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Guidance and Control System (GC) - Malfunction Procedures for Guidance and Navigation (GN) & Reaction Control System (RCS)

National Aeronautics and Space Administration (NASA)

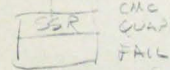
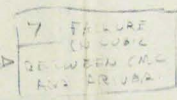
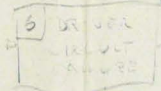
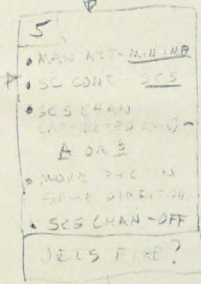
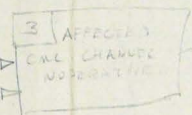
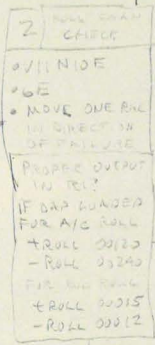
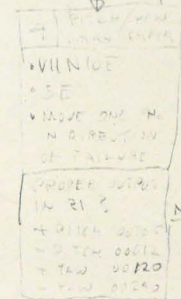
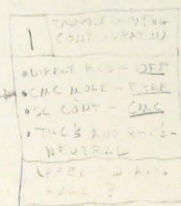
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① Assume DAP
is locked in 2
and a signal
is sent to the
key
V04 N 6 E
A of R1 should be 1
and R2 should be
01111 (for 2/3 roll) or
11111 (for A/C roll)

RCS
PAC
STP DRUM
RHC USE

1 TROUBLE SHOOTING
CONFIGURATION

- DIRECT RHC - OFF
- CMC MODE - FREE
- SC CONT - CMC
- TMC - NEUTRAL

AFFECTED
RHC ROLL?

2 ROLL CHAN
CHECK

- VII NIDE
- GE
- MOVE AFFECTED
RHC IN DIRECTION
OF FAILURE

PROPER OUTPUT
IN RHC?

IF BAP LOADED
FOR A/C ROLL
+ ROLL 00120
- ROLL 00240

FOR BIG ROLL
+ ROLL 00005
- ROLL 00012

3 INPUT CHAN
CHECK

- VII NIDE
- 312
- MOVE BAP
RHC IN SARE

PROPER INPUT
IN RHC?

+ ROLL 17737
- ROLL 17757
- ROLL 17776
- ROLL 17775
- ROLL 17773
- ROLL 17787

4 AFFECTED CMC
CHANGES
INDICATED

5 PITCH/TAN
CHAN CHECK

- VII NIDE
- 5E
- MOVE AFFECTED
RHC IN DIRECTION
OF FAILURE

PROPER OUTPUT
IN RHC?

+ PITCH 00005
- PITCH 00012
+ TAN 00110
- TAN 00140

5 REPEAT STEP 2
WITH OTHER
RHC.

PROPER INPUT
IN RHC?

6 ORIGINAL
RHC B/D DEN

7 INPUT 00000
IF CMC
(FROM RHC)

9 MAN ATT - R/W
IMP

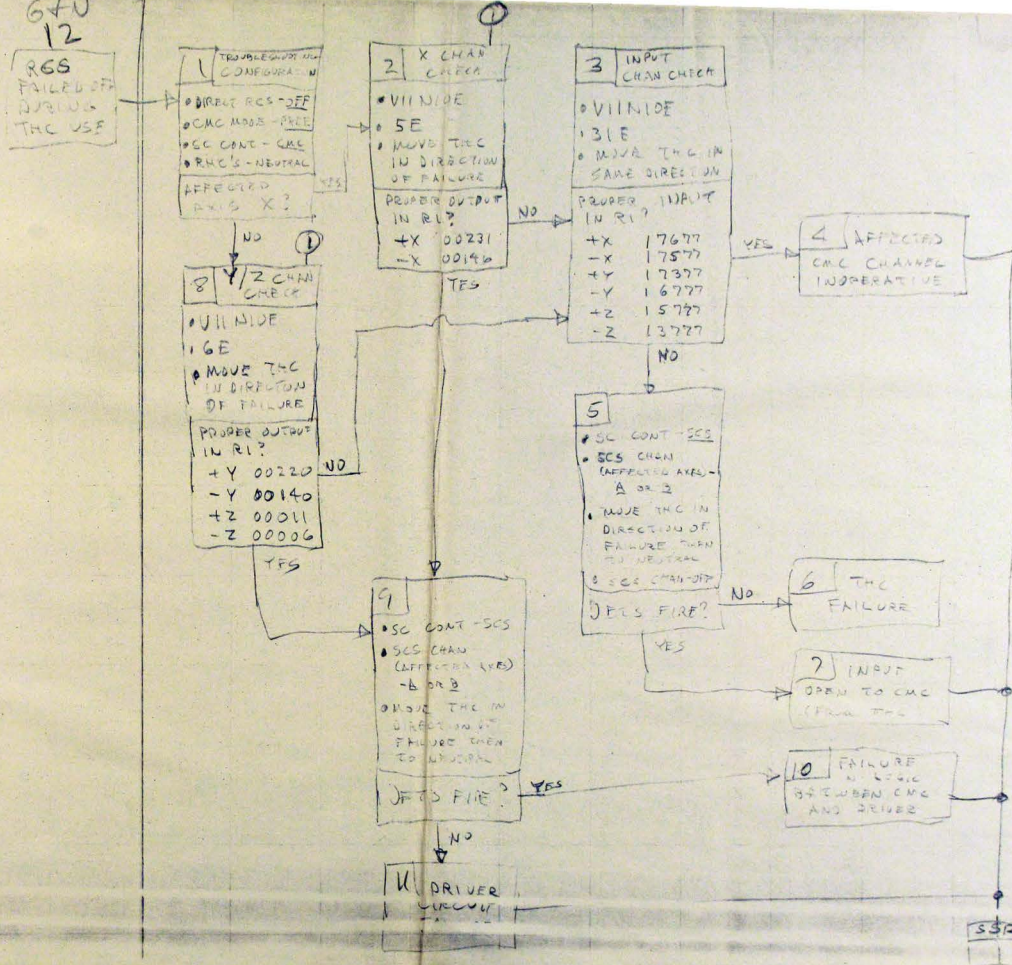
- SC CONT - SC
- SC5 CHAN
(AFFECTED AXIS)
- A OR B
- MOVE AFFECTED
RHC IN DIRECTION
OF FAILURE
- SC5 CHAN - OFF

