

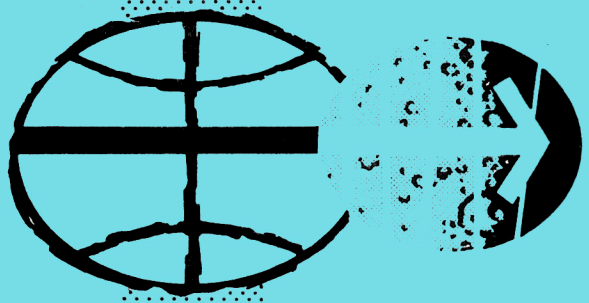
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FLIGHT DIRECTOR LOG

APOLLO 13

PREPARED BY

FLIGHT CONTROL DIVISION



MANNED SPACECRAFT CENTER

HOUSTON, TEXAS

FLIGHT DIR MISSION LOG	DAY	REV	PG 1

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	START A-13 —
	On Console at 2AM (Yawn).
on our clock	Holding at T-9hrs
T-11:20	Count going OK - Only network problem
	is ~~[illegible]~~ HSK CMD Cmptr is looping
	Works OK as TM - No estimate on problem
	Would go with problem anyway - Earth
	Orbit is OK, although we would lose
	last cmd station before TLI. Can uplink
	from GWM, CRO on coast. Correction HPK
	does not see S/C on E/O ~~b~~ 2nd rev.
	So it's GO all the way - But they are
	Trying to fix.

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG (2)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
NetInt	
-10:06	GO TO CVTS -
	Only problem is HSK and cmptr looping)
	does not do it with DM program in -
	Still no estimate -
	Can recover it in 2 minutes -
	(3 or 4 fuels in 3 hours)
T-9:59	- No Land IP's (-EDS) To Bob Moser
	5199 + LDM number
	it cannot raise him on FD, call on CVTS.
T-9:55	60', 535' Anemometer Xducers
	systems have apparently failed
	REPRO Cabinet temp
	~~SR-51~~
T-9:52	Site Redlines Test @ HSK was OK -
	No problem with 'looping computer'
	Red - Can Support

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

FD 12

WEATHER FORECAST FOR APOLLO THIRTEED

Prepared 1000CDT Friday 10 April 19 70

Latest analyses show a cold front extending from a low pressure area south of Nova Scotia through southern Georgia and westward along the Gulf Coast into Texas. That portion of the front northeast of South Carolina will move into the Atlantic while that portion extending west southwest of South Carolina moves very slowly southeastward as a weak low pressure area now near Louisiana moves northeastward. At launch time this low pressure area is expected to be in southeastern Georgia. Southwest of this feature the front will extend into a weak low pressure area near southern Louisiana. This would mean that skies would be cloudy over Cape Kennedy with a chance of showers during some portion of the launch window.

Elsewhere at potential abort landing points winds and swells are likely to be marginal at the potential abort landing point in the central Atlantic but satisfactory elsewhere.

SURFACE CONDITIONS AT LAUNCH TIME

	LAUNCH SITE	31N/71W	33N/50W	31N/28W	28N/19W	12N/161W	16N/164W	25N/158W	31N/158W
WIND	160/12	Vrbl/10	260/28	270/15	Vrbl/10	070/15	070/15	070/18	160/10
SKY CONDITION	Cloudy	Mostly Cloudy	Cloudy	Sctd Shwrs	Partly Cloudy	Partly Cloudy	Partly Cloudy	Partly Cloudy	Partly Cloudy
VISIBILITY	10Miles	10	10	8	10	10	10	10	10
TEMPERATURE	77	66	65	65	65	77	75	70	68
SEAS	2-4 ft	3-4	8-10	5-8	2-3	5	5	6	3
REMARKS	30% chance aftn shwrs		Frontal zone w/shwrs apchg stn	Incrg NWly swell					

KSC
J.R. Nicholson

FLIGHT DIR MISSION LOG	DAY	REV	PG 3

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Changed headsets -
T-8:40	Go To CVTS for Cryo loading -
8:20	BSE - LOXFill cmd given -
8:03	BSE - FAST fill on SIVB
7:44	E] Good Purity in S/C CRYOS
7:32	Weather from Sandy -
	Will be on back of console -
	30% Chance of showers -
	Outin Atlantic, 8-10' seas, 28 knots
	from 60W To 45W - (STA #2 A/C)
	Avoid ~~Avoid~~ if possible - GET 6:30 → 8:10
7:25	Net] All Config for Cmd -
	Milan Armed
7:21	CVTS Carrier Coming on -
	We're all set

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG (4)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
7:18	Already for LV cmd checks -
7:15	LV Sensor H49 - Alarm on Camera 30 -
	talk Will monitor -
7:14	Test Complete -
7:11	All done - Safed -
6:30	- Pot Tank Inlet Valve - Open or Close
	Seq 20-228
	T-3hrs /25
	It's in Vol 2 - 06 - 322
	at Chlorine Injection
	Break fast - Don't order Ham

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG
			5

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
5:34	G) Couch 72.04 loaded - No change -
	72° 02' 36"
	No changes To Ememory -
	Ememory - all GO -
5:34	H) Since last discussion, HSK has faulted
	and recovered three Times.
	GSFC has taken machine for Testing.
	All biomed / TM / Cmd / AG interface
	checks are done -
	HSK - diagnostic - Red - Can support -
	- Will run again after diagnostic
	- Tracking Data Processor - #1
	Cannot support
	Rdndt #2 is OK - Can support -

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 6

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
4:45	Finished Trajectory Run - All OK -
4:34	STC - AZ is GO EMemory is GO -
4:32	Net] VANGUARD T.D.P. Red - Cannot support - VAN is H.D. at all azimuths -
	TRACKING DATA PROCESSOR -
	Assuming VAN TDP stays red:
	You need Ant (for high azimuths) Cape Tracking + BDA Tracking To give you 10 minutes Tracking coverage (BDA Tracking - C band IP / S band MSFN) AT Cutoff, need IU + CMC from either BDA or VAN (right now, both good)
	ETO 15:00 Z on VAN T.D.P.
4:05	Some problem w/ which long line to use for 2H. EECOM wants his long lines

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG (7)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
3:53	G/ E Manny Verify - Complete
	MSFC - Does not understand why lines are being patched this late! -
3:50	→ 214 Comm check TO MSFC - OK
	AFD-EECOM still working on internal patching -
3:44	COM 23 fps max V horizontal
	No problem for land landing -
3:34	No land LM's on - EDS -
3:32	TO CVTS, for COM -
	During Hold GO TO CVTS -
L-4:15	M VAN GTO is now 1600Z - (During hold)
L-4:01	FC's online now -

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 8

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
L-3:45	Bake off pyro armkey in slot -
	took rest out - Getting the other
	key -
	No lost ~~parts~~ parts - have 2 parts -
	Newkey on way up -
	Newkey works
L-3:35	Go to CVTS to pick up Count -
	XJ little more hopeful to VAN -
	looking at A-12 program -
	FIDO also considering -
	Picked up Count - Ontario -

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 9

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
3:12	(C) 1 Resuscitator leaking - Have backup one
	For Milt
	(1) No known Vehicle problems -
	(2) A) Van CDP - A12
	B) HSK Cmd Lpp Pt
	(3) Atlantic - Mode 2 weather bad -
3:08	Crew has left the suit room -
	R/ CSM Wt increase - did not change
	Trim
	-1.54
	+1.32
	32# heavier due to CMP -
	GGT λ 60 → 38 W
	GGT 6:40 → 8:45
	up to 16' swells at 38°W
	Avoid

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 10

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	HSK - GO - Red - Con Support -
	Weather
	58W TO 49W 29K 8-10 seds -
	7:→ 8 GET
	38 8:50
- 1657Z	- Maroon ON
	461
	LAU Az +072.04
	thumb p - 1.54
	y + 1.32
	4039
1722	Lox Vent Valve Stuck open ☆
	SIC
1749	Vent Valve Closed - will leave
	closed
	pressure switch maybe -
	Engine 3 only

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 11

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	17- T-15
	Bact C - 36
1902	72° 2' 38"
	4/0 1913:00
2+10	EDS Man
2+17	1/B out
2+46	O/B
	S II, spint
	S II Sep
	Tur Jet
5+00	Go—
5+34	1/B out
5+48	SIVB to C/OI
	8+38 -
	9+48 S II
7+10	SIVB to Orbit

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 12

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
7+11	
8+45	Leon Sense arm
9+10	PU Shift
9+48	Mode IV
9+52	Staging
	SIVB go
11+00	12+34 - C/O
12+30	SECO -
	Go -
	SIVB configured
	102.5 x 100.3
	z torquing + .26
	F/C reactant valves not off
	Valves closed now

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 13

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
+28	lost Both SIVB Chilldown measurements
	no problem
+52	AOS CRO
	P-52
	Star 26, 33
	∠ 0000
	N 93 − 067 45:35 torquing
	− 000
	+ 162
	looks good
+59	LOS CRO
+01	AOS HSK
	−5.8 x Mem − OK
	0 y 45 min
	−8.6 z
	Systems data on booster
	FM
	No IU Update required
	Strip charts go

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 14

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
1+30	AOS - GYM
	1H + S/C Go
1+32	TLI+90, L/O +8 PADS Up-
1+36	TV ON
	S Band Aux to TV
1+38	Go for TLI from MSFC
	6 Sec burn pad
	3 Sec above 3 T
1+41	TV OK -
	TLI PAD up -
	Ball bias 8° vice 6° at ignition
	GO FOR TLI
	Docking probe is extended - indications good -
1+50	Go for Pyro Arm
	~~Secured~~
	Z pippa approaching .003

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 15

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	TLI
	Up TLM CMD reset + back to Normal at CYI LOS -
	TLI - T16 - 2+35+44 | CRO LOS - 2+32
	R - 179 | 2+45
	P 108
	Y 000
	B_T 5+47
	V_i 35587
2+06	57+00 Vice 57:20
2+25	AOS CRO -
	2+12 - O_2 flow high - NO Sweat
2+31	SIVB Chilldown
2+35+50	Ignition
	2+08 - A-13 OK
	4+44 - Vibration (little)
	5+56 - SECO

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 16

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	~~10 AM~~ 10417 = ΔVc - PAD
2+46	AOS HAW
	SIVB - Vel Cutoff -
	35560
	+000
	ΔVc -3.0
	B_T 3.75 sec long on Watch
2+48	2+56+37 to Sep attitude
	in 4 min
	3+06+37 Sep -
	PRE-TLI EMS DRIFT BIAS CK ☆
	C/O - Good -
	1st cut at MCC$_2$ looks good
	Omni A -
	pitch 317 vice 319 - told
3+02	Go for T+D
3+06+50	S/C Sep

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 17

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
3+09	S/V B at 80'
3+10	TV Good
	f-32 on TV
	f-44 now - peak
3+12	Rate 2 ~~on~~ BMAGS vice Rate 2
3+17	Docked -
	Venting 3+41+37
	3+56+37
3+19	Hard docked -
3+23	T+D Prop nominal
	55#
3+33	HGA locked up OK during T+D
3+36	Hold off on opening Waste management
	vent valve - until later ☆
3+37	now 4.4 - on Camera - low as it will go
3+39	All latches latched

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 18

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
3+46	CM Power on – 2.6 to 5.7a
	Pyro Arm
3+56	2 latches not Caught – now reset
3+58	Windows look OK
3+59	Go for Ejection
	S-IVB – yaw at 4+09
4+09	SIVB yaw
4+09+46	Sband 70%
	600# total 50# T+D
	4+18+00 APS evasive
4+11	Shroud on IU is intact
	Yaw Mnvr Complete
4+14	Not yet started Waste Management Vent Closed – still in make-up OK to open Vent

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 19

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
4+18	Evasive burn
	omni D
	p - -60
	y +90
4+19	APS burn Complete -
4+21	Lox dump 04+39+20
4+24	MCC$_2$ 30 to 50 fps
4+24	Waste Vent open —
4+25	Charging Batt B
	Waste Vent Valve ~~close~~ before PTC
	(FAO has - Should be in ~~flight~~
	flight plan update *
	Booster data on SII engine out:
	Some Vibrations before C/O
	also accelerometer failed at 4og +

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG
			20

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
4+37	MCC_2 now 16 fps No MCC, REQ'D ★
	HGA – now locked on
4+39	LOX dump – complete – ΔV nominal
	PRE TLI – ΔV EMS bias + .8
	POST TLI ΔV EMS bias +1.0
5+01	MCC Capability – 13+00 | SIVB STATUS
	Attitude Control 13+00 | 5+00
	S band TM Capab 19+24
	S band Track Capab 84+42
5+16	RCS Status OK – slightly above Flt plan –
	SIVB is SAFED
	640 sec APS Capability available
5+20	EECOM – Want to do Cryo Status ★
	at time of Cryo Stirring (@ Fans on)
	twice per day – this is compatable
	with crew status

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	MAROON STATUS
(1)	No Real News on S/C - some rumors of vibrations
(2)	Should not need MCC_1 - MCC_2 looks nominal ie 16 to 30 fps
(3)	Some High Gain ~~anomalies~~ funnies but wouldn't worry too much about them since they probably have to do with the short distances involved - Inco is not worried and also switch positions
(4)	Waste management Vent Valve needs to be closed prior to PTC FAO has info and will update flight plan
(5)	RCS is slightly above flight plan
(6)	S-IVB Status in log ~~of~~ page 20
(7)	EECOMS want to do Cryo Status twice per day - when fans are turned on -
8	- PT Transducer on Quad D may be failed

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 21

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
5+40	CDR - Suit Stowed
5+41	L/O +15 PAD
5+42	- 6 hr SIVB burn data in
5+43	217 sec APS burn
5+48	Quad D - P-T ~~transducer~~ within 1 PCM y full scale May be instrumentation - should have gone down SR-5028
5+50	- Gold Team on -
5+54	Att set switch to - [redacted] GDC
6+00	SIVB MCC 1 initiate
6+01	PZ3 in progress
6+03+45	MCC 1 complete
6+16	6 db loss (uplink) what antenna config? HGA - auto track - Turned out to be a HAW ground problem.

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	STATUS
	Retro - Block data on board
	Guido - P23 monitor
	GNC - P23 propellant nominal
	pyros & drifts OK
	Quad D P/T xducer farming
	EECOM - Normal
	Batt B charging
	Waste mgt valve closed
	Surgeon - No problems
	data OK
	Inco - downlink OK
	uplink 6-7 db low
	FAO - 12+24 waste vent closed
	Network - B hardcopy down
	One computer red at HSK (642 B)
	BSE - all normal
	372 sec. burn time with att
	control to 12 hours

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DYNAMICS CHANGE OF SHIFT

SHEET 1 OF 1

MISSION Apollo 13 DATE 4-11-70 GET 6 : 30 : 00

PHASE TRANSLUNAR REV _____ GMT __ : __ : __

CURRENT

h_a N/A nm V_i 10960 ft/sec

h_p 126 nm GET_{pc} 77 : 45 : 47 h_{pc} 385 nm

Orbit Period N/A min h_{earth} 30833 nm

h_{moon} _____ nm

MANEUVERS

Maneuver 1

☒ Predicted
☒ Actual

Mvr TLI

GET 2 : 35 : 43

GMT __ : __ : __

Rev ___ Over ___

ΔV 10416.9

Thruster S-2

Δt_B 5 M: 48 sec

PREBURN	POSTBURN
h_a _____	_____ nm
h_p _____	_____ nm

NOTE:

Maneuver 2

☒ Predicted
☒ Actual

Mvr LM EJECTION

GET 4 : 01 : 00

GMT __ : __ : __

Rev ___ Over ___

ΔV 00005

Thruster RCS

Δt_B _____ M: ___ sec

PREBURN	POSTBURN
h_a _____	_____ nm
h_p _____	_____ nm

NOTE:

Maneuver 3

☐ Predicted
☒ Actual

Mvr S-IVB APS EVASIVE

GET 4 : 18 : 00

GMT __ : __ : __

Rev ___ Over ___

ΔV 9.7

Thruster S-2

Δt_B _____ M: ___ sec

PREBURN	POSTBURN
h_a _____	_____ nm
h_p _____	_____ nm

NOTE:

Prepared by Dave Reed

FLIGHT DIR MISSION LOG	DAY	REV	PG 22

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Fido - ~~MCC1 15.6 fps~~
	MCC2 15.6 fps (77+47 LOI)
	SIVB planning for 9 hour burn
6+52	Disable quads A & B for PTC - GNC
7+00	Purging fuel cells
	Waste water dump
7+09	Complete fuel cell purge + dump
7+17+44	1st earth weather photo
7+32	Starting PTC
7+34	Stowing HGA
7+39+48	2nd earth weather photo
7+55	A-13 - how long Batt B charge?
	4½ to 5 hrs is answer
8+00	PTC - no good
	Primary Evap just activated? Momentarily.

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	GNC wants roll rate of .375°/deg in R1 for roll rate of .3°/sec in DAP. Has something to do with the way the DAP fires. Shud be done everytime.
8+30	Reestablishing PTC
8+36	Start PTC
8+42+08	3rd Earth weather photo
	Pred. Booster Lifetime
	MCC 13+48+00
	att control 13+48+00
	S Band TM 19+24+00
	S Band Track 84+42+00
	Impact pred. 77+49+23
9+03+11	4th earth weather photo
	GNC Ox tank (SPS) decreasing due to helium absorption. normal

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY 4	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	During the P23 series
	starting at 4:00 the Astronaut
	did a V37 during a .4 sec
	window approximately 16 sec
	after doing a OPTICS ZERO.
	This V37 caused some bits
	to be kept from being reset.
	The effect of these bits being
	set is to cause an OCDU FAIL
	from being detected onboard.
	This could be serious if comm
	were lost.
	This problem is the subject
	of Colossus Program Note 1.2.1-6.
	The procedure for correcting
	the problem follows:
	V25N07E
	13.31E
	7E
	E
	AGC Support

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	PTC looks good
9+24	CMP hit a V37 at at improper time (see previous sheet) during P23 Read him a procedure to clear the problem.
9+26+35	5th earth weather photo
	Computer bits got reset OK
9+30	Booster is securing except for data monitors.
9+47+11	6th Earth weather photo
	EMS null bias test
	100.0 to 101.8 in 100 sec
10+08+40	7th Earth weather photo
10+10	CSM S.V. & V66
	EMS bias +.34 fps (Calculated) SPS burns
10+31+00	8th Earth weather photo

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

GET 10:00

P-23 (PRELIMINARY RESULTS).

Corrected altitude 17 ± 4 KM.

Effective altitude 10 ± 12 KM

Comments

1. consistent horizon locator selection

2. Substellar point error was 15 arc-MIN.

a. 5 arc-MIN is desired
b. error can be decreased by minimizing rates and
" use of roll

[signature]

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
10+45	Releasing DSC at this time
	Platform gyro drifts are OK, but may require updating eventually. Approx 1 11/2 MERU / axis. GNC wants more data points before making decision.
10+53+00	9th Earth weather photo
11+15+00	10th Earth weather photo
	P23 results
11+50	Got about 5 master alarms – no explanation GNC or EECOM. Crew says they were testing it.
12+01	P37 block data
12+08	Prosleep checklist started – no medication
12+10	LM/CM ΔP = .5 psi
	HSK command computer faulted

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 26

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
12+12	Bat C 37 V
	Pyro A 37 V
	Pyro B 37 V
	RCS A 94 %
	RCS B 95 %
	RCS C 93 %
	RCS D 96 %
	TELMU SAYS:
12+18	.066 #/hour - LM cabin leak rate.
12+20	EMOD dump
	HSK and computer still down
12+35	Closed waste vent valve
	Terminate Batt B charge

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG
KRANZ	1300 GET		27

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	HSK Command Computer
	down — will Lose ~~HSK~~ GDS
	@ 1346 & may not be able
	to cmd via HSK, will
	use GUM for omni
	Sel.
	White Team on Shift
	@ 0230 h 13+20 GET
	• HSK Cmd Computer
	• Review PTC Procedures
	.375 vice .3° roll rate
	• MCC2 Status
	• HGA Status
	• Suit P Xducer
13+30	H/O GDS to GUM
0843Z	
13+32	EMOD Dump Verified,
	CMC GO
Retro:	CSM Mass Prop
	Block Data thru +60 GET
	Onbd clock .6 ms fast
FDO	253 nm POCA @ 77+47
	ΔV MCC2 - 23 fps (≈3 sec
	@ 30+41 GET
	S-IVB Impact 5° S of tst point
	@ 77+50 .5E

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Will RVD some rel motion between S-IVB & CSM.
GDO –	EMOD OK –
	DSKY Clear
GNC –	Quad A 275 ~~#~~ 0
	B 287 +7
	C 273 -3
	D 289 +7
	All Quads Disabled
	SPS Ox Tank Press is stable & stopped
	Absorbing He
	May have to update
	Gyro drifts ≈ 1/2 MEMO
	per IRIG – will watch
	for about 24 HRS or so
ECOM –	Suit Press Xducer
	≈ 4.3 when cabin
	5.1 — try & figure
	out whether it is cal shift
	• Gly flow a bit low,
	may be xducer shift
	• FC Load Sharing
	FC #1 32
	FC #2 32
	FC #3 36

KRANZ 1300 GET

FLIGHT DYNAMICS CHANGE OF SHIFT

SHEET 1 OF 1

MISSION APOLLO 13 DATE 4-12-70 GET 13:45:00

PHASE _____ REV _____ GMT __:__:__

CURRENT

h_a _____ nm V_i _____ ft/sec

h_p _____ nm GET_{pc} 77:28:35 h_{pc} 252,85 nm

Orbit Period _____ min

13+45+00 { h_{earth} 65852 nm

h_{moon} 150333 nm

MANEUVERS

☑ Predicted	☐ Predicted	☐ Predicted
☐ Actual	☐ Actual	☐ Actual
Mvr MCC2	Mvr _____	Mvr _____
GET 30:40:57	GET __:__:__	GET __:__:__
GMT __:__:__	GMT __:__:__	GMT __:__:__
Rev ___ Over ___	Rev ___ Over ___	Rev ___ Over ___
ΔV 23.0	ΔV _____	ΔV _____
Thruster SPS	Thruster _____	Thruster _____
Δt_B 0 M: 3.25 sec	Δt_B ____ M: ____ sec	Δt_B ____ M: ____ sec

PREBURN	POSTBURN	PREBURN	POSTBURN	PREBURN	POSTBURN
h_a ____	____ nm	h_a ____	____ nm	h_a ____	____ nm
h_p ____	____ nm	h_p ____	____ nm	h_p ____	____ nm

NOTE: MCC2 { Preburn Hpc=252,85 / Postburn Hpc=57,8

S/IVB impact:
GET: 77+49+27
ϕ = 8+09 (S)
δ = 29+33 (W)

NOTE:

NOTE:

Prepared by Bill Boone

EECOM CONSUMMABLES STATUS @ 12+30 GET

CRYOGENICS

	TOTAL (LBS)	MARGIN (LBS)	SINGLE TANK LIFETIME (GET) 40 AMPS	70 AMPS
H_2	49.2	+1.4	233	139
O_2	582	+79	253	169

WATER

POTABLE TANK 103 %

WASTE TANK 85% @ 39 GET

NEXT DUMP: TO 25 % @ 30+20 GET

BATTERIES

BATTERY A 30.2 A-H REMAINING

BATTERY B 39.9 A-H REMAINING

BATTERY C 38.8 A-H REMAINING

108.9 A-H TOTAL REMAINING

MARGIN WITHOUT CHARGER +7 A-H

ΔV CAPABILITY

GET 13 GNC _____

SM RCS

WPU USABLE TOTAL 1121

CSM WEIGHT 63660 1 OR (3) MEN

DAP SM ΔV 34 TOTAL BT 193

SCS SM ΔV 30 TOTAL BT 172

SPS

WPU 40167

BT 598

CSM WEIGHT	63734	ΔV	10030
CSM WEIGHT + LM	97233	ΔV	5373
CSM WEIGHT + LM (ASCENT)	74236	ΔV	7853

FLIGHT DIR MISSION LOG	DAY	REV	PG 28

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
Capcom	– GO
Sursn	– Sleeping + LMP – rest well
	CDR/CMP no data
INCO	– HSK Cmd Computer
	is down.
	– Crew failed to turn
	off A/G Subcarrier
PCd	– OK
AFD	– OK
FAO	– May try to get Comet
	Bennet Photo Tomorrow
	FC H_2 & O_2 @ 30+20
	H_2O Dump @ 30+20
	Battery A Chg
Network	– HSK Cmd Computer
	is still Red – running
	Diagnostics. Will keep
	going with 30 ft until
	pick up MAD 85' sites.
CptrSup	– Running 1 machine –
RCOV	– IP's thru 60 hr
	are OK, covered by
	prime RCOV ship.
BSE	– Lost a couple Batts – on
	S-IV & 1 on IU. Estimate
	T/M till about 19 hrs.

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
15+12	Note: People are working on Suit P Xducer – we have 2 other measurements that provide us indication of safe Cabin & equivalent of Suit loop P– CF0001P Cabin P & CF0120 H2O Res – If you subtract ≈ 20psi you can get Cabin Press. I.E. The H2O Res is referenced to Cabin P.
	EECOM has a good writeup on the problems in this Xducer for A-12. See plot opposite Pg–
15+21	Next shift • Crew Consummable Update • Launch Vehicle 2x2 Debriefing @ 25+00 • MCC-2
	I pulsed the BSE & MSN Director & SPAN to see if we could get started on working on any more

FLIGHT DIR MISSION LOG	DAY	REV	PG 29

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Questions for the +25HR LV Debriefing.
15+31	Altitude 72,868.4
	V_i 6743
	γ_i 75.64
16+09	Reviewing the Lunar Orbit Attitude profile with EECOM & FAO - There are several places where we orient in a solar hot attitude for long periods, the PC1 [redacted] is a good example - [redacted] the CSM X Axis is normal to the sun for about 2/3 rev - we are setting the GE Predictions on the Evaporator Operation in Lunar Orbit - we would also be expecting Evap Operation in the DOI orbit - It might be interesting to predict the RCS usage as a function of Evaporator operation.

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
16+30	Played back some TDE T.V.
16+40	PTC Holding about 15° Half Angle
16+43	Handover from Guam to Madrid —
17+21	Notes Spacecraft Sighting Program is causing Real Time program problem — Look into details & check procedures for use in critical phases.
17+50	OK All systems — Doing some work with Format 30, suppressing 2DAC bits to get increased granularity on Analog Recorders.
18+05	HSK at LOS has not found problem in the Command Computer. They believe that it is a hdw problem, since and software works in the T/M Computer. The Auto Fault Recovery works

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FLIGHT DIRECTOR'S MISSION LOG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	most of the time, occasionally they have to manually recover. They have sent several memory dumps to GSFC — & GSFC has not found problem but they say that the Univac people on site at HSK will probably be in the best position to solve the problem.
	Nominal S-IVB Impact 3°S 30°W, presently it looks like 28°30'W & 10.09° South.
18+31	Note: Fuel Cell #3 is Exhibiting a 1½° variation on TCE with a period of about 70" as opposed to 200" last mission The first cut sez we will impact about 140 nm from the A-12 Alsep on a bearing about due SW of site (3.55, 24W) see hardcopy — Next good update to vector will be ~~at~~ about 20-22 GET.

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	BSE has measured some ΔV — it may be due to uncoupled commands as the LV G&N is failing.
18+48	h = 84,651 ‖ V_I = 6043 ‖ γ_I = 76.3 ‖
19+19	S-IVB has lost platform & LVDC & has rates of 2.5°/sec P&Y. Madrid reports variation in S.S. That continues rates.
19+35	BSE Terminated —
	Note: TCE freq is higher 70's 200" due to fact that FC#3 is on MNB, running at higher Amps, producing more H_2O; slobs when set into H_2 Sep cause transients due to fact that TCE sensor
15 AT	output of condensor & cold water globs impinging on sensor

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 31

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
20+02	Recovery Advises A Tropical Storm has developed that will make the 25 & 35 Hour Abort Areas unusable. See hardcopy.
	Briefed by Brooks/Kundel on HFE.
20+02	Mad sez T/M Static on Booster —
20+35	8°+33"S } New IP for BSE
	33°+54"W }
	77+51+32 Time

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 32

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Shift Summary
	White Team 13+20 → 22+00
1.	HSK Cmd Computer still faulting, think it is a HDW problem. GSFC & Onward people at HSK still working on it
2.	EMOD Dump Verified - OK
3.	ΔV MCC ≈ 23.1 fps @ 30+41 GET; ΔT_B = 3.48 sec
4.	Will probably update IRIG Drift Terms on IRIG's within next 24-36 hours. X = -1.6 MERU Y = -1.5 MERU Z = +1.2 MERU
5.	Suit P Xducer looks biased by about .8 PSI; no sweat since we have Cabin P & H2O Res P.
6.	Gly flows is about 10-30 pounds low but everything in Coolant sys seems NORMAL - could be xducer shift 1 PCM count = 3 pph.
7.	FAO Scheduling Comet Bennet Photo @ 32+00.

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	8. Booster Tumbling about 2.5°sec, it died at About 19+20 GET, T/M stayed up till 20+00.
	Impact 8'35"S
	33'54"W
	77+21+32 GET
	9. Spacecraft Sighting Program causing RTCC Computer interrupt when using the Sun pointing option.
	10. FC#3 TCE varying 1½° with period of 70 sec.
	11. Recovery advises we have a Tropical Storm that will make the MPL unacceptable for 25 & 35 Hour Aborts, will have to retarget.

FLIGHT DIR MISSION LOG	DAY	REV	PG 33

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Black Team - 22hrs GET
	FC#3 TCG -
	BUDGETS (ALL) -
	MCC - Hybrid data -
	- W/o Burn -
	Meetings -
	1 - She
	2 - Photo
	LM CB for SCE?
	SHVB impact - Revs for photos -
	SRV Questions - Corrections -
	Answer on STI -
	TROPICAL STORM
	Comet Bennett
	TRIG PRIFTI
	GLY FLOX X dancer

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 34

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Crew asleep –
	FAO Activity –
	(1) BSE QUESTIONS
	(2) MCC-2
	(3) P23
	(4) COMET BENNETT
	On duty at 22/00
	BSE – 2 Questions –
	Written Description of SII problem –
	TM off –
	Out of control –
	Still Tracking – New Vector every 2 or
	4 hours –
	Saw a little ΔV, BSE says he
	vented everything to zero –
	FAO – Difficult to get pictures
	Sand W of Bermuda –
	Retro – Bad Weather at ~~[illegible]~~
	GET 25 & 35
	Moving Target eastward at 10°E.
	Will have in one hour/30 minutes

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 35

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	FIDO GETL Present Vsj – GET 154 Close
	254 hpc on present course/
	MCC
	23 fps – generally retrograde –
	hpc 60.2 nmiles –
	Tracking well behaved –
	Retro LH – + To Velocity Vector (see sketch)
	GUID Update Ephem in E load –
	No update To Δh –
	GNC – ① P/T Xducer on Quad D OK now
	biased inaccurate during hi-usage
	periods – Real close now –
	② next couple P52's will give
	data on comp
	③ PTC hard copy
	④ Slightly above budget flight
	plan –

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 36

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	EECOM (1) Erratic Suit Xducer .8 psi → .5 psi low - watching - Cabin p OK -
	(2) CRYO Margins - H_2 +1.4# O_2 79# above redlines -
	Right on nominal -
	Update after stirring -
	(3) Complete BAT B charge - Charging nominal - Charging BAT A.
	(4) Another H_2O dump to 25% @ 30:20
	(5) FC purging nominal - Good purity -
	(6) Glycol flow rate lower 10#/hr out of loop 235#/hr -
	(7) TCE on FC#3 glitch - 1½° shift every 70 seconds, every 200 to 6 minutes -
	Probably related to being on B alone - more current off that bus -

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 37

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	(8) Avg pwr 65A, 70-72 during day —
	(9) Cannister change soon —
	CapCom — (1) Prel SIVB IP and Time —
	(2) Cnsmb update —
	(3) What ordeal ball look like during TLI burn?
	Surgeon — (1) Crew Status Report —
	No medications —
	(2) 7½ good sleep — Think on LMP —
	Whoruss on? —
	Inco — (1) Switching omnis —
	AFD —
	FAO — Verify some exposure times for comet w dim lite film with
	DAC on SXT —
	Will have pointing data —
	before PTC —
	Present IP — looking at LM impact
	Time for SIVB photos —

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

SIVB IMPACT:

$\phi = 8.57S$

$\lambda = 33.90W$

GET = 77 + 51 + 32

does not have perturbation of ~ ~~26 hrs~~ 19:17 GET

will have vector with that in in 26 hrs —

RIDX91

22+26+00 wrns

FLIGHT DIR MISSION LOG	DAY	REV	PG 38

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Really remains to be seen
	Bob Lindsey to photo -
	Net - HSK cmptr -
	Sbe Don Arabians office -
	Mtg LM operators will be there -
	John Weggener & Bob Hance -
	Span - Do not pull C/B on SCE -
	- Been resolved -
	½ hour for briefing -
	No other inputs to room -
22/38 -	Last IP did not include apparent
	perturbation at 19:17 GET
22/42	Looked through hourly span reports -
	Nothing not already covered -

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 39

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
22/46	EJ Potable H_2O is brining around — back to normal — went from 100 to 70%
	Have seen previously, but first time in this mission
22/49	EJ 1½ fps at TEI would have raised MCC-2 from 15 to 23 fps — in X direction, + to vector —
23/05	EJ Saw 2 urine dumps — Surgeon thinks they are up —
	waiting for their call —
23/11	↓ Hello Houston Fairly Good Nights sleep —
	EJ STirring Cryo
	Std Config — heaters in auto — fans off —

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 40

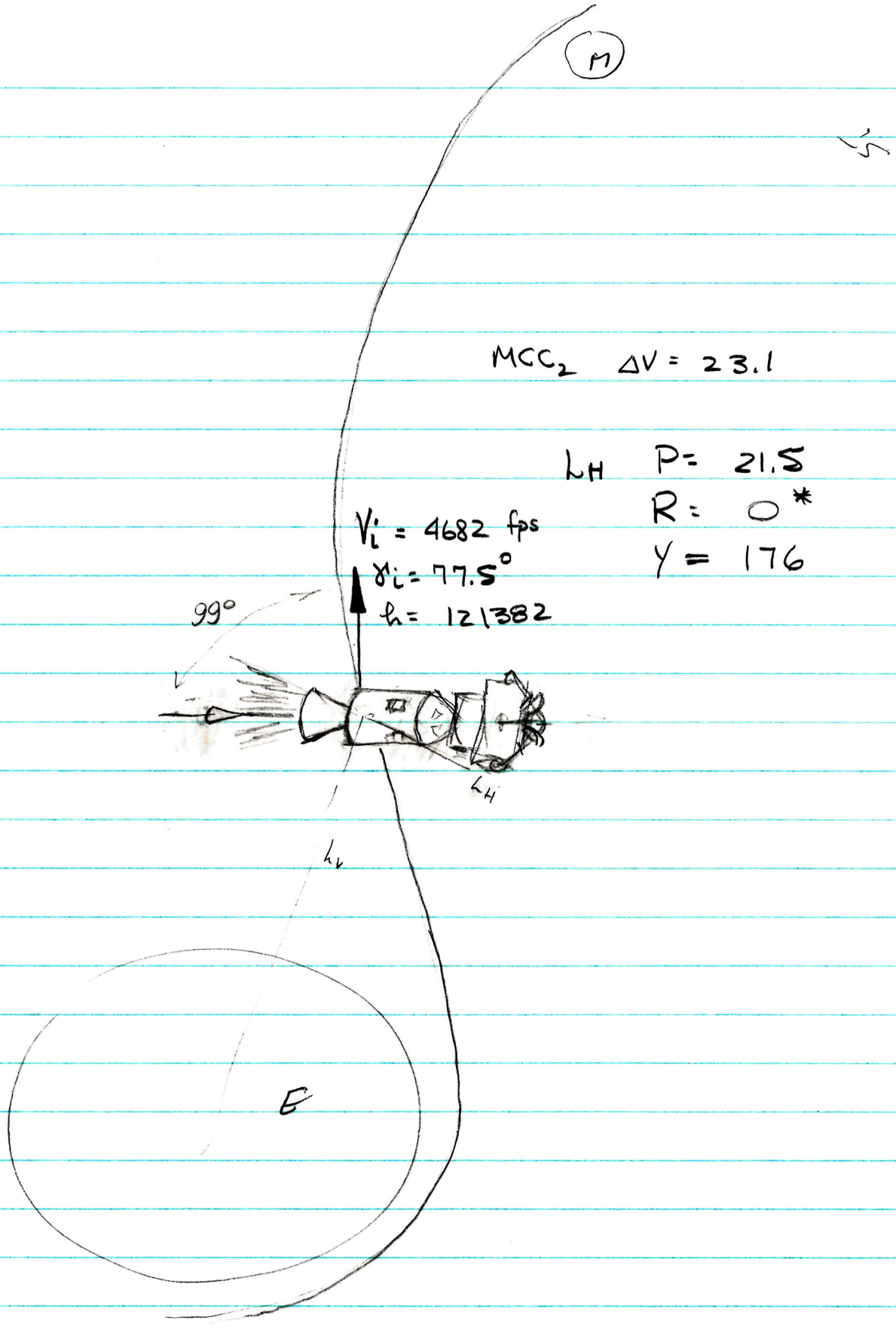
SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
23/15	↓ Starting to charge BAT A
	↑ BAT B looks good from yesterdays charge -
	↓ Dosimeters in suits/packed away - will get picks out in 1 hour
	E) Cycled fans in O_2 & H_2 - Did not see O_2
	↓ Averaged 5½ sleep apiece/good -
	↑ MCC-2 about 23 fps, approx retro on time -
	↑ SIVB impact 0.5°S 33.9 W 77+51 GET Pretty soft
	↑ Crawl in a little while
	↑ Cycle O_2 fans - ↓ Red - MCH W on H_2 Cryo Press ∴ Not much stratification in O_2 -

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG


M
MCC$_2$ ΔV = 23.1
LH P= 21.5
R= 0*
Y= 176
V_i = 4682 fps
γ_i = 77.5°
h = 121382
99°
L_H
L_V
E

FLIGHT PLAN UPDATE		
TIME	ITEM	
	UPDATE TO THE	
	CSM G&C CHECKLIST	
	PAGE G 9-2	
1.	CHANGE LOAD VALUES	
	IN LINE 4 COLUMN B	
	FROM 03366 TO 05253	
2.	CHANGE LINE 5 COLUMN	B
	FROM 11000 TO 33661	

FLIGHT PLAN UPDATE	
TIME	ITEM
25:00	ADD ADDITIONAL ITEMS FOR DEBRIEFING:
	9. MORE SPECIFICALLY ON ITEM 2:
	DESCRIBE YOUR OBSERVATIONS DURING THE EARLY S-II CENTER ENGINE CUTOFF. APPROXIMATELY 90 SEC. PRIOR TO TLI YOU REPORTED A HIGH VIBRATION IN THE S-IVB. DESCRIBE THE BUILD-UP OF THIS VIBRATION THROUGH CUTOFF.
	10. A QUESTION FOR JIM LOVELL:
	COMPARING THIS FLIGHT WITH YOUR RIDE ON APOLLO 8, WERE THERE ANY SIGNIFICANT DIFFERENCES IN THE FLIGHT ENVIRONMENT?
	11. WHAT DID THE ORDEAL BALL LOOK LIKE DURING TLI?

P37 Pad
LO + 35 Update

0	3	5	0	0	GETI
X	7	8	8	3	ΔVT
X	−	1	5	5	LONG
0	6	9	5	4	GET 400K
					GETI
X					ΔVT
X	□				LONG
					GET 400K
					GETI
X					ΔVT
X	□				LONG
					GET 400K
					GETI
X					ΔVT
X	□				LONG
					GET 400K
					GETI
X					ΔVT
X	□				LONG
					GET 400K

Notes:

1. Update is for weather avoidance in MPL at GETL = 70 hrs.
2. L.O. +45 hr abort (that's onboard) will be ok — GETL in MPL is 1 day later than LO+35.

P37 Pad
L0 + 35 update

GETI	0	0	5	3	0
AVT	3	8	8	7	X
LON6	5	5	1	−	X
GET 400K	4	5	9	6	0
GETI					
AVT					X
LON6					X
GET 400K					
GETI					
AVT					X
LON6					X
GET 400K					
GETI					
AVT					X
LON6					X
GET 400K					
GETI					
AVT					X
LON6					X
GET 400K					

Notes:

1. Update is for weather avoidance in MPL at GETL = 70 hrs.
2. L.O. + 45 hr abort (that's onboard) will be ok — GETL in MPL is 1 day later than L0+35.

EECOM CONSUMMABLES STATUS @ 23+15 GET

CRYOGENICS

above redline

	TOTAL (LBS)	MARGIN (LBS)	SINGLE TANK LIFETIME (GET) 40 AMPS	70 AMPS
H_2	47.68	+1.8C	238+42	146+17
O_2	565	+82.9	258+37	176+00

WATER

POTABLE TANK 102.8 %

WASTE TANK 85% @ 39+00 GET

NEXT DUMP: TO 25 % @ 30+20 GET

BATTERIES

BATTERY A 30.1 A-H REMAINING

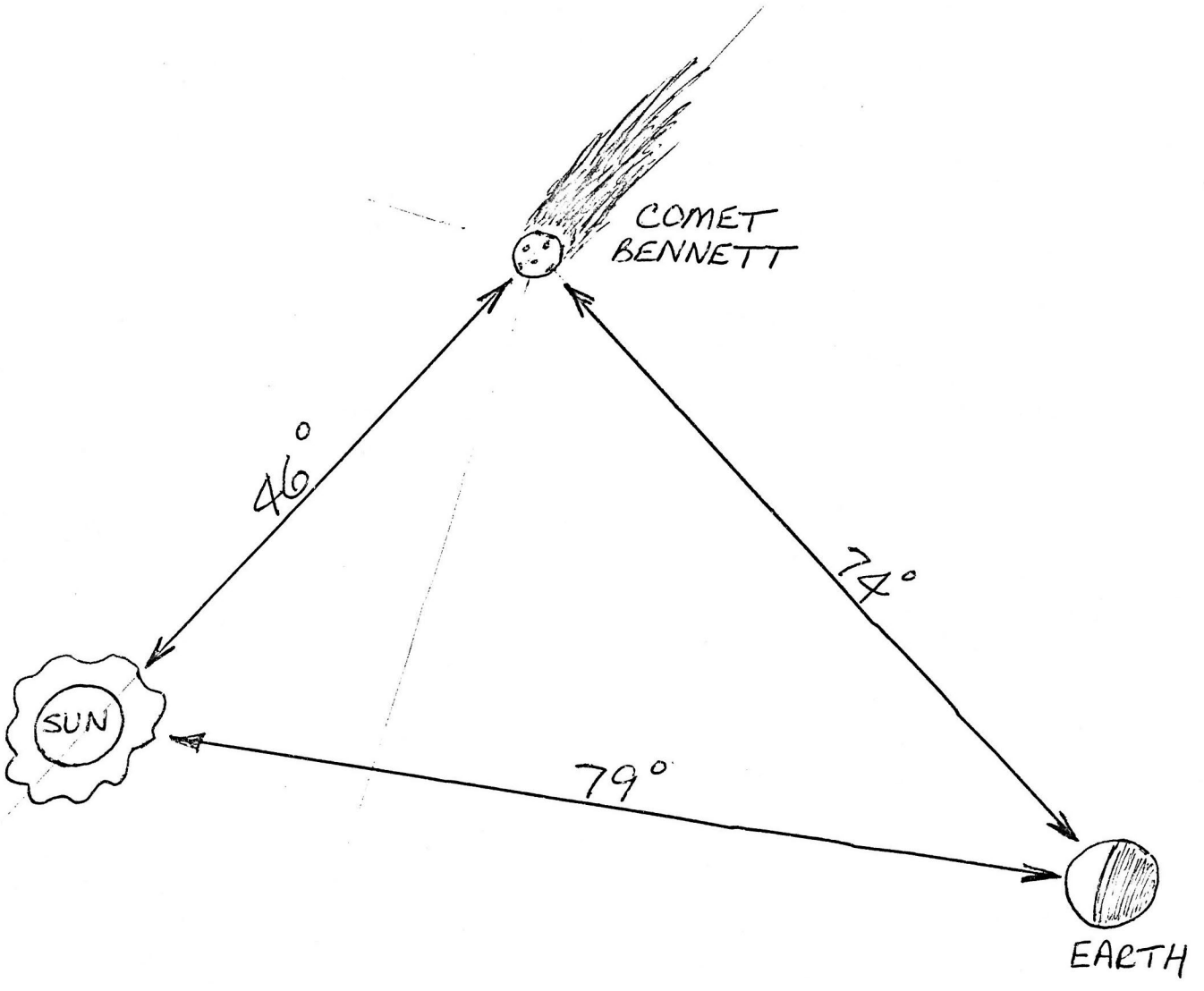
BATTERY B 39.1 A-H REMAINING

BATTERY C 38.8 A-H REMAINING

108.0 A-H TOTAL REMAINING

MARGIN WITHOUT CHARGER +6.5 A-H

32 00 GET



FLIGHT DIR MISSION LOG	DAY	REV	PG 41

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	GNC/ Return ATTsat switch to GDC position -
	↑ ready for flight plan update
	↑ Going up
	G&C checklist updates -
	3 questions for BSE debrief -
	Jim understands - 1st one -
	2nd one - Any significant diff.
	Retro - if no MCC-2, flyby at LOI-5
	(TOMPC) is 305 fps -
	with MCC-2, PC+2 159 fps
	for corridor -
	LO + 35 pad moved 10°E 155W°
	↑ News - hold off
23/31	FAO → Make optional, deletion
	updates -
	Jack left card in suit room -

MSC FORM 1441 (APR 66)

NASA — MSC

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 42

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
23/32	ATTSet Switch returned To GDC -
	on IMU -
	~~Improve~~
	Excessive ~~load~~ on IMU resolvers
	To ball -
	~~X~~ Will send up after breakfast -
	FIDO, at 30 hours GET, 1:6 fps To return to
	free return -
	Point of interest
25:37	
	Reminder on dosimeter when suits are
	unpacked at moon - To ~~go~~ keep CDR
	~~[illegible]~~ LMP dosimeter out for rest of
	flight
	Surgeon reports Radiation will be
	satisfied with the one PRD for now -
	No need To unpack other 2 -

MSC FORM 1441 (APR 66)

NASA — MSC

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 43

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
23/45	G/PS2
	Torques Angles -
	23/47/30 - GGT Torques -
	+00001 Star Angle Difference -
	Yet Pgd Attset +35HR PAD
	8 fps gives us Corridor + ATL landing
	Close to free return & area -
24/16	↑ News -
	↓ Jack Swigert - Income tax Return -
	Really Serious about that -
24/22	↑ P37 - update -
	GNC - Attset is back to GDC

MSC FORM 1441 (APR 66)

NASA — MSC

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 44

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	↓ Jack practicing putting on his suit
	Will get PRD reading when it's out -
24/41	↓ 02022 on Dosimeter -
	↑ LM/CM ΔP Rdg -
	.65 psi
	E - Says nominal, rate decay -
	F] Moved 8° N - Weak Geometry -
	SW 10 fps out of plane
	5 fps X speedup -
	only 1 hour of good geometry
	Now North of Target - Still
	west, though

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 45

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	BSE - New Questions -
	not approved -
	Any damage to S/C ? OK
	Did notice PU shift during SII
	burn? -
	On SII -
	Vibrations during SII were
	similar to last
	340 - 360, burst of ~~[illegible]~~
	vibration .5 sec duration 16 cps
	Caused lox pump Cavitation -
	Caused T thrust decrease
	& TOK switches -

MSC FORM 1441 (APR 66)

NASA — MSC

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 46

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
25/11	
	↑ LV Systems Debriefing -
	① 1st & other
	SII - SIVB quiet
	S&C - noisy until hi q -
	Comm was good throughout entire flight
	better than expected -
	② Vibration transient shortly
	before engine went out -
	Then went away & was smooth -
	SIVB - Vibration about same -
	Hi freq vibration -
	more noticeable during TLI
	than launch
	all the time, seemed to
	grow as burn progressed -
	Ride on 8 was smoother on SIVB -

MSC FORM 1441 (APR 66)

NASA — MSC

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 47

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	(3)
	All noticed PU shift on STI -
	all glance at engine lite -
	all can feel change in rcvl -
	? α meter something
	(4) IU thermal shroud - no loose
	particles, completely intact -
	(5) No comm problem during powered
	flight
	(6) No venting -
	(7) Last time we saw SIVA -
	venting @ 5 hours -
	Might have seen it later on
	sparticle out there 7:30 → 9 hours -
	was tumbling / was probably a
	SLA panel -

MSC FORM 1441 (APR 66)

NASA — MSC

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 48

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	(9) definite vibration before engine out –
	frequency → much higher
	Fido / 700 miles – from SIVB –
	are above thread –
	(8) Burn on RI, 3.75 longer than
	predicted – otherwise nominal –
	(10) Compare 8-13 –
	40 – about same vibration –
	less sideway motion
	SIC sep felt more violent,
	maybe a different seat –
	SII smooth as 8 except for
	8 vibration at end of
	burn –
	(11) update on ball – 8° pitch dn –
	Yaw right on all way –
	except towards end –

MSC FORM 1441 (APR 66)

NASA — MSC

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 49

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

↑ Preliminary Analysis on SII –

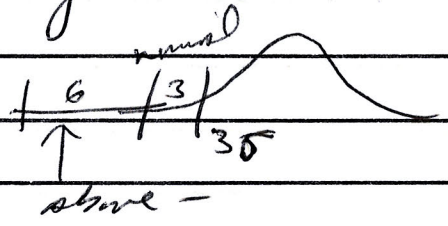
↓ What margin for TLI? –

↑ 6 seconds longer than nominal –

nominal 3 seconds ± 5

good for second opportunity –

never got above 25% on cue ball –



FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 50

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
26	Had my discussion w John Young
???	& Ken Russell - We will fly it Kens way -
	No unique, untried procedures
	GNC - PTC OK
	9° yaw
	20° pitch -
26/07	EECOM - LM/CM Δp - 3 points
	scattered on nominal - Presently,
	we probably do not have to do any
	purging
26/30	↑↓ Seeing Something / SIVB?
	↓ Can tell its tumbling -
	FIDO CSM is Above, ahead & to right of SIVB -

MSC FORM 1441 (APR 66)

NASA — MSC

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 51

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	↓ Jack
26/43 —	↓ Are changes ready? — deletions & options in 40 phase —
	↑ still in work —
27/03	E/ possible Water Xducer drop @ 22:45
	Under investigation.
	Gene — Mel tells me there is
	a possibility that people will want
	To go into LM FAM 3-4 hours
	early if no MCC-3 is required. That
	would occur on your shift — ~55
	hours —
	Another meeting Today is
	scheduled @ 4:30 and it goes —

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

MISSION NOTES

AIRCRAFT A	AIRCRAFT B	AIRCRAFT C	SRS-1
32°35'N	35°00'N	27°35'N	30°50'N
71°00'W	49°05'W	28°25'W	71°00'W

VANGUARD (FOR INSERTION TRACKING)

28°00'N
49°00'W

FLIGHT DIR MISSION LOG	DAY	REV	PG 52

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Milt - Have you made arrangements to have Ken M. capcom during c/o portions? He was asking me how he could get configured if he really had the measles - I don't know what's gone on here, but he can go to the second floor FSMR - and have TV channel attach & constant keying on A/G. Would be problem to give him keying control.

