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TECHNICAL PUBLICATION

NATIONAL PHOTOGRAPHIC
INTERPRETATION CENTER

PHOTOGRAPHIC EVALUATION REPORT
MISSION 1116

Handle via
~~Talent-Keyhole~~
Channels Only

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[redacted]

SEPTEMBER 1972
COPY NO [redacted]
31 PAGES

[redacted]

[redacted]

[redacted]

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PHOTOGRAPHIC EVALUATION REPORT
MISSION 1116

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NATIONAL PHOTOGRAPHIC INTERPRETATION CENTER

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GLOSSARY OF TERMS

ALTITUDE - Vertical distance from the vehicle to the Hough Ellipsoid at the time of exposure.

APOGEE - That point in an elliptical orbit of a satellite at which the distance is greatest between the orbiting body and the surface of the Hough Ellipsoid.

BINARY TIME WORD - Binary presentation of the accumulated system time.

DATE OF PHOTOGRAPHY - Day, month, and year (GMT) that the photography was acquired.

DISIC - Dual Improved Stellar Index Camera.

ECCENTRICITY - A measure of the deviation of an ellipse from a true circle; expressed by dividing the distance between the foci of the ellipse by the length of its major axis.

EXPOSURE TIME - Time during which a light-sensitive material is subjected to the influence of light; expressed in this text in fractions of a second. Formula:

$$\text{Exposure time (sec)} = \frac{\text{slit width (in)}}{\text{scan rate (in per sec)}}$$

FIDUCIAL MARK - A standard geometrical reference point imaged within the frame of a photograph. The intersection of the primary fiducial marks usually defines the intersection of the principal ray with the focal plane.

FOCAL LENGTH (CALIBRATED) - Adjusted value of the equivalent focal length. Computed to distribute the effect of lens distortion over the entire field.

FOCAL LENGTH (EQUIVALENT) - Distance measured along the lens axis from the rear nodal point to the plane of best average definition over the entire field. Points other than the rear nodal point may be used but must be specified for correct interpretation of data.

FOCAL PLANE - Plane perpendicular to the lens axis, in which images of points in the object field of the lens are focused.

FORMAT - The portion of the frame that contains imagery produced by the primary optical system of the camera.

FRAME* - A single exposure which contains the format and peripheral border information relevant to the format.

GENERATION - Number of reproductive steps by which a negative or positive photographic copy is separated from the original scene, i.e., the original negative is generation one, a positive made from the original negative is generation two, etc.

GROUND RESOLUTION* - The minimum distance (expressed as bar plus space) between two adjacent linear features which can be detected by a photographic system, as determined from standard three bar resolution targets. A target is considered to be resolved when a grouping of three bars can be distinguished as three distinct lines.

HOUGH ELLIPSOID - A reference ellipsoid around the earth having a semi-major axis of 20,925,738.18 feet and a semiminor axis of 20,855,588.20 feet.

IMAGE MOTION COMPENSATION (IMC) - A correction made to compensate for relative image motion at the camera focal plane.

INCLINATION - The angle between the orbital and equatorial planes measured counterclockwise from the equatorial plane to the orbital plane with the ascending node as the vertex.

INTERPRETABILITY (PHOTOGRAPHIC) - Suitability of the imagery with respect to answering requirements on a given type of target. Various factors such as halation, uncompensated image motion, poor contrast, incorrect focus, improper film processing, atmospheric conditions (both natural and manmade), ground resolution, and insufficient natural or artificial lighting of the target affect interpretability. The 3 levels of interpretability are: Poor (P) - Unsuitable for adequately answering requirements on a given type of target. Fair (F) - Suitable for answering requirements on a given type of target but with only average detail. Good (G) - Suitable for answering requirements on a given type of target in considerable detail.

INDEX CAMERA - A framing camera used to record terrain imagery. The product is used for relative orientation and mapping purposes.

LOCAL SUN TIME - Time of day computed from the position of the sun relative to the imaged terrain.

MATERIAL CHANGE DETECTOR (MCD) - A pre-exposed pre-processed film strip (approximately three feet long) that is detected by telemetry when it passes through the panoramic camera. This strip is generally spliced between two different film types to signal the film change.

NODAL TRACE - A continuous line imaged along the major axis of each frame to define the optical axis of the lens relative to any given instant of exposure.

PAN GEOMETRY DOTS - Images of the rail holes associated with the pan geometry calibration of the camera.

PANORAMIC CAMERA - Photographs a partial or complete panorama of the terrain in a transverse direction through a scanning motion of the lens system.

PASS - Photographic portion of an orbital revolution. A prefix "D" indicates the descending node, a prefix "A" indicates the ascending node, and a prefix "M" indicates a continuous camera operation from the ascending node through the descending node. An additional suffix "E" indicates that the associated photography was generated for engineering purposes.

