[redacted]

CORONA CR

MISSION SUMMARY

AND

TELEMETRY ANALYSIS

MISSION 1115

AGENA 1662/PAYLOAD CR-15

22 OCT. 1971

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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

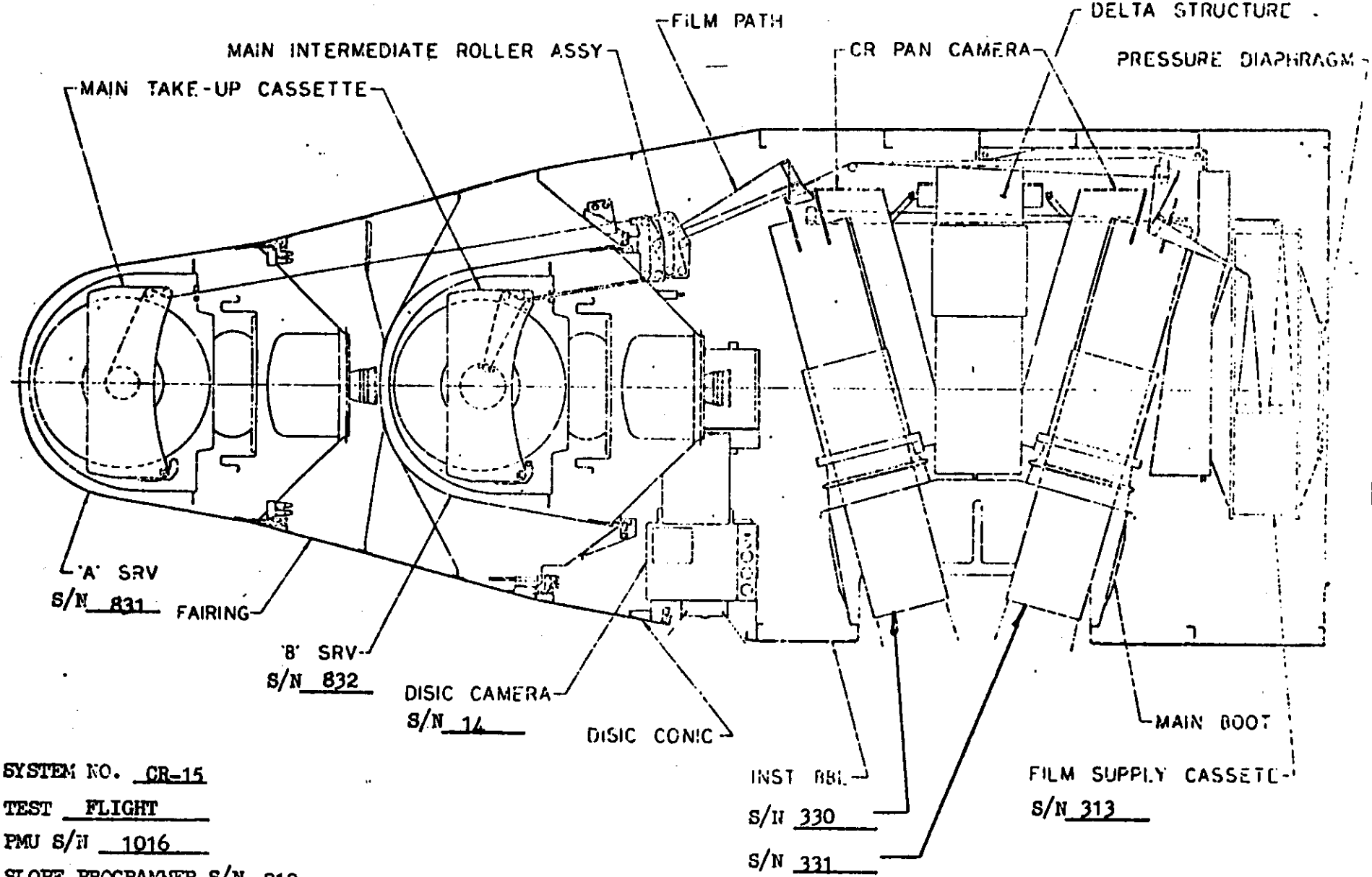
b) Delay step increment - 50 seconds

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

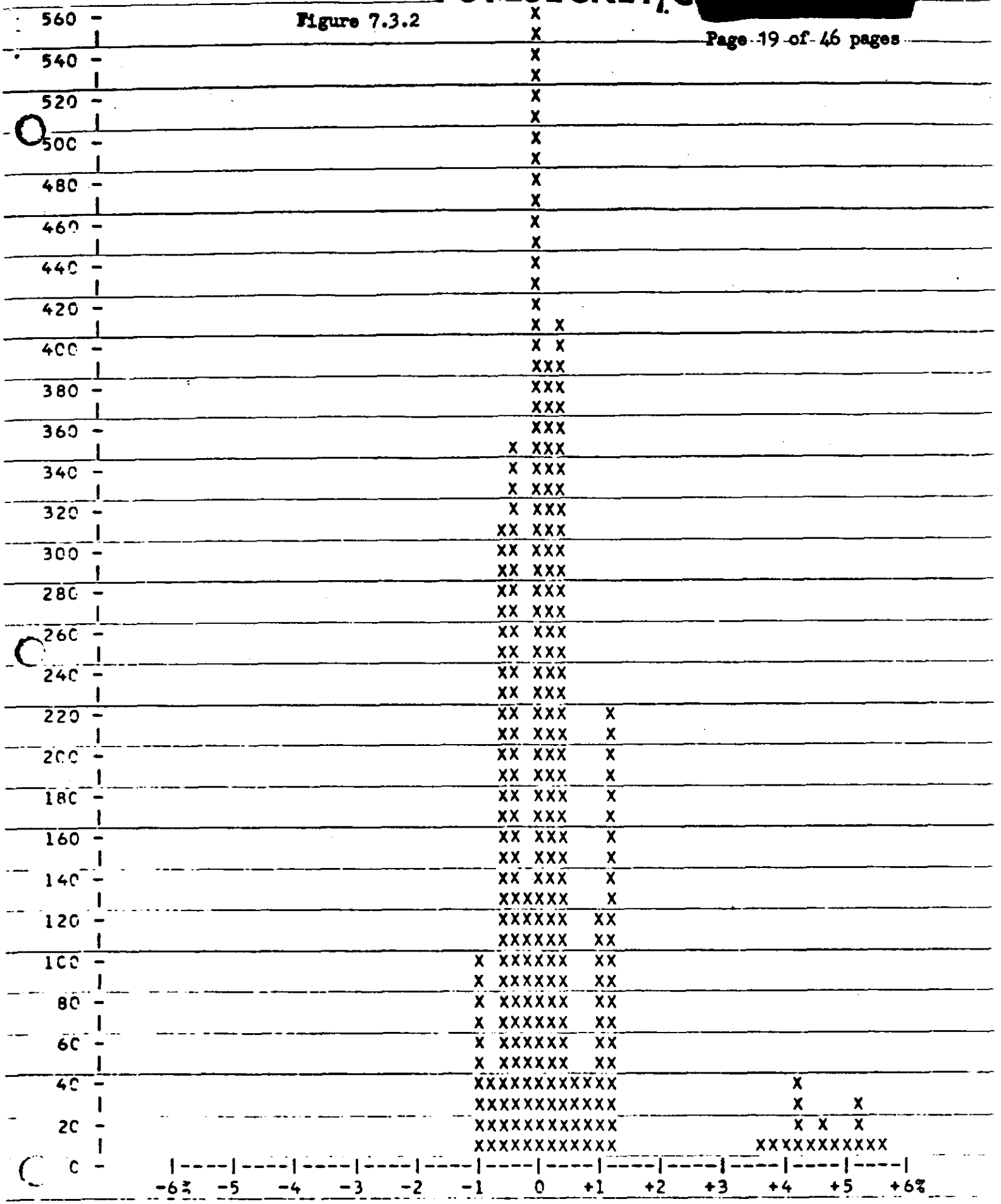
REV	P O P	S 1/2 POS.	SYSTEM CALIB.	ORL TUR	ECC TUR	INST. 330 ACTUAL PERIOD	INST. 330 UNIT DEV.	INST. 330 SYSTEM DEV.	INST. 331 ACTUAL PERIOD	INST. 331 UNIT DEV.	INST. 331 SYSTEM DEV.
16	0 1	1 10	1.918	3392	1998	1.920	0.12S	0.09S	1.930	0.59S	0.61S
48	0 1	4 12	1.855	3475	2067	1.850	0.22E	0.25E	1.850	0.27E	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

