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Pages
(Including Cover Sheet)

CORONA "M" FLIGHT DATA BOOK

SYSTEM NO. M4

VEHICLE NO. 1128

MISSION NO. 9035

Prepared by: [redacted]

Checked by: [redacted]

Approved by: [redacted]
(Engineering Manager)

Approved by: [redacted]
(Project Manager)

Approved by: [redacted]
(SPTD)

SYSTEM NO. M4
VEHICLE NO. 1128
MISSION NO. 9035
CAMERA NOS. 76 & 77

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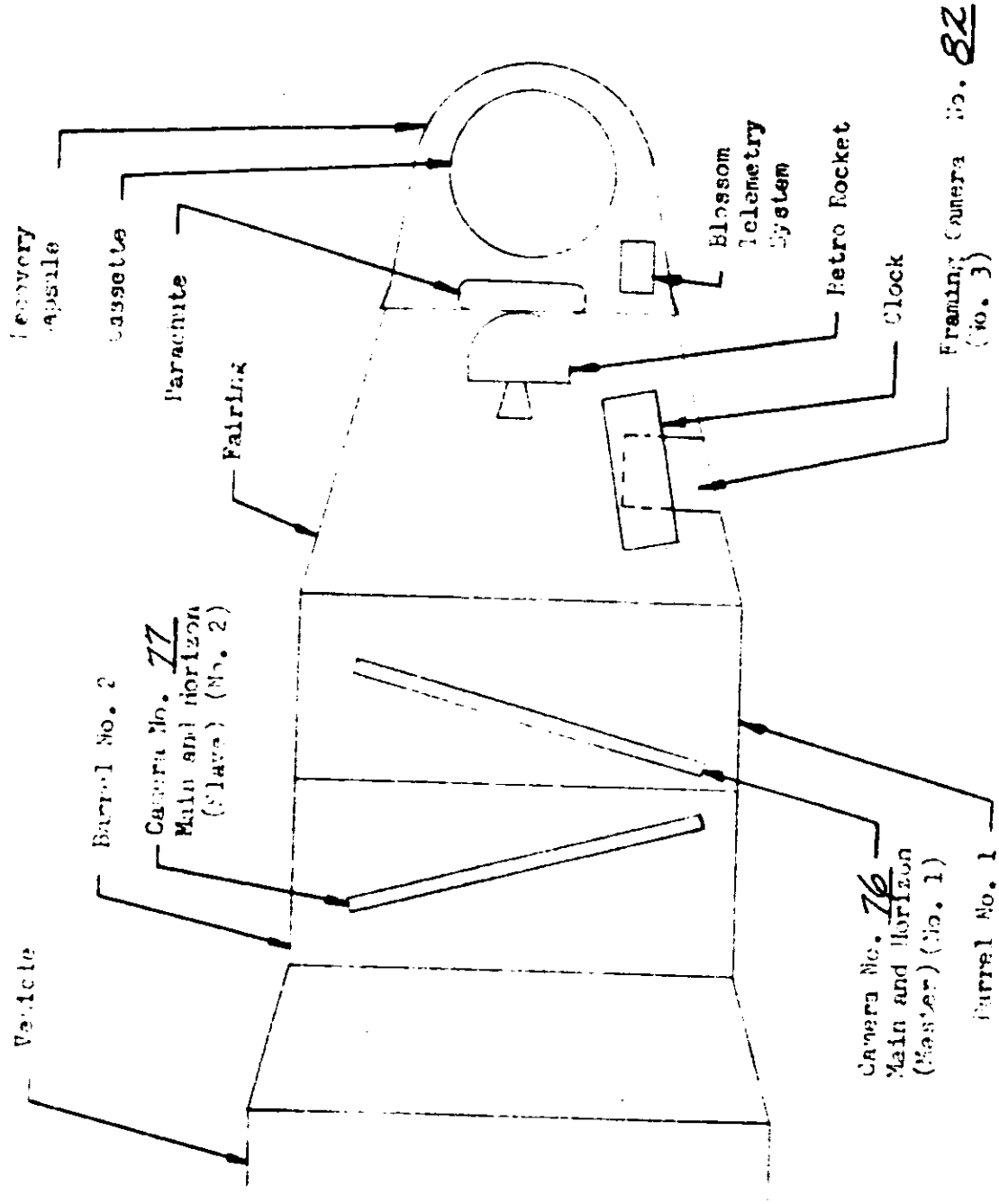
SYSTEM NO. M4
VEHICLE NO. 112B
MISSION NO. 9033
CAMERA NOS. 76 & 77

