[redacted] [redacted]

TOP SECRET

TOP SECRET [redacted]

CORONA "H" FLIGHT DATA BOOK

SYSTEM NO. 110

VEHICLE NO. 1152

MISSION NO. 9041

Prepared by: [redacted]

Checked by: [redacted]

Approved by: [redacted]
(Engineering Manager)

Approved by: [redacted]
(Project Manager)

Approved by: [redacted]

[redacted]

TOP SECRET

TOP SECRET

[redacted]

SYSTEM NO. [illegible]
VEHICLE NO. [illegible]
MISSION NO. [illegible]
CAMERA NOS. [illegible]

[redacted]

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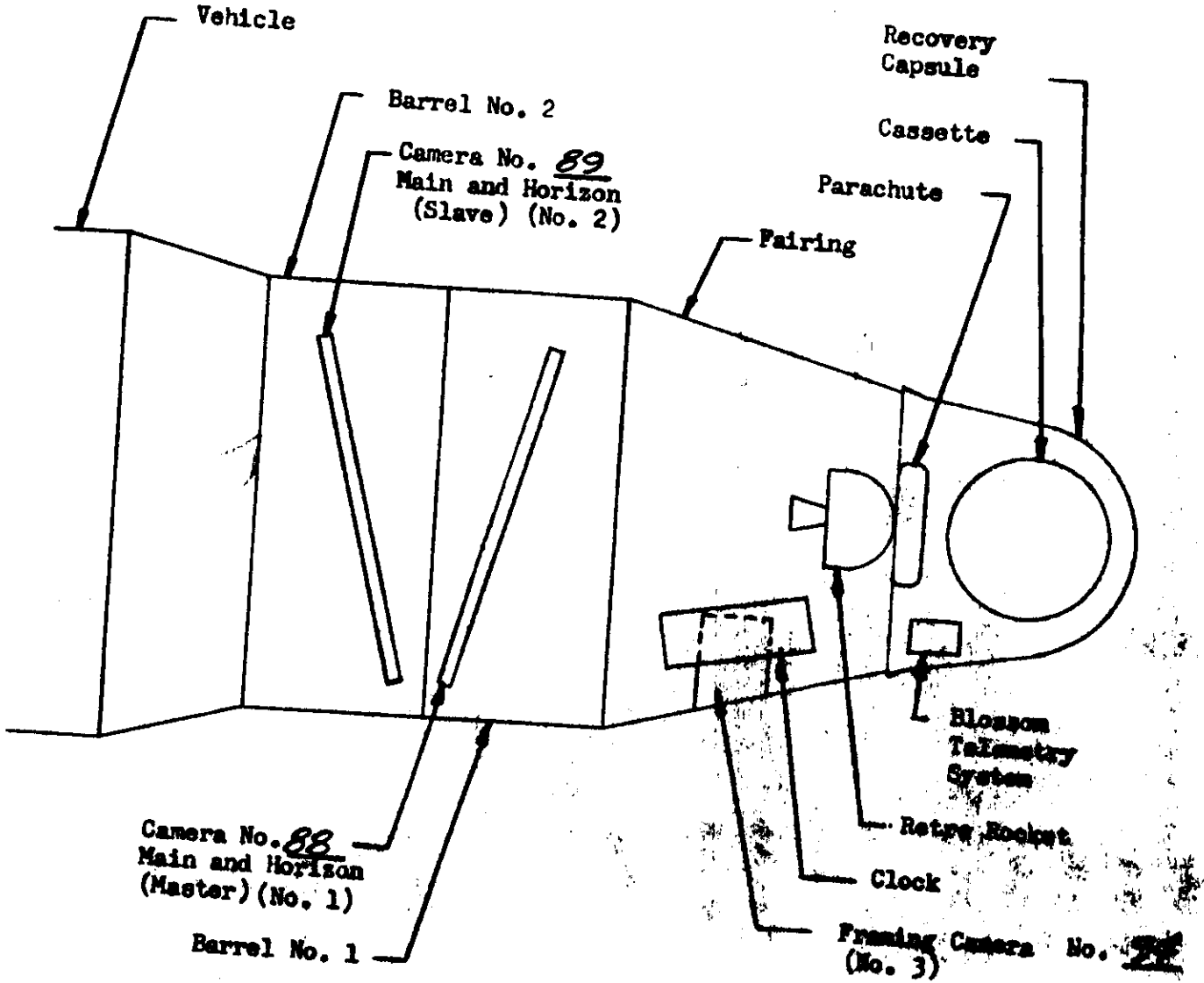


VEHICLE LAYOUT

GENERAL FLIGHT DATA:

Discoverer No. 48

Main Camera No. 1 Serial No. 88

Main Camera No. 2 Serial No. 89

Framing Camera Serial No. 94

Launch Date 8/1/62

Orbital Parameters: (Rev. 22)

