[redacted]

CORONA CR

MISSION SUMMARY

AND

TELEMETRY ANALYSIS

MISSION 1115

AGENA 1662/PAYLOAD CR-15

22 OCT. 1971

Prepared by [redacted]

Reviewed by

Approved by [redacted] 10-20-71
Manager
Eng., Ops., & Analysis

Approved by [redacted]
Manager
Advanced Projects

Distribution:

[redacted]

TABLE OF CONTENTS

1.0 SUMMARY

Mission 1115 utilized a Thorad booster (SLV-2H) S/N 567, Agena vehicle 1662, and payload system CR-15. The CR-15 payload system contained panoramic cameras S/N 330 and 331, and DISIC camera S/N 14. Payload profile and additional component serial numbers are included in Figure 7-1.

Lift-off occurred at 14:32:56 PDT on 10 September 1971 from the Vandenberg SLC-3 west pad. All payload ascent events were normal with In-flight Reset (door ejection), AP to Orbit mode, instrumentation switchover, and panoramic camera transfer to orbit mode occurring as programmed. The orbit attained was within the three sigma of predicted.

The normal mission plan was 8/11 days with an actual of 7/12 days.

Panoramic cameras S/N 330 and 331 performed normally throughout the flight. The film supply of both cameras was exhausted on Rev 300.

The DISIC camera system S/N 14 performed normally throughout the flight. This was the last DISIC camera system to be flown on the Corona program.

The panoramic camera A-to-B transfer sequence was performed on Rev 105[redacted] and the DISIC camera A-to-B cut and splice sequence on Rev 107[redacted] Both the panoramic and DISIC camera A-to-B sequences were normal. The -1 mission recovery capsule was recovered by air catch on Rev 115 at 1630 PDT on 17 September 1971. The -2 mission recovery capsule was recovered by air catch on Rev 309 at 1402 PDT on 29 September 1971. The Lifeboat recovery system was utilized for the -2 capsule recovery because the primary recovery select command decoder was locked out due to a diode failure in the +20 VDC converter. All Lifeboat systems performed normally.

The SRV-1 tape recorder data was unusable because of tape jitter during recording which prevented the AGE processor from syncing on the data. The SRV-2 tape recorder system performed normally with all data extracted.

The slope programmer eccentricity function failed to operate on passes 120 and 192.

The clock system, command and instrumentation system, pressure make-up system, and the thermal environment were normal throughout the flight.

2.0 SUBSYSTEM PERFORMANCE

2.1 Panoramic Camera. Panoramic cameras S/N 330 and 331 performed normally during the -1 and -2 missions.

2.1.1 Film Consumption and Type.

Frames

	Pan 330	Pan 331
Sample	24	24
Pre-launch	191	191
-1 Mission	2950	2945
-2 Mission	3016	3019
Total	6,181	6,179

Film Supply Length and Type

Pan 330	Pan 331
16300 FT/3414	16300 FT/3414

2.2 DISIC Camera. The DISIC camera system performed normally throughout the -1 and -2 missions. This was the last DISIC camera to be flown on the Corona program.

2.2.1 Film Consumption and Type.

	Frames (Terrain)
Sample	12
Pre-launch	133
-1 Mission	2472
-2 Mission	2616
Total	5233

Film Supply Length and Type

Terrain	Stellar
2200 FT/3400	2000 FT/3401

2.3 Command and Control.

2.3.1 Command System. The stored Programmer Command brush 45 apparently shifted its index point during ascent. When utilizing a brush 45 as an "on" or "off" brush, the instrument operate command would occur approximately 2 seconds early. This resulted in some instrument operations to be either short or long in duration depending on whether brush 45 was used as an "off" or as an "on" brush. Due to normal "padding" required for H-Timer tape punching, this anomaly did not seriously degrade operational coverage.

2.3.2 FMC Match. The ramp to orbit match was maintained satisfactorily throughout the flight. Approximately 87% of the first mission operations and 70% of the second mission operations were less than ± 1.0 % mismatch error. The increase in the -2 mission mismatch error was caused by the utilization of flat

ramps. The eccentricity programmer failed to start on two revs (120 and 192), thus necessitating the use of a flat ramp when the verification of the eccentricity programmer operation was not possible. A flat ramp was used on 21 of 73 operations after Rev 120. This particular kind of failure has not been experienced previously on any other system.

The most probable cause(s) of the programmer failure are (1) a dirty or bent brush on the orbital programmer (H-Timer), (2) the controller failed to start, (3) the control relay failed to respond, (4) a broken wire or loose connection.

Additional testing of the remaining flight programmers is being conducted in conjunction with the 400 cycle motor replacement to insure satisfactory operation.

2.3.3 Exposure Control System. The slit width control programmer performed satisfactorily throughout the -1 and -2 missions.

2.4 Data Systems.

2.4.1 Instrumentation. The instrumentation system performed satisfactorily throughout the -1 and -2 missions. The pan and terrain door separation telemetry monitor changed from a both "on" condition to the terrain "off" condition during "Pogo" in Ascent, and then changed to the proper position of both doors "off" later during Ascent. This condition was attributed to an adjustment of the microswitch.

2.4.2 Clock System. The payload clock system performed satisfactorily throughout the -1 and -2 missions. The third order fit was determined to be the most desirable for computations. The third order constants and coefficients are:

Third Order Fit

System Time = $A_0 + A_1$ (Clock Time) + A_2 (Clock Time)^2
+ A_3 (Clock Time)^3

A_0 = -0.2803944729530378 D 06

A_1 = +1.000000070220526 D 01

A_2 = -.1163614458769420 D - 12

A_3 = +0.2676357033049752 D - 19

Sigma = 0.00042562

Number of points = 330

2.4.3 SRV Tape Recorder. The -1 SRV tape recorder data was unusable because the AGE processor could not sync on the data. It was determined that a faulty drive belt produced excessive tape jitter thus preventing data retrieval. The -2 SRV tape recorder performed normally throughout the -2 mission with 104 minutes of data retrieved satisfactorily.

2.5 Recovery.

2.5.1 -1 Mission. The -1 recovery capsule was successfully recovered by air catch on Rev 115 at 1630 PDT on 17 September 1971. All re-entry events were within tolerance with the impact 10 miles north of predicted.

	Actual	Predicted
Impact Location	22°44'N/160°53'W	22°58'N/160°56'W

2.5.2 -2 Mission. The -2 recovery capsule was successfully recovered by air catch on Rev 309 at 1402 PDT on 29 September 1971. All re-entry events were within tolerance with the impact within 5 miles of the predicted.

	Actual	Predicted
Impact Location	22°05'N/162°41'W	22°00'N/162°34'W

3.0 ORBITAL PERFORMANCE

3.1 Orbital Parameters.

Parameter	Predicted	Tolerance	Actual(STC)	Actual(APF)
Period(Min.)	88.43	+.27,-.33	88.52	88.53
Perigee(N.M.)	84.7	± 7	86.1	86.7
Apogee(N.M.)	137.0	+9,-14	136.3	136.3
Eccentricity	.0076	+.0015,-.0024	.0071	.0066
Inclination(Deg.)	75.01	+.21,-.15	74.94	74.96
Arg. of Perigee(Deg.)	134	+71,-62	146.8	147

3.2 DMU Operation. Ten DMU rockets were required during the mission life to maintain the orbit at the mean perigee altitude of 85 N.M. The rocket firings were selected to keep perigee between 82 and 88 N.M. and located between 23 to 63 degrees north descending. The ground track longitudinal error at the equator varied between 10 and 100 N.M. west of the nominal. The greatest ground track error occurred early in the mission as a result of the injection period of 88.53 minutes rather than the 88.43 nominally planned.

The rocket firings occurring in the second mission were largely selected with the objective of accessing a special target area.

TABLE 3.2.1

DMU Performance

Rocket No.	Rev No.	System Time (Sec)	Period Change (Sec)	Velocity Change (FT/Sec)	Period at Firing (Min)	Impulse (Lb/Sec)
1	66	81905	14.96	23.90	88.15	3088
2	91	41618	14.65	23.46	88.18	3014
3	122	34507	16.75	26.76	88.08	3075
4	142	52144	16.38	26.20	88.15	2987
5	171	33927	16.20	25.92	88.13	2918
6	197	84209	17.00	27.12	88.13	3052
7	218	24137	16.30	26.07	88.17	2929
8	250	20850	16.90	26.95	88.09	2999
9	267	24946	16.35	26.14	88.19	2890
10	292	69530	17.00	27.18	88.23	2989

NOTE: DMUs No. 11 and 12 were fired after Event II.

4.0 ENVIRONMENTAL CONTROL

4.1 Pressure Make-up System. The pressure make-up system (PMU) operated properly throughout the flight. There were 123 panoramic camera operates for a total of 188.5 minutes which resulted in a gas consumption rate of 4.9 psi/min of operate time. There were 262 DISIC camera operates for a total of 692.7 minutes for an alternate level gas consumption rate of 1.5 psi/min of operate time.

4.2 Thermal Environment. The temperature data obtained during this flight indicated the temperature environment was within the pre-flight predictions for the duration of the flight. The averages of the panoramic camera temperatures ranged from 62° F to 68° F for S/N 330 and 62° F to 67° F for S/N 331 during

the -1 mission and 64° F to 69° F for S/N 330 and 62°F to 68° F for S/N 331 during the -2 mission. Refer to Tables 7.8.1 and 7.9.1 thru 7.9.6.

The on-orbit temperature profiles for Revs. 42, 105, and 187 are included in Figures 7.8.2 thru 7.8.11.

5.0 POST EVENT 2 TESTING

The panoramic and DISIC cameras were enabled at the end of the H-Timer tape in order to deplete the surplus vehicle power. No other payload testing was performed.

6.0 HARDWARE DEFINITION

6.1 Agena. FTV 1662 was an Agena vehicle (SS01B) and a Thorad booster (SLV-2H) S/N 567. The Agena was oriented nose first with the following configuration.

1) Twelve Thiokol 3000 lb/sec DMU rockets.
2) Three primary control gas spheres with the -5 heavy control gas mixture.
3) -3 payload system with a digital storage register (DSR) and the capability of accepting both Silo and Uncle commands.
4) Ten panel, single wing, solar array system with two (2) 1H batteries (depleting system).
5) 3/4 speed Type VIII programmer (325 subcycles).
6) Link II frequency for this vehicle only was 2202.5 MHZ instead of 2232.5 MHZ.
7) Aft payload-Doppler Beacon #6, [redacted] SSU #007.
8) Six Silo Commands for Doppler Beacon control.
9) Three real time commands for vehicle tape recorder control.

6.2 Payload. The CR-15 payload system configuration included the following:

1) Panoramic Camera

a) Constant rotating type with a servo-controlled supply cassette.

b) Digital Storage Register/Cascade system utilized for camera enable/disable.

c) Emergency program back-up available by RTC.

UHF 116/Silo 316 Emergency Program Select

UHF 118/Silo 318 Emergency Intermix Select

UHF 120/Silo 320 Emergency Mode Select

d) Exposure Control

1. Programmer control by Stored Programmer Command (SPC) (51, 52,17) and Real Time Command (RTC) UHF 105/Silo 305.

2. Automatic slit width control with override by RTC UHF101-126/ Silo 301-326.

e) Filter Selection

1. Control by RTC UHF 103-104/Silo 303-304.

2. The automatic filter change capability through the material change detector (MCD) was disconnected prior to launch.

2) DISIC Camera

a) Mode select ccntrolled by RTC UHF 124/Silo 324.

b) Both slave and independent modes of operation had a 1:1 ratio of stellar to terrain frames.

c) Operate off provided by RTC UHF 107/Silo 307.

3) FMC Programmer

a) Initiated by SPC 14 and SPC 27.

b) Control delay increment by RTC UHF 125/Silo 325.

c) Ramp profile provided by:

UHF 121/Silo 321 Eccentricity start level.

UHF 122/Silo 322 Eccentricity Half cycle.

4) Pressure Make-up System

a) Enable/disable controlled by RTC UHF 110/Silo 310.

b) Two bottle system with dual range capability.

c) PMU operation in low range with DISIC independent mode of operation.

5) Panoramic camera "A" to "B" Transfer available by RTC KIK-SILO 38.

6) DISIC camera "A" to "B" Transfer available by RTC KIK-SILO 39.

7) Yaw Steering available by RTC UHF 106/SILO 306.

8) Agena tape recorder for on-orbit temperature profiles time shared with vehicle data.

9) SRV tape recorder available in -1 and -2 recovery capsule for camera diagnostic data.

10) Payload weight: EWO = 1810 lbs.

11) Instrumentation: RTC UHF 127/SILO 327 for operational/diagnostic commutator selection.

12) Thermal Configuration: The top black surface was 56 degrees on the fairing and 76 degrees on the conic and barrel section.

13) Command system included a DSR for primary operation of the camera system with a two program/4 rev. intermix emergency capability.

6.3 Camera and Programmer Settings

6.3.1 Panoramic Cameras.

	S/N 330	S/N 331
Filter Type	W-23	W-25
Primary	0.037 Glass	0.037 Glass
Alternate	0.040 Glass	0.040 Glass
Slit Width(inches)		
Position 1	0.122	0.131
" 2	0.154	0.167
" 3	0.204	0.242
" 4	0.287	0.334
Failsafe	0.247	0.200

Auxiliary Optics	Take-up	Supply	Take-up	Supply
Filter	W-25	W-25	W-25	W-25
Aperture	F6.3	F8.0	F8.0	F6.3

6.3.2 DISIC Camera.

	Stellar	Terrain
Filter	None	W-12
Aperture	F2.8	F6.3
Cycle Period	9.375	9.375

6.3.3 Exposure Control Settings.

	Seconds
T-1 (20 second increment) initial setting	200
T-2 DISIC Exposure to 1/500	120*
T-3 Slit position 3 Duration	240
T-4 Slit position 2 Duration	240
T-5 DISIC exposure to 1/250	120*
T-6Δ	420
T-6 (T6Δ -T1)	220

* NOTE: Exposure fixed at 1/500 for this mission.