PERIGEE - That point in an elliptical orbit of a satellite at which its distance is nearest the surface of the Hough Ellipsoid.

PERIOD - The time required for a satellite to complete one revolution about the earth.

PITCH - Rotation of the camera about its transverse axis. Positive pitch indicates nose up attitude.

PRINCIPAL RAY - That ray of light which emanates from a point in object space and passes undeviated through the centers of curvature of the lens surfaces. It is coincident with the optical axis of the lens.

RELATIVE ORIENTATION - The determining (analytically or in a photogrammetric instrument) of the position and attitude of one of a pair of overlapping photographs with respect to the other.

RESOLUTION - Measure, expressed in lines/mm, of the smallest array of point objects distinguishable as independent point images.

ROLL - Rotation of the camera about its longitudinal axis. Positive roll indicates left wing up attitude.

SOLAR ELEVATION - The angular distance to the sun measured from a plane tangent to the earth at the intersection of the principal ray of the camera and the earth.

STELLAR CAMERA - A framing camera which records stellar images. The product, in conjunction with the product of the Index camera, is used for attitude determination.

UNIVERSAL GRID - An X - Y coordinate system used to define image location on photographic formats.

VEHICLE GROUND TRACK AZIMUTH - Clockwise horizontal angle measured from the longitudinal meridian's intersection of the earth's surface to the vehicle's ground track.

VIGNETTING - Gradual reduction in density of parts of a photographic image due to the stopping of some of the rays entering the lens.

YAW - Rotation of the camera about its vertical axis. Positive yaw represents nose left attitude, as viewed from top of the camera.

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* Defined differently than in the Glossary of NPIC Terminology.

SYNOPSIS

Mission 1116 was successfully launched at 2144Z on Wednesday, 19 April 1972. The mission produced 6,019 fwd frames and 6,021 aft frames. Approximately 40 percent of the mission was allotted to mapping requirements.

Bucket one was processed at [redacted] and bucket two was processed at Special Project Production Facilities (SPPF).

The image quality of Mission 1116 is generally good and each bucket is assigned an MIP value of 115. The fwd imagery is slightly better than the aft imagery. Approximately 15 to 20 percent of the mission was obscured by clouds.

Stellar and index cameras were not included on this mission.

[redacted]

PART I. GENERAL SYSTEM INFORMATION

A. Camera Numbers

Forward-Looking Panoramic	333
Aft-Looking Panoramic	332
DISIC Unit	None on this mission.

B. Launch and Recovery

	1116-1	1116-2
Launch	19 Apr 72/2144Z	NA
Recovery	1 May 72/0010Z	8 May 72/2223Z
Recovery Rev	D180	D309

C. Orbital Elements

Element	1116-1 (Pass D024)	1116-2 (Pass D279)
Period (min)	88.711	88.424
Perigee (nm)	83.64	86.22
Apogee (nm)	149.73	133.06
Eccentricity	0.00913	0.00630
Inclination (deg)	81.48	81.49
Perigee Latitude (Geod) (deg-min)	11-54N	12-11N
Perigee Longitude (Geod) (deg-min)	65-47E	143-04E

NA - Not applicable.

D. Photographic Operations (Panoramic Cameras)

Type	1116-1 Revs	1116-1 Frames	1116-2 Revs	1116-2 Frames	Total Revs	Total Frames
Operational	52	2,697	44	2,958	96	5,655
Fwd	52	2,699	44	2,958	96	5,657
Operational/Domestic						
Fwd	1	27	0	0	1	27
Aft	1	27	0	0	1	27
Domestic						
Fwd	7	203	4	119	11	322
Aft	7	203	4	119	11	322
Engineering (no imagery)						
Fwd	1	9	1	6	2	15
Aft	1	9	1	6	2	15
Total						
Fwd	61	2,936	49	3,083	110	6,019
Aft	61	2,938	49	3,083	110	6,021

E. Film Usage

Camera	Film Load (Total)*	Pre-Flight Footage	Processed Footage**	Film Type
Fwd-Looking (1116-1)	16,340	373	7,719	3414
Aft-Looking (1116-1)	16,340	370	7,720	3414
Fwd-Looking (1116-2)	NA	NA	8,250	3414
Aft-Looking (1116-2)	NA	NA	8,250	3414

F. Acquisition: The altitude distribution of all operational frames of Mission 1116 is illustrated in Figure 1. The altitude ranges from 82 to 110 nm. The mean altitude is 91.5 nm which is 5 miles higher than the mean altitude of Mission 1115.

