NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

APOLLO 17

ALL LAUNCH DATES

CHANGE A

CSM EXP/EVA CHECKLIST

PREPARED BY

EVA & EXPERIMENTS BRANCH

CREW PROCEDURES DIVISION

MANNED SPACECRAFT CENTER

HOUSTON, TEXAS

NOVEMBER 8, 1972

APOLLO 17

CSM EXP/EVA CHECKLIST

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ACKNOWLEDGMENT

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Apollo 17

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SIM EXPERIMENTS

1 SIM EXP PREP

1 SIM BASIC CONFIGURATION

AUTO RCS SELECT - OFF (Pnl 8)
  except A1,C2 (or D1,B2), A3,C4,B3,D4
  (Note: Use D1, B2 for transearth coast)
PCM BIT RATE - HIGH (Pnl 3)
S-BD AUX TV - SCI
SM/AC PWR - ON (Pnl 181)
LOGIC PWR (2) - DPLY/RETR
MAP CAM ON - STBY
MAP CAM TRACK - RETRACT
LS OPERATE - STBY
LS HF ANTENNA 1 & 2 - OFF
IMAGE MTN - OFF
LASER ALTM - OFF
RCDR - OFF
RADAR - OFF
MODE - HF
DATA SYS ON - ON
IR - ON
PAN CAM SELF TEST - HTRS
PAN CAM STEREO - STEREO
PAN CAM MODE - STBY
PAN CAM PWR - off (ctr)
V/h OVRD - off (ctr)
UV SPECT - ON
Verify map cam retr (tb - gray)
MAP CAM/LASER EXP COVERS - CLOSE (Pnl 278)
IR EXP COVER - CLOSE
UV EXP COVER - CLOSE

SIM
EXPERIMENTS

BACK

2 SIM STATUS CODE

X
1-2

COLOR

A	B	C	D	E
SIM ATT	MAP CAMR (COVER/ POSTION)	LS HF ANT	IR COVER	UV COVER
+ +XFWD - -XFWD * NON SIM	0 CLOSED 1 OPEN/EXTD 2 OPEN/RETR	0 RETR 1 EXTD	0 CLOSED 1 OPEN	0 CLOSED 1 OPEN
F	**G**	**H**	**I**	**J**
PAN CAMR	MAP CAMR/ LASER ALTM	LS	IR	UV
0 OFF/STBY 1 PWR/STBY 2 PWR/OPERATE 3 BOOST/STBY	0 OFF/OFF 1 STBY/OFF 2 ON/ON 3 STBY/ON 4 ON/OFF 5 ON (IMC OFF)/OFF	0 OFF 1 HF MODE 2 VHF MODE 3 RECEIVE ONLY 4 STBY	0 OFF 1 ON	0 OFF 1 ON

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3 PRE-SPS BURN PREP
LASER ALTM - OFF
ANTS, CAMR, & COVERS - RETR
LOGIC PWR (2) - OFF
SM/AC PWR - ON (Pnl 181)
MAP CAM ON - STBY
IMAGE MTN - OFF
PAN CAM PWR - BOOST

4 POST-SPS BURN PREP
PAN CAM PWR - OFF
LOGIC PWR (2) - DPLY/RETR

5 PWR DOWN - MIN PWR
BASIC CONFIGURATION (1.1) complete
MAP CAM ON - OFF
PAN CAM SELF TEST - off (ctr)
IR - OFF
UV SPECT - OFF
SM/AC PWR - OFF (Pnl 181)
S-BD AUX TV - off (ctr) (Pnl 3)
DATA SYS ON - OFF

6 KILL PWR
NONESS BUS - OFF (Pnl 5)

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7 OTHER SIM CONFIGURATIONS

1 SLEEP
ATT - +X fwd, 2.5° db
MAP CAM ON - STBY
LASER ALTM - OFF
Pan Cam PWR - OFF
UV and IR - COVER OPEN and ON

2 SIM BAY SECURE (Dumps, Thermal)
MAP CAM ON - STBY
Laser - OFF
Camr retr and covers closed
Pan Cam PWR - OFF
IR - ON/cover closed
UV - ON/cover closed

3 SIM BAY SECURE (Thruster)
SIM BAY SECURE (7.2) and ANT retracted

8 TALKBACK SUMMARY

MAP CAM - ON TB
1. T<45° or T>110°F, ON SW - ON or STBY
2. ~4 sec bp when IMAGE MTN mechanism ON to OFF or OFF to ON (if MAP CAM ON sw is STBY)
3. IMAGE MTN SW in INCR; IMC set at nominal 60NM (if MAP CAM ON sw is ON)

MAP CAM - TRACK EXTEND TB
BP when track is not fully extended or fully retracted (and TRACK sw in EXTEND or RETRACT)

PAN CAM TB
1. Malfunction when in OPERATE mode
   A. Lens rotation stops
   B. No film motion
   C. Supply spool empty (15-sec delay)
   D. No stereo gimbal (if in STEREO)
   E. Capping shutter failure
2. 2 sec bp when PWR SW, OFF to PWR
3. 2 sec bp when MODE SW, STBY to OPERATE (with PWR on)
4. 1 min bp during SELF TEST. If failure, 2 sec gray then bp.

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LS HF ANT EXTEND TB (2)
BP when ant not completely in or out
(and EXTEND sw in EXTEND or RETRACT)

LS HF ANT JETT TB
Gray - normal jett (JETT sw in JETT)
BP (JETT sw in JETT and EXTEND sw off)
- jett failure

LS OPERATE TB
BP ~3 sec, then gray, when RCDR & RADAR ON
and OPERATE sw STBY to OPERATE

If bp >5 sec:
1. Radar out of temp limits
2. Xmit pwr too low
3. Non-acceptable frequency
4. No film motion

When RADAR ON and OPERATE sw in STBY,

If bp >5 sec:
RADAR out of temp limits

COVER TB (3) (Pnl 278)
BP ~2 sec when cover not completely
open or closed (and cover sw in OPEN or
CLOSED)

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9 SCIENTIFIC DATA SYSTEM PREP
PCM BIT RATE - HIGH (Pnl 3)
S-BD AUX TV - SCI
DATA SYS ON - ON

Data system shutdown (as reqd)
IR - OFF
UV - OFF
DATA SYS ON - OFF
S-BD AUX TV - off (ctr)

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10 <u>SIM DOOR JETT</u>

Verify:
- MAP CAM TRACK - OFF (tb - gray)
- LS OPERATE - STBY
- HF ANTENNA 1 & 2 - off (ctr)
- MAP CAM IMAGE MTN - OFF
- LASER ALTM - OFF
- RCDR - off (ctr)
- RADAR - OFF
- LS MODE - HF
- DATA SYS ON - ON
- PAN CAM SELF TEST - off (ctr)
- PAN CAM STEREO - STEREO
- PAN CAM MODE - STBY (tb - gray)
- PAN CAM V/h OVRD - off (ctr)
- UV SPECT - OFF
- SM/AC PWR - ON

S-BD AUX TV - SCI
IR - ON
MAP CAM ON - STBY (possible bp during warmup)
On STDN cue,
- PAN CAM PWR - PWR (tb-bp 2 sec - gray)
- Wait 2 min
- PAN CAM PWR - BOOST

FC REACS VALVES - LATCH (Pnl 3)
cb LOGIC PWR (2) - close (Pnl 181)
LOGIC PWR (2) - JETT
Go/no go for SIM door jett (cue STDN)
DOOR JETT - jett (up)
DOOR JETT - off (down)
LOGIC PWR (2) - DPLY/RETR
FC REACS VALVES - NORM
SM RCS PRPLNT tb (8) - gray (verify) (Pnl 2)
SM RCS He tb (8) - gray (verify)
SM RCS SEC PRPLNT FUEL PRESS (4) - close
PAN CAM SELF TEST - HTRS
UV SPECT - ON
IR - OFF (on STDN cue)

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2 INFRA-RED SCANNING RADIOMETER

Exp - Laser altimeter opr, data system opr (1.9)
Lunar sounder off
FOV - 162° crosstrack scan, instr FOV 1.26°,
ground coverage (60NM) 2.2 KM at nadir
Sun avoidance - same as FOV
ATT - ±X fwd, ≤3.5° db
Dumps - none for 1 hr prior to and during opr

1 ACTIVATION
DATA SYS ON - ON (verify)
IR - ON

2 COVER OPEN
LOGIC PWR (2) - DPLY/RETR
IR EXP COVER - OPEN (tb-bp 2 or 3 sec-gray)

3 COVER CLOSE
LOGIC PWR (2) - DPLY/RETR
IR EXP COVER - CLOSE (tb-bp 2 or 3 sec-gray)

4 TERMINATION
IR - OFF

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3 FAR ULTRA-VIOLET SPECTROMETER

Exp - Lunar Sounder off
FOV - 12° X 20° rect (optical); 60° X 90° (unobstructed)
Sun avoidance - 20° to LOS (opr)
Att - mode 1: Near side terminator, +X fwd, +5° of nadir, 3°db
2: Far side terminator, -X fwd, ±5° of nadir, 3°db
3: Lunar grazing
4: Solar atmosphere
5: Stellar targets, TEC; LOS directed to selected celestial points
6: PTC Galactic Scan +X tilted away from sun
Dumps - none except special cases

1 ACTIVATION
DATA SYS ON - ON (verify)
UV SPECT - ON

2 COVER OPEN
LOGIC PWR (2) - DPLY/RETR
UV EXP COVER - OPEN (tb-bp 2 or 3 sec-gray)

3 COVER CLOSE
LOGIC PWR (2) - DPLY/RETR
UV EXP COVER - CLOSE (tb-bp 2 or 3 sec-gray)

4 TERMINATION
UV SPECT - OFF

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4 LUNAR SOUNDER

EXP - all other expts prohibited during all LS operate and receive-only modes
HIGH GAIN ANT must be off in HF and Receive-Only modes

No LS operation when docked with or within 1000 feet of LM to prevent inadvertent firings of LM pyros

1 ENABLE TLM

LUNAR SOUNDER OPERATE - STBY (verify)

CAUTION

The OPERATE sw must be in STBY
*before going RCDR - ON to *
*prevent film usage. *

RCDR - ON
MODE - HF
RADAR - ON

2 STANDBY

LS OPERATE - STBY
RCDR - ON
RADAR - ON

3 HF ANTENNAE DEPLOY

LOGIC PWR (2) - DPLY/RETR (Pnl 181)
PCM BIT RATE - HIGH
DATA SYS ON - ON
HF ANTENNA 1 - EXTEND (tb-bp ~1:05-gray)
- OFF (on STDN cue)
HF ANTENNA 2 - EXTEND (tb-bp ~1:20-gray)
- OFF (on STDN cue)

CAUTION

If no tb response within 12 sec
*or if tb-bp > 2:00 *
*HF ANTENNA - off (ctr) *
*Refer to Malf. Proc. X/1-27 *

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4 HF MODE ACTIVATION

At T-30 min,
- LS OPERATE - STBY
- RCDR - ON
- RADAR - ON
- RCDR - OFF
- HF Antennae Deploy (4.3) complete
- MODE - HF

Secure SIM bay:
- MAP CAM ON - OFF
- LASER ALTM - OFF
- IR - OFF
- PAN CAM SELF TEST - off (ctr)
- PAN CAM PWR - off (ctr)
- UV SPECT - OFF
- HIGH GAIN ANT POWER - OFF
- PCM BIT RATE HIGH - LOW
- DATA SYS ON - OFF
- SM/AC PWR - OFF

At T-15 min,
- RCDR - ON

At T-START,
- LS OPERATE - OPERATE

5 HF MODE TERMINATION

At T-STOP,
- LS OPERATE - STBY

At T-STOP + 1 min,
- RCDR - OFF
- RADAR - OFF
- SM/AC PWR - ON

6 VHF MODE ACTIVATION

At T-30 min,
- LS OPERATE - STBY
- RCDR - ON
- RADAR - ON
- RCDR - OFF
- MODE - VHF

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Secure SIM bay:
- MAP CAM ON - OFF
- LASER ALTM - OFF
- IR - OFF
- PAN CAM SELF TEST - off (ctr)
- PAN CAM PWR - off (ctr)
- UV SPECT - OFF
- DATA SYS ON - OFF
- SM/AC PWR - OFF

At T-15 min,
- RCDR - ON

At T-START,
- LS OPERATE - OPERATE

7 VHF MODE TERMINATION

At T-STOP,
- LS OPERATE - STBY

At T-STOP + 1 min,
- RCDR - OFF
- RADAR - OFF
- SM/AC PWR - ON

8 RECEIVE ONLY

At T-30 min,
- LS OPERATE - STBY
- RCDR - ON
- RADAR - ON
- RCDR - OFF
- HF Antennae Deploy (4.3) complete
- MODE - HF

Secure SIM bay:
- MAP CAM ON - OFF
- LASER ALTM - OFF
- IR - OFF
- PAN CAM SELF TEST - off (ctr)
- PAN CAM PWR - off (ctr)
- UV SPECT - OFF
- DATA SYS ON - OFF
- HIGH GAIN ANT POWER - OFF
- SM/AC PWR - OFF

At T-START,
- Configure DSE(HBR/RCD/FWD/CMD RESET)

At T-STOP,
- RADAR - OFF
- SM/AC PWR - ON

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9 HF ANTENNAE RETRACT

LOGIC PWR (2) - DPLY/RETR
PCM BIT RATE - HIGH
DATA SYS ON - ON
HF ANTENNA 1 - RETRACT (tb-bp ~1:35-gray)
- OFF (on STDN cue)
HF ANTENNA 2 - RETRACT (tb-bp ~1:35-gray)
- OFF (on STDN cue)

CAUTION

If no tb response within 12 sec
*or if tb-bp >2:00, *
*HF ANTENNA - off (ctr) *
*Refer to Malf. Proc. X/1-28 *

10 HF ANTENNAE JETTISON

P20 OPT 5 MNVR to JETTISON ATTITUDE
N78 (+000.00)
(+000.00)
(+180.00)
LOGIC PWR (2) - JETT
HF ANTENNA 1 & 2 - OFF (ctr) for proper tb indication

When in attitude:
HF ANTENNA JETT - JETT (mom)(tb-gray)
LOGIC PWR (2) - DPLY/RETR

5 PANORAMIC CAMERA

FOV - lens: 12.5° half-angle cone
39° fore/aft x 108° crosstrack (stereo)
11° fore/aft x 108° crosstrack (mono)
Sun avoidance - 66° fore/aft, 90° side (opr)
V/H sensor: ±10° LOS
Att - +X fwd
± 1/2° of nadir, 1/2° db
Thermal - 30 min max continuous opr
opr temp <85°, degraded resolution
15 min max sun on lens barrel (stowed)
Dumps - none for 3 hr prior to exp opr
exp off; lens stowed

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1 BOOST MODE (SPS MNVRS, LAUNCH, and TLI)
NONESS BUS - MNA
PAN CAM PWR - BOOST
After SPS mnvr,
  PAN CAM PWR - off (ctr)

2 TEMP CONTROL (continuous after door jett)
SM/AC PWR - on (up)
PAN CAM SELF TEST - HTRS
To turn htrs off,
  PAN CAM SELF TEST - OFF

3 ENABLE TLM
Data sys prep complete (verify)
SM/AC PWR - on (up)
PAN CAM MODE - STBY (verify)
PAN CAM PWR - PWR (tb-bp 2 sec-gray)
PAN CAM SELF TEST - HTRS (verify)
To turn TLM off,
  PAN CAM PWR - OFF

4 OPERATION
PAN CAM MODE - STBY (verify)
PAN CAM PWR - PWR (tb-bp 2 sec - gray)
Verify cam temps in limits (STDN)
PAN CAM STEREO - STEREO or MONO (per flt pln)
PAN CAM V/h OVRD - off (ctr)
PAN CAM MODE - OPR at T START (tb-bp 2 sec-gray)

```
*If tb stays bp, go to STBY for 30 sec,*
*  then back to OPR -                  *
*If tb-bp persists - out of film or    *
*  hdwr failure                        *
*PAN CAM MODE - STBY                   *
*Consult STDN                          *
```

Note: The V/h OVRD sw has 3 settings:
  HI ALT - 57-64NM/1 meter resolution; 55-75NM/
           2 meter res
  off (ctr) - Automatic V/h control
  LO ALT - 53.4-57NM/1 meter res; 49-65NM/
           2 meter res
  (Set to HI or LO only upon direction from
     STDN)

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5 TERMINATION

PAN CAM MODE - STBY at T STOP
STDN verify lens stow

After lens stow (STDN),
PAN CAM PWR - OFF

LENS STOW LOGIC (NO COMM):
To insure lens stow,
PAN CAM MODE - STBY (T STOP)
PAN CAM MODE - STBY (30 sec) at sub-solar pt. (±5°)
PAN CAM PWR - OFF

Note: For stereo mode, pause at STBY for 30 sec, then turn pwr off. For mono, pause 45 sec. This insures camera will cycle completely.