6.3.4 FMC Control Settings.

1) Eccentricity Function

a) Period - 3995 seconds

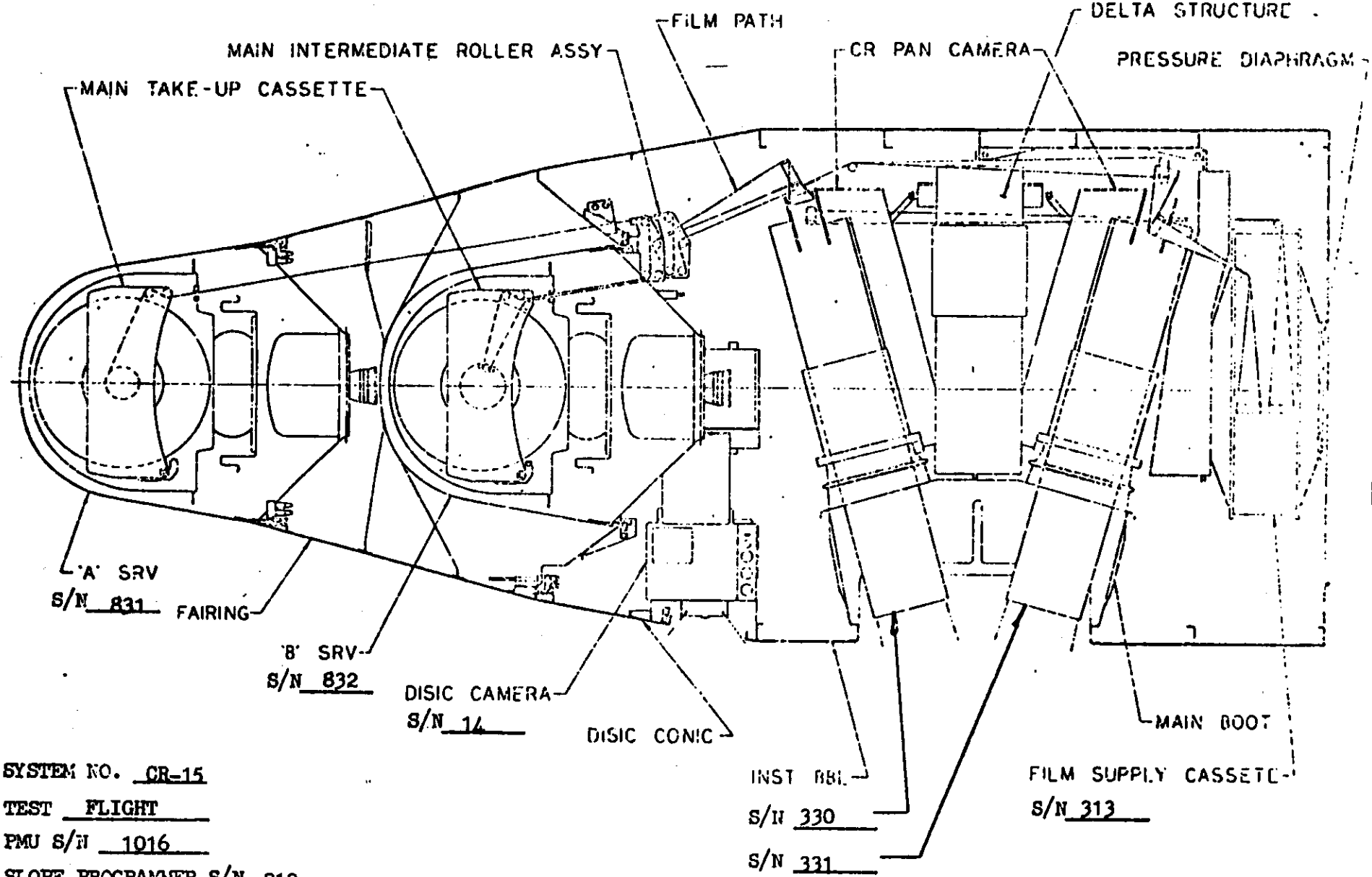
b) Delay step increment - 50 seconds

2) Oblateness Function

a) Period - 5235 seconds

b) Gain factor - 0.1130

2. PAYLOAD PROFILE AND SERIAL NUMBERS



SYSTEM NO. CR-15
TEST FLIGHT
PMU S/N 1016
SLOPE PROGRAMMER S/N 212
CLOCK S/N 623
SWITCH PROGRAMMER S/N 218

Figure 7.1

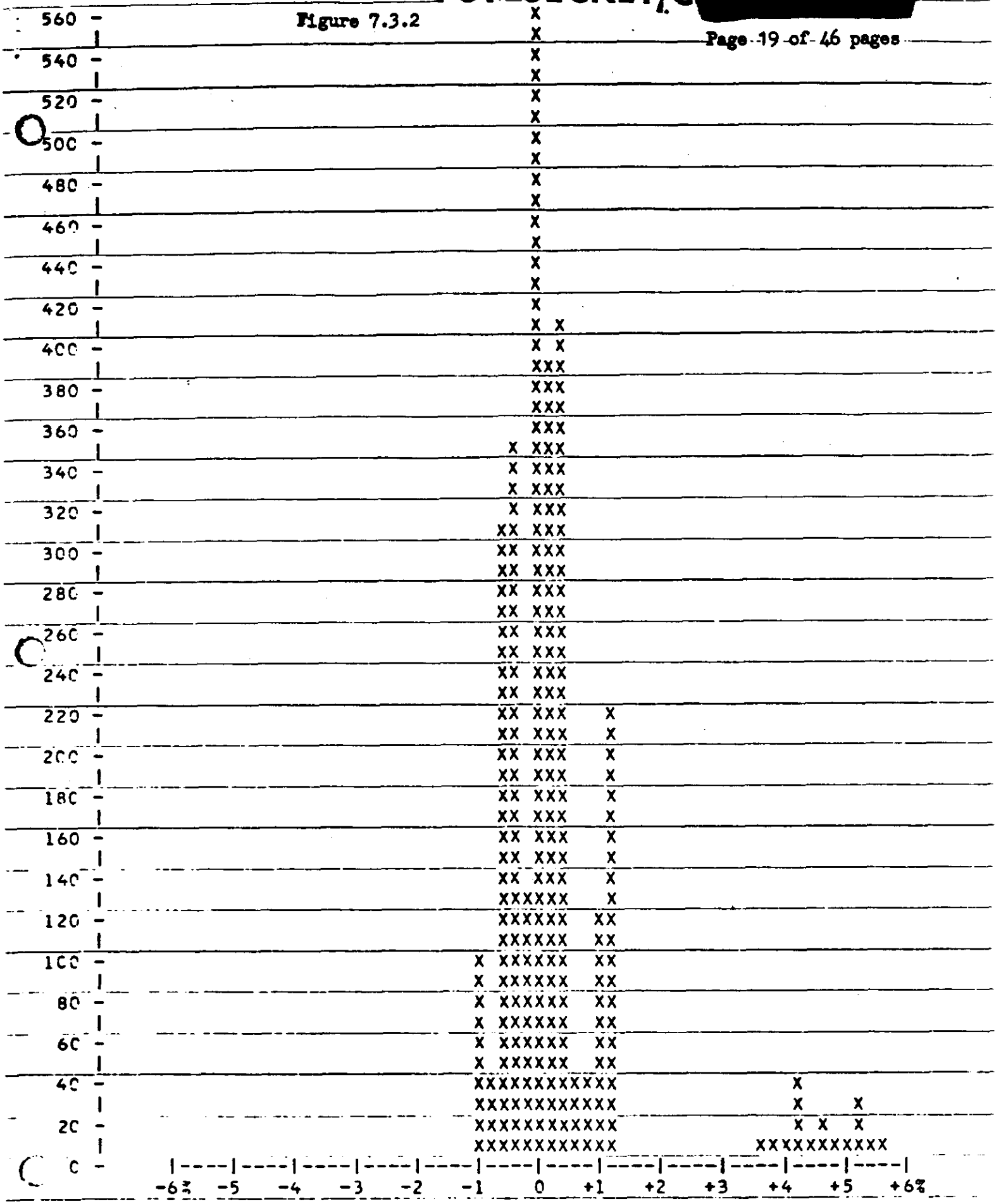
REV	P O P	S 1/2 POS.	SYSTEM CALIB.	ORL TUR	ECC TUR	INST. 330 ACTUAL PERIOD	INST. 330 UNIT DEV.	INST. 330 SYSTEM DEV.	INST. 331 ACTUAL PERIOD	INST. 331 UNIT DEV.	INST. 331 SYSTEM DEV.
16	0 1	1 10	1.918	3392	1998	1.920	0.12S	0.09S	1.930	0.59S	0.61S
48	0 1	4 12	1.855	3475	2067	1.850	0.22E	0.25E	1.850	0.27E	0.25E
79	0 1	3 14	1.841	3373	2179	1.835	0.30E	0.33E	1.840	0.08E	0.05E
176	0 1	17 14	1.843	3318	2131	1.842	0.01E	0.04E	1.850	0.37S	0.40S
127	0 1	2 11	1.91P	3294	1960	1.910	0.30E	0.42E	1.910	0.45E	0.42E
224	0 1	2 13	1.879	3279	2103	1.875	0.16E	0.19E	1.870	0.49E	0.46E
274	0 1	3 10	1.919	3446	1800	1.920	0.14S	0.11S	1.920	0.08S	0.11S

Table 7.2

Figure 7.3.1

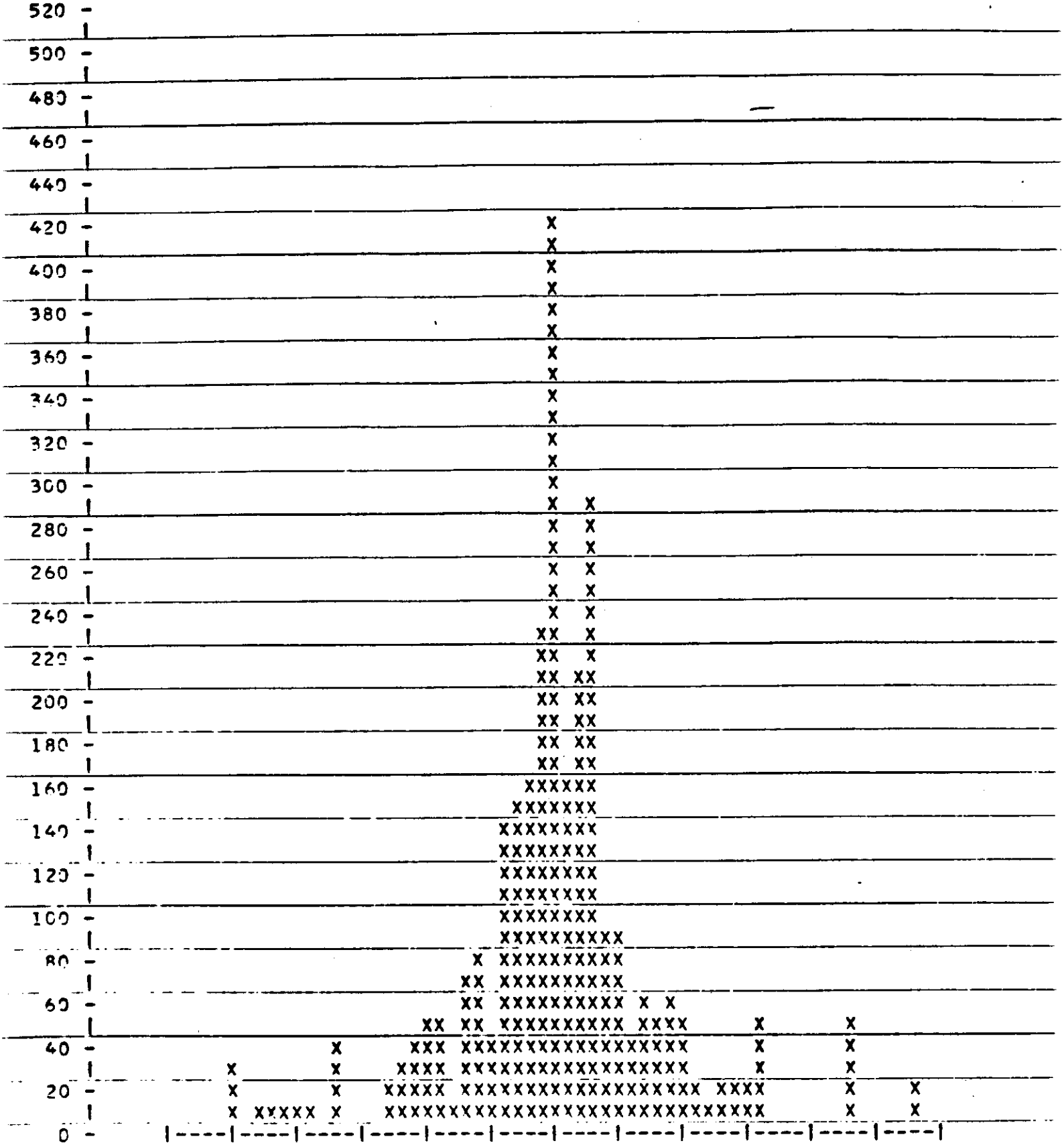
MISSION 1115-1 AFT LOOKING--ORBIT MATCH
MEAN= 0.39 ONE SIGMA= 1.15 TOTAL FRAMES=2950
2583 FRAMES MATCHED ORBIT +/- 1σ, REPRESENTS 87.56%, OF THE MISSION