A histogram of the latitude is shown in Figure 2. The right side peak in the bimodal distribution illustrates some of the approximately 40 percent coverage which represents the Southern Hemisphere, allotted for mapping requirements.

*Total load for both buckets (feet).
**Values include pre-flight footages.
NA - Not applicable.

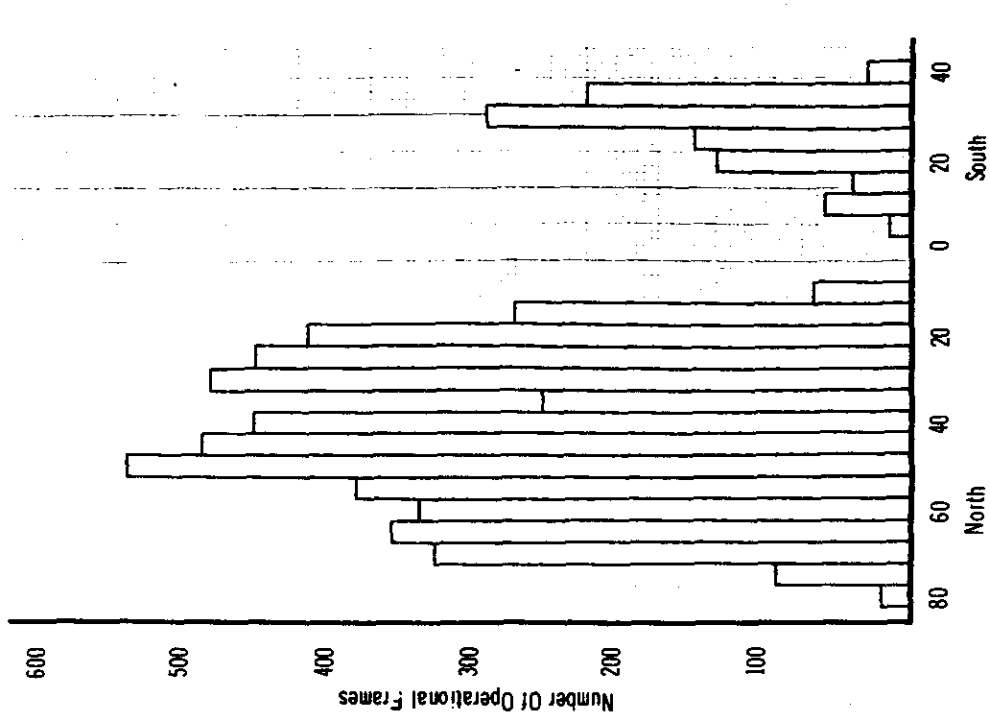

FIGURE 2. LATITUDES OF OPERATIONAL FRAMES

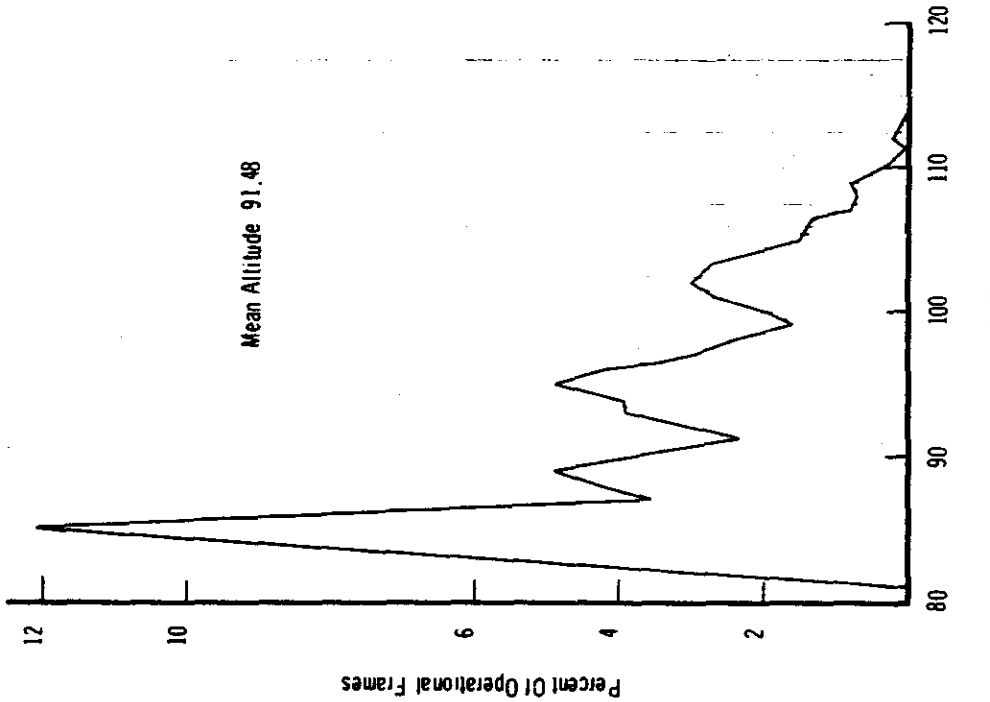

FIGURE 1. ALTITUDES OF OPERATIONAL FRAMES

[redacted]

PART II. CAMERA SYSTEM OPERATION

A. Panoramic Cameras

The fwd- and aft-looking cameras operated properly throughout the mission.

