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22 Pages
(Including Cover Sheet)

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CORONA "M" FLIGHT DATA BOOK

SYSTEM NO. M-18

VEHICLE NO. 1157

MISSION NO. 9051

Prepared by: [redacted]

Checked by: [redacted]

Approved by: [redacted]
(Engineering Manager)

Approved by: [redacted]
(Project Manager)

Approved by: [redacted]
(SEID)

[redacted]

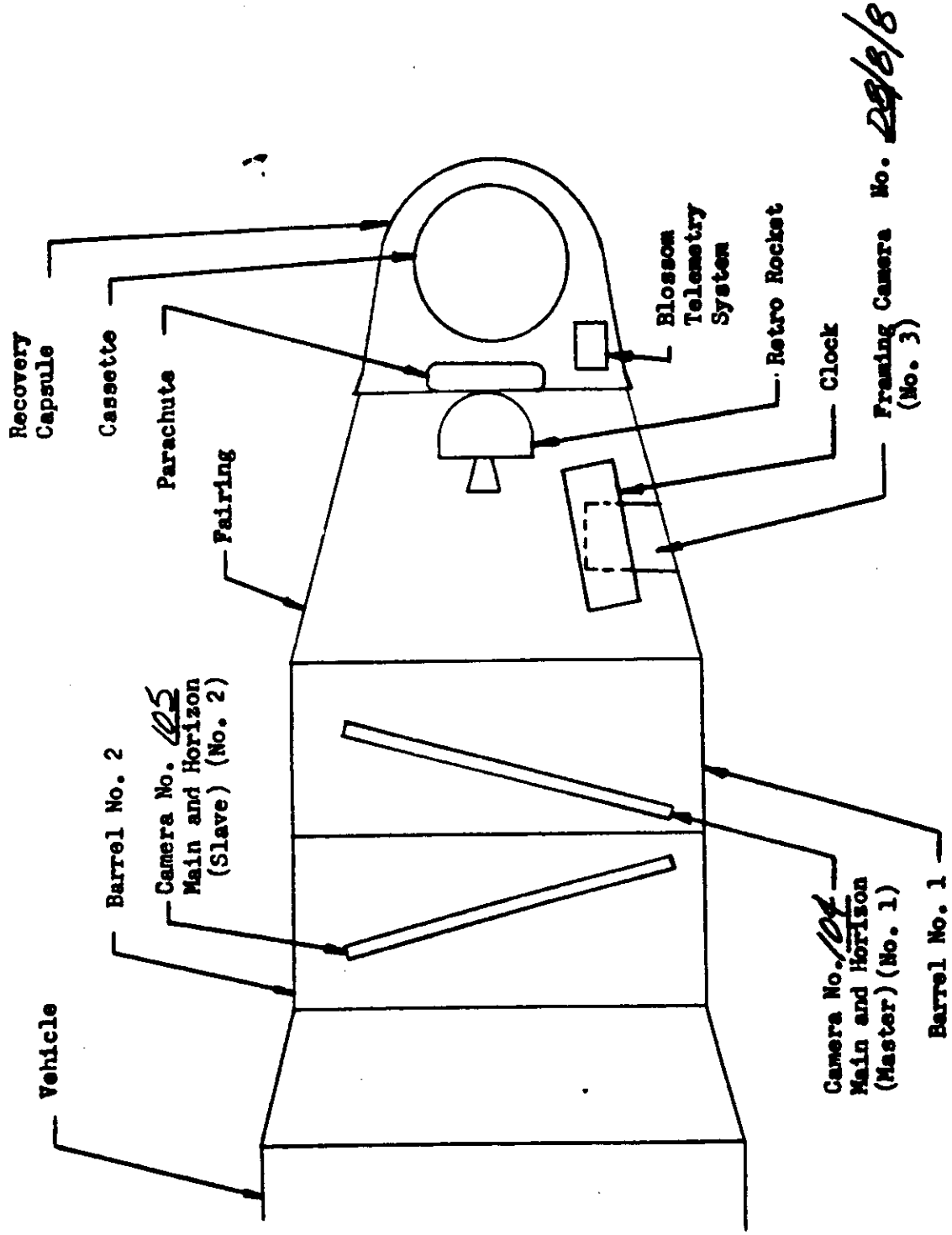
[redacted]

*** NOTICE OF MISSING PAGES ***

PAGE 2 IS MISSING IN THE ORIGINAL COPY.

