QUESTIONS RELATIVE TO THE CONTENTS OF
THIS DOCUMENT SHOULD BE DIRECTED TO:

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A NOTE TO THE STUDENT

The following pages contained within this handout have been revised since the 1 November 1968 release: 4, 14, 17, 26, 39, 54, 70, 71, 84, 85, 86, 88, & 90.

These pages have been added to the handout since the 1 November 1968 issue: 45, 46, 77, 78, 87, & 89.

The following pages of the 1 November 1968 handout have been deleted from this publication: 62, 65, 66, 67, 71, 73, 74, 87, & 88.

Due to the above listed revisions, additions, and deletions the pages in this handout, beginning with page 45, have been completely renumbered. The schematics, power distribution, and system data sections have been rearranged to make the handout more convenient for you to use. For the location of all the displays and controls associated with Sequential Systems, please refer to the latest Displays and Controls drawings for CSM 106 and subs.
SEQUENTIAL SYSTEMS

WHAT ARE THEY?

- THE INTEGRATION OF THE LAUNCH VEHICLE (LV) EMERGENCY DETECTION SYSTEM (EDS) WITH A NUMBER OF APOLLO SUBSYSTEMS

FOR THE PURPOSE OF:

1. PROVIDING A FLIGHT CREW WITH IMMEDIATE ABORT AND CERTAIN EARLY MISSION TERMINATION CAPABILITIES (PRIME CONCERN: CREW SAFETY)
2. PERFORMING MANY NORMAL MISSION FUNCTIONS
DEFINITION OF TERMS

• ABORT

A MISSION TERMINATION BY UNSCHEDULED INTENTIONAL SEPARATION OF
THE SPACECRAFT FROM THE LAUNCH VEHICLE PRIOR TO ORBIT INSERTION

• EARLY MISSION TERMINATION

AN UNSCHEDULED INTENTIONAL MISSION TERMINATION AT OR AFTER
ORBIT INSERTION
SEQUENTIAL SYSTEMS
MAJOR SUBSYSTEMS

LAUNCH VEHICLE
EMERGENCY
DETECTION
SYSTEM

SEQUENTIAL
EVENTS
CONTROL
SUBSYSTEM

LAUNCH
ESCAPE
SUBSYSTEM

EARTH
LANDING
SUBSYSTEM

GENERAL PURPOSES

EDS 1. MONITOR THE CRITICAL PARAMETERS OF THE LV & PROVIDE THIS STATUS TO THE ASTRONAUTS
2. PROVIDE AN AUTOMATIC ABORT CAPABILITY TO THE ASTRONAUTS WITH ANY 2 FIRST STAGE ENGINES FAILING AFTER LIFTOFF OR EXCESSIVE LV ANGULAR RATES

SECS 1. PROVIDE AUTOMATIC SEQUENCING OF THE NUMEROUS EVENTS (GENERALLY THE ACTIVATION OF PYROTECHNIC DEVICES) REQUIRED TO SAFELY RESCUE THE CREW IF A SERIOUS EMERGENCY ARISES WHILE THE CSM IS ATTACHED TO THE LV
2. PROVIDE CONTROL OF THE PYROTECHNIC DEVICES REQUIRED TO PERFORM CERTAIN NORMAL MISSION EVENTS

LES 1. PROVIDE A MEANS FOR THE ASTRONAUTS TO IMMEDIATELY ESCAPE FROM A DANGEROUS SITUATION EITHER FROM THE LAUNCH PAD OR UP UNTIL THE LAUNCH ESCAPE TOWER (LET) IS JETTISONED

ELS 1. RECOVER THE ASTRONAUTS AND CM SAFELY EITHER SUBSEQUENT TO AN UNSCHEDULED INTENTIONAL MISSION TERMINATION OR A NORMAL MISSION

SEQ - 560
MISSION PHASES
WHERE SEQUENTIAL SYSTEMS
ARE UTILIZED

• LAUNCH AND EARTH ASCENT
  • EARTH ORBIT
    • TRANSLUNAR INJECTION
      • TRANSLUNAR COAST
        • LUNAR ORBIT COAST
          • PRE-ENTRY
            • ENTRY
              • PARACHUTE DESCENT
                • POSTLANDING

SEQ - 562
APOLLO SPACECRAFT
SA-IB LV

LAUNCH ESCAPE SYSTEM
BOOST PROTECTIVE COVER
COMMAND MODULE
SERVICE MODULE
ADAPTER
INSTRUMENT UNIT

SA-1B
225 FT
S-1B
82 FT
S-IVB
S-1VB
SEQ-522A
SEQUENTIAL SYSTEMS FUNCTIONS

LAUNCH AND EARTH ASCENT

• RESET & START EVENT & MISSION TIMERS AT LIFTOFF
• ENABLE EDS AUTO. ABORT CAPABILITY AT LIFTOFF
• ENABLE AUTO. CM RCS PROPELLANT & PRESSURANT DUMP CAPABILITY AT LIFTOFF & DISABLE AT T + 42 SEC.
• MONITOR LV STATUS
• JETTISON LAUNCH ESCAPE TOWER (LET)
• PROVIDE IMMEDIATE ABORT CAPABILITY THROUGHOUT
SEQUENTIAL SYSTEMS FUNCTIONS

EARTH ORBIT AND TRANSLUNAR INJECTION

- MONITOR LV STATUS
- PROVIDE IMMEDIATE EARLY MISSION TERMINATION CAPABILITY

TRANSLUNAR COAST

- ENABLE SM RCS/SCS
- SEPARATE CSM FROM LV
- RETRACT DOCKING PROBE
- SEPARATE LM FROM LV

TRANSPOSITION & DOCKING
TRANSPOSITION & DOCKING

FUNCTIONS

S-IVB/LM SEPARATION

DOCKING PROBE RETRACTION

CSM/LV SEPARATION
APOLLO SPACECRAFT
TRANSLLUNAR CONFIGURATION
SEQUENTIAL SYSTEMS FUNCTIONS

LUNAR ORBIT COAST

- RETRACT DOCKING PROBE
- SEPARATE LM FROM CSM

PRE-ENTRY AND ENTRY

- SEPARATE SM FROM CM
- MANEUVER SM AWAY FROM ENTERING CM
- PRESSURIZE CM
- TRANSFER RCS CONTROL TO CM
- PROVIDE AUTO. TRANSFER OF BATTERY POWER TO MAIN DC BUSES
- ARM & ACTIVATE ELS

