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22 Pages
(Including Cover Sheet)

TOP SECRET
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CORONA "M" FLIGHT DATA BOOK

SYSTEM NO. M13

VEHICLE NO. 1154

MISSION NO. 9045

Prepared by: [redacted]

Checked by: [redacted]

Approved by: [redacted]

Approved by: [redacted]

Approved by: [redacted]
(SETD)

[redacted]

TOP SECRET
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SYSTEM NO. M13
VEHICLE NO. 1154
MISSION NO. 9043
CAMERA NOS. 96 & 97

[redacted]

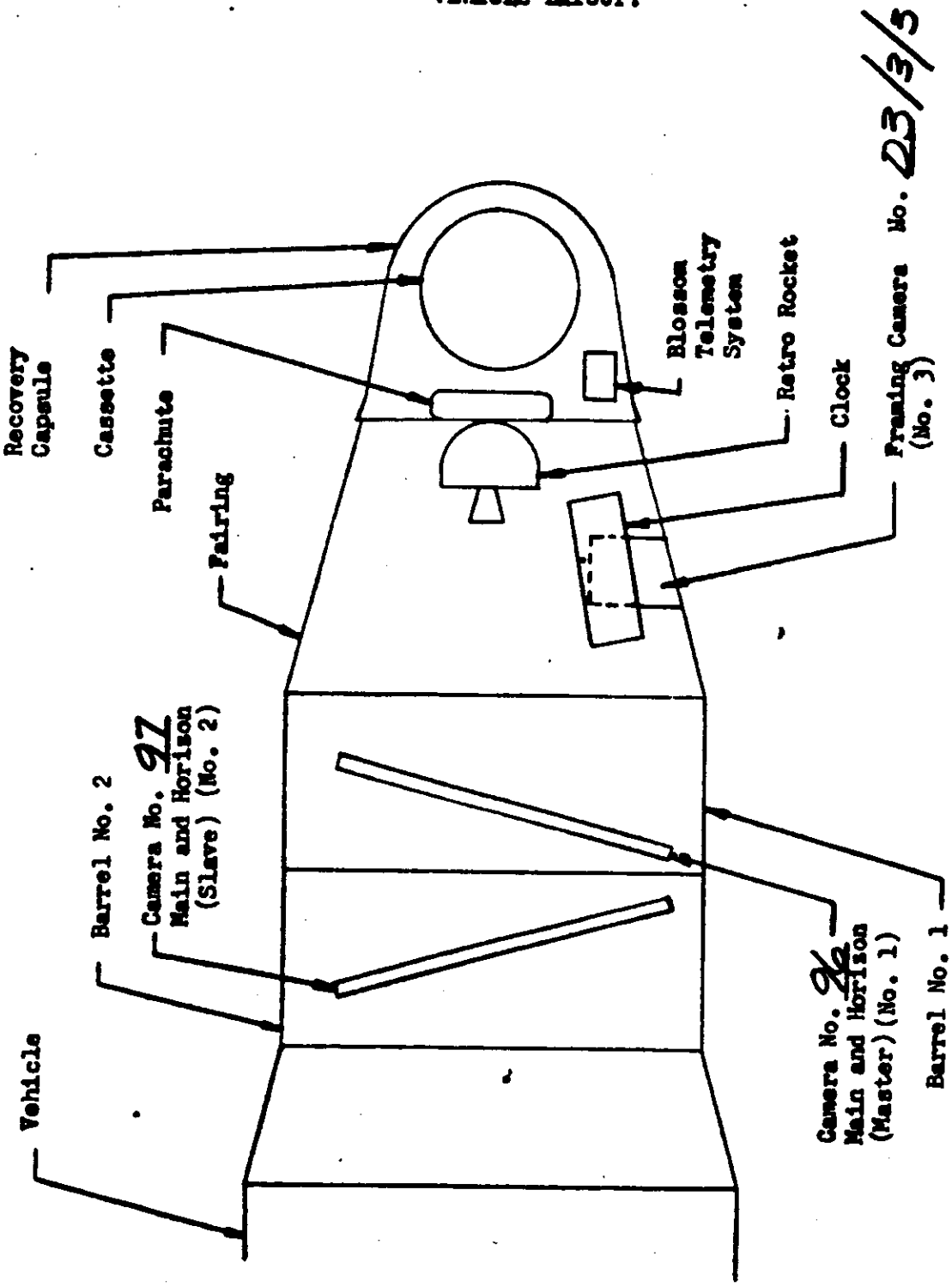
TABLE OF CONTENTS

[redacted]

SYSTEM NO. MK3
VEHICLE NO. 1134
MISSION NO. 9045
CAMERA NOS. 96 & 97

[redacted]

VEHICLE LAYOUT:



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SYSTEM NO. M13
VEHICLE NO. 1154
MISSION NO. 9043
CAMERA NOS. 96 & 97