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6 MAPPING CAMERA/LASER ALTIMETER

Exp - Laser Altimeter opr
FOV - 74° sq (cam)
12° half-angle cone (stellar)
Sun avoidance - ±37° LOS (non-opr), 4 min max
±82° LOS (opr)
stellar: ±25° LOS (opr)
Att - +X fwd (lighted side); ±X fwd (dark side)
± 1/2° of nadir (± 1/2° of att for obliques), 1/2°db
Dumps - none for 3 hr prior to exp opr
exp off, cover closed

1 STANDBY (SPS MNVRS, LAUNCH, TLI, AND WARMUP)
NONESS BUS - MNA
SM/AC PWR - on (up)
MAP CAM ON - STBY (If ON, pause at OFF 30 sec)
Note: MAP CAM tb may be bp during warmup
MAP CAM IMAGE MTN - OFF (tb-bp ~4 sec-gray)

2 COVER OPEN
LOGIC PWR (2) - DPLY/RETR
MAP CAM/LASER EXP COVERS - OPEN (tb-bp 2 or 3 sec - gray)

3 DEPLOYMENT
Verify cover open
LOGIC PWR (2) - DPLY/RETR
MAP CAM TRACK - EXTEND (tb-bp ~1:20 - gray)

4 OPERATION
LASER ALTM - ON

CAUTION
LASER ALTM MUST NOT BE OPERATED WITH COVER CLOSED

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MAP CAM ON - STBY (tb-gray)(verify)
MAP CAM IMAGE MTN - ON (tb-bp ~4 sec-gray)
MAP CAM ON - ON at T START

If tb goes bp, go to STBY
* and consult STDN *

MAP CAM IMAGE MTN - INCR (mom) (per MSFN)
Note: tb-bp 57-61NM
bp+1 54-57NM
bp+2 <54NM
bp+3 65-125NM
bp+4 61-65NM

5 TERMINATION
MAP CAM ON - OFF (30 sec) - STBY
MAP CAM IMAGE MTN - OFF (tb-bp ~4 sec - gray)
LASER ALTM - OFF

6 RETRACTION
LOGIC PWR (2) - DPLY/RETR
MAP CAM TRACK - RETRACT (tb-bp ~1:20 - gray)

7 COVER CLOSE
Verify steps 5 & 6 complete.
LOGIC PWR (2) - DPLY/RETR
MAP CAM/LASER EXP COVERS - CLOSE
(tb-bp 2 or 3 sec - gray)

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7 PAN AND MAP CAMERA FILM CYCLING (24+6 hr)

VERIFY:
- cb SCI EQUIP SEB 1&2 - close (Pnl 5)
- NONESS BUS - MNA
- cb SM SECTOR 1 AC2 (3) - close (Pnl 181)
- MAP CAM IMAGE MTN - OFF

DATA SYS ON - ON
S-BD AUX TV - SCI
SM/AC PWR - on (up)
MAP CAM ON - STBY (tb-gray)
PAN CAM MODE - STBY
PAN CAM PWR - PWR (tb-bp 2 sec - gray)
PAN CAM SELF TEST - HTRS
On STDN cue,
- ACQ STDN, HGA: REACQ, NARROW
  - HGA P -40, Y +90

PCM BIT RATE - HIGH
On STDN cue,
- MAP CAM ON - ON (2 min) - OFF
- PAN CAM SELF TEST - SELF TEST (mom)
  - (tb-bp 1 min - gray)

Wait 10 sec
PAN CAM PWR - OFF (ctr)
After MAP CAM OFF for 30 sec,
- SM/AC PWR - OFF

S-BD AUX TV - off (ctr)
PCM BIT RATE - LOW

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8 LASER ALTIMETER

Exp - MC cover open
MC extd (for more than 2 hr opr)
FOV - .02°
Sun avoidance - direct at sun (non-opr)
±10° LOS (opr)
Att - ±2° of nadir, 5° deadband
Dumps - exp off, cover closed

1 COVER OPEN
LOGIC PWR (2) - DPLY/RETR
MAP CAM/LASER EXP COVERS - OPEN
(tb-bp 2 or 3 sec - gray)

CAUTION
Laser Altm must not be operated with cover closed

2 OPERATION
Verify map cam cover open
Extend map cam/laser altm if laser is to be operated longer than 2 hr.
NONESS BUS - MNA
SM/AC PWR - on (up)
LASER ALTM - ON

3 TERMINATION
LASER ALTM - OFF

4 COVER CLOSE
LOGIC PWR (2) - DPLY/RETR
Verify MAP CAM TRACK retracted
MAP CAM/LASER EXP COVERS - CLOSE
(tb-bp 2 or 3 sec - gray)

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9 SIM EQUIPMENT BUS LOSS LIST

1 AC BUS 2
LASER ALTIMETER
LUNAR SOUNDER
PAN CAMERA

2 MAIN BUS (A or B)
LASER ALTIMETER (B)
LUNAR SOUNDER:
  RADAR (A)
  OPTICAL RECORDER (B)
MAPPING CAMERA (B)
PAN CAMERA (A)
Cover Operation & tb:
  IR RADIOMETER (A)
  MAP CAM/LASER EXP (A)
  UV SPECTROMETER (A)
Extend & Retract Function & tb:
  LUNAR SOUNDER ANTENNAE:
    HF 1 (A)
    HF 2 (B)
  MAPPING CAMERA (A)

3 LOGIC BUS (A or B)
SIM Door (A & B)
Cover Operation & tb:
  IR RADIOMETER (A)
  MAP CAM/LASER EXP (A)
  UV SPECTROMETER (A)
Extend & Retract Function & tb:
  LUNAR SOUNDER ANTENNAE:
    HF 1 (A)
    HF 2 (B)
  MAPPING CAMERA (A)

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4 JETTISON BUS (A or B)
LUNAR SOUNDER ANTENNAE (A & B)
SIM Door (A & B)

5 EXPERIMENT BUS (1, 2 or 3)
IR RADIOMETER (1)
LASER ALTIMETER (1 & 2)
LUNAR SOUNDER (3)
MAPPING CAMERA (2)
PANORAMIC CAMERA (1)
UV SPECTROMETER (3)

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SIM BAY ATTITUDE CONTROL
FAILURE MATRIX

FAILED AUTO COIL	RHC	PULL CB CONTR/DIRECT	ROT CONTR PWR SWITCH
A3 (+ PITCH) B3 (+YAW) C4 (- PITCH) D4 (- YAW)	#2	2 - MNB 2 - MNA 2 - MNB 2 - MNA	DIRECT 2 MNA/MNB (ROT CONTR PWR NORMAL 2 - OFF)
A3 (+ PITCH) B3 (+ YAW) C4 (- PITCH) D4 (- YAW)	#1	1 - MNA 1 - MNB 1 - MNA 1 - MNB	DIRECT 1 MNA/MNB (ROT CONTR PWR NORMAL 1 - OFF)

(Configuration for firing a single CSM RCS direct jet when a forward CSM RCS auto coil has failed)

Note: For auto coil failures of A3(+P) or B3(+Y), jets C3(+P) or D3(+Y) may be enabled to retain auto control.

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DATE

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DATE _____

DATE 9/29/72

INSTRUMENTS SCI EQUIP
SEB 1

SIM MALFUNCTION PROCEDURES

DATE 9/29/72

BACK

COLOR_____

X
1-24

SIM MALFUNCTION PROCEDURES

INSTRUMENTS SCI EQUIP
SEB 2

DATE 9/29/72

INSTRUMENTS SCI EQUIP
HATCH

DATE 9/29/72

DATE

LUNAR SOUNDER EXP MALFUNCTION PROCEDURES

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X
1-27

HF ANTENNA DEPLOYMENT MALFUNCTION PROCEDURE

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DATE

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X
1-28

HF ANTENNA RETRACTION MALFUNCTION PROCEDURE

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DATE

DATE 9/29/72

SIM EXP
ORIENTATION

DATE

X
1-29

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UV SPECTROMETER ORIENTATION

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1 ALFMED (GET 68)

Review ALFMED Experiment Notes

All don LtWt Headsets
Unstow blindfolds (A8, Sec 2)
Unstow ALFMED (A8, Sec 1)
Remove cover plate and leave in A8, Sec 1
Unstow vacuum cleaner cable (A2, Sec 3)
PNL 201 AC UTIL PWR - OFF (verify)
ALFMED PWR sw - OFF (verify)
Conn vac cleaner cable to ALFMED &
AC util outlet
PNL 201 AC UTIL PWR - on (up)
All to couches (ALFMED in ctr.)
ALFMED CLUTCH - OPERATE
Don ALFMED (with blindfold)
Photograph CMP with ALFMED on (bottom & side) to
see position on head & in S/C
CM/NK/55/CIN(Use camr mtr, focus)
Record MAG, FR # _____
CDR don blindfold
LMP prepare to copy CMP & CDR comments
Report start of experiment and crew location in CM
ALFMED PWR - ON (Give verbal "MARK" and record GET)

At end of experiment (after 60 min):
- Doff blindfolds
- ALFMED PWR sw - OFF (Give verbal "MARK" and record GET)
- Photograph CMP with ALFMED on (bottom & side) to see position on head & in S/C
  - CM/NK/55/CIN(Use Camr mtr, focus)
  - Record MAG, FR # _____
- Doff ALFMED
  - *If motor did not shut*
  - *off automatically at *
  - *the end of 60 min, *
  - *wait 5 min before *
  - *proceeding *
- ALFMED CLUTCH - Mid position (rap on lower frame)
- Listen for moving frame
- ALFMED CLUTCH - OPERATE, then STOW
- PNL 201 AC UTIL PWR - OFF
- Disconnect vacuum cleaner cable from ALFMED
- Install cover plate on ALFMED & stow (A8, Sec 1)
- Stow blindfolds (A8, Sec 2)
- Discon & stow vac cleaner cable (A2, Sec 3)

CM EXPERIMENTS

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ALFMED EXPERIMENT NOTES

PRIORITY OF REPORTING (formal sessions)

Rept all light flashes to MSFN (VOX mode)

1. Time (mark)
2. Eye (left or right)
3. Type of event (streak, star, cloud, etc)
4. Location in visual field
5. Remarks (color, brightness, apparent motion of streaks)

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GENERAL QUESTIONS (all sessions)

1 Is drk adapt reqd? (ΔT to first flash)

2 Any subtle halos, glows or clouds (espec in periphery) alone or with other events?

3 Any apparent propogation of streaks? (Seem to begin at one end & propogate like an O'scope trace?) Try to est spd & length (in fraction of visual field). How sharp or diffuse are streaks?

4 If there is a coincidence bet two observers, could 1st MARK also be used for 2nd obsvr?

5 Any marked difference (freq or other) at different mission times? Try to note: Phase of mission (EO, TLC, LO, TEC), Loc & att of CM, Physical condt (fatigue, hunger, thirst, etc) Note diff in freq (etc) between couch & LEB. Up Sun., Dn Sun.

6 During lunar orbit, is there diff depending on orientation WRT lunar surface & SM? Is there a diff from orbit to orbit?

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DATE

DATE _____

CREWMAN		TIME	EYE		TYPE OF EVENT					LOCATION IN VISUAL FIELD	REMARKS
CDR	CMP		L	R	STREAK/DIRECTION		STAR	CLOUD	OTHER		

DATE 9/29/72

X
2-3a

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X
2-3b

CREWMAN		TIME	EYE		TYPE OF EVENT				LOCATION IN VISUAL FIELD	REMARKS
CDR	CMP		L	R	STREAK/DIRECTION	STAR	CLOUD	OTHER		

DATE _____

(TRIM FRONT PAGE ON SOLID CROP MARKS: BACK PAGE ON DASH CROP MARKS.)

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CREWMAN		TIME	EYE		TYPE OF EVENT				LOCATION IN VISUAL FIELD	REMARKS
CDR	CMP		L	R	STREAK/DIRECTION	STAR	CLOUD	OTHER		

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X
2-3c

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X
2-3d

CREWMAN		TIME	EYE		TYPE OF EVENT					LOCATION IN VISUAL FIELD	REMARKS
CDR	CMP		L	R	STREAK/DIRECTION		STAR	CLOUD	OTHER		

DATE

(TRIM FRONT PAGE ON SOLID CROP MARKS: BACK PAGE ON DASH CROP MARKS.)

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CREWMAN		TIME	EYE		TYPE OF EVENT				LOCATION IN VISUAL FIELD	REMARKS
CDR	CMP		L	R	STREAK/DIRECTION	STAR	CLOUD	OTHER		

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X

2-3e

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X
2-3f

CREWMAN		TIME	EYE		TYPE OF EVENT					LOCATION IN VISUAL FIELD	REMARKS
CDR	CMP		L	R	STREAK/DIRECTION		STAR	CLOUD	OTHER		

DATE _____

(TRIM FRONT PAGE ON SOLID CROP MARKS: BACK PAGE ON DASH CROP MARKS.)

