TOP SECRET [redacted]

Copy No. [redacted]

[redacted]

[redacted]

CORONA J

FLIGHT REPORT

MISSION 1034

AGENA 1626/PAYLOAD J-31

5 July 1966

Prepared By: [redacted]

Reviewed By: [redacted]

Approved By: [redacted]
Manager
Operations & Analysis

Approved By: [redacted]
Manager
Advanced Projects

Distribution:

[redacted]

TOP SECRET [redacted]

TABLE OF CONTENTS

1.0 INTRODUCTION

FTV 1626 was an Agena (S901B) and the booster was an improved THOR (LV2A-SN466). The Agena/Payload had the capability for dual recovery and deactivate/reactivate. The flight was a tail-first in orbit configuration.

The payload system was a standard J1 reconnaissance camera system. Major payload component serial numbers are shown in Figure 1-1.

The flight consisted of five day first mission and a five day second mission with the deactivate/reactivate capability not being utilized.

FTV 1626 was launched on 21 June 1966 at 14:31 PDT with first recovery terminated by air catch on Rev 81 and second recovery terminated by air catch on Rev 161.

2.0 SUMMARY

All launch, ascent, and injection events occurred as programmed which resulted in achieving the desired orbit. For the first time, the tape recorder was turned on during the ascent sequence to record the payload system temperature environment.

Both panoramic cameras operated satisfactorily throughout the flight. Average cycle rates on both instruments deviated from the pre-flight calibrated values by less than 2 per cent.

The V/H programmer failed on the end of Rev 4 or the beginning of Rev 5 and did not operate for the remainder of the flight. This resulted in FMC match errors greater than 5 per cent (Refer to 3.5).

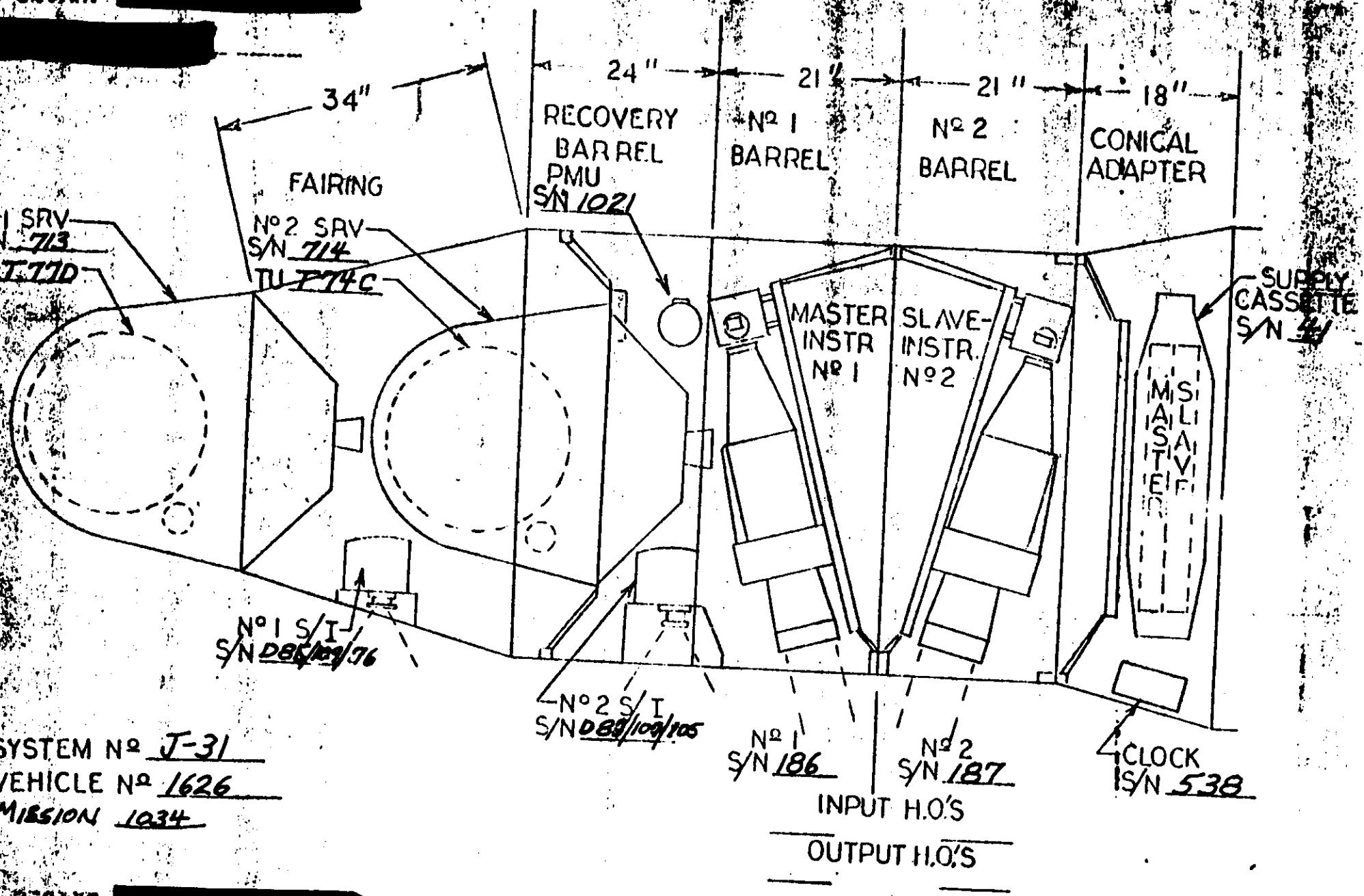
The pressure make-up system developed a high pressure leak and gas depletion occurred on Rev 32 (Refer to 8.0).

The -1 and -2 stellar/index cameras operated satisfactory throughout the flight.