Period 90.75 Min. Eccentricity .0160

Perigee 111 NM Perigee Latitude 23.15 Deg. N

Apogee 228 NM Inclination Angle 82.25 Deg. N

Recovery Revolution No. 65

Recovery Date 8/5/62

REMARKS:

[redacted]

SYSTEM NO. MIO
VEHICLE NO. 1152
MISSION NO. 9041
CAMERA NOS. 88 & 89

PRE-LAUNCH INFORMATION:

V/H Programmer Set On Step 3 At Launch

Main Camera Settings:

	Camera No. 88	Camera No. 89
Main Optics Slit Width	.200 in.	.200 in.
Horizon Optics Exposure Time	1/200 Sec.	1/200 Sec.
Horizon Optics Aperture	F 6.8	F 8.0
Horizon Optics Filters	NEUTEU 25	NEUTEU 12

Framing Camera Settings:

Exposure Time 1/250 Sec.

Aperture F 6.3

Ratio: One Framing Camera Frame Per 7
Camera No. 1 Frames

Film:

	Camera No. 88	Camera No. 89	Framing Camera
Type	SO 132	SO 132	SO 130
Length	7800 Ft.	7800 Ft.	135 Ft.
No. of Splices	1	1	None
Emulsion Data	33-12-6-2	33-12-6-2	15-2-4-2

[redacted]

SISTER NO. 410
VEHICLE NO. 1132
MISSION NO. 9041
CAMERA NOS. 22 & 24
FRAMING CAMERA NO. 24

[redacted] Page 6 of 20

PERFORMANCE ESTIMATE

Pass No.	Frame Camera No.			Fwd. Camera No.			Lat. Wide Degrees On	Lat. Wide Degrees Off	Time On Hr. Min.	Day Sec.	Solar Angle On	Solar Angle Off	Day Time On	Day Time Off	Range No.	Instr. On Seq. Up Rang

PERFORMANCE ESTIMATE NOT COMPLETED IN TIME FOR INCLUSION IN DATA BOOK.

[redacted]

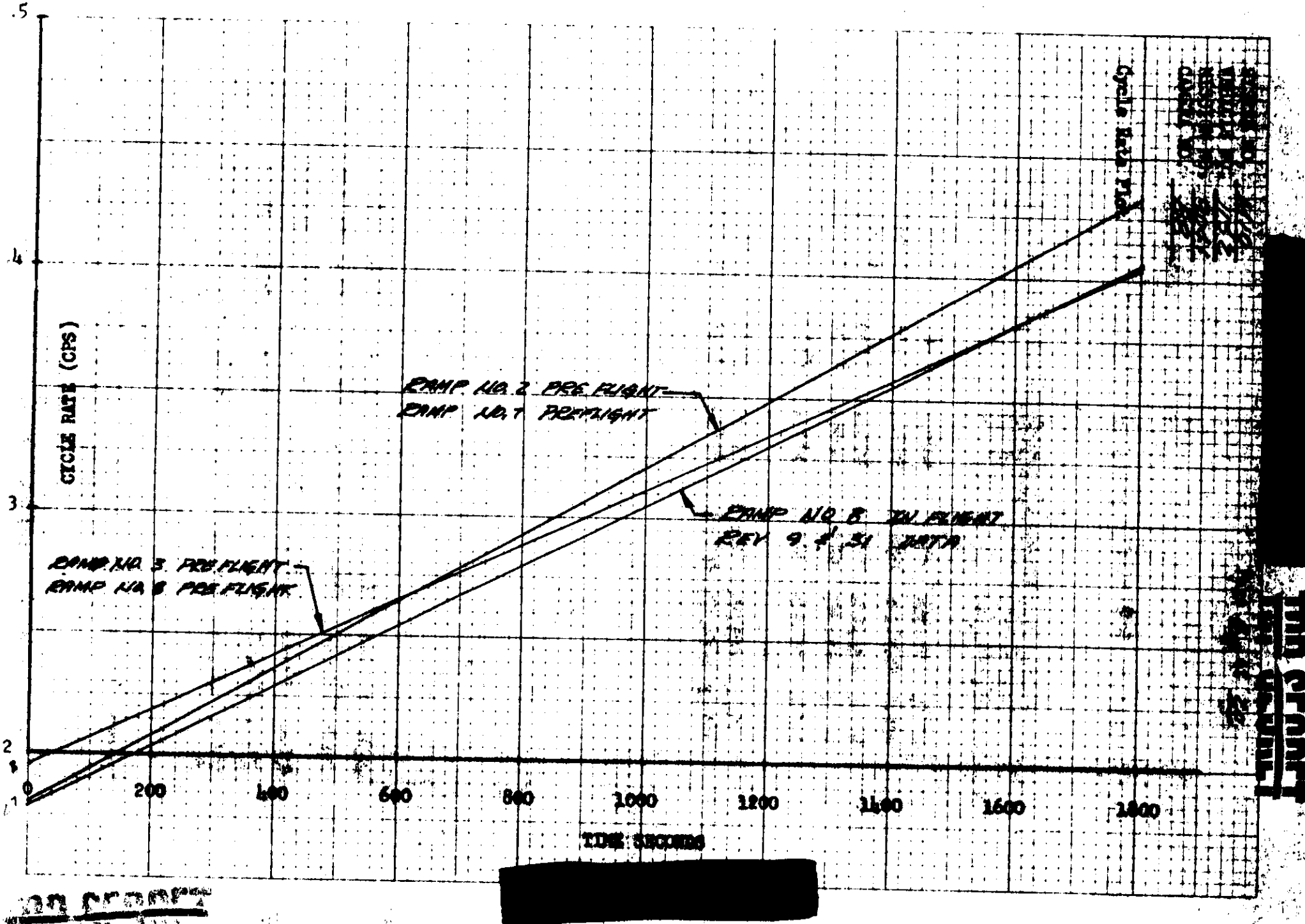
PRE-FLIGHT CYCLE PERIOD: (CAMERA NO. 88)