JE TO FURTHER?

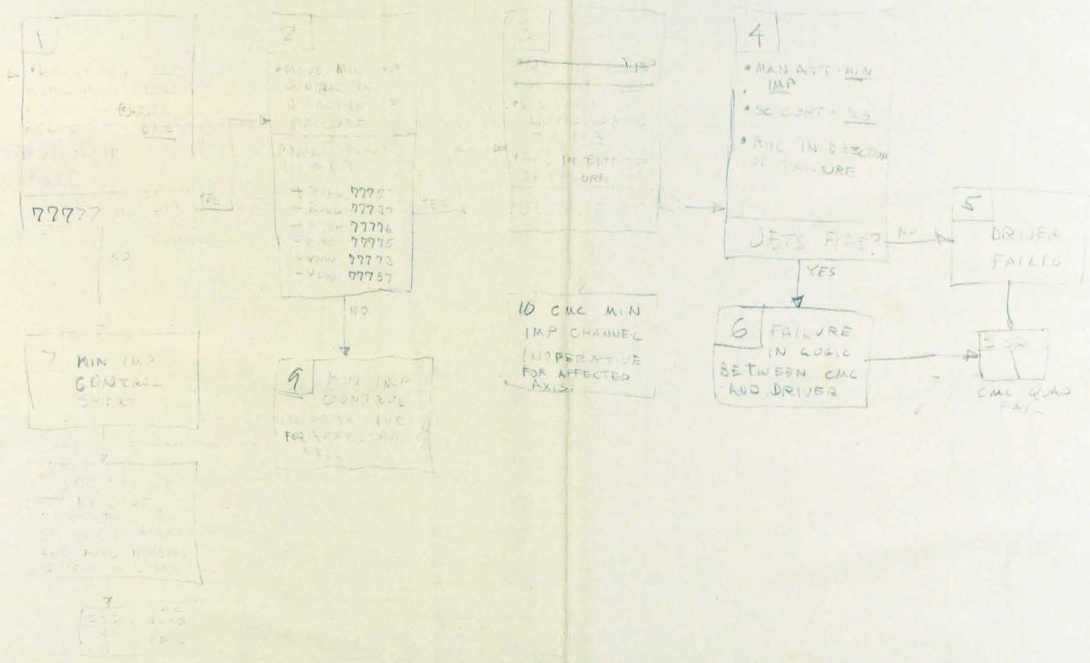
10 FAILURE
IN LOGIC
OF CMC - CMC
AND DRUM

11 DRIVER
CIRCUIT

1) Examples RHC ...
- 1 RHC B/D for
SM BAP and no
quad failure ...
verify key
VCR HAD ...
A ...
and RHC ...
01111 (C) ...
11111 (C) ...