The clock, instrumentation, and command system functioned properly throughout the flight.

[redacted]

CORONA J PROFILE



SYSTEM Nº J-31
VEHICLE Nº 1626
MISSION 1034

[redacted]

NO.

FIGURE 1.1

The thermal environment was within tolerance. The ascent temperature data from the tape recorder is included in Figure 9.1 and 9.2.

Both recovery systems operated satisfactorily with the exception of the -2 flashing light. This was the second -2 recovery system which the flashing light equipment was inoperative. (Ref. 10.2)

3.0 MISSION DESCRIPTION SUMMARY

3.1 Orbital Parameters - ORBIT #1

Parameters	Predicted	Actual
Period - Min.	90.07	90.20
Apogee - N.M.	192.5	201.82
Perigee - N.M.	109.5	106.45
Eccentricity	.0116	.0133
Inclination - Deg.	80.00	80.11
Agreement of Perigee - Deg.	161	170.3

3.2 Programmed Mission

	Programmed	Actual
Launch Time - PDT	1430-1530	14:31
-1 Duration - Days	4	5
Deactivation - Days	0	0
-2 Duration - Days	5	5

3.3 Panoramic Film Consumption

	Actual	
	Master	Slave
Pre-launch	102	105
-1 Mission	2896	2930
-2 Mission	3039	2995
Total	6037	6030

3.4 Camera Settings and Film Types

3.4.1 Panoramic Camera

	Master	Slave
Film Type	3404	3404
Slit Width - Inches	.200	.150
Filter Type - Wratten	23A	21

3.4.2 Horizon Optics

	Master		Slave	
	Take-Up	Supply	Take-Up	Supply
Aperture	F8.0	F6.3	F6.3	F8.0
Exposure Time - Sec.	1/100	1/100	1/100	1/100
Filter Type - Wratten	25	25	25	25

3.4.3 Stellar/Index

	-1		-2	
	Stellar	Index	Stellar	Index
Film Type	4401	4400	4401	4400
Aperture	F1.8	F4.5	F1.8	F4.5
Exposure Time - Sec.	2.0	1/500	1.0	1/500
Filter Type - Wratten	None	21	None	21

3.5 FMC Match

The V/H programmer failed to cycle after Rev 04 of the mission. Telemetry indicated that the programmer started properly on the beginning of Rev 04 but was inoperative during Rev 05. This failure caused the two panoramic camera systems to operate at a constant cycle rate regardless of the time up ramp position.

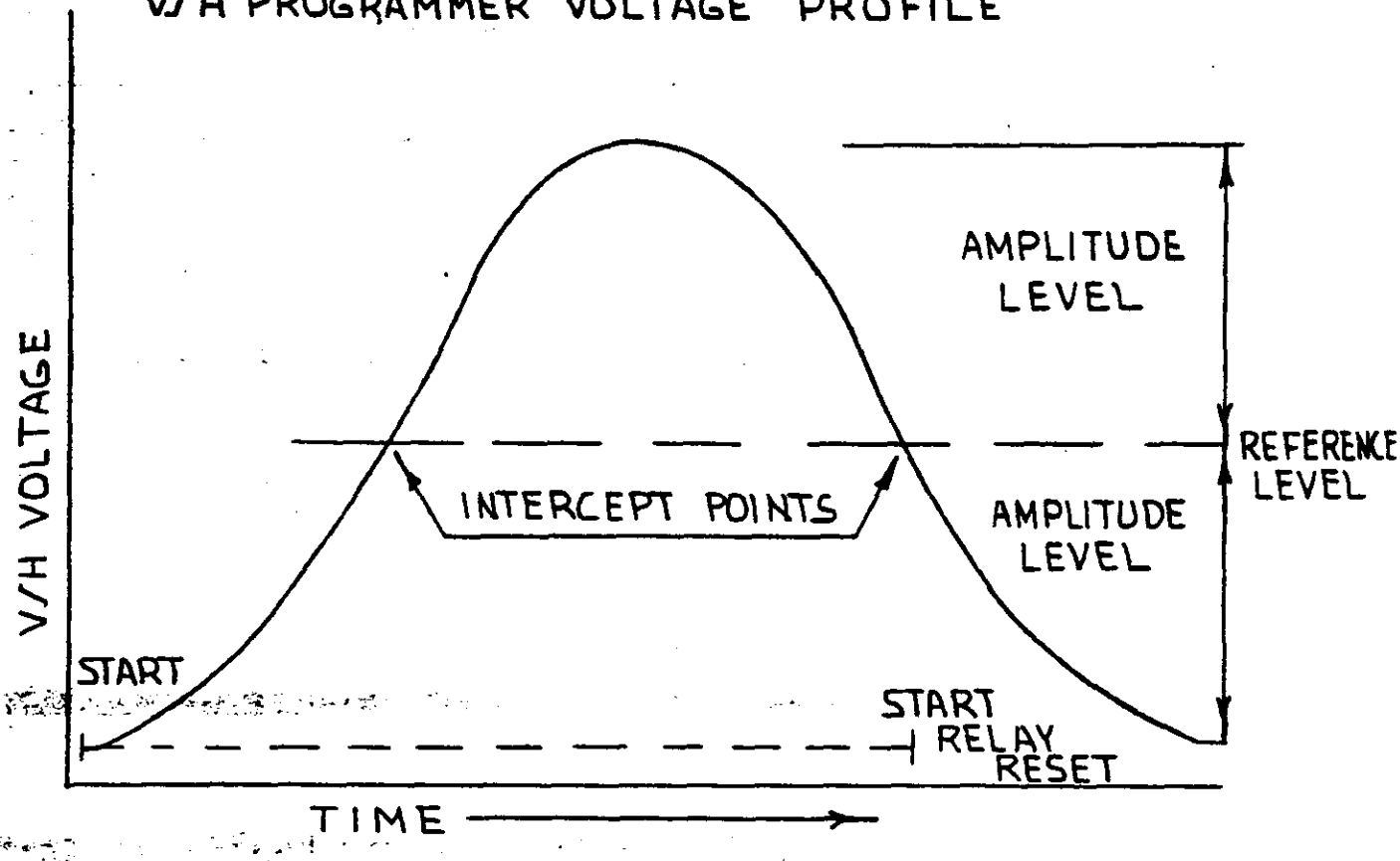
Telemetry data indicated the V/H Programmer had stopped at a position equivalent to the Reference Level voltage (See Figure 3.5). With the programmer in this position the Amplitude Command setting had no effect on the output voltage and only the Reference Command settings could be used to minimize FMC errors. Operational control under the above restrictions produced FMC errors of generally less than 10 per cent. However, FMC error on a few operations exceeded 20 per cent.