MSC FORM 1441 (APR 66)

NASA — MSC

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

FLIGHT DIR MISSION LOG	DAY	REV	PG 53

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
27/59	↓ Having lunch - Hot Dog Sandwich w Ketchup
	Very Tasty
	↓ Fitchek on Hyon camera -
	Everything OK
	Gene
28/17	Dick Thorson just came back from the
	meeting - 770
	>660 ~~770~~ - do nothing
	>772 - get another reading
	>800 - Get another reading for
	rise rate -
	TMan (probably)
	Just cycle it for heat -
	1800 psi @ PDI
	Do burn/vent procedure -
	7 sec CSM ullage (-X)
	Start engine - 3½ or 5 seconds

MSC FORM 1441 (APR 66)

NASA — MSC

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

ITEMS DELETED FROM APOLLO 13 FLIGHT PLAN

GET	ACTIVITY DELETED	REMARKS
104:58	Photo Target 14	Deletes one maneuver sequence and frees 20 minutes of timeline.
106:53	Visual Target 3	Eases extremely tight timeline.
108:41	Visual Target 1	Deletes one maneuver sequence and frees 10 minutes of timeline
109:50	Visual Target 17	Eases critical time sequence
114:29	Limb Brightening (Dim Light)	Eases timeline
126:28	Photo Target 5	Eases critical time sequence that might interfere with Censorinus stereo photography.
126:35	Photo Target 13	
127:02	Visual Target 9	
127:14	Detailed Visual Observations of Fra Mauro	
127:20	Photo Target 56	
132:28	Photo Target 12	Eases critical time sequence of events.
156:52	Visual Target 16	Eases critical time sequence of events
159:40	Contamination Field Photos (Dim Light)	Eliminates possible interference with Bootstrap Photography of Davy Rille and Descartes.

OPTIONAL ITEMS (May be deleted by Crew if time becomes a problem)

107:39	Solar Corona Photos (Dim Light)	Would ease critical time sequence of events and free 16 minutes of timeline
109:39	Earthshine Photos	Would ease critical time sequence of events and free 15 minutes of timeline
114:29	Solar Corona	Eases sequence of events
131:11	Topo Target 54A S-4 impact crater	considered of lesser importance than preceeding targets (Censorinus and target 33, Hyginus Rille to Copernicus)
131:43	Zodical Light Photos	Ease timeline and free crew for 50 minutes

APOLLO 13 PRESS RELEASE

A few of the lower priority orbital activities are being deleted from the Apollo 13 Flight Plan by voice update on Sunday night, April 12. The time line was specifically tailored to Mattingly's desires and training. The items deleted are only a portion of those generated at his request. The deletions will have minor effect on the total return from orbital activities. The revised flight plan was coordinated with Astronaut Swigert preflight. Further review has shown no need to change the results of this preflight review. A list of the deleted activities is attached.

In addition, five activities have been designated as optional and dependent upon Swigerts decision as to time available to carry them out. The revised flight plan will still be much more ambitious than any yet attempted in the Apollo program.

The SHe Mtg of 12 April 1970 resulted in the following agreements:

Don Arabian will submit a SMEAR detailing the procedures to be followed by the crew and the flight controllers upon the crew entering the LM at 55 hours GET. The procedure will include the SHe tank pressures associated with each decision to be made.

The Flight Plan will be modified to move the LM Familiarization from 58 hours GET to 55 hours GET. This flight plan change is based upon the assumption that the MCC-3 maneuver will not be required. This is a valid assumption, since the possibility of a DPS engine burn exists, even though it is extremely remote. The Flight Dynamics Officer would therefore plan to correct the trajectory with MCC-4, which would also correct for any perturbations introduced by the DPS burn.

The TV pass at 58 hours will either have to be rescheduled, or the crew will have to reenter the LM at 58 hours. FAO will decide this.

M. F. Brooks FOD SPAN Mgr
R. W. Kubicki · ASPO SPAN Mgr

Rec'd at 28/57

FLIGHT DIR MISSION LOG	DAY	REV	PG 54

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	What pressure are we supposed to get
	into this new rise rate?
	This needs clear discussion —
	At what GET, is new rise rate expected
	To start happening? —
	These are critical assumptions &
	must be right — or the whole analysis /
	prediction is on shaky ground.
28/29	FIDO - last Traj update
	Working on loads, MVR pads now

MSC FORM 1441 (APR 66)

NASA — MSC

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

MANEUVER PAD

	MC	C	−	2			PURPOSE
	S	P	S	/	G	E	N PROP/GUID
+	6	3	6	3	4		WT N47
+	0	0	0	9	6		P_{TRIM} N48
−	0	0	0	2	3		Y_{TRIM}
+	0	0		3	0		HRS GETI
+	0	0	0	4	0		MIN N33
+	0	4	9	0	0		SEC
−	0	0	2	1	7		ΔV_X N81
−	0	0	0	1	7		ΔV_Y
−	0	0	0	8	0		ΔV_Z
X	X	X	0	8	0		R
X	X	X	1	6	4		P
X	X	X	3	2	6		Y
+				N	A		H_A N44
				N	A		H_P
+	0	0	2	3	2		ΔVT
X	X	X	0	0	3.5		BT
X	0	0	1	8	5		ΔVC *
X	X	X	X	4	4		SXTS
+		1	3	5	9	0	SFT
+		2	8	1	0	0	TRN
X	X	X		N	A		BSS
X	X						SPA
X	X	X					SXP
	0						LAT N61
							LONG
+							RTGO EMS
+							V10
				N	A		GET .05G

COMMENTS:

31 ARCTURUS 23 DENEBOLA

GDC ALIGN _____ SET STARS

R ALIGN 288

P ALIGN 205

Y ALIGN 034

ULLAGE NONE

HORIZON/WINDOW _____

OTHER _____

LM Wt = 33499

ΔVC IS BIASED −.34 FPS

HPC = 60

FLIGHT DIR MISSION LOG	DAY	REV	PG 55

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
28/44	FIDO - GUID - PAD -
	- NAV VECTOR READY
	P52-60
28/47	↓ FM Xmtr - up -
28/48	↑ NAV VECTOR -
28/49	↑ P30 PAD
29/30	↑ HGA P-69
	y 180
	GO for MCC-2 - 60 day extension
	How about can they?
	↓ Josh Thinks he's got ~~them~~ -
	on income tax for being out of
	the country.
29/34	FIDO - morning 29.50V
	SIVB impact

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 56

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
29/36	E/ 29/50 To Terminate BAT A -
29/41	↓ EMS hall bias 100 sec 100 - 101.5
29/49	(E) Purging & Dumping
29/53	(E) BAT A off charge
	Done
30/08	N/ Just reported lost 2 lines To GDS -
	F/ AT 35 GET AFTER MCC, CORRIDOR
	CONTROL is 6 FPS.
	Lines back -
30/12	↑ GO ahead in TV -
	TV of water dump -
	↑ Try Average rather than peak -
	Move from bright spot -

MSC FORM 1441 (APR 66)

NASA — MSC

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 57

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
30/35	T16 - 6 min on checklists
	↑ T16 - 3 min - Good here - Go for burn
	h = 121,520
30/40	Burn normal -
30/53	(E) 10° FC #3 TCG vice 1½°
	went up with burn -
30+55	Maroon Team On -
	FAO - After P23
	- Pad for Bennett photography
	after PTC starts - give CMP
	Solo Book + Flt plan
31+02	TV Terminated -
	Surgeon - Crew status - good
	need - status report prior to sleep -

MSC FORM 1441 (APR 66)

NASA — MSC

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 58

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Guido - No problems -
31+07	Bennett datup -
	TELMU - Ops Normal - .066#/hr
31+11	P-23 - Cal completed - Now going into Sightings
	GNC - prop - A +8 Δ's from
	B +17 flt plan
	C ~~[illegible]~~ +8
	D +17
~~31+13~~	NBD in work - to go to S/C
	Dampening A + B for PTC -
	EMS bias + .34 fps -
	SPS - looked good - 30 min
	Disable C + D
	375 to get .3
	FIDO - 65 nm hp - post burn -
	however normal
	LOI - 5h flyby pad
	SIVB - 0°.56" N @ 29:30
	29°33' W
	77 hrs 57'37"
	update 35 to 36 hrs GET

MSC FORM 1441 (APR 66)

NASA — MSC

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Network - HSK CMD Computer still faulting - think they have isolated fault in chassis - Goddard trying to get part
	CSM Carrier at GDS until 38hrs
	No problem in tracking SIVB
	Tumble rate - 2 Rpm
	Inco - Uplink mode CMD only on 30' site
31+33	IRIG update after P-23's
31+34	TV early tomorrow - 55hrs
	Network is scheduling - only problem is giving 2 hr notice on change if not early
	Retro - Block data o/B
	4/0+35 updated due to Wx
	4/0+45 -
31+38	P-23 3 - #212
	4/0+35hrs - 7883 ΔV, 70hr Landing
	+45 6208 ΔV 95hr "
	+60 5993 ΔV 119hr Landing
	2 Flyby 72+25 360 ΔV 167hr
	4600 fps - 119hrs

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT PLAN UPDATE	
TIME	ITEM
32:00	AT COMPLETION OF P23 MNVR TO R 101.0 NEA
	P 090.0 P-23
	Y 000.0 Y 93
	USE NORMAL PTC PROCEDURES to DAMPEN RATES. AFTER VEHICLE STABLE AND BEFORE SPIN UP TAKE PHOTOGRAPHS OF COMET BENNETT.
	USE DAC ON SXT with MAG G (UNBW).
	Take 3 photos, 1ea, at 5, 20 +60 sec time exp using auto optics. N88 values are, R1 + 34717 R2 - 08028, R3 + 35075.
	Take 3 photos, 1ea, at 5, 20 +60 sec time exp using manual optics, Shaft 000.8°, TRUNION 12.5°
	STRIP off ±50 Frames (2 sec at 24 fps) before 1st frame and after last frame of photos.

FLIGHT DIR MISSION LOG	DAY	REV	PG 60

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	CECOM – F/C #3 TCE 1.5° peak to peak
	@ 70 Sec – now 160°–150.4° @ 37 ~~Secs~~ Sec
	3 pcm Counts away from MC&W
	May need to swap F/C #2 to F/C #3
	Trying to balance H_2
	H_2 Tank 1 heater off –
	Irig update – ✓
	Potable Water fluctuation
	Suit pressure anomaly
31+57	Need PTC type stability for Bennett photos
	TO 13 ① – SPS – No anomalies
	② H_2 heater #1 off
	③ .375 for PTC
	④ Bennett stability
	⑤ TCE fluctuation
	⑥ Irig update –
32+00	↓ flow O_2 vs H_2 not matched on F/C #3
	↑ Irig update
32+01	↓ B + D disabled

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG
			61

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	S/C Stabilized in PTC - Go for Photos
32+	Unable to pick up Comet due to washout FAO Suspected this
	Sun is coming from LM -
32+21	FAO Sees No way to avoid the Sun problem - Same thing will happen at 59 hrs - best thing is to scratch this until TEC - Crew told this
32+25	PTC Started - looks good so far -
32+25	HGA Secured
	SV - Ready at 33:40
32+50	Flt plan update read up -
32+50	Need to watch Pre-sleep Comm - S band Normal Voice
32+52	SPS - post burn report - looks great on all recorders -
32+53	PTC May be had

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

P-23 (PRELIMINARY RESULTS)

	CORRECTED	EFFECTIVE	MPE*
BATCH 1	17 ± 4 KM	10 ± 12 KM	15
BATCH 2	21 ± 11 KM	13 ± 15 KM	4

* MPE = SUBSTELLAR POINT ERROR IN ARC-MIN.

~~THIS~~ this is good

SAMELY

GET 33:30

FLIGHT DIR MISSION LOG	DAY	REV	PG 62

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
33+11	MC+W - H_2 tank heater off until Asleep
33+18	PTC - out to 18° P+Y - need to reinitialize
	Gene - Photo changes to Flt Plan are in back of log book
33+36	- Another dump - jet firing - still not stable
33+38	hp now 62 nm - Vector need for LOI-5 hr flyby PAD
33+53	another dump - still not stable
34+06	Dead band has been collapsed by Uplink - need to remember for tomorrow
34+04	- PTC initiated
34+58	- PTC - looks good -

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

April 10, 1970

Note of Interest - Supercritical Helium Procedure

At a GET of 59:00 the crew will make its first entrance into the LM. Since ground problems with the SHe tank have been detected, it will be desirable at that time to examine the SHe pressure and determine if any anomalies have occurred during flight. This may be carried out by the crew using the procedure in Attachment 1. If ground monitoring is then desired the crew can supply low bit rate TM by performing the procedure in Attachment 2. If a problem does exist with the SHe then it may become necessary to vent the SHe pressure down to some acceptable number. In order to do so, it becomes first necessary to blow the SHe squib which can only be accomplished by doing a DPS burn. This DPS burn will be a no ullage, no start tank, 3.5 second burn using CSM attitude control. Once the SHe squib is blown an attempt to vent the SHe pressure will be initiated. If this vent can not be achieved in a zero-g enviroment, the LM RCS system will have to be pressurized, and an ullage maneuver will have to proceed the next attempt at venting. Ullage will be obtained by using +X translation button with CSM maintaining attitude control. Attachment 3 shows the procedure for a DPS burn and venting with and without an ullage.

Initial studies have shown that using one vent valve gives a helium flow rate of 0.11 lbm/sec. An initial vent of nine seconds will lower the SHe pressure 80 psi. Futher studies are presently being performed by Grumman to determine SHe pressure drops for vents longer than nine seconds and will be presented in a parametric form.

John E. Essing
LSB

As far as I know this has not yet been completely agreed to —

TO OBTAIN CREW SHe PRESSURE DISPLAY ONLY

(1) TLC - 1

(2) ACT-11, STEP 1

(3) CB (11) AC BUS B: He PQGS PROP DISP - CLOSE

: NUM LTG - CLOSE

: BUS TIE INV 1 - CLOSE

EPS: INV 1 - CLOSE

CB (16) INST : SIG SENSOR - CLOSE

(4) INV - 1

(5) HELIUM MON - SUPCRIT PRESS

MONITOR SUPCRIT PRESS _____

*NOTE:

(TO DEACTIVATE)

(6) INV - OFF

(7) ACT-15, STEPS 4 and 5

(8) TLC - 2

NOTE: If monitor for >15 minutes is required:

Verify: GLYCOL PUMP - 2

CB(11) ECS - GLYCOL PUMP 2 - CLOSE

TO OBTAIN LO BIT RATE TM

(1) TLC - 1

(2) ACT 11 and 12 except for VHF

(3) AUDIO (LMP): S-BD T/R - T/R

COMM: S-BD-PM, PRIM, PRIM, DN VOICE B/U, PCM, OFF/RESET, OFF, LO

S-BD ANT SEL - Appropriate OMNI

(TO DEACTIVATE)

(4) ACT-15, STEPS 2, 4 and 5

(5) THC - 2

TO PERFORM DPS BURN

(1) TLC - 1

(2) ACT 11 and 12 except for VHF

(3) AUDIO (LMP): S-BD T/R - T/R

COMM: S-BD-PM, PRIM, PRIM, DN VOICE, B/U, PCM, OFF/RESET, OFF, LO

S-BD ANT SEL - APPROPRIATE OMNI

(4) CB (11) AC BUS B: He PQGS DISP - CLOSE

: NUM LTG - CLOSE

: BUS TIE INV 1 - CLOSE

PROPUL : DES He REG VENT - CLOSE

FLIGHT DISPLAYS: THRUST - CLOSE

STAB/CONT : ENG CONT - CLOSE

: ENG START OVRD - CLOSE

: DECA PWR - CLOSE

ED : LOGIC PWR A — CLOSE

CB (16) PROPUL : DES/ENG OVRD LOGIC - CLOSE

ED : LOGIC POWER B - CLOSE

STAB/CONT : ATCA [illegible]

(5) INV - 1

(6) MASTER ARM - ON
DES PRPLNT ISOL VLV - FIRE
ENG ARM - DES

ENG START - PUSH
ENG STOP - PUSH } 3.5 SEC INTERVAL
ENG ARM - OFF
ENG STOP RESET

~~ENG ARM - OFF~~

~~MASTER ARM - OFF~~

Landing Gear deploy?

(7) OXID AND FUEL VENT - CLOSE

~~MASTER ARM - ON~~

DES VENT - FIRE
MASTER ARM - OFF

(FOR NO ULLAGE VENT)

(7a) OXID VENT - OPEN TBD
TIME ~~RBD~~ REAL TIME

OXID VENT - CLOSE

IF VENT IS SUCCESSFUL PERFORM NEXT TWO STEPS - IF NOT SKIP TO STEP 10

(8) INV - OFF

(9) ACT 15

(10) ~~PN~~(11) CB RCS SYS A: MAIN SOV - CLOSE

: ISOL VLV - CLOSE

STAB/CONT : ATT DIR CONT - CLOSE

HEATERS RCS SYS A/B - 1: QUAD 1 - CLOSE

: QUAD 2 - CLOSE

: QUAD 3 - CLOSE

: QUAD 4 - CLOSE

~~PN~~(16) CB RCS SYS B: TEMP/PRESS DISP FLAGS - CLOSE

: PQGS DISP - CLOSE

: MAIN SOV - CLOSE

: CRSFD - CLOSE

: ISOL VLV - CLOSE

HEATERS RCS SYS A/B -2: QUAD 1 - CLOSE

QUAD 2 - CLOSE

QUAD 3 - CLOSE

QUAD 4 - CLOSE

(11) ACT 35 AND 36 (RCS PRESSURIZATION ONLY)

(12) +X TRANSLATION BUTTON - DEPRESS FOR 3 SECONDS

(WAIT 8 MINUTES FOR HEATERS TO HEAT UP QUADS)

(13) +X TRANSLATION BUTTON - DEPRESS

Need deactivate steps

(AFTER 15 SECONDS ATTEMPT VENT AND IF NOT SUCCESSFUL, RECONTINUE VENT PROCEDURE EVERY 5 SECONDS TILL SUCCESSFUL - TOTAL VENT TIME TBD REAL TIME)

FLIGHT DIR MISSION LOG	DAY	REV	PG 63

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Open item pre sleep - H_2 fan - auto
35+05	Batc - 37 v Status check
	Pyro A 37 v
	Pyro B 37 v
	Quad A 97
	B 97
	C 96
	D 97
35+31	Crew told that there was a possibility that we might go into ~~for~~ EM early (ie 55 hrs vice 59) and read the pressure on onboard gage - we did not mention turning on instrumentation
35+33	- TCE on F/C #3 - started about 6 min after SPS burn - EECOM thinks it is the cooling valve gain control hunting - expect it to continue all the way to moon - should be no problems.
	Gene see page 52

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 64

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
35+41	AFD is taking a measles data Questionaire to ~~All~~ All areas per Surgeon's request — all MOCR OPS have copies for their SSRS all shifts, the AFD will take care of MOCR OPSrators for all shifts
35+43	S IVB VECTOR @ 35+40
	GET impact 77hrs56 min 54 sec
	Lat 2°35's
	Long 28°31' W
	Note: S IVB Vector @ 24+38 GET is last one with effects of unscheduled ΔV included —
35+44	LM/CM ΔP = 0.9 — Experiments has data
	leak rate = .014 #/hr
	@ 5psi — really tight cabin
35+49	— Watch out for Storm Helen — data due at 0700 CST Mon may affect 45hr about pad
36+43	hp - 62.1

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 65

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
36+50	- Presleep -
	No Medication - feel good.
	Chlorinating Water
	E Menu dump -
	Stirring Cryos - heater on H_2 tank #1 ON AUTO
	Comm Conf. OK -
36+57	SIVB tumble rate
	prime - 1 rev per 33 sec
	secondary - 1 rev per 100 sec
	HSK - had hard stop 2 hrs ago -
	No go CMDs - part learning NY
	Mon night, at HSK Tue night -
37+13	Crew Called to Say they will be
	off comm use crew alert to get
	them — ★
	~~they are not~~
37+18	Lovell has Bio med harness on tonight
37+19	GNC Says first PTC had opposite
	jet firing about 13 sec after PTC started
	thinks this caused bad attitude - still
	looking

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

EECOM CONSUMMABLES STATUS @ 37+30 GET

after cryo stir

CRYOGENICS

	TOTAL (LBS)	MARGIN (LBS)	SINGLE TANK LIFETIME (GET) 40 AMPS	70 AMPS
H_2	44.95	+1.7	241+50 261+20	154+13
O_2	539	+82	~~182+5~~	182+50

WATER

POTABLE TANK 103.7 %

WASTE TANK 85% @ 59+40 GET

NEXT DUMP: TO 25 % @ 55+10 GET

BATTERIES

BATTERY A 37.316 A-H REMAINING

BATTERY B 36.457 A-H REMAINING

BATTERY C 38.809 A-H REMAINING

112.582 A-H TOTAL REMAINING

MARGIN WITHOUT CHARGER 14.6 A-H

FLIGHT DIR MISSION LOG	DAY	REV	PG 66

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
38+08	MC+W to Crew – H2 tank #1 got down to MC+W limit before heaters kicked in – may have forgotten to put heater switch back to AUTO – (although he indicated he was doing it and we thought we saw the proper response)
38+10	GNC is convinced the opposite jets fired to slow down the rate and threw us off – this was 1 sec before going to Accel Cmd (±1 sec) – Can't explain further – some H2 tank #2 heater switch to OFF – this will make tank 1 sensor work to avoid MC+W –
38+17	hp Now 62.2
38+48	S1VB – Vector 38+46 2°10'S 28°50'W 77'+57+04

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DYNAMICS CHANGE OF SHIFT

SHEET ___ OF ___

MISSION Apollo 13 DATE 4-13-70 GET 39:45:00

PHASE TLC REV ___ GMT ___:___:___

CURRENT

h_a ___ nm V_i 4035 ft/sec

h_p ___ nm GET_{pc} 77 :28 :38 h_{pc} 62.22 nm

Orbit Period ___ min h_{earth} 144197 nm

h_{moon} 83399 nm

MANEUVERS

☒ Predicted ☐ Actual Mvr NONE GET ___:___:___ GMT ___:___:___ Rev ___ Over ___ ΔV ☐☐☐☐☐.☐ Thruster ___ Δt_B ___ M: ___ sec	☐ Predicted ☐ Actual Mvr ___ GET ___:___:___ GMT ___:___:___ Rev ___ Over ___ ΔV ☐☐☐☐☐.☐ Thruster ___ Δt_B ___ M: ___ sec	☐ Predicted ☐ Actual Mvr ___ GET ___:___:___ GMT ___:___:___ Rev ___ Over ___ ΔV ☐☐☐☐☐.☐ Thruster ___ Δt_B ___ M: ___ sec
PREBURN / POSTBURN h_a ___ ___ nm h_p ___ ___ nm	PREBURN / POSTBURN h_a ___ ___ nm h_p ___ ___ nm	PREBURN / POSTBURN h_a ___ ___ nm h_p ___ ___ nm
NOTE: S/SB IMPACT DATA: GET= 77+57+04.30 ϕ_{IP} = 21.589(S) 21°10' λ_{IP} = 28.8187(W) 28°50'	NOTE:	NOTE:

Prepared by Bill Boone

39+45+00



FLIGHT DIR MISSION LOG	DAY	REV	PG 67

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
40+00	— Gold Team On —
	TCE is back & it's old tricks, i.e., 1½° @ 70 sec period
40+15	H2 tank 1 got very close to MCW limit - squeaked by again.
	Gene - ① MCC #3 not required ② Early (55 hours) CM Jam. Need to update crew on procedure for reading out SM press. ③ Next sleep period starts @ 61+00 hours. Make sure Glynn is squared away on establishing PTC, i.e., don't collapse deadband, reference page 62 @ 34+06. ④ HSK cmd computer still down ⑤ Need to establish and try a cryo plan for today so we can insure good sleep period. Eecom has plan. Involves turning off tank 2 heater (H_2) and

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

The latest data shows the SIVB impact point to be at 2°10'S, 28°50'W on the corner of LANSBERG-G. This site will have a sun angle of approximately 10° by Revolution 27 which is desirable for photos of the impact site. Two candidates for deletion in the flight plan in order to obtain these photos are TOPO TGT 46/54 (Apollo 12 LM crash site) on Rev. 27 (129:15 GET) and TOPO TGT 54A (Apollo 13 LM crash site) on Rev. 28 (131:14 GET).

Since TOPO TGT 54A and the zodiacal light photos following (131:50 GET) are now optional, it appears that Rev. 28 might be the best candidate for these photos.

Plenty of time to think about this one.

ERASABLE LOAD CHANGE FORM NO. 3

TAPE NUMBER —
ORIGINATOR R & C — LAUNCH — MISSION
PARAMETER REV. NO. see below CMC

	name	address	decimal	octal
rev 2	NBDX	1460	+0.6 mem	00114
"	NBDY	1461	−1.2 mem	77546
rev 2	NBDZ	1462	−3.0 mem	77201

COMMENTS: CREW CHECKLIST MUST BE UPDATED. PAGE G-9-2 of CSM GNC CHECKLIST.

LOAD A

LINE	OCTAL
11	00114
12	77546
13	77201

	notify	apprv	not req
GUIDO	✓	✓	
MIT	✓	✓	
MIT/KSC			✓
G+P			✓
AGPS	✓	✓	
NASA G+N			✓
ASPO			✓
RTCC			✓
RTACF			✓
G+CD(imu)	✓	✓	
G+CD(dap)			✓
FIDO			✓
RETRO			✓
GNC	✓	✓	
PGNS(KGNL)			✓

FLIGHT DIRECTOR (approve) disapprove

NEW TAPE: ksc mit (no)
MANUAL LOAD: (yes) no
loading to be done: / : :

loading actually complete: GET 32:03:

loading done prior to erasable memory verification number:
1 2 3 4 5 6 7

G.E.T. (present) 41:45:

completed by John Jurgensen
date 4/13 time(gmt) 13:00:00

NOTE: GUIDO - same change has to be made to RTCC tapes

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	see if tank 1 will control higher. Eecom thinks it will. If that works, then for today we will turn off tank 1 heaters and turn on tank 2 heaters. This will create imbalance which we will correct over the next sleep period by turning tank 2 htrs off and tank 1 heaters on. Shud keep us further away from MCW ~~limit~~ limit.
	⑥ FAO has plan for taking a look at Bennett comet through the SCT. We will update crew at wake up.
	⑦ Keep an eye on storm Helen
41+55	SIVB Impact update:
	77 +57 +09
	2° 11' S
	28 58' W
	Previous page is paper work to bring the crew checklist for erasable load up to date. Will be done after wake-up.

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
43+00	Retro/Weather are moving the GET 60+00 abort landing point & 153 W in order to avoid tropical storm Helen. Will need to update pad.
43+18	EECOM says looks like the H_2 situation is improving, i.e., we aren't staying down in the low range as long as we previously were.
43+43	Lost Net 2 and all comm links to Madrid.
43+46	Reestablished comm w/ Madrid.
45+42	SIVB impact update: 1.90 S 28.78 W 77+57+05
46+15	Procedures says that if we can't get the HSK and computer aligned, the only potential problem is during ascent. He's putting together a full story for Glynn.

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 70

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Stuff for crew at wake-up:
	1) Retro update P37 for 60 km abort
	2) Guido - needs to update erasable paper work
	3) ~~Consumables~~ Consumables
	4) H_2 tank config
46+43	CDR called -
	Sleep DOS.
	LMP orbit 9 hrs
	CMP orbit 8 hrs 02026
	CDR intermittent 5 hrs
	EECOM - looks like we lost the O_2 Tk 2 quantity meas. Looks like failed off ~~scale~~ scale high. ~~Happened~~ Happened @ 46+45, about the time he stirred cryos
*	Fido - wants to update S.V.
*	EECOM - Wants O_2 TK 2 quantity readout

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT PLAN UPDATE	
TIME	ITEM
49:30	After the P52 REALIGN at 49:00, when
	time permits, would like crew to investi-
	gate while in PTC if there is a roll
	angle in which comet can be observed for
	photos. If so, record optimum roll angle
	for possible photography prior to PTC
	restart @ 56:30. Use P52 (PLANET OPTION)
	and the following 1/2 unit vectors for
	tracking Comet Bennett @ 49:46
	R1 +.34202
	R2 -.073740
	R3 +.35719
	You can expect AOS of Comet at a roll of
	45° and LOS at a roll of 155°

MSC Form 1190 (Apr 65)

FLIGHT PLAN UPDATE FAO	
TIME	ITEM
54:00	1) Delete all presently scheduled
TO	activities except the following:
57:00	a) Continue PTC to 55:00 only. For
	TV stop at R 285, HGA P 23 Y 267
	b) Move BATT CHARGE - BATT A/B @ 55:32
	to 52:32
	c) Move LM TUNL VENT VALVE - LM/CM ΔP
	etc. @ 55:45 to 52:45
	d) Perform TV @ 55:00 - 55:30
	e) Perform O_2 FUEL CELL PURGE & WASTE
	WATER DUMP @ 54:50→
	f) Start PTC @ 56:30
	2) Move all activities scheduled present-
	ly from 57:00 - 60:00 to 54:00 - 57:00
	GET
	3) Readout LM SHe PRESS during LM
	FAMILIARIZATION
	4) PERFORM PS2 OPTION 3
	REFSMMAT AFTER
	GOING INTO PTC @ 56:30
	AT ANY TIME YOU WANT

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
47+39	P37 pad update to crew Consumables update to crew
47+41	O_2 Tk 2 readout is off scale hi onboard
47+42	H_2 tank 2 htrs to off
47+43	S.V. update
47+43+30	LM/CM ΔP is 1.0 PSI
	V16 N91 will give us readout of CDU shaft & trunnion.
47+45	Flight plan update
	Cabin leak rate (LM) is .014 psi/hour
47+54 [redacted]	Recycle fans in O_2 Tk 2
47+57	Told CMP & observer CDC shaft jitter prior to P52

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 72

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
48+01	Briefed on procedure for looking for comet Bennett in SCT.
48+06	O_2 Tk 2 fan off - didn't recover quan. xducer.
	LUNNEY !! Please improve your handwriting or at least flag significant items so we can go to AFD log and find out wha' happen. Mercy! Amen!!
48+15	PTC now out to 24° cone angle
48+18	O_2 Tk 2 quan shud be within ≈3% of Tk 1. We will probably ask for a few more fan cycles to keep a close hack on gauging. Will tell crew this later.
48+30	SIVB Impact update 2.31 S 28.83 W 77+57+05

MSC FORM 1441 (APR 66)

NASA — MSC

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG
KRAUZ	48+30	1413 Local – 2213 EOS	

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Pre shift Summary ✓
ECOM	1. CSM Pot H_2O Xducer dropped from 104.1 to 75% for 4 min @ 22+46 then back to 104.1
ECOM	2. FC# 3 ICE VARIATION changed from 1½°/70sec at 17+00 GET to 10°/35sec – now NORMAL. MAJOR IMPACT IS AVOIDING MC&W if it bothers crew. Would reconfigure FC & Bus
ECOM	3. Hot Thermal Attitude data
Control TRIM LM Gimbals –	4. SHE Procedures / Limits / Assumptions – CSM Control stuff
FAO	5. Photo Flt plan update for Timeline book.
Telcom	6. GAEC 4CB33 – Is this item closed – closed
ECOM	7. Cryo Plan • Stirring • sleep
ECOM	8. Suit P Xducer / & other instrumentation problems. Look at effect of next critical item in Oa Sys
GNC	9. MCC-2 SPS Eval
Net/FAO	10. TV at 55 HRS Lines, etc

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
C REVIEW	11. CMC Support – Note of interest on things that collapse d.b.
GNC/C	12. Update Crew C.L. pg G-9-2 after next P-52 for IRIG Drift.
GNC/C	13. Optics Jitter – Same as A-12??
	All items ASSIGNED AT START of shift –

ΔV CAPABILITY

GET 50+00 GNC WHITE

SM RCS

WPU USABLE TOTAL 1098

CSM WEIGHT 63367 1 OR 2 3 MEN

DAP SM ΔV 37 TOTAL BT 209

SCS SM ΔV 33 TOTAL BT 189

SPS

WPU 39912

BT 594

CSM WEIGHT	63367	ΔV	10032
CSM WEIGHT + LM	96866	ΔV	5359
CSM WEIGHT + LM (ASCENT)	73869	ΔV	7844

EECOM CONSUMMABLES STATUS @ 47+30 GET

CRYOGENICS

	TOTAL (LBS)	MARGIN (LBS)	SINGLE TANK LIFETIME (GET) 40 AMPS	70 AMPS
H_2	43.03	+1.43	240	157
O_2	520.6	+81	262	186

WATER

O_2 TANK 2 QUANTITY SENSOR FAILED OFF SCALE HIGH @ 46+45 GET

POTABLE TANK 102.8 %

WASTE TANK 85% @ ~~56~~ 56:17 GET

NEXT DUMP: TO 25 % @ 54+30 GET

BATTERIES

BATTERY A 37 A-H REMAINING

BATTERY B 36 A-H REMAINING

BATTERY C 39 A-H REMAINING

112 A-H TOTAL REMAINING

MARGIN WITHOUT CHARGER 13.8 A-H

RETURN TO EARTH STATUS 51 : 00 GET

PRESENT TRAJECTORY

hpc 60 nm

V_{400K} ~~NON~~

GAMMA $_{400K}$ ~~FREE~~

hp ~~RETURN~~

LAT_{IP}

$LONG_{IP}$

GET

FUEL CRITICAL MCC PC+2

GETI 79:30:00

DELTA V 161

LAT_{IP} 20:535

$LONG_{IP}$ 89:32E

GET $_{400K}$ 149:47:53

BLOCK DATA ONBOARD

E	GETI	DELTA V	GET 400K	LAT_T	$LONG_T$	UPDATE @
LO+60	60:00:00	6079	118:04	21:055	153:00W	
Flyby	72:24:33	361	166:54	23:165	165:00 W	
PC+2						71:10

Retro 2

Best regards,

Pct2
Flyby
Total 60:00:00 6079 118:04 91:022 123:00m
72:34:33 321 166:24 23:165 125:00m
21:10

RETURN
FREE
NON

60 mm

14d:47:23
8d:32E
90:232
161
Jd:30:00
Pct2

21 00

FLIGHT DIR MISSION LOG	DAY	REV	PG 73

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
49+00	White TEAM on CONSOLE
20+12Z	see previous sheet for
	MAJOR WORK TASKS.
49+01	V16-91 on DSKY, CREW called
	us for w
	shaft .2
	TRUNNION 359.92 } T-PAC
	TPAC readout jumping
	from .21 to .15.
***	See list in FRONT of BOOK
	on things to AVOID during
	PTC.
49+06	Advised Crew to continue
	P-52, TORQUED VALUES, STAR
	< difference is ALL ZEROES.
*	Note the optics ~~zet~~ jitter
	is the SAME AS we SAW
	on A-12, when we ARE
	NOT using Optics turn
	~~the Optics ZERO SW to~~
	~~OFF~~. Optics Power off.

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
Retro	+ 60 HR abort & Flyby updated for Wx Avoidance
FDO	+ Scrubbed MCC3, MCC4 is about zero. Will start working with Control on Possible DPS Burn. ≈ 60+00 GET.
GDO	+ NBD X,Y,Z Pad passed to Capcom for update to pcr G-9-2 of Checklist
GNC —	+ Studying the procedures for Controlling the Docked DPS Burn.
ECOM	+ H_2 Cryo Tnk #1 MC&W problem. Now Tnk #1 Auto, Tnk #2 off
	+ O_2 Tnk 2 Qty Press Xducer Failed OSH — No sweat even if we fail either port.
	+ FC #3 TCE — Not a problem, will use purge if cycling is crew annoyance
	+ Pot H_2 Variation, Suit Pxducer
	+ CO_2 PP Xducer is OK.

FLIGHT DIR MISSION LOG	DAY	REV	PG 74

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
CAPCOM	– GO
SURGN	– CREW OK –
INCO	– NOT MUCH HBR ON OMNI'S
FAO	– LOOKING FOR BENNET PHOTO OPTION.
NETWORK	– HAS LINES FOR TV AT 55 HRS/ SCRUBBED 58 HR RESERVATION.
	– HSK CMD COMPUTER STILL RED.
COMPUTER SUPPORT.	– S/C POINTING DISPLAY COMPUTER INTERRUPT WHEN USING SUN OPTION
~~TELCOM~~	– ~~WE~~ HAVE FIXED PROBLEM WITH WORKAROUND PCD.
TELCOM	– WILL NOT OPEN 4 CB 22.
CONTROL	– ADVISED I WANT TO REVIEW SHE IN 10 MINS. • LM GIMBAL TRIM • CSM CONTROL

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
49+41	Cryo Plan
	H_2 Tnk 1 Htrs Auto
	2 Htrs OFF
	Fixed 233.1 as Low point
	with 224.5 as C&W Limit,
	watched 2 htr cycles on
	Tank #1. This will be
	our sleep config, now
	we want to unbalance
	so Tank #1 is 3% higher
	prior to sleep - will set
	some MC&W's for next
	few hours.
	P-52 Tracked Bennet using
	planet option from
	49+34, but it was always
	occulted from the LM,
	terminate & we will try
	& come up with pointing
	data based on cone ∠
	we are in from PTC.

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION L

FLIGHT DIR MISSION LOG	DAY	REV	PG 75

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
49+48	Going H2 TNK 1 HTR - OFF
	2 Auto
	to establish 3% unbalance
	at beginning of sleep
	period. Briefed crew on
	Rationale.
	Note: We had cross talk
	between AFD Conference
	& GOSS ~~[illegible]~~ - Loop is down
	for work. Conference
49+51	Advised crew on Optics
	Jitter, and gave the
	crew the NBD x, y, z data
	for the crew checklists,
	page G-9-2.
	ETA for parts at HSK is
	14/2245Z — No ETO.

MSC FORM 1441 (APR 66)

NASA — MSC

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 76

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
50+27	Reading up to the crew the changes to the Activation checklist & the RATIONALE ASSOCIATED with the DPS Values. HAVE A problem with wins site at GDS - Crew has been switching the omni's * which has made our comm difficult we handed over to prime site at GDS & it's ok better.
50+50	Crew PROCEDURE FOR IVT completed. If we need bring up the T/M we will read crew procedure in R.T.
51+06	Advised crew to stir Cryo's both O_2 & H_2 • H_2 to get balance for sleep • O_2 to maintain better TRACK since we lost Qty sensor.

MSC FORM 1441 (APR 66)

NASA — MSC

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

USE BLACK BALLPOINT PEN	SPAN / MISSION EVALUATION ACTION REQUEST	USE BLACK BALLPOINT PEN

TIME (T-MINUS/GET)	REQUEST ORGANIZATION	RESPONSE ORGANIZATION	CONTROL NUMBER
45:35	FCD CONTROL	MER-H 45	L-20

ACTION REQD BY (TIME): 47:00 REQUESTER THORSON

SUBJECT: CHECK LIST CHANGE (SHe Press)

APPROVAL

FOD REP M F Brooks TIME 45:35

SPAN MGR RWK TIME 45:47

PLEASE REVIEW THE ENCLOSED CHECK LIST CHANGE (STEP 6-12 ON TLC-1A & STEP 1-3 ON TLC-3). THIS CHANGE IS TO PROVIDE CREW READ OUT OF SHe PRESS AT STEP 8 ON TLC1-A IF READING IS BETWEEN 770 AND 800 CREW WILL PROCEDE TO STEP 9 & WILL PERFORM TLC-3 AT 59 HOURS. IF SHe PRESS > 800 PSIA, CREW WILL BE TOLD TO GO TO ANOTHER PROCEDURE TO BRING UP T/M. WE ARE WORKING ON THAT PROCEDURE NOW.

