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25 Pages
(Including Cover Sheet)

CORONA "M" FLIGHT DATA BOOK

SYSTEM NO. M2

VEHICLE NO. 1124

MISSION NO. 9032

Prepared by: [redacted]

Checked by: [redacted]

Approved by: [redacted]
(Engineering Manager)

Approved by: [redacted]
(Project Manager)

Approved by: [redacted]
(SSID)

[redacted]

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[redacted]

[redacted]

SYSTEM NO. M2
VEHICLE NO. 1124
MISSION NO. 5032
CAMERA NOS. 72 & 73

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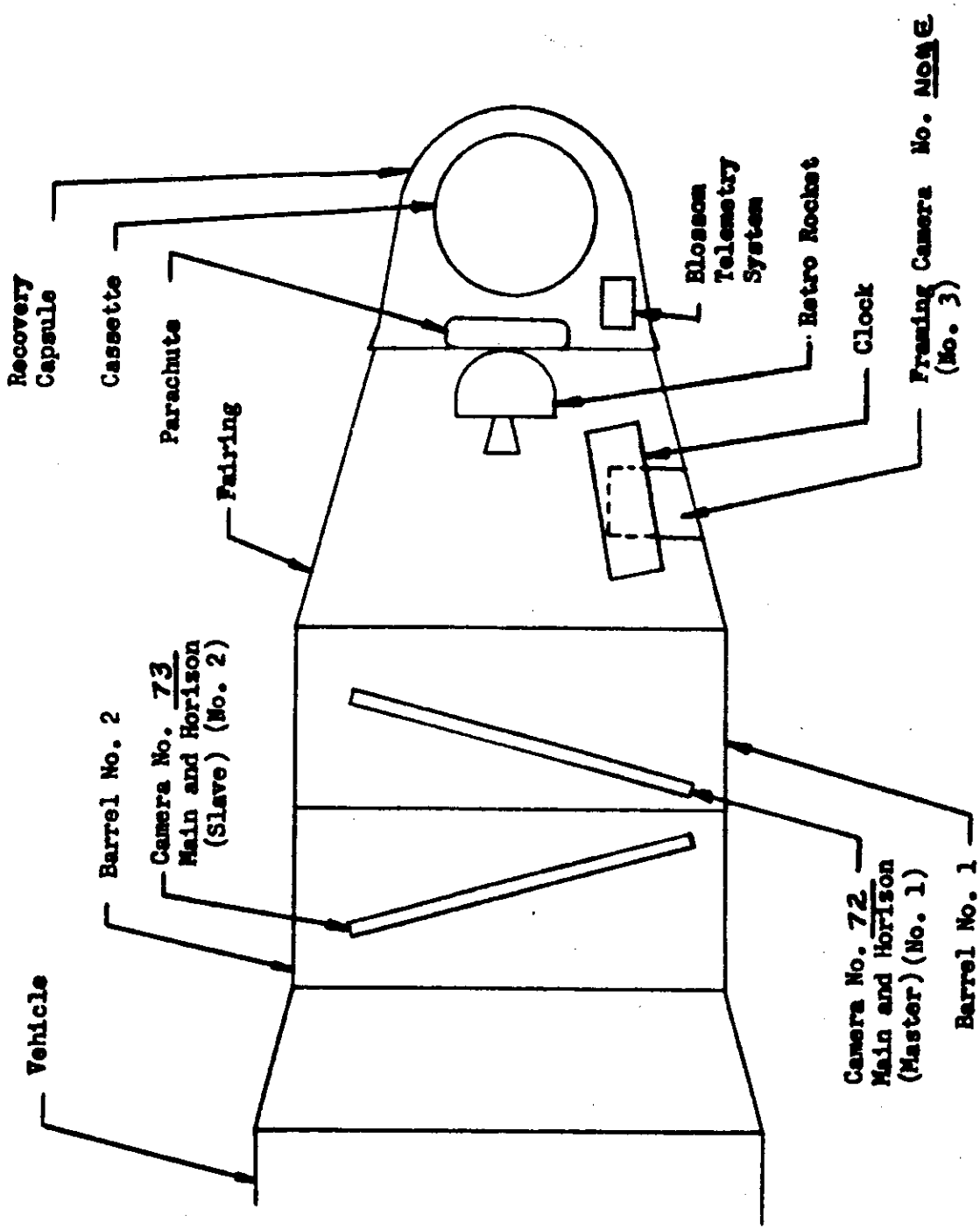
[redacted]

SYSTEM NO. M2
VEHICLE NO. 1124
MISSION NO. 3032
CAMERA NOS. 72 & 73

VEHICLE LAYOUT:



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SYSTEM NO. M2
VEHICLE NO. 1124
MISSION NO. 9032
CAMERA NOS. 72 & 73

GENERAL FLIGHT DATA:

Discoverer No. 39

Main Camera No. 1 Serial No. 72

Main Camera No. 2 Serial No. 73

Framing Camera Serial No. NONE

Launch Date 17 APR 62

Orbital Parameters: (Rev. 16)

Period 91.675 Min. Eccentricity .0224

Perigee 113 NM Perigee Latitude 30 Deg. N

Apogee 279 NM Inclination Angle 73.48 Deg. N

Recovery Revolution No. REV 33

Recovery Date 19 APR 62

REMARKS:

1- Performance Estimate:

(a) Latitude coverage is estimated full stereo coverage. Camera 73 will have about 6 frames before the stereo Turn on Latitude. Camera No. 72 will have about 6 frames after the stereo Turn off Latitude.

(b) Severe cycle period variations were indicated by data received on operations 9AE and 25AE. Data available as of 4/20/62 indicate that the instruments operated properly until operation 5DY2 or 6DY1 after these operations the cycle periods appeared 15 to 20 % slower than nominal.

(c) Although exposure times are apparently slow it is estimated that they are within tolerance.

2- Cycle period variations noted above are also used in calculating IMC and scan velocities.

3- The Framing camera was not carried on this mission.

[redacted]

[redacted]

SYSTEM NO. M2
VEHICLE NO. 1124
MISSION NO. 9032
CAMERA NOS. 72 & 73

PRE-LAUNCH INFORMATION:

V/H Programmer Set On Step 3 At Launch

Main Camera Settings:

	Camera No. 72	Camera No. 73
Main Optics Slit Width	.200 in.	.200 in.
Horizon Optics Exposure Time	1/50 Sec.	1/50 Sec.
Horizon Optics Aperture	f6.8	f6.8

Framing Camera Settings:

Exposure Time NO FRAMING CAMERA CARRIED ON MISSION Sec.

Aperture _____

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

Film:

	Camera No. 72	Camera No. 73	Framing Camera
Type	SO 132	SO 132	—
Length	7600 Ft.	7600 Ft.	— Ft.
No. of Splices	1	1	—
Emulsion Data	26-4-3-2	26-4-3-2	—

[redacted]

SYSTEM NO. M-2
VEHICLE NO. 1124
MISSION NO. 9022
CAMERA NOS. 72 & 73
FRAMING CAMERA NO. —

PERFORMANCE ESTIMATE

Pass No.	Frames Camera No.		Feet Camera No.		Latitude Degrees		Time On Hr. Min.	Dur Sec.	Solar Angle		Exp. Time Milliseconds		Ramp No.	Instr. On Sec Up Ramp
	72	73	72	73	On	Off			On	Off	On	Off		
0E	8	8	21	21			18/	45			6.9	6.9	3	—
1DE	12	12	31	31	56	53	02 24	66	25	25	6.9	6.9	3	—
2AX1	98	98	258	258	48	68	03 38	404	14	22	6.4	5.6	3	227
3AY1	94	94	248	248	49	67	05 10	381	15	21	6.3	5.5	8	274
3DY1	55	55	145	145	60	51	05 26	158	26	24	4.3	4.0	8	12.39
4AY1	41	41	108	108	66	71	06 47	154	21	23	5.7	5.4	8	582
4DY1	35	35	92	92	52	47	07 00	98	24	24	4.0	3.8	8	1371
5DY1	80	80	211	211	61	49	08 29	227	26	24	4.3	3.9	8	1218
5DY2	46	46	121	121	43	37	08 34	122	23	21	3.7	3.4	8	1512
6DY1	39	38	103	100	60	52	10 01	137	26	25	5.6	5.2	8	1255
6DY2	51	50	134	132	43	35	10 06	164	23	20	4.6	4.2	8	1516
7DY1	40	39	105	103	59	53	11 33	140	26	25	5.3	5.0	8	1235
7DY2	36	35	95	92	49	43	11 36	120	24	23	4.9	4.6	8	1420
8DY1	36	35	95	92	70	64	13 01	138	26	26	5.9	5.6	8	1027
8DY2	65	64	171	169	59	47	13 05	225	26	24	5.4	4.8	8	12.37
9AE	7	7	18	18	26	29	14 14	48	5	7	9.0	9.0	8	—
9DX1	92	91	243	240	60	42	14 36	309	26	22	5.3	4.5	3	1240
13AY1	34	34	89	89	50	59	20 27	176	15	19	7.7	7.2	8	277
17AX1	33	33	87	87	50	59	19/ 02 34	122	15	19	8.2	7.6	3	302
18AX1	78	77	206	203	49	69	04 06	403	15	22	8.2	7.0	3	306
19AX1	92	91	243	240	49	71	05 37	466	15	23	8.2	6.8	3	306
20AX1	29	29	76	76	67	71	07 14	139	21	23	7.2	6.9	3	644
20DX1	59	58	155	153	53	41	07 27	204	25	22	5.2	4.6	3	1395
21DX1	60	60	158	158	60	47	08 57	218	26	24	5.5	4.9	3	1276
21DX2	97	95	256	250	43	23	09 01	312	23	16	4.7	4.1	3	15765
24DX1	134	132	354	348	63	35	13 31	470	26	20	5.7	4.4	3	1207
25AE	7	7	18	18	26	29	14 41	48	5	7	9.0	9.0	3	—
29AX1	24	24	63	63	53	60	20 55	118	16	19	7.1	6.8	4	406
30AX1	24	24	63	63	50	57	22 26	121	15	18	7.3	7.0	4	306
31AX1	43	42	113	110	51	62	20/ 23 58	208	16	20	7.2	6.7	4	327
31DX1	15	15	39	39	41	37	00 17	47	22	21	4.2	4.1	4	1566
32AX1	43	42	113	110	49	61	01 29	210	15	19	7.3	6.8	4	311
33AX1	72	71	190	187	53	70	03 02	333	16	23	7.1	6.3	4	366
33DX1	31	31	81	81	65	59	03 15	109	26	26	5.2	5.0	4	1165

