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28 Pages
(Including Cover Sheet)

CORONA "J" FLIGHT DATA BOOK

SYSTEM NO. J1

VEHICLE NO. 1162

MISSION NO. 1001

CAMERA NOS. 114 & 115

Prepared by: [redacted]

Checked by: [redacted]

Approved by: [redacted] nager
Requirement [redacted] Analysis

Approved by: [redacted]

Approved by: [redacted] nager
S. E. [redacted]

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SYSTEM NO. 5/1
VEHICLE NO. 1162
MISSION NO. 1021
CAMERA NOS. 116 & 115

TOP SECRET

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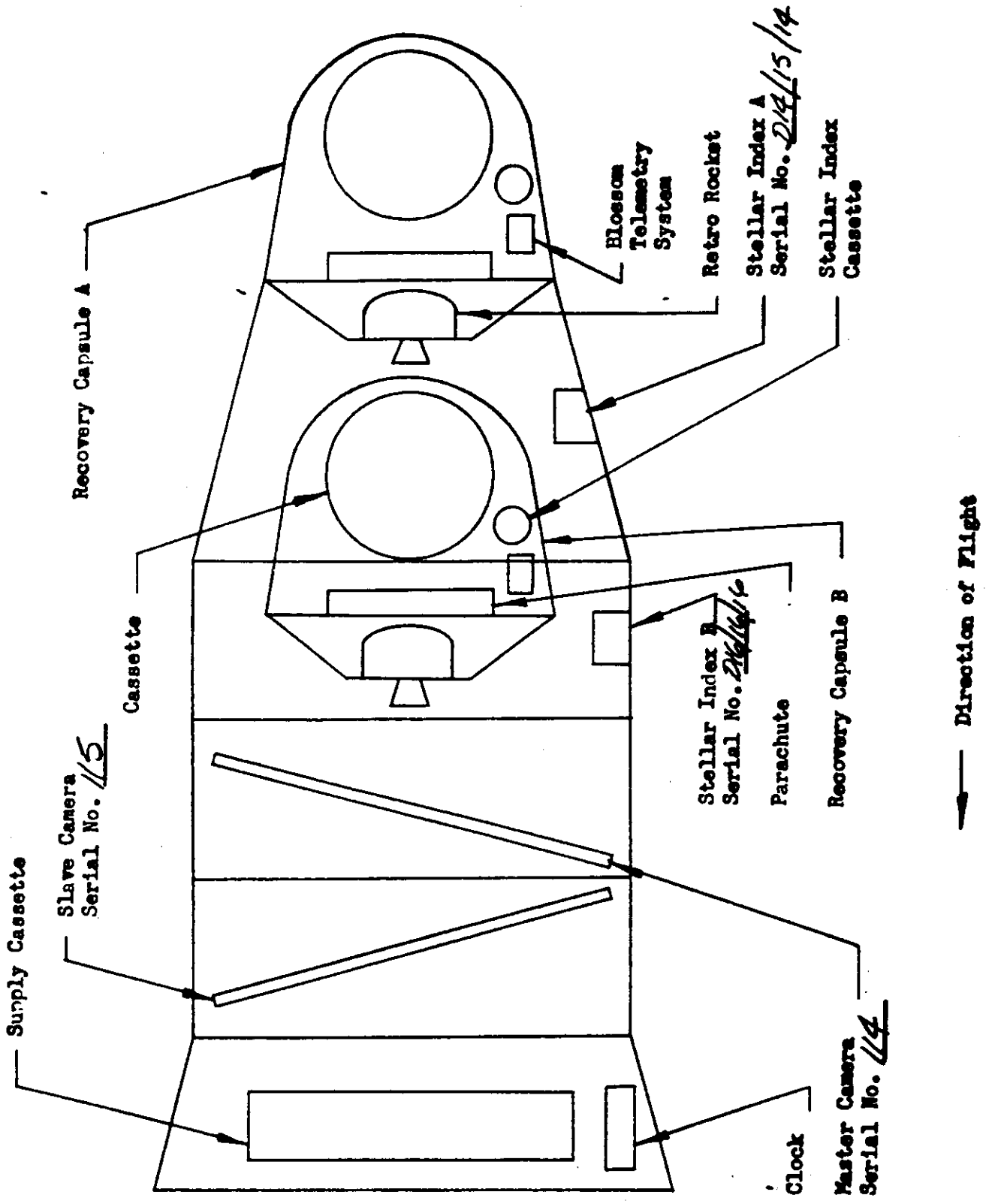
VEHICLE NO. 1162
MISSION NO. 1001
CAMERA NOS. 114 & 115

TOP SECRET

VEHICLE LAYOUT:



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SYSTEM NO. J1
VEHICLE NO. 1102
MISSION NO. 1001
CAMERA NOS. 114 & 115

[redacted]

GENERAL FLIGHT DATA:

Master Camera Serial No. 114

Slave Camera Serial No. 115

Stellar Index "A" Serial No. D14/15/14

Stellar Index "B" Serial No. D16/16/16

Launch Date 8/24/63

Orbital Parameters: (Rev. 49)

Period 90.58 Min. Eccentricity .0193

Perigee 98.95 NM Perigee Latitude 33.8 Deg. N

Apogee 237.81 NM Inclination Angle 75 Deg. N

Recovery Orbit No. 65

Recovery Date 8/28/63

REMARKS:

CORRECTED CALIBRATION DATA FOR MISSION 9056, CAMERA NOS. 110 & 111 IS INCLUDED.

[redacted]

[redacted]

SYSTEM NO. J1
VEHICLE NO. 1162
MISSION NO. 1001
CAMERA NOS. 114 & 115

LENS SETTINGS AND FILM TYPES:

Panoramic Camera Settings:	Camera No. 114	Camera No. 115
Panoramic Optics Slit Width	0.200 in.	0.200 in.
Panoramic Optics Filter Type	WRATTEN 21	WRATTEN 21
Horizon Optics Exp. Time	1/100 sec.	1/100 sec.
Horizon Optics Aperture	F 6.8	F6.8
Horizon Optics Filter Type	WRATTEN 25	WRATTEN 25

Stellar Index Camera Settings:

	Stellar Index A		Stellar Index B	
	Stellar	Index	Stellar	Index
Exposure Time	2 SEC Nom	1/500 Sec	2 SEC Nom	1/500 Sec.
Aperture Setting	F1.9	F4.5	F1.9	F4.5
Filter Type	NONE	WRATTEN 21	NONE	WRATTEN 21

Ratio: One Stellar Index Frame Per 7 Master Camera Frames.

