



**Aerospace
Systems Division**

ALSEP Configuration D Two-Man
Deployment Task Sequence

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The Apollo Lunar Surface Experiments Package (ALSEP) Configuration D two-man deployment sequence, based on current Apollo 16 flight configurations and design is incorporated in this ATM.

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The following assumptions and conditions are applicable to this deployment sequence:

- 1) The sequence is for ALSEP Flight 5, Configuration D.
- 2) The sequence is for the two-man deployment planned for ALSEP.
- 3) The Lunar Module (LM) is oriented on the lunar surface with the Scientific Equipment Bay (SEQ) facing southeast.
- 4) The ASE deployment complies with the following NASA Ground Rules:
 - a) 300 min. ft. from LM to first geophone.
 - b) Offset of Mortar Package should not be less than 45° from Line of LM.
 - c) Central Station can not be within 105° of line of Mortor flight (Back of Mortar Box).
 - d) Offset of geophone no more than 45° from line of LM. Can not fire in direction of LM.
5. The commander and the LM Pilot maintain constant voice contact while deploying ALSEP.
6. The voice link between the command/LM pilot and Mission Control Center (MCC), during ALSEP deployment, is through the LM directly to MCC.
7. The Commander and the LM Pilot are pressurized to 3.75 psi in Extravehicular Mobility Units (EMU) during ALSEP deployment.
8. The times in hours, minutes, and seconds are based on part-task tests conducted with Crew Engineering mock-ups.

This ATM includes both a condensed timeline and detailed timeline deployment sequence. The condensed timeline is essentially a major task flow analysis along a time base, showing the major points of interaction between the two crewmen. The detailed timeline lists, in sequence of performance, each of the steps required to carry out the main tasks identified in the condensed timeline. It is in the detailed timeline that the crew/equipment interfaces are revealed.



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Both timelines present the CDR's and the LMP's tasks side-by-side so that no confusion will exist as to which crewman is doing what, or how the two cooperate in the operations on the lunar surface.

Task No.	CDR	Time	Task No.	LMP	Time
C1.0	Open SEQ Bay Doors	00:00:00	P1.0	LRV Load	00:00:00
C2.0	Offload ALSEP Pkgs.	00:01:00			
C3.0	Fuel RTG	00:10:45			
C4.0	Configure ALSEP for Traverse	00:15:55			
C5.0	Close SEQ Bay Doors	00:16:45			
C6.0	ALSEP Traverse	00:17:45	P2.0	ALSEP Traverse (LRV Drive)	00:17:45
C7.0	Site Survey	00:28:00	P3.0	Site Survey	00:28:00
C8.0	Position ALSEP at Site	00:36:00			
			P4.0	Remove HFE Pull Pins	00:37:30
			P5.0	Rotate Pkg #2	00:38:10
			P6.0	Remove HFE Subpallet	00:38:50
			P7.0	Remove Subpallet	00:39:50
C9.0	Deploy RTG Power Cable and Connect to Central Station	00:40:50			
C10.0	Remove and Deploy PSE Stool	00:44:25			
			P8.0	Release Astromate Connector and Connect to Central Station	00:45:00
C11.0	Disconnect Carry Bar from Pkg. #1	00:46:15			
			P9.0	Offload HFE Probe Pkg.	00:47:40
C12.0	Emplace Pkg #1	00:47:45			
C13.0	PSE Deploy	00:50:05			
			P10.0	Separate Probe Pkgs.	00:51:00
			P11.0	Locate First Bore Hole	00:52:05
			P12.0	Locate Second Bore Hole	00:53:05
			P13.0	ALSD Set-Up	00:55:00
C14.0	Remove Thumper/Geophone Assembly	00:56:05			
C15.0	Remove Mortar Pkg. Assembly	00:58:30			
C16.0	LSM Offload	01:00:25			
C17.0	Release C/S Sunshield	01:03:40			
			P14.0	Drill First Bore Hole	01:05:00
C18.0	Deploy C/S Sunshield	01:10:25			
C19.0	Assembly Antenna	01:13:20			
			P15.0	Transfer Equipment	01:17:00
C20.0	Orient Antenna	01:18:10			
			P16.0	Drill Second Bore Hole	01:20:00

Task No.	CDR	Time	Task No.	LMD	Time
C21.0	Deploy LSM	01:23:50			
C22.0	Activate Central Station	01:30:05			
C23.0	Deploy Geophones	01:41:00	P17.0	Emplace First Probe	01:32:00
C24.0	Conduct Thumper Activity	01:52:45	P18.0	Emplace Second Probe	01:40:00
C25.0	Photograph ALSEP	02:09:20	P19.0	Align HFE Electronics Pkg.	01:47:00
C26.0	Recover CORE	02:20:00		<u>LMP ALSEP</u>	
C27.0	Deploy Mortar Pkg. Assembly	02:26:00		<u>Activity Complete</u>	
	<u>ALSEP</u>				
	<u>Deployment</u>				
	<u>Complete</u>	02:38:20			

Task No.	Commander Activity	ALD Time (Cumulative)	LM Pilot Activity	Task No.
C1.0	<u>Open SEQ Bay Doors.</u>	00:00:00 :02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22 :24 :26 :28 :30 :32 :34 :36 :38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 00:01:00	<u>LRV Load</u>	P1.0

Task No.	Commander Activity	ALSEP/ D e (Cumulative)	LM Pilot Activity	Task No.
C2.0	<u>Offload ALSEP Pkgs.</u>			
C2.1	. Retrieve Pkg #1 deployment lanyard.	00:01:00		
		:02		
		:04		
		:06		
		:08		
C2.2	. Walk 10' from LM with lanyard.	:10		
		:12		
		:14		
		:16		
		:18		
C2.3	. Pull lanyard white lower Section to extend boom assy. and remove Pkg #1 from SEQ bay.	:20		
		:22		
		:24		
		:26		
		:28		
		:30		
		:32		
		:34		
		:36		
		:38		
		:40		
		:42		
		:44		
		:46		
		:48		
		:50		
C2.4	. Hold lanyard white lower Section taut, ratchet Pkg #1 to lunar Surface.	:52		
		:54		
		:56		
		:58		
		00:02:00		

Task No.	Commander Activity	AJ P/ D (Cumulative)	LM Pilot Activity	Task No.
		00:02:00		
		:02		
		:04		
		:06		
		:08		
		:10		
		:12		
		:14		
		:16		
		:18		
C2.5	. Discard Pkg #1 deployment lanyard.	:20		
		:22		
C2.6	. Walk to Pkg #1	:24		
		:26		
		:28		
C2.7	. Disconnect quick release latch from carry handle and discard.	:30		
		:32		
		:34		
		:36		
		:38		
		:40		
		:42		
C2.8	. Pull velcroed pull ring from carry handle, pull lanyard, separate Pkg #1 from boom, discard lanyard/boom attachment assy.	:44		
		:46		
		:48		
		:50		
		:52		
		:54		
		:56		
		:58		
		00:03:00		

Task No.	Commander Activity	A P/ D e (Cumulative)	LM Pilot Activity	Task No.
C2.9	. Lift Pkg #1, carry to a point 5' from astronaut protection door, and lower to lunar surface.	00:03:00 :02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22 :24 :26 :28 :30 :32 :34 :36 :38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 00:04:00		
C2.10	. Retrieve Pkg #2 deployment lanyard.			
C2.11	. Walk 10' from LM with lanyard.			

Task No.	Commander Activity	ALP/ D (Cumulative)	LM Pilot Activity	Task No.
C2.12	. Pull lanyard white lower Section to extend boom assy. and remove Pkg #2 from SEQ bay.	00:04:00 :02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22 :24 :26 :28 :30 :32		
C2.13	. Hold lanyard white lower Section taut, ratchet Pkg #2 to lunar surface.	:34 :36 :38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 00:05:00		

Task No.	Commander Activity	ALSEP/ D (Cumulative)	LM Pilot Activity	Task No.
		00:05:00		
C2.14	. Discard Pkg #2 deployment lanyard.	:02		
		:04		
		:06		
		:08		
C2.15	. Walk to Pkg #2.	:10		
		:12		
		:14		
C2.16	. Disconnect quick release latch from carry handle and discard.	:16		
		:18		
		:20		
		:22		
		:24		
		:26		
		:28		
C2.17	. Pull velcroed pull ring from carry handle, pull lanyard, separate Pkg #2 from boom, discard lanyard/boom assy.	:30		
		:32		
		:34		
		:36		
		:38		
		:40		
		:42		
		:44		
		:46		
		:48		
		:50		
		:52		
		:54		
		:56		
		:58		
		00:06:00		

Task No.	Commander Activity	A P/ D Time (Cumulative)	LM Pilot Activity	Task No.
C2.18	. Retrieve Pkg #1 deployment lanyard.	00:06:00 :02 :04 :06 :08		
C2.19	. Pull Pkg #1 lanyard striped section to restow boom assy.	:10 :12 :14 :16 :18 :20 :22 :24 :26 :28		
C2.20	. Walk to SEQ bay with Pkg #1 lanyard and stow in compartment I.	:30 :32 :34 :36 :38 :40 :42		
C2.21	. Retrieve Pkg #2 deployment lanyard.	:44 :46 :48 :50 :52		
C2.22	. Pull Pkg #2 lanyard striped section to restow boom assy.	:54 :56 :58 00:07:00		

Task No.	Commander Activity	AP/DP/D Time (Cumulative)	LM Pilot Activity	Task No.
C2.23	Walk to SEQ bay with Pkg #2 lanyard and stow in compartment II.	00:07:00 :02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22 :24 :26 :28 :30 :32 :34 :36 :38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 00:08:00		
C2.24	Lift Pkg #2, carry to a point next to astronaut protection door, and lower to lunar surface.			

Task No.	Commander Activity	ALSEP/ D (Cumulative)	LM Pilot Activity	Task No.
C2.25	. Remove subpallet pull pin and discard.	00:08:00		
		:02		
		:04		
		:06		
C2.26	. Remove two (2) tool restraining pull pins and discard.	:08		
		:10		
		:12		
		:14		
		:16		
		:18		
		:20		
		:22		
		:24		
		:26		
C2.27	. Remove tool bracket assy. and discard.	:28		
		:30		
		:32		
		:34		
		:36		
		:38		
C2.28	. Remove two (2) Universal Handling Tools (UHT).	:40		
		:42		
		:44		
		:46		
		:48		
		:50		
		:52		
		:54		
		:56		
		:58		
		00:09:00		

Task No.	Commander Activity	ALSEP/ D (Cumulative)	LM Pilot Activity	Task No.
C2.29	. Engage first UHT in Pkg. #2 temporary stowage socket.	00:09:00 :02 :04 :06 :08		
C2.30	. Walk to Pkg #1.	:10 :12		
C2.31	. Engage second UHT in Pkg. #1 temporary stowage socket.	:14 :16 :18 :20 :22		
C2.32	. Return to Pkg #2.	:24 :26 :28		
C2.33	. Remove first antenna mast/carry bar section.	:30 :32 :34 :36 :38 :40 :42		
C2.34	. Remove second antenna mast/carry bar section.	:44 :46 :48 :50 :52 :54 :56 :58 00:10:00		

Task No.	Commander Activity	ALSEP/D Time (Cumulative)	LM Pilot Activity	Task No.
.35	. Mate two antenna mast/carry bar sections.	:00 :02 :04 :06 :08		
.36	. Walk to Pkg. #1.	:10 :12		
.37	. Install carry bar in fitting on Pkg. #1.	:14 :16 :18 :20 :22 :24 :26 :28 :30 :32		
.38	. Walk to Fuel Cask.	:34 :36 :38 :40		
3.0	<u>Fuel RTG</u>	:42		
3.1	. Retrieve cask lanyard.	:44 :46 :48 :50 :52		
3.2	. Walk 11 feet from cask.	:54 :56 :58 00:11:00		