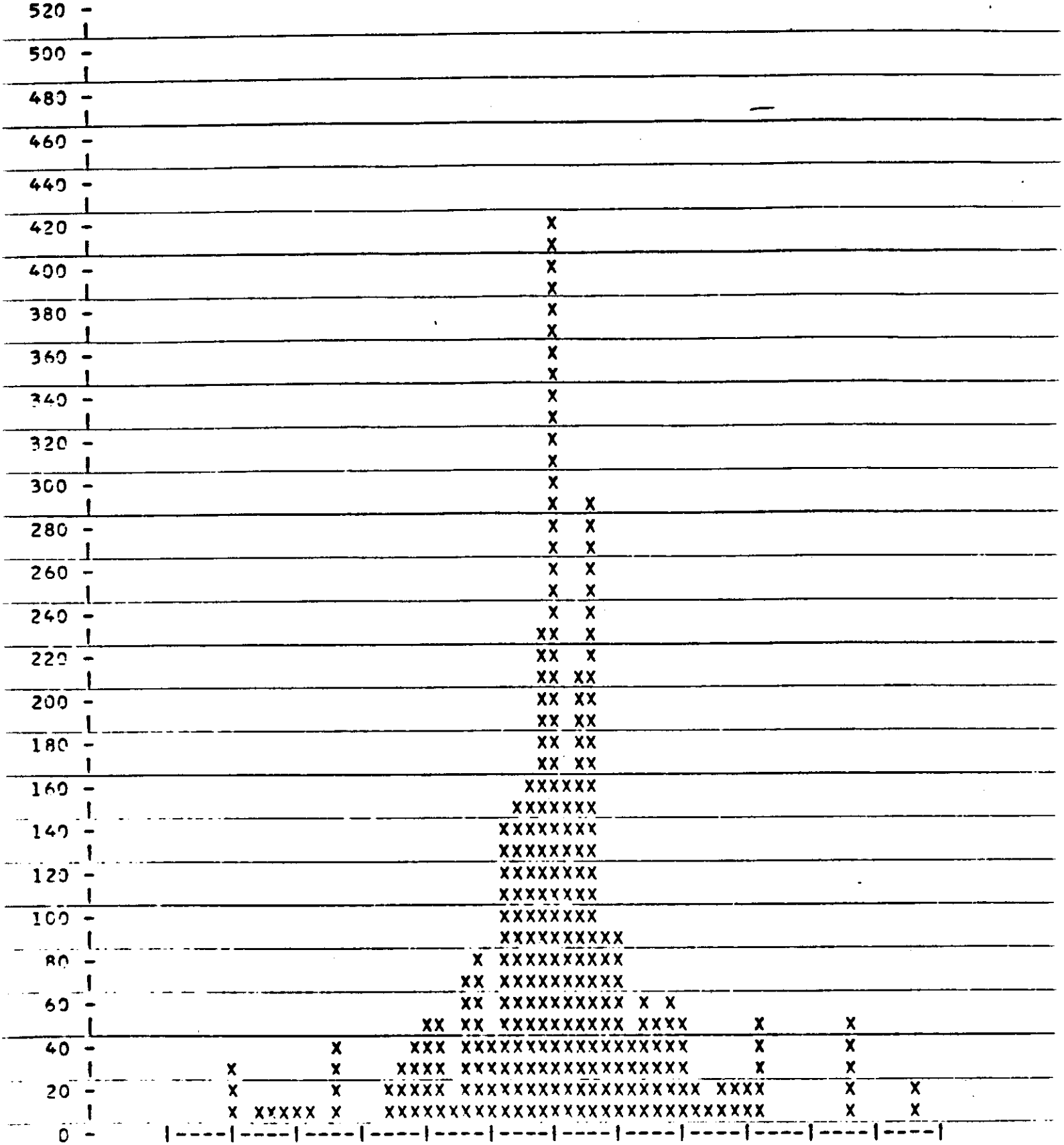
MISSION 1115-1 AFT LOOKING--ORBIT MATCH
MEAN= 0.39 ONE SIGMA= 1.15 TOTAL FRAMES=2950
2583 FRAMES MATCHED ORBIT +/- 1σ, REPRESENTS 87.56%, OF THE MISSION

Figure 7.3.2



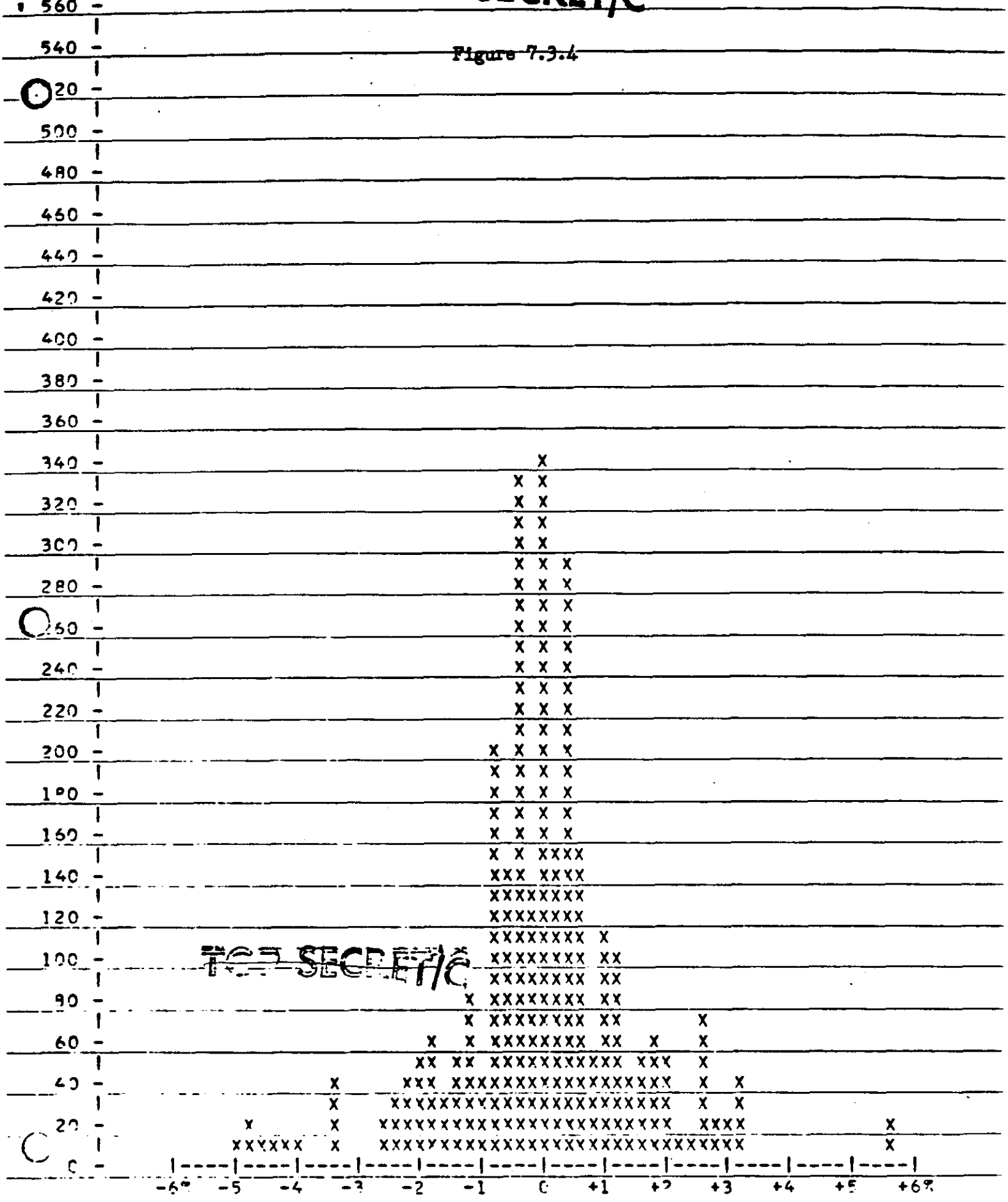
MISSION 1115-1 FWD LOOKING--ORBIT MATCH
MEAN= 0.30 ONE SIGMA= 1.14 TOTAL FRAMES=2945
2579 FRAMES MATCHED ORBIT +/- 1%, REPRESENTS 87.57%, OF THE MISSION

