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NATIONAL PHOTOGRAPHIC
INTERPRETATION CENTER

PHOTOGRAPHIC EVALUATION REPORT

MISSION 1115

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JANUARY 1972
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MISSION 1115

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[redacted]

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1041	[redacted]	Slant Range Computations Related to Universal Grid Coordinates for the KH4A Camera System
1042	[redacted]	None
1043		Scan Speed Deviation Analysis of the Forward Camera, Mission 1043
1044	[redacted]	Dual Gamma/Viscose Vs Conventional/Spray Processing Analysis (Mission 1044)
1045	[redacted]	None
1046		SO-230 Vs 3404 Evaluation
1047		None
1048		None
1049		Image Quality Comparison Mission 1102--Original Negative Vs Duplicate Positive
1050	[redacted]	None
1051		None
1052		SO-239 Second Generation Vs Third Generation Negative
1101	[redacted]	Slant Range Computations Related to Universal Grid Coordinates for the KH4B Camera System
1102	[redacted]	None
1103		None
1104		Bicolor Evaluation Report SO-180 Evaluation, Mission 1104
1105		SO-121 Evaluation; SO-180 Supplement
1106	[redacted]	None
1107		MIP 1100 Series; Effects of Conjugate Imagery Loss, Mission 1107
1108	[redacted]	SO-242 Evaluation, Mission 1108
1109		None
1110		None
1111		None
1112		None
1114		None
1115		None

[redacted]

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 1115, a two-part satellite reconnaissance mission, was launched at 2134Z on 10 September 1971. The first bucket was recovered dry during rev 117 at 0216Z on 18 September 1971 and was processed at the primary processing facility. The second bucket was recovered dry during rev 309 at 2049Z on 29 September 1971 and was processed at the secondary processing facility.

The overall image quality of Mission 1115-1 is good and comparable to the best of past missions; the quality of Mission 1115-2 is less than that for Mission 1115-1. Visual Edge Matching (VEM) analysis indicates that this quality loss equates to a 24 percent relative resolution loss.

All cameras operated satisfactorily through pass D300 which ended photographic acquisition.

Approximately 25 to 30 percent of this mission was obscured by weather.

PART I. GENERAL SYSTEM INFORMATION

A. Camera Numbers

Forward-Looking Panoramic	331
Aft-Looking Panoramic	330
DISIC Unit	14

B. Launch and Recovery Dates

	1115-1	1115-2
Launch	10 Sep 71/2134Z	NA
Recovery	18 Sep 71/0216Z	29 Sep 71/2049Z
Recovery Rev	D117	D309

C. Orbital Elements

Element	Actual 1115-1 (Rev D073)	Actual 1115-2 (Rev D264)	Photo Range
Period (min)	88.291	88.177	NA
Perigee (nm)	83.8	83.4	80.0 (D121)
Apogee (nm)	134.5	127.3	100.0 (D008)
Eccentricity	0.00675	0.00579	NA
Inclination (deg)	74.95	74.96	NA
Perigee Latitude (Geod) (deg-min)	32-50N	23-48N	NA

NA - Not applicable.

D. Photographic Operations

1. Panoramic Cameras:

Type	1115-1 Revs	1115-1 Frames	1115-2 Revs	1115-2 Frames	Total Revs	Total Frames
Operational						
Fwd	30	2,831	49	2,903	79	5,734
Aft	30	2,838	49	2,898	79	5,736
Operational/Domestic						
Fwd	0	0	0	0	0	0
Aft	0	0	0	0	0	0
Domestic						
Fwd	4	106	5	109	9	215
Aft	4	106	5	109	9	215
Engineering (no imagery)						
Fwd	0	0	2	17	2	17
Aft	0	0	2	17	2	17
Total						
Fwd	34	2,937	56	3,029	90	5,966
Aft	34	2,944	56	3,024	90	5,968

2. Secondary Cameras:

Camera	Frames
Stellar (1115-1)	2,454 Starboard 2,449 Port
Index (1115-1)	2,462
Stellar (1115-2)	2,686 Starboard 2,680 Port
Index (1115-2)	2,616

E. Film Usage

Camera	Film Load (Total)	Pre-Flight Footage	Processed Footage*	Film Type
Fwd-Looking (1115-1)	16,300**	526	8,253	3414
Aft-Looking (1115-1)	16,300**	522	8,291	3414
Fwd-Looking (1115-2)	NA	NA	8,032	3414
Aft-Looking (1115-2)	NA	NA	8,046	3414
Stellar (1115-1)	2,000**	49	732	3401
Stellar (1115-2)	NA	NA	860	3401
Index (1115-1)	2,200**	61	1,103	3400
Index (1115-2)	NA	NA	1,119	3400

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

PART II. CAMERA OPERATION

All cameras operated satisfactorily throughout the mission. Photographic acquisition ended with pass D300 because of film depletion.