B. Horizon Cameras

The aft port horizon camera shutter failed to close on six instances throughout the mission. In each instance the shutter closed properly on the next programmed operation. During each failure, the two succeeding main camera frames were severely fogged. All other horizon cameras operated correctly.

C. Tape Recorder

The in-flight tape recorder performed normally throughout the mission.

D. Clock System

A loss of the clock/system correlation time on all passes after D081 caused larger than normal inaccuracies of orbital positioning.

[redacted]

PART III. IMAGE ANALYSIS

A. Fwd-Looking Panoramic Camera

1. Density: Generally medium with the exception of snow-covered passes, which are slightly dense.

2. Contrast: Mostly medium to high in nonsnow-covered passes.

3. Image Quality: Good on both buckets of Mission 1116. Most imagery maintains edge sharpness at magnifications of 100X. The assignment of an MIP value of 115 to both segments is unusual considering that both MIP areas are located in the first third of the format and not in the optimum position near center format.

4. Imaged Degradations:

a. Light Leaks - A characteristic fog pattern, associated with camera exit periods, is present eight frames from the end of most operations of bucket one. This fog pattern is of higher than normal density and degrades the immediate imagery.

b. Static - Dendritic static edge fog is present intermittently on the first bucket and more frequently on the second bucket. Imaged degradation is minimal.

c. Other - All frames corresponding to the recovery rev D180 contain many small minus density spots.

5. Physical Degradations:

a. An emulsion scratch begins on pass D186 and increases in severity until it ends at a manufacturing splice on frame 6 of Pass D187.

b. Fail scratches are heaviest at the beginning of the mission. No associated image degradation was noted.

c. Splices occur at the following locations:

Pass	Frame	Type
D138	10	Manufacturer's
D145	21	Manufacturer's
D134	01	Manufacturer's
D154	23	Bucket transfer

D187	06	Manufacturer's
D204	93	Manufacturer's
D250	99	Manufacturer's

B. Aft-Looking Panoramic Camera

1. Density: Generally medium with the exception of snow-covered passes which are slightly denser.

2. Contrast: Mostly medium to high.

3. Image Quality: Good aft imagery, but generally not as good as the fwd imagery.

4. Imaged Degradations:

a. Light Leaks - A characteristic fog pattern, less severe than that on the fwd record, appears on the sixth frame from the end of most passes.

b. Static - Dendritic static edge fog noted only on the second bucket was less severe and less frequent than on the fwd record.

5. Physical Degradations:

a. A series if closely spaced stress marks is present within a .25-inch distance across the format on frame 23, pass D250. These marks were apparently caused by the extremely dry film passing over a small diameter roller in the camera system.

b. Splices occur at the following locations:

Pass	Frame	Type
D039	45	Manufacturer's
D123	21	Manufacturer's
D154	05	Bucket transfer
D168	53	Manufacturer's
D183	03	Manufacturer's
D250	37	Manufacturer's
D251	07	Manufacturer's

C. Horizon Camera

An unidentified object (probably a foreign particle) either inside or outside the camera is imaged on approximately 40 aft port frames near the end of bucket one. The image size is about .1 X .1 inch and its position varies as the mission progresses. It was not observed after the recovery pass D180.

[redacted]

PART IV. IMAGED AUXILIARY DATA

A. Fwd-Looking Panoramic Camera

All auxiliary camera data is imaged properly throughout the mission.

B. Aft-Looking Panoramic Camera

1. The camera number is improperly located and is multiply-imaged intermittently throughout the mission.

2. Most passes of the second bucket contain an auxiliary, out of focus time word on the second to the last frame.

PART V. MENSURATION QUALITY

The total number of OAK mensuration requests for Mission 1116 was 62, forty-five of which were for the length and width of airfields. The remaining 15 requests were for missile test centers, ICBM complexes, oil spills, nuclear test sites, submarines, and crates aboard ships. The image quality is comparable to previous KH-4 missions.

As no DISIC package was deployed for this mission, the Photogrammetry Division/IEG could not determine reliable geodetic positioning. There was a loss of clock/system correlation time after pass D081. As a result, mensuration accuracies after pass D081 could be less reliable due to the higher inaccuracies of orbital position.