V/H Ramp	Cycle Period Seconds	FMC Rate		Scan Rate		
		Rad. Per Second	In. Per Second	Rad. Per Second	In. Per Second	Exposure Millisec
2 START	5.55	.015	.365	1.132	27.170	7.36
2 END	2.29	.037	.884	2.274	65.849	3.04
3 START	5.09	.017	.398	1.234	29.626	6.75
3 END	2.47	.034	.820	2.544	61.050	3.27
7 START	5.52	.015	.367	1.138	27.318	7.32
7 END	2.27	.037	.892	2.768	66.429	3.01
8 START	5.07	.017	.399	1.239	29.742	6.72
8 END	2.47	.034	.820	2.543	61.050	3.28

IN-FLIGHT CYCLE PERIOD: (CAMERA NO. 88)

Rev.No.	V/H Ramp	Cycle Period Seconds	FMC Rate		Scan Rate		
			Rad. Per Second	In. Per Second	Rad. Per Second	In. Per Second	Exposure Millisec
9	8(47)	5.60	.015	.362	1.122	26.928	7.43
15	3(1544)	2.80	.030	.725	2.244	53.855	3.71
31	8(1595)	2.63	.032	.770	2.389	57.336	3.49
40	7(125)	5.12	.016	.396	1.227	29.452	6.79
47	8(1650)	2.72	.031	.744	2.310	55.439	3.61

Note: No. IN PARENTHESIS INDICATES TIME OF RAMP AT CYCLE PERIOD MEASUREMENT.


.5
4
3
2
1
CYCLE RATE (CPS)
0
200
400
600
800
1000
1200
1400
1600
1800
TIME SECONDS
RAMP NO. 2 PRE FLIGHT
RAMP NO. 7 PREFLIGHT
RAMP NO. 3 PRE FLIGHT
RAMP NO. 8 PRE FLIGHT
RAMP NO. 8 IN FLIGHT
REV 9 & 34 DATA
Cycle Rate

[redacted]