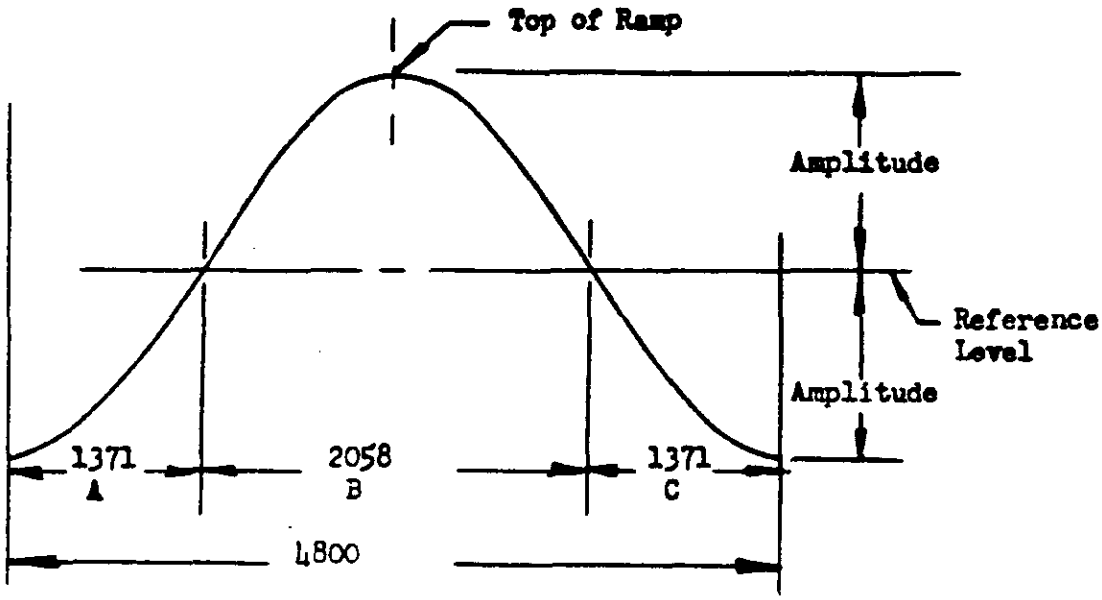
Film:

Panoramic Cameras:	Camera No. 114	Camera No. 115
Type	2J40 (50132)	2J40 (50132
Length	16,000 ft.	16,000 ft.
Splices	4	4
Emul. Data	31-9-10-5-3	31-10-5-3

Stellar Index Cameras:

	Stellar Index A		Stellar Index B	
	Stellar	Index	Stellar	Index
Type	3J34(50102)	7J33(50130)	3J34(50102)	7J33(50130)
Emul. Data	2-3-5-3	9-3-6-3	2-3-5-3	9-3-6-3

V/H RAMP CONFIGURATION AND CONSTANTS:



Cycle Rate Computation:

A. 0 to 1371 Sec Up Ramp: CPS=R+A Sin (1.5 X -1.5707963)

B. 1372 to 3429 Sec Up Ramp: CPS=R+A Sin (2 X -2.0943951)

C. 3430 to 4800 Sec Up Ramp: CPS=R+A Sin (1.5 X - 0.7853982)

FMC Rate Computation:

$$\text{FMC Rate (In/Sec)} = 2\pi\left(\frac{0.3223}{CP}\right) = 2.02507 \times CPS$$

$$\text{FMC Rate (Radians/Sec)} = 2\pi\left(\frac{0.3224}{24\ CP}\right) = 0.84378 \times CPS = \frac{V}{H}$$

Scan Velocity Computation:

$$\text{Scan Velocity (In/Sec)} = \frac{48\pi}{CP} = 150.796 \times CPS$$

$$\text{Scan Velocity (Radians/Sec)} = \frac{48\pi}{24\ CP} = 6.28319 \times CPS$$

$$\text{Exposure Time (Milliseconds)} = 1000\left(\frac{CP \times SLIT}{48\pi}\right) = 6.63146\left(\frac{SLIT}{CPS}\right)$$

WHERE: $X = \frac{\text{Time Up Ramp (Seconds)}}{1309.6179}$ $R = \frac{1}{2}$ (CPS (top) + CPS (bottom))

$A = \frac{1}{2}$ (CPS top - CPS bottom) CP = Camera Cycle Period in Sec/Cycle

CPS = Camera Cycle Rate in Cycles/Sec

SLIT = Slit Width in Inches

SYSTEM NO. TI
VEHICLE NO. 1162
MISSION NO. 1001
CAMERA NOS. 114 & 115

[redacted]

CYCLE PERIOD DATA:

PRE-FLIGHT CYCLE PERIODS:

V/H Ramp Level	V/H Ramp Amplitude	Cycle Period Seconds		Time Up Ramp Sec
		Master	Slave	
3	4	5.32	5.41	0
3	4	2.17	2.22	2400
2	4	4.95	5.00	0
2	4	2.14	2.16	2400

IN-FLIGHT CYCLE PERIODS

V/H Ramp Level	V/H Ramp Amplitude	Cycle Period Seconds		Orbit No.	Time Up Ramp Sec.
		Master	Slave		
2	4	4.46	4.34	9	625
2	4	4.15	4.08	25	725
2	4	4.06	4.01	41	775
2	4	2.12	2.13	47	2275
2	4	3.95	3.90	56	825

[redacted]

J 1 V/H RAMP DATA.

V/H RAMP LEVEL 3. AMPLITUDE 4.

TUR	CYC/SEC	SEC/CYC	V/H RATIO	NO OF CYC
	.1880	5.319	.0170	0
100	.1868	5.295	.0170	19
200	.1914	5.224	.0173	38
300	.1956	5.111	.0176	57
400	.2014	4.963	.0182	77
500	.2088	4.788	.0188	98
600	.2176	4.595	.0196	119
700	.2277	4.390	.0205	141
800	.2390	4.183	.0216	164
900	.2514	3.977	.0227	189
1000	.2646	3.778	.0239	215
1100	.2785	3.589	.0251	242
1200	.2930	3.412	.0265	270
1300	.3078	3.248	.0278	300
1400	.3241	3.084	.0293	332
1500	.3439	2.907	.0311	365
1600	.3631	2.753	.0328	401
1700	.3812	2.622	.0344	438
1800	.3979	2.512	.0359	477
1900	.4127	2.422	.0373	518
2000	.4253	2.350	.0384	560
2100	.4355	2.295	.0393	603
2200	.4429	2.257	.0400	647
2300	.4474	2.234	.0404	691
2400	.4490	2.227	.0406	736
2500	.4474	2.234	.0404	781
2600	.4429	2.257	.0400	825
2700	.4355	2.295	.0393	869
2800	.4253	2.350	.0384	912
2900	.4127	2.422	.0373	954
3000	.3979	2.512	.0359	995
3100	.3812	2.622	.0344	1034
3200	.3631	2.753	.0328	1071
3300	.3439	2.907	.0311	1106
3400	.3241	3.084	.0293	1140
3500	.3078	3.248	.0278	1171
3600	.2930	3.412	.0265	1201
3700	.2785	3.589	.0251	1230
3800	.2646	3.778	.0239	1257
3900	.2514	3.977	.0227	1283
4000	.2390	4.183	.0216	1307
4100	.2277	4.390	.0205	1331
4200	.2176	4.595	.0196	1353
4300	.2088	4.788	.0188	1374
4400	.2014	4.963	.0182	1395
4500	.1956	5.111	.0176	1415
4600	.1914	5.224	.0173	1434
4700	.1868	5.295	.0170	1453
4800	.1880	5.319	.0170	1472

[redacted]

J 1 V/H RAMP DATA.

V/H RAMP LEVEL 2, AMPLITUDE 4.