PART VI. FILM PROCESSING

A. Processing Data

Camera	Mission	Machine/Process	Process Chemistry	Film	Average Gamma	Speed AEI	Speed AFS
Fwd	1116-1	Yardleigh 6/ Dual Gamma	XK30	3414	2.10	5.13	15.40
	1116-2	Trenton/Dual Gamma	16DN	3414	2.01	5.61	16.01
Aft	1116-1	Yardleigh 5/ Dual Gamma	XK30	3414	2.28	4.91	14.70
	1116-2	Fultron/Dual Gamma	16DN	3414	1.97	5.36	15.71

B. Film Handling Summary

Mission 1116-1 was processed and reproduced at [redacted]; and Mission 1116-2 was processed and reproduced at the SPPF. Operations at both facilities proceeded smoothly. The last 18 inches of the fwd record of 1116-2 was removed and hand processed because of severe damage caused by film runout in the camera. The same action was taken with the last 11 inches of the aft record, which was also damaged.

Figures 3 and 4 are plots of the sensitometric curves for 1116-1 and 1116-2. Mission 1116-1 was duplicated on SO-192 and viscous processed, while Mission 1116-2 was duplicated on SO-192 and spray processed.

C. Timetable

Mission	Recovered	Received at Processing Site	Priority 1A at NPIC
1116-1	1 May 72/0210Z	1 May 72/1715Z	3 May 72/2325Z
1116-2	8 May 72/2203Z	9 May 72/1015Z	12 May 72/0400Z

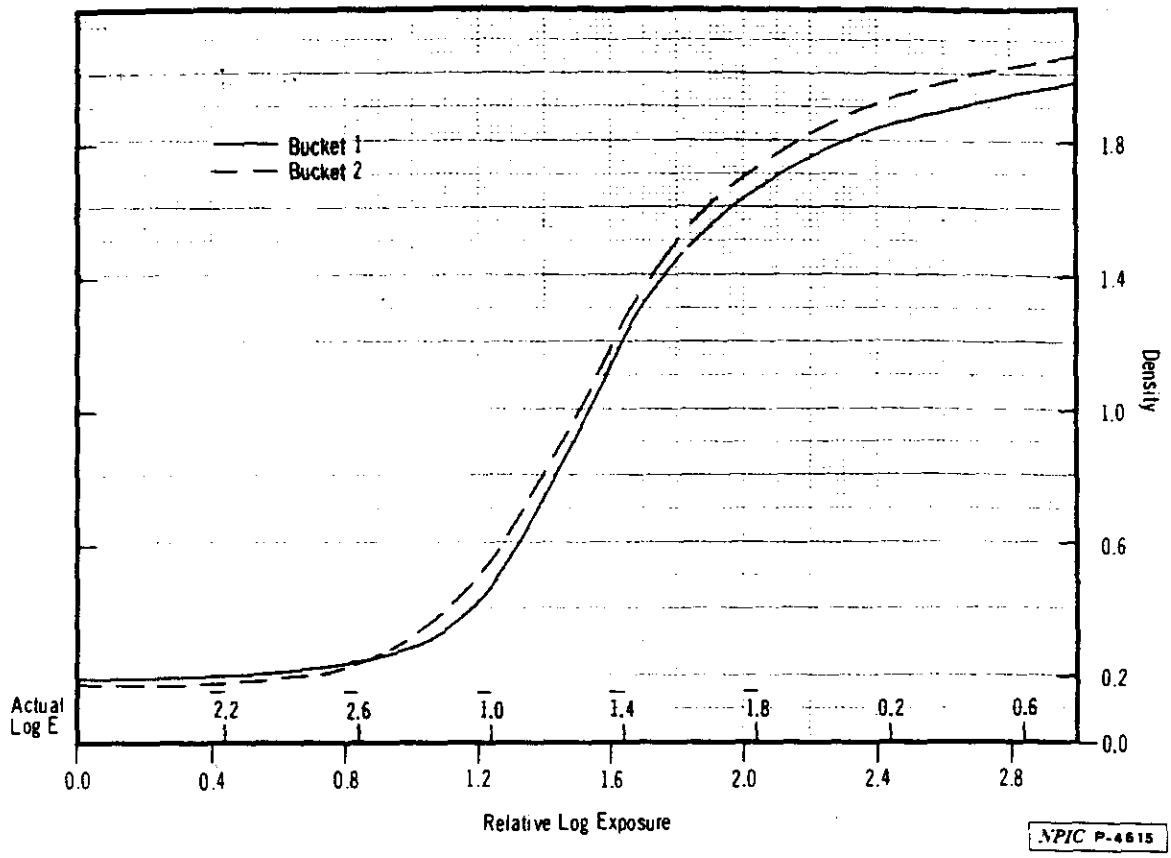

FIGURE 3. COMPARISON OF SENSITOMETRIC CURVES FOR MISSION 1116 (FWD CAMERA)