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

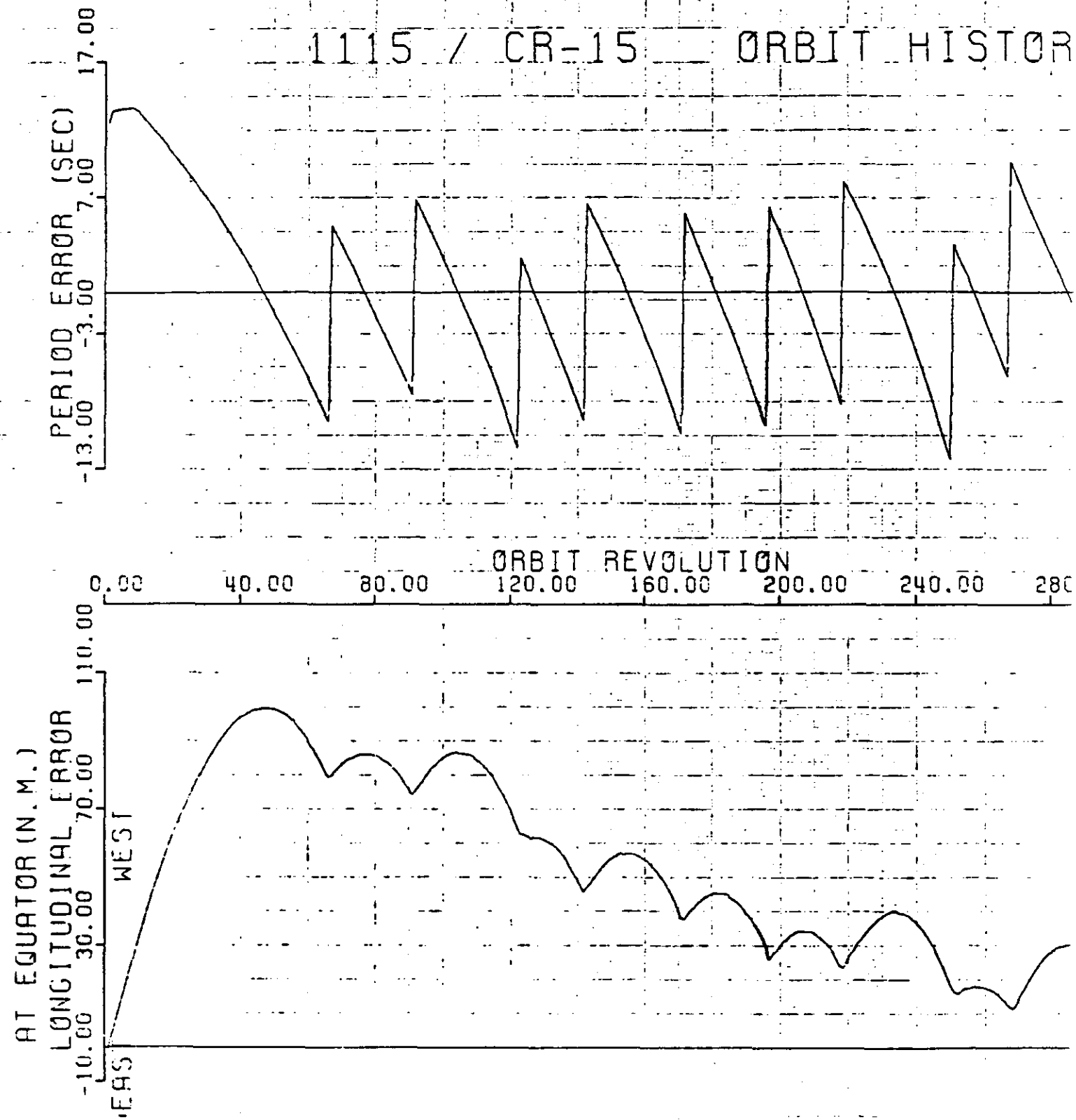
Table 7.5

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~~

