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20 Pages
(Including Cover Sheet)

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CORONA "M" FLIGHT DATA BOOK

SYSTEM NO. M22

VEHICLE NO. 1166

MISSION NO. 9056

Prepared by: [redacted]

Checked by: [redacted]

Approved by: [redacted]

Approved by: [redacted]

Approved by: [redacted]

[redacted]

[redacted]

SYSTEM NO. M22
VEHICLE NO. 1166
MISSION NO. 9056
CAMERA NOS. 110 & 111

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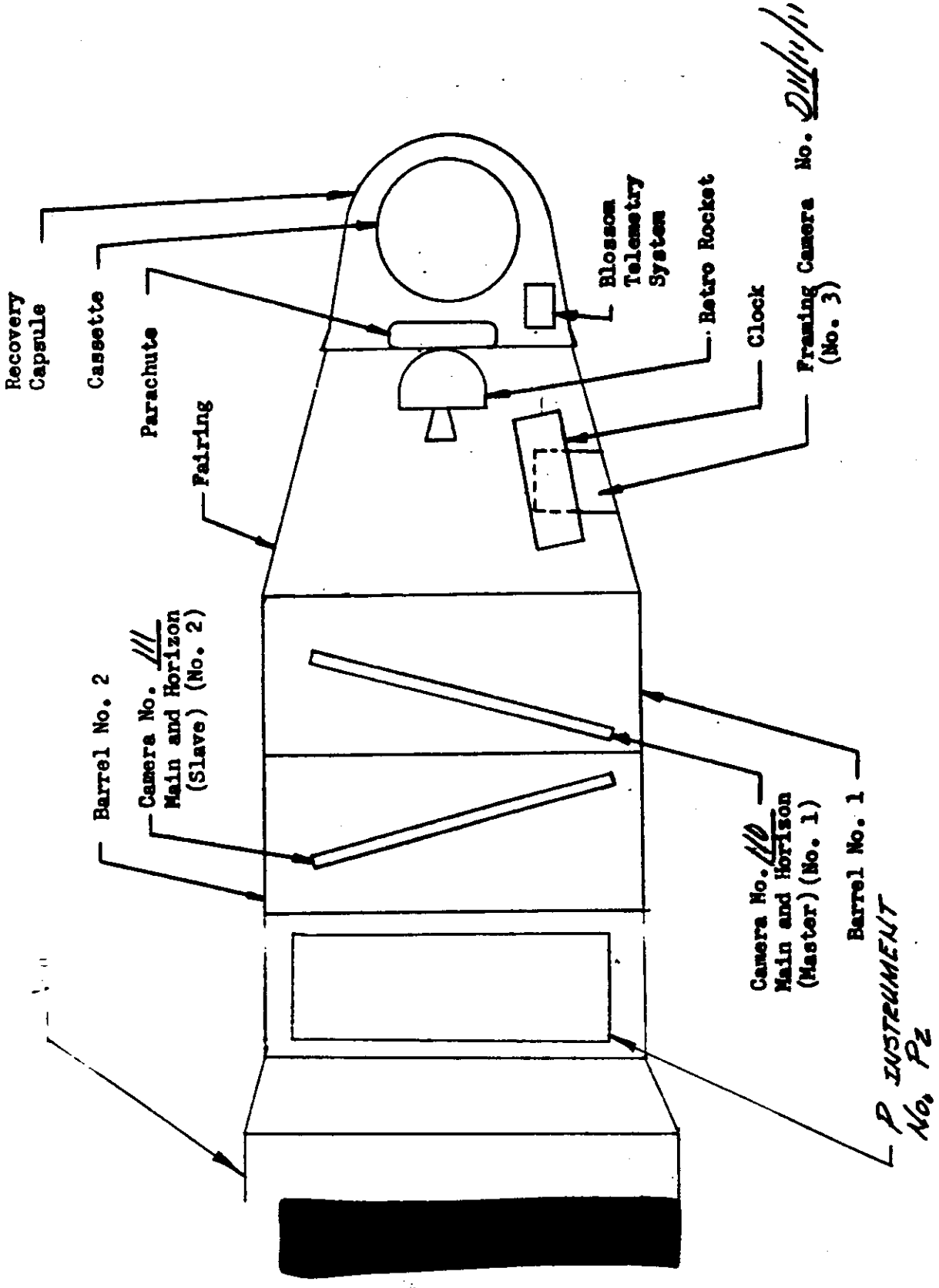
[redacted]

SYSTEM NO. M22
VEHICLE NO. 1166
MISSION NO. 3056
CAMERA NOS. 110 & 111

VEHICLE LAYOUT:



*** NOTICE OF MISSING PAGES ***

PAGE 4 IS MISSING IN THE ORIGINAL COPY.