[redacted]

GENERAL FLIGHT DATA:

Discoverer No. 52

Main Camera No. 1 Serial No. 96

Main Camera No. 2 Serial No. 97

Framing Camera Serial No. 03/3/3

Launch Date 9/29/62

Orbital Parameters: (Rev. 2)

Period 90.27 Min. Eccentricity .0134

Perigee 108 NM Perigee Latitude 9.45 Deg. N

Apogee 205 NM Inclination Angle 65.35 Deg. N

Recovery Revolution No. 49

Recovery Date 10/2/62

REMARKS:

[redacted]

[redacted]

[redacted]

TOP SECRET
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SYSTEM NO. M13
VEHICLE NO. 1134
MISSION NO. 9043
CAMERA NOS. 96 & 97

PRE-LAUNCH INFORMATION:

V/H Programmer Set On Step 5 At Launch

Main Camera Settings:

	Camera No. 96	Camera No. 97
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 6.8

Framing Camera Settings:

	Terrain Lens	Stellar Lens
Exposure Time	1/125 Sec.	1/2 SEC.
Aperture	F 4.5	F 1.9

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

Film:

	Camera No. 96	Camera No. 97	Framing Camera Terrain	Framing Camera Stellar
Type	3123 (SO132)	3123 (SO132)	SO 206	SO 130 SP 380-4400
Length	7800 Ft.	7800 Ft.	——— Ft.	——— Ft.
No. of Splices	2	1	NONE	NONE
Emulsion Date	35-5-6-62	33-18-62	1-9-2	1-4-9-2

TOP SECRET
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SYSTEM NO. M13
VEHICLE NO. 1154
MISSION NO. 9045
CAMERA NOS. 96 & 97
FRAMING CAMERA NO. D-3/8/5

[redacted] FOR DRAFT FOR COMMENT

PERFORMANCE ESTIMATE

PASS NO.	FRAMES CAMERA NO.		FEET CAMERA NO.		LATITUDE DEGREES		TIME GMT HR. MIN.	SOLAR ANGLE		EXP. TIME MILLISEC		RAMP NO.	INST ON SEC. UP RAMP	DUR.
	96	97	96	97	ON	OFF		ON	OFF	ON	OFF			
PRE-LAUNCH	161	149	424	393	-	-	-	-	-	-	-	-	-	-
1DX1	30	29	79	76	65	65		23	23	4.3	4.2	5	762	100
2DX1	49	49	129	129	63	58	0229	25	27	4.2	4.1	5	863	155
7DX1	173	173	456	456	64	41	1000	24	29	4.7	3.7	2	797	543
8DX1	112	112	295	295	61	46	1132	26	29	4.5	3.9	2	894	355
9AX1	9	8	23	21	38	41	1247	1	[redacted]	8.0	8.0	7	0	54
9DY1	43	42	113	110	53	46	1306	28	29	4.2	4.0	7	1084	132
14AX1	33	33	87	87	55	60	2024	11	14	5.6	5.2	4	264	138
14DY1	51	51	134	134	25	17	2046	27	25	3.5	3.3	7	1580	132
18DX1	48	48	126	126	61	54	0236	26	28	4.5	4.2	2	923	161
20DY1	74	73	195	192	54	43	0539	28	29	4.1	3.8	7	1095	221
21AY1	39	39	103	103	63	65	0660	17	19	5.4	5.0	7	525	157
21DY1	73	73	192	192	60	49	0707	26	29	4.4	4.0	7	960	232
21DY2	39	39	103	103	43	37	0713	29	29	3.8	3.6	7	1299	113
22DX1	100	99	264	261	51	48	0836	26	29	4.5	3.9	7	908	317
23DX1	160	160	422	422	64	43	1005	24	29	4.7	3.8	2	814	507
30AX1	41	41	108	108	53	62	2028	9	16	5.5	5.1	4	279	165
[redacted]	52	52	[redacted]		[redacted]		[redacted]	[redacted]	25	[redacted]	3.2	7	1406	132
31AY1	42	42	111	111	64	65	2203	[redacted]	19	6.4	5.0	7	540	167
32DX1	35	34	92	90	65	64	2336	23	24	5.0	4.7	2	710	129
32DY1	8	8	21	19	61	59	2340	26	[redacted]	[redacted]	4.8	2	441	32
[redacted]	51	50	[redacted]		64	59	0107	24	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	192
[redacted]	53	52	[redacted]		[redacted]		[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]		[redacted]		[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	52	51	[redacted]		[redacted]		[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

SYSTEM NO. M13
VEHICLE NO. 1154
MISSION NO. 9045
CAMERA NOS. 96 & 97
FRAMING CAMERA NO. D-2/3/3

[redacted]

