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21 Pages
(Including Cover Sheet)



CORONA "M" FLIGHT DATA BOOK

SYSTEM NO. MB

VEHICLE NO. 1130

MISSION NO. 9039

Prepared by: [REDACTED]

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(Engineering Manager)

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(Project Manager)

Approved by: [REDACTED]

Declassified and Released by the N R O

In Accordance with E. O. 12958

on NOV 26 1997

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TOP SECRET

SYSTEM NO. MB
VEHICLE NO. 1130
MISSION NO. 9039
CAMERA NOS. 90 & 91

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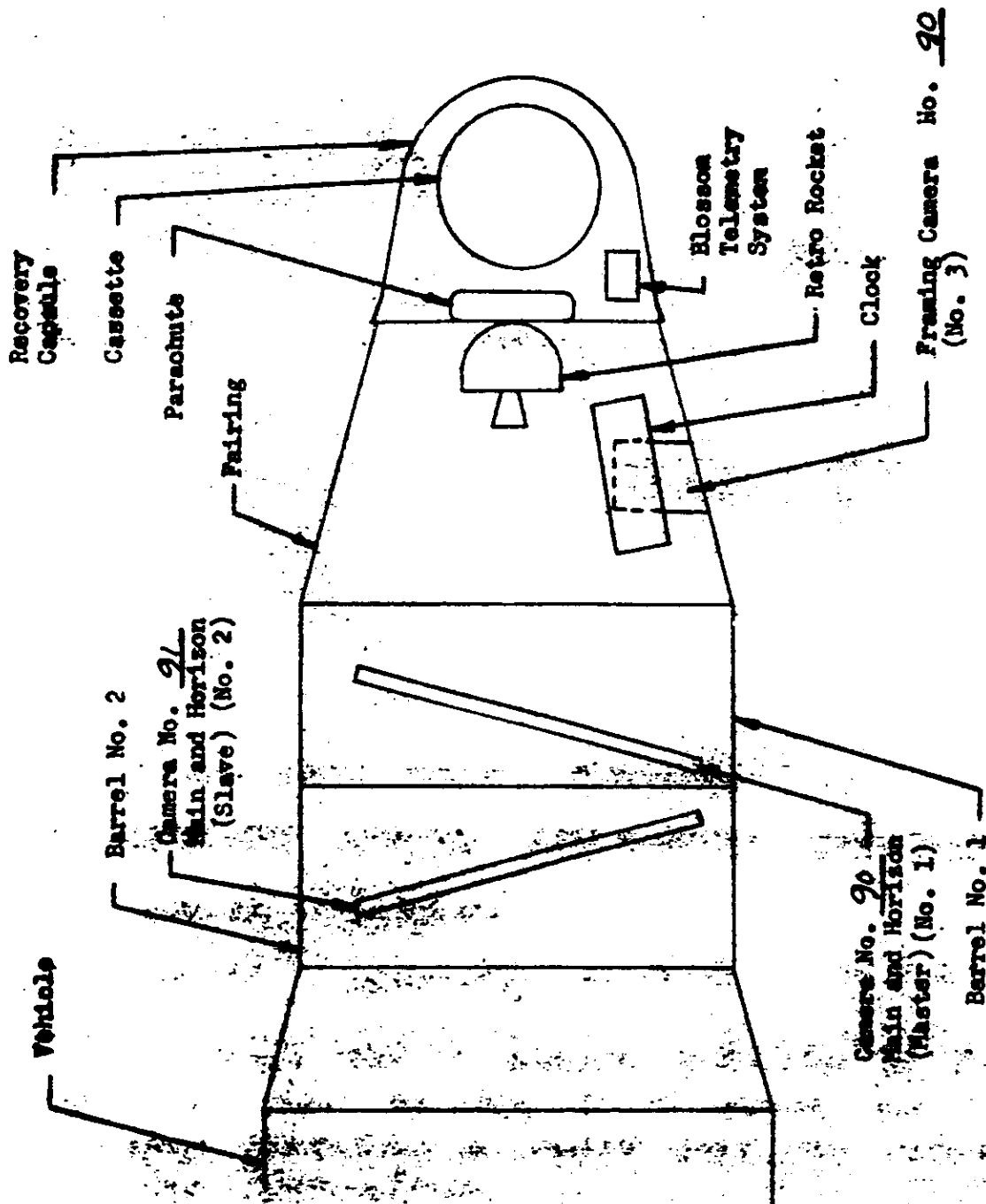
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SYSTEM NO. 118
VEHICLE NO. 1150
MISSION NO. 9039
CAMERA NOS. 9059

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VEHICLE LAYOUT:



SYSTEM NO. MB
VEHICLE NO. 130
MISSION NO. 9039
CAMERA NOS. 90591

GENERAL FLIGHT DATA:

Discoverer No. 46
Main Camera No. 1 Serial No. 90
Main Camera No. 2 Serial No. 91
Framing Camera Serial No. 90
Launch Date 7/20/62

Orbital Parameters: (Rev. 23)

Period 90.91 Min. Eccentricity .0137
Perigee 210 NM Perigee Latitude 18.23 Deg. N
Apogee 110 NM Inclination Angle 70.29 Deg. N

Recovery Revolution No. 33
Recovery Date 7/22/62

REMARKS:

Preliminary Clock correlation.