SYSTEM NO. MIB
VEHICLE NO. 1157
MISSION NO. 9051
CAMERA NOS. 104 105

VEHICLE LAYOUT:



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SYSTEM NO. M18
VEHICLE NO. 457
MISSION NO. 9031,
CAMERA NOS. 104 & 105

GENERAL FLIGHT DATA:

Main Camera No. 1 Serial No. 104

Main Camera No. 2 Serial No. 105

Framing Camera Serial No. DB/B/B

Launch Date 1/7/63

Orbital Parameters: (Rev. 11)

Period 90.55 Min. Eccentricity .0161

Perigee 104 NM Perigee Latitude 4.4 Deg. N

Apogee 220 NM Inclination Angle 82.25 Deg. N

Recovery Revolution No. 65

Recovery Date 1/11/63

REMARKS:

[redacted]

SYSTEM NO. M18
VEHICLE NO. 1157
MISSION NO. 9051
CAMERA NOS. 104 & 105

PRE-LAUNCH INFORMATION:

Command settings at launch:

Command	8	9	10	11	12	—
Setting	3	1	4	4	11	—

Main Camera Settings:	Camera NO. 104	Camera NO. 105
Main Optics Slit Width	.250 in.	.250 in.
Main Optics Filter Type	WRATTEN 21	WRATTEN 21
Horizon Optics Exp. Time	1/100 sec.	1/100 sec.
Horizon Optics Aperture	F 6.8	F 6.8
Horizon Optics Filter Type	WRATTEN 25	WRATTEN 25

Framing Camera (S/I) Settings:	Terrain Lens	Stellar Lens
Exposure Time	1/125 sec.	1/2 sec.
Aperture Setting	F4.5	F1.9
Filter Type	WRATTEN 21	NONE

Ratio: One Framing Camera (S/I) Frame Per 7 Camera No. 1 Frames.

Film:	Camera No. 104	Camera No. 105	Framing Camera (S/I) Terrain	Framing Camera (S/I) Stellar
Type	2424 (SO132)	2424 (SO132)	2T (SO206)	3414400 (SO130)
Load	7800 ft.	7800 ft.	135 ft.	75 ft.
Splices	2	2	—	—
Prel. Data	7-15-13-10-2	75-12-10-2	206-2-6-11-2	4400-1-3-11-2

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SYSTEM NO. M-18
VEHICLE NO. 1157
MISSION NO. 9051
CAMERA NOS. 104 & 105
FRAMING CAMERA NO. DA/B/B

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.
	104	105	104	105	ON	OFF		ON	OFF	ON	OFF			
PRELAUNCH	122	118	322	311	—	—	—	—	—	—	—	—	—	—
5DY1	111	111	292	292	54	34	04 42	14	34	4.9	4.4	3	1289	315
6DX1	45	45	119	119	61	53	06 11	7	15	5.1	4.8	2	1084	138
6DX2	162	162	427	427	44	17	06 15	24	50	4.6	4.0	2	1325	417
6DX3	76	76	200	200	2N	9S	06 25	64	72	3.9	3.9	2	1894	180
7DX1	96	95	253	250	60	43	07 42	8	25	5.0	5.0	2	1087	273
7DX2	70	70	185	185	39	28	07 47	29	40	4.4	4.1	2	1403	180
9AE	8	8	21	21	38	40	10 23	—	—	9.8	9.8	2	0	46
9DX1	97	97	256	256	62	45	10 42	6	23	5.2	4.6	2	1063	289
9DX2	40	40	105	105	36	28	10 49	32	40	4.4	4.2	2	1468	106
14DX1	41	41	108	108	25	19	18 24	43	48	4.2	4.1	2	1627	104
20DX1	56	56	148	148	55	45	03 20	13	23	4.9	4.6	2	1194	160
21DY1	96	93	253	245	45	29	04 53	23	39	4.6	4.2	2	1367	253
21DY2	108	106	285	279	6N	11S	05 03	60	73	3.9	3.9	2	1883	256
22DX1	47	0	124	0	60	52	06 20	8	16	4.9	4.6	2	1134	138
22DX2	148	0	390	0	44	20	06 24	24	47	4.4	3.9	2	1375	372
22DX3	111	0	292	0	7N	9S	06 33	59	72	3.8	3.8	2	1862	258
23DX1	146	145	385	382	61	35	07 50	7	33	5.0	4.3	2	1122	407
24AE	8	8	21	21	38	40	09 00	—	—	9.8	9.8	2	0	46
24DX1	80	80	211	211	63	48	09 20	5	20	4.9	4.5	2	1110	229
25DX1	84	83	221	219	62	47	10 51	6	21	5.0	4.6	2	1113	244
25DX2	59	59	156	156	35	25	10 58	33	43	4.3	4.0	2	1533	150
30DX1	42	42	111	111	25	19	18 32	43	48	4.0	3.9	2	1677	104
35DX1	62	62	163	163	62	46	01 55	6	22	5.0	4.7	2	1154	182
	[redacted]													