PERFORMANCE ESTIMATE

PASS NO.	FRAMES CAMERA NO.		FEET CAMERA NO.		LATITUDE DEGREES		TIME ON HR. MIN.	SOLAR ANGLE		EXP. TIME MILLISEC		RAMP NO.	INST ON SEC. UP RAMP	DUR.
	96	97	96	97	ON	OFF		ON	OFF	ON	OFF			
36 DX1	79	78	286	286	53	41	0543	28	29	4.1	3.7	2	1127	233
37 AX1	30	30	79	79	65	65	0705	19	19	5.2	5.0	2	599	116
37 DX1	72	72	190	190	60	50	0711	26	29	4.3	3.9	2	983	227
37 DX2	115	115	303	303	43	25	0717	29	27	3.8	3.4	2	1326	310
38 DX1	100	100	264	264	62	48	0840	25	29	4.5	3.9	2	923	317
38 DX2	35	35	92	92	46	41	0846	29	29	3.8	3.7	2	1291	100
39 DX1	182	182	480	480	63	38	1010	25	29	4.6	3.6	2	865	545
40 DX1	94	94	248	248	60	46	1142	26	29	4.3	3.8	2	991	289
40 DX2	33	33	87	87	43	39	1148	29	29	3.7	3.6	2	1315	96
41 AE	9	8	23	21	38	40	1256	1	2	8.1	8.1	2	0	54
41 DX1	33	32	87	84	54	49	1314	28	29	4.3	4.2	2	1076	106
45 DX1	64	64	169	169	26	16	1924	27	25	3.2	3.1	4	1609	156
46 AX1	43	42	113	111	65	60	2032	11	14	5.4	4.9	4	321	165
46 DX1	52	52	137	137	25	18	2054	27	25	3.4	3.2	2	1634	132
47 AX1	45	45	119	119	64	65	2207	18	19	5.3	4.8	2	613	173
49 DX1	36	36	95	95	63	59	2339	25	27	4.6	4.3	2	885	124

SYSTEM NO. M13
VEHICLE NO. 1154
MISSION NO. 9045
CAMERA NOS. 96 & 97
FRAMING CAMERA NO. 09/3/2

PERFORMANCE ESTIMATE [redacted]

PASS NO.	FRAMES CAMERA		FEET CAMERA	
	TERRAIN	STELLAR	TERRAIN	STELLAR
Pre-Launch	23	23	4.6	2.3
1DX1	4	4	.8	.4
2DX1	7	7	1.4	.7
7DX1	25	25	4.9	2.5
8DX1	16	16	3.2	1.6
9AE	1	1	.2	.1
9DY1	6	6	1.2	.6
14AX1	5	5	1.0	.5
14DY1	7	7	1.4	.7
18DX1	7	7	1.4	.7
20DY1	11	11	2.2	1.1
21AY1	5	5	1.0	.5
21DY1	11	11	2.2	1.1
21DY2	5	5	1.0	.5
22DY1	15	15	3.0	1.5
23DX1	12	12	2.4	1.2
30AX1	6	6	1.2	.6
30DY1	8	8	[redacted]	[redacted]
31AY1	6	6	[redacted]	[redacted]
32DX1	5	5	[redacted]	[redacted]
32DX2	1	1	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

PASS NO.	FRAMES CAMERA		FEET CAMERA	
	TERRAIN	STELLAR	TERRAIN	STELLAR
36AX1	7	7	1.4	.7
36DX1	11	11	2.2	1.1
37AX1	5	5	1.0	.5
37DX1	10	10	2.0	1.0
37DX2	16	16	3.2	1.6
38DX1	15	15	3.0	1.5
38DX2	5	5	1.0	.5
39DX1	26	26	5.2	2.6
40DX1	13	13	2.6	1.3
40DX2	5	5	1.0	.5
41AE	1	1	.2	.1
41DX1	5	5	1.0	.5
45DX1	9	9	1.8	.9
46AX1	6	6	1.2	.6
46DX1	7	7	1.4	.7
47AX1	7	7	1.4	.7
49DX1	5	5	1.0	.5
[redacted]				
[redacted]				
[redacted]				
[redacted]				

[redacted]

SYSTEM NO. M13
VEHICLE NO. 1154
MISSION NO. 9045
CAMERA NOS. 96 & 97

[redacted]