4N
13

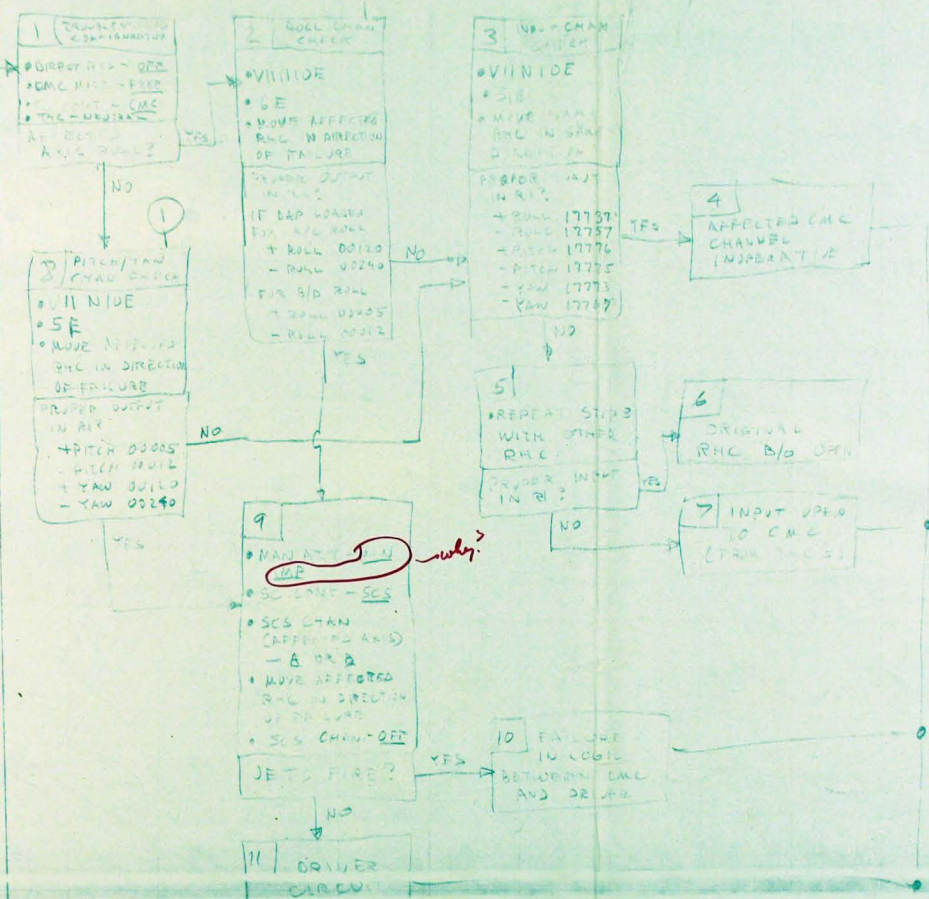


6C 11

2/25/68

From Russ Larson

2nd attempt at dynamic
proc



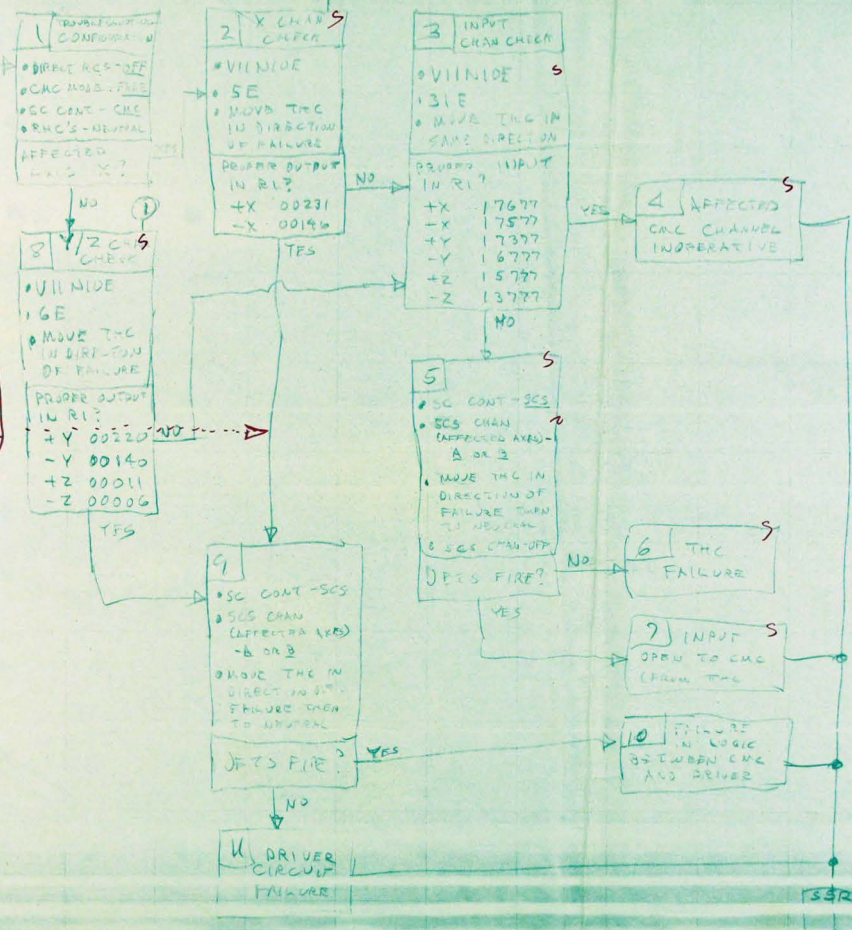
and location for
SM GAP and no
quad failure as
verify any
100 140 E

A of R1 must be 1
and R2 must be 2
01111 (for B/D roll)
11111 (for A/C roll)

why?