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SYSTEM NO. M22
VEHICLE NO. 1166
MISSION NO. 9036
CAMERA NOS. 110 & 111

[redacted]

PRE-LAUNCH INFORMATION:

Command settings at launch:

Command	4	8	9	10	11	12	15
Setting	1	3	1	5	4	11	1

Main Camera Settings:	Camera NO. 110	Camera NO. 111
Main Optics Slit Width	0.200 in.	0.200 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	1/500 sec.	2 sec.
Aperture Setting	F 4.5	F 1.9
Filter Type	WRATTEN 21	NONE

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

Film:	Camera No. 110	Camera No. 111	Framing Camera (S/I) Terrain	Framing Camera (S/I) Stellar
Type	TI23(S0132)	TI23(S0132)	TI33(S0130)	S0130/S0102
Length	7800 ft.	7800 ft.	135 ft.	75 ft.
Splices	2	2	NONE	1
Real Data	7-14-5-10-2	7-16-13-10-2	1-6-2-3	4400/4401

[redacted]

[redacted]

[redacted]

SYSTEM NO. M-22
VEHICLE NO. 1166
MISSION NO. 9056
CAMERA NOS. 110, 111

[redacted]

PRE-FLIGHT CYCLE PERIOD. (CAMERA NO. 110)

V/H NO.	RAMP TIME	CYCLE PERIOD SECONDS	FMC RATE RAD./ SECOND	FMC RATE IN./ SECOND	SCAN RATE RAD./ SECOND	SCAN RATE IN./ SECOND	EXPOSURE MILLISEC
3	0	4.74	.017	.427	1.325	31.813	6.287
3	1800	2.49	.033	.813	2.523	60.560	3.302
8	0	5.03	.016	.402	1.249	29.979	6.671
8	1800	2.49	.033	.813	2.523	60.560	3.302

IN-FLIGHT CYCLE PERIOD. (CAMERA NO. 110)

REV NO.	V/H NO.	RAMP TIME	CYCLE PERIOD SECONDS	FMC RATE RAD./ SECOND	FMC RATE IN./ SECOND	SCAN RATE RAD./ SECOND	SCAN RATE IN./ SECOND	EXPOSURE MILLISEC
9	8	295	4.19	.020	.483	1.499	35.989	5.557
25	8	295	4.01	.021	.505	1.566	37.605	5.318
40	8	400	4.12	.020	.491	1.525	36.601	5.464

NOTE. ACTUAL V/H RAMP FOR ORBIT 40 WAS RAMP 7 HOWEVER, CYCLE RATE WAS EQUAL TO NOMINAL RATE FOR RAMP 8 SO DATA FOR RAMP 7 IS NOT INCLUDED AS THESE RAMPS ARE PARALLEL.

[redacted]

[redacted]

[redacted]

SYSTEM NO. M-22 [redacted]
VEHICLE NO. 1166
MISSION NO. 9056
CAMERA NOS. 110, 111

PRE-FLIGHT CYCLE PERIOD. (CAMERA NO. 111)

V/H NO.	RAMP TIME	CYCLE PERIOD SECONDS	FMC RATE RAD./ SECOND	FMC RATE IN./ SECOND	SCAN RATE RAD./ SECOND	SCAN RATE IN./ SECOND	EXPOSURE MILLISEC
3	0	4.69	.017	.431	1.339	32.152	6.220
3	1800	2.51	.033	.806	2.503	60.078	3.329
8	0	4.98	.016	.406	1.261	30.280	6.605
8	1800	2.51	.033	.806	2.503	60.078	3.329