<u>READING</u>	<u>SYSTEM TIME</u>	<u>CLOCK TIME</u>	<u>DELTA SYSTEM TIME</u>	<u>DELTA CLOCK TIME</u>	<u>DIFFERENCE</u>
LAUNCH	0386.521	51928.997			
FPS 9 UNIT	51926.917	022316.583	47258.296	47258.268	.028

Note: 1- All times are in seconds. System time is GMT.
2- System time accuracy $\pm .10$ seconds due to paper speed deviations of record used for obtaining time correlations.

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STATUS NO. MB
VOLUME NO. 130
MISSION NO. 3039
CAMERA NOS. 90 & 91

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PRE-LAUNCH INFORMATION:

V/R Programmer Set On Step 3 At Launch

Main Camera Settings:

	Camera No. <u>90</u>	Camera No. <u>91</u>
Main Optics Slit Width	<u>.200</u> in.	<u>.200</u> in.
Horizon Optics Exposure Time	<u>1/50</u> Sec.	<u>1/10</u> Sec. (SUPPLY) <u>1/100</u> Sec. (TAKE-UP)
Horizon Optics Aperture	<u>F 8.0</u>	<u>F 6.8</u> (SUPPLY) <u>F 8.0</u> (TAKE-UP)

Framing Camera Settings:

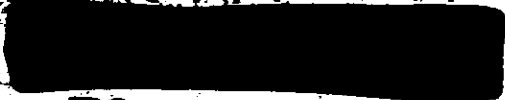
Exposure Time 1/250 Sec.
Aperture F 6.3

Ratio: One Framing Camera Frame Per 7
Camera No. 1 Frames

FILE:

	Camera No. <u>90</u>	Camera No. <u>91</u>	Framing Camera
Type	<u>S0132</u>	<u>S0132</u>	<u>S0138</u>
Length	<u>7000</u> Ft.	<u>7000</u> Ft.	<u>135</u> Ft.
No. of Splices	<u>3</u>	<u>3</u>	<u>None</u>
Emulsion Data	<u>21-4-19-11-52</u>	<u>21-2-5-2</u>	<u>15-2-4-2</u>

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SYSTEM NO. NR
 VEHICLE NO. 1130
 MISSION NO. 9039
 CAMERA NOS. 90 & 91

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PRE-FLIGHT CYCLE PERIOD: (CAMERA NO. 90)

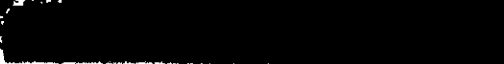
V/H Ramp	Cycle Period Seconds	FMC Rate		Scan Rate		
		Rad. Per Second	In. Per Second	Rad. Per Second	In. Per Second	Exposure Millisec
3 START	5.24	.016	.886	1.199	28.718	6.94
3 END	2.46	.034	.823	2.554	61.301	5.26

IN-FLIGHT CYCLE PERIOD: (CAMERA NO. 90)

(NO IN FLIGHT OPERATIONS OBSERVED)