RCS
FAILED OFF
DURING
THE USE

This procedure
assumes that the
power is at BOTH

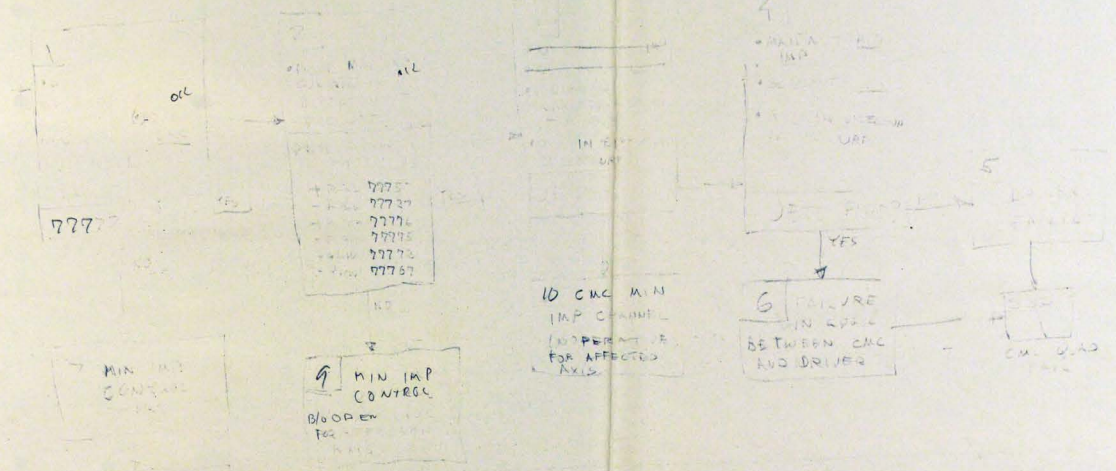


① Assumes DAP is on and
Controlled for SA DAP,
4 jet X translation
and no gas retention.
To verify this
VO4 N20E.
RI should be 111 XX
R2 should be
01111 (30301, or
11111 (20301)