PART III. IMAGE ANALYSIS

A. Fwd-Looking Panoramic Camera

1. Density: Medium throughout the mission.

2. Contrast: Medium throughout the mission.

3. Image Quality: Quality for Mission 1115-1 is good and comparable to the best of past missions; the quality of Mission 1115-2 is less than that of Mission 1115-1. The MIPs for Mission 1115 are 120 and 110, respectively. The quality loss between buckets one and two was investigated by a Visual Edge Matching (VEM) analysis of the original negatives on both mission segments. One hundred and sixty edges were selected from ten passes of each bucket (total 320 edges). The edges were obtained from cloud-free areas and were randomly spaced to provide data at the beginning, middle, and end of each bucket. This sampling contained both in-track and along-track edges which were generally located within plus or minus 15 degrees from nadir.

The VEM analysis resulted in an average loss in image quality between buckets of approximately one VEM edge (a relative resolution loss of 24 percent at 95 percent confidence level). The average edge sharpness does change from pass to pass, and occasionally bucket two imagery has edges as sharp as bucket one. However, the average edge for passes of Mission 1115-1 is consistently better than that of Mission 1115-2. There is no gradual decrease in quality from beginning to end of the mission; the loss is the same for along- and across-track edges. In addition to the VEM analysis, acutance measurements were made of 13 edges from the fwd camera original record. This analysis resulted in a 22 percent loss in acutance on bucket two (90 percent confidence level). The lack of suitable edges is responsible for the reduced number of edges used. The cause for the loss in quality between buckets is unknown.

4. Imaged Degradations:

a. Light Leaks - Roller/equipment shadowgraphs are present on the eighth and ninth frames from the end of several first bucket passes. These are associated with camera sit periods. Pass D135 contains a fog pattern from the latter part of frame 160 into the beginning of frame 161. In all cases, image degradation is minor.

b. Static - Static caused dendritic-type fog patterns to be present along both film edges throughout the mission. These patterns occur with increased frequency on the second bucket.

c. Other - Random, minute, plus density spots are present intermittently throughout the format on all passes following the recovery rev D115. These spots are very numerous on pass D117.

5. Physical Degradations:

a. Characteristic rail scratches are most severe at the beginning of bucket one.

b. An intermittent base rub, impossible to detect except by reflected light, occurs on approximately half of the first bucket record. This rub wavers slightly along the major axis of the film.

c. Frames 66 to 68, pass D300, are heavily fogged and badly creased. The last half of frame 67 and the 6-inch partial frame 68 were damaged to the extent that it was removed and hand-processed; this piece was neither titled nor reproduced.

d. Splices occur at the following locations:

Pass	Frame	Type
D053	23	Manufacturer's
D056	119	Manufacturer's
D089	03	Manufacturer's
D104	182	Bucket transfer
D137	04	Manufacturer's
D203	73	Manufacturer's
D234	38	Manufacturer's

B. Aft-Looking Panoramic Camera

1. Density: Medium throughout the mission.

2. Contrast: Medium throughout the mission.

3. Image Quality: The quality of the aft record is slightly less than that of the fwd for both buckets of Mission 1115. Further, the aft record image quality of Mission 1115-2 is less than that of Mission 1115-1; i.e., a relative resolution loss of 24 percent. To verify this, a VEM analysis similar to that described for the fwd record was conducted on the aft record. A total of 220 edges were analyzed with the VEM instrument. The results are nearly identical with those for the fwd record.

4. Imaged Degradations:

a. Light Leaks - Characteristic roller/equipment shadowgraphs are present on the sixth and seventh frames from the end of a few bucket one passes. A fog pattern extends 1.25 inches into the frame from the time-word edge on frames 112, 113, and part of 114, pass D135. Image degradation is minor.

b. Static - None noted.

c. Other - Random, minute, plus density spots are present throughout the format on all passes following the recovery rev D115.

5. Physical Degradations:

a. Very heavy rail scratches are present throughout bucket one.

b. An intermittent base rub, similar to that described for the fwd record, is present on the first bucket record.

c. A diagonal tear was detected during the presplice operation of the aft record at the take-up end of frame 190, pass D104. Subsequent splicing procedure affected approximately 2 inches of frame 190.

d. Splices occur at the following locations:

Pass	Frame	Type
D039	16	Manufacturer's
D055	03	Manufacturer's
D088	101	Manufacturer's
D104	185	Bucket transfer
D135	105	Manufacturer's
D203	31	Manufacturer's

C. Stellar Cameras

1. Density: Medium throughout the mission.

2. Contrast: Adequate for detection of stellar images.

3. Image Shape: Generally point-type.

4. Images per Frame: Approximately 10 to 15 stellar images are detectable in each frame (port and starboard).

5. Imaged Degradations:

a. Light Leaks - None noted.

b. Static - Static discharges caused minor dendritic-type fog patterns along both film edges. There is minor static fog at the take-up end of many starboard formats.

c. Other - A minor, plus density mark, 0.15 inch in diameter, is present on most starboard frames. This marking is apparently pressure induced.