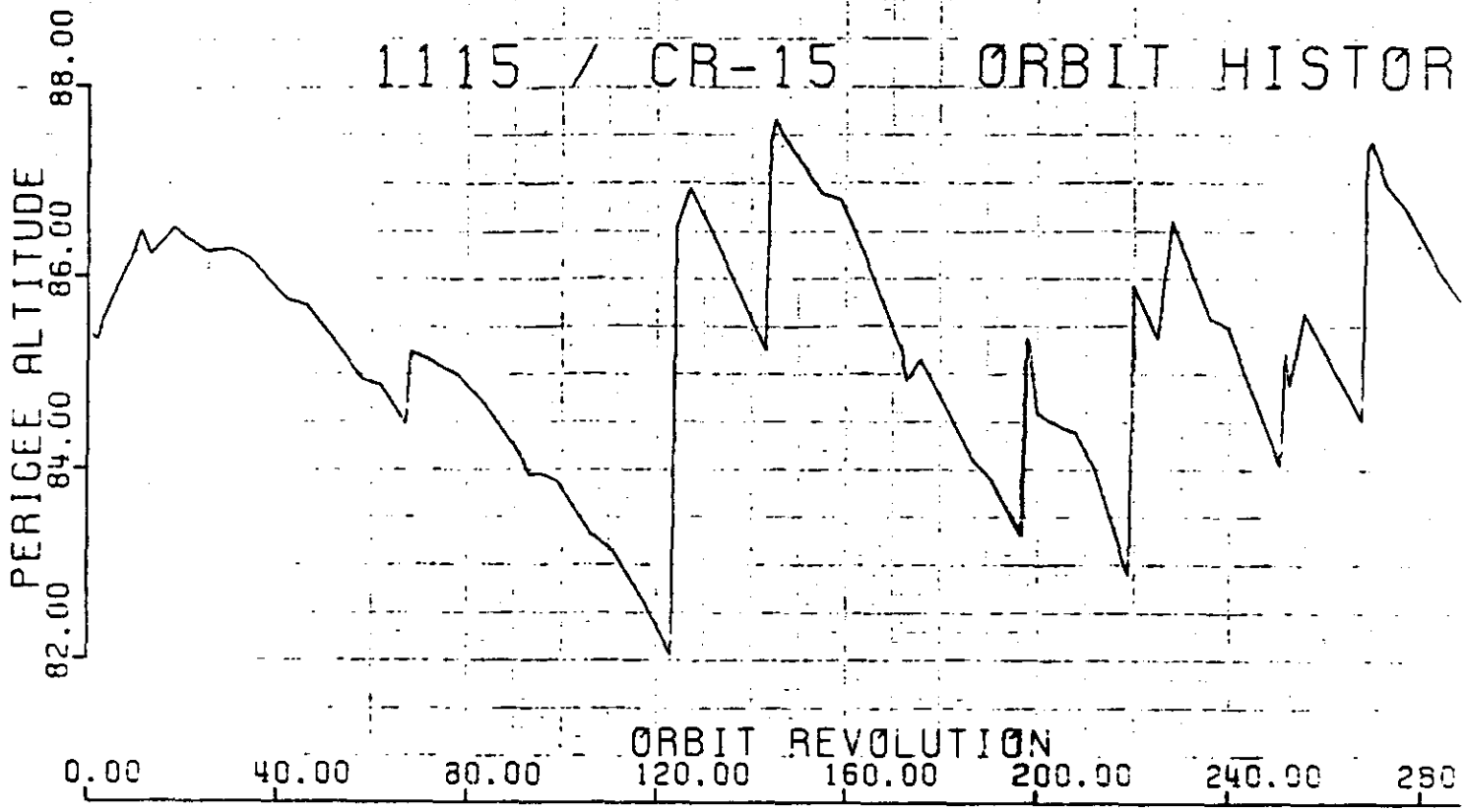
Figure 7.6.1

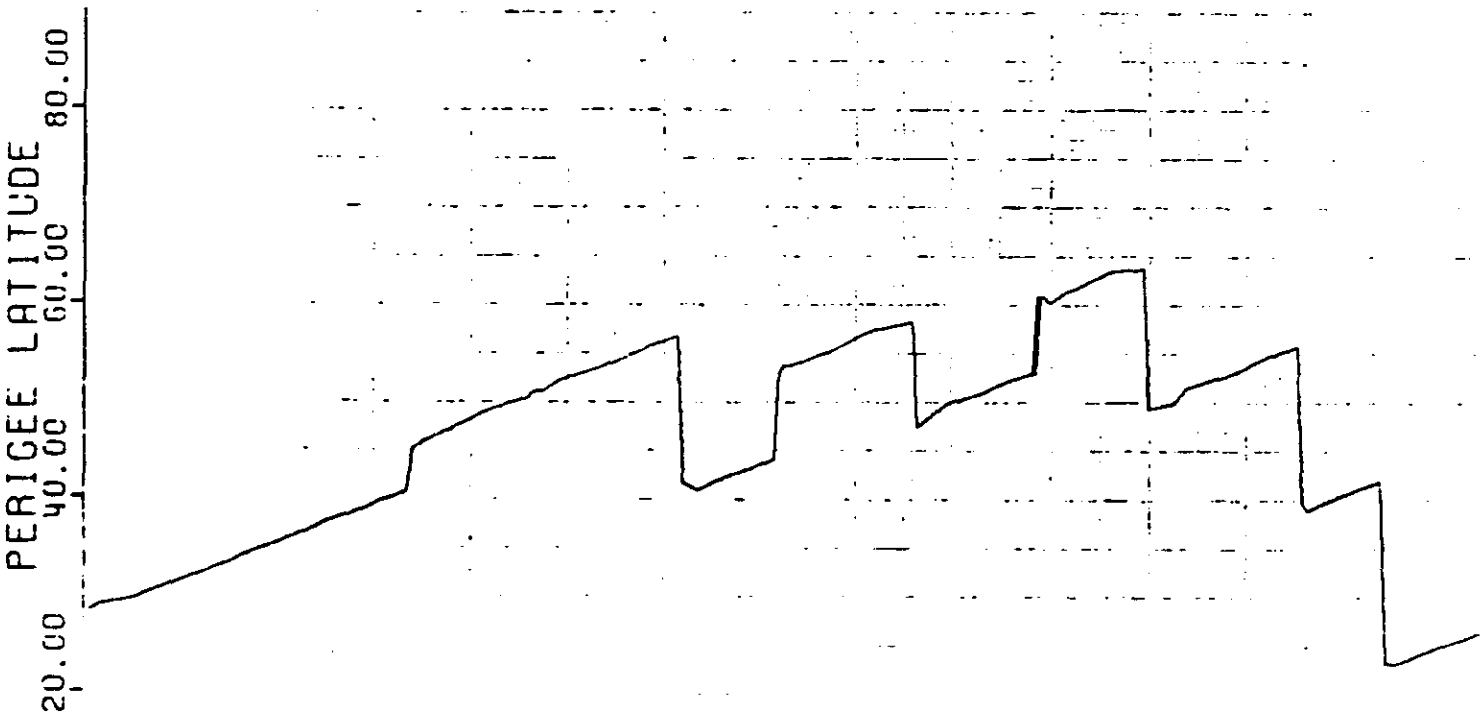


~~TOP SECRET/C~~

HANDLE VI
CONTROL SYSTEM

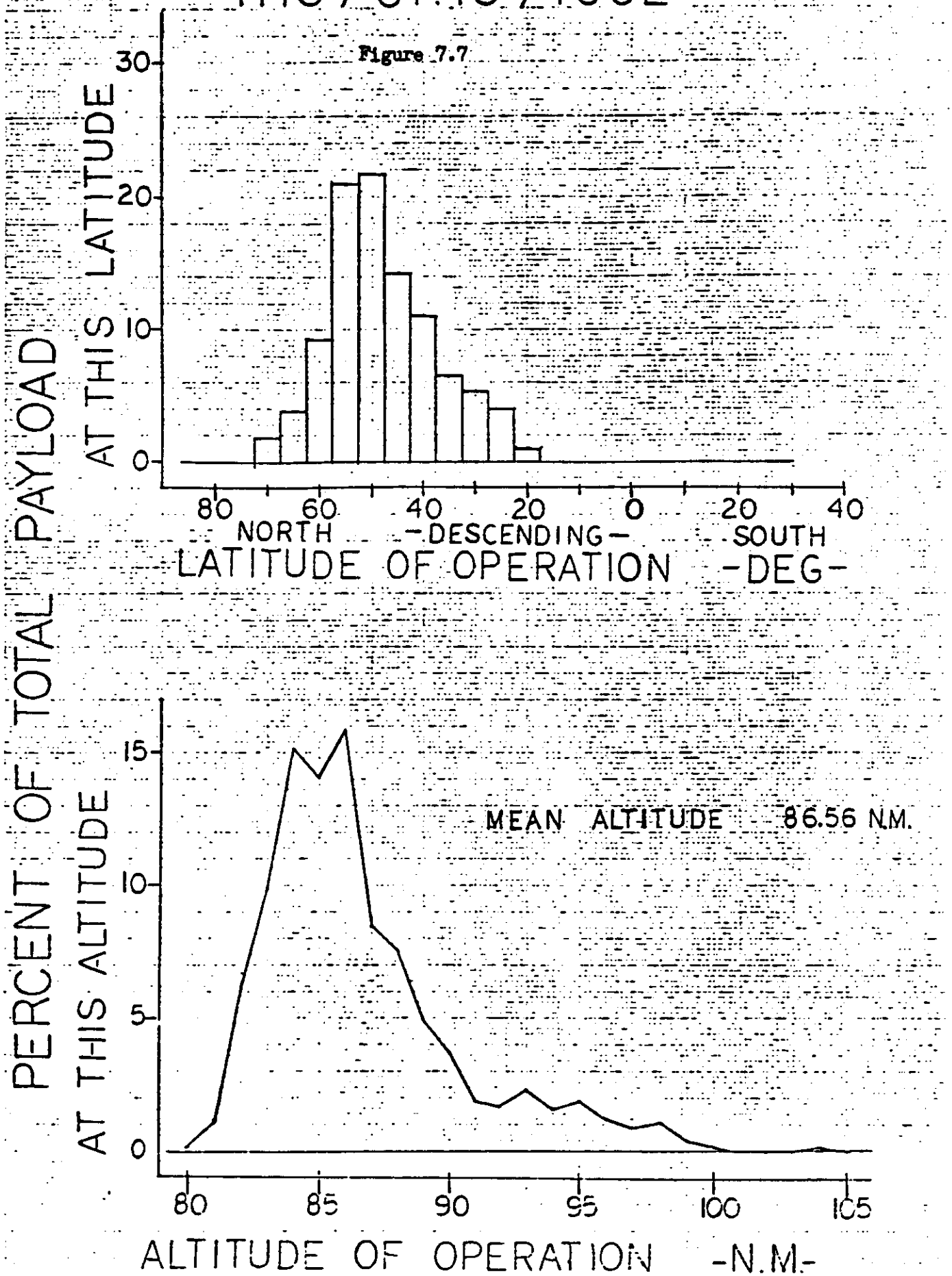