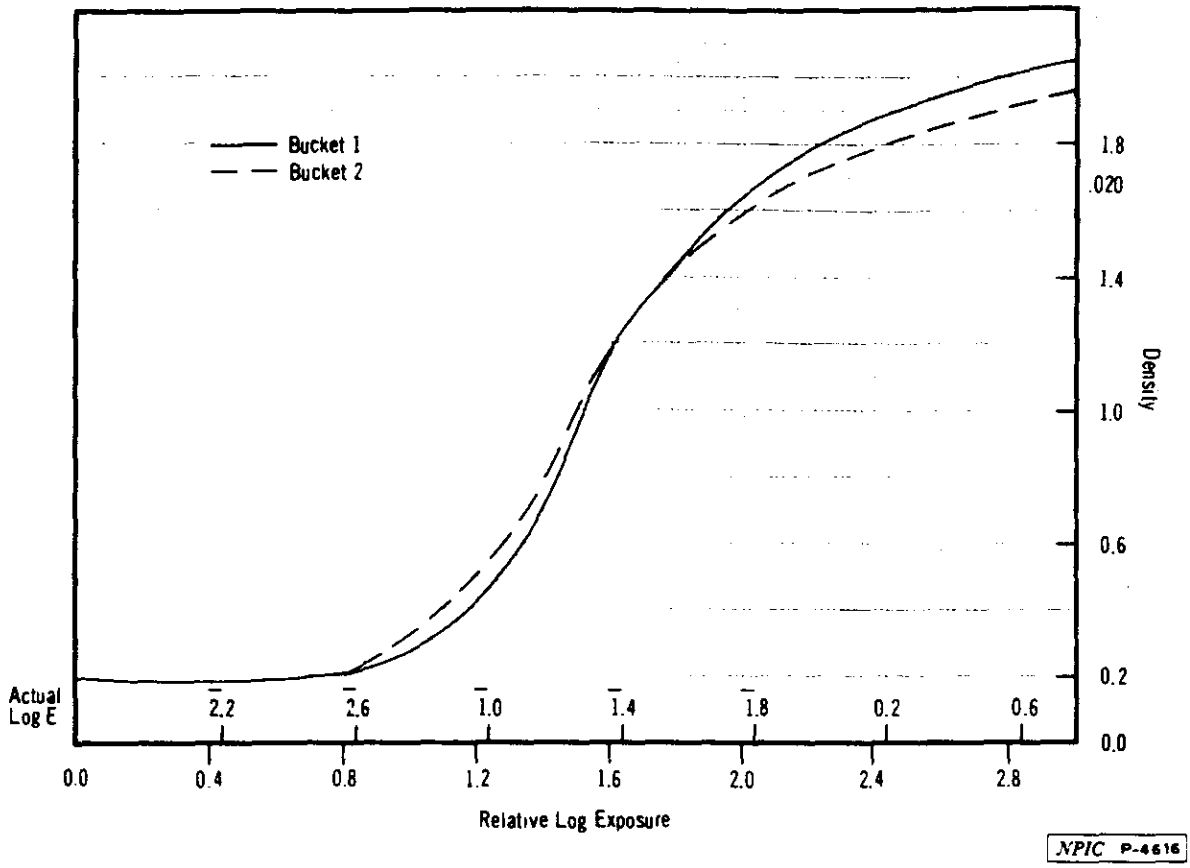

FIGURE 4. COMPARISON OF SENSITOMETRIC CURVES FOR MISSION 1116 (AFT CAMERA)

PART VII. PI SUITABILITY OF PRIORITY 1 TARGETS*

A. PI Statistics

1. Target Summary:

	1116-1	1116-2	Total
Programmed	177	240	417
Reported	151	215	366

2. PI Quality:

Target Type	Ratings Ex	Good	Fair	Poor	Total Reports
Mission 1116-1					
Missiles	0	2	31	9	42
Air Installations	0	0	12	21	33
Nuclear Energy	0	0	1	10	11
Military Installations	0	0	32	8	40
Chemical/Biological/ Radiological Warfare	0	1	4	4	9
Electronics	0	0	1	0	1
Industry	0	4	5	5	14
Urban Complexes	0	0	1	0	1
Miscellaneous	0	0	0	0	0
Total	0	7	87	57	151
Mission 1116-2					
Missiles	0	1	17	58	76
Air Installations	0	1	18	20	39
Nuclear Energy	0	4	23	2	29
Military Installations	0	0	3	24	27
Chemical/Biological Radiological Warfare		0	4	6	10
Industry		1	15	6	22
Urban Complexes		0	0	1	1
Unidentified Installations/ Activities		0	0	2	2
Miscellaneous	0	0	1	8	9
Total	0	7	81	127	215

*All Priority 1 targets are reported in the OAKs.