VEHICLE LAYOUT:



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SYSTEM NO. M4
VEHICLE NO. 1128
MISSION NO. 9035
CAMERA NOS. 76 & 77

GENERAL FLIGHT DATA:

Discoverer No. 42

Main Camera No. 1 Serial No. 76

Main Camera No. 2 Serial No. 77

Framing Camera Serial No. 82

Launch Date 5/29/62

Orbital Parameters: (Rev. 11)

Period 90.02 Min. Eccentricity 0.0124

Perigee 104 NM Perigee Latitude .68 Deg. N

Apogee 192 NM Inclination Angle 74.15 Deg. N

Recovery Revolution No. 49

Recovery Date 6/1/62

REMARKS:

[redacted]

[redacted]

SYSTEM NO. M4
VEHICLE NO. 1128
MISSION NO. 9035
CAMERA NOS. 76 & 77

PRE-LAUNCH INFORMATION:

V/H Programmer Setting Step 3 At Launch

Main Camera Settings.

	Camera No. 76	Camera No. 77
Main Optics Slit Width	.200 in.	.200 in.
Horizon Scene Exposure Time	1/50 Sec.	1/50 Sec.
Horizon Scene Aperture	F8.0 TAKE UP F6.8 SUPPLY	F8.0 TAKE UP F6.8 SUPPLY

Earth Camera Settings:

Exposure Time 1/250 Sec.

Aperture F6,3

Earth Tracking Camera Frame No. 7
Camera No. 1 Frames

Film:

	Camera No. 76	Camera No. 77	Framing Camera
Type	50132-(J23)	50132(J23)	50130
Length	7800 Ft.	7800 Ft.	135 Ft.
No. of Perforations	2	2	NONE
Marking Data	27-2-5-2	27-2-3-5-2	15-2-4-2

[redacted]

[redacted]

SYSTEM NO. M4
VEHICLE NO. 1128
MISSION NO. [illegible]
CAMERA NOS. 76 77
[illegible] CAMERA NO. 82

[illegible]

PERFORMANCE ESTIMATE

Pass No.	Frames Camera No. 76	Frames Camera No. 77	Feet Camera No. 76	Feet Camera No. 77	Latitude Degrees On	Latitude Degrees Off	Time On Hr. Min.	Dur Sec.	Solar Angle On	Solar Angle Off	Exp. Time Millisec On	Exp. Time Millisec Off	Ramp	Instr [illegible]
PRE-LAUNCH	[illegible]	[illegible]	[illegible]	732	—	—	— —	—	—	—	—	—	—	—
[illegible]	[illegible]	22	58	58	46	51	30/0110	167	9	13	6.5	6.2	3	75
[illegible]	[illegible]	[illegible]	75	75	55	61	[illegible]	128	16	21	[illegible]	5.6	3	[illegible]
[illegible]	23	23	60	60	[illegible]	55	0134	66	45	45	[illegible]	[illegible]	3	1255
[illegible]	64	[illegible]	174	[illegible]	46	62	0240	[illegible]	9	21	6.4	5.5	3	[illegible]
[illegible]	34	34	90	90	60	62	0256	[illegible]	42	43	4.0	3.9	3	1072
[illegible]	47	47	124	124	58	[illegible]	0414	194	19	27	5.8	5.3	8	[illegible]
[illegible]	[illegible]	60	[illegible]	[illegible]	51	41	0428	171	43	45	3.9	3.7	8	1131
[illegible]	[illegible]	46	[illegible]	[illegible]	71	74	0549	75	29	33	5.0	4.6	8	[illegible]
[illegible]	50	50	132	132	54	45	0730	140	45	44	3.8	3.6	8	1259
[illegible]	42	42	121	121	43	44	[illegible]	122	43	41	3.6	3.4	8	1449
[illegible]	42	41	[illegible]	[illegible]	58	57	0859	123	44	45	3.9	3.7	8	1166
[illegible]	[illegible]	153	414	[illegible]	61	44	1025	[illegible]	41	43	[illegible]	3.2	3	1041
[illegible]	[illegible]	[illegible]	277	[illegible]	67	49	1156	[illegible]	41	45	4.2	3.8	8	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	35	38	1308	48	1	3	7.1	7.0	8	—
[illegible]	76	75	[illegible]	[illegible]	59	46	1324	[illegible]	44	44	3.7	3.4	8	[illegible]
[illegible]	55	54	45	42	42	56	[illegible]	[illegible]	5	16	6.0	5.8	3	230
[illegible]	18	18	47	47	[illegible]	45	2209	[illegible]	3	9	6.6	[illegible]	3	51
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	49	[illegible]	2212	152	12	17	6.1	[illegible]	3	[illegible]
[illegible]	[illegible]	—	[illegible]	[illegible]	40	[illegible]	[illegible]	46	43	40	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7	10	[illegible]	[illegible]	[illegible]	[illegible]

