia for a 5 min 43.06 sec TLI burn.

03:28:10 PM T+002:39:10.58 speed = 24263.07 mph, inclination = 31.710°. Saturn IVB shutdown.

03:28:20 PM T+002:39:20.58 height = 207.048 mi, flight path angle = 7.379°, heading = 61.065°, speed = 24247.47 mph. TLI into an earth free-return trajectory with pericyynthion near 69 mi. Earth splashdown at latitude = 24.9° S, longitude = 84.3° E would occur about 06:37 PM EDT on 24 May with only SM RCS burns if the free-return option is exercised.

03:28:29 PM T+002:39:29.6 Saturn IVB initiates LVLH attitude hold.

03:43 PM T+002:54 Saturn IVB maneuvers to spacecraft separation attitude.

03:51:42 PM T+003:02:42.4 height = 4030.750 mi, speed = 17419.58 mph. CSM separates from the SLA at 1 mph relative speed with 3.3-sec RCS burn.

03:53 PM T+003:04 CSM begins pitch maneuver to docking attitude.

03:55:00 PM T+003:06:00 height = 4120 mi. 22-min telecast from CM begins.

04:06:36 PM T+003:17:36.0 CSM docks with LM.

04:45:00 PM T+003:56:00 13 min 25 sec telecast from CM begins.

04:45:25 PM T+003:56:25.7 docked spacecraft is ejected from Saturn IVB at 1 mph.

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- 05:28:09 PM T+004:39:09.8 height = 20643.3 mi, speed = 9695.6 mph. SPS ignition for a 2.9-sec in-plane evasive burn, imparting  $V = 12.78$  mph and placing the spacecraft a safe distance from the Saturn IVB when it performs its propellant dump to target lunar gravity assist into solar orbit. Height after burn = 20650.4 mi, flight path angle =  $65.1^\circ$ , heading =  $91.22^\circ$ , speed = 9684.3 mph.
- 05:31:15 PM T+004:42:15.8 Saturn IVB initiates maneuver to propellant dump attitude.
- 05:34:36 PM T+004:45:36.4 Saturn IVB APS initiates a 4 min 40.6 sec propellant dump.
- 05:43:15 PM T+004:54:15.79 Saturn IVB initiates a 5 min 0.21 sec LOX dump.
- 05:55:34 PM T+005:06:34 height = 22781 mi. 13 min 15 sec telecast from CM begins.
- 06:17:55 PM T+005:28:55.8 Saturn IVB APS initiates a 9.1-sec propellant dump. Weight following dump = 31000 lbs.
- 07:24 PM T+006:35 MCC updates CSM weight = 63308 lbs, LM weight = 30719 lbs.
- 08:00:27 PM T+007:11:27 24-min telecast from CM begins.
- 08:29 PM T+007:40 CSM water dump is initiated.
- 11:59 PM T+011:10 GDS Saturn IVB LOS due to battery power depletion.

### 19 May 1969 EDT

- 02:44 AM T+013:55 height = 76882 mi. Assuming no further burns, MCC predicts pericyynthion = 331 mi at 076:40:03 GET.
- 10:46 AM T+021:57 MCC updates CSM weight = 63153 lbs.
- 12:18 PM T+023:29 8-min CSM water dump is initiated.
- 03:21:56 PM T+026:32:56.8 height = 126758.6 mi, speed = 3473.5 mph. SPS ignition for a 7.09-sec MCC-2 burn, imparting  $V = 33.5$  mph. Height after burn = 126765.1 mi, flight path angle =  $77.8^\circ$ , heading =  $108.92^\circ$ , speed = 3484.1 mph, weight = 93419 lbs.
- 03:49:48 PM T+027:00:48 27 min 43 sec telecast from CM begins.
- 04:34 PM T+027:45 MCC updates SPS model with thrust = 21360 lbs, flow rate = 67.83 lbs/sec.

