


TO: Room 210 Science Support Personnel

18 APR 1972

FROM: TD5/Apollo Missions Science Manager

SUBJECT: Real-Time Support Aids for Apollo 16 Lunar Orbital
Experiments and Photographic Tasks

The data enclosures have been prepared for use by science personnel involved in real-time support activities for Apollo 16. If you have any comments concerning them, please submit them directly to me.


Richard R. Baldwin/TD5

Enclosures:

- 1 - Apollo 16 Experiment Requirements Summary
- 2 - Apollo 16 Science Activities Timeline Summary
- 3 - Apollo 16 Orbital Science Operation Periods
- 4 - Apollo 16 Lunar Orbital Experiments - Status and Requirements (Wall Display Reductions)
- 5 - Apollo 16 SIM Bay Experiments and Systems - Functional Control Diagram

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SCIENCE REQUIREMENTS SUMMARIES
FOR
SIM BAY ORBITAL EXPERIMENTS
AND PHOTOGRAPHIC TASKS

- SM Orbital Photographic Tasks
- CM Photographic Tasks
- Gamma-Ray Spectrometer (S-160)
- X-Ray Fluorescence (S-161)
- Alpha Particle Spectrometer (S-162)
- Mass Spectrometer (S-165)
- UV Photography - Earth and Moon (S-177)
- Bistatic Radar (S-170)

Note:

For constraints, refer to the following documents:
CSM/LM Spacecraft Operational Data Book, SNA-8-D-027,
Volume VI, and CSM Experiments Data Book for J-Missions,
dated September 22, 1970.

SM ORBITAL PHOTOGRAPHIC TASKS

1. OBJECTIVES

- a. Obtain high-resolution panoramic photographs with stereoscopic and monoscopic coverage of the lunar surface (Panoramic Camera).
- b. Obtain high-quality metric photographs of the lunar surface (Mapping Camera).
- c. Obtain data on the altitude of the CSM above the lunar surface (Laser Altimeter).

2. DATA COLLECTION

- a. Operate PC during portions of lunar orbit lightside passes per MRD/Table 1; use monoscopic mode within 7 degrees of either terminator. Maximum duration of photographic sequence will be \leq 30 minutes.
- b. Operate MC over dark and light lunar surface areas per MRD/Table 2. Concurrent LA operation required except for MC oblique passes and post-TEI operation.
- c. There will be periods of independent LA data collection per MRD/Table 3.

CM PHOTOGRAPHIC TASKS

1. OBJECTIVES

Obtain photographs of:

- a. Diffuse galactic light of selected celestial subjects.
- b. Solar corona after CSM sunset and before CSM sunrise.
- c. Zodiacal light.
- d. Specific lunar surface areas in low light levels near the terminator and in earthshine.
- e. Lunar surface areas of prime scientific interest.
- f. Comet, if available.

GAMMA-RAY SPECTROMETER (S-160)

1. OBJECTIVES

- a. From CSM in lunar orbit, measure gamma-ray flux from lunar surface.
- b. While the CSM is in transearth coast, measure the gamma-ray flux of cislunar space, the spectrum of the cosmological gamma-ray flux, the departure from isotropy of the flux along four scan planes, the flux from the galactic anti-center point, and the CSM/SIM radioactivity background flux.
- c. Perform γ -ray astronomy during TEC.

2. DATA COLLECTION

- a. Operate GRS in lunar orbit with boom fully extended for 10 hours minimum (not necessarily continuously) with mapping camera cover closed.
- b. Operate GRS during TEC for 10 hours with boom fully deployed and mapping camera cover closed as soon as practical after TEI. An additional 2 hours of data collection is required with the boom fully deployed and the mapping camera cover opened. It is highly desirable to collect data for 2 hours at each of other boom positions of 0, 2, 4, 6 and 8 feet with the mapping camera cover closed.
- c. Collect γ -ray astronomy data from areas of SCO X-1, CYG X-1 and galactic anti-center point. Perform γ -ray astronomy scans of the ecliptic, supergalactic, supergalactic auxiliary and ecliptic auxiliary planes.
- d. While in lunar orbit, concurrent data collection by the Alpha Particle and X-ray experiments is highly desirable. During γ -ray pointing astronomy, concurrent data collection by the X-ray experiment is highly desirable.

X-RAY FLUORESCENCE (S-161)

1. OBJECTIVES

- a. While the CSM is in lunar orbit, measure the lunar fluorescent X-ray flux and monitor the solar X-ray flux.
- b. While the CSM is in transearth coast, measure the X-ray flux from selected galactic objects and perform a survey of the supergalactic equator.

2. DATA COLLECTION

a. Lunar Orbit:

Collect data for 10 hours minimum with continuous operation for at least 8 hours 10 minutes. Additional data collection during available time is HD.

Maneuver the CSM once during each activity day, if possible, so that sensor is oriented toward deep space at an angle of 135° - 180° with respect to nadir.

Concurrent operation of this experiment and GRS and APS experiments is HD.

b. TEC:

Collect data for 2 hours from each of two galactic objects: SCO X-1 and CYG X-1.

Additional data collection up to 4 hours is HD. Data collection on a different day from SCO X-1 is also HD.

ALPHA PARTICLE SPECTROMETER (S-162)

1. OBJECTIVE

- a. While the CSM is in lunar orbit, obtain data on lunar surface alpha particle emission from RN^{222} , RN^{220} , and their daughter products.

2. DATA COLLECTION

a. Lunar Orbit:

Collect data for 10 hours minimum. Additional data collection during available time is HD.

Maneuver CSM once during each activity day, if possible, so that sensor is oriented toward deep space at an angle of $135^\circ - 180^\circ$ with respect to nadir.

b. TEC:

Collection of data concurrent with X-ray and γ -ray experiments is HD.

MASS SPECTROMETER (S-165)

1. OBJECTIVES

- a. While the CSM is in lunar orbit, obtain data to (1) determine the natural distribution of gases in the lunar atmosphere, (2) locate areas of possible lunar volcanism, and (3) determine the amount of lunar atmospheric contamination due to rocket firing near the lunar surface and due to the spacecraft.
- b. While the CSM is in lunar orbit and during transearth coast, obtain data on the amount of contamination due to the spacecraft.

2. DATA COLLECTION

- a. 60 x 9 NM Orbit: Outgas for 1 hour continuously, followed by data collection for 5 minutes in each of 4 possible combinations of MULT and DSCRM switch positions, and with CSM in either -X axis or +X axis orientation.

Collect data during 2 complete, consecutive revolutions with CSM in -X axis orientation and MULT and DSCRM switches in LO-LO positions.

