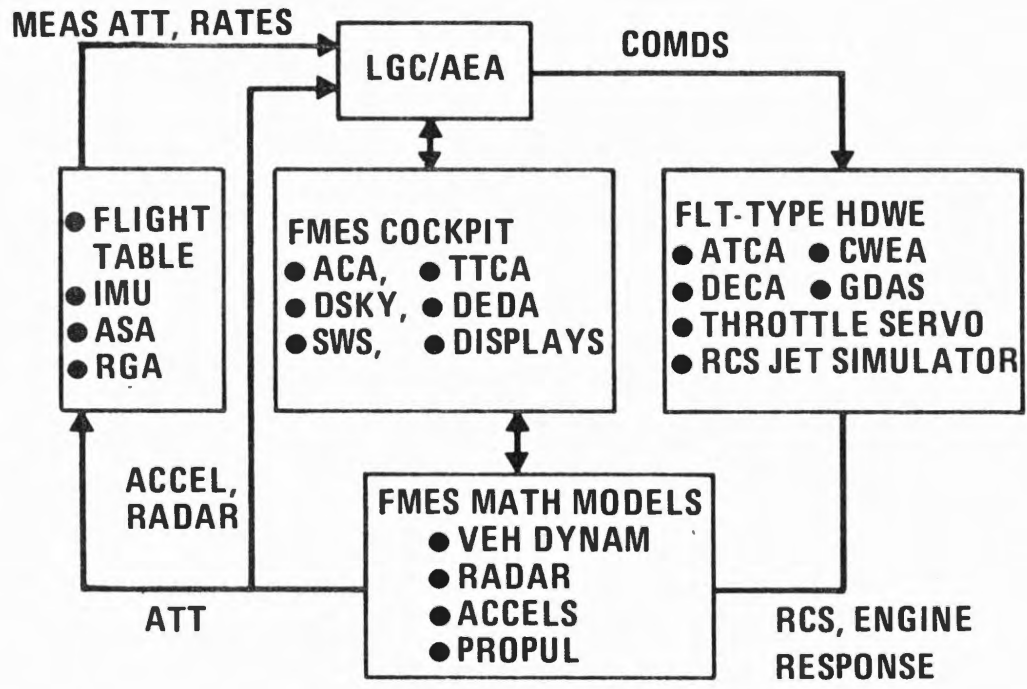


**FMES/FCI**

H2 - MISSION TESTS



# FMES/FCI FUNCTIONAL FLOW



**SCOPE OF TESTS**

<u>NOMINAL MISSION</u>	<u>LUM 131 R.9</u>	<u>LUM 131A R.3 (LM131)</u>	<u>LUM 131</u>
CSM CIRC (P52, P76, P20)	✓	✓	✓
PDI - AUTO LANDING (P63, P64, P65/66)	✓	✓	✓
PDI - ROD LANDING (P63, P64, P66)	✓	✓	✓
PDI - AUTO P66 WITH ROD (P63, P64, P66)		✓	
ASCENT THRU MCC I (P12, P20, P32, P33, P34, P35, P41)	✓	✓	✓
PDI - AUTO LANDING, USING P27	✓		
PDI - LPD - ROD LANDING (P63, P64, P65)	✓		
DEORBIT (P30, P42)		✓	✓

**SCOPE OF TESTS**

<b><u>SOFTWARE CHECKS</u></b>	<b><u>LUM 131 R.9</u></b>	<b><u>LUM 131A R.3 (LM131)</u></b>	<b><u>LUM 131</u></b>
<b>TLOSS</b>			
- PDI, AUTO LDG	✓ (5)	✓ (3)	✓ (2)
- PDI, ROD LDG	✓ (2)	✓ (2)	✓ (1)
- POWERED ASCENT	✓		
- EARLY AND LATE ABORT			✓ (2)
<b>RESTARTS</b>			
- PDI, AUTO LDG	✓		
- PDI, ROD LDG	✓		
- ASC THRU MCCI	✓	✓	✓
<b>OTHER TESTS OF AUTO P66</b>	✓		
<b>P22 TEST</b>	✓		
<b>ABORTS - EARLY &amp; LATE</b>		✓	✓

## SCOPE OF TESTS

### REDLINE TESTS

### LUM131 REV 9

PDI, LR LOCKED IN POS 1	✓
PDI, LR LOCKED IN POS 2	✓
LR REASONABLENESS CHECK	✓
PDI, LR CAPABILITY ERRORS, TO AUTO LDG	✓
P20, RR BORESIGHT ERROR	✓
SLOW ENGINE START TRANSIENTS - P63, P12, P40, P42	✓