TUR	CYC/SEC	SEC/CYC	V/H RATIO	NO OF CYC
	.2020	4.950	.0182	0
100	.2026	4.929	.0183	20
200	.2054	4.867	.0185	41
300	.2097	4.767	.0189	61
400	.2156	4.636	.0195	83
500	.2231	4.481	.0201	105
600	.2320	4.308	.0209	127
700	.2423	4.126	.0219	151
800	.2538	3.939	.0229	176
900	.2663	3.754	.0240	202
1000	.2798	3.573	.0253	229
1100	.2939	3.401	.0265	258
1200	.3086	3.239	.0279	288
1300	.3236	3.089	.0292	320
1400	.3402	2.938	.0307	353
1500	.3603	2.775	.0325	388
1600	.3798	2.632	.0343	425
1700	.3982	2.511	.0360	464
1800	.4151	2.408	.0375	504
1900	.4302	2.324	.0389	547
2000	.4430	2.257	.0400	590
2100	.4533	2.205	.0410	635
2200	.4608	2.169	.0416	681
2300	.4654	2.148	.0420	727
240	.4670	2.141	.0422	774
2 00	.4654	2.148	.0420	821
2600	.4608	2.169	.0416	867
2700	.4533	2.205	.0410	913
2800	.4430	2.257	.0400	957
2900	.4302	2.324	.0389	1001
3000	.4151	2.408	.0375	1043
3100	.3982	2.511	.0360	1084
3200	.3798	2.632	.0343	1123
3300	.3603	2.775	.0325	1160
3400	.3402	2.938	.0307	1195
3500	.3236	3.089	.0292	1228
3600	.3086	3.239	.0279	1260
3700	.2939	3.401	.0265	1290
3800	.2798	3.573	.0253	1319
3900	.2663	3.754	.0240	1346
4000	.2538	3.939	.0229	1372
4100	.2423	4.126	.0219	1397
4200	.2320	4.308	.0209	1420
4300	.2231	4.481	.0201	1443
4400	.2156	4.636	.0195	1465
4500	.2097	4.767	.0189	1486
4600	.2054	4.867	.0185	1507
4700	.2026	4.929	.0183	1528
4800	.2020	4.950	.0182	1548

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SYSTEM NO. J1
VEHICLE NO. 1162
MISSION NO. 1001
CAMERA NOS. 114 & 115

LENS DATA SUMMARY: Panoramic Camera No. 114

Lens Serial No. 0562435-I-29

Slit Width 0.200 Inch

Filter Type WRATTEN 21

Equivalent Operational Focal Length 609.12 MM

Resolution:

Static:

	Lines/MM	Film Type	Target Contrast
Bench Test	297	S0243	HIGH
Other	139	S0132	LOW

Dynamic:

Itek Pre-Vibration	161	S0132	HIGH
Itek Post Vibration			
AP	179.2	S0132	HIGH
AP	96.8	S0132	LOW
Other			

Note: ~~Itek Post Vibration~~ AP Resolution of 179.2 lines/MM Reported In Message No. _____ dated _____

Distortion - Positive (Pincushion)

Angle Off Axis Deg.	3	2	1	0					
Distortion Millimeters	.003	.002	.001	.000					

[redacted]

SYSTEM NO. J1
VEHICLE NO. 1162
MISSION NO. 1001
CAMERA NOS. 114 & 115

LENS DATA SUMMARY: (Horizon Cameras for Panoramic Camera No. 114)

	Take-Up	Supply
Lens Serial No.	808968	808629
Exposure Time	1/100 Sec.	1/100 Sec.
Filter Type	WRATTEN 25	WRATTEN 25
Aperture	F6.8	F6.8
Operational Focal Length	89.9 MM	88.96 MM
Radial Distortion:		
10° off Axis	.006 MM	.021 MM
20° off Axis	.044 MM	.068 MM
Tangential Distortion (Maximum Vector)	.006 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	44	37	27	31	29	27	51	49	39	30	30	30	27
Tangential Resolution	56	44	37	33	32	27	22	51	49	39	30	25	29	22

36.2 Lines/MM Avg. 35.8 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. J1
VEHICLE NO. 1162
MISSION NO. 1001
CAMERA NOS. 114&115

LENS DATA SUMMARY: Panoramic Camera No. 115

Lens Serial No. 0582435-E-31

Slit Width 0.200 Inch

Filter Type WRATTEN 21

Equivalent Operational Focal Length 609.63 MM

Resolution:

Static:

	Lines/MM	Film Type	Target Contrast
Bench Test	265.2	S0243	HIGH
Other	135.4	S0243	LOW

Dynamic:

Itek Pre-Vibration	168	S0132	HIGH
Itek Post Vibration			
AP	191.2	S0132	HIGH
AP	93.0	S0132	LOW
Other			

Note: AP ~~Itek Post Vibration~~ Resolution of 191.2 lines/MM Reported In Message No. _____ dated _____

Distortion - Positive (Pincushion)

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

[redacted]

SYSTEM NO. J1
VEHICLE NO. 1162
MISSION NO. 1001
CAMERA NOS. 114 & 115

LENS DATA SUMMARY: (Horizon Cameras for Panoramic Camera No. 115)

	Take-Up	Supply
Lens Serial No.	808630	808971
Exposure Time	1/100 Sec.	1/100 Sec.
Filter Type	Wratten 25	Wratten 25
Aperture	F6.8	F6.8
Operational Focal Length	89.12 MM	89.1 MM
Radial Distortion:		
10° off Axis	.003 MM	.015 MM
20° off Axis	.042 MM	.062 MM
Tangential Distortion (Maximum Vector)	.009 MM	.000 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	40	34	30	29	24	56	49	39	34	30	29	24
Tangential Resolution	51	49	35	30	29	25	19	56	49	37	37	35	30	22

35.4 Lines/MM Avg. 37.6 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]

DEFINITION OF PANORAMIC 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 orbital vehicle.

2.0 Two sets of three targets each, are aligned to be coplanar within ±5" of arc so positioned to form an angle of 105.00° ±5" to the mechanical interface for master camera calibrations and an angle of 75.00° ±5" to the mechanical interface for slave camera calibrations.

2.1 One target, Target 1 of each set is imaged on the Terrain format.

2.2 The second and third targets of each set are at angles of 75.00° ±5" from target one and are imaged on the horizon formats.

3.0 The indicated center of format for the panoramic 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 of the panoramic cameras 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 the master camera and is the edge containing the shrinkage markers for the slave camera.

8.0 Dimensions A, B and C are the spacings of the shrinkage markers and 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.

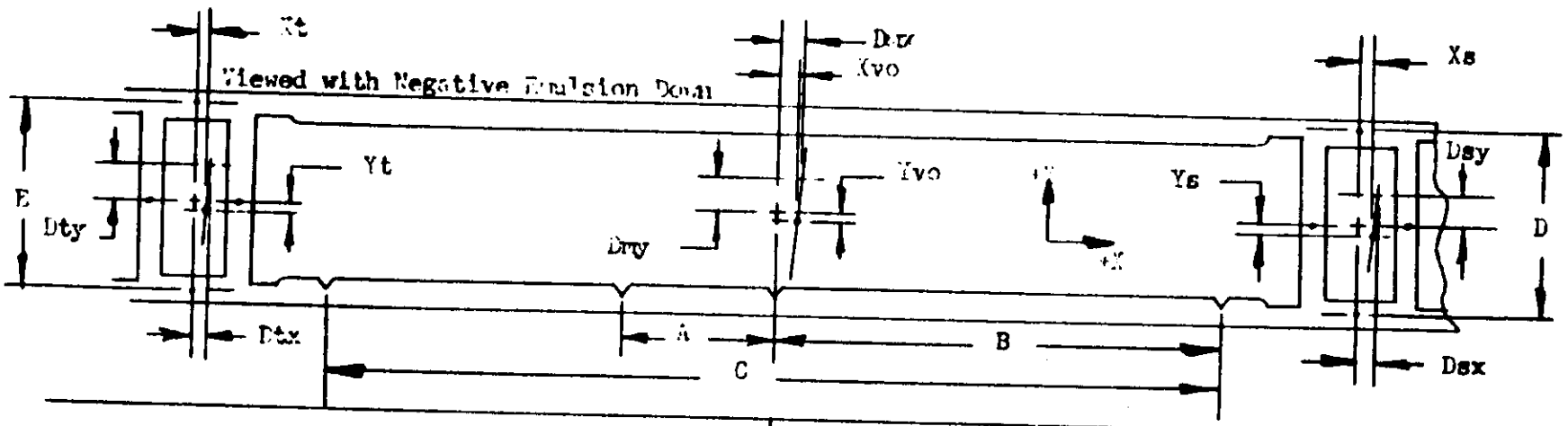
9.0 The format dimensions are measured to the best estimate of format edge.