Task No.	Commander Activity	ALSEP/ D Time (Cumulative)	LM Pilot Activity	Task No.
		00:11:00		
3	. Pull cask lanyard to rotate levers and remove spline.	:02		
		:04		
		:06		
		:08		
		:10		
		:12		
		:14		
		:16		
		:18		
		:20		
		:22		
3.4	. Continue pulling cask lanyard until cask is rotated to correct fuel transfer attitude.	:24		
		:26		
		:28		
		:30		
		:32		
		:34		
		:36		
		:38		
		:40		
		:42		
3.5	. Discard cask lanyard.	:44		
		:46		
		:48		
3.6	. Walk to Pkg #2.	:50		
		:52		
		:54		
		:56		
		:58		
		00:12:00		

Task No.	Commander Activity	ALSEP/ D Time (Cumulative)	LM Pilot Activity	Task No.
3.7	. Remove Dome Removal Tool (DRT).	00:12:00		
		:02		
		:04		
		:06		
3.8	. Walk to Fuel cask.	:08		
		:10		
		:12		
		:14		
		:16		
3.9	. Mate DRT with Dome Locking Mechanism, pull outward, press inward and rotate Dome Locking Mechanism clockwise.	:18		
		:20		
		:22		
		:24		
		:26		
		:28		
		:30		
		:32		
		:34		
		:36		
		:38		
		:40		
		:42		
3.10	. Remove Dome, read Tempilabel, report, and discard DRT/Dome.	:44		
		:46		
		:48		
		:50		
		:52		
		:54		
		:56		
		:58		
		00:13:00		

Task No.	Commander Activity	ALSEP/ D Time (Cumulative)	LM Pilot Activity	Task No.
		00:13:00		
		:02		
		:04		
		:06		
		:08		
3.11	. Walk to Pkg #2.	:10		
		:12		
		:14		
		:16		
		:18		
3.12	. Remove Fuel Transfer Tool (FTT).	:20		
		:22		
		:24		
		:26		
		:28		
3.13	. Use stowed UHT to rotate Pkg #2 to the fueling position.	:30		
		:32		
		:34		
		:36		
		:38		
3.14	. Remove RTG dust cover.	:40		
		:42		
		:44		
		:46		
		:48		
		:50		
3.15	. Walk to Fuel cask.	:52		
		:54		
		:56		
		:58		
		00:14:00		

Task No.	Commander Activity	ALSEP/ D Ti (Cumulative)	LM Pilot Activity	Task No.
3.16	. Insert FTT fingers into Fuel Capsule Head.	00:14:00 :02 :04 :06 :08		
3.17	. Engage FTT fingers in Fuel Capsule Head by rotating knob clockwise.	:10 :12 :14 :16 :18 :20 :22		
3.18	. Withdraw Fuel Capsule from Fuel cask	:24 :26 :28 :30 :32		
3.19	. Walk to Pkg #2.	:34 :36 :38 :40 :42 :44		
3.20	. Lower Fuel Capsule into RTG.	:46 :48 :50 :52 :54 :56 :58 00:15:00		

Task No.	Commander Activity	ALSEP D Time (Cumulative)	LM Pilot Activity	Task No.
		00:15:00		
.21	. Report -RTG Fueled	:02		
		:04		
		:06		
.22	. Disengage FTT from Fuel Capsule by counter-rotation of knob, read Tempilabel and report.	:08		
		:10		
		:12		
		:14		
		:16		
		:18		
		:20		
		:22		
		:24		
		:26		
		:28		
		:30		
		:32		
		:34		
		:36		
		:38		
		:40		
		:42		
3.23	. Discard FTT.	:44		
		:46		
		:48		
		:50		
4.0	<u>Configure ALSEP for Traverse</u>	:52		
		:54		
4.1	. Use UHT to rotate Pkg #2 to the carry position.	:56		
		:58		
		00:16:00		

Task No.	Commander Activity	ALSEP/ D T (Cumulative)	LM Pilot Activity	Task No.
1.2	. Relocate Pkg #2 near Pkg #1.	00:16:00 :02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22		
1.3	. Install carry bar in fitting on Pkg #2.	:24 :26 :28 :30 :32 :34 :36 :38 :40 :42		
1.0	<u>Close SEQ Bay Doors</u>	:44 :46 :48 :50 :52 :54 :56 :58 00:17:00		

Task No.	Commander Activity	ALSEP / D Ti (Cumulative)	LM Pilot Activity	Task No.
		00:17:00		
		:02		
		:04		
		:06		
		:08		
		:10		
		:12		
		:14		
		:16		
		:18		
		:20		
		:22		
		:24		
		:26		
		:28		
		:30		
		:32		
		:34		
		:36		
		:38		
		:40		
		:42		
5.0	<u>ALSEP Traverse</u>	:44	<u>ALSEP Traverse</u> (LRV Drive)	P2.0
5.1	. Use carry bar to lift ALSEP Pkgs.	:46		
		:48		
		:50		
		:52		
		:54		
		:56		
		:58		
		00:18:00		

Task No.	Commander Activity	AJ P/ D (Cumulative)	LM Pilot Activity	Task No.
6.2	<p>. Start traverse toward deployment site.</p> <p>00 : 18 : 00 TRAVERSE TIME 00 : 28 : 00</p>	<p>00:18:00 :02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22 :24 :26 :28 :30 :32 :34 :36 :38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 00:28:00</p>	<p>00 : 18 : 00 TRAVERSE TIME 00 : 28 : 00</p>	

Task No.	Commander Activity	AL / D T (Cumulative)	LM Pilot Activity	Task No.
7.0	00 : 28 : 00 Site Survey 00 : 36 : 00	00:28:00 :02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22 :24 :26 :28 :30 :32 :34 :36 :38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 00:36:00	00 : 28 : 00 Site Survey 00 : 36 : 00	P3.0

Task No.	Commander Activity	ALSEP/ D (Cumulative)	LM Pilot Activity	Task No.
8.0	<u>Position ALSEP at Site</u>			
8.1	. Lower ALSEP Pkgs. to lunar surface.	00:36:00		
		:02		
		:04		
		:06		
		:08		
8.2	. Disengage carry bar from Pkg. #2.	:10		
		:12		
		:14		
		:16		
		:18		
		:20		
		:22		
		:24		
		:26		
		:28		
8.3	. Lift Pkg #1, walk 10 feet east of Pkg #2 on E-W axis and lower Pkg #1 to lunar surface.	:30		
		:32		
		:34		
		:36		
		:38		
		:40		
		:42		
		:44		
		:46		
		:48		
		:50		
		:52		
		:54		
		:56		
		:58		
		00:37:00		

Task No.	Commander Activity	AI P/ D T (Cumulative)	LM Pilot Activity	Task No.
8.4	. Disengage UHT from Pkg #1 temporary stowage socket.	00:37:00		
		:02		
		:04		
		:06		
8.5	. Tether UHT to EMU.	:08		
		:10		
		:12		
		:14		
		:16		
8.6	. Return to Pkg #2.	:18		
		:20		
		:22		
		:24		
		:26		
		:28		
		:30	<u>Remove HFE Pull Pins</u>	P4.0
		:32	. Release first velcroed Astromate pull ring on left side of Pkg #2.	P4.1
		:34	. Use pull ring to remove Astromate pull pin and first HFE subpallet pull pin and discard.	P4.2
		:36		
		:38		
		:40		
		:42		
		:44		
		:46		
		:48		
		:50		
		:52		
		:54	. Release second velcroed HFE Subpallet pull ring on right side of pkg. #2.	P4.3
		:56		
		:58		
		00:38:00		

Task No.	Commander Activity	ALD Time (Cumulative)	LM Pilot Activity	Task No.
		00:38:00	. Use pull ring to remove the second HFE subpallet pull pin and discard.	P4.4
		:02		
		:04		
		:06		
		:08	<u>Rotate Pkg #2</u>	P5.0
		:10	. Use stowed UHT to rotate Pkg #2 to the	P5.1
		:12	deployed position on E-W axis.	
		:14		
		:16		
		:18		
		:20		
		:22		
		:24		
		:26		
		:28		
		:30	. Disengage UHT from Pkg #2 temporary	P5.2
		:32	stowage socket.	
		:34		
		:36		
		:38		
		:40	. Tether UHT to EMU.	P5.3
		:42		
		:44		
		:46		
		:48	<u>Remove HFE Subpallet</u>	P6.0
		:50	. Release velcroed HFE subpallet carry	P6.1
		:52	handle and lock in position.	
		:54		
		:56		
		:58		
		00:39:00		

Task No.	Commander Activity	ALSEP/ D T (Cumulative)	LM Pilot Activity	Task No.
		00:39:00	. Unstow UHT.	P6.2
		:02		
		:04		
		:06	. Use UHT to release two strut boyd bolts	P6.3
		:08	on HFE Subpallet.	
		:10		
		:12		
		:14		
		:16		
		:18		
		:20		
		:22		
		:24	. Stow UHT.	P6.4
		:26		
		:28		
		:30	. Grasp the HFE Subpallet carry handle and	P6.5
		:32	lift the HFE Subpallet from Pkg #2.	
		:34		
		:36		
		:38		
		:40	. Using HFE Subpallet carry handle, lower	P6.6
		:42	HFE Subpallet to lunar surface so that	
		:44	it rests on its legs.	
		:46	<u>Remove Subpallet</u>	P7.0
		:48	. Unstow UHT.	P7.1
		:50		
		:52		
		:54		
		:56	. Use UHT to release two Boyd bolts on Tool	P7.2
		:58	carrier Subpallet.	
		00:40:00		

Task No.	Commander Activity	ALSTW/D T (Cumulative)	LM Pilot Activity	Task No.
		00:40:00		
		:02		
		:04		
		:06		
		:08		
		:10		
		:12		
		:14		
		:16	. Engage UHT in Subpallet carry socket.	P7.3
		:18		
		:20		
		:22		
		:24	. Use UHT to remove Subpallet from	P7.4
		:26	Pkg #2.	
		:28		
		:30		
		:32		
		:34		
		:36	. Walk 10 feet east with Subpallet and lower	P7.5
		:38	to lunar surface.	
		:40		
		:42		
		:44		
9.0	<u>Deploy RTG Power Cable and Connect to</u>	:46		
	<u>C/S</u>	:48		
9.1	. Read tempilabel on RTG cable reel and	:50		
	report.	:52		
		:54		
		:56		
		:58		
		00:41:00		

Task No.	Commander Activity	ALSTP/ D T (Cumulative)	LM Pilot Activity	Task No.
		00:41:00		
3.2	. Unstow UHT.	:02		
		:04	. Disengage UHT from Subpallet.	P7.6
		:06		
3.3	. Use UHT to release three Boyd bolts on RTG cable reel.	:08		
		:10		
		:12		
		:14	. Use UHT handle to hook MPA pallet handle.	P7.7
		:16		
		:18		
		:20		
		:22		
		:24		
		:26	. Use UHT to rotate Subpallet to a upright (standing on back support) position.	P7.8
		:28		
		:30		
		:32		
		:34		
		:36	. Disengage UHT handle from MPA pallet handle.	P7.9
3.4	. Engage UHT in RTG cable reel carry socket.	:38		
		:40		
		:42		
		:44		
		:46	. Stow UHT.	P7.10
		:48		
3.5	. Use UHT to remove the RTG cable reel from Pkg #2 and walk to Pkg #1 deploying power cable.	:50	. Grasp the MPA pallet pull ring and use to remove MPA pallet pull pin and discard pull ring/pull pin assembly.	P7.11
		:52		
		:54		
		:56		
		:58		
		00:42:00		