DO YOU CONCUR

RESPONSE:

CONCUR

EP concurs in the procedure as presented -

E. Cuvier 4/13/70

TEAM LDR W. Kaulich GET TIME 46:56

CON SR REP JPD TIME 47:56

ME MGR JWD TIME 47:56

SPAN MGR RWK TIME 48:12

RESPONDER TIME : MANAGER: TIME :

FOD REP CW M. Brooks TIME 48:14

[illegible]

SPAN MANAGER R H Kohn TIME 48:20

MSC Form 1214A (Oct 69) (OT) NASA — MSC

LM 7

Basic Date _____ 2/6/70
Changed _____
TLC-1

~~58:00~~ 55:00

IVT TO LM

1 Activate CABIN DUMP VALVE & Open Hatch
Take CSM 02 Hose When Transfering

2 Record Docking Tunnel Index Angle

_____Rc

3 FLOOD LIGHT - All
EXTERIOR LTG - OFF
Window Shades - Down

4 DES H20 - OPEN
DES 02 - OPEN
CABIN REPRESS - AUTO
CB(16) CABIN REPRESS - CLOSE

5 Check AOT Visibility

MSC FORM 2206A (JUL 67)
Front
Color _____

6. TRANSFER TO LM POWER (FLOOD LTS. BLINK, C/W PWR CAUTION LT-ON)
   GET _____: _____: _____ (REPORT TO MCC)
   CB(11) EPS: XLUNAR BUS TIE-CLOSE
   CB(16) EPS: XLUNAR BUS TIE-CLOSE
   CB(11) LTG: UTIL-CLOSE
   ACTIVATE UTILITY LIGHTS

7. CB(11) AC BUS B: He PQGS PROP DISP-CLOSE
   NUM LTG-CLOSE
   BUS TIE INV 1-CLOSE
   CB(11) EPS: INV 1-CLOSE
   CB(16) INST: SIG SENSOR-CLOSE
   INV-1: SELECT
   He MONITOR-SUPERCRIT PRESS
   MONITOR SUPERCRIT PRESS (REPORT TO MCC)

8. ON MCC REQUEST PERFORM STEP 9

9. He MONITOR-OFF
   INV-OFF

10. CONFIGURE CB PANELS PER INT ACT STATUS CHART (ACT 3,4)

11. DEACTIVATE UTILITY LIGHTS

12. TRANSFER TO CSM POWER, OBSERVE C/W PWR LT-OFF
    GET _____: _____: _____ (REPORT TO MCC)

IVT TO LM

MSC FORM 2205B (JUL 67)

Back

Color

TLC-2
~~59X45~~ 56:45

IVT TO CSM

1 DES H2O - CLOSE
DES O2 - CLOSE
CABIN REPRESS - CLOSE
CB(16) CABIN REPRESS - Open
FLOOD LIGHT - OFF
Window Shades - Up

2 CABIN DUMP VALVE - OPEN
IVT TO CSM
CLOSE LM HATCH

TLC-3
59:00

1. ON MCC REQUEST PERFORM STEP 2

2. REPEAT TLC-1 AND 1A

3. REPEAT TLC-2

LM 7

Basic Date 2/6/70
Changed

TO OBTAIN LO BIT RATE TM

CSM MNVR TO P 90 Y 0 R ~~355~~ 335, LM-Z AXIS AT GDS 210 SITE

COMM ACTIVATION

1. CB(11) INST: SIG CONDR 1- CLOSE
   ECS: GLYCOL PUMP 2 - CLOSE

2. CB(16) INST: SIG CONDR 2 - CLOSE
   EPS: DISP - CLOSE
   : DES ECA CONT - CLOSE
   VERIFY DES BATS tb(4) - LO,DES BATS-tb-GRAY
   PWR/TEMP MON - CHECK VOLTAGES

   WHEN BUS VOLT ≤ 27V, SELECT HI VOLTAGE TAPS
   DB(16)EPS: CROSS TIE BAL LOADS - OPEN
   BAT 1 HI VOLTAGE - OFF/RESET
   BAT 1 HI VOLTAGE - ON
   REPEAT FOR BATS 2,3,4
   CB(16) EPS: CROSS TIE BAL LOADS - CLOSE

3. CB(16) COMM: DISP - CLOSE
   ; PRIM S-BD (2) - CLOSE
   : PMP - CLOSE
   : PCM/TE - CLOSE
   ECS: DISP - CLOSE

S-BAND

1. COMM: S-BAND-PM,PRIM,PRIM,PCM,OFF/RESET,OFF,LO
   S-BAND ANT - AFT OMNI

DEACTIVATION

1. COMM: S-BAND - PM,OFF,OFF,OFF,OFF,OFF/RESET,OFF,LO

2. CB(16)EPS: CROSS TIE BAL LOADS-OPEN
   SELECT LO TAPS
   UTILITY LTS - OFF

3. He MON - OFF
   INV - OFF

4. CONFIGURE CB PANELS PER INT ACT STATUS CHART (ACT 3,4)

5. TRANSFER TO CSM POWER, OBSERVE C/W PWR LT - OFF
   GET _____:_____:_____ (REPORT TO MCC)

LMP IVT TO CSM

1. GO TO TLC-2

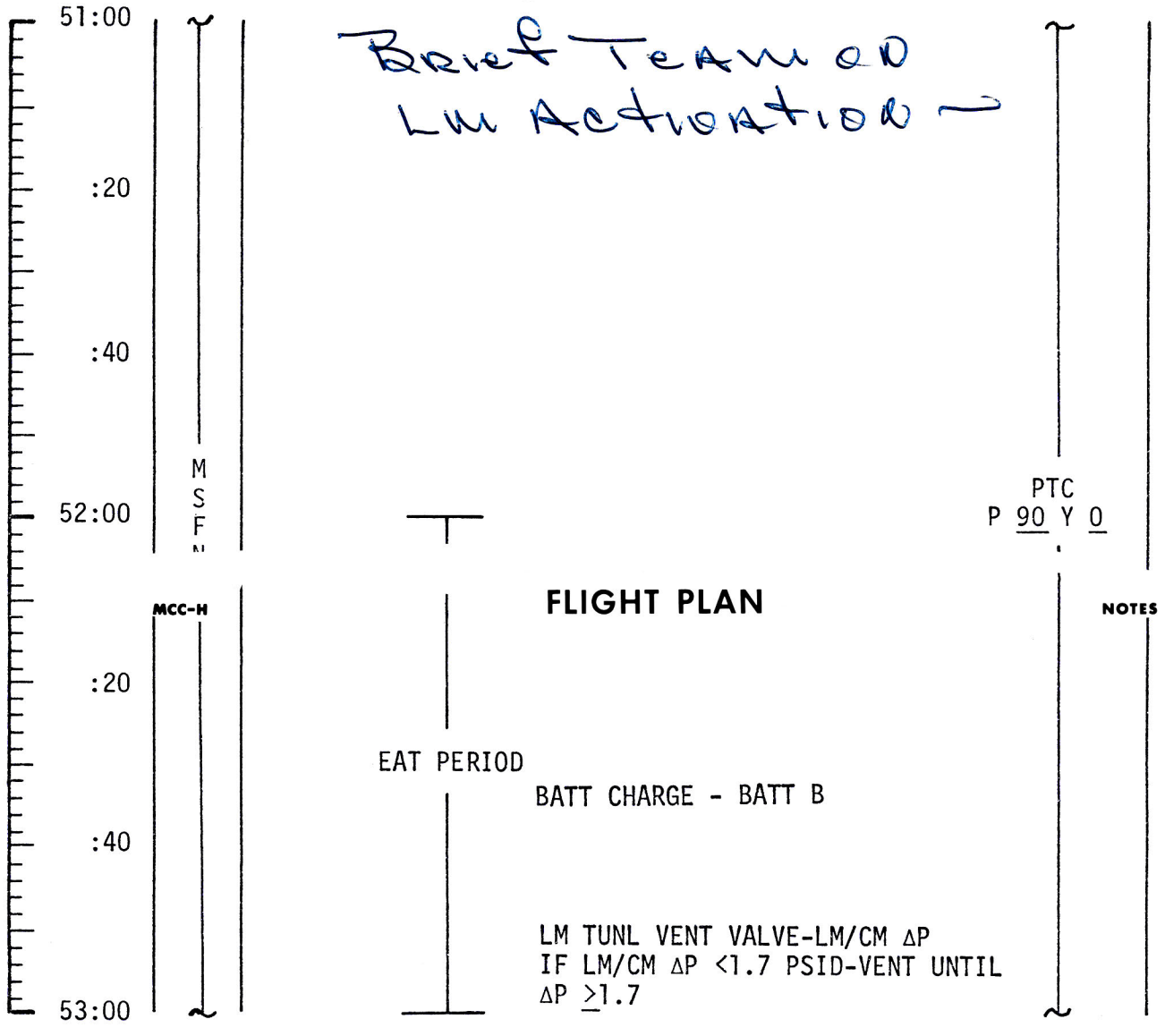
KRANZ

MCC-H

1613 CST

FLIGHT PLAN

NOTES



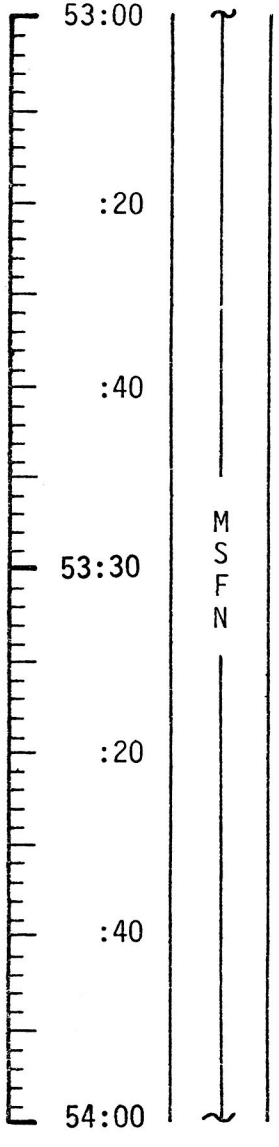
MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	51:00 - 53:00	3/TLC	3-36

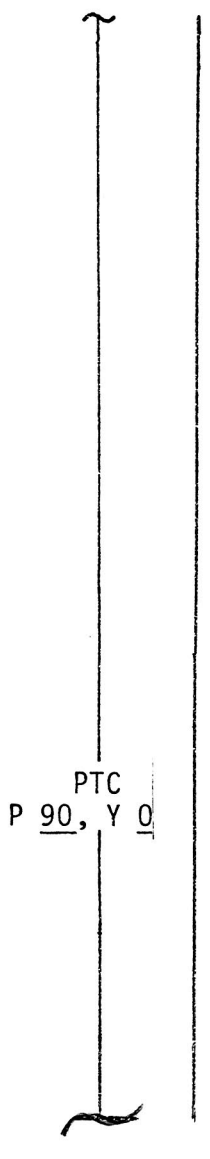
MCC-H

1813 CST

FLIGHT PLAN

NOTES





MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	53:00 - 55:00	3/TLC	3-37

FLIGHT PLAN

MCC-H

2213 CST

UPLINK TO CSM
ΔH (IF REQUIRED)

54:00

:10

:20

54:30

:40

:50

55:00

MSFN

PRESSURIZE CSM TO 5.7 PSIA
PRESSURIZE LM

T EPHEM: V05N01 1706E
COPY IN LM ACTIVATION CHECKLIST (ACT 33)

CLEAR TUNNEL OF
CM HATCH
INSPECT TUNNEL &
DOCKING LATCHES
REMOVE PROBE & DROGUE

TV (GDS) ~~58:00~~ 55:00 TO ~~58:30~~ 55:30
CM__/TV-AVG (f5.6)

LOAD DAP, N46 (20111, 11111)

02 FUEL CELL PURGE *
WASTE WATER DUMP

STOP PTC ROLL AT 285,

HGA P 23 Y 267

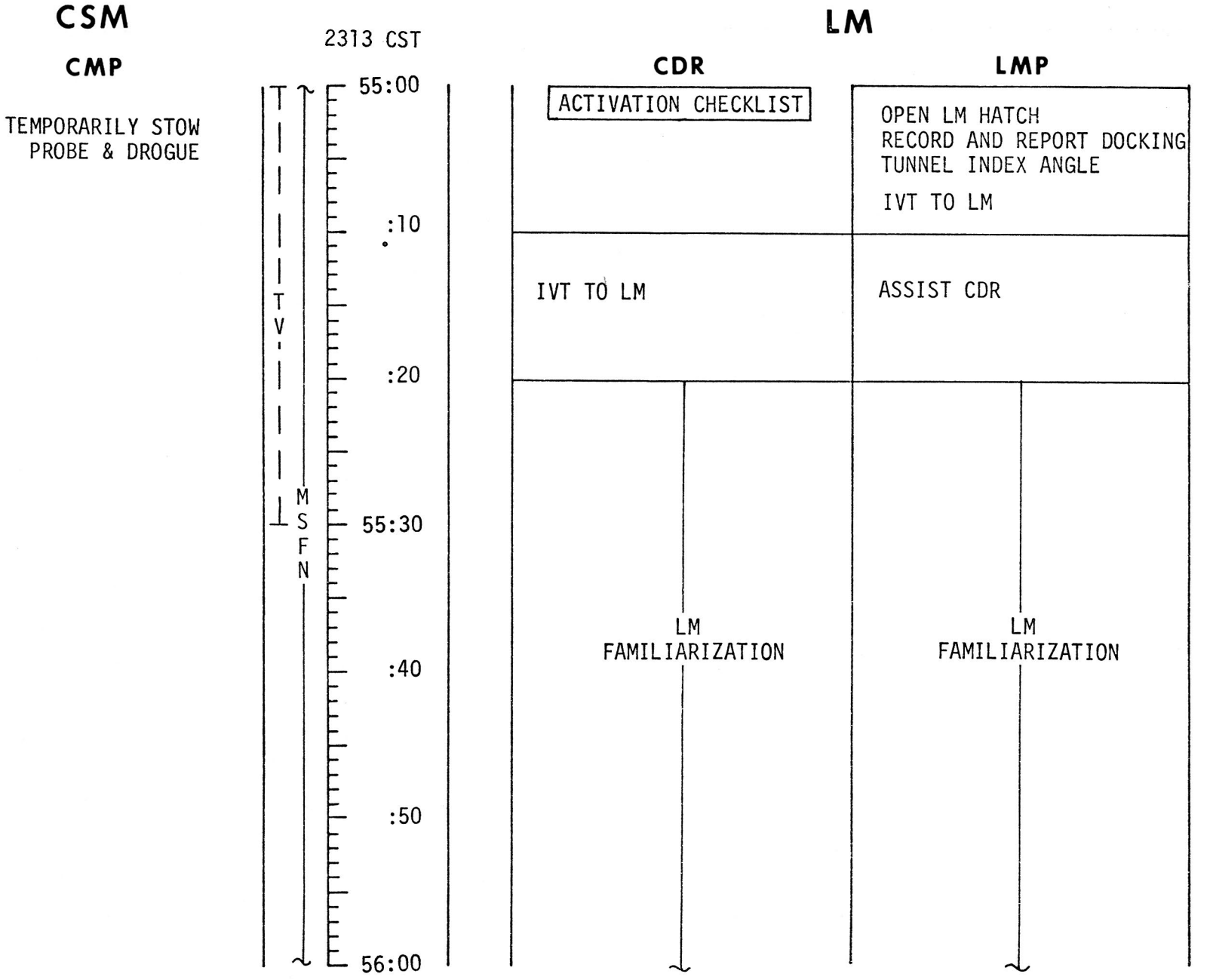
PTC
P 90, Y 0

NOTES

ΔH DETERMINED FROM STAR/EARTH HORIZON SIGHTINGS WILL BE UPLINKED IF IT DIFFERS FROM ΔH IN E-MEMORY BY MORE THAN 5.0 KM

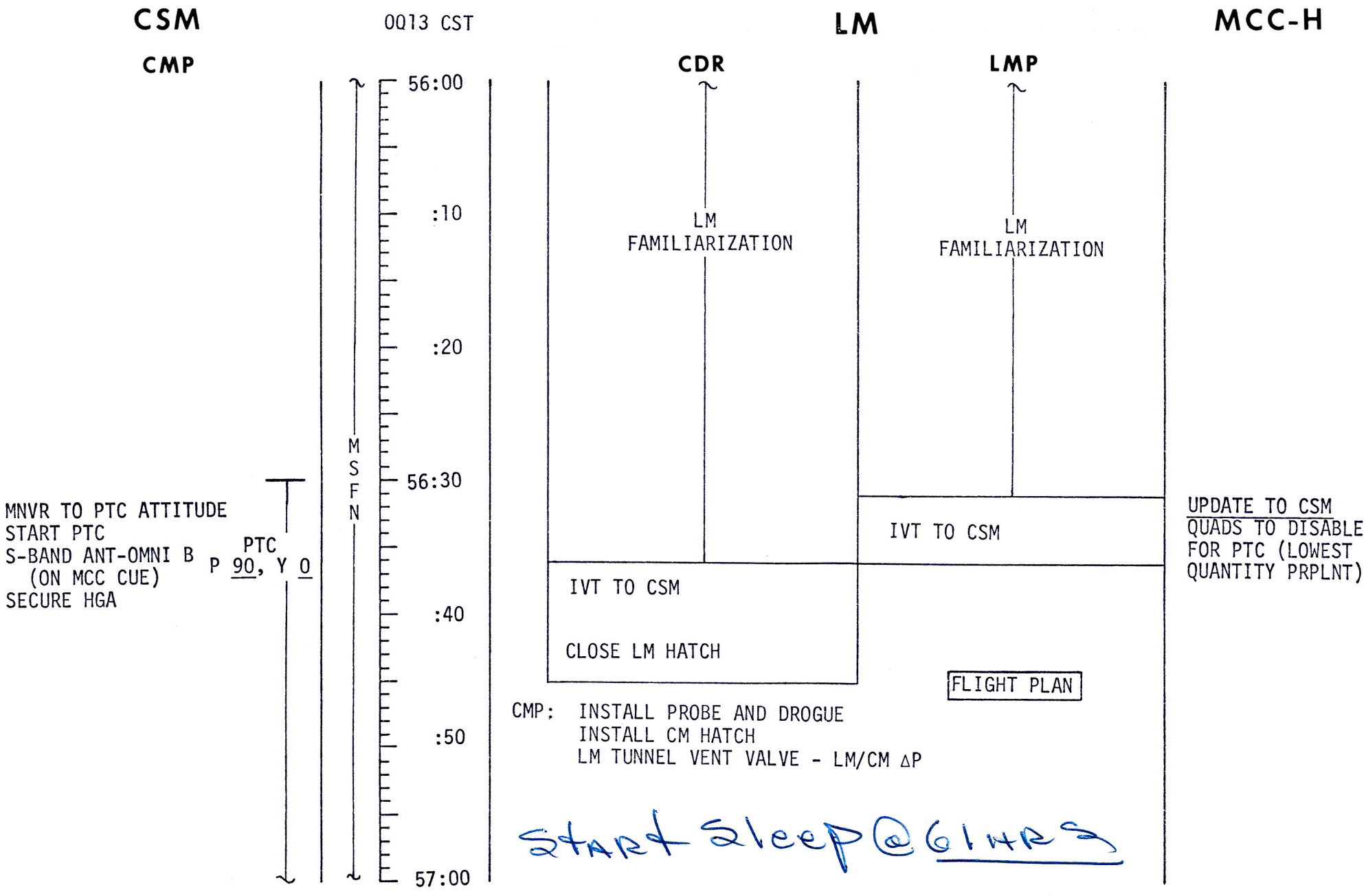
MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	54:00 - 55:00	3/TLC	3-38

FLIGHT PLAN



MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	55:00 - 56:00	3/TLC	3-39

FLIGHT PLAN



MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	FINAL (APRIL)	MARCH 16, 1970	56:00 - 57:00	3/TLC	3-40

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
51+09	GDS wing - Green then Red Again -
***	Note: We hold tape on site only 24 hours then send into ASPO — CSR & I think that it shd. be min of 48 & preferably 72 hours.
	Note: Have talked with Mager/Mattingly & Windler & if Mattingly has measles symptoms we will put him on 2nd Floor Network console for Surface Ops.
	Note: if the LM Purs is applied to Inst more than 15 min Gly Pump #2 CB pnl 11 to avoid component overheating.
52+08	Advised crew to expect Cryo Tank warning on H_2 Tnk #1 shortly — they got

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	it within 30 sec of the call.
52+14	MCC$_4$ is running about 3.6 to 0 fps - trying to schedule DPS Blorb so it won't affect the LOI Burn
52+17	170,494 h V_1 3416 γ_1 78.51
52+23	CP's Down - Exec buffer Depletion.
	S-II ~~2.65 South~~ 2° 33" South 28° 18" West 77+56+45 * Impact
****	Charging Battery B per the Flight Plan.
	DPS Plan if necessary 1. TGT MCC Processor such that we would have 1.2 fps with 5" DPS & 7" ullage - will get us to moon about 15" later - Burn at 60+00 GET.

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 79

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Went thru the mec 2 data - looked good, the Pc was about 3-4% lower than previous burns, but the Inlets looked good - GNC sez that they assumed this was an Instrumentation problem -
53+19	
53+27	LM CM ΔP 1.1, & was vented to 1.7. Cleared crew to Ingress the LM, about 1½ hours early.
53+34	Pressurizing the LM* Crew said that the LM/CM ΔP is now 2.2psi
53+45	Dumping H_2O Purging Fuel Cells — Equalizing the Cabin pressure.
*	Review inst discrepancies with crew.
53+50	CABIN PRESS STABILIZED
53+51	FC O_2 PURGE COMPLETE.

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

Not Read

Front Color _____

2 HOUR ACTIVATION

IVT TO LM

1 Activate CABIN DUMP VALVE & Open Hatch
✓Carry Comm Carrier, CWG Connector And CSM 02 Hose

2 Record Docking Tunnel Index Angle _____
Window Shades - Down

3 Transfer To LM PWR
GET ___:___:___
(FLOOD Lts. Blink, C/W PWR Caution Lt-On)
CB(11) EPS: XLUNAR BUS TIE - Close
CB(16) EPS: XLUNAR BUS TIE - Close

4 FLOOD LIGHT - All
CB(11) LTG: UTIL - Close
Activate Utility Lts

5 DES H2O - OPEN
DES 02 - OPEN
CABIN REPRESS - AUTO
CB(16) ECS: CABIN REPRESS - Close

Basic Date 1/6/70
Changed _____

EPS ACTIVATION

1 LTG: ANUN/NUM - BRIGHT (1 Caution, 9 Power Failure, 1 COMP Lt - On)

2 CB(11) INST: SIG CONDR 1 - Close
EPS: DES ECA CONT - Close
CB(16) INST: SIG SENSOR - Close
: PCM/TE - Close
: SIG CONDR 2 - Close
EPS: DISP - Close
: DES ECA CONT - Close

✓3 Connect To LM Comm Umbilical

LM-7 ✓ AUDIO (BOTH): S-BAND T/R - T/R
: ICS - T/R

Back Color_____

2 HR ACTIVATION

4 Verify BAT 1,2,3,4 - tb-LO
DES BATS tb-gray
BATS 5&6 NORMAL & BACKUP (4)=tb-bp
Check BAT and BUS Voltages

When BUS Volts ≤ 27V, Select High Voltage Taps
CB(16) EPS: CROSS TIE BAL LOADS - Open
BAT 1 HI VOLTAGE-OFF/RESET
BAT 1 HI VOLTAGE-ON
Repeat for BATS 2,3,4

5 CB(11) AC BUS B&A: BUS TIE INV 2&1(4)-Close
: AC BUS VOLT(1) - Close
EPS: INV 1 - Close
CB(16) EPS: INV 2 - Close

6 POWER/TEMP MON - AC BUS
INV -1 Then 2
Verify Voltage in GREEN Band
CB(11) EPS: INV 1 - Open

MISSION TIMER ACTIVATION

1 CB(11) AC BUS B: NUM LTG - Close
FLIGHT DISPLAYS: MISSION TIMER-Close
Set MSN TMR On CSM Mark

PRIMARY GLYCOL LOOP ACTIVATION

CB(10) ECS Disp Close

CB(11) ECS: GLYCOL PUMP 2 - Close
Verify Press Psia

Basic Date 1/6/70

(Trim front page on solid crop marks; back page on dash crop marks.)

CAUTION/WARNING CHECKOUT

1 CB(16) LTG: MASTER ALARM - Close
INST: CWEA - Close

WARN	CAUT
ASC PRESS	PREAMP
CES AC	HEATER
CES DC	ECS
LGC	GLYCOL (ON IF TEMP >50°)
RCS A REG	
RCS B REG	

CB(16) LTG: ANUN/DOCK/COMPT - Close
STAB/CONT: ATCA - Close
HEATER: DISP - Close
INST: CWEA - Cycle
CB(11) STAB/CONT: ENG CONT - Close

2 HTR TEMP MONITOR - Cycle Then LDG
(HEATER Lt - Off)
LAMP/TONE TEST - Check All Positions

4 CLOSE CB's PER ACTIVATION PWR UP CHART

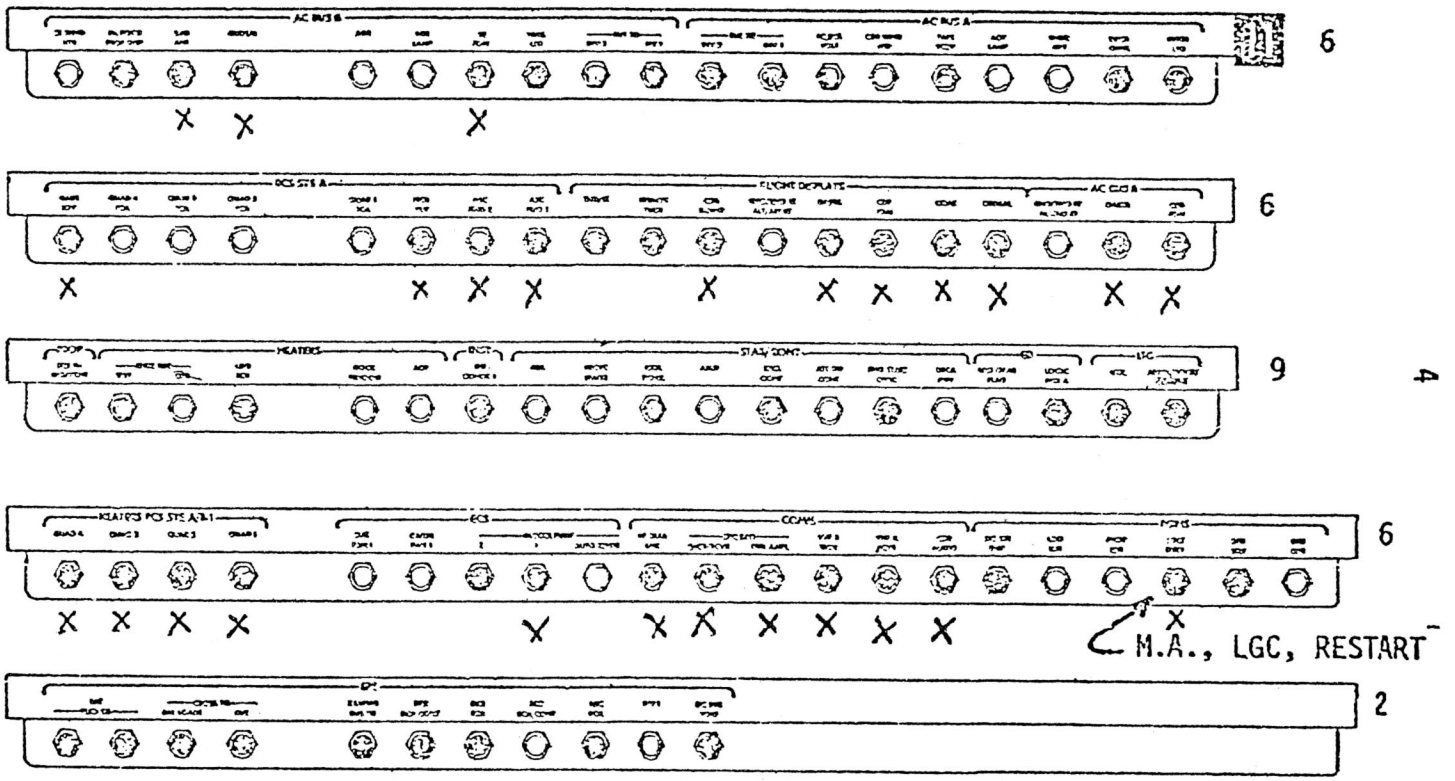
Basic Date 1/6/70
Changed 2/13/70

Basic Date
Changed

Basic Date _____
Changed _____

X = CHANGE TO OPEN

ACTIVATION PWR UP (MODE I, IIA, II, III)



LM-7

Basic Date 1/6/70
Changed 3/10/70

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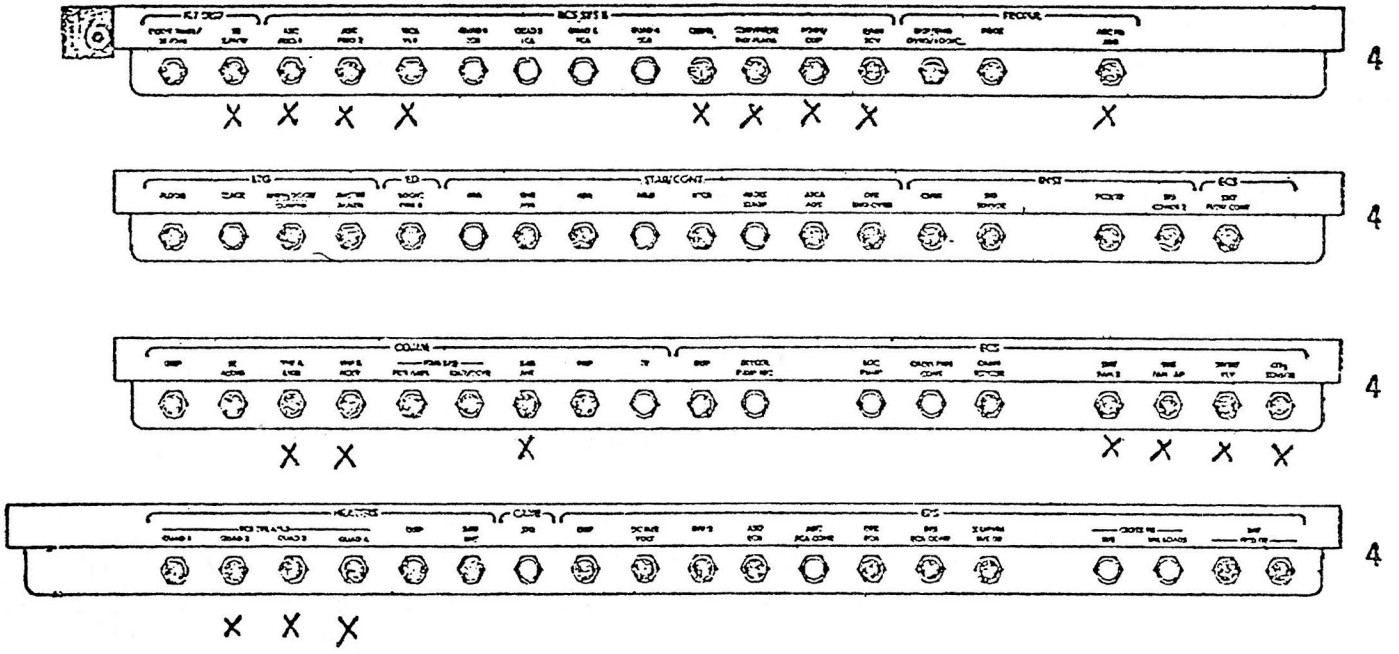
LM-7

Basic Date 1/6/70
Changed 2/9/70

X = CHANGE TO OPEN

ACTIVATION PWR UP



Basic Date _____
Changed _____

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(Trim front page on solid crop marks; back page on dash crop marks.)

7

S-BAND ACTIVATION

1. S-BD -PM, PRIM, PRIM, ~~DATA~~ VOICE ~~DATA~~, PCM, OFF/RESET, OFF, LO
   ANT: S-BD - FWD or AFT

Basic Date 1/6/70
Changed 2/13/70

Basic Date
Changed

(Trim front page on solid crop marks; back page on dash crop marks.)

Basic Date 1/6/70
2/13/70

LANDING GEAR DEPLOY

1 CB 11) ED: LDG GEAR FLAG-Close
: LOGIC POWER A-Open
MASTER ARM-ON
LDG GEAR DEPLOY-FIRE, tb-gray
CB(11) ED: LOGIC POWER A-Close
LDG GEAR DEPLOY-FIRE
MASTER ARM-OFF
CB(11) ED: LDG GEAR FLAG-Open

LM-7

(Trim front page on solid crop marks; back page on dash crop marks.)

Basic Date 1/6/70
Changed 2/T3/70

DAP SET, GIMBAL/THROTTLE TEST

1 CB(11) STAB/CONT: DECA PWR - CLOSE

THR CONT - MAN
MAN THROT - CDR
TTCA(Both)-THROTTLE (MIN)

Basic Date
Changed

4 MASTER ARM - ON
DES PRPLNT ISOL VLV - FIRE

MASTER ARM-OFF

5 PRPLNT TEMP/PRESS MON: DES 2&1
(50°-90° FUEL, 50°-90° OXID/158-144 FUEL
HELIUM MON: AMB PRESS (3000-2250 OXID
: SURCRIT PRESS (230 VERIFY

Front Color _____

16

DOCKED DPS BURN (PGNS)

Basic Date 1/6/70
Changed _____

CSM Mnvr to Burn Attitude, Then CMC - FREE

DOCKED DPS BURN (PGNS)

LM-7

-15:00 FUEL VENT -CLOSE ,TB-BP (HOLD FOR 15-20 MINUTES UTILIZING TAPE FRO
ACCESSORIES KIT OF FLIGHT DATA FILE)

-4:00 CB (11) INV 1 -CLOSE
SELECT INV 1
ENG GIMB -OFF
CB (16) CWEA - CYCLE
CYCLE TEMP MON

TTCA (CDR) - THROT (MIN)

MAN THROT -CDR
DES ENG CMD OVRD -OFF
ENG STOP (2) - RESET
ABORT/ABORT STAGE - RESET
~~PRPLNT~~ QTY MON - DES 1

OXID VENT -CLOSE, TB - BP
MASTER ARM - ON
DES~~CENT~~ VENT - FIRE

- Freeze Fu/He Hk
- Parker valve Operation.
- Reduce pred press @ PDI
- Vent

LM .4 fps ΔV
CSM ullage →
1° offset
.2/.3%

-:30 ENG ARM -DES

:00 ENG START PB-PUSH
+04 ~~CSM ULLAGE~~ 4 JET —X
* +~~06~~ FUEL VENT -OPEN (HOLD UNTIL SUPERCRIT PRESS _____)
FUEL VENT OPEN

:05 ENG STOP PB-PUSH, ENG ARM-OFF

+ 011 CSM TERM ~~ULLAGE~~ —X

MASTER ARM-OFF
FUEL VENT -CLOSE (AT DES REG 1 CLOSE ~~AT~~ _____ PSI SHE TK PRESS)
ENG STOP-RESET
~~PROPELLANT QTY MON -OFF~~
~~HELIUM MON -OFF~~
CONFIGURE VEHICLE FOR INITIAL ENTRY STATUS
~~CHECK PER ACT 15-616.616~~
PRPLNT TEMP/PRESS MON - DES 1

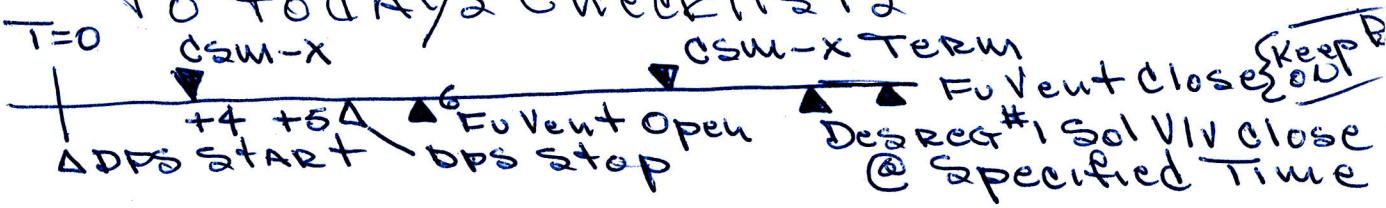
ΔP Drop 90 psi drop per pound
Vent at Least 5 #
Need 36 # for Des Nom

(NOTE: DO NOT HOLD FUEL VENT OPEN, IF PRESS NOT REACHED, CONTACT GROUND;

Vent rate is .11 #/sec

NOTE: GLYCOL TEMP NOT TO EXCEED 93° (EST 4-5 HRS)

① Need CSM Checklist
② Update to ~~CSM~~ Comt Checklist —
③ Verify that this CL is current to todays checklists



SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
53+54	CREW NOTIFIED GRND THAT FC PURGE
	AND H_2O DUMP COMPLETE
53+59	EECOM PROVIDED "MISSION NOTE" ON
	INSTRUMENTATION FUNNY.
54+02	GUIDANCE INFORMED THAT ΔH
	WILL BE UPDATED; HOWEVER DOESN'T
	KNOW THE MAGNITUDE AT THIS
	TIME. THERE IS NO PROBLEM WITH
	DELAYING THIS ~~UPDATE~~/UPLINK.
54+06	LM/CM AP CONSTANT; GOING AHEAD
	WITH HATCH REMOVAL.
54+24	CLOSEST APPROACH 60 N.M. NOMINAL
	BASED ON TRAJ UPDATE. FROM FIDO
54+25	LMP IN LM
54+27	MCC READY FOR TV; CREW
	INDICATED THEY ARE GETTING IN
	PROPER CONF.
54+41	RAW VIDEO TX;
	COLOR MONITOR ON CHN 6
	FOR TV.
54+43	EECOM GAVE FLT A GRAPH
	SHOWING FAILURE OF THE
	CRYO O_2 QTY SENSOR; TNK 2.
54+45	TIME OF LM X-FER 54 +46 +15
	DOCKING TUNNEL INDEX -2°
54+49	.
	720 AND FLICKERED DOWN TO 710

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

USE BLACK BALLPOINT PEN

SPAN / MISSION EVALUATION ACTION REQUEST

USE BLACK BALLPOINT PEN

TIME (T- MINUS / GET)	REQUEST ORGANIZATION	RESPONSE ORGANIZATION	CONTROL NUMBER
53:20	BLDG 45	ECOM	C-27

ACTION REQD BY (TIME): EECOM INFO ONLY

REQUESTER S.L. OWENS

SUBJECT: O2 TK 2 QUANTITY GAGE FAILURE

ATTACHED CURVE WAS COMPILED FROM APOLLO 10, 11 AND 12 DATA TO DETERMINE THE ERROR INHERENT TO PRESSURE-TEMP CALCULATIONS TO DETERMINE TANK QUANTITY. RESULTS SHOW THAT FLUID TEMPERATURE NEAR THE PROBE (TEMP SENSOR) IS ABOUT 15°F HOTTER THAN THE AVERAGE TEMP OF THE FLUID IN THE TANK. THEREFORE GOOD CORRELATION BETWEEN CALCULATED QUANTITY AND ACTUAL QUANTITY MAY BE OBTAINED BY USING P-T RELATIONSHIP AND ATTACHED CURVE TO CORRECT ANSWER. ANOTHER METHOD WOULD BE TO TAKE T.M DATA FOR TEMPERATURE AND SUBTRACT 15°F AND MAKE THE PRESSURE-TEMPERATURE-QUANTITY CALCULATIONS

APPROVAL

TEAM LDR TIME 53:30

CON SR REP TIME 53:37

ME MANAGER TIME 53:38

SPAN MGR TIME :

RESPONSE:

CONCURRENCE

FOD REP TIME :

SPAN MGR TIME :

TEAM LDR TIME :

CON SR REP TIME :

RESPONDER

ME MANAGER		SPAN MANAGER
TIME :		TIME :

MSC Form 1214B (Feb 70) (OT)

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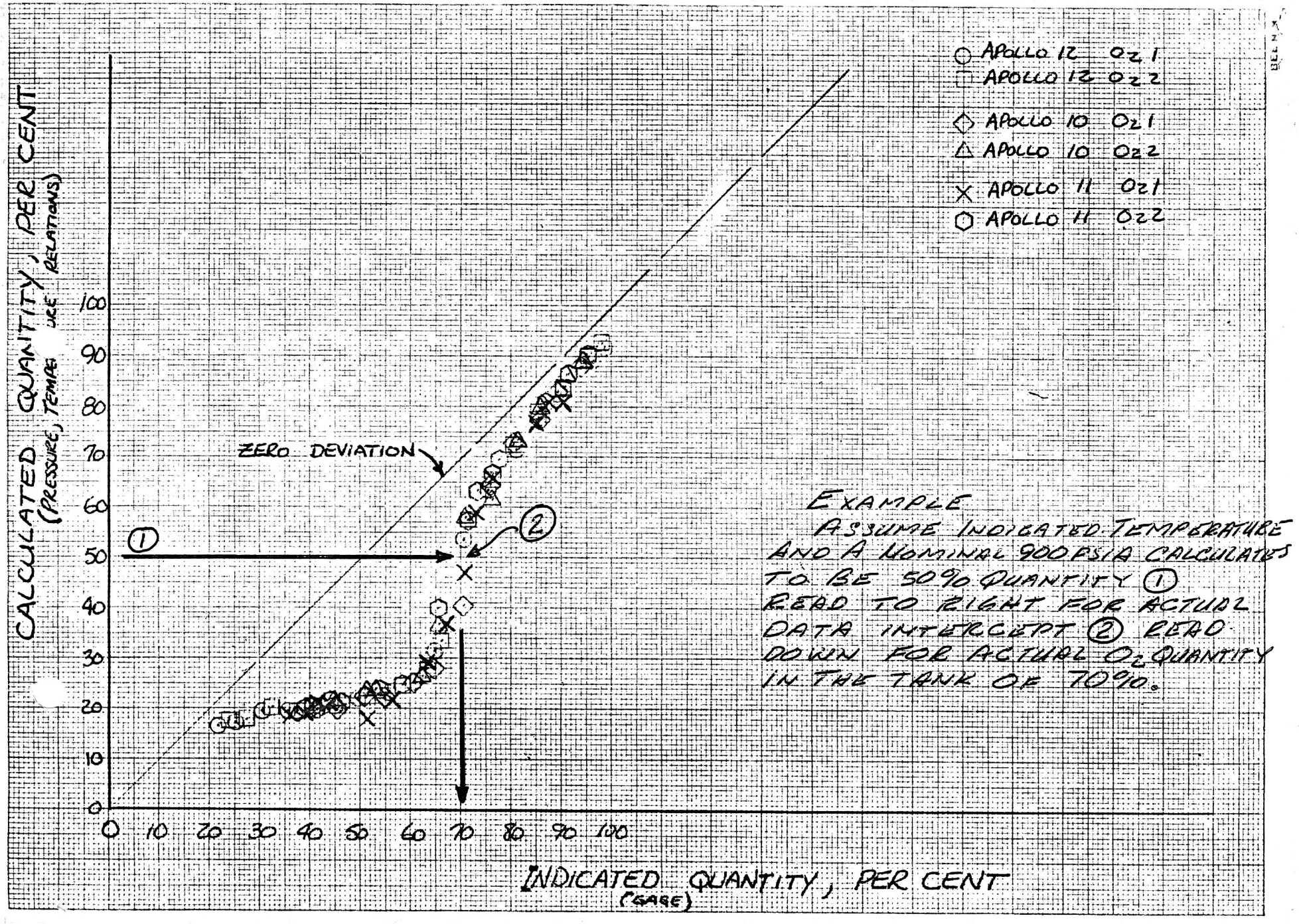
CALCULATED QUANTITY, PER CENT
(PRESSURE, TEMP, ICE RELATIONS)
INDICATED QUANTITY, PER CENT
(GAGE)
0
10
20
30
40
50
60
70
80
90
100
ZERO DEVIATION
1
2
APOLLO 12 O2 1
APOLLO 12 O2 2
APOLLO 10 O2 1
APOLLO 10 O2 2
APOLLO 11 O2 1
APOLLO 11 O2 2
EXAMPLE
ASSUME INDICATED TEMPERATURE AND A NOMINAL 900 PSIA CALCULATES TO BE 50% QUANTITY (1) READ TO RIGHT FOR ACTUAL DATA INTERCEPT (2) READ DOWN FOR ACTUAL O2 QUANTITY IN THE TANK OF 70%.

MSC Form 750 (Apr 70) NASA — MSC

APOLLO 13 PROBLEM TRACKING LIST

ITEM NO.	VEHICLE CSM	VEHICLE LM	DESCRIPTION	ACTION IN PROGRESS	ACTION ASSIGNED TO	STATUS	ESTIMATED COMPLETION TIME
1	X		Suit pressure transducer reading approximately .5 psi below cabin pressure.	1. Analysis of failure history. 2. Similar to Apollo 12 post flight test.	Spence/NR	Open	June 15
2	X		Potable water quanity reading - reading erratic. Dropped approximately 20% at approximately 22:42:50, then returned to 100%.	Similar to previous flight experience - expect contamination on transducer wiper.	Hurt/NR	Open	
3	X		40:00 GET - Optics coupling display unit fluctuating 0.16 degrees in zero optics mode.	Similar condition on Apollo 12 flight test being developed to isolate servo loop affects from readout effects.	Hanaway	Open	
4	X		O_2 Tank$_2$ Qty went to Off scale Hi GET 46:45. Cabin meter confirmed as Off scale Hi by crew at GET 47:42. Problem occurred after the Cryo fans were activated.	Transducer failure modes are being evaluated.	Ferenson NR	Open	

GET 54:00
DO Qualin.

FLIGHT DIRECTOR

APOLLO 13

Third Daily Report

(27 hours to 51 hours)

The first midcourse correction maneuver was performed at the second option point (30:40:49). System performance during the maneuver was satisfactory with residuals of 0.0, 0.2, and 0.2 in the X, Y, and Z axes, respectively. The closest approach to the lunar surface will be 59.98 nautical miles at 77:28:31.

A preliminary evaluation has been made of the launch phase command module vibration data. These data show low-level 15 to 16 hertz structural oscillations in all axes. These levels were measured prior to center engine cutoff during second stage operation. The maximum amplitudes measured were 0.05g and were of no structural significance to the spacecraft.

The optics shaft fluctuations noted during the Apollo 12 mission have also been noted on this mission. The fluctuation was between 0 and 0.22 degree with the system in the "ZERO" optics mode. A test at 49 hours verified that the fluctuations were the same as observed on Apollo 12. These variations have no adverse effect on the computer and manual modes of system operation.

Temperature oscillations of 2° to 10° F in the fuel cell condenser exit temperature have been observed during periods of high electrical loads. These oscillations have been noted on all previous manned Apollo flights and are not detrimental to fuel cell performance.

The tank 2 cryogenic oxygen quantity sensor went to full scale at 46:45:00. The fans were being manually operated at this time. A subsequent fan cycle did not cause a change in the reading; therefore pressure and temperature indications from tank 2 as well as the valid indications from tank 1, will be used to manage the system for the remainder of the mission.

At 37-1/2 hours, the potable water quantity transducer fluctuated with the indicated quantity decreasing from 102.4 percent to 89.8 percent with no change in water quantity. The measurement indication returned to 102.4 percent shortly thereafter and continues to indicate properly. Alternate procedures are available for determining water quantity should a complete failure of the transducer occur.

Satisfactory communications have been maintained throughout the flight using the omnidirectional and high-gain antennas. Good quality television pictures were received during the third transmission between 30 and 31 hours.

All systems are operating satisfactorily except for the minor discrepancies discussed above. All consumables and temperatures are within nominal limits.

for Donald D. Arabian
Evaluation Manager

FLIGHT DIR MISSION LOG	DAY	REV	PG 81

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	54+58+50 BACK ON CSM
	Power.
	Standing by for T.V. —
55+00	Crew locking up the High
	GAIN. — .
	• HGA {P 5 / Y 237} *
	• Crew can't get it to
	NARROW beam, will go
	to Manual & try & tweak
	it up. Crew tried Auto
	& ReAcq with both sets
	of electronics.
	• Crew sez that
c/b	pnl 225 HG Gp II C/B
	Hi Gain flt Bus
	Both C/B are IN —
	P 90, Y 0, R 285 for
	start of
**	Quads A & B / Disable *
	all jets on C & D.
*	Get Pitch & Yaw data
	from CSM.

MSC FORM 1441 (APR 66)

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 82

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
55+21	Crew TV Discussion
*	ALC Settings on Camera on Peak - try Average.
	Roll 060° for Comet** Bennet photo *, will stay in
	attitude for a while until
	TV is over
	28° / 267° ‖ HGA ~~onboard~~ compares with the ground values.
55+33	TV Pictures thru AOT
	were good, also thru
	windows to moon.
	Predicting Batt B Chg
	Cutoff at 55+50, also
	will want a cryo stir
	at same time.
	The Tank #1 Unbalance
	will not be as we wanted
	it — i.e. They will be
	balanced tonite —
***	CSM/LM Power looks good,
	Verify —

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 83

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Terminate TV @ 55+46
55+48 *	Terminate Bath B Charge
*	Enable C&D for Roll to 060
*	Verify confis on CSM HGA
Crew *	Auto Trk/Narrow Beam/ Primary Electronics.
*	Verify that crew has enabled C-4 for Roll Mnvr.
*	40 AH Back in Bath B.
**	Stir H_2 & O_2 Cryo's — Last one prior to sleep period.
55+53 *	Shaft/Trunnion for Comm ct Bennet
55+55	~~AC~~ Mn B Bus undervolt — CMC had Hdw Restart. Switched HGA went to wide beam * O_2 Quantity #2 dropped to
**	2m RCS He #1 many problems FC#1 MnA ? FC#3 MnB ? Looks like we lost AC

MSC FORM 1441 (APR 66)

NASA — MSC

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
*	Quad #2 He Vlv Open
	55+55+04
	FC #1 & #3 show grey flags — FC #1 on MNB FC #3 on MNB.
	MNA 25V — it is OK 53A on FC #2
	AC Bus 2 — zero output
**	Omni ~~B~~ — C.
	FC Press 1 — O/N2
	2
	3 — O/P
*	RCS — Min Fu Usage
**	LM Htr Current static
*	All RCS Quads off. Verify — Open Circuit Fuel Cell #1. Crew thinks we may be venting —

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 84

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	GNC ‖ C3/C4 MNA ‖
	‖ B3/B4 MNA ‖
	‖ C1/C2 MNA ‖
	Getting close to Gimbal Lock
56+13	Venting from Window #1,
56+14	Omni Bravo
‖	*Emer 1-5 power down A ~~total~~ delta of 10 Amps, big discussion of
|	Something giving the S/C RATE
	Inv #1 on both AC Busses + ‖*
	Think FC 1 & 3 may
***	Fuel Cell 2 Pump to AC-1.
**	Rates - P & - Roll

MSC FORM 1441 (APR 66)

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	RTCC 2 MACHINES & DeLOS CAPABILITY.
56+32	TURN A-3 to MAN A
*	Get BATTERY off line.
	Get O_2 TANK #1 PRESS up
56+34 *	FC-3 Open CIRCUIT
	TURN B-OFF } *RCS D-MAN A }
	~~to V~~
56+35	TURN BATT A - OFF
**	Isolate SURGE TANK save for Entry.
*	Need get power to MN B-
	Cryo-O_2 TNK #1 HEATERS ON
	CRYO PRESS MN A & B
*	Isolate repress pack.

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	KEYSER to FOLLOW CONFIG
	FANS ON IN TANK #1.
	Vehicle has damped out
	CK POI 226 • CRYO O_2 HTR 1 MDA
	226 • FAN MOTOR TANK #1 30 —
	ALL C/B ARE IN.
•	Number of particles has decreased.
•	Verify both BMAG'S ARE OFF.
56+48 •	SURVEY COCKPIT
	100 PSI IN LESS than 2 HOURS —
•	THRUSTER C1 - to OFF
•	TURN O_2 ~~#~~ REACTANT to FC #3 to OFF.
	We think that we
	MAY have A MANIFOLD
	LEAK.
•	Shutdown the INLINE
	HEATERS
	CREW had 06 18 FINALLY

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	FC#3 C/B - Pnl 226
	verify closed.
57+05	A-4 on to stop pitch
	RATE
	Barkepole on residents #3
57/08	GAC
	A-1
	C-2 off
	C-2 on main A
	B-1 off
	D-1
	B-2 off
	A-3 A-3 A-4 C4 on
	Accel and - No rate damping -
	Both SMDC phgs off -
57/09	255 pOn #1

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 86

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	FC#1 & 3 on system readout —
	1a Lower scale — 0
	b — 3.45
57/10	251
57/11	247
57/11	243
57/11	251
	Close repress pack —
57/12	238
	226 — FC#1
57/14	Isolate - Repress off -
57/16	Repress & FC#1
57/18	Close FC#1
	Enable B/D roll —
57/19	226 222 psi —

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 87

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	230
	HOA pur switch off —
	Jack — when he got the
	loud bang — restart —
	V74
	V74 did it —
	217
	209
	Sending up pur up CM —
✓	Act 1 — ✓
	Don to step 3 ✓ ✓
	Act 11, 12, 13 step 1 —
	Tomit 9
	Demand regs to cabin —
	Discontinue —

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 88

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Suit fan #1
	ECS
	Pnl 11 - LGC DSKY CB close
	ACT Pg 25
	1-2-3
	Act 30
	Thru Step 7 p ACT 31 -
	Bypass - Pump -
57/54	Pwr to everything but IMU -
	O2 fan #2
	Verify FC pumps off -
57/57	AOS LM
	Control - Tolman -
	Suit Gas Diverter Kabin -

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 89

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
50/01	
50/04	BATA on –
	Good Align – 2°
	CM
	Act 20
	Act
	Heaters Tank #1 off –
58/15	Master Alarm –
	LM Act 20 –
	Act 21 (step 3 – only)
50/22	✓ RCS heaters on –
	RCS pressurized –
	CB's on 11-16
	GASA TA –

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 90

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	TCA breakers in last –
	PAP Data Loaded –
	30120
	63,400#
	Go into no control –
	Affirmative –
50/35	Got Control in LM –
	Closing dn CSM –
50/40	Odyssey found dn –
	Gyro torquing angles –

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 91

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	See any stars out LM window -
50/48	Contactio water -
	ASC O_2 Tank #2 -
	✓ Close Desc O_2 Valve / open ASC O_2 Tank #2
	901 psi -
	830 psi -
50/54	- 1 of particles
	don't recognize any constellations in this attitude right now -
	Display CB's -
50/56	Control - RCS press 5 psi in OASC OX & fuel -
	Verify - ASC feed closed - sealed -

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG (92)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Display CB's —
	Control — Asc feed —
	Guid — Emergency dump —
	Display CB's open —
	Pad — P30 — PCM 2 ADL
	Panel 16 —
59/08	Rest of CB's —
59/19	V74 Emergency dump —
	ASC —
59/21	Loading Reformatt —
	Close NVA CB.
59/2~	Cycled Ascent feeds

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 93

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	(1) PTC - AGS - PAGS Config - Control - ikon
	Keep IMU up until burn -
	Other pwr config -
	(3) Later CO_2 scrubbing
	(2) All Crankels - Recommended profile O_2, H_2O, AH.
	(4) Changed over - Comm to get Tracking -
	(5) Stowage - Move to LM or CSM -
59/36	↑ Aft omni Try to establish tracking 60 nmile -
59/41	↓ Urine Dump TO Side Hatch -

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT PLAN UPDATE	
TIME	ITEM
	Remind Crew —
	Either put WMS QD
	pressure cap over
	side latch nozzel or
	keep hose on.