SYSTEM NO. M-1A
VEHICLE NO. 1157
MISSION NO. 9051
CAMERA NOS. 104 & 105
FRAMING CAMERA NO. DA/B/A

PERFORMANCE ESTIMATE

PASS NO.	FRAMES CAMERA NO.		FEET CAMERA NO.		LATITUDE DEGREES		TIME ON	SOLAR ANGLE		EXP. TIME MILLISEC		RAMP NO.	INST ON SEC. UP RAMP	DUR.
	104	105	104	105	ON	OFF	HR. MIN.	ON	OFF	ON	OFF			
37DX1	38	38	100	100	55	49	04 58	13	19	4.8	4.6	2	1242	110
37DX2	136	136	358	358	44	22	05 01	24	45	4.5	4.0	2	1407	346
37DX3	102	102	269	269	4N	6S	05 10	62	70	3.9	3.9	2	1938	243
38DX1	0	59	0	155	61	51	06 27	7	17	4.8	4.5	2	1169	168
38DX2	0	105	0	277	46	29	06 31	22	39	4.4	4.0	2	1395	270
38DX3	0	71	0	187	8N	3S	06 40	58	68	3.8	3.8	2	1957	166
41DX1	75	75	198	198	60	46	10 58	8	22	4.9	4.5	2	1191	213
41DX2	59	59	156	156	34	25	11 05	34	43	4.2	4.0	2	1580	150
52DX1	80	80	211	211	55	42	03 33	13	26	4.7	4.3	2	1291	220
53DX1	58	58	153	153	60	49	05 03	8	19	4.9	4.6	2	1228	168
53DX2	103	103	272	272	45	28	05 06	23	40	4.5	4.1	2	1454	269
53DX3	97	98	256	258	5N	10S	05 16	61	73	4.0	4.0	2	1984	236
55DY1	56	56	148	148	62	53	08 02	6	15	4.9	4.6	2	1190	163
55DY2	78	78	206	206	49	37	08 06	19	31	4.5	4.2	2	1389	206
56AE	9	9	24	24	37	41	09 13	—	—	8.5	8.2	2	30	46
56DY1	63	62	166	163	63	52	09 33	5	16	4.9	4.5	2	1193	180
56DY2	105	104	277	274	47	30	09 37	21	38	4.4	4.0	2	1435	266
57DX1	68	66	179	174	57	46	11 05	11	22	4.6	4.3	2	1286	182
63DE	17	17	45	45	36	34	20 11	32	34	4.2	4.1	2	1586	44
[redacted]														

CAMERA NOS. [redacted]

FRAMING CAMERA NO. [redacted]

PERFORMANCE ESTIMATE [redacted]

PASS NO.	FRAMES		FEET	
	CAMERA		CAMERA	
	TERRAIN	STELLAR	TERRAIN	STELLAR
PRELAUNCH	17	17	3.4	1.7
5DX1	16	16	3.2	1.6
6DX1	6	6	1.2	0.6
6DX2	23	23	4.6	2.3
6DX3	11	11	2.2	1.1
7DX1	14	14	2.8	1.4
7DX2	10	10	2.0	1.0
9AE	1	1	0.2	0.1
9DX1	14	14	2.8	1.4
9DX2	6	6	1.2	0.6
14DX1	5	5	1.0	0.5
20DX1	8	8	1.6	0.8
21DY1	14	14	2.8	1.4
21DY2	16	16	3.2	1.6
22DX1	6	6	1.2	0.6
22DX2	21	21	4.2	2.1
22DX3	16	16	3.2	1.6
23DX1	21	21	4.2	2.1
24AE	1	1	0.2	0.1
24DX1	12	12	2.4	1.2
25DX1	12	12	2.4	1.2
25DX2	8	8	1.6	0.8
30DX1	6	6	1.2	0.6
35DX1	9	9	1.8	0.9
37DX1	5	5	1.0	0.5