SYSTEM NO. 112
VEHICLE NO. 1124
MISSION NO. 9032
CAMERA NOS. 72 & 73

PRE-FLIGHT CYCLE PERIOD: (CAMERA NO. 72)

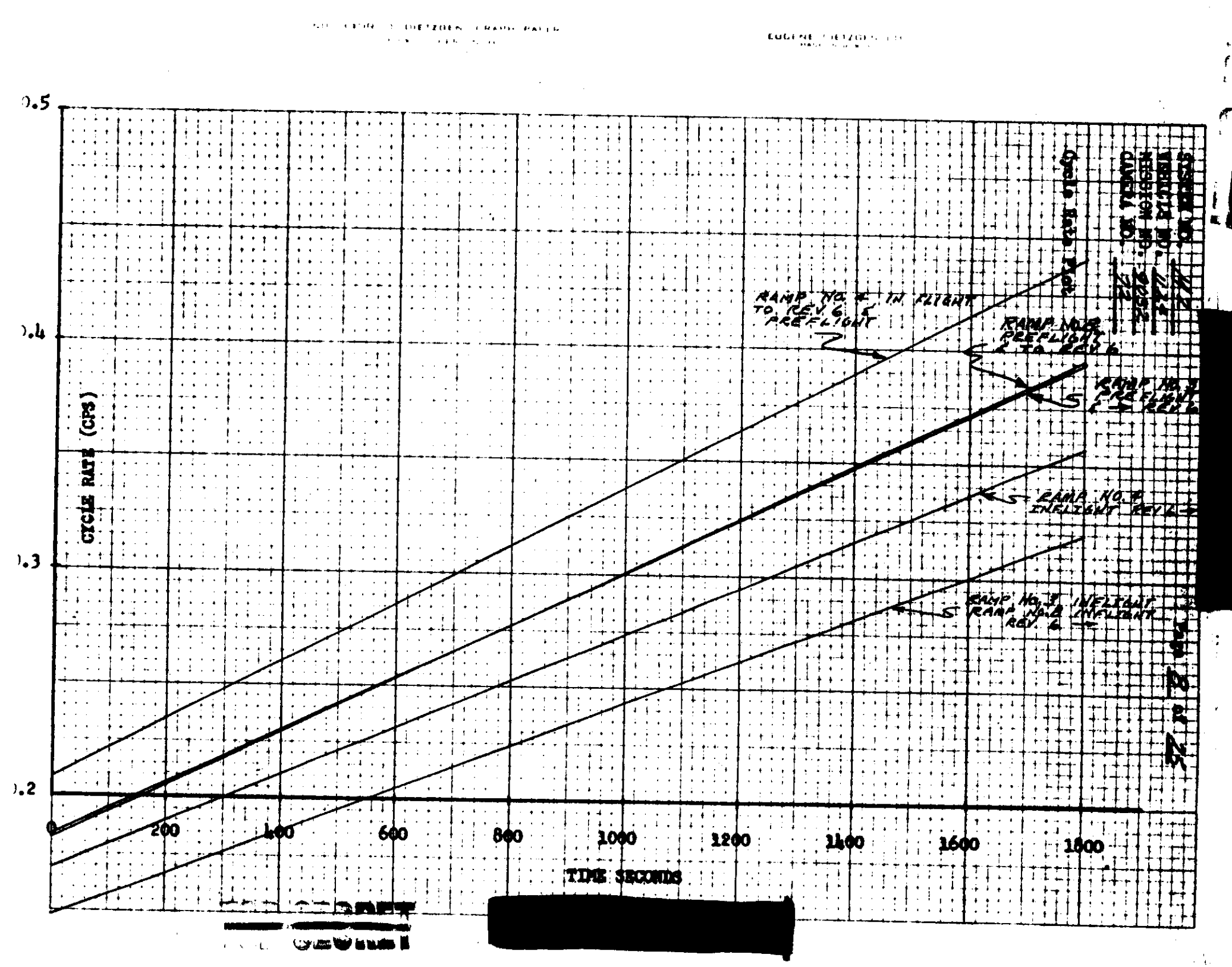
V/H Ramp	Cycle Period Seconds	FMC Rate		Scan Rate		
		Rad. Per Second	In. Per Second	Rad. Per Second	In. Per Second	Exposure Millisec
3 start	5.45	.015	.371	1.151	27.638	7.2
3 End	2.55	.033	.797	2.475	59.414	3.3
4 Start	4.74	.017	.424	1.315	31.573	6.3
4 End	2.24	.037	.893	2.772	66.546	3.0
8 Start	5.37	.015	.370	1.149	27.577	7.3
8 End	2.50	.033	.800	2.483	59.602	3.35