Additional data collection HD in both -X axis and +X axis orientation.

- b. 60 x 60 NM Orbit: Outgas continuously for 30 minutes followed by data collection for one complete revolution with CSM in -X axis orientation.

Outgas continuously for 4 hours followed by data collection for two complete revolutions with CSM in -X axis orientation.

After each plane change outgas continuously for 30 minutes and collect data for two complete consecutive revolutions with CSM in -X axis orientation; additional data collection in both -X axis and +X axis orientation is HD.

After a sleep cycle, outgas for 10 minutes and collect data for at least 30 minutes with spacecraft remaining in the -X orientation.

It is highly desirable during each revolution to collect data from a lunar surface area extending ± 15 degrees longitude on each side of the sunset and sunrise terminators.

Collect data for 5 minutes at each of 4 boom retracted positions (19, 14, 9, and 4 ft) with CSM in -X axis orientation, and for 1/2 revolution with boom at 12 ft.

Collect data with boom fully extended during a water dump and fuel cell purge.

c. TEC:

Outgas for 30 minutes within 1 hour after TEI; then collect data for 1 hour minimum.

Collect data for 25 minutes minimum at each of 4 boom retracted positions (19, 14, 9, and 4 ft), and for 25 minutes with boom fully retracted.

Collect data for 25 minutes with the boom fully retracted.

Collect data during a water dump and a fuel cell purge with boom fully extended; and for a 2-minute period during a fuel cell oxygen purge when the boom is fully extended, at 12 ft, and at 6 ft.

Collect data for 30 minutes before and after RCS jets A2, B4, C1, and D4 have been fired in pairs for about 1 second and the experiment outgassed for 10 minutes.

UV PHOTOGRAPHY - EARTH AND MOON (S-177)

1. OBJECTIVE
 - a. Obtain photographs of the earth and the lunar surface in three UV and one visual region of the spectrum.
2. DATA COLLECTION
 - a. Fifty-two photographs are required (13 sets, 4 photographs per set; and an additional fifty-two are highly desirable. Each set contains one photograph with each of 4 filters. One color photograph in each set is HD.

BISTATIC RADAR (S-170)

1. OBJECTIVES
 - a. Obtain data in the S-Band and in the VHF band to allow determination of geological structure and electrical characteristics of the lunar crust.
 - b. Obtain data in the S-band and in the VHF band over the same lunar surface track to allow determination of geological structure and electrical characteristics of the lunar crust.
2. DATA COLLECTION
 - a. S-Band or VHF Band:

Collect data for one-half frontside pass minimum for S-band, and another one-half frontside pass for VHF band.

Additional data from lunar frontside passes are HD.
 - b. S-Band and VHF Band:

Collect both S-Band and VHF data over the same ground track for a minimum of one-half frontside pass.

Additional data from lunar frontside passes are HD.

APOLLO 16 MISSION/SCIENCE EVENT SCHEDULE SUMMARY

MISSION/SCIENCE EVENT	DATE/DAY	REV	SCHEDULED G.E.T.		ACTUAL G.E.T.		TOTAL TIME (HRS)
			START	STOP	START	STOP	
LIFT-OFF	4-16 (SUN)		0:00				
TLI		TLC	2:34				
CSM/S-IVB SEPARATION			3:04				
CSM/LM DOCKING			3:14				
CSM/LM EJECTION			3:59				
S-IVB EVASIVE BURN			4:22				
UV Photos (Earth)			7:15				
O ₂ FUEL CELL PURGE	4-17 (MON)		11:16				
WASTE WATER DUMP			11:18				
MCC-1			11:39				
IV Photos (Earth)			12:30				
PTC			13:20	29:15			
Electrophoresis			25:05	25:45			
UV Photos (Earth)			29:30				
WASTE WATER DUMP			30:19				
H ₂ /O ₂ FUEL CELL PURGE			30:20				
MCC-2 (IF REQUIRED)			30:39				
PTC	4-18 (TUES)		35:46	52:10			
Visual Light Flash Test			47:00	48:30			
MCC-3 (IF REQUIRED)			52:29				
UV Photos (Earth)			52:30				
O ₂ FUEL CELL PURGE			53:00				
WASTE WATER DUMP			53:03				
PTC			56:05	67:35			
UV Photos (Moon)	4-19 (WED)		68:00				
MCC-4 (IF REQUIRED)			69:29				
SIM Door Jettison			69:59				
Alpha Particle Spectrometer			70:04	73:31			
Gamma-Ray Spectrometer			71:00	73:31			
LOI			74:29				
S-IVB LUNAR IMPACT			74:30				
Alpha Particle Spectrometer			74:46	78:14			
Gamma-Ray Spectrometer			74:46	78:14			
+X FWD SIM ATTITUDE			75:25				
H ₂ /O ₂ FUEL CELL PURGE			76:23				
WASTE WATER DUMP			76:24				
URINE DUMP			76:24				

APOLLO 16 MISSION/SCIENCE EVENT SCHEDULE SUMMARY

MISSION/SCIENCE EVENT	DATE/DAY	REV	SCHEDULED G.E.T.		ACTUAL G.E.T.		TOTAL TIME (HRS)
			START	STOP	START	STOP	
DOI		1	78:36				
Alpha Particle Spectrometer		3	79:42	97:15			
Gamma-Ray Spectrometer			79:42	97:15			
+X FWD SIM ATTITUDE			79:59				
X-Ray Fluorescence			80:04	92:16			
Laser Altimeter			80:09	80:48			
Mass Spectrometer (Outgassing)			80:09	81:10			
Mapping Camera Photos			80:38	80:46			
Pan Camera Photos			80:38	80:46			
-X FWD SIM ATTITUDE		4	81:05				
Mass Spectrometer			81:10	92:15			
CM Photos (Terminator)	4-20 (THUR)	11	94:51				
CSM/LM UNDOCK-SEPARATION		12	96:14				
CSM CIRCULARIZATION BURN			97:42				
Alpha Particle Spectrometer		13	97:54	152:05			
Gamma-Ray Spectrometer			97:54	152:05			
PDI			98:35				
LM LUNAR TOUCHDOWN			98:47				
O ₂ FUEL CELL PURGE			99:25				
WASTE WATER DUMP			99:26				
URINE DUMP			99:26				
-X FWD SIM ATTITUDE		14	100:59				
Mass Spectrometer (Outgassing)			101:03	101:33			
X-Ray Fluorescence			101:04	150:20			
Mass Spectrometer			101:33	103:22			
CM Photos (L/S in Earthshine)		15	102:18				
EVA 1			102:26	109:26			
Orbital Science Visuals (Landing Site)			102:39				
CM Photos (L/S in Earthshine)			102:51				
Mass Spectrometer (Outgassing)			103:22	107:02			
+X FWD SIM ATTITUDE			103:35				
Mapping Camera Photos			103:38	106:42			
Laser Altimeter			103:38	107:39			
CM Photos (Sharonov)			103:43				
CM Photos (Mendeleev)		16	103:54				