### 20 May 1969 EDT

- 09:25 AM T+044:36 MCC updates CSM weight = 62548 lbs.
- 09:39:00 AM T+044:50:00 height = 180202 mi, speed = 2589.6 mph.
- 11:50 AM T+047:01 assuming no further burns, MCC predicts pericyynthion = 71.1 mi at 076:00:13 GET.
- 12:09 PM T+047:20 crew sights the Saturn IVB at a range from CSM = 3500 mi.
- 12:49:51 PM T+048:00:51 height = 188700 mi, speed = 2618 mph. Recorded 14 min 39 sec telecast from CM begins.
- 01:13:00 PM T+048:24:00 recorded 3 min 51 sec telecast from CM begins.
- 02:43:00 PM T+049:54:00 4 min 49 sec telecast from CM begins.
- 04:11:05 PM T+051:22:05 height = 196118.3 mi, speed = 2383 mph.



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- 04:29 PM T+051:40 at LOI SPS shutdown, MCC predicts pericyynthion will be at lunar longitude 160° E with the spacecraft 15° uprange of pericynthion. At that time, the earth antipode will lie at lunar longitude 176° E.
- 05:04 PM T+052:15 CSM initiates 12 min 40 sec water dump.
- 06:24:30 PM T+053:35:30 height = 201000 mi, speed = 2300 mph. 25-min telecast from CM begins.
- 07:49 PM T+055:00 MCC computes a  $V = 8.9$  mph is required to hit the free return reentry corridor from the current trajectory.
- 10:49 PM T+058:00 height = 211000 mi.

### 21 May 1969 EDT

- 02:39:49 AM T+061:50:49 height = 219264 mi, speed = 2127 mph, lunar height = 38919 mi, speed = 2588 mph. Spacecraft enters lunar gravitation sphere of influence.
- 03:49 AM T+063:00 height = 222000 mi.
- 08:49 AM T+068:00 height = 232000 mi.
- 12:49:00 PM T+072:00:00 lunar height = 11948.7 mi, speed = 2865.0 mph, pericynthion = 79.0 mi, CSM weight = 62554 lbs, LM weight = 30727 lbs.
- 01:26:26 PM T+072:37:26 17 min 16 sec telecast from CM begins.
- 01:43:40 PM T+072:54:40 spacecraft sunset.
- 03:39:11 PM T+074:50:11 spacecraft sunrise.
- 04:37:41 PM T+075:48:41 first lunar occultation LOS.
- 04:44:54 PM T+075:55:54.0 height = 248224 mi, lunar height = 109.4 mi, speed = 5612.9 mph. SPS ignition for a 5 min 56.1 sec LOI-1 burn, imparting  $V = 2033.5$  mph. Lunar height after LOI-1 = 70.4 mi, speed = 3730.8 mph, apocynthion = 195.6 mi, pericynthion = 69.3 mi.
- 05:11:49 PM T+076:22:49 first lunar occultation AOS.
- 06:09:00 PM T+077:20:00 lunar height = 192.2 mi, speed = 3377.9 mph. CSM weight = 38650 lbs.
- 07:43:04 PM T+078:54:04 lunar latitude = 1.58 N, longitude = 65.45 E, height = 2016 mi. Saturn IVB pericynthion. Resulting aphelion = 94.55 million mi, perihelion = 84.39 million mi.
- 09:14:08 PM T+080:25:08.1 lunar height = 69.5 mi, speed = 3739.6 mph. SPS ignition for a 13.9-sec LOI-2 burn, imparting  $V = 94.8$  mph. Apocynthion after LOI-2 = 70.2 mi, pericynthion = 68.1 mi.
- 09:33:40 PM T+080:44:40 29 min 9 sec telecast from CM begins.
- 10:19 PM T+081:30 LM cabin is pressurized.
- 10:34 PM T+081:45 Cernan enters LM for a 2-hour checkout.
- 11:01 PM T+082:12 MCC updates CSM weight = 37624 lbs.