Note: Above values represent actual pre-flight and estimated in-flight values for all operations prior to Rev. No. 6

IN-FLIGHT CYCLE PERIOD: (CAMERA NO. 72)

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
See Note	3 Start	6.73	.012	.300	.932	22.386	8.9
	3 End	3.13	.026	.646	2.005	48.126	4.2
	4 Start	5.89	.014	.343	1.065	25.574	7.8
	4 End	2.79	.030	.724	2.245	53.902	3.7
	8 Start	6.75	.013	.299	.931	22.338	8.9
	8 End	3.12	.027	.648	2.011	48.278	4.1

Note: Above values are estimated in-flight values. for operations after Rev 6.


0.5
0.4
0.3
0.2
CYCLE RATE (CPS)
0
200
400
600
800
1000
1200
1400
1600
1800
TIME SECONDS
RAMP NO. 5 IN FLIGHT TO REV. 6 PREFLIGHT
RAMP NO. 5 PREFLIGHT TO REV. 6
RAMP NO. 5 IN FLIGHT REV. 6
RAMP NO. 3 INFLIGHT REV. 6
RAMP NO. 3 INFLIGHT
RAMP NO. 2 INFLIGHT REV. 6

SYSTEM NO. M2
VEHICLE NO. 1124
MISSION NO. 9032
CAMERA NOS. 72 & 73

PRE-FLIGHT CYCLE PERIOD: (CAMERA NO. 73)

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	5.51	.015	.374	1.162	27.888	7.2
3 End	2.55	.034	.816	2.532	60.779	3.3
4 Start	4.82	.027	.429	1.333	31.988	6.3
4 End	2.25	.038	.915	2.838	68.109	2.9
8 Start	5.48	.015	.375	1.164	27.940	7.2
8 End	2.55	.034	.816	2.532	60.779	3.3

Note: Above values represent actual pre-flight and estimated in-flight values for operation prior to Rev. 6.