Analysis of this failure indicated that the most probable cause was the failure of the programmer self-energize switch (S201), See Figure 3.5. Failure of this switch to make contact resulted in loss of 400 cps voltage to the drive motor at the time S-202 applied reset voltage to the start relay. With S-202 retaining voltage on the reset coil, subsequent start commands were ineffective. This drive design has been used since the start of the Corona Program without a failure and this failure was considered to be random. The only corrective action was to review test procedures to assure proper operation of S-201.

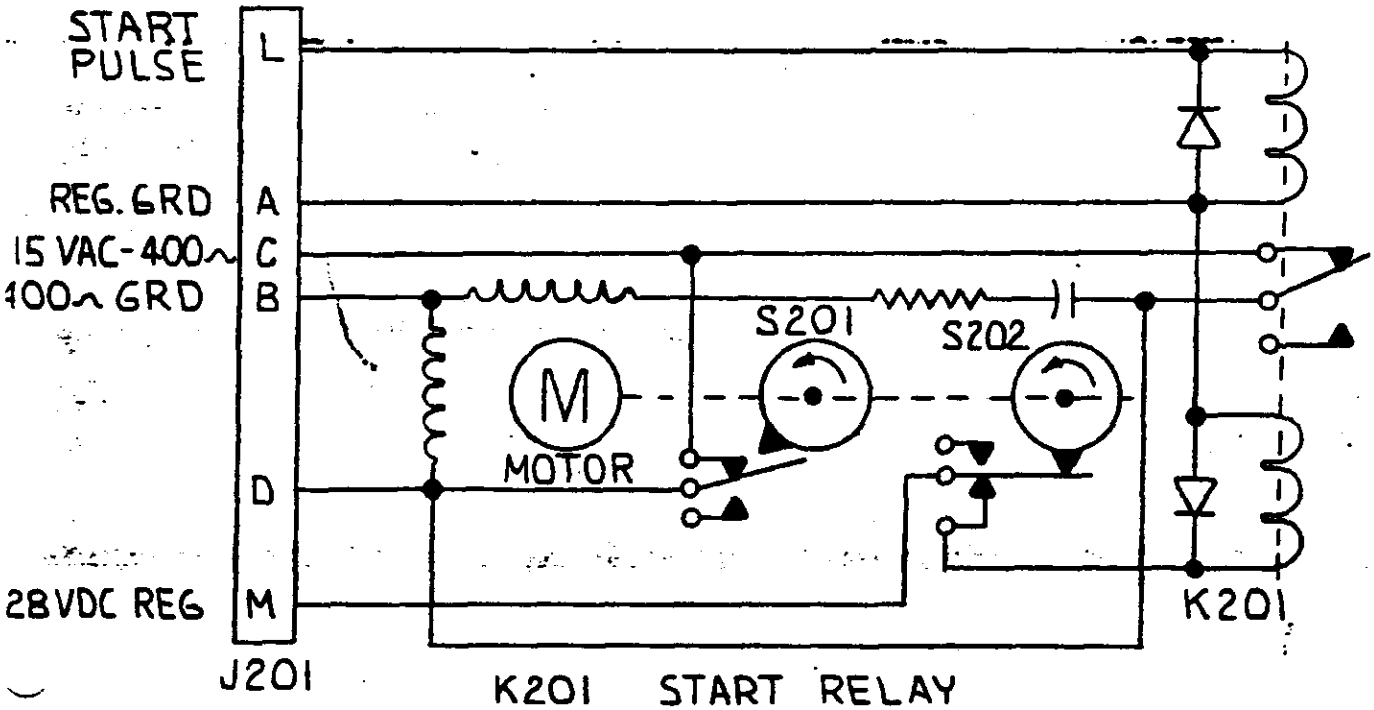
4.0 PANORAMIC CAMERA PERFORMANCE

Camera system dynamics were normal throughout the -1 and -2 missions. The film transport of both camera systems were normal. Cycle rate data (Table 4-1) indicates that the camera systems were generally less than 2.0 per cent from the calibrated systems value. The master and slave instruments were generally less than 1.0 per cent apart throughout most of the flight The 99/101 average clutch ratio was 6/6 for the master instrument and 6/6 for the slave instrument. Film depletion on the slave camera occurred prior to the engineering operation on Rev. 159.