6. Physical Degradation: None noted.

D. Index Camera

1. Density: Medium throughout the mission.

2. Contrast: Medium throughout the mission.

3. Image Quality: Generally good.

4. Imaged Degradations:

a. Light Leaks - None noted.

b. Static - Minor, dendritic-type fog patterns are noted throughout the record.

c. Other - Minus density spots are present throughout. An emulsion pick approximately one-half millimeter in size is present throughout the mission. Fine, plus density lines parallel to the major axis of the film are present on the last 200 frames; these lines are present across the entire film web.

5. Physical Degradations: None noted.

PART IV. IMAGED AUXILIARY DATA

The auxiliary data for all cameras is imaged properly throughout the mission with the following exceptions:

1. The first bucket of the fwd record contains several multiple imaged camera numbers. In other instances, the camera numbers are improperly located along the film.

2. Rail holes are faintly imaged throughout the aft record, especially at the start of scan on most frames.

3. The stellar time word was underexposed on many frames of the second bucket; the index time word was underexposed to the extent that it is unreadable throughout the mission.

PART V. MENSURATION QUALITY

There were only 28 requests for mensuration support during the initial-phase readout of Mission 1115. Despite a quality difference between buckets, there were no problems encountered in target measurements for either mission segment. The overall mensuration quality was comparable to that of Mission 1114.

PART VI. FILM PROCESSING

A. Processing Data

Camera	Mission	Machine/Process	Process Chemistry	Film	Average Gamma	Speed AEI	Speed AFS
Fwd	1115-1	Yardleigh 5/ Dual Gamma	16DN	3414	2.06	5.54	15.53
	1115-2	Viscous Fultron/ Dual Gamma	16DN	3414	1.98	7.57	21.43
Aft	1115-1	Yardleigh 6/ Dual Gamma	16DN	3414	2.00	5.54	15.00
	1115-2	Viscous Trenton/ Dual Gamma	16DN	3414	2.05	7.66	22.29
Stellar	1115-1	Trenton/Single Level Spray	P693	3401	2.12	65.91	227.03
	1115-2	Versamat	MX641	3401	2.20	60.00	165.00
Index	1115-1	Viscous Fultron/ Dual Gamma	XK15	3400	1.59	28.12	75.18
	1115-2	Versamat	MX819	3400	1.62	8.10	23.00

B. Film Handling Summary

1. Processing: The processing of Mission 1115-1 was conducted at the primary processing facility, while the back-up processing facility served to perform this function on Mission 1115-2. The change in processing site between buckets one and two was effected as an exercise to test the capability of the back-up facility.

The original negative records were processed by viscous Yardleighs at the primary facility; a viscous Fultron and a viscous Trenton processed the second bucket fwd and aft original negatives, respectively. The slower film processing speed of the Fultron/Trenton necessitated an adjustment in the parameters of development temperature and development time to produce similar sensitometric results to those of the Yardleigh processor. Figures 1 and 2 show a comparison of the sensitometric curves for the two mission segments. The difference between the curves amounts to about one-third of a stop which is representative of the typical scene variance from frame to frame and is considered insignificant.

2. Breakdown: The breakdown phase was accomplished by both facilities as per normal procedure with the following exception: A diagonal tear was detected during the presplice operation on the aft record of Mission 1115-2; the tear occurred at the take-up end of frame 190, pass D104. It was the conclusion of the PET that the probable cause of this tear was the off-spooling procedure and not an in-flight anomaly.