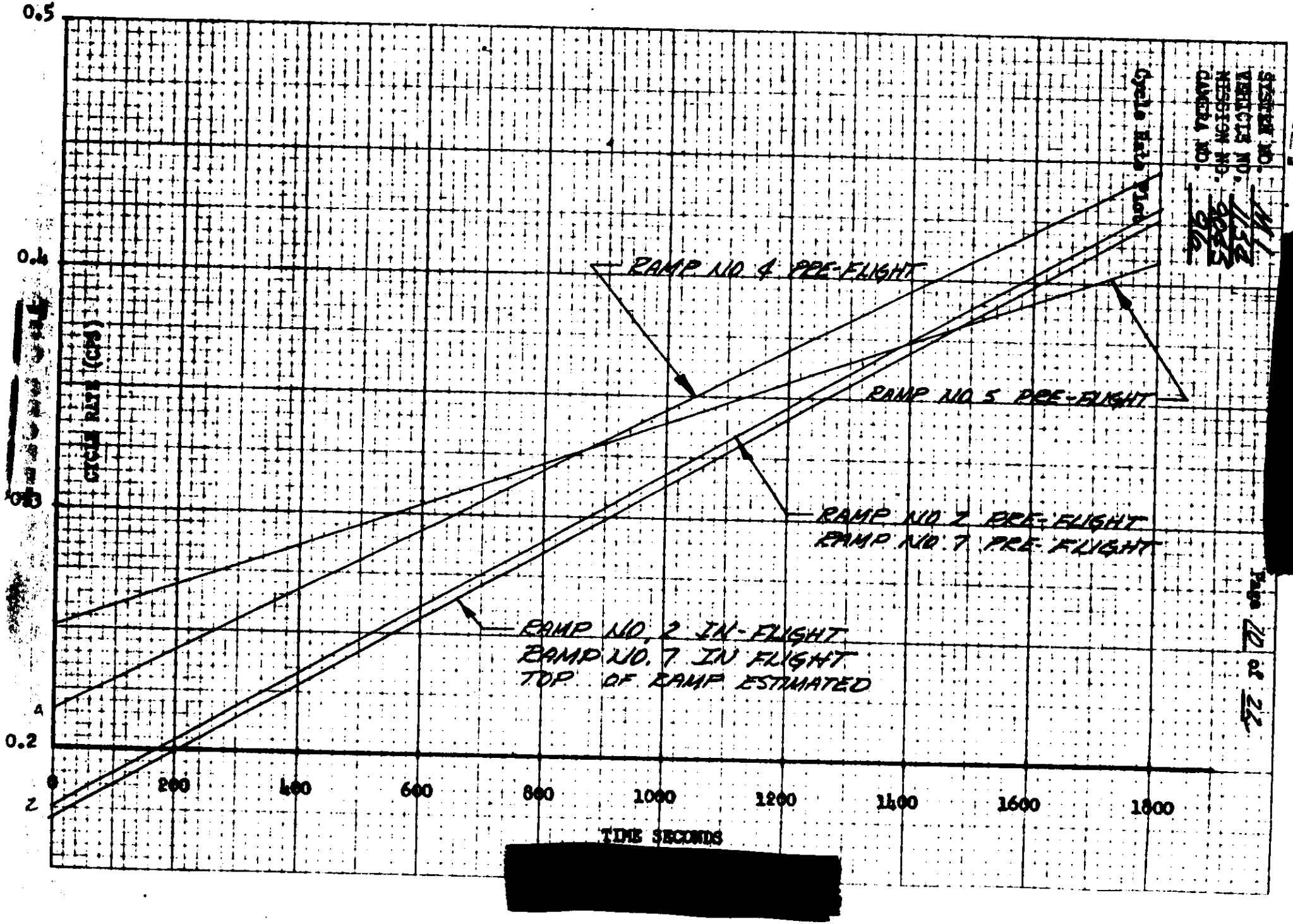
PRE-FLIGHT CYCLE PERIOD: (CAMERA NO. 96)

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	5.69	.015	.356	1.104	26.502	7.55
2 END	2.32	.036	.873	2.708	64.998	3.08
4 START	4.59	.018	.441	1.369	32.853	6.09
4 END	2.24	.038	.904	2.805	67.319	2.97
5 START	3.97	.021	.510	1.583	37.983	5.27
5 END	2.44	.035	.830	2.575	61.801	3.24
7 START	5.67	.015	.357	1.108	26.595	7.52
7 END	2.33	.036	.873	2.708	64.998	3.08

IN-FLIGHT CYCLE PERIOD: (CAMERA NO. 96)

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	7 START	5.84	.014	.347	1.076	25.821	7.75
41	2 START	5.79	.015	.350	1.085	26.044	7.68

[redacted]



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SYSTEM NO. M 13
VEHICLE NO. 1154
MISSION NO. 9043
CAMERA NOS. 96 & 97