V/H PROGRAMMER VOLTAGE PROFILE



V/H PROGRAMMER DRIVE SCHEMATIC



K201 START RELAY
S201 SELF ENERGIZE SWITCH
S202 START RELAY RESET SWITCH

FIGURE 3-5

TABLE 4-1

J-31 FLIGHT

REV. MODE	CP	RAMP R	RAMP A	TUR SECS	SYSTEM CALIB.	INST. 186 ACTUAL	INST. 186 UNIT DEV.	INST. 186 SYSTEM DEV.	INST. 187 ACTUAL	INST. 187 UNIT DEV.	INST. 187 SYSTEM DEV.	186/187 DIFF.
09	A	7	6	2740	2.890	2.893	0.10S	0.11S	2.909	0.67S	0.66S	0.55
16	A	5	11	2740	2.638	2.650	0.50S	0.47S	2.680	1.57S	1.60S	1.13
32	A	3	11	2740	2.427	2.440	0.61S	0.52S	2.451	0.90S	0.98S	0.45
47	A	3	11	2740	2.427	2.450	1.02S	0.94S	2.450	0.85S	0.94S	-0.00
63	A	3	11	2740	2.427	2.426	0.03S	0.05F	2.443	0.57S	0.65S	0.70
79	A	3	11	2740	2.427	2.455	1.22S	1.14S	2.445	0.65S	0.73S	-0.41
88	B	5	11	2740	2.638	2.672	1.34S	1.30S	2.665	1.00S	1.03S	-0.26
95	B	3	11	2740	2.427	2.451	1.06S	0.98S	2.430	0.03S	0.11S	-0.86
111	B	3	11	2740	2.427	2.465	1.64S	1.55S	2.453	0.98S	1.06S	-0.49
127	B	2	11	2740	2.338	2.380	1.90S	1.79S	2.380	1.69S	1.79S	-0.00
143	B	2	11	2740	2.338	2.390	2.32S	2.22S	2.370	1.26S	1.36S	-0.84
159	B	2	11	2740	2.338	2.369	1.43S	1.32S	2.367	1.13S	1.24S	-0.08

DEV. AND DIFF. ARE IN PERCENT
THE (-) SIGN INDICATES THAT INST 1 IS SLOWER THAN INST 2
F=FAST AND S=SLOW

5.0 STELLAR/INDEX CAMERA PERFORMANCE

The -1 stellar/index camera operation was normal throughout the mission with telemetry indicating proper metering and shutter operation.

The -2 stellar/index camera operation was also normal throughout the mission with no abnormalities noted on telemetry.

6.0 INSTRUMENTATION AND COMMAND SYSTEM PERFORMANCE

The instrumentation and command systems operated satisfactorily throughout the -1 and -2 missions with no abnormalities evident. The mono delay time was within the specified tolerance and operated satisfactorily.

7.0 CLOCK SYSTEM PERFORMANCE

The payload clock system performed satisfactorily during both phases of the mission. The clock/system time correlation data obtained from the [redacted] acquisitions are included in Table 7-1 and 7-2.

8.0 PRESSURE MAKE-UP SYSTEM PERFORMANCE

The pressure make-up system (PMU) developed a high pressure leak and gas depletion occurred on Rev 32 as indicated by Figure 8.1. This high pressure leak most probably occurred on the supply side of the on-off solenoid.

A review of the PMU design and the performance from the previous 25 flight units indicated the design was adequate. This failure was considered to be random and no further corrective action was taken.

9.0 THERMAL ENVIRONMENT

The temperature data obtained from the [redacted] acquisitions are contained in Table 9-1, -2, -3, and -4. Average panoramic camera temperatures for the master camera varied from 77° F to 61° F and the slave camera varied from 71° F to 55° F during the mission.

The ascent thermal environment was recorded on the tape recorder and is included in Figure 9.1 and 9.2.

TABLE 7-1

[redacted]

J-31 1626 1034

ORDER FIT 1

SYS TIME I/P	CL TIME I/P	COMP SYS TM	DELTA ST	REV	STA
0.38511438D 05	C.157176991D C6	C.385114491D 05	-0.0111	9	
0.77963978D 05	C.196629539D C6	C.779639903D 05	-0.0123	16	
0.33219818D 05	C.238285373D C6	C.332198171D 05	0.0009	24	
0.78121671D 05	C.281187234D C6	C.781216704D 05	0.0006	32	
0.33387683D 05	0.324853255D C6	C.333876842D 05	-0.0012	40	
0.728721680 05	C.364337739D C6	C.728721614D 05	0.0066	47	
0.33519076D 05	C.411384660D C6	C.335190743D 05	0.0017	56	
0.72992641D 05	C.450858229D 06	C.729926365D 05	0.0045	63	
0.33644948D 05	C.497910553D C6	C.336449524D 05	-0.0044	72	
0.73094120D 05	C.488804000D C3	C.730941086D 05	0.0114	79	
0.33737155D 05	C.475318510D C5	C.337371475D C5	0.0075	88	
0.731267480 05	C.586921440C0 C5	C.731267297D 05	0.0183	95	
0.338080930 05	C.134C02806D C6	C.338080876D 05	0.0054	104	
0.731993480 05	C.173354074D C6	C.731993488D 05	-0.0008	111	
0.338746110 05	C.220469349D C6	C.338746157D 05	-0.0047	120	
0.730629530 05	0.259657698D C6	C.730629579D 05	-0.0049	127	
0.339014050 05	C.306896156D 06	C.339014078D 05	-0.0028	136	
0.733064750 05	C.346301235D C6	0.733064800D 05	-0.0050	143	
0.339098330 05	C.393304597D 06	C.339098339D 05	-0.0009	152	
0.732530500 05	C.432647829D C6	C.732530591D 05	-0.0091	159	

A0=-0.1186655148D C6 A1= 0.9999999827700D 00

SIGMA=0.00716 NO. POINTS= 20

RATIO OF CLOCK TIME TO SYS TIME= 0.100000017230D 01

[redacted]

TABLE 7-2

[redacted]