SEQ - 566
NORMAL CSM/LM SEPARATION
APOLLO TRANSEARTH CONFIGURATION
NORMAL CM-SM SEPARATION AND SM JETTISON

SMJC RCS FUNCTIONS
-X TRANSLATION
5.5 SEC + ROLL AFTER
2 SEC

SEPARATION ATTITUDE A

FLIGHT TRAJECTORY
LOCAL HORIZONTAL

≈ 45°

SEPARATION ATTITUDE B

≈ 20°

CM ENTRY ATTITUDE

SEQ-543B
SEQUENTIAL SYSTEMS FUNCTIONS

PARACHUTE DESCENT AND POSTLANDING

- DISABLE CM RCS/SCS
- JETTISON APEX COVER
- DEPLOY DROGUE PARACHUTES
- RELEASE DROGUE PARACHUTES & DEPLOY MAIN PARACHUTES
- EXTEND VHF RECOVERY ANTENNAS & FLASHING BEACON LIGHT
- DISPOSE OF REMAINING RCS PROPELLANTS & PRESSURANT
- RELEASE MAIN PARACHUTES AFTER SPLASHDOWN
EARTH LANDING SYSTEM
NORMAL SEQUENCE

1. APEX COVER JETTIISONED AT 24,000 FT + 4 SEC
2. DROGUE CHUTES DEPLOYED REEDED AT 24,000 FT +2 SEC
3. DROGUE CHUTE SINGLE STAGE DISREEF 10 SEC
4. MAIN CHUTE DEPLOYED REEDED VIA PILOT CHUTES AND DROGUE CHUTES RELEASED AT 10,000 FT
5. MAIN CHUTE INITIAL INFLATION
6. MAIN CHUTE FIRST STAGE DISREEF 6 SEC
7. VHF RECOVERY ANTENNAS AND FLASHING BEACON DEPLOYED 8 SEC
8. MAIN CHUTE SECOND STAGE DISREEF 10 SEC
9. MAIN CHUTES RELEASED

SPLASH DOWN VELOCITIES:
3 CHUTES - 32 FT/SEC
2 CHUTES - 36 FT/SEC
ABORT DESIGNATIONS
LAUNCH & EARTH ASCENT PHASE

T + 3' 14"
\approx 310K FT

T + 1' 50"
\approx 100K FT

T + 42"
\approx 8.5K FT

PAD

MODE 1A

MODE 1B

MODE 1C

TOWER JETTISON

SPS OR SM ABORT AREA
(MODES 2, 3, 4 AFTER TWR.
JETT. TO ORBIT INSERTION)
SPS ABORTS
EARTH ASCENT PHASE

- TOWER JETTISON
- ABORT INITIATION
- CM-SM SEP
- PARACHUTE DEPLOYMENT
APOLLO EDS COMPONENTS
FOR LV STATUS

LV PARAMETERS MONITORED
1. LV ANGLE OF ATTACK
2. S-11/S-1VB TANK PressURES
3. S-11 SKIRT SEPARATION
4. LV GUIDANCE FAILURE
5. LV ENGINE FAILURES*
6. LV RATES EXCESSIVE*

*AUTO ABORT CAPABILITY

LV TANK PRESS
S-11 FUEL/SIVB OXID | S-IVB FUEL

Q BALL
LVa/SPS Pc

ANGLE OF ATTACK

LV ENGINES
4 1
5
3 2

EDS ANNUNCIATOR ASSEMBLY
ABORT SYSTEM
2 ENG OUT AUTO
OFF
LV RATES AUTO
OFF

SEQ-528A
EDS Q-BALL

PORTING ARRANGEMENT
VIEW A

13.3  INCH DIA

13.375  INCHES

TRANSDUCERS

ELECTRONIC MODULES
EDS FUNCTIONS

- Indicate abort requests to the flight crew
- Provide a liftoff signal to the crew and to CSM subsystems
- Provide an emergency LV engine cutoff capability to the crew
- Monitor S-II interstage skirt separation
  
  Monitor for and warn crew of:

- Excessive LV angle of attack
- Loss of attitude reference in the LV guidance system
- Out-of-tolerance S-I/S-IVB tank pressures
- Out-of-tolerance LV engine thrusts
- Excessive roll, pitch, or yaw angular rates on the LV

- Initiate an auto. abort with a 2 out of 3 vote logic whenever any
  2 first stage engine thrusts drop to 89% rated or LV angular rates
  become equal to or greater than 20 degrees per sec. in roll or 4
  degrees per sec. in pitch or yaw

- S-IVB restart sequence for TLI
SECS MAJOR COMPONENTS

DISPLAYS & CONTROLS

PYRO BATTERY

ENTRY & P/L BATTERY

MESC

LDEC

PCVB

ELSC

LSSC

SMJC

RCSC

FUEL CELL
SECS CONTROLLERS
IN CM RHEB

• 2 MASTER EVENTS SEQUENCE CONTROLLERS (MESC)

PURPOSES: PROVIDES FOR ARMING THE LOGIC BUSES OF THE SECS
PROVIDES MASTER CONTROL OF ALL SEQUENCED EVENTS REQUIRED
FOR LAUNCH ESCAPES & OF CERTAIN NORMAL MISSION EVENTS

• 2 LUNAR DOCKING EVENTS CONTROLLERS (LDEC)

PURPOSES: PROVIDES FOR ARMING THE PYRO BUSES OF THE SECS
CONTROLS ALL DOCKING PROBE RETRACTIONS, DOCKING RING
SEPARATION, & ASSISTS IN S-IVB/LM SEPARATION

• 2 EARTH LANDING SEQUENCE CONTROLLERS (ELSC)

PURPOSE: SEQUENCE THE DEPLOYMENT & RELEASE OF THE ELS PARACHUTES

• 1 PYRO CONTINUITY VERIFICATION BOX (PCVB)

PURPOSES: PROVIDE AN ACCESSIBLE POINT IN THE CM TO VERIFY THE
CONTINUITY OF THE PYRO FIRING CIRCUITS IN THE FWD.
COMPT. OF THE CM
ELIMINATE SINGLE POINTS OF FAILURE IN THE ELSC PYRO
FIRING CIRCUITS

SEQ - 570
SECS CONTROLLERS
IN CM AFT COMPT., SM, & SLA

• 1 REACTION CONTROL SYSTEM CONTROLLER (RCSC)
   PURPOSE: CONTROLS THE PROPELLANT & PRESSURANT DISPOSAL OF THE
   CM RCS BEFORE ANY SPLASHDOWN

• 2 SERVICE MODULE JETTISON CONTROLLERS (SMJC)
   PURPOSE: MANEUVERS THE SM AWAY FROM THE CM BEFORE ENTRY
            TO PREVENT A COLLISION WITH THE CM