APOLLO 16 MISSION/SCIENCE EVENT SCHEDULE SUMMARY

MISSION/SCIENCE EVENT	DATE/DAY	REV	SCHEDULED G.E.T.		ACTUAL G.E.T.		TOTAL TIME (HRS)
			START	STOP	START	STOP	
Pan Camera Photos			104:15	104:41			
UV Photos (Lunar Maria)			104:26				
Pan Camera Photos		17	105:45	106:14			
Orbital Science Visuals (Mendeleev)			105:54				
CM Photos (Crozier)			106:23				
CM Photos (Descartes)			106:33				
Mass Spectrometer			107:02	118:08			
Mapping Camera Photos	4-21(FRI)	18	107:41	108:40			
CM Photos (Terminator)			108:38				
Mass Spectrometer (Outgassing)		23	118:08	118:18			
Mass Spectrometer			118:18	150:18			
CM Photos (Terminator)			118:35				
H ₂ /O ₂ FUEL CELL PURGE			119:12				
WASTE WATER DUMP			119:13				
URINE DUMP			119:14				
CM Photos (Terminator)		24	120:33				
CM Photos (Gum Nebula)			121:10				
Mapping Camera Photos (25° Fwd Obliques)		25	121:32	122:32			
CM Photos (Zodiacal Light)			122:55				
Bistatic Radar (S-Band/VHF)		26	123:49	125:00			
EVA-2			124:50	131:50			
Mapping Camera Photos (40° N. Obliques)		27	125:30	126:30			
UV Photos (Lunar Terra)			126:08				
CM Photos (Gegenschein Calib.)			127:03				
Pan Camera Photos			127:19	128:20			
Laser Altimeter		28	127:27	130:30			
Mapping Camera Photos			127:28	130:28			
+X FWD SIM ATTITUDE			127:29				
Orbital Science Visuals (Kapteyn)			128:00				
CM Photos (Terminator)			128:28				
Orbital Science Visuals (Farside Highlands)		29	129:26				
WASTE WATER DUMP			129:58				
URINE DUMP			129:59				
CM Photos (Catharina)			130:12				
-X FWD SIM ATTITUDE	4-22(SAT)	30	131:26				
CM Photos (Terminator)			131:28				

APOLLO 16 MISSION/SCIENCE EVENT SCHEDULE SUMMARY

MISSION/SCIENCE EVENT	DATE/DAY	REV	SCHEDULED G.E.T.		ACTUAL G.E.T.		TOTAL TIME (HRS)
			START	STOP	START	STOP	
CM Photos (Gegenschein-Antisolar Pt.)		35	142:30				
CM Photos (Gegenschein-Midway Pt.)			142:53				
CM Photos (Gegenschein-Moulton Pt.)			143:08				
Deep Space Measurements		36	144:47				
Mapping Camera Photos (40° N. Obliques)		37	145:18	146:18			
CM Photos (Saenger)			145:36				
Orbital Science Visuals (Alphonsus)			146:09				
+X FWD SIM ATTITUDE			146:26				
Laser Altimeter			146:27	150:20			
Mapping Camera Photos		38	147:11	150:15			
CM Photos (Terminator)			147:16				
EVA-3			148:25	155:25			
CM Photos (Solar Corona-Sunrise)			149:02				
Pan Camera Photos		39	149:20	149:37			
Pan Camera Photos			150:02	150:15			
O ₂ FUEL CELL PURGE			150:44				
WASTE WATER DUMP			150:45				
URINE DUMP			150:46				
UV Photos (Lunar Horizon/Earth)			151:04				
LOPC-1		40	152:29				
Alpha Particle Spectrometer			152:40	171:33			
Gamma-Ray Spectrometer			152:40	171:33			
X-Ray Fluorescence			152:42	167:08			
Mass Spectrometer (Outgassing)			152:45	153:15			
-X FWD SIM ATTITUDE			153:00				
Mass Spectrometer Boom Photos			153:04	154:22			
Mass Spectrometer		41	153:15	167:09			
Orbital Science Visuals (Landing Site)			154:00				
CM Photos (Terminator)			154:13				
CM Photos (Kohlschuetter)	4-23(SUN)	42	155:13				
+X FWD SIM ATTITUDE		47	165:00				
Laser Altimeter			165:00	167:07			
Mapping Camera Photos			165:01	167:05			
CM Photos (Terminator)			165:04				

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MISSION/SCIENCE EVENT	DATE/DAY	REV	SCHEDULED G.E.T.		ACTUAL G.E.T.		TOTAL TIME (HRS)
			START	STOP	START	STOP	
Orbital Science Visuals (Colombo Highlands)			165:39				
Orbital Science Visuals (Landing Site)		48	167:48				
H ₂ /O ₂ FUEL CELL PURGE		49	170:28				
WASTE WATER DUMP			170:29				
URINE DUMP			170:30				
LM LUNAR LIFT-OFF		50	171:45				
RENDEZVOUS MANEUVERS/DOCKING		51	171:52	173:50			
Alpha Particle Spectrometer			174:00	192:55			
Gamma-Ray Spectrometer			174:00	192:55			
LM JETTISON		53	177:31				
+X FWD SIM ATTITUDE		54	178:50				
Mass Spectrometer (Outgassing)			178:52	180:00			
Laser Altimeter			178:52	180:00			
X-Ray Fluorescence			178:53	191:54			
Mapping Camera Photos			178:58	179:57			
Pan Camera Photos	4-24 (MON)		179:12	179:25			
LM DEORBIT BURN			179:16				
Pan Camera Photos			179:38	179:41			
LM LUNAR IMPACT			179:39				
Mass Spectrometer			180:00	191:34			
CM Photos (Gum Nebula)			180:34				
-X FWD SIM ATTITUDE		55	181:05				
+X FWD SIM ATTITUDE		59	189:51				
Mapping Camera Photos			189:51	191:51			
Laser Altimeter			189:51	191:54			
Orbital Science Visuals (Landing Site)		60	191:29				
CM Photos (Parry)			191:40				
O ₂ FUEL CELL PURGE			192:25				
WASTE WATER DUMP			192:26				
URINE DUMP			192:26				
LOPC-2		61	193:14				
Alpha Particle Spectrometer			193:27	216:30			
Gamma-Ray Spectrometer			193:27	216:30			
Mass Spectrometer (Outgassing)			193:36	194:07			
X-Ray Fluorescence			193:36	215:40			
-X FWD SIM ATTITUDE			193:48				
CM Photos (Terminator)			193:51				