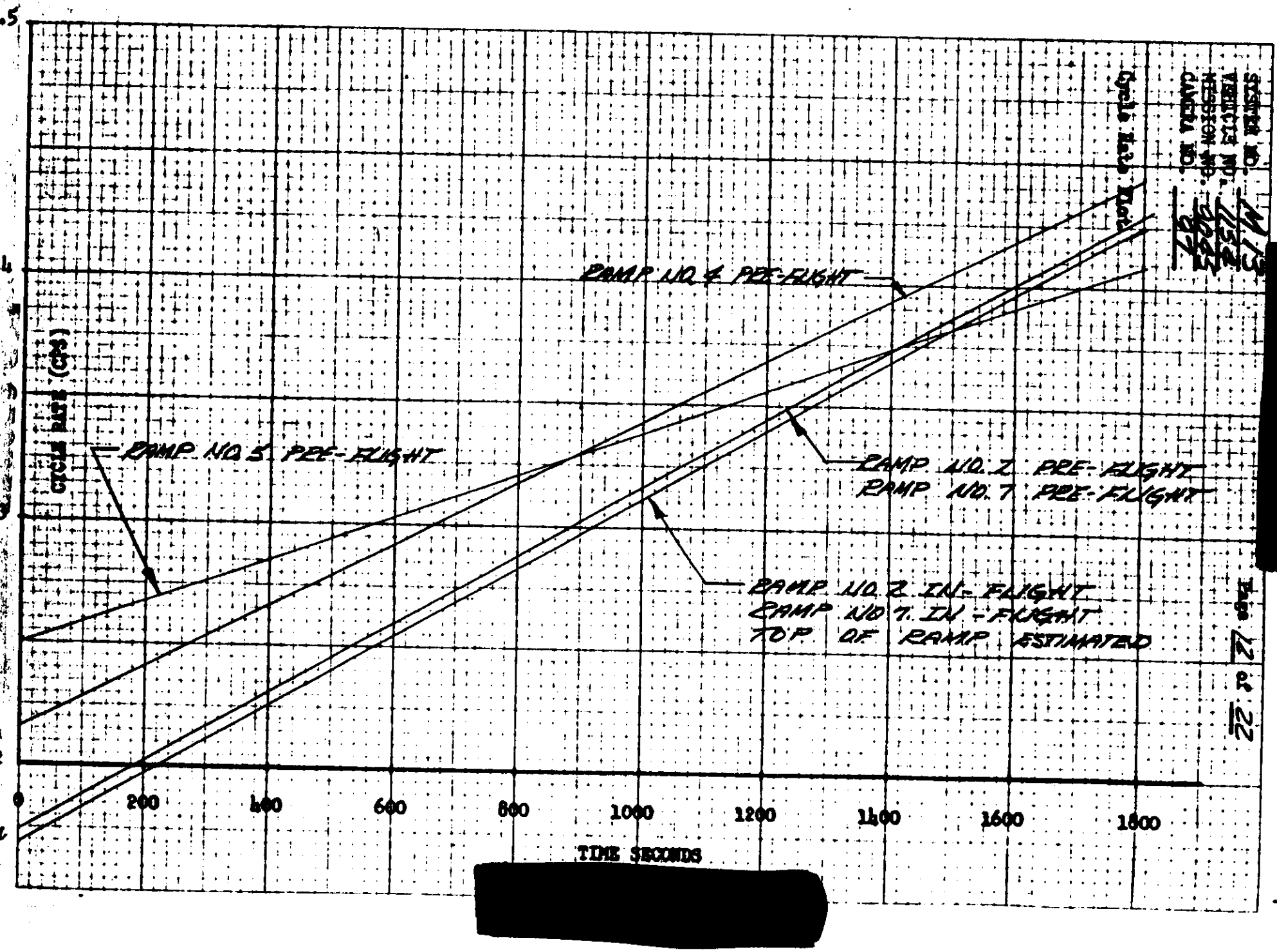
PRE-FLIGHT CYCLE PERIOD: (CAMERA NO. 97)

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	5.96	.015	.352	1.091	26.180	7.64
2 END	2.33	.036	.869	2.697	64.719	3.09
4 START	4.63	.018	.437	1.357	32.569	6.14
4 END	2.25	.037	.900	2.792	67.020	2.98
5 START	3.99	.021	.508	1.575	37.793	5.29
5 END	2.45	.034	.827	2.565	61.549	3.25
7 START	5.73	.015	.353	1.097	26.317	7.60
7 END	2.33	.036	.869	2.697	64.719	3.09

IN-FLIGHT CYCLE PERIOD: (CAMERA NO. 97)

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	7 START	5.97	.014	.339	1.052	25.259	7.92
41	2 START	5.93	.014	.342	1.060	25.429	7.87

[redacted]


RAMP NO 4 PRE-FLIGHT
RAMP NO 5 PRE-FLIGHT
RAMP NO. 2 PRE-FLIGHT
RAMP NO. 7 PRE-FLIGHT
RAMP NO. 2 IN-FLIGHT
RAMP NO 7. IN-FLIGHT
TOP OF RAMP ESTIMATED
TIME SECONDS
0
200
400
600
800
1000
1200
1400
1600
1800
.5
.4
.3
.2

[redacted]

SYSTEM NO. M13
VEHICLE NO. 1134
MISSION NO. 9043
CAMERA NOS. 96 & 97

[redacted]