Task No.	Commander Activity	ALTIMETER / D T (Cumulative)	LM Pilot Activity	Task No.
		00:42:00		
		:02		
		:04		
		:06		
39.6	. Release velcroed shorting switch pull ring and pull to verify switch is in shorted position.	:08		
		:10		
		:12		
		:14		
		:16		
		:18		
39.7	. Remove shorting plug pull pin and discard.	:20	. Grasp MPA pallet handle and pull to remove MPA pallet from Subpallet.	P7.1
		:22		
		:24		
		:26		
39.8	. Remove shorting switch plug bracket and discard.	:28		
		:30		
		:32		
		:34		
		:36		
		:38		
		:40		
39.9	. Grasp shorting plug assembly.	:42		
		:44		
		:46		
		:48		
39.10	. Disengage UHT from RTG cable reel and discard cable reel.	:50	. Lower MPA pallet by handle to lunar surface and position MPA pallet in vertical (upright) position.	P7.1
		:52		
		:54		
		:56		
		:58		
		00:43:00		

Task No.	Commander Activity	AI P/ D (Cumulative)	LM Pilot Activity	Task No.
9.11	. Stow UHT.	00:43:00		
		:02		
		:04		
9.12	. Read ammeter to verify that the reading is greater than zero and report.	:06		
		:08		
		:10	. Rotate Subpallet back to horizontal position.	P7.1
		:12		
		:14		
		:16		
		:18		
		:20	. Return to Pkg #2	P7.1
		:22		
9.13	. Remove Central Station connector dust cover and discard.	:24		
		:26		
		:28		
		:30	. Unstow UHT.	P7.1
		:32		
9.14	. Remove shorting switch assembly dust cover and discard.	:34	. Use UHT to release two Boyd bolts on Aiming Mechanism Housing.	P7.1
		:36		
		:38		
		:40		
9.15	. Mate power cable to Central Station.	:42		
		:44		
		:46		
		:48		
		:50		
		:52		
		:54		
		:56	. Use UHT to hook carry handle and to remove Aiming Mechanism Housing from Pkg #2.	P7.1
		:58		
		00:44:00		

Task No.	Commander Activity	CP/ D Time (Cumulative)	LM Pilot Activity	Task No.
		00:44:00		
		:02		
		:04		
		:06		
		:08		
		:10		
		:12		
C9.16	. Walk to Subpallet.	:14		
		:16	. Walk 10 feet east with Aiming Mechanism Housing.	P7.1
		:18		
C10.0	<u>Remove and Deploy PSE Stool</u>	:20		
		:22		
C10.1	. Unstow UHT	:24		
		:26	. Use UHT to lower Aiming Mechanism Housing to lunar surface.	P7.2
		:28		
C10.2	. Use UHT to release Boyd bolt on PSE stool.	:30		
		:32		
		:34		
		:36	. Disengage UHT from carry socket.	P7.2
		:38		
C10.3	. Engage UHT in PSE stool carry socket.	:40		
		:42		
		:44		
		:46	. Stow UHT.	P7.2
		:48		
		:50		
C10.4	. Use UHT to remove PSE stool from Subpallet.	:52	. Walk to HFE Subpallet.	P7.2
		:54		
		:56		
		:58		
		00:45:00		

Task No.	Commander Activity	ALSD Time (Cumulative)	LM Pilot Activity	Task No.
			<u>Release Astromate Connector and Connect</u> <u>Central Station</u>	P8.0
110.5	. Walk 10 feet southeast of Pkg #1 with PSE stool.	00:45:00 :02 :04 :06 :08	. Grasp the HFE Subpallet carry handle and lift the HFE Subpallet from the lunar surface.	P8.1
110.6	. Pack lunar surface and gouge hole in center for PSE stool.	:10 :12 :14 :16 :18 :20 :22 :24 :26 :28 :30 :32 :34 :36 :38		
C10.7	. Lower PSE stool to lunar surface centered over gouged hole.	:40 :42 :44 :46 :48	. Grasp Astromate handle, rotate Astromate connector clockwise and remove Astromate connector from its stowage assembly.	P8.2
C10.8	. Disengage UHT from PSE stool carry socket.	:50 :52 :54 :56 :58 00:46:00	. Verify HFE cable reel deployment and ensure that sufficient HFE cable is deployed for connection to Central Station.	P8.3

Task No.	Commander Activity	ALSEP/ D (Cumulative)	LM Pilot Activity	Task No.
C10.9	. Stow UHT	00:46:00		
C10.10	. Return to Pkg #1	:02 :04 :06 :08 :10		
C11.0	<u>Disconnect Carry Bar from Pkg #1</u>	:12	. Lower HFE Subpallet to lunar surface.	P8.4
C11.1	. Disengage carry bar from Pkg #1	:14 :16 :18 :20 :22 :24 :26 :28 :30 :32	. Walk to Central Station with HFE Astromate connector deploying cable.	P8.5
C11.2	. Walk to Subpallet with antenna mast/carry bar.	:34 :36 :38	. Remove C/S connector dust cover and discard.	P8.6
C11.3	. Stow antenna mast/carry bar on Subpallet taper fitting.	:40 :42 :44 :46 :48 :50 :52 :54 :56 :58 00:47:00	. Remove HFE Astromate connector dust cover and discard.	P8.7
			. Ensure the locking lever is fully counter-clockwise and mate Astromate connector to Central Station.	P8.8

Task No.	Commander Activity	ALSEP/ D e (Cumulative)	LM Pilot Activity	Task No.
C11.4	. Return to Pkg #1.	00:47:00		
		:02		
		:04		
		:06		
		:08		
		:10	. Press down on Astromate Handle and rotate locking lever clockwise 45° to lock position.	P8.9
		:12		
		:14		
		:16		
		:18		
		:20		
		:22		
		:24		
		:26		
		:28		
		:30	. Return to HFE Subpallet.	P8.1
		:32		
		:34		
		:36		
		:38	<u>Offload HFE Probe Pkg.</u>	P9.0
C12.0	<u>Emplace Pkg #1</u>	:40	. Grasp HFE Subpallet carry handle and lift the HFE Subpallet from lunar surface.	P9.1
C12.1	. Untether UHT from EMU and engage in Pkg #1 temporary stowage socket.	:42		
		:44		
		:46		
		:48		
		:50		
		:52		
		:54		
		:56		
		:58		
		00:48:00		

Task No.	Commander Activity	SEP/ D ne (Cumulative)	LM Pilot Activity	Task No.
		00:49:00	. Unstow UHT.	P9.1
		:02		
		:04		
C12.5	. Disengage UHT from Pkg #1 temporary stowage socket.	:06	. Hook UHT handle in HFE Subpallet carry handle and use UHT to rotate the HFE Subpallet to lunar surface so that the HFE Probe Pkg and Electronics Pkg are positioned upward.	P9.1
		:08		
		:10		
		:12		
C12.6	. Hook UHT handle in the dust cover pull ring and pull to release cover.	:14		
		:16		
		:18		
		:20		
		:22		
		:24		
		:26	. Disengage UHT from HFE Subpallet carry handle.	P9.1
		:28		
		:30		
		:32		
		:34		
		:36	. Use UHT to release four Boyd bolts on HFE Probe Pkg.	P9.1
		:38		
		:40		
		:42		
		:44		
C12.7	. Disengage UHT handle from dust cover pull ring and discard dust cover.	:46		
		:48		
		:50		
		:52		
		:54		
C12.8	. Tether UHT to EMU.	:56		
		:58		
		00:50:00		

Task No.	Commander Activity	Time (Cumulative)	LM Pilot Activity	Task No.
C13.0	<u>PSE Deploy</u>	00:50:00		
C13.1	. Unstow UHT.	:02		
		:04		
		:06		
		:08		
C13.2	. Use UHT to release four Boyd bolts on PSE.	:10		
		:12		
		:14		
		:16	. Use UHT handle to hook HFE Probe Pkg handle.	P9.
		:18		
		:20		
		:22		
		:24		
		:26	. With UHT handle remove the HFE Probe Pkg. from HFE Subpallet.	P9.
		:28		
		:30		
		:32		
		:34		
		:36	. Grasp HFE Probe Pkg handle.	P9.
		:38		
		:40		
		:42		
		:44		
		:46	. Disengage UHT handle from HFE Probe Pkg. handle.	P9.
		:48		
C13.3	. Engage UHT in PSE carry socket.	:50		
		:52		
		:54		
		:56	. Stow UHT.	P9.
		:58		
		00:51:00		

Task No.	Commander Activity	AP/D Time (Cumulative)	LM Pilot Activity	Task No.
C13.4	. Use UHT to remove PSE from sun-shield and to carry PSE to stool.	00:51:00	<u>Separate Probe Pkgs</u> . Remove first velcroed closure strap and discard.	P10. P10.
		:02		
		:04		
		:06		
		:08		
		:10		
		:12		
		:14		
		:16	. Support HFE Probe Pkg., remove second velcroed closure strap and discard.	P10.
C13.5	. Remove girdle pull pin.	:18		
		:20		
		:22		
		:24		
		:26		
		:28		
		:30		
		:32		
C13.6	. Emplace PSE on stool and rough align.	:34	. Use HFE Probe Pkg. handles to separate two halves of Probe Pkg.	P10.
		:36		
		:38		
		:40		
		:42		
		:44		
		:46		
		:48		
		:50		
		:52		
		:54	. Lean marked half of HFE Probe Pkg. against the HFE Subpallet.	P10.
		:56		
		:58		
		00:52:00		

Task No.	Commander Activity	A P/ D e (Cumulative)	LM Pilot Activity	Task No.
C13.7	. Remove PSE girdle and discard.	00:52:00 :02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22 :24	<u>Locate First Bore Hole</u> . Grasp HFE Probe Pkg. carry strap.	P11.0 P11.1
C13.8	. Disengage UHT from PSE.	:26 :28 :30 :32 :34	. Walk 16 feet east of the HFE Electronics Pkg. to the first bore hole site, deploying probe cable.	P11.2
C13.9	. Use UHT to deploy thermal shroud.	:36 :38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 00:53:00	. Lower HFE Probe Pkg. to lunar surface, open face downward. . Return to HFE Subpallet.	P11.3 P11.4

Task No.	Commander Activity	ALSEP/ D (Cumulative)	LM Pilot Activity	Task No.
		00:53:00		
		:02		
		:04	<u>Locate Second Bore Hole</u>	P12.0
		:06	. Grasp HFE Probe Pkg. handle and	P12.1
		:08	retrieve marked half of HFE Probe	
		:10	Pkg from HFE Subpallet.	
		:12		
		:14		
		:16	. Grasp pull ring and rotate emplacement	P12.2
		:18	tool holding device from its stowed	
		:20	position, and velcro the holding device	
		:22	to the bottom of the Probe Pkg.	
		:24		
		:26		
		:28		
		:30		
		:32		
		:34		
		:36		
		:38		
		:40		
		:42		
		:44	. Grasp HFE Probe Pkg. carry strap.	P12.
		:46		
		:48		
		:50		
		:52		
		:54		
		:56	. Walk 16 feet southwest of the HFE	P12.
		:58	Electronics Pkg. to the second bore	
		00:54:00	hole site, deploying probe cable.	

Task No.	Commander Activity	EP/ D ne (Cumulative)	LM Pilot Activity	Tas No
C13.10	. Observing bubble level, use UHT to level PSE.	00:54:00 :02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22 :24 :26 :28 :30 :32 :34 :36 :38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 00:55:00	. Lower HFE Probe Pkg. to lunar surface, open face downward. . Walk to LRV	P12. P12.