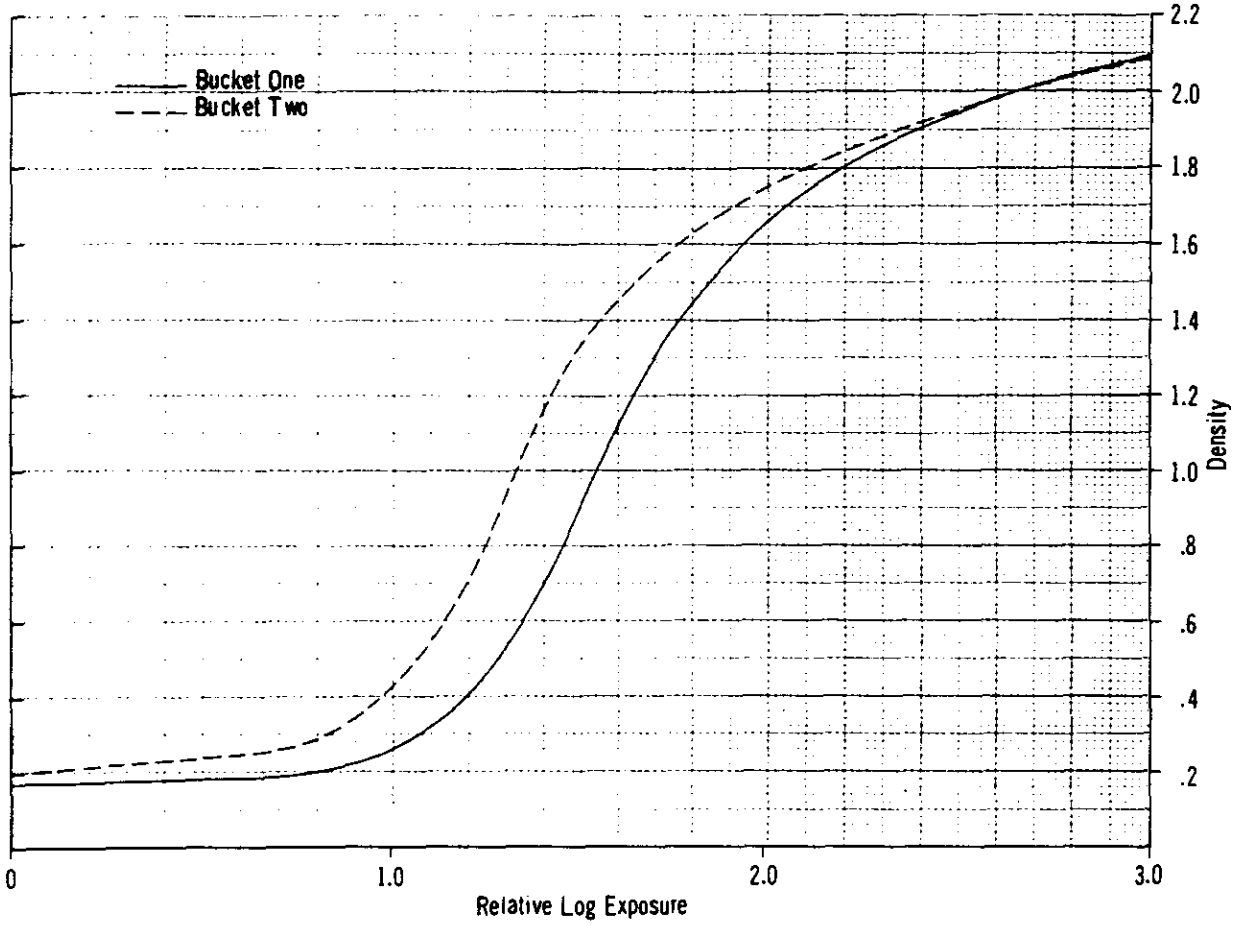


FIGURE 1. COMPARISON OF SENSITOMETRIC CURVES FOR MISSION 1115 (FWD CAMERA)