APOLLO 16 MISSION/SCIENCE EVENT SCHEDULE SUMMARY

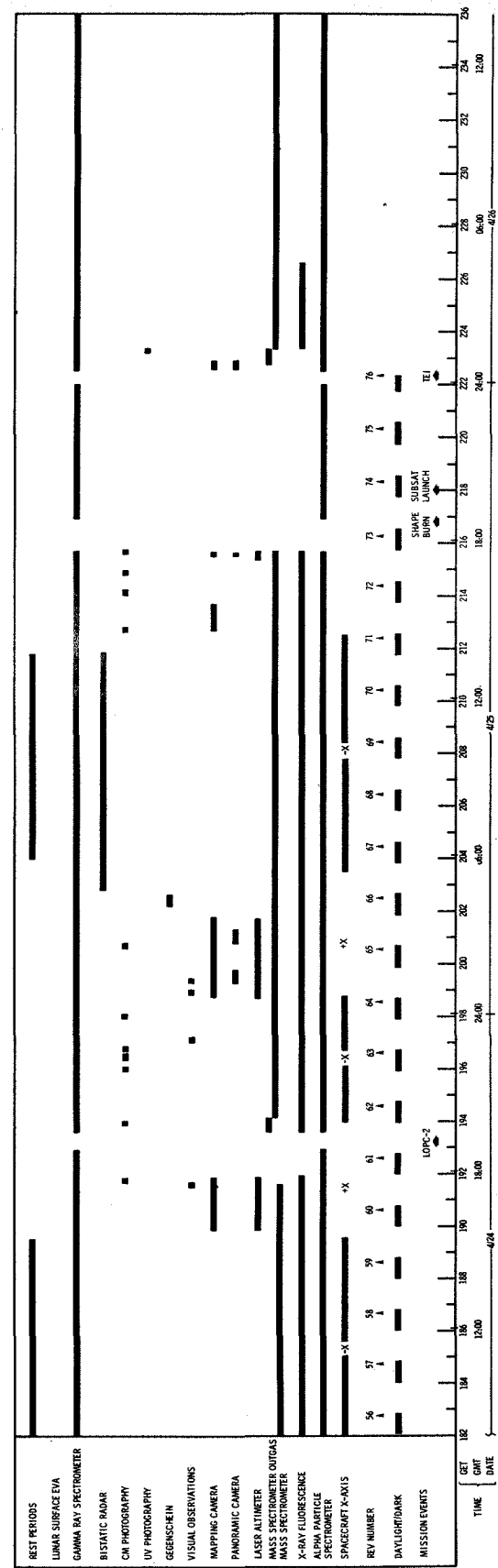
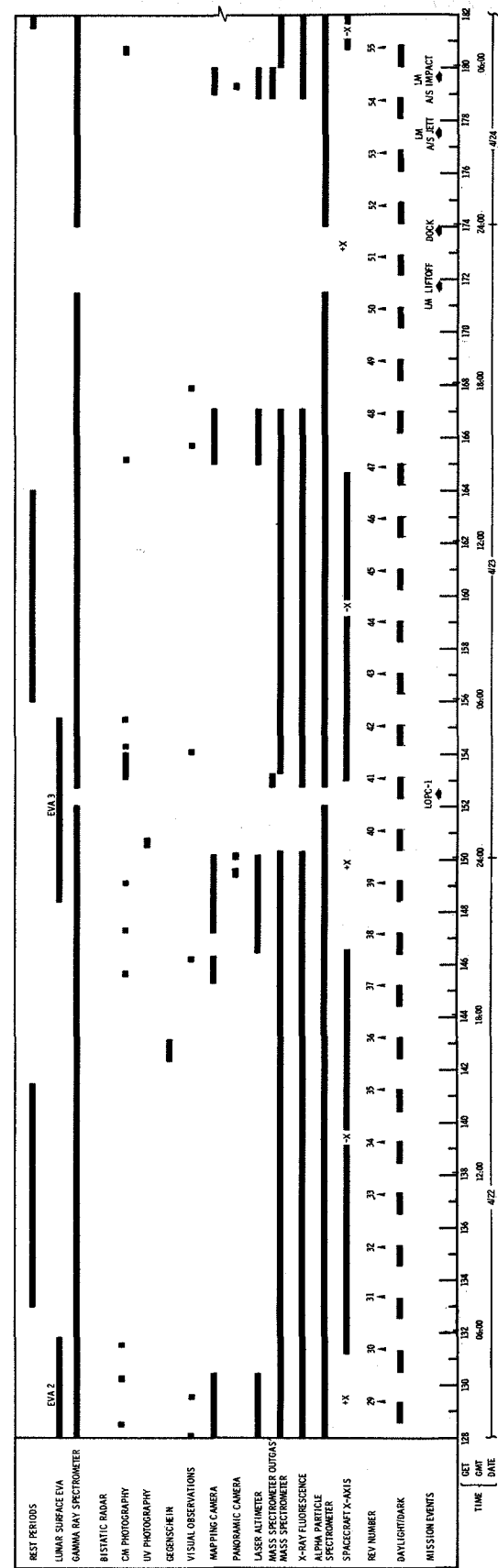
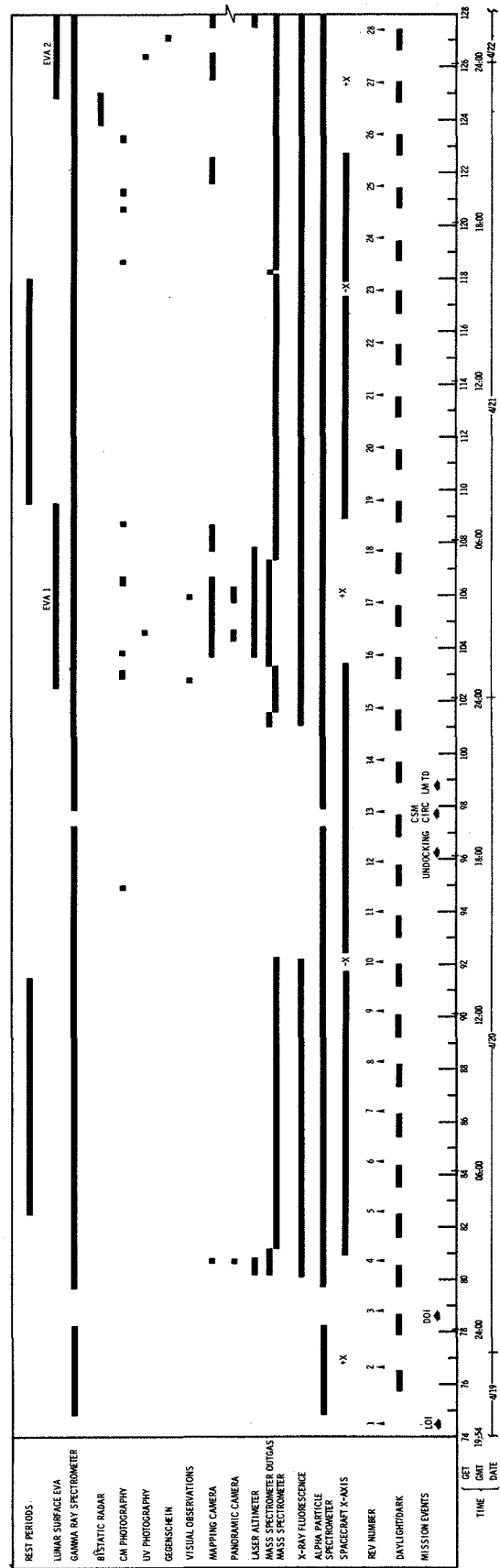
MISSION/SCIENCE EVENT	DATE/DAY	REV	SCHEDULED G.E.T.		ACTUAL G.E.T.		TOTAL TIME (HRS)
			START	STOP	START	STOP	
Mass Spectrometer			194:07	215:17			
CM Photos (Solar Corona-Sunset)		62	195:35				
CM Photos (Solar Corona-Sunset)			195:49				
CM Photos (Gum Nebula)			196:13				
CM Photos (Gum Nebula)			196:19				
Mass Spectrometer Boom Retract Test		63	196:39				
-X FWD SIM ATTITUDE			196:48				
CM Photos (Terminator)			196:49				
Orbital Science Visuals (Goddard)			197:02				
CM Photos (Solar Corona-Sunset)			197:34				
CM Photos (Solar Corona-Sunset)			197:48				
Deep Space Measurements			198:10				
Laser Altimeter		64	198:43	201:48			
+X FWD SIM ATTITUDE			198:45				
Mapping Camera Photos			198:46	201:45			
Orbital Science Visuals (King)			198:49				
Pan Camera Photos			199:16	199:43			
Orbital Science Visuals (Isiderus/Capella)			199:17				
CM Photos (Solar Corona-Sunrise)			200:15				
CM Photos (Solar Corona-Sunrise)		65	200:31				
Pan Camera Photos			200:46	201:15			
CM Photos (Gegenschein)			202:06				
Bistatic Radar (S-Band/VHF)			202:48	203:28			
Bistatic Radar (VHF)	4-25(TUES)	66	203:28	211:48			
-X FWD SIM ATTITUDE			203:35				
CM Photos (Fleming)		71	212:38				
Mapping Camera Photos (40° N. Obliques)			212:39	213:39			
CM Photos (Al-Biruni)			212:48				
CM Photos (Galactic Light)			214:00				
CM Photos (Descartes)		72	215:11				
CM Photos (Vogel/Lassell)			215:16				
Laser Altimeter			215:23	215:40			
CM Photos (Bulualdus/Gassendi)			215:24				
Mapping Camera Photos			215:31	215:38			
Pan Camera Photos			215:31	215:38			
CM Photos (Hansteen)			215:34				
H ₂ /O ₂ FUEL CELL PURGE			216:06				