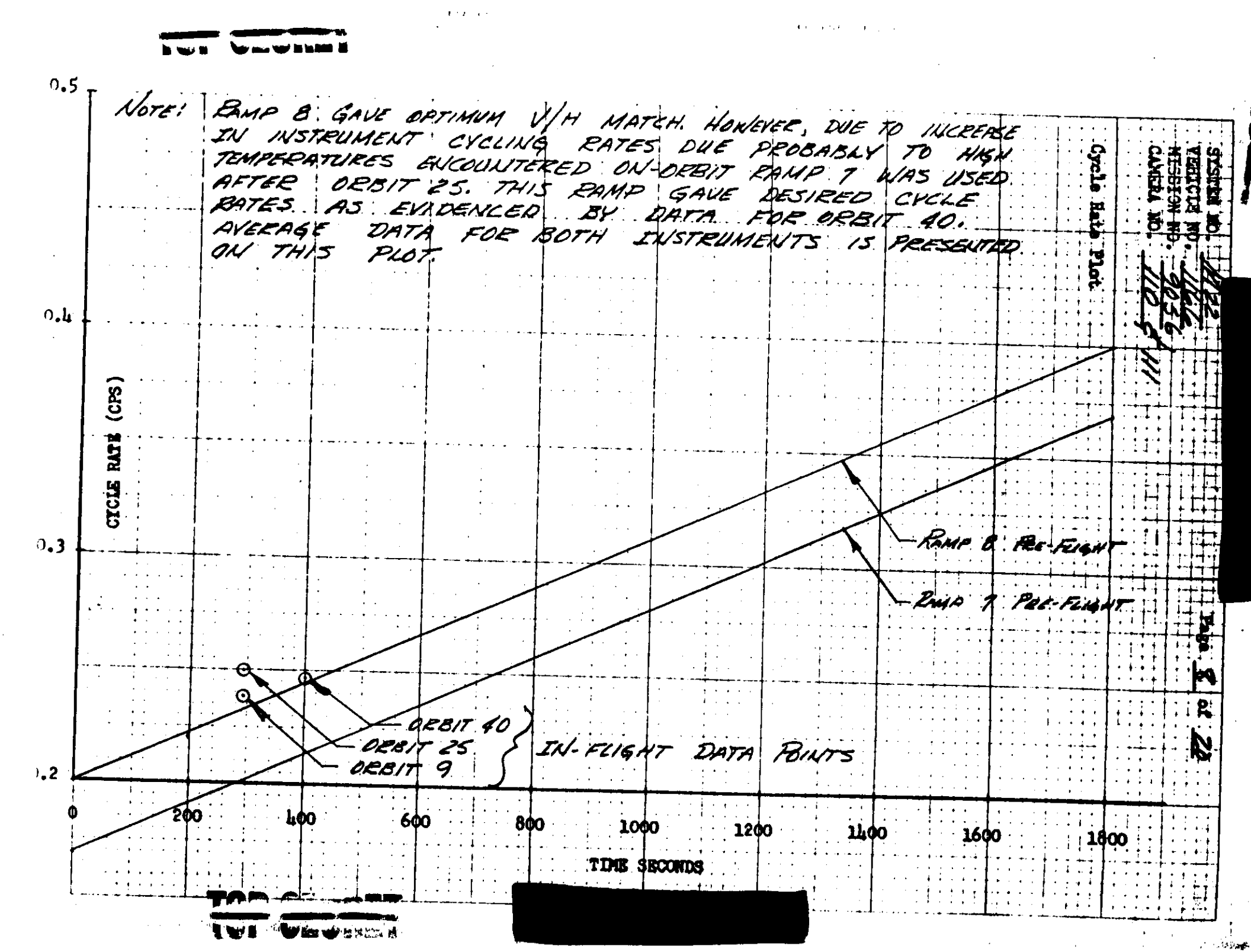
IN-FLIGHT CYCLE PERIOD. (CAMERA NO. 111)

REV NO.	V/H NO.	RAMP TIME	CYCLE PERIOD SECONDS	FMC RATE RAD./ SECOND	FMC RATE IN./ SECOND	SCAN RATE RAD./ SECOND	SCAN RATE IN./ SECOND	EXPOSURE MILLISEC
9	8	295	4.17	.020	.485	1.506	36.162	5.531
25	8	295	3.97	.021	.510	1.582	37.983	5.265
40	8	400	4.09	.020	.495	1.536	36.869	5.425

NOTE. ACTUAL V/H RAMP FOR ORBIT 40 WAS RAMP 7 HOWEVER, CYCLE RATE WAS EQUAL TO NOMINAL RATE FOR RAMP 8 SO DATA FOR RAMP 7 IS NOT INCLUDED AS THESE RAMPS ARE PARALLEL.