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[redacted]

SYSTEM NO. M4
VEHICLE NO. 1129
MISSION NO. [illegible]
CAMERA NOS. 76, 77
[illegible] CAMERA NO. [illegible]

PERFORMANCE ESTIMATE

Pass No.	Frames Camera No. 76	Frames Camera No. 77		Last Camera No. 76	Last Camera No. 77		Latitude Degrees On	Latitude Degrees Off	Time On Hr. Min.	Dur Sec.	Solar Angle On	Solar Angle Off	Exp. Time Millisec On	Exp. Time Millisec Off	Ramp No.	Instr. [illegible] Seq [illegible] Ramp
[illegible]	42?	42		115?	11[illegible]		51	60	2345?	170	13	20	5.0?	5.0	[illegible]	40[illegible]
[illegible]	5[illegible]	56?		132	132		54	64?	3/0415?	20[illegible]	15	23	5.9?	5.9?	[illegible]	[illegible]
[illegible]	3[illegible]	40?		79	79		57	54	042[illegible]	90?	44	45	3.9	3.7	[illegible]	2[illegible]
[illegible]	34?	34		9[illegible]	[illegible]		73?	[illegible]	0550	121	32	33	4.7	4.5	[illegible]	[illegible]
[illegible]	47	[illegible]		[illegible]	24		[illegible]	47	0[illegible]	13[illegible]	45	44	3.7	3.6?	[illegible]	1314?
[illegible]	44	44		[illegible]	[illegible]		55	48	0730	124	45	44	3.[illegible]	3.6	[illegible]	12[illegible]
[illegible]	41	40		128?	1[illegible]		42?	36	0733?	106	43	41	3.5?	3.4	9?	[illegible]
[illegible]	42?	42		115?	11[illegible]		58	51	0858	123	44	45	3.[illegible]	3.7	9?	[illegible]
[illegible]	45?	4[illegible]		1[illegible]	1[illegible]		45	31?	0902?	120	43	42	3.6?	3.4	5?	1445?
[illegible]	[illegible]	[illegible]		216	213?		65	53	1026	23[illegible]	42	45	4.0	3.7	[illegible]	[illegible]16
[illegible]	45?	45		1[illegible]	[illegible]		50?	43?	[illegible]	12?	45	43	3.6	3.5	[illegible]	13[illegible]
[illegible]	52	53?		[illegible]	[illegible]		52	46	1325?	137	45	44	3.7	3.5	[illegible]	1545?
[illegible]	24	24		[illegible]	[illegible]		56	61	19[illegible]	1[illegible]	17	21	5.6	5.[illegible]	[illegible]	365?
[illegible]	3[illegible]	3[illegible]		32?	79?		55?	[illegible]	2[illegible]4	135	12	17	6.0	5.5	[illegible]	258?
[illegible]	24?	[illegible]		[illegible]	[illegible]		[illegible]	44	[illegible]07?	164	1	9	[illegible]	6.2	5	3[illegible]
[illegible]	27?	27?		71?	[illegible]		56	[illegible]	22 11	119	12	17	6.0	5.[illegible]	[illegible]	[illegible]
[illegible]	[illegible]			47?	47		37?	35?	23 3[illegible]	46	42	41	3.4	3.3?	[illegible]	1[illegible]4
[illegible]	[illegible]	2[illegible]		74	7[illegible]		54	6[illegible]	23 42	120	15	20	5.7	5.3?	5?	35[illegible]
[illegible]	[illegible]	[illegible]		9[illegible]	[illegible]		42	[illegible]	[illegible]	[illegible]	7	21	6.1?	5.[illegible]	5	1[illegible]
[illegible]	[illegible]	42?		[illegible]	[illegible]		6[illegible]	[illegible]	[illegible]24	12[illegible]	41	43?	4.[illegible]	3.9?	3	1[illegible]
[illegible]	[illegible]	2		[illegible]	[illegible]		45?	[illegible]	[illegible]	4[illegible]	9	[illegible]	[illegible]	4.[illegible]		[illegible]

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[redacted]

[illegible] No. 44
[illegible] No. [illegible]
[illegible] No. [illegible]
[illegible] No. [illegible]
[illegible] No. [illegible]