9.5% T LOSS  
 + 16 92 - NO LR DATA

LGC TAPE METER OUTPUTS, FT/SEC (EVERY 1/2 SEC)

<u>TLOSS</u>	<u>TLOSS</u>	<u>RESTART</u>
-81.5	-35	-62.0
-80.0	-35	-63.5
▶ -75.5	▶ -26.5	▶ -58.0
-81.0	-34.5	-64.0
-81.5	-36.5	-62.0
-81.5	-36.5	-63.5
▶ -78.0	▶ -28.0	-64.0
-81.0	-36.0	
-81.5	-36.5	ALTITUDE RATE TAPE HAS 1 FPS INCREMENTS
-81.5	-37.5	
	▶ -28.0	
	-37.0	
	-37.0	
	-38.0	
	▶ -28.5	
	-38.5	

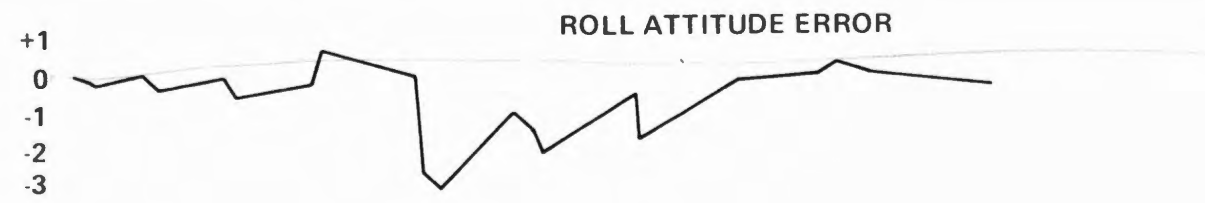
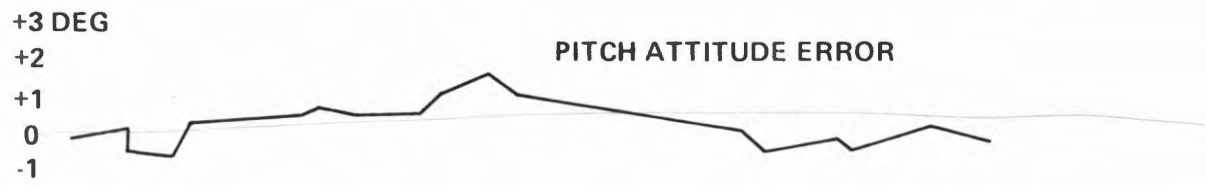
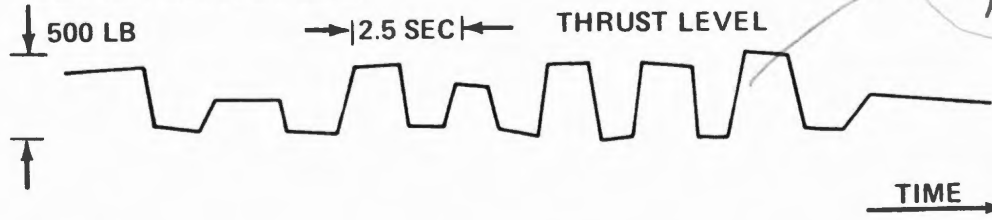
NOT OBSERVED WITH 0 T LOSS!

RUN H20T - 4.2 #3

TIME (HR/MIN/SEC)	FORWARD VELOCITY (FPS)			LATERAL VELOCITY (FPS)	
	FMES	LGC		FMES	LGC COMPUTED
		DSKY	COMPUTED		
108/3/16.7	2.3	0.6	2.0	-2.7	-3.3
3/17.7	2.4	0.6		-2.8	
3/18.7	2.4		2.1	-3.0	-3.6
AUTO → 3/19.7	2.4	0.6		-3.1	
3/20.7	2.5		2.2	-3.2	-3.7
3/21.7	2.3	0.6		-3.0	
3/22.7	2.1		1.8	-2.6	-3.3
3/23.7	1.8	0.6		-2.1	
3/24.7	1.5		1.1	-1.4	-2.1
3/25.7	1.2	0.0		- .7	
3/26.7	1.0		.5	- .1	- .9

*This says ~~FOR~~ FOR VEL  
LAT VEL  
are in computer  
error.*

### P66 AUTO PROFILE





# TLOSS TESTS

LUM 131

normals  
ph  
DS # 4

RUN NO.	% TLOSS	TYPE OF TEST	A/C AND NO. OBSERVED		
			P63	P64	P65/66
H2-131-11.1#1	9.5	AUTO LAND	31201(3)	31201(2)	NONE
H2-131-11.2#1	9.5	ROD (ATT. HOLD)	31201(3)	NONE	NONE
H2-131-11.3#1	9.5	PDI+196 ABORT	NONE	N/A	N/A