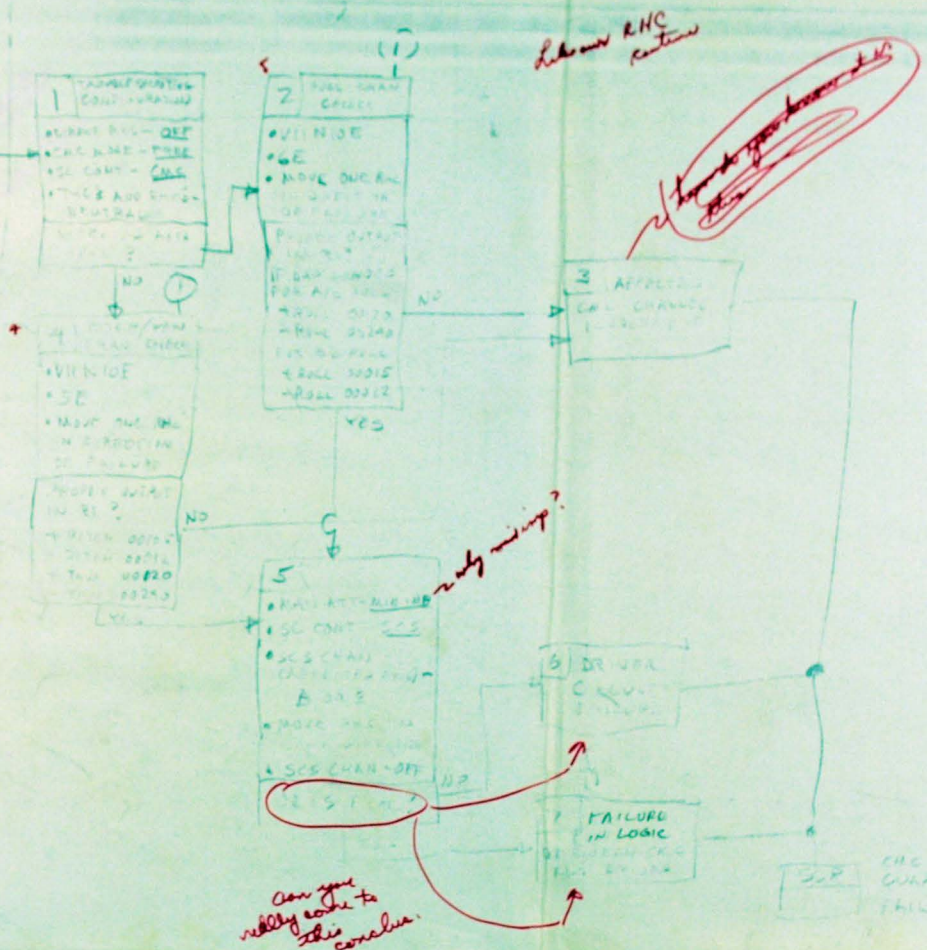
SSR	CMC DRIVER
	FAIL

6411
13

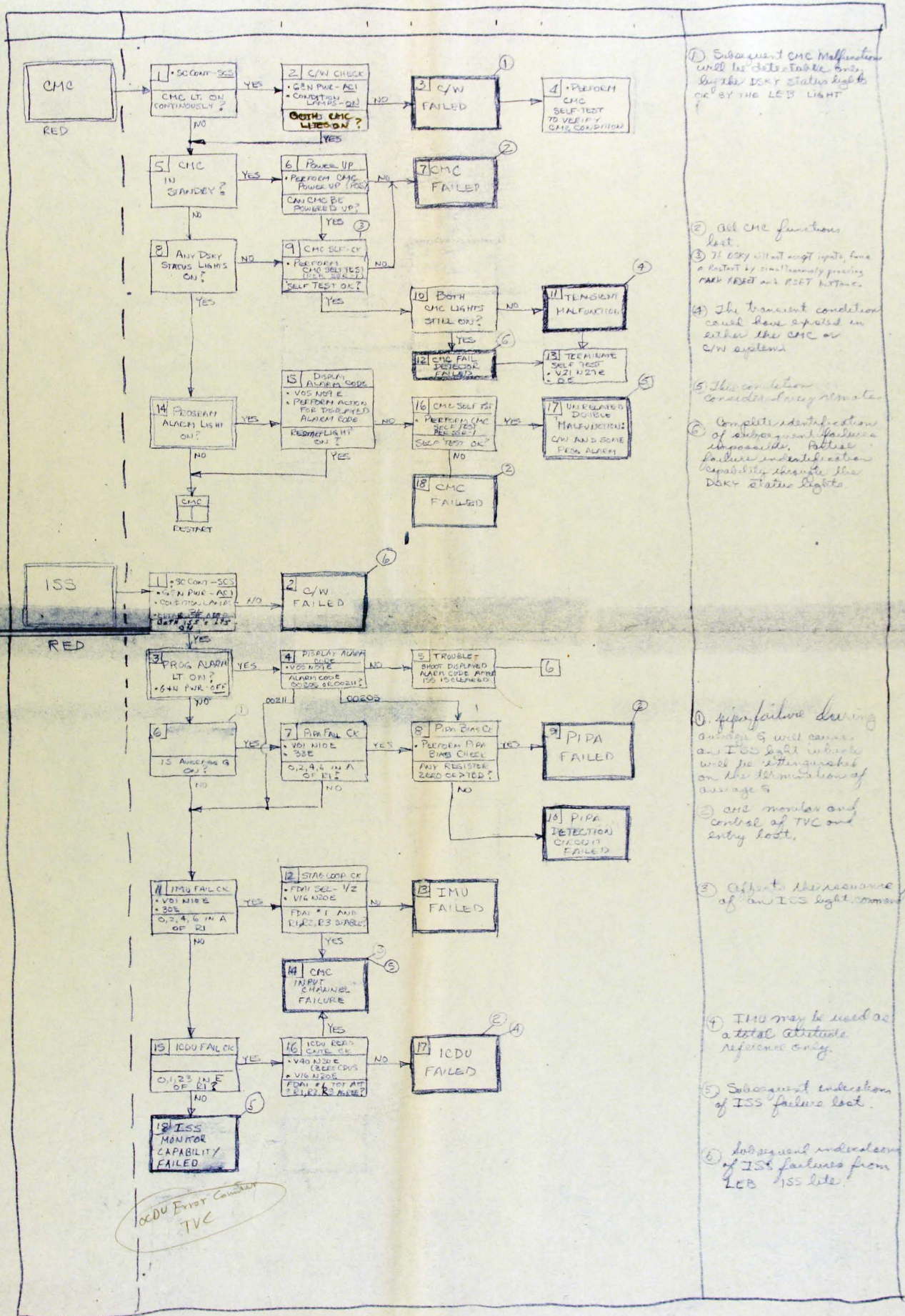
?