• 2 LM SEPARATION SEQUENCE CONTROLLERS (LSSC)
   PURPOSE: SEPARATES THE LM FROM THE S-IVB STAGE
CIRCUIT CONCEPT

PYRO BUS

LOGIC BUS

BATTERY BUS

MANUAL CONTROL

FUSISTOR

TO NEXT TIME DELAYS OR RELAYS
TYPICAL SECS CIRCUITS
LOGIC AND PYRO

1. ENTRY AND POST LANDING BATTERY ONE OF THREE
2. REDUNDANT SOURCE OF LOGIC POWER
3. REDUNDANT SYSTEM INTERFACE
4. RELAY CONTACTS CONTROLLED BY LOGIC OF PREVIOUS EVENT
5. AUTOMATED CONTROL TO NEXT EVENT

SEQ-557
PYROTECHNIC DEVICES

SINGLE BRIDGewire
APOLLO STANDARD
INITIATOR

1" MAX

HOT WIRE
INITIATOR

APPROX 1.55"

ELECTRICALLY
INITIATED
DETONATOR
CARTRIDGE

L = 1.12 -
1.95"

HW INITIATOR

1.14"

ELECTRICALLY
INITIATED
PRESSURE
CARTRIDGE (GAS)

SEQ-572
TOWER SEPARATION SYSTEM

FRANGIBLE NUT
WASHER
PARACHUTE RISER PROTECTOR
SPRING
STUD
SEAL

DETONATOR
FRANGIBLE NUT
BOLT BODY ASSEMBLY

A
B

SEQ-519
DOCKING PROBE SEPARATION MODES

NORMAL ASCENT TOWER JETTISON

TENSION TIE SEPARATES FROM PROBE HEAD

MDF CHARGE SEPARATES DOCKING RING FROM CM—RING & PROBE REMAIN ATTACHED TO LES TOWER

SOFT INSULATION

OUTER ABLATIVE RING

ALUMINUM BACKUP RING

DOCKING RING

MDF CHARGE

MDF SEPARATES DOCKING RING

LES ABORT

SPS ABORT

DKG-025
EARTH LANDING SYSTEM PARACHUTES

DROGUE CHUTES (2)
CONICAL RIBBON TYPE
MORTAR DEPLOYED
(REEFED FOR 10 SEC)
16.5 FT DIAMETER
13.0 FT NOMINAL
INFLATED DIAMETER

PILOT CHUTES (3)
RING SLOT
MORTAR DEPLOYED
7.2 FT DIAMETER
6.0 FT NOMINAL
INFLATED DIAMETER

MAIN CHUTES (3)
RING SAIL
DEPLOYED BY PILOT CHUTES
(REEFED IN 2 STAGES FOR 10 SEC)
83.5 FT DIAMETER
77.0 FT NOMINAL
INFLATED DIAMETER

MAIN CHUTE BAG

PILOT CHUTE

SEQ-520C( )
REEFING LINE CUTTER INSTALLATION

REEFING LINES

REEFING LINE CUTTER

SUSPENSION LINE

LANYARD

SKIRT BAND
PARACHUTE DISCONNECT
(FLOWER POT)
BLK II

- DROGUE CHUTE
- DROGUE CHUTE
- MAIN CHUTES
- DROGUE CHUTE

- DROGUE MORTAR
- SHEAR PIN
- O RING

- GAS PRESSURE CARTRIDGE
- BLADE

SECTION A A

GAS PRESSURE CARTRIDGE

SEQ-511E
EVENT PROFILE
NORMAL ASCENT
SA-1B LV

1. LIFT-OFF/EDS ENABLED
2. AUTO PRPLNT DUMP "OFF", PC MOTOR INHIBITED, AND ARM AUTO. RCS ENABLE
3. MAX. Q REGION
4. INHIBIT AUTO. ABORT
5. S-1B INB'D ENG "OFF"
6. S-1B OUTB'D ENG "OFF"
7. S-1B JETTISON
8. S-IVB IGNITION
9. S-IVB THRUST COMMITMENT
10. JETTISON TOWER
11. S-IVB ECO

NOTE: THE SECS AND EDS POWER WILL BE TURNED OFF FOLLOWING ORBITAL S-IVB STABILIZATION
EVENT PROFILE
NORMAL ASCENT
SATURN V LV + TOTAL PAYLOAD

1. LIFTOFF/EDS AUTO. ABORT ENABLED
2. ARM AUTO. RCS ENABLE, AUTO. PRPLNT DUMP AND PC MOTOR INHIBITED
3. MAX Q REGION
4. INHIBIT AUTO. ABORT
5. S-IC INB'D ENG CUTOFF
6. S-IC OUTB'D ENG CUTOFF
7. S-IC SEPARATION
8. S-II IGNITION
9. S-II THRUSTING
10. S-II SECOND PLANE SEP
11. JETTISON TOWER
12. S-II ENGINE CUTOFF
13. S-II SEPARATION
14. S-IVB IGNITION
15. S-IVB THRUSTING
16. S-IVB ENGINE CUTOFF

NOTE: THE SECS AND EDS POWER WILL BE TURNED OFF FOLLOWING ORBITAL S-IVB STABILIZATION
EVENT PROFILE
NORMAL PRE-ENTRY, ENTRY & DESCENT

1. ARM SECS
2. TRANS RCS CONTROL TO CM
3. PRESS. CM RCS
4. TRANS RCS CONTROL TO SM
5. INITIATE CM-SM SEP
6. CM-SM UMB DEADFACED
7. RCS CONTROL TRANS TO CM
8. CM-SM SEPARATED
9. CM-SM SEP PYRO CUTOFF
10. ARM ELS
11. BARO LOCK-IN (ELSC ACT.)
12. CM RCS/SCS DISABLED
13. APEX COVER JETTISONED
14. DROGUE CHUTES DEPLOYED
15. DROGUE CHUTES RELEASED & PILOT CHUTES DEPLOYED
16. BURN RCS PROPELLANTS
17. PURGE CM RCS
18. RELEASE MAIN CHUTES
19. SAFE SECS