10.0 Measurement of the angle between the indicated axis of the panoramic cameras and the line of intersection of the plane defined in Paragraph 2 on the format is obtained from the offset dimensions Dmx and Dmy of Target 1 for each camera

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 measuring the scan direction offset of the targets defined in Paragraph 2.2 at a fixed distance from the target center in the Y direction. Dimensions Dtx, Dty, Dsx and Dsy are the offsets of these measurements.

SYSTEM NO. 1
VEHICLE NO. 116 2
MISSION NO. 1021
CAMERA NOS. 114 115

FORMAT DIMENSIONS: (PANORAMIC CAMERAS)



Camera No. 114	Vehicle Motion	Scan Direction
A 76.030	Xt −1.055	Dtx −.908
B 354.760	Yt +.015	Dty +10.014
C 709.520	Xs +.108	Dsx +.169
D 56.505	Ys +.059	Dsy +10.059
E 56.424	Xvo +1.195	Dmx +1.244
	Yvo +1.170	Dmy +11.170

Format Dimensions:

	Panoramic	Take-Up	Supply
Height	55.7	53.4	53.4
Width	156.3	22.9	22.9

Camera No. 115	Vehicle Motion	Scan Direction
A 76.150	Xt −.915	Dtx −.915
B 355.100	Yt −.363	Dty +9.637
C 710.045	Xs +.252	Dsx +.383
D 56.349	Ys −.440	Dsy +9.559
E 56.413	Xvo −1.205	Dmx −1.214
	Yvo −.150	Dmy +9.850

Format Dimensions:

	Panoramic	Take-Up	Supply
Height	56.2	53.3	53.3
Width	157.3	22.8	22.8

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. Dt, Dm, Ds, X and Y dimensions are taken 10" above point defining target center.
4. Format Sign Convention

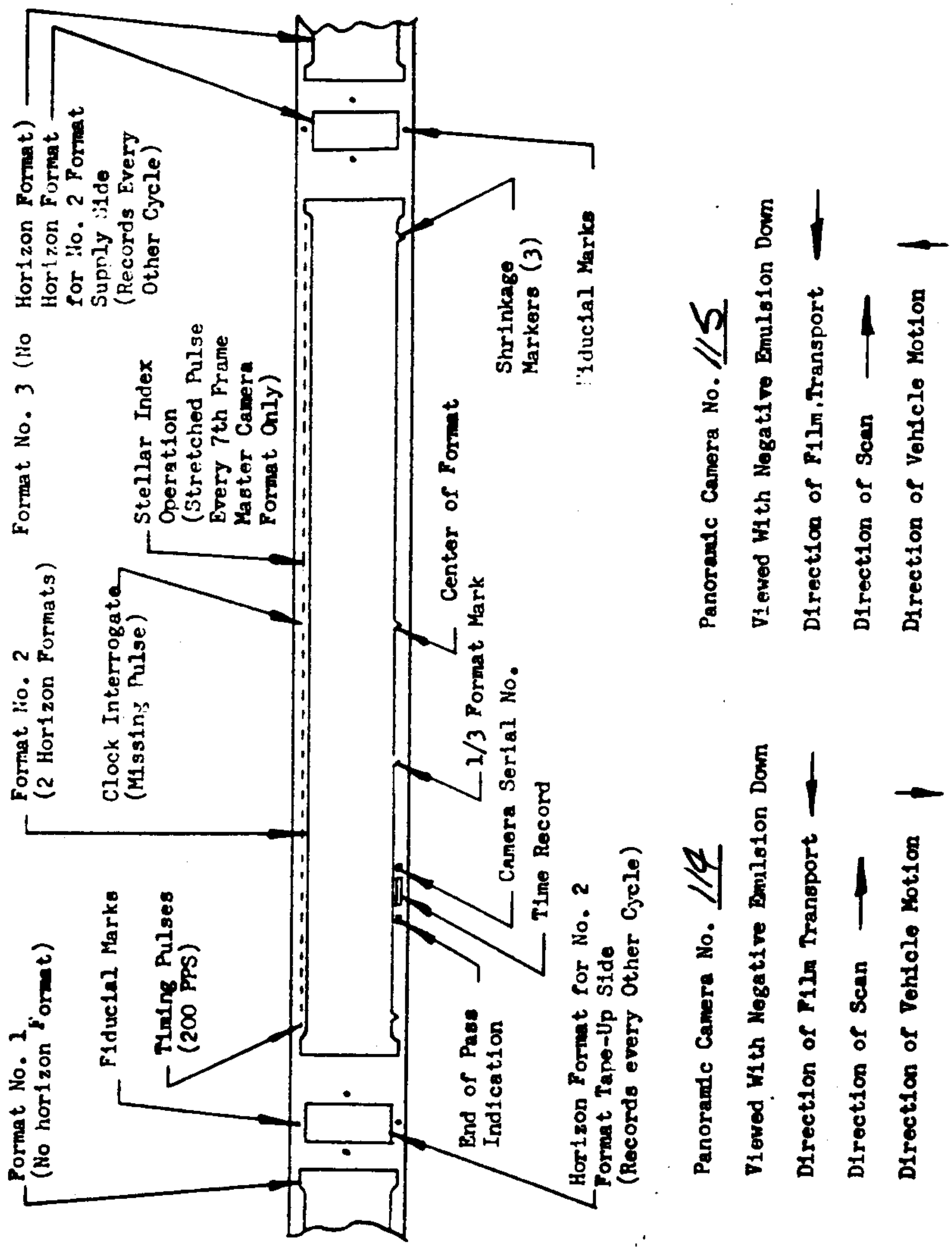
−X+Y	+X+Y
−X−Y	+X−Y

[redacted]

[redacted]

SYSTEM NO. J1
VEHICLE NO. 1162
MISSION NO. 1001
CAMERA NOS. 114 & 115

FORMAT LAYOUT: (PANORAMIC CAMERAS)


Format No. 1 (No horizon Format)
Fiducial Marks
Timing Pulses (200 PPS)
Format No. 2 (2 Horizon Formats)
Clock Interrogate (Missing Pulse)
Format No. 3 (No Horizon Format)
Horizon Format for No. 2 Format Supply Side (Records Every Other Cycle)
Stellar Index Operation (Stretched Pulse Every 7th Frame Master Camera Format Only)
Shrinkage Markers (3)
Fiducial Marks
Center of Format
1/3 Format Mark
Camera Serial No.
Time Record
End of Pass Indication
Horizon Format for No. 2 Format Tape-Up Side (Records every Other Cycle)
Panoramic Camera No. 115
Viewed With Negative Emulsion Down
Direction of Film Transport
Direction of Scan
Direction of Vehicle Motion
Panoramic Camera No. 114
Viewed With Negative Emulsion Down
Direction of Film Transport
Direction of Scan
Direction of Vehicle Motion