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CREWMAN		TIME	EYE		TYPE OF EVENT					LOCATION IN VISUAL FIELD	REMARKS
CDR	CMP		L	R	STREAK/DIRECTION		STAR	CLOUD	OTHER		

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X
2-3g

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X
2-3h

CREWMAN		TIME	EYE		TYPE OF EVENT					LOCATION IN VISUAL FIELD	REMARKS
CDR	CMP		L	R	STREAK/DIRECTION		STAR	CLOUD	OTHER		

DATE _____

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CREWMAN		TIME	EYE		TYPE OF EVENT					LOCATION IN VISUAL FIELD	REMARKS
CDR	CMP		L	R	STREAK/DIRECTION		STAR	CLOUD	OTHER		

DATE 9/29/72

X
2-3i

(TRIM FRONT PAGE ON SOLID CROP MARKS: BACK PAGE ON DASH CROP MARKS.)

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X
2-3j

CREWMAN		TIME	EYE		TYPE OF EVENT				LOCATION IN VISUAL FIELD	REMARKS
CDR	CMP		L	R	STREAK/DIRECTION	STAR	CLOUD	OTHER		

DATE

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CREWMAN		TIME	EYE		TYPE OF EVENT					LOCATION IN VISUAL FIELD	REMARKS
CDR	CMP		L	R	STREAK/DIRECTION		STAR	CLOUD	OTHER		

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X
2-3i

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X
2-31

CREWMAN		TIME	EYE		TYPE OF EVENT				LOCATION IN VISUAL FIELD	REMARKS
CDR	CMP		L	R	STREAK/DIRECTION	STAR	CLOUD	OTHER		

DATE _____

2 HEAT FLOW AND CONVECTION (HFC)

PREPARATION

Unstow HFC (A7)
Open lids HFC and lock and mount on PNL 122
  using bungee straps (LH LEB with lineal
  cell towards +X)
Verify flood light ON
Install all window shades
Verify PNL 16 UTIL PWR - OFF
Verify PNL 100 UTIL PWR - OFF
Verify HFC EXP PWR - OFF
Position HFC light
Attach HFC light cable
Connect HFC (DAC) power cable to HFC
  and PNL 100
Configure Camera
  CM/DAC/10/CIN/(T1.8,1/60,1') 1 fps
Expand camera mount and mount camera
Connect DAC power cable to PNL 16
  and camera

PNL 100 UTIL PWR - ON
PNL 16 UTIL PWR - ON
FDAI scale - 5/1
PCM BIT RATE - HIGH

Wind watch and record time vs GET
  WATCH __ __:__ __:__ __
  GET __ __ __:__ __:__ __ (USE CMC)
Mount watch to lineal unit support
  bracket (orange color code)

EXP/HEAT SELECT - LIGHT 3
EXP PWR - ON
  (light ON)

NOTE - HFC should be kept motionless
       during all tests

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RADIAL & LINEAL TEST #1

0:00 Reset stop watch and start
START DAC
1:00 EXP/HEAT SELECT - RADIAL & LINEAL
11:00 EXP/HEAT SELECT - LIGHT 5
16:00 END OF TEST
Proceed to next test

FLOW PATTERN HI HEAT TEST

1 FLOW - OPEN (CCW - 4 Turns)

2 Unlock and open FLOW PATT cover
(LK, CCW - 1/4 Turn)

3 Rotate FLUID INJECT (CW - 4 Turns until
fluid fills bottom retainer lip and
is level with lip over entire pan)

NOTE - If fluid is jarred out of
pan, open cover, wipe clean
with tissues and repeat
step 3.

0:00 Reset stop watch and start
2:00 EXP/HEAT SELECT FLOW PATT - HI
17:00 EXP/HEAT SELECT - LIGHT 4
19:00 Rotate FLUID INJECT (CCW - 4 Turns)
Stuff two tissues into FLOW PATT
pan
Close cover secure
FLOW - CLOSE (cw - 4 Turns)
EXP PWR - OFF
DAC - OFF

Let HFC unit cool down

Start PTC spin up wait 1 hr
until next test

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RADIAL & LINEAL TEST #2

0:00 Reset stop watch and start
DAC - ON
1:00 EXP PWR - ON
EXP/HEAT SELECT - LIN + RAD
11:00 EXP/HEAT SELECT - LIGHT 4
(cool down)
16:00 END OF TEST
Proceed to next test

FLOW PATTERN LOW HEAT TEST

Unlock and open FLOW PATT LID
Remove tissue, wipe pan to remove residual fluid
FLOW - OPEN (CCW - 4 Turns)
Rotate FLUID INJECT - CW, slowly 8 revs exactly, after fluid sighted

0:00 Reset stop watch and start
2:00 EXP/HEAT SELECT - FLOW PATT - LO
17:00 EXP/HEAT SELECT - LIGHT 4
19:00 Rotate FLUID INJECT, CCW to stop (about 8 Turns)
Stuff two tissues in FLOW PATT pan, close cover and lock
DAC - OFF
Record GET
EXP PWR - OFF
PNL 16 UTIL PWR - OFF
PNL 100 UTIL PWR - OFF

Remove liquid crystal sample from HFC cover
Tape patch face down to DAC MAG

Disassemble and stow equipment

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X
2-7

3 SOLAR CORONA (SUNSET) (GET 208,)
(EL-9 FR REQ) (DARKESS REQ)

1 P20 OPT 5 (-X FORWARD, ORB RATE)

2 Configure camera

Note: Take protection frames before mounting camera in window

Tape flood light
CM4/EL/80/VHBW - BRKT(f2.8,1/500,INF)
Remote control cable, PCM cable
Record MAG _____, FR # _____
Cycle 1 FR - Cover lens
Shutter to 1/60
Mount in window
Prep penlights (2)
Verify shutter settings
Dim interior lights

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X
2-8

3 SEQUENCE #1 - Timing accuracy reqd ~2 sec

0:00 MISSION TIMER, RESET/START
T START __ __ __:__ __:__ __
__ __ __:__ __:__ __
(SS - 5 MIN)
PCM BIT RATE - HIGH (verify)

EL
4:30 CMC MODE - FREE
5:10 1/60 - 1 FR
HOLD DOWN TRIGGER
5:20 1/30 - 1 FR
Skip one stop
5:30 1/8 - 1 FR
Skip one stop
5:40 1/2 - 1 FR
5:50 1 sec - 1 FR
Shutter to B
6:00 4 sec - 1 FR
6:15 10 sec - 1 FR
CMC MODE - AUTO
1/500 - 1 FR (cover lens)

4 Lights up
Record FR # _____

NOTES

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X
2-9

4 SOLAR CORONA (SUNRISE)
(EL-9 FR REQ)(DARKNESS REQ)(GET 137,232)

1 P20 OPT 5 (+X FORWARD, ORB RATE)

2 Configure camera

CM4/EL/80/VHBW - BRKT(f2.8,1/500,INF)
Remote control cable, PCM cable
Record MAG _____, FR # _____
Cycle 1 FR _____
Set to B - Install
Verify shutter settings
Prep penlights (2)
Dim interior lights

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X
2-10

3 SEQUENCE #1 - Timing accuracy reqd ~2 sec

0:00 MISSION TIMER,RESET/START
T START __ __ __:__ __:__ __
__ __ __:__ __:__ __
(SR-7 MIN)
PCM BIT RATE - HIGH (verify)

EL
4:30 CMC MODE - FREE
HOLD DOWN TRIGGER
5:45 10 sec - 1 FR
6:00 4 sec - 1 FR
6:10 Shutter to 1 sec - 1 FR
6:20 1/2 - 1 FR
Skip one stop
6:30 1/8 - 1 FR
Skip one stop
6:40 1/30 - 1 FR
6:50 1/60 - 1 FR
CMC MODE - AUTO
NOTE: Remove camera for protection frames
1/500 - 1 FR (Cover lens)

4 Lights up
Record FR # _____

NOTES

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X
2-10a

CMP SOLAR CORONA SKETCH PAD

SUNRISE, GET _____

SUNSET, GET _____

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SOLAR CORONA
SKETCH PADS

BACK

COLOR _____

X
2-10b

SUNRISE, GET _____

SUNSET, GET _____

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SOLAR CORONA
SKETCH PADS

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X
2-10c

CDR SOLAR CORONA SKETCH PAD

SUNRISE, GET _____

SUNSET, GET _____

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DATE

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X
2-10d

SUNRISE, GET _____

SUNSET, GET _____

DATE _____

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X
2-10e

LMP SOLAR CORONA SKETCH PAD

SUNRISE, GET _____

SUNSET, GET _____

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DATE

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X
2-10f

SUNRISE, GET _____

SUNSET, GET _____

DATE _____

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5 ZODIACAL LIGHT (POL)
(24 FR REQ) (GET 185)
(+X FORWARD, ORB RATE)
(P20 OPT 2 PER FP)

1 Configure camera
CM4/NK/55/VHBW-BRKT(30 DEG) POL FIL
(f1.2,1/1000,INF)
Record MAG _____, FR # _____
Prep penlights
Dim interior lights
Tape flood lights

2 ZODIACAL SEQ

Timing accuracy reqd ~2 sec
Start pitch rate

MIN SEC
0:00 MISSION TIMER, RESET/START
T START _____:__ __:__ __
(SR-15 MIN)
CYCLE 1 FR
Change shutter to T
For each shutter speed
Take 2 FR - one with POL FIL -0 DEG,
One with POL FIL -90 DEG
1:00 90 sec - 2 FR
5:00 60 sec - 2 FR
8:00 30 sec - 2 FR
10:00 20 sec - 2 FR
11:30 10 sec - 2 FR
13:00 5 sec - 2 FR
13:30 3 sec - 2 FR
13:50 Shutter to 1 - 2 FR
Skip one stop
14:10 Shutter to 1/4 - 2 FR
Skip one stop
14:30 Shutter to 1/15 - 2 FR
Skip one stop
14:50 Shutter to 1/60 - 2 FR
Shutter to 1/1000 - 1 FR (Cover lens)
Lights up

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X
2-12

3 Record FR # _____
Stow camera

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X
2-13

6 ZODIACAL LIGHT RED/BLUE
(13 FR REQ) (GET 133 RED,163 BLUE)
(+X FORWARD, ORB RATE)
(P20 OPT 5 PER FP)

1 Configure camera
First run use red filter
Second run use blue filter
CM4/NK/55/VHBW-BRKT(0 DEG)
(f1.2,1/1000,INF)
Record MAG _____, FR # _____
Enable jets C3, D3
Disable jets A3, B3
Prep penlights
Dim interior lights
Tape flood lights

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2 ZODIACAL SEQ

Timing accuracy reqd ~2 sec

```
MIN SEC
  0:00 MISSION TIMER, RESET/START
       T START __ __ __:__ __:__ __
               __ __ __:__ __:__ __
               (SR-15 MIN)
       CYCLE 1 FR
       Change shutter to T
       V22 N79, +005.00
  1:00 90 sec - 1 FR
  5:00 60 sec - 1 FR
  8:00 60 sec - 1 FR
 10:00 40 sec - 1 FR
 11:30 20 sec - 1 FR
 13:00 10 sec - 1 FR
 13:30  6 sec - 1 FR
 13:50 Shutter to B, 2 sec - 1 FR
 14:10 Shutter to 1/2 - 1 FR
 Skip one stop
 14:30 Shutter to 1/8 - 1 FR
 Skip one stop
 14:50 Shutter to 1/30 - 1 FR
       Shutter to 1/1000 - 1 FR (Cover lens)
       Lights up
 CMC - FREE
 V22 N79, +000.50
 Enable jets A3, B3
 Disable jets C3, D3
 CMC - AUTO
```

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3 Record FR # _____
Stow camera

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7 GALACTIC PHOTO (GET)
(4 FR REQ)

1 ATT MNVR REQ - GALACTIC PT #1
Check star pattern
F 50 18
V62

2 Configure camera
Install camera shield with camera
in the 30 DEG BRKT position
CM4/NK/55/VHBW-BRKT(30 DEG)(f1.2,1/1000,INF)
Record MAG, FR #_____
Tape flood lights
Dim interior lights

3 Damp rates - wait 5 MIN
DESIRABLE < .05 DEG/sec
ATT ERROR < 5 DEG

4 CMC MODE - FREE (DOUBLE UMBRA REQ)
Cycle 1 FR _____
Shutter to T
Use kitchen timer
5 MIN - 1 FR _____
CMC MODE - AUTO
MNVR to GALACTIC PT ATT #2 R_____P_____Y_____
Check star pattern
Damp rates - wait 3 MIN
CMC MODE - FREE
5 MIN - 1 FR _____
Shutter to 1/1000 - 1 FR _____
CMC MODE - AUTO
Lights up
V61

5 Record FR #_____

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8 L-4 LIBRATION POINT PHOTO (GET)
(6 FR REQ)

1 ATT MNVR REQ
Leave F 50 18
V 62 E
Check star pattern

2 Configure camera
Install camera shield with camera
in the 30 DEG BRKT position
CM4/NK/55/VHBW - BRKT (30 DEG)(f1.2,1/1000,INF)
Record MAG, FR # _____
Dim interior lights
Tape flood lights

3 Damp rates - wait 5 MIN
DESIRABLE <.03 DEG/sec
ATT ERROR <5 DEG
Check TARGET CHART

4 CMC MODE - FREE (DARKNESS REQ)
Cycle 1 FR _____
Shutter to T
1 MIN - 1 FR _____
3 MIN - 1 FR _____
CMC MODE - AUTO
Trim ATT
Damp rates - wait 3 MIN
CMC MODE - FREE
1 MIN - 1 FR _____
3 MIN - 1 FR _____
Shutter to 1/1000 - 1 FR _____
CMC MODE - AUTO
LIGHTS up

5 Record FR #_____
V 61 E

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9 LUNAR SURFACE IN EARTHSHINE (GET 121)
(40 FR REQ)

1 Configure camera
CM5/NK/55/VHBW (f1.2,1/8,INF)
Record MAG, FR # _____
Install window shades except CM5
Dim interior lights

2 Point camera SOUTH window 5

NOTE: Position long axis of frame
NORTH-SOUTH

Timing accuracy reqd ±5 sec

0:00	MISSION TIMER: RESET/START(T START)
	T START __ __ __:__ __ __:__ __ (SS)
2:00	Cycle 1 FR
2:30	Cycle 1 FR
3:00	Cycle 1 FR
3:30	Cycle 1 FR
4:00	Cycle 1 FR
4:30	Cycle 1 FR
5:00	Cycle 1 FR
5:30	Cycle 1 FR
6:00	Cycle 1 FR
6:30	Cycle 1 FR
7:00	Cycle 1 FR
7:30	Cycle 1 FR
8:00	Cycle 1 FR
8:30	Cycle 1 FR
9:00	Cycle 1 FR
9:30	Cycle 1 FR
10:00	Cycle 1 FR
10:30	Cycle 1 FR