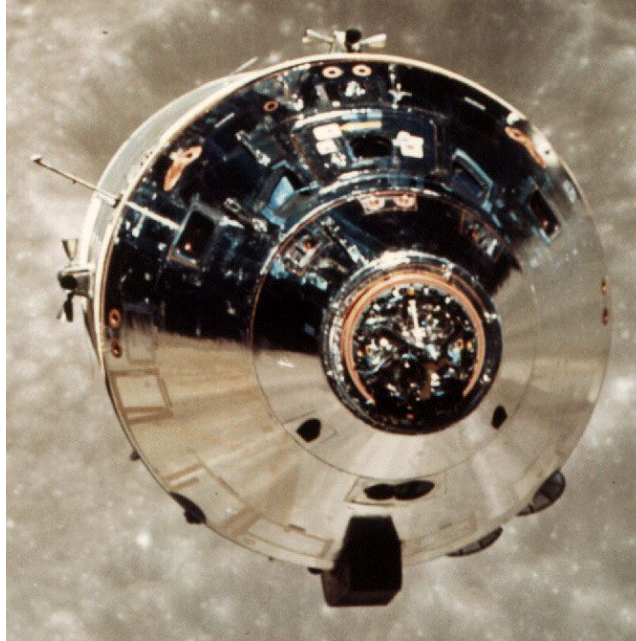
### 22 May 1969 EDT

- 09:59 AM T+093:10 MCC updates CSM weight = 36688 lbs, LM weight = 31117 lbs.
- 11:51 AM T+095:02 Stafford and Cernan enter LM.
- 02:49 PM T+098:00 LM landing gear are deployed.

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03:00:57 PM T+098:11:57 lunar height = 66.9 mi, speed = 3653.0 mph, apocynthion = 72.4 mi, pericynthion = 66.4 mi. LM undocks from CSM.

03:18:20 PM T+098:29:20 20 min 10 sec telecast from CM begins.



### **CSM *Charlie Brown* Prior to Separation From LM *Snoopy* (Note LM Reflection at 10-O'clock Near CM Apex)**

03:36:17 PM T+098:47:17.4 lunar height = 68.1 mi, speed = 3649.2 mph, range from LM = 30 ft. CSM 8.3-sec RCS burn establishes initial 1.7 mph radial down motion with respect to LM. Height after burn = 68.1 mi, speed = 3649.2 mph, apocynthion = 72.4 mi, pericynthion = 66.4 mi.

04:35:01 PM T+099:46:01.6 lunar height = 70.9 mi, speed = 3640.6 mph, range to CSM = 2 mi. LM DPS ignition for a 27.4-sec DOI burn. A retrograde  $V = 48.6$  mph is achieved by throttling at 10% for 15 sec and 40% for 12.4 sec. Apocynthion after burn = 70.1 mi, pericynthion = 9.8 mi. Pericynthion is located  $15^\circ$  uprange of Apollo Landing Site 2 (lunar latitude =  $0.7^\circ$  N, longitude =  $23.7^\circ$  E).

05:25 PM T+100:36 MCC updates LM weight = 30891 lbs.

05:30:43 PM T+100:41:43 speed = 3800 mph. LM pericynthion = 47400 ft (8.98 mi) is recorded.

05:47:25 PM T+100:58:25.93 lunar height = 20.4 mi, speed = 3758.5 mph. LM DPS ignition for a 39.95-sec phasing burn. A posigrade  $V = 120$  mph is achieved by throttling at 10% for 26 sec and 100% for 13.95 sec. Height after burn = 21.9 mi, speed = 3867.9 mph, apocynthion = 218.8 mi, pericynthion = 13.9 mi.