[redacted]

[redacted]


NOTE: RAMP B GAVE OPTIMUM V/H MATCH. HOWEVER, DUE TO INCREASE IN INSTRUMENT CYCLING RATES DUE PROBABLY TO HIGH TEMPERATURES ENCOUNTERED ON-ORBIT RAMP 7 WAS USED AFTER ORBIT 25. THIS RAMP GAVE DESIRED CYCLE RATES. AS EVIDENCED BY DATA FOR ORBIT 40. AVERAGE DATA FOR BOTH INSTRUMENTS IS PRESENTED ON THIS PLOT.
Cycle Rate Plot
SYSTEM NO.
VEHICLE NO.
MISSION NO.
CAMERA NO.
CYCLE RATE (CPS)
0.5
0.4
0.3
0.2
RAMP B PRE-FLIGHT
RAMP 7 PRE-FLIGHT
ORBIT 40
ORBIT 25
ORBIT 9
IN-FLIGHT DATA POINTS
0
200
400
600
800
1000
1200
1400
1600
1800
TIME SECONDS

[redacted]

LENS DATA SUMMARY: (Main Camera No. 110)

Lens Serial No. 0492435

Filter Type WRATTEN 21

Equivalent Operational Focal Length 609.602 MM

Resolution:

Static:

	Lines/MM	Film Type	Target Contrast
Bench Test	256.6	S0243	HIGH
Other			

Dynamic:

Itek Pre-Vibration	166	S0132	HIGH
Itek Post Vibration	161	S0132	HIGH
AP	161	S0132	HIGH
AP			
Other			

Note: Itek Post Vibration Resolution of 161 lines/MM Reported In Message No. [redacted] dated

Distortion - Positive (Pincushion)

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

[redacted]

[redacted]

SYSTEM NO. M2[redacted] Page 10 of 20
VEHICLE NO. 1160
MISSION NO. 4036
CAMERA NOS. 110 & 111

[redacted]

LENS DATA SUMMARY: (Horizon Cameras for Main Camera No. 110)

	Take-Up	Supply
Lens Serial No.	807102	807101
Exposure Time	1/100 Sec.	1/100 Sec.
Filter Type	WRATTEN 25	WRATTEN 25
Aperture	F6.8	F6.8
Operational Focal Length	89.0 MM	89.0 MM
Radial Distortion:		
10° off Axis	.006 MM	.001 MM
20° off Axis	.021 MM	.023 MM
Tangential Distortion (Maximum Vector)	.008 MM	.010 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	34	27	29	29	30	51	44	41	37	35	32	27
Tangential Resolution	51	47	39	32	34	27	20	51	37	37	32	30	25	20

36 Lines/MM Avg. 35.6 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. 111)

Lens Serial No. 0532435

Filter Type WRATTEN 21

Equivalent Operational Focal Length 609.704 MM

Resolution:

Static:

	Lines/MM	Film Type	Target Contrast
Bench Test	266.3	S0243	HIGH
Other			

Dynamic:

Itek Pre-Vibration	168	S0132	HIGH
Itek Post Vibration	174	S0132	HIGH
AP	174	S0132	HIGH
AP			
Other			

Note: Itek Post Vibration Resolution of 174 lines/MM Reported In Message No. [redacted] dated _____

Distortion - Positive (Pincushion)

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

[redacted]

[redacted]

SYSTEM NO. M22 [redacted] Page 12 of 20
VEHICLE NO. 1166
MISSION NO. 9036
CAMERA NOS. 110 & 111 [redacted]

LENS DATA SUMMARY: (Horizon Cameras for Main Camera No. 111)

	Take-Up	Supply
Lens Serial No.	806556	806564
Exposure Time	1/100 Sec.	1/100 Sec.
Filter Type	W/RATTEN 25	W/RATTEN 25
Aperture	F6.8	F6.8
Operational Focal Length	88.9 MM	89.1 MM
Radial Distortion:		
10° off Axis	.005 MM	.003 MM
20° off Axis	.035 MM	.034 MM
Tangential Distortion (Maximum Vector)	.008 MM	.003 MM