Figure 7.6.2


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

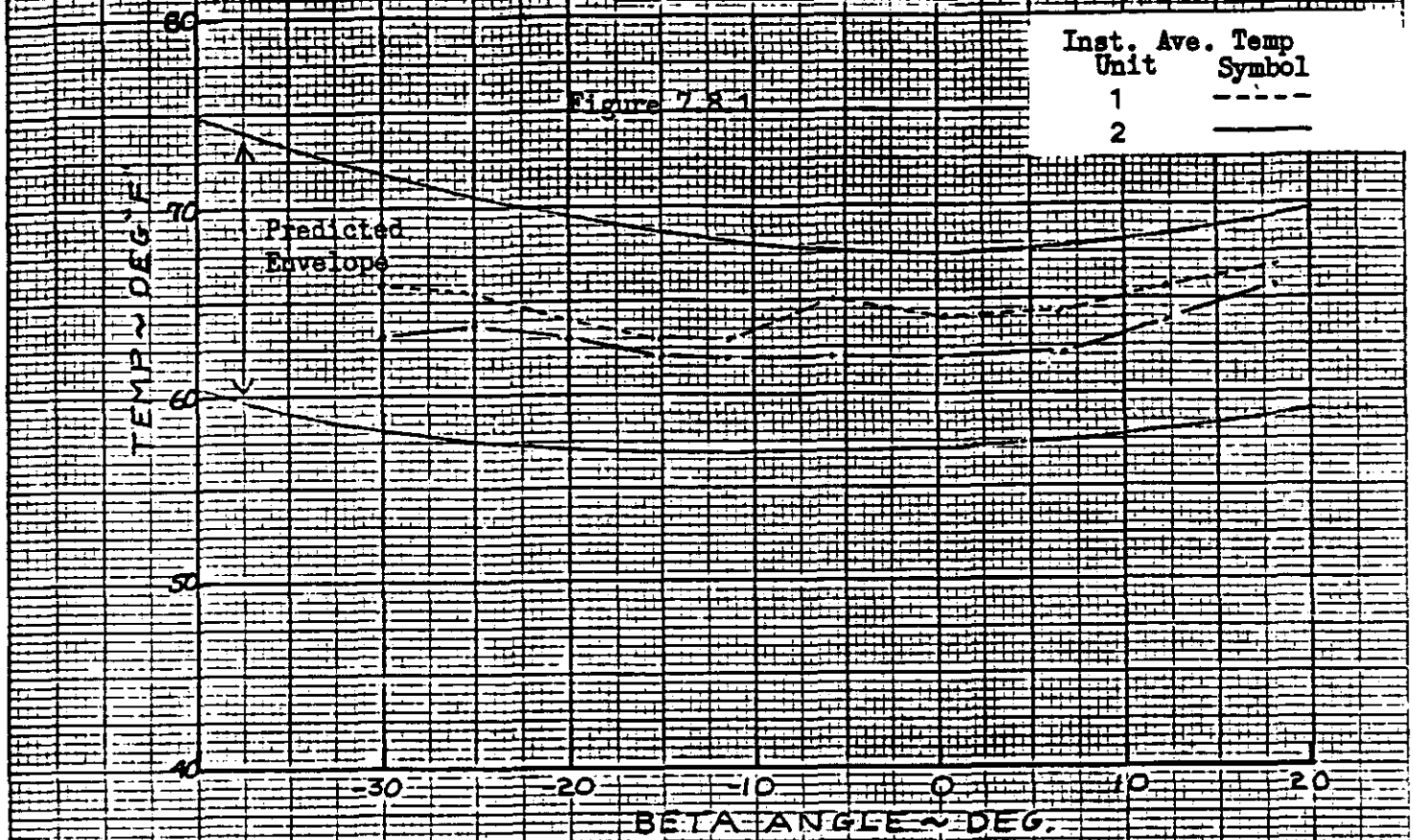
1115/CR15/1662

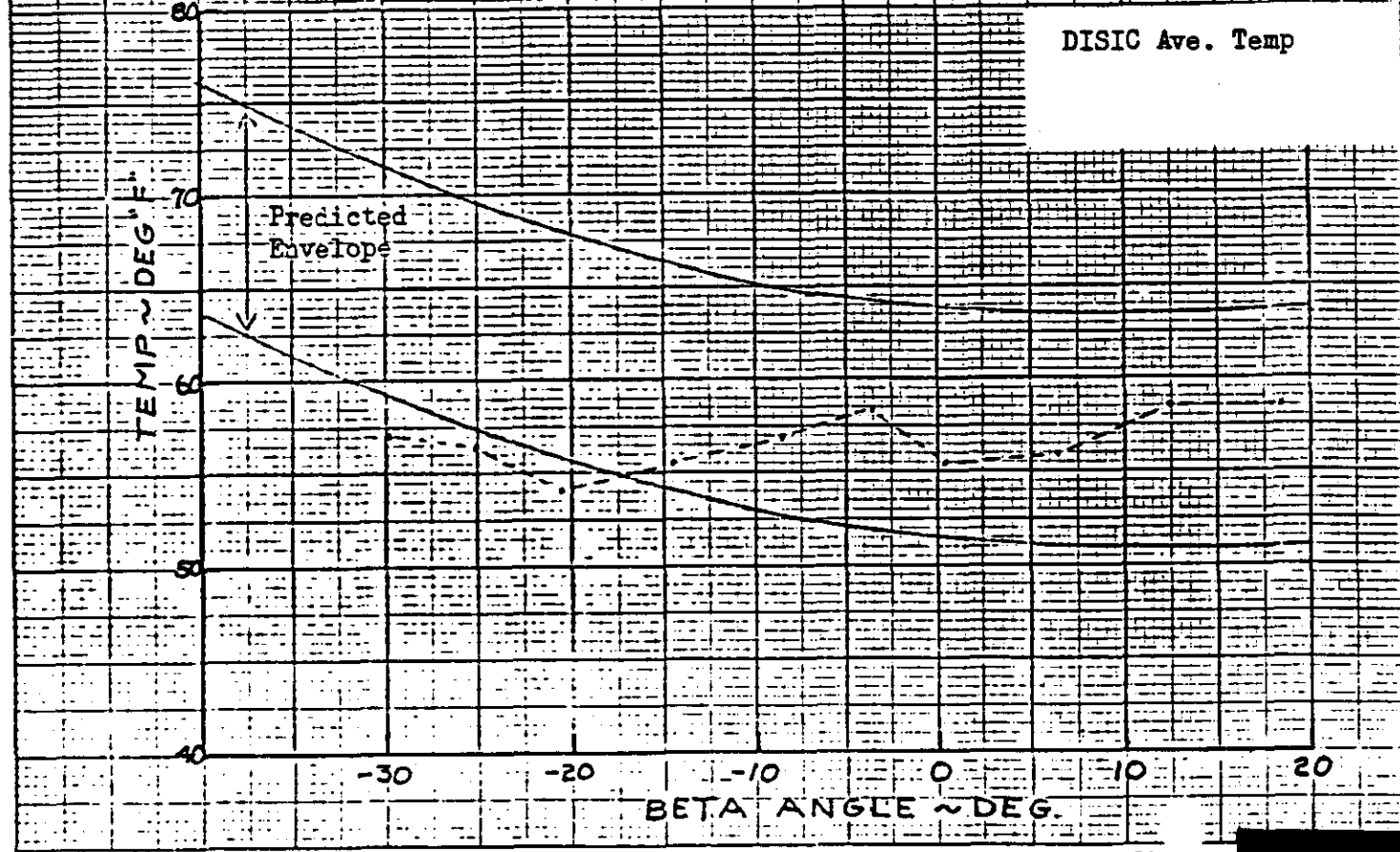
Figure 7.7