J-31 1626 1C34

ORDER FIT 2

SYS TIME I/P	CL TIME I/P	COMP SYS TM	DELTA ST	REV	STA
0.385114380 05	C.157176991C C6	C.3851143910 05	-0.0011	9	[redacted]
0.779639780 05	C.196629539C C6	0.7796398330 05	-0.0053	16	
0.332198180 05	C.238285373C C6	0.3321981290 05	0.0051	24	
0.781216710 05	C.283187234C C6	C.7812166880 05	0.0022	32	
0.333876830 05	C.324853255C 06	C.3338768470 05	-0.0017	40	
0.728721680 05	C.364337739C C6	C.7287216350 05	0.0045	47	
0.335190760 05	C.411384660C C6	C.3351907800 05	-0.0020	56	
0.729926410 05	C.450858229C C6	C.7299264120 05	-0.0062	63	
0.336449480 05	C.497910553C C6	C.3364495790 05	-0.0099	72	
0.730941200 05	C.489804000C 03	C.7309411450 05	0.0055	79	
0.337371550 05	C.475318510C C5	C.3373715340 05	0.0016	88	
0.731267480 05	C.869214400C C5	C.7312673530 05	0.0127	95	
0.338080930 05	C.134002806C 06	0.3380809240 05	0.0006	104	
0.731993480 05	C.173394074C C6	C.7319935260 05	-0.0046	111	
0.338746110 05	C.220469349C C6	0.3387461800 05	-0.0070	120	
0.730629530 05	C.259657698C C6	C.7306295860 05	-0.0056	127	
0.339014050 05	C.306896156C C6	0.3390140610 05	-0.0011	136	
0.733064750 05	0.346301235D 06	0.7330647600 05	-0.0010	143	
0.339098330 05	C.393304597C 06	C.3390982680 05	0.0062	152	
0.732530500 05	C.432647829C C6	C.7325304910 05	0.0009	159	

A0=-0.11866553950 C6 A1= 0.999999936404D 00
A2=-0.96579448387110-13

SIGMA=0.00499 NO. POINTS= 20

[redacted]

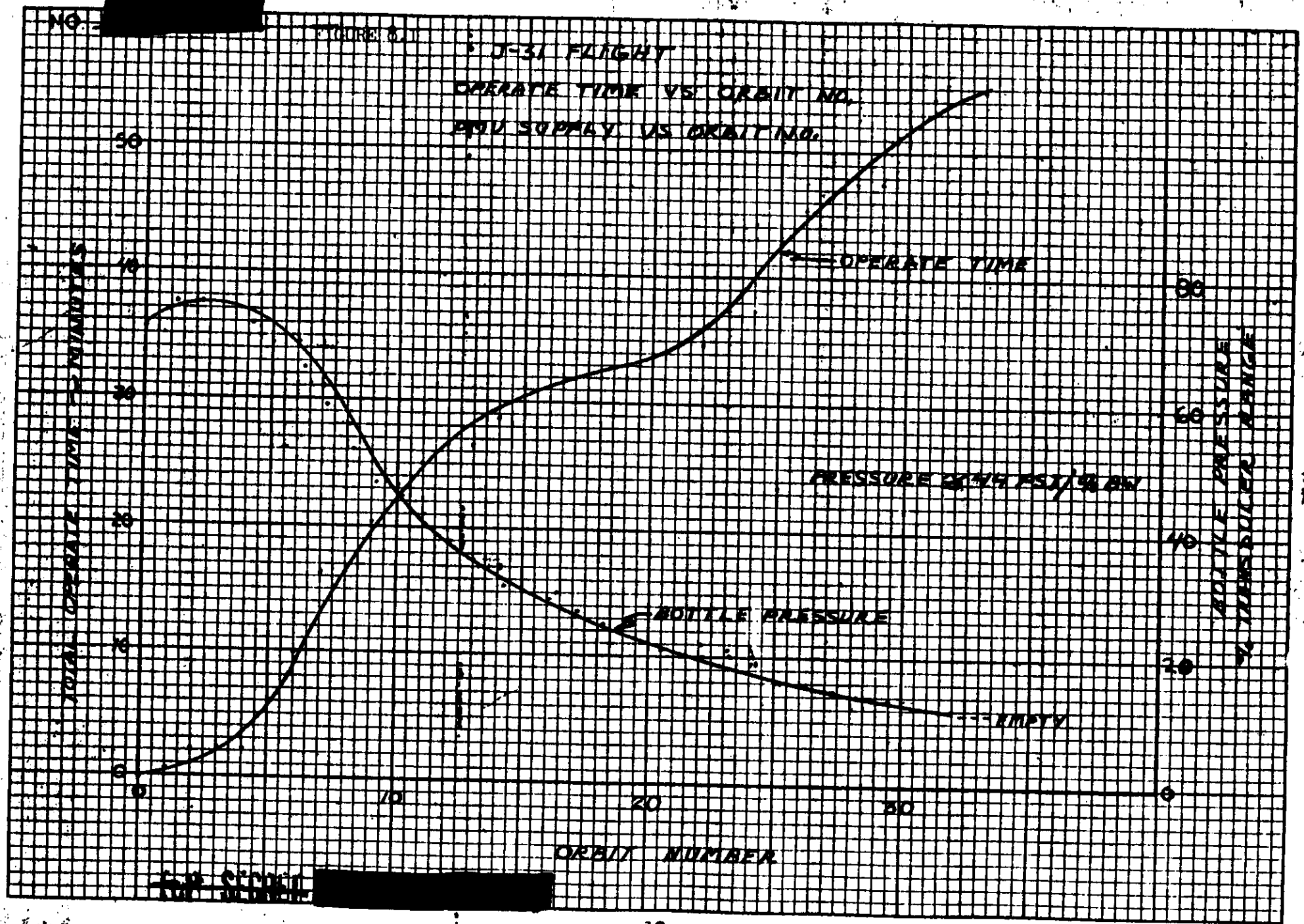
NO. [redacted]

FIGURE 6.11

J-31 FLIGHT

OPERATE TIME VS. ORBIT NO.