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

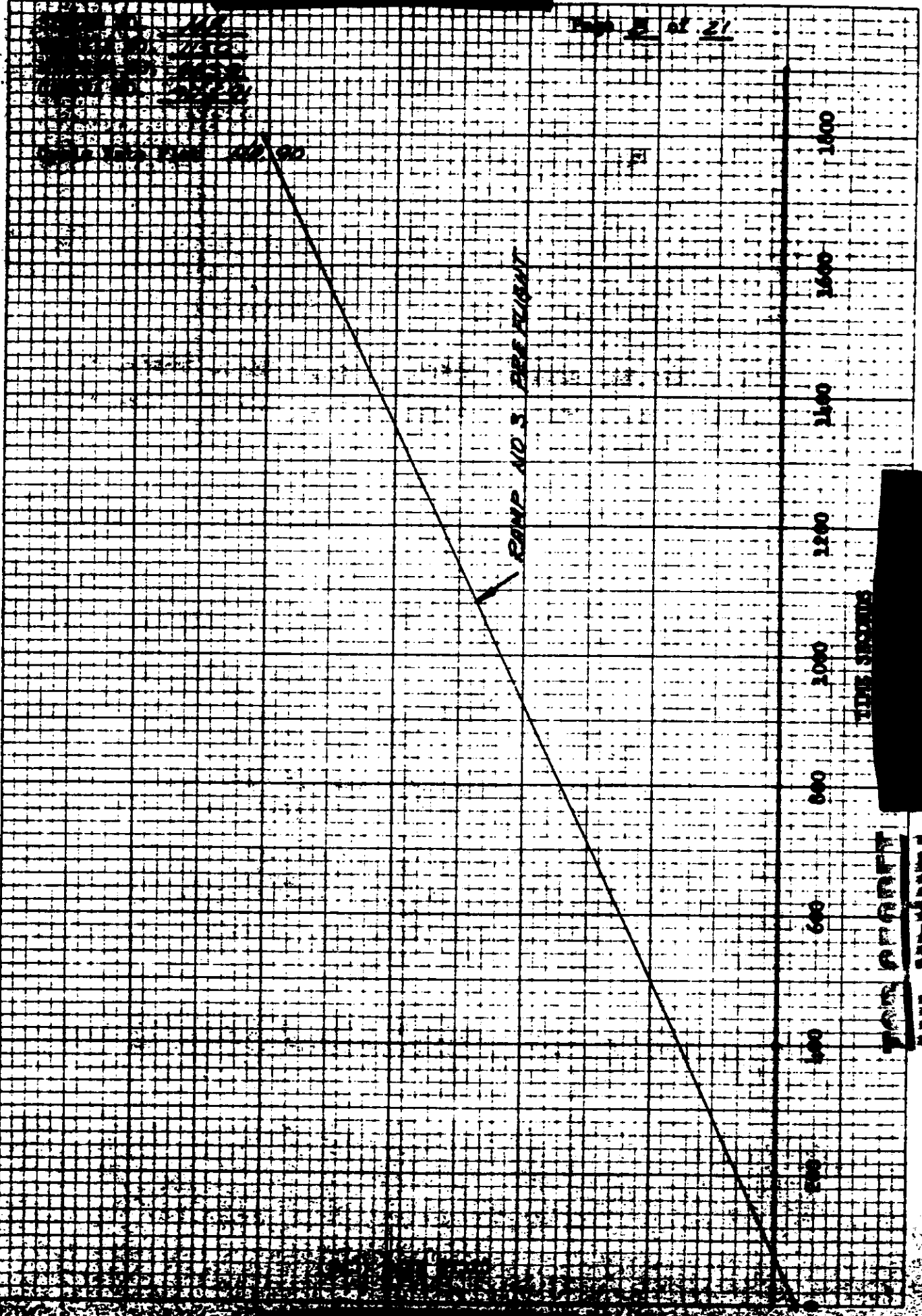
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MADE IN U.S.A.

NO. 340R-10 DIEZSEN GRAPH PAPER
10 X 10 PER INCH

Fig. 2 of 21



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SYSTEM NO. 148
 VESSEL NO. 1150
 MISSION NO. 9039
 CAMERA NOS. 90F91

PRE-FLIGHT CYCLE PERIOD: (CAMERA NO. 91)

V/H Ramp	Cycle Period Seconds	FMC Rate		Scan Rate		
		Rad. Per Second	In. Per Second	Rad. Per Second	In. Per Second	Exposure Millisec
<i>3 START</i>	<i>5.28</i>	<i>.06</i>	<i>.388</i>	<i>1.204</i>	<i>28.888</i>	<i>6.92</i>
<i>3 END</i>	<i>2.46</i>	<i>.034</i>	<i>.823</i>	<i>2.554</i>	<i>61.301</i>	<i>326</i>

IN-FLIGHT CYCLE PERIOD: (CAMERA NO. 91)

(NO IN FLIGHT OPERATIONS OBSERVED)