Task No.	Commander Activity	Air P/ D (Cumulative)	LM Pilot Activity	Task No.
		00:55:00	<u>ALSD Set - Up</u>	P13.0
		:02		
		:04		
		:06		
		:08		
		:10		
		:12		
		:14		
		:16		
		:18		
		:20		
		:22		
		:24		
		:26		
		:28		
		:30		
		:32		
C13.11	. Observe sun compass and report alignment.	:34		
		:36		
		:38		
		:40		
		:42		
		:44		
		:46		
C13.12	. Stow UHT.	:48		
		:50		
		:52		
C13.13	. Return to Pkg #1.	:54		
		:56		
		:58		
		00:56:00		

Task No.	Commander Activity	ALSEP/ D e (Cumulative)	LM Pilot Activity	Task No.
C14.0	<u>Remove Thumper/Geophone Assembly</u>	00:56:00		
C14.1	. Unstow UHT	:02		
		:04		
		:06		
		:08		
C14.2	. Use UHT to release Boyd bolt on	:10		
	Thumper/Geophone Assembly	:12		
	restraining arm.	:14		
		:16		
		:18		
C14.3	. Stow UHT	:20		
		:22		
C14.4	. Use restraining arm to remove Thumper/	:24		
	Geophone Assembly from sunshield.	:26		
		:28		
		:30		
		:32		
		:34		
		:36		
		:38		
		:40		
		:42		
		:44		
		:46		
		:48		
		:50		
		:52		
		:54		
C14.5	. Grasp Thumper/Geophone Assembly,	:56		
	remove from restraining arm/plate	:58		
	assembly and discard restraining arm/	00:57:00		
	plate assembly.			

Task No.	Commander Activity	AJ P/ D (Cumulative)	LM Pilot Activity	Task No.
C14.6	. Unfold Thumper/Geophone Assembly and position sleeves to lock sections.	00:57:00 :02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22 :24 :26 :28 :30 :32 :34 :36 :38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 00:58:00		
C14.7	. Deploy enough T/G cable (approx. 8 feet) to expose the first two cable loops.			

Task No.	Commander Activity	AISEP/ D (Cumulative)	LM Pilot Activity	Task No.
		00:58:00		
C14.8	. Walk to Subpallet.	:02		
		:04		
		:06		
C14.9	. Lean Thumper/Geophone Assembly against the Subpallet.	:08		
		:10		
		:12		
		:14		
		:16		
		:18		
		:20		
		:22		
C14.10	. Return to Central Station	:24		
C15.0	<u>Remove Mortar Package Assembly</u>	:26		
C15.1	. Unstow UHT.	:28		
		:30		
		:32		
C15.2	. Engage UHT in Mortar Package Assembly carry socket.	:34		
		:36		
		:38		
		:40		
		:42		
C15.3	. Use UHT to remove Mortar Package Assembly from sunshield.	:44		
		:46		
		:48		
		:50		
		:52		
		:54		
		:56		
		:58		
		00:59:00		

Task No.	Commander Activity	EP/ D ne (Cumulative)	LM Pilot Activity	Tas No.
C15.4	. Remove carry socket rotation pull pin and discard.	00:59:00 :02 :04 :06 :08 :10 :12		
C15.5	. Ensure carry socket fully rotates and locks.	:14 :16 :18 :20 :22		
C15.6	. Deploy two Mortar Package Assembly support legs and ensure legs are locked and foot pads are properly rotated.	:24 :26 :28 :30 :32 :34 :36 :38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 01:00:00		

Task No.	Commander Activity	AJ-TP/ D (Cumulative)	LM Pilot Activity	Task No.
C15.7	. Emplace Mortar Package Assembly on lunar surface near direction of traverse.	01:00:00 :02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22 :24 :26 :28 :30 :32 :34 :36 :38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 01:01:00		
C16.0	<u>LSM Offload</u>			
C16.1	. Unstow UHT.			
C16.2	. Use UHT to release two Boyd bolts on LSM.			
C16.3	. Stow UHT.			
C16.4	. Pull handle of upper support bracket fully upward and then forward.			

Task No.	Commander Activity	EP/ D ne (Cumulative)	LM Pilot Activity	Tas No
C16.5	. Continue to lift upper support bracket/ brace assembly clear of LSM and discard.	01:01:00 :02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22 :24 :26 :28 :30 :32 :34 :36 :38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 01:02:00		

Task No.	Commander Activity	ALSEP/ D (Cumulative)	LM Pilot Activity	Task No.
C16.6	. Grasp lift-off handle, pull fully upward and remove LSM from sunshield.	01:02:00 :02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22 :24 :26 :28 :30 :32 :34 :36 :38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 01:03:00		
C16.7	. Walk to southwest corner of Central Station.			
C16.8	. Grasp carry handle and rotate LSM to the vertical position.			

Task No.	Commander Activity	ALSEP/ D T (Cumulative)	LM Pilot Activity	Task No.
		01:03:00		
C16. 9	. Grasp handle of lower part of upper support bracket, pull free of LSM, and discard.	:02		
		:04		
		:06		
		:08		
		:10		
		:12		
		:14		
		:16		
		:18		
		:20		
		:22		
C16.10	. Lower LSM to lunar surface.	:24		
		:26		
		:28		
		:30		
		:32		
C16.11	. Return to central station.	:34		
		:36		
C17. 0	<u>Release Sunshield</u>	:38		
C17.1	. Unstow UHT.	:40		
		:42		
C17. 2	. Engage UHT in Package #1 temporary stowage socket.	:44		
		:46		
		:48		
		:50		
		:52		
C17. 3	. Observing bubble level and sun compass, use UHT to level and align Central Station.	:54		
		:56		
		:58		
		01:04:00		

Task No.	Commander Activity	ALSTP / D Ti (Cumulative)	LM Pilot Activity	Task No.
C17.4	. Disengage UHT from Package No. 1.	01:04:00 :02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22 :24 :26 :28 :30 :32 :34 :36 :38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 01:05:00		

Task No.	Commander Activity	ALSEP/ D T (Cumulative)	LM Pilot Activity	Task No.
C17.5	. Use UHT to release five Boyd bolts on South Side of Central Station.	01:05:00 :02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22 :24 :26 :28 :30 :32 :34 :36 :38 :40 :42 :44 :46 :48 :50 :52	<u>Drill First Bore Hole</u>	Pl4. 0
C17.6	. Use UHT to release four Boyd bolts on West side of Central Station.	:54 :56 :58 01:06:00		

Task No.	Commander Activity	AL / D T (Cumulative)	LM Pilot Activity	Task No.
		01:06:00		
		:02		
		:04		
		:06		
		:08		
		:10		
		:12		
		:14		
		:16		
		:18		
		:20		
		:22		
		:24		
		:26		
		:28		
		:30		
		:32		
CI7.7	. Engage UHT in rear thermal curtain/PDM cover socket.	:34		
		:36		
		:38		
		:40		
		:42		
		:44		
		:46		
		:48		
CI7.8	. Pull lanyard to release two pull pins and attach rear thermal curtain/PDM cover socket to the Velcro patch on PDM cover.	:50		
		:52		
		:54		
		:56		
		:58		
		01:07:00		

Task No.	Commander Activity	AL / D T. (Cumulative)	LM Pilot Activity	Task No.
		01:07:00		
		:02		
		:04		
		:06		
		:08		
C17.9	. Allow slack in cable in order to release cover and discard cover.	:10		
		:12		
		:14		
		:16		
		:18		
		:20		
		:22		
		:24		
		:26		
		:28		
C17.10	. Use UHT to lower rear curtain to lunar surface.	:30		
		:32		
		:34		
		:36		
		:38		
C17.11	. Engage UHT in antenna cable restraint UHT socket.	:40		
		:42		
		:44		
		:46		
		:48		
		:50		
		:52		
		:54		
C17.12	. Pull lanyard to release cable restraint and to deploy cable.	:56		
		:58		
		01:08:00		

Task No.	Commander Activity	ALSEP/ D T (Cumulative)	LM Pilot Activity	Task No.
C17.13	. Use UHT to release three Boyd bolts on North side of Central Station.	01:08:00 :02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22 :24 :26 :28 :30 :32 :34 :36 :38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 01:09:00		
C17.14	. Use UHT to release four Boyd bolts on East side of Central Station.			

Task No.	Commander Activity	ALSD Time (Cumulative)	LM Pilot Activity	Task No.
		01:09:00		
		:02		
		:04		
		:06		
		:08		
		:10		
		:12		
		:14		
C17.15	. Walk to north side of Central Station.	:16		
		:18		
		:20		
		:22		
C17.16	. Check for release of sunshield from primary structure.	:24		
		:26		
		:28		
		:30		
		:32		
C17.17	. Use UHT to release two Boyd bolts on antenna.	:34		
		:36		
		:38		
		:40		
		:42		
		:44		
		:46		
		:48		
		:50		
		:52		
C17.18	. Use UHT to release two northmost, interior sunshield Boyd bolts.	:54		
		:56		
		:58		
		01:10 :00		

Task No.	Commander Activity	ALSEP/D Time (Cumulative)	LM Pilot Activity	Task No.
		01:10:00		
		:02		
		:04		
		:06		
		:08		
		:10		
		:12		
C17.19	. Use UHT to release center Boyd bolt.	:14		
		:16		
		:18		
		:20		
C18.0	<u>Deploy Sunshield</u>	:22		
C18.1	. Use UHT to control Sunshield deployment	:24		
		:26		
		:28		
		:30		
		:32		
		:34		
		:36		
		:38		
		:40		
		:42		
C18.2	. Remove UHT from center guide cup.	:44		
		:46		
		:48		
		:50		
		:52		
		:54		
C18.3	. Stow UHT.	:56		
		:58		
		01:11:00		

Task No.	Commander Activity	ALSF D Tin (Cumulative)	LM Pilot Activity	Task No.
C18.4	. Complete sunshield deployment, using manual assist.	01:11 :00 :02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22 :24 :26 :28		
C18.5	. Check for proper deployment of side curtains, remove three sunshield curtain covers and discard.	:30 :32 :34 :36 :38 :40 :42 :44 :46 :48 :50 :52		
C18.6	. Unstow UHT.	:54 :56 :58 01:12 :00		

Task No.	Commander Activity	ALSEP/ D Time (Cumulative)	LM Pilot Activity	Task No.
C18.7	. Use UHT to attach rear and front of right side curtain to Central Station.	01:12:00 :02 :04 :06 :08 :10 :12 :14 :16 :18		
C18.8	. Use UHT to attach front of left side curtain to Central Station.	:20 :22 :24 :26 :28 :30 :32		
C18.9	. Use UHT to attach rear thermal curtain to side curtains.	:34 :36 :38 :40 :42 :44 :46 :48		
C18.10	. Observing sun compass and bubble level, check alignment and level.	:50 :52 :54 :56 :58 01:13:00		

Task No.	Commander Activity	ALSF D Time (Cumulative)	LM Pilot Activity	Task No.
		01:13:00		
		:02		
		:04		
C18.11	. Stow UHT.	:06		
		:08		
		:10		
C18.12	. Walk to subpallet.	:12		
		:14		
C19.0	<u>Assemble Antenna</u>	:16		
C19.1	. Retrieve antenna mast from subpallet.	:18		
		:20		
		:22		
		:24		
		:26		
C19.2	. Return to Central Station	:28		
		:30		
		:32		
C19.3	. Install antenna mast on Central Station.	:34		
		:36		
		:38		
		:40		
		:42		
		:44		
		:46		
		:48		
		:50		
		:52		
		:54		
		:56		
		:58		
		01:14:00		

Task No.	Commander Activity	ALSEP/ D T (Cumulative)	LM Pilot Activity	Task No.
C19.4	. Walk to Aiming Mechanism Housing.	01:14:00 :02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22 :24 :26 :28 :30 :32 :34 :36 :38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 01:15:00		