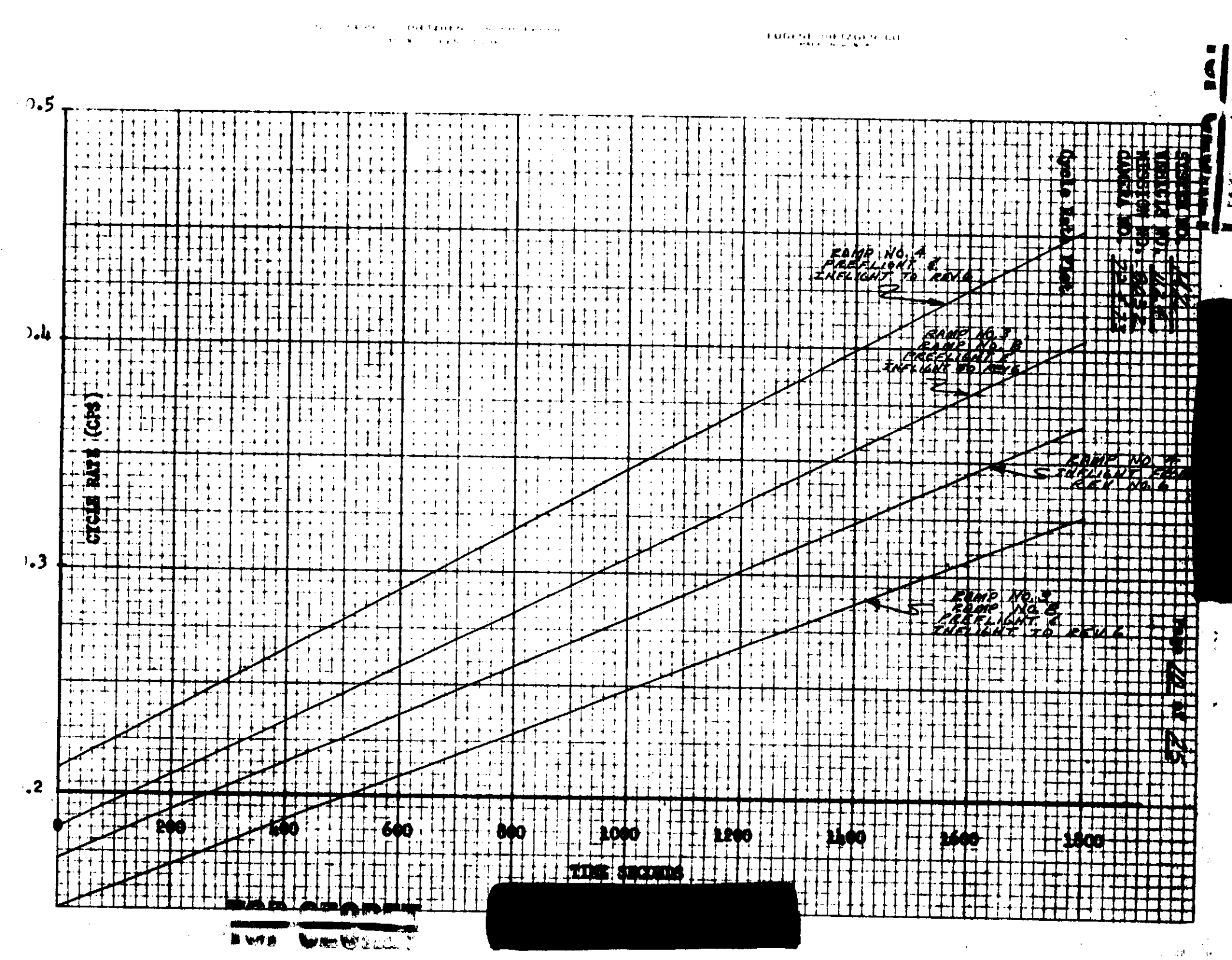
IN-FLIGHT CYCLE PERIOD: (CAMERA NO. 73)

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
See Note	3 start	6.67	.013	.303	.94	22.59	8.9
	3 End	3.06	.028	.661	2.051	49.231	4.1
	4 Start	5.81	.015	.348	1.079	25.91	7.7
	4 End	2.73	031	.740	2.298	55.168	3.6
	8 start	6.66	.012	.304	.94	22.627	8.8
	8 End	3.05	.027	.664	2.059	49.41	4.0

Note: Above values are estimated in-flight values for operations After Rev 6.

[redacted]

[redacted]


0.5
0.4
0.3
.2
CYCLE RATE (CPS)
RAMP NO. A
PREFLIGHT &
INFLIGHT TO REVS
RAMP NO. 3
RAMP NO. B
PREFLIGHT &
INFLIGHT TO REVS
RAMP NO. 3
RAMP NO. B
PREFLIGHT &
INFLIGHT TO REVS
200
400
600
800
1000
1200
1400
1600
1800
TIME SECONDS

LENS DATA SUMMARY: (Main Camera No. 72)

Lens Serial No. F8

Filter Type WRATTEN 21

Equivalent Operational Focal Length 609.627 MM

Resolution:

Static:

	Lines/MM	Film Type	Target Contrast
Bench Test	196.4	SO243	High
Other	None		

Dynamic:

Itek Pre-Vibration	175	SO132	High
Itek Post Vibration	192	SO132	High
AP Pre-HATS	145.5	SO132	High
AP Post-HATS	168.4	SO132	High
Other	None		