SEQ-532H ☑️
EVENT PROFILE
PAD TO T+42" LES ABORT
MODE IA

1. INITIATE ABORT (TLM)
2. BECO (AFTER 30 SEC RANGE SAFETY INHIBIT)
3. CMDRS EVENT TIMER RESET & STARTED
4. CM-SM UMB DEADFACED (TLM)
5. CM RCS PRESS.
6. RCS CONTROL TRANS TO CM
7. BATS, TIED TO MAIN DC BUSES
8. CM RCS OXID DUMPED (TLM)
9. CM-SM SEPARATED
10. LE MOTOR IGNITED (TLM)
11. PC MOTOR IGNITED
12. CM-SM SEP PYRO CUTOFF
13. CM RCS FUEL DUMPED
14. CANARDS DEPLOYED
15. ELS ARMED
16. BARO LOCK-IN (ELSC ACT.)
17. TOWER AND DOCKING RING JETTISONED (TLM)
18. APEX COVER JETTISONED (TLM)
19. DROGUE CHUTES DEPLOYED
20. CM RCS HELIUM DUMPED
21. DROGUE CHUTES RELEASED & PILOT CHUTES DEPLOYED (TLM)
22. RELEASE MAIN CHUTES (TLM)
23. SAFE SECS

SPLASHDOWN

SEQ-533E (Δ)
EVENT PROFILE
T+42" TO 30,000 FT LES ABORT
MODE IB

1. INITIATE ABORT (TLM)
2. BECO
3. CMDSR EVENT TIMER RESET & STARTED (TLM)
4. CM-SM UMB DEADFACED
5. CM RCS PRESS.
6. RCS CONTROL TRANS TO CM (TLM)
7. BATS. TIED TO MAIN DC BUSES
8. CM-SM SEPARATED (TLM)
9. LE MOTOR IGNITED
10. CM RCS/SCS ENABLED (TLM)
11. CM-SM SEP. PYRO CUTOFF
12. CANARDS DEPLOYED
13. ELS ARMED
14. BARO LOCK-IN (ELSC ACT.)
15. CM RCS/SCS DISABLED
16. TOWER AND DOCKING RING JETTIISONED
17. APEX COVER JETTIISONED (TLM)
18. DROGUE CHUTES DEPLOYED (TLM)
19. DROGUE CHUTES RELEASED & PILOT CHUTES DEPLOYED (TLM)
20. BURN RCS PROPELLANTS
21. PURGE CM RCS
22. RELEASE MAIN CHUTES (TLM)
23. SAFE SECS

SEQ-534F
PAD TO = 30,000 FT LES ABORT

- ELS ARMED TOWER, BPC, AND DOCKING RING JETTISONED (14 SEC)
- CANARDS DEPLOYED (11 SEC)
- APEX COVER JETTISONED (14.4 SEC)
- DROGUE CHUTES DEPLOYED (16 SEC)
- MAIN CHUTES DEPLOYED

PC MOTOR IGNITED TO 42 OR 61 SEC AFTER LIFT-OFF

LE MOTOR IGNITED
EVENT PROFILE
T+1'50" TO TWR. JETT. LES ABORT
MODE IC

1. INITIATE ABORT (TLM)
2. BECO
3. CMDRS EVENT TIMER RESET & STARTED
4. CM-SM UMB DEADFACED
5. CM RCS PRESS. (TLM)
6. RCS CONTROL TRANS TO CM
7. BATS. TIED TO MAIN DC BUSES
8. CM-SM SEPARATED (TLM)
9. LE MOTOR IGGITED
10. CM RCS/SCS ENABLED (TLM)
11. CM-SM SEP PYRO CUTOFF
12. CANARDS DEPLOYED
13. ELS ARMED-JETT TOWER (OPTION)
14. BARO LOCK-IN (ELSC ACT.)
15. CM RCS/SCS DISABLED
16. TOWER AND DOCKING RING JETTISONED
17. APEX COVER JETTISONED (TLM)
18. DROGUE CHUTES DEPLOYED (TLM)
19. DROGUE CHUTES RELEASED & PILOT CHUTES DEPLOYED
20. BURN RCS PROPELLANTS
21. PURGE CM RCS
22. RELEASE MAIN CHUTES (TLM)
23. SAFE SECS

MANUAL INTERVENTION
MANTAIN PITCH RATE

CANARDS ORIENT
CM BELOW MACH 3.8

MANUALLY ORIENT
CM FOR ENTRY

24K' 14, 15, 16
\[ \frac{1}{4}'' \]
17, 18
\[ 1.6'' \]
19
\[ 10K' \]
20
\[ 2\frac{1}{2}'' \]
21

SPLASHDOWN 22, 23
30,000 FT TO TWR JETT LES ABORT

CANARDS DEPLOYED (11 SEC)

ELS ARMED (14 SEC)

CANARDS EFFECT & DAMP TURN-AROUND MANEUVER BELOW Mach 3 B

TOWER, BPC, AND DOCKING RING JETTISONED AT 24,000 FT

LE MOTOR IGNITED

APEX COVER JETTISONED AT 24,000 FT +.4 SEC

SEQ-5468
EVENT PROFILE
SPS ABORT AND RETURN TO EARTH
MODES II & III

1. INITIATE ABORT (TLM)
2. BECO (TLM)
3. CMDRS EVENT TIMER RESET & STARTED (TLM)
4. DIRECT S/C ULLAGE STARTED (PITCH & YAW STAB INHIBITED) (TLM)
5. CSM-LV SEPARATED (TLM)
6. SM RCS/SCS ENABLED (ROLL STAB. ONLY WITH ULLAGE) (TLM)
7. TERMINATE ULLAGE (TRANS HAND CONT TO NEUTRAL DETENT) (TLM)
8. JETTISON DOCKING RING (TLM)
9. INITIATE CM-SM SEP (TLM)
10. CM-SM UMB DEADFACED (TLM)
11. CM RCS PRESS. (TLM)
12. RCS CONTROL TRANS TO CM (TLM)
13. BATS. TIED TO MAIN DC BUSSES (TLM)
14. CM-SM SEPARATED (TLM)
15. CM-SM SEP PYRO CUTOFF (TLM)
16. ARM ELS (TLM)
17. BARO LOCK IN (ELSC ACT.) (TLM)
18. CM RCS/SCS DISABLED (TLM)
19. APEX COVER JETTISONED (TLM)

SPLASHDOWN
ELS EVENTS

SEQ-537E
PYRO ARM SWITCH GUARD
**SECS DATA**

**Master Events Sequence Controller (MESC)**

- **Part No.:** ME901-0567
- **Mfr’d. by:** Autonetics, Anaheim, Calif.
- **Dimensions:** 14" x 14" x 8"
- **Weight:** 38 lbs.
- **No. of electrical receptacles:** 8 ea.
- **Relays:** Babcock, 4 pole
  - 42 non-latching & 2 latching
  - 10 amps. continuous current rating