Figure 7.3.2



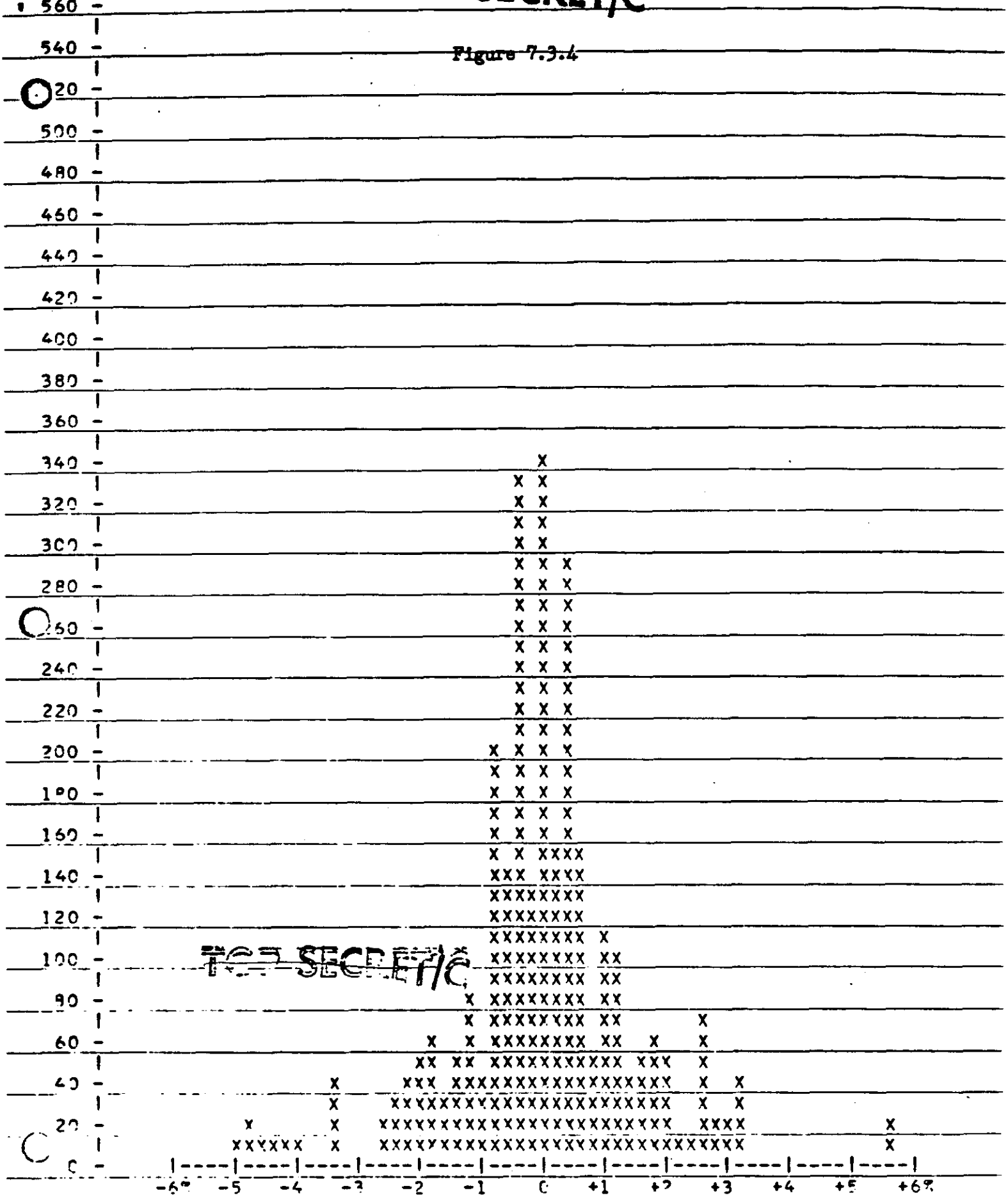
MISSION 1115-1 FWD LOOKING--ORBIT MATCH
MEAN= 0.30 ONE SIGMA= 1.14 TOTAL FRAMES=2945
2579 FRAMES MATCHED ORBIT +/- 1%, REPRESENTS 87.57%, OF THE MISSION

Figure 7.3.3



MISSION 1115-2 AFT LOOKING--ORBIT MATCH
MEAN= 0.09 ONE SIGMA= 1.55 TOTAL FRAMES=2857
1961 FRAMES MATCHED ORBIT +/- 1σ, REPRESENTS 68.64%. OF THE MISSION

Figure 7.3.4



MISSION 1115-2 FWD LOOKING--ORBIT MATCH

MEAN= 0.00 ONE SIGMA= 1.47 TOTAL FRAMES=2853

1919 FRAMES MATCHED ORBIT +/- 1σ, REPRESENTS 67.26%, OF THE MISSION

MISSION 1115-1 AFT LOOKING, TOTAL FRAME COUNT- 2950

FRAME FREQUENCY DISTRIBUTION BETWEEN -6% AND +6% ORBIT MATCH

DISTRIBUTION OVER 61 POINTS INCREMENTED AT .2 PERCENT

PERCENT	FRAMES	PERCENT	FRAMES
		0.0	499
-0.2	148	0.2	393
-0.4	451	0.4	432
-0.6	211	0.6	163
-0.8	35	0.8	37
-1.0	54	1.0	160
-1.2	0	1.2	0
-1.4	0	1.4	0
-1.6	0	1.6	217
-1.8	0	1.8	0
-2.0	0	2.0	0
-2.2	0	2.2	0
-2.4	0	2.4	0
-2.6	0	2.6	0
-2.8	0	2.8	0
-3.0	0	3.0	0
-3.2	0	3.2	0
-3.4	0	3.4	0
-3.6	0	3.6	0
-3.8	0	3.8	12
-4.0	0	4.0	11
-4.2	0	4.2	37
-4.4	0	4.4	11
-4.6	0	4.6	22
-4.8	0	4.8	10
-5.0	0	5.0	0
-5.2	0	5.2	29
-5.4	0	5.4	9
-5.6	0	5.6	9
-5.8	0	5.8	0
-6.0	0	6.0	0

Table 7.4.1

MISSION 1115-1 FWD LOOKING, TOTAL FRAME COUNT- 2945

FRAME FREQUENCY DISTRIBUTION BETWEEN -6% AND +6% ORBIT MATCH

DISTRIBUTION OVER 61 POINTS INCREMENTED AT .2 PERCENT

PERCENT	FRAMES	PERCENT	FRAMES
		0.0	651
-0.2	129	0.2	391
-0.4	349	0.4	413
-0.6	312	0.6	38
-0.8	35	0.8	37
-1.0	104	1.0	120
-1.2	0	1.2	216
-1.4	0	1.4	0
-1.6	0	1.6	0
-1.8	0	1.8	0
-2.0	0	2.0	0
-2.2	0	2.2	0
-2.4	0	2.4	0
-2.6	0	2.6	0
-2.8	0	2.8	0
-3.0	0	3.0	0
-3.2	0	3.2	0
-3.4	0	3.4	0
-3.6	0	3.6	10
-3.8	0	3.8	10
-4.0	0	4.0	9
-4.2	0	4.2	35
-4.4	0	4.4	9
-4.6	0	4.6	16
-4.8	0	4.8	7
-5.0	0	5.0	7
-5.2	0	5.2	29
-5.4	0	5.4	9
-5.6	0	5.6	9
-5.8	0	5.8	0
-6.0	0	6.0	0

Table 7.4.2

MISSION 1115-2 AFT LOOKING, TOTAL FRAME COUNT- 2857

FRAME FREQUENCY DISTRIBUTION BETWEEN -6% AND +6% ORBIT MATCH

DISTRIBUTION OVER 61 POINTS INCREMENTED AT .2 PERCENT

PERCENT	FRAMES	PERCENT	FRAMES
		0.0	419
-0.2	227	0.2	156
-0.4	157	0.4	205
-0.6	146	0.6	288
-0.8	141	0.8	90
-1.0	44	1.0	88
-1.2	75	1.2	44
-1.4	65	1.4	56
-1.6	9	1.6	52
-1.8	53	1.8	57
-2.0	54	2.0	45
-2.2	35	2.2	15
-2.4	32	2.4	9
-2.6	15	2.6	20
-2.8	C	2.8	20
-3.0	0	3.0	18
-3.2	0	3.2	50
-3.4	38	3.4	0
-3.6	0	3.6	0
-3.8	7	3.8	0
-4.0	7	4.0	0
-4.2	7	4.2	0
-4.4	7	4.4	0
-4.6	6	4.6	51
-4.8	0	4.8	0
-5.0	25	5.0	0
-5.2	0	5.2	0
-5.4	0	5.4	0
-5.6	C	5.6	24
-5.8	0	5.8	0
-6.0	0	6.0	0

Table 7.4.3

MISSION 1115-2 FWD LOOKING, TOTAL FRAME COUNT- 2853

FRAME FREQUENCY DISTRIBUTION BETWEEN -6% AND +6% ORBIT MATCH

DISTRIBUTION OVER 61 POINTS INCREMENTED AT .2 PERCENT

PERCENT	FRAMES	PERCENT	FRAMES
		0.0	342
-0.2	129	0.2	152
-0.4	327	0.4	288
-0.6	141	0.6	150
-0.8	201	0.8	46
-1.0	35	1.0	108
-1.2	78	1.2	98
-1.4	46	1.4	41
-1.6	32	1.6	51
-1.8	55	1.8	56
-2.0	54	2.0	47
-2.2	35	2.2	10
-2.4	32	2.4	10
-2.6	15	2.6	71
-2.8	0	2.8	21
-3.0	0	3.0	19
-3.2	0	3.2	42
-3.4	38	3.4	0
-3.6	0	3.6	0
-3.8	0	3.8	0
-4.0	7	4.0	0
-4.2	7	4.2	0
-4.4	7	4.4	0
-4.6	7	4.6	0
-4.8	19	4.8	0
-5.0	12	5.0	0
-5.2	0	5.2	0
-5.4	0	5.4	0
-5.6	0	5.6	24
-5.8	0	5.8	0
-6.0	0	6.0	0

Table 7.4.4

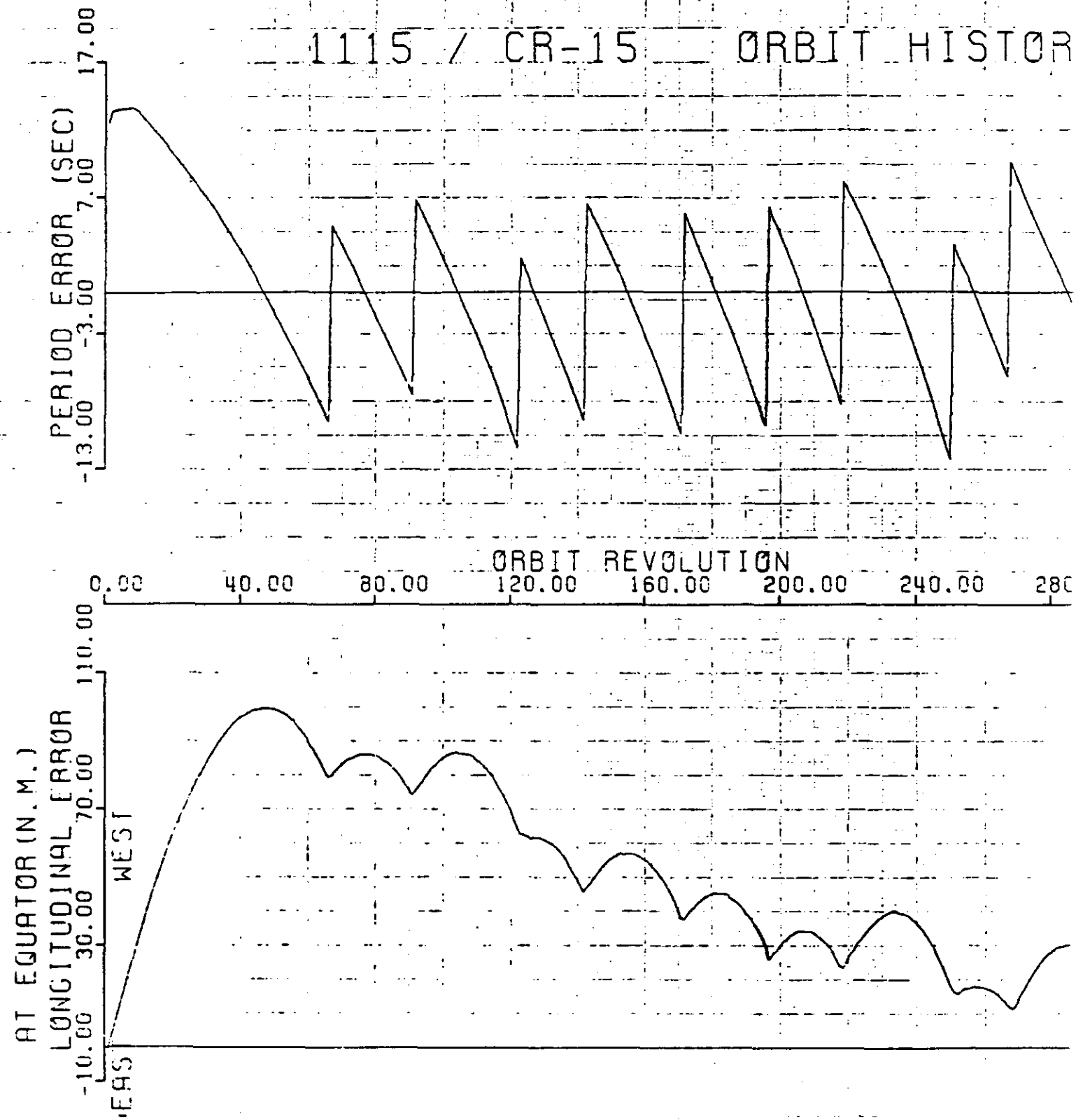
Table 7.5

Re-Entry Sequence of Events

Event	Delta Time-Seconds		
	Nominal	SRV #1	SRV #2
D-Timer Start	0	0	0
Arm	6.0 ± .5	6.0	6.0
Transfer	81.0 ± .5	80.8	80.68
Elec. Disconnect	82.0 ± .5	81.8	81.67
Separation	83.0 ± .5	82.8	82.68
Spin	3.40 ± .30	3.18	3.43
Retro	7.55 ± .45	7.55	7.56
Despin	10.75 ± .54	10.77	N/A
Thrustcone Sep.	1.50 ± .15	1.52	N/A
"G" Switch Open	-	-	-
Parachute Cover Ejec.	2.60 ± .15	26.63	26.32
Deceleration Chute Deploy	.58 ± .08	.53	.56
Ablative Shell Disconnect	.58 ± .08	.53	.56
Main Chute Bag Sep.	10.25 ± 1.5	10.73	10.27
Main Chute Deploy	.52 ± .13	.52	.52
Main Chute Desreef	4.50 ± .80	4.51	4.26
K-10 Reset	28.0 ± 1.9	27.64	27.95