Note: Itek Post Vibration Resolution of 192 lines/MM Reported In Message No. [redacted] dated 4/18/62

Distortion - Positive (Pincushion)

Angle Off Axis Deg.	3	2	1	0	1	2	3		
Distortion Millimeters	.011	.005	.000	.000	.002	.005	.005		

[redacted]

SYSTEM NO. M2 [redacted] Page 12 of 25
VEHICLE NO. 1124
MISSION NO. 9032
CAMERA NOS. 72 and 73

[redacted]

LENS DATA SUMMARY: (Horizon Cameras for Main Camera No. 72)

	Take-Up	Supply
Lens Serial No.	806561	806862
Exposure Time	1/50 Sec.	1/50 Sec.
Filter Type	WRATTEN 25	WRATTEN 25
Aperture	F6.8	F6.8
Operational Focal Length	88.8 MM	89.00 MM
Radial Distortion:		
10° off Axis	.005 MM	.006 MM
20° off Axis	.037 MM	.035 MM
Tangential Distortion (Maximum Vector)	.008 MM	.005 MM

Resolution:

Angle off Axis Deg.	0	5	10	15	20
Radial Resolution	56	49	42	30	32
Tangential Resolution	63	49	49	29	32

43.1 Lines/MM Avg.

0	5	10	15	20	22.5
51	49	44	39	32	34
51	49	44	36	29	27

40.2 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]

SYSTEM NO. M2
VEHICLE NO. 1124
MISSION NO. 9032
CAMERA NOS. 72 and 73

[redacted]

LENS DATA SUMMARY: (Main Camera No. 73)

Lens Serial No. I4

Filter Type WRATTEN 21

Equivalent Operational Focal Length 609.699 MM

Resolution:

Static:

	Lines/MM	Film Type	Target Contrast
Bench Test	202.2	SO243	High
Other	NONE		

Dynamic:

Itek Pre-Vibration	158	SO132	High
Itek Post Vibration	175	SO132	High
AP Pre-HATS	144	SO132	High
AP Post-HATS	131	SO132	High
Other	NONE		

Note: Itek Post Vibration Resolution of 175 lines/MM Reported In Message No. [redacted] dated 4/18/62

Distortion - Positive (Pincushion)

Angle Off Axis Deg.	357	358	359	0	1	2	3		
Distortion Millimeters	.014	.001	.000	.000	.000	.006	.008		

[redacted]

SYSTEM NO. M2 [redacted] Page 14 of 25
VEHICLE NO. 1124
MISSION NO. 9032
CAMERA NOS. 72 And 73

TOP SECRET
[redacted]

LENS DATA SUMMARY: (Horizon Cameras for Main Camera No. 73)

	Take-Up	Supply
Lens Serial No.	803796	806560
Exposure Time	1/50 Sec.	1/50 Sec.
Filter Type	WRATTEN 25	WRATTEN 25
Aperture	F6.8	F6.8
Operational Focal Length	89.0 MM	89.2 MM
Radial Distortion:		
10° off Axis	.004 MM	.006 MM
20° off Axis	.034 MM	.041 MM
Tangential Distortion (Maximum Vector)	.003 MM	.012 MM

Resolution:

Angle off Axis Deg.	0	5	10	15	20
Radial Resolution	44	42	27	18	13
Tangential Resolution	44	42	27	20	15

29.2 Lines/MM Avg.

0	5	10	15	20
56	50	44	34	32
51	47	39	34	29

41.6 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

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.