PASS	FRAMES		FEET	
	CAMERA		CAMERA	
	TERRAIN	STELLAR	TERRAIN	STELLAR
37DX2	20	20	4.0	2.0
37DX3	14	14	2.8	1.4
38DX1	0	0	0	0
38DX2	0	0	0	0
38DX3	0	0	0	0
41DX1	11	11	2.2	1.1
41DX2	9	9	1.8	0.9
52DX1	11	11	2.2	1.1
53DX1	9	9	1.8	0.9
53DX2	14	14	2.8	1.4
53DX3	14	14	2.8	1.4
55DX1	8	8	1.6	0.8
55DX2	11	11	2.2	1.1
56AE	2	2	0.4	0.2
56DY1	9	9	1.8	0.9
56DY2	15	15	3.0	1.5
57DX1	9	9	1.8	0.9
63DE	3	3	0.6	0.3

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SYSTEM NO. M18
VEHICLE NO. 1157
MISSION NO. 9051
CAMERA NOS. 104 & 105

PRE-FLIGHT CYCLE PERIOD: (CAMERA NO. 104)

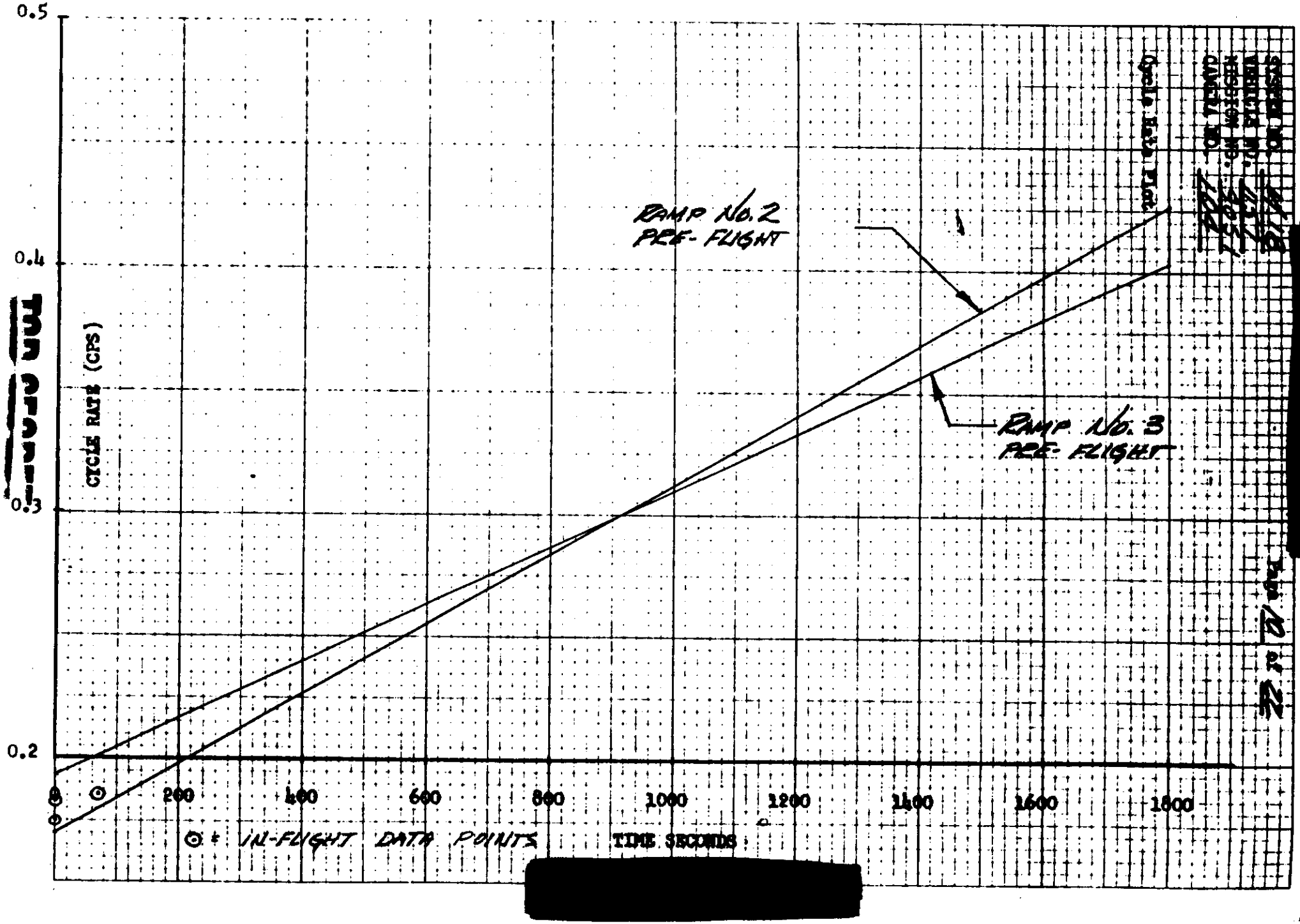
V/H Ramp	Cycle Period Seconds	FMC Rate		Scan Rate		
		Rad. Per Second	In. Per Second	Rad. Per Second	In. Per Second	Exposure Millisec
2 START	5.88	.014	.344	1.069	25.645	9.75
2 END	2.34	.036	.865	2.685	64.442	3.88
3 START	5.17	.016	.391	1.215	29.167	8.57
3 END	2.48	.034	.817	2.534	60.804	4.11