[redacted]

SYSTEM NO. J1
VEHICLE NO. 1162
MISSION NO. 1001
CAMERA NOS. 114 & 115

[redacted]

LENS DATA SUMMARY STELLAR INDEX DM/15/14: 1001-1

	Stellar	Index
Lens Serial No.	80377	810724
Reseau Serial No.	14	15
Filter Type	NONE	WRATTEN 21
Aperture	F1.9	F4.5
Exposure Time	2-5 Sec.	1/500 Sec.
Operational Focal Length	83.84 MM	38.40 MM
Equivalent Focal Length	83.94 MM	38.23 MM

Resolution:

Angle off axis						0	10	20	30	35
Resolution L/MM High Contrast						71/71	88/75	104/88	115/64	87/35
Resolution L/MM Low Contrast						51/64	59/62	82/60	78/51	70/32

Note: Index Resolution of 81.46 Lines/MM AWAR
Read From 50130 Film.

Distortion:

Angle off Axis Deg.										
Distortion Millimeters							-			

Perpendicularity of Reseau to Optical Axis	.006 IN 35MM	.015MM IN 57.15MM
Location of Principal Point:	X .000 MM	X +.014 MM
	Y -.020 MM	Y +.036 MM

[redacted]

SYSTEM NO. V1
VEHICLE NO. 1162
MISSION NO. 1001
CAMERA NOS. 114 & 115

TOP SECRET

1001-2

LENS DATA SUMMARY STELLAR INDEX D16/16/16:

	Stellar	Index
Lens Serial No.	80122	810920
Reseau Serial No.	16	16
Filter Type	NONE	WRATTEN 21
Aperture	F1.9	F4.5
Exposure Time	2-5 Sec.	1/500 Sec.
Operational Focal Length	83.67 MM	38.42 MM
Equivalent Focal Length	83.79 MM	38.27 MM

Resolution:

Angle off axis						0	10	20	30	35
Resolution L/MM High Contrast						81/86	83/74	103/74	105/57	78/33
Resolution L/MM Low Contrast						48/48	54/55	79/61	66/44	63/32

Note: Index Resolution of 74.98 Lines/MM AWAR
Read From S0130 Film.

Distortion:

Angle off Axis Deg.										
Distortion Millimeters										

	Stellar	Index
Perpendicularity of Reseau to Optical Axis	000	000
Location of Principal Point:	X +.048 MM	X -.015 MM
	Y -.064 MM	Y +.021 MM

[redacted]

TOP SECRET

PRELIMINARY CLOCK CORRELATION:

ORBIT	SYSTEM TIME	CLOCK TIME	DIFFERENCE
9	49386.840	308451.664	—
25	50067.848	395532.680	+.008
47	84752.940	516617.794	+.022
56	45769338	27154.282	+.001

[redacted]

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SYSTEM NUMBER J-01
VEHICLE NUMBER 1162
MISSION NUMBER 1001
PANORAMIC CAMERA NUMBERS 114 AND 115
STELLAR/INDEX CAMERA NUMBER D14/15/14

PERFORMANCE ESTIMATE
FIRST OPERATION

REV	PROG		CAM NO.	PAN FR.	SI FR	LAT. ON	LAT. OFF	TIME ON ZD-H-M		NO	TUR SEC.	DUR SEC	SOLAR ON	SOLAR OFF	EXPOS. ON	EXPOS. OFF
LAUNCH			114	153	21											
LAUNCH			115	142												
1	7	1	114	32	04	151	159	250141	3	4	667	142	12	16	6.2	5.8
1	7	1	115	32		150	158	250141	3	4	667	142	11	15	6.3	5.9
1	7	2	114	41	06	170	175	250147	3	4	1001	153	21	25	5.2	4.8
1	7	2	115	40		168	174	250147	3	4	1001	153	21	24	5.3	4.9
1	7	3	114	42	06	272	267	250153	3	4	1355	130	27	29	4.3	4.0
1	7	3	115	41		273	268	250153	3	4	1355	130	27	29	4.4	4.1
2	7	1	114	29	04	154	161	250313	3	4	724	125	14	17	6.1	5.7
2	7	1	115	29		153	160	250313	3	4	724	125	13	16	6.1	5.7
3	4	1	114	61	09	148	163	250442	3	4	608	261	11	18	6.1	5.4
3	4	1	115	61		146	162	250442	3	4	608	261	10	17	6.1	5.4
3	4	2	114	50	07	274	268	250453	3	4	1298	153	27	28	4.3	3.9
3	4	2	115	49		274	269	250453	3	4	1298	153	26	28	4.3	4.0
3	4	3	114	66	09	260	250	250458	3	4	1601	172	29	29	3.6	3.3
3	4	3	115	65		261	251	250458	3	4	1601	172	29	29	3.6	3.4
5	4	1	114	99	15	254	239	250801	3	4	1708	244	29	27	3.4	3.1
5	4	1	115	98		255	239	250801	3	4	1708	244	29	27	3.5	3.1
6	4	1	114	69	09	258	248	250931	3	4	1718	170	29	29	3.4	3.2
6	4	1	115	68		259	248	250931	3	4	1718	170	29	29	3.4	3.2
6	4	2	114	85	13	238	226	250936	3	4	2035	192	27	24	3.0	2.9
6	4	2	115	84		239	226	250936	3	4	2035	192	27	24	3.1	3.0
7	6	1	114	48	06	259	252	251101	2	4	1630	120	29	29	3.5	3.3
7	6	1	115	47		260	253	251101	2	4	1630	120	29	29	3.5	3.3
7	6	2	114	75	11	249	237	251104	2	4	1795	179	29	27	3.2	3.0
7	6	2	115	75		250	238	251104	2	4	1795	179	29	27	3.3	3.1
8	8	1	114	94	14	262	249	251231	2	4	1730	222	29	29	3.3	3.0
8	8	1	115	93		263	249	251231	2	4	1730	222	29	29	3.3	3.0
9	5	0	114	11	01	136	138	251342	2	4	574	48	4	6	6.3	6.2
9	5	0	115	10		134	136	251342	2	4	574	48	3	5	7.0	6.8
9	5	1	114	72	10	259	248	251403	2	4	1792	171	29	29	3.2	3.1
9	5	1	115	71		259	249	251403	2	4	1792	171	29	29	3.3	3.1
9	5	2	114	46	07	235	228	251409	2	4	2171	100	26	25	2.9	2.9
9	5	2	115	46		235	229	251409	2	4	2171	100	27	25	2.9	2.9
11	5	0	114	7	01	125	126	251641	2	4	0	32	0	0	6.9	6.9
11	5	0	115	6		123	124	251641	2	4	0	32	-1	-1	8.1	8.1
16	3	1	114	38	05	151	159	260021	2	4	861	143	10	14	5.3	4.9
16	3	1	115	37		149	158	260021	2	4	861	143	9	13	5.4	5.0
17	5	1	114	62	09	271	263	260204	2	4	1599	160	28	30	3.6	3.3
17	5	1	115	61		271	264	260204	2	4	1599	160	28	30	3.6	3.4
21	10	1	114	51	08	255	248	260811	2	4	1886	120	31	30	3.2	3.1
21	10	1	115	50		256	249	260811	2	4	1886	120	31	31	3.3	3.2
22	6	1	114	54	07	273	267	260936	2	4	1544	138	27	29	3.6	3.3
22	6	1	115	54		273	268	260936	2	4	1544	138	27	29	3.6	3.3
22	6	2	114	88	13	260	248	260940	2	4	1811	203	30	30	3.2	3.0