**Z1K1, Z1K2, & Z2K1**
- EDS Auto. Abort Voting
- EDS Bus Changeover
- Escape Tower Physical Separation
- EDS Auto. Abort Enable
- Booster Cutoff & Abort Initiate
- LES Abort Lockup
- CM RCS Pressurize
- CM-SM Umbilical Deadface
- CM-SM Separation
- Launch Escape Motor Fire
- Canard Deploy
- ELS Activate
- Tower Jettison
- Apex COVER Jettison
- Direct Ullage
- SLA Separation
- RCS Enable Arm
- RCS Enable/Disable (latching)
- SECS Logic Bus Arming
- CM-SM Sep. Pyro Cutoff
- Pitch Control Motor Fire
- Apex COVER Drag Parachute

**Time Delays:**
- Parko, resistance-capacitance-transistor type, 18 ea.
- TD1 & 2
  - 0.03 sec. Booster Cutoff
- TD3 & 4
  - 0.1 sec. CM-SM Separation
- TD5 & 6
  - 11.0 sec. Canard Deploy
- TD7 & 8
  - 3.0 sec. ELS Activate
- TD11 & 12
  - 3.0 sec. SLA Separate
- TD13 & 14
  - 0.8 sec. RCS Enable Arm
- TD15 & 16
  - 1.0 sec. RCS Enable/Disable

67
SECS DATA

TD17 & 18                                      0.4 sec. Apex Cover Jettison
TD23 & 24                                      1.7 sec. CM-SM Sep. Pyro Cutoff

Lunar Docking Events Controller (LDEC) 2 ea.

Part No.: ME476-0035
Mfr'd. by: Autonetics, Anaheim, Calif.
Dimensions: 11.5" x 6" x 8.5"
Weight: 12 lbs.
No. of electrical receptacles: 5 ea.
Motorswitch: Kinetics, 9 pole
1 ea. powered during transfer only
15 amps. continuous current rating

K1

Relays: SECS Pyro Bus Arming

7 non-latching & 1 latching
10 amps. continuous current rating

Z1K1 (latching) & Z1K2
Z2K1 & 2
Z3K1 & 2
Z4K1 & 2

Time Delays:

TD1 & 2 0.03 sec. LM-SLA Sep. Initiate

Earth Landing Sequence Controller (ELSC) 2 ea.

Part No.: ME901-0001
Mfr'd. by: Northrop-Ventura, Newbury Park, Calif.
Dimensions: 7" x 4.5" x 3"
Weight: 5 lbs.
No. of electrical receptacles: 4 ea.
Relays: Filtors, 4 pole
4 non-latching
5 amps. continuous current rating

K1 Baroswitch Lock-in
SECS DATA

K2
Drogue Parachute Deploy
K3
Drogue Parachute Release & Pilot Parachute Deploy
K4
Not Used

Time Delays:

TD1 & 2
General Time, resistance-capacitance-transistor type, 4 ea.
TD3 & 4
2.0 sec. Drogue Parachute Deploy
14.0 sec. Pilot Parachute Deploy

Pyro Continuity Verification Box (PCVB)

Part No.: V16-540130
Dimensions: 10.5" x 7" x 3"
Weight: 10 lbs.
No. of electrical receptacles: 8 ea.
Relays:
Babcock, 4 pole
10 non-latching (2 modules - 5 ea.)
10 amps. continuous current rating

Z2K1
Sys. A Drogue Parachute Deploy
Z2K2
Sys. A Drogue Parachute Release & Pilot Parachute Deploy Lockup
Z2K3
Sys. A Main Parachute Release
Z2K4
Sys. A Drogue Parachute Release & Pilot Parachute Deploy
Z2K5
Sys. A Main Parachute Release
Z1K1
Sys. B Drogue Parachute Deploy
Z1K2
Sys. B Drogue Parachute Release & Pilot Parachute Deploy Lockup
Z1K3
Sys. B Main Parachute Release
Z1K4
Sys. B Drogue Parachute Release & Pilot Parachute Deploy
Z1K5
Sys. B Main Parachute Release

Reaction Control System Controller (RCSC)

Part No.: V36-447520
### SECS DATA

**Dimensions:**
15" x 13" x 9"

**Weight:**
35 lbs.

**No. of electrical receptacles:**
18 ea.

**Motorswitches:**
Kinetics, 22 pole
2 ea. powered during transfer only
5 amps. continuous current rating

**S1 & 2**
Sys. 1 & 2 CM-SM RCS Transfer

**Relays:**
Babcock, 4 pole
18 non-latching
10 amps. continuous current rating

**K1 & 7**
Sys. 1 Oxidizer Dump Valves

**K2 & 8**
Sys. 2 Oxidizer Dump Valves

**K3 & 9**
Sys. 1 Helium & Oxidizer Interconnect Valves

**K4 & 10**
Sys. 2 Helium & Oxidizer Interconnect Valves

**K5 & 11**
Sys. 1 Fuel & Oxidizer By-pass Valves

**K6 & 12**
Sys. 2 Fuel & Oxidizer By-pass Valves

**K13 & 14**
Sys. 1 & 2 CM-SM RCS Transfer

**K15 & 17**
Sys. 1 CM RCS Heaters

**K16 & 18**
Sys. 2 CM RCS Heaters

**Time Delays:**
Eagle-Signal, resistance-capacitance-transistor type, 14 ea.

**TD1 & 8**
42.0 sec. Sys. 1 & 2 Propellant Dump Inhibit

**TD3 & 9**
5.0 sec. Sys. 1 Fuel Dump

**TD2 & 10**
5.0 sec. Sys. 2 Fuel Dump

**TD5 & 11**
13.0 sec. Sys. 1 Helium Dump

**TD4 & 12**
13.0 sec. Sys. 2 Helium Dump

**TD7 & 13**
13.0 sec. Sys. 1 Main DC Bus OFF

**TD6 & 14**
13.0 sec. Sys. 2 Main DC Bus OFF

---

**Service Module Jettison Controller (SMJC)**

2 ea.

**Part No.:**
ME901-0569

**Mfr'd. by:**
Autonetics, Anaheim, Calif.

**Dimensions:**
13.5" x 5.25" x 5.75"
SECS DATA

Weight: 8 lbs.
No. of electrical receptacles: 4 ea.
Relays: Babcock, 4 pole
4 non-latching & 2 latching
10 amps. continuous current rating
SMJC Activate/X-Translation
Positive Roll Initiate
Positive Roll Deactivate

Time Delays:
Parko, resistance-capacitance-transistor type, 4 ea.

Z1K1 & 2 (latching)
Z2K1 & 2
Z3K1 & 2

Z2 TD1 & 2
Z3 TD1 & 2

2.0 sec. Roll Initiate
5.5 sec. Roll Deactivate

LM Separation Sequence Controller (LSSC) 2 ea.