~~TOP SECRET/C~~

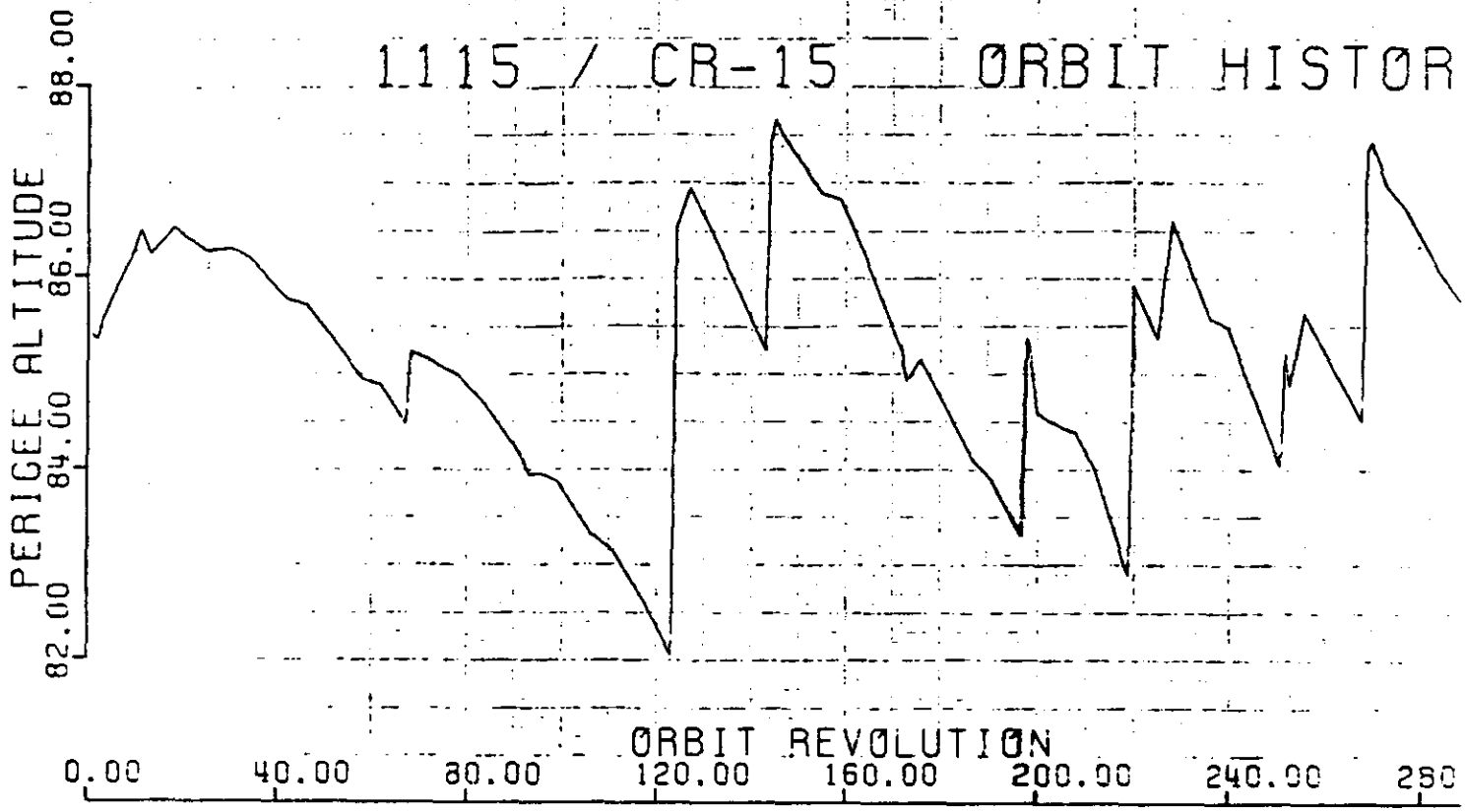
Figure 7.6.1

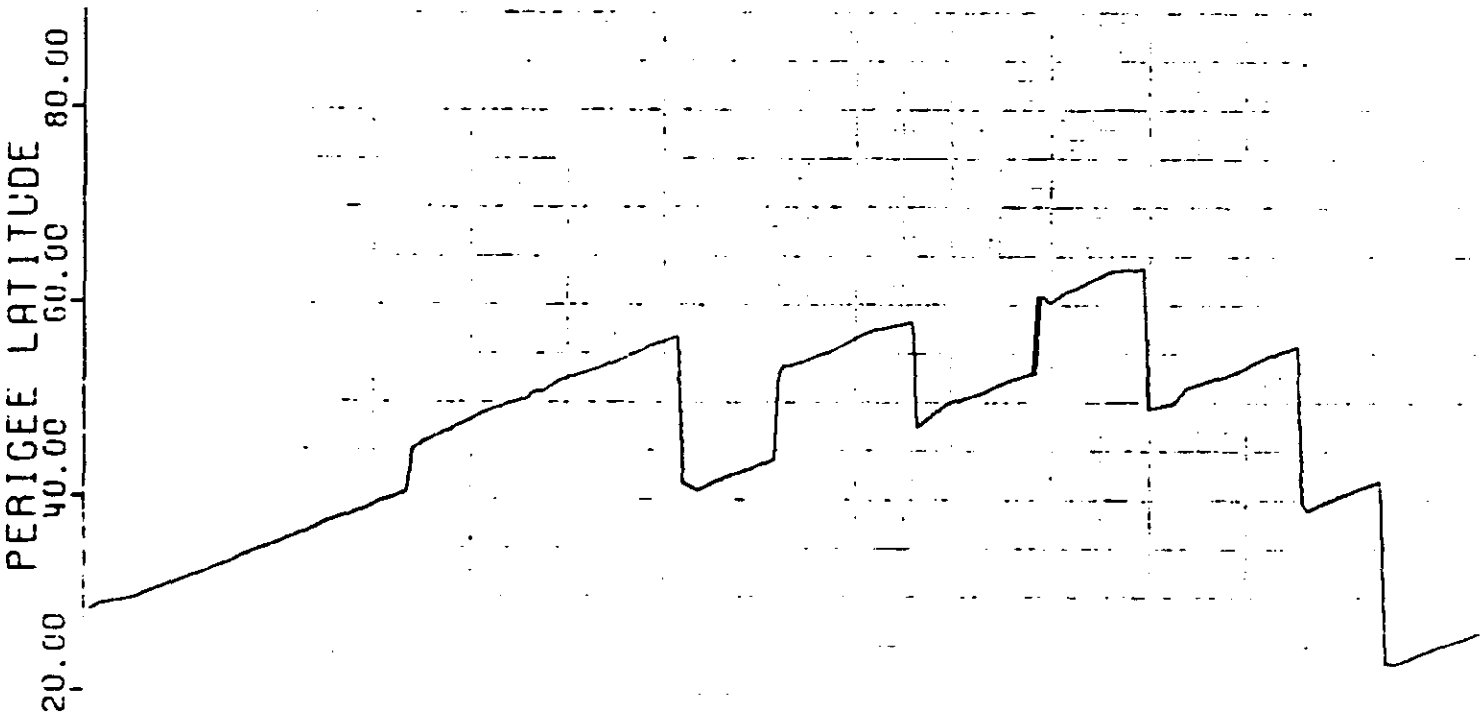


~~TOP SECRET/C~~

HANDLE VI
CONTROL SYSTEM

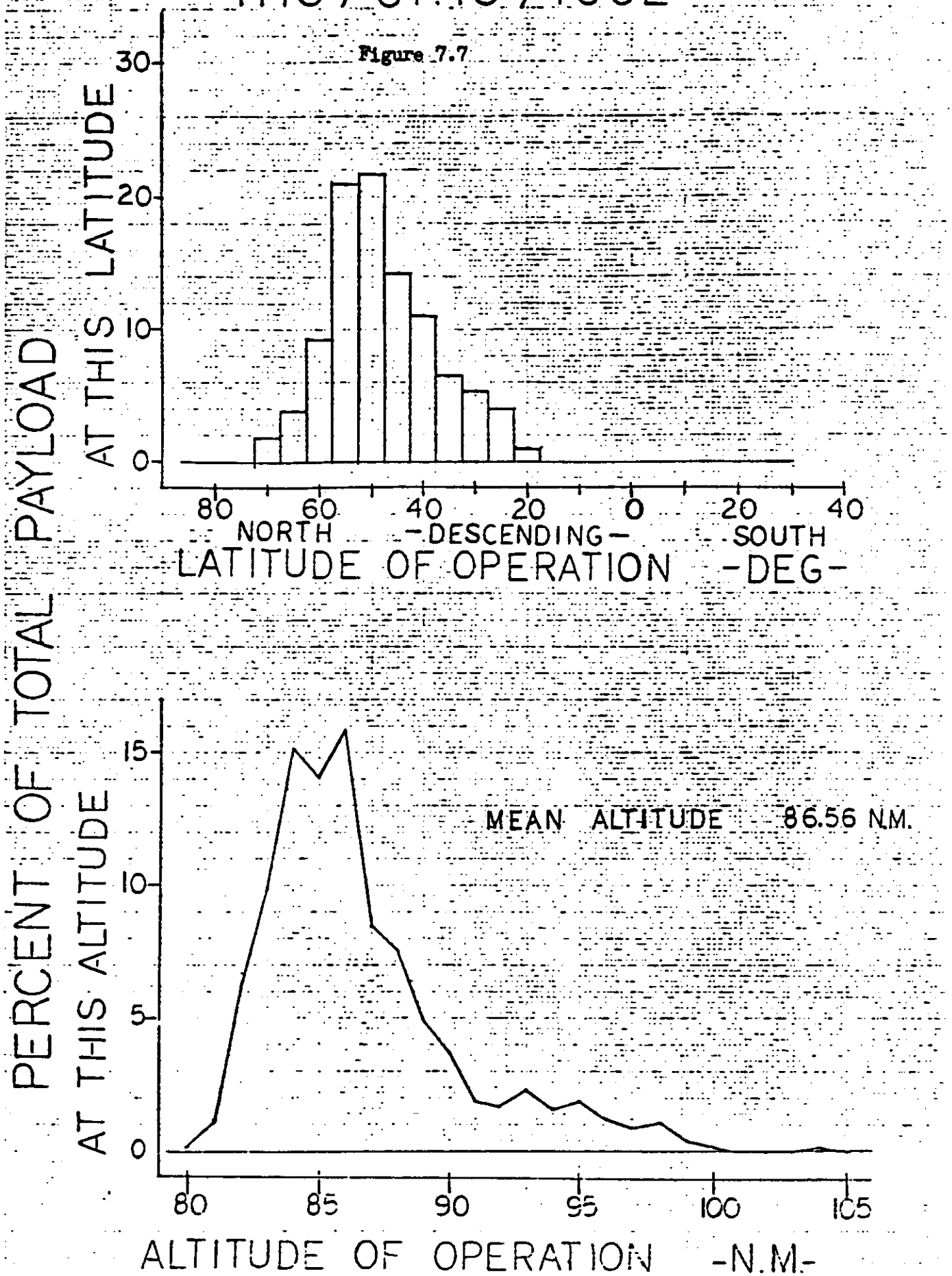
Figure 7.6.2


1115 / CR-15 ORBIT HISTOR
PERIGEE ALTITUDE
88.00
86.00
84.00
82.00
ORBIT REVOLUTION
0.00
40.00
80.00
120.00
160.00
200.00
240.00
280