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22	6	2	115	88		261	248	260940	2	4	1811	203	30	30	3.2	3.0
22	6	3	114	123	17	245	228	260944	2	4	2055	268	30	27	2.9	2.8
22	6	3	115	123		246	228	260944	2	4	2055	268	30	27	2.9	2.8
23	8	1	114	61	09	260	252	261111	2	4	1881	138	30	31	3.1	3.0
23	8	1	115	60		261	253	261111	2	4	1881	138	30	31	3.2	3.0
24	8	1	114	81	12	249	238	261245	2	4	1991	180	31	29	3.0	2.9
24	8	1	115	79		250	238	261245	2	4	1991	180	31	29	3.1	2.9
25	8	0	114	11	01	139	142	261353	2	4	680	48	4	5	6.3	6.2
25	8	0	115	12		137	140	261353	2	4	680	48	3	4	5.8	5.6
33	8	1	114	30	05	154	160	270202	2	4	963	106	10	13	5.0	4.7
33	8	1	115	29		153	159	270202	2	4	963	106	9	12	5.1	4.9
33	8	2	114	41	05	167	173	270206	2	4	1200	131	17	21	4.4	4.2
33	8	2	115	40		166	172	270206	2	4	1200	131	17	21	4.6	4.3
34	6	1	114	44	07	153	162	270332	2	4	931	159	9	14	5.1	4.7
34	6	1	115	43		151	160	270332	2	4	931	159	8	13	5.1	4.7
36	6	1	114	38	05	245	240	270653	2	4	2086	85	32	32	3.0	3.0
36	6	1	115	38		246	241	270653	2	4	2086	85	32	32	3.0	3.0
37	6	1	114	58	08	258	250	270820	2	4	1880	136	31	32	3.2	3.1
37	6	1	115	58		259	251	270820	2	4	1880	136	31	32	3.2	3.1
38	1	1	114	46	07	258	251	270951	2	4	1892	106	31	32	3.1	3.0
38	1	1	115	45		258	252	270951	2	4	1892	106	31	32	3.2	3.1
39	2	1	114	60	09	260	252	271121	2	4	1853	139	31	32	3.2	3.0
39	2	1	115	60		261	253	271121	2	4	1853	139	31	32	3.2	3.0
39	2	2	114	60	08	249	241	271124	2	4	2033	133	32	32	3.0	2.9
39	2	2	115	60		250	241	271124	2	4	2033	133	32	32	3.0	2.9
40	10	1	114	74	11	261	251	271251	2	4	1837	173	31	32	3.2	3.0
40	10	1	115	73		262	252	271251	2	4	1837	173	31	32	3.2	3.1
40	10	2	114	66	09	246	237	271255	2	4	2080	147	32	31	3.0	2.9
40	10	2	115	66		247	238	271255	2	4	2080	147	32	31	3.0	2.9
41	10	0	114	12	02	139	142	271403	2	4	724	49	1	3	5.9	5.7
41	10	0	115	11		137	140	271403	2	4	724	49	0	2	6.4	6.3
44	4	1	114	35	05	161	167	271841	2	4	1115	115	14	17	4.6	4.3
44	4	1	115	34		160	166	271841	2	4	1115	115	13	17	4.7	4.5
46	5	1	114	24	03	149	154	272139	2	4	915	89	7	9	5.2	5.0
46	5	1	115	23		148	153	272139	2	4	915	89	6	9	5.4	5.2
47	5	3	114	54	08	242	235	272330	2	4	2178	118	32	31	2.9	2.9
47	5	3	115	54		243	235	272330	2	4	2178	118	32	31	3.0	2.9
48	5	1	114	53	08	148	159	280039	2	4	904	192	4	11	5.1	4.6
48	5	1	115	52		147	158	280039	2	4	904	192	3	10	5.1	4.7
49	2	1	114	64	09	270	263	280223	2	4	1691	159	28	31	3.4	3.2
49	2	1	115	64		271	263	280223	2	4	1691	159	28	31	3.4	3.2
50	5	1	114	82	11	144	162	280340	2	4	845	292	2	12	5.1	4.4
50	5	1	115	80		143	160	280340	2	4	845	292	1	11	5.2	4.5
51	5	1	114	34	05	167	171	280516	2	4	1229	103	15	19	4.2	4.0
51	5	1	115	33		166	170	280516	2	4	1229	103	15	18	4.3	4.1
52	5	1	114	54	08	246	239	280702	2	4	2115	117	34	34	2.9	2.8
52	5	1	115	53		247	240	280702	2	4	2115	117	34	34	3.0	2.9
54	5	1	114	104	15	252	238	281001	2	4	2027	228	33	34	3.0	2.8
54	5	1	115	104		253	239	281001	2	4	2027	228	33	34	3.0	2.8
55	8	1	114	119	17	260	244	281130	2	4	1897	265	32	34	3.1	2.9
55	8	1	115	119		261	245	281130	2	4	1897	265	32	34	3.1	2.9
56	5	0	114	13	02	139	142	281242	2	4	769	49	-1	0	5.3	5.2

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56	5	0	115	13		137	140	281242	2	4	769	49	-1	0	5.3	5.2
56	5	1	114	169	24	261	238	281300	2	4	1881	377	32	34	3.1	2.8
56	5	1	115	169		262	239	281300	2	4	1881	377	31	34	3.1	2.8
64	5	1	114	45	06	273	269	290101	2	4	1684	112	26	29	3.4	3.3
64	5	1	115	44		274	270	290101	2	4	1684	112	26	29	3.5	3.3

AAA BB C DDD EEE FF GHH GII JJJJJJ K L MMMM NNN OO PP QQQ RRR

A REV. NUMBER
B PROGRAM NUMBER
C OPERATION NUMBER
D PAN. CAMERA SERIAL NUMBER (MASTER IS EVEN, SLAVE IS ODD)
E EST. NO OF PAN FRAMES, BASED ON COUNTER READINGS INFLITE
F EST. NUMBER OF STELLAR/INDEX FRAMES
G QUADRANT (QUAD 1 IS NORTHBOUND FROM ASCENDING NODE)
H EST. LATITUDE OF FIRST FORMAT CENTER IN PASS
I EST. LATITUDE OF LAST FORMAT CENTER IN PASS
J EST. GMT AT OPERATE COMMAND ON
K FMC PROGRAMMER REFERENCE LEVEL
L FMC PROGRAMMER AMPLITUDE LEVEL
M EST. TIME UP RAMP IN SECONDS TO OPERATE COMMAND
N EST. SECONDS DURATION OF OPERATION, BETWEEN ON AND OFF
O SOLAR ELEVATION AT ITEM H
P SOLAR ELEVATION AT ITEM I
Q EST. MILLISECONDS EXPOSURE TIME AT ITEM H
R EST. MILLISECONDS EXPOSURE TIME AT ITEM I