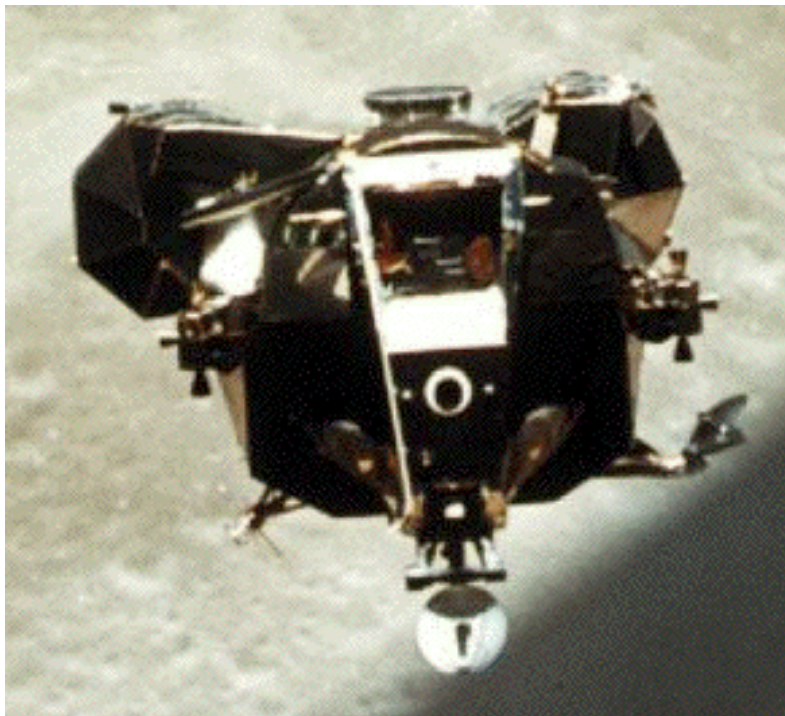
07:33:49 PM T+102:44:49 inadvertent LM AGS mode to AUTO (vice the intended ATTITUDE HOLD mode) triggers start of a slow yaw maneuver to acquire the CSM via rendezvous radar.

07:34:12 PM T+102:45:12 LM AGS initiates rapid roll, together with smaller pitch and yaw rates, under AUTO mode.

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- 07:34:16 PM T+102:45:16.9 lunar height = 36.1 mi speed = 3822.0 mph. LM descent stage jettison and ascent stage separation. Stafford assumes LM manual attitude control and stabilizes rates in 8 sec.
- 07:44:02 PM T+102:55:02.13 lunar height = 13.3 mi, speed = 3889.9 mph. LM APS ignition for a 15.55-sec ascent insertion simulation burn. A retrograde  $V = 150.6$  mph is achieved. Height after burn = 13.5 mi, speed = 3764.0 mph, apocynthion = 53.5 mi, pericynthion = 12.7 mi.
- 07:51 PM T+103:02 MCC updates LM weight = 8051 lbs.
- 08:20 PM T+103:31 CSM/LM range = 188 mi.
- 08:34:55 PM T+103:45:55.3 lunar height = 51.4 mi, speed = 3637.8 mph. LM RCS ignition interconnected to APS for a 27.3-sec, 30.9 mph posigrade CSI burn. Height after burn = 51.3 mi, speed = 3669.3 mph, apocynthion = 56.0 mi, pericynthion = 46.8 mi.
- 09:32:53 PM T+104:43:53.28 lunar height = 51.0 mi, speed = 3678.2 mph. LM RCS ignition for a 1.65-sec, 2.0 mph posigrade CDH burn. Speed after burn = 3678.3 mph, apocynthion = 56.2 mi, pericynthion = 48.4 mi.
- 10:03 PM T+105:14 CSM/LM range = 48 mi. Young reports seeing LM flashing beacon.
- 10:11:55 PM T+105:22:55.58 lunar height = 55.7 mi, speed = 3660.8 mph, CSM elevation angle =  $+26.6^\circ$ . LM RCS ignition for a 16.50-sec, 16.4 mph TPI burn thrusting along the CSM line-of-sight. Speed after burn = 3679.6 mph, apocynthion after burn = 67.1 mi, pericynthion = 53.9 mi.
- 10:24 PM T+105:35 MCC updates LM weight = 7544 lbs.
- 10:26:56 PM T+105:37:56 LM MCC-1 burn achieves  $V = 0.87$  mph.
- 10:19 PM T+105:30 MCC updates LM weight = 7488 lbs.
- 10:41:56 PM T+105:52:56 LM MCC-2 burn achieves  $V = 1.25$  mph.
- 10:54:49 PM T+106:05:49 LM braking burn achieves  $V = 21.5$  mph. Apocynthion after burn = 72.8 mi, pericynthion = 64.9 mi.

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### **LM Snoopy Prior to Docking with CSM Charlie Brown**

11:11:02 PM T+106:22:02 lunar height = 62.9 mi, speed = 3658.6 mph. LM soft docks with CSM.

11:11:15 PM T+106:22:15 LM hard docks with CSM.

11:31 PM T+106:42 Stafford and Cernan enter the CM.

### **23 May 1969 EDT**

01:13:36 AM T+108:24:36 CSM jettisons LM.