APOLLO 16 MISSION/SCIENCE EVENT SCHEDULE SUMMARY

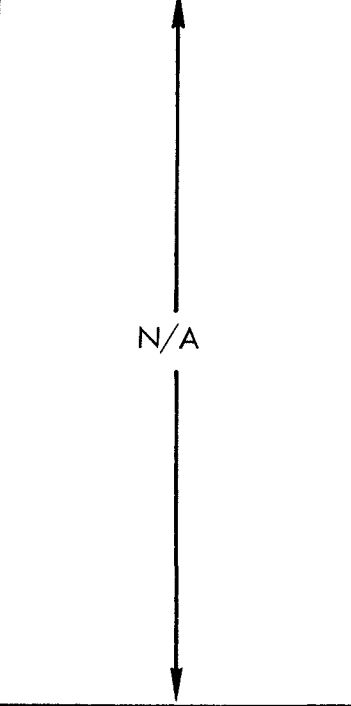
MISSION/SCIENCE EVENT	DATE/DAY	REV	SCHEDULED G.E.T.		ACTUAL G.E.T.		TOTAL TIME (HRS)
			START	STOP	START	STOP	
WASTE WATER DUMP			216:07				
URINE DUMP			216:08				
CSM SHAPE BURN		73	216:49				
Alpha Particle Spectrometer			216:55	222:00			
Gamma-Ray Spectrometer			216:55	222:00			
SUBSATELLITE LAUNCH			218:02				
Subsatellite Tracking		74	218:32				
TEI		75	222:21				
Alpha Particle Spectrometer		TEC	222:27	239:08			
Gamma-Ray Spectrometer			222:27	239:08			
Pan Camera Photos			222:35				
Mapping Camera Photos			222:35				
Mass Spectrometer (Outgassing)			222:47	223:21			
UV Photos (Moon)			223:03				
Mass Spectrometer			223:21	238:31			
X-RAY POINTING (SCO X-1)			224:07				
X-Ray Fluorescence (SCO X-1)			224:07	226:36			
Mass Spectrometer Boom Retract Test			224:09	225:25			
PTC			226:48	237:43			
CM Photos (Corona Calib.)	4-26 (WED)		238:03				
O ₂ FUEL CELL PURGE			239:00				
WASTE WATER DUMP			239:03				
URINE DUMP			239:05				
MCC-5			239:21				
X-RAY POINTING (CYG X-1)			244:22				
Alpha Particle Spectrometer			245:03	285:38			
Gamma-Ray Spectrometer			245:03	285:45			
Mass Spectrometer (Outgassing)			245:16	246:00			
X-Ray Fluorescence (CYG X-1)			245:30	248:44			
Mass Spectrometer			246:00	270:30			
X-RAY POINTING (SCO X-1)			248:45				
X-Ray Fluorescence (SCO X-1)			249:00	251:26			
PTC	4-27 (THUR)		251:32	260:43			
PTC (SUPERGALACTIC AUX PLANE)			260:45	264:00			
PTC (ECLIPTIC PLANE)			264:00	266:58			
H ₂ /O ₂ FUEL CELL PURGE			264:31				
URINE DUMP			264:49				