3. Summary of PI Quality Ratings:

	All PI Reports		Clear Weather Only PI Reports	
	1116-1	1116-2	1116-1	1116-2
Excellent	0%	0%	0%	0%
Good	4.6%	3.3%	6.9%	6.5%
Fair	57.6%	37.7%	74.5%	55.4%
Poor	37.7%	59.1%	18.6%	38.0%

B. PI Comments

1. Atmospheric Attenuation: Listed below are the weather conditions for all reported targets.

Weather Conditions	Reported Targets	Percent
Clear	194	53.0
Clear/Semi-Darkness	9	2.5
Clear/Shadow	1	.3
Scattered Clouds	45	12.3
Scattered Clouds/Haze	23	6.3
Scattered Clouds/Shadow	20	5.5
Scattered Clouds/Semi-Darkness	7	1.9
Heavy Clouds	15	4.1
Heavy Clouds/Haze	9	2.5
Heavy Clouds/Shadow	1	.3
Heavy Clouds/Semi-Darkness	4	1.1
Haze	37	10.1
Haze/Heavy Dust-Smoke	1	.3
Total	366	100.0

Major Weather Categories	Percent*
Clear	56
Scattered Clouds	26
Heavy Clouds	8
Haze**	19

* Total does not add to 100 percent because some reports are included twice.
** This is the highest haze percentage reported on any KH-4B mission.

2. Product Interpretability: As usual the PI quality ratings varied depending on the particular target and the acquisition parameters. The 1110 system commonly receives a large percentage of poor ratings due to small scale. This was especially the case for this mission, the poor ratings for buckets one and two are 37.7 and 59.1, respectively. Despite these large percentages of poor ratings, several PIs reported that the quality of this mission is as good as any previous 1100 series mission. For example, one PI was able to distinguish between Faggot and FRESCO aircraft.

The 20 percent increase in the poor ratings of 1116-2 compared to 1116-1 is possibly because of the mean altitude of 1116-2 is slightly higher than the mean altitude of 1116-1.

PART VIII. RESOLUTION TARGET DATA

Target Designator	1		2	
Pass	D161		D161	
Date of Photography	29 Apr 72		29 Apr 72	
Location	Ft. Huachuca, Ariz		Ft. Huachuca, Ariz	
Type	Fixed, Leg A		Fixed, Leg C	
Bar (%) - Background Reflectance (%)	61 - 6		88 - 5	
Contrast	10:1		17:1	
Geographic Coordinates (deg-min)	31-36N 110-19W		31-36N 110-19W	
Elevation (mean sea level)	4,635		4,635	
Local Sun Time	1238		1238	
Solar Elevation (deg-min)	72-73		72-73	
Vehicle Ground Track Azimuth (deg-min)	172-56		172-56	
ON Material Processing	3414-Dual Gamma		3414-Dual Gamma	
Dupe Material Processing	SO-192 Spray		SO-192 Spray	
Weather Conditions	Clear		Clear	
Camera (looking)	Fwd	Aft	Fwd	Aft
Frame	07	13	07	13
Universal Grid Coordinates (cm)	x-30.8 y-2.6	x-44.8 y-3.2	x-30.8 y-2.6	x-44.8 y-3.2
Wratten Filter	W25	W23A	W25	W23A
Exposure Time (sec)	1/596	1/720	1/596	1/720
Slit Width (in)	.1340	.1110	.1340	.1110
Altitude (nm)	86.76	86.63	86.76	86.63
Scale	1:274861	1:275298	1:274861	1:275298

GROUND RESOLUTION IN FEET AND MEDIAN SYSTEM RESOLUTION IN 1/mm ORIGINAL NEGATIVE AND SECOND GENERATION DUPLICATE POSITIVE

		ORIGINAL NEGATIVE				DUPLICATE POSITIVE			
		Fwd		Aft		Fwd		Aft	
Target	Observer	Along Track	Across Track	Along Track	Across Track	Along Track	Across Track	Along Track	Across Track
1	1	5.0	5.0	4.5	6.3	6.3	7.9	5.0	6.3
	2	4.3	5.0	5.0	6.3	7.0	5.6	5.0	6.3
	3	5.0	4.0	4.5	7.0	7.9	7.0	5.6	7.0
	4	4.3	5.0	3.6	6.3	7.9	6.3	5.0	6.3