FRAMES TO FEET, PAN X 2.636, STELLAR X 0.099, INDEX X 0.198

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A. MISSION NO.	A. 1001
B. VEHICLE	B. 1162
C. INSTRUMENT NUMBERS	C. INSTRUMENT NUMBERS
1. MASTER	1. 114
2. SLAVE	2. 115
3. STELLAR INDEX A	3. D 14/15/14
4. STELLAR INDEX B	4. D 16/16/16
D. LENS SERIAL NUMBERS	D. LENS SERIAL NUMBERS
1. MASTER	1. MASTER
A. PANORAMIC LENS	A. 0562435-I-29
B. TAKE-UP HORIZON	B. 808968
C. SUPPLY HORIZON	C. 808629
2. SLAVE	2. SLAVE
A. PANORAMIC LENS	A. 0582435-I-31
B. TAKE-UP HORIZON	B. 808630
C. SUPPLY HORIZON	C. 808971
3. STELLAR INDEX A	3. STELLAR INDEX A
A. STELLAR (LENS/RESEAU)	A. 80377/14
B. INDEX (LENS/RESEAU)	B. 810724/15
4. STELLAR INDEX B	4. STELLAR INDEX B
A. STELLAR (LENS/RESEAU)	A. 80122/16
B. INDEX (LENS/RESEAU)	B. 810920/16
E. OPERATIONAL FOCAL LENGTHS (MM)	E. OPERATIONAL FOCAL LENGT
1. MASTER	1. MASTER (MM)
A. PANORAMIC LENS	A. 609.12
B. TAKE-UP HORIZON	B. 89.9
C. SUPPLY HORIZON	C. 88.96
2. SLAVE	2. SLAVE (MM)
A. PANORAMIC LENS	A. 609.63
B. TAKE-UP HORIZON	B. 89.12
C. SUPPLY HORIZON	C. 89.1
3. STELLAR INDEX A	3. STELLAR INDEX A (MM)
A. STELLAR	A. 83.84
B. INDEX	B. 38.40
4. STELLAR INDEX B	4. STELLAR INDEX B (MM)
A. STELLAR	A. 83.67
B. INDEX	B. 38.42
F. LENS DISTORTION	F. LENS DISTORTION
1. MASTER	1. MASTER
A. PANORAMIC LENS (PINCUSHION)	A. MM / DEG.
	.003 / 3
	.002 / 2
	.001 / 1
	.000 / 0
B. TAKE-UP HORIZON	B.
1. RADIAL	1. MM / DEG.
	.006 / 10
	.044 / 20
2. TANGENTIAL	2. .006 MAX.
C. SUPPLY HORIZON	C.
1. RADIAL	1. MM / DEG.
	.021 / 10
	.068 / 20
2. TANGENTIAL	2. .009 MAX.
2. SLAVE	2. SLAVE
A. PANORAMIC LENS (PINCUSHION)	A. MM / DEG.

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	.002 / 3
	.001 / 2
	.000 / 1
	.000 / 0
B. TAKE-UP HORIZON	B.
1. RADIAL	1. MM / DEG.
	.003 / 10
	.042 / 20
2. TANGENTIAL	2. .009 MAX.
C. SUPPLY HORIZON	C.
1. RADIAL	1. MM / DEG.
	.015 / 10
	.062 / 20
2. TANGENTIAL	2. .000 MAX.
3. STELLAR INDEX A	3. STELLAR INDEX A
A. STELLAR	A. STELLAR
	MM / DEG.
	NOT AVAILABLE
B. INDEX	B. INDEX
	MM / DEG.
	NOT AVAILABLE
4. STELLAR INDEX B	4. STELLAR INDEX B
A. STELLAR	A. STELLAR
	MM / DEG.
	NOT AVAILABLE
B. INDEX	B. INDEX
	MM / DEG.
	NOT AVAILABLE
G. RESOLUTION (L/MM/FILM/TYPE)	G. RESOLUTION (L/MM/FILM/T
1. MASTER (AVERAGE)	1. MASTER (AVERAGE)
A. PANORMIC LENS	A. 179.2/S0132
B. TAKE-UP HORIZON	B. 36.2/SUPER XX
C. SUPPLY HORIZON	C. 35.8/SUPER XX
2. SLAVE (AVERAGE)	2. SLAVE (AVERAGE)
A. PANORAMIC LENS	A. 191.2/S0132
B. TAKE-UP HORIZON	B. 35.4/SUPER XX
C. SUPPLY HORIZON	C. 37.6/SUPER XX
3. INDEX A (AWAR)	3. INDEX A (AWAR)
	81.46/S0130
4. INDEX B (AWAR)	4. INDEX B (AWAR)
	74.982/S0130
H. PLATEN AND FORMAT DIMENSIONS (MM)	H. PLATEN AND FORMAT DIM.
1. MASTER	1. MASTER
A. SHRINKAGE MARKER DIMENSION	A. 76.030
B. SHRINKAGE MARKER DIMENSION	B. 354.760
C. SHRINKAGE MARKER DIMENSION	C. 709.520
D. HORIZON FIDUCIAL SPACING	D. 56.505
E. HORIZON FIDUCIAL SPACING	E. 56.424
2. SLAVE	2. SLAVE
A. SHRINKAGE MARKER DIMENSION	A. 76.150
B. SHRINKAGE MARKER DIMENSION	B. 355.100
C. SHRINKAGE MARKER DIMENSION	C. 710.045

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D. HORIZON FIDUCIAL SPACING	D. 56.349
E. HORIZON FIDUCIAL SPACING	E. 56.413
3. STELLAR INDEX A	3. STELLAR INDEX A
A. STELLAR (LOC. OF P.P.)	A. STELLAR (LOC. OF P
	1.X .000 (MM
	2.Y -.020 (MM
B. INDEX (LOC. OF P.P.)	B. INDEX (LOC. OF P.P
	1.X PLUS .014 (MM
	2.Y PLUS .036 (MM
4. STELLAR INDEX B	4. STELLAR INDEX B
A. STELLAR (LOC. OF P.P.)	A. STELLAR (LOC. OF P
	1.X PLUS .048 (MM
	2.Y -.064 (MM
B. INDEX (LOC. OF P.P.)	B. INDEX (LOC. OF P.P
	1.X -.015 (MM
	2.Y PLUS .021 (MM
I. ANGULAR RELATION BETWEEN CAMERAS (MM)	I. ANG REL BETWEEN CAMERAS
1. MASTER	1. MASTER (MM)
A. HORIZON OFFSET	A. HORIZON OFFSET
	XT -1.055
	YT PLUS .015
	XS PLUS .108
	YS PLUS .059
	DTX -.908
	DTY PLUS 10.014
	DSX PLUS .169
	DSY PLUS 10.059
B. VERTICAL OFFSET	B. VERTICLE OFFSET
	XVO PLUS 1.195
	YVO PLUS 1.170
	DMX PLUS 1.244
	DMY PLUS 11.170
2. SLAVE	2. SLAVE (MM)
A. HORIZON OFFSET	A. HORIZON OFFSET
	XT -.915
	YT -.363
	XS PLUS .252
	YS -.440
	DTX -.915
	DTY PLUS 9.637
	DSX PLUS .383
	DSY PLUS 9.559
B. VERTICAL OFFSET	B. VERTICLE OFFSET
	XVO -1.205
	YVO -.150
	DMX -1.214
	DMY PLUS 9.850
3. ANGLE BETWEEN MASTER AND SLAVE	3. 29 DEG 53.7 MM
4. DIRECTION OF X DIMENSIONS	4. X SCAN
DIRECTION OF Y DIEMSNIONS	Y FLIGHT
5. STELLAR/INDEX A (PERPENDICULARITY OF RESEAU TO OPTICAL AXIS)	5. S/I A PERP OF RESEAU TO OPTICAL AXIS