PPU SUPPLY VS. ORBIT NO.



NO. _____

Meter	L/O Fed	09	16	24	32	40	47	56	63	72	79	88	95	104	
3	65	70	68	70	67	70	68	69	66	67	65	65	60	63	
4	64	76	71	75	71	74	73	74	69	70	68	69	64	67	
5	64	80	76	79	75	78	75	77	73	74	71	71	66	70	
6	59	78	74	77	74	76	74	74	72	71	70	69	65	66	
7	59	78	76	77	75	76	76	75	73	72	72	69	66	67	
8	64	78	75	77	74	77	76	76	74	73	73	72	69	70	
9	63	80	76	77	75	78	76	76	72	73	71	71	67	70	
10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
11	67	78	76	82	76	77	75	75	71	69	69	67	62	64	
12	71	78	73	74	73	77	73	76	71	73	70	72	66	70	
13	59	76	75	72	74	75	74	74	72	71	70	67	64	64	
AVG. INSTR. TEMP.	64	77	74	76	73	75	74	74	73	72	70	69	65	67	
[redacted]															
1	61	73	70	71	69	69	69	69	66	65	63	62	58	59	
2	54	69	64	68	62	66	64	66	60	62	59	60	53	56	
3	59	76	72	75	71	73	68	73	69	71	68	69	63	67	
4	59	75	71	75	71	73	73	73	70	70	70	69	64	66	
5	55	74	72	74	71	72	73	71	69	69	69	67	63	64	
6	57	72	67	71	66	70	67	70	64	67	63	63	59	62	
7	58	73	69	73	68	72	69	72	68	70	67	68	63	66	
8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
11	62	67	63	66	63	65	63	66	61	62	59	59	55	58	
12	57	69	66	69	64	67	64	67	61	63	60	61	54	58	
13	53	66	64	65	64	65	63	64	62	62	60	58	55	56	
AVG. INSTR. TEMP.	63	71	68	71	67	69	67	69	65	66	64	64	59	61	
[redacted]															
1	59	62	59	62	58	62	62	62	60	61	60	59	55	57	
2	59	63	60	63	60	62	61	62	59	61	58	59	56	55	

NOTE: All data corrected for self-heating, except injection.

[redacted]

ORBITS ACQUIRED

Ring/Barrel #1 ("B")	L/O Pad	09	16	24	32	40	47	56	63	72	79	88	95	104
1	---	22	81	22	78	19	81	22	78	15	71	21	44	21
2	—	0	13	0	10	0	16	0	16	-4	29	56	78	53
3	227	-13	15	-9	8	-9	18	-9	15	-13	15	58	143	58
4	223	35	52	35	42	32	52	33	48	26	45	19	68	19
5	—	44	54	41	47	37	54	37	44	34	44	22	28	22
6	—	35	83	35	77	32	74	32	71	25	61	—	—	—
Barrel No. 2														
1	144	39	54	33	48	30	51	30	45	27	42	28	36	21
2	144	31	90	31	84	24	81	28	76	21	70	21	61	21
3	—	50	140	54	140	50	143	50	140	44	137	54	134	50
4	216	48	64	55	64	51	74	51	74	48	77	55	74	55
5	191	48	68	64	63	45	64	42	64	42	64	38	55	38
Conic Adapter														
1	164	26	39	29	36	23	36	23	29	16	26	13	16	10
Clock														
1	90	61	61	63	61	61	63	61	61	59	61	55	51	51
2	94	60	60	62	60	60	62	60	60	58	58	54	52	50
Thrust Cone "A" to "B" SRV														
1	116	37	34	34	33	33	40	33	33	32	32	56	52	53
2	72	53	35	47	43	44	42	43	41	37	37	62	57	58
Ring/Ladder "A" to "B"														
1	84	51	51	48	51	48	48	45	51	42	48	54	51	51
2	71	48	48	48	45	45	45	45	45	42	42	52	46	49
Other Bath "B" SRV														
1	69	67	63	63	63	63	63	62	63	61	62	83	79	78
Film Cassette "A" SRV														
2	91	67	64	64	65	66	66	66	66	65	66	---	—	—

NOTE: Only Thrust Cone Data corrected for Self-heating.

[redacted]

[redacted] DOPE [redacted]

TEMPERATURE ASSAY

ORBITS ACQUIRED

VEHICLE 1626

[redacted]	111	120	127	135	143	152									
3	58	64	57	63	59	63									
4	62	68	61	66	62	66									
5	65	70	64	69	65	67									
6	62	67	61	64	61	62									
7	64	67	63	66	65	65									
8	63	69	63	68	63	67									
9	64	69	63	69	63	66									
10	--	--	--	--	--	--									
11	59	64	57	63	59	61									
12	64	70	64	69	66	69									
13	62	64	60	63	61	61									
[redacted] TEMP.	62	67	61	66	62	65									
[redacted]															
3	55	58	53	57	65	55									
4	50	57	50	55	50	53									
5	62	66	62	65	62	64									
6	62	66	62	66	63	65									
7	60	64	60	64	62	62									
8	57	63	57	61	58	61									
9	61	66	61	66	62	66									
10	--	--	--	--	--	--									
11	53	57	52	56	53	55									
12	52	57	52	56	52	54									
13	54	55	50	55	53	54									
[redacted] TEMP.	56	61	55	60	57	59									
[redacted]															
2	53	56	53	56	54	55									
3	57	54	49	53	51	52									

NOTE: All data corrected for self-heating, except injection.