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

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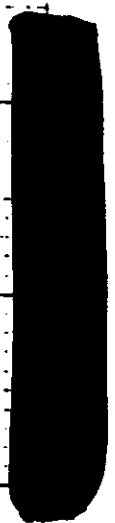
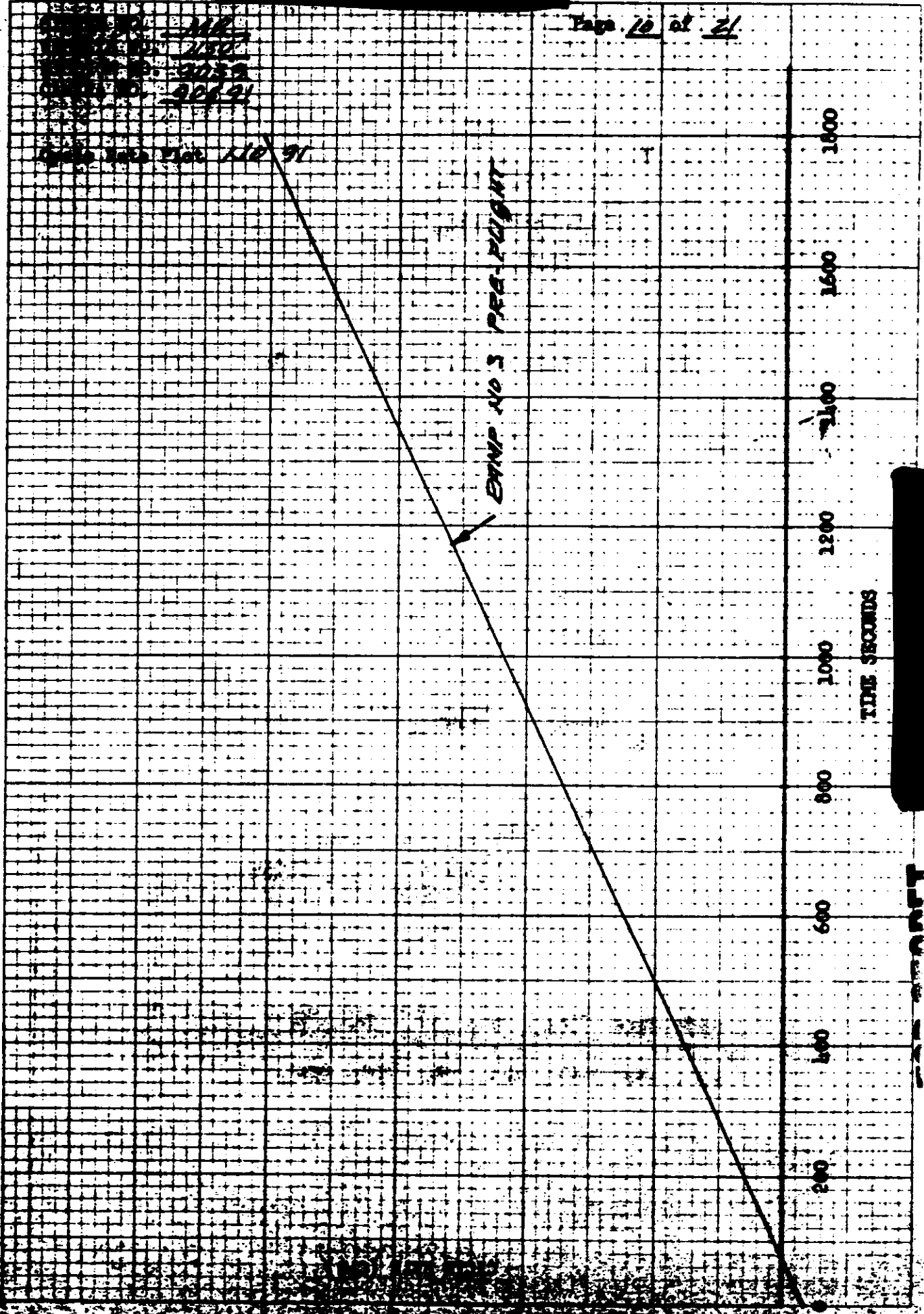
AMERICAN AIRWAYS

NO. 340R10 DRAZSEN DRAPE PAPER
10 X 10 PER INCH

DATE: MAR 21 1950
TIME: 20:52
NO. 20691

16 211

EMMP NO 3 PRE-FLIGHT



TIME SECONDS

SYSTEM NO. MB
 VEHICLE NO. 130
 MISSION NO. 9039
 CAMERA NOS. 90491

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LENS DATA SUMMARY: (Main Camera No. 90)

Lens Serial No. 0302435

Filter Type WRITTEN Z1

Equivalent Operational Focal Length 609.526 MM

Resolution:

Static:

	Lines/MM	Film Type	Target Contrast
Bench Test	<u>203.6</u>	<u>50243</u>	<u>High</u>
Other	<u>None</u>		

Dynamic:

Itek Pre-Vibration	<u>138</u>	<u>50132</u>	<u>High</u>
Itek Post Vibration	<u>169</u>	<u>50132</u>	<u>High</u>
AP Pre-HATS			
AP Post-HATS	<u>158.6</u>	<u>50132</u>	<u>High</u>
Other			

Note: Itek Post Vibration Resolution of 169 lines/MM Reported In
 Message No. [REDACTED] dated 7/22/62

Distortion - Positive (Pincushion)

Angle Off Axis Deg.	3	2	1	0	359	358	357		
Distortion Millimeters	<u>.008</u>	<u>.005</u>	<u>.001</u>	<u>.000</u>	<u>.000</u>	<u>.001</u>	<u>.003</u>		

TOP SECRET

LENS DATA SUMMARY: (Horizon Cameras for Main Camera No. 90)

	Take-Up	Supply
Lens Serial No.	<u>807546</u>	<u>807542</u>
Exposure Time	<u>1/50</u> Sec.	<u>1/50</u> Sec.
Filter Type	<u>HRATEK 25</u>	<u>HRATEK 25</u>
Aperture	<u>F8.0</u>	<u>F8.0</u>
Operational Focal Length	<u>89.2</u> MM	<u>89.0</u> MM
Radial Distortion:		
10° off Axis	<u>.003</u> MM	<u>.010</u> MM
20° off Axis	<u>.034</u> MM	<u>.040</u> MM
Tangential Distortion (Maximum Vector)	<u>.004</u> MM	<u>.004</u> MM

Resolution:

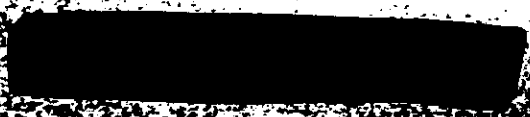
Angle off Axis, Deg.	0	5	10	15	20	25	27.5	0	5	10	15	20	25	27.5
Radial Resolution	51	49	37	39	31	29	27	51	49	44	42	32	31	24
Tangential Resolution	51	47	34	28	27	25	20	51	44	44	34	31	23	19

35.4 Lines/MM Avg. 37.1 Lines /MM Avg.

Note:

1. Distortion and resolution are read at equivalent operational focal length.
2. Resolution is read on Sample film and High contrast target.