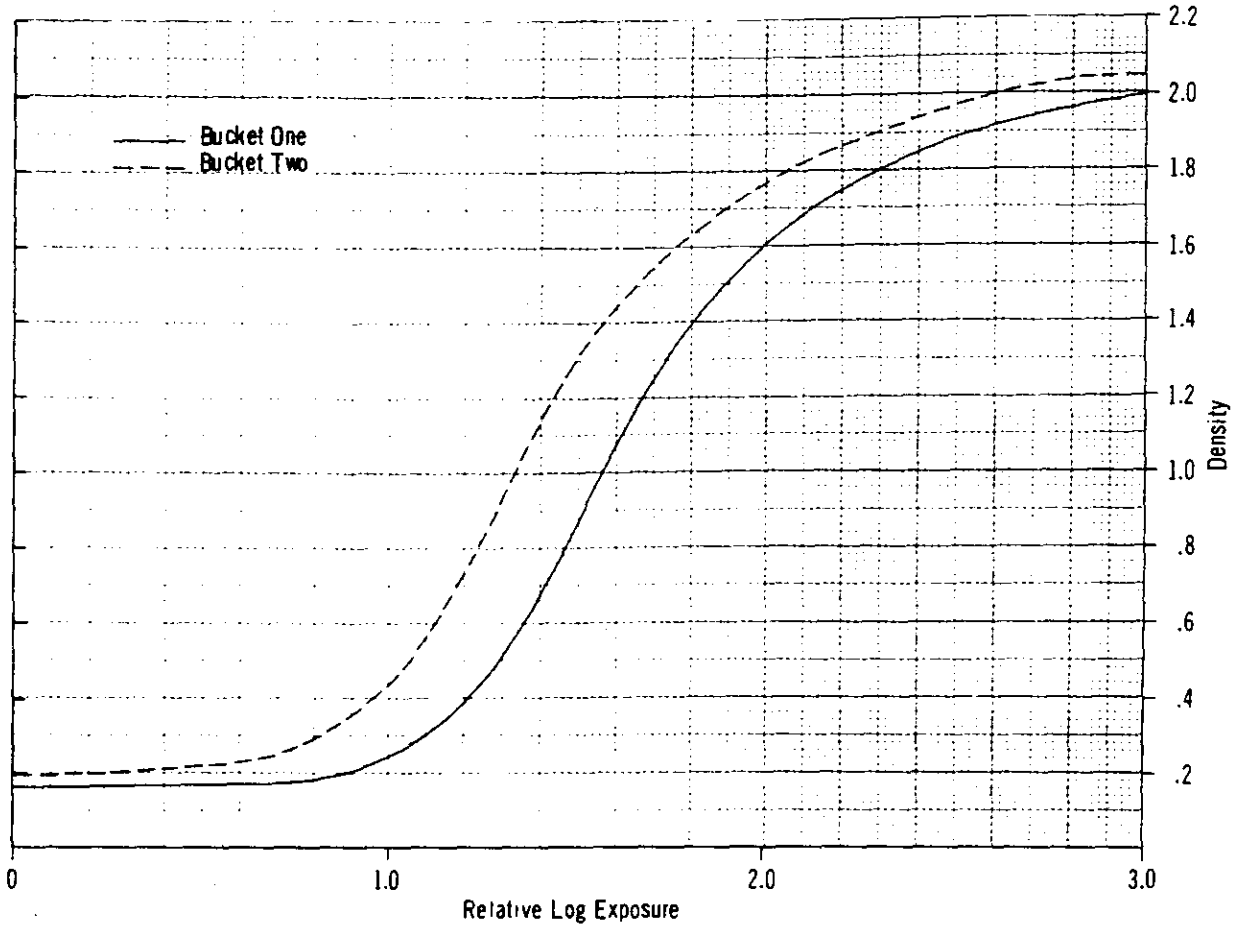


FIGURE 2. COMPARISON OF SENSITOMETRIC CURVES FOR MISSION 1115 (AFT CAMERA)

3. Duplication: Mission 1115-1 was duplicated on SO-192 with viscous processing. The second bucket was duplicated on SO-192, which was processed in a low-gamma spray chemistry developed by the AFSPPF. An NPIC special study [redacted] has shown no statistically significant difference in resolution between spray processed and viscous processed SO-192. This study, however, included only a limited number of samples above 150 cy/mm.

C. Timetable

Mission	Recovered	Received at Processing Site	Priority 1A at NPIC
1115-1	18 Sep 71/0216Z	18 Sep 71/2150Z	21 Sep 71/1102Z
1115-2	29 Sep 71/2049Z	29 Sep 71/2245Z	4 Oct 71/0821Z

PART VII. PI SUITABILITY

A. PI Statistics

1. Target Summary:

	1115-1	1115-2	Total
Reported	125	229	354

2. PI Quality:*

Target Type	Ratings Ex	Good	Fair	Poor	Total Reports
Mission 1115-1					
Missiles	0	3	27	25	55
Air Installations	0	2	18	0	20
Nuclear Energy	0	1	3	13	17
Military Installations	0	0	3	1	4
Chemical/Biological/ Radiological Warfare	0	1	10	0	11
Electronics	0	0	0	0	0
Industry	0	4	8	4	16
Basic Services	0	0	0	0	0
Ports and Harbors	0	0	0	0	0
Storage	0	0	0	1	1
Urban Complexes	0	0	0	0	0
Unidentified Installations/ Activities	0	0	0	1	0
Miscellaneous	0	0	0	0	0
Total	0	11	69	45	125
Mission 1115-2					
Missiles	0	1	53	45	99
Air Installations	0	2	14	20	36
Nuclear Energy	0	0	10	19	29
Military Installations	0	1	23	13	37
Chemical/Biological/ Radiological Warfare	0	3	9	0	12
Electronics	0	0	0	0	0
Industry	0	0	5	9	14
Basic Services	0	0	0	0	0
Ports and Harbors	0	0	0	0	0
Storage	0	0	1	0	1
Urban Complexes	0	0	0	0	0
Unidentified Installations/ Activities	0	0	0	1	1
Miscellaneous	0	0	0	0	0
Total	0	7	115	107	229

*Data from OAK Report by target type in NPIC category code order.

3. Summary of PI Quality Ratings:

	1115-1	1115-2
Excellent	0%	0%
Good	9%	3%
Fair	55%	50%
Poor	36%	47%

B. PI Comments

1. Atmospheric Attenuation: Listed below is the photointerpreters' report of weather conditions for Priority 1 targets covered on this mission.

a. Clear 202 or 57%

b. Scattered Clouds 77 or 22%

c. Heavy Clouds 47 or 13%

d. Haze 28 or 8%

e. Cloud Shadow 0 or 0%

2. Product Interpretability: The PI suitability for the entire mission ranges from good to poor. The majority of PI comments fall in the fair to poor category. The percentage of poor ratings increased by 11 percent on the second bucket, which is probably the result of the quality loss on bucket two. Interpretation suitability of the aft record is less than that of the fwd for the entire mission. The altitude range during photo acquisition was 82 to 100 nm for Mission 1115-1 and 80 to 96 nm for Mission 1115-2. No special prints were produced for Mission 1115-1; special prints were made of three operational revs over the Middle East on Mission 1115-2.