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A. STELLAR
B. INDEX
6. STELLAR/INDEX B (PERPENDICULARITY OF RESEAU TO OPTICAL AXIS)
A. STELLAR
B. INDEX

J. FILTERS AND EXPOSURES
1. MASTER
A. PANORAMIC 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. PANORAMIC LENS
1. FILTER TYPE
2. APERTURE
3. EXPOSURE
4. SLIT WIDTH
B. HORIZON OPTICS
1. FILTER TYPE
2. APERTURE SETTING
3. EXPOSURE TIME
3. STELLAR INDEX A
A. STELLAR
1. FILTER TYPE
2. APERTURE SETTING
3. EXPOSURE TIME
B. INDEX
1. FILTER TYPE
2. APERTURE SETTING
3. EXPOSURE TIME
4. STELLAR INDEX B
A. STELLAR
1. FILTER TYPE
2. APERTURE SETTING
3. EXPOSURE TIME
B. INDEX
1. FILTER TYPE
2. APERTURE SETTING
3. EXPOSURE TIME

K. FILM
1. MASTER
A. FILM TYPE
B. FILM IDENTIFICATION
C. EMULSION NO. AND CODE
D. WT. NO. OF SPLICES SPOOL NO.
E. BOX SERIAL NUMBER

A. .006 MM IN 35
B. .015 MM IN 57.
5. S/I B PERP OF RESEAU TO OPTICAL AXIS
A. .000 MM. IN 35
B. .000 MM. IN 57

J. FILTERS AND EXPOSURES
1. MASTER
A.
1. WRATTEN 21
2. F3.5
3. 1/275 AVG SE
4. .200 IN
B.
1. WRATTEN 25
2. F6.8
3. 1/100 SE
2. SLAVE
A.
1. WRATTEN 21
2. F3.5
3. 1/275 AVG SE
4. .200 IN
B.
1. WRATTEN 25
2. F6.8
3. 1/100 SE
3. STELLAR INDEX A
A. STELLAR
1. NONE
2. F1.9
3. 2 SE
B. INDEX
1. WRATTEN 21
2. F4.5
3. 1/500 SE
4. STELLAR INDEX B
A. STELLAR
1. NONE
2. F1.9
3. 2 SE
B. INDEX
1. WRATTEN 21
2. F4.5
3. 1/500 SE

K. FILM
1. MASTER
A. S0132
B. 7J40-16000
C. 31-9-10-5-3
D. 91.5-81.5-4S-1
E. 2

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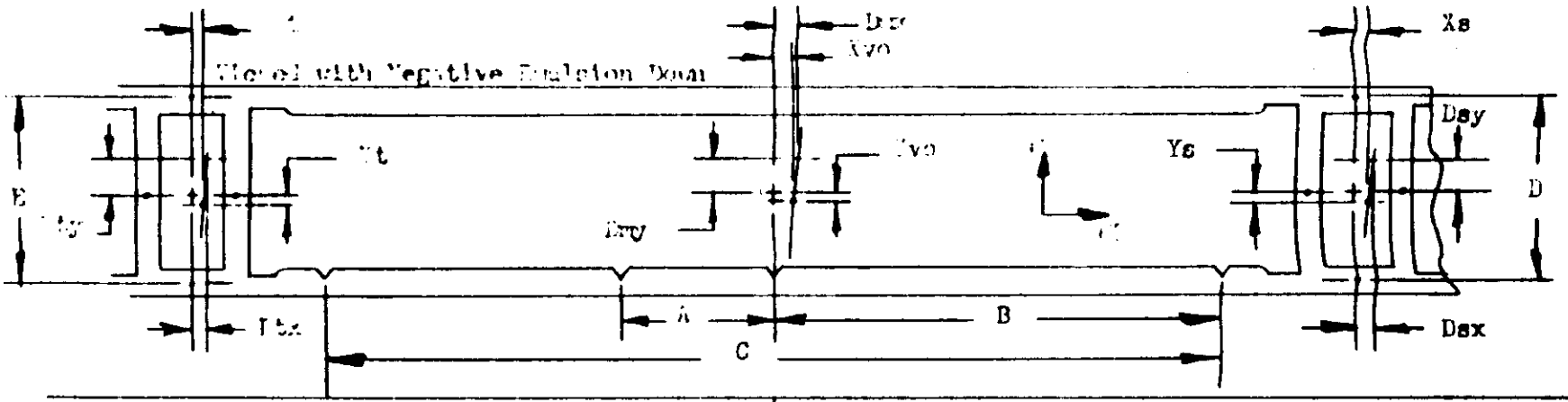
2. SLAVE
   A. FILM TYPE
   B. FILM IDENTIFICATION
   C. EMULSION NO. AND CODE
   D. WT NO. OF SPLICES SPOOL NO.
   E. BOX SERIAL NUMBER
3. STELLAR INDEX A
   A. STELLAR
      1. FILM TYPE
      2. FILM IDENTIFICATION AND LENGTH
      3. EMULSION NO. AND CODE
   B. INDEX
      1. FILM TYPE
      2. FILM IDENTIFICATION AND LENGTH
      3. EMULSION NO. AND CODE
4. STELLAR INDEX B
   A. STELLAR
      1. FILM TYPE
      2. FILM IDENTIFICATION AND LENGTH
      3. EMULSION NO. AND CODE
   B. INDEX
      1. FILM TYPE
      2. FILM IDENTIFICATION AND LENGTH
      3. EMULSION NO. AND CODE

2. SLAVE
   A. S0132
   B. 7J40-16000
   C. 31-10-5-3
   D. 91.0-81.5-4S-16
   E. 2
3. STELLAR INDEX A
   A. STELLAR
      1. S0102
      2. 3J34-75
      3. 2-3-5-3
   B. INDEX
      1. S0130
      2. 7J33-135
      3. 9-3-6-3
4. STELLAR INDEX B
   A. STELLAR
      1. S0102
      2. 3J-34-75
      3. 2-3-5-3
   B. INDEX
      1. S0130
      2. 7J33-135
      3. 9-3-6-3



Camera No. 110	Vehicle Motion	Scan Direction
A 75.700	Xt −.034	Dtx +.025
B 354.710	Yt −.003	Dty +9.997
C 709.850	Xs +.301	Dsx +.377
D 56.421	Ys +.523	Dsy +10.525
E 56.478	Xvo +.490	Dvx +.386
	Yvo +.960	Dvy +10.959

Format Dimensions:

	Panoramic	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	Xt +.289	Dtx +.253
B 355.270	Yt −.773	Dty +9.227
C 710.500	Xs +.501	Dsx +.580
D 56.434	Ys +.756	Dsy +10.756
E 56.443	Xvo −.685	Dvx −.759
	Yvo −.255	Dvy +9.745

Format Dimensions:

	Panoramic	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. Dt, Dv, Ds, X and Y dimensions are taken 10" above point defining target center.
4. Format Sign Convention

−X+Y	+X+Y
−X−Y	+X−Y

[redacted]