MSC Form 1190 (Apr 65)

FLIGHT PLAN UPDATE	
TIME	ITEM
	FOR DOCKED DPS BURN
	1. 2 CREWMEN IN LM
	1 CREWMAN " CSM
	HATCH OPEN
	2. TRANSFER TO LM
	TOWELS FROM A1
	2 PEN LIGHTS FROM A1
	2 FECAL BAGS FROM R10
	2 UTS FROM R11
	FOR COAST PERIODS
	1. 1 CREWMAN IN LM
	2 CREWMEN IN CSM
	HATCH OPEN

FLIGHT DIR MISSION LOG	DAY	REV	PG 94

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	H_2O & Elect Pwr -
	H_2O - 34 hours left -
	Pwr - 67½ hrs ASC + Desc
	at present load - 35 -
	Pwr Amp - LBR - 2.5A -
	AC inverter -
	PHGS attitude -
59/59	Fwd omni -
	Comm - up to pilot discriminant -
60/23	
	Water Critical -
	Free Return MVR of 16 fps at 61 Hrs

MSC FORM 1441 (APR 66)

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 95

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	CM too much light into AOT -
	Going thru ACT ✓
	Step 5 for V1 - open -
	Omit Step 6 -
60/51	Go on CB panel -
	Walking thru 2hr Activation checklist
	Recommend TTCA -
	Eng Gimbl - off - ✓
	TTCA for att - ✓
	Mode Control to att Hold - ✓
	15.7 y 178.1 p.
	R 4.47 ✓

MSC FORM 1441 (APR 66)

NASA — MSC

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG
			96

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	ATCA - CB - 16 ATCA - 16
	PECA - Gimbal / Pwr - mff -
	CB - 11
	136.5 nmiles -
	γ_{GI} / - 6.53
	Doppler Confirms -
61/52	POG - Pull LGI DSKY
	PRO -
62/13	Still no resolution
	Inco -
	Disable uplink squelch -

MSC FORM 1441 (APR 66)

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 97

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
62/26	
	+X Axis South
	Telem
62/27	Recommendation
	Bal loads cross tie/closed
	on both panels —
	LGC PSKY +IMU-
	PNGS RETHOLD TTCA
	CDR P 267.5
	y - 4.5
	V16 N20
	+ 00120
	+ 267.50
	+ 004.50

MSC FORM 1441 (APR 66)

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 98

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
63/05	PCT2 psd - MPL -
	Not having too much luck in this attitude -
63/17	G/ Ready in Vertn -
20.5	
1420	From now Δt
	a 25.6A 78.5 hrs
	H_2O 75 hrs.
	O_2 w/o ops pkss 69 hrs -
	15.4A after 80 hrs 100 hrs
	H_2O " 92 hrs
63/32	Telmo CO_2 removal -
	list of CB's -
	Cabin repress / ASA
63/47	GNC - IMU heaters only one in question !!

MSC FORM 1441 (APR 66)

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG
			99

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Check PTC rotation rate –
63/50	↑ Big otteros
	Don't drink out of LM –
	↓ Yes – remember no O_2 press
63/51	Open DUA.
	CB explains –
64/02	↑ CO_2 removal – Take CDR hose
	& cap the red one (the return hose)
	Stick in tunnel –
	↓ Extend CDR hose w/ vacuum hose –
	Subjects:
	(1) 60–65 AH To retain PIPAS
	(2) SM retention pros/cons –
	(3) Comm duty cycle – maybe using one –
	(4) CSM optics for align

MSC FORM 1441 (APR 66)

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 10-0

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Still 137 -
64/40	Being Convinced To leave IMU heater CB on - To save P.P.R.S
64/47	↑ Pur Amplifier steps Control GET 65° 90
	FAO/work unit - P52 w earth/moon -
	Comm procedure - background noise with P/A off - Hard To read -
65/04	HOA after 90° yaw -
	Gnd/Pad 11 Row 33 - Annunciator/Duke/Cmpt -

MSC FORM 1441 (APR 66)

NASA — MSC

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 101

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
65/30	Still going to attitude
	Discussed LM → CM pur - takes 3 people
	up - Do not do until all three up -
	Assuming the IMU heater CB will still
	save the pipes, it will be worth an
	~~amp~~ to retain that option for awhile -
	May be all the way -
	GHC is checking to see that CB in
	@ 69 HAS will save pipes - IRIGS
	are advertised to be all right w/o
	heater -
	We have to do this config some
	time to use LM pur to CM for
	whatever purposes may come up

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FLIGHT DIRECTOR'S MISSION LOG

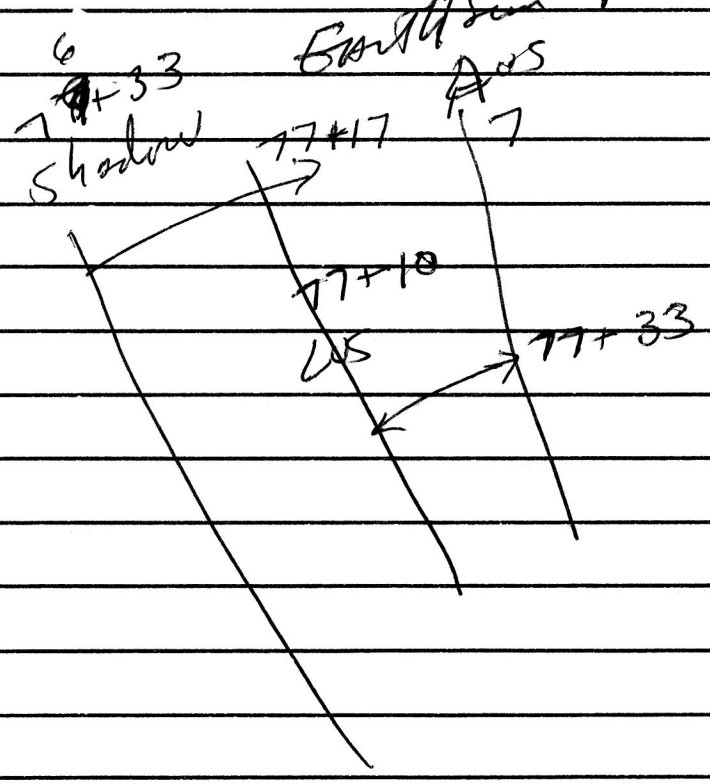
FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG
			102

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
65/34	Function Switch to Voice -
	Did not help -
	Back to Dn Voice Backup
65/40	Push in E B.
	
	FAO Have Earth-Sun P52 info at AOS -
	Telmo/Control - Minimum power for P52
	AC - moving Rndy, Radar, etc -

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG
			103

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	EECOM/FELMU - Procedure To pur CSM
	from LM - Standing by -
	Should have 3 men to run -
66 hours	hardover -
	(1) PTC - YAW 90° every 1 hour
	(2) Do CSM Pwr from LM - but have 3
	men up - not yet discussed with
	crew -
	IMU heater CB To sake PIPAS for
	entry - Still not sure
	(3) Pur Amp CB saves 2 amps but
	is noisy
☆	(4) To dump or not dump SM - May save
	1 day return -
	Launch in SPAN
	Considerations - See EFK summary.
	Runs DPS low To come back
	day early - So hairy Tradeoff
	You better jump in -

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

RETRO PLAN

ON BOARD — 60 hr Abort
ΔV = 6079
LAND 118hrs PACIFIC

UNDOCKED

#1 — 60 hr Abort
ΔV 10000 (MAX AVAILABLE)
LAND 94 hrs — PACIFIC
ETA of PAD — 57+15

#2 — ABOUT 62-~~63~~ hr Abort
ΔV 7000 to 8000 fps
~~ATLANTIC~~
LAND 109 hrs — ATLANTIC

#3 Pc +2 @ 79+30

~~DP~~
DOCKED

ΔV = 46+57
LAND AT 118 — PACIFIC

#4 Pc+2 — 79+30

Land AT 143

MISSION PERIOD TTY FORMAT

CIRCLE THE DESIRED ROUTING INDICATOR (S)

TO: (HALO) (HMOC) DSDB DSDQ DSDK MCSQ MVAN MWTN MRKV MRED MHTV MRTK MMER

GACN LCYI ACNB ACRO LMAD PHAW GGDS GGYM GMIL GMCC GPAT GBDA GUPA LKNO

GALA LTAN GGBM PCTN PGWM GCAL GPRE GTEX GEGL GWHS AWOM

GSPA GCEN GUNV

SPE OPN OTHER

ACK CIRCLE IF REQUESTED

TO:

TEXT: (PRINT-PUNCTUATE)

DDD BBB KKK (CIRCLE IF DESIRED)

ORIGINATOR: _____ AFD OR O&P _____

MSC Form 1437 (Rev Jun 67)

oO NFR

PC+2 79+30 161 fps 20 53's
89+32 E
EI 149+47+52

Block Data -
60 hr abort -
TLG 60+00
60 79 fps
EI - 118 @153w - moved due to Wx
will check

LOI - fly by
72+24
ΔV=361
EI 166+54 - @165w -
23°16'

Next Block data ~~7+10~~ PC+2 -
Fast Return to MPL
79+30 ΔV ~~4657~~ 4657 EI 118+00
MPL 165w

Min Return time ? Can't run -
60 hr abort - No LM -
MPL - 4000 ΔV EI=143 hrs
- 5000 ΔV 119 hr
- 9000 ΔV 94 hr
AOL - 3500 ΔV 158 hrs
4700 ΔV 134 hrs
7000 ΔV 109 hrs

MISSION PERIOD TTY FORM

CIRCLE THE DESIRED ROUTING INDICATOR (S)

TO: (HALO) (HMOC) DSDB DSDQ DSDK MCSQ MVAN MWTN

GACN LCYI ACNB ACRO LMAD PHAW GGDS GGYM GMIL GMCC GPA

GALA LTAN GGBM PCTN PGWM GCAL GPRE GTEX GEGL GWHS AWOM

GSPA GCEN GUNV

SPE OPN OTHER

ACK CIRCLE IF REQUESTED

TO:

TEXT: (PRINT-PUNCTUATE)

DDD BBB KKK (CIRCLE IF DESIRED)

ORIGINATOR: _____ _____ AFD OR O&P _____

Form 1437 (Rev Jun 67)

REV "A"

MISSION PROFILE — ESTIMATE AT 64:18

BURN#	GET		ΔV	NOTES:
1	61:30	LM DPS -	≈ 40 fps	COMPLETE
2	79:30	- LM DPS - PC+2	850 fps	
		- POWER DOWN TO MAX EXTENT POSSIBLE UNTIL NEXT BURN		
3	~~92:00~~ 104	- 1st MIDCOURSE	NOM (0 fps)	MAY BE DPS or RCS
4	140:00	2st MIDCOURSE	NOM (0 fps)	" " "

NOTES — LM PGNS WILL BE USED FOR BURN PC+2 AND ALLOW 2 HOURS OF PGNS POWERED UP FOR ALIGNMENT AT EACH MIDCOURSE CORRECTION.

Bob Carlton

MISSION NOTES

Communication Status to Crew

(1) MCC will lose capability to advise on antennas when IMU is powered down

(2) LM squelch is best indication of loss of lock on - be sure uplink squelch is OFF

(3) When antenna is switched on LM - it will take 3 to 5 min to establish lock again

(4) Houston will initiate voice check after each re-acquisition

(5) When earth is view forward window. Forward antenna is good - when moon is in view aft antenna is good

Communication Status to Users

1. MCC will have capability to cause antenna system LMN to ~~[illegible]~~ [illegible]

2. LM equipment is [illegible] [illegible] [illegible]

FC 1 N_2 PRESSURE STEP FUNCTION from 55.80 psi to 0 psi at GTE 55:54:56. THIS appeared to be a TM problem because the regulated H_2 AND O_2 PRESSURE DID not FOLLOW the N_2 PRESS. (N_2 PRESS PROVIDES REG PRESS FOR H_2 & O_2 PRESS) ALL OTHER FUEL CELL PARAMETERS WERE NORMAL (I, V, T)

AT 55:57:32 ALL 3 F/C were NORMAL

FC I	MN Bus V
1 27.3	MN A = 28.65
2 26.5	
3 22.6	MN B = 28.13

AT 55:57:33 MN BUS A (28.65V) & MN BUS B (27.95V) VOLT BEGAN TO DIVERGE. LOADSHARING WAS 1 = 36.3% 2 = 35.2% 3 = 28.5%

AT 55:57:26 ALL 3 FC LOADSHARING WERE EQUAL WHERE PREVIOUSLY FC 3 HOGGED the load 36%, THEREAFTER FC 3 LOADSHARING BEGAN TO drop.

55:57:43
MAIN BUS B VOLT began to degrade to 19.22 V and at 55:57:44 FC 3 I = 24.9 OUTPUT dropped to 9.5 amps and MN BUS B VOLT was 17.62 V and AC 2 VOLT = 0

AT 55:57:26 FC 1 O_2 Press ~~dropped~~ Began to decrease

FC 1 current = 24.1

From this time FC 1 load sharing began to decrease

at 55:58:01 FC 3 I = 4.8 Amps.

at 55:58:13 FC 1 I = 4.7 amps.

FC 2 I = 50.2 amps.

55:58:16 Bat charge on Bat A to get as much Bat energy as possible

55:59:03 FC 2 O_2 Pressure began to decrease. as from here on all pressures began to go out of tolerance

58+ ~~all FC~~

ECS O_2 LOSS SUMMARY

:56
46:41 - STIR CRYOS.
46:42 - O_2 TANK 2 QTY XDUCER FAILED - WILL GO TO A EQUATION OF STATE QTY DETERMINATION MODE, USIN PRESSURE & TEMP DATA.

H_2 TANK Pressures HIT THE LOW M&W POINT A NUM OF TIMES AS SHOWN BELOW.

52:02 M&W ON H_2 TNK 1 LOW PRESS.
52:46 " " " " " "
55:52 M&W ON H_2 TNK 1 LOW PRESS.

~~55:50~~
55:52 O_2 TNK 1 PRESS = 900 PSIA
O_2 TNK 2 PRESS = 895 PSIA.

AT THIS TIME THE O_2 PRESSURES WERE DECREAS AND AT APPROXIMATELY HALF WAY THRU ~~RES~~ TH DOWNSWING. ~~(O_2 PRESSURE =~~

55:53 THE PRESSURE IN O_2 TNK 2 STARTED TO INCREASE RAPIDLY AND PRESSURE IN O_2 TNK 1 HELD ITS OWN.

55:54	O_2 TNK 2 PRESSURE =	945 PSIA
55:54:10	" " " =	954 PSIA
55:54:20		962 PSIA
55:54:30		971 "
55:54:40		992 "
55:54:50		1005 PSIA
55:54:52		1004 PSIA
55:54:53		1000 PSIA
55:54:57		998 PSIA ← RUPTURE
55:54:58		19 PSIA

Prop Isol Quad C shut

AT RUPTURE TIME, O_2 TANK 1 PRESSURE DECREASED AT A RATE OF 10 PSIA/SEC.

BUT, AT 56:46 THE O_2 TANK 1 PRESSURE DECREASE RATE SLOWED DOWN TO 1.7 PSIA/MIN. IT WAS CALCULATED THAT THE TIME OF O_2 TNK 1 PRESSURE = 100 PSIA IS 58:36.

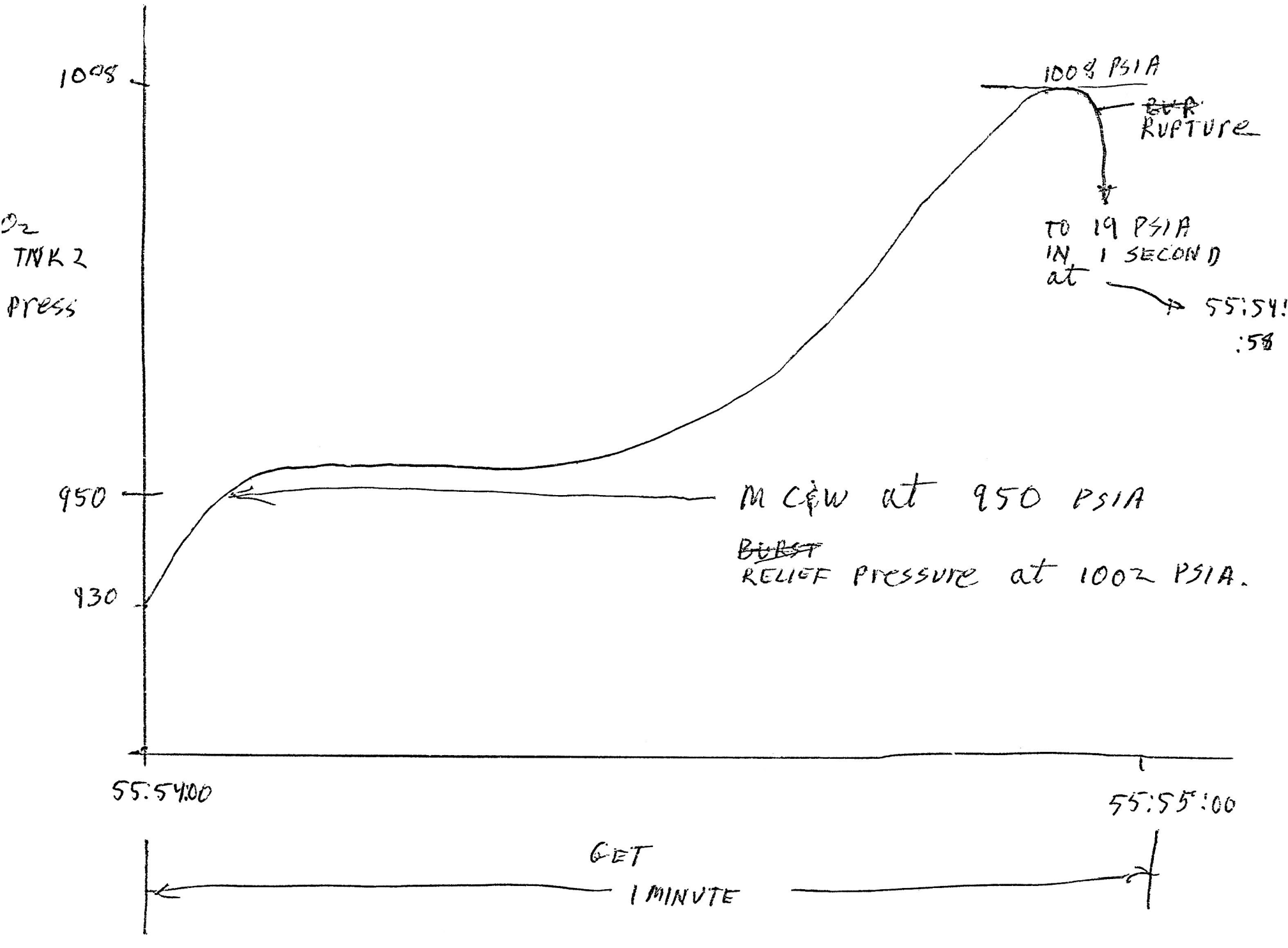
THE CREW REPORTED A BANG AT 55:54:55 AND HEROMED HEART RATE DATA VERIFIED THIS. CREW ALSO REPORTED GAS VENTING OUT OF SM.

55:55 NOTED NO SURGE TANK DROP.
SURGE P= 881 PSIA.
NOTED H_2 TNK 2 QTY → LOOKS LIKE LOSS OF AC
BUS 2.
EPS REPORTED FC PROBLEM.

56:12 WITH M. BUS B LOSS - NO H_2 or O_2 HTRS —.
NOTED SURGE TNK SLOWLY DECREASING.
PRESENT SURGE PRESS = 879 PSIA.

56:14 REQUESTED POWER DOWN EMERGENCY. L-S
56:20 SURGE PRESS = 870 PSIA
56:23 SIM STILL VENTING - BUILDING UP A RATE.

56:31 SURGE TANK STILL DECREASING.


1005
O2 TNK 2 press
950
930
1002 PSIA
RUPTURE
TO 19 PSIA IN 1 SECOND at
55:54:58
M C&W at 950 PSIA
RELIEF Pressure at 1002 PSIA.
55:54:00
55:55:00
GET
1 MINUTE

FLIGHT DIR MISSION LOG	DAY	REV	PG 104

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Pwr/Amplin –
66/12	Switch to voice
	(5) PS2 – Geometry –
	Other checks – ✓
	Optics – need CSM pwr
	Earth sun – after moon pass –
	Relates to SM/return
☆	(6) Landing Area versus Return time
	Tradeoff + SM jett –
	all needs addressing
	(7) Plan is for 79+30
	92 MCC-5
	140 MCC-6
	(8) Keep track of Crumbls – H_2O
	PLSS-CSM into LM/AH –
	(9) still need to work out LiOH arrangement
	LM canisters not enough –
	(10) ASC O_2 #2 goes hi – Use it occassionally
	(11) CO_2 scrubbing – CDR Hose to CSM
	(12) Urine dump in Side hatch – EECOM

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 105

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Dropping SM -
	PC+2 179°E
	4557 4797
	3σ ~~4726~~ low
	4726
	PC+1
	4463 300 fps ped 3σ low 4726
	for 118 return -
	50 to 160 fps MCC for 1° pitch -
	(13) Potable H2O - need to open surge to get drink.
	(14) Consider Comm duty cycle for AH
	(15) ~~177~~ FAO - Earth/Sun numbers
66/33	yaw 177° Fwd -
	(16) Telmu - Control - Min pwr proc for PS2 - AC to move ready radar -

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NASA — MSC

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 106

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Span things -
	GAEC - AGS aspects of PTC &
	Docked DPS -
	CM/ CSM
	MIT - PNGS
	Thermal - jett SM problems -
	cannot do -
	Sep Procedures - MPAP / 45
	Ham Standard -
	NAA - Verified recordings in //.
	-
	- Control modes / pwr -
	DMU heaters -

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG
			107

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	— Issues —
	1) What maneuver to perform at PC+2?
	a) Super fast return? PC+2 1½ 118 hours.
	b) Fast return? 142 hours. PC+2
	c) Free return? 153 hours.
	2) Super fast return pushes DPS capability to margin. Fast return is "unstable" Fast return is also less sensitive to misalignment.
	3) Alignment problem - should be able to get P52 with AOT in the shadow of the moon. If not, we should be able to do the 142 hour return with the present alignment with good results. People are also working on a method to align LM platform w/ CSM optics

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 108

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
66+50	- Gold Team On -
67+20	Conducted briefing of team - see previous page
67+29	Pull power amp CB. Mode function to down voice b/u.
	~~[illegible]~~
67+48	Told FAO to work on flt plan assuming a PC+2 for a 142 GET ~~[illegible]~~ landing. They are also deltaing the Docked DPS checklist as required from the first burn stuff
67+52	Asked Telmu to get the post PC+2 power down checklist into shape to inform the crew.
68+18	Fido Clearance at perilune: > 136 DC is ~~[illegible]~~ 74 hours 30 min is next traj update

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

PTC CHEATSHEET
(UNOFFICAL)

GIVEN THAT PTC IS RUNNING, CMC/AUTO, RCSDAP, P00, THE FOLLOWING HAPPENS

(AGC – CONSOLE 37)

ACTION	DB COLLAPSE	CENTER OF DB SHIFTED	CMC RATE DRIVE OFF
MOVE RHC		*	*
MOVE THC			
CMC→SCS→CMC	*	*	*
AUTO→HOLD		*	*
AUTO→FREE→AUTO OR HOLD		*	*
V37E XXE	*		*
V0X, V1X, V3X: NXYE			
V40 N20 E		*	*
V41 N91E			
V42, P5X			
V46E (RCS DAP)	*	*	*
V48E (R03)	*		
V49E (COMPLETED)		*	*
V47, V60, V61, V62, V63			
V64, V66			
GOTOPOOH FVV37 DISPLAY, INITIATED	*		*
V70, V71, V72, V73, V74, V82, V83, V85			
V89 (COMPLETED		*	*
V96	*		*

NOTES

1) LIST IS NOT COMPLETE

2) CMC RATE DRIVE USUALLY N/A SINCE ROLL JETS DISABLED

3) DB COLLAPSED NO PROBLEM IF P/Y JETS FIRST DISABLED

THERE, RECOVERY (GIVEN THAT CMC RATE DRIVE NOT NEEDED SINCE ROLLS JETS OFF):

1) IF DB COLLAPSED WITH P/Y DISABLED, REPEAT LOADING OF DB THEN ENABLE P/Y JETS

2) IF CENTER OF DB SHIFTED THEN WHOLE PTC PROCEDURE MUST BE REPEATED IF NEW CENTER

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

Procedure for Redesignate RR to NOT position

(1) CB(16) EPS - INV 2 - CLOSE
(2) PNL 14 INV SW - 2
(3) CB(11) RR(2) CLOSE
(4) RNDZ RDR - RELEASED
(5) RR - LGC
(6) V41 N72 E
+00000 TRUN
+28300 SHFT
(7) MONITOR WITH V16 N72
(8) CB(11) RR(2) - OPEN
(9) V44
(10) CB(16) EPS - INV 2 - OPEN

This will be worked into flt plan by FAO. Sometime prior to PS 2

FLIGHT DIR MISSION LOG	DAY	REV	PG 109

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
68+26	PTC maneuver complete
68+29	Any problem getting water out of pot. tank in CSM? Crew never answered!
68+30	FAO estimates 1 hour to get summary flt plan complete
68+35	Span - LIOH cannister procedure is is preliminary shape. All areas ~~[illegible]~~ are reviewing at this time.
68+37	Control has procedure for getting RR out of the way of the AOT.
68+39	CDR wants ~~[illegible]~~ proc. for repowering CSM when & if req.
	CMP wants to know when we are thinking about powering up CSM for entry. EI+2

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 110

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
68+45	Need to remove LiOH canisters from CSM loop to keep them from swelling and getting stuck. Will advise crew to do this a sleep shift change. We advised crew. Crew said they would do when Fred gets up.
68+57	Requirement for IMU Align at 69 hours has been waived. Still looking to see if we have to do it later
69+11	Using approx 1% per hour of RCS. Looks high.
69+14	Chet Lee needs some data for the President.
70+30	Results of mtg w/ all the boss: 1) We will do PC+2 for ≈900 fps 2) 142 hour landing at MPL 3) Will do a star check at 74 hours for alignment 4) Will do an earth-sun align if off more than 1°

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 111 (1)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

Summary of Notes

1. Q - Recommended 2 impulse Technique

2. - Recommended retain S/M
   - RCS S/M
     - 65 FPS docked
     - 100 FPS undocked
   - SPS Capability if necessary
   - Heat Shield Thermal Capability if necessary
   - Question of the LM DAP w/o the S/M

3. LM Electrical Power
   - Most Average 25A to Return at 143 hours
   - Can power down to 8A if necessary to Sustain Life
   - 2132 AH available at 59+00 GET.
   - Arabian computes 1752 Req'd, we added another 160AH due to keeping the platform up.

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

SITE/ACQ/LOS | FLIGHT EVENTS/HISTORY/BRIEFING

Open Items in Work

1. USE of LIOH Canisters
   - CSM Taped to Xfer Hoses
   - PLSS using PLSS Fans to Circulate (Saves LM Power)

2. Decisions on PC+2 MNVR
   - IF Alignment no good or if Lose LM PGNS Continue Flyby & Accept IOS Landing at 1 52 GET at 58°E.
   - Optional use of SPS for MNVR — I would recommend computing MNVR for PC+3, but would not recommend using it since we may have some Engine damage.
   - IF Alignment is problem could conceivably Compute A second MNVR at PC+2½ for LM — could consider using the Sun/Earth for Alignment

Note should use ~~Sun first FOV~~ is 5° then Earth FOV is 30°

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 113 (2)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

3. Arnie feels that they CAN use PGNS (About 25 AH) for a CSM PGNS Alignment prior to a ~~P~~ Normal Docked Alignment. Here I would recommend using CSM Power, but checking the CSM Configuration prior to bringing batteries on (K Mattingly is developing a checklist). You have a second option to use LM Power 17A Load Across the umbilical, but due to LM H_2O status I would not use it.

Note have 99 AH in CSM

CSM Pwr Req is

IMU Oper	6.55
CMC Oper	2.5
Optics	3.1
CMC AC (Htr	.75
Inverter	4.0
	16.90 A

Estimate 1½ Hours

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 112 (4)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	4. Watch the Burn Constraints on CSM-X RCS
	5. Separation Considerations • SMJC will not work since we have no Fuel Cell Bus power. Consider Performing Separation using LM-X (stay within Impingement), then pressurize the Tunnel & use pop-gun ΔV to separate.
	6. Tracking Plan Minimum. • Tracking thru 1st Impulse +2 hrs • Track 3 hrs prior to 2nd Impulse • Track after 2nd Impulse for 6 hrs prior to MCC5 • Track From EI-10 thru Entry

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

SITE/ACQ/LOS | FLIGHT EVENTS/HISTORY/BRIEFING

M. H_2O USAGE

20A LOAD 1800 BTU.
CREW 1000 BTU.
2800 BTU

- Estimate need to maintain AVERAGE of 2.8#/HOUR
- Estimate return sweat of .5#/HOUR
- Net requirement is for 2.3#/HOUR
- H_2O Available is

	230#/des
298 AVAIL	84#/ASC
200 REQ'd	314# TOTAL
98 RESERVE	-16 UNUSABLE
	298 AVAILABLE

- Bldg 45 is working on a Procedure for using PLSS H_2O in the ASC. TANKS this should provide ABOUT 16 more# of H_2O.
- To SAVE H_2O SUGGEST CDRs to some duty cycle with COMM/TM of ABOUT 10 MIN/HR.

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 116 (6)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
8.	CSM CAPABILITIES –
	• BATTERIES 99 AH – OK
	• O2 SURGE TANK – OK
	• MNA – OK
*	• MNB – PROBABLY OK
	• BATT A/B – OK
	• BATTRLY BUS – OK
	• CM RCS – OK
	• PGNS – OK
	• BMAG/SCS – OK
*	• PYRO BUS – PROBABLY OK
	• SM RCS – A & B – OK
*	• SM RCS – C & D PROBABLY OK
*	• SPS – I would not use the SPS, would accept the INDIAN OCEAN AT 152+00
9.	ARNIE is working a procedure for using CSM optics & CMC for aligning platform. CANNON & MATTINGLY are working up the procedure

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DYNAMICS CHANGE OF SHIFT

SHEET ___ OF ___

MISSION 13 DATE 4-14-70 GET 65:32:00

PHASE _____ REV _____ GMT ___:___:___

CURRENT

h_a _____ nm V_i 29778 ft/sec

h_p _____ nm GET_{pc} 22:21:31 h_{pc} 136.5 nm

Orbit Period _____ min h_{earth} 155648 nm

h_{moon} 27678 nm

MANEUVERS

☑ Predicted ☐ Actual Mvr DPS FLYBY GET 61:29:42.84 GMT ___:___:___ Rev ___ Over ___ ΔV 38.0 Thruster DPS Δt_B ~~30~~ M:30.7 sec	☐ Predicted ☑ Actual Mvr FLYBY GET 61:29:42.84 GMT ___:___:___ Rev ___ Over ___ ΔV 32.8 Thruster _____ Δt_B _____ M:30.4 sec	☐ Predicted ☐ Actual Mvr _____ GET ___:___:___ GMT ___:___:___ Rev ___ Over ___ ΔV _____ Thruster _____ Δt_B _____ M: ___ sec
PREBURN: h_a _____ h_p _____ POSTBURN: _____ nm _____ nm	PREBURN: h_a _____ h_p _____ POSTBURN: _____ nm _____ nm	PREBURN: h_a _____ h_p _____ POSTBURN: _____ nm _____ nm
NOTE: HCA = 60 ~~HCA = 136.5~~ HCA = 136.5 γ_{E1} = -6.53	NOTE: HCA = 136.25 γ_{E1} = -6.53	NOTE:

Prepared by Bill Boone

FLIGHT DIR MISSION LOG	DAY	REV	PG 117

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	5) Will do an AOT star check after LOS behind to moon
70+53	Briefed LMP on overall plan. He's got it!
	Got some Ranging - going back to Dn voice b/c. Pwr anyd-off
	LMP Drain hose will plug into PLSS Wants us to think about it - He's thinking -
	Dr. Paine wants to debrief the significant stuff prior to the FD's post shift press briefing. He wants FD and anybody else that has significant data to attend.
71+32	FIDO PCA now confirmed at 135 NM based on track during ranging.
	Jim McDivitt says no sweat on LM thermally at any attitude. The CSM aft heat shield thermal data looks marginal w/ respect to

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NASA — MSC

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

APOLLO 13

SNAP-27

The SNAP-27 fuel capsule is contained in a Graphite LM Fuel Cask (GLFC) reentry body attached to the LM descent stage. The GLFC is designed to protect the fuel capsule on reentry into the earth's atmosphere from earth orbit and lunar return trajectories. The GLFC has been analyzed and tested to verify its capability exceeds the lunar return reentry conditions presently anticipated.

If the LM descent engine is used for the final midcourse correction the LM will reenter at approximately the same atmosphere earth reentry point as the CM. The higher drag of the LM will cause it to fall short of the CM impact point. The LM will break up and release the GLFC to impact as a free body. The exact impact location of the GLFC will depend on the final trajectory, but will be 300-500 miles uprange from the impact point of the CM. If the GLFC lands in open, deep ocean, as expected, it will immediately sink, making recovery impossible. Seawater corrosion tests and dispersion analyses indicate that deep ocean disposal is perfectly acceptable.

FLIGHT PLAN UPDATE	
TIME	ITEM
74:00	PERFORM AOT SUN CHECK
	USE DETENT #2, CENTER SUN IN AOT
	GIMBAL ANGLES
	R 339.2
	P 180.0
	Y 089.9
	FDAI ANGLES
	R 270.3
	P 090.3 ~~90.3~~
	Y 290.8
	R1 +.45498 } UNIT ~~VECTORS~~ GOOD FOR 74:00
	R2 +.19024 }
	R3 +.08250 }
	Note: IF SUN CHECK IS UNSUCCESSFUL, A SUN-EARTH IMU ALIGNMENT WILL BE PERFORMED @ 75:00
	1. USE P52 TO MANEUVER TO ATT, DURING MANEUVER MONITOR ROLL GIMBAL, BE IN ATT BY 73:50
	2. TO SET-UP P52 USE PLANET OPTION
	3. LOAD DAP N46
	R1 ~~(32000)~~
	31120

FLIGHT PLAN UPDATE

TIME	ITEM
75:00	EARTH-SUN IMU ALIGNMENT:
	USE AOT - DETENT #2
	SUN:
	(N88)
	GIMBAL Δ — FDAI Δ — ½ UNIT VECTORS
	R 339.2 — R 276.6 — R1 +45483
	P 184.2 — P 101.2 — R2 +.19053
	Y 087.5 — Y 290.9 — R3 +.08262
	@ 75:00 GET
	EARTH:
	(N88)
	GIMBAL Δ — FDAI Δ — ½ UNIT VECTORS
	R 339.2 — R 205.3 — R1 +.32120
	P 308.6 — P 143.3 — R2 −.34155
	Y 143.6 — Y 326.3 — R3 −.17370
	@ 75:00 GET
	NOTES
	1. USE PSZ TO MNVR TO ATT. DURING MNVR, MONITOR ROLL GIMBAL ANGLE. BE IN ATT FOR SUN BY 74:50
	2. USE PLANET OPTION TO SET UP THE P 52

FLIGHT PLAN UPDATE

TIME	ITEM
66+00	Using the earth & Sun
	we would like to
	perform a P52 AOT
	realign, &
	ATTITUDE FOR ALIGNMENT
	ON ~~Earth's~~ SUN:
	Gimbal ∡ R 318.0 P 251.2 Y 56.8
	Ball ∡'s R 301.3 P 205.6 Y 321.5
	ATTITUDE FOR ALIGNMENT
	ON EARTH:
	GIMBAL BALL
R	~~223.5~~ 318.0 R 223.5
P	295.9 P 128.3
Y	161.8 Y 346.6
	half unit vectors
	SUN R_1 +.45615
	R_2 +.18785
	R_3 +.08146
	EARTH R_1 +.31847
	R_2 −.34317
	R_3 −.17550

MSC Form 1190 (Apr 65)

FLIGHT DIR MISSION LOG	DAY	REV	PG
			118

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	jettisoning the service module.
71+42	Retro - we are within 4 fps of free return at 90 hours based on latest tracking
	~~RCS Control~~ -
	Control - see RCS status on previous page.
72+28	Configuring for good comm to update AOT, sun check procedure
72+29	Control has inputs on DAP deadband, V62 → Mode II needles at zero for a mark would be accurate.
	CB11 flight display CDR FDAI to ~~Strike FDAI L's on PAD~~ get Mode II needles
	Passed RR redesignate Procedure

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NASA — MSC

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 119

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Briefed on how to get AOT lamp on.
72+57	Another PTC change.
	~~[illegible]~~
	Won't need AOT lamp for Sun check
73+12	Parking the radar
73+23	In new PTC attitude
73+27	FIDO says PCA is holding at 135 NM solid.
73+32	Starting maneuver to sun check attitude
	Sun check passes approx 1/2 diame to the right of the cross hair.
73+52	<'s for burn attitude
	R_1 YAN 271
	R_2 PITCH 355
	R_3 ROLL 330

MSC FORM 1441 (APR 66)

NASA — MSC

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	TO WIDEN DB TO 5° (DOCKED DAP)
	V21N01E 301 1E 44E
	TO ~~WIDEN~~ RETURN DB TO 1.4° (DOCKED DAP)
	V21N01E 301 1F 200E
	THIS PROCEDURE IS RECC. TO SAVE FUEL ON THE ATT. HOLD ~~FOR~~ periodic 1/4 rotation PTC method currently in use. AGC

MSC FORM 1441 (APR 66)

FLIGHT DIR MISSION LOG	DAY	REV	PG 120

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Much trouble getting to bum attitude
74+35	Going back to down voice backup - power amp - off
	When he does 90° yaw - do it in ~~[illegible]~~ PNGS - auto

MSC FORM 1441 (APR 66)

NASA — MSC

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 121 (2)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
(5)	Working on a Procedure for Platform Alignment on LM using CSM Optics

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NASA — MSC

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY 72+44 / 4/14/70	REV	PG 122

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
—	Pre Shift Summary —
**1.	Brief crew on future plan — i.e. sometime toward end of shift review consummables/times/options
2.	How accomplish subsequent MCC
3.	Develop last Ditch option for 3rd Impulse
	• Dump S/M
	• Accept IOS Landing
4.	Setup Sked for Spt Functions
	• PTC ✓
	• LIOH
	• Comm/TM
Went to PTC 5.	Review Drifting flight RCS Plan.
*7.	Requirement for CSM IMU Htr Power.
8.	Burn Monitoring Procedures
	• C/O Limits
	• Rate/AH
	• RCS
	• PGNS/AGS SWO

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 123

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
X	9. Do we have an Acceptable Alignment technique so that we can power LM Platform Down. i.e. use of CSM Optics
1/w	10. CSM Configuration should be setup ASAP. — i.e. Set into known config. then delta.
	11. Perform PC+2 ΔV 900 fps MPL at 142+00 • Sun check at 74+00 — • Perform Earth Sun Align if off more than 1°
Yes	12. Has Bldg 45 Given the CM a clean bill of health MDB/PyroBus/SMRCS C&D
	13. Plan all subsequent P-52 etc using the Sun/Earth — forget stars.
1/w	14. Look at RCS Conservation procedures — D/B —
	15. Look at H_2O Xfer from ~~LM~~ CSM.

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG | DAY T. England | REV Lion Peterson | PG Telemu Thorsey Control 3

124

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
74+46	Post Burn Tracking
	Requirements ← Fendell
	& FDO working -
	Tig 79+27+40
	ΔV 848.2
74+55	Reading Crew Checklist
	Changes for docked DPS
	Burn Cont 2HR Activation
75+03	Advised ~~burn~~ crew that
	when they perform 90°
	Yaw for PTC, use X Axis
	override in PGNS Auto vice
	Att Hold - otherwise they
	will establish a new null
	for db & move out of
	burn att.
	Schedule PTC Mnvrs so
	that we will end up in
	Burn Attitude at time
	of STAR check.
75+12	Brief discussion on Takeover
	Rules - crew concurs in
	shutdown - we will discuss
	the Manual AGS with
	crew in M.R. summary -

MSC FORM 1441 (APR 66)

NASA — MSC

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 4 (125)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING	
	Note: ALL Shifts - there is a MGMT Review with All Bosses in Dir Conf Room after every shift Change - TAKE KEY GUYS & Brief on	
	1. Current Status	
	2. Action this shift	
	3. Next shift DATA	
75+21	Ready for SV & TAT - POO & DATA -	
	PC+4 Trg 81+30	
	AV 870	
	- HBR -	LBR
	VDL C/B - P11	- open
*	PRI P/A C/B - P16	- open
	Voice - Voice ✓	- DN B/O
	RNG - RNG ✓	- OFF
	T/M BR - Hi ✓	- LO
	POO & DATA	
75+38*	Bldg 45 Concurs, w the C.L. update & Advises that we do not need to perform PTC from now	

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	to the Burn.
75+24	Readings the crew the Mver Pad —
	Dure readings C.L. to Engle in simulator for a final verification of DPS Burn Procedure.
75+33	Advised crew to configure for the P-27 update
75+36	HBR DATA — for P-27 S.V. & TGT.
75+43	Computer is his
	No PTC req thru Burn
	RCSA 71% |
	B 72% | No usage wd db. —
	DPS Prop - 1973 fps
	Telmv O2 Des 49# 87%
	.25#/HR
	H20 - 62% | ~~168~~ 238
	4#/HR
	AH - 1663 total
	25A Avg

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 6 (127)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Crew working on list of things they have pitfered from the ~~LM~~ CSM & are using in the LM that must go back across to CSM for entry.
76+33	Mission Rule Review DPS
	1. The DPS burn is the same as LOI mode I
	2. Monitor Limits – cutoff Pc = 85%/7700 bd at FTP Inlet 150 ground/160 on bd Fu/Ox AP > 25 ground call Attitude ±10° } except during throttle up Rates 10°/sec } Gimbal Fail
	3. Loss of Auto Eng-On without violation of above limits • Village • Man Throttle 10% • ~~PRO on Flash~~ V97 • Eng Start PB – Push • Des Eng Cmd Override

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 7 (128)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	4. If shutdown during burn a small MCC will return you to a free return
	5. ~~If~~ Terminate burn for MANUAL TAKEOVER w AGS
	6. Terminate for ISS WARN with-MSTR ALARM LGC WARN CES DC WARNING Inverter WARN after SUD
	7. Free return @ 152+02 after MCC #5, IOS recov
	8. No Trim Req
	9. If shutdown earliest MCC will be at Pc+4 Also if no burn will sked for Pc+4 with AV Increase of 24 fps over Pc+2
76+42	Crew Readback was OK
	Crew entering moon shadow, stars coming out.
76+44	Close des reg at 10 sec TGO on Des Reg #1.

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 8 (129)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
76+23	Crew can give us a Cursor & Spiral on Shala & Nonke.
76+50	20°R, 20°P, 100° out of burn Attitude, is proceeding to make the make V49 number to burn attitude.
	D Scott – concerned over the Alignment, Suggest Surface Align P-57, with 2 stars in FOV. Have done in the simulator set sfc. Flag, Req Att Hold,
77+00	Crew discussing the AOT star check, looks reasonable — but they were about 3° off Attitude.
77+06	– ≈ 2 min till LOS, All looks Good —
77+08	LOS —
	Note: Windler is sleeping at Home

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG
			9 130

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
77+23	FAO & GDO say that the STAR/window data we gave the crew was bad.
	Power down will leave us • LBR T/M • S Voice • Gly Pumps • Suit Fan • Cabin Repress • RCSMAN ATT C+I (15 min delay for normal use) • Onbd EPS & ECS Readout we will watch All Systems on T/M
Impact Time	Note: NO CWEA
77+56+27	S-IVB shud be out of our way.
77+3H	AOS - Systems OK. A/G Voice seems a bit better - ~~Crew~~ HAVE TAKEN TRAJ update - working on PAD's shud make 78 HR update -

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 10 (131)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
77+40	Standing by for Activation — should be starting in about 30 minutes —
77+43	Activation — you requested about 1+15 previously, & we concur feel that this is a crew pref item.
77+46	— Guido estimate based on sun check data — sez that we shod be aligned within about 1/2 degree.
77+49	+ Advise crew that the COAS data, and sun data we gave them previously was wrong for burn attitude — we will go on sun data.
77+56	Final Mnvr PC+2
	079+27+38 GET

ullage		ΔV_x +833.0	hp 20nm
2 jet	10"	ΔV_y − 50.9	
CSM	62480	ΔV_z − 213.9	
LM	33452	TB 4+24	
5"	@10%	FDAI 272 R —	
21"	@40%	081 P —	

MSC FORM 1441 (APR 66)

NASA — MSC

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
77+56	LM Impact really stroked the recorders. Impact time 77+56+40.025
78+03	Added c/L Item to close He Reg #1 at T&D -10 sec. Expect to run 38-40 amps for MNB Bus for the Burn
78+09	Crew on Activation #3 —

See next pg

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 1D 133

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
78+19	POO & DATA for S.V & TGT LOAD FINAL.
	Crew feels that we have AN ACCEPTABLE EARTH-SUN ALIGNMENT CAPABILITY AS A BACKUP
	Verify RNG function SW to RANGE —
78+22	NOW RUNNING 40 AMPS
Act 13	AGS Body Axis Align
	~~Crew still using~~
	CO_2 PP 7.6 mm Hg leave for switching to sec CANNISTER —
TIG-1	D/B NARROW * 1.4°
78+25	Decided to keep the SBAND P/A up (3A) thru the P-30/P-40 work.
78+30 *	DAP weights are loaded Crew, completed P-30 & has cycled to P-40.
III	Could slip TIG if necessary About 30 minutes — would not PRO on A FLASHING 99, Proceed when desire to MAKE burn.

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 13 (134)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
78+40	Crew queried whether to move TIG up 30 min — we said no — we just advised them that burn was not time critical.
78+45	Advised all FLIGHT controllers that we would power down at C/O +5.
78+55	Reviewed ground rules with the Control/Guido/Telemv. TIG -30.
79+04	Note: Moon should be in CDR window at 15° on LPD at TIG —
79+09	Crew reports that moon is in proper position on LPD. Lovell can see mount Marilyn —
79+14	— SPAN advises use APTC. — Berry advises 15mm Hg — Advised SPAN to tag up.

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 14 (135)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
79+18	GO FOR BURN —
	~~BF~~ checklist OK
	DPS ARM
	AVGG
	Ullage
79+27+40	+X
	IGN
	40%
	stable
	FTP
	+60 — OK
	Throttle man to 100% as
	Backup
	1+45 GO —
	DPS — OK
	2+45 GO —
	50 A Current
	3+30 She Peaked
	3+45 GO —
	Remind des Reg 1 off
	at 10" —
79+32	Shutoff
	Disarmed
	AVx+1.0
	y+.3
	—

MSC FORM 1441 (APR 66)

NASA — MSC

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT PLAN UPDATE

TIME	ITEM
①	GUIDANCE CONTROL - PGNS ✓
②	MODE CONTROL - ATT HOLD ✓
③	V76 E ✓
④	MANEUVER TO PTC ATTITUDE RO, P90, PRESENT YAW (V16090)
⑤	AT ATTITUDE MODE CONTROL - AUTO
⑥	V16 N20 MONITOR RATES
	LESS THAN .1°/SEC IN ALL AXES
⑦	DISABLE +X THRUSTERS with ✓
⑧	V25 N07 E
	1257E
	252E
	1E
⑨	V77E
⑩	V48E
[redacted]	DAP 22110 PRO
	V34E
⑪	V16 N20 MONITOR RATES
	LESS THAN .01°/sec IN ALL AXES
⑫	V76 MODE CONTROL - ATT HOLD
~~⑬~~	~~V25E~~
⑬	30 CLICKS YAW RIGHT
	3# RCS

USE BLACK BALLPOINT PEN	SPAN / MISSION EVALUATION ACTION REQUEST	USE BLACK BALLPOINT PEN

TIME MINUS/GET)	REQUEST ORGANIZATION	RESPONSE ORGANIZATION	CONTROL NUMBER
76:13		EG	CL-87

ACTION REQD BY (TIME): | REQUESTER

SUBJECT: PTC PROCEDURE POSTDOWN

THE ENCLOSED PROCEDURES ARE RECOMMENDED FOR PTC.

THE PGNS IS RECOMMENDED AS PRIMARY WITH THE AGS AS AN ALTERNATIVE OR BACKUP

APPROVAL

TEAM LDR: [signature] TIME 75:10

CON SR REP: [signature] TIME :

ME MANAGER: SCY TIME 75:45

SPAN MGR: DAN TIME 76:36

RESPONSE:

Procedure is concurred to for PGNS initiated PTC - Not for USE with AGS.

George L Silver
MIT/DL

CONCURRENCE

EOD REP: [signature] TIME 77:21

SPAN MGR: DAN TIME 77:22

TEAM LDR: TIME :

CON SR REP: [signature] TIME 76:36

RESPONDER

ME MANAGER: TIME :

[signature] MIT 77:19 hrs

SPAN MANAGER: [signature] TIME 77:22

Form 1214B (Feb 70) (OT)

NASA — MSC

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY. .IEFING
	Primary answers
	1. GO TO PTC attitude
	2. Remain in PGNS AUTO 10 min ✓ WAIT till .1°/sec
	3. Disable +X thrusters
	V25N07E
	1257E
MIT PROCEDURE SRK	252E
	1E
	4. V77E
	5. V48 LOAD 22110 in N46E PRO, V34E
	6. Wait 15 min - ~~[illegible]~~ .005/.007
	7 V76E PGNS - ATT HOLD:
	8. 30 (PULSES) clicks in YAW - RHC
MIT PROCEDURE	(BUILDUP RATE TO .3°/sec - .5°/sec)
NOT MIT RECOMMENDED PROCEDURE	9 If used for post burn PTC OPEN QUAD TCAs
	Note: Ajt failed on for 3 sec during step 6 will break the docking tunnel!