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X
2-18

Point camera NORTH window 3

12:30 Cycle 1 FR
13:00 Cycle 1 FR
13:30 Cycle 1 FR
14:00 Cycle 1 FR
14:30 Cycle 1 FR
15:00 Cycle 1 FR
15:30 Cycle 1 FR
16:00 Cycle 1 FR
16:30 Cycle 1 FR
17:00 Cycle 1 FR
17:30 Cycle 1 FR
18:00 Cycle 1 FR
18:30 Cycle 1 FR
19:00 Cycle 1 FR
19:30 Cycle 1 FR
20:00 Cycle 1 FR
20:30 Cycle 1 FR
21:00 Cycle 1 FR
21:30 Cycle 1 FR
22:00 Cycle 1 FR
22:30 Cycle 1 FR
23:00 Cycle 1 FR

3 Lights up
Record FR # _____

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10 COMET PHOTOS

1 Configure camera
CM/DAC/SXT/VHBW (1/1000) 24 fps
Record MAG, % _____
UTILITY PWR - ON

2 V49 MNVR to COMET ATT

3 G&N PWR (AC) - OFF (PNL 5)

4 P52 (No marks) N70 (00000)
N88 ( ) _____
( ) _____
( ) _____
Dim LEB lights

5 Verify target through SXT
Mount DAC on SXT
NOTE: Green light on when shutter closes
Dim interior lights
DAC - ON 24 fps - 2 sec
Change to TIME and 1/60
60 sec - 1 FR
20 sec - 1 FR
5 sec - 1 FR
Change to 24 fps and 1/1000
Run DAC for 2 sec, lights up

6 Record MAG and % _____
Remove and stow DAC
G&N PWR - AC1 or AC2 (PNL 5)
Lights up

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BIOMEDICAL URINE SAMPLING SYSTEM (BUSS)

BUSS

VOIDING

Unstow BUSS from stowage package (U1)
Insert BUSS into cover (shut off valve handle exposed), snap cover
Don roll-on cuff at receiver end of container
Open shut off valve
Void urine
Manipulate residual urine from cuff into receiver
Close shut off valve
Doff cuff
Temp stow BUSS

SAMPLE COLLECTING

Remove cover from BUSS
Agitate urine for approx one min (until tracer shows thorough mix)
Detach sample container from BUSS
Record GET on sample container
Connect sample container to BUSS with mating halves
Fill sample container by squeezing BUSS
Squeeze urine from sample container to BUSS, agitate 5 sec with sample container collapsed
Assemble constraint over sample container
Refill sample container (until tight against restraint)
Disconnect sample container

STOWING AND DUMPING

Remove sample container from restraint
Stow sample container in fecal transfer bag
Temp stow restraint

Dump urine from BUSS through dump system per CSM Systems Checklist, S/1-11
Disconnect empty BUSS, discard in TSB

Note: Do not dump last BUSS used by each crewman. Stow last BUSS's (3) in fecal transfer bag.

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BUSS

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1 CM EVA PREP

CABIN PREP FOR EVA

CDR and LMP don biomed harness and verify operation
Stow Optics
Pnl 379 Prim accum fill vlv ON until 50-55%, then OFF
Temp stow A9 rock bag between PGA bag and A9 container
Install EVA stabilizer strut
Unstow 2 CM EVA and 2 EMER cue cards (R2), add turnover tape and attach to MDC

Stow MDC ingress bar
Verify ORDEAL stowed
Stow COAS

Unstow EVA umbilical bag from side of A7, attach 4 snaps to top of A4, A5 & A6
Discon inboard hooks on A2 Decon bag, attach to handhold on L3
Discon inboard hooks on A7 Decon bag, attach to R9 handle
Stow LEVA bags (2) in tunnel using short bungees (Remove tunnel TSB, if req'd)
Retrieve JETT bag, secure draw string, tape (VW pouch)
Temp stow JETT bag
Verify DAC mag FF in F-2
Unstow from A8:
- Sect-1 1-interconnect - stow in CMP TSB (top pkt)
- Sect-1 EMU maint kit, stow in CMP TSB (top pkt)
- Sect-2 CWG's (3), stow in CMP TSB
- Sect-2 Biomed harness (3), stow in CMP TSB, or verify unstowed and/or donned
- Comm carriers (3), stow in CMP TSB (top pkt)
- Sect-3 Tool kit - verify jack screws fully opened inside, snap 2 snaps to LH girth ring
- Close A8

Unstow MDC guards (3) and TV pole from side of A8

Stow TV pole on RH LEB
Install MDC guards

Unstow From A2
- Sect-3 EVA bag, snap top, bot & side to center LEB
- Sect-3 CMP EV gloves - stow CMP TSB (top pkt)
- Sect-3 heel clips and vac cleaner bag - stow in A7 after removing OPS
- Sect-1 Entry tiedown ropes and headrest pads stow in A7
- Sect-1 Lunar Sounder cassette bag - stow in EVA bag
- Sect-1 FCS - stow in LH TSB
- Sect-2 Tissue dispenser - stow in LH TSB, top pkt
- Sect-2 Pressure Gage - Place in EVA bag (Wrist Tether pouch)
- Close A2

Stow A9 rock bag in A7
Close A7

Perform OPS Checkout per decal
- OPS press 5380-6380
- Hose locked
- O2 vlv - Open, press 3.4-4.0
- O2 vlv - Close (Reg press decrease)

Snap OPS thermal cover on LEB above B3

Pnl 1 - TRANS CONT PWR - OFF (verify)
ROT CONTR PWR NORMAL (2) - OFF
ROT CONTR PWR DIRECT (2) - OFF
Verify THC and both RHC's locked
Stow RHC No. 1 in F2

Remove THC, secure behind Decon bag straps on L3
Install RHC No. 2 on THC mount, route under couch

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Pnl 1 - ROT CONTR PWR NORMAL #2 - AC/DC
Lower handcontroller struts and lock the
handcontroller mount push locks
Install meter covers (4 EVA Bag)
Add alignment mark on counterbalance
Disconnect Hatch counterbalance Lock Pin
(Tool B, Turn CCW to STOP)

TV AND DAC PREP

Unstow from F1
DAC, install mag FF (F2)
Power cable
Close F1
Unstow 10mm lens (B3), attach to DAC

Discon inboard hook on A1 DECON bag and attach
to Y-Y strut
Unstow from A1
Sect-2 TV camera
Sect-2 Power cable, beside camera
Sect-2 Monitor cable, under camera
Sect-2 TV monitor
Sect-3 1 Pkg towels, stow in CDR TSB, top pkt
Close A1
Attach cameras to pole (TV - LH dovetail)
Pnl 3 - S-BD AUX TV - SCI
Connect cables to cameras:
TV power cable P20 to J20 on camera
TV monitor cable P10 to J10 on camera
16mm power cable
Route wiring along pole
Tape cables together

DAC settings (T8,1/250,3) 6 fps, tape settings
TV settings:
Focus - 4
Zoom - 25
Aperture - 22
Tape settings with removable strip
TV camera transmit/standby sw - XMIT (up)
TV camera auto light control sw - PEAK (dwn)

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Stow TV pole assembly top of EVA stabilizer strut
Pnl 15 - UTILITY PWR - OFF
Route DAC power outboard of strut
Connect DAC power to receptacle on Pnl 15
Pnl 15 - UTILITY PWR - POWER (verify DAC operation)
Pnl 15 - UTILITY PWR - OFF

Route TV power/COAX outboard of strut and connect to receptacles in tunnel. Route cable along tunnel handstraps and across MDC, tape (do not attach to MDC guard)
Secure wires to TV brkt with spring bungee
Connect cable to TV monitor (P30 to J30 on monitor)

EVA EQUIPMENT PREP

Unstow IV crewman tether from EVA bag -
- Conn to fitting on Pnl 301,
- Route along LMP umb,
- Snap strap at suit end
- Shorten LMP comm cable by looping the cable in the tunnel area

Pnl 10 - POWER - OFF
SUIT POWER - OFF
AUDIO CONTROL - NORM

Pnl 604 - SUIT PRESS ALARM - OFF (verify)
Remove all caps from Pnl 603

Unsnap CMP comm cable from O2 umbilical
- Route outboard of strut and wires and connect CCU head to pnl 603
- Secure cable to TV bracket and top of strut using 2 straps - (R5)
- Position TV monitor, tape as required

Disconnect PGA bag from couch (4 places)
Remove center couch
Close and lock marmon clamps
Stow couch under LMP couch using 2 straps (R5)

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Open EVA umbilical bag
Unsnap top strap and remove spacecraft end of EVA
umb all the way to the 2nd tiedown strap
(unsnap 2nd tiedown strap)
Pnl 603 - EVA STA O2 - OFF (verify)
Attach EV umbilical to Pnl 603 - (route over couch
beam and under wires)
O2/lock
ELEC/lock (Remove Protective Cap)
Umb tether to couch ring/lock, install pin
SCU - open, bleed system, SCU - close
Unstow press gage from EVA bag, (Wrist tether
pouch)
Remove Pnl 603 QD and connect gage
Tape flashlight to pnl 603 guard
Stow tape in VW pouch

Unstow from LH TSB, top pkt
PURGE VLV - stow in EVA bag, PURGE VLV pouch
Waist Tethers - 2
Unstow Waist Tether (from EVA bag)
Extend to max length
Attach tethers to MDC guards (1 LH - 2 RH)
(large hooks outboard)
Lock small hooks only

Unstow CDR LEVA, leave EV gloves in
LEVA bag - close bag
Unstow LMP LEVA and EV gloves
Stow LMP EV gloves in LH TSB, top pkt
Close LEVA bag
Restow LEVA bags in tunnel

Unstow CDR helmet and IV gloves
Stow HSB in CDR TSB
Place accessory bag in CDR TSB, top pkt
Place CDR IV gloves in CDR TSB, top pkt
Unstow CMP helmet (HSB RH LEB), restow
CMP HSB with IV gloves on RH LEB

Verify all visors and shades on CMP LEVA operate
Install LEVA on CMP helmet (or don separately)
Unstow LMP helmet and restow HSB

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Unstow antifog wet wipes (3) - EMU maintenance
kit (CMP TSB, top pkt)
Wet wipe 3 helmets, inside, straight line motion
Wipe dry with tissue (LH TSB, top pkt)
Stow helmets and LEVA's under CDR couch
Stow loose items, etc.

Pnl 278 - MAP CAM/LASER EXP COVER - CLOSE (verify)
IR EXP COVER - CLOSE
UV EXP COVER - CLOSE

Pnl 230 - MAP CAM ON - OFF
LS RCDR - OFF
IR - OFF
PAN CAM SELF TEST - off (ctr)
UV SPECT - OFF
DATA SYS ON - OFF

Pnl 181 - LOGIC PWR (2) - OFF
SM/AC PWR - OFF
cb SM SECTOR 1 AC 2 (3) - open

Pnl 5 - cb INST SCI EQUIP SEB (2) - open

DATE_____

PGA DONNING

Remove PGA's from bag, disconnect PGA bag
Verify BUSS's covers installed and snapped
Stow BUSS's in PGA bag and place under
LMP couch

CMP PGA donning:
FCS - CMP TSB
CWG - CMP TSB
Biomed harness - on crewman/CMP TSB
UCTA - inside PGA
Verify PGA zipper locked
Comm carrier - CMP TSB, Top Pkt (don later)
Remove PGA gas connector plugs and stow in EVA bag,
purge vlv pouch
Conn O2 hoses to LH side R/R, B/B
PGA Diverter vlvs - as desired
Pnl 302 - Suit Flow - full flow (If reqd)
Move scissors to PGA EVA pocket

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LMP PGA donning:
- FCS - inside PGA
- CWG - CMP TSB
- Biomed harness - on crewman/CMP TSB
- UCTA - inside PGA
- Verify PGA zipper locked
- LCG plug - installed (spare in EVA bag)
- Gas connector plugs installed
- Don comm carrier - CMP TSB (Top Pkt)

Pnl 6 - POWER - OFF
SUIT POWER - OFF
AUDIO CONTROL - NORM

Conn O2 hoses blue to red for cooling
Conn comm
Pnl 6 - POWER - AUDIO
SUIT POWER - on (up)
Pnl 300 - Suit Flow - full flow (If reqd)
Conn IV tether to RH side/Lock, install pin

V49 MNVR to EVA Att (310,356,009)
HGA P +43, Y +262

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CDR PGA donning:
- FCS - inside PGA
- CWG - CMP TSB
- Biomed harness - on crewman/CMP TSB
- UCTA - inside PGA
- Verify PGA zipper locked
- LCG plug - installed (spare in EVA bag)
- Gas connector plugs installed
- Comm carrier - CMP TSB (don later)

Pnl 9 - POWER - OFF
SUIT POWER - OFF
AUDIO CONTROL - NORM

Conn O2 hoses blue to red for cooling
Conn comm
Pnl 301 - Suit Flow - full flow (If reqd)

CMP verify cap off PGA relief vlv
CDR, LMP - cap PGA relief vlv

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PRESS GAGE STATIC CHECK

Verify SCU - CLOSED
Pnl 2 - CRYO PRESS IND - SRG/3
Pnl 603 - EVA STA O2 - ON
Verify EVA STA O2 gage reads approx same as
surge tank press (approx 900 psig)
SCU - OPEN
Verify flow and purge umbilical
Pnl 603 - EVA STA O2 - OFF

Remove waist belt stowage strap from umbilical
- stow in EVA bag
Connect EVA umbilical elec and O2 to CMP PGA
RH blue and lock
Connect waist belt and lock (buckle LH side)
Verify belt is under scissor pocket
CDR/CMP don comm carriers - CMP TSB, Top Pkt

COMM CHECK

Pnl 9 - POWER - AUDIO
SUIT POWER - on (up)

Pnl 10 - POWER - AUDIO
SUIT POWER - on (up)
MODE - VOX
VOX SENS TW (as reqd, ~7)
PAD COMM - OFF
S-BD - T/R
AUDIO CONT - NORM
INTERCOM - T/R
VHF AM - OFF

Pnl 3 - S-BD AUX TAPE - off (ctr) (verify)
Pnl 3 - S-BD AUX TV - TV
TV MONITOR PWR - ON

Perform comm check with crew & Hou
Pnl 604 - Suit Press Alarm SW - ON/OFF, verify-tone
Pnl 3 - S-BD AUX TV - off (ctr)