Task No.	Commander Activity	ALSEP/ D Time (Cumulative)	LM Pilot Activity	Task No.
19.5	. Unstow UHT.	01:15 :00		
19.6	. Use UHT to hook carry handle and to lift aiming mechanism housing from lunar surface.	:02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22		
19.7	. Return to Central Station.	:24 :26 :28		
19.8	. Stow UHT.	:30 :32		
19.9	. Release pull ring and remove cover from aiming mechanism housing and discard.	:34 :36 :38 :40 :42 :44 :46 :48 :50 :52		
19.10	. Install aiming mechanism on antenna mast.	:54 :56 :58 01:16 :00		

Task No.	Commander Activity	AL T / D (Cumulative)	LM Pilot Activity	Task No.
C19. 11	. Remove aiming mechanism housing and packaging and discard.	01:16:00 :02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22 :24 :26 :28 :30 :32 :34 :36 :38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 01:17:00		

Task No.	Commander Activity	AI P/ D T (Cumulative)	LM Pilot Activity	Task No.
C19.12	. Rotate antenna tie-down brackets, retrieve antenna and install on aiming mechanism.	01:17 :00 :02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22 :24 :26 :28 :30 :32 :34 :36 :38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 01:18:00	<u>Transfer Equipment</u>	P15. 0

Task No.	Commander Activity	ALST D Ti (Cumulative)	LM Pilot Activity	Task No.
C20.0	<u>Orient Antenna</u>	01:18 :00		
C20.1	. Observing bubble level, adjust leveling knobs.	:02		
		:04		
		:06		
		:08		
		:10		
		:12		
		:14		
		:16		
		:18		
		:20		
		:22		
		:24		
		:26		
		:28		
		:30		
		:32		
		:34		
		:36		
		:38		
		:40		
		:42		
		:44		
		:46		
		:48		
		:50		
		:52		
		:54		
		:56		
		:58		
		01:19 :00		

Task No.	Commander Activity	ALSEP/ D T (Cumulative)	LM Pilot Activity	Task No.
		01:19 :00 :02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22 :24 :26 :28 :30 :32 :34 :36 :38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 01:20:00		

Task No.	Commander Activity	ALSEP/ D T (Cumulative)	LM Pilot Activity	Task No.
C20.2	. Observing sun compass, adjust alignment knob.	01:20:00 :02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22 :24 :26 :28 :30 :32 :34 :36 :38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 01:21:00	<u>Drill Second Bore Hole</u>	P16.0

Task No.	Commander Activity	ALP/ D T (Cumulative)	LM Pilot Activity	Task No.
C20.3	Enter azimuth offset.	01:21:00 :02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22 :24 :26 :28 :30 :32 :34 :36 :38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 01:22:00		

Task No.	Commander Activity	ALSTP/ D T (Cumulative)	LM Pilot Activity	Task No.
C20.4	. Enter elevation offset.	01:22:00 :02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22 :24 :26 :28 :30 :32 :34 :36 :38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 01:23:00		

Task No.	Commander Activity	ALSEP/ D T (Cumulative)	LM Pilot Activity	Task No.
		01:23 :00		
		:02		
		:04		
		:06		
		:08		
C20.5	. Recheck level.	:10		
		:12		
		:14		
		:16		
		:18		
		:20		
		:22		
		:24		
		:26		
		:28		
		:30		
		:32		
		:34		
		:36		
		:38		
C20.6	. Walk to LSM (Southwest corner of Central Station).	:40		
		:42		
		:44		
		:46		
C21.0	<u>Deploy LSM</u>	:48		
C21.1	. Grasp carry handle and lift LSM from lunar surface.	:50		
		:52		
		:54		
		:56		
		:58		
		01:24:00		

Task No.	Commander Activity	ALSEP/ D I (Cumulative)	LM Pilot Activity	Task No.
C21. 2	. Carry LSM 50 feet Southwest of Central Station.	01:24:00 :02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22 :24 :26 :28 :30 :32 :34 :36 :38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 01:25:00		

Task No.	Commander Activity	ALSED / D Ti (Cumulative)	LM Pilot Activity	Task No.
C21.3	. Deploy three lunar support legs.	01:25:00 :02 :04 :06 :08 :10 :12 :14 :16 :18		
C21.4	. Rotate LSM so color-coded lunar support leg is oriented eastward and lower LSM to lunar surface.	:20 :22 :24 :26 :28		
C21.5	. Unstow UHT.	:30 :32 :34		
C21.6	. Use UHT to remove and discard foam packaging.	:36 :38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 01:26:00		

Task No.	Commander Activity	ALSEP/ D Time (Cumulative)	LM Pilot Activity	Task No.
C21.7	<ul style="list-style-type: none"> Deploy three sensor arms by rotating and locking each upper sensor arm section and lowering each sensor arm into the deployed position. 	01:26:00 :02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22 :24 :26 :28 :30 :32 :34 :36 :38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 01:27:00		

Task No.	Commander Activity	AL / D Time (Cumulative)	LM Pilot Activity	Task No.
C21. 8	. Use PRA removal lanyard to remove PRA covers and discard PRA covers.	01:27:00 :02 :04 :06 :08 :10 :12 :14 :16		
C21. 9	. Observing bubble level, use UHT to level LSM.	:18 :20 :22 :24 :26 :28 :30 :32 :34 :36 :38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 01:28:00		

Task No.	Commander Activity	AI 7/ D 7 (Cumulative)	LM Pilot Activity	Task No.
		01:28 :00		
		:02		
		:04		
		:06		
		:08		
		:10		
		:12		
		:14		
		:16		
		:18		
21.10	Observing the shadowgraph, align LSM.	:20		
		:22		
		:24		
		:26		
		:28		
		:30		
		:32		
		:34		
		:36		
21.11	Check bubble level and shadowgraph for level and alignment, and report alignment to within 1° of azimuth orientation.	:38		
		:40		
		:42		
		:44		
		:46		
		:48		
21.12	Grasp sunshade and release from storage.	:50		
		:52		
		:54		
		:56		
		:58		
		01:29 :00		

Task No.	Commander Activity	ALSEP/ D T (Cumulative)	LM Pilot Activity	Task No.
C21. 13	. Deploy sunshade and attach to Velcro.	01:29:00		
		:02		
		:04		
		:06		
C21. 14	. Stow UHT.	:08		
		:10		
		:12		
		:14		
C21. 15	. Return to Central Station.	:16		
		:18		
		:20		
		:22		
		:24		
		:26		
		:28		
		:30		
		:32		
		:34		
		:36		
		:38		
		:40		
		:42		
		:44		
		:46		
		:48		
		:50		
		:52		
		:54		
		:56		
		:58		
		01:30:00		

Task No.	Commander Activity	ALSEP/ D T (Cumulative)	LM Pilot Activity	Task No.
C22.0	<u>Activate Central Station</u>	01:30:00		
		:02		
		:04		
C22.1	. Unstow UHT.	:06		
		:08		
		:10		
C22.2	. Use UHT to actuate shorting switch assembly push button and verify that ammeter indicates a load condition (reading zero amps).	:12		
		:14		
		:16		
		:18		
		:20		
		:22		
		:24		
		:26		
		:28		
C22.3	. Use UHT to turn on astronaut switches No. 1 and No. 5. (Sw#1 CW - Sw#5CCW)	:30		
		:32		
		:34		
		:36		
		:38		
		:40		
		:42		
		:44		
		:46		
		:48		
C22.4	. Stow UHT.	:50		
		:52		
		:54		
C22.5	. <u>Request Transmitter turn-on.</u>	:56		
		:58		
		01:31:00		

Task No.	Commander Activity	AI STEP/ D (Cumulative)	LM Pilot Activity	Task No.
C22.6	. <u>Verify downlink</u> (Receive confirmation of receipt of RF Signal and useful data).	01:31:00 :02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22 :24 :26 :28 :30 :32 :34 :36 :38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 01:32 :00		

Task No.	Commander Activity	ALSD Time (Cumulative)	LM Pilot Activity	Task No.
		01:32:00	<u>Emplace First Probe</u>	P17.0
		:02	. Unstow UHT.	P17.1
		:04		
		:06	. Use UHT handle to hook carry handle of	P17.2
		:08	marked half of HFE Probe Pkg.	
		:10		
		:12		
		:14		
		:16	. Use UHT to lift the HFE Probe Pkg from	P17.3
		:18	lunar surface.	
		:20		
		:22		
		:24	. Grasp HFE Probe Pkg. carry strap.	P17.4
		:26		
		:28		
		:30		
		:32		
		:34	. Disengage UHT handle from HFE Probe	P17.5
		:36	Pkg. carry handle.	
		:38		
		:40		
		:42		
		:44	. Stow UHT.	P17.6
		:46		
		:48		
		:50	. Remove remainder of probe cable from	P17.7
		:52	HFE Probe Pkg.	
		:54		
		:56		
		:58		
		01:33:00		

Task No.	Commander Activity	ALST / D T (Cumulative)	LM Pilot Activity	Task No.
		01:33:00		
		:02		
		:04		
		:06		
		:08		
		:10	. Use pull ring to rotate sleeve containing probe forward and to remove probe assembly from sleeve.	P17. 8
		:12		
		:14		
		:16		
		:18		
		:20		
		:22		
		:24		
		:26		
		:28		
		:30	. Lower HFE Probe Pkg. to lunar surface.	P17. 9
		:32		
		:34		
		:36		
		:38		
		:40	. Grasp probe assembly.	P17. 10
		:42		
		:44		
		:46		
		:48		
		:50	. Remove sail cloth retaining first probe end piece and discard sail cloth.	P17. 11
		:52		
		:54		
		:56		
		:58		
		01:34:00		

Task No.	Commander Activity	ALSF D Tin (Cumulative)	LM Pilot Activity	Task No.
		01:34:00	. Remove sail cloth retaining second probe end piece and discard sail cloth.	P17. 12
		:02		
		:04		
		:06		
		:08		
		:10	. Position lower sunshield over spring on upper probe section.	P17. 13
		:12		
		:14		
		:16		
		:18		
		:20		
		:22		
		:24		
		:26		
		:28		
		:30	. Unfold probe assembly	P17. 14
		:32		
		:34		
		:36		
		:38		
		:40	. Insert probe into bore hole.	P17. 15
		:42		
		:44		
		:46		
		:48		
		:50		
		:52		
		:54		
		:56		
		:58		
		01:35:00		

Task No.	Commander Activity	ALSEP/ D Ti (Cumulative)	LM Pilot Activity	Task No.
		01:35:00	. Unstow UHT.	P17. 16
		:02		
		:04	. Use UHT handle to hook HFE Probe	P17. 17
		:06	Pkg. carry handle.	
		:08		
		:10		
		:12		
		:14	. Use UHT to lift the HFE Probe Pkg.	P17. 18
		:16	from lunar surface.	
		:18		
		:20		
		:22		
		:24		
		:26	. Grasp HFE Probe Pkg. carry strap.	P17. 19
		:28		
		:30		
		:32		
		:34	. Disengage UHT handle from HFE Probe	P17. 20
		:36	Pkg. carry handle and stow UHT.	
		:38		
		:40		
		:42		
		:44	. Remove emplacement tool from holding	P17. 21
		:46	device by pulling "crow's foot. "	
		:48		
		:50		
		:52		
		:54	. Discard HFE Probe Pkg.	P17. 22
		:56		
		:58		
		01:36:00		

Task No.	Commander Activity	ALSEP / D Time (Cumulative)	LM Pilot Activity	Task No.
		01:36:00	. Extend emplacement tool to maximum length and verify full extension.	P17. 23
		:02		
		:04		
		:06		
		:08		
		:10		
		:12		
		:14		
		:16		
		:18		
		:20		
		:22		
		:24		
		:26		
		:28		
		:30	. Place emplacement tool "crow's foot" between lower and upper sunshield.	P17. 24
		:32		
		:34		
		:36		
		:38		
		:40		
		:42		
		:44		
		:46		
		:48		
		:50	. Use emplacement tool to complete emplacement of probe in drill hole.	P17. 25
		:52		
		:54		
		:56		
		:58		
		01:37:00		