PERIGEE LATITUDE
80.00
60.00
40.00
20.00

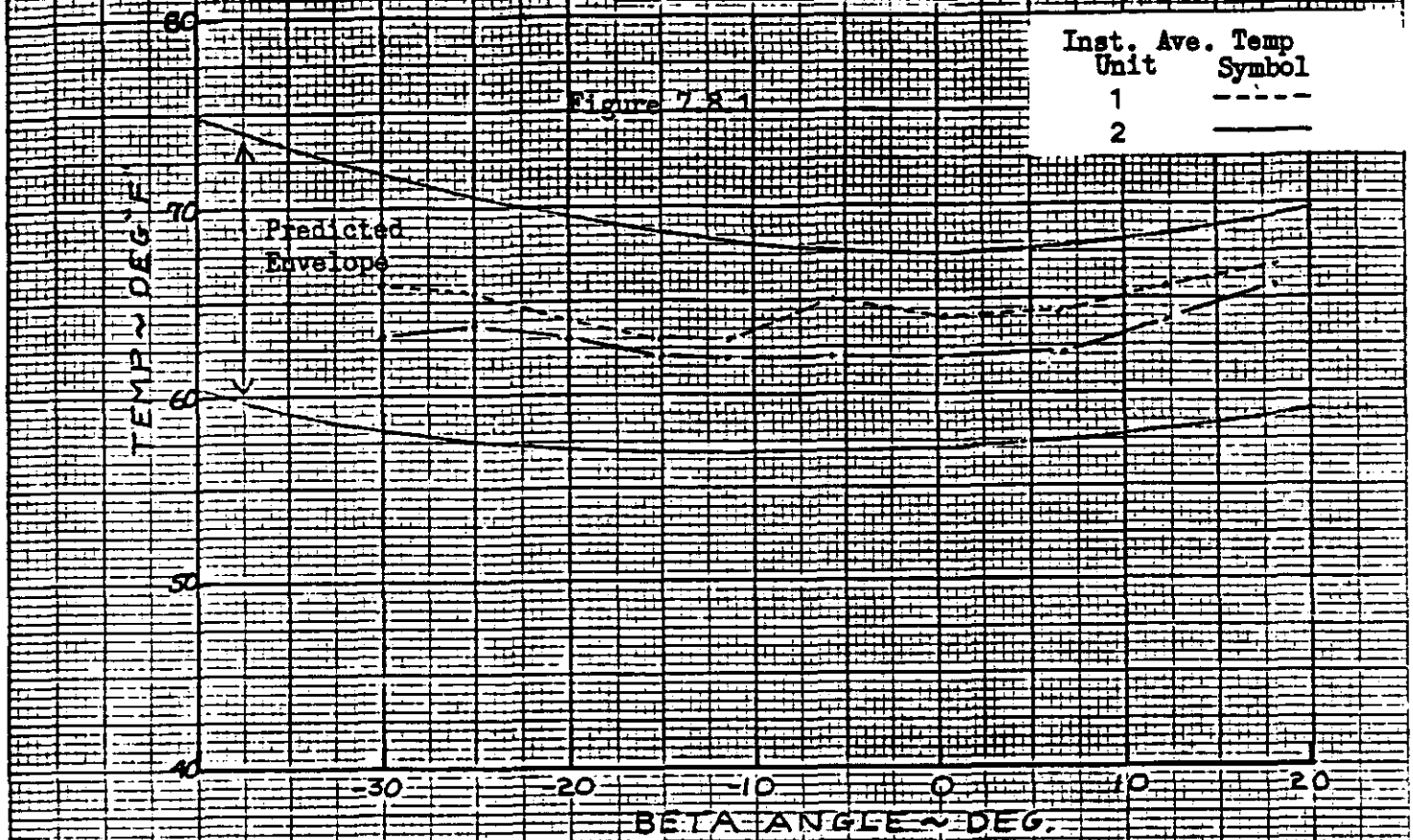
1115/CR15/1662

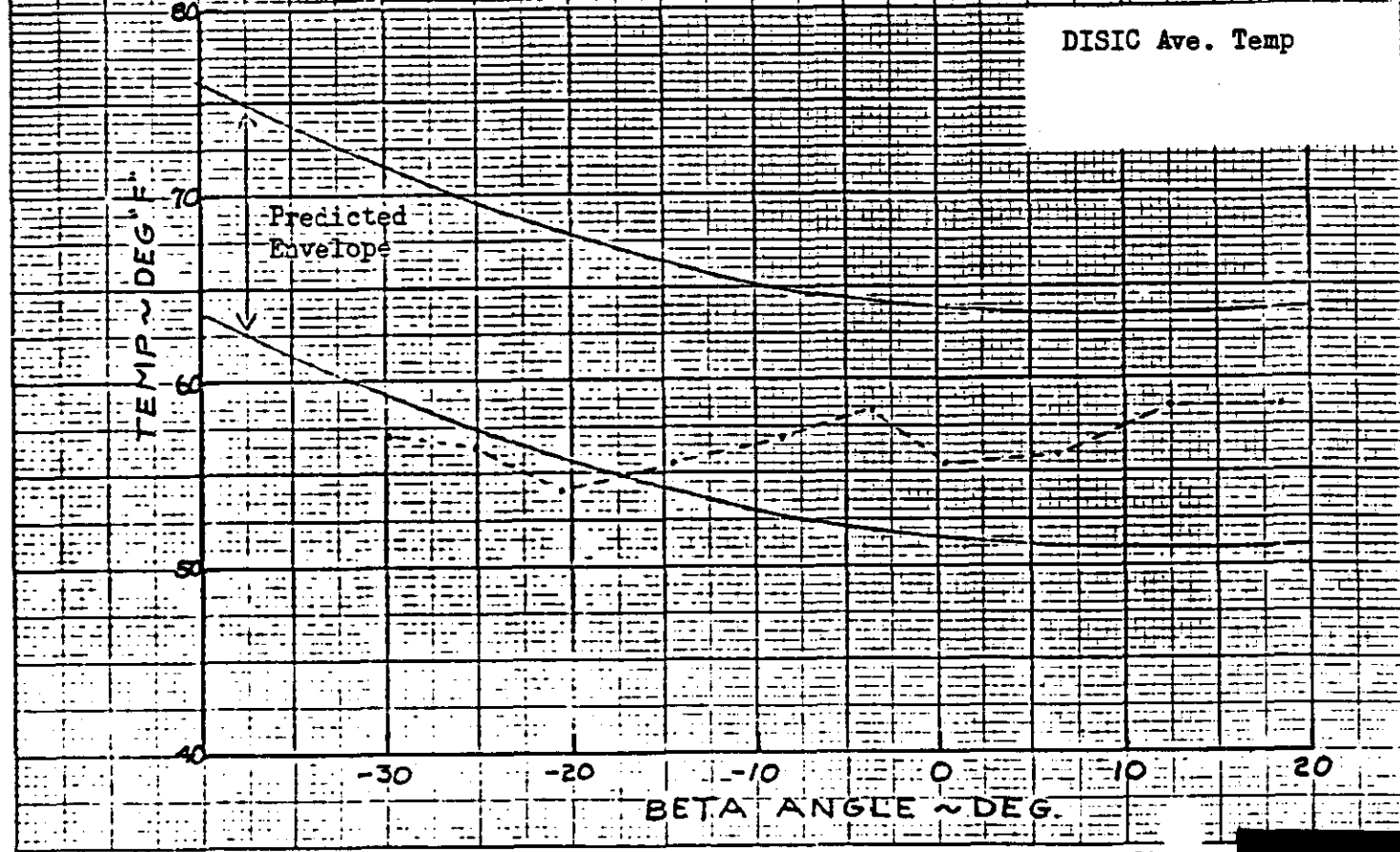
Figure 7.7



GR-15 FLIGHT VS PREDICTED TEMPERATURE

Figure 7.8-1

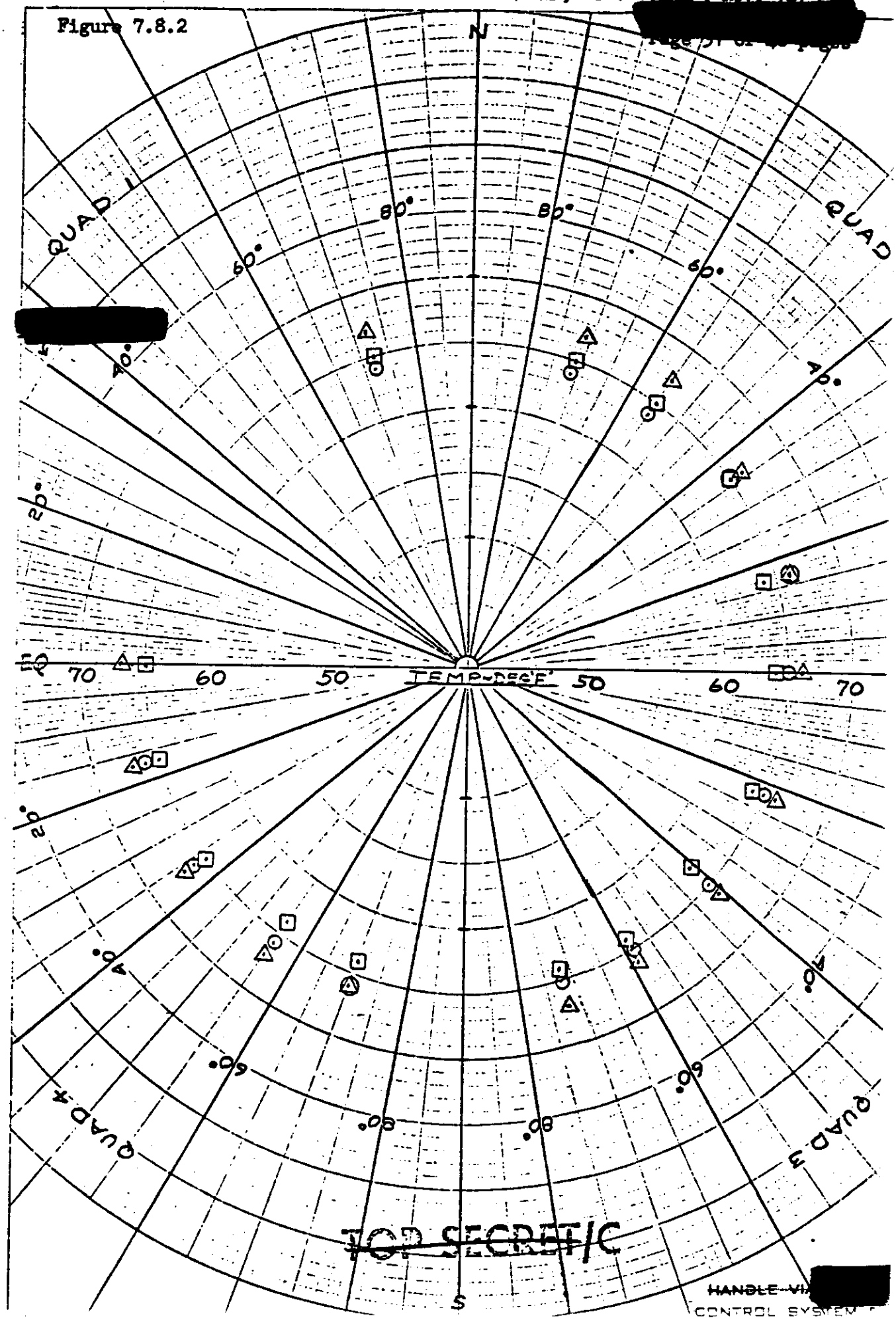




Instrument No. 1 Lens Cell
Rev. 42 △, Rev. 105 ⊡, Rev. 187 ⊙

[redacted]

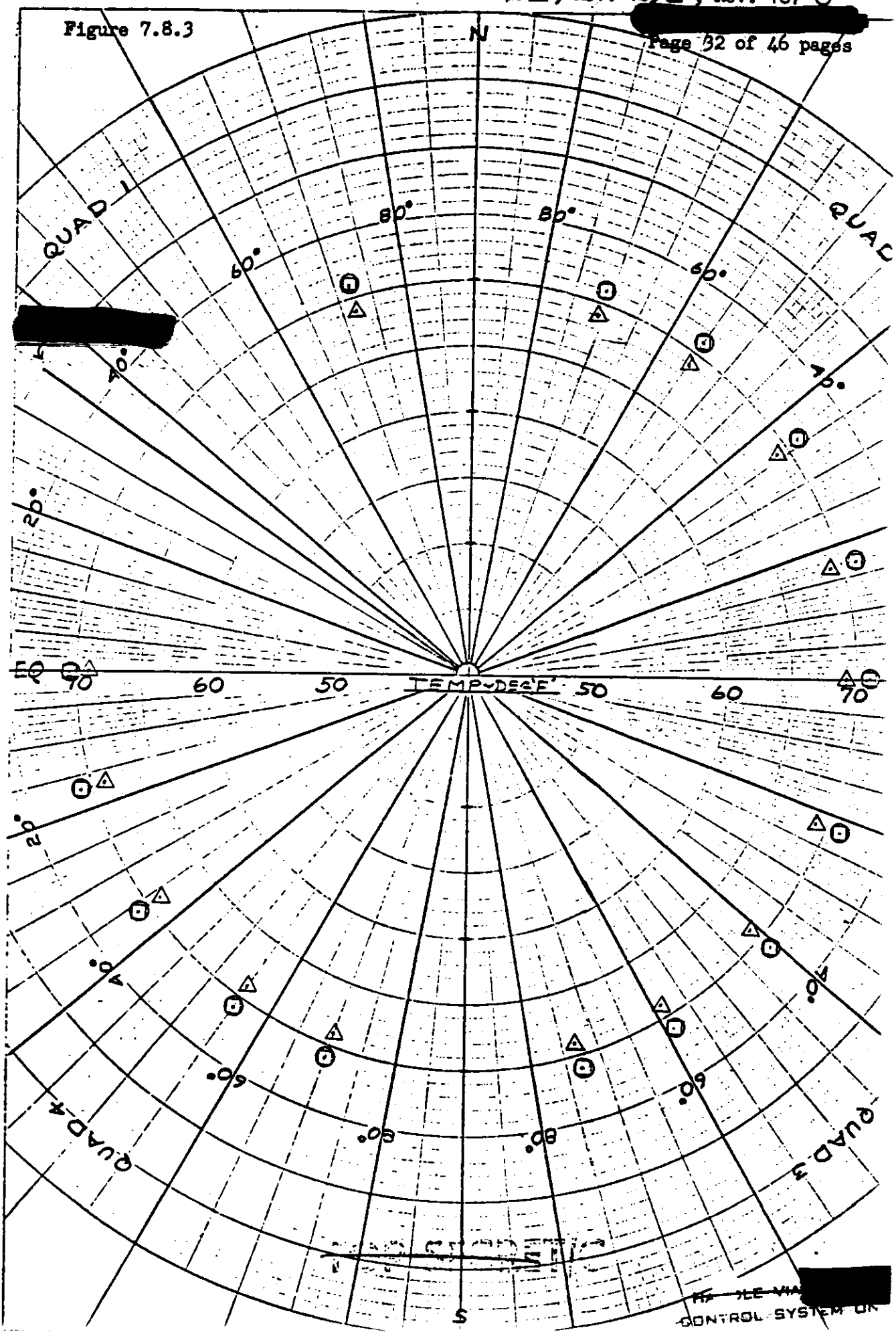
Figure 7.8.2



HANDLE VIA [redacted]

CONTROL SYSTEM

Figure 7.8.3



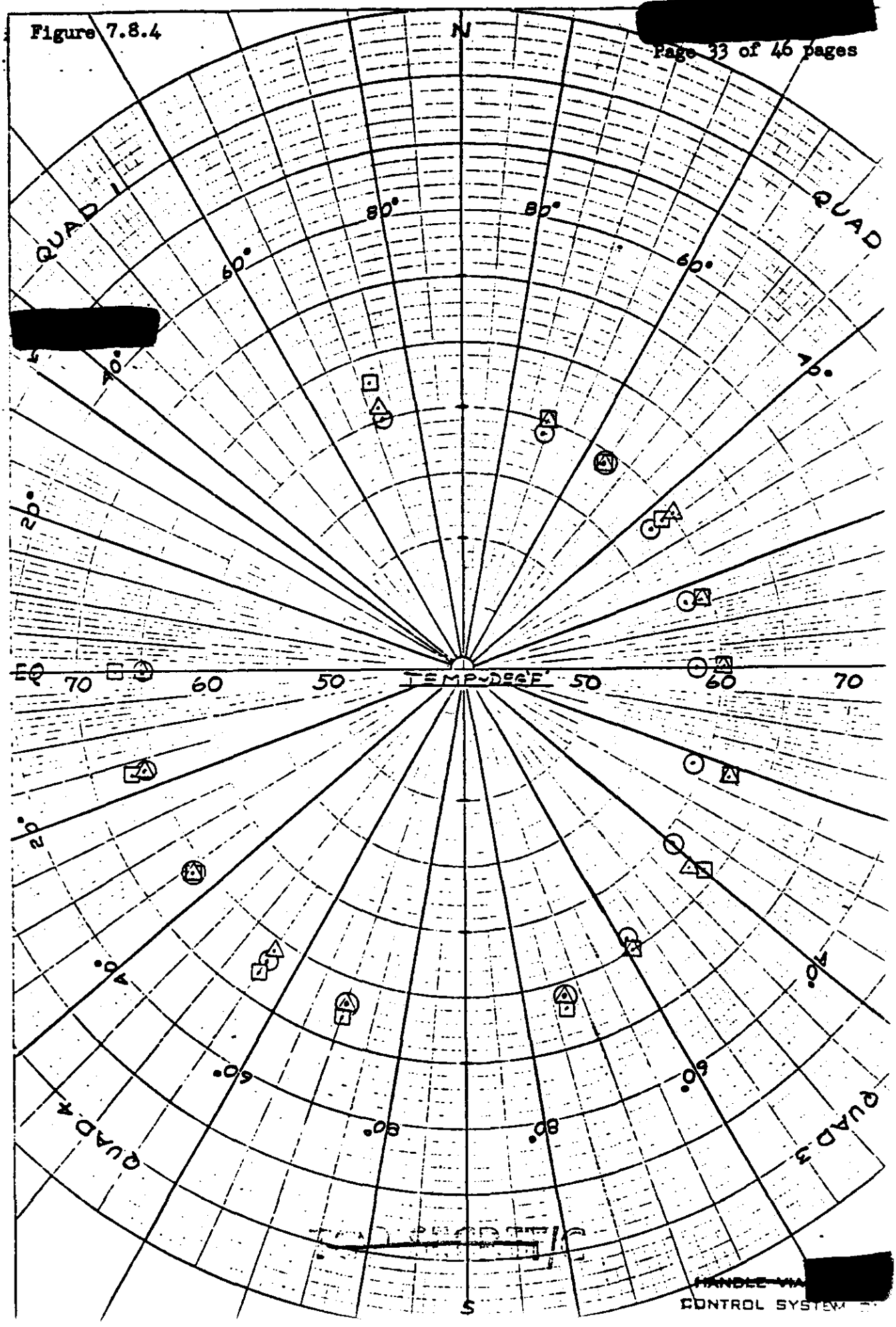
[redacted]