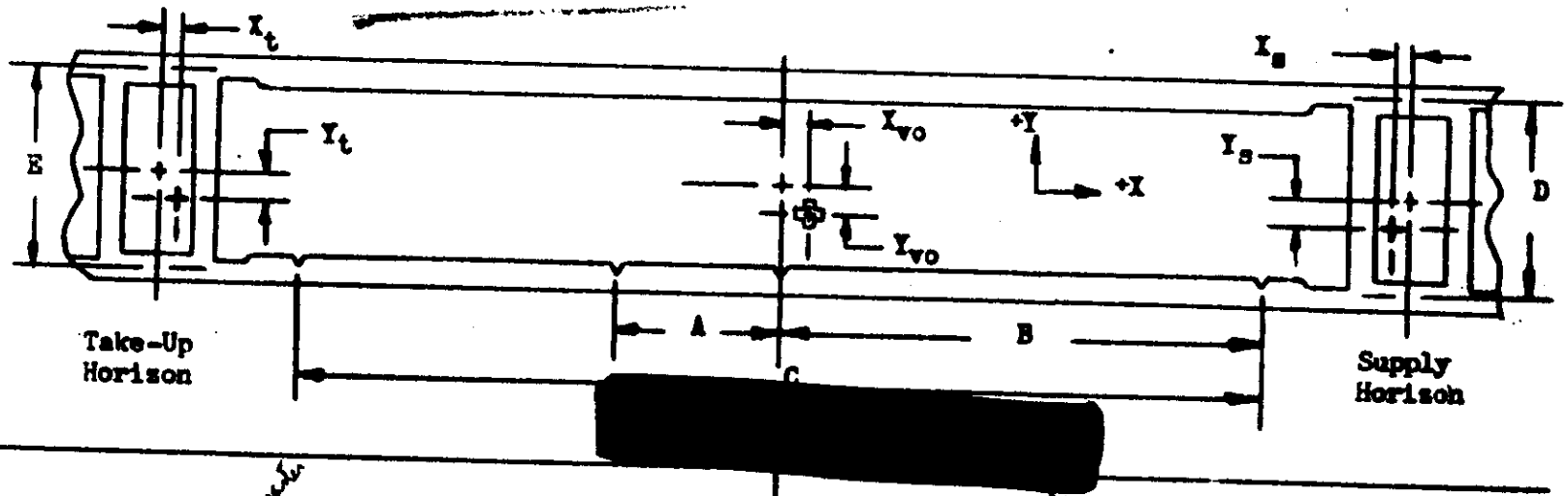
9.0 The format dimensions are measured to the best estimate of format edge.

10.0 Measurement of the angle between the indicated axis of the 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.

11.0 Similarly, the angle between the plane and the indicated axis on the main format is uncontrolled and assumed to be zero.

[redacted]

[redacted]



[redacted]

Camera No. 72 Format Viewed with Negative Emulsion Down

Vehicle Motion ↓ Scan Direction →

X_t -0.561 Y_t +0.040 A 76.067

X_s +0.511 Y_s +0.346 B 355.283

X_{vo} -0.123 Y_{vo} -2.790 C 712.017

D 56.416 E 56.490

Format Dimensions:

	Supply	Main	Take-Up
Height	53.4	55.9	53.4
Width	22.9	768.2	22.9

Camera No. 73 Format Viewed with Negative Emulsion Down

Vehicle Motion ↓ Scan Direction →

X_t +0.598 Y_t +0.034 A 76.100

X_s -0.254 Y_s +0.237 B 355.150

X_{vo} +0.592 Y_{vo} +2.212 C 711.836

D 56.486 E 56.481

Format Dimensions:

	Supply	Main	Take-Up
Height	53.3	56.4	53.4
Width	22.9	756.6	22.9

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

-I+Y	+I+Y
-I-I	+I-I

[redacted]

SYSTEM No. M2
VEHICLE NO. 1124
MISSION NO. 9012
CAMERA NOS. 72 & 73

FORMAT DIMENSIONS: (MAIN CAMERAS)

SYSTEM NO. M2
VEHICLE NO. 1124
MISSION NO. 9032
CAMERA NOS. 72 & 73

[redacted]

FORMAT LAYOUT: (MAIN CAMERAS)

[redacted]

~~TOP SECRET~~

OPERATIONAL TNX NO. [redacted]

A. Mission No. [redacted]

B. Vehicle 112h

C. Instrument Numbers

1. Master 72
2. Slave 73
3. Framing *

D. Lens Serial Numbers

1. Master
   a. F8
   b. 806561
   c. 806862
2. Slave
   a. 14
   b. 803796
   c. 806560
3. Framing
   *

E. Operational Focal Lengths (MM)

1. Master
   a. 609.627
   b. 88.8
   c. 89.00
2. Slave
   a. 609.699
   b. 89.0
   c. 89.2
3. Framing
   *

[redacted]

F. Lens Distortion

1. Master

a. Main Lens

MM	Deg.
.011	3
.005	2
.000	1
.000	0
.002	1
.005	2
.005	3

b. Take-Up Horizon

1. Radial

MM	Deg.
.005	10
.037	20

2. Tangential

2. .008 Max Vector

c. Supply Horizon

1. Radial

MM	Deg.
.006	10
.035	20

2. Tangential

2. .005 Max Vector

2. Slave

a. Main Lens

MM	Deg.
.014	357
.001	358
.000	359
.000	0

F. Lens Distortion (Continued)

.000	1
.006	2
.008	3

b. Take-Up Horison

1. Radial

MM	Deg.
.004	10
.034	20

2. Tangential .003 Max. Vector

c. Supply Horison

1. Radial

MM	Deg.
.006	10
.041	20

2. Tangential .012 Max. Vector

3. Framing *

MM	Deg.