Task No.	Commander Activity	ALST D Time (Cumulative)	LM Pilot Activity	Task No.
		01:37:00		
		:02		
		:04		
		:06		
		:08		
		:10		
		:12		
		:14		
		:16		
		:18		
		:20		
		:22		
		:24		
		:26		
		:28		
		:30	. Observe emplacement tool marking and	P17. 26
		:32	report.	
		:34		
		:36		
		:38		
		:40	. Remove emplacement tool from drill hole	P17. 27
		:42		
		:44		
		:46		
		:48		
		:50		
		:52		
		:54		
		:56		
		:58		
		01:38:00		

Task No.	Commander Activity	AL D Time (Cumulative)	LM Pilot Activity	Task No.
		01:38:00		
		:02		
		:04		
		:06		
		:08		
		:10	. Use emplacement tool "crow's foot" to	P17. 28
		:12	retrieve probe cable near upper sunshield	
		:14		
		:16		
		:18		
		:20	. Place emplacement tool "crow's foot"	P17. 29
		:22	around cable on far side of upper sunshield.	
		:24		
		:26		
		:28		
		:30	. Use emplacement tool to slide upper sun-	P17. 30
		:32	shield along probe cable and toward probe	
		:34	assembly.	
		:36		
		:38		
		:40	. Use emplacement tool to ensure upper	P17. 31
		:42	sunshield is fully deployed over drill	
		:44	hole.	
		:46		
		:48		
		:50		
		:52		
		:54		
		:56		
		:58		
		01:39:00		

Task No.	Commander Activity	ALS Time (Cumulative)	LM Pilot Activity	Task No.
		01:39:00	. Remove emplacement tool "crow's foot" from probe cable.	P17. 32
		:02		
		:04		
		:06		
		:08		
		:10	. Lower probe cable to lunar surface.	P17. 33
		:12		
		:14		
		:16		
		:18		
		:20	. Walk to first bore hole site with emplacement tool.	P17. 34
		:22		
		:24		
		:26		
		:28		
		:30		
		:32		
		:34		
		:36		
		:38		
		:40		
		:42		
		:44		
		:46		
		:48		
		:50	. Lower emplacement tool to lunar surface.	P17. 35
		:52		
		:54		
		:56		
		:58		
		01:40 :00		

Task No.	Commander Activity	ALSO / D T (Cumulative)	LM Pilot Activity	Task No.
		01:40:00	<u>Emplace Second Probe</u>	P18. 0
		:02	. Unstow UHT.	
		:04		
		:06		
		:08	. Use UHT handle to hook HFE Probe	P18. 2
		:10	Pkg. carry handle.	
		:12		
		:14		
		:16		
		:18	. Use UHT to lift the HFE Probe Pkg.	P18. 3
		:20	from lunar surface.	
		:22		
		:24		
		:26	. Grasp HFE Probe Pkg. carry strap.	P18. 4
		:28		
		:30		
		:32		
		:34	. Disengage UHT handle from HFE Probe	P18. 5
		:36	Pkg. carry handle.	
		:38		
		:40		
		:42		
		:44	. Stow UHT.	P18. 6
		:46		
		:48		
		:50	. Remove remainder of Probe cable from	P18. 7
		:52	HFE Probe Pkg.	
		:54		
		:56		
		:58		
		01:41:00		

Task No.	Commander Activity	ALSEP/D Time (Cumulative)	LM Pilot Activity	Task No.
023.0	<u>Deploy Geophones</u>	01:41:00		
023.1	. Retrieve hammer from HTC and return to MPA pallet	:02		
		:04		
		:06		
		:08		
		:10	. Use pull ring to rotate sleeve containing probe forward and to remove probe assembly from sleeve.	P18. 8
		:12		
		:14		
		:16		
		:18		
		:20		
		:22		
		:24		
		:26		
		:28		
		:30	. Discard HFE Probe Pkg.	P18. 9
		:32		
		:34	. Grasp probe assembly.	P18. 10
		:36		
		:38		
		:40		
		:42		
		:44	. Remove sail cloth retaining first probe end piece and discard sail cloth.	P18. 11
		:46		
		:48		
		:50		
		:52		
		:54	. Remove sail cloth retaining second probe end piece and discard sail cloth.	P18. 12
		:56		
		:58		
		01:42:00		

Task No.	Commander Activity	ALSEP/ D T (Cumulative)	LM Pilot Activity	Task No.
		01:42:00		
		:02		
		:04	. Position lower sunshield over spring	P18. 13
		:06	on upper probe section.	
		:08		
		:10		
		:12		
		:14		
		:16		
		:18		
		:20		
		:22		
		:24	. Unfold probe assembly.	P18. 14
		:26		
		:28		
		:30		
		:32		
		:34	. Insert probe into bore hole.	P18. 15
		:36		
		:38		
		:40		
		:42		
		:44		
		:46		
		:48		
		:50		
		:52		
		:54	. Unstow UHT.	P18. 16
		:56		
		:58		
		01:43:00		

Task No.	Commander Activity	ALSEP/ D Ti (Cumulative)	LM Pilot Activity	Task No.
C23. 2	Retrieve the first cable stake from MPA Pallet	01:43:00	. Use UHT handle to hook emplacement tool strap.	P18. 17
		:02		
		:04		
		:06		
		:08		
		:10	. Use UHT to lift emplacement tool from lunar surface.	P18. 18
		:12		
		:14		
		:16		
		:18		
		:20	. Grasp emplacement tool.	P18. 19
		:22		
		:24		
		:26		
		:28		
		:30	. Disengage UHT handle from emplacement tool strap and stow UHT.	P18. 20
		:32		
		:34		
		:36		
		:38		
		:40	. Place emplacement tool "crow's foot" between lower and upper sunshield.	P18. 21
		:42		
		:44		
		:46		
		:48		
		:50		
		:52		
		:54		
		:56		
		:58		
		01:44:00		

Task No.	Commander Activity	AL / D T (Cumulative)	LM Pilot Activity	Task No.
C23.3	. Insert the stake through the cable loops near central station and embed into lunar surface using hammer.	01:44:00 :02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22 :24 :26 :28 :30 :32	. Use emplacement tool to complete emplacement of probe in drill hole.	P18.22
C23.4	. Return to MPA Pallet.	:34 :36		
C23.5	. Retrieve second stake from MPA Pallet and attach to suit/UHT attachment.	:38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 01:45:00	. Observe emplacement tool marking and and report. Remove emplacement tool from drill hole.	P18.23 P18.24

Task No.	Commander Activity	ALSD Time (Cumulative)	LM Pilot Activity	Task No.
C23.6	. Retrieve thumper/Geophone from subpallet.	01:45:00		
		:02		
		:04		
		:06		
		:08		
C23.7	. Return to thumper/Geophone cable stake/ marker flag.	:10		
		:12		
		:14		
C23.8	. Select line for geophone deployment.	:16		
		:18		
C23.9	. Walk 13 feet west SW (along sunline) deploying geophone cable.	:20	. Use emplacement tool "crow's foot" to	P18. 25
		:22	retrieve probe cable near upper sunshield.	
		:24		
		:26		
		:28		
		:30	. Place emplacement tool "crow's foot"	P18. 26
		:32	around cable on far side of upper	
C23.10	. Emplace first geophone.	:34	sunshield.	
		:36		
		:38		
		:40	. Use emplacement tool to slide upper sun-	P18. 27
		:42	shield along probe cable and toward probe	
		:44	assembly.	
		:46		
		:48		
		:50	. Use emplacement tool to ensure upper	P18. 28
		:52	sunshield is fully deployed over drill	
C23.11	. Walk 150 ft West SW deploying geophone cable and exposing the second cable loop.	:54	hole.	
		:56		
		:58		
		01:46:00		

Task No.	Commander Activity	ALSTP/ D T (Cumulative)	LM Pilot Activity	Task No.
		01:46:00		
		:02		
		:04		
		:06		
		:08		
		:10	. Remove emplacement tool "crow's foot"	P18. 29
		:12	from probe cable.	
		:14		
		:16		
		:18		
		:20	. Lower probe cable to lunar surface.	P18. 30
		:22		
		:24		
		:26		
		:28		
		:30	. Discard emplacement tool.	P18. 31
		:32		
		:34		
		:36		
		:38		
		:40	. Walk to HFE Electronics Pkg.	P18. 32
		:42		
		:44		
		:46		
		:48		
		:50		
		:52		
		:54		
		:56		
		:58		
		01:47:00		

Task No.	Commander Activity	AI P/ D 1 (Cumulative)	LM Pilot Activity	Task No.
		01:47:00	<u>Align HFE Electronics Pkg.</u>	P19.0
		:02	. Unstow UHT.	P19.1
		:04	. With UHT handle retrieve dust cover	P19.2
		:06	pull ring and pull to remove dust cover.	
		:08		
		:10		
		:12		
		:14		
		:16		
		:18		
		:20		
		:22		
		:24	. Disengage UHT handle from dust cover	P19.3
		:26	and discard dust cover.	
		:28		
		:30		
		:32		
		:34		
		:36		
		:38		
		:40		
		:42		
		:44	. Use UHT to release four Boyd bolts on	P19.4
		:46	HFE Electronics Package.	
		:48		
		:50		
		:52		
		:54		
		:56		
		:58		
		01:48:00		

Task No.	Commander Activity	ALSEP/ D T (Cumulative)	LM Pilot Activity	Task No.
		01:48:00		
		:02		
		:04		
		:06		
		:08		
		:10		
		:12		
		:14		
		:16		
		:18		
		:20		
		:22		
123.12	. Check geophone deployment line for straightness with respect to sunline and marker flag.	:24	. Engage UHT in HFE Electronics Pkg. carry socket.	P19. 5
		:26		
		:28		
		:30		
		:32		
123.13	. Emplace second geophone.	:34	. Use UHT to remove HFE Electronics Pkg. from HFE Subpallet.	P19. 6
		:36		
		:38		
		:40		
		:42		
		:44	. Use UHT to lower HFE Electronics Pkg. to lunar surface so that its open side faces away from the equator.	P19. 7
		:46		
		:48		
		:50		
		:52		
123.14	. Retrieve the second stake from Suit/UHT attachment.	:54		
		:56		
		:58		
		01:49:00		

ask o.	Commander Activity	ALS / D T. (Cumulative)	LM Pilot Activity	Task No.
		01:50:00		
		:02		
		:04		
		:06	. Disengage UHT from HFE Electronics	P19.10
		:08	Pkg.	
		:10		
		:12		
		:14	. Untether UHT from EMU and discard	P19.11
		:16	UHT.	
		:18		
		:20		
		:22		
		:24		
		:26		
		:28		
		:30	. <u>LM Pilot ALSEP Activity Complete</u>	
		:32		
		:34		
		:36		
		:38		
		:40		
		:42		
		:44		
		:46		
		:48		
		:50		
		:52		
		:54		
		:56		
		:58		
		01:51:00		

ask
o.

Commander
Activity

ALST D
Tim
(Cumulative)

LM Pilot
Activity

Task
No.