IN-FLIGHT CYCLE PERIOD: (CAMERA NO. 104)

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	2 START	5.72	.015	.354	1.098	26.363	9.48
24	2 START	5.46	.015	.371	1.151	27.618	9.05
56	2 (75)	5.34	.016	.379	1.177	28.239	8.85

(XX) = Time Up Ramp

[redacted]


0.5
0.4
0.3
0.2
CYCLE RATE (CPS)
RAMP No. 2
PRE-FLIGHT
RAMP No. 3
PRE-FLIGHT
200
400
600
800
1000
1200
1400
1600
1800
⊙ = IN-FLIGHT DATA POINTS
TIME SECONDS

[redacted]

SYSTEM NO. M18
VEHICLE NO. 1157
MISSION NO. 9037
CAMERA NOS. 104 E 105

PRE-FLIGHT CYCLE PERIOD: (CAMERA NO. 105)

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	5.94	.014	.341	1.058	25.386	9.85
2 END	2.33	.036	.869	2.697	64.719	3.86
3 START	5.22	.016	.387	1.204	28.888	8.65
3 END	2.97	.034	.820	2.544	61.050	4.09

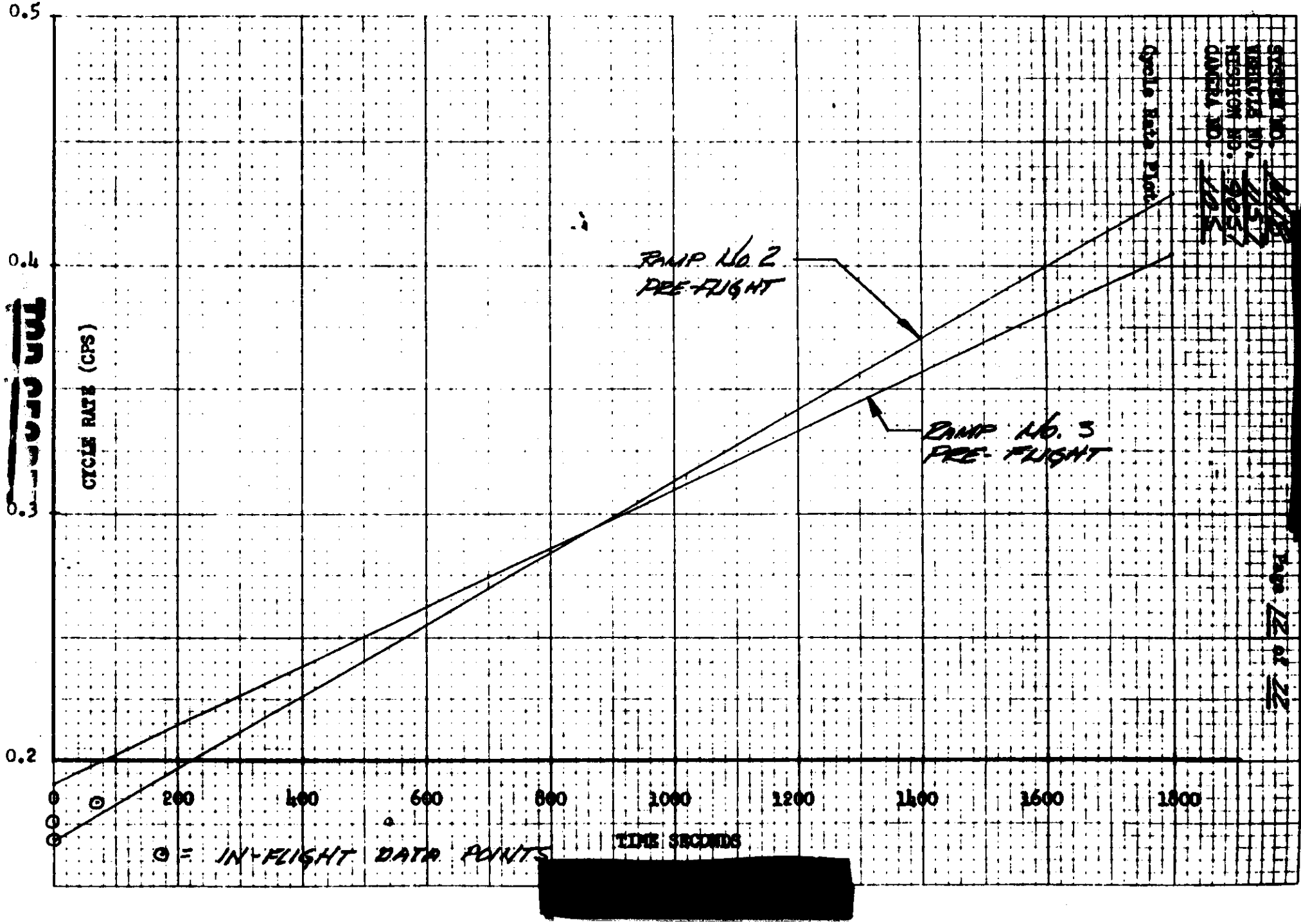
IN-FLIGHT CYCLE PERIOD: (CAMERA NO. 105)

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	2 (START)	5.85	.014	.346	1.074	25.777	9.70
24	2 (START)	5.64	.015	.359	1.114	26.737	9.35
56	2 (75)	5.44	.015	.372	1.155	27.720	9.02

(XX) = TIME UP RAMP

[redacted]

[redacted]


0.5
0.4
0.3
0.2
CYCLE RATE (CPS)
RAMP NO. 2
PRE-FLIGHT
RAMP NO. 3
PRE-FLIGHT
0
200
400
600
800
1000
1200
1400
1600
1800
TIME SECONDS
= IN-FLIGHT DATA POINTS

VEHICLE NO. 157
MISSION NO. 9037