GR-15 FLIGHT VS PREDICTED TEMPERATURE

Figure 7.8-1

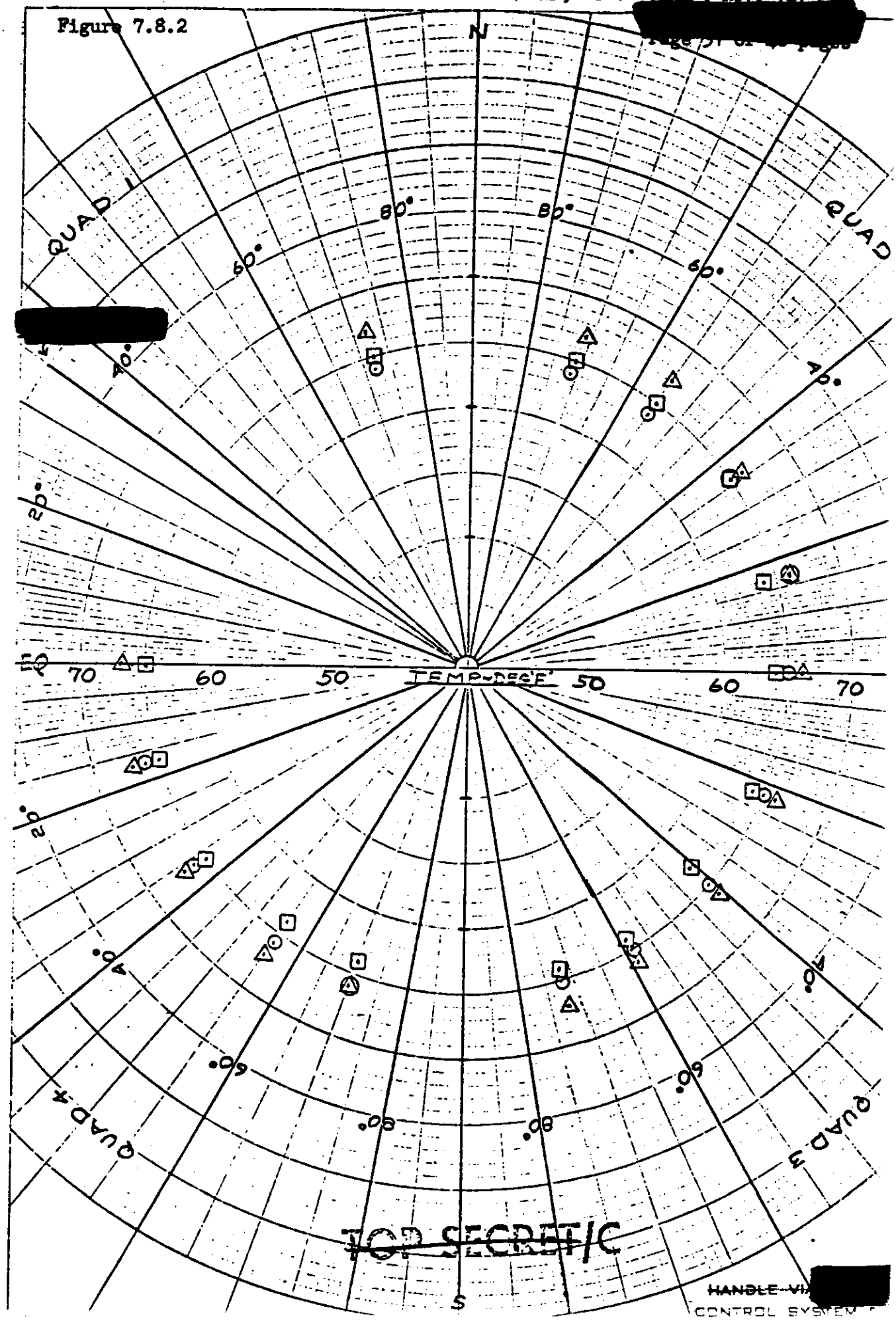




Instrument No. 1 Lens Cell
Rev. 42 △, Rev. 105 ⊡, Rev. 187 ⊙

[redacted]