APOLLO 16 MISSION/SCIENCE EVENT SCHEDULE SUMMARY

MISSION/SCIENCE EVENT	DATE/DAY		REV	SCHEDULED G.E.T.		ACTUAL G.E.T.		TOTAL TIME (HRS)
				START	STOP	START	STOP	
WASTE WATER DUMP				264:50				
X-Ray Fluorescence				266:44	269:35			
X-RAY POINTING (SCO X-1)				267:15				
X-Ray Fluorescence (SCO X-1)				267:15	269:55			
Mass Spectrometer (Outgassing)				270:30	270:40			
Mass Spectrometer				270:40	285:31			
X-Ray Fluorescence				273:00	285:36			
X-RAY POINTING (CYG X-1)				273:30				
X-Ray Fluorescence (CYG X-1)				273:30	275:51			
PTC (SUPERGALACTIC PLANE)		4-28 (FRI)		275:51	284:30			
MCC-7 (IF REQUIRED)				287:23				
uv Photos (Earth)				287:38				
CM/SM SEPARATION				290:07				
ENTRY INTERFACE				290:23				
SPLASHDOWN				290:36				



APOLLO 16 LUNAR ORBITAL EXPERIMENTS - STATUS AND REQUIREMENTS

EXPERIMENT/EQUIPMENT		SCHEDULED OPERATION (GET)		COVERS	BOOM	DATA COLLECTION	REMARKS	
NAME	STATUS	START	STOP	OPEN/CLOSED	EXTENDED/RETRACTED	PRIME/DEGRADED		
PANORAMIC CAMERA				N/A	N/A			
MAPPING CAMERA								
LASER ALTIMETER								
GAMMA-RAY SPECTROMETER				N/A	FT			
MASS SPECTROMETER					FT			
X-RAY FLUORESCENCE								
ALPHA PARTICLE SPECTROMETER								
S-BAND TRANSPONDER				N/A				
BISTATIC RADAR								
UV PHOTOGRAPHY	N/A							
GEGENSCHNITT	N/A			N/A				
SUBSATELLITE								

APOLLO 16 LUNAR ORBITAL EXPERIMENTS - STATUS AND REQUIREMENTS

EXPERIMENT/EQUIPMENT NAME	SPACECRAFT ATTITUDE		RCT JET INHIBIT MODE	EFFLUENT DUMPS AND PURGES COMPLETED/SCHEDULED (GET)			REMARKS
	SIM BAY (NDB/WDB)	PTC (YES/NO)		URINE	WATER	FUEL CELL	
PANORAMIC CAMERA	NDB	NO	1				
MAPPING CAMERA	NDB	NO	1				
LASER ALTIMETER	NDB	NO	1				
GAMMA-RAY SPECTROMETER	WDB	TEC	1	LAST: <div style="border: 1px dashed black; width: 40px; height: 20px; margin: 5px;"></div>	LAST: <div style="border: 1px dashed black; width: 40px; height: 20px; margin: 5px;"></div>	LAST: <div style="border: 1px dashed black; width: 40px; height: 20px; margin: 5px;"></div>	
MASS SPECTROMETER	WDB	TEC	3				
X-RAY FLUORESCENCE	WDB	NO	1				
ALPHA PARTICLE SPECTROMETER	WDB	TEC	1	NEXT: <div style="border: 1px dashed black; width: 40px; height: 20px; margin: 5px;"></div>	NEXT: <div style="border: 1px dashed black; width: 40px; height: 20px; margin: 5px;"></div>	NEXT: <div style="border: 1px dashed black; width: 40px; height: 20px; margin: 5px;"></div>	
S-BAND TRANSPONDER	WDB	N/A	0 *				
BISTATIC RADAR	N/A	N/A	0				
UV PHOTOGRAPHY	NDB	NO	2				
GEGENSCHWEIN	NDB	N/A	2				
SUBSATELLITE	NDB	N/A	1				