CONTROL SYSTEM

Instrument No. 1 Rear Rail
Rev. 42 △, Rev. 105 ⊡, Rev. 187 ⊙

[redacted]

Figure 7.8.4



[redacted]

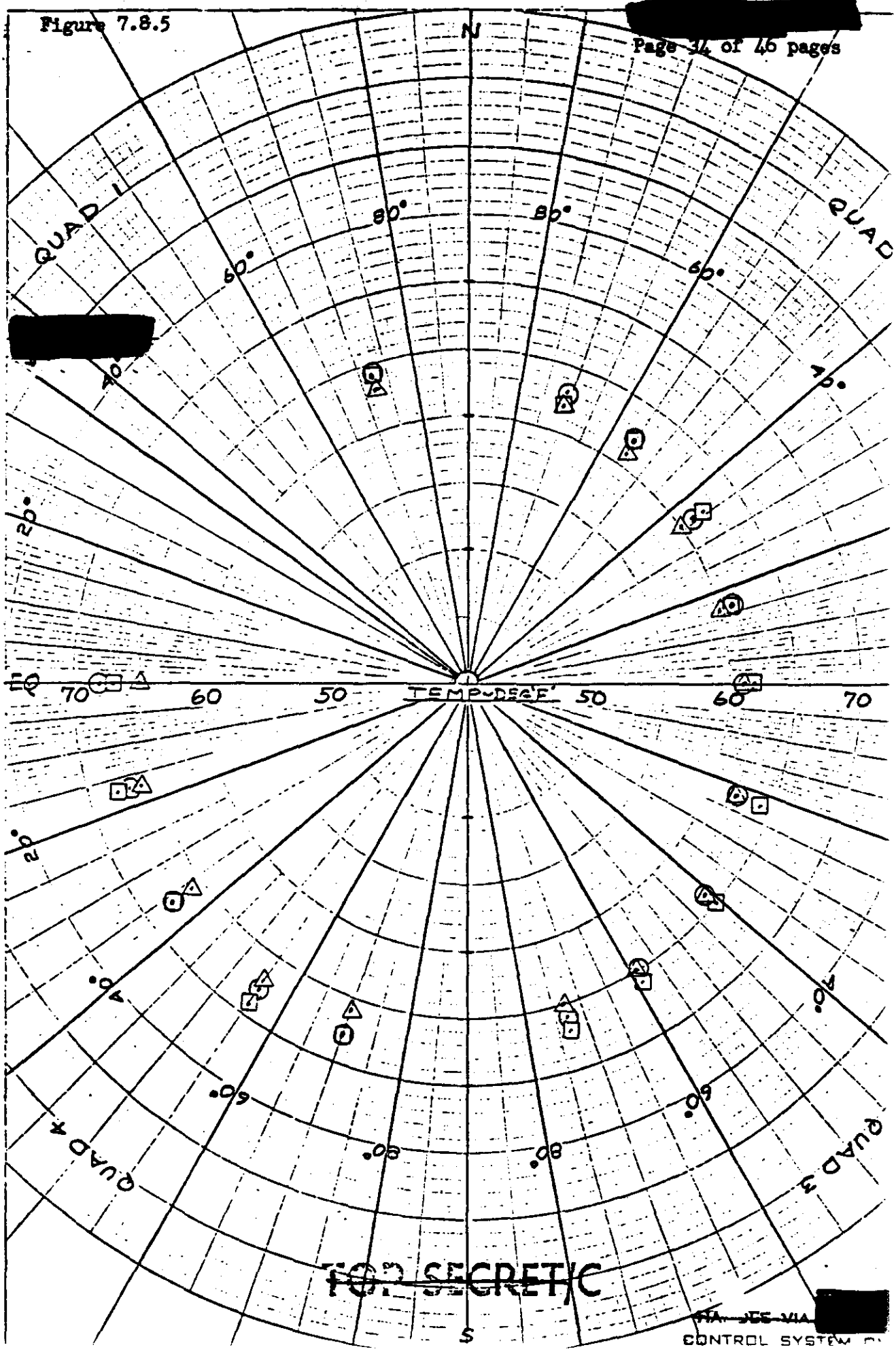
[redacted]

CONTROL SYSTEM

Instrument No. 1 Front Rail
Rev. 42 △, Rev. 105 ⊡, Rev. 187 ⊙

[redacted]

Figure 7.8.5



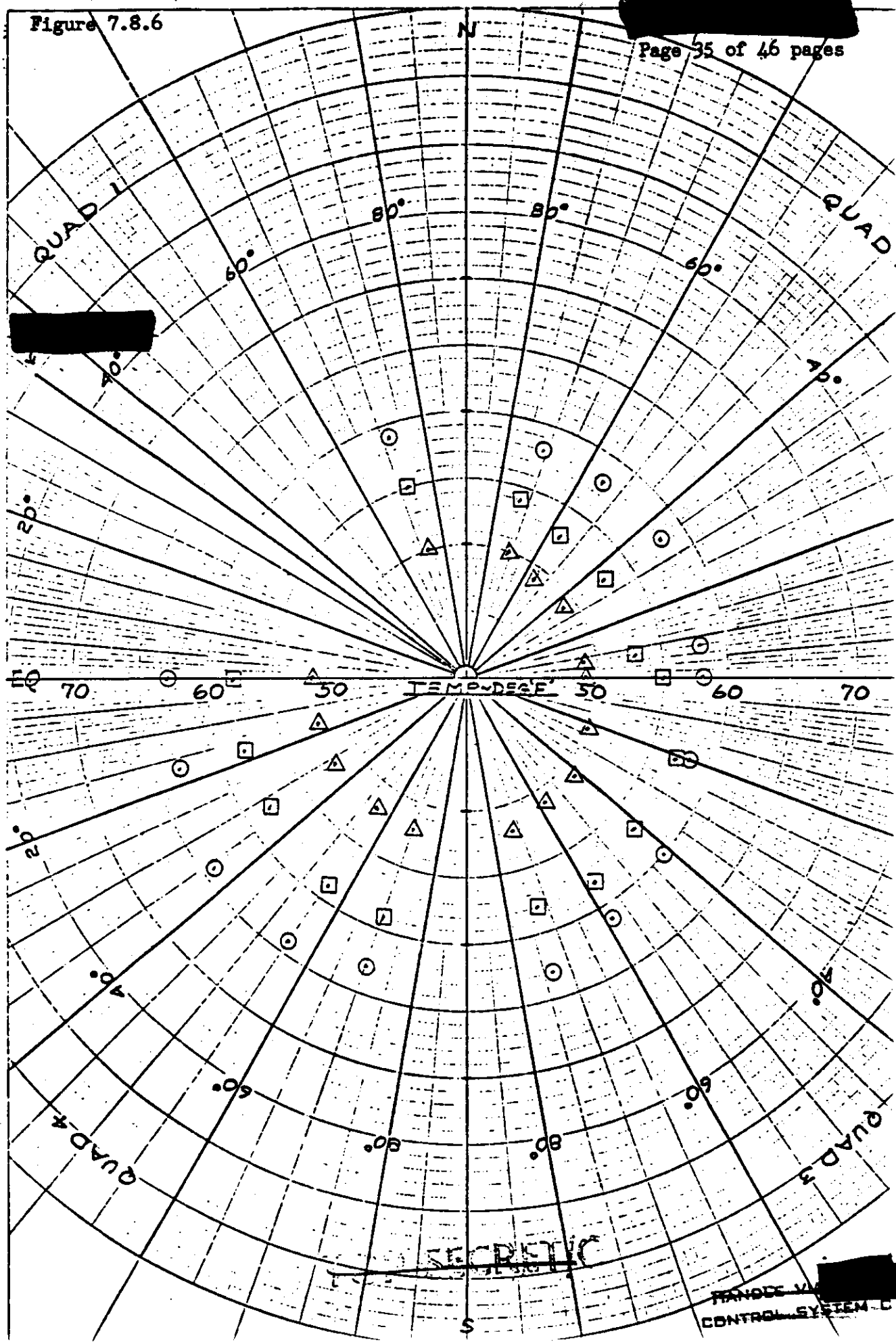
[redacted]

CONTROL SYSTEM

Instrument No. 1 Output A0
Rev. 42 △, Rev. 105 ⊡, Rev. 187 ⊙

Figure 7.8.6

[redacted]



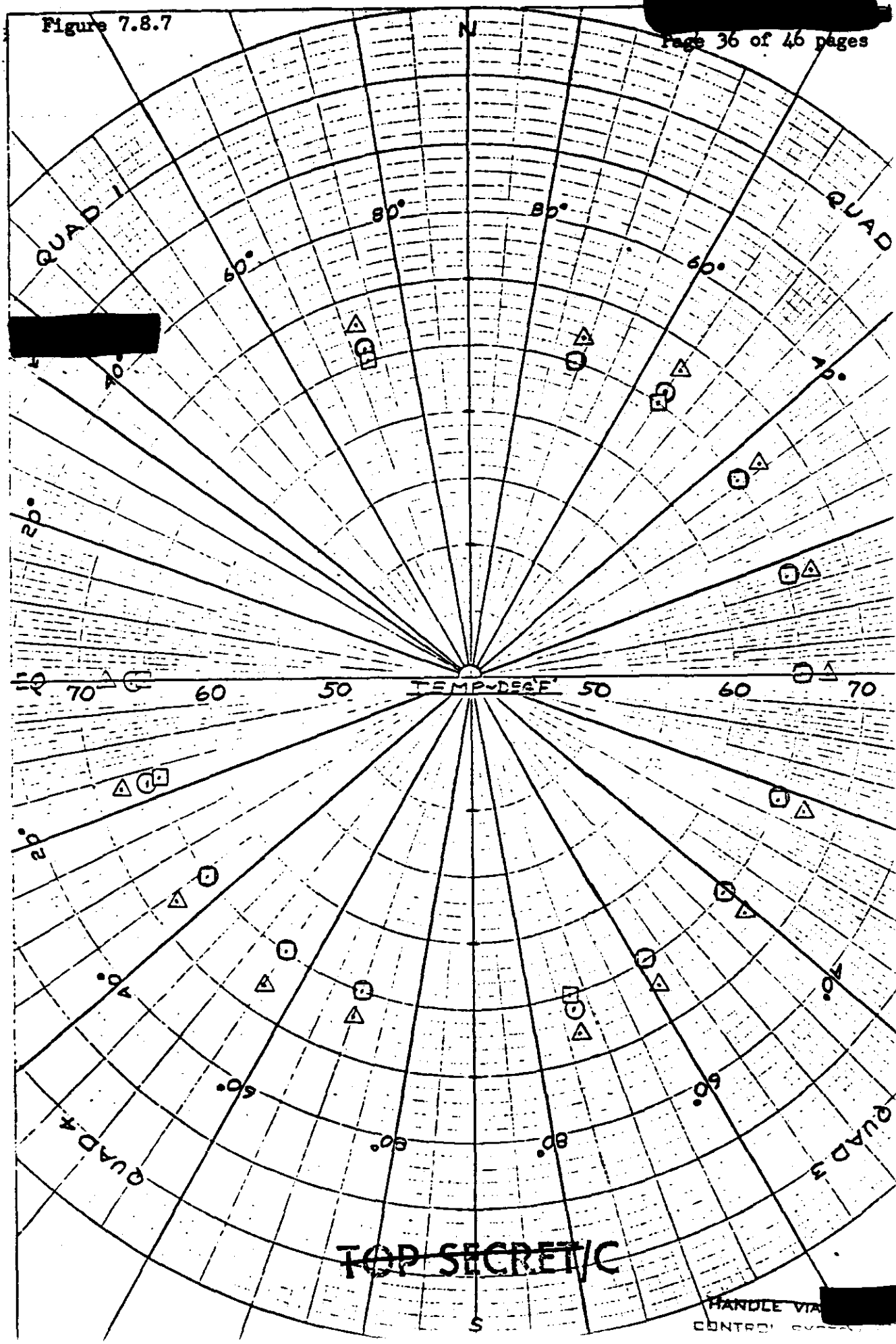
[redacted]

HANDLE VIA
CONTROL SYSTEM C

Instrument No. 2 Lens Cell
Rev. 42 △ , Rev. 105 ⊡ , Rev. 187 ⊙

[redacted]