FOR APPROVAL



SYSTEM NO. MB
 VERSION NO. 430
 MISSION NO. 9039
 CAMERA NOS. 90391

TOP SECRET

LENS DATA SUMMARY: (Main Camera No. 91)

Lens Serial No. 0532455

Filter Type WRITTEN 21

Equivalent Operational Focal Length 609.600 MM

Resolution:

Static:

	Lines/MM	Film Type	Target Contrast
Bench Test	<u>231.8</u>	<u>50243</u>	<u>High</u>
Other	_____	_____	_____

Dynamic:

Itek Pre-Vibration	<u>151</u>	<u>50132</u>	<u>High</u>
Itek Post Vibration	<u>160</u>	<u>50132</u>	<u>High</u>
AP Pre-HATS	_____	_____	_____
AP Post-HATS	<u>152</u>	<u>50132</u>	<u>High</u>
Other	_____	_____	_____

Note: Itek Post Vibration Resolution of 160 lines/MM Reported In

Message No. [REDACTED] dated 7/22/62

Distortion - Positive (Pincushion)

Angle of View								
Distortion Millimeters	<u>.007</u>	<u>.005</u>	<u>.004</u>	<u>.000</u>	<u>.004</u>	<u>.002</u>	<u>.003</u>	

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LENS DATA SUMMARY: (Horizon Cameras for Main Camera No. 91)

	Take-Up	Supply
Lens Serial No.	<u>007533</u>	<u>007565</u>
Exposure Time	<u>1/100</u> Sec.	<u>1/10</u> Sec.
Filter Type	<u>NONE</u>	<u>NEUTRAL 25</u>
Aperture	<u>F8.0</u>	<u>F6.8</u>
Operational Focal Length	<u>88.95</u> MM	<u>89.0</u> MM
Radial Distortion:		
10° off Axis	<u>.005</u> MM	<u>.005</u> MM
20° off Axis	<u>.020</u> MM	<u>.041</u> MM
Tangential Distortion (Maximum Vector)	<u>.007</u> MM	<u>.007</u> 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	44	37	29	32	32	27	56	49	46	32	30	29	31
Tangential Resolution	56	44	37	34	31	27	19	51	44	37	28	27	25	22

35.8 Lines/MM Avg. 35.8 Lines /MM Avg.

Note:

- Distortion and resolution are read at equivalent operational focal length.
- Resolution in lines per mm at 1000 f/11 and high contrast target.

TOD OPERATOR
FOR USE

SYSTEM NO. 140
VEHICLE NO. 1130
MISSION NO. 9039
CAMERA NOS. 2059

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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 $\pm 5''$ of arc. The longitudinal axis of the vehicle (Z axis) is so positioned to form an angle of $105.00^\circ \pm 5''$ to the target plane for camera number one calibrations and an angle of $75.00^\circ \pm 5''$ 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 $75.00^\circ \pm 5''$ 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 X_0 and Y_0 are the offsets of Target 1 from the indicated center of format as defined in paragraph 3.
- 6.0 X_s, Y_s and X_t 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 Para. 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 Para. 2 on the format is made by positioning two targets for each horizon format normal $\pm 5''$ of arc to the plane defined in Para. 2. Dimensions F, G, H, I, J, K, L, M and N are the offsets of these targets.

REPORT NO. NA
 VEHICLE NO. 1120
 MISSION NO. 2039
 CAMERA NOS. 20391

FORMAT DIMENSIONS: (MAIN CAMERAS)



Camera No. 24 Vehicle Motion / Scan Direction

A	26051	Xo	-118	H	-23.483
B	210.592	Yo	+1.380	J	-4.554
C	255.403	Xv	+1.07	K	+4.949
D	56.555	Yv	+2.21	L	+24.027
E	24.502	F	-4.709	M	-23.547
X1	22.362	O	+22.003	N	+5.008
Y1	22.240				

Format Dimensions:

Height	56.2	Not Available
Width	29.6	Not Available

Main Take-Up Supply

Height	22.0	Not Available
Width	23.6	Not Available

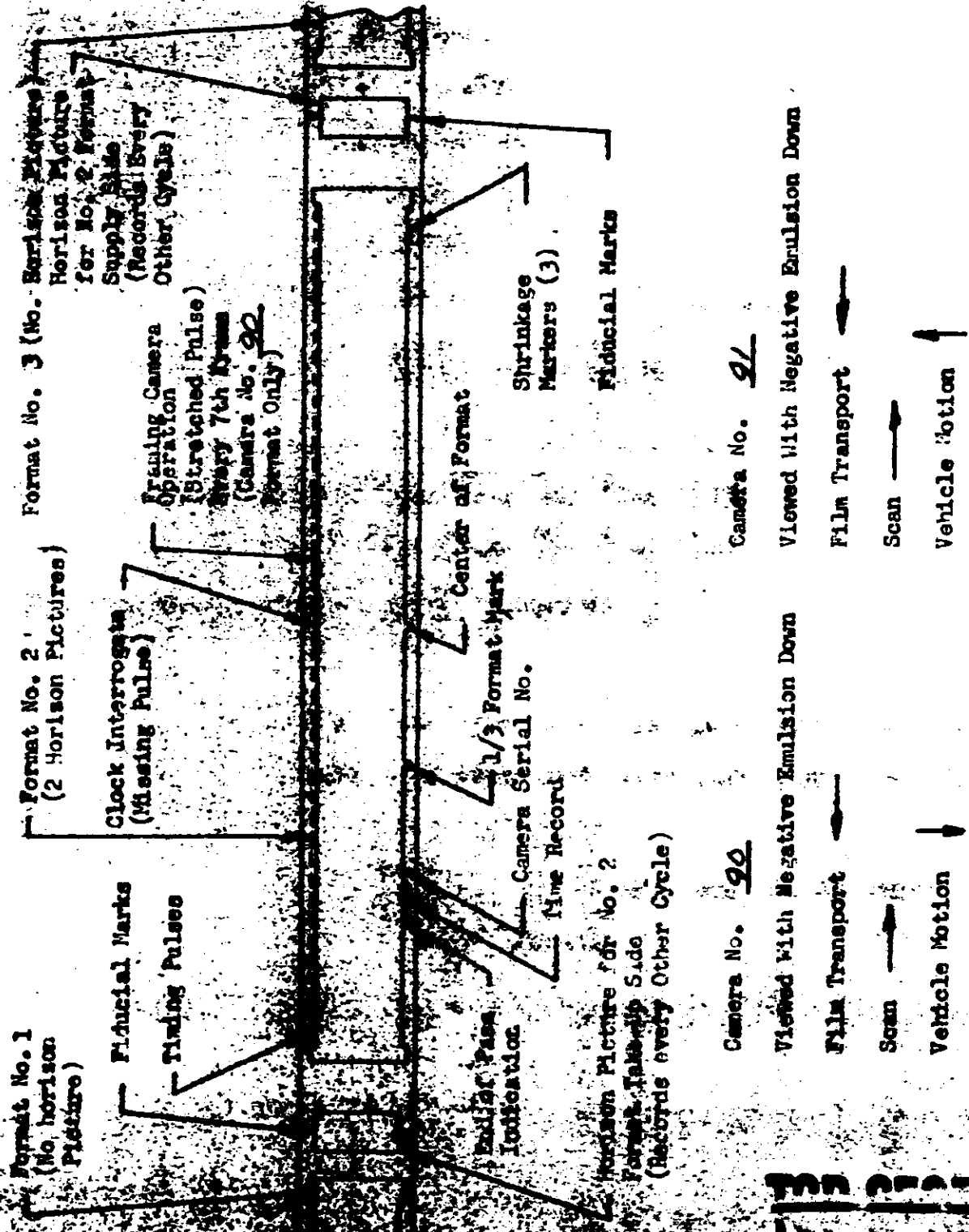
Note: 1. All dimensions are in millimeters and are average dimensions of three formats.
 2. Height of main format is taken at center of format.
 3. Format sign convention



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

MISSION NO. 1130
MISSION NO. 9039
CAMERA NO. 90191

FORMAT LAYOUT: (MAIN CAMERAS)



1130 9039 90191

MODEL NO. MB
 SERIAL NO. 11500
 MFG. NO. 90392
 CAMERA NOS. 90191

THE CENTER
FOR OPTICS

LENS DATA SUMMARY: (Priming Camera No. 90)

Lens Serial No. 2552613

Roseam Serial No. 86

Filter Type WRITTEN 21

Aperture F6.3

Exposure Time 1/250 Sec.

Equivalent Focal Length 38.42 MM *Operational Focal Length 38.51*

Resolution: 929 Lines/MM AWAR

Angle off axis	0	10	20	30	35
Resolution L/PM High Contrast	113/120	110/109	100/84	91/66	81/55
Resolution L/PM Low Contrast	64/71	65/64	58/57	52/46	45/38

Note: Resolution data read from SD130 film

Distortion:

Angle off Axis Deg.	0	10	20	30	35	325	330	340	350
Distortion Millimeters	.000	.004	.005	.010	.017	.031	.038	.045	.012