01:32:23 AM T+108:43:23.3 lunar height = 65.9 mi, speed = 3649.3 mph. CSM RCS ignition for a 6.5-sec, 1.4 mph radial down separation burn. Speed after burn = 3649.2 mph, apocynthion = 73.6 mi, pericynthion = 64.8 mi.

01:34 AM T+108:45 MCC updates CSM weight = 36818 lbs.

01:41:05 AM T+108:52:05.5 lunar height = 68.0 mi, speed = 3643.0 mph. APS ignition for a 4 min 9 sec, 3136.4 mph posigrade depletion burn over the moon's nearside, placing the LM ascent stage in solar orbit. Height after burn = 103.2 mi, speed = 6174.8 mph, pericynthion = 64.7 mi, weight = 4744 lbs.

07:59:00 AM T+115:10:00 LM RCS ignition for a 32-sec, 27.5 fps burn.

12:06:25 PM T+119:17:25 LM longitude = 30° E, height = 266000 mi, flight path angle = 27°, speed = 5585 mph, lunar longitude = 127° W, height = 38919 mi, flight path angle = 87°, speed = 3665 mph.

12:49 PM T+120:00 LM communications terminate following ascent stage battery depletion.

03:38 PM T+122:49 MCC updates SPS model with thrust = 21500 lbs, flow rate = 69 lbs/sec.

06:57 PM T+126:08 at orbit 26 AOS, crew reports sighting jettisoned LM descent stage ahead of CSM over the lunar farside.

07:08 PM T+126:19 17-min telecast from CM begins.

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11:32 PM T+130:43 MCC updates CSM weight = 36685 lbs.

### 24 May 1969 EDT

12:56:12 AM T+132:07:12 24 min 12 sec telecast from CM begins.

01:05:27 AM T+132:16:27 lunar longitude = 52° E. Crew reports LM descent stage is 10 mi below CSM.

01:28:50 AM T+132:39:50 CSM sunset near its point of closest approach to LM descent stage. MCC estimates range to descent stage will be 700 mi at TEI.

02:50:57 AM T+134:01:57 lunar latitude = 0.97° N, longitude = 86.97° E, apocynthion = 78.8 mi, pericynthion = 61.6 mi.

03:48 AM T+134:59 MCC estimates LM descent stage will trail CSM by 980 mi at a lunar height 150 mi above CSM at TEI.

05:52 AM T+137:03 CSM LOS.

06:12:32 AM T+137:23:32 CSM sunrise.

06:25:28 AM T+137:36:28.9 lunar longitude = 155° E, height = 64.4 mi, speed = 3656.4 mph. SPS ignition for a 2 min 44.8 sec, 2509.3 mph TEI burn. Lunar height after burn = 65.0 mi, flight path angle = 2.53°, heading = -76.68°, speed = 6127.6 mph.

06:34:26 AM T+137:45:26 CSM AOS.

06:39:51 AM T+137:50:51 43 min 3 sec telecast from CM begins. Height at end of telecast = 235900 mi, speed = 3300 mph.

08:19:16 AM T+139:30:16 6 min 55 sec telecast from CM begins.

08:49 AM T+140:00 MCC updates CSM weight = 25240 lbs.

09:02 AM T+140:13 height = 231000 mi.

09:28 AM T+140:39 MCC updates SPS model with thrust = 20380 lbs, flow rate = 65.5 lbs/sec.

12:07 PM T+143:18 minimum transearth speed = 3251.2 mph.

03:51 PM T+147:02 height = 211905 mi, speed = 3290 mph, lunar height = 33355 mi, speed = 3453 mph.

04:12:00 PM T+147:23:00 11 min 25 sec telecast from CM begins.

05:28:03 PM T+148:39:03 height = 206588 mi, flight path angle = -82.4°, speed = 3320 mph, inclination = 29.22°, lunar height = 38918 mi, flight path angle = 86.74°, speed = 3443 mph. CSM departs lunar gravitation sphere of influence.

05:39 PM T+148:50 speed = 3324 mph, lunar speed = 3442 mph.

06:49 PM T+150:00 height = 201473 mi.

09:18:19 PM T+152:29:19 29 min 5 sec telecast from CM begins.