Resolution:

Angle off Axis Deg.	0	5	10	15	20	22.5		0	5	10	15	20	25	27.5
Radial Resolution	63	49	37	30	29	26		51	47	39	37	32	32	30
Tangential Resolution	56	49	42	29	29	27		44	42	37	33	32	27	20

38.8 Lines/MM Avg. 33.3 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]

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 paralle 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 Paragraph 2 on the format is defined as delta sub M (DM). Measured from the indicated center of format.

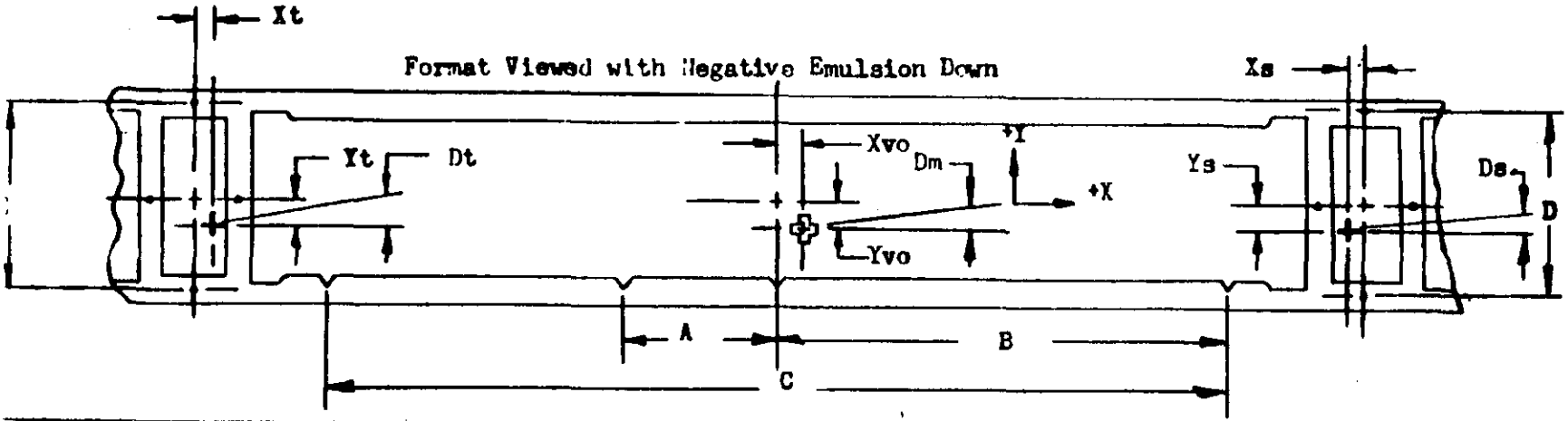
11.0 Measurement of the angle between the indicated axis of the horizon cameras and the line of intersection of the plane defined in Paragraph 2 on the format is made by positioning one target for each horizon format normal ± 5" of arc to the plane defined in Paragraph 2. Dimensions delta sub S (Ds) and delta sub T (Dt) are the angles for the supply and take-up formats respectively. These angles are taken from the indicated center of format.

[redacted]

[redacted]

SYSTEM NO. _____
VEHICLE NO. _____
MISSION NO. _____
CAMERA NOS. _____

FORMAT DIMENSIONS: (MAIN CAMERAS) [redacted]



Camera No. 110 Vehicle Motion ↓ Scan Direction →

A	75,700	Xs	+.301		
B	354,710	Ys	+,523		
C	709.850	Xvo	+,490		
D	56.421	Yvo	+.960		
E	56.478	Ds	-26.3 MINUTES		
Xt	-.034	Dm	+35.6 MINUTES		
Yt	-.003	Dt	-20.3 MINUTES		

Format Dimensions:

	Main	Take-Up	Supply
Height	56.7	53.4	53.4
Width	754.2	22.9	22.9

Camera No. 111 Vehicle Motion ↓ Scan Direction →

A	76.160	Xs	+,501		
B	355.270	Ys	+,756		
C	710,500	Xvo	-,685		
D	56.434	Yvo	-,255		
E	56.443	Ds	-27.0 MINUTES		
Xt	+,289	Dm	+25.5 MINUTES		
Yt	-,773	Dt	+12.5 MINUTES		