PART VIII. RESOLUTION TARGET DATA

Target Designator	A-3		A-4	
Pass	D016		D016	
Date of Photography	11 Sep 71		11 Sep 71	
Location	Edwards Low Range		Edwards Low Range	
Type	A		A	
Contrast	8:1		8:1	
Geographic Coordinates (deg-min)	34-41N 118-12W		34-41N 118-12W	
Local Sun Time	1320		1320	
Solar Elevation (deg)	54.3		54.3	
Vehicle Ground Track Azimuth (deg-min)	164-17		164-17	
Altitude (nm) (avg fwd and aft)	87.5		87.5	
Processing	Dual Gamma		Dual Gamma	
Weather Conditions	Clear		Clear	
Camera (looking)	Fwd	Aft	Fwd	Aft
Frame	05	11	05	11
Universal Grid Coordinates (cm)	x-51.3 y-3.5	x-24.9 y-1.7	x-52.4 y-3.6	x-23.8 y-1.8
Exposure	1/601	1/647	1/601	1/647
Filter (Wratten)	W25	W23	W25	W23

GROUND RESOLUTION IN FEET AS DETERMINED FROM THE 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
A-3	1	NR	NR	NR	NR	4.5	NR	NR	NR
	2	5.0	NR	NR	NR	5.0	NR	NR	NR
	3	NR	NR	NR	NR	4.5	NR	NR	NR
	4	NR	NR	NR	NR	NR	NR	NR	NR
	5	NR	NR	NR	NR	5.0	NR	NR	NR
A-4	1	NR	NR	NR	NR	5.0	NR	NR	NR
	2	4.5	NR	NR	NR	5.0	NR	NR	NR
	3	4.5	NR	NR	NR	5.0	NR	NR	NR
	4	NR	NR	NR	NR	NR	NR	NR	NR
	5	5.0	NR	NR	NR	5.0	NR	NR	NR

NR - Not resolved.

PART VIII. (CONTINUED)

Target Designator	A-6		A-7	
Pass	D016		D016	
Date of Photography	11 Sep 71		11 Sep 71	
Location	Edwards Low Range		Edwards Low Range	
Type	A		A	
Contrast	12:1		3:1	
Geographic Coordinates (deg-min)	34-41N 118-12W		34-41N 118-12W	
Local Sun Time	1320		1320	
Solar Elevation (deg)	54.3		54.3	
Vehicle Ground Track Azimuth (deg-min)	164-17		164-17	
Altitude (nm) (avg fwd and aft)	87.5		87.5	
Processing	Dual Gamma		Dual Gamma	
Weather Conditions	Clear		Clear	
Camera (looking)	Fwd	Aft	Fwd	Aft
Frame	05	11	05	11
Universal Grid Coordinates (cm)	x-54.3 y-3.7	x-21.9 y-1.9	x-53.2 y-3.7	x-23.2 y-1.8
Exposure	1/601	1/647	1/601	1/647
Filter (Wratten)	W25	W23	W25	W23

GROUND RESOLUTION IN FEET AS DETERMINED FROM THE 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
A-6	1	NR	NR	NR	NR	NR	NR	NR	NR
	2	5.0	NR	NR	NR	NR	NR	NR	NR
	3	5.0	NR	NR	NR	NR	NR	NR	NR
	4	5.0	NR	NR	NR	NR	NR	NR	NR
	5	5.0	NR	NR	NR	NR	NR	NR	NR
A-7	1	5.0	NR	NR	NR	NR	NR	5.0	NR
	2	5.0	NR	NR	NR	NR	NR	NR	NR
	3	NR	NR	NR	NR	5.0	NR	NR	NR
	4	NR	NR	NR	NR	5.0	NR	NR	NR
	5	5.0	NR	NR	NR	NR	NR	NR	NR

NR - Not resolved.