LENS DATA SUMMARY: (Main Camera No. 96)

Lens Serial No. 0322435

Filter Type WRATTEN 21

Equivalent Operational Focal Length 609.577 MM

Resolution:

Static:

	Lines/MM	Film Type	Target Contrast
Bench Test	211	SO243	HIGH
Other			

Dynamic:

Itek Pre-Vibration	160	SO132	HIGH
Itek Post Vibration	155	SO132	HIGH
AP	173	SO132	HIGH
AP	95	SO132	LOW
Other			

Note: Itek Post Vibration Resolution of 155 lines/MM Reported In Message No. [redacted] dated _____

Distortion - Positive (Pincushion)

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

[redacted]

[redacted]

[redacted]

LENS DATA SUMMARY: (Horizon Cameras for Main Camera No. 96)

	Take-Up	Supply
Lens Serial No.	807527	807555
Exposure Time	1/200 Sec.	1/200 Sec.
Filter Type	WRATTEN 25	WRATTEN 25
Aperture	F6.8	F6.8
Operational Focal Length	89.1 MM	89.00 MM
Radial Distortion:		
10° off Axis	.004 MM	.001 MM
20° off Axis	.047 MM	.025 MM
Tangential Distortion (Maximum Vector)	.005 MM	.002 MM

Resolution:

Angle off Axis Deg.	0	5	10	15	20	25	27.5	0	5	10	15	20	25	22.5
Radial Resolution	51	49	37	29	30	31	30	51	44	38	34	34	30	29
Tangential Resolution	51	44	37	32	32	27	19	51	44	36	34	29	29	19

35.6 Lines/MM Avg. 35.9 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]

[redacted]

LENS DATA SUMMARY: (Main Camera No. 97)

Lens Serial No. 0402435

Filter Type WRATTEN 21

Equivalent Operational Focal Length 609.602 MM

Resolution:

Static:

	Lines/MM	Film Type	Target Contrast
Bench Test	245	SO243	HIGH
Other			

Dynamic:

Itek Pre-Vibration	160	SO132	HIGH
Itek Post Vibration	171	SO132	HIGH
AP	166.6	SO132	HIGH
AP	89.8	SO132	LOW
Other			

Note: Itek Post Vibration Resolution of 171 lines/MM Reported In Message No. [redacted] dated ____

Distortion - Positive (Pincushion)

Angle Off Axis Deg.	3	2	1	0	359	358	357		
Distortion Millimeters	.004	.002	.000	.000	.001	.002	.005		

[redacted]

SYSTEM NO. M13 [redacted] Page 16 of 22
VEHICLE NO. 1154
MISSION NO. 9035
CAMERA NOS. 96 97

[redacted]

LENS DATA SUMMARY: (Horizon Cameras for Main Camera No. 97)

	Take-Up	Supply
Lens Serial No.	807532	807567
Exposure Time	1/200 Sec.	1/200 Sec.
Filter Type	WRATTEN 25	WRATTEN 25
Aperture	F6.8	F6.8
Operational Focal Length	88.95 MM	89.2 MM
Radial Distortion:		
10° off Axis	.007 MM	.010 MM
20° off Axis	.053 MM	.039 MM
Tangential Distortion (Maximum Vector)	.003 MM	.008 MM

Resolution:

Angle off Axis Deg.	0	5	10	15	20	25	27.5	0	5	10	15	20	25	27.5
Radial Resolution	51	49	35	27	29	27	30	56	44	35	30	32	31	27
Tangential Resolution	51	47	39	34	31	27	19	51	44	37	32	34	29	14

35.4 Lines/MM Avg. 35.3 Lines/MM Avg.

Note:

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

[redacted]

[redacted]

[redacted]

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 XY 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 Xu, Yu 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 dfined 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 horizon 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.