Figure 7.8.7



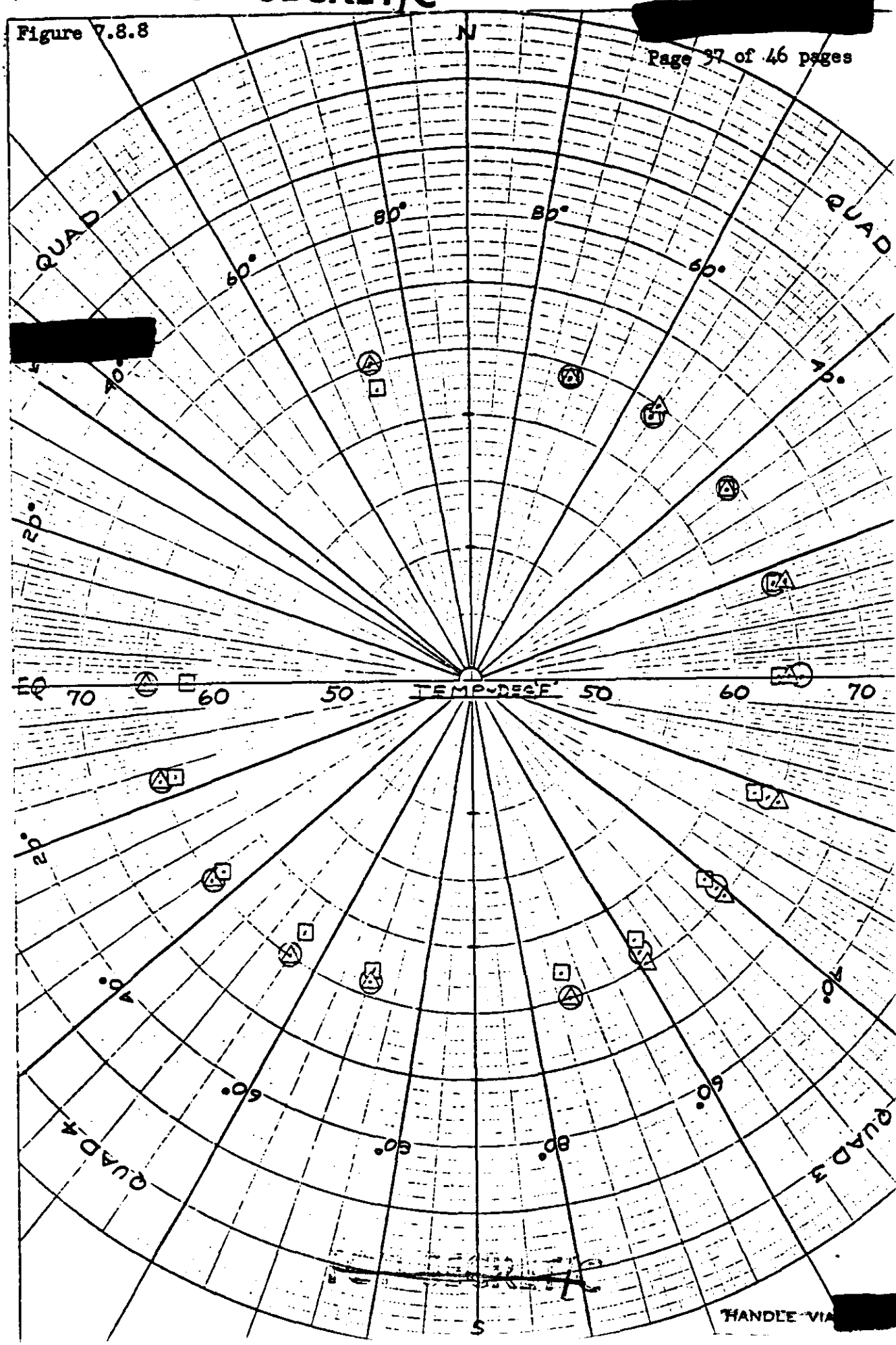
[redacted]

HANDLE VIA [redacted]
CONTROL SYSTEM

Instrument No. 2 Lens Cone
Rev. 42 △ , Rev. 105 ⊡ , Rev. 187 ⊙

[redacted]

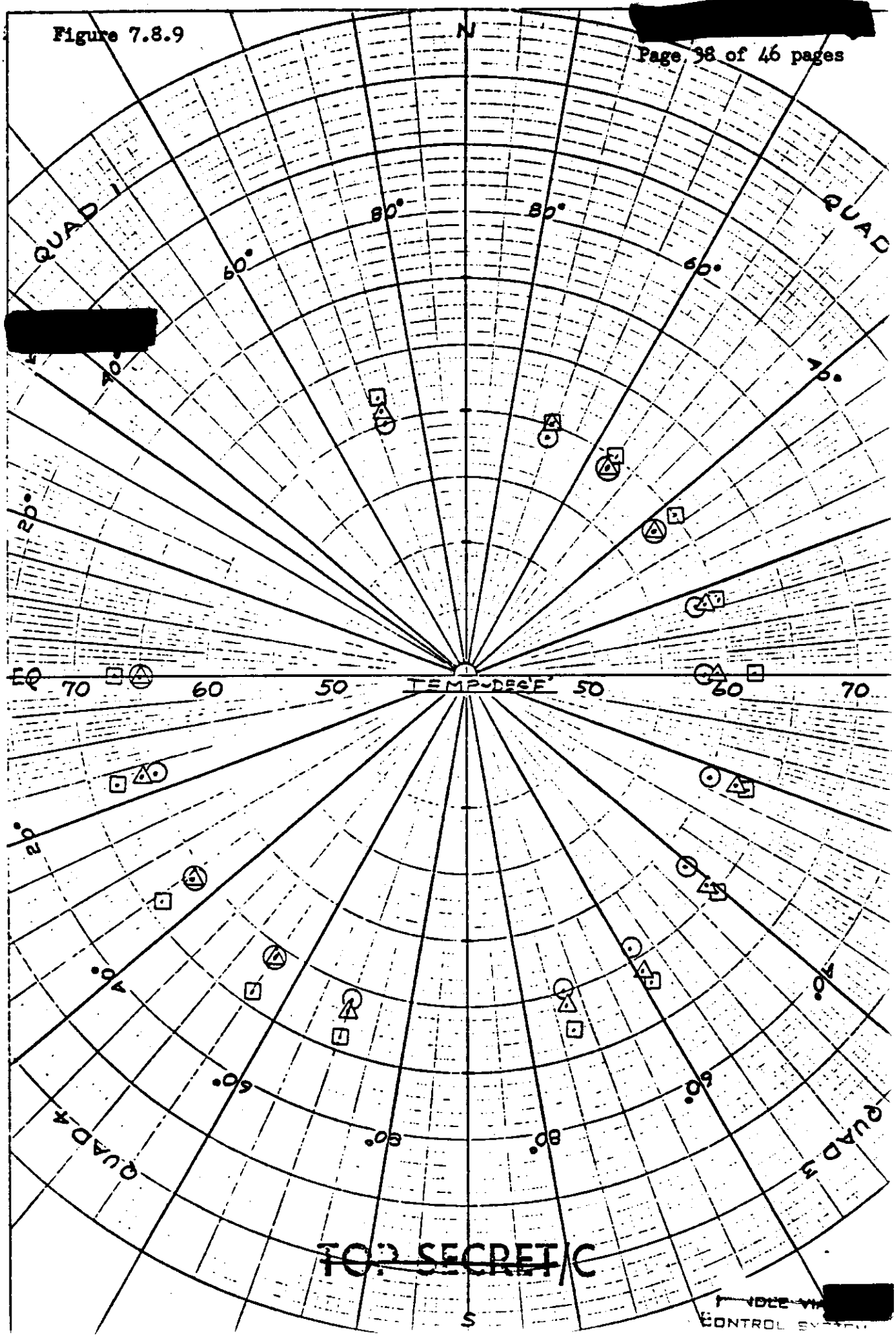
Figure 7.8.8



[redacted]

HANDLE VIA [redacted]

Figure 7.8.9

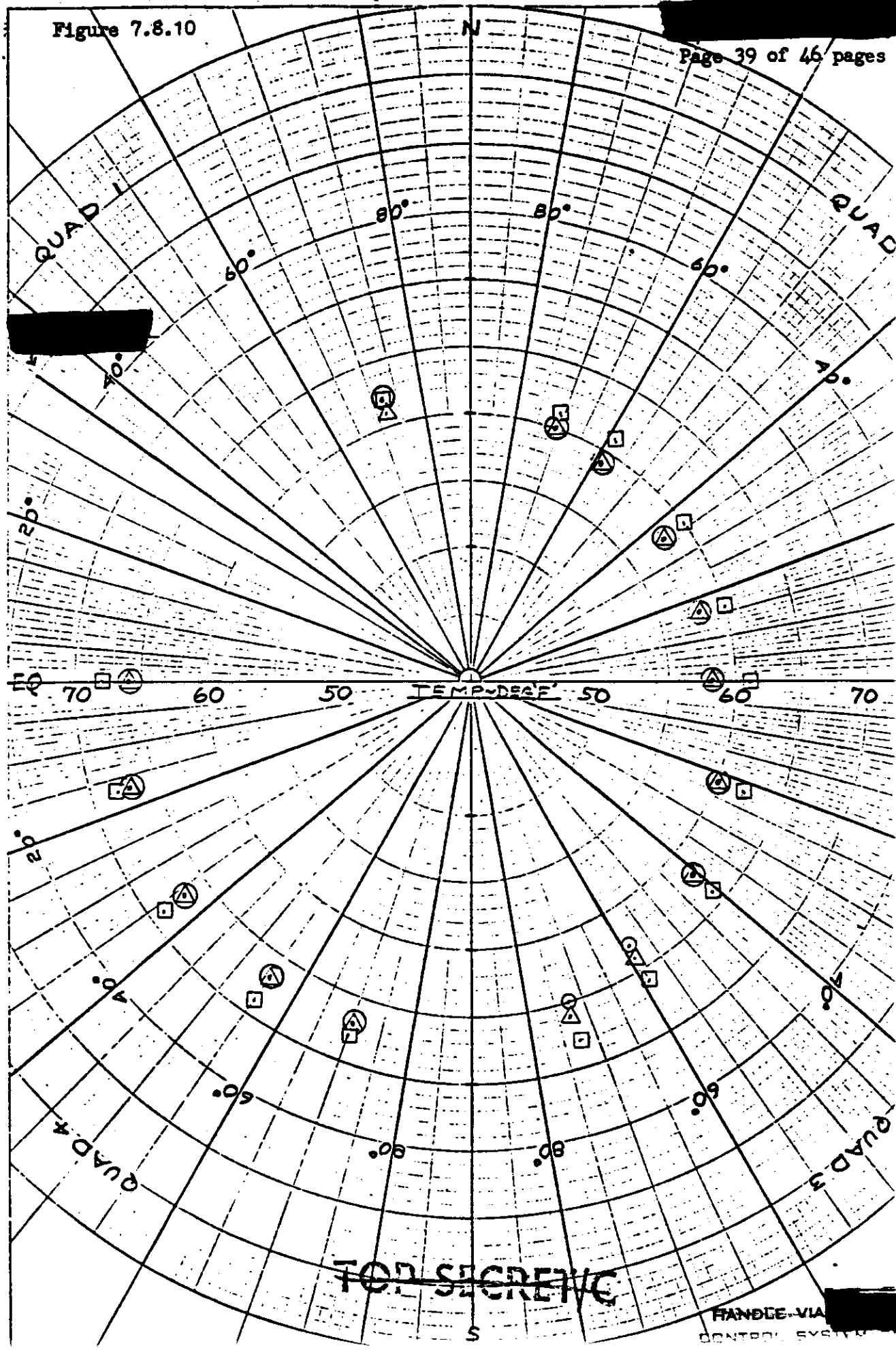


[redacted]

GR-15 Polar Plot of Temp. vs. Latitude
Instrument No. 2 Front Rail
Rev. 42 △, Rev. 105 ⊡, Rev. 187 ⊙

Figure 7.8.10

[redacted]



[redacted]
HANDLE VIA
CONTROL SYSTEM

Figure 7.8.11

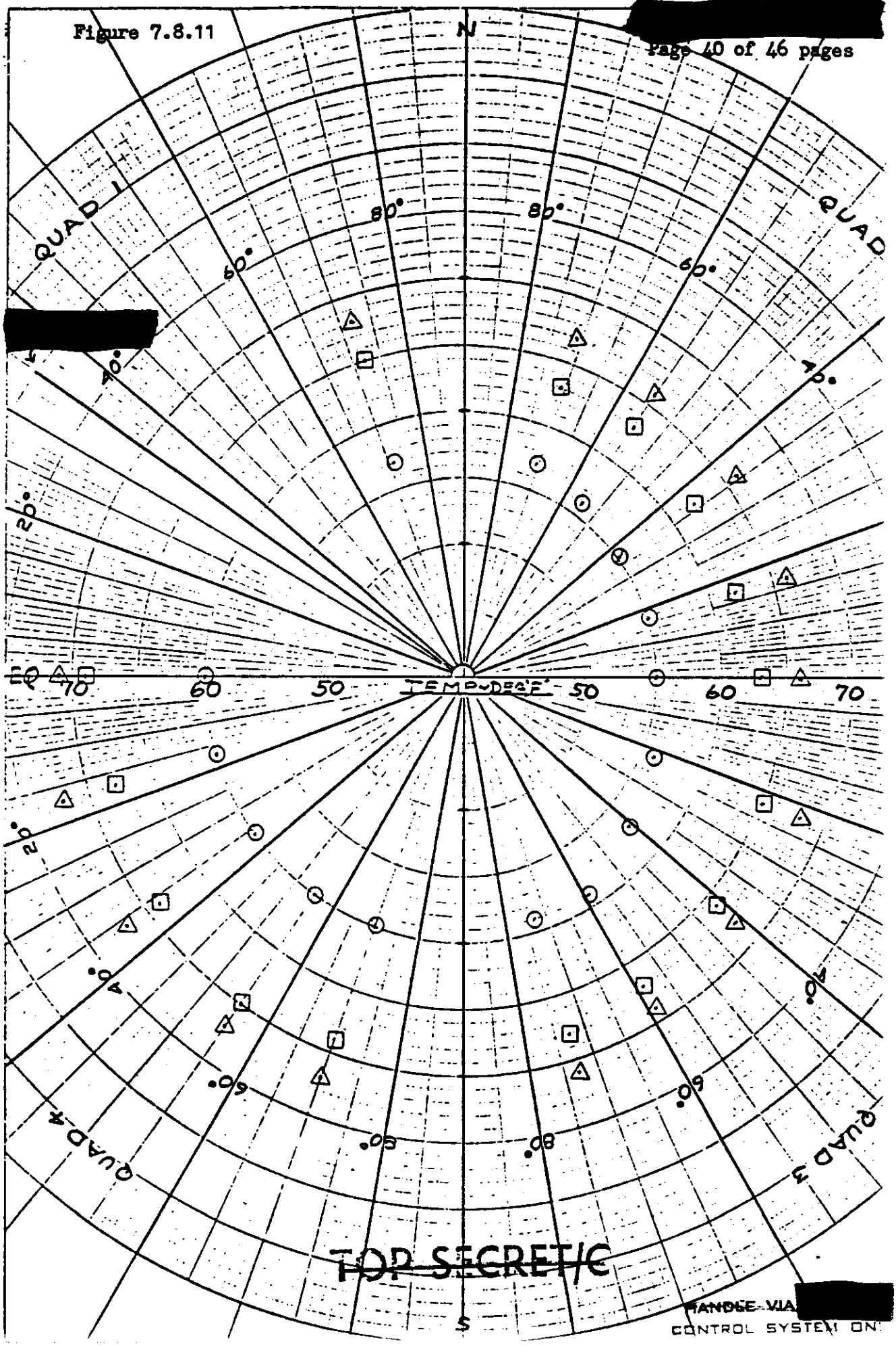

N
S
E
QUAD 1
QUAD 2
QUAD 3
QUAD 4
80°
60°
40°
20°
70
60
50
TEMP DEG F
50
60
70
.04
.06
.08

Table 7,9.1

TEMPERATURE SUMMARY (°F) (CR-6 & Up)