Part No.: ME450-0007
Mfr'd. by: Autonetics, Anaheim, Calif.
Dimensions: 10" x 8.5" x 4"
Weight: 5 lbs.
No. of electrical receptacles: 4 ea.
Relays: Babcock, 4 pole
4 non-latching
10 amps. continuous current rating

Z1K1 & 2
Z2K1 & 2

LM-SLA Separation (LM legs)
LM-SLA Separation (Guillotine)

Time Delays:
Parko, resistance-capacitance-transistor type, 2 ea.

TD1 & 2
0.03 sec. LM-SLA Sep. (guillotine)

NOTE: All of the above controllers are fully qualified for any spacecraft environment.
Launch Escape Motor

Mfr'd. by: Lockheed Propulsion, Redlands, Calif.
Dimensions: 26 inch diameter, 15.5 ft. long, incl. nozzles & igniter
Propellant: 8 point star grained solid using a polysulphide ammonium perchlorate formulation
Resultant Thrust: 147,000 pounds force (lbf.) nominal at 70 degrees F. & sea level barometric pressure
Burn Time: Total of 8 sec. of which the greatest portion of the total impulse is delivered in the first 3.5 to 4.0 sec.
Nozzle Cant Angle: 4 nozzles each canted 35 degrees off the motor centerline
Nozzle Insert I. D.: \(-Y \& +Y = 5.2\) inches, \(-Z = 4.8\) inches, \(+Z = 5.6\) inches
Resultant Thrust Vector: 2.75 degrees offset of motor centerline

Pitch Control Motor

Mfr'd. by: Lockheed Propulsion, Redlands, Calif.
Dimensions: 9 inch dia., 22 inches long incl. nozzle & igniter
Propellant: 14 point star grained solid using a polysulphide ammonium perchlorate formulation
Resultant Thrust: 2,850 pounds force (lbf.) nominal at 70 degrees F. & sea level barometric pressure
Burn Time: 0.6 plus or minus 0.1 sec.
Resultant Thrust Vector: Coincidental with motor centerline

Tower Jettison Motor

Mfr'd. by: Thiokol Chemical, Elkton, Md.
Dimensions: 26 inch dia., 55.5 inches long
Propellant: 10 point star grained solid using a polysulphide ammonium perchlorate formulation
LES DATA

Resultant Thrust: 32,000 pounds force (lbf.) nominal at 70 degrees F. & sea level barometric pressure

Burn Time: 1.1 plus or minus 0.06 sec.

Nozzle Cant Angle: 2 nozzles each canted 30 degrees off the motor centerline

Nozzle Insert I. D.: -Z = 3.5 inches & +Z = 3.2 inches

Resultant Thrust Vector: 4.0 degrees offset of motor centerline
ELS DATA

Apex Cover Drag Parachute

Mfr'd. by: Northrop-Ventura, Newbury Park, Calif.
How Deployed: Mortar
Type: Ring Slot
No. of Rings: 9
No. of Gores: 12
No. of Suspension Lines: 12
Dimensions: 7.2 ft. dia.
Weight: 10 lbs. incl. mortar

2 ea.

Drogue Parachutes

Mfr'd. by: Northrop-Ventura, Newbury Park, Calif.
How Deployed: Mortar
Type: Conical Ribbon
No. of Ribbons: 36
No. of Gores: 20
No. of Suspension Lines: 20
Dimensions: 16.5 ft. dia.
Weight: 50 lbs. incl. mortar
Reefing: Single stage, 10 sec. from line stretch plus a permanent skirt band

3 ea.

Pilot Parachutes

Mfr'd. by: Northrop-Ventura, Newbury Park, Calif.
How Deployed: Mortar
Type: Ring Slot
No. of Rings: 9
No. of Gores: 12
No. of Suspension Lines: 12
Dimensions: 7.2 ft. dia.
Weight: 9 lbs. incl. mortar

3 ea.

Main Landing Parachutes

Mfr'd. by: Northrop-Ventura, Newbury Park, Calif.
How Deployed: Pilot parachutes
Type: Ring Sail
No. of Rings: 12
No. of Gores: 68
No. of Suspension Lines: 68
Dimensions: 83.5 ft. dia.
ELS DATA

Weight: 136 lbs.
Reefing: Two stage, 6 & 10 sec. from line stretch

NOTE: All weights quoted which include a mortar do not include the weight of the dual gas pressure cartridges in the breach.
QUANTITIES OF SECS CONTROLLED PYROTECHNIC DEVICES ON THE APOLLO SPACECRAFT

Launch Escape Tower

Canard Thruster 2
Pitch Control Motor 2
Tower Jettison Motor 2
Launch Escape Motor 2
Tower Separation System 8

CM Fwd. Compt. & Docking Subsystem

Docking Probe Retraction Bottles 4
* Docking Ring Separation System 2
* Apex Cover Separation System (thrusters) 4
* Apex Cover Separation System (drag chute) 2
* Drogue Parachute Deployment Mortars 4
* Pilot Parachute Deployment Mortars 6
* Parachute Disconnect Mechanism 10

CM Aft Compt.

* Helium Isolation Valves 4
* Oxidizer & Fuel Dump Valves 4
* Oxidizer, Fuel, & Helium Interconn. Valves 4
* Oxidizer & Fuel By-pass Valves 4
* Circuit Interrupters 4
* CM-SM Umbilical Guillotine 2

SM Fwd. Compt.

Circuit Interrupters 4
CM-SM Separation System 6

Spacecraft LM Adapter

SLA Separation System 2
S-IVB/LM Separation System 10
Total 92

* Denotes live or expended pyrotechnic devices recovered on CM.