Format Dimensions:

	Main	Take-Up	Supply
Height	55.7	53.4	53.4
Width	754.2	22.9	22.9

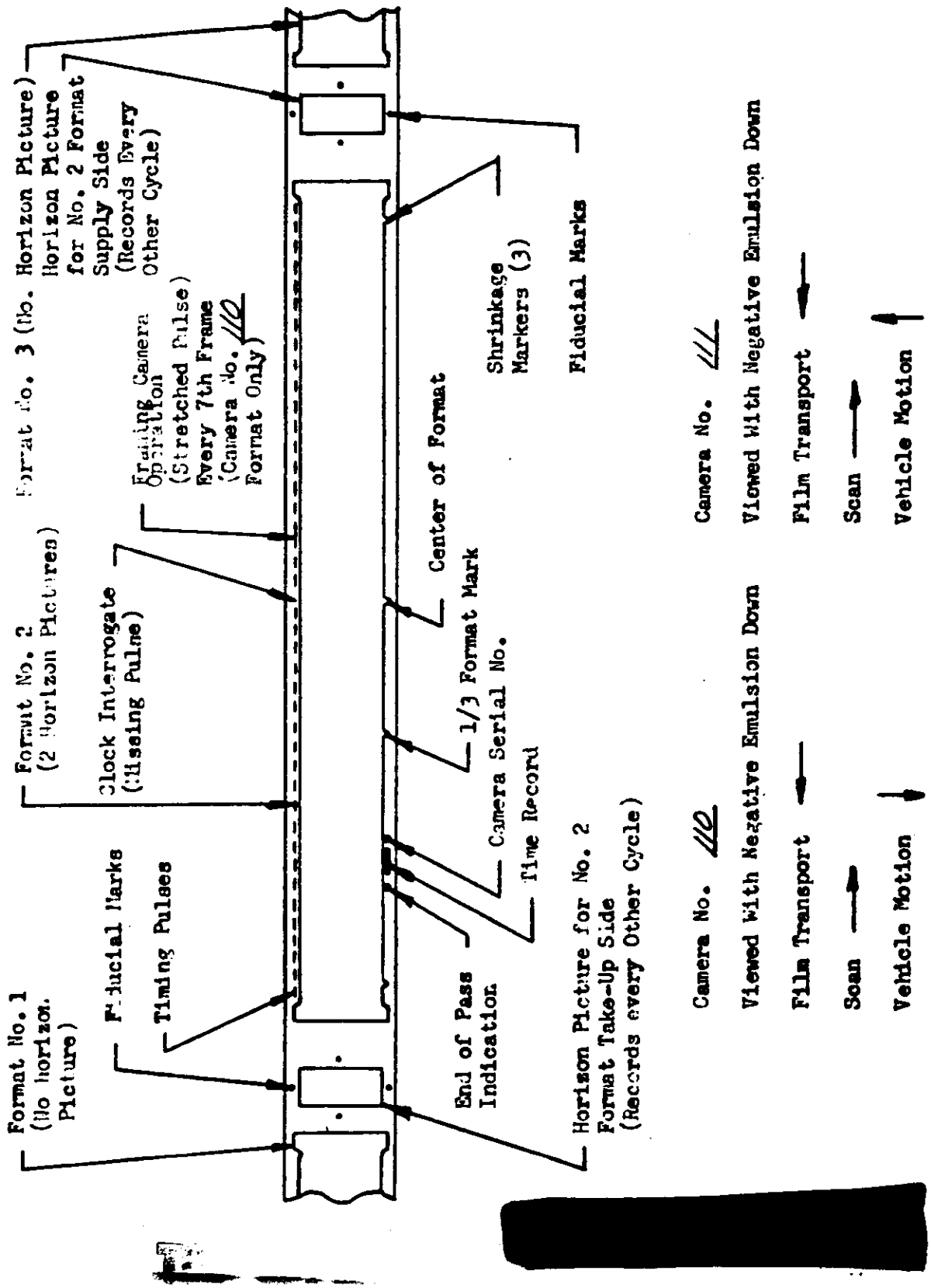
Note: 1. All dimensions are in millimeters and are average dimensions of three formats.
2. Height of main format is taken at center of format.
3. Format sign convention