93m 20
sur OMC
routine

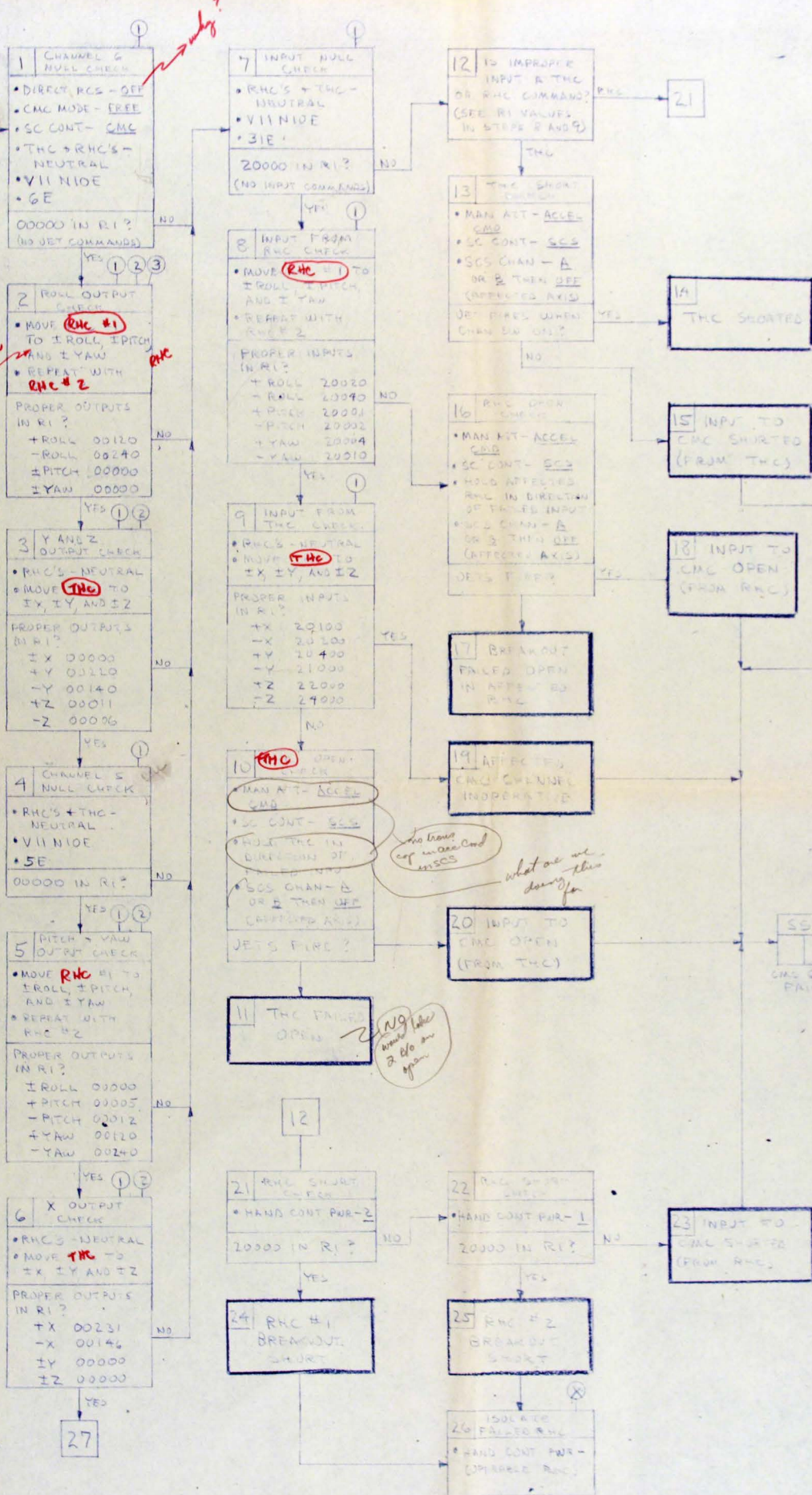


2-28-68
N 18



FAILURE
WITH CMC
CONT

do we want to
do all ops if we
have a problem or
just one?



1 Read correct channel values displayed in RT.

2 Announces DAPIs on and loaded for 4 jet X translation, AC roll, and no equal failures. Verify by V04 N46 E R1-11111 R2-11111

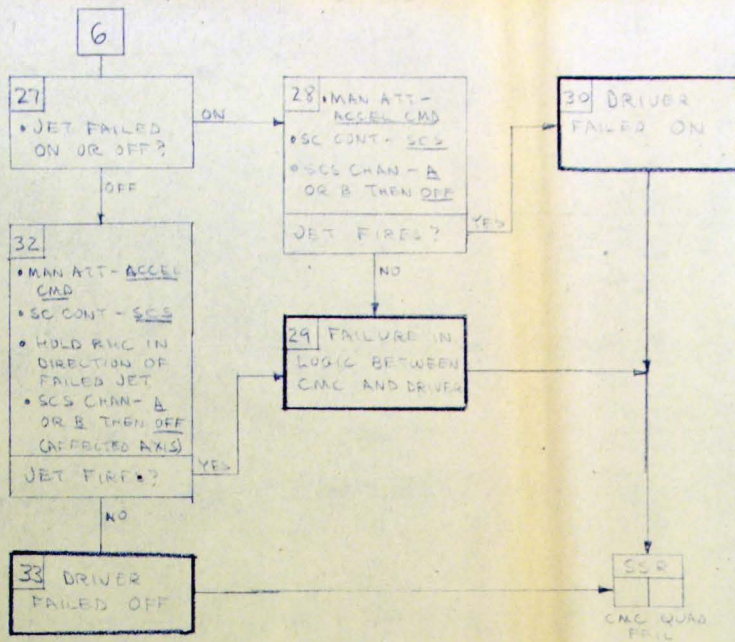
3 Roll outputs are for AC roll and selection of BS roll is selected in the JAP V04 N46 E displays in R2-01111 and output channel 6 display is +ROLL 00005 -ROLL 00012