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 15 (136)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Advise crew we will use A PTC —
79+34	Readoff the procedure FDO Tracking thru the burn — LGC Clocked the burn to within .1 sec.
	*
79+39	Advised crew we would perform A PTC. Initial residuals small — Looks like we got A good burn.
	PTC Attitude —
79+42	090 pitch, stay At present yaw Angle, 0 roll.
79+44	Reading up the Pwr down checklists. • Inco/Telmo tag up was poor on the Power down list.
	Evans/Rossa & EECOM are working on the CSM Std Config And Entry Checklists, & Entry Checklists.

Tindall will also work on it.

MSC FORM 1441 (APR 66)

NASA — MSC

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 10 (137)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
80+11	— Powered down to 23.8 Amps.
80+14	— Started mvr to PTC Attitude. Much discussion on how long to damp rates & the technique for damping.
80+18	- Expect to have a good answer on the TRACKING of the burn — Remove roll with ITCA Crew will let, ignore P & Y & concentrate on Roll.
	PCO2 Tripped — ECS right, need some decision on use of LIOH.
80+43	long time getting into the PTC —
	LiOH 15mm HS PRIMARY Crew switchover. Recommend that we don't bring Biomed data on for the sleep period

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 17 (138)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
80+52	S/C is Rolled 10 Roll, ≈ 28° out in Pitch +
	Crew really having problems setting Attitude —
80+57	looks like we are finally in Attitude the PTC took approx
	Reading 24° out in pitch, the real x
81+11	went to Att Hold —
	Mode control - Auto.
	starting to damp rates
Todo	HIOH —
	Comm —
	Brief on Cows —
	Rates < .1°/sec @ 81+17
	starting into
	V25 N07E
	125 7E
	252E
	1E
	V77E
	V48E
	22110 PRO
	V34E

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 18 (139)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	TOTAL ≈ 60 HRS
ELS	1498 AH REMAIN @ 81+24
	with 61 HOURS REMAINING
	IN FLIGHT
	◉ Expect to be able to
	maintain 14A for
	majority of T.E.
	except for MCC.
	◉ 24.5 A or less gives
	VS AVG Power for return
	• Expect about 500 AH
	reserve @ EOM
H2O	215# usable @ 25A using
	4.3 pph
	@ 14A using
	3.2/2.7 pph
	Must average 3.5 pph
	SPAN wants A Ops Reserve
	of 20 pph -
	Also have reserve of
	using PLSS ETC
LiOH	- 16 CSM CANS X 12 HOURS
	- LM Canisters - 44 HRS remaining

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
O_2	.36 pph 44# Total
	Des + Asc.
	≈ 120 Hours of O_2
RCS	A 62% — } * | 314 total
	B 62% — }
	— 2% used for PTC — less 13%
DPS	ΔV DPS 1190 fps
	~~ATB~~
CSM EPS - 99 AH	

So have 49% usable

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 19 (140)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Crew Talking about the LiOH Mod procedures. they think that they have a reasonable handle on how to use CSM LiOH.
81+43	Have processed 1½ MCC @ 104+00 of about 6-8 fps ~~expect TFF to set smaller~~
81+45	Providing the crew a Briefing on the Consummables MCC$_5$ ≈ 4-6 fps *
81+58	Crew described the Initial conditions of the Failure.
82+01	Reading the crew the Power down Checklists — Make a master for FD Console.
82+04	Read the crew the Comm Procedures —

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG
			20 (141)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
82+17	Started power down — down to 16A at 82+20. 14.8A at 82+21 VARYING from 13.5 to 15.5
82+19	8° HALF CONE ∠ for PTC* WORKING GOOD
	E.I 142+39
	V_E 36211
	γ_{EI} 6.51
	MAJOR WORK ITEMS —
	① CM Config
	② Orientation for MCCs
	③ MNB Verification.
	④ H_2O X for procedures
	LMP WATCH
	CMP
	Sobscove
	Brief consumables
	RTG — West of IP
	About 3 crew

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT PLAN UPDATE	
TIME	ITEM
81:00	EAT PERIOD - ALL
82:00	CMP AND CDR
to	REST PERIOD
88:00	LMP
to	REST
94:00	PERIOD
94:00	EAT PERIOD -ALL
94:30	CMP AND CDR
to	REST
100:30	PERIOD
100:30	EAT PERIOD -ALL
103:00	POWER UP LM SYSTEMS
	PREP FOR MCC-5
104:30	MCC-5
105:00	EAT PERIOD
106:00	CMP
to	REST
112:00	PERIOD

X5186 (AEC)
REMINI

APOLLO 13

SNAP-27

The SNAP-27 fuel capsule is contained in a Graphite LM Fuel Cask (GLFC) reentry body attached to the LM descent stage. The GLFC is designed to protect the fuel capsule on reentry into the earth's atmosphere from earth orbit and lunar return trajectories. The GLFC has been analyzed and tested to verify its capability exceeds the lunar return reentry conditions presently anticipated.

If the LM descent engine is used for the final midcourse correction the LM will reenter at approximately the same atmosphere earth reentry point as the CM. The higher drag of the LM will cause it to fall short of the CM impact point. The LM will break up and release the GLFC to impact as a free body. The exact impact location of the GLFC will depend on the final trajectory, but will be 300-500 miles uprange from the impact point of the CM. If the GLFC lands in open, deep ocean, as expected, it will immediately sink, making recovery impossible. Seawater corrosion tests and dispersion analyses indicate that deep ocean disposal is perfectly acceptable.

CURRENT STATUS OF APOLLO 13
SNAP-27 ENTRY PLANNING
AS OF 4/14 1900Z

1. The reentry considerations for the Graphite LM Fuel Cask (GLFC) impose no constraints on the flight operation for the free return or the 142:00 GET entry options.

2. Data are desired to help in predicting the projected GLFC impact location. The data needed are as follows:

   a. LM weight at entry interface.

   b. LM configuration (gross).

   c. Trajectory information to define entry interface parameters.

   d. Best estimate of GLFC impact point.

3. The AEC and their support contractors will also run entry analyses to study impact locations and entry environment for the GLFC. The AEC will conduct/coordinate any post-impact sampling or recovery operations they determine necessary.

4. The AEC jointly with NASA Headquarters has released a response to an inquiry from the PAO concerning the SNAP-27 entry.

E.O. - G.D. Griffith

Concurrence:
William C. Remine AEC-ZS-5
Robert T. Carpenter AEC HQS
J.R. Bailey MSC-PPD

APOLLO 13 SPECIAL STATUS REPORT
April 14, 1970

GET: 75:00

COMMUNICATIONS

CSM:

Between 55:14 and 55:46, the CSM was operating on the high gain antenna with S-band transponder, two S-band power amplifiers, premodulation processor, audio centers, FM transmitter, and TV camera energized. The FM transmitter, television camera, and one power amplifier were secured at 55:46. The high gain antenna was switched to the manual mode at 55:56 and power to the high gain antenna was removed at 57:20. The power amplifier was turned off at 58:15 and the CSM communications system was completely powered down at 58:40. No changed in communications system performance was noted during or after the incident.

LM:

Initial acquisition of the S-band signal from the LM occurred at 57:58. Initially, the LM was configured with the signal processor assembly, S-band transceiver, S-band power amplifier, and both audio centers energized. Performance of the LM communication system has been nominal. The only changes to the original configuration have been turning the DUA and the S-band power amplifier on and off. The power amplifier operations are summarized below.

PA On	PA Off
57:58	61:45
66:11	67:34
70:53	71:05
72:28	73:03
74:18	74:35
61:52	64:04

THERMAL

Docked configuration - Hatch open and probe stored.

Modified PTC being utilized.

LM RCS heaters in "Auto".

CREW SYSTEMS

CM ECS - All ECS is completely powered down. Surge tank and repress package are isolated with approximately 860 psi residual (approximately 6.5 lbs. total). Primary water glycol system was left with radiators bypassed. Indicated water tank residuals

are 18.0 lbs. in waste tank and 37.5 lbs. in potable tank. Recommendation had been made to remove the (2) LiOH elements from the cannister but transmittal to crew or crew action is unknown. LiOH elements #1 thru #6 have been used; elements #7 thru #20 have seen no duty.

LM ECS - Descent stage water is 273.6 lbs., ascent stage #1 and ascent stage #2 contain 42.3 lbs. each. Predicted water remaining at splashdown at GET 142:47 is $7\frac{1}{2}$ lbs. in each ascent stage tank.

The descent stage oxygen tank indicates 43:48 lbs. and more than one half of this is expected to be remaining at splashdown.

The CO_2 level is 1.7 mm Hg with $49\frac{1}{2}$ manhours on the original primary cartridge. Nominal rating is 41 manhours indicating a better than rated cartridge or a lower metabolic rate than 520 BTU/manhour at which the cartridge is rated. An additional primary and 3 secondary cartridges are available with a nominal rating of 56 manhours.

Total power level is currently at approximately 780 watts and is in agreement with the planned power profile at this time. A lower power level is planned following the DPS burn at GET 79:00.

ECS equipment currently operating:

Suit-compressor	6.3 amps (177 watts)
Glycol pump	.96 amps (27 watts)
CO_2 sensor	$\angle$0.1 amp
ECS displays	$\angle$0.2 amp

After power down the same ECS equipment will continue to operate.

GUIDANCE AND CONTROL

CM:

Subsequent to the power failure at approximately 57:50, the IMU, computer, #SCS were completely powered down. This status continues at the present time.

LM:

The LM IMU, LGC, SCS, AGS were powered up. The LM IMU was aligned. Performed DPS burn, later powered the LGC down to standby. Powered AGS down to ASA heater power only and SCS was turned off. Before

the sun check at about 73:00, the LGC and CDR's FDAI were powered up and remained up until maneuver to the burn attitude was completed. At this time, the CDR's FDAI was powered down. This agrees with our present configuration which is IMU in operate, LGC in operate, and ASA heater power on.

INSTRUMENTATION

LM:

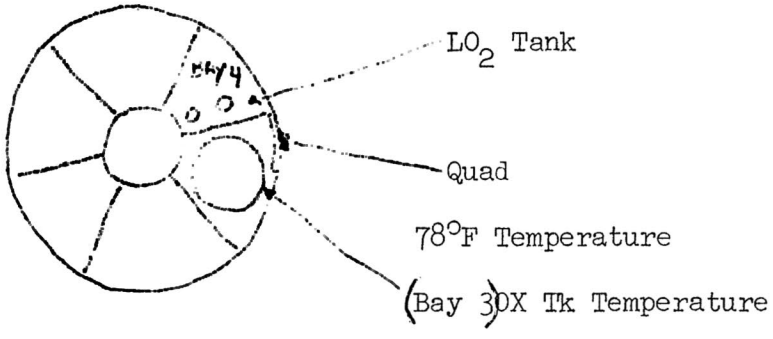
The LM operational instrumentation subsystem was powered at 58 hours with certain equipment left off to conserve power and water usage (caution and warning [CWEA], data storage electronics assembly [DSEA] were left off). Most transducers, the signal sensor fuse assembly, both signal conditioners were powered. Certain transducers (PQMD) were not powered up. From initial power until the present 74 hours the operational instrumentation has been performing nominally. (Note-one RCS pressure switch in the thrust chamber failed on during initial RCS firings and has remained in that state.

CSM:

At the time of the intial problem with fuel cells, the CSM operational instrumentation subsystem was performing nominally. The following measurements exhibited decreases during the period GET 055:50:00 through 056:24:00.

SA2378T (Bay 3 OX Tk Surface Temperature 77.7°F to 66.6°F
SR5067T Temperature Engine Pack C 134°F to 97°F

It should be noted that these temperature transducers are located in the general region of the fuel cell LO_2 tanks



The subsystem was powered down and performed nominally up to and through the deactivation.

DISPLAYS AND CONTROLS

CSM:

The caution and warning system initially indicated at 55:54:56 a main Bus B undervoltage. This was first crew indication of spacecraft problem. A review of data on the O_2 tank #2 pressure (SC0038P) indicates the pressure reached the expected caution and warning alarm point of 975.7 psia at approximately 55:54:28. The nearest master alarm occurred at 55:54:56 (28 seconds later). Present data indicates no MA occurred for the O_2 tank #2 high pressure. Included is matrix of known master alarm that occurred just before or during the CSM problem. Data is being reviewed to determine causes during the crew trouble shooting of spacecraft problem;there was no report of any anomalies associated with the displays and controls subsystem.

All CSM displays and controls subsystem hardware (lighting, caution and warning, timers, etc.) were powered down.

There is no known command module displays and controls hardware problems.

Master Alarm Occurrances

ON	OFF	SECONDS
55:23:15.000	55:23:23.000	8
55:52:30.000	55:52:34.000	4
55:54:56.000	55:54:59.000	3
55:57:39.000	55:57:45.000	6
55:58:1.000	55:58:3.000	2
55:58:6.000	55:58:19.000	13
56:00:5.000	56:00:7.000	1
56:00:37.000	56:00:39.000	1
56:02:55.000	56:03:13.000	18
56:17:52.000	56:17:59.000	7
56:19:59.000	56:20:1.000	2
56:20:13.000	56:20:15.00	2

LM:

After initial LM power up all displays including lighting were deenergized, about 59:00 GET. Since that time, the only known displays turned on was the CDR FDAI and CASTA at GET 73:00 and this remained on until approximately 74:10.

POWER DISTRIBUTION AND SEQUENCING

CSM EPS - At approximately GET 55:55:50, a main Bus B under voltage alarm occurred and a Main Bus A under voltage alarm at approximately GET 55:58. At GET 55:57:44, main Bus B voltage went to 4.0 volts and AC Bus 2 went to zero. Crew positioned FC1 to main Bus A and FC 3 to main Bus B with no change in F/C 1 and 3 current. Fuel cell talkbacks indicated GRAY (showing fuel cells connected to the bus). Crew put ENTRY Battery A on main Bus A (paralled with F/C #2) at approximately GET 56:03. Crew then took fuel cell 1 off main Bus A and current dropped from approximately four amps to zero amps (indicating the fuel cell motor switch had been closed and now opened). Later crew put inverter number one on AC Bus 1 and 2. At GET 56:32 Battery A was disconnected from main Bus A. At GET 57:27:11 Battery A was put on charge and taken off charge at GET 57:48:54.

At GET 58:04 Battery A back on main Bus A and back off at GET 58:40. At that time, AC Bus 1 went off due to loss of main Bus A voltage. No CSM power sources on buses.

Main Bus A and AC Bus 1 and 2 were verified to be still good. Suspect that Main Bus B is also good.

LM EPS - The EPS was powered up to provide requirement to support a DPS burn. The GPI was cycled to conserve energy. Average current levels varied from 25 amps (GPI off) to 30 amps (GPI on). Bus voltage has been maintained above 30 volts. The status of bal cross tie C.B. is uncertain but no problem exists presently.

After DPS at 79:00 it is planned to power down to approximately 18 amps to conserve energy.

PROPULSION AND POWER

CSM

SPS - All propulsion system parameters were nominal before and after the fuel cell anomaly with no noticeable effects due to the anomaly. A structural temperature measurement on the oxidizer

storage tank did drop at the time of the cryogenic anomaly but no corresponding tank pressure decay was noted prior to CSM power down. No SPS configuration changes have taken place since the anomaly.

CM RCS - The status remains the same as before the anomaly: unpressurized and ready.

SM RCS - Initially, all four quads were active. At approximately the same time as the anomaly, several SM RCS status flags went barber pole. These were reset; however, barber poles again occurred; some of which evidently could not be reset when the system was powered down. All SM RCS heaters were deactivated when the system was powered down. At last data, pressures were steady and normal.

Cryogenics -

H_2 Storage: It is assumed that the H_2 tanks are both venting properly. The H_2 pressures were 227 and 236 psia on tanks 1 and 2, respectively at GET 56:00:00. The tanks could be expected to vent at approximately 63 hours GET and vent continuously at approximately .03 16/hrs/tank.

O_2 Storage: For events prior to 61:47 GET, see attached status. At the present time, the following areas are being considered:

(a) The mode of tank failure is still being investigated.
(b) The LOX compatibility of materials within the cap. probe are being rechecked.
(c) Investigation of ignition sources in LOX is underway.
(d) Test efforts are in planning to investigate the failure modes.
(e) The prior history of the system is being gathered.
(f) All data from KSC is being datafaxed in.

Fuel Cells -

The fuel cells performance and operation was nominal for the first 55 hours and 57 minutes of the mission except a condenser exit temperature oscillation at 6-9 degrees occurred on fuel cell 3 from GET 30:52 to 40:12. At GET 55:57:44 the fuel cell 3 current dropped below 10 amps and undervoltage occurred on Bus B connected only to fuel cell 3. At GET 55:58:48 the fuel cell 1 current dropped to zero. These fuel cell events followed the failure of oxygen tank 2 at GET 55:54:52. By GET 56:14 fuel cells 1 and 3 had been taken off line. Fuel cell #2 remained in operation

until GET 57:58:06 at which time available oxygen pressure had dropped to 61 psia. No fuel cell operation has occurred since GET 57:58 due to complete loss of the oxygen supply. Reactant shut off valves on all fuel cells are closed.

CM Batteries -

CSM Pyro Batteries and LM ED Batteries: No change. No data. No reason exists to believe there is any problem with these batteries. They are (and were) on no-load.

CM Entry Batteries:

(a) At 54:00
Battery A - 35.77 AH remaining. Carrying parasitic loads.
Battery B - 37.77 AH remaining. On charge.
Battery C - 38.89 AH remaining. On no-load.

(b) At 55:51
Battery A - 35.65 AH remaining. Carrying parasitic loads.
Battery B - 39.92 AH remaining. Just off charge, - carrying parasitics.
Battery C - No change

(c) At 56:03
Battery A - on Main Bus A. Off at 56:32

(d) At 57:27
Battery A - on charge for 0.741 AH. Back on Main Bus A at 58:04.

(e) At 58:40
Entry batteries removed from all CSM loads, including parasitics. Capacity status was:

Battery A - 20.51 AH remaining
Battery B - 39.67 AH remaining
Battery C - 38.81 AH remaining
TOTAL 98.99

SSR total at this time was 97.99 AH, which we have been using since then.

LM Batteries:

Ascent Batteries - Unused still. Minimum of 296 AH available/battery, or 592 AH.

Descent Batteries - These batteries have supplied all LM/CSM power since approximately 58:23*. Consumables info as of 74:30:

Battery	AH_o	AH Remaining
1	92	308
2	97	303
3	160	240
4	146	254
TOTAL	495	1,105 AH

LM:

APS - No APS data was available till after fuel cell anomaly at which time all system parameters were nominal. At 74+30 all parameters are still nominal. No configuration changes have been made to the APS since liftoff.

DPS - All DPS parameters have been normal since the anomaly last night (GET 56:00). The DPS was pressurized with the ambient helium start bottle at approximately GET 61:20 and no problems were encountered. A 32 second DPS burn was performed at GET 61:30 to obtain a free return trajectory. This burn was performed satisfactorily. The SHe heat leak incurred an increase in rise rate subsequent to this burn. Preburn rise rate was 6.9 psi/hr. Postburn rise rate stabilized at 11.5 psi/hr after 2 hours and still remains at that level. This increased rise rate will not cause excessive SHe tank pressure for subsequent DPS burns.

RCS - The LM RCS was inactive when the anomaly occurred. All quads were activated at 58:15. All quads remain active with heaters in the auto mode.

Pyrotechnics:

Possibility of damage to firing lines to the three CM-SM tension tie cutters by shrapnel from the #2 oxygen tank has been investigated and can be discounted. The firing lines penetrate the CM aft heat shield about one inch from the tension tie with the system A and B lines penetrating separately. They are well protected from below by the blast shields surrounding the tension tie cutters; only about twelve inches of each line is below the heat shield and each line is a twisted, shielded pair. Additional protection is obtained from the thermal blanket (30 layers of 1.5 mylar), equipment mounted on the SM forward bulkheat (one inch honeycomb). Further protection is afforded one cutter by the three fuel cells and a one inch honeycomb shelf; another by a radialbeam and propellant tank; the third by the centrally mounted helium bottles.

The CM-SM guillotine firing lines pass directly into the CM by the umbilical bundle and could not be damaged by oxygen bottle explosion. A guillotine has recently been fired at -20°F; it cut the umbilical bundle and penetrated 0.10 inch into an aluminum block. NR is attempting to fire two guillotine tests at -50°F on April 15, 1970.

Sidney C. Jones

GET 78:35

Scott H. Simpkinson

80:00

FLIGHT PLAN UPDATE

TIME	ITEM
(1)	GUIDANCE CONTROL - PGNS
(2)	MODE CONTROL - ATT HOLD
(3)	V76 E
(4)	MANEUVER TO PTC ATTITUDE
(5)	MODE CONTROL - AUTO
(6)	V16 N20 MONITOR RATES
	LESS THAN .1°/SEC IN ALL AXES
(7)	DISABLE +X THRUSTERS
(8)	V25 N07 E
	1257E
	2527E
	1E
(9)	V77E
(10)	V48E
	DAP 22110 PRO
	V34E
(11)	V16 N20 MONITOR RATES
	LESS THAN .01°/sec IN ALL AXES
(12)	MODE CONTROL - ATT HOLD
(13)	V76E
(14)	30 CLICKS YAW RIGHT
	- wait shortly -
	Then power down PGN

Torq-U + −
Torq-V
Torq-W

+ firing in jet seconds

I
change of Torq U V P of .2 jet-second in + and then −

II
.014 jet second + and then −

*

APOLLO 13

Fourth Daily Report

(51 hours to 75 hours)

The Apollo 13 lunar landing mission has been aborted because of the loss of cryogenic oxygen and the resulting loss of capability to generate electrical power in the command and service modules. A 30.4-second descent propulsion system midcourse correction maneuver of 37.8 ft/sec was performed at 61:29:42.8 to place the spacecraft on a free-return circumlunar trajectory with an altitude at closest approach to the moon 136.75 nautical miles at 77:21:31. An additional descent propulsion system firing of 4 minutes 24 seconds will be performed at 79:27:38. This firing will result in a velocity change of 860.0 ft/sec with the time of landing at 142:39:49 at 165.00° west longitude and 21.38° south latitude. The velocity and flight path angle at entry interface, as a result of this second maneuver, will be 36 210 ft/sec and -6.51°, respectively.

Fuel cell and cryogenic system performance was nominal until 55:53:42 when an unusual pressure rise of 9 psia in oxygen tank 2 was noted during a 26-second period. The pressure continued to rise to approximately 1008 psia in an additional 62 seconds, at which time the tank vent valve opened. Six seconds later the pressure had decreased to 999.9 psia and two seconds later (55:54:52), the pressure had decreased to 9 psia. Two minutes 52 seconds later, an undervoltage condition occurred on bus B which was powered by fuel cell 3. Four seconds later, fuel cell 1 current dropped to zero. Concurrent with the abrupt loss of oxygen tank pressure, oxygen tank 1 pressure showed a rapid decrease of about 373 psia in one minute and 14 seconds. Fuel cell 1 and 3 were removed from the line about 18 minutes after the anomaly. Fuel cell 2 remained in operation for about 2 hours before the oxygen pressure in tank 1 had decreased to 61 psia and the fuel cell was removed from the line. As a result of these occurrences, the command module was powered-down and the lunar module was configured to supply the necessary power.

The command module environmental control surge tank and rapid repressurization package have been isolated and have about 860 psia residual oxygen (6.5 pounds). The lunar module environmental control system is maintaining cabin pressure in both spacecraft. About 358 pounds of water are remaining in the descent and stage tanks. Available oxygen in the descent stage is 43.5 pounds.

The pressures and temperatures of the command and service module propulsion systems were satisfactory until power-down. At the time of the rapid pressure loss in oxygen tank 2, a structural temperature measurement on the oxidizer storage tank in bay 3 dropped 10° F in about 15 minutes. No corresponding oxidizer pressure decay was noted prior to powering down the command and service module instrumentation system. At

about the same time as the loss of cryogenic oxygen, several service module reaction control system propellant isolation valve status indications in the cabin went barberpole. The lunar module propulsion systems are within nominal limits and are operating satisfactorily.

The lunar module primary and abort guidance systems have been powered up and were used to perform the descent propulsion system firing to place the spacecraft on the translunar free-return trajectory. These will also provide guidance and control for the second descent propulsion system firing.

At the completion of total power-down at 58 hours 40 minutes, 98.99 ampere hours remained in the three entry batteries. At 75 hours, over 1100 ampere hours remained in the lunar module descent stage batteries and 590 ampere hours in the two ascent stage batteries.

All lunar module systems are operating within nominal limits.

Donald D. Arabian
Evaluation Manager

MSC Form 750 (Apr 70) NASA — MSC

APOLLO 13 PROBLEM TRACKING LIST

ITEM NO.	VEHICLE CSM	VEHICLE LM	DESCRIPTION	ACTION IN PROGRESS	ACTION ASSIGNED TO	STATUS	ESTIMATED COMPLETION TIME
1	X		Suit pressure transducer reading approximately .5 psi below cabin pressure.	1. Analysis of failure history. 2. Similar to Apollo 12 post flight test.	Spence/NR	Open	June 15
2	X		Potable water quanity reading - reading erratic. Dropped approximately 20% at approximately 22:42:50, then returned to 100%.	Similar to previous flight experience - expect contamination on transducer wiper.	Hurt/NR	Open	
3	X		40:00 GET - Optics coupling display unit fluctuating 0.16 degrees in zero optics mode.	Similar condition on Apollo 12 flight test being developed to isolate servo loop affects from readout effects.	Hanaway	Open	
4	X		O_2 Tank 2 Qty went to Off scale Hi GET 46:45. Cabin meter confirmed as Off scale Hi by crew at GET 47:42. Problem occurred after the Cryo fans were activated.	Transducer failure modes are being evaluated.	Ferenson/ NR	Open	
5	X		Oxygen tank 2 pressure dropped to zero psi at 55:54:52. Oxygen tank 1 pressure began to decay at the same time, dropping 373 psi in 1 minute 14 seconds.	Task team has been established to investigate the occurrence.	D. Teagarden	Open	

GET 80:10
1004

PC+2 BURN GUIDELINES

1. IF NO MANEUVER - FREE RETURN TRAJECTORY WITH LANDING AT 152:02:00 AFTER SMALL MCC5 (INDIAN OCEAN) (MCC5 = 4 FPS @ 93 hrs)

2. IF NOMINAL MANEUVER EXECUTION FREE RETURN TRAJECTORY WITH LANDING AT 142:46:30 AT MPL

3. NO TRIM REQ'TS

4. IF SHUTDOWN DURING MANEUVER SUBSEQUENT MCC REQ'D WITH EARLIEST POSSIBLE EXECUTION TIME OF PC+4

5. IF NO MANEUVER BUT STILL DESIRE MCC - WILL ATTEMPT PC+4 - ΔV INCREASE OF 24 FPS. LANDING AT MPL AT 142:46:30

6. EXPECT NEW PADS, STATE VECTORS, & TARGETS AT APPROX. 78+00+00. FOR PC+2.

FLIGHT DIR MISSION LOG	DAY	REV	PG 21 (142)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
82+37	LM Power now approx 12a - crew told
	FIDO - track plan - DC shortly - by 83+00
	Guido - not much to do except support the MCC + entry studies
82+47	all prop temps except DPS plus ASA and Pippa temps also Quad temps - | can be monitoring
82+48	New Venting out of #1 window ~~#1 window~~
	plus 1 chunk of metal 4" sq - loose
~~82+49~~	lots of particles out of LM window (not heavy)
82+50	really can't say Venting is new although did not see this from LM before
82+52	told Fred about comm, RCS preheat requirements, C+W status, temp monitoring on ground.

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

Crew: Vance this is Jack.

Ground: Go ahead Jack.

Crew: Let me give you my observations on Main Bus B, things happened pretty fast there and we first heard the impact or explosion or whatever it was, I'm not sure, about one second later there was a master alarm which was a Main Bus B undervolt. I looked at the voltage and the voltage was good at this time so I'm suspecting that it was a spike. Fuel cell three was also good with good flow, however, Fred at that point was coming into the Command Module and got over into his seat, at that time we shortly had an AC Bus 2 lite, about the time he got into his seat he looked at the Main Bus B and the Main Bus B was reading zero. However, in the fuel cell flows were zero. I'm kinda suspecting that perhaps we do have a good Main Bus B, but, thats merely a guess. I never did try to reset it, we were having other problems with Main Bus A having an undervolt and a few other things like that. I would kinda like to hear what your feelings are down there.

Ground: Well, Jact we copy your information and we would like to hold off because we are still working the problem so we will have to give you information later.

Crew: Thank you.

Ground: Aquaris _____ request _____

_____

Crew: Vance are you back with me.

Ground: Roger, we are with you.

FLIGHT DIR MISSION LOG	DAY	REV	PG ~~22~~ 143

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
82+54	PCO_2 – now 11 ppm
	12.5 on board
	Venting still coming out – #1 window
	– y and 2 axis
82+57	Jack thinks level is 1/3 to 1/2 that
	seen at time of F/C problem
	Jack has 250mm lens
	Fred has – #Hasselad SFC camera
	also Resseau – handy handy
83+01	may have sleep problems if try to
	do it out of CM window
	Will not do the camera
	L1-OH ① Switch @ 15 on Crew gage
	② Change Primary as soon as
	③ that
	④ go to Bio med Rt –
	⑤ give O/B reading every 30 min
	Consumables at 0900 ☆
	particularly O_2

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 23 (144)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	f-5.6 @ 1/250 focus could change f stops surface Hasselblad
	FAO - Flight plan Entry data priority
83+30	Hardware restart - now on DSE
83+31	Latest from Grumman has the AGS unstable for controlling DPS Pete Frank should be aware ★
83+31	3RD machine now up
83+35	MCC5 now 7 fps -
	Do we want to do MCC5 @ 144 hrs if PTC is good ★
84+00	PTC - degrading - earth lower, Moon higher - now than later

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 24 (145)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
84+07	PTC - Earth + moon now back in
	PCO_2 - 13.8 O/B (Ours 12.8)
	PTC - Earth [redacted] higher Moon lower
84+16	earth center LPD - 4 moon center LPD 21 PTC antenna @ 82 hrs 13 min/rev @ 84 hrs 13 min/rev
84+27	earth center - 6 on LPD
84+39	Earth - now 1° on LPD
	antenna Rate 13 to 11 min/rev
84+43	Moon center - 2° LPD
84+50	earth 18° LPD
84[redacted]51	0900 z Dept Pago Pago (18 APR) 2300 z - Arr Ellington
84+54	Moon - -17 to -20 on LPD

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 25 (146)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
85+00	Thrusters - look in good shape hardly any color change
85+01	earth LPD 42
85+03	Brief comm loss - due to attitude
	Moon -14°
85+08	Landing data
	local time 0800 - can either
	stay on board overnight or COD
	off earlier - 14 hr flight Back to
	EAFB
	Wx - 5' waves wind 270/15 KT
	10 NM Vis 10% showers
	LPD - earth 32
85+22	LPD earth 24
85+23	- Change LiOH - to Secondary
~~85+27~~	PCO2 dropped rapidly to 6.0
	then slowed down but still dropping
85+30	LiOH change Complete 4.5 on PCO2

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	ABORT PLANS FOR 104 hrs
	① - JETT SM - DPS 2900 fps
	land 132 hrs @ 18°W
	② DOCKED - DPS 1100 FPS
	land 138 hrs @ 98°W (OFF EASTER ISLAND)
85+32	earth LPD = 8°
85+37	Moon LPD = 42
85+49	Weather Status - Watch out for HELEN - Not moving as fast as Prog said —
85+50	PCO_2 4.2
85+51	Lovell up - Cold in CSM Haise to the sack
86+14	Lovell asked for people to work on stowage for entry
86+17	PCO_2 now 4.0 to 4.1

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 27 (148)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
86+17	Bio med switch off – voice better
86+33	Block data plan – get No Comm MCC on Board for ~~MCC~~ EI – 8 hrs
86+34	AOT – #4 detent – can see particles
	Light rear reticle –
86+35	before could see from CSM Window #1 small particles – some force
86+36	Fido cannot pick up venting on doppler
86+41	earth LPD 10°
	PTC Still looks Good – 11 min/Rev
	GNC Says Not to turn IMU heaters on until entry – SPAN is still fumbling around –
86+46	moon LPD 24
86+47	P_{CO_2} is 3.6 and Still dropping

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 20 (149)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
86+54	LPD on moon 22°
86+59	earth -2° LPD
87+04	moon LPD 10°
87+09	MCC procedure
	↑ AGS (ball)
	Manual burn
	Att Manual control
	Start Stop Manual
	Now shallow
	from dark side - must thrust in direction of sun
	— Power up AGS
	AGS 8 ball
	For attitude -
	Coas in front window
	Manual to place earth in
	front S/C -out Z axis
	Manually rotate to get
	earth in center of Coas -
	~~Coas~~ crescent up with
	points down
	put points of crescent on y
	axis

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 29 (157)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
87+04	– ↓ Roll S/C 90° to get right attitude
87+08	↑ points of crescent on y axis and on center of earth will take care of pitch and yaw
	Mode control to Att hold, roll pulse, pitch pulse, yaw mode control
	TTCA Central
	Engine Gimbals off
	Manual start + stop
	Ullage Buttons 10 sec
	ags align to get ball zero zero
	then ~~agl~~ ags align
	400+5 then 400+0
87+17	MCC, Block data up –
	Jim Understands it is for loss of Comm
	He also remembers it from Apollo 8
	Entry Pad up –
87+35	Battery charging data(?)
	a) it costs 4 to 5 amps to get 1 into Batt
	b) it costs .2# H_2O per hour to get 15 amps into CSM
	c) We are 20 amp hrs down in CSM Batts

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 30 (157)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
87+48	Water transfer procedure available with EECOM (Not checked by me)
87+48	Procedure to power up CSM MN B is available with EECOM
87+50	SPAN has preliminary schedule for powering up items in CSM for entry – waiting to see if LM power and water available
87+51	Wx to Jim
87+52	Lengthy discussion about AGS procedure to get to attitude – both Jim and Control happy – also guido + Capcom
87+56	Go to Single CP @ 0500 CST for maintainence – afraid to put C machine on line for dynamic standby
87+57	PCO_2 now 3.3 – almost steady
	Should look at Water management – ie – Deplete Descent tank ? completely

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 31 (152)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
88+14	MCC5 - still @ 7 fps
88+16	Venting not showing up in doppler must be less than .04 fps
88+24	Antenna switching rate now 9 min/rev INCO looking at each antenna for difference
88+29	thinks PTC is diverging in pitch - asked if we could suggest a way to re-initialize - we said no - there are no plans to change -
88+53	Water transfer procedure calls for depleting Descent tanks, ~~tanking~~ using mostly ascent water, @ 10% hook 1 plss to connection so it will flow when ascent tank is exhausted - after using the plss - the old one could be recharged from CSM
88+57	Venting coming from more than one spot -
89+06	Jack + Fred still asleep -

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 32 (153)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Shift Briefing
(1)	Consumables - (Items)
(2)	No Comm pad E1-8 hrs up to S/C. + Alignment Technique -
(3)	Save remaining PRI LM Canister, use CSM with hose/bag connections -
	Run up to 15 on this secondary -
	DOGHOUSE PROCEDURE
(4)	WX in RCY Area - (AVOIDANCE MCC)
(5)	MCC-5 GET TIME
(6)	MCC-5 BURN CHECKLIST - ESTIMATE -
(7)	ENTRY ARRANGEMENTS - HWT -
(8)	MN B.
(9)	PWR TO CSM FROM LM
(10)	PLSS STORY + H_2O FROM CSM (AVAILABLE BUT NOT TO CREW) → (USE ALL PESC FIRST UNTIL ΔP GOES DOWN)

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 33

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	(11) CSM CONFIG SQUARE #1 - WHEN
	(12) KRANZ - WHITE TEAM - CONCENTRATE WITH REST OF TEAM -
	(1) L/OH STORY
	(2) CM SWITCH CONFIG - SQUARE #1 for ENTRY C/L START
	(3) MN BUS B CHECK - ??
	(4) MCC - S 104 vice 110
	(5) CM → LM PWR. / PROCEDURE -

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 34

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	BLACK TEAM BRIEFING - on @ 90 GET
	(1) 3.8 mm -
	CSM cannister / Readup
	Procedure is to use before last PRI
	cannister -
	7.6 mm chargeout -
	(3) For Emergency - CSM POWER FROM LM
	15A)
	Have it -
	Need for LOH procedure
90/09	↑ 2 Cannister
	gray tape
	2 LCG's (bags from them)
	Cardboard Cue CARD (cutoff 1"
	from rings)
	(2) Square L/O Config
	Sometime Today.
	(4) Discussion - MNB -
	(5) MCC - S / 104 → 118 /

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 35

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	☆ (6) NEED WX STORY ON -
	Get me later
	(7) EI-8HR - PAD / ONBOARD
	SUN / EARTH TERMINATOR / -
	Checklist → Estimates -
	(8) WHITE TEAM - NOON -
	☆ (9) PLSS - how to do
	(10) MSC-5 / 7 fps -
	RETRO -
	MCC-5 7 → 9 fps @ 118 TIG -
	ENTRY PREPS - JETT -
	FIDO - GUID - CONTROL
	PLSS H2O PROCEDURES IN WORK -
	ONC - EECOM - Repress Pack Readout -

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 36

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
90/21	↓ Material Gathered / Putting back on headset -
	Cut LCG outer bag - along heat seal -
	Remove inner bag / Cut inner bag along heat seals -
	Stow it conveniently -
	Cut tapes for use -
	Wrapping tape -
	Cue Card -
	Stuff up bypass hole -
	Covered w bag - Trim bag at bottom - Tape -
90/25	Saw John O'neill going To C/C - Told him my interest in getting c/c done in Time To verify in LMS + Read up for crew consideration
90/32	FAO/ ACS PTC c/c - Get early // Control
	need well before use

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FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

Mgmt Brief

filled the format

SHIFT BRIEFING 90 hrs

1. CONSUMABLES 90 hrs (0715

LiOH - WORST CASE - 1 PRI CART.
LASTED 27 hrs - NOW ON SEC EXPECT
TO LAST 2.25 hrs
OTHER LM LiOH REMAINING - 37 hrs (GET 129)
CSM LiOH REMAINING - 168 hrs

CSM LiOH BEING TRIED NOW -

H_2O_2 - NEXT WORST

188# - USABLE REMAINING 15# UNCERTAINTY
2.7#/hr - PRESENT RATE 15# PLSS
4.7 - 87:30
3.2 - 89:00
70 hrs remaining - GET 160 hrs

O_2 41.6 # REMAINING
.31# RATE (COMPARES WITH CSM RATE)
134 hrs REMAINING GET 224 hrs

BATTERY POWER 1330 AMP HRS REMAINING
12.5a PRESENT RATE
106 HRS REMAINING GET 196 hrs

2. COMMUNICATIONS — ANTENNA SWITCHING BY CREW
97% GOOD DATA, FAIRLY STABLE
MOTION ABOUT 10 MIN/REV

3. TRAJECTORY - MCC_5 ABOUT 7 fps @ 104 hrs
9 fps @ 118 hrs
CREW HAS DPS MCC @ E1-8 hrs ON BOARD
WITH ALIGNMENT PROCEDURE
ΔV = 19 fps B_T 39 SEC 10% THROT
MCC_5 TRADEOFF - GOOD PTC vs RETURN TO CORRIDOR

4. WEATHER - MEDIUM - TROPICAL STORM NOT
MOVING AS PROGGED

5. MCC_5 DETAIL PROCEDURES
ENTRY PROCEDURES
CSM POWER UP PROCEDURES
CSM ITEMS TO BE POWERED BY LM
AGS PTC
} IN WORK

6. POWER TRANSFER TO MN B
MN B CHECKOUT
PLSS WATER TRANSFER FROM CSM
CSM INITIAL SWITCH CB CONF
} AVAIL

7. NEW VENTING SEEN BY CREW - NO EFFECT ON DOPPLER - ALSO 4" SQ METAL PIECE OF METAL NOT RELATABLE TO H_2

8. CREW REST
CDR 3 HRS (MAYBE MORE)
CMP 9 HRS (ASLEEP NOW)
CMP 8 HRS

RETURN TO EARTH STATUS 90 : 22 GET

PRESENT TRAJECTORY

hpc _____

V_{400K} —

GAMMA $_{400K}$ —

hp 78.9 → 82.6

LAT_{IP} _____

$LONG_{IP}$ _____

GET _____

FUEL CRITICAL MCC

GET I 104:00

DELTA V 7

LAT_{IP} 21:40S

$LONG_{IP}$ 165:22W

GET $_{400K}$ 142:40:31

~~BLOCK DATA ONBOARD~~

PE	GET I	DELTA V	GET 400K	LAT_T	$LONG_T$	UPDATE @
	95:00:00	2900	128:57	24:44S	32:15E	on African
	100:00:00	2900	130:46	24:42S	4:45E	at 1 off African
	105:00:00	2900	132:31	24:42S	21:28W	
	138:43:00	31	142:41	21:35S	165:19	
onboard	134:59:42	19.3	142:41	21:37S	165:22W	
	118	282	143:26	21:30	176W	
	118	72	142:51	21:36	168W	← for weather avoidance if desired (moves west) 180 miles
	@ 104	↑ would be less				
	105 →	39 fps			168	

FD

USE BLACK BALLPOINT PEN

SPAN / MISSION EVALUATION ACTION REQUEST

USE BLACK BALLPOINT PEN

TIME (T-MINUS/GET)	REQUEST ORGANIZATION	RESPONSE ORGANIZATION	CONTROL NUMBER
83+25	FOD	45/MER	C-92

ACTION REQD BY (TIME): ASAP

REQUESTER FLIGHT (WINDLER)

SUBJECT: S/M VENTING

APPROVAL

FOD REP [signature] TIME 83:30

SPAN MGR [signature] TIME 83:39

At 82+50 CREW REPORTED OBSERVING VENTING FROM THE SM APPARENTLY ORIGINATING BETWEEN THE -Y & -Z CSM AXES. (OBSERVATION MADE OUT THE #1 WINDOW). Intensity ABOUT 1/2 TO 1/3 OF ORIGINAL VENTING DURING O_2 ANOMALY. WHAT IS YOUR OPINION AS TO ORIGIN OF VENTING?

RESPONSE:

CONCUR

TEAM LDR [signature] TIME 86:53

CON SR REP [signature] TIME 88:44

ME MGR [signature] TIME 88:48

SPAN MGR [signature] TIME 89:30

ECS - H_2O & H_2O-Glycol tankage and lines in SM, however doubt if these could vent visible amounts. R.F. Hunt

CRYOS - Based on the data from the H_2 tanks when data in the CSM was terminated, venting was estimated to begin at approximately GET 63 hours. The flowrate expected would be approximately .06 lb/hr total. Based on the quantities remaining at data termination, it should take over 300 hours to completely vent the tanks. Venting should be approx. continuous and the flowrate would be so small that it should not cause disturbing torques. The H_2 vent location is approx. 180° away from the fuel cell sector (approx. at + Y axis) and is near the SM/CM interface (venting is through the fly away umbilical while on the pad). (Vent location is at Beam 1). HAW.

SPS - Fuel Relief valve

Not likely since high temperature required to raise pressure in the

RESPONDER

(Continued)

FOD REP MF Brooks TIME 89:52

SPAN MANAGER J.R. Sevier TIME 89:53

MSC Form 1214A (Feb 70) (OT)

NASA — MSC

SPAN / MISSION EVALUATION ACTION REQUEST
(CONTINUATION SHEET)

(PLEASE USE BLACK BALLPOINT PEN)

TIME (T- MINUS / GET)	REQUEST ORGANIZATION	RESPONSE ORGANIZATION	CONTROL NUMBER
83 + 25	FOD	45/MER	C-92

tank to reflief valve setting (225 psia) Tank pressure and feedline temps were normal at last reading (GET 58:06) before CSM power-down. MMW

CM RCS -

No CM-RCS helium or propellant tanks in -Y, -Z area. Possibly propellant line but these lines are well protected behind heat shield. MMW

SM RCS-

Propellant Line Failure - Not indicated as systems were performing normally up to the time data was lost.

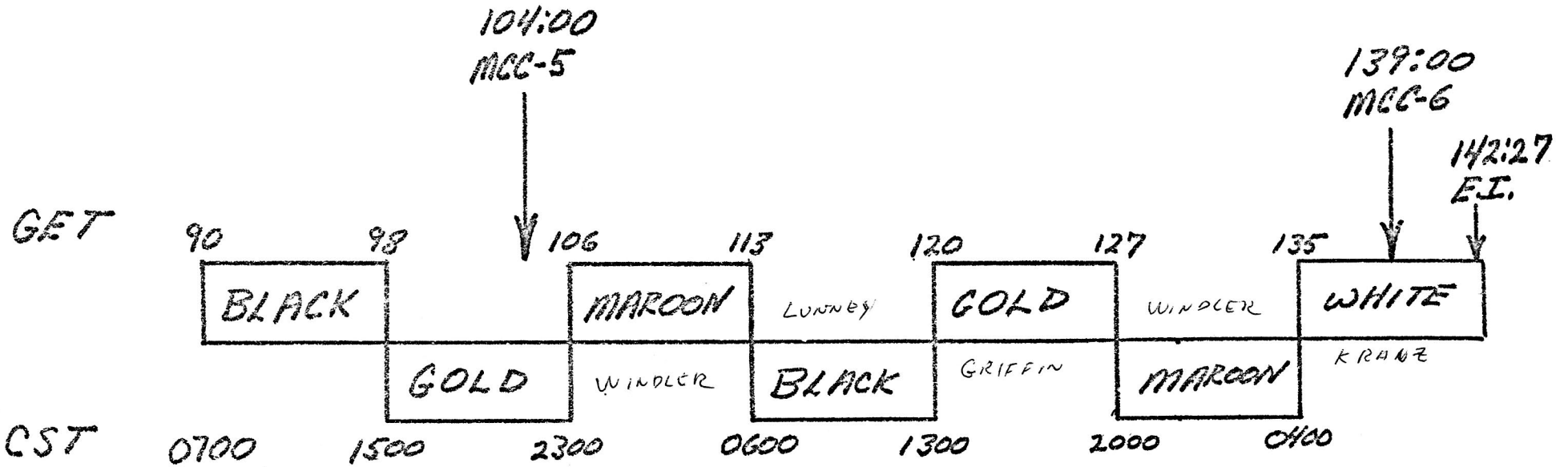
Propellant Relief Valve - Not likely since temperatures were within limits up to the time data was lost. MMW

CM Vents - Three other vents are located on the CM aft end near the SM interface: (a) steam vent duct, (b) urine dump nozzle, and (c) an air vent. None of these areas should be venting as the steam duct has been shut off; crew would know if urine dump nozzle was in use, and air vent is normally used to vent air from toroidal area of CM during launch to relieve A pressure. This area contains the reentry control system propellant and pressurization modules. AMS

In summary, we can make no conclusions at this time. Recommend CSM be powered up for short period of time to look at temperatures and those systems that are suspect. See C-95 for details of instrumentation power up procedure.

The desirability of powering-up CSM instrumentation is questionable at this time in view of the consumables situation and the fact that LM must still be powered-up for two more Burns. The issue will be considered today and a determination made if the situation warrants it.