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SYSTEMS PREP FOR DEPRESS

Pnl 325 - CABIN PRESS RELIEF vlv (2) - NORMAL
Pnl 326 - REPRESS PKG vlv - ON
Pnl 326 - verify SURGE TK vlv - ON
Pnl 351 - CABIN REPRESS vlv - OFF (verify)
Pnl 600 - EMER O2 vlv - CLOSED (verify)
Pnl 601 - verify REPRESS O2 vlv - CLOSED
Pnl 602 - Verify REPRESS O2 PRESS - 865-935 psi
Pnl 2 - SURGE TANK PRESS - 865-935 psi
Pnl 2 - CABIN FANS - OFF
After mnvr,
   V48 (10101)(10011)
   Configure AUTO RCS SEL:
   A1,A2,B1,D1,B2,D2,A3,A4,B3,B4 - OFF
   C1,C2,C3,C4,D3,D4 - MNA
   cb A/C ROLL, PITCH & YAW MNB (3) - open
O2 heaters 1,2,& 3 (3) - AUTO
MAN ATT (3) - RATE CMD
LIMIT CYCLE - on (up)
ATT DB - MIN
RATE - LOW
SC CONT - CMC/AUTO
BMAG MODE (3) - RATE 2

```
*IF SM RCS THRUSTER FAILED ON:          *
*   SC CONT - SCS                       *
*   AUTO RCS (affected jet) - OFF       *
*     (odd jet gives + rotation)        *
*   Damp rates with RHC                 *
*                                       *
*    IF CONDITION PERSISTS:             *
*   SM RCS PRPLNT (QUADS A&B) - CLOSE *
*   ROT CONTR PWR DIRECT #2 - MNA/MNB *
*   Damp rate with RHC                  *
```

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CMP EVA EQUIP DONNING

Unstow PCV - EVA bag, (Press vlv pouch)
Connect PCV to PGA RH red connector, lock
PCV - on, turn left (CCW)
Unstow Wrist Tether (Wrist Tether pouch) - Attach to MDC guard or don, right arm
Discon red ECS O2 hose
Unstow purge vlv (EVA bag, purge vlv pouch) SET LO (CW), lock and install on PGA

Pnl 302 - Suit Flow - OFF
Disconnect CMP ECS hoses, route around CDR X-X foot-strut and install interconnect (CMP TSB, top pkt)

Pnl 603 - EVA STA O2 - ON, verify flow

NOTE: Cabin press increases from CMP flow - when cabin press increases to 5.6 psia, open side hatch dump valve to decrease pressure to 5.0 psia and close dump valve

OPS DONNING

Verify OPS reg press <2.5 psid
Unstow OPS O2 hose and actuator
Snap all flaps

Unstow from EVA bag
OPS straps (4), attach with letters to OPS (top straps - letters face out, bottom straps - letters face up)
OPS adapter brkt, attach adapter to PGA

Don OPS, connect lower straps to PGA D-Ring and upper straps to adapter brkt
Connect OPS O2 actuator to brkt
Conn OPS O2 hose to PGA, route under OPS and under left arm (LMP assist)

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Unstow CDR & LMP ECS hoses from CM stowage straps

CDR/LMP - Connect ECS hoses to inboard connectors (R/R,B/B)

Diverter vlvs - Horizontal

LMP move to LEB

Place CMP helmet and LEVA on LMP Couch

LMP verify hoses routed around RH side

LMP don helmet and LEVA, verify alignment

LMP don EV gloves, verify locked (comfort gloves)

CDR don helmet, verify alignment

CDR don IV gloves (CDR TSB) verify locked (comfort gloves)

Check all connections and locks:

CMP	CDR/LMP
1. UMB (O2)	1. COMM
2. Elec	2. O2
3. PCV	3. Gas conn plugs
4. Purge vlv	
5. OPS	
6. SCU - OPEN, locked	

Pnl 9 - MODE - VOX

VOX SENS TW - ADJUST

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CDR/LMP INTEGRITY CHECK

Pnl 380 - SUIT CKT RETURN vlv - close (push)

Pnl 7 - DIRECT O2 - CLOSE (CW)
SUIT PRESS ind - 4.7-5.3 psia
O2 FLOW ind - 0.2-0.4 LB/HR

CAUTION

SUIT TEST vlv should remain in the PRESS position until suit circuit pressure is stabilized to preclude seal scarring. If repositioning of SUIT TEST vlv from PRESS is required prior to suit pressure and O2 flow stabilization, perform the following:

a. O2 DEMAND REG vlv - OFF
b. Allow 15 sec (min) stabilization time
c. Reposition SUIT TEST vlv - DEPRESS or OFF as applicable
d. When suit pressure stabilized, O2 DEMAND REG vlv - BOTH

SUIT TEST vlv - PRESS
DIR O2 - OPEN

O2 FLOW ind - 1.0 LB/HR (pegged)
O2 FLOW HI lt - on
M/A pb lt - ON (push)

When SUIT PRESS ind 1.5-2.0 psi > CAB PRESS
SUIT CKT RETURN vlv - open then close

When SUIT PRESS ind 3.5 - 4.0 psi > CAB PRESS
Verify side hatch dump vlv - closed
Pnl 603 - EVA STA O2 - OFF
DIR O2 - CLOSED

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SUIT PRESS ind - 8.8-9.8 psia
Cuff Gage -4.1-4.5 psig
O2 FLOW HI lt - out
Allow O2 FLOW To Stabilize 15 sec
O2 FLOW shall remain below 0.80 LB/HR
for 30 sec after stabilization

If O2 FLOW >0.80 LB/HR reverify
* all connections and repeat *
* CDR/LMP INTEGRITY CHECK. *
* Continue after recheck if *
* O2 FLOW <0.97 LB/HR for *
* 30 sec after stabilization *

SUIT TEST vlv - DEPRESS

Pnl 603 - EVA STA O2 - ON
Adjust side hatch dump vlv - as required

O2 FLOW ind - 0.2-0.4 LB/HR
SUIT PRESS ind - Slightly > CABIN PRESS ind
SUIT TEST vlv - OFF
Pnl 380 - O2 DEMAND REG vlv - BOTH (verify)

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CMP HELMET/GLOVE DONNING

Purge vlv - Pull pin (CDR hold),
activate purge vlv LO (CW)
CMP - PGA diverter vlvs - (2) vertical
Partially unzip fecal containment bags (2),
temp stow if desired
CMP - adjust PGA tiedown strap
Set wrist rings to engage position

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— GO TO CM EVA CUE CARD AND STOW EXP/EVA CHECKLIST —

Don helmet, lock
Don wrist tether - ring fwd
Don LEVA, verify alignment
Don comfort gloves
Don one glove, lock
Pnl 603 - EVA Sta O2 - OFF
Don other glove, lock

Pnl 603 - EVA STA O2 - ON, Modulate OFF/ON as
required to pressurize CMP
Cuff Gage - 3.7 - 4.0 psig
Pnl 604 - SUIT PRESS ALARM - ON
Verify Tone - off

Pnl 10 - Adjust CMP Master Vol if required
LMP-Pnl 351 - EMER CAB PRESS sel - OFF

EVA WARNING TONE CHECK

CMP Monitor cuff gage, set PURGE
vlv - Hi (CCW), verify EVA warning
tone on at 3.1 - 3.4 psig,
then PURGE vlv - close
Verify tone - off
PURGE vlv - lock, Hi, CDR install pin

Verify flow & Cuff Gage reads 3.7 - 4.0 psig

CMP INTEGRITY CHECK

Pnl 603 - EVA Sta O2 - OFF, Monitor cuff gage
to verify PCV closes - monitor press decay
for 1 min, verify decay less than 0.8 psi
(If suit press decays 0.3 to 0.8, reverify
helmet, wristrings, outer zipper and all
connectors locked.)
Tone - On (low flow)

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Pnl 603 - EVA Sta O2 - ON
Install guard
Verify PGA press - 3.7 - 4.0 psig and stable
Verify Tone - off
Verify EVA sta press gage - 100-500 psi
Verify surge tank press > 750 psia

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CABIN DEPRESS

GN2 vlv handle - pull
Gage reads - min
Leave in vent position
Verify helmet, gloves locked
Confirm GO for depress from Hou

NOTE: EVA warning tone may come on momentarily
during depress

Side hatch dump vlv - open, O2 Hi Flow warning lt
may come on prior to cabin press reg lock up
Close side hatch dump vlv at 3.25 psia
O2 FLOW ind - Less than 0.5 LB/HR
CDR/LMP verify suit press 3.5-4.0 psia
Side hatch dump vlv - open
Dump cabin to zero

CDR/LMP verify - suit press 3.5-4.0 psia (stable)
Verify HI O2 flow warning lt - off
CMP verify - CMP cuff gage press 3.7 - 4.0 psig
EVA sta press gage 100-500 psi
No tone
Pnl 3 - S-BD AUX TV - TV
Pnl 9 - MODE - INT/PTT

HATCH OPENING
Lock pin release knob - unlock
Lock pin indicator released (white to yellow)
Gear box sel - Unlatch
Actr handle sel-U
Unstow ACTR handle
Unlock Hatch
ACTR handle SEL-L
Stow actr handle
Gear box SEL - latch
Lower Inner Visors (CMP/LMP)
Open hatch
Verify Hex clears
Verify hatch full open

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2 EVA OPERATIONS

Egress
Lower outer visors
Verify TV picture quality
CMP adjust aperture if required
Settings: if needed
DAC-(T8,1/250,3) 6 fps
TV-Focus 4, Zoom 25, Aperture 22
Install TV/DAC pole (align)
Jettison jett bag
Pnl 15 - UTILITY PWR - ON
DAC - on
Verify DAC operation

Transfer to SIM bay and enter foot restraints
LMP tend Umb (stop at mark)
CMP verify cuff gage 3.7 - 4.0 psig

Retrieve Lunar Sounder Cassette
- Remove cover
- Attach hook and lock
- Rotate handle and verify handle locked in detent
- Remove cassette
- Transfer to hatch
- LMP attach LMP tether large hook to cassette and lock
- Remove wrist tether hook
- Temp stow cassette on LMP couch
- CMP return to work station
- CMP verify cuff gage 3.7 - 4.0 psig

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Retrieve Pan Camera Cassette
- Remove hard and soft covers
- Attach hook and lock
- Pull pip pin, squeeze handle and remove cassette

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Transfer to hatch
LMP attach LMP tether large hook to cassette and lock
Remove wrist tether hook
Temp stow cassette on LMP couch
CMP - Return to work station
CMP verify cuff gage 3.7 - 4.0 psig
Rest - inspect SIM BAY

Retrieve Mapping Camera Cassette
Remove hard and soft covers
Attach hook and lock
Squeeze handle and rotate
Remove cassette
Transfer to hatch
LMP attach CDR tether large hook to cassette and lock
Remove wrist tether hook and temp stow cassette
LMP move to C couch area

Pnl 15 - UTILITY PWR - OFF
Rest at hatch
CMP remove TV/DAC Pole
Stow under CDR couch
Ingress
S-BD AUX TV - OFF (CTR)
CDR - PNL 9 - MODE - VOX

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3 CM POST EVA

HATCH CLOSING

Unstow lanyard
Pull and close hatch
Verify hex clears
Close hatch
Unstow ACTR handle
Lock hatch
Verify lock pin dropped in (white to white)
Stow ACTR handle
ACTR handle select-N
Gear box SEL-latch (verify)

CABIN REPRESS

Use EVT decal on hatch for Rapid Repress
Side hatch dump vlv - close
Pnl 326 - REPRESS PKG vlv - OFF
Pnl 601 - REPRESS O2 vlv - OPEN then close at cabin press of 1 psia
Cabin press ind-read and monitor for gross leakage (30 sec)
Pnl 601 - REPRESS O2 - OPEN, monitor repress O2 ind to zero
Cabin press approx 2 psia
Pnl 601 - REPRESS O2 vlv - CLOSE

Allow CMP umb flow to bring cabin pressure up to 3.0 psia
CMP disconnect OPS O2 hose and hold (direct into open volume)
OPS O2 - on
During repress Hi O2 FLOW light will come ON
Monitor cabin press to 5.0 psia, then OPS O2 - OFF
Hi O2 FLOW light - OFF
PNL 9 - MODE - INT/PTT

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POST EVA PROCEDURES

Pnl 351 - EMER CAB PRESS sel-BOTH
CDR/LMP doff gloves, then helmets
Pnl 380 - SUIT CKT RTN vlv - open (pull)
Unstow accessory bag from CDR TSB, top pkt.
CMP purge vlv - HI, pull pin, activate purge vlv
(Stow pin in accessory bag)
Pnl 603 - EVA STA O2 - OFF
Pnl 604 - SUIT PRESS ALARM - OFF
When PGA press zero (psid) CMP pop glove, do
not remove gloves
Pnl 603 EVA STA O2 - ON
CMP place both gloves in accessory bag
Remove gloves handling wrist rings only
Doff helmet with LEVA
Pnl 603 EVA STA O2 - OFF

Verify surge tank press > 400 psia
Pnl 326 - REPRESS PKG vlv - FILL

CLEANUP PROCEDURES

Unstow 3 towels from CDR TSB, top pkt
Remove OPS

Wet 1 towel with water gun
Wipe cassette handles with wet towel
Wipe other contaminated areas as required,
stow towel in accessory bag
Stow wrist tether in accessory bag
Zip up fecal containment bags (2)
Place Lunar Sounder Cassette in DECON bag
(EVA bag),temp stow

Tape (VW pouch) film openings on cassettes, do
not cover breather holes, mapping camera only
Stow Tape (VW pouch)
Stow Mapping camera cassette (Handle Up) in B1
Snap curtain, lock B1
Stow comfort gloves in accessory bag
Wipe hands with second wet towel, then dry,
stow towel in accessory bag

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Pnl 10 - POWER - OFF
SUIT POWER - OFF

Pnl 604 - SUIT PRESS ALARM - OFF (verify)
Discon EV umb and waist belt from PGA
Snap OPS to B1

CMP doff PGA, stow FCS, UCTA, inside PGA
Stow PGA's in LMP couch (or CDR and LMP may stay in PGA's during post EVA)

TO BE PERFORMED WHEN LMP DOFFS PGA:
LMP Pnl 6 - POWER - OFF
SUIT POWER - OFF
Pnl 300 - SUIT FLOW - OFF
Disconnect O2 and comm
Pnl 300 - SUIT FLOW VLV - CABIN FLOW
Doff PGA, stow FCS, UCTA inside PGA

TO BE PERFORMED WHEN CDR DOFFS PGA:
CDR Pnl 9 - POWER - OFF
SUIT POWER - OFF
Pnl 301 - SUIT FLOW - OFF
Disconnect Comm and O2
Pnl 301 SUIT FLOW VLV - CABIN FLOW
Doff PGA, stow FCS, UCTA, inside PGA
Connect lt wt headset as req'd
Pnl 9 - POWER - AUDIO
SUIT POWER - on (up)

CMP/LMP doff biomed harness (if desired), stow in TSB
CDR reconnect biomed harness for transmission of data to ground