CAMERA NOS. 104 & 105

[redacted]

LENS DATA SUMMARY: (Main Camera No. 104)

Lens Serial No. 0412435

Filter Type WRATTEN 21

Equivalent Operational Focal Length 609.628 MM

Resolution:

Static:

	Lines/MM	Film Type	Target Contrast
Bench Test	236	SO243	HIGH
Other			

Dynamic:

Itek Pre-Vibration	148	SO132	HIGH
Itek Post Vibration	153	SO132	HIGH
AP	164	SO132	HIGH
AP	87	SO132	LOW
Other			

Note: Itek Post Vibration Resolution of 153 lines/MM Reported In Message No. _____ dated _____

Distortion - Positive (Pincushion)

Angle Off Axis Deg.	3	2	1	0	359	358	357		
Distortion Millimeters	.004	.003	.001	.000	.001	.002	.003		

[redacted]

TOP SE[redacted]

SYSTEM NO. [redacted] Page 14 of 22
VEHICLE NO. 1157
MISSION NO. 9051
CAMERA NOS. 104 & 105

LENS DATA SUMMARY: (Horizon Cameras for Main Camera No. 104)

	Take-Up	Supply
Lens Serial No.	807100	808627
Exposure Time	1/100 Sec.	1/100 Sec.
Filter Type	Wratten 25	Wratten 25
Aperture	F6.8	F6.8
Operational Focal Length	89.2 MM	89.3 MM
Radial Distortion:		
10° off Axis	.008 MM	.013 MM
20° off Axis	.044 MM	.041 MM
Tangential Distortion (Maximum Vector)	.010 MM	.011 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	44	37	41	29	30	27	56	44	39	34	32	30	30
Tangential Resolution	51	44	37	39	30	25	22	56	44	42	38	35	27	25