J.R. Sevier



Apollo 13 Revised Shift Schedule

4-15-70

FLIGHT DIR MISSION LOG	DAY	REV	PG
			$37

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Slip hose thru hole - Tape good -
	↓ Hose on its side versus dn -
91/06 Telmo	Want to go to 7.6 now and know we're done with it -
	4.6 now - 1/2 hour estimate -
	To get 7.6
	Then use CSM canister /w
	hose to suit loop -
	Try PLSS into ASC H2O so as to avoid special procedures at end
91/12	↑ Want to hold off connecting to suit loop until 7.6 -
	Set up second canister until 7.6.
	next item we have is Square 1 checklist
	↓ Launch C/C ?
	↑ Yes, we have marked one up -

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG
			38

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	MCC-5
	104 24hrs after 79+30
91/15	↓ On hose, shouldn't it be working -
	↑ need more suit loop things -
	e.g. need to close cabin dir return
	etc
	All room positions - need to firm up TIG
	for MCC-5 - Get PROS/CONS LAID OUT -
91/20	EECOM - NR will have in 2 hours
	whether it's req'd to put bats
	on bat busses -
	Concern for motor switches
	at lo Temp -
	May request closing those
	switches now - w CB to close
	for sat watch

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 39

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Wx - Estimate 3 o'clock here
	(GET 9 hours) for a
☆	recon report on the weather
	in the Key area -
	To decide on TIG Time +
	weather avoidance ΔV -
91/42	Telmer 2MCC - 76 AH Δ GET 204.
	6 hrs lifetime Δ
	- H_2O 14# Δ 160:30
	5 hr lifetime Δ
	Jack Knight Considering Using PLSS early -
	ASC H_2O will take about 30 hours -
	@ 2.5#/HR
	Then we can try PLSS's -
	Have to empty both water tanks to
	Try PLSS H_2O xfer procedure -
	So we have to decide soon -
	Another 20# available for instrument
	~ 8 hours

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG (40)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
91/53 → To	↑ L/O checklist - Modified -
	On TIG time -
	Retro would like not to have
	to do a weather avoidance ΔV because
	it may force a MCC-7 which he does
	not like from timeline considerations.
	So if we are going to do a weather avoidance
	we should be as sure as practical.
	(at 118, costs ΔV 71 fps to move 3° west)
	Also AGS known checklists
	availability.
	168 165
	?? weather -

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 41

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
92/07	Control - Just found that out from him -
	She will go @ 107 hrs -
	blowdown ΔV is ——— .
	She went will probably blow PTC
	So it looks like only tradeoff is
	weather - ΔV assurance etc -
92/26	TELMU - Suit loop changes to Caplan -
	Agrees with them —
92/32	60 min -
92/46	↑ Jack over to CM with switch
	list -
	Chilly in CM -
92/52	E/ AA/ Want to activate motor
	switches
	Get procedure - do at end of Jack config

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 4

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Work - Will activate motor switch -
92/58	↑ Have procedures stdg by for CSM comm.
93/00	↓ Condensate Containers - Is it completely airtight for zero g?
☆	FDO will answer -
	834 fps blowdown on DPS w̄ she about to go -
	107 ± 1 hr on She drive - effector PTC -
93/28	↑ CSM Connectors -
	To Cap Com - Try Biomed Sw see if it effects voice -
93/45	↓ Jack back in LM
	Rd 3 procedures stuck in holes -

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 43

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	WX –
	last recon – no real consistency
	in winds –
	Not organized to be anything –
	Prog is that it doesn't get to T.P.
	5° away – 170°
	T.P = 165° W
	1700 CST next recon report –
	Conclusion is – No weather avoidance
	MVR at this time
93/55	↓ Cannister setup ~~in~~ ~~fair~~ clear
	1 in tunnel / 1 in LM –
	Setup blue boxes
	4' or 5' different – in lengths
	in tunnel –
	Telm – Get me a sketch of lines +
	cannisters –

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG (44)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
94/00	on CSM cannisters now –
	.5
94/02	.7
94/03	.8
94/03	↑ Pnl 225 – CB changes –
	↑ (2)
	Then BAT/BUS procedures
94/05	.7 CO_2 –
94/08	.6
94/10	.5
	1 Exception to List as read
94/10	Pnl 382 – H_2O Accum valve in
	Left = off position –
	FAO – EECOM + putting one on
	☆ Reminder about Cannister/stowage
	for entry.
94/14	.4 CO_2
94/15	Control Shift in rise rate on She tank
	Looks like rise rate is increasing

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 45

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
☆	Report on CSM elec -
94/19	250 | 32.3 A
	CB | 37.0 B
	↓
	225 CB's - Bats IV MNB.
	36.0 A 0 Amps -
	37.0 B 0 Amp
	All breakers pulled
94/25	Deo F/O X prop Temps -
	Push in 1 CB -
	Vehicle has thermal short w DPS plug out -
	Predictions say DPS water may
	freeze at 140 - another reason
	To not do this one here
	↓
94/26	PLSS/ASC Depletion/Procedure Discussion -
	Discussion on loop -
	Don't do -
	Current predictions are 60 -
	Would have to start and to allow
	30 hours of ASC usage.

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

PROCEDURE FOR ONBOARD READOUT OF DESCENT PROPELLANT TANK TEMPS.

CB(16) PROP: DISP/ENG OVRD LOGIC - CLOSE

PRPLNT TEMP/PRESS MON SW
DES 1 - Read Fuel and OX tanks temp

DES 2 - Read Fuel and OX tanks temp

Relay readings to MSFN.

CB(16) PROP: DISP/ENG OVRD LOGIC - OPEN

Repeat Procedure every 5 hours

9/11/36

for

FLIGHT DIR MISSION LOG	DAY	REV	PG (46)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	.2
94/33	L, O2 - Working fine -
94/36	↑ Procedure for onboard readouts of Des prop temps -
	CSM all confirmed -
	Telmu - 125 GET Desc H2O gone -
	Absolutely - Don't deplete Asc Tanks
	first & Try Press fill.
94/44	Telmu →
	O2 flow has gone up TO .6 #/hr.
	Glitch in demand Reg A -
	Did they change position (from cabin) in Reg A?
	Cycle B Close, back to cabin -
94/47	↑ No - in cabin all Time -
	Suit fan noise has gone down

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 47

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	OK) Fred Cycling demand reg –
94/53	Telem watching rate –
94/54	↓ How far out now?
	40K from moon –
94/55	↓ Particles floating by – from SM
94/56	Biomed SW – off –
94 57	
	104 → 118 GET FIDO –
	105 / FIDO /
	She 107 ± __ hours
	Vector will be as good at 105 as 118
	Maximize post She or mid course tracking –
	∴ Early Vote to get more
	Track after MCC.
	Retro – Early
	~~AP~~ Weather avoidance

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG (48)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	FIDO/Control – Weather Avoidance known use LOC for accuracy –
	∴ Weather Avoidance – No – No Needed Need LOC To do key known –
	GUIDANCE –
	CONTROL – Ske going To go earlier than 106–107 105 maybe earlier – ΔV when it vents .003 fps Comparable To the dump –
	Checklists being marked –
	RCHO –
95/03	↓ Another good pic coming out of other side on below window 6 – Ken M. ↑ Snap few pictures of service module

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	PROCEDURE FOR USING PLSS CONDENSATE CONTAINER
1.	Connect PGA FITTING TO BOX.
2.	TAPE TISSUE OR AN ABSORBANT MATERIAL AROUND THE VENT VALVE ON THE BOX
3	TRANSFER URINE SLOWLY AND DON'T SHAKE THE BOX.
	REASON: FOR SLOW TRANSFER IS THE VENT VALVE WILL UNSEAT AT 2.2 PSI AND WILL RESEAT AT 1.8 PSI AND SMALL DROPLETS OF URINE COULD ESCAPE.
	REASON: FOR NOT SHAKING BOX IS THAT THERE IS A SCOTCH FOAM LINING ON THE INSIDE OF THE BOX WHICH HAS A CAPILLARY ACTION AND WILL HELP ABSORB THE URINE THAT LEAKS INTO

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	The Box.
4	DON'T FILL THE BAG COMPLETELY IF YOU CAN HELP IT SINCE THIS could CAUSE THE VENT TO UNSEAT.
	CONDENSATE ~~BOX~~ BOX CONSISTS OF A TEFLON BAG IN A BOX WITH A ONEWAY VALVE. THIS BOX WAS NOT DESIGNED FOR ZERO G USE AND URINE WILL LEAK FROM THE BAG INTO THE BOX.
	IF THE CREW EXPECTS TO BE ABLE TO RETRIEVE THE URINE A CLUGE WILL HAVE TO BE FOUND TO GET IT BACK OUT.

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 49

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
95/12	↑ Procedure for purging CSM from LM
95+12	↑ She tank - will blow around 105 GET
	Plenty blowdown -
95+13	
95+42	↓ Wobble worse, hard to see earth
	thru window -
95+44	Telmar / Stop purging CM from LM -
	pull LM cbin ~~breaker~~ CM -
	Have hot umbilical -
	or GO to lo voltage taps on 1 Desc batt
	To interrupt path to relays
	which hold in pur thru
	umbilical -
95+47	↑ Words on condensate container

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 50

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	MARS-210 97:30 → 110:24 -
	Lot of people went to power up CSM instr
	& look at HBR for Temps
	pwr 4.88 A
	10.88
	11.98 12A for CSM instr.
	Conclusion for now -
	MCC - 105:30
	around time / of she going -
	@ 98:40 - ABS burn & PRC
	checklists -
	MCC - Around 105 - 106 -
	Watch she schedule around it -
	Telm - O_2 flow .4#/hr.
	7.6 fps 14.8 sec ΔC DPS
	+ 10 sec ullage

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

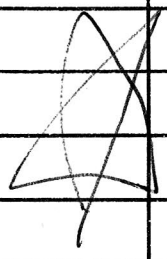
FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 51



SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	We go around on Spoon working for this Instr Pur up.
	on Instr + procedures A Lamsfrand
	it entails pairing the CSM from the CM
	Lam leary of that, I have been told
	There are single point failures which
	could leave us without Resc pur -
	This is an unreasonable risk
	now - EI - 4 hours or thereabouts
	is OK - It's only 15D for
	several minutes anyway.

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 52

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Control off on AGS status switch
	CMP/ CSM optics -
	Telmn. .022#/hr - present O_2 rate
	Calculation
	1) H_2 should start venting now
	2) Potable tank gone.

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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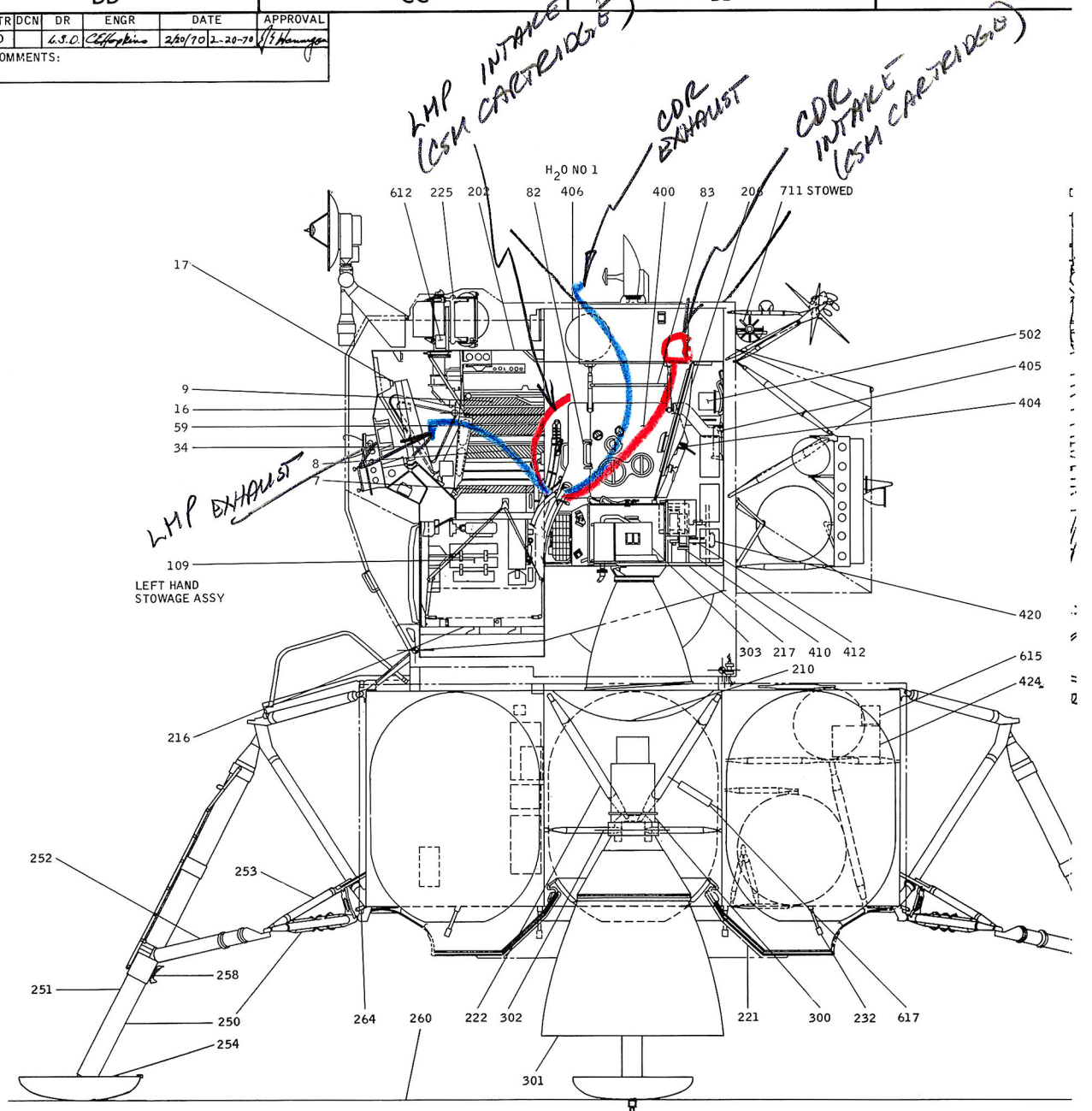
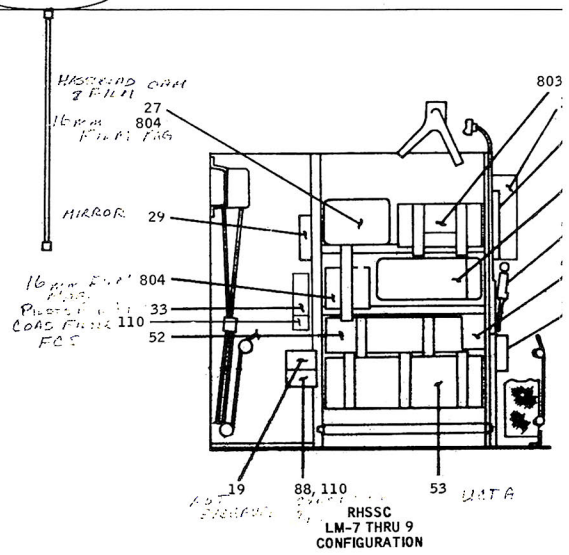
FLIGHT DIRECTOR'S MISSION LOG

LTR	DCN	DR	ENGR	DATE	APPROVAL
D		L.S.O.	C.E. Hopkins	2/20/70 2-20-70	J.S. Hannigan

COMMENTS:





NOTES: 1 RCS PLUME DEFLECTOR TYPICAL INSTALLATION, CHECK VEHICLE CONFIGURATION FOR EFFECTIVITY

NATIONAL AERONAUTICS & SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER • HOUSTON, TEXAS

LM EQUIPMENT LOCATIONS

SIGNATURES	DATE
DR Linda L. Drouilli	1-11-69
DSGN Bobby J. Osborn	1-17-69
QC Betty M. [illegible]	1-17-69
ENGR L. A. Frere	1-17-69
APP Donald R. Puddy	1-17-69
FEC Dean J. Rieker	1-17-69
AUTH D. Bray	1-17-69

40 PERCENT

DWG NO FIGURE 2-2 | SIZE J | LM UNIVERSAL | 67.5 X 23.75

SHEET 1 OF 2 | PAGE

SC Roger. Write it down. Seriously, Jack, I got the phase that I put you (garbled) the earth, I'm going to have to roll in LM time, roll the spacecraft 90 degrees to get the (garbled) of the earth ball on the Y-axis.

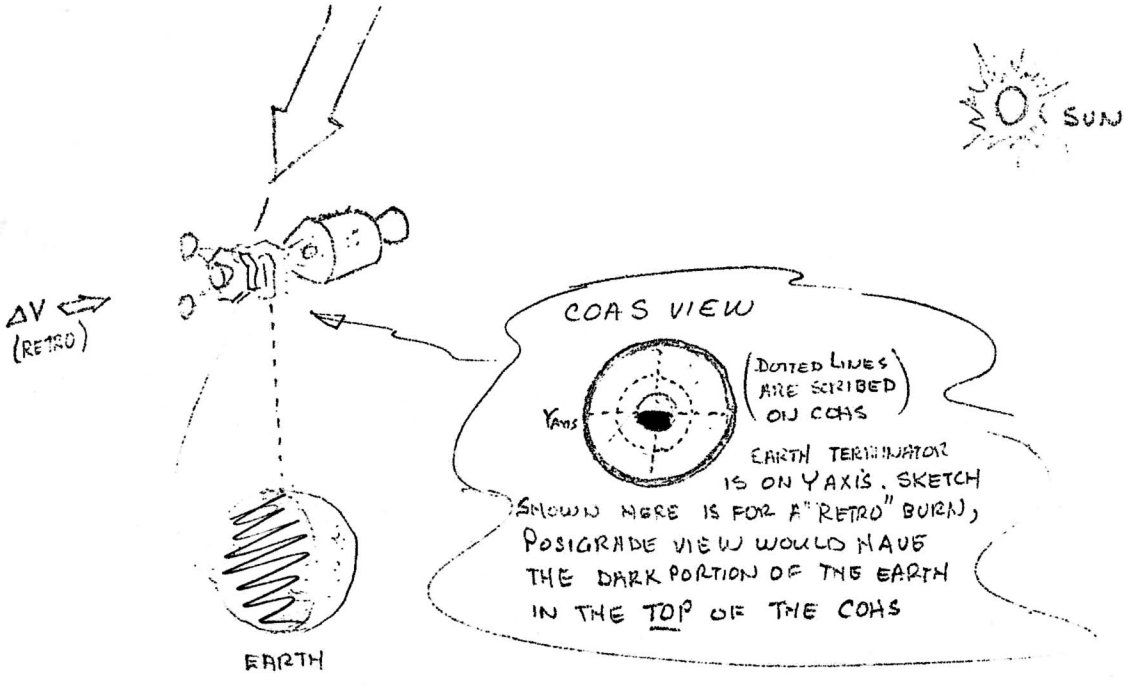
CAPCOM That's affirmative, Jim. You're going to have to roll 90 degrees to point your plus X-axis at the sun and put the crescent - the point of the crescent on the Y-axis. The points of the crescent on the Y-axis with the COAS pointed at the center of the earth will take care of your yaw and your pitch.

SC Roger.

CAPCOM Okay, Jim. After you get that orientation to come in a little more steeply, we perform AGS body axis aline which is 400 plus 5 on the ~~D~~eda. If the AGS ball is up at this time, the AGS ball will go to 000. We can talk more about control modes later, but we recommend doing this, of course, in AGS attitude hold. Attitude hold. Put your yaw to mode control and leave pitch and roll in pulse. Therefore, controlling your attitude with the PTCA. We don't want to use the gimbal so have engine gimbal off. We'll make the burns at 10 percent thrust. We'll use a manaual start and stop. For ullage, we'll use the plus X translational button and ullage will be for 10 seconds. Over.

SC Okay. Understand what you're saying, but you'll have to repeat it here.

END OF TAPE



FLIGHT DIR MISSION LOG	DAY	REV	PG 53

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	↓ new shower sort flashes from DPS –
	assuming 6#/man day
	Calculation show potable water may run out,
	H_2 venting may start –
97/20	↓ PTC deteriorated far enough to lose
	comm –
	Short period of time / loss of [illegible]
97/24	↓ Optics thru 1 rev – look good
	SXT ~ SCT
	Internal discussion
97/29	Pot Water – when we run out in CSM
	15# in CSM Survival Kit – Po
	7½ = 15# total – in both PLSS's –
	3/4# in LCG –
	TCMU – working on How To drink PLSS water –
97/36	↓ 4 cakes stuck together w/ epoxy
	Complaining about food

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 54

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
98/00	Procedures in LMS –
	Burn & PJL –
98/07	Control Not cooling down as fast in LM from last readouts –
	– Gold Team On –
	Retro – 105+30 for MCC #5
	Fido – No problems
	Guido – MCC in AGS
	Control – She low range @ ≈ 105+45. Will use time as cutoff criteria. 4-jet 10 sec ullage & min throttle. 99+30 another temp readout.
	Telmu – Consumables OK
	GNC – } Going to power up TM and
	EECOM – } look at CSM for about 5 min.
	Eecom wants a repress pack readout.

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 55

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Crew status - still in question - Surgeon would like when possible.
	Inco - no problems
	AFD - nothing
	FAO - procedures for power up, alignment, burn and PTC in work
	Net - OK
	Recovery - Wx acceptable in Mid-Pac
98+26	Jim is up: Slept for ≈ 6 hours
98+34	SM venting has ceased at least momentarily
98+43	Advised Jim that the MCC is scheduled so that the SMe will vent while he is powered up.
	Telmu - has update to LM to CSM power procedure
	ASC ECA control CB
	CB EPS - Panel 11, 16 - open
98+48	CDR Repress package press is 830 PSI

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FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	LM TO CSM POWER TRANSFER
LM	CB (11 & 16) ASC ECA - CLOSE (2)
	CB (11 & 16) ASC ECA CNTL - CLOSE (2)
	BATT 5 & 6 NORM FEED - ON
	BATT 1 & 3 - OFF/RESET
	WAIT 30 MIN FOR PRECONDITIONING
	BATT 2 & 4 - OFF/RESET
CSM	CONNECT LM/CSM UMBILICAL
	✓ CB - LM PWR-1 MN B - CLOSE (MDC 5)
	✓ CB LM PWR-2 MN B - CLOSE (MDC 5)
	✓ CB BATT B PWR ENTRY/POST LANDING - CLOSE (PNL 250)
	✓ CB EPS SENSOR SIGNAL MAIN B - CLOSE (5)
	✓ CB MAIN B BATT BUS B - CLOSE
	✓ VERIFY MAIN BUS VOLTAGE
	✓ LM PWR SW - CSM (MDC 2)
	CB MAIN B BATT BUS B - OPEN (275)
	CB BATT B PWR ENTRY/POST LANDING - OPEN (250)
	VERIFY MAIN BUS B VOLTAGE

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
LM	BATT 1, 2, 3, 4 – HI VOLT – ON
	BATT 5, 6 – OFF
	▷
	NOTES:
	1. CIRCUIT BREAKER PROTECTION LIMITS CURRENT TO 15 AMPS
	2. LM/CSM UMBILICAL IS "HOT" AND MAIN BUS VOLTAGES MAY BE MONITORED BY SELECTING MAIN B
	PNL's 11 + 16
	cb ASC ECA Cntl (2)

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

Lemmey

Mon fright 9 pm

Tues ~~8:30~~ AM

11:30 AM

~~Tues~~

Wed 15 6 am

6 pm

Thurs 5a

FLIGHT DIR MISSION LOG	DAY	REV	PG 1

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	SHIFT BRIEFING
	97: Mgmt
	Consumables:
	2, OH - Keep fri LM cartridge in reserve (first one lasted 27 hours)
	- Operating on CSM cannisters - Very good - (165 hrs remaining)
	H_2O - WORST item now -
	Total Usable 171.3# (Desc + ASC)
	Present Rate 2.5# Desc out @ 125 hr
	GET 165:31
	2 MCC 5# hrs
	+20# = 8 hr msmt inc 160# GET
	Drinking water @ 6#/man day
	Potable would be depleted.
	PLSS water / procedure to get it out -
	Survival 15# 3.5# Cans
	waste tank had 17# at LOS -
	O_2 30.80# (.22#/hr)
	GET OUT → 273 GET

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG
			2

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	EPS 1300 AH rng.
	11.9 current rate
	206:15 depletion
	-5 2MCC
	200 GET
	~~([illegible])~~
	RCS ~~[illegible]~~ 50% usable -
	CSM
	1 ENTRY - ~~[illegible]~~ 98 out of 120 AH
	for 40 AH BATS
	Take out of BAT B -
	Comm - Been good - omni switching
	210 at GDS, HSK
	TRAJ - 86 perigee -
	7.7 MCC 14.8 sec DPS @ 10%
	Crew has EI - ehr pad
	No weather Avoidance
	Checklists - Due here - been worked in
	LM Sim -
	Should be good
	Earth Crescent in COAS -
	Burn To sun

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 3

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	BURN /PTC.
	Entry - Launch -
	CSM vehicle status
	All switches in zero pwr -
	Motor Switches closed
	CSM Instr to be powered up
	for thermal data.
	Optics are clean -
	Reluctant to power CSM from LM.
	Predictions - Out of Potable @ 9 ehrs
	H_2 venting @ 9 ehrs.
	LM Vehicle
	Drifting PTC -
	She - 35 psi/hr
	105/30 → 108
	Crew Rest CDR to CSM @ 91 hrs.
	CMP 6 hrs up @ 90 hrs
	LMP 6 hrs

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 4

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Onboard
	CSM switches
	Procedure for Purging CSM from LM
90hrs	Jack & Fred just up
90+21	Material for LiOH Cannister
91+12	
	Jim Tosleep
91+53	CSM Checklist
92+46	over to CM
93+45	back in LM
94	on CSM Cannister
94+03	Motor Sw / 2 changes
94+10	
94+15	Rise rate to 30-35 psi/hr
94+19	CSM elec - GO 32.3 37.0
94+25	Des Flox Temps - GO.
95+42	Wobble worse
96	MCC 105:30 → 108 No weather Avoidance
98	Jim up -

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 56

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
98+56	Updated Jim on the 2 CB's to open for LM to CSM power transfer
	Retro says that ± 30 min on Trig for MCC5 is acceptable for entry conditions.
99+49	Master alarm - batt mal Batt #2
	Power amp. CB - Hi bit rate
	Bat load x tie Delta - panel 16
99+53	Batt 2 - off
	Bat load x tie - close
	Probe Delta vertex - Oldest battery -
100+01	Procedure for burn read up

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 57

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
100+16	Felmm beginning to think that Batt 2 problem is not a real temp problem. Wants to leave batt off for approx another 45 minutes, then turn back on.
100+59	Jack & Jim could see largest stars about a half hour ago.
101+02	Panel 16 - Open Cross tie Bat load CB - Panel 16
	Batt 2 - on still have a batt mal.
	Close cross tie bat loads C.B. Crew will not set batt mals now, but we should be able to detect on ground
101+09	Start CSM power up v list

MSC FORM 1441 (APR 66)

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 58

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
101+38	CMP starting power up
	Back to LBR, power amp - off
	CMP had no ~~[illegible]~~ VM_B at first
Panel 5	Main bus tie Bat Bus C - on
275	
	AFT - BRAVO
	FWD DELTA
	About 52° F in CM
	01+08+15 Z CSM data 0
	101+55+14 GET
	01+15+52 Z data loss
	102+02+51
	Had CSM data about 7.5 min
102+10	CMP readouts:

		SYS TEST METER	
Batt C	37.0	5C	4.5
Pyro A	37.0	5D	3.5
Pyro B	37.0	6A	4.0
SPS He	3450	6B	4.6
		6C	4.0
N_2A	2300	6D	3.8
N_2B	2400	4A	1.4

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 59

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
102+58	Batt charger Batt B C.B. was not in when he first tried to read the VHF in CM.
103+43	Briefed on general plan for burn: 1) Rate limit of 10°/sec 2) No attitude limits 3) Go for trim from us before he trims 4) Sun in AOT 5) Start press at 104+30 6) No problem in slipping burn 30 min.
103+52	Sint temp rheostat in full cold will make cabin temp higher. It was in full ~~hot~~ hot - he put it to full cold.
103+58	Decrease in H_2O - 8.2#/hour about 2# total about 15 min ago - Pete is back & sound now. Advised crew.

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

EECOM CONSUMMABLES STATUS @ 103+30 GET

CRYOGENICS

	TOTAL (LBS)	MARGIN (LBS)	SINGLE TANK LIFETIME (GET) 40 AMPS	70 AMPS
H_2	—	—	—	—
O_2	—	—	—	—

WATER

POTABLE TANK → → 0 %

WASTE TANK 85% @ — GET

NEXT DUMP: TO — % @ — GET

BATTERIES

BATTERY A 20.5 A-H REMAINING

BATTERY B 37.3 A-H REMAINING

BATTERY C 38.8 A-H REMAINING

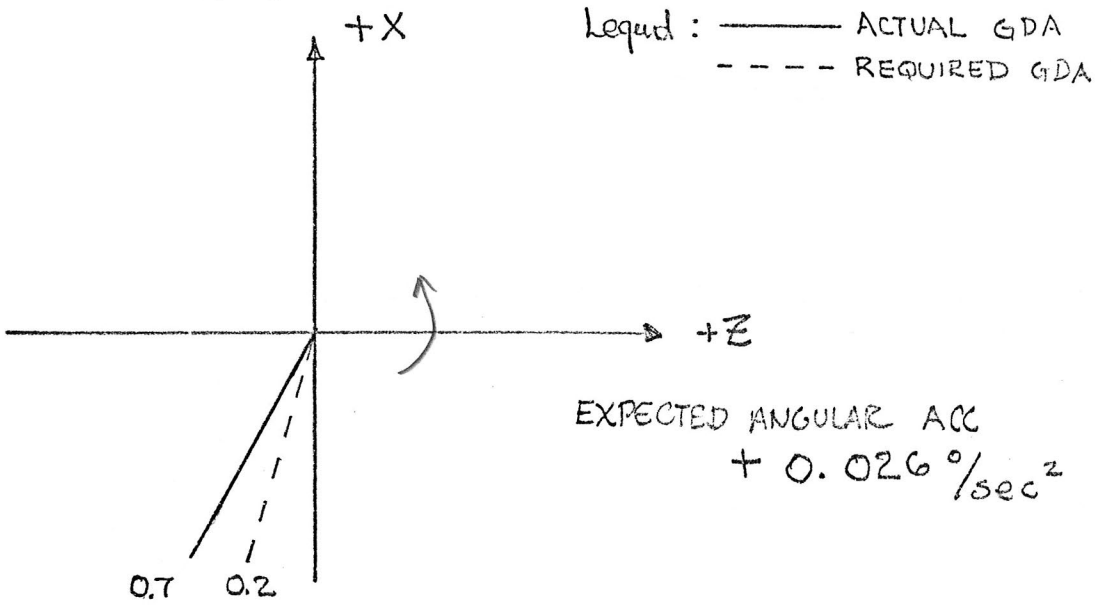
96.6 A-H TOTAL REMAINING

CSM Activation used 2.4 amp hours.

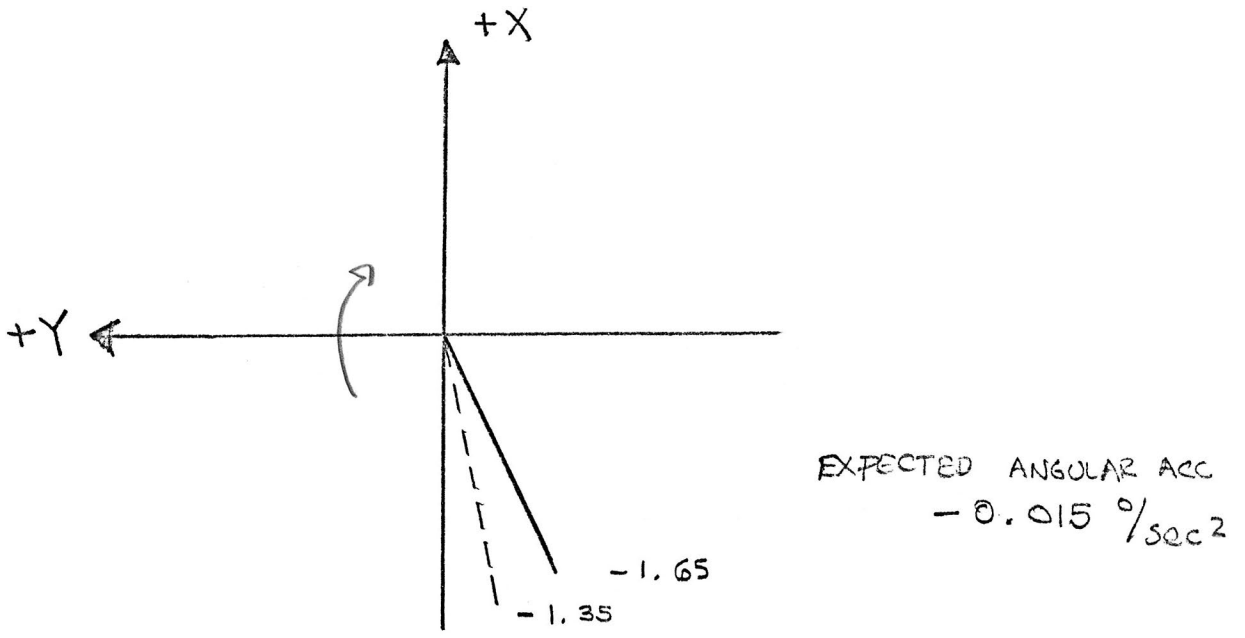
MARGIN WITHOUT CHARGER — A-H

3RD DPS Burn Offsets

PITCH GDA ∠'s



ROLL GDA ∠'s



30-MIN ACTIVATION

~~IVT TO LM~~

~~1 CSM Mnvr To Burn Attitude~~
Activate CABIN DUMP VALVE & Open Hatch
Carry COMM Carrier & CWG Connector to LM

2 FLOOD LIGHT - All
DES O2 - OPEN
DES H2O - OPEN
CABIN REPRESS- AUTO
CB(16)ECS: CABIN REPRESS - CLOSE
SUIT GAS DIVERTER - CABIN

3 CSM Transfer To LM PWR
(Flood Lts Blink, C/W PWR Caution Lt-On)
CB(11) EPS: XLUNAR BUS TIE - CLOSE
HEATERS: RCS SYS A/B-1 QUAD 4,3,2,1 (4)-CLOSE
CB(16) EPS: XLUNAR BUS TIE - CLOSE
~~HEATERS: RCS SYS A/B-2 QUAD 1,2,3,4 (4)-CLOSE~~

4 RCS SYS A/B-2: QUADS (4) - AUTO

EPS ACTIVATION

1 LTG: ANUN/NUM - BRIGHT

2 ~~CB(11) INST: SIG CONDR 1 - CLOSE~~
~~EPS: DES ECA CONT - CLOSE~~
~~CB(16) INST: SIG SENSOR - CLOSE~~
~~: PCM/TE - CLOSE~~
~~: SIG CONDR 2 - CLOSE~~
EPS: DISP - CLOSE
~~: DES ECA CONT - CLOSE~~

Basic Date 1/6/70
Changed

LM-7

30-MIN ACTIVATION

3 Verify BAT 1,2,3,4 - tb-LO
DES BATS - tb-gray
BATS 5&6 NORMAL & BACKUP(4)-tb-bp
Check BAT and BUS Voltages
When BUS Volts <27V, Select High Voltage Taps
CB(16) EPS: CROSS TIE BAL LOADS - OPEN
BAT 1 HI VOLTAGE-OFF/RESET Then ON
Repeat for BATS 2,3,4

4 CB(11) AC BUS B&A: BUS TIE INV 2&1(4) - CLOSE
: AC BUS VOLT - CLOSE
EPS: INV 1 - CLOSE
~~CB(16) EPS: INV 2 - CLOSE~~

5 INV-1, Verify Voltage In Green Band

PRIMARY GLYCOL LOOP ACT

1 CB(16) ECS: DISP - CLOSE (CREW OPTION)
~~CB(11) ECS: GLYCOL PUMP AUTO TRNFR - CLOSE~~
: GLYCOL PUMP 1 - CLOSE
: GLYCOL PUMP AUTO TRNFR - OPEN
GLYCOL - PUMP 1
CB(11) ECS: GLYCOL PUMP 2 - CLOSE

2 PRIM EVAP FLOW No. 1 - OPEN

3 Close CB's Per 30-MIN ACTIVATION Chart

Basic Date 1/6/70
Changed 2/13/70

30-MIN ACTIVATION

LM-7

O Open
X Close

LM-7

Basic Date 1/6/70
Changed 3/10/70

30-MIN ACTIVATION

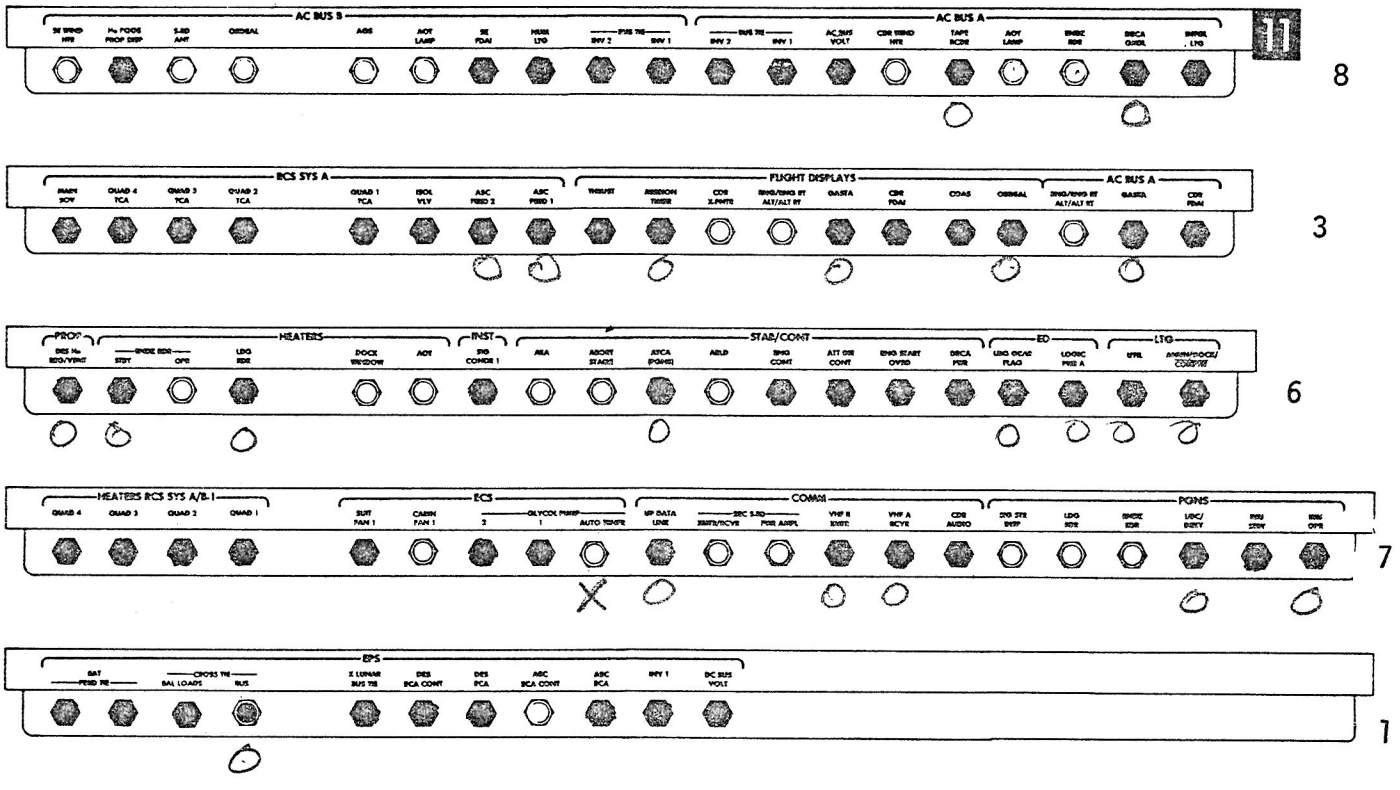
20's

60's

80's

60's

1



Basic Date
Changed

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MSC FORM 2206 (JUN 67)

MSC FORM 2206 (JUN 67)

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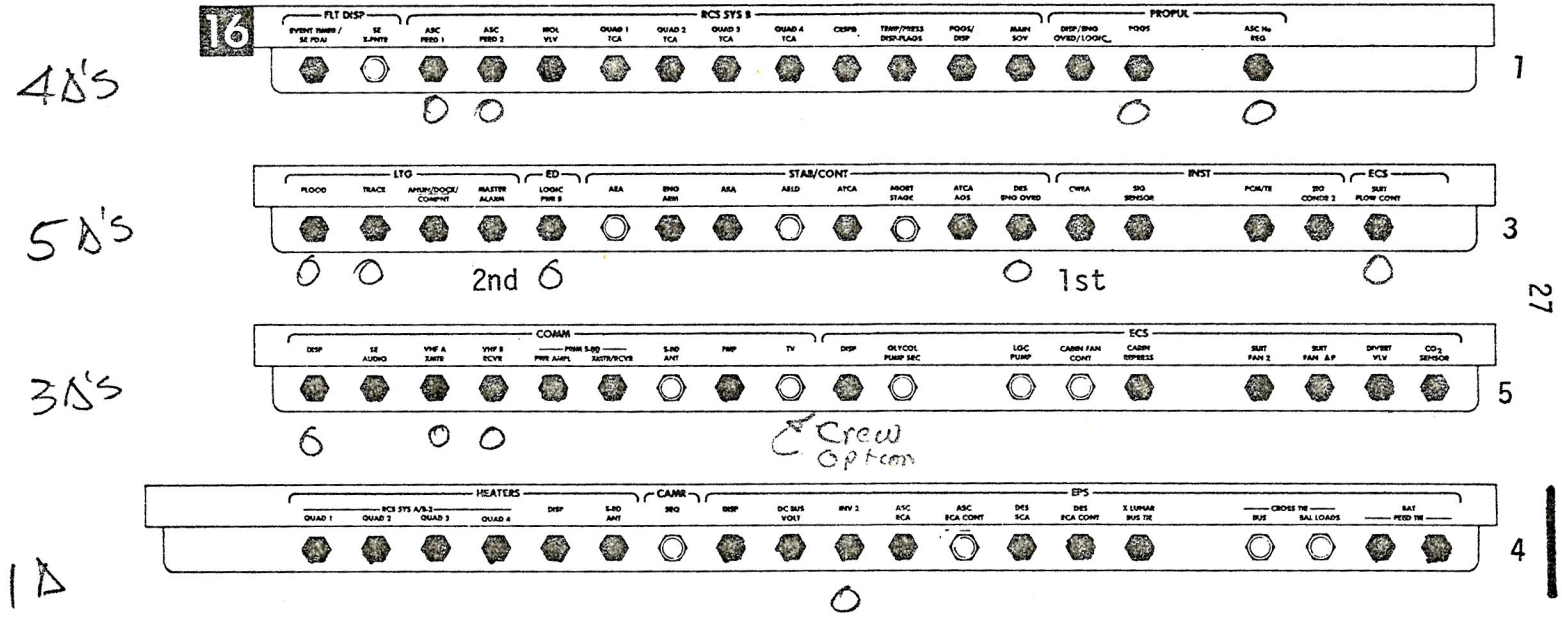
30-MIN ACTIVATION



27

LM-7

Basic Date 1/6/70
Changed 3/10/70

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4 CB(16) INST: CWEA - Open Then Close

WARN
ASC PRESS
~~RCS A REG~~
~~RCS B REG~~
LGC

CAUT
PREAMPS

VHF/S-BD ACTIVATION AND CHECKOUT

1 ~~CSM Configure For VHF Simplex A~~
VHF - A: XMTR - VOICE
RCVR - ON
AUDIO (BOTH): S-BAND T/R - T/R
ICS T/R - T/R
~~VHF A - T/R~~

2 COMM: S-BD-PM,PRIM,PRIM,~~DN~~ VOICE BU,
PCM,OFF/RESET,OFF,HI
S-BD ANT-As Required

3 ~~LMP Perform Comm Check With CSM~~

PGNS TURN - ON

1 NO ATT Lt - Off
V96E

2 Set EVENT TIMER

DAP SET/GIMBAL DRIVE

1 MODE CONT: PGNS - AUTO
GUID CONT - PGNS
TTCA (CDR) - THROTTLE (MIN)

2 V48E
N46 31021
PRO
N47 + _____ (33731)
+ _____ (From MSFN or CSM)

PRO
N48 + _____ (From MSFN or Chart)
+ _____ (From MSFN or Chart)

Basic Date 1/6/70
Changed 3/10/70

LM-7

Basic Date 1/6/70
Changed

LM-7

(Trim front page on solid crop marks; back page on dash crop marks.)

Verify RCS Htrs In AUTO For 15 Min
BAL CPL - OFF
DEADBAND - MIN
ATT CONT, P, R - PULSE, YAW - DIR
MODE CONT (AGS) - ATT HOLD
GUID CONT - AGS 29
Damp Rates, Pitch & Roll with TTCA, YAW with AGS DIR

~~ENG STOP - PUSH~~
~~ENG ARM - DES (DES REG Lt-ON)~~
~~PRO (ENG GMBL Lt-ON)~~
~~MSFN Verify GDA Position~~

3 ~~F 50 48~~
~~PRO~~
~~ENG ARM - OFF (ENG GMBL Lt-OFF)~~
~~ENG STOP - Reset~~

AGS ACTIVATION

Verify ASA CB In For 10 Min

1 AGS STATUS - STBY (AGS Warn Lt - On)
CB(11) AC BUS B: AGS - CLOSE
CB(16) STAB/CONT: AEA - CLOSE (AGS Warn Lt-Off)
AGS STATUS - OPERATE (AGS Warn Lt - On)
O2/H2O QTY MON - C/W RESET, Then DES

2 412R + 1 SELF TEST SATISFACTORY

~~RCS PRESS~~

~~1 Recycle: SYS A&B ASC FEED 2(2) - CLOSE, tb(4)-bp~~
~~: SYS A&B ASC FEED 1(2) - OPEN, tb(4)-bp~~
~~: SYS A&B THRUSTER PAIR QUADS-OPEN, tb(8)-gray~~
~~: CRSFD - CLOSE~~
~~: MAIN SOV SYS A&B - OPEN~~

~~2 Cycle TEMP/PRESS MON~~

~~3 MASTER ARM - ON~~
~~HE PRESS RCS - FIRE~~
~~(RCS A&B REG. Warning Lts - Off)~~
~~RECYCLE: SYS A&B ASC FEED 2(2) - CLOSE, tb(4)-bp~~
~~: SYS A&B ASC FEED 1(2) - OPEN, tb(4)-bp~~
~~: SYS A&B THRUSTER PAIR QUADS-OPEN, tb(8)-gray~~
~~: CRSFD - CLOSE~~
~~: MAIN SOV SYS A&B - OPEN~~

Basic Date 1/6/70
Changed 3/10/70

Basic Date
Changed

(Trim front page on solid crop marks; back page on dash crop marks.)

4 TEMP/PRESS MON - He (2750-3200 psi)
- PRPLNT (40°-100°/178-188 psi)
- FUEL MANF (175-188)
- OXID MANF (175-188)

DPS PRESS

1 PRPLNT QTY MON - DES 1
PROP TEMP/PRESS MON - DES 2
HELIUM MON - AMB PRESS
DES HE REG 1 - tb-gray bp
DES HE REG 2 - tb-bp

2 DES PRPLNT ISOL VLV - FIRE
HE PRESS/DES START - FIRE

3 PRPLNT TEMP/PRESS MON: DES 2&1
(50°-90° FUEL, 50°-90° OXID/242-253 psi)
HELIUM MON: AMB PRESS (200-1110 psi)
SUPRCRIT PRESS (610-1070 psi)

LANDING GEAR DEPLOY

1 CB(11) LOGIC PWR A - Open
LDG GEAR DEPLOY - FIRE, tb-gray

2 CB(11) LOGIC PWR A - Close
LDG GEAR DEPLOY - FIRE
MASTER ARM - OFF

Basic Date 1/6/70
Changed 3/10/70

Basic Date
Changed

MNVR TO BURN ATT

VERIFY AGS IN OPERATE FOR 5 MIN

400 + 5

400 + 0

ATT CONT: P, R - PULSE

: YAW - MODE CONT

Mnvr using TTCA.