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Load DAP, 11101,01111
SIM EXP PREP
   AUTO RCS SELECT - OFF
     except D1,B2,A3,C4,B3,D4
   PCM BIT RATE - HIGH
   S-BD AUX TV - SCI
   DATA SYS ON - ON
   LOGIC PWR (2) - DPLY/RETR
   cb INST SCI EQUIP SEB (2) - close
   IR - ON
   UV - ON
   IR EXP COVER - OPEN
   UV EXP COVER - OPEN
Manually roll left 40° to 270°
V49 MNVR to UV STELLAR TGT Att (206,161,301)
   OMNI A
O2 HEATERS 3 - OFF
Temp stow hoses as req'd
Restow LMP LEVA bag - LMP EV gloves, LEVA
Restow CDR LEVA bag - LEVA, CDR EV gloves
Stow LEVA bags in tunnel
Stow CMP helmet in HSB RH LEB with CMP IV gloves

Stow CDR helmet and IV gloves in CDR HSB (CDR TSB)
Stow LMP helmet and IV gloves in LMP HSB

Move DECON bag on LHS if req'd to open A2
Open A2 remove contents
Stow pan camera cassette (handle to LEB)
Install tissues around cassette
Close A2

Discon from Pnl 603 - EVA Umb O2, elec, comm cable,
   and couch hook
Remove EVA sta O2 gage, place in EVA bag,
   (Wrist Tether pouch)
Install dust caps: Elec (2), O2 (1) on Pnl 603
Install QD on Pnl 603
Connect Umb dust caps and lock
Stow Umb in umb bag

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Stow the following in EV bag
- PCV - Press valve pouch
- Purge vlv - Purge valve pouch
- Waist tethers (3) - LM tether pouch
- OPS adapter bkt - PGA adapter plate pouch
- OPS straps (4) - OPS strap pouch
- IV tether - IV tether pouch (resnap comm cable to LMP hoses)
- Meter covers (4) - meter cover pouch

Verify hatch counterbalance bellcranks are aligned, install lock pin using tool B (turn CW to stop)

Reconnect CMP comm cable to O2 hoses

Pnl 15 - UTILITY PWR - OFF (verify)

Remove spring bungee from TV wires and stow

Remove DECON bag from A1 if reqd (temp stow RH LEB)

Stow in A1: or temp stow for later use
- Sect 2 Monitor
- Sect 2 Monitor cable, secure with strap
- Sect 2 TV power cable, secure with strap
- Sect 2 TV camera
- Sect 1 Towels - CDR TSB

Stow in F1:
- DAC 10mm lens
- DAC power cable
- Remove EVA MAG, stow in F2
- DAC

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Snap straps on pole

Temp stow pole on RH LEB

Remove C couch and temp stow under CDR couch

Stow couch straps in R5

Stow OPS hose, actuator, and flaps, Verify O2 - off

Report OPS press to Hou

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Remove A9 Rock bag (A-7) and temp stow
Stow in A7:
  OPS (Flag up, feet inboard)
  EVA equipment container (Fold up, place next to OPS)
  Secure strap
  Lunar Sounder cassette in bag
  Stow entry boots, ropes, headrest pads (or install)
  Vac cleaner bag
  Accessory bag with CMP gloves, wrist tether, and purge valve pin (mark contents on bag and location on entry stowage map)

Stow TV pole and MDC guards on side of A8

Stow in A8:
  Interconnect from CMP O2 hoses - (Sect 1)
  EMU maint kit (CMP TSB, top pkt) - (Sect 1)
  CWG's (CMP TSB) - (Sect 2)
  Tool Kit - (Sect 3)
  Comm carriers (3) or place in TSB
  Close A8

Pnl 302 - SUIT FLOW VLV - CABIN FLOW
Install Decon bag top A1,A2,A7 as reqd
Stow umb bag on side of A7 (4 snaps, 2 hooks)
Unstow and install handcontrollers
Close F2

GN2 vlv handle - OFF (on hatch)
Stow hatch lanyard and handle
Install PGA bag - connect hooks (6 bottom, 2 top)
Remove counter pressure garment from PGA bag, stow in TSB
Remove BUSS's (3) from PGA bag, temp stow
Stow PGA's (3) in bag
Install couch
Stow EVA stabilizer strut
Connect PGA bag upper straps (2)
Remove flashlight from pnl 603 guard, stow.

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3-24

Stow LMP hoses, route to RHS
Stow CMP hoses in tunnel
Stow CDR hoses, route to LHS
Stow A9 rock bag between A9 and PGA bag
Stow 4 CM EVA cue cards in R2

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CONTINGENCY EVA

1 CM PREP FOR CONTINGENCY EVA

1 Unstow From A-8
  Sect 1 - 2-O2 Interconnects
  - EMU Maint Kit
  Sect 3 - Tool Kit
  Side A-8 - MDC Bars (3)
2 C & R SUIT FLOW - OFF
3 Center hoses stowed around CDR X-X foot strut, right hoses on LMP couch
4 Interconnect C & R O2 hoses
5 Install EVA Stabilizer Strut
6 TSB's installed on L Girth Ring and R and L LEB
7 Verify Tool Kit has jack screws fully opened inside, snap to LH Girth Ring
8 Stow EMU MAINT KIT in CMP TSB, top pkt
9 Hatch Counterbalance (Pull Pip Pin, stow R-6 or disconnect hex with tool B)
10 MDC Ingress Bar - Stow
11 Install MDC Bars
12 Install meter covers (4 EVA Bag, A2)

FINAL CABIN PREP

1 Depress tunnel, if docked
2 Stow Optics
3 Stow COAS
4 Stow cameras and bkt in TSB
5 Set up comm panels
6 Place helmet shield (PGA bag) in jett bag
7 Disconnect PGA Bag from couch
8 Verify BUSS'S covers installed and snapped
9 Stow BUSS'S in PGA bag
10 Remove center couch
11 Close and lock marmon clamps
12 Stow under LMP couch using 2 straps (R5)
13 Remove PGA (PGA bag), place on LMP couch

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14 Disconnect PGA bag and stow under
   LMP couch
15 Stow RHC 1 in F2
16 L and R Couch - Stow foot, leg, and
   seat pans, 0°
17 LH X-X Strut - Connected or Disconnect
   and tie off
18 Stow in jettison bag:
   A9 contents and partition
   Misc waste
19 Unstow B5, B6
20 Prepare Jettison Bag, Secure Draw String, Tape

SYSTEM PREPARATION FOR DEPRESS

Pnl 325 - CAB PRESS REL vlv (2) - NORMAL
Pnl 326 - REPRESS PKG vlv - FILL
Pnl 326 - Verify SURGE TANK vlv - ON
Pnl 351 - Verify CAB REPRESS - OFF
Pnl 600 - EMERG O2 vlv - CLOSED
Pnl 601 - Verify REPRESS O2 vlv - CLOSED
Pnl 602 - Verify REPRESS O2 press 865-935 psi
Pnl 2 - CRYO PRESS - IND - SRG/3
Pnl 2 - SURGE TANK PRESS - 865-935 psi
Pnl 2 - CABIN FANS - OFF
Check status of LM prep for egress
Stow loose items
   NOTE: Perform PLSS Comm check if required
         On request by LM,
           VHF AM A - DUPLEX
           VHF AM B - off (ctr)(verify)
           VHF RANGING - OFF (verify)
           Pnl 9 - VHF AM - T/R
         Verify Comm with,
           2 PLSS - CDR (EVCS #1) and then
             LMP (EVCS #2)
            or
           1 PLSS - EVCS #1 or #2

FINAL SYSTEMS PREP FOR DEPRESS

EXT LTS - RUN/EVA - on (up) (IF REQ'D)
EXT LTS - RNDZ/SPOT - off (ctr)

2 PREP FOR CABIN DEPRESS

Don PGA
Verify L O2 hoses connected Red/Red, Blue/Blue, Locked
PGA flow diverter valves (2) (as desired)
Verify PGA Zipper - Lock-Lock
Unstow helmet
Verify feed port cover installed and locked,
Wipe helmet with anti-fog (EMU KIT, CMP TSB, top pkt)
dry with tissue
Unzip fecal bags (2)
Don helmet and lock
Don gloves and lock
Pnl 380 - SUIT CKT RET vlv - close (push)
Pnl 351 - EMERG CAB PRESS sel - OFF
Check all PGA connections and verify locked (Helmet, Wrist, O2 Hoses, Comm, Feedport)
Ingress CDR couch

SUIT CKT CHECK (DECAL)

1 SUIT CKT RETURN VLV - CLOSE
2 CHECK SUIT FLOW VLVS
3 CHECK SUIT PRESS
4 CHECK O2 FLOW <.4
5 SUIT TEST PRESS
6 DIR O2 - OPEN
7 CYCLE SUIT CKT RETURN VLV
8 AT 4.0 PSID DIR O2 - CLOSE
9 CHECK
SUIT PRESS 8.8-9.8
CUFF 4.1-4.5
O2 FLOW <.80
STABLE FOR 30 SEC
10 SUIT TEST DEPRESS
11 SUIT PRESS ~ CABIN
SUIT TEST - OFF
12 VERIFY DEMAND REGS - BOTH

TO REVERSE BEFORE STABLE
A. DEMAND REGS - OFF
B. WAIT 15 SEC
C. SUIT TEST - DEPRESS/OFF
D. DEMAND REG - BOTH

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Select attitude control mode and maneuver
spacecraft to EVT attitude

CABIN DEPRESS
Egress LH couch and transfer to hatch
Adjust RH strut mirror to read cabin pressure

CABIN DEPRESS (DECAL) - EVT
1 SIDE HATCH DUMP vlv - OPEN
O2 FLOW HI LT may come on
prior To CABIN PRESS REG lock up
2 At 3.25 psia, SIDE HATCH DUMP vlv - CLOSE
3 O2 FLOW ind - LESS THAN 0.5 LB/HR
4 CABIN PRESS 3.25 psia
5 SUIT CKT PRESS stable 3.5 - 4.0 psia
6 SIDE HATCH DUMP vlv - OPEN
7 CABIN PRESS ind - 0
8 Verify SUIT CKT PRESS STABLE 3.5-4.0 psia
9 Verify O2 FLOW HI Lt - OFF

3 HATCH OPENING (DECAL) - EVT
1 GN2 vlv HANDLE - PULL
2 GAGE READS - MIN
3 LOCK PIN RELEASE KNOB - UNLOCK
4 LOCK PIN INDICATOR RELEASED (white to yellow)
5 GEAR BOX SEL - UNLATCH
6 ACTR HANDLE SEL-U
7 UNSTOW ACTR HANDLE
8 UNLOCK HATCH
9 ACTR HANDLE SEL-L
10 STOW ACTR HANDLE
11 GEAR BOX SEL-LATCH
12 OPEN HATCH
13 Start Elapse Time When OPS Activated

JETT: BAG, B5, B6
Station Keep At LM Fwd Hatch

AUTO RCS SELECT - undocked transfer
PITCH - A3, C4 - OFF
VERIFY 1/2° DEADBAND
AUTO RCS SELECT - Docked transfer
All - OFF

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4 CM CONTINGENCY EVA

EVT (DOCKED)
Give GO for TRANSFER TO OPS & EVT
Start elapse time when OPS activated

EVT (UNDOCKED, STABLE)
Maneuver CSM apex to LM forward hatch
Give GO for transfer to OPS & EVT
Start elapse time when OPS activated

EVT (UNDOCKED, UNSTABLE)
Maneuver CSM to LM
Give GO for transfer to OPS & EVT
Start elapse time when OPS activated
After CDR & LMP push away from LM, maneuver apex to CDR and LMP

5 2 OPS EVT

INGRESS
CMP protect RHC
CDR Ingress CM, head first, face toward MDC and sit on A9 in LEB
Purge vlv to LO (as req'd)
Retrieve C O2 hoses and elec umbilical
CMP Connect C electrical umbilical to CDR
CDR Audio panel sws - as desired
Secure position in LEB and manage lifeline for LMP
LMP remove transfer bag, push inside
LMP Ingress CM, feet first, face toward MDC and assume position in center couch area
Purge vlv to LO (as req'd)
CM back off from LM
CDR Connect R electrical umbilical to LMP
CMP Close hatch

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VAC TRANSFER TO CM ECS
(If 25 minutes elapsed from
OPS start time, perform the following)
C and R SUIT FLOW vlvs - OFF
Remove interconnects
Connect O2 hoses (Red/Red, Blue/Blue)
C to CDR, R to LMP
Close Purge vlv
SUIT FLOW vlv - adjust for comfort
OPS O2 - OFF

HATCH CLOSING (DECAL) - EVT (X/4-12)

1 CLOSE HATCH
2 Verify PIP PIN Bracket is to left
3 LOCK HATCH
4 Verify LOCK PIN dropped in (white to white)
5 STOW ACTR HANDLE
6 ACTR HANDLE SELECT-N
7 GEAR BOX SEL-LATCH (verify)

CABIN REPRESS (DECAL) - EVT

1 SIDE HATCH DUMP vlv - CLOSE
2 Pnl 326 - REPRESS PKG - FILL
3 Pnl 601 - REPRESS O2 vlv - OPEN, then CLOSE at cabin press - 1 psia
4 CABIN PRESS ind - monitor for gross leakage (30 sec)
5 Pnl 601 - REPRESS O2 vlv - OPEN
6 When surge tank decreases to 150 psia, Pnl 326 REPRESS PKG vlv - OFF
7 CABIN PRESS ind - 3.0 psia
8 Pnl 601 - REPRESS O2 vlv - CLOSE
9 Pnl 351 - CABIN REPRESS vlv - OPEN (CW), adjust to maintain surge tank press >150 psia
10 Helmet/Glove Doffing
   O2 VLV - OFF
   Depress PGA
   Remove Helmet and Gloves
   Dump OPS into Cabin (if 2 avail)
11 When Cab >4.7, CABIN REPRESS Vlv - OFF

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TRANSFER TO ECS
(3.0 PSIA CABIN)
Remove LEVA'S From Helmets
Verify cabin pressure above 3.0 psia
Verify C and R SUIT FLOW vlv - OFF

-CDR-

Remove interconnect from C O2 hoses
CDR OPS O2 - OFF
As PGA press equalizes with cabin,
connect hoses to PGA (red to red, blue to blue)
No flow condition, remove helmet at safe cabin press
C SUIT FLOW vlv - adjust for comfort
L SUIT FLOW vlv - increase for comfort
CDR Close Purge vlv

-LMP-

Remove interconnect from R O2 hoses
LMP OPS O2 - OFF
As PGA press equalizes with cabin
connect hoses to PGA
(red to red, blue to blue)
No flow condition, remove helmet at
safe cabin press
CDR SUIT FLOW vlv (3) - FULL FLOW
LMP Close Purge vlv

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POST EVA SYSTEMS CONFIGURATION
CMP CAB PRESS ind - 4.7-5.3 psia
Pnl 351 - CDR CAB REPRESS vlv - OFF (CCW)
Doff gloves, helmets, and LEVA's, if req'd
If helmets and gloves doffed:
Pnl 351 - EMERG CAB PRESS sel - BOTH
Pnl 380 - SUIT CKT RET vlv - open (pull)