38.0 Lines/MM Avg. 36.9 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 1/16# contrast target.

[redacted]

SYSTEM NO. M18
VEHICLE NO. 1137
MISSION NO. 9051
CAMERA NOS. 104/105

LENS DATA SUMMARY: (Main Camera No. 105)

Lens Serial No. 0452435

Filter Type WRATTEN 21

Equivalent Operational Focal Length 609.069 MM

Resolution:

Static:

	Lines/MM	Film Type	Target Contrast
Bench Test (9/11/62)	247	SO243	HIGH
Other Boresight (9/19/62)	214	SO243	HIGH

Dynamic:

Itek Pre-Vibration	151	SO132	HIGH
Itek Post Vibration	158	SO132	HIGH
AP	162	SO132	HIGH
AP	88	SO132	LOW
Other			

Note: Itek Post Vibration Resolution of 158 lines/MM Reported In

Message No. _____ dated _____

Distortion - Positive (Pincushion) (DATA FROM 9/11/62 TEST)

Angle Off Axis Deg.	3	2	1	0					
Distortion Millimeters	.001	.000	.000	.000					

[redacted]

VEHICLE NO. 1157
MISSION NO. 9051
CAMERA NOS. 104 & 105

LENS DATA SUMMARY: (Horizon Cameras for Main Camera No. 105)

	Take-Up	Supply
Lens Serial No.	807098	808625
Exposure Time	1/100 Sec.	1/100 Sec.
Filter Type	Wratten 25	Wratten 25
Aperture	F6.8	F6.8
Operational Focal Length	89.2 MM	89.7 MM
Radial Distortion:		
10° off Axis	.013 MM	.011 MM
20° off Axis	.044 MM	.042 MM
Tangential Distortion (Maximum Vector)	.010 MM	.009 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	49	42	29	32	32	27	51	47	42	34	32	29	29
Tangential Resolution	56	44	42	32	32	27	20	51	44	42	34	32	29	22

37.1 Lines/MM Avg. 37.0 Lines /MM Avg.

Note:

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

[redacted]

TOP SECRET

SYSTEM NO. 1110
VEHICLE NO. 1157
MISSION NO. 9051
CAMERA NOS. 104 & 105

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 with ± 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 Yvo 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 Paragraph 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 Paragraph 2 on the format is made by positioning two targets for each horizon format normal ± 5" of arc to the plane defined in Paragraph 2. Dimensions F, G, H, J, K, L, M and N are the offset of these targets.

SYSTEM NO. M18
VEHICLE NO. 1157
MISSION NO. 9051
CAMERA NOS. 104 & 105

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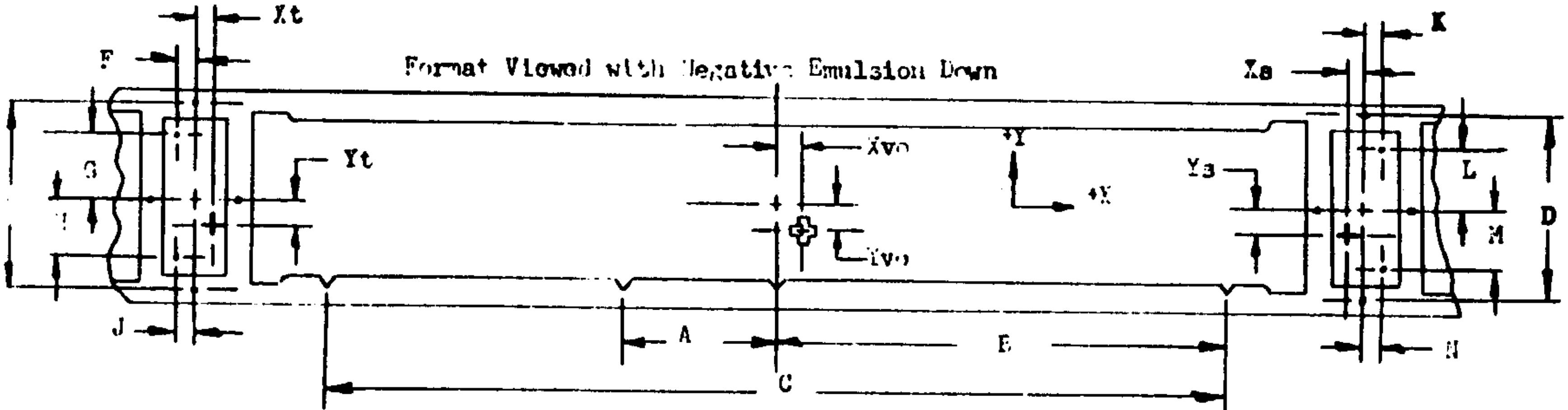
FORMAT DIMENSIONS: (MAIN CAMERAS)