01:51 :00
:02
:04
:06
:08
:10
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01:52 :00

ask o.	Commander Activity	ALSEP/ D T (Cumulative)	LM Pilot Activity	Task No.
		01:52:00		
		:02		
		:04		
		:06		
		:08		
		:10		
		:12		
C23.17	. Check geophone deployment line for straightness with respect to sun line and the two marker flags.	:14		
		:16		
		:18		
		:20		
		:22		
C23.18	. Emplace third geophone.	:24		
		:26		
		:28		
		:30		
		:32		
		:34		
		:36		
		:38		
		:40		
C24.0	<u>Conduct Thumper Activity</u>	:42		
C24.1	. Remove Thumper/Geophone dust covers.	:44		
		:46		
		:48		
		:50		
		:52		
		:54		
C24.2	. Lower thumper base plate to lunar surface.	:56		
		:58		
		01:53:00		

Task No.	Commander Activity	ALP/ D (Cumulative)	LM Pilot Activity	Task No.
C24.3	. Rotate squib selection knob to first position.	01:53 :00 :02 :04 :06		
C24.4	. Rotate arm/fire switch to arm position, wait at least 4 seconds, and press to fire.	:08 :10 :12 :14 :16 :18		
C24.5	. Lift thumper from lunar surface, walk 15 feet alongside geophone cable toward stake, deploying thumper cable.	:20 :22 :24 :26 :28 :30 :32 :34 :36 :38		
C24.6	. Lower thumper base plate to lunar surface.	:40 :42 :44		
C24.7	. Rotate squib selection knob to second position.	:46 :48 :50 :52 :54		
C24.8	. Rotate arm/fire switch to arm position, wait at least 4 seconds, and press to fire.	:56 :58 01:54 :00		

Task No.	LM Pilot Activity	ALP/ D T (Cumulative)	Commander Activity	Task No.
		01:54:00		
		:02		
		:04		
C24.9		:06	. Lift thumper from lunar surface, walk 15 feet alongside geophone cable toward stake, deploying thumper cable.	
		:08		
		:10		
		:12		
		:14		
		:16		
		:18		
		:20		
		:22		
C24.10		:24	. Lower thumper base plate to lunar surface.	
		:26		
		:28		
C24.11		:30	. Rotate squib selection knob to third position.	
		:32		
		:34		
		:36		
		:38		
C24.12		:40	. Rotate arm/fire switch to arm position, wait at least 4 seconds, and press to fire.	
		:42		
		:44		
		:46		
		:48		
C24.13		:50	. Lift thumper from lunar surface, walk 15 feet alongside geophone cable toward stake, deploying thumper cable.	
		:52		
		:54		
		:56		
		:58		
		01:55:00		

Task No.	Commander Activity	AL D Time (Cumulative)	LM Pilot Activity	Task No.
		01:55:00		
		:02		
		:04		
		:06		
		:08		
C24.14	. Lower thumper base plate to lunar surface.	:10		
		:12		
C24.15	. Rotate squib selection knob to fourth position.	:14		
		:16		
		:18		
		:20		
		:22		
		:24		
C24.16	. Rotate arm/fire switch to arm position, wait at least 4 seconds, and press to fire.	:26		
		:28		
		:30		
		:32		
C24.17	. Lift thumper from lunar surface, walk 15 feet alongside geophone cable toward stake, deploying thumper cable.	:34		
		:36		
		:38		
		:40		
		:42		
		:44		
		:46		
		:48		
		:50		
		:52		
C24.12	. Lower thumper base plate to lunar surface.	:54		
		:56		
		:58		
		01:56:00		

Task No.	Commander Activity	ALSEP/ D Ti (Cumulative)	LM Pilot Activity	Task No.
C24.19	. Rotate squib selection knob to fifth position.	01:56 :00 :02 :04 :06 :08		
C24.20	. Rotate arm/fire switch to arm position, wait at least 4 seconds, and press to fire.	:10 :12 :14 :16 :18		
C24.21	. Lift thumper from lunar surface, walk 15 feet alongside geophone cable toward stake, deploying thumper cable.	:20 :22 :24 :26 :28 :30 :32 :34 :36 :38		
C24.22	. Lower thumper base plate to lunar surface.	:40 :42		
C24.23	. Rotate squib selection knob to switch position.	:44 :46 :48 :50 :52		
C24.24	. Rotate arm/fire switch to arm position, wait at least 4 seconds, and press to fire.	:54 :56 :58 01:57 :00		

Task No.	Commander Activity	Time (Cumulative)	LM Pilot Activity	Task No.
		01:57:00		
C24.25	. Lift thumper from lunar surface, walk 15 feet alongside geophone cable toward stake deploying thumper cable.	:02		
		:04		
		:06		
		:08		
		:10		
		:12		
		:14		
		:16		
		:18		
		:20		
		:22		
C24.26	. Lower thumper base plate to lunar surface.	:24		
		:26		
		:28		
C24.27	. Rotate squib selection knob to seventh position.	:30		
		:32		
		:34		
		:36		
		:38		
C24.28	. Rotate arm/fire switch to arm position, wait at least four seconds, and press to fire.	:40		
		:42		
		:44		
		:46		
		:48		
C24.29	. Lift thumper from lunar surface, walk 15 feet alongside geophone cable toward stake, deploying thumper cable.	:50		
		:52		
		:54		
		:56		
		:58		
		01:58:00		

Task No.	Commander Activity	ALSEP/ D Ti (Cumulative)	LM Pilot Activity	Task No.
		01:58:00		
		:02		
		:04		
		:06		
		:08		
C24.30	. Lower thumper base plate to lunar surface.	:10		
		:12		
		:14		
C24.31	. Rotate squib selection knob to eighth position.	:16		
		:18		
		:20		
		:22		
C24.32	. Rotate arm/fire switch to arm position, wait at least 4 seconds, and press to fire.	:24		
		:26		
		:28		
		:30		
		:32		
C24.33	. Lift thumper from lunar surface, walk 15 feet alongside geophone cable toward stake, deploying thumper cable.	:34		
		:36		
		:38		
		:40		
		:42		
		:44		
		:46		
		:48		
		:50		
		:52		
C24.34	. Lower thumper base plate to lunar surface.	:54		
		:56		
		:58		
		01:59:00		

Task No.	Commander Activity	ALSEP/ D Ti (Cumulative)	LM Pilot Activity	Task No.
C24.35	. Rotate squib selection knob to ninth position.	01:59:00 :02 :04 :06 :08 :10		
C24.36	. Rotate arm/fire switch to arm position, wait at least 4 seconds, and press to fire.	:12 :14 :16 :18		
C24.37	. Lift thumper from lunar surface, walk 15 feet alongside geophone cable toward stake, deploying thumper cable.	:20 :22 :24 :26 :28 :30 :32 :34 :36 :38		
C24.38	. Lower thumper base plate to lunar surface.	:40 :42 :44		
C24.39	. Rotate squib selection knob to tenth position.	:46 :48 :50 :52 :54		
C24.40	. Rotate arm/fire switch to arm position, wait at least 4 seconds, and press to fire.	:56 :58 02:00:00		

Task No.	Commander Activity	ALSEP/ D Time (Cumulative)	LM Pilot Activity	Task No.
		02:00 :00		
		:02		
		:04		
C24.41	. Lift thumper from lunar surface, walk 15 feet alongside geophone cable toward stake, deploying thumper cable.	:06		
		:08		
		:10		
		:12		
		:14		
		:16		
		:18		
		:20		
		:22		
C24.42	. Lower thumper base plate to lunar surface.	:24		
		:26		
		:28		
C24.43	. Rotate squib selection knob to eleventh position.	:30		
		:32		
		:34		
		:36		
		:38		
C24.44	. Rotate arm/fire switch to arm position, wait at least 4 seconds, and press to fire.	:40		
		:42		
		:44		
		:46		
		:48		
C24.45	. Lift thumper from lunar surface, walk 15 feet alongside geophone cable toward stake, deploying thumper cable.	:50		
		:52		
		:54		
		:56		
		:58		
		02:01 :00		

ask o.	Commander Activity	ALSF D Tin (Cumulative)	LM Pilot Activity	Task No.
		02:01:00		
		:02		
		:04		
		:06		
		:08		
C24.46	. Lower thumper base plate to lunar surface.	:10		
		:12		
		:14		
C24.47	. Rotate squib selection knob to twelfth position.	:16		
		:18		
		:20		
		:22		
C24.48	. Rotate arm/fire switch to arm position, wait at least 4 seconds, and press to fire.	:24		
		:26		
		:28		
		:30		
		:32		
C24.49	. Lift thumper from lunar surface, walk 15 feet alongside geophone cable toward stake, deploying thumper cable.	:34		
		:36		
		:38		
		:40		
		:42		
		:44		
		:46		
		:48		
		:50		
		:52		
C24.50	. Lower thumper base plate to lunar surface.	:54		
		:56		
		:58		
		02:02:00		

Task No.	Commander Activity	ALP/ D 1 (Cumulative)	LM Pilot Activity	Task No.
C24. 51	. Rotate squib selection knob to thirteenth position.	02:0200 :02 :04 :06 :08		
C24. 52	. Rotate arm/fire switch to arm position, wait at least four seconds, and press to fire.	:10 :12 :14 :16 :18		
C24. 53	. Lift thumper from lunar surface, walk 15 feet alongside geophone cable toward stake, deploying thumper cable.	:20 :22 :24 :26 :28 :30 :32 :34 :36 :38		
C24. 54	. Lower thumper base plate to lunar surface.	:40 :42 :44		
C 24. 55	. Rotate squib selection knob to fourteenth position.	:46 :48 :50 :52		
C24. 56	. Rotate arm/fire switch to arm position, wait at least 4 seconds, and press to fire.	:54 :56 :58 02:03:00		

Task No.	Commander Activity	ALSEP/ D T (Cumulative)	LM Pilot Activity	Task No.
		02:03 :00		
		:02		
C24. 57	. Lift thumper from lunar surface, walk 15 feet alongside geophone cable toward stake, deploying thumper cable.	:04		
		:06		
		:08		
		:10		
		:12		
		:14		
		:16		
		:18		
		:20		
		:22		
C24. 58	. Lower thumper base plate to lunar surface.	:24		
		:26		
		:28		
C24. 59	. Rotate squib selection knob to fifteenth position.	:30		
		:32		
		:34		
		:36		
		:38		
C24. 60	. Rotate arm/fire switch to arm position, wait at least 4 seconds, and press to fire.	:40		
		:42		
		:44		
		:46		
		:48		
C24. 61	. Lift thumper from lunar surface, walk 15 feet alongside geophone cable toward stake, deploying thumper cable.	:50		
		:52		
		:54		
		:56		
		:58		
		02:04 :00		

Task No.	Commander Activity	AI / P / D (Cumulative)	LM Pilot Activity	Task No.
		02:04 :00		
		:02		
		:04		
		:06		
C24. 62	. Lower thumper base plate to lunar surface.	:08		
		:10		
		:12		
C24. 63	. Rotate squib selection knob to sixteenth position.	:14		
		:16		
		:18		
		:20		
		:22		
C24. 64	. Rotate arm/fire switch to arm position, wait at least 4 seconds, and press to fire.	:24		
		:26		
		:28		
		:30		
		:32		
C24. 65	. Lift thumper from lunar surface, walk 15 feet alongside geophone cable toward stake, deploying thumper cable.	:34		
		:36		
		:38		
		:40		
		:42		
		:44		
		:46		
		:48		
		:50		
		:52		
		:54		
C24. 66	. Lower thumper base plate to lunar surface.	:56		
		:58		
		02:05 :00		

Task No.	Commander Activity	ALSEP/ D (Cumulative)	LM Pilot Activity	Task No.
C24.67	• Rotate squib selection knob to seventeenth position.	02:05:00 :02 :04 :06 :08		
C24.68	• Rotate arm/fire switch to arm position, wait at least 4 seconds, and press to fire.	:10 :12 :14 :16 :18		
C24.69	• Lift thumper from lunar surface, walk 15 feet alongside geophone cable toward stake, deploying thumper cable.	:20 :22 :24 :26 :28 :30 :32 :34 :36 :38		
C24.70	• Lower thumper base plate to lunar surface.	:40 :42 :44		
C24.71	• Rotate squib selection knob to eighteenth position.	:46 :48 :50 :52 :54		
C24.72	• Rotate arm/fire switch to arm position, wait at least 4 seconds, and press to fire.	:56 :58 02:06:00		