SYSTEM NO. 2410
VEHICLE NO. 452
MISSION NO. 2041
CAMERA NOS. 88 89

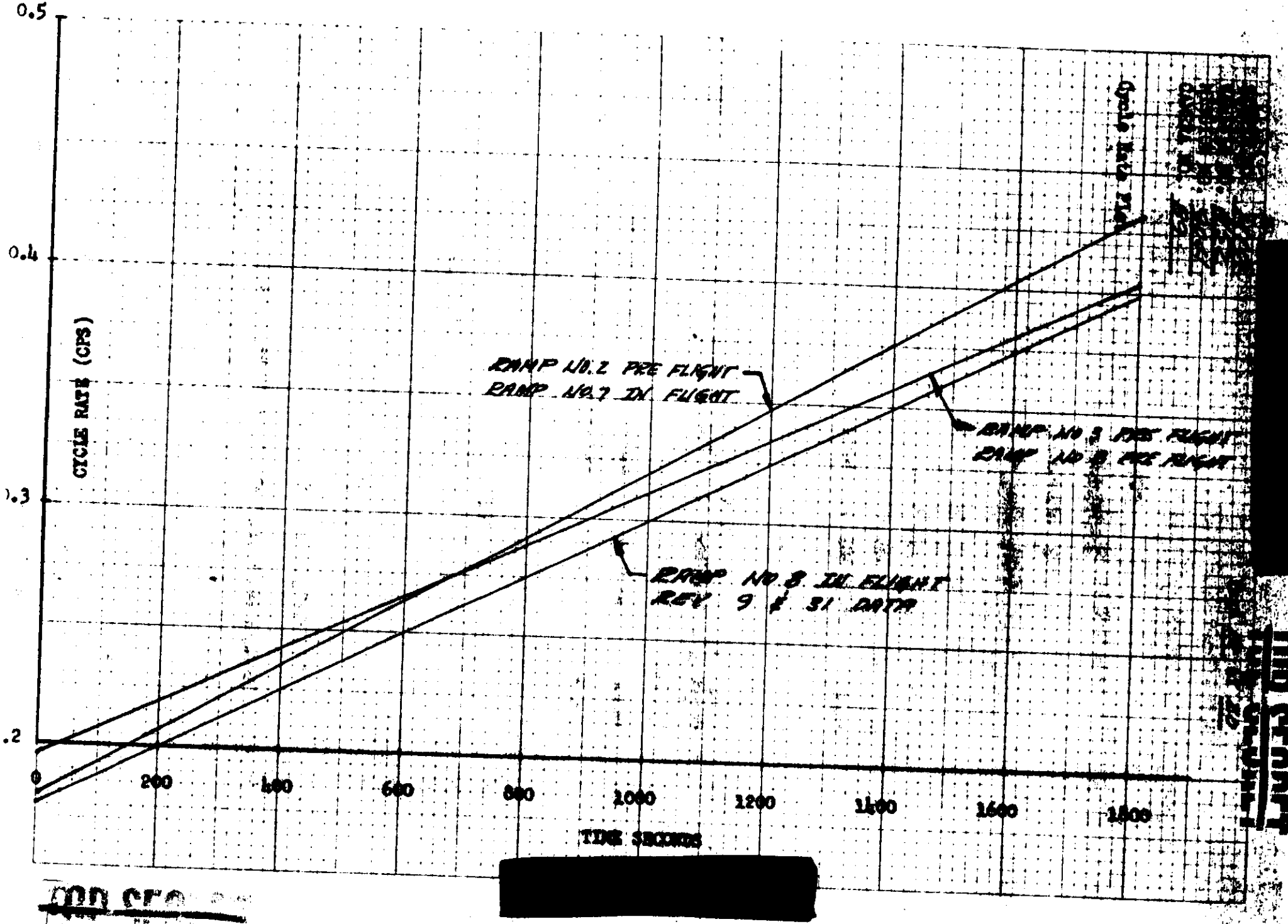
PRE-FLIGHT CYCLE PERIOD: (CAMERA NO. 89)

V/H Ramp	Cycle Period Seconds	FMC Rate		Scan Rate		
		Rad. Per Second	In. Per Second	Rad. Per Second	In. Per Second	Exposure Millisec
2 START	5.56	.015	.364	1.130	27.121	7.37
2 END	2.31	.036	.877	2.720	65.279	3.06
3 START	5.06	.017	.399	1.257	29.604	6.79
3 END	2.48	.034	.816	2.534	60.804	3.29
7 START	5.54	.018	.366	1.134	27.219	7.35
7 END	2.31	.036	.877	2.720	65.279	3.06
8 START	5.06	.017	.400	1.242	29.801	6.71
8 END	2.48	.034	.817	2.534	60.804	3.29

IN-FLIGHT CYCLE PERIOD: (CAMERA NO. 89)

Rev.No.	V/H Ramp	Cycle Period Seconds	FMC Rate		Scan Rate		
			Rad. Per Second	In. Per Second	Rad. Per Second	In. Per Second	Exposure Millisec
9	8(47)	5.55	.015	.365	1.132	27.170	7.36
15	3(1540)	2.72	.031	.745	2.310	55.439	3.61
31	8(1595)	2.67	.032	.758	2.353	56.477	3.54
40	7(125)	5.09	.016	.398	1.234	29.626	6.75
47	8(1650)	2.63	.032	.770	2.389	57.336	3.49

NOTE. NO. IN PARENTHESIS INDICATES TIME UP RAMP AT CYCLE PERIOD MEASUREMENT.


0.5
0.4
0.3
.2
0
200
400
600
800
1000
1200
1400
1600
1800
CYCLE RATE (CPS)
TIME SECONDS
RAMP NO.2 PRE FLIGHT
RAMP NO.7 IN FLIGHT
RAMP NO.3 IN FLIGHT
REV 9 & 31 DATA

LENS DATA SUMMARY: (Main Camera No. 88)

Lens Serial No. 0342435

Filter Type WRATTEN 21

Equivalent Operational Focal Length 609.599 MM

Resolution:

Static:

	Lines/MM	Film Type	Target Contrast
Bench Test	215.5	SO243	High
Other			

Dynamic:

	Lines/MM	Film Type	Target Contrast
Itek Pre-Vibration	136	SO132	High
Itek Post Vibration	150	SO132	High
AP 15 Degree	70.6	SO132	Low
AP 0 Degree	156.8	SO132	High
Other			

Note: Itek Post Vibration Resolution of 150 lines/MM Reported In Message No. [redacted] dated 7/31/62