Camera No. 104 Vehicle Motion ↓ Scan Direction →

A	76.130	Xs	-.950	H	-23.914
B	355.010	Ys	+.356	J	-5.169
C	710.190	Xvo	-.570	K	+4.041
D	56.483	Yvo	+.120	L	+23.584
E	56.429	F	-5.296	M	-22.853
Xt	-.164	G	+23.785	N	+3.897
Yt	-.001				

Format Dimensions:

	Main	Take-Up	Supply
Height	55.6		
Width	754.7		

Camera No. 105 Vehicle Motion ↓ Scan Direction →

A	76.055	Xs	-.052	H	-23.001
B	354.980	Ys	-.014	J	-5.213
C	709.840	Xvo	+.512	K	+5.047
D	56.465	Yvo	+.025	L	+23.981
E	56.458	F	-5.220	M	-23.981
Xt	-.265	G	+23.546	N	+5.036
Yt	+.328				

Format Dimensions:

	Main	Take-Up	Supply
Height	56.0		
Width	753.8		

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

TOP SECRET

[redacted]

SYSTEM NO. M16
VEHICLE NO. 1157
MISSION NO. 9051
CAMERA NOS. 104&105

FORMAT LAYOUT: (MAIN CAMERAS)

[redacted]

SYSTEM NO. M18
VEHICLE NO. 1137
MISSION NO. 9051
CAMERA NOS. 104 & 105

[redacted]

LENS DATA SUMMARY: (Framing Camera No. 08) (INDEX Lens)

Lens Serial No. 809928

Reseau Serial No. 8

Filter Type WRATTEN 21

Aperture F 4.5

Exposure Time 1/125 Sec.

Equivalent Focal Length 38.55 MM Operational Focal Length 38.36 MM

Resolution: 70.8 Lines/MM ANAR

Angle off axis	0	10	20	30	35
Resolution L/MM High Contrast	120	114	85	62	54
Resolution L/MM Low Contrast	79	78	53	35	34

Note: Resolution data read from SO 130 Film

Distortion:

Angle off Axis Deg.	0	10	20	30	35				
Distortion Millimeters	.000	.019	.062	.132	.170				

Perpendicularity of Reseau to Optical Axis .010 MM IN 57.15 MM

Date of Stellar Calibration ———

Knee Calibration NOT REPORTED Deg. ——— Min. ——— Sec.

Location of Principal Point:

X +.003 MM Y -.046 MM

[redacted]

LENS DATA SUMMARY: (Framing Camera No. 08) (STELLAR Lens)

Lens Serial No. 80242

Reseau Serial No. 8

Filter Type NONE

Aperture F 1.9

Exposure Time 1/2 Sec.

Equivalent Focal Length 83.81 MM Operational Focal Length 83.73 MM

Resolution: _____ Lines/MM AWAR

NOT REPORTED

Angle off axis	0				
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					c
Distortion Millimeters	.000	.000	.003	.006					

Perpendicularity of Reseau to Optical Axis .020 MM IN 35 MM

Date of Stellar Calibration _____

Knee Calibration NOT REPORTED Deg. _____ Min. _____ Sec.

Location of Principal Point:

X -.163 MM Y +.034 MM

[redacted]

SYSTEM NO. M18
VEHICLE NO. 1157
MISSION NO. 9051
CAMERA NOS. 104 & 105

PRELIMINARY CLOCK CORRELATION:

Rev. No.	System Time	Clock Time	Delta Sys. Time	Delta Clock Time	Diff.
9	3736.070	56297.224			
24	32475.024	137801.214	81505.954	81503.990	-1.964
56	33211.075	311334.714	173535.901	173533.500	-2.401

AN EXCESSIVE CLOCK ERROR IS APPARENT FROM THE ABOVE DATA. THIS ERROR IS UNEXPLAINED AT THIS TIME.

[redacted]

[redacted]