PERFORMANCE ESTIMATE

Pass No.	Frames Camera No.		Last Camera No.		Latitude Degrees On	Latitude Degrees Off	Time On Hr. Min.	Dur Sec.	Solar Angle On	Solar Angle Off	Exp. Time Millisec On	Exp. Time Millisec Off	Ramp	Instr. [illegible] Sec [illegible]
[illegible]	45	45	66	66	59	54?	01/2257	74	44	45	3.8	3.7	5	.23[illegible]
[illegible]	78	78?	21[illegible]	21[illegible]	5	46	1553?	207	45	42	3.6	3.4	5	[illegible]
[illegible]	23?	[illegible]	[illegible]	63	74	7[illegible]	0720?	130?	35	39	4.4	4.2	5	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	53?	43?	0728	103	45	44	3.7	3.6?	5	[illegible]
[illegible]	41	41	105?	105?	42	3[illegible]	[illegible]	106	43	41	3.5	3.4	5	1524?
[illegible]	24?	[illegible]	5[illegible]	5[illegible]	17?	23?	[illegible] 54	112	42	43	4.1	3.9	5	10[illegible]
[illegible]		[illegible]	[illegible]	[illegible]	57?	[illegible]	[illegible] 51	238	45	42	3.6	3.4	5	.279?
[illegible]	17?	[illegible]	[illegible]	[illegible]	59	46	10 26	333?	44	42	3.8	3.4	5	.23[illegible]
[illegible]	[illegible]	9?	24	24?	39?	41	1127?	45?	3	4	6.5	6.4?	5	9?
[illegible]	[illegible]	121?	[illegible]	[illegible]	59?	40?	11 56	333	44	42	3.9?	3.4	5	.216
4[illegible]	42?	49	129?	129?	53?	64	2140?	205?	14	23	5.9?	5.3?	3	270
[illegible]	19?	[illegible]	76	[illegible]	45	52	2208?	35?	9	13	6.3	5.9	3	2[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	57?	67	22 11	214?	17	25	5.6	5.1	3	341
[illegible]		[illegible]	47	47	[illegible]	47	22 2[illegible]	46?	39	38	3.2?	3.3?	[illegible]	16[illegible]
[illegible]	[illegible]	[illegible]	31?	31?	51	62?	2239?	306?	13	25	6.0	5.1	3	2[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	56	63	12/[illegible]	257	17	27	5.7	5.0	3	3[illegible]
[illegible]	[illegible]	[illegible]	16	[illegible]	[illegible]	57?	0,24?	124?	44	45	4.0	3.8	3	111?

[redacted]

[redacted]