Distortion - Positive (Pincushion)

Angle Off Axis Deg.	3	2	1	0	359	358	357		
Distortion Millimeters	.011	.007	.002	.000	.001	.005	.005		

[redacted]

LENS DATA SUMMARY: (Horizon Cameras for Main Camera No. 88)

	Take-Up	Supply
Lens Serial No.	[illegible]	807535
Exposure Time	1/200 Sec.	1/200 Sec.
Filter Type	Wratten 25	Wratten 25
Aperture	F6.8	F6.8
Operational Focal Length	89.4 MM	89.2 MM
Radial Distortion:		
10° off Axis	.005 MM	.013 MM
20° off Axis	.036 MM	.047 MM
Tangential Distortion (Maximum Vector)	.005 MM	.003 MM

Resolution:

Angle off Axis Deg.	0	5	10	15	20	25	27.5	0	5	10	15	20	25	27.5
Radial Resolution	56	48	37	27	29	25	26	56	49	42	40	32	34	30
Tangential Resolution	56	48	37	32	31	24	18	51	46	39	34	27	28	20

35.3 Lines/MM Avg. 37.7 Lines /MM Avg.

Note:

1. Distortion and resolution are read at equivalent operational focal length.

2. Resolution in lines per mm on Super XX film and High contrast target.

LENS DATA SUMMARY: (Main Camera No. 89)

Lens Serial No. 0232435

Filter Type WRATTEN 21

Equivalent Operational Focal Length 609.044 MM

Resolution:

Static:

	Lines/MM	Film Type	Target Contrast
Bench Test	211.3	SO243	High
Other			

Dynamic:

	Lines/MM	Film Type	Target Contrast
Itek Pre-Vibration	152	SO132	High
Itek Post Vibration	164	SO132	High
AP 15 Degree	91	SO132	Low
AP 0 Degree	171.5	SO132	High
Other			

Note: Itek Post Vibration Resolution of 164 lines/MM Reported In Message No. [redacted] dated 7/31/62

Distortion - Positive (Pincushion)

Angle Off Axis Deg.	3	2	1	0	359	358	357		
Distortion Millimeters	.011	.006	.002	.000	.000	.000	.001		

[redacted]

[illegible]
[illegible]
MISSION NO. [illegible]
CAMERA NOS. 88 & 89

[redacted]

TOP SECRET

LENS DATA SUMMARY: (Horizon Cameras for Main Camera No. 89)

	Take-Up	Supply
Lens Serial No.	807545	806864
Exposure Time	1/200 Sec.	1/200 Sec.
Filter Type	WRATTEN 12	WRATTEN 12
Aperture	F8.0	F8.0
Operational Focal Length	89.1 MM	89.4 MM
Radial Distortion:		
10° off Axis	.009 MM	.005 MM
20° off Axis	.041 MM	.035 MM
Tangential Distortion (Maximum Vector)	.003 MM	.006 MM

Resolution:

Angle off Axis Deg.	0	5	10	15	20	25	27.5	0	5	10	15	20	25	27.5
Radial Resolution	56	47	39	44	29	25	24	56	44	30	26	26	27	26
Tangential Resolution	51	47	36	36	29	24	20	56	44	42	31	25	24	17

36.2 Lines/MM Avg. 33.8 Lines /MM Avg.

Note:

1. Distortion and resolution are read at equivalent operational focal length.
2. Resolution in lines per mm on Super XX film and High contrast target.

[redacted]

TOP SECRET

DEFINITION OF MAIN CAMERA FORMAT CALIBRATIONS:

1.0 Measurements are made with respect to collimator targets fixed with respect to the mechanical interface between the total payload assembly and the Agena vehicle with the position of the total payload being changed for each instrument calibration.

2.0 Three targets are aligned to be coplanar within ± 5" of arc. The longitudinal axis of the vehicle (Z axis) is so positioned to form an angle of 105.00° ± 5" to the target plane for camera number one calibrations and an angle of 75.00° ± 5" to the target plane for camera number two calibrations.

2.1 One target, Target 1, is in the ZX plane (Nadir) imaging on the terrain format.

2.2 The second and third targets are at angles of 75.00° ± 5" from target one and are imaged on the horizon formats.

3.0 The indicated center of format of the main cameras is given by the intersection of a line through the center of mass of the central shrinkage marker drawn normal to the edge of format containing the shrinkage marker and a line parallel to the same edge located at a position half-way between the format edges.

4.0 The indicated principal points of the horizon cameras are the points of intersection of lines joining opposite fiducials.

5.0 Xvo and Yvo are the offsets of Target 1 from the indicated center of format as defined in paragraph 3.

6.0 Xs, Ys and Xt, Yt are the offsets of Targets 2 and 3 from the indicated principal points of the supply and take-up horizon cameras respectively.