LM 131

H20T-6.8#1	9.5	ROD AUTO	NONE	31201(1)	NONE
H20T-6.9#2	5	AUTO	NONE	NONE	NONE
H20T-6.11#2	9.5	ROD(ATT. HOLD)	31201(2)	NONE	NONE
H20T-6.12#4	9.5	AUTO	NONE	NONE	NONE
H20T-6.13#2	5	ROD(ATT. HOLD)	NONE	NONE	NONE

PROBLEM AREAS

LUM 131

LM 131

COMMENTS

?

JET FIRINGS IN P65	P66 HORIZONTAL VELOCITY DISPLAYS	WORKAROUND AVAILABLE
TLOSS P63, P64 EFFECTS ( TAPE METER)	TLOSS P63, P64 EFFECTS (TAPE METER)	WORKAROUND AVAILABLE SYMPTOMS NOT UNSAFE
1301 ALARM IN PLANE CHANGE P41	1301 ALARM IN PLANE CHANGE P41	NOT UNSAFE
HARDWARE RESTARTS AFFECTING P20 RR UPDATES	HARDWARE RESTARTS AFFECTING P20 RR UPDATES	WORKAROUND AVAILABLE
X-AXIS OVERRIDE ALTITUDE QUANTIZATION	X-AXIS OVERRIDE ALTITUDE QUANTIZATION	NOT UNSAFE
STEP IN THROTTLE RECOVERY	STEP IN THROTTLE RECOVERY	NOT UNSAFE
AZBIAS POLARITY ERROR	AZBIAS POLARITY ERROR	FIX PADLOAD VALUE

-T LOSS

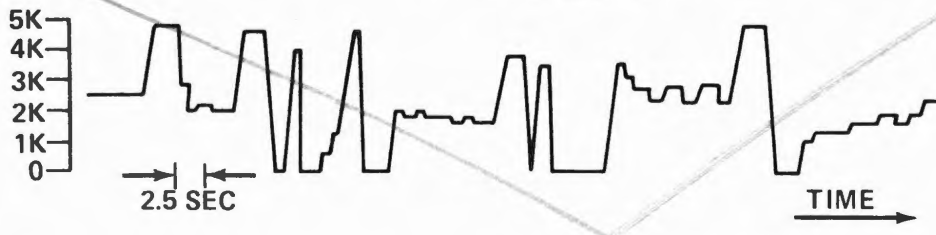
2

will be fixed in 10

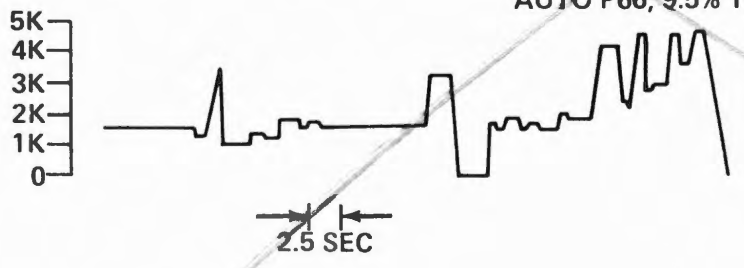
# TLOSS THROTTLE PROFILE, LUM 131 REV 9

THRUST VS TIME

ATT HOLD P66, 9.5% TLOSS



AUTO P66, 9.5% TLOSS



**FMES/FCI SIMULATOR DISCREPANCY REPORTS  
6 JAN-10 MAR 1970**

TYPE	QTY	PROG CHG	RESOLUTION FOR H-2			STATUS	
			PROG NOTE	PROCD OR REPAIR	NOT LM-7 PRIME PROBLEM	CLOSED	OPEN
HARDWARE	0	0	—	—	—	—	—
SOFTWARE	8	2	1	1	8	4	5
SIMULATOR	6	0	—	5	6	6	0
<b>TOTAL</b>	<b>14</b>	<b>2</b>	<b>1</b>	<b>6</b>	<b>14</b>	<b>10</b>	<b>5</b>

## **CONCLUSIONS**

**A SUCCESSFUL NOMINAL OR ABORT LM-7 MISSION  
CAN BE FLOWN USING EITHER LM 131 OR LUM 131  
WITH APPROPRIATE WORKAROUND PROCEDURES.**