Task No.	Commander Activity	A P/ D (Cumulative)	LM Pilot Activity	Task No.
		02:06 :00		
C24.73	. Lift thumper from lunar surface, walk 15 feet alongside geophone cable toward stake, deploying thumper cable.	:02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22		
C24.74	. Lower thumper base plate to lunar surface.	:24 :26 :28		
C24.75	. Rotate squib selection knob to nineteenth position.	:30 :32 :34		
C24.76	. Rotate arm/fire switch to arm position, wait at least 4 seconds, and press to fire.	:36 :38 :40 :42 :44 :46 :48		
C24.77	. Lift thumper from lunar surface, walk 15 feet alongside geophone cable toward stake, deploying thumper cable.	:50 :52 :54 :56 :58 02:07 :00		

Task No.	Commander Activity	AI P/ D (Cumulative)	LM Pilot Activity	Task No.
		02:07 :00		
		:02		
		:04		
		:06		
C24.78	. Lower thumper base plate to lunar surface.	:08		
		:10		
		:12		
		:14		
C24.79	. Rotate squib selection knob to twentieth position.	:16		
		:18		
		:20		
		:22		
C24.80	. Rotate arm/fire switch to arm position, wait at least 4 seconds, and press to fire.	:24		
		:26		
		:28		
		:30		
		:32		
C24.81	. Lift thumper from lunar surface, walk 15 feet alongside geophone cable toward stake, deploying thumper cable.	:34		
		:36		
		:38		
		:40		
		:42		
		:44		
		:46		
		:48		
		:50		
		:52		
		:54		
C24.82	. Lower thumper base plate to lunar surface.	:56		
		:58		
		02:08 :00		

Task No.	Commander Activity	ALSEP/ Time (Cumulative)	LM Pilot Activity	Task No.
C24. 83	. Rotate squib selection knob to twenty-first position.	02:08:00		
		:02		
		:04		
		:06		
		:08		
C24. 84	. Rotate arm/fire switch to arm position, wait at least 4 seconds, and press to fire.	:10		
		:12		
		:14		
		:16		
		:18		
C24. 85	. Discard thumper assembly.	:20		
		:22		
		:24		
		:26		
		:28		
C24. 86	. Return to Central Station.	:30		
		:32		
		:34		
		:36		
		:38		
		:40		
		:42		
		:44		
		:46		
		:48		
		:50		
		:52		
		:54		
		:56		
		:58		
		02:09:00		

Task No.	Commander Activity	ALSEP/ D Time (Cumulative)	LM Pilot Activity	Task No.
C24. 87	. Unstow UHT.	02:09 :00		
C24. 88	. Use UHT to turn off Astronaut switch No. 5 (Sw#5-CW-Disable)	:02 :04 :06 :08 :10 :12 :14		
C24. 89	. Stow UHT.	:16 :18		
C25. 0	<u>Photograph ALSEP</u> 02:20:00	:20 :22 :24 :26 :28 :30 :32 :34 :36 :38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 02:20 :00		

Task No.	Commander Activity	ALSEP Time (Cumulative)	LM Pilot Activity	Task No.
26.0	Recover Core	02:20:00 :02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22 :24 :26 :28 :30 :32 :34 :36 :38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 02:26:00		

Task No.	Commander Activity	ALSEP/ D T (Cumulative)	LM Pilot Activity	Task No.
C27.0	<u>Deploy Mortar Pkg. Assembly</u>	02:26 :00		
C27.1	. Unstow UHT.	:02		
		:04		
C27.2	. Engage UHT in Mortar Package Assembly carry socket.	:06		
		:08		
		:10		
		:12		
C27.3	. Use UHT to lift Mortar Package Assembly from lunar surface.	:14		
		:16		
		:18		
		:20		
		:22		
C27.4	. Walk approximately 50 feet north from central station (at a right angle to the T/G line).	:24		
		:26		
		:28		
		:30		
		:32		
		:34		
		:36		
		:38		
		:40		
		:42		
		:44		
		:46		
		:48		
		:50		
		:52		
		:54		
		:56		
		:58		
		02:27 :00		

ask o.	Commander Activity	ALSEP/ D Tim (Cumulative)	LM Pilot Activity	Task No.
		02:27 :00		
		:02		
		:04		
		:06		
		:08		
		:10		
		:12		
		:14		
		:16		
		:18		
		:20		
		:22		
C27.5	. With UHT lower Mortar Package to lunar surface.	:24		
		:26		
		:28		
		:30		
C27.6	. Disengage UHT from Mortar Package Assembly carry socket.	:32		
		:34		
		:36		
		:38		
		:40		
		:42		
C27.7	. Stow UHT.	:44		
		:46		
		:48		
C27.8	. Walk to MPA Pallet.	:50		
		:52		
		:54		
		:56		
		:58		
		02:28 :00		

Task No.	Commander Activity	ALSEP Time (Cumulative)	LM Pilot Activity	Task No.
		02:28:00		
		:02		
		:04		
		:06		
		:08		
		:10		
		:12		
		:14		
		:16		
		:18		
		:20		
		:22		
		:24		
		:26		
		:28		
		:30		
		:32		
		:34		
		:36		
		:38		
		:40		
		:42		
		:44		
		:46		
		:48		
		:50		
		:52		
		:54		
		:56		
		:58		
C27.9	. Grasp MPA Pallet by handle and lift from lunar surface.	02:29:00		

Task No.	Commander Activity	ALSF / D Time (Cumulative)	LM Pilot Activity	Task No.
C27.10	. Return to Mortar Package Assembly site.	02:29 :00 :02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22 :24 :26 :28 :30 :32 :34 :36 :38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 02:30 :00		

Task No.	Commander Activity	ALSEP D Tim (Cumulative)	LM Pilot Activity	Task No.
C27.11	. Release velcroed MPA Pallet anchor pull ring and pull lanyard to deploy the MPA Pallet anchors and discard pull ring/lanyard assembly.	02:30 :00 :02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22 :24 :26 :28		
C27.12	. Release velcroed MPA Pallet deployment pull ring and use pull ring to remove pull pin and deploy MPA Pallet.	:30 :32 :34 :36 :38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 02:31 :00		

Task No.	Commander Activity	T (Cumulative)	LM Pilot Activity	Task No.
		02:31:00		
		:02		
		:04		
		:06		
		:08		
		:10		
		:12		
		:14		
		:16		
C27.13	. Discard pallet deployment pull ring/pull pin assembly.	:18		
		:20		
		:22		
		:24		
		:26		
		:28		
C27.14	. Lower MPA Pallet to lunar surface so that the MPA will fire west SW.	:30		
		:32		
		:34		
		:36		
		:38		
		:40		
		:42		
		:44		
		:46		
		:48		
C27.15	. Engage UHT into MPA Pallet UHT socket.	:50		
		:52		
		:54		
		:56		
		:58		
		02:32:00		

ask o.	Commander Activity	ALSF Tim (Cumulative)	LM Pilot Activity	Task No.
C27.16	. Observing the compass rose/UHT align the MPA pallet on the lunar surface so that the MPA will fire west SW (along sunline) and parallel to the T/G deployment line.	02:32:00 :02 :04 :06 :08 :10 :12 :14 :16 :18		
C27.17	. Embed pallet anchors into lunar surface with UHT and lunar boot.	:20 :22 :24 :26 :28 :30 :32 :34 :36 :38		
C27.18	. Engage UHT in Mortar Package Assembly carry socket.	:40 :42 :44 :46 :48		
C27.19	. Use UHT to lift Mortar Package Assembly from lunar surface.	:50 :52 :54 :56 :58 02:33:00		

ask o.	Commander Activity	ALSF D Tim (Cumulative)	LM Pilot Activity	Task No.
C27.20	. Partially unfold Mortar Package Assem- bly antenna.	02:33:00		
		:02		
		:04		
		:06		
		:08		
		:10		
		:12		
		:14		
		:16		
		:18		
C27.21	. With UHT emplace and lock Mortar package assembly on MPA Pallet.	:20		
		:22		
		:24		
		:26		
		:28		
		:30		
		:32		
		:34		
		:36		
		:38		
		:40		
		:42		
		:44		
		:46		
		:48		
		:50		
		:52		
		:54		
		:56		
		:58		
		02:34:00		

Task No.	Commander Activity	ALSET Time (Cumulative)	LM Pilot Activity	Task No.
C27.22	. Complete Mortar Package Assembly antenna deployment.	02:34 :00 :02 :04 :06 :08 :10 :12 :14 :16 :18		
C27.23	. Check level and alignment of the MPA/ Pallet assembly (MPA/Geophone alignment must be parallel within $\pm 5^\circ$).	:20 :22 :24 :26 :28 :30 :32 :34 :36 :38		
C27.24	. Disenagage UHT from Mortar Package assembly carry socket.	:40 :42 :44 :46 :48		
C27.25	. Use UHT to rotate latch on safety pin 90° CCW.	:50 :52 :54 :56 :58 02:35 :00		

ask o.	Commander Activity	ALSEP/D Time (Cumulative)	LM Pilot Activity	Task No.
C27.26	. Engage UHT in Mortar package assembly carry socket.	02:35:00 :02 :04 :06 :08		
C27.27	. Retrieve safety pin removal lanyard.	:10 :12 :14 :16 :18		
C27.28	. Pull safety pin removal lanyard, while exerting a counter-force on UHT, to remove safety pin, and discard safety pin.	:20 :22 :24 :26 :28		
C27.29	. Disengage UHT from Mortar package assembly carry socket.	:30 :32 :34 :36 :38		
C27.30	. Use UHT to turn on two Mortar package assembly safe/arm switches.	:40 :42 :44 :46 :48 :50 :52 :54 :56 :58 02:36:00		

Task No.	Commander Activity	ALSEP/ D Time (Cumulative)	LM Pilot Activity	Task No.
C27.31	. Recheck MPA/Pallet level and alignment.	02:36:00		
		:02		
		:04		
		:06		
		:08		
		:10		
		:12		
C27.32	. Stow UHT	:14		
		:16		
C27.33	. Return to central station.	:18		
		:20		
		:22		
		:24		
		:26		
		:28		
		:30		
		:32		
		:34		
		:36		
		:38		
		:40		
		:42		
		:44		
		:46		
		:48		
		:50		
		:52		
		:54		
		:56		
		:58		
		02:37:00		

Task No.	Commander Activity	ALSEP Time (Cumulative)	LM Pilot Activity	Task No.
		02:37 :00		
		:02		
		:04		
		:06		
		:08		
		:10		
		:12		
C27.34	. Unstow UHT	:14		
		:16		
		:18		
C27.35	. Use UHT to turn on Astronaut switch No. 5 (full CCS rotation).	:20		
		:22		
		:24		
		:26		
		:28		
C27.36	. Recheck antenna orientation.	:30		
		:32		
		:34		
		:36		
		:38		
		:40		
		:42		
		:44		
		:46		
		:48		
		:50		
		:52		
		:54		
		:56		
		:58		
		02:38 :00		

Task No.	Commander Activity	ALSEP Time (Cumulative)	LM Pilot Activity	Task No.
C27.37	. Untether UHT from EMU and discard UHT. <u>ALSEP Deployment Complete</u>	02:38:00 :02 :04 :06 :08 :10 :12 :14 :16 :18 :20 :22 :24 :26 :28 :30 :32 :34 :36 :38 :40 :42 :44 :46 :48 :50 :52 :54 :56 :58 02:39 :00		