MEDIAN SYSTEM RESOLUTION (l/mm)		160	180	200	145	120	135	180	145
2	1	5.6	5.6	4.5	6.3	5.6	5.6	5.0	6.3
	2	6.3	6.3	4.5	6.3	6.3	5.6	5.6	6.3
	3	5.6	5.6	3.6	5.6	6.3	5.0	5.6	7.0
	4	5.6	5.6	5.6	7.0	5.6	4.5	5.6	7.9
MEDIAN SYSTEM RESOLUTION (l/mm)		160	160	200	145	150	170	160	135

CAMERA MISSION DATA

	Forward-Looking			Aft-Looking		
	Pan	Takeup Horizon	Supply Horizon	Pan	Takeup Horizon	Supply Horizon
Camera Number	333			330		
Lens Serial Number	[illegible]	E40760	E40738	[illegible]	E40799	E40779
Slit Position						
Slit Width (in) 1	0.134			0.111		
2	0.[illegible]			0.130		
3	0.[illegible]			0.162		
4	0.[illegible]			0.1[illegible]		
5	0.114			0.111		
Aperture		8.0	8.3		6.3	8.0
Exposure Time (sec)	Variable	.010	.010	Variable	.010	.010
Filter (Wratten) Primary	W25(.037 Glass)	W25	W25	W23A(.037 Glass)	W25	W25
Alternate	W25(.040 Glass)			W23A(.040 Glass)		
Focal Length (mm	609.587	55.0	55.0	609.587	55.0	55.0
Film Length (Ft)	16,340			16,340		
Splices	8			6		
Emulsion	7-2-3-1			7-2-3-1		
Film Type	3414			3414		
Resolution Data (1/mm)		0°0A 166R/148T	185R/166T		187R/166T	187R/166T
Static		5°0A 165R/164T	186R/154T		186R/164T	186R/175T
Static						
High Contrast	295			282		
Low Contrast	290			165		
Dynamic						
I High Contrast	280			278		
I Low Contrast	172			174		
F High Contrast	270			288		
F Low Contrast	170			159		

OA - Off axis.
R - Radial resolution on axis.
T - Tangential resolution on axis.

TOP SECRET RUFF
NO FOREIGN DISSEM

Handle Via [redacted] Control System Only

[redacted]

PART X. MISSION INFORMATION POTENTIAL (MIP) HISTORY, 1100 Series

Mission	MIP#	Pass	Frame	Universal Grid Coord	
1101	85	159D	2 Fwd	39.0	1.5
1102*	90	16D	22 Fwd	26.8	1.3
1103	90	79D	15 Fwd	41.8	3.8
1104*	115	16D	6 Fwd	33.1	4.1
1105*	95	16D	20 Aft	47.3	1.2
1106*	110	32D	8 Fwd	17.9	1.8
1107	95	122D	30 Aft	43.7	2.4
1108-1	105	30D	20 Fwd	28.8	0.5
1108-2	100	242D	20 Fwd	33.7	2.3
1109-1	110	16D	3 Fwd	25.8	3.2
1109-2	100	145D	6 Fwd	40.5	2.5
1110-1	90	122D	55 Fwd	49.1	6.3
1110-2	95	201D	112 Fwd	51.7	4.8
1111-1	105	A10	1 Fwd	36.7	1.9
1111-2	105	A189	14 Fwd	16.9	4.2
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1114-1	120	D056	95 Fwd	13.3	2.8
1114-2	125	D203	32 Fwd	38.5	3.2
1115-1	120	D016	10 Fwd	23.5	2.1
1115-2	110	D154	62 Fwd	32.8	3.1
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

*Standards

[redacted]

FIGURE 5. BEST IMAGE QUALITY (1116-1 MIP)
CLEVELAND HOPKINS AIRPORT

FIGURE 6. BEST IMAGE QUALITY (1116-2 MIP)
TUCSON INTERNATIONAL AIRPORT

[redacted]

	Figure 5	Figure 6
Camera	Fwd	Aft
Pass	D095	D161
Frame	4	2
Date of Photography (GMT)	25 Apr 72	29 Apr 72
Time (GMT)	18:10:54	19:37:43
Universal Grid Coordinates (cm)	x-21.0; y-2.0	x-13.2; y-0.7
Enlargement Factor	20X	20X
Geographic Coordinates (format center) (deg-min)	41-30.3N 81-17.1W	32-15.9N 110-11.0W
Altitude (ft)	513,699	527,834
Vehicle Ground Track Azimuth (deg-min)	171-6	172-48
Solar Elevation (deg-min)	59-58	71-48
Exposure Time (sec)	1/609	1/595
Slit (in)	.1340	.1340
Filter	W25	W25
Processing	Dual Gamma	Dual Gamma