REQUIRED IN L/O

REQUIRED

REQUIRED

*UNCOUPLED RCS FIRINGS ARE UNDESIRABLE

SHEET 2 OF 2

NDB: NARROW
DEADBAND
WDB: WIDE
DEADBAND

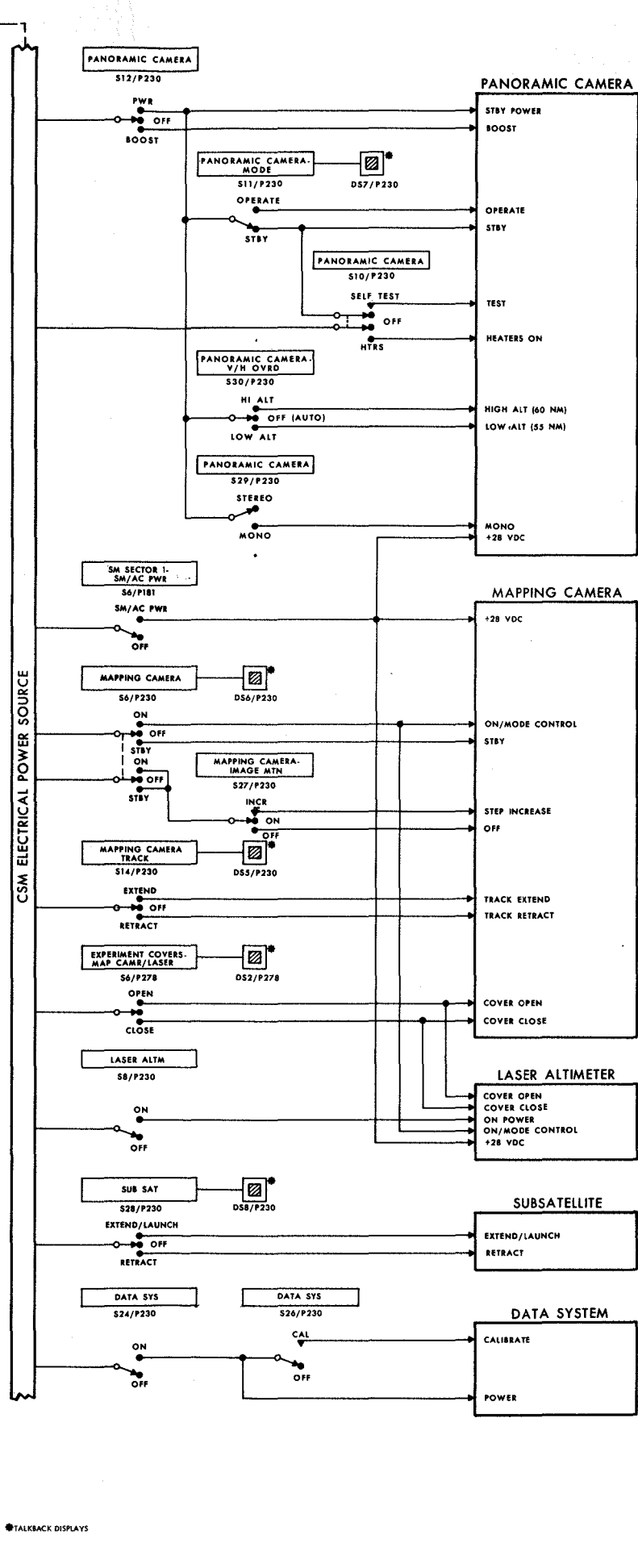
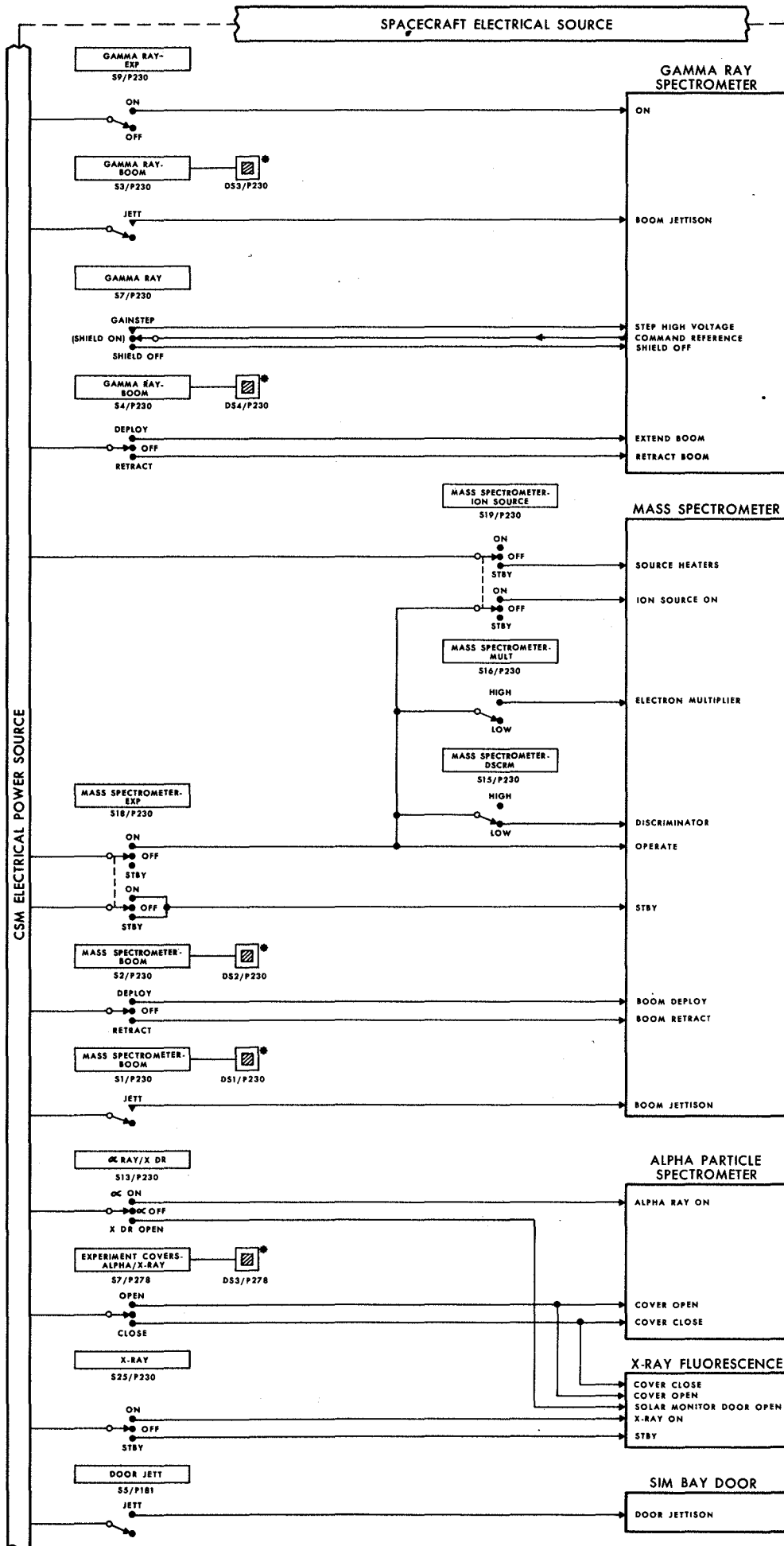
TEC: TRANSEARTH
COAST
N/A: NOT
APPLICABLE

0 - NONE REQUIRED
1 - A2/A4/B1/B4
2 - A3/B3/C4/D4
3 - A2/A4/B1/B4/C1/C3

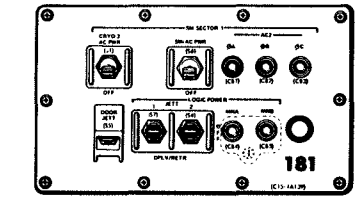
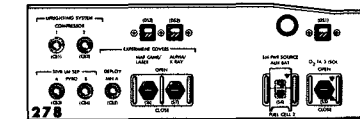
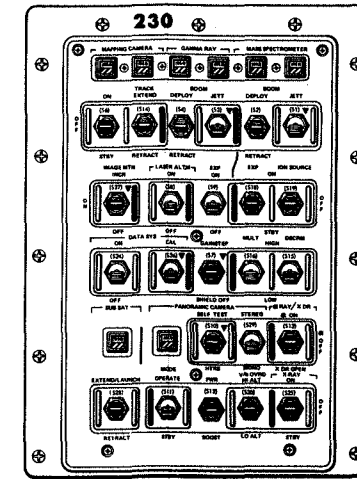
DAP DATA LOAD CONFIGURATION