SPACECRAFT NO. M4
[redacted] NO. 1128
MISSION NO. 9035
CAMERA NOS. 76 & 77

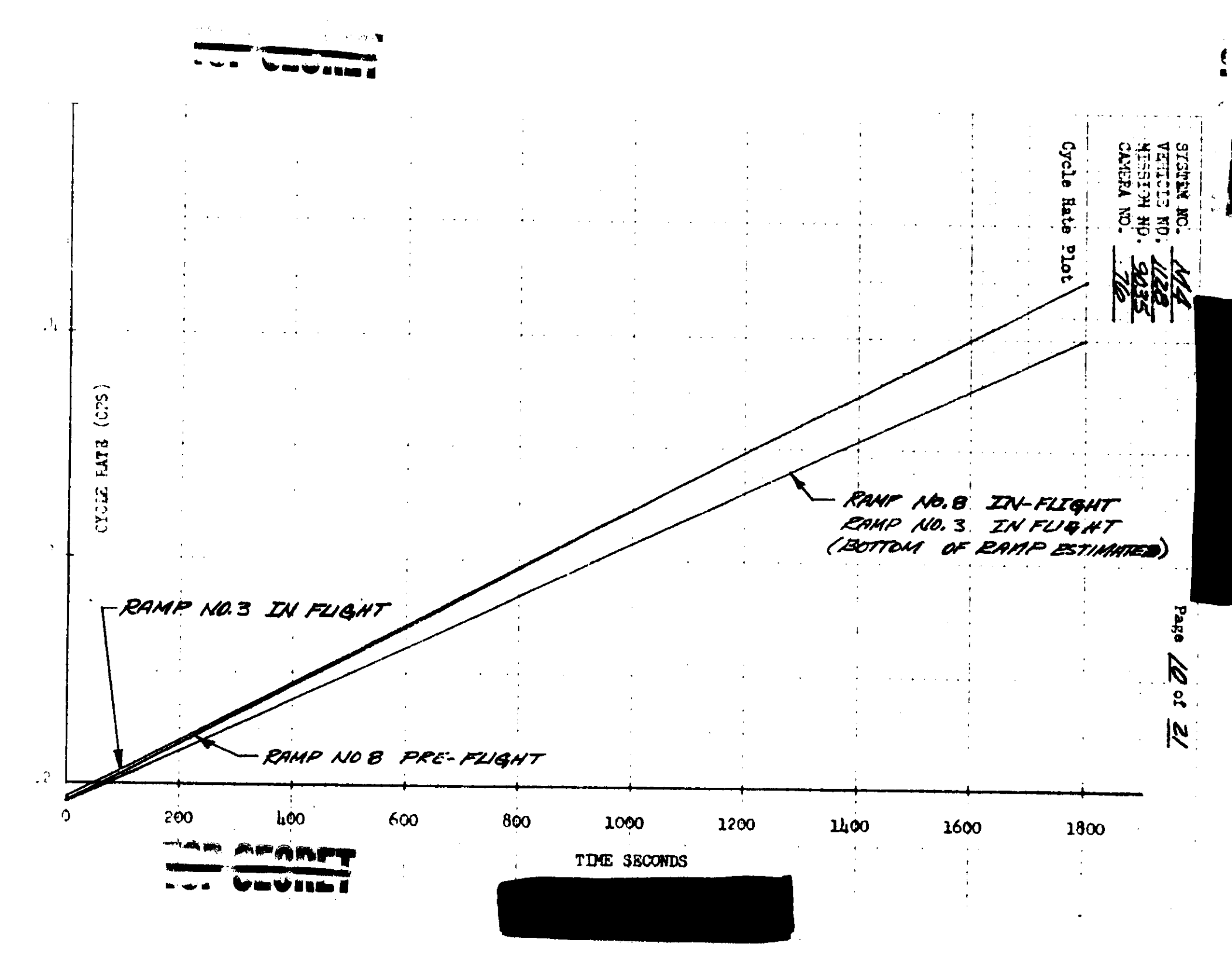
PRE-FLIGHT CYCLE PERIOD: (CAMERA NO. 76)

V/H Ramp	Cycle Period Seconds	FMC Rate		Scan Rate		
		Rad. Per Second	In. Per Second	Rad. Per Second	In. Per Second	Exposure Millisec
3 START	5.06	.017	.400	1.242	29.805	6.71
3 END	2.35	.036	.862	2.674	64.176	3.12
8 START	5.15	.016	.393	1.220	29.284	6.83
8 END	2.35	.036	.862	2.674	64,176	3.12

IN-FLIGHT CYCLE PERIOD: (CAMERA NO. 76)

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 START	5.16	.016	.392	1.217	29.227	6.84
31	8 END	2.50	.034	.810	2.513	60.325	3.32
40	8 140Sec UP Bmp	4.77	.018	.425	1.317	31.617	6.32
47	3 END	2.50	.034	.810	2.513	60.325	3.32

[redacted]


SYSTEM NO. MK
VEHICLE NO. 128
MISSION NO. 2035
CAMERA NO. 76
Cycle Rate Plot
CYCLE RATE (CPS)
RAMP NO. 8 IN-FLIGHT
RAMP NO. 3 IN FLIGHT
(BOTTOM OF RAMP ESTIMATED)
RAMP NO. 3 IN FLIGHT
RAMP NO 8 PRE-FLIGHT
0
200
400
600
800
1000
1200
1400
1600
1800
TIME SECONDS

[redacted]

SYSTEM NO. M4
TOHIDL NO. 1128
MISSION NO. 9035
CAMERA NOS. 76 & 77

PRE-FLIGHT CYCLE PERIOD: (CAMERA NO. 77)