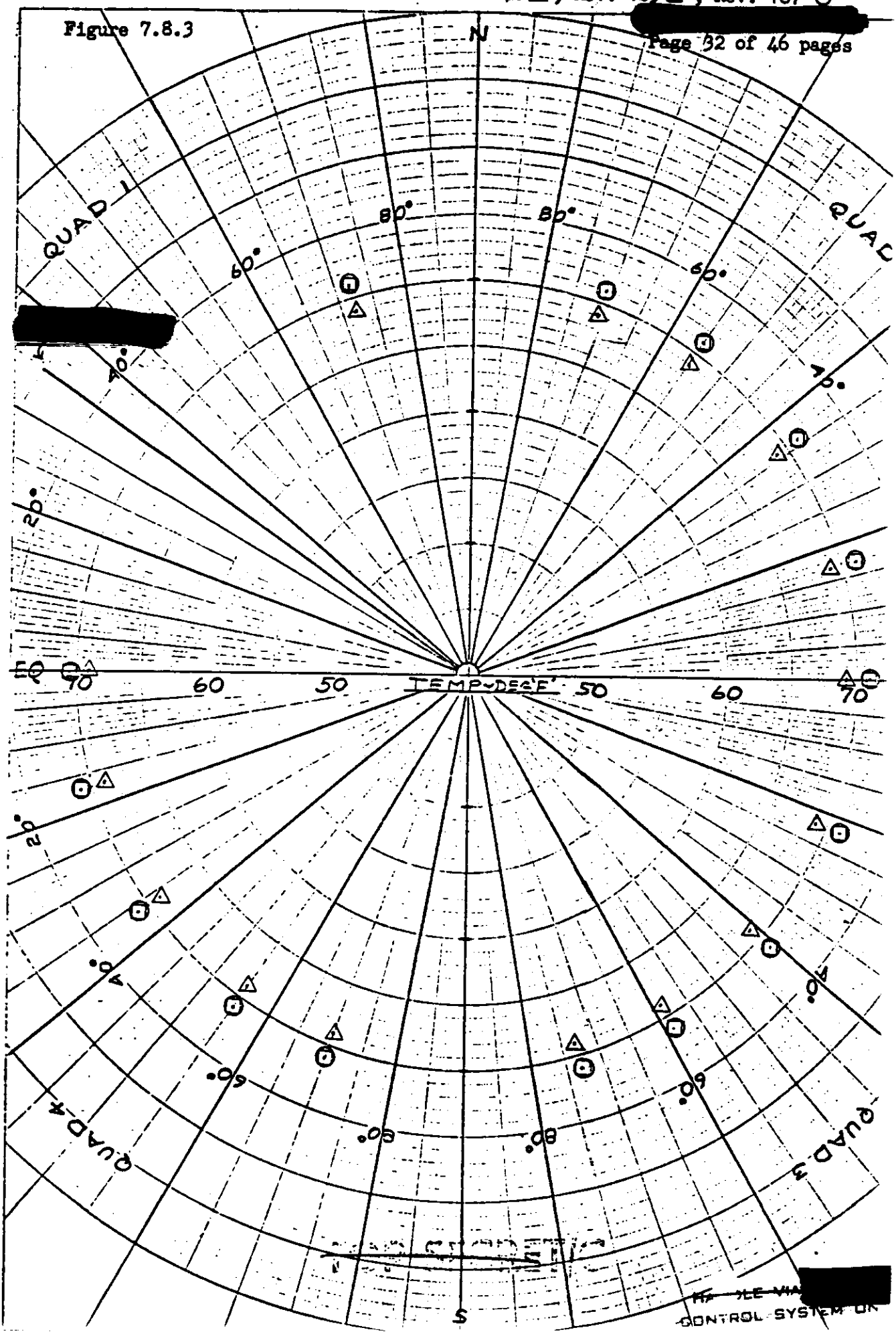
Figure 7.8.2



HANDLE VIA [redacted]

CONTROL SYSTEM

Figure 7.8.3



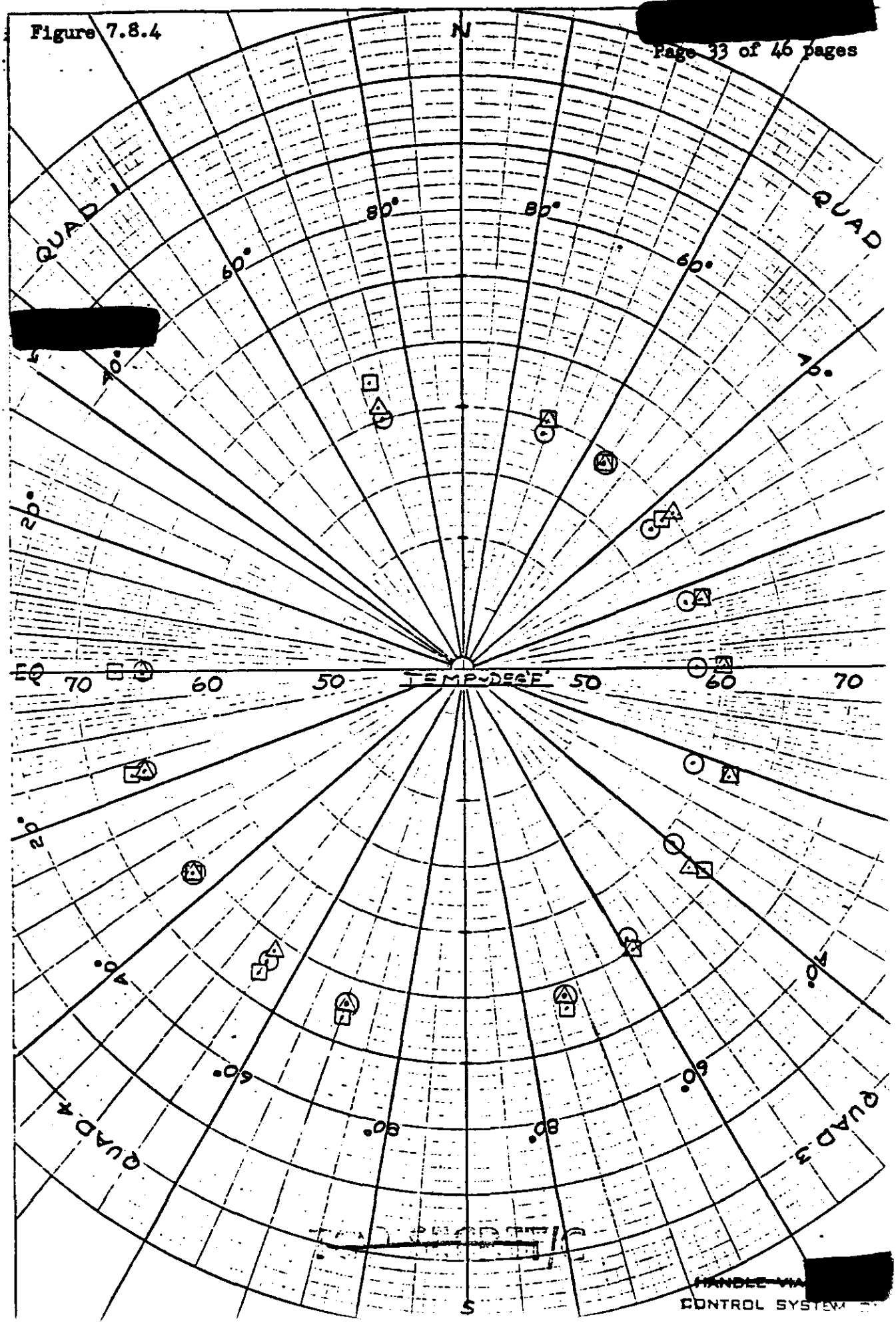
[redacted]

CONTROL SYSTEM

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

[redacted]

Figure 7.8.4



[redacted]