[redacted]

[redacted] TEMPERATURE DATA Vehicle [illegible]

ORBITS ACQUIRED

[illegible]/Barrel #1 ("A") ("B")	111	120	127	135	143	152
1	44	18	11	21	44	21
2	78	53	84	59	90	53
3	146	55	148	58	146	49
4	59	16	52	13	49	10
5	35	16	25	16	25	9
[illegible]	--	--	--	--	--	--
[illegible] No. 2						
1	30	18	24	18	27	12
2	53	15	49	15	46	12
3	131	50	137	50	137	44
4	77	55	83	55	89	51
5	51	38	51	42	58	38
[illegible]						
[illegible]	10	6	6	6	6	3
[illegible]						
1	49	51	47	51	51	49
2	48	50	46	50	50	48
[illegible] "A" to "B" SRV						
1	49	53	49	53	51	50
2	49	58	53	57	55	55
[illegible]/Index "A" to "B"						
1	48	48	45	48	48	42
2	43	46	40	49	46	43
[illegible] Batt. "B" SRV						
[illegible]	79	81	81	84	84	84
[illegible] "A" SRV						
2	--	--	--	--	--	--

[illegible]: Only Thrust Cone Data corrected for Self-heating.

[redacted]

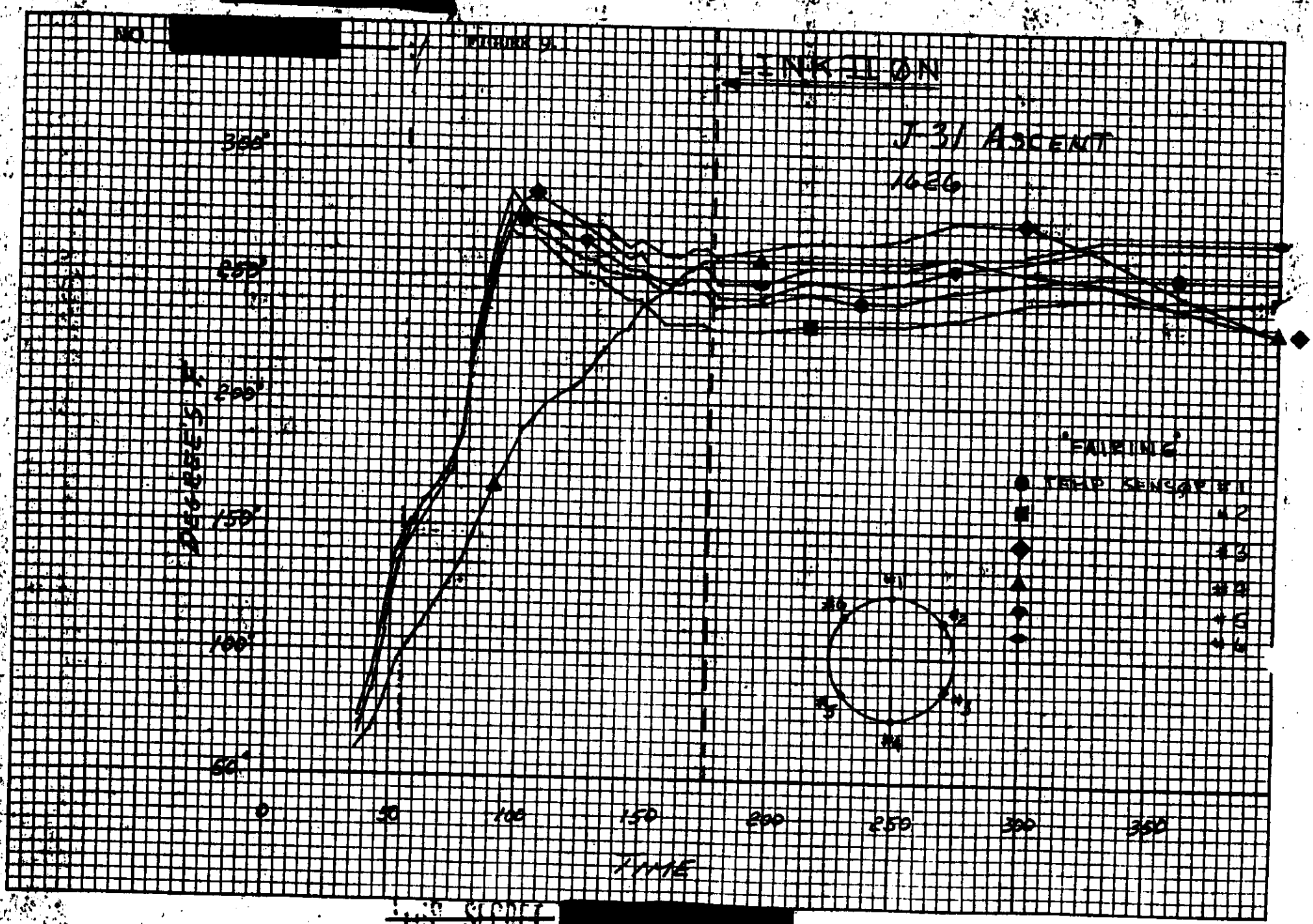
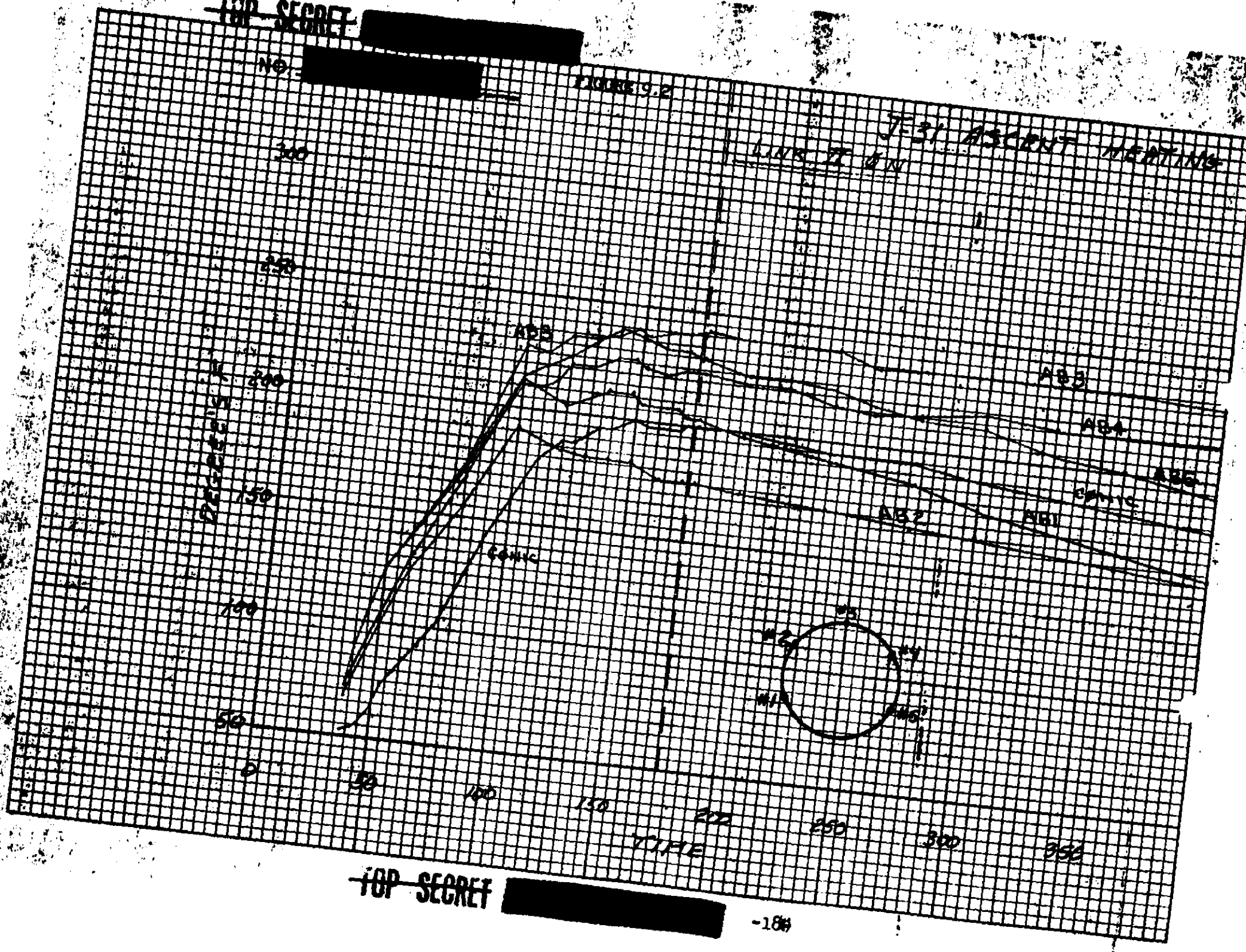