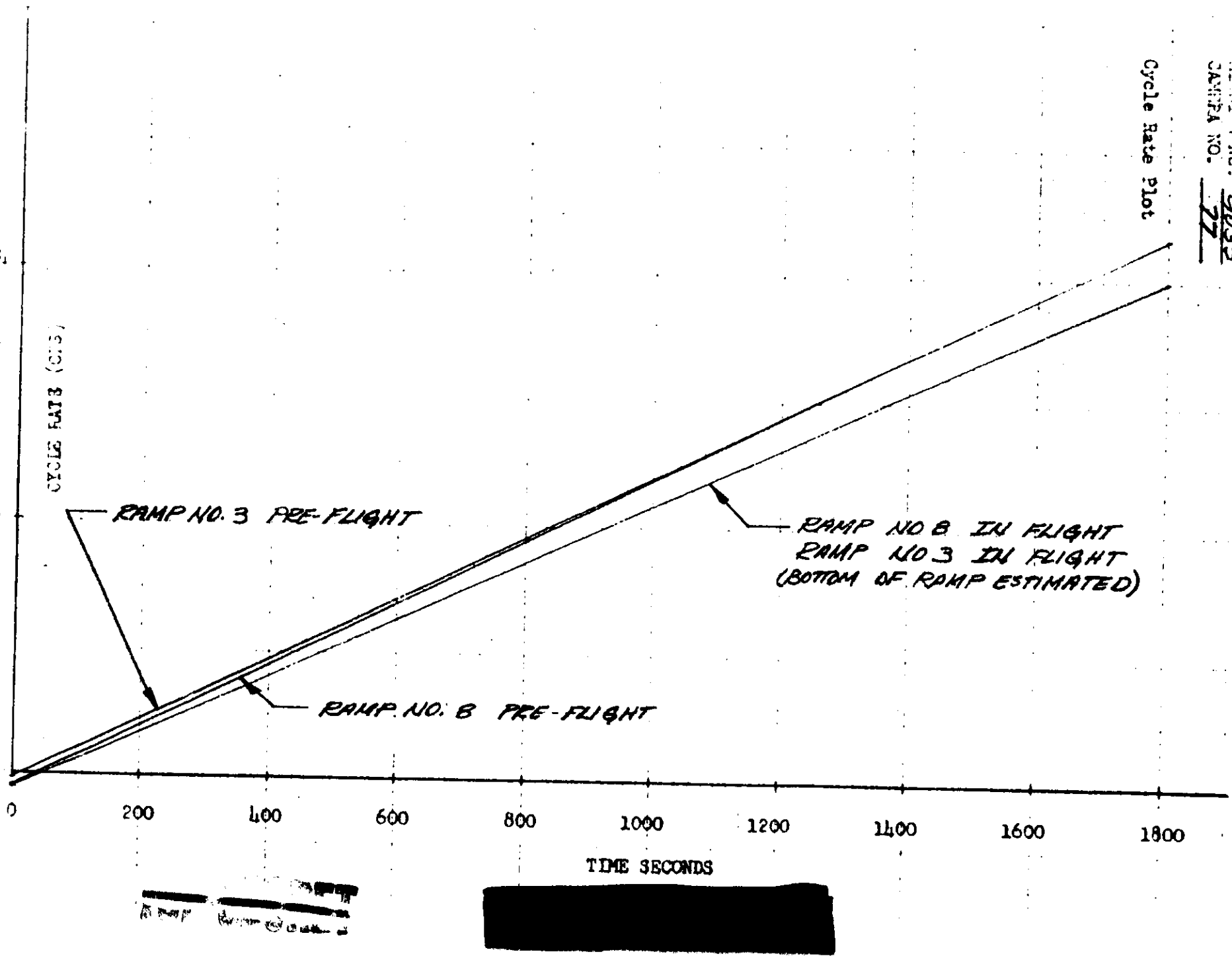
V/H Ramp	Cycle Period Seconds	FMC Rate		Scan Rate		
		Rad. Per Second	In. Per Second	Rad. Per Second	In. Per Second	Exposure Millisec
3 START	5.05	.017	.401	1.244	29.864	6.70
3 END	2.40	.035	.844	2.618	62.839	3.18
8 START	5.10	.016	.397	1.232	29.571	6.76
8 END	2.40	.035	.844	2.618	62.839	3.18

IN-FLIGHT CYCLE PERIOD: (CAMERA NO. 77)

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 START	5.12	.016	.396	1.227	29.456	6.79
31	8 END	2.50	.034	.810	2.513	60.325	3.32
40	8 140 Spc UP Ramp	4.77	.018	.425	1.317	31.617	6.32
47	3 END	2.50	.034	.810	2.513	60.325	3.32

[redacted]

SYSTEM NO. MK
VEHICLE NO. 1128
MISSION NO. 9033
CAMERA NO. 77



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SYSTEM NO. M4
VEHICLE NO. M26
MISSION NO. 9033
CAMERA NOS. 76 & 77

LENS DATA SUMMARY: (Main Camera No. 76)

Lens Serial No. 0122435 (I3)

Filter Type WRATTEN 21

Equivalent Operational Focal Length 609.617 IN.