Perpendicularity of Roseam to Optical Axis .09 MM in 57 MM

Date of Stellar Calibration Not Available

SYSTEM NO. 118
VEHICLE NO. 130
MISSION NO. 9039
CAMERA NOS. 2054
FRAMING CAMERA NO. 90

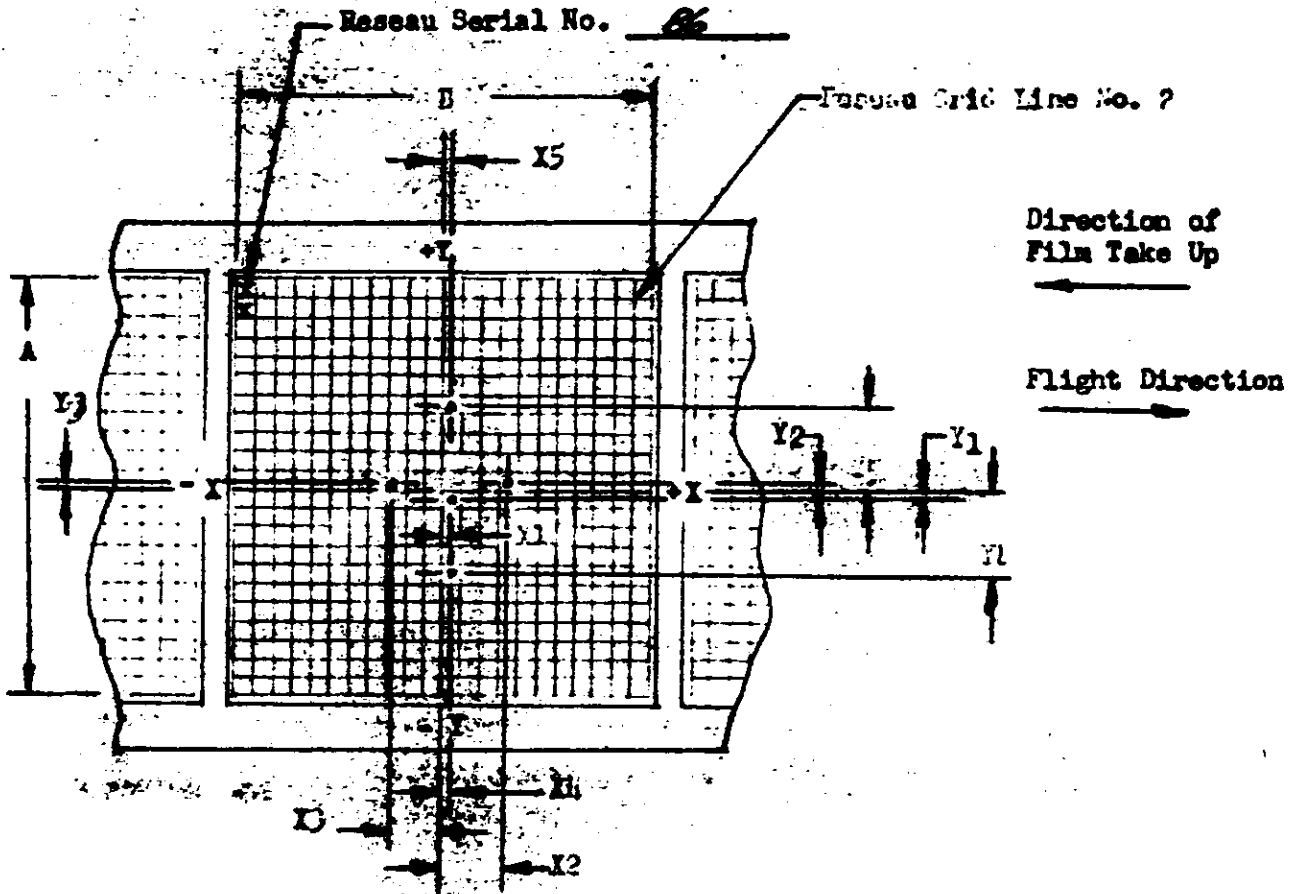
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DEFINITION OF FRAMING CAMERA FORMAT CALIBRATIONS:

1. Measurements are made with respect to targets fixed perpendicular to the mechanical interface between the total payload and the Agena vehicle and parallel to the planes formed by the vehicle Z Y axes.
2. Three targets, targets 1, 4 and, 5 form a horizontal line parallel + 5" of arc to the light plane or target plane used for main camera calibrations. Targets 4 and 5 are equidistant to target No. 1.
3. Three targets, targets 1, 2 and 3 form a vertical line perpendicular + 5" of arc to the light plane or target plane used for main camera calibrations. Targets 2 and 3 are equidistant to target No. 1.
4. Target 1 is common to the lines defined in Paras. 2 and 3 and forms the point of intersection of these lines.
5. The vehicle Z axis is in a vertical position during framing camera calibration.
6. The framing camera is mounted in the fairing in a pitched attitude of 1 1/2 degrees to compensate for the in orbit pitch of the Agena F vehicle. The targets defined in Paras. 2 and 3 will normally be biased toward the plus Y half of the format as a result of this pitch.
7. The indicated flight direction is the direction of camera motion with respect to the ground during orbit.
8. X1, Y1, X2, Y2, etc. are the offsets of target 1, target 2, etc. These measurements are referenced to the Reseau grid lines 12X and 12Y.
9. Dimensions A and B are the overall dimensions of the Reseau Grid taken at Reseau grid lines 12X and 12Y.

SYSTEM NO. MB
 VEHICLE NO. 1150
 MISSION NO. 9059
 CAMERA NOS. 96691

FRAMING CAMERA FORMAT DIMENSIONS; FRAMING CAMERA NO. 90
 (Format viewed with negative emulsion side up.)