-X+Y +X+Y
-X-Y +X-Y

[redacted]

SYSTEM NO. M22
VEHICLE NO. 1166
MISSION NO. 9056
CAMERA NOS. 110 & 111

FORMAT LAYOUT: (MAIN CAMERAS)



(INDEX)

LENS DATA SUMMARY: (Framing Camera No. DII) (TERRAIN Lens)

Lens Serial No. 809925

Reseau Serial No. 11

Filter Type WRATTEN 21

Aperture F4.5

Exposure Time 1/500 Sec.

Equivalent Focal Length 38.45 MM Operational Focal Length 38.45 MM

Resolution: 71 Lines/MM AWAR

Angle off axis	0	10	20	30	35
Resolution L/MM High Contrast	101	118	113	62	57
Resolution L/MM Low Contrast	71	83	83	53	44

Note: Resolution data read from SO130 Film

Distortion:

Angle off Axis Deg.	0	10	20	30	35				
Distortion Millimeters	.000	.020	.069	.150	.170				

Perpendicularity of Reseau to Optical Axis .021 MM IN 57.15 MM

Date of Stellar Calibration _____

Knee Calibration _____ Deg. _____ Min. _____ Sec.

Location of Principal Point:

X −.019 MM Y −.018 MM

[redacted]

LENS DATA SUMMARY: (Framing Camera No. D11) (STELLAR Lens)

Lens Serial No. 80291

Reseau Serial No. 11

Filter Type NONE

Aperture F1.9

Exposure Time 2 Sec.

Equivalent Focal Length 83.81 MM Operational Focal Length 83.71 MM

Resolution: _____ Lines/MM AVAR

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	.007					

Perpendicularity of Reseau to Optical Axis .000 IN 35 MM

Date of Stellar Calibration _____

Knee Calibration _____ Deg. _____ Min. _____ Sec.

Location of Principal Point:

X −.045 MM Y +.051 MM

[redacted]

[redacted]

SYSTEM NO. M-22
VEHICLE NO. 1166
MISSION NO. 9056
CAMERA NOS. 110, 111

[redacted]

PRELIMINARY CLOCK CORRELATION.

ORBIT	SYSTEM TIME	CLOCK TIME	DIFFERENCE
09	49818.667	74420.314	
25	50386.272	161387.924	PLUS 0.005
31P 1	84507.756	195504.432	-4.976
31P 2	84537.239	195533.913	-4.976
31P 3	84603.252	195599.869	
40	45498.203	242899.869	PLUS 0.014
47P	85104.945	282506.605	-0.006

P WITH ORBIT NUMBER DESIGNATES P OPERATIONS WITH THE FOLLOWING BINARY DATA. LSB IS FIRST BIT. 3 CLOCK WORDS ARE ON ORBIT 31.

31P 1	00001100100101001110010111010
31P 2	10011010001110011110010111010
31P 3	00011100011110011110010111010
47P	10110110101011010110101100001

THE HIGH ERROR ON ORBIT 31 APPEARS TO BE DUE TO A SYSTEM TIME ERROR.

DATA FOR E, AND 4C ARE CORRELATED TO THE 2C DATA.

[redacted]

[redacted]

SYSTEM No. M22
VEHICLE No. 1166
MISSION No. 9056
CAMERA Nos. IIC & IIL

[redacted]

INSTRUMENT DATA:

SERIAL No. P2

RESOLUTION:

ON AXIS 34 L/MM

RIGHT HAND SIDE 32.5 L/MM

LEFT HAND SIDE 29.5 L/MM

FOCAL LENGTH: 229.0 INCHES

SLIT WIDTH 0.060 INCH

FILTER TYPE: WRATTEN 12

FILM:

TYPE SC 130

DESIGNATION 70 MM X 500 FT

EMULSION NO. 4000 - [illegible]

[redacted]

SYSTEM No. M22
VEHICLE No. 1166
MISSION No. 9056
P INST No. 2

FORMAT LAYOUT: (P INSTRUMENT)

FORMAT VIEWED WITH EMULSION UP

NOTE: BINARY TIME