Resolution:

Static:

	Lines/MM	Film Type	Target Contrast
Bench Test	198	SO 243	HIGH
Other	NONE		

Dynamic:

Lock Pre-Vibration	NOT	AVAILABLE	
Lock Post Vibration	NOT	AVAILABLE	
A/P Pre-HATS	155.7	SO 132	HIGH
A/P Post-HATS	181	SO 132	HIGH
Other			

Note: ~~Lock~~ A/P ~~Post Vibration~~ HATS Resolution of 181 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	.003	.003	0	0	.003	.011		

[redacted]

[redacted]

[redacted]

SYSTEM NO. M4 [redacted] Page 14 of 21
VEHICLE NO. H28
MISSION NO. 9033
CAMERA NOS. 76 & 77

LENS DATA SUMMARY: (Horizon Cameras For Main Camera No. 76)

	Take-Up	Supply
Lens Serial No.	806856	807530
Exposure Time	1/50 Sec.	1/50 Sec.
Filter Type	WRATTEN 25	WRATTEN 25
Aperture	F8.0	F6.8
Operational Focal Length	89.1 MM	89.2 MM
Radial Distortion:		
10° off Axis	.005 MM	.003 MM
20° off Axis	.041 MM	.032 MM
30° off Axis	.157 MM	.131 MM
Tangential Distortion (Maximum Vector)	.009 MM	.006 MM

Resolution:

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

36.9 Lines/M.M. Avg.

0	5	10	15	20	25
56	49	40	31	30	29
56	49	39	32	32	27

36.9 Lines/M.M. 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]

SYSTEM NO. M4
VEHICLE NO. 1128
MISSION NO. 9035
CAMERA NOS. 76 & 77

LENS DATA SUMMARY (Main Camera No. 77)

Lens Serial No. 0152435 (P7)

Filter Type WRATTEN 21

Equivalent Operational Focal Length 609.597 mm

Resolution:

Static:

	Lines/mm	Film Type	Target Contrast
[illegible] Test	242	50243	HIGH
[illegible]	NONE		

Dynamic:

[illegible] Calibration	Not Available		
[illegible] Calibration	Not Available		
[illegible] - [illegible]	150	50132	HIGH
[illegible]	186.4	50132	HIGH
[illegible]	NONE		

A/P HATS [illegible] of 186.4 Lines/mm Reported In [illegible] No. [redacted] [illegible] ______

Distortion - [illegible]

[illegible] Axis [illegible]	357	358	359	0	1	2	3		
Distortion [illegible]	.010	.004	.000	.000	.000	.002	.002		

[redacted]

[illegible]

SYSTEM NO. M4 [redacted]
VEHICLE NO. 1128
MISSION NO. 9035
CAMERA NOS. 76 & 77

LENS TEST SUMMARY: (Horizon Cameras for Main Camera No. 77)

	Take-Up	Supply
Lens Serial No.	806859	806562
Exposure Time	1/50 Sec.	1/50 Sec.
Filter Type	WRATTEN 25	WRATTEN 25
Aperture	F8.0	F6.8
Operational Focal Length	89 MM	89 MM
Radial Distortion:		
10° off Axis	0 MM	.005 MM
20° off Axis	.035 MM	.034 MM
30° off Axis	.147 MM	
Tangential Distortion (Max. Vector)	.008 MM	.002 MM

Resolution:

Field Angle Deg.	0	5	10	15	20	22.5
[illegible]	56	56	47	39	30	31
[illegible]	51	49	47	42	32	31

42.6 Lines/MM Avg.

0	5	10	15	20
56	49	44	34	32
51	49	44	32	29

42 Lines/MM Avg.

[illegible]

1. [illegible] equivalent operational [illegible]

2. [illegible] SuperXX [illegible] and HIGH contrast [illegible]

[illegible]

[redacted]

SYSTEM NO. M4
VEHICLE NO. 1128
MISSION NO. 9035
CAMERA NOS. 76 & 77

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

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

6. Xc, Yc and Xt, Yt are the offsets of Targets 2 and 3 from the indicated principal points of the stellar and take-up horizon cameras respectively.

7. 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. 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 given are measurements made on hand processed film without control of shrinkage.