10:19 PM T+153:30 11-min CSM water dump is initiated.

11:43 PM T+154:54 height = 185545 mi, flight path angle = -81.6°, speed = 3486 mph, lunar height = 60557 mi, flight path angle = 87.2°, speed = 3454 mph.

## The Apollo 10 Mission: Compiled by Daniel R. Adamo

### 25 May 1969 EDT

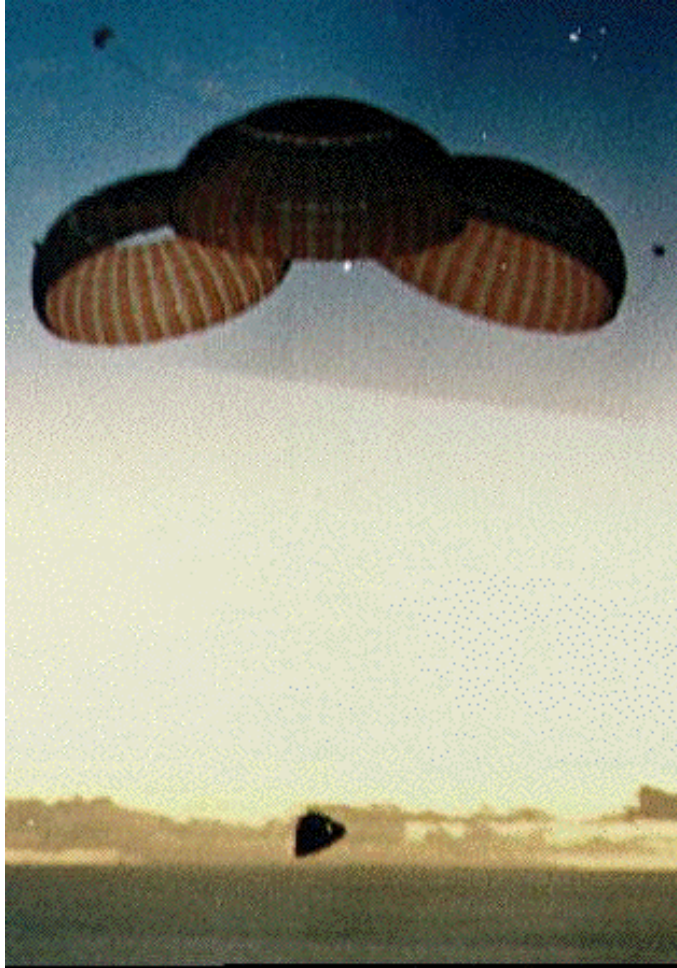
08:49 AM T+164:00 height = 152384 mi, speed = 3815 mph.  
10:39:48 AM T+165:50:48 CSM initiates a 7 min 50 sec water boiler dump.  
11:38 AM T+166:49 CSM initiates 3-hour fuel cell hydrogen purge.  
02:19 PM T+169:30 MCC estimates EI flight path angle =  $-6.77^\circ$ .  
02:50 PM T+170:01 height = 129162 mi, speed = 4185 mph.  
04:40 PM T+171:51 height = 121221 mi.  
06:16:17 PM T+173:27:17 10 min 22 sec telecast from CM begins.