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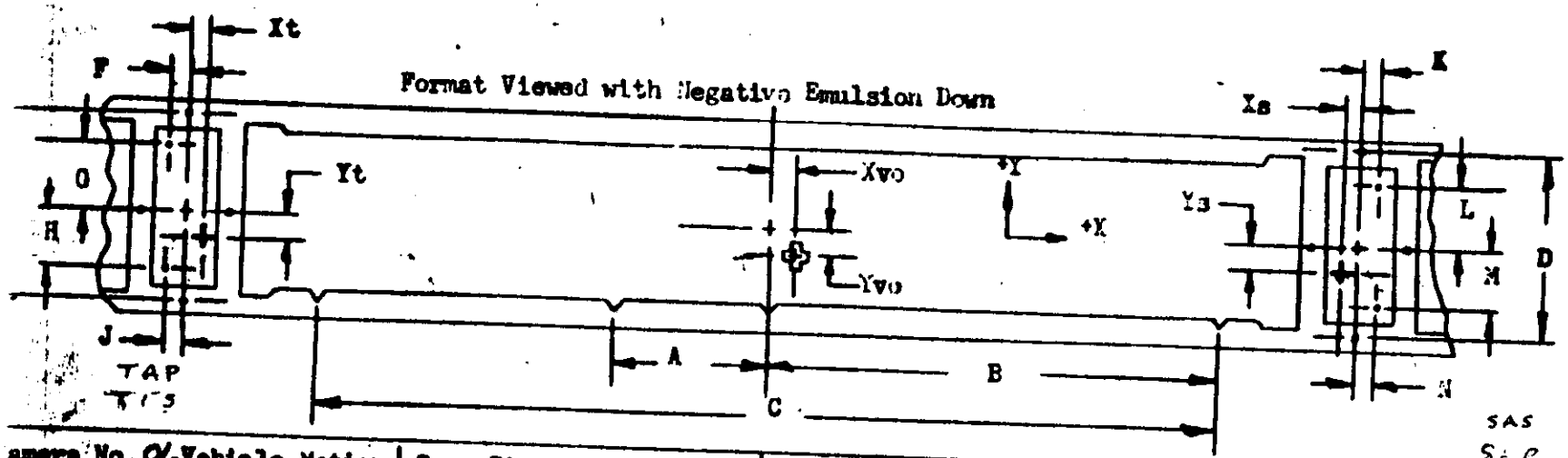


SYSTEM NO. 113
VEHICLE NO. 2132
MISSION NO. 9025
CAMERA NOS. 96 & 97

FORMAT DIMENSIONS (MAIN CAMERAS)

Camera No. 96 Vehicle Motion → Scan Direction →

A	76.105	Xs	-.550	H	-25.022
B	355.230	Ys	+.179	J	-4.190
C	710.350	Xvo	-.505	K	+4.225
D	56.513	Yvo	+.038	L	+23.457
E	56.454	F	-4.864	M	-22.994
Xt	+.264	G	+22.725	N	+4.519
Yt	-1.049				

Format Dimensions:

	Main	Take-Up	Supply
Height	55.7		
Width	754.1		

Camera No. 97 Vehicle Motion → Scan Direction →

A	76.070	Xs	-.394	H	-23.363
B	355.090	Ys	+.199	J	-4.282
C	710.050	Xvo	+.455	K	+4.623
D	56.473	Yvo	+.385	L	+24.094
E	56.454	F	-4.100	M	-23.652
Xt	+.715	G	+23.023	N	+4.737
Yt	-.143				

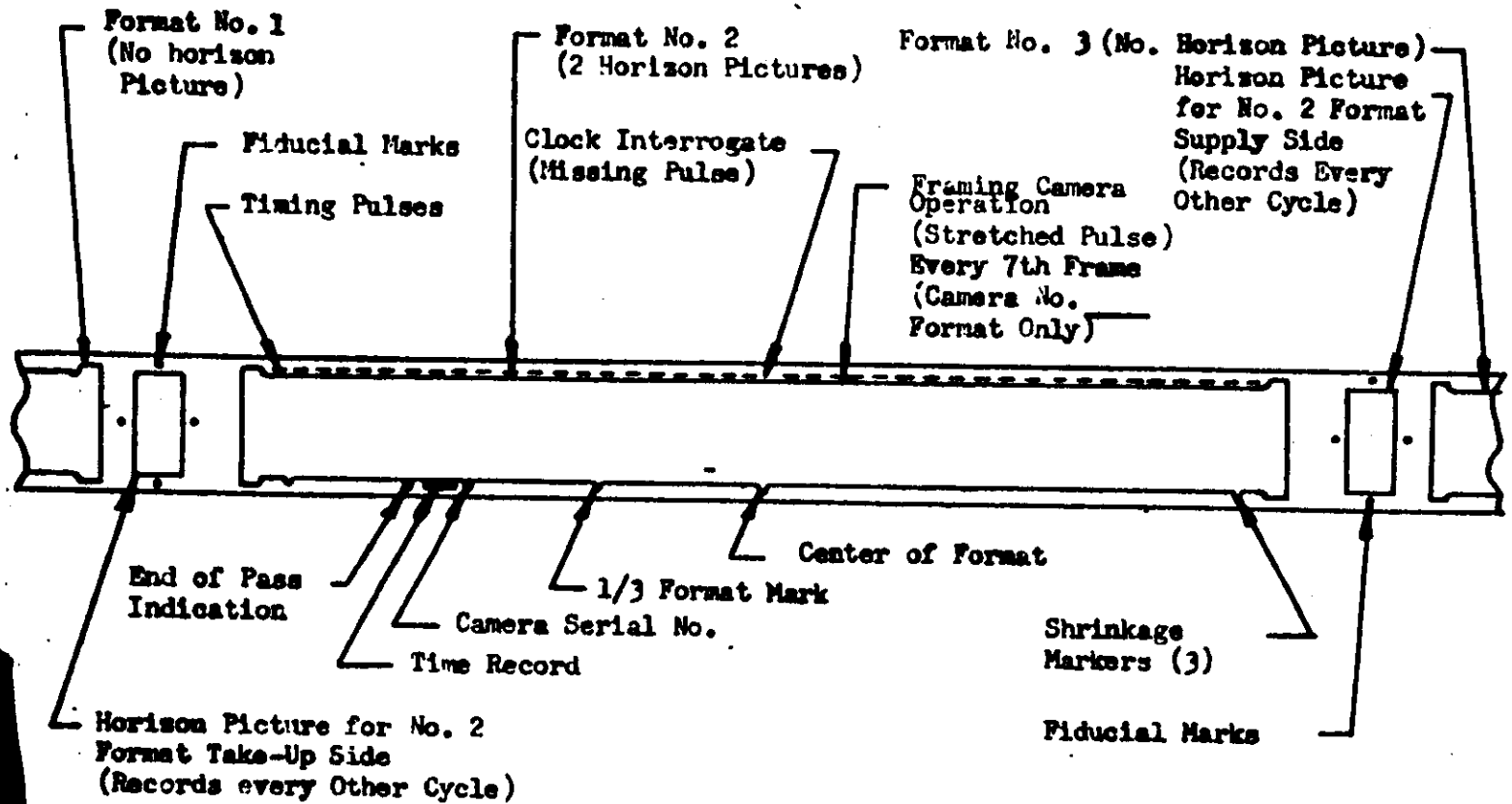
Format Dimensions:

	Main	Take-Up	Supply
Height	56.1		
Width	753.4		

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]



Camera No. 96

Viewed With Negative Emulsion Down

Film Transport ←

Scan →

Vehicle Motion ↓

Camera No. 97

Viewed With Negative Emulsion Down

Film Transport ←

Scan →

Vehicle Motion ↑

FORMAT LAYOUT: (MAIN CAMERAS)

SYSTEM NO. M/S
VEHICLE NO. 133
MISSION NO. 9013
CAMERA NOS. 96 & 97

[redacted]

SYSTEM NO. M13
VEHICLE NO. 434
MISSION NO. 9003
CAMERA NOS. 96 & 97

LENS DATA SUMMARY: (Framing Camera No. 03) (Terrain Lens)

Lens Serial No. 809671

Reseau Serial No. 3

Filter Type WRATTEN 21

Aperture F4.5

Exposure Time 1/125 Sec.

Equivalent Focal Length 38.15 MM O.F.L. 38.22 MM

Resolution: 90 Lines/MM AWAR

Angle off axis	0	10	20	30	35
Resolution L/MM High Contrast	118	94	92	75	65
Resolution L/MM Low Contrast					

Note: Resolution data read from SO 130 Film

Distortion:

Angle off Axis Deg.	0	10	20	30	35				
Distortion Millimeters	.000	.020	.065	.142	.195				

Perpendicularity of Reseau to Optical Axis .050 MM IN 57

Date of Stellar Calibration Not Available

Knee Calibration 89 Deg. 36 Min. 12.8 Sec.

Location Of Principal Point:

X -.029 MM

Y +.014 MM

FOR CRAFT
FOR CLOSE

[redacted]

SYSTEM NO. M13
VEHICLE NO. 1134
MISSION NO. 9043
CAMERA NOS. 96 & 97

LENS DATA SUMMARY: (Framing Camera No. 03) (Stellar Lens)

Lens Serial No. 8002B

Reseau Serial No. 3

Filter Type NONE

Aperture F 1.9

Exposure Time 1/2 Sec.

Equivalent Focal Length 83.76 MM O.F.L. 83.86 MM

Resolution: N.A. Lines/MM AWAR

Angle off axis					
Resolution L/MM High Contrast					
Resolution L/MM Low Contrast					

Note: Resolution data read from ____ Film

Distortion:

Angle off Axis Deg.	0	2.5	5	7.5					
Distortion Millimeters	.000	.000	.002	.006					

Perpendicularity of Reseau to Optical Axis .022 W 35 MM

Date of Stellar Calibration NOT AVAILABLE

Knee Calibration 89 DEG. 36 MIN. 12.8 SEC

Location Of Principal Point:

X +.036 MM

Y +.060 MM

TOP SECRET

[redacted]

[redacted]

SYSTEM NO. M13
VEHICLE NO. 1154
MISSION NO. 9045
CAMERA NOS. 96 & 97

PRELIMINARY CLOCK CORRELATION:

Rev. No.	System Time	Clock Time	Delta Sys. Time	Delta Clock Time	Diff.
9	46081.725	214154.006			
25	46402.138	300874.871	86720.863	86720.865	+.002
41	46594.331	387467.076	86592.193	86592.195	+.002

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