NO [redacted]
FIGURE 9
LIFTOFF
J-31 ASCENT
1426
FAILING
TEMP SENSOR #1
#2
#3
#4
#5
#6
400°
350°
300°
250°
200°
150°
100°
50°
0
50
100
150
200
250
300
350
TIME

FIGURE 9.2

J-3 ASCENT TRAJECTORY



10.0 RECOVERY SYSTEM PERFORMANCE

10.1 -1 Mission

The -1 recovery system operated satisfactorily and was successfully recovered by air catch on 26 June 1966.

REV 81 Impact Point

Predicted	Actual
25° 02'N/156° 59'W	25° 00'N/157° 02'W

10.2 -2 Mission

It was reported by the recovery aircraft that the flashing light was working during descent. However, after the recovery system was caught and being reeled into the aircraft the flashing light was inoperative. Post recovery tests indicated satisfactory operation of all equipment. The unit is being returned to G.E. for a detailed analysis.

The -2 recovery system was successfully recovered by air catch on 01 July 1966.

REV 161 Impact Point

Predicted	Actual
24° 36'N/170° 16'W	24° 38.4'N/169° 59.4'W

Refer to Table 10-1 for the sequence of events for both -1 and -2 recoveries.

TABLE 10-1

RE-ENTRY SEQUENCE OF EVENTS

EVENT	SYSTEM TIME		DELTA TIME		
	No. 1	No. 2	No. 1	No. 2	Nominal
*Arm	83390.65	83572.33	76.97	76.96	77.0 ± 1.0
*Transfer	83465.61	83647.33	2.01	1.96	2.0 ± .25
Electrical Disconnect	83466.25	83648.23	.64	.90	.9 + .43 - .40
Separation	83467.62	83649.29	———	———	———
**Spin	83469.66	83651.64	3.41	3.41	3.4 ± .30
Retro	83477.15	83659.27	7.49	7.63	7.55 ± .45
Despin	83487.75	83670.00	10.60	10.73	10.75 ± .59
T/C Separation	83489.27	83671.51	1.52	1.51	1.5 ± .15
.3" Switch Open	84004.60	84194.21	527.45	534.94	528.6 ± 534.0
Parachute Cover Off	84038.40	84228.29	33.80	34.08	34.0 ± 1.5
Drogue Chute Deployed	84039.07	84228.92	.67	.63	.63 ± .08
Main Chute Bag Separate	84049.26	84238.70	10.19	9.78	10.25 ± 1.5
Main Chute Deployed	84049.81	84239.14	.55	.44	.52 ± .13
Main Chute Disreef	84054.32	84243.46	4.51	4.32	4.5 ± .80

*From separation **From elect. disc. ***From retro