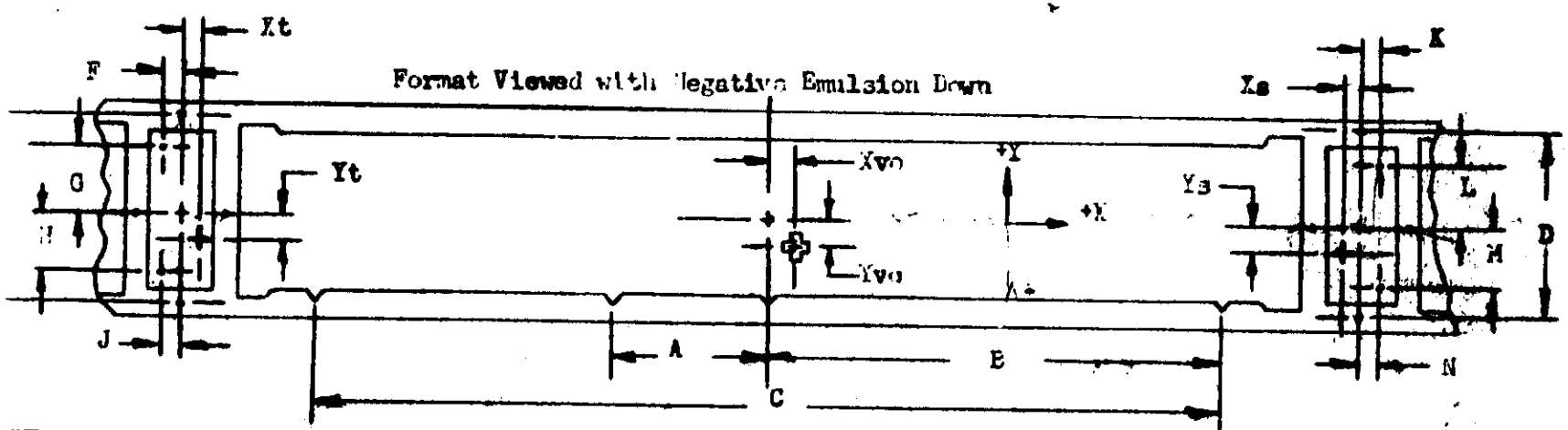
7.0 The indicated flight direction is the direction of vehicle travel during orbit. The forward edge of format is the edge opposite the shrinkage markers for camera number one and is the edge containing the shrinkage markers for camera number two.

8.0 Dimensions A, B, and C are the spacings of the shrinkage markers. Dimensions D and E are the spacings of the Y Axis fiducials. Techniques for exact measurement of these dimensions have not been developed. The figures quoted are measurements made on hand processed film without control of shrinkage.

9.0 The format dimensions are measured to the best estimate of format edge.

10.0 Measurement of the angle between the indicated axis of the main cameras and the line of intersection of the plane defined in Para. 2 on the format is not currently available. It is assumed to be zero, but is uncontrolled.

11.0 Measurement of the angle between the indicated axis of the horizon cameras and the line of intersection of the plane defined in Para. 2 on the format is made by positioning two targets for each horiozn format normal ± 5" of arc to the plane defined in Para. 2. Dimensions F, G, H, J, K, L, M and N are the offsets of these targets.



FORMAT DIMENSIONS: (MAIN CAMERAS)

[redacted]

Camera No. 68 Vehicle Motion → Scan Direction →

A	76.180	Xs	+.349	H	−24.159
B	355.500	Ys	−.081	J	−4.325
C	710.925	Xvo	−.252	K	+5.353
D	56.449	Yvo	−.522	L	+23.127
E	56.378	F	−4.382	M	−23.246
Xt	+.597	G	+23.728	N	+5.430
Yt	−.140				

Format Dimensions:

	Main Take-Up	Supply
Height	56.1 Not Available	
Width	755.2 Not Available	

Camera No. 69 Vehicle Motion → Scan Direction →

A	76.150	Xs	−.292	H	−23.460
B	355.516	Ys	+.415	J	−4.792
C	710.880	Xvo	+.832	K	+4.669
D	56.539	Yvo	+1.165	L	+26.328
E	56.493	F	−4.678	M	−23.434
Xt	+.312	G	+22.930	N	+4.595
Yt	−.197				

Format Dimensions:

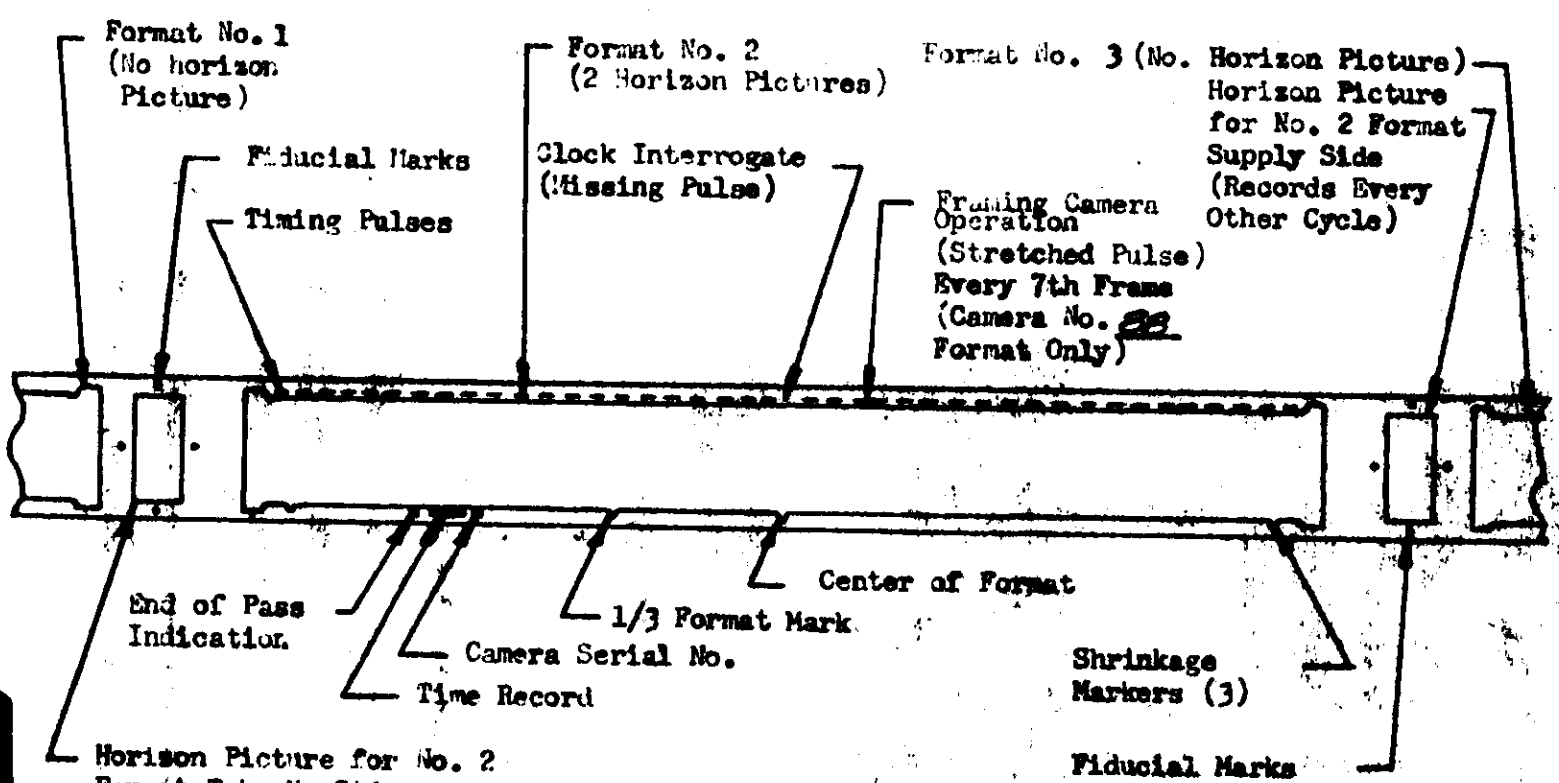
	Main Take-Up	Supply
Height	56.5 Not Available	
Width	756.6 Not Available	

Note: 1. All dimensions are in millimeters and are average dimensions of three formats.
2. Height of main format is taken at center of format.
3. Format sign convention

−X+Y	+X+Y
−X−Y	+X−Y

[redacted]

N-15
D



Camera No. 88

Viewed With Negative Emulsion Down

Film Transport ←

Scan →

Vehicle Motion ↓

Camera No. 89

Viewed With Negative Emulsion Down

Film Transport ←

Scan →

Vehicle Motion ↑

FORMAT LAYOUT (MAIN CAMERAS)

LENS DATA SUMMARY: (Framing Camera No. 94)

Lens Serial No. 2552610

Reseau Serial No. 94

Filter Type WRATTEN 21

Aperture F6.3

Exposure Time 1/250 Sec.