PART VIII. (CONTINUED)

Target Designator	A-8		A-9	
Pass	D016		D016	
Date of Photography	11 Sep 71		11 Sep 71	
Location	Edwards Low Range		Edwards Low Range	
Type	A		A	
Contrast	11:1		5:1	
Geographic Coordinates (deg-min)	34-41N 118-12W		34-41N 118-12W	
Local Sun Time	1320		1320	
Solar Elevation (deg)	54.3		54.3	
Vehicle Ground Track Azimuth (deg-min)	164-17		164-17	
Altitude (nm) (avg fwd and aft)	87.5		87.5	
Processing	Dual Gamma		Dual Gamma	
Weather Conditions	Clear		Clear	
Camera (looking)	Fwd	Aft	Fwd	Aft
Frame	05	11	05	11
Universal Grid Coordinates (cm)	x-53.4 y-4.4	x-22.7 y-1.2	x-54.1 y-3.7	x-22.1 y-1.9
Exposure	1/601	1/647	1/601	1/647
Filter (Wratten)	W25	W23	W25	W23

GROUND RESOLUTION IN FEET AS DETERMINED FROM THE 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
A-8	1	NR	NR	NR	NR	NR	NR	NR	NR
	2	4.5	5.0	NR	NR	5.0	5.0	NR	NR
	3	5.0	NR	NR	NR	NR	NR	NR	NR
	4	5.0	NR	NR	NR	5.0	NR	NR	NR
	5	5.0	NR	NR	NR	5.0	5.0	NR	NR
A-9	1	NR	NR	NR	NR	NR	NR	NR	NR
	2	5.0	NR	5.0	NR	NR	NR	5.0	NR
	3	5.0	NR	NR	NR	NR	NR	5.0	NR
	4	NR	NR	5.0	NR	NR	NR	NR	NR
	5	5.0	NR	NR	NR	NR	NR	NR	NR

NR - Not resolved.

PART VIII. (CONTINUED)

Target Designator	A-10		C-1	
Pass	D016		D016	
Date of Photography	11 Sep 71		11 Sep 71	
Location	Edwards Low Range		Edwards Low Range	
Type	A		C	
Contrast	8:1		6:1	
Geographic Coordinates (deg-min)	34-41N 118-12W		34-41N 118-12W	
Local Sun Time	1320		1320	
Solar Elevation (deg)	54.3		54.3	
Vehicle Ground Track Azimuth (deg-min)	164-17		164-17	
Altitude (nm) (avg fwd and aft)	87.5		87.5	
Processing	Dual Gamma		Dual Gamma	
Weather Conditions	Clear		Clear	
Camera (looking)	Fwd	Aft	Fwd	Aft
Frame	05	11	05	11
Universal Grid Coordinates (cm)	x-53.4 y-3.4	x-22.8 y-2.2	x-53.4 y-4.0	x-22.8 y-1.6
Exposure	1/601	1/647	1/601	1/647
Filter (Wratten)	W25	W23	W25	W23

GROUND RESOLUTION IN FEET AS DETERMINED FROM THE 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
A-10	1	NR	NR	NR	NR	4.5	NR	NR	NR
	2	5.0	4.5	NR	NR	5.0	NR	NR	NR
	3	5.0	NR	NR	NR	5.0	NR	NR	NR
	4	5.0	NR	NR	NR	5.0	NR	NR	NR
	5	5.0	NR	NR	NR	4.5	NR	NR	NR
C-1	1	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
	2	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
	3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
	4	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
	5	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3

NR - Not resolved.

PART VIII. (CONTINUED)

Target Designator	B-1		B-2	
Pass	D016		D016	
Date of Photography	11 Sep 71		11 Sep 71	
Location	Edwards Low Range		Edwards Low Range	
Type	B		B	
Contrast	4:1		11:1	
Geographic Coordinates (deg-min)	34-41N 118-12W		34-41N 118-12W	
Local Sun Time	1320		1320	
Solar Elevation (deg)	54.3		54.3	
Vehicle Ground Track Azimuth (deg-min)	164-17		164-17	
Altitude (nm) (avg fwd and aft)	87.5		87.5	
Processing	Dual Gamma		Dual Gamma	
Weather Conditions	Clear		Clear	
Camera (looking)	Fwd	Aft	Fwd	Aft
Frame	05	11	05	11
Universal Grid Coordinates (cm)	x-53.2 y-3.7	x-23.0 y-1.9	x-53.8 y-3.7	x-22.4 y-1.9
Exposure	1/601	1/647	1/601	1/647
Filter (Wratten)	W25	W23	W25	W23

GROUND RESOLUTION IN FEET AS DETERMINED FROM THE 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
B-1	1	6.3	7.1	6.3	7.1	5.7	8.9	6.3	5.7
	2	5.7	5.7	6.3	5.7	5.7	7.1	6.3	6.3
	3	5.7	6.3	6.3	7.1	5.7	8.9	6.3	7.1
	4	6.3	7.1	6.3	7.1	5.7	7.1	6.3	6.3
	5	5.7	5.7	6.3	8.0	5.7	7.1	6.3	7.1
B-2	1	5.7	6.3	6.3	6.3	5.7	6.3	6.3	6.3
	2	5.7	7.1	5.7	5.7	5.7	5.7	6.3	5.7
	3	5.7	8.0	6.3	7.1	5.7	6.3	6.3	7.1
	4	5.7	6.3	6.3	7.1	5.7	6.3	6.3	5.7
	5	5.7	7.1	7.1	7.1	5.7	5.7	6.3	5.7