Reefing Line Cutters
Drogue Parachutes, 8 ea; Main Landing Parachutes, 18 ea; VHF Recovery Antennas, 4 ea; and Recovery Flashing Beacon, 2 ea. Total - 32.
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<tr>
<th>MEAS. ID</th>
<th>DESCRIPTION</th>
<th>SWITCH OR RELAY NO.</th>
<th>CHANNEL CODE</th>
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<td>CD0005V</td>
<td>DC Voltage Pyro Bus A</td>
<td>K1</td>
<td>11A9</td>
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<td>CD0006V</td>
<td>DC Voltage Pyro Bus B</td>
<td>K1</td>
<td>11A5</td>
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<td>CD0023X</td>
<td>CM-SM Sep. Relay Close A</td>
<td>Z9</td>
<td>11E22-1</td>
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<td>CD0024X</td>
<td>CM-SM Sep. Relay Close B</td>
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<td>11E23-1</td>
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<td>CD0123X</td>
<td>SLA Separation Relay A</td>
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<td>CD0124X</td>
<td>SLA Separation Relay B</td>
<td>Z17</td>
<td>11E23-7</td>
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<td>Hand Controller Input B</td>
<td>Manual Abort</td>
<td>11E13-6</td>
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<td>Z1K1, Z1K2, &amp; Z2K1</td>
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<td>EDS Abort Logic Output B</td>
<td>Z1K1, Z1K2, &amp; Z2K1</td>
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<td>CD0170X</td>
<td>RCS Activate Signal A</td>
<td>Z19 (latched)</td>
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<td>CD0171X</td>
<td>RCS Activate Signal B</td>
<td>Z19 (latched)</td>
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<td>CM RCS Pressurize Signal A</td>
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<td>CD0174X</td>
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<td>DC Voltage Logic Bus B</td>
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<td>Forward Heatshield Jettison A</td>
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<td>Forward Heatshield Jettison B</td>
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<td>EDS Abort Request A</td>
<td>UDL</td>
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<td>EDS Abort Request B</td>
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<td>11E4-3</td>
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<td>Master Caution Warning ON</td>
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<td>11E4-6</td>
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<td>Angle of Attack (Vector Sum Output)</td>
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<td>Temp. Docking Probe</td>
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<td>CE0001X</td>
<td>Drogue Deploy Relay Close A</td>
<td>K2 &amp; Z2K1</td>
<td>11E29-1</td>
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<td>CE0002X</td>
<td>Drogue Deploy Relay Close B</td>
<td>K2 &amp; Z1K1</td>
<td>11E30-6</td>
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<td>CE0003X</td>
<td>Main Chute Deploy-Drogue Rel. Relay A</td>
<td>K3 &amp; Z2K4</td>
<td>11E29-8</td>
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<td>CE0004X</td>
<td>Main Chute Deploy-Drogue Rel. Relay B</td>
<td>K3 &amp; Z1K4</td>
<td>11E30-3</td>
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<td>CE0321X</td>
<td>Main Chute Disconnect Relay A</td>
<td>Z2K3 &amp; Z2K5</td>
<td>11E29-5</td>
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<td>CE0322X</td>
<td>Main Chute Disconnect Relay B</td>
<td>Z1K3 &amp; Z1K5</td>
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SC-104, -106 & SUBS.
TELEMETRY MEASUREMENT ID
APOLLO LAUNCH ESCAPE SYSTEM
DRAWING NUMBERING SYSTEM (V35-)

V34
COMPLETE SPACECRAFT GENERAL

V35-000002
GENERAL ASSY.
LAUNCH ESCAPE SYS.

V35-30XXXX
BODY GROUP
LAUNCH ESCAPE SYS.

V35-44XXXX
ELEC. INSTL.
LAUNCH ESCAPE SYS.
APOLLO SERVICE MODULE
DRAWING NUMBERING SYSTEM (V37-)

V34
COMPLETE SPACECRAFT GENERAL

V37-000002
GENERAL

V37-200001
SYSTEMS INSTL.
COMPLETE

V37-40XXXX
POWER SYSTEMS INSTL.
COMPLETE

V37-44XXXX
ELECTRICAL INSTL.

V37-50XXXX
VEHICLE MECHANISMS

V37-54XXXX
SEQUENCER INSTL.
JETTISON CONT. SYS.
APOLLO SPACECRAFT LUNAR MODULE ADAPTER
DRAWING NUMBERING SYSTEM (V24-)

V34
COMPLETE SPACECRAFT
GENERAL

V24-008002
GENERAL ASSY.
SLA

8V24-790064
WIRE SYSTEM INSTL.
BUNDLE
BATTERY C EDS POWER
CSM 103 & SUBS

ENTRY & POSTLANDING BAT. A

ENTRY & POSTLANDING BAT. C

ENTRY & POSTLANDING BAT. B

RHEB '250

BAT. A PWR ENTRY/POSTLANDING
80A CB20

BAT. C PWR ENTRY/POSTLANDING
80A (NORMALLY OPEN) CB15

BAT. B PWR ENTRY/POSTLANDING
80A (NORMALLY OPEN) CB24

BAT. C TO BAT. BUS A

BAT. C TO BAT. BUS B

BAT. C BAT. CHGR/EDS 2

MDC 8

CB22

CB23

CB50

10A

5A

EDS 2 BAT. C

SEQ-576A
MAIN A DC POWER

CSM 106 AND SUBS

MAIN BUS A

MDC 229
EPS MNA
GROUP 5
CB34

MDC 8
CB13 10A
CB70 5A
CB72 3A
CB67 20A
CB43 15A
CB68 10A
CB15 15A
CB11 15A
CB17 15A
CB25 3A
CB29 7.5A
CB76 10A
CB52 5A

GROUP 2
CB26

30A
CB32 GROUP
4

30A
TIMERS MN A
CB44

5A

GROUP 1
CB26

30A
CB19 15A
CB23 3A
CB24 5A
CB40 7.5A
CB41 10A
CB21 15A
CB63 3A
CB39 7.5A

GROUP 3
CB30

30A

SPS LINE HTRS
CB46

20A

SCS CONTR/DIRECT 1 MN A
SCS CONTR/DIRECT 2 MN A
SCS DIRECT ULLAGE MN A
CM HEATERS 1 - MN A
RCS LOGIC MN A
SPS PILOT VALVES MN A
SCS ROLL A/C MN A
SCS SYSTEM MN A
SCS ROLL B/D MN A
SPS GAUGING MN A
SPS HELIUM VALVE 1, SPS INJECTOR PRE-VALVE A - MN A
DOCKING PROBE MN A
EMS MN A
TIMERS MN A
SCS PITCH MN A - RCS
SCS LOGIC BUS 3/4 MN A
SCS CONTR/AUTO MN A
SM RCS HEATERS MN A - QUAD D
RCS PROPELLANT ISOLATION, HELIUM AND PROPELLANT ISOLATION VALVES SMRCS QUAD B & D
PROPELLANT ISOLATION VALVES CMRCS QUAD B & D
SCS YAW MN A - RCS
SCS LOGIC BUS 1/2 MN A
SM RCS HEATERS MN A - QUAD D
SM RCS QUAD B & D HELIUM AND PROPELLANT ISOLATION VALVE POSITION INDICATORS AND CM RCS SYSTEM 1 PROPELLANT ISOLATION VALVE INDICATOR
SPS LINE HEATERS A
SEQUENTIAL SYSTEMS
POWER DISTRIBUTION