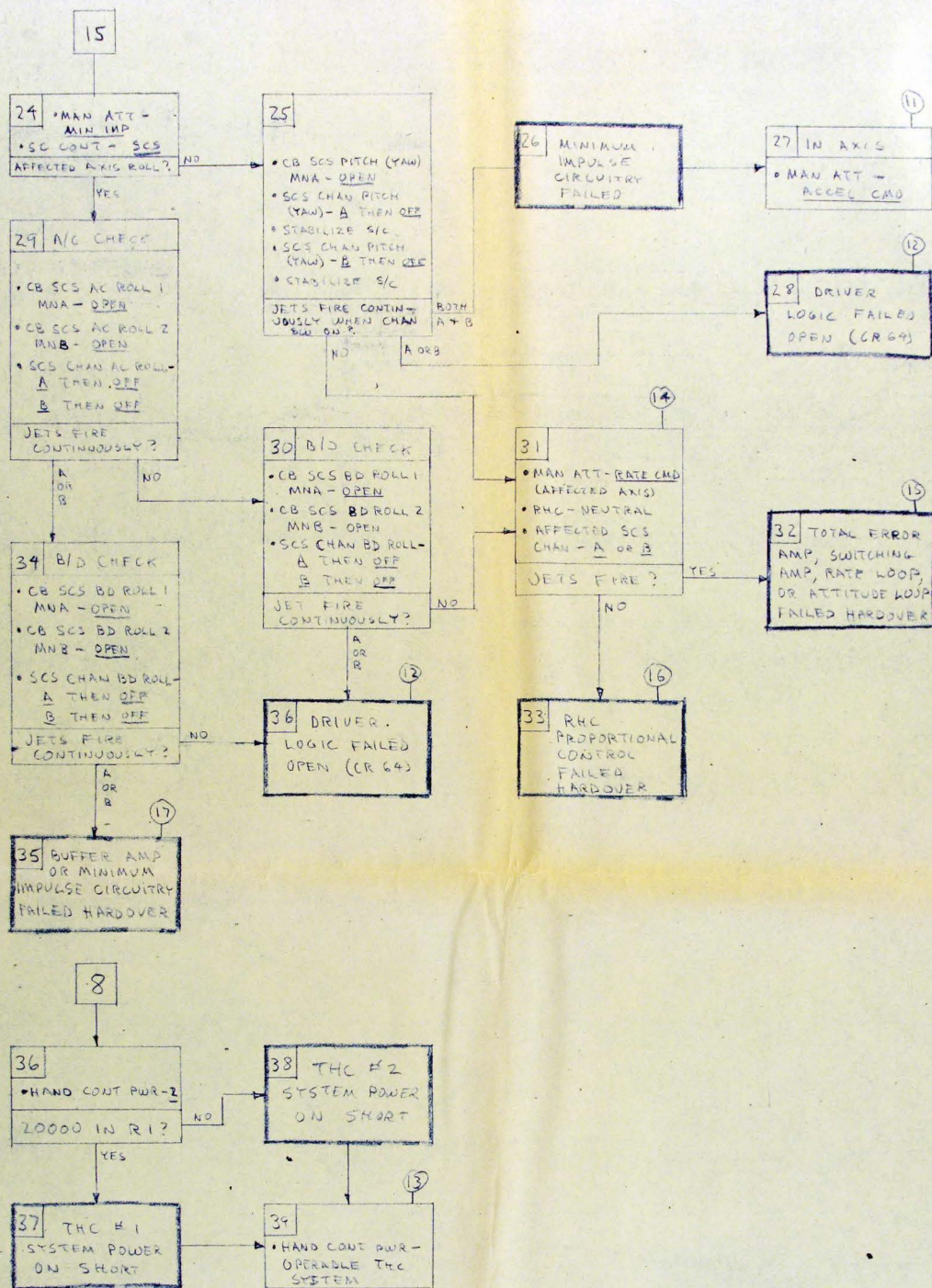
Would like to see the trouble shooting segregated by controller so that we are able easily to troubleshoot SCS controller problems with the G & N. We could not do it with this procedure

THC - 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

where is min dump controller LEB.?

See note 7 in SCS procedure 1 (SCS) for





SSR

CMC
QUAD
FAIL

1
DETERMINE WHICH JET IS INOPERATIVE. USE FOLLOWING CHART TO RELATE CMC CHANNEL READINGS TO JETS AND QUADS.

OUTPUT CHANNELS	INPUT CHANNELS (31)	QUAD	JET	POTENTIAL COMMAND	TRANSITION COMMAND
00001*	-	C	1		
00002*	-	C	4		
00004*	-	A	3		
00005	20001	A, C	3, 1	+PITCH	
00006	20200	A, C	3, 4		-X (2 JET)
00010*	-	A	2		
00011	20100	A, C	2, 1		+X (1 JET)
00012	20002	A, C	2, 4	-PITCH	
00020*	-	D	5		
00040*	-	D	8		
00100*	-	B	7		
00120	20004	B, D	7, 5	+YAW	
00140	20200	B, D	7, 8		-X (2 JET)
00146	20200	A, B, C, D	3, 7, 4, 8		-X (4 JET)
00200*	-	B	6		
00220	20100	B, D	6, 5		+X (2 JET)
00231	20100	A, B, C, D	2, 6, 1, 5		+X (4 JET)
00240	20010	B, D	6, 3	-YAW	
00001*	-	B	9		
00002	-	B	12		
00004*	-	D	11		
00005	20020	B, D	9, 11	+ROLL (BD)	
00006	24000	B, D	12, 11		-Z
00010*	-	D	10		+Z
00011	22000	B, D	9, 10		
00012	20040	B, D	12, 10	-ROLL (BD)	
00020*	-	A	13		
00040*	-	A	16		
00100*	-	C	15		
00120	20020	A, C	13, 15	+ROLL (AC)	
00140	21000	A, C	16, 15		-Y
00200*	-	C	14		+Y
00220	20400	A, C	13, 14		
00240	20070	A, C	16, 14	-ROLL (AC)	