Equivalent Focal Length 38.39 MM Operational Focal Length 38.52 M

Resolution: 96.5 Lines/MM AWAR

Angle off axis	0	10	20	30	35
Resolution L/MM High Contrast	107 / 120	109 / 103	103 / 88	101 / 72	88 / 52
Resolution L/MM Low Contrast	68 / 64	73 / 76	68 / 61	67 / 49	64 / 39

Note: Resolution data read from SO 130 Film

Distortion:

Angle off Axis Deg.	325	330	340	350	0	10	20	30	35
Distortion Millimeters	.188	.139	.068	.019	.000	.016	.046	.096	.127

Perpendicularity of Reseau to Optical Axis .04 MM in 57 MM

Date of Stellar Calibration Not Known

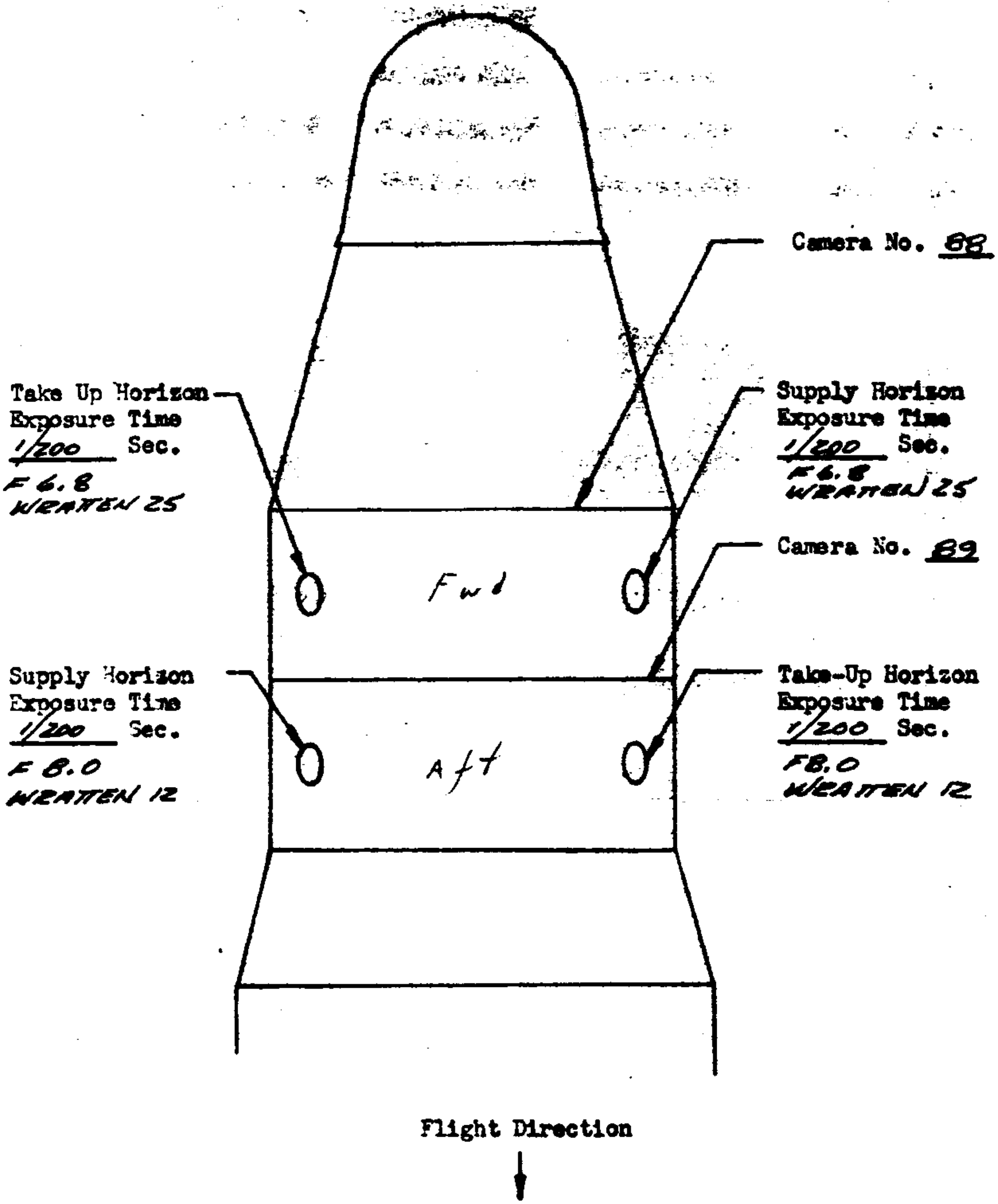
Location of Principal Point:

X +.005 MM

Y -.020 MM

Note: No Angular calibration between panoramic and Framing cameras for this System.

HORIZON LENS SETTINGS (Viewed from top of vehicle inflight)



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TOP SECRET

SYSTEM NO. KH-10
VEHICLE NO. 45
MISSION NO. 9021
CAMERA NOS. AFT

PRELIMINARY CLOCK CORRELATION:

Rev. No.	System Time	Clock Time	Delta Sys. Time	Delta Clock Time	Diff.
9	4772.693	299988.804			
31	83673.378	421288.384	121300.685	121300.580	+.015
40	44748.618	468764.629	47475.240	47475.245	+.005
47	84382.554	508398.564	39633.936	39633.935	-.001

[redacted]