Payload_____

Rev. No.		TASK	9C	16C	25C	32C	41C	48C		64C	74C	81C	90C	97C	106C	113C	122C	12
Beta Angle		#4	-30.4	-29.2	-27.6	-26.3	-24.7	-23.4		-20.5	-18.7	-17.4	-15.8	-14.5	-12.9	-11.6	-9.9	-8
Pan No. 1 Lens Cell	2	67	71	68	67	67	66	67		66	66	65	66	65	65	65	67	68
Lens Cone	4	67	73	71	69	69	69	69		68	67	67	67	66	66	66	68	69
Rear Rail	6	66	68	61	66	60	65	59		59	65	59	64	58	64	59	67	60
Drive Mtr	10	64	68	66	65	64	64	63		65	64	64	64	63	64	63	65	65
Front Rail	12	65	67	62	65	60	65	60		61	66	61	65	61	66	61	70	63
Average		65.8	68.4	65.6	66.4	64	65.8	64		64	67	63	65.2	62	65.0	63	67.4	65
Pan 1 Output AO	8	63	53	48	51	48	52	49		50	55	51	56	51	57	53	60	56
Delta Top Left	14	64	56	51	55	48	55	47		48	57	47	56	47	58	47	59	47
Drum Support	16	63	66	61	63	60	62	59		61	63	60	63	60	63	61	65	62
Pan No. 2 Lens Cell	18	67	70	68	67	67	67	67		66	66	66	66	65	66	65	66	67
Lens Cone	20	67	68	65	64	65	64	65		64	64	63	64	63	64	64	65	65
Rear Rail	22	64	65	59	64	59	64	58		59	65	59	64	59	65	59	66	60
Drive Mtr	26	64	68	65	65	64	64	63		64	64	63	64	63	64	63	65	64
Front Rail	28	64	66	59	64	59	64	59		60	66	59	65	59	66	59	67	61
Average		65.2	67.2	63.3	65	63	64	62		63	65	62	65	62	65	62	66	63
Pan 2 Output AO	24	63	74	68	73	67	72	65		65	70	63	68	62	68	61	68	61
Supply Cassette	30	62	60	58	60	58	60	58		59	62	59	62	59	62	60	63	60
Aux. Electronic Box	32	63	74	67	72	66	71	64		64	70	63	68	61	68	61	68	61
Slope Programmer	34	75	97	96	94	92	92	90		90	89	88	88	86	86	86	86	86
PMU	36	57	72	67	69	65	69	65		65	69	65	67	65	67	65	74	67
Switch Programmer	43	58	81	78	81	75	78	71		71	78	71	71	68	75	68	71	65
[illegible] Power Box	49	61	49	49	52	49	52	49		52	55	52	55	52	58	55	58	55
SRV "A" T/U	40	70	59	50	50	48	51	48		49	53	49	52	49	49	49	-	-
Retro	42	67	64	61	61	58	61	58		59	61	58	61	58	61	59	-	-
SRV "B" T/U	44	68	69	69	67	68	67	67		69	68	69	67	68	68	69	72	72
Retro	46	66	67	65	65	64	64	64		65	65	64	64	64	64	64	70	68

TEMPERATURE SUMMARY (°F) CR-6 & Up Payload

Mov. No.		TASK	9C	16C	25C	32C	41C	48C	64C	74C	81C	90C	97C	106C	113C	122C	129C
Time Angle		#4	-30.4	-29.2	-27.6	-26.3	-24.7	-23.4	-20.5	-18.7	-17.4	-15.8	-14.5	-12.9	-11.6	-9.9	-8.6
Blast Shield	48	59	62	62	62	59	62	59	62	62	62	62	62	65	65	53	120
	50	55	61	64	61	61	61	58	61	61	58	58	58	58	61	40	167
DISIC Platen	53	62	62	57	58	56	58	56	55	58	56	58	56	58	55	62	57
Lens Cell	55	62	61	56	56	54	57	54	53	58	55	57	55	56	54	61	56
Fairing	5	57	21	162	21	137	24	126	131	21	129	21	120	24	120	27	109
	7	57	69	128	66	114	69	106	106	66	101	63	95	63	92	63	98
	9	59	37	83	34	80	34	77	77	37	71	31	71	34	71	31	71
	11	58	33	77	33	73	33	70	70	33	67	33	64	33	67	24	80
	13	57	41	51	44	44	47	47	51	51	54	51	57	57	63	57	63
	15	57	5	96	8	79	11	79	88	11	93	11	91	17	96	20	93
DISICONIC	17	59	-5	129	-2	109	-2	101	109	-2	112	-2	106	1	109	1	101
	19	57	79	116	76	105	76	97	97	70	91	67	85	67	82	76	82
	21	58	40	71	37	68	37	61	61	40	58	34	55	34	55	40	58
	23	60	23	54	26	51	26	48	48	29	45	26	45	26	48	32	48
	25	60	41	44	41	41	44	44	47	47	47	47	50	50	53	60	57
	31	57	-2	79	1	66	1	63	73	0	82	4	82	7	84	14	82
Forward Barrel	33	58	33	116	36	94	40	83	83	33	76	30	67	33	61	33	52
	35	58	39	61	39	58	39	52	52	39	49	33	46	39	43	39	43
	37	60	23	47	26	44	26	41	41	29	38	26	38	29	41	32	41
	39	59	-28	83	-25	59	-25	53	59	-22	68	-25	65	-18	65	-18	59
Aft Barrel	41	59	40	103	40	84	40	75	71	40	68	37	59	37	53	37	44
	45	57	35	67	35	64	35	60	60	39	54	32	51	32	51	32	48
	47	58	24	55	27	52	27	49	49	30	42	27	42	27	46	30	46
	51	59	-19	43	-15	28	-12	25	31	-9	40	-9	40	-6	43	-6	40
DSR	38	87	69	69	69	69	69	69	69	70	69	61	69	72	69	72	70

Table 7.9.2

TEMPERATURE SUMMARY (°F) (CR-6 & Up)

Rev. No.		138C	145C	155C	161	171C	178C	187C	194C	203C	210C	219C	226	235	242C	252	259C	268
Beta Angle		-6.95	-5.7	-3.8	-2.7	-.85	.45	2.1	3.4	5.08	6.4	8.04	9.3	11.0	12.3	14.14	15.4	17.
Pan No. 1 Lens Cell	2	66	66	66	66	66	66	66	67	67	67	67	66	67	68	69	69	70
Lens Cone	4	67	67	67	67	66	66	66	67	66	66	67	66	66	68	69	69	69
Rear Rail	6	66	61	65	59	66	60	65	61	66	60	67	60	68	62	69	64	69
Drive Mtr	10	65	65	64	64	64	65	63	65	64	64	65	65	64	66	67	67	67
Front Rail	12	68	64	67	62	68	63	67	64	68	64	69	63	68	65	72	65	72
Average		66.4	65	65.6	63.6	66	64	65.4	64.8	66.2	64.2	67	64	66.6	65.8	69.2	66.8	69.
Pan 1 Output AO	8	60	57	60	57	62	58	69	60	65	61	67	62	68	65	72	67	73
Delta Top Left	14	57	48	57	47	58	47	58	48	59	47	58	47	59	48	62	49	61
Drum Support	16	64	62	63	61	64	62	63	62	64	62	65	63	65	64	68	66	67
Pan No. 2 Lens Cell	18	66	65	65	66	65	65	65	66	66	66	66	66	66	67	68	68	69
Lens Cone	20	64	64	64	65	64	64	64	65	65	65	65	66	66	67	68	69	69
Rear Rail	22	65	59	64	59	64	59	64	59	65	59	65	59	65	61	68	62	67
Drive Mtr	26	64	64	63	63	63	63	63	63	64	63	64	64	64	65	66	66	66
Front Rail	28	66	60	65	59	65	60	65	60	66	60	66	60	66	62	68	62	68
Average		65.0	62	64.1	62	64.1	62	64.1	62	65	62	65	63	65	64	68	65.4	68
Pan 2 Output AO	24	65	60	63	59	62	58	60	57	60	56	59	55	59	56	59	56	59
Supply Cassette	30	63	60	62	60	63	61	63	61	64	61	65	62	66	65	68	66	68
Aux. Electronic Box	32	67	60	65	60	64	59	63	59	62	57	62	57	61	59	63	58	62
Slope Programmer	34	86	84	83	83	82	82	81	81	81	80	82	81	81	82	83	82	82
PMU	36	69	67	67	63	69	65	67	65	67	63	67	63	65	65	69	63	67
Switch Programmer	43	71	65	68	61	68	61	65	61	65	58	65	61	61	61	65	61	65
Aft Power Box	49	61	55	58	55	61	58	61	61	64	61	67	64	67	67	77	70	77
SRV "A" T/U	40																	
Retro	42																	
SRV "B" T/U	44	75	76	74	72	72	72	74	72	74	72	75	74	74	72	76	74	76
Retro	46	69	69	68	67	69	68	68	69	70	69	71	68	69	72	74	73	73

TEMPERATURE SUMMARY (°F) CR-6 & Up Payload

Rev. No.		138C	145C	155C	161C	171C	178C	187C	194C	203C	110C	219C	226	235	242C	252	259C	268C
Nose Angle		-6.95	-5.7	-3.8	-2.7	-.85	.45	2.1	3.4	5.08	6.4	8.04	9.3	11.0	12.3	14.14	15.4	17.0
Blast Shield	49	44	122	41	125	50	125	41	133	44	133	44	122	41	131	47	117	44
	50	34	167	31	170	37	175	31	178	31	178	31	167	31	178	34	167	31
DISIC Platen	53	60	61	59	57	57	56	58	57	59	57	60	56	58	59	63	59	62
Lens Cell	55	59	61	58	55	56	55	57	56	58	55	59	55	57	58	62	58	61
Fairing	5	17	107	14	104	17	107	17	95	17	90	14	79	14	84	17	73	17
	7	54	90	45	84	51	78	48	75	48	66	45	54	45	60	48	48	48
	9	25	71	22	71	25	74	25	77	28	71	25	62	25	71	28	56	25
	11	15	80	15	86	18	86	18	89	18	86	15	77	18	89	18	70	18
	13	51	69	44	79	54	87	54	96	57	101	57	101	60	118	63	115	66
	15	14	96	14	99	17	110	17	104	17	107	17	99	20	110	23	104	23
DISICONIC	17	-2	101	1	101	1	109	1	98	1	95	-2	87	-2	93	1	90	1
	19	67	79	60	70	60	67	57	64	57	60	57	51	54	57	57	51	54
	21	34	58	34	58	34	58	34	61	37	58	34	52	34	58	40	49	37
	23	29	54	29	57	29	60	29	63	32	63	32	63	36	73	37	67	39
	25	57	60	53	66	60	72	60	81	63	84	66	87	69	98	75	98	78
	31	11	87	11	90	14	101	14	98	14	98	14	98	14	104	20	107	20
Forward Barrel	33	27	46	27	40	24	40	24	30	21	21	18	18	15	18	18	12	15
	35	33	46	33	43	33	43	33	46	33	43	33	39	33	46	36	39	33
	37	29	44	29	47	29	47	32	50	35	50	35	50	38	60	41	53	41
	39	-18	65	-18	65	-15	80	-15	68	-15	65	-15	65	-15	71	-12	71	-12
Aft Barrel	41	31	40	31	34	28	31	28	25	25	19	19	13	19	16	19	10	19
	45	29	48	29	51	29	51	29	51	29	48	29	48	29	51	32	42	29
	47	30	49	30	52	30	52	30	55	36	52	36	55	39	61	39	55	39
	51	-6	46	-3	49	0	65	3	59	3	59	3	62	6	58	9	74	9
DSR	38	72	70	74	72	74	75	74	74	77	74	78	75	78	81	83	84	83

Table 7.9.4

TEMPERATURE SUMMARY (°F) (CR-6 & Up)

Payload

Rev. No.		275C	284	291C	300C
Beta Angle		18.4	20	21.3	22.96
Pan No. 1 Lens Cell	2	70	69	71	69
Lens Cone	4	69	68	69	68
Rear Rail	6	63	68	64	68
Drive Mtr	10	67	67	67	67
Front Rail	12	65	70	65	70
Average		66.8	68.4	67.2	68.4
Pan 1 Output AO	8	67	73	69	74
Delta Top Left	14	49	60	48	60
Drum Support	16	65	66	65	66
Pan No. 2 Lens Cell	18	69	68	70	68
Lens Cone	20	70	69	70	69
Rear Rail	22	62	67	62	66
Drive Mtr	26	66	66	66	66
Front Rail	28	62	68	62	67
Average		65.8	68	66.0	67
Pan 2 Output AO	24	54	57	53	55
Supply Cassette	30	67	68	67	68
Aux. Electronic Box	32	57	60	56	60
Slope Programmer	34	82	81	81	80
PMU	36	63	63	61	63
Switch Programmer	43	58	61	58	61
[illegible] Power Box	49	70	77	70	68
SRV "A" T/U	40				
Retro	42				
SRV "B" T/U	44	74	76	74	75
Retro	46	72	73	73	73

Table 7.9.5 [illegible] HANDLE VIA [redacted]

TEMPERATURE SUMMARY (°F) CR-6 & Up Payload _____

Rev. No.		275C	284	291C	300C
Cone Angle		18.4	20	21.3	22.96
Heat Shield	48	106	41	106	38
	50	158	27	156	24
DISIC Platen	53	59	60	59	60
Lens Cell	55	58	59	58	59
Fairing	5	64	11	45	11
	7	42	42	39	39
	9	49	22	43	22
	11	67	15	55	12
	13	118	63	118	69
	15	104	20	88	23
DISICONIC	17	87	-2	66	-2
	19	45	48	42	45
	21	46	31	40	31
	23	63	36	67	39
	25	101	78	104	81
	31	104	17	93	20
Forward Barrel	33	6	9	-3	9
	35	36	30	30	30
	37	50	38	50	41
	39	71	-15	49	-12
Aft Barrel	41	3	13	-3	13
	45	39	26	35	26
	47	55	39	55	39
	51	77	9	62	12
PSR	28	85	84	82	81

Table 7.9.6