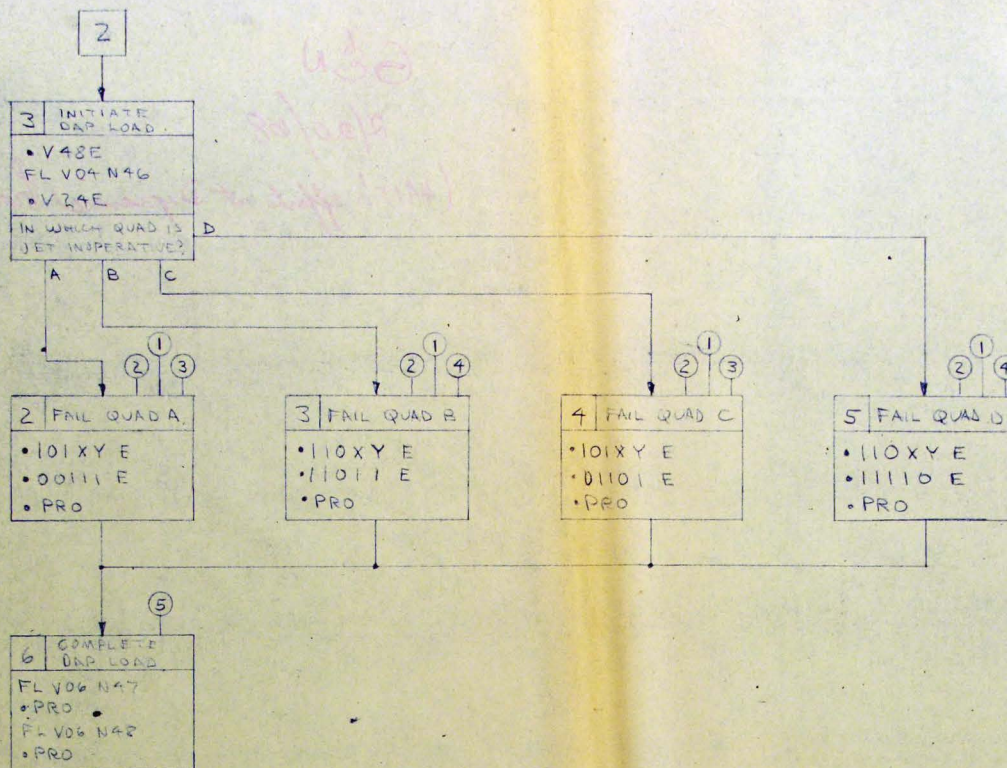
* INDICATES SINGLE JET COMMAND. IF MALFUNCTION WAS A JET FAILED ON, ISOLATE THE INDICATED JET. IF MALFUNCTION WAS A JET FAILED OFF, ISOLATE THE OTHER JET OF THE PAIR.

2 IF FAILURE OCCURS IN SCSS CONTROL - ISOLATE FAILED JET WITH SCSS CHAN

SW'S AND SCSS C32 AS INDICATED IN FOLLOWING CHART

FAILED JET	OPEN CB	CMN SW POSITION	ALTERNATE METHOD IN PARENTHESES
1 OR 2	PITCH MNA (MNB)	PITCH - A (B)	
3 OR 4	PITCH MNA (MNB)	PITCH - B (A)	
5 OR 6	YAW MNA (MNB)	YAW - B (A)	
7 OR 8	YAW MNA (MNB)	YAW - A (B)	
9 OR 12	B/D ROLL 1 MNA AND MNB	B/D ROLL - A OR B	
10 OR 11	B/D ROLL 2 MNA AND MNB	B/D ROLL - A OR B	
13 OR 16	A/C ROLL 1 MNA AND MNB	A/C ROLL - A OR B	
14 OR 15	A/C ROLL 2 MNA AND MNB	A/C ROLL - A OR B	

3



① The X in R1 is the DA
headboard.

0 = 0.5 deg

1 = 5.0 deg

This Y is the rate.

0 = 0.05 deg/sec

1 = 0.2 deg/sec

2 = 0.5 deg/sec

3 = 4.0 deg/sec

② Subsequent X
translation will
be 2 ft.

③ Subsequent pitch
and Y maneuvers
will be single jet

④ Subsequent yaw
and Z maneuvers
will be single jet

⑤ N47 and N48 display
other DAP parameters
this procedure
assumes these
parameters to be
correct.

GEN

2/20/68

(MIT's efforts at Dynamic Proc