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OPS DOFFING
Remove waist tethers, lifeline, and stow in TSB
Remove purge valves and stow in TSB
Verify PLSS antenna stowed
Verify OPS O2 - OFF
Verify OPS O2 actuator stowed
Disconnect OPS O2 hose and stow
Secure thermal cover
Doff OPS and straps
Stow interconnects in A8
Secure transfer bag

END OF 2 OPS EVT
(Go to FINAL SYSTEMS CONFIG) (X/4-16)

6 PLSS - OPS EVT

INGRESS (CDR-OPS, LMP-PLSS)
CDR Ingress CM, head first, face toward MDC
and move to LEB
Purge vlv to LO (as req'd)
Retrieve C O2 hoses and electrical umbilical
CMP Connect C electrical umbilical to CDR
CDR Audio panel sws - as desired
Secure position in LEB and manage lifeline for LMP
LMP Ingress CM, feet first, face toward MDC
CMP Connect R electrical umbilical to LMP
LMP PLSS PRIM and AUX FEEDWATER - CLOSE
CMP Close hatch

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VAC TRANSFER TO CM ECS
(If 25 minutes elapsed from OPS start time,
perform the following)

-CDR (OPS)-

CDR Verify C SUIT FLOW vlv - OFF
Remove interconnect and hand C O2
hoses to CMP
CMP Connect C O2 hoses to CDR PGA (red to red, blue to
blue)
CDR Close purge vlv
C SUIT FLOW vlv - adjust for comfort
OPS O2 - OFF

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-LMP (PLSS)-

CDR Verify R SUIT FLOW vlv - OFF
Remove interconnect and hand R O2 hoses to CMP
CMP Connect R O2 hoses to LMP PGA (red to red, blue to blue)
CDR SUIT FLOW vlv (3) - FULL FLOW
LMP Verify flow
PLSS O2 - OFF
PLSS PUMP - OFF
PLSS FAN - OFF
PLSS MODE SEL - POS 0

HATCH CLOSING (DECAL) - EVT (X/4-12)

1 CLOSE HATCH
2 Verify PIP PIN Bracket is to left
3 LOCK HATCH
4 Verify LOCK PIN dropped in (white to white)
5 STOW ACTR HANDLE
6 ACTR HANDLE SELECT-N
7 GEAR BOX SEL - LATCH (verify)

CABIN REPRESS - (DECAL) - EVT

1 SIDE HATCH DUMP vlv - CLOSE
2 Pnl 326 - REPRESS PKG - FILL
3 Pnl 601 - REPRESS O2 vlv - OPEN, then CLOSE at cabin press - 1 psia
4 CABIN PRESS ind - monitor for gross leakage (30 sec)
5 Pnl 601 - REPRESS O2 vlv - OPEN
6 When surge tank decreases to 150 psia, Pnl 326 _ REPRESS PKG vlv - OFF
7 CABIN PRESS ind - 3.0 psia
8 Pnl 601 - REPRESS O2 vlv - CLOSE
9 Pnl 351 - CABIN REPRESS vlv - OPEN (CW), adjust to maintain surge tank press >150 psia
10 Helmet/Glove Doffing
O2 vlv - OFF
DEPRESS PGA
Remove Helmet and Gloves
Dump OPS into cabin (if 2 avail)
11 When Cab >4.7, CABIN REPRESS vlv - OFF

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TRANSFER TO ECS (3.0 PSIA CABIN)

Remove LEVA's from helmets
Verify cabin pressure above 3.0 psia
Verify C and R SUIT FLOW vlv - OFF

-CDR (OPS)-

Remove interconnect from C O2 hoses
CDR OPS O2 - OFF
As PGA press equalizes with cabin
Connect hoses to PGA (red to red, blue to blue)
No flow condition, remove helmet at safe cabin press
C SUIT FLOW vlv - adjust for comfort
L SUIT FLOW vlv - increase for comfort
Close Purge vlv

-LMP (PLSS)-

Remove interconnect from R O2 hoses
LMP PLSS O2 - OFF
Connect Hoses to PGA (red/red, blue/blue)
For no flow condition, avoid negative pressure, remove helmet at safe cabin press
To depress suit remove PLSS blue hose
Depress blue O2 connector
CDR SUIT FLOW vlv (3) - FULL FLOW
PLSS PUMP - OFF
PLSS FAN - OFF
PLSS MODE SEL - POS 0
Verify PRIM/AUX feedwater - CLOSE

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(TRIM FRONT PAGE ON SOLID CROP MARKS: BACK PAGE ON DASH CROP MARKS.)

POST EVA SYSTEMS CONFIGURATION

CMP CAB PRESS ind - 4.7-5.3 psia
Pnl 351 - CDR CAB REPRESS vlv - OFF (CCW)
Doff gloves, helmets, and LEVA's, if req'd
If helmets and gloves doffed - Pnl 351 - EMERG
CAB PRESS sel - BOTH
Pnl 380 - SUIT CKT RET vlv - open (pull)

OPS DOFFING
Remove waist tethers, lifeline, and stow in TSB
Remove purge valves and stow in TSB
Verify PLSS antenna stowed
Verify OPS O2 - OFF
Verify OPS O2 actuator stowed
Disconnect OPS O2 hose and stow
Secure thermal cover
Doff OPS and straps
Stow interconnects in A-8
Secure transfer bag

PLSS/DOFFING

Remove waist tethers, lifeline, and stow in TSB
All RCU ELEC CNTLS - OFF (verify)
Disconnect RCU stow in TSB
Disconnect PLSS O2 and H2O hoses
Disconnect lower, then upper, PLSS straps-Doff PLSS
Stow PLSS-O2, H2O, and COMM umbilicals
Temp stow PLSS

END OF PLSS - OPS EVT
(Go To FINAL SYSTEMS CONFIG) (X/4-16)

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SIDE HATCH will not latch (frozen gearbox)

```
*The Following tools are required:                  *
*  Tool B, Tool F, (3) jackscrews                   *
*Install (3) jackscrews to restrain hatch            *
*  in closed position                               *
*Use tool B to remove (2) clevis pins                *
*  connecting linkage to gearbox and                *
*  (1) clevis pin from linkage in corner            *
*  above gearbox.                                   *
*Tighten jackscrews to close hatch as far            *
*  as possible                                      *
*Use tool F on flats of latch bellcrank              *
*  to drive latch to over-center closed position    *
*  (Apply tool F to upper latch on hinge            *
*  side to drive the lower and hinge side           *
*  linkage closed).  Apply tool F to center         *
*  latch to drive upper linkage closed.  Gearbox    *
*  side linkage may not close if gearbox is         *
*  in full open position.                           *
*Install clevis pin in threaded hole                 *
*  in linkage bell crank at upper gearbox           *
*  side (Clevis pin installed when approx half      *
*  the threads are visible).                        *
```

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7 2 PLSS/OPS EVT

INGRESS

CDR Ingress CM, head first, face toward MDC
and move to LEB
CDR Secure position in LEB and manage lifeline for LMP
LMP Ingress CM, feet first, face toward MDC and assume
position in center couch area
BOTH PLSS PRIM and AUX FEEDWATER - CLOSE
CMP Close hatch

VAC TRANSFER TO CM ECS

Verify C and R SUIT FLOW vlv - OFF
Remove interconnects
Remove OPS O2 hose and Purge vlv
Connect O2 hoses to PGA (red/red, blue/blue)
C-CDR, R-LMP
SUIT FLOW vlv - adjust for comfort
PLSS O2 - OFF
PLSS PUMP - OFF
PLSS FAN - OFF

CONNECT TO CM COMM, IF REQ'D

PLSS MODE SEL - POS 0
Disconnect PLSS COMM
Connect electrical umbilical (C-CDR, R-LMP)
Audio panel sws - as desired

HATCH CLOSING (DECAL) - EVT (X/4-12)

1 CLOSE HATCH
2 Verify PIP PIN Bracket is to left
3 LOCK HATCH
4 Verify LOCK PIN dropped in (white to white)
5 STOW ACTR HANDLE
6 ACTR HANDLE SELECT-N
7 GEAR BOX SEL - LATCH (verify)

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CABIN REPRESS - (DECAL) - EVT

1 SIDE HATCH DUMP vlv - CLOSE
2 Pnl 326 - REPRESS PKG - FILL
3 Pnl 601 - REPRESS O2 vlv - OPEN, then CLOSE at cabin press - 1 psia
4 CABIN PRESS ind - monitor for gross leakage (30 sec)
5 Pnl 601 - REPRESS O2 vlv - OPEN
6 When surge tank decreases to 150 psia, Pnl 326 - REPRESS PKG vlv - OFF
7 CABIN PRESS ind - 3.0 psia
8 Pnl 601 - REPRESS O2 vlv - CLOSE
9 Pnl 351 - CABIN REPRESS vlv - OPEN (CW), Adjust To maintain surge tank press >150 psia
10 Helmet/Glove Doffing
   O2 vlv - OFF
   Depress PGA
   Remove Helmet and Gloves
   Dump OPS into cabin (if 2 avail)
11 When Cab >4.7, CABIN REPRESS Vlv - OFF

TRANSFER TO ECS (3.0 PSIA CABIN)

-CDR-

Remove LEVA's from helmets
Verify cabin pressure above 3.0 psia
Verify C and R SUIT FLOW vlv - OFF
Remove interconnect from C O2 hoses
CDR PLSS O2 vlv - OFF
Open Purge vlv to equalize press
No flow condition, avoid negative press, remove helmet at safe cabin press
Remove OPS hose and Purge vlv
Connect hoses to PGA (red/red, blue/blue)
C SUIT FLOW vlv - adjust for comfort
L SUIT FLOW vlv - increase for comfort
PLSS PUMP - OFF
PLSS FAN - OFF

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-LMP-

Remove LEVA
Remove interconnect from R O2 hoses
LMP PLSS O2 vlv - OFF
Open Purge vlv to equalize press
No flow condition, avoid negative press,
remove helmet at safe cabin press
Remove OPS hose and Purge vlv
Connect hoses to PGA connectors
(red/red, blue/blue)
CDR SUIT FLOW vlv (3) - FULL FLOW
LMP PLSS PUMP - OFF
PLSS FAN - OFF

CONNECT TO COMM

Verify SUIT PWR - OFF
Verify PWR - OFF
Verify AUDIO CONT - NORM
PLSS MODE SEL - POS 0
Disconnect PLSS COMM
Connect electrical umbilical to PGA
Audio panel sws - as desired

POST EVA SYSTEMS CONFIGURATION

CMP CAB PRESS ind - 4.7-5.3 psia
Pnl 351 - CDR CAB REPRESS vlv - OFF (CCW)
Doff gloves, helmets, and LEVA's, if req'd
If helmets and gloves doffed - Pnl 351 - EMERG
CAB PRESS sel - BOTH
Pnl 380 - SUIT CKT RET vlv - open (pull)

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PLSS/OPS DOFFING

Remove waist tethers, lifeline, and stow in TSB
All RCU ELEC CNTLS - OFF
Disconnect RCU stow in TSB
Disconnect PLSS O2 and H2O hoses
Disconnect lower then upper PLSS straps-Doff PLSS
Stow PLSS-O2, H2O, and COMM umbilicals
Stow OPS-O2 Actuator and O2 hose
Temp stow PLSS/OPS

FINAL SYSTEMS CONFIGURATION

Pnl 2 - CRYO PRESS IND-SRG/3
Pnl 2 - SURGE TANK PRESS - > 500 psia
Pnl 351 - Verify CAB REPRESS vlv - OFF (CCW)
Pnl 601 - Verify REPRESS O2 - CLOSE
Pnl 326 - REPRESS PKG vlv - FILL
Pnl 602 - Verify Repress O2 press increasing
Pnl 2 - SURGE TANK PRESS - 865-935 psia
Pnl 2 - CRYO PRESS IND-1/2
Pnl 326 - REPRESS PKG vlv - OFF

CM EQUIPMENT JETTISON

Inspect PGA zipper-verify lock-lock

SYSTEMS PREPARATION FOR DEPRESS

SUIT FLOW vlv - SUIT FULL FLOW
Pnl 2 - CABIN FANS - OFF
Pnl 351 - CAB REPRESS - OFF
Pnl 326 - REPRESS PKG VLV - FILL
PNL 325 - CAB PRESS REL VLV (2) - NORMAL
Pnl 380 - SUIT CKT RET vlv - open (pull)
Pnl 351 - EMER CAB PRESS sel - BOTH
Pnl 602 - Verify Repress O2 pressure 865-935 psi
Pnl 600 - EMERGENCY O2 vlv - CLOSED
Pnl 601 - REPRESS O2 vlv - CLOSED
Pnl 326 - Verify SURGE TANK vlv - ON
Pnl 2 - CRYO PRESS IND-SRG/3
Verify surge tank pressure 865-935 psi

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EQUIPMENT PREPARATION FOR DEPRESS

Stow loose items
Prepare all equipment to be
  jettisoned and secure
    PLSS (1-2)
    RCU (1-2)
    OPS (Retain 1)
    PURGE VALVE (Retain 1)
    LIFELINE (1)
Retain both LEVA's
Retain both WAIST TETHERS

PREP FOR CABIN DEPRESS

Verify O2 hoses connected (red/red, blue/blue)
PGA diverter valves- horizontal or vertical
Unstow helmet
Verify feed port cover installed and locked,
  wipe helmet with anti-fog
Position mikes, don helmet and "lock"
Secure helmet stowage bags
Don gloves and lock
Pnl 380 - SUIT CKT RET vlv - close (push)
Pnl 351 - EMER CAB PRESS sel - OFF
Check all PGA connections and verify
  lock-lock (Helmet, Wrist, O2 Hoses, Comm, Feedport)

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SUIT CKT CHECK (DECAL)

1 SUIT CKT RETURN VLV - CLOSE
2 CHECK SUIT FLOW VLVS
3 CHECK SUIT PRESS
4 CHECK O2 FLOW <.4
5 SUIT TEST PRESS
6 DIR O2 - OPEN
7 CYCLE SUIT CKT RETURN VLV
8 AT 4.0 PSID DIR O2 - CLOSE
9 CHECK
  SUIT PRESS 8.8-9.8
  CUFF 4.1-4.5
  O2 FLOW <.80
  STABLE FOR 30 SEC
10 SUIT TEST DEPRESS
11 SUIT PRESS ~ CABIN
   SUIT TEST - OFF
12 VERIFY DEMAND REGS - BOTH