SYSTEM A SHOWN; SYSTEM B IDENTICAL
D = REFERENCE TO REDUNDANT SYSTEM B
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>ACE</td>
<td>Acceptance Checkout Equipment</td>
</tr>
<tr>
<td>AOA</td>
<td>Angle of Attack</td>
</tr>
<tr>
<td>AOH</td>
<td>Apollo Operations Handout</td>
</tr>
<tr>
<td>BECO</td>
<td>Booster Engine Cutoff</td>
</tr>
<tr>
<td>BPC</td>
<td>Boost Protective Cover</td>
</tr>
<tr>
<td>CB</td>
<td>Circuit Breaker</td>
</tr>
<tr>
<td>CDF</td>
<td>Confined Detonating Fuse</td>
</tr>
<tr>
<td>CECO</td>
<td>Center Engine Cutoff</td>
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<tr>
<td>CM</td>
<td>Command Module</td>
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<tr>
<td>COI</td>
<td>Contingency Orbital Insertion</td>
</tr>
<tr>
<td>CSM</td>
<td>Command Service Module</td>
</tr>
<tr>
<td>D &amp; C</td>
<td>Displays &amp; Controls</td>
</tr>
<tr>
<td>DET</td>
<td>Digital Event Timer</td>
</tr>
<tr>
<td>DS</td>
<td>Docking Subsystem</td>
</tr>
<tr>
<td>ECS</td>
<td>Environmental Control Subsystem</td>
</tr>
<tr>
<td>EDS</td>
<td>Emergency Detection System</td>
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<tr>
<td>ELS</td>
<td>Earth Landing Subsystem</td>
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<td>ELSC</td>
<td>Earth Landing Sequence Controller</td>
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<td>EPS</td>
<td>Electrical Power Subsystem</td>
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<tr>
<td>ET</td>
<td>Event Timer</td>
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<tr>
<td>FDAI</td>
<td>Flight Director Attitude Indicator</td>
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<tr>
<td>FLSC</td>
<td>Flexible Linear Shaped Charge</td>
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<tr>
<td>GPI</td>
<td>Gimbal Position Indicator</td>
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<tr>
<td>GSE</td>
<td>Ground Support Equipment</td>
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<tr>
<td>IECO</td>
<td>Inboard Engine Cutoff</td>
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<tr>
<td>IPB</td>
<td>Illuminated Push Button</td>
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<tr>
<td>IU</td>
<td>Instrument Unit</td>
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<tr>
<td>LCC</td>
<td>Launch Control Center</td>
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<tr>
<td>LDEC</td>
<td>Lunar Docking Events Controller</td>
</tr>
<tr>
<td>LEB</td>
<td>Lower Equipment Bay</td>
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<tr>
<td>LEM</td>
<td>Launch Escape Motor</td>
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<tr>
<td>LHEB</td>
<td>Left Hand Equipment Bay</td>
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<tr>
<td>LHFEB</td>
<td>Left Hand Fwd. Equip. Bay</td>
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<tr>
<td>LM</td>
<td>Lunar Module</td>
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<tr>
<td>LES</td>
<td>Launch Escape Subsystem</td>
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<tr>
<td>LET</td>
<td>Launch Escape Tower</td>
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<tr>
<td>LEV</td>
<td>Launch Escape Vehicle</td>
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<tr>
<td>LOC</td>
<td>Lunar Orbit Coast</td>
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<td>LOI</td>
<td>Lunar Orbit Insertion</td>
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<tr>
<td>LSSC</td>
<td>LM Separation Sequence Controller</td>
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<tr>
<td>LV</td>
<td>Launch Vehicle</td>
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<tr>
<td>MDC</td>
<td>Main Display Console</td>
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<tr>
<td>MDF</td>
<td>Mild Detonating Fuse</td>
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<td>MESC</td>
<td>Master Events Sequence Controller</td>
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<tr>
<td>MSC</td>
<td>Manned Spacecraft Center</td>
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<tr>
<td>MCC</td>
<td>Mission Control Center</td>
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<td>MSFC</td>
<td>Marshall Space Flight Center</td>
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<td>MSFN</td>
<td>Manned Space Flight Network</td>
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<td>MT</td>
<td>Mission Timer</td>
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<tr>
<td>NR</td>
<td>North American Rockwell Corp.</td>
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<tr>
<td>OECO</td>
<td>Outboard Engine Cutoff</td>
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<tr>
<td>OI</td>
<td>Orbit Insertion</td>
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<tr>
<td>PCM</td>
<td>Pitch Control Motor</td>
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<tr>
<td>PCVB</td>
<td>Pyro Continuity Verification Box</td>
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<td>PGNCS</td>
<td>Primary Guidance, Navigation, and Control System</td>
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<tr>
<td>PSO</td>
<td>Pad Safety Officer</td>
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<tr>
<td>RCS</td>
<td>Reaction Control Subsystem</td>
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<td>RCSC</td>
<td>Reaction Control System Controller</td>
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<tr>
<td>RHC</td>
<td>Rotation Hand Control</td>
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<td>Right Hand Equipment Bay</td>
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<tr>
<td>RHFEB</td>
<td>Right Hand Fwd. Equip. Bay</td>
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<tr>
<td>RSO</td>
<td>Range Safety Officer</td>
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<tr>
<td>SBASI</td>
<td>Single Bridgewire Apollo Standard Initiator</td>
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<tr>
<td>SECO</td>
<td>S-IVB Engine Cutoff</td>
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<tr>
<td>SECS</td>
<td>Sequential Events Control Subsystem</td>
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<tr>
<td>SC</td>
<td>Spacecraft</td>
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<tr>
<td>SCS</td>
<td>Stabilization and Control Subsystem</td>
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<td>Spacecraft LM Adapter</td>
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<tr>
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<td>Service Module</td>
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<td>Service Module Jettison Controller</td>
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<td>Service Propulsion Subsystem</td>
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<tr>
<td>TB</td>
<td>Talkback</td>
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<td>Telecommunications Subsystem</td>
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<td>Transearth Coast</td>
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<td>TEI</td>
<td>Transearth Injection</td>
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<td>THC</td>
<td>Translation Hand Control</td>
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<td>Tower Jettison Motor</td>
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<td>TLC</td>
<td>Translunar Coast</td>
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<tr>
<td>TLI</td>
<td>Translunar Injection</td>
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<tr>
<td>TLM</td>
<td>Telemetered or Telemetry</td>
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<tr>
<td>UDL</td>
<td>Up-Data Link</td>
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