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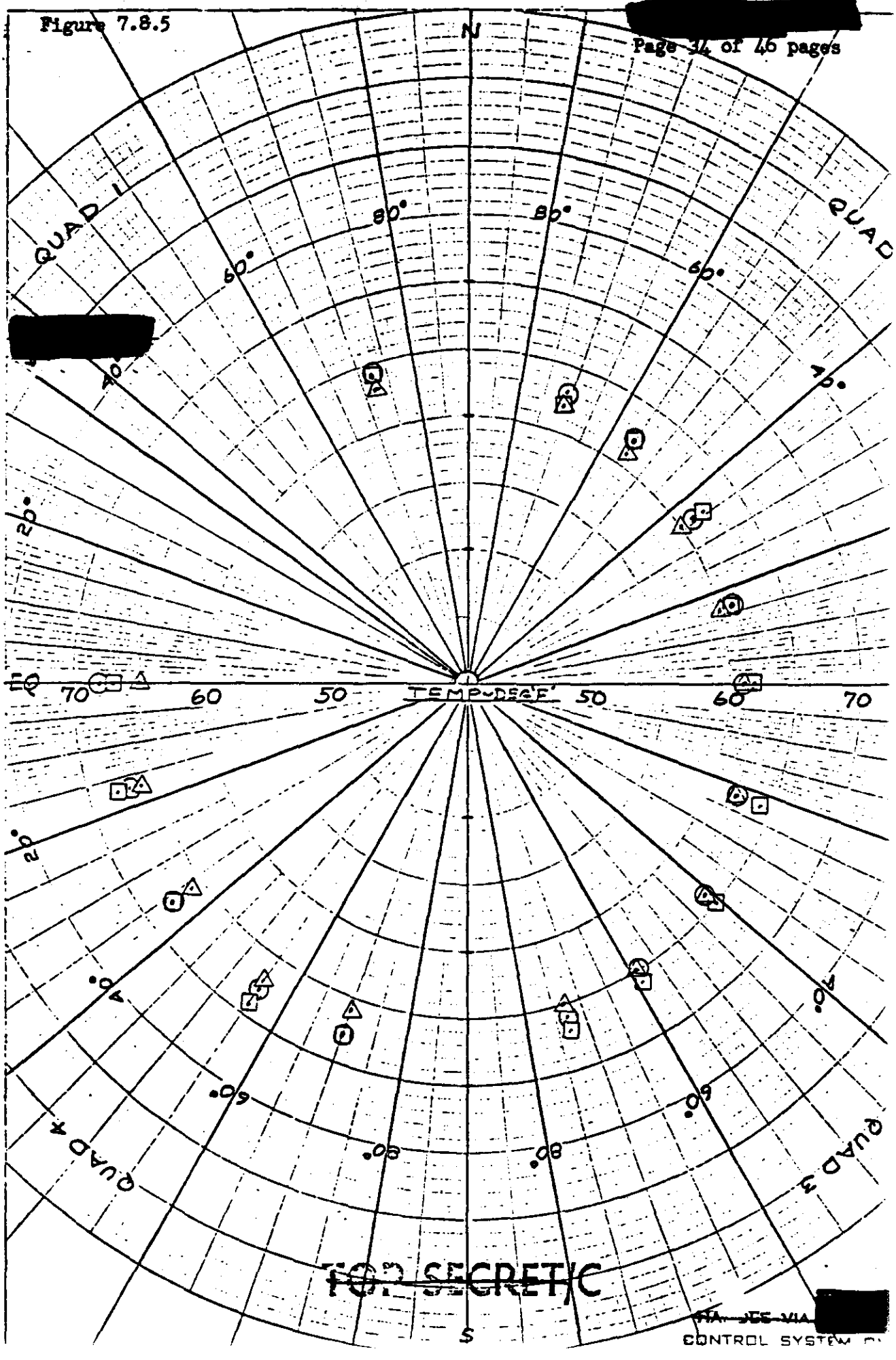
CONTROL SYSTEM

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

[redacted]

Figure 7.8.5



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CONTROL SYSTEM

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

Figure 7.8.6

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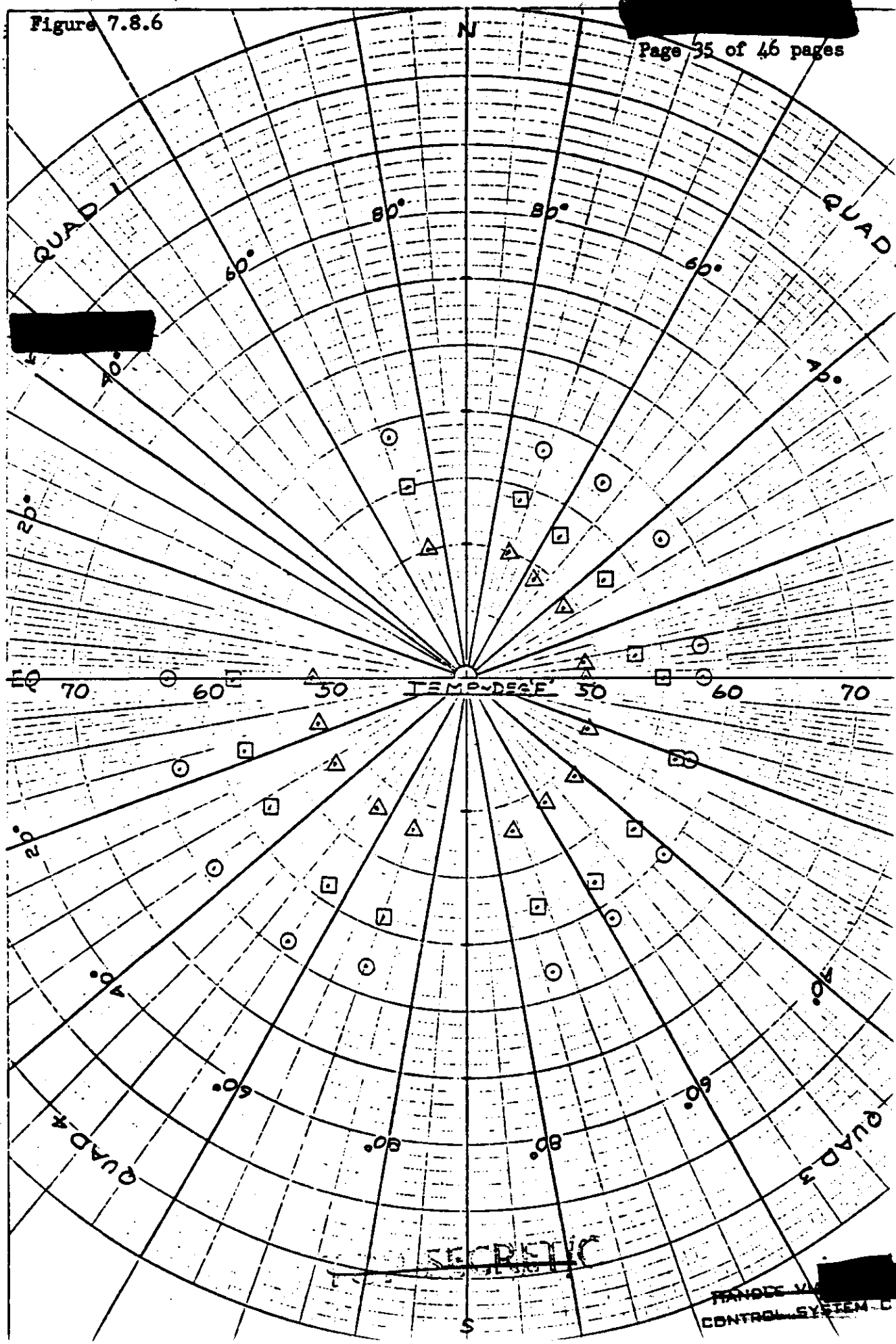

[redacted]

HANDLE VIA
CONTROL SYSTEM C