### 26 May 1969 EDT

02:49 AM T+182:00 MCC estimates EI flight path angle =  $-6.67^\circ$ . An MCC-7 burn will be required for EI flight path angles less than  $-6.62^\circ$  or greater than  $-6.32^\circ$ .  
06:19 AM T+185:30 assuming no further burns, MCC predicts flight path angle =  $-6.70^\circ$  and speed = 24760 mph at EI.  
06:49 AM T+186:00 MCC updates CSM RCS model with thrust = 187.64 lbs, flow rate = 0.766 lbs/sec.  
07:40:49 AM T+186:51:49 height = 43000 mi. 11 min 53 sec telecast from CM begins.  
09:38:58 AM T+188:49:58.0 height = 29425.9 mi, speed = 8550.0 mph. CSM RCS ignition for a 6.7-sec, 1.5 mph MCC-7 burn. Height after burn = 29410.9 mi, flight path angle =  $-69.64^\circ$ , heading =  $119.34^\circ$ , speed = 8552.4 mph.  
10:06 AM T+189:17 MCC updates CSM weight = 25221 lbs, CM weight = 12155 lbs.  
10:29 AM T+189:40 CSM maneuvers to reentry attitude.  
12:08:54 PM T+191:19:54 CSM sunset.  
12:22:26 PM T+191:33:26 SM is jettisoned. Forward-firing RCS jets burn until depletion (Quad A for 325 sec, Quad B for 464 sec, Quad C for 428 sec, and Quad D for 432 sec). SM splashdown is estimated at latitude =  $19.4^\circ$  S, longitude =  $173.4^\circ$  W.  
12:37:48 PM T+191:48:48.52 latitude =  $23.77^\circ$  S, longitude =  $173.87^\circ$  E, altitude = 425000 ft (80.5 mi), speed = 24745.6 mph.  
**12:37:54 PM T+191:48:54.5 latitude =  $15.07^\circ$  S, longitude =  $164.67^\circ$  W, altitude = 400000 ft (75.8 mi), flight path angle =  $-6.52^\circ$ , speed = 24760 mph. CM reenters earth's atmosphere.**  
12:38:12 PM T+191:49:12 altitude = 300000 ft. CM enters radio blackout.  
12:39:14 PM T+191:50:14 altitude = 200000 ft, exterior temperature =  $5000^\circ$  F, maximum acceleration = 6.78 Gs.  
12:40 PM T+191:51 recovery forces establish visual contact with CM.  
12:42 PM T+191:53:40 CM exits radio blackout.  
12:44 PM T+191:55 altitude = 60000 ft. Reentry computer guidance ends.  
12:46:18 PM T+191:57:18.0 altitude = 23000 ft, speed = 300 mph. Drogue parachutes are deployed and unreefed.  
12:47:05 PM T+191:58:05 altitude = 10000 ft. Drogue parachutes are released. Pilot and main parachutes are deployed and unreefed.

## The Apollo 10 Mission: Compiled by Daniel R. Adamo

12:48 PM T+191:59 CM radio antenna and flashing beacon are deployed.



### CM Approaching Splashdown

12:52:23 PM T+192:03:23 latitude = 14° S, longitude = 170° W, speed = 17 mph, weight = 10901 lbs. CM splashdown 3.9 mi from the USS Princeton. CM attains Stable 1.

12:54 PM T+192:05 sunrise.

01:17 PM T+192:28 CM hatch is opened.

01:31 PM T+192:42 crew arrives aboard USS Princeton.

02:28 PM T+193:39 CM arrives aboard USS Princeton.

## The Apollo 10 Mission Acronym List: Compiled by Daniel R. Adamo

**AGS:** Abort Guidance System  
**AOS:** Acquisition Of Signal  
**APS:** Auxiliary Propulsion System (Saturn IVB); Ascent Propulsion System (LM)  
**AS:** Apollo-Saturn  
**CDH:** Constant Delta Height  
**CM:** Command Module  
**CSI:** Coelliptic Sequence Initiate  
**CSM:** Command-Service Module  
**DOI:** Descent Orbit Insertion  
**DPS:** Descent Propulsion System  
**EDT:** Eastern Daylight Time  
**GET:** Ground Elapsed Time  
**GDS:** GoIDStone  
**IGM:** Iterative Guidance Mode  
**KSC:** Kennedy Space Center  
**LC:** Launch Complex  
**LES:** Launch Escape System  
**LM:** Lunar Module  
**LOI:** Lunar Orbit Insertion  
**LOS:** Loss Of Signal  
**LVLH:** Local Vertical Local Horizontal  
**MCC:** Mission Control Center; Mid-Course Correction  
**MLP:** Mobile Launch Platform  
**MSC:** Manned Spacecraft Center  
**NASA:** National Aeronautics and Space Administration  
**RCS:** Reaction Control System  
**SM:** Service Module  
**SLA:** Spacecraft Lm Adapter  
**SPS:** Service Propulsion System  
**TEI:** Trans-Earth Injection  
**TLI:** Trans-Lunar Injection  
**TPI:** Terminal Phase Initiate  
**USS:** United States Ship