TO REVERSE BEFORE STABLE
A. DEMAND REGS - OFF
B. WAIT 15 SEC
C. SUIT TEST - DEPRESS/OFF
D. DEMAND REG - BOTH

CABIN DEPRESS (DECAL) - EVT

1 SIDE HATCH DUMP vlv - OPEN
  (O2 FLOW HI WARNING LT may come on prior to CABIN PRESS REG LOCK UP)
2 At 3.25 psia, SIDE HATCH DUMP vlv - CLOSE
3 O2 FLOW ind - less than 0.5 LB/HR
4 CABIN PRESS 3.25 psia
5 SUIT CKT PRESS STABLE 3.5-4.0
6 SIDE HATCH DUMP vlv - OPEN
7 CABIN PRESS ind - 0
8 Verify SUIT CKT PRESS stable 3.5-4.0 psia
9 Verify O2 FLOW HI LT - OFF

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HATCH OPENING (DECAL) - EVT

1 GN2 vlv HANDLE - PULL
2 GAGE READS - MIN
3 LOCK PIN RELEASE KNOB - UNLOCK
4 LOCK PIN INDICATOR RELEASED (white to yellow)
5 GEAR BOX SEL - UNLATCH
6 ACTR HANDLE SEL-U
7 UNSTOW ACTR HANDLE
8 UNLOCK HATCH
9 ACTR HANDLE SEL-L
10 STOW ACTR HANDLE
11 GEAR BOX SEL-LATCH
12 OPEN HATCH
13 START ELAPSE TIME WHEN OPS ACTIVATED

EQUIPMENT JETTISON

JETTISON EQUIPMENT:
PLSS (1-2)
RCU (1-2)
OPS (Retain 1)
PURGE VALVE (Retain 1)
LIFELINE (1)
Retain both LEVA's
Retain both WAIST TETHERS

DATE 9/29/72

HATCH CLOSING (DECAL) (X/4-12)

1 CLOSE HATCH
2 Verify Pip pin bracket is to left
3 LOCK HATCH
4 Verify LOCK PIN dropped in (white to white)
5 STOW ACTR HANDLE
6 ACTR HANDLE SELECT-N
7 GEAR BOX SEL - LATCH (verify)

DATE

CABIN REPRESS (DECAL)

1 SIDE HATCH DUMP vlv - CLOSE
2 Pnl 326 - REPRESS PKG - FILL
3 Pnl 601 - REPRESS O2 vlv - OPEN, then
  CLOSE at cabin press - 1 psia
4 CABIN PRESS ind - monitor for gross
  leakage (30 sec)
5 Pnl 601 - REPRESS O2 vlv - OPEN
6 When surge tank decreases to 150 psia,
  Pnl 326 - REPRESS PKG vlv - OFF
7 CABIN PRESS ind - 3.0 psia
8 Pnl 601 - REPRESS O2 vlv - CLOSE
9 Pnl 351 - CABIN REPRESS vlv - OPEN (CW), adjust to
  maintain surge tank press >150 psia
10 Helmet/Glove Doffing
  O2 VLV - OFF
  DEPRESS PGA
  Remove Helmet and Gloves
  Dump OPS into cabin (if 2 avail)
11 When Cab >4.7, CABIN REPRESS Vlv - OFF

SYSTEM CONFIGURATION

Pnl 2 - CAB PRESS ind - 4.7 - 5.3 psia
Pnl 351 - CAB REPRESS vlv - OFF (CCW)
Doff gloves and helmets, if req'd
If helmets and gloves doffed:
  Pnl 351 - EMERG CAB PRESS sel - BOTH
  Pnl 380 - SUIT CKT RET vlv - open (pull)

POST EVA CABIN CONFIGURATION

EXT LTS - RUN/EVA - OFF (down)
Perform as desired
  (a) Recharge Repress Pkg
  (b) Change crew stations
  (c) Restow tool B & jack screws
  (d) Unstow & install PGA bag
  (e) Reinstall center couch
  (f) Connect counterbalance (Pip Pin in R-6)
  (g) Stow meter covers (4 EVA bag, A2)

NASA — MSC
DATE 11/8/72
DATE

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8 EVT EQUIPMENT STOWAGE FOR ENTRY

I. CM entry without suits:

ITEM	STOWAGE LOCATION FOR ENTRY
a. OPS (2)	In PGA Bag - over PGA (or one in A7)
b. Purge Valve (2)	A7
c. Lifeline	In PGA Bag
d. EV Gloves	On PGA
e. LEVA (2)	2 on helmet attached to suits in RH & LH sleep restraints
f. Waist tether (2)	EVA BAG A7
g. Rock Bag w/Decom Bag	In Decom Bag on top of A7 or A1
h. Suits - with elec covers Note: Stow RH & LH Suits first	2 Suits in sleep restraint under LH & RH couch w/tie down rope 1 Suit with OPS in PGA Bag w/tie down rope
i. Helmets	2 On suits with LEVA 1 In PGA Bag
j. IV Gloves	On PGA
k. ISA w/Decom Bag	On A2

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II. CM entry with suits:

ITEM	STOWAGE LOCATION FOR ENTRY
a. OPS (2)	LH & RH sleep restraint in PGA Bag w/tie-down rope (or one in A7)
b. Rock Bag in Decom Bag	On A7 or A1
c. Purge Valve (2)	In EVA Bag (A7)
d. Waist Tether (2)	EVA Bag (A7)
e. EV Gloves	On PGA
f. LEVA (2)	PGA Bag
g. Lifeline	PGA Bag

III. The following equipment may be transferred in PGA pockets during the EV transfer:

ITEM	STOWAGE LOCATION
a. Film Magazines	Vol R13, A8
b. Log Books	Vol R1, R2 and R3

DATE

DATE 9/29/72

X
5-_

NO.	ITEM ⇨	ACTION	BACKOUT

DATE 9/29/72

REAL TIME
CHECKLIST

BACK

COLOR_____

X
5-_

NO.	ITEM ⇨	ACTION	BACKOUT

REAL TIME
CHECKLIST

DATE 9/29/72

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X
5- __

NO.	ITEM ⇨	ACTION	BACKOUT

DATE 9/29/72

DATE 9/29/72

(TRIM FRONT PAGE ON SOLID CROP MARKS: BACK PAGE ON DASH CROP MARKS.)

X
5- __

NO.	ITEM	ACTION	BACKOUT

DATE 9/29/72

DATE 9/29/72

(TRIM FRONT PAGE ON SOLID CROP MARKS: BACK PAGE ON DASH CROP MARKS.)

X
5- __

NO.	ITEM ⇨	ACTION	BACKOUT

DATE 9/29/72

DATE 9/29/72

(TRIM FRONT PAGE ON SOLID CROP MARKS: BACK PAGE ON DASH CROP MARKS.)

X
5- __

NO.	ITEM	ACTION	BACKOUT

DATE 9/29/72

DATE 9/29/72

(TRIM FRONT PAGE ON SOLID CROP MARKS: BACK PAGE ON DASH CROP MARKS.)

X
5- __

NO.	ITEM ⇨	ACTION	BACKOUT

DATE 9/29/72

DATE 9/29/72

(TRIM FRONT PAGE ON SOLID CROP MARKS: BACK PAGE ON DASH CROP MARKS.)

X
5- ___

NO.	ITEM	ACTION	BACKOUT

DATE 9/29/72

DATE 9/29/72

(TRIM FRONT PAGE ON SOLID CROP MARKS: BACK PAGE ON DASH CROP MARKS.)

X
5- __

NO.	ITEM ⇨	ACTION	BACKOUT

DATE 9/29/72

DATE 9/29/72

(TRIM FRONT PAGE ON SOLID CROP MARKS: BACK PAGE ON DASH CROP MARKS.)

X
5- __

DATE 9/29/72

NO.	ITEM	ACTION	BACKOUT

DATE 9/29/72

16 MM
CAM TYPE

PHOTO LOG
X
6-1

MAG AA
ASA 64

GET	%	REMARKS (f, t, LENS, FILTER)
		Undocking, LM Ejection

DATE 9/29/72

16MM PHOTO LOG

BACK

16MM PHOTO LOG

16 MM / CAM TYPE	PHOTO LOG X 6-2	MAG BB / ASA 64
GET	%	REMARKS (f, t, LENS, FILTER)
Door Jett, Orbital Science, Rendzevous, Docking		

DATE 9/29/72

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16 MM CAM TYPE	PHOTO LOG X 6-3	MAG CC ASA 64

GET	%	REMARKS (f, t, LENS, FILTER)
		Undocking

DATE 9/29/72

DATE

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16 MM / CAM TYPE	PHOTO LOG X 6-4	MAG DD ASA 64

GET	%	REMARKS (f, t, LENS, FILTER)
		LM Jettison

DATE

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16 MM
CAM TYPE

PHOTO LOG
X
6-5

MAG EE
ASA 64

GET	%	REMARKS (f, t, LENS, FILTER)

DATE 9/29/72

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16 MM CAM TYPE	PHOTO LOG X 6-6	MAG FF ASA 64

GET	%	REMARKS (f, t, LENS, FILTER)
		CM EVA

DATE

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16 MM CAM TYPE	PHOTO LOG X 6-7	MAG GG ASA 64

GET	%	REMARKS (f, t, LENS, FILTER)
		Fireball, Drogue Chute

DATE 9/29/72

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16 MM CAM TYPE	PHOTO LOG X 6-8	MAG HH ASA 500

GET	%	REMARKS (f, t, LENS, FILTER)
		HEAT FLOW

DATE

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16 MM
CAM TYPE

PHOTO LOG
X
6-9

MAG II
ASA 500

GET	%	REMARKS (f, t, LENS, FILTER)
		SC Interior (Optional)

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16 MM CAM TYPE	PHOTO LOG X 6-10	MAG JJ ASA 4000
GET	%	REMARKS (f, t, LENS, FILTER)

DATE

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70 MM CAM TYPE	PHOTO LOG X 6-11	MAG KK ASA 64
GET	NO.	REMARKS (f, t, LENS, FILTER)
Earth Photo, Orbital Science, Undocking		

70MM PHOTO LOG

DATE 9/29/72

BACK

70 MM
CAM TYPE

PHOTO LOG
X
6-12

MAG KK
ASA 64

GET	NO.	REMARKS (f, t, LENS, FILTER)

70MM PHOTO LOG

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70 MM / CAM TYPE	PHOTO LOG X 6-13	MAG LL / ASA 64
GET	NO.	REMARKS (f, t, LENS, FILTER)
		Orbital Science

DATE 9/29/72

DATE

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70 MM
CAM TYPE

PHOTO LOG
X
6-14

MAG LL
ASA 64

GET	NO.	REMARKS (f, t, LENS, FILTER)

DATE

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70 MM
CAM TYPE

PHOTO LOG
X
6-15

MAG MM
ASA 64

GET	NO.	REMARKS (f, t, LENS, FILTER)
		Orbital Science

DATE 9/29/72

DATE

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70 MM
CAM TYPE

PHOTO LOG
X
6-16

MAG MM
ASA 64

GET	NO.	REMARKS (f, t, LENS, FILTER)

DATE

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70 MM / CAM TYPE	PHOTO LOG X 6-17	MAG NN / ASA 64
GET	NO.	REMARKS (f, t, LENS, FILTER)
Undocking, LM Ejection, Docking, Orbital Science		

DATE 9/29/72

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70 MM CAM TYPE	PHOTO LOG X 6-18	MAG NN ASA 64
GET	NO.	REMARKS (f, t, LENS, FILTER)

DATE

DATE 9/29/72

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70 MM / CAM TYPE	PHOTO LOG X 6-19	MAG 00 / ASA 64
GET	NO.	REMARKS (f, t, LENS, FILTER)
		Schmitt Option

DATE 9/29/72

DATE

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70 MM CAM TYPE	PHOTO LOG X 6-20	MAG 00 ASA 64

GET	NO.	REMARKS (f, t, LENS, FILTER)

DATE

DATE 9/29/72

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70 MM CAM TYPE	PHOTO LOG X 6-21	MAG PP ASA 64
GET	NO.	REMARKS (f, t, LENS, FILTER)
		Evans Option

DATE 9/29/72

DATE

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70 MM / CAM TYPE	PHOTO LOG X 6-22	MAG PP / ASA 64
GET	NO.	REMARKS (f, t, LENS, FILTER)

DATE

DATE 9/29/72

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70 MM CAM TYPE	PHOTO LOG X 6-23	MAG QQ ASA 4000

GET	NO.	REMARKS (f, t, LENS, FILTER)
Solar Corona (SR & SS), Terminator		

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DATE

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70 MM CAM TYPE	PHOTO LOG X 6-24	MAG QQ ASA 4000
GET	NO.	REMARKS (f, t, LENS, FILTER)

DATE

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70 MM / CAM TYPE	PHOTO LOG X 6-25	MAG RR / ASA 4000

GET	NO.	REMARKS (f, t, LENS, FILTER)
		Terminator

DATE 9/29/72

DATE

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70 MM / CAM TYPE	PHOTO LOG X 6-26	MAG RR / ASA 4000
GET	NO.	REMARKS (f, t, LENS, FILTER)

DATE

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35 MM
CAM TYPE

PHOTO LOG
X
6-27

MAG SS
ASA 500

GET	NO.	REMARKS (f, t, LENS, FILTER)
		ALFMED

DATE 9/29/72

35MM PHOTO LOG

BACK

35 MM
CAM TYPE

PHOTO LOG
X
6-28

MAG TT
ASA 500

GET	NO.	REMARKS (f, t, LENS, FILTER)

35MM PHOTO LOG

DATE 9/29/72

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35 MM
CAM TYPE

PHOTO LOG
X
6-29

MAG UU
ASA 4000

GET	NO.	REMARKS (f, t, LENS, FILTER)
		Preflight Calibration

DATE 9/29/72

DATE

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35 MM
CAM TYPE

PHOTO LOG
X
6-30

MAG VV
ASA 4000

GET	NO.	REMARKS (f, t, LENS, FILTER)
		Dim Light Backup

DATE

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(TRIM FRONT PAGE ON SOLID CROP MARKS: BACK PAGE ON DASH CROP MARKS.)

35 MM
CAM TYPE

PHOTO LOG
X
6-31

MAG WW
ASA 4000

GET	NO.	REMARKS (f, t, LENS, FILTER)
		Earthshine

DATE 9/29/72

DATE

(TRIM FRONT PAGE ON SOLID CROP MARKS: BACK PAGE ON DASH CROP MARKS.)

35 MM
CAM TYPE

PHOTO LOG
X
6-32

MAG XX
ASA 4000

GET	NO.	REMARKS (f, t, LENS, FILTER)
		Zodiacal Light (Red/Blue)

DATE

DATE 9/29/72

(TRIM FRONT PAGE ON SOLID CROP MARKS: BACK PAGE ON DASH CROP MARKS.)

35 MM
CAM TYPE

PHOTO LOG
X
6-33

MAG YY
ASA 4000

GET	NO.	REMARKS (f, t, LENS, FILTER)
		Zodical Light (Pol)

DATE 9/29/72

DATE

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35 MM
CAM TYPE

PHOTO LOG
X
6-34

MAG ZZ
ASA 4000

GET	NO.	REMARKS (f, t, LENS, FILTER)

DATE

DATE 9/29/72

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