[redacted]

I. Angular Relation Between Cameras (MM)

1. Master

a. Horizon Offset

b. Vertical Offset

2. Slave

a. Horizon Offset

b. Vertical Offset

3. Angle Between Master and Slave

4. Direction of X Dimensions

Direction of Y Dimensions

[redacted]

I. Angular Relation Between Cameras (M

1. Master

a.

XT - .561

YT + .040

XS + .511

YS + .346

b.

XVO - .123

YVO - 2.790

2. Slave

a.

XT + .598

YT + .034

XS - .254

YS + .237

b.

XVO + .592

YVO + 2.212

3. 30° 3' 16"

4. X Scan

Y Flight

Note: XT = X Sub T

XS = X Sub S

XVO = X Sub VO

Etc.

Item I 3 calculated assuming a set-up error of zero.

[redacted]

[redacted]

G. Resolution

1. Master (L/MM Avg)

a. Main Lens

b. Take-Up Horizon

c. Supply Horizon

2. Slave (L/MM Avg)

a. Main Lens

b. Take-Up Horizon

c. Supply Horizon

3. Framing (L/MM AWAR)

H. Platen And Format Dimensions (MM)

1. Master

A. Shrinkage Marker Dimension

B. Shrinkage Marker Dimension

C. Shrinkage Marker Dimension

D. Horizon Fiducial Spacing

E. Horizon Fiducial Spacing

2. Slave

A.

B.

C.

D.

E.

3. Framing

G. Resolution

1. Master (L/MM Avg)

a. 192

b. 43.1

c. 40.2

2. Slave (L/MM Avg)

a. 175

b. 29.2

c. 41.6

3. Framing * L/MM AWAR

H. Platen And Format Dimensions (MM)

1. Master

A. 76.067

B. 355.283

C. 712.017

D. 56.416

E. 56.490

2. Slave

A. 76.100

B. 355.150

C. 711.835

D. 56.486

E. 56.481

3. Framing

J. IMC Ramps And Cycle Periods

Launch _____

1. Master

2. Slave

[redacted]

J. IMC Ramps And Cycle Periods

Launch 3

1. Master

Ramp	C.P. Start	C.P. End
1	6.60	2.74
2	5.98	2.34
3	5.41	2.55
4	4.74	2.24
5	4.07	2.47
6	6.66	2.73
7	5.92	2.33
8	5.37	2.50
9	4.72	2.24
10	4.06	2.46

2. Slave

Ramp	C.P. Start	C.P. End
1	6.73	2.76
2	6.08	2.36
3	5.51	2.55
4	4.82	2.25
5	4.12	2.48
6	6.80	2.74
7	6.05	2.34
8	5.48	2.55
9	4.79	2.24
10	4.09	2.46

[redacted]

[redacted]

K. Filters And Exposures

1. Master

a. Main Lens

1. Filter Type
2. Aperture
3. Exposure
4. Slit Width

b. Horizon Optics

1. Filter Type
2. Aperture Setting
3. Exposure Time

2. Slave

a. Main Lens

1. Filter Type
2. Aperture
3. Exposure
4. Slit Width

b. Horizon Optics

1. Filter Type
2. Aperture Setting
3. Exposure Time

3. Framing

a. Filter Type

b. Aperture Setting

c. Exposure Time

K. Filters And Exposures

1. Master

a.

1. Wratten 21
2. F 3.5
3. 1/270 Sec Avg.
4. .200 Inch

b.

1. Wratten 25
2. F 6.8
3. 1/50 Sec

2. Slave

a.

1. Wratten 21
2. F 3.5
3. 1/270 Sec Avg.
4. .200 Inch.

b.

1. Wratten 25
2. F 6.8
3. 1/50 Sec

3. Framing *

a. _____

b. _____

c. _____ Sec

[redacted]

L. Film

1. Master

a. Film Type

b. Film Identification

c. Box Serial Number

2. Slave

a. Film Type

b. Film Identification

c. Box Serial Number

3. Framing

a. Film Type

b. Film Identification

c. Box Serial Number

L. Film

1. Master

a. SO 132

b. 7J-23-7600
26-4-3-2
39.2-1S-406

c. 1032

2. Slave

a. SO 132

b. 7J-23-7600
26-4-3-2
39.4-1S-319

c. 1009

3. Framing *

a. _____

b. _____

_____

_____

c. _____

*Framing not carried on this mission

[redacted]