Crew can control Pitch, Roll w/ TTCA

Computer controls Yaw but ACA can override

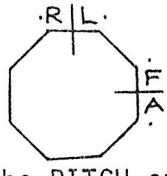
When in Attitude - ACA Out of Detent

TO ZERO ERROR NEEDLES

Set EVNT TMR

DOCKED DPS BURN (MANUAL)

```
*        DPS BURN TECHNIQUE          *
*If PITCH Error Needle Goes Down,    *
*LMP Thrust AFT (Pull Out On TTCA).  *
*If ROLL Needle Left, CDR Thrust     *
*   Right (Push Right On TTCA).      *
*See FDAI Picture Below.             *
*                                    *
*                                    *
*                                    *
*                                    *
*                                    *
*                                    *
*Only Set The PITCH or ROLL ATTITUDE *
*CONTROL Switches To MODE CONT When   *
*The Rates & Errors Are Zero And      *
*Not Thrusting With TTCA's.  Throt-   *
*tle Initially At 10%, Then Throt-    *
*tle Up When Stabilized, 10% Before   *
*Cutoff.                             *
```



GIMBL LOCKED

Basic Date 1/6/70
Changed _____

LM-7

DOCKED DPS BURN (MANUAL)

~~V76E~~
GUID CONT - AGS
MODE CONT (~~BOTH~~) - ~~OFF~~
ENG STOP (2) - RESET
ABORT/ABORT STAGE - RESET

~~-6:00 MODE CONT: PGNS - ATT HOLD~~
~~V41 N20E, E, E, E~~

~~At burn attitude:~~
~~V40 N20E~~

~~V25 N07E, 77E, 10000E, 1E~~
~~V01 N01E, 77E (Verify A = 1,3,5,7)~~
~~V37E 51E, PRO, V37E00E~~

400 + 5

At burn attitude:
400 + 0

~~V37E 47E~~
~~When CMPTR ACTY Lt - ON~~
~~V06 N65 E~~ _____ hrs
_____ min
_____ sec

~~Load N65 Into N38:~~
~~V25 N38E (hrs) E~~
~~(min) E~~
(.01 sec) E

404 + 0
405 + 0
406 + 0
470R

AGS
ATT HOLD
Caution: Do not go out of detent on ACA again

Basic Date 1/6/70
Changed _____

-4:00 RATE/ERR MON (BOTH) - LDG RDR/CMPTR
ATT MON (BOTH) - AGS
RATE SCALE - 5°/SEC
THR CONT - MAN
MAN THROT - CDR
ATT/TRANSL - 4 JET
BAL CPL - OFF
ENG GMBL - ~~ENABLE~~ OFF
DES ENG CMD OVRD - OFF
DEADBAND - MIN
ATT CONT: ROLL - PULSE
PITCH - PULSE
YAW - MODE CONT — AGS
MODE CONT (~~BOTH~~) - ATT HOLD
~~PRPLNT QTY MON - DES~~

TTCA (CDR) - THROT (MIN)
TTCA (LMP) - JETS

~~-1:00 MASTER ARM - ON~~

- :35 ~~V32E~~
~~F 16 83 ΔVX,Y,Z (ATT Zero)~~ (~~-1fps~~)
ENG ARM - DES

- :10 MANUAL ULLAGE (LMP)

~~-:02 CMC MODE - FREE~~

~~ACA - Out of Detent (Yaw) (Zero Error Needles)~~

:00 ENG START (CDR) - PUSH
Ignition
:01 Release ullage

~~+:05 TTCA (CDR) - Throttle Up As Req'd~~
~~ATT CONT: PITCH, ROLL - As Req'd~~

~~+:15 MASTER ARM - OFF~~

Basic Date 1/6/70
Changed 3/23/70

Basic Date
Changed

Monitor ΔVX Via ~~N83~~ 470

~~When PRPLNT QTY = 37%:~~
~~DES He REG 1 - CLOSE~~

~~TTCA (CDR) - Reduce to 10% when Vgo = 10.0 fps~~
Shutdown on Burn Time - 1 sec
~~When ΔVX = Final ΔVX:~~
ENG STOP - PUSH
~~ATT CONT: YAW - PULSE~~
~~Record [illegible]~~
~~Damp Excessive Rates Via LM Y, Z Translation~~ NULL ERROR NEEDED
TRIM 470 TO .1 FPS

~~CSM Resume Attitude Control~~

~~PRO, V96E~~
ENG ARM - OFF
~~PRPLNT QTY MON - OFF~~
ENG STOP - RESET
TTCA (CDR) - JETS

ESTABLISH PTC
ATT CONT (3) - PULSE
ROLL WITH TTCA until R 90°
P 0°
Y 0°

When at attitude go Out of Detent w/ ACA
ATT CONT: YAW - MODE CONT
When rates are <.05:
ATT CONT: YAW - DIR
Spin up to .3 °/sec in yaw
MODE CONT: AGS - OFF

PWR DOWN Per PWR-5
(AS MODIFIED)

Basic Date 1/6/70
Changed 3/23/70

Basic Date
Changed

LM-7

Monitor ΔVX Via ~~N83~~ 470

~~When PRPLNT QTY = 37%:~~
~~DES He REG 1 - CLOSE~~

~~TTCA (CDR) - Reduce to 10% when Vgo = 10.0 fps~~
Shutdown on Burn Time - 1 sec
~~When ΔVX = Final ΔVX:~~
ENG STOP - PUSH
~~ATT CONT: YAW - PULSE~~
~~Reset [illegible]~~
~~Damp Excessive Rates Via LM Y, Z Translation~~ NULL ERROR NEEDLES
TRIM 470 TO .1 FPS

~~CSM Resume Attitude Control~~

~~PRO, V96E~~
ENG ARM - OFF
~~PRPLNT QTY MON - OFF~~
ENG STOP - RESET
TTCA (CDR) - JETS

ESTABLISH PTC

ATT CONT (3) - PULSE
ROLL WITH TTCA until R 90°
P 0°
Y 0°

Basic Date 1/6/70
Changed 3/23/70

When at attitude go Out of Detent w/ ACA
ATT CONT: YAW - MODE CONT
When rates are <.05:
ATT CONT: YAW - DIR
Spin up to .3 °/sec in yaw
MODE CONT: AGS - OFF

PWR DOWN Per PWR-5
(AS MODIFIED)

Basic Date
Changed

LM-7

FLIGHT DIR MISSION LOG	DAY	REV	PG 60

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
104+32	Start power up
104+34	Burn gas
104+50	Stopping PTC
	AOT at Top - 2° right y cursor
	Proceeding to burn early
	Armed in LTP
105+18	Burn complete - 7.8 fps
	Going to PTC
105+30	γ -6.52 - confirmed maneuver
105+38	PTC - rates below .1
	started yaw
	Some pitch rates - but is really yaw -
105+39	She - 1830
105+45	- Power down

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG (61)

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING 15021H
105+49	Still in HBR + Power Amp ON
105+53	LBR, Down Voice B/U
	Powered down – 11-13a
	- INCO – Good Comm in PTC mode
	Retro –
	Fido – when she trust - if no ΔV - 2hrs
	if ΔV - 6hrs
106+06	Burn Control good –
	Guido – working
	Surgeon – looks good – LM Pos Data
	Need crew status –
	Jim - 5 hrs
	Control – 107 hrs – @ earliest
	110 hrs – @ latest
	1900 ± 20 fps 107 – 108.5
	FAO – CMP, LMP – go to sleep
	Lat @ 112
	Control – She only problem

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	TELMU - 112 hrs - LM power to CSM
	PLSS - for
	↑ Flt plan suggestions - LMP + CMP to bed now, CDR [redacted] @ 113 hrs
	DPS burst disk data up -
	↓ could see constellations earlier
106+38	No medication -
	- No tireder than normal
106+42	CM has stabilizing - cannot see stars due to that
	GNC - did get look at data
	21° CM-RCS - ok
	LiOH - #7 #8 in use
	LiOH procedure -
	① Go to 112 hrs before changing at that time use modified method
	② if PCO2 goes above 7.6 - use LM canister

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 63

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	2000 psi Max on She - involves ✗
	10 sec ullage every 5 hrs -
107+06	PTC ~~Very Top~~ over head
	Sun - topside of LMP window to CDR window
	Moon in Center of Both windows
107+13	SHE - 30 psi/hr - 1889
	earth in view of Top left LMP going down - - not as high as last time too high to get LPD reading
	2000 psi 114 - ~~115~~ 115 hrs
107+22	moon in middle LPD 5°
107+45	Moon South part LPD -15°
	APS - 723 fps - ascent feed -
	stacked 27 fps - RCS only
	Ascent only Consumables
	H_2O - 32 hrs @ 2.5
	O_2 - 22 hrs .22
	BATTS - 49 hrs - within

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 64

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	EI-4 - Nominal time for MCC-7
107+59	SPAN + CONTROL Now Say - any vent will freeze the DPS
	She Vent attitude - out of plane - rotate 90°
	Vent procedure @ 109:30
108+54	She Venting @ 1939 psi
	↓ Changed PTC
	yawed some -
	Was in R+ yaw - now left
	plus some pitch
	may have been in roll some
	Roll rate before She vent .2 °/sec
	18 min/rev
109+04	earth 18°
109+09	1st hack at PTC - 3.6°/se
	1+45/Rev
	↓ 3+50 sec for 2 Revs -

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 65

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
109+13	MC+W - Battery light flickering
109+15	Battery 2
109+16	High Bit Rate -
	Battery 2 looks OK now - think it was a temperature sensor failure -
109+20	Back to LBR
	-SPAN Says No problem on roll rate
109+40	3+49 min y data - $\gamma = -6.24$
	She ΔV change .2 fps based on rotation
	Fido sees no effect yet

MSC FORM 1441 (APR 66)

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 66

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
110 +30	↑Lovell briefing:
	① Need to verify if CM power can be transferred to CSM & charge Battery
	② MCC 7 @ 5 hrs
	③ SM Jett right after MCC
	④ Power up CM including G+N -4 to -2 hrs
	⑤ LM Jett @ -1 hr
	⑥ What to do about suited entry and OPS
↓	Jims thoughts -
	① wants to get stowage done early
	② OPS + PLSS not needed if CSM consumables OK - he would just as soon leave OPS + PLSS in LM
	③ How would he align PGNCS
	Told him - ① get set up as per MCC proc ② go to AGS/all angles ③ Coarse align - to MCC supplied ④ Sight on Moon -

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

MD
FLT
CAPCOM
Rec Council
" Status
Retro

WEATHER FORECAST

Apollo 13
(T+111 Update)

SHEET NUMBER 22

DATE/TIME OF PREPARATION:

16/1000 GMT

0400 CST LOCAL

MPL
EOM
17/18Z

LANDING AREA	CLOUD BASE/COVER	WIND DIR/VEL DEG/KTS	VSBY-MI/ WAVE HGT-FT	ALTIMETER	REMARKS
21040'S 165°22'W	2000 SCTD HIGH SCTD	090/15	10/4	29.88	WIDELY SCTD SHWRS <10% AREA
N 21°S 169°W	2000 SCTD HIGH SCTD	080/15	10/4	29.82	
S 23°S 168°30'W	2000 SCTD HIGH SCTD	080/15	10/4	29.86	

LM TO CSM POWER TRANSFER

ASSUMES ALL DES BATTERIES ON-LINE AND NO ASCENT BATTERIES ON-LINE

LM CB (11 and 16) - ASC ECA - CLOSE (2)
BATT 6 NORM FEED - ON
BATT 1, 2, 3, and 4 - OFF/RESET

CSM CONNECT LM/CSM UMBILICAL
CB - LM PWR-1 MN B - CLOSE
CB - LM PWR-2 MN B - CLOSE
CB BATT B PWR ENTRY/POST LANDING - CLOSE
CB EPS SENSOR SIGNAL MAIN B - CLOSE
CB MAIN B BATT BUS B - CLOSE
VERIFY MAIN BUS VOLTAGE
LM PWR SW - CSM
CB MAIN B BATT BUS B - OPEN
CB BATT B PWR ENTRY/POST LANDING - OPEN
VERIFY MAIN BUS B VOLTAGE

LM BATT 1, 2, 3, and 4 - HI VOLT - ON

NOTES:

1. CIRCUIT BREAKER PROTECTION LIMITS CURRENT TO 15 AMPS

2. LM/CSM UMBILICAL IS "HOT" AND MAIN BUS VOLTAGE MAY BE MONITORED BY SELECTING MAIN B

POWER REMOVAL FROM CM/LM UMBILICAL

ASSUMES ALL DESCENT BATTERIES ON-LINE AND ASCENT BATTERY 6 ON NORMAL FEED

CSM CB66 LM PWR 2 - OPEN
CB74 LM PWR 1 - OPEN
EPS Sensor signal MN B - open

LM CB(16) EPS : BAT FEED TIE (2) - OPEN
BAT 1 HV - OFF/RESET
BAT 2 LV - OFF /RESET THEN ON
BAT 2 HV - OFF/RESET THEN ON
BAT 1 HV - ON
CB(16) EPS: BAT FEED TIE (2) - CLOSE

Batt A Charge Proc

PNL 250

CB BATT A PWR ENTRY/POSTLANDING - Close

PNL 275

CB INVERTER PWR 2 MAIN B - Close

PNL 5

CB BAT RELAY BUS BAT A - Close

CB EPS SENSOR UNIT AC BUS 2 - Close

CB EPS SENSOR SIGNAL AC-2 - Close

CB BATTERY CHARGER MN B - Close

CB BATTERY CHARGER AC PWR - Close

CB BATTERY CHARGER BAT A CHG - Close

CB INVERTER CONTROL 2 - Close

CB INVERTER CONTROL 3 - Close

SW MAIN BUS TIE BAT A/C - OFF

SW BAT CHARGE - AC-2

PNL 3

SW AC INVERTER 2 - MN B

SW(65) INVERTER 2 AC BUS 2 - ON (up)

SW(67) AC BUS 2 RESET - RESET (CENTER)

SW. BATTERY CHARGE - A

SW DC INDICATOR SEL - BAT CHARGER

REPORT CHARGER CURRENT AND VOLTAGE TO MSFN EVERY 10 MIN. FOR FIRST ½ HOUR, THEN ONCE EVERY 30 MIN. (MSFN WILL CALL)

FLIGHT DIR MISSION LOG	DAY	REV	PG 67

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
110+38	MC+W - Batt 2 looks OK to us -
	MC+W OFF - Cb pulled
110+57	Batt charge procedure read up also power down procedure
	Turned Biomed off - much better ~~data~~
	Voice - No data anyway
111+34	What heavy things can we stow in the CSM SRC areas ?
111+36	Turns out Battery charge procedure not really ready - or at least the Span switched a little on Battery relay bus
111+56	- HBR -
112+07	Ready for charge
112+11	Fred didn't hear the she go - he was asleep -
112+11	Battery charge initiated
	34.3v - 2.5a

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 68

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
112+14	CSM Not Venting now
	Δamps = 6.9 amps
112+16	Back on LGR
112+24	Power amp cb open
112+25	~~34.6v~~ 2.05 (under slightly) 34.6v -
	Jack can see Stars + Constellations some times when no quad reflections
112+35	35.0v 2.4a - Batt charger
112.+48	37.8v 2.3a - Batt char

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Subjects for our Team
Info -	MCC - ASS/Manual/Timed C/O
98+56	CB EPS - ASCECA Cntl CB.
	Pur Proc.
	Single Pt. Failure -
99+49	BATT MAL ✓
101+55	7 Minutes of CSM HBR
105+~~30~~ 18	MCC-S
	L, OH procedure -
107+59	Vent freezing DPS (SPAN)
108+54	She Venting -
	Briefing Subjects;
	Plan for checklist readup -

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 64

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
113	Briefing - Black Team ON
	Yee - 6.25
	FIDO Wellkehood - 114
	Guid -
	Telmer
	BATT Mal #2 - Sensor Circuitry.
	no longer Mal.
	Pulled Master/Alarm C/B.
	Seem TM/ he gets BAT Mal lite
	To take Asc Batoff - Close ~~AC~~ CB ASC ECD - cntl
	Turn batt off - BAT6 normal off -
	To take Desc batt off - normal proc
	Tape on another CSM canister
	Control -
	No comments -
	Blowdown 800 fps -
	GNC Will have to preheat
	Pipes - degrade - OK from cabin temp

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 20

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	EECOM
	Charg Data - Normal -
	5 min data -
	CAPCOM
	Surgeon - Sound good -
	Inco - fast PTC -
	every 1 min -
	Does not need to switch
	6th Repress / Surge -
	Rex -
	PCMU - Pur removal from umbilical
	assumes Bat 6 only
	From now on / CM pur to Entry
	checklist

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 71

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	FDO - hoping that Lovell will go to sleep -
113/15	↑ CSM Cannister -
	Put new cannister in line -
	Put Cardboard around sides -
	Tape up good -
	113:20 CO_2 ≈ 1.7
	So 2 CSM cannisters took us from
	94 hours
113/20	↓ Fred Said something I did not copy -
	Sounded sort of trivial -
	↑ need another charger readout
	↑ Going take 8 hours before entry c/c
	so they can take easy -
	IHCO) still switching omnis
113/23	↑ Goaked with CSM cannisters when
	you can

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 72

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
113/30	↓ 38.9 / 1.9 a
113/26	↓ Fred – Jack & Jane awake –
	Fred just got 5/6 hours –
	Not inclined to go back to sleep
	Jim Sleeping
113/36	Telm – CO_2 coming down –
	H_2O Speed down also –
	must have at least one cannister
	taped on –
113/38	↓ 1 of them rigged
	Explained his technique
	Modded the procedure –
113/56	↓ Both Cannisters rigged
	↑ How's H_2O ??
	↓ Hdn't tried to get potable H_2O yet today

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

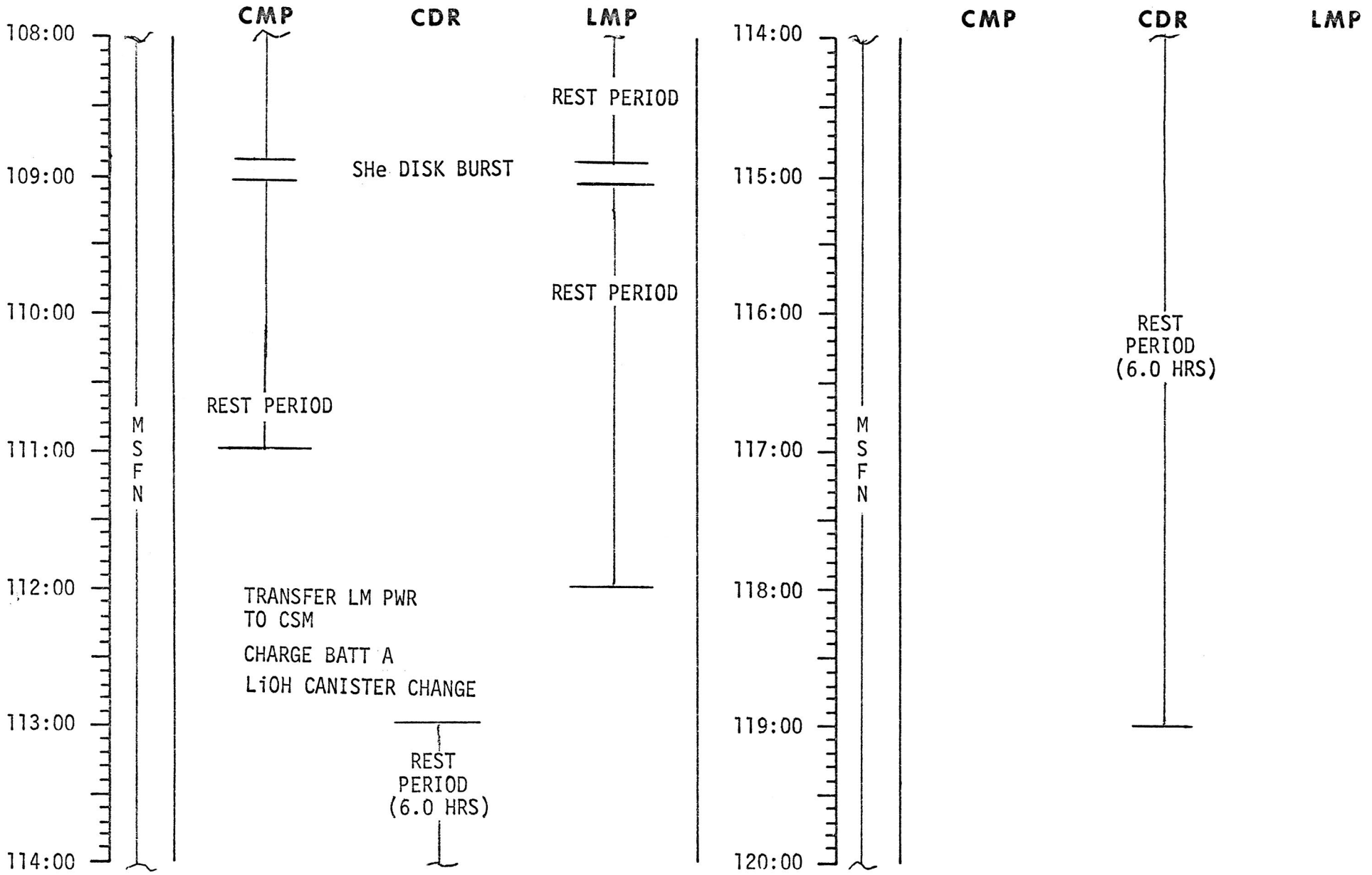
SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

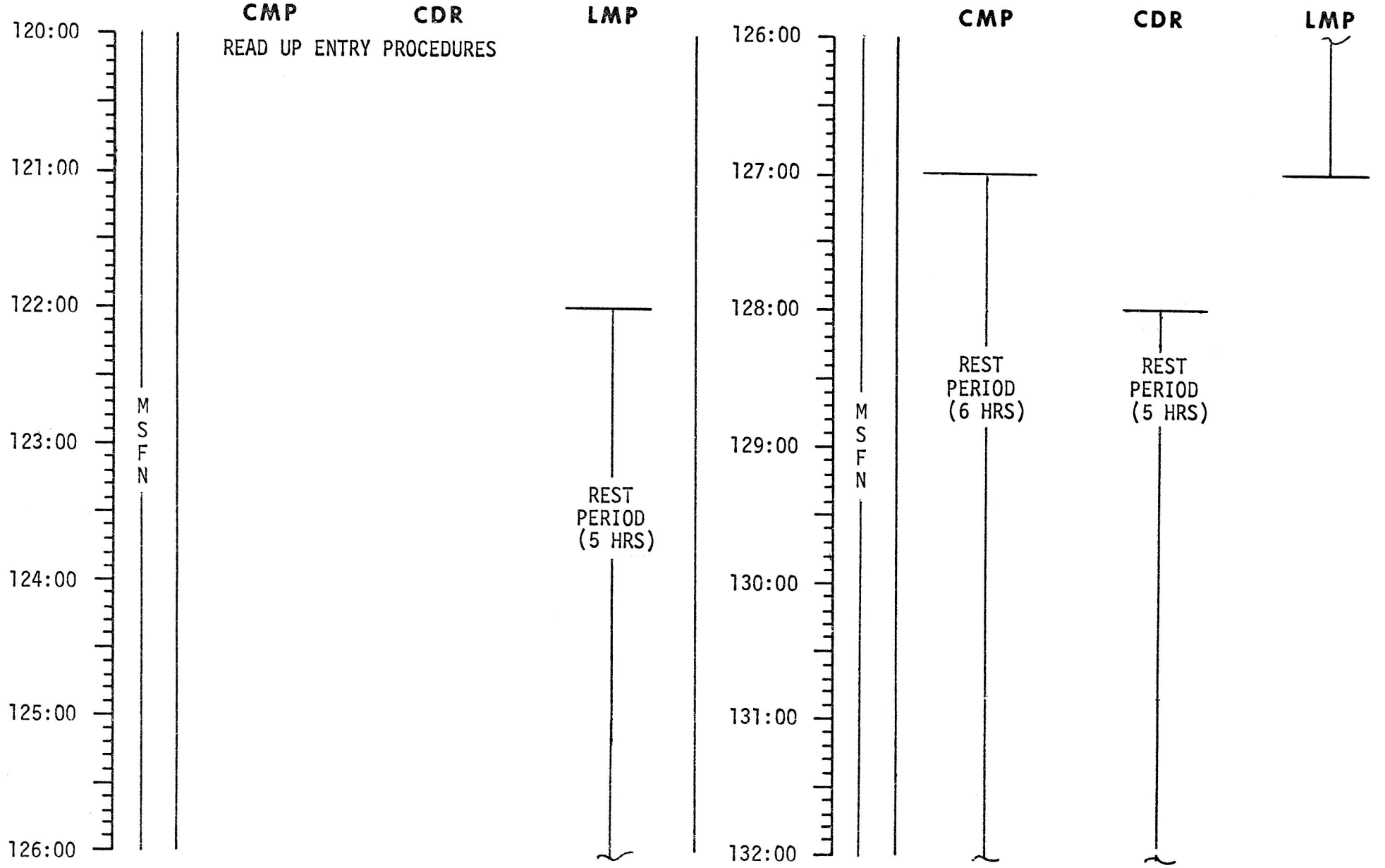
FLIGHT PLAN

114/30 GET



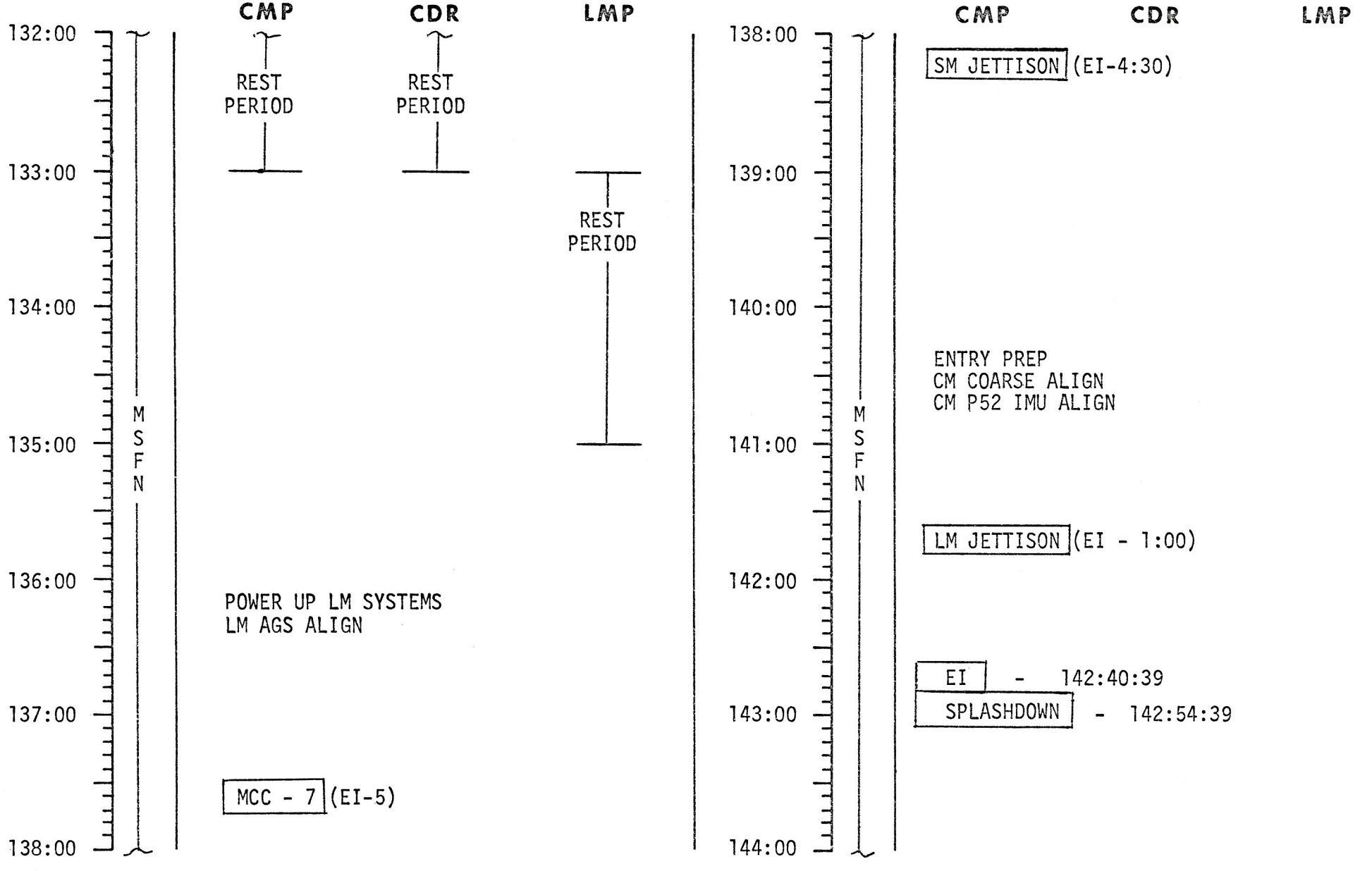
MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13		APRIL 15, 1970	108:00 - 120:00		5

FLIGHT PLAN



MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13		APRIL 15, 1970	120:00 - 132:00		6

FLIGHT PLAN



MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 13	114:45	APRIL 15, 1970	132:00 - 144:00		7

GET (114:45)

Apollo 13
Thermal Status
Command Module

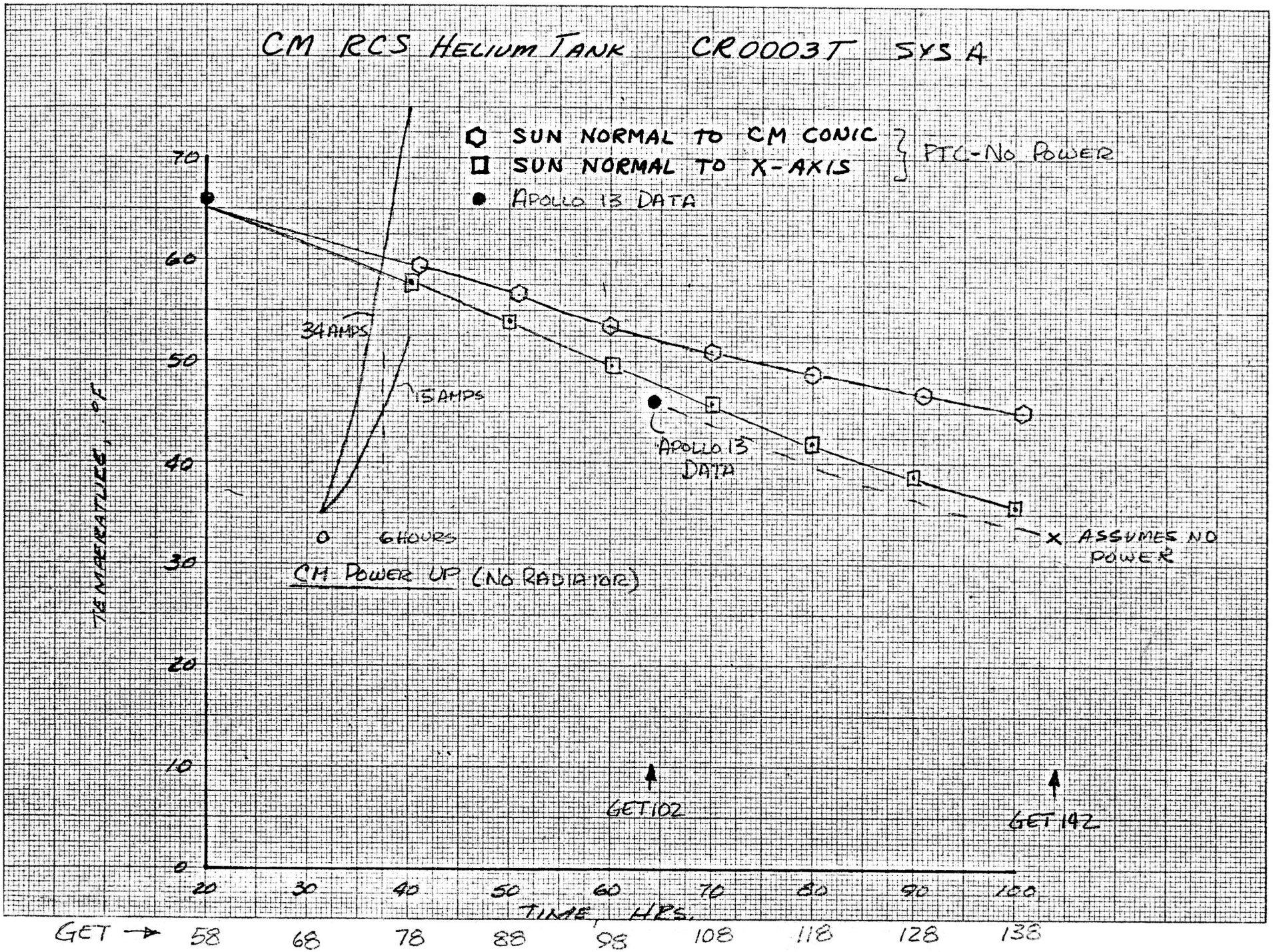
	GET 58 Act.	GET 102 Pred.	GET 102 Act.	GET 142 Assumes Est. No Power
CM RCS Helium				
Tank A	66°F	48 to 52	46°F	33°F
Tank B	60°F	42 to 48	49°F	41°F
CM Oxidizer Tanks		43 to 48		36°F
CM Fuel Tanks		49 to 54		41°F
CM Potable Water		35 to 44		31°F
CM Waste Water		41 to 48		35°F
CM RCS Engines				
5C CR 2110T		—	42°F	—
5D CR 2116T		17	21°F	16°F
6A CR 2114T		11	32°F	29°F
6B CR 2100T		—	44°F	—
6C CR 2103T		12	31°F	28°F
6D CR 2119T		14	27°F	26°F

Addition of power to the CM will increase all above tabulated areas, but will have least affect on the RCS engines. RCS engines are heated if ANY temperature is below 29°F.

Service Module

	GET 58 Act.	GET 102 Pred.	GET 102 Act	GET 142 Est.
RCS Helium				
A	80°F	48 to 70	68°F	67°F
B	72°F	↕	60°F	60°F
C	81°F	↕	67°F	66°F
D	70°F	48 to 70	63°F	62°F
SPS Fuel Stor.	74°F		73°F	72°F
Fuel Sump.	72°F		71°F	70°F
Ox Stor.	72°F		71°F	70°F
Ox Sump.	60°F		60°F	60°F
SPS Feedlines (4 Measurements)	69 to 73°F		68-77°F	68-75°F
SPS Helium Tank	82°F		72°F	70°F

K+E 10 X 10 TO ½ INCH 46 1323
7 X 10 INCHES MADE IN U.S.A.
KEUFFEL & ESSER CO.



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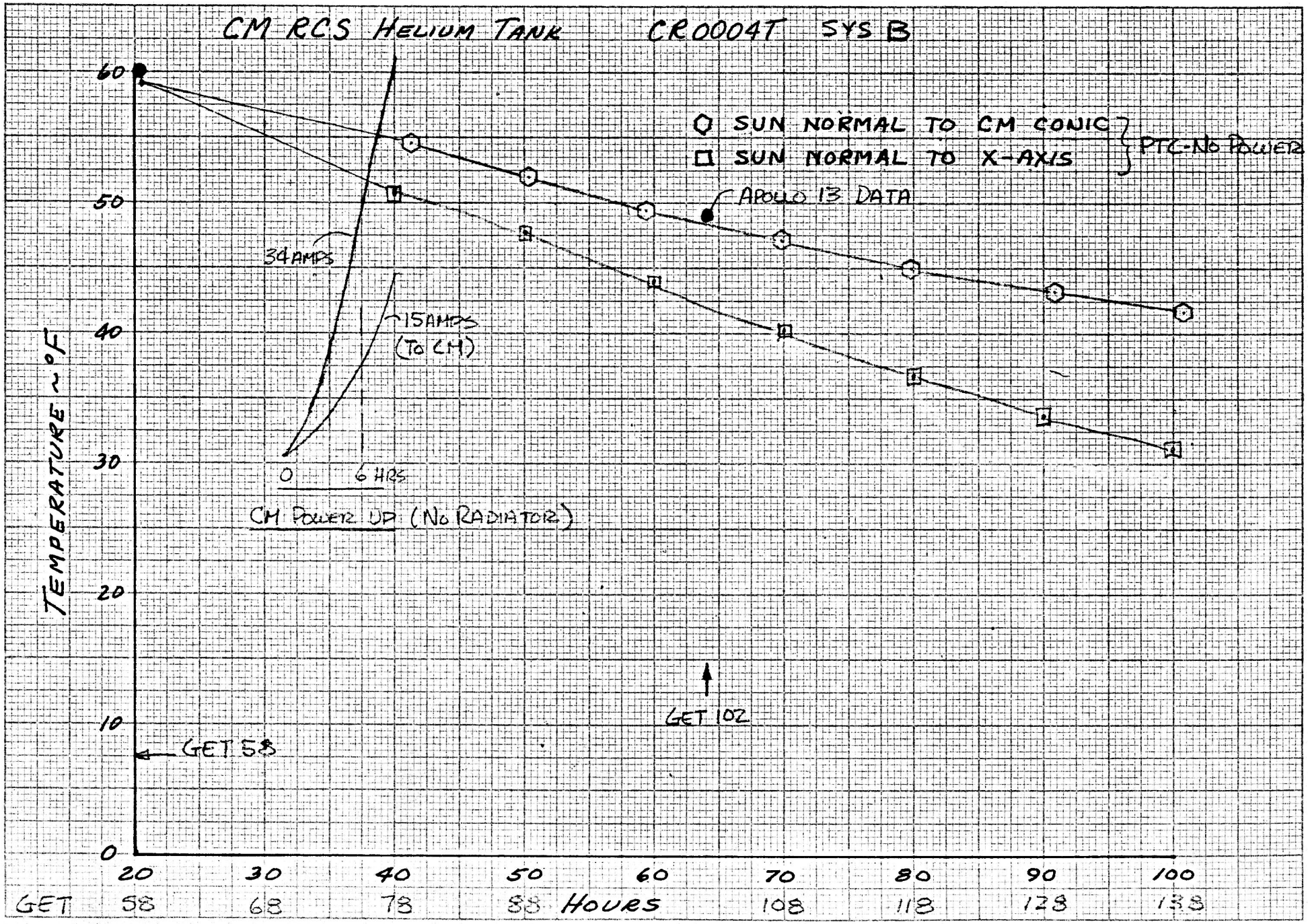
7 X 10 INCHES MADE IN U.S.A.
KEUFFEL & ESSER CO.



K+E 10 X 10 TO ½ INCH 46 1323
7 X 10 INCHES MADE IN U.S.A.
KEUFFEL & ESSER CO.

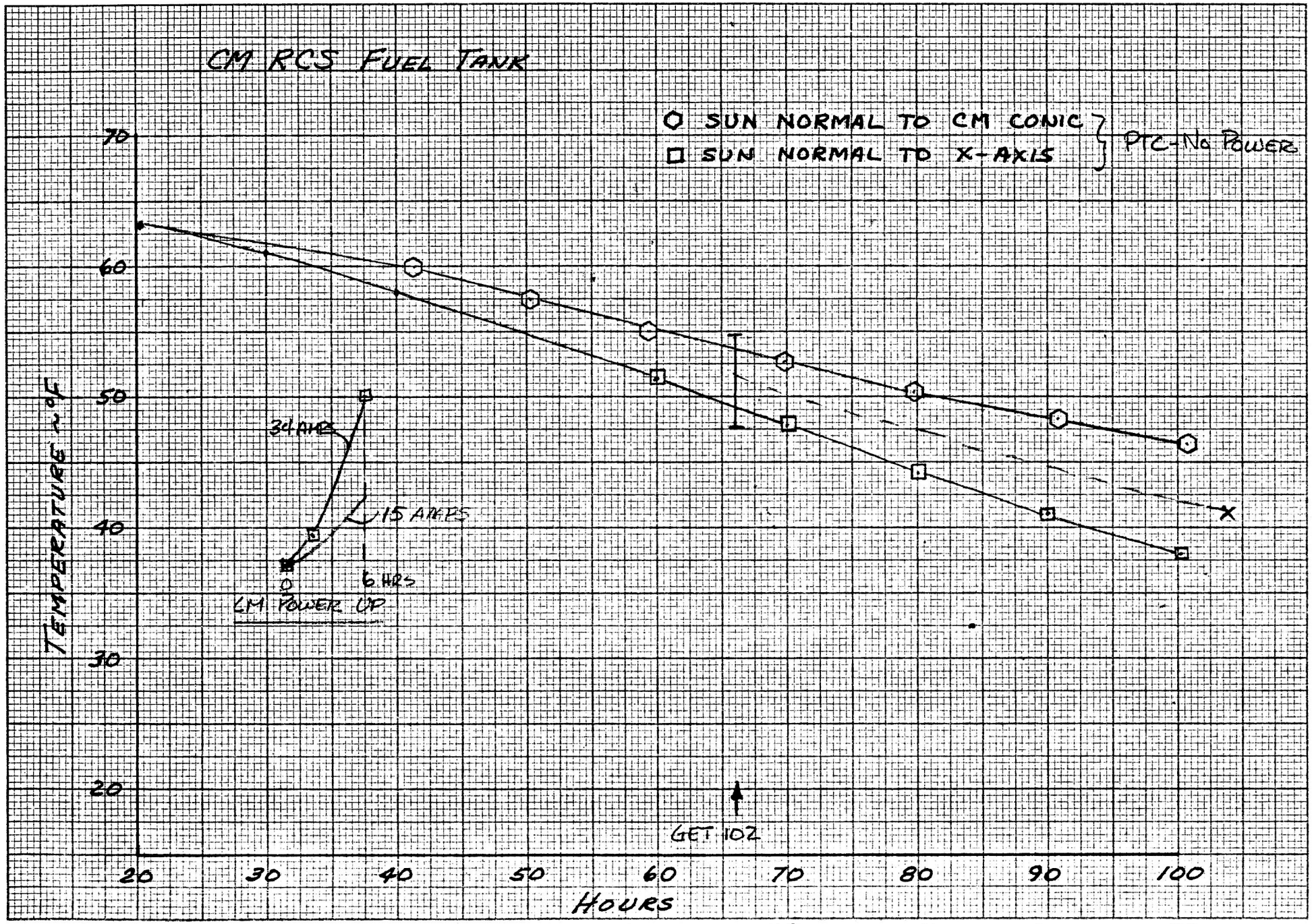
CM Oxidizer Tank

○ SUN NORMAL TO CM CONIC
□ SUN NORMAL TO X-AXIS
} PTC – No Power

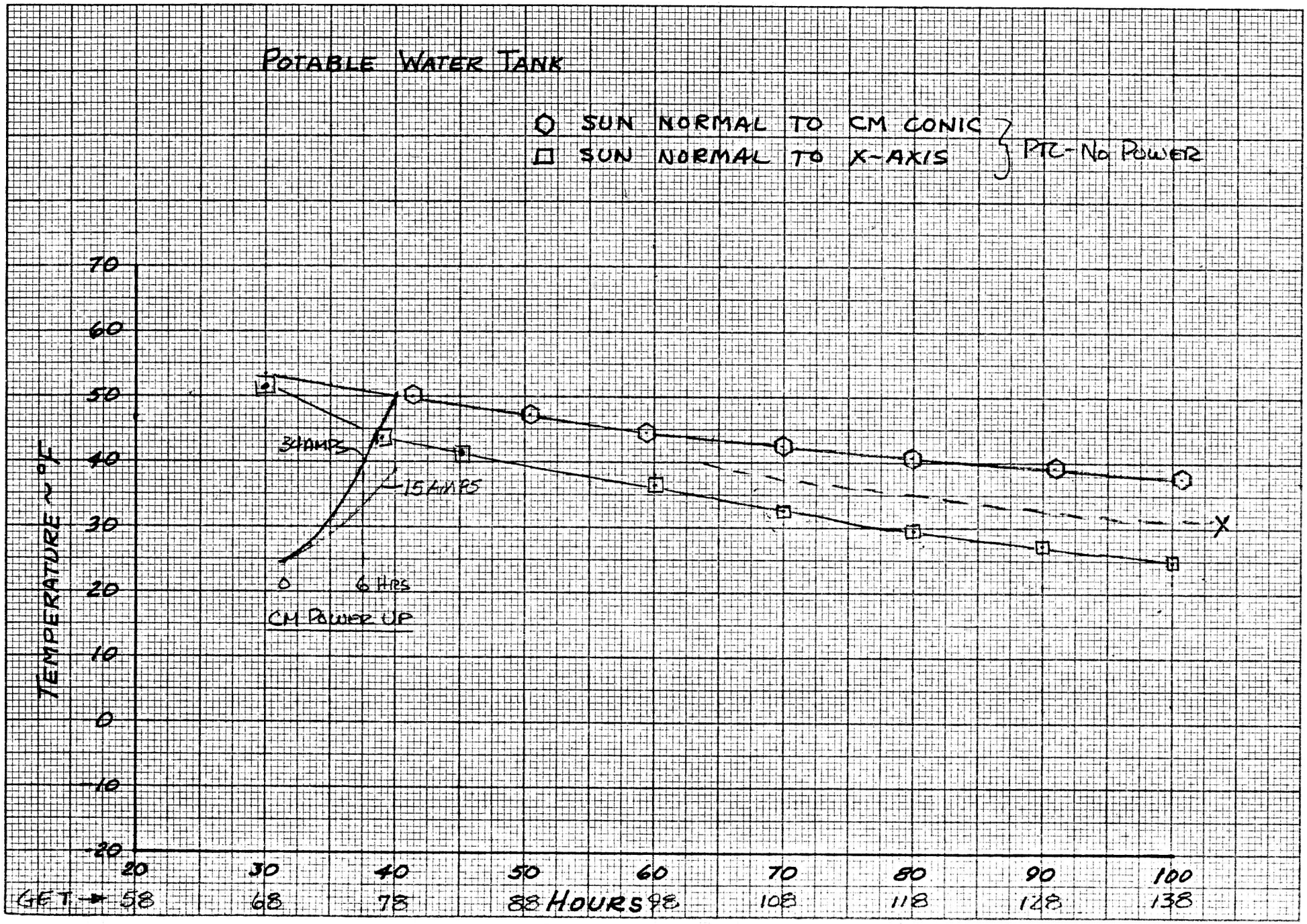


K+E 10 X 10 TO ½ INCH 46 1323
7 X 10 INCHES MADE IN U.S.A.
KEUFFEL & ESSER CO.

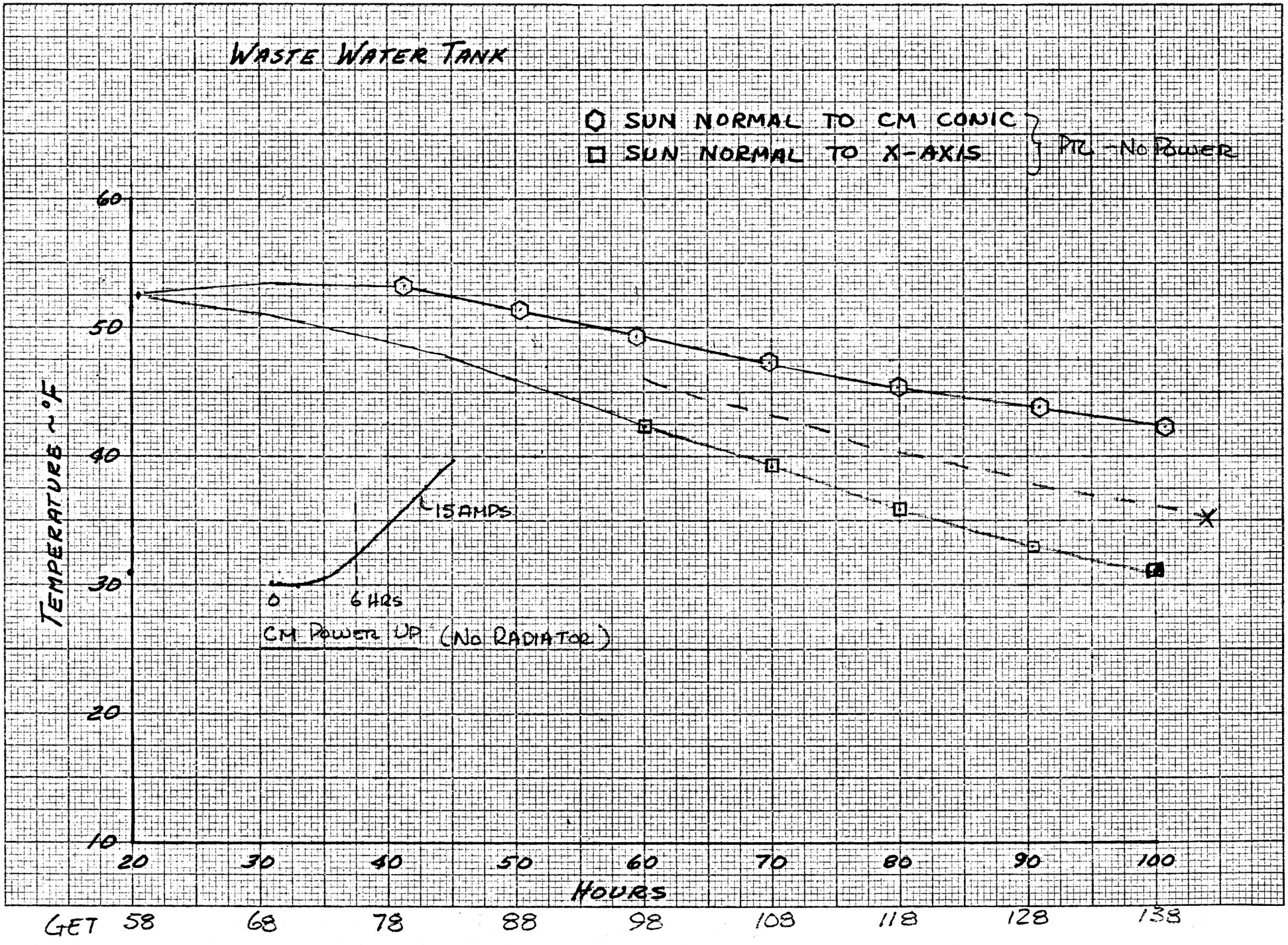
492



K+E 10 X 10 TO ½ INCH 46 1323
7 X 10 INCHES MADE IN U.S.A.
KEUFFEL & ESSER CO.
510

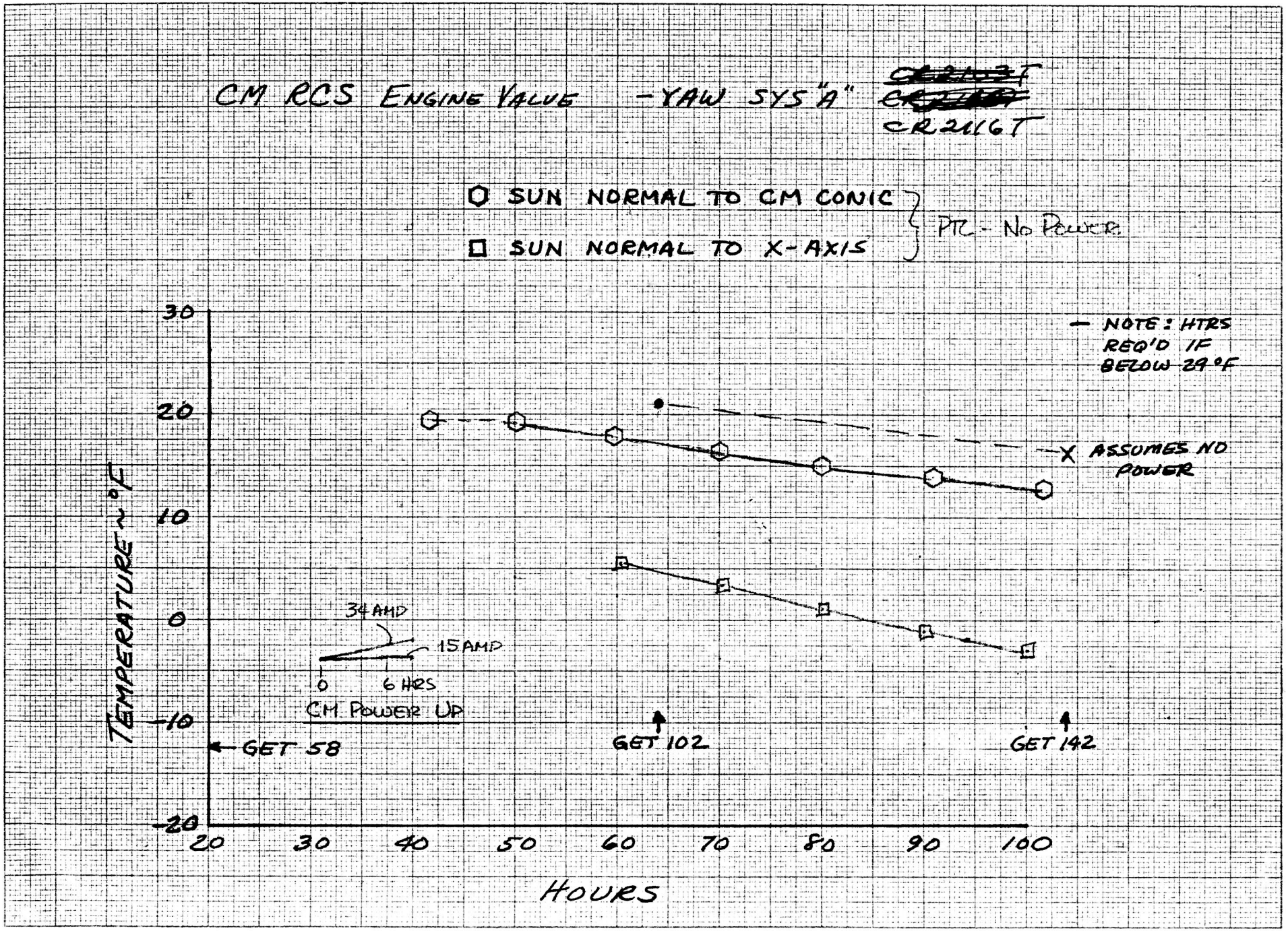


K+E 10 X 10 TO ½ INCH 46 1323
7 X 10 INCHES MADE IN U.S.A.
KEUFFEL & ESSER CO.