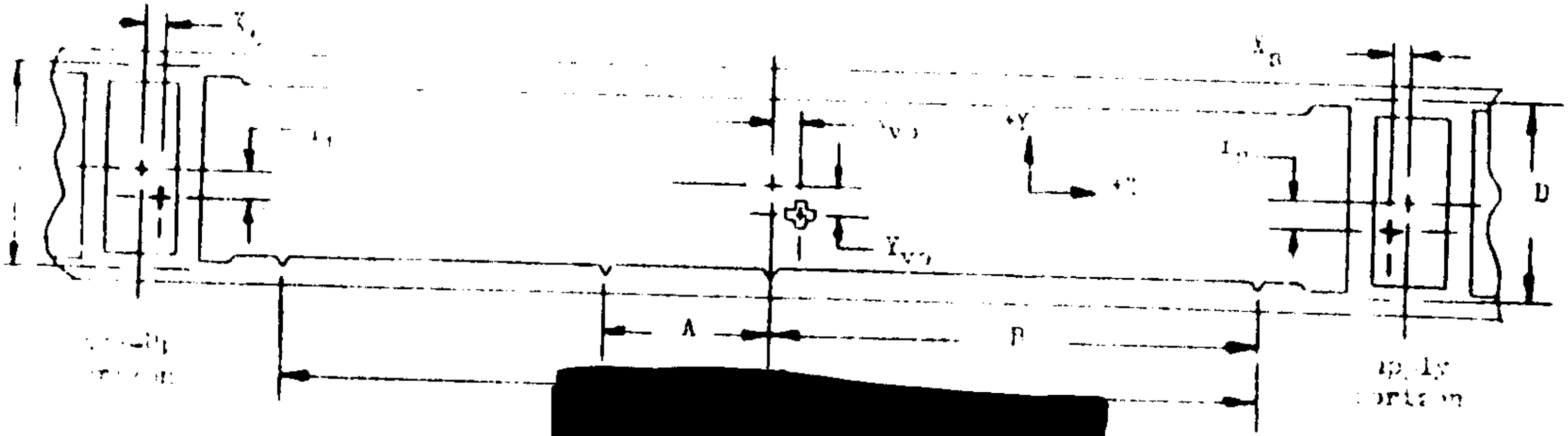
9. The format dimensions are measured to the best estimate of format edge.

10. 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 not currently available. It is assumed to be zero, but is uncontrolled.

11. Similarly, the angle between the plane and the indicated axis on the main camera is uncontrolled but assumed to be zero.

[redacted]

FORMAT DIMENSIONS (MAIN CAMERAS)



[redacted]

Camera No. 76 [illegible]
Emulsion Down

[illegible] Scan Direction

[illegible]	+.035	[illegible]	-.269	A	76.116
[illegible]	-.894	[illegible]	+.474	[illegible]	355.077
[illegible]	-.015	[illegible]	-.262	[illegible]	710.200
[illegible]	56.412	E	56.418		

Format Dimensions:

	Supply	Main	Take-Up
Height	53.3	56.4	53.4
Width	23.0	754.1	23.0

Camera No. 77 Format Viewed with Negative
Emulsion Down

Vehicle Motion ↑ Scan Direction →

[illegible]	+.101	Y_1	-.027	A	76.048
X_2	-.302	Y_2	-.024	B	354.930
X_{vo}	-.185	Y_{vo}	+.435	C	709.750
[illegible]	56.451	[illegible]	56.526		

Format Dimensions:

	Supply	Main	Take-Up
Height	53.4	56.9	53.4
Width	22.9	753.8	22.9

Notes:
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

SYSTEM NO. M4
VEHICLE NO. 1124
MISSION NO. 9035
CAMERA NOS. 76, 77

FORMAT LAYOUT: (MAIN CAMERAS)

SYSTEM NO. M4
VEHICLE NO. 1128
MISSION NO. 9035
CAMERA NOS. 76 & 77

LENS DATA SUMMARY: (Frame Camera No. 82)

Lens Serial No. 2552612

Camera Serial No. 82

Filter Type WRATTEN 21

Aperture F6.3

Exposure Time 1/250 Sec.

Equivalent Focal Length 38.48 [illegible]

Resolution: 94.3 Lines/MM AWAR SO-132
68.9 Lines/MM AWAR J-30

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

Note: Resolution data read from ________ film

Distortion: (Not Available) No Stellar Calibrations.

Angle off Axis									
Distortion (Millimeters)									

RESEAU SERIAL No.

+Y

← FILM TAKE-UP DIRECTION
→ CAMERA MOTION DIRECTION

-X +X

LOCATION OF OPTICAL AXIS:
X = -.046 MM
Y = +.02 MM

-Y

FILM SHOWN NEGATIVE EMULSION SIDE DOWN

SYSTEM NO. M4
VEHICLE NO. 1128
MISSION NO. 9036
CAMERA NOS. 76 & 77

HORIZON LENS SETTINGS (Viewed from top of vehicle inflight)