	VEHICLE CONFIG	QUAD A/C FOR X	QUAD B/D FOR X	ERR DEADBAND	RATE SELECT
R1	0 = No DAP	0 = Fail A/C	0 = Fail B/D	0 = ±0.5°	0 = 0.05°/sec
	1 = CSM	1 = Use A/C	1 = Use B/D	1 = ±5.0°	1 = 0.2°/sec
	2 = CSM & LM				2 = 0.5°/sec
	3 = CSM & SIVB				3 = 2.0°/sec
	6 = CSM & LM (Ascent Stg only)				
	Roll Quad Select	Quad A	Quad B	Quad C	Quad D
R2	0 = Use B/D	0 = Fail	0 = Fail	0 = Fail	0 = Fail
	1 = Use A/C	1 = Use	1 = Use	1 = Use	1 = Use

APOLLO 16 SIM BAY EXPERIMENTS AND SYSTEMS - FUNCTIONAL CONTROL DIAGRAM



EXPERIMENT CONTROL PANELS



SCIENTIFIC INSTRUMENT MODULE EXPERIMENT STATUS CODE

A	B	C	D	E
SIM ATT	MAP CAM (COVER/POSITION)	GAMMA RAY BOOM	MASS SPECT ROOM	ALPHA/X-RAY COVER
+X FWD -X FWD NOM SIM	0 CLOSED 1 OPEN/EXTD 2 OPEN/RETR	0 RETR 1 DPLY 2 PARTIAL DPLY	0 RETR 1 DPLY 2 PARTIAL DPLY	0 CLOSED 1 OPEN
F	G	H	J	J
PAN CAM	MAP CAM/LASER ALTM	GAMMA RAY EXP/SHIELD	MASS SPECT EXP/ION SOURCE	ALPHA/X-RAY
0 OFF 1 STBY 2 ON 3 BOOST	0 OFF/OFF 1 STBY/OFF 2 ON/OFF 3 STBY/ON 4 ON/ON 5 ON/ON 6 ON/ON	0 OFF 1 ON/OFF 2 ON/ON	0 OFF/OFF 1 ON/OFF 2 ON/ON 3 ON/STBY 4 STBY/STBY	0 OFF/OFF 1 OFF/STBY 2 ON/ON 3 ON/ON 4 ON/STBY

SIM EXP STATUS
(ABCDE) - EXAMPLE CODE: +1110
(FGHIJ) - EXAMPLE CODE: 01222

OPERATING MODES - CONTROL SETTINGS FOR SIM BAY EXPERIMENTS AND SYSTEMS

EXPERIMENT/SYSTEM	OPERATING MODE	REQUIRED CONTROL SETTINGS	
		SWITCH TITLE	POSITION
DATA SYSTEM	TELEMETRY SYSTEM "ON"	DATA SYS (S24/P230)	ON
SIM BAY DOOR	DOOR JETTISON	DOOR JETT (S5/P181)	Jett (up)
SUBSATELLITE	DEPLOY	GAMMA RAY - BOOM (S4/P230) EXPERIMENT COVER - ALPHA/X-RAY (S7/P278) SUBSAT (S28/P230)	RETRACT CLOSE EXTEND/LAUNCH
GAMMA RAY SPECTROMETER	DATA COLLECTION (PRIME)	MAPPING CAMERA - TRACK (S14/P230) EXPERIMENT COVERS - MAP CAM/LASER (S6/P278) GAMMA RAY - BOOM (S4/P230) GAMMA RAY - EXP (S9/P230) GAMMA RAY (S7/P230)	RETRACT CLOSE DEPLOY ON As Required
MASS SPECTROMETER	OUTGASSING	MASS SPECTROMETER - BOOM (S2/P230) MASS SPECTROMETER - EXP (S18/P230) MASS SPECTROMETER - ION SOURCE (S19/P230) MASS SPECTROMETER - MULT (S16/P230) MASS SPECTROMETER - DSCRM (S15/P230)	DEPLOY ON STBY Optional
	DATA COLLECTION (PRIME)	MASS SPECTROMETER - BOOM (S2/P230) MASS SPECTROMETER - MULT (S16/P230) MASS SPECTROMETER - DSCRM (S15/P230) MASS SPECTROMETER - EXP (S18/P230) MASS SPECTROMETER - ION SOURCE (S19/P230)	DEPLOY LOW LOW ON
ALPHA PARTICLE SPECTROMETER	DATA COLLECTION (PRIME)	EXPERIMENT COVERS - ALPHA/X-RAY (S7/P278) ALPHA RAY/X DR (S13/P230)	OPEN ON
X-RAY FLUORESCENCE	DATA COLLECTION (PRIME)	ALPHA RAY/X DR (S13/P230) EXPERIMENT COVERS - ALPHA/X-RAY (S7/P278) X-RAY (S23/P230)	X DR OPEN OPEN OPEN
PANORAMIC CAMERA	LUNAR SURFACE PHOTOGRAPHY (PRIME)	SM SECTOR 1 - SM/AC PWR (S6/P181) PANORAMIC CAMERA - (S10/P230) MASS SPECTROMETER - BOOM (S2/P230) GAMMA RAY - BOOM (S4/P230) PANORAMIC CAMERA (S12/P230) PANORAMIC CAMERA - MODE (S11/P230) PANORAMIC CAMERA (STEREO/MONO) (S29/P230) PANORAMIC CAMERA - V/H OVRD (S30/P230)	SM/AC PWR HTRS RETRACT TO 8 FT RETRACT TO 8 FT PWR OPERATE As Required As Required
MAPPING CAMERA/LASER ALTIMETER	LUNAR SURFACE/STELLAR PHOTOGRAPHY (PRIME) AND ALTITUDE DATA COLLECTION	MASS SPECTROMETER - BOOM (S2/P230) GAMMA RAY - BOOM (S4/P230) SM SECTOR 1 - SM/AC PWR (S6/P181) EXPERIMENT COVERS - MAP CAM/LASER (S6/P278) MAPPING CAMERA - TRACK (S14/P230) LASER ALTM (S8/P230) MAPPING CAMERA (S6/P230) MAPPING CAMERA - IMAGE MTN (S27/P230)	RETRACT RETRACT SM/AC PWR OPEN EXTEND ON ON As Required
LASER ALTIMETER	CSM-LUNAR SURFACE ALTITUDE DATA COLLECTION	EXPERIMENT COVERS - MAP CAM/LASER (S6/P278) MAPPING CAMERA - TRACK (S14/P230) SM SECTOR 1 - SM/AC PWR (S6/P181) LASER ALTM (S8/P230)	OPEN EXTEND SM/AC PWR ON

* SOLAR MONITOR DOOR CANNOT BE RETRACTED ONCE RELEASED.
** RETRACTED BOOMS ARE HIGHLY DESIRABLE DURING INDEPENDENT MAPPING CAMERA OPERATION.
*** FOR OPERATIONAL PERIODS GREATER THAN 2 HOURS.

● TALKBACK DISPLAYS