Location of Principal Point:

X -0.03 MM

Y +0.09 MM

Offset Dimensions:

X1 _____ Y1 _____

Y1 _____ X2 _____

X2 _____ Y2 _____

Y2 _____ X3 _____

X3 _____ Y3 _____

Grid Dimensions:

Notes:

1. Offset dimensions and principal point locations shown exaggerated for clarity.

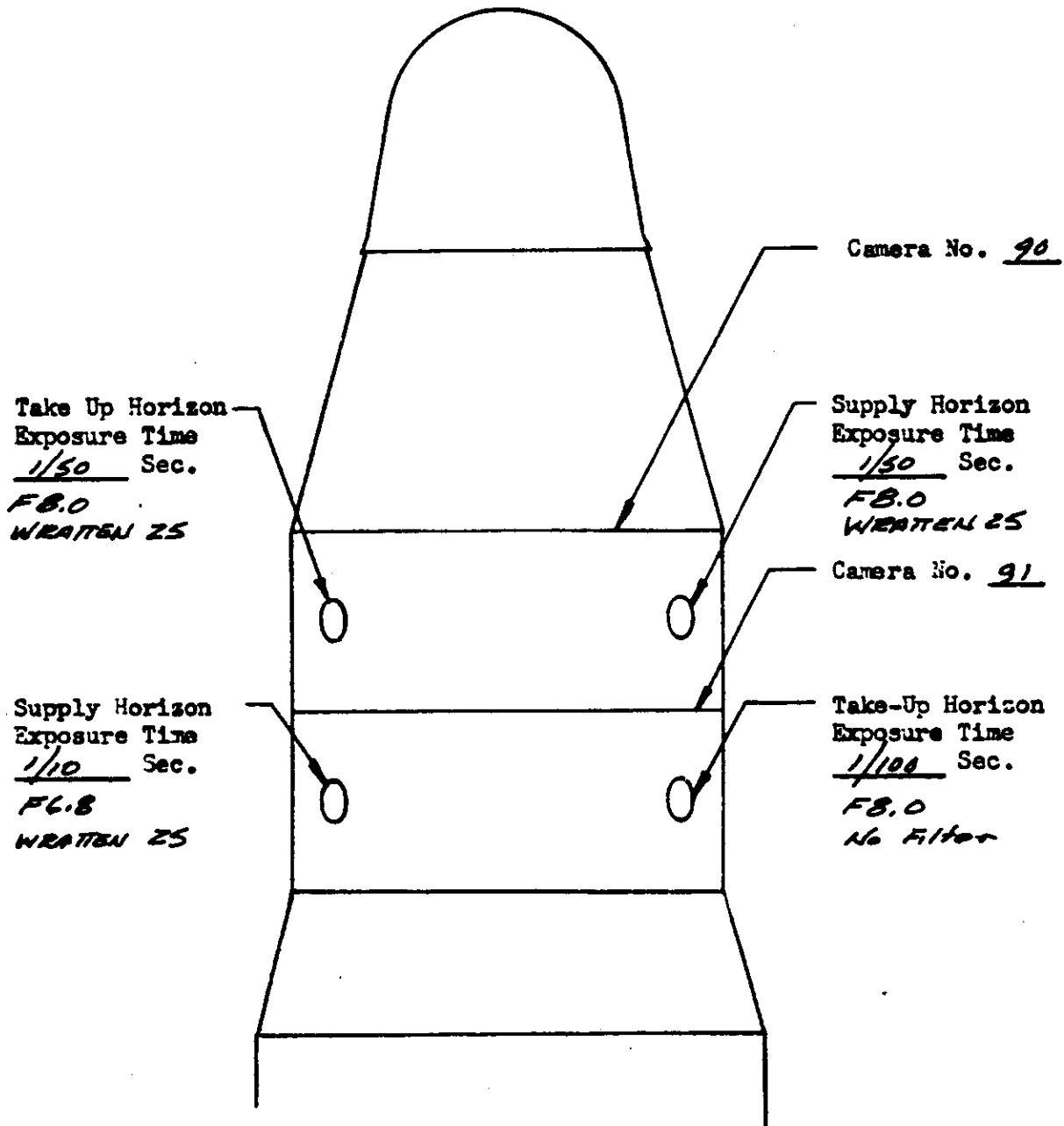
2. Grid dimensions A and B are taken at Grid lines 12X and 12Y.

3- No Angular calibration between Framing Camera and panoramic cameras for this system.

TAN AFAM

SYSTEM NO. 48
VEHICLE NO. 1130
MISSION NO. 9039
CAMERA NOS. 90 & 91

HORIZON LENS SETTINGS (Viewed from top of vehicle in flight)



Take Up Horizon
Exposure Time
1/50 Sec.
F8.0
WRITTEN 25

Camera No. 90

Supply Horizon
Exposure Time
1/50 Sec.
F8.0
WRITTEN 25

Camera No. 91

Supply Horizon
Exposure Time
1/10 Sec.
F6.8
WRITTEN 25

Take-Up Horizon
Exposure Time
1/100 Sec.
F8.0
No Filter

Flight Direction



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