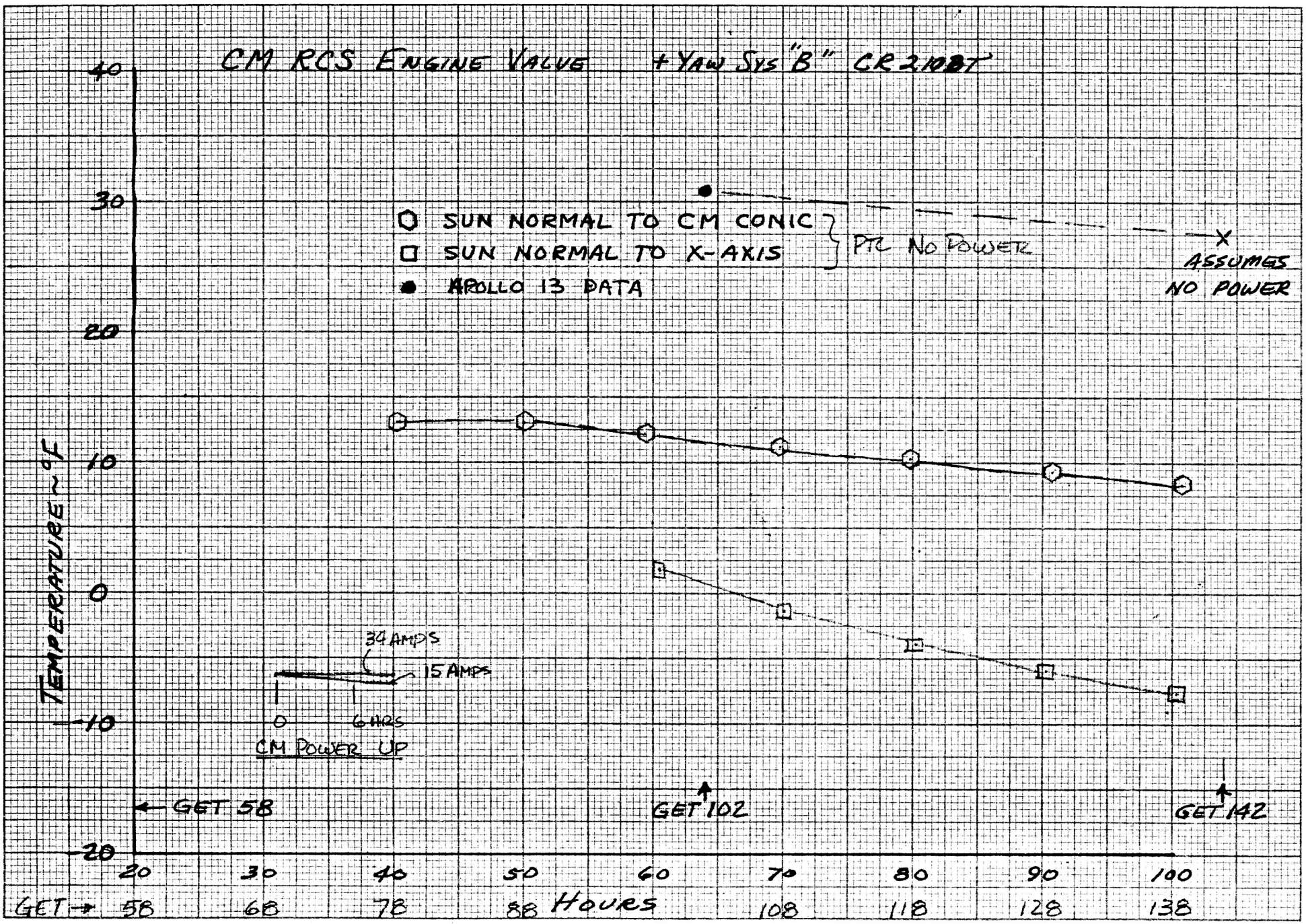


K+E 7 X 10 TO THE CENTIMETER 46 1513
18 X 25 CM. MADE IN U.S.A.
KEUFFEL & ESSER CO.

675



K+E 10 X 10 TO ½ INCH 46 1323
7 X 10 INCHES MADE IN U.S.A.
KEUFFEL & ESSER CO.



(EECOM,GNC) 1. During the dual operation, the only CSM data would be sim data from the CMS. Since only one source, we will tag this data as R/T and use real-time displays.

(TELMU,CONTROL) 2. With two sources of LM data (sim and real world), one must be tagged as P/B and one R/T. In order to retain BATT AH CALC and history tabs for the real world LM, this data will be tagged as P/B. The only known disadvantage in this mode of operation is that GUIDO/FIDO will not be able to "SAVE" either state vectors or REFFSMATTS from the LM simulation data. This should not be a significant constraint since MCC-7 will probably be done in AGS with no vectors to save. This data can be saved from the CSM data.

(INCO,GUIDO) 3. CMD capability in real world will be given up to get this capability in the SIM. No impact on mission support.

(FIDO) 4. FIDO says looking at simulated LSD trk will be of no use to him. Since the monitoring of real world track data would be compromised somewhat by adding this to the sim, this will not be done.

5. Jim Miller and company are verifying the MCC interface with the Houston simulators tonight (UNIVAC 418 - performing the same function that the ALDS performs for the KSC simulators). The FSD people (Sanborn, Mager, Miller) seem confident that the system will work.

6. A maximum of approximately 10 minutes would be required to return from the sim configuration to a full mission support mode. This assumes the LSD track remains normaled through.

7. The comm configuration for the sim will be the dual ops mode as planned for the EVA's. The sim would use the loops planned for CSM solo support (AFD/MSFC, A/G-2/GOSS-2).

8. ALSEP support is planned from 7 AM - 7 PM Thursday. The sim would require that ALSEP use Mode 1 command during this period.

9. RETRO has one RTCC machine scheduled for Thursday at 2 PM. An alternate approach would be to let the trench do their preps there and only include the two sets of systems people in the integrated sim. If you go this way, you still might want the GUIDO in the integrated sim with the trainers.

H. Draughon
4-16-70

FLIGHT DIR MISSION LOG	DAY	REV	PG 73

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
113/59	↑ Charger R/O
	↓ 39.0 1.7
114/30	↓ 39.0 1.75A
	Talking To FAO - Storage sounds OK -
	Their approach is To minimize the
	Traffic / So there are a few items
	To bring back from CM / what is
	already stowed in CSM will be left
	alone unless required To dump it into
	CM -
	So that looks like not too heavy
	aboard -
114/30	Neil H. going over To CMS/CMS with
	CM / CSM checklists - will be back

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

Consumables @ 115 HRS GET

Water	163 hrs	122# Rem	2.5 #/hr - No Change
Oxygen	229 hrs	34.29# Rem	.3 #/hr up from .21
Batts	172 hrs	1046 ah Rem	18.5a down from 20.0 5.9a Ascent
L. OH	143:30 - Present Conf 37 hrs Available LM		
Battery A	5.7 ah back in	(costs 6.5a per hr)	

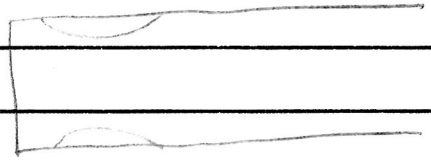
Ascent Stage

Water	32 hrs @ 2.5 #/hr	
Oxygen	22 hrs @ .22 #/hr	+10#
Batts	49 hrs @ 12.5a	

ΔV - DPS ~800 fps
RCS (Ascent Feed) 723 fps

γ Now - 6.14 - present thinking -6.25 to -6.75

FLIGHT DIR MISSION LOG	DAY	REV	PG 74



SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	w MCC (1.6 fps) (2.2 now)
	GET L 142:54:39
	GET EI 142:40:39
	LM JETT 141:40 (Tunnel press) (1.6 LM) (1 CM)
	SM DUMP 138:10
	GET MCC 137:40:39
114/56	↓ Couldn't get us on either omni for awhile -
	↑ Think lost lock at MAD for awhile
	↓ Vacuum perigee
114/59	↑ 23.6 w/o MCC (
	-6.2[illegible]5
	MCC - 2 fps
	20 w/MCC
	little Banter about no Urine dumps -

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 75

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
115/09	↓ 39.2 1.6A
115/14	Stanley CP going TO P.M.
	We will be on 1 for 1½ hrs.
	BAT A will be fully charged - 127 GET
	B " " " " 129 GET
115/38	↓ Jim Lovell up - relieved watch -
	No questions -
115/40	LUX GOOD
115/43	BAT MDL BLINKING
115/44	↓ 39.2 1.4
	↑ Told them of BAT MDL

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 76

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	for Gene
	No Sun filters for SXT
	BATMAC Temp — Not - Glycol Temps
115/50	Reverse Current - Not - would see
	Over Current — Not/would see + also take batt off
	Thermal wafer switch on battery giving
	because it is purdie batt - it
	signal conditioning logic circuitry was
	culprit, it would stay on. ∴ it
	is in temp circuit which is deactivated
	when bat off -
	When problem originally occurred, bat
	off for 1 hour. When back on, got the light
	again. It's conceivable that it is contam
	in O/C, R/C sensing circuit but bat is on

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 77

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	The thermal wafer switch
116	Net VSM problem for 2 minutes
	Cannot switch channels
116/30	↓ 39.3 1.25
117/00	↑ Prop Tank Temps
	RCS 55° A 55 B -
	DPS ~~68°~~ #1 64°F 65 OX
	#2 67 66
117/05	↓ 39.3 1.2 A
	↑ Reset H_2O QTY to reset in 45 min
	when you get Caution lite -
117/17	CP Stalby Coming back up -
117/20	Control Don't ~~do~~ need any more DPS Prop
	Tank Temps

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 78

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
117/34	↓ QTY lite -
117/50	↓ 39.3 ✓ 1.26 a
117/55	Jim says too cold to sleep in CSM -
119/00	-6.14 currently
	-5.25 neg lift to peak g
	hold 4g, 2500 miles
	-6.51 Target
	-7.4 15° 12g peak
	undershoot
	Can fly ~~to Target~~ 1250 mile range
	up to -5.6
118/25	9.3 AH back in at 29.8 AH in A
	↑ Check Charge - 30 AH in
	39.3 1.26 a

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 79

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
118/28	↑ What doing about cold?
	↓ lunar boots / repair underwear -
	reluctant to break out suits -
118/37	H_2O separator dropped, coming up
	3100 → 1400 back to 3031
	Telmer
	Telmer Went to auto on suit, [illegible] - now back to
	close -
	Correlated w/ H_2O sep increase
	OK now - So won't bother him
118/43	Did not do intentionally
	LiOH V got caught in it or bumped it
	hose
	WATCH FOR THAT KIND OF STUFF
118/57	Ford Comment
119/	BAT CHRGE
	McDivitt wants more CSM HBR
	We will wait until GDS 210 & another
	pilot is up ↓ 121:40

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 90

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Should be able to be done on LM PWR TO GDS
	To watch for -
	1) when present double cannisters run out - Go To Pri on LM cannister -
	2) CSM HBR at GDS with Jackson Fed up - To Terminate BAT A charge & pwr up Comm on LM pwr
	for Thermal data
	3) Story To crew on overall plan - Procedures Read up -
	This reading will Take some Time - all are working on it - Hope it gets done on Time -
	Get crew feeling on when They want To be awake Tomorrow - That's the day.
	4) Too cold To sleep in CSM

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 91

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	One of the ECS valves (suit relief) was bumped by LiOH hose. (Maybe crewmen sleeping on Ascent cover) Watch for that kind of thing -
	5) You will run out of Descent H_2O at some time (125 - maybe later in ~~[illegible]~~ measurement uncertainty) Better have people watching for it. & switching to ASC H_2O
	6) ~~Get some~~ Find out what LM budgets are being run for Tomorrow - EFK has them doing something - Perhaps you ought to check on them every once in a while

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	MGMT BRIEFING
	MCC DONE (INCORRIDOR)
	IN PTC
	QUIET, PROCEDURES IN WORK
	CHARGING BAT A.
	① CONSUMABLES
	LM ON Sheet
	CSM - Good Surge 762 & Repress 840
	118:27 - BATS - A - 29.8 B 37.3 C 38.8
	② COMM - SAME
	③ TRAJ - -6.14 vice 6.5
	④ Weather - Very good.
	⑤ PROCEDURES -
	⑥ REST CYCLE
	142:54 SPLASH
	142:40 EI ~~140:~~
	~~137:40~~ ~~MCC~~ ~~138:10~~ 141:40 LM JETT out of plane
	~~140:10~~
	~~138:10~~ 138:10 SM JETT in plane
	137:40 MCC-7
	136:40 PWR UP LM AGS ← ~~136:~~ 136:10 START IMU HTR PWR
	PREHEAT CM RCS

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	LAST NITE - MCC, PTC, She disc
173	Onduty - Team Briefing
	$\gamma_{EI} = -6.25$
	BAT 2 MAL = Thermal wafer switch
	Thermal data - generally good / probable preheat
	LM PWR TO CSM from now on / keep config
	Charging BAT A (START - 112/06 EST 127)
113/15	CSM CANNISTER
113/36	CO_2 coming down
113/26	Jack & Fred awake Fred (5/6 hours)
	Jim sleeping
113/56	BOTH RIGGED (CSM CANNISTERS)
	CHARGER READOUTS EVERY ½ HR.
115	TRAJ update 23.6 (-6.25) w/o mcc
115/30	Jim up - Fred Jack To sleep -
	WX GOOD
115/43	BAT MAL TOLD HIM SENSOR
117	PROP TANK TEMPS
117/20	DON'T NEED ANY MORE DPS TEMPS -
117/34	QTY LITE
117/55	TOO COLD TO SLEEP IN CSM (LUNAR BOOTS)

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 92

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	7)
	— Gold Team On —
120+00	Battery readouts
120+18	Suit circuit relief valve in auto again — told him to go to close
120+22	Bringing up power amp
	Briefed crew on general plan
	1) Timeline of all major events
	Entry Interface 142+40
	EI - 6.5 hours IMU htr power
	- 6.0 Power up LM
	—
	Att control discussion of LM/CM combination.
	AGS att hold - wide deadband for LM lett.
	CSM align - moon - sun - ~~[illegible]~~
	Hatch integ. check - suits off for entry
☆	Went over the whole plan w/crew and they understand the general plan.

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 03

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
[redacted]	Batt A Voltage - 39.5 V
121+00	Batt Charger Current - 1.25 a
	Retro - MCC #7 coming up - 2.2 fps at last look
	Fido - New vector coming
*	Guido - Needs to confirm docking inclop. before course adj.
	Control - No pubs.
	Telmu - power up procedure Will go to LM primary on LiOH when we use up present config. GET 138 ~~[illegible]~~ hours in present config. O.
	GNC - CM RCS pre heats
	EECOM - powering up stuff Charging batt A - ≈32 AH in.
	Surgeon - Would like a crew status report. Heart readout. Bio med data to 210' dish
	FAO - Stowage checklist Sleep plan

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

ENTRY STOWAGE

4/16/70
14:30

ES-1

LM TO CM EQUIP XFER
(DELTA FROM LAUNCH STOWAGE)

	ITEM	STOWAGE LOCATION
1)	DSEA	R13
2)	LM FDF	R1, R2, R3
3)	3 PPK'S	A8
4)	16MM, 70MM EXP FILM — ALL FILM →	R13
5)	02 Hose Screen Caps	On 02 Hoses
6)	(2) 70MM Hssblad	B6 in empty LiOH Volume
7)	B&W TV Camera	On top of A7 & A11 in Decontam Bag
8)	Flag Kit	A-8
9)	LM Fecal Bags (Used)	R9, WMS, Chute

CM TO LM EQUIP XFER
(DELTA FROM LAUNCH STOWAGE)

	ITEM	CM STOW	LM STOW
1)	Cabin Fan Filter & Bag	PGA bag	ISA
2)	Decontam Bags (Except ones to wrap camera)	A8	ISA
3)	(2) LCG'S	UI	ISA
4)	(4) LiOH Can (Units used in LM)	B6	Jettison Bag

NOTES:

1) ISA after loading, secure to R.H. Restraint system.

2) Jettison bag secured to PLSS on floor.

FLIGHT DIR MISSION LOG	DAY	REV	PG 84

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Recovery - Wx looking good 4' seas 2000 std. Carrier almost on station.
121+28	FAO has stowage list - see previous ~~page~~ page.
	Fido just took in a new vector. δ is -6.0 - pretty confident #
121+48	Batt A - 39.4 Charge Current - 1.25
121+51	Stowage list read up - see previous page
	Latest MCC 7 shows ΔV of 3.1 fps see next page. Based on 12 hours of data.
122+15	Open CB power amp C.B Pin power amp & pin
	Nobody has or trained.

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

RETURN TO EARTH STATUS 121:00 GET

PRESENT TRAJECTORY

hpc N/A

V_{400K} 36 210

GAMMA $_{400K}$ −5.99

hp +26.8

LAT_{IP} 21:40S

$LONG_{IP}$ 165:23W

GET$_L$ 142:54:29

FUEL CRITICAL MCC

GETI 137:39:48

DELTA V 3.1

LAT_{IP} 21:40S

$LONG_{IP}$ 165:22W

GET $_{400K}$ 142:40:40

BLOCK DATA ONBOARD

ᵖE	GETI	DELTA V	GET 400K	LAT_T	$LONG_T$	UPDATE @

Retro

FLIGHT DIR MISSION LOG	DAY	REV	PG
RSN			1

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING		
96:45	LM RCS PROPELLANT PROFILE		
UPDATED			
119:41			
			RUNNING TOTAL
TIME	EVENT	REQ'D	63.0%
103:30	OUT OF PTC	0.5%	62.5%
104:06	MAN TO BURN ATT	2.0%	60.5%
104 → 105	ATT HOLD - W DB	1.0%	59.5%
105:30	MCC ULLAGE 2.4%) 4.4%	4.4%	55.1%
	BURN & TRIM 2.0% }		
106:00	MAN TO PTC	2.0%	53.1%
106:30	INTO PTC (YAW)	0.5%	52.6%
106:30 → 136:00	FREE DRIFT	0.0%	52.6%
E-6 136:00	OUT OF PTC	0.5%	52.1%
	AGS ALIGN MAN (3-AXIS)	2.0%	50.1%
E-6 to 136:00 - E-5 → 137:00	ATT HOLD W DB	1.0%	49.1%
E-5 137:00	MCC7 MAN TO BURN 2.0%)	5.5%	43.6%
	2.0 FPS BURN 3.5%)		
E-5 → E-4¾	MAN TO SM JET	2.0%	41.6%
E-4¾ 137:15	NULL CM HOT FIRE	1.0%	40.6%
E-4½ 137:30	SM JET: +X ⅓ FPS	0.8%	39.8%
	-X ½ FPS	0.4%	39.4%
E-4½ → E-4	PHOTO SM (2-3 AXIS @ 0.5%/sec)	2.0%	37.4%
E-4 → E-3 140 → 139	AGS WIDE DB ATT HOLD	2.2%	35.2%
E-3 139:00	MAN TO LM ALIGN ATT	1.1%	34.1%
E-3 → E-2½	ATT HOLD W DB	1.7%	32.4%
E-2¼	CM ALIGN 2-3 AXIS 0.5°/SEC	2.0%	30.4%

FLIGHT DIR MISSION LOG	DAY	REV	PG
RSN	•		2

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING		
E-2 → E-1½	ATT HOLD W/DB	1.7%	28.7%
E-1½	MAN TO LM JET	1.1%	27.6%
E-1½ → E-1	ATT HOLD W/DB	0.5%	27.1%
E-1 142:00	LM JET	0.5%	26.6%

~~less~~ 13% UNCERTAINTY GAUGE, etc.

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 85

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	One helmet to man on watch – everyone else completely loose.
122+25	Advised crew to proceed with CSM TM up at their convenience.
	101,000 NM 5848 FPS
	Need batt A and charger readout prior to terminating charge.
	Going for batt readouts.
	Batt A 39.4 Current 1.25
122+47	Jack going over to CSM to terminate charge
	PCM to LBR
122+50	Terminate charge

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
123+00	Jack going over to start the CSM power up
123+06	CSM data
123+14	Going back to Batt charge
123+22	Batt A 39.4
	Current 1.4
	Batt C 37.0 — 5C 3.9
	Pyro A 37.0 — 5D 3.2
	B 37.0 — 6A 3.6
	SPS He 3400 — 6B 3.9
	N_A 2200 — 6C 3.5
	N_B 2400 — 6D 3.4
	4A 1.4
123+34	Batt A 39.3
	Current 1.3
123+39	Suit relief valve been bumped to auto.
	We want it closed. That's 3rd
	time it has happened.

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

SPAN

CSM
SPECIAL REPORT

THERMAL GET 123:30

The following is a comparison of CSM temperatures at previous data points to the present temperatures:

GET	58:06	102:01	123:08
Measurement Number			
SR 5013T RCS Quad A Helium (SM)	80	68	60
SR 5014T RCS Quad B Helium (SM)	72	60	52
SR 5015T RCS Quad C Helium (SM)	81	67	59
SR 5016T RCS Quad D Helium (SM)	70	63	59
SA 2380T Bay 6 Fuel	74	73	71
SA 2377T Bay 2 Ox	72	71	67
SA 2378T Bay 3 Ox	60	60	65
SA 2379T Bay 5 fuel	72	71	70
CR 0003T CM He Tank 1	66	46	41
CR 0004T CM He Tank 2	60	49	40
SP 0002T SPS He Tank	82	72	66
SP 0048T Fuel Feed Line	70	68	70
SP 0049T Ox Feed Line	69	68	68
SP 0054T Ox Distr. Line	73	70	71
SP 0057T Fuel Distr. Line	72	77	75
SP 0045T Engine Valve	63	61	62

CM RCS helium tank temperatures CR 0003T and CR 0004T, are still following the predicted temperature curve. SM RCS engine package and RCS and SPS tank temperatures are indicative of a reasonable PTC..

CSM ECS GET: 123:40

The status of the CSM potable and waste water tanks are still unknown. There are 3.20 pounds of oxygen remaining in the CSM surge tank. This plus the 3 pounds in the repress package is sufficient oxygen for re-entry. No anomalies can be detected and ECS appears to be capable of re-entry.

Comparison of ECS measurements:

	GET 58:04	GET 102:00	GET 123:10
CF 0001 Cabin P psia	4.9	5.1	5.1
CF 0006 Surge P psia	858	762	749
CF 0008 Suit T Deg. F	56.4	52.9	45.2
CF 0005 Cabin T Deg. F	59	52	47
CF 0019 Pri. Accum. Qty Pct	33.6	32.4	32.0
CF 0181 Evap. In T Deg. F	48.9	50.8	44.9
CF 0018 Evap. Out T Deg. F	59.2	53.0	46.2
CF 0017 Steam T Deg. F	63.8	53.8	45.5
CF 0012 Suit P psia	4.1	5.1	5.1

The cabin suit and glycol temperatures are still dropping, 6° to 7° in 21 hours. The primary accumulator quantity is holding indicating a tight loop. Suit pressure transducer which had earlier anomaly is reading correct now. Secondary coolant loop parameters indicate that it is operable also.

CSM EPS

All bus voltages and inverter performance were nominal during the data check at GET 123 hours.

Main Bus B - 29.4 to 29.2 volts (LM Power)
Battery Bus B voltage - 37.2 (Open circuit)
AC Bus 1 - 116.8 to 116.2 volts
Inverter No. 1 temperature - 56°F (OFF)
Inverter No. 2 temperature - 84°F to 86°F (ON)
Inverter No. 3 temperature - 62°F (OFF)

Inverter No. 2 had been on for 11 hours without cooling, the thermal prediction for temperature of inverter was higher than that actually experienced; actual was 84°F.

CSM Batteries - Instrumentation power-up

Prior to the power-up, batteries B and C were on open circuit and battery A was on charge. The charge was interrupted for the power-up, at which point, the battery capacities were:

Batt A:	36.00 AH remaining
Batt B:	37.33 AH remaining
Batt C:	38.81 AH remaining
Total:	112.14 AH remaining

The batteries were not used during power-up, so their status remained unchanged at completion of the power-up.

The following applicable readings were called out from the crew:

Entry Battery C volts	- 37.0
Pyro Battery A volts	- 37.0
Pyro Battery B volts	- 37.0
Battery manifold pressure	- 1.4 V = 5.04 psia

All of the above readings are nominal for present battery subsystem status.

Entry Battery Bus B voltage read 37.21 volts which is also nominal for Battery B on open circuit. Entry battery bus voltage was not on the display because it had not been returned to the battery bus when the charge was interrupted. No problem.

CSM OPERATIONAL INSTRUMENTATION

Power up at 123 hours indicated no new instrumentation problems. The pressure/temperature sensors continued to accurately monitor SM RCS quantities. The CTE indicated 8 minutes 14 seconds accumulator time at LOS. CB 20 and CB 21 were open which disabled the following measurements:

CB 20		CB 21	
SC0043T	H_2 Tk 1 Temp	SC0044T	H_2 Tk 2 Temp
SC0030Q	H_2 Tk 1 Quan	SC0031Q	H_2 Tk 2 Quan

CB 20		CB 21	
SC0041T	O_2 Tk 1 Temp	SC0042T	O_2 Tk 2 Temp
SC0032Q	O_2 Tk 1 Quan	SC0033Q	O_2 Tk 2 Quan

DISPLAYS AND CONTROLS

During the second CSM power-up, there were no displays and controls anomalies. There are no known command module displays and controls subsystem anomalies.

COMMUNICATIONS GET 123:26

Goldstone reported receipt of an S-band downlink signal at 123:05:34 and loss of the S-band downlink signal at 123:12:00. Communication system performance was nominal throughout the time period it was powered up.

SM RCS

All SM RCS data were within the nominal expected range. Package temperatures were as follows:

Quad A - 50°F
Quad B - 47°F
Quad C - 96°F
Quad D - 91°F

CM RCS

The CM injector temperatures continued to decrease. The positive yaw engine in system B continues to be the coldest at 14.7°F. This represents a more rapid temperature drop than previously expected. The expected temperature of this injector at warmup time (about 136 GET) was 16°F.

All instrumented injector temperatures were as follows:

-PB - 29.7°F
+YB - 14.7°F
CWB - 18.8°F
-PA - 29.6°F
-YA - 20.4°F
CCWA - 23.0°F

All other data indicate that the CM system is nominal.

CSM CRYOGENICS

The hydrogen tanks continue as expected to show pressures in the venting range. H_2 tank # 1 pressure is 274.3 psi and H_2 tank # 2 pressure is 276.4 psi. All other cryogenic measurements are not powered.

SPS GET: 122:19

All parameters are remaining nominal. A pressure decay of approximately 3 to 4 psi was noted in the oxidizer tank and can be attributed to helium absorption as a result of the DPS burn.

John M Crockett
GET 125:16

Scott H Simpson
125:40

4/10/70
1745

SM PHOTOS FROM LM

A. LM 70MM (Priority 1)

1) 70MM DC (Reseau) with 80MM lens from A13.

2) Fresh mag of 3400 B&W.

3) MAG R on camera or MAG S from A13.

4) Xfer to LM.

5) LM/DC/80/BW 3400 (f5.6,250,focus).

B. CM 16MM (Priority 3)

1) 16MM DAC & POWER PACK from A8.
2) 10MM lens remove/18MM from B3 to camera.
3) Attach power cable. XFER TO LM
4) 12 FPS 75
5) CM/DAC/~~18~~/CEX, BATT (f8,250,focus).
   Photos for 2 1/2 minutes then use 70MM. (CF [illegible])

SM PHOTOS FROM CM

4/16/70
1745

(B) CM 70MM (Priority 2)

1) 70MM EL with 80MM lens from B3.
Remove & stow 80MM lens.

2) 250MM lens from U4 to camera.

3) CEX film from A13.

4) Ring site from A7.

5) From Window 5
CM/EL/250/CEX, RING (f8,250,focus).

FLIGHT DIR MISSION LOG	DAY	REV	PG 87

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
123+45	Batt A – 39.4 Current – 1.25
	Jack wants to take some water out of the LM for drinking purposes.
124+02	We are going to let them have one bag of H_2O out of the LM – about 1½ lbs.
124+15	Fido – X now – 5.93
124+17	Batt AV – 39.4 Charger A – 1.245
	3.4 fps – 25 secs
	Camera discussion – told him what camera's to use for SM photos. He's got it.
125+19	Batt A – 39.5 Current – 1.24
125+19	Potable tank is empty

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

CHARGE OF BAT B FOLLOWING BAT A CHARGE

PNL 3

SW	BATTERY CHARGE	– OFF	

PNL 5

SW	MAIN BUS TIE BAT A/C	– BAT A/C	(UP)
cb	BATTERY CHARGER BAT A CHG	– OPEN	
cb	BATTERY CHARGER BAT B CHG	– CLOSE	

PNL 250

cb	BAT B PWR ENTRY/POSTLANDING	– CLOSE	

PNL 5

SW	MAIN BUS TIE BAT B/C	– OFF	(DOWN)

PNL 3

SW	BATTERY CHARGE	– B	

FOR CHARGE TERMINATION - DO BELOW FIRST

THEN GO TO PREVIOUS BACK OUT PROCEDURE

PNL 3

SW	BATTERY CHARGE	— OFF
SW	AC INVERTER INVERTER 2	— OFF

PNL 5

SW	MAIN BUS TIE BAT B/C	— BAT B/C (UP)

PNL 250

cb	BAT A PWR ENTRY/POSTLANDING	— OPEN
cb	BAT B PWR ENTRY/POSTLANDING	— OPEN

PNL 5

Cb	BATTERY CHARGER BAT B CHG	— OPEN

Not used up

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	No bagged water left.
125+34	Start entry checklist readup
	CM has been stowed with exception of the two Hasselblad camera's
	LM is stowed except for probe & drogue
	Windows in CM are coated w/ water - he'll try to clean off as best he can before sep.
125+54	Procedure for Batt B charge
	We did not readup the back out procedure. See previous page
	Batt A is now fully charged
126+03	Batt B is now on charge
	Batt B 39.6 V
	Current 1.1 A
	Batt B 40.4 V
	Current

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 89

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
126+12	Bring up good comm
126+15	Restart entry checklist readings
126+46	Batt B - 39.1
	Charger - 1.3
	Fido sez γ now -6.05. MCC7 2.7 fps
127+11	Batt B - 39.4v 1.2a - charger
	↓ Umbilical connection?
	↑ no problem there - pyro sep -
	crew want to disconnect
	are they hot? ☆
	pass coarse align to CSM ☆
	Tel Mu -
	Ascent water 1 hr from now
	128+30 - drink from descent tank
	Li OH - go to LM @ E1-8
	Suit circuit relief

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Control – pulsing system to see if constraint still valid
127+50	Network – in process of putting Gross Conf. to White House ★
	Completed – ★
	Read: ENTRY Timeline
	CSM Entry check list
	CSM G+C check
	Batt charger – OFF and cleaned up
128+	Hatch pressure check read up – S-2-6 –
~~128+05~~	
128+05	– Switch to Ascent Water ★ Feeding OK
128+30	~~Dockin~~ +2.1 Docking Tunnel index −2.1
	told crew OK to drink all descent water they like –
	LM ENTRY PROCEDURES READ UP –

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 91

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Ranging
	133 hrs – HSK 10 to 15 min
	this Vector will be used for MCC-7
1	~~Y~~ = -6.03 2.81 fps 21.39 sec
	Fred – traj status
	consumables –
	Will track @ 133
	Power amp –
	John Young – 2½ hrs very tight – 240+
	CREW SHOULD BE BRIEFED ON
	CM Battery status – that Nominal is
	106 out 118 – and don't power up items
	early ★
130+20	HSK – hand over – 132+30 to aid FIDO
130+30	Y=6.03 2.81
	ARRANGEMENTS ARE BEING MADE
	TO OPEN Room 210 AND BLD 30
	AUDITORIUM FOR ENTRY MONITORING BY TROOPS
	WHO HAVE BEEN WORKING ON ENTRY
	ANNOUNCEMENT MADE OF FD LOOP ★

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	L/D = .2905 - Retro happy with stowage
	.31 NOMINAL
	Cabin return auto
	select Pri CO_2
	142+40+58 - Begin Blackout
	142+44+03 - End
	142+48+53 - Prague
	3/4 ah from EBD to main
	2 ah if forgotten
	Sounds like we should turn on S Band power amp -
132+29	γ -6.03 2.81 fps -
	Relief valve
	Suit ~~flow~~ back to close -
	Jack awake -
	Jim awake
	E-6:30 Viewing angles
	Crew very cold
133+24	Powering up LM -
	6.9 hr pad - @ 40.7 a

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 93

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
133+35	Timer initiated –
133+45	– RCS up to temp –
	AOT - Sun angle front detent ½ way up - 18°
134+17	16 Bal load cb ~~closed~~ open now closed – OK
~~00~~ 134+27	Contingency Checklist p 8 – steps 5 + 6 Set drift + refsmatflag
134+31	Good clock update – Uplink complete – Burn Refsmatt flags Sets – OK
134+40	↑ Option 1 on P-52
134+46	Sun 246 / Moon 250 | Sun 46 / Moon 50
134+49	Marks on Sun – going to moon

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 94

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	γ -5.95
	V_{EI} 36,810 | no MCC
135+03	Crew completing the P-52
	— 01713
V06N93	— 03278 } P-52 Torque
	— 03195
135+04	Used about 3% RCS During the P-52.
**	MCC 7 137+40 ***
	Docking ∠ -2.1°
135+12	All Stowage complete except Probe/Drogue —
135+13	Crew happy with Alignment
	V74 - EMOD Dump
•	GO PGNS ATT Hold with 5° db, — we decided to stay in AGS Pulse.
135+24	ΔV MCC 7 -3.35 fps. *
	ΔTB = 23.6 sec
135+47	Decided to Perform a docked coarse align in the S/C Jett Attitude, then we will perform a normal P-52.

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG 95

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
135+52	Note: ~~we~~ I verified with SPAN(Poddy) that we have no thermal constraints after SM Jettison.
135+56	LM EMOD is GO-
136+00	P-30 Pad
	MCC-7 137+39+48
	ΔV_x -3.1
	ΔV_y 0
	ΔV_z .1
	ΔT_B 23sec
	DAP LM 25181
	CSM 62468
	+X 4Jet RCS
•	Pad read to Crew at 136+06 they said they had 1 Pad Left
•	S/M Sep Pad
•	L/M Jett Pad
•	Entry Pad
136+12*	Uplinking P-27 load for MCC-7.
	* Recommend TTCA for MCC-7.

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
136+20	Crew has provided umbilical power for start of the RCS Preheat, looks like ≈ 2A Inst Pwr from LM.
	Note: Config now is batt C on MN A & LM Pwr on MN B for Preheat.
	Consumable Status
	H2O 54.8 #
	4 #/HR USAGE
	13.7 HRS REM
	A/H 641.0 REM
	38.0 USE
	16.5 AH
	RCS 50% REM
	25% LM Jett
	13% UNCERTAINTY —
136+42	Batt A has shown a 2V Drop during Preheat, but Test meter did not show preheat.
136+45	Picked up a 12A increase in LM Current, indicating preheat Ring B —

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FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
136+47	Crew cycled into P-40
	vice P-41 For burn —
	"Advised & they thanked
	for keeping them honest"
136+50	Att Cont Mode cont —
	If goes back to AGS
	go ~~min Iv~~ pulse.
	Advised crew return
	to Mode Cont Att Hold vice
	Auto *
	Stay in PGNS Min Imp
	at Burn Attitude, then
	AUTO for Burn then
	Back to Att Hold.
	V77 at Tig-1+
	137+01 went to Rate Cmd
	RCS usage Looks Good.
	RCS Preheat
	AGS-PGNS Align 400+3
	Fly P359
*	Body Axis Align in Burn
	Attitude +

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

MSC FORM 1441 (APR 66)

FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
137+09	Maneuver + PGNS / Min Impulse Body Axis 400+5 / 400+0 AGS
	The Roll & Yaw needles did not null after completion — of Auto Maneuver —
*	Mode control P Body Axis PR Att Pulse AGS — Sel
****	+ Pitch Attitude OK Roll 18° out of planes *
137+27 TIG-12	FDAI { 0° P * { 8° R * Yaw = OK
	Body Axis Align — 400+5 — 400+0
	Attitude Ctl P, R — Pulse AGS-Select Monitor in P-41 Bypass Trim
TIG-10	All pulled together —

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
137+40	470 R for Monitor ✓
	AVG G.
137+40	MCC-M Burning — OK
	Burn Complete —
	S/C Pitching to S/M
	Sep Attitude
	FDAI R0, P91.3, Y0
	Terminate P-41
137+48	Broken into medkit,
	per Slayton req —
	hit it again in 2 HRS —
137+50	AFT Omni —
137+55	S/C in S/M Jettison Att.
	Batt 3 start
137+57	All CM RCS Thrusters
	fired on both rings.
137+59	Advised crew S/M Jett
	Advised to return to
	AGS From PGNS
138+01+50	— Push/pull mnvr
***	S/M Sep —

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	S/C Pitching for Photos of S/M —
138+04	Return * to S/M Sep Attitude After Photo's
**	One whole side of S/C missing *
138+06	Down to 35% on RCS. Advised crew to minimize propellant usage.
138+10	MNA - Volt 30.2
	BATTC - Amps 2
	Consummable Status —
	H_2O 45.4# rem
	4.8#/HR use
	9.5 HR REM
	A/H 557.4 rem
	41.2 rate
	13.5 HR REM
	RCS 32% rem.
138+14	AGS Pulse for MNVRS.

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
138+21	FL 37
	Resele V37E 06E
	ESS Inst
	IMU HTR
	Computer - stby
	Brings up 3 Balls
	- has Flash so 25
	but cannot PRO,
	hold down for 10-20
	sec.
	Some concern about
	leaving computer up
	w/o cooling for this
	time.
138+27	~~Now~~
	Now we are trying to
	find out why we have a
	2A Load on MNA — shud
	be in the noise at this
	time, this is confirmed
	by the Battery voltage
	Advised crew to verify
138+32	that they have properly
	Configured the CSM
	• Flood Lts } MNA
	• ESS Inst } MNA
	• C&W } MNA

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
138+34	Final Mcc looks good -
	Crew reports Flood Lts
	are out.
	V MN A ~~2A~~ 30.2
	Batt C 2A
	Rins 1 is Selected to
	MN A - try turning
	Auto Coils off &
	check readings - they
	shud not be drawing
	current.
	Auto Coils back on,
	Rins #1 MN A
138+40	Entry Pad
	Weather
	Recovry Pad
	- Δ for Equations for
	Docking index is - 1.05.
138+52	Verify that the
	SCS Logic Pwr 2/3 - OFF
	Verify CM RCS Htr Sw-OFF
	MN A Voltage up to 31.0
138+59	Moving to Pitch Attitude
	to give CM optics better
	star field.

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Dry run of Alignment
	1. EMOD V74
	2. P-27 Update
	3. Snapshot Gbl L/S
	4 Compute CSM Coarse Align.
	5. Free Platform set Bits
	6. P-52 Option (1) Perf
	~~7.~~ 7. Take Star Shots
	8.
139+10.	Compute CSM Coarse Align Attitudes ~~prior~~ to the 2+30 Time, we may have to recompute— but it will put us 3 min ahead on timeline at the 2:30 point.
~~139+15~~ *	Battery 3 - OFF, it is pulling only about 1 Amp Load now. Battery 1 is off
	CMP can see ALTAIR

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FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
139+23	Suit Rel - Closed +
139+26	Advised crew that we will go to the backup Alignment PAD if we cannot perform P-52 using STARS VIA PICAPAR,
	* Need recommended attitude crew will go to the PAD recommended Attitude.
139+34	BATT #4 is now past spec lifetime —
139+38	Advised crew that COARSE ALIGN is good enuf for entry.
139+40	Advised crew to keep MN Busses above 24V. Assume that crew will go to the SEP Attitude & Compute COARSE ALIGN < 1½°. 0, 91, 30
139+46	MAY BE SHORT DELAY IN UPLINK SEQ WHILE CLOCK Δ IS BEING GENERATED.

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Passed crew the
	Coarse Align Gimbal
	∠'s for FDAI R0, P91, Y0
	R +298.95
	P +271.30
	Y +000.20
139+52	LM in PGNS - Min Imp.
	Dap not configured
	for PGNS Auto -
	must stay in Pulse.
	Dap wt loaded OK
	now - could use
	PGNS Auto.
	γ -6.50
140+01	V_{EI} 36,211
	142+40+39
	Need Acceptable star
	∠ difference -
	.50 is acceptable
	for Telescope moon/sun
	.stars shud be
	.0X for sxt & .5 for SCT.

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
-2+30	Starting Power up of C/M —
140+10	LM Power Removed
	BATT 1 OFF
	BATT 5 OFF
	LV TAPS
	BATT 2/1 HV
140+12	Power OFF for umbilical disconnect.
	Loads standing by
	TGT
	REFS
	S.V.
140+15	HSK sez CSM AOS
	Omni C — CSM
	CRO 2way —
	Cmd P/A Low —
140+20	CSM TRACK
	CSM T/M — LBR
	CM RCS looks Good
140+23	• P/A low in S/C Verify Tb — Grey
	• Hi Pwr Cmd —
140+24	HBR
	Break
	Omni C —

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Crew * LBR/HBR both RATTY *
•	V55 Clock increment update
•	Platform up
•	Optics up
	Control PGNS Rate Cmd.
-2 HRS	Have REFS SV TGT Clock Inc
140+40	V74 EMOD — Did not set Emod. Scrub —
***	Sec. P/A — EMOD dump being copied, must have locked on
140+44	— Crew completed Coarse Align, Setting Refs & Drift Flag, going to P-52.
140+46	Opt #1 in P-52
-1:54	

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	Coarse Align looks Good — crew read them a list.
	Crew trying Vega/Altair
**	Verify See P/A — Star Diff All Zips Torque
*	Omni B CSM
140+5	Also got 1 complete pass of Emod @ CRO.
*	Recommend AGS AH Hold for Jettison.
140+58	Omni C * Recom V48 30021 due to
141+01	Optics Power — OFF
	RCS 1 & 2 Injector
	{ Rings 1 = 50 * } He
**	{ Rings 2 = 22 * } * TNK T.
	Gething Injectors
	RSC 4.2
	5D 4.6 Both
	6A 4.3 — Yaw
	6B 4.3 + Thrusters
	6C 3.6 *
	6D 3.6

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
*	LM S/C Oriented to the North out of plane vice South. Crew did not Fly to the FDAI <'s
141+10*	EMOD GO —
	O2 FLOW HIGH — LOOK AT CABIN PRESSURE WATCHING CSM MGA — HAVE CSM YAW THRUSTER
	~~WET~~*
	BRING BMAG #1 TO WARMUP
141+19	TUNNEL ΔP to 2.0
	ENTRY DAP will be initialized with FINAL PRO on P-62.
141+24	• Still bringing up the SCS
	• Suit Compressor ON
	• Gly Evap Out 58° w/o Evap
	• BMAG's OK.

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
	SV
	Time INC update
141+28	Loose
	Pyro ARM —
141+30	LM Jettison
	Almost went into
	Gimbal Lock —
	Gimbal
	*S/C in Mid Impulse
-1+08	Omni Bravo —
	*Update Z PIPA —
-1+03	Ext Star Ck - OK.
-1+01	Starting EMS Check
	20AH Margin - Steady
-55 **	Looking Good on Power
*	Suit Comp #2 OFF.
141+49	Entry PAD
-51	36,211 V_{EI}
	-6.2 γ_{EI}
	142+38+19

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
141+53	Clock increment
	Pipa Bias update Z
	≈ 2nm landing.
	Const GIP has moved
	about 100 E nm — Recov moving
	an A/C into Pos. EMS &
	G&N unchanged.
-40	POO Accept
	Final SV → V66
	Pipa Bias
	Clock Inc
-38	Moon Check Attitude OK
	about 45°.
-35	Uplink Complete
	Data still hanging
	in with γ -6.22 vice
	6.5, lift vector is
	up —
-32	HSK HBR PCM
	SBand P/A - OFF
-30	Evaporator - ON, Outlet
	w/o EVAP was max 60°

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
142+13	γ is starting to steepen up - slightly short.
	32AH total @ Splash
-25	All GO —
	EMS - OK
-23	Initialized & Setting on Entry.
-20	P-61
	06 N 60 - Tst Lat & Long
	• Batt C ← may deplete about mainchute time, plenty in A & B
	• No S Comm after B/O - we have power so will leave PMP up thru B/O — passed thru to crew —
	• T/M LOS — 142+39

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
142+28	LM LOS — T/M
142+29	Pipp's OK
	"Good bedside manner"
	"Wish he could go to
	FDO Party"
142+39	OMNI C For Entry Attitude
	— Moon check complete
	HSK Final LM LOS
142+39	Final LOS HSK
	21° 39'S }
	165° 22'W }
	13+49 Lds —
	8+04 Drogue —
142+45	ARIA 4 AOS —
	Contact — OK Joe —
	2 Band Contact *
	Samoa Reserve 4
	Drogues 8,000
	Iwo Jima — Sonic Boom
|	Visual at Disreefing
	3 Chutes —
	Saw Fuel Dump —
142+52	Good Voice with Recd
	A/C

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FLIGHT DIRECTOR'S MISSION LOG

FLIGHT DIR MISSION LOG	DAY	REV	PG

SITE/ACQ/LOS	FLIGHT EVENTS/HISTORY/BRIEFING
142+54+47	— Splash —
	3 1/2 miles
	Stable 1
	≈ 15° oscillation
	above vertical
	Axis.
	Crew in good Shape
	CASK 25+12 S }
	174+59 W }
	25+33 S }
	176+08 W }
143+19	Hatch Open / Closed
	Passed Something
	in. — new life
	vests.
143+22	Hatch Open —
143+39	Landed Iwo Jima
	43 min

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FLIGHT DIRECTOR'S MISSION LOG