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
1112-1	115	D16	11 Aft	50.8	2.9
1112-2	115	D242	12 Aft	38.0	1.2
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

*Standards

[redacted]

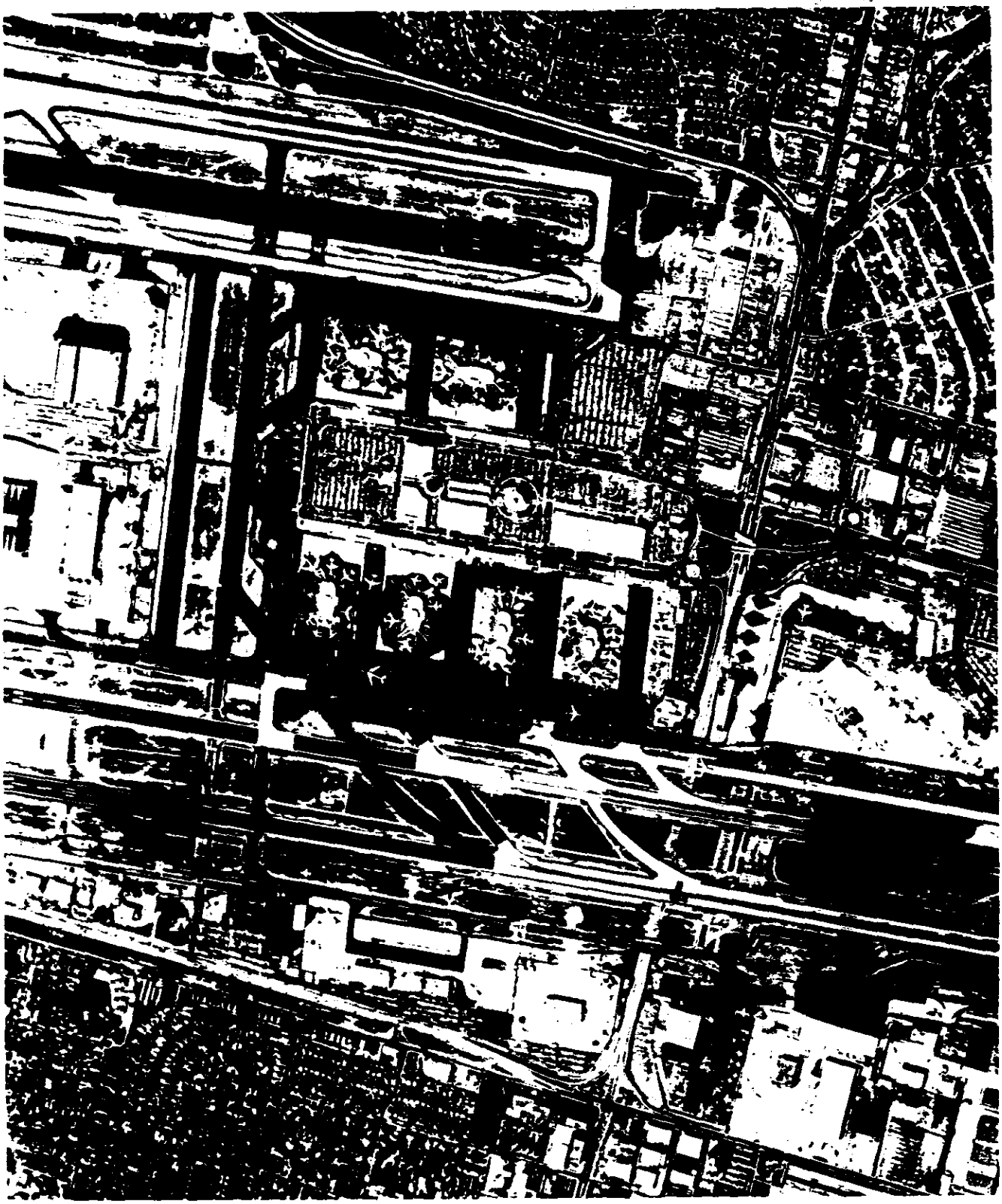
FIGURE 3. BEST IMAGE QUALITY (1115-1 MIP)
LOS ANGELES INTERNATIONAL AIRPORT, USA

FIGURE 4. BEST IMAGE QUALITY (1115-2 MIP)
MINERALNYYE VODY AIRFIELD, USSR

	Figure 3	Figure 4
Camera	Fwd	Fwd
Pass	D016	D154
Frame	10	62
Date of Photography (GMT)	11 Sep 71	20 Sep 71
Universal Grid Coordinates (cm)	x-23.5; y-2.1	x-32.8; y-3.1
Enlargement Factor	20X	20X
Geographic Coordinates (format center) (deg-min)	34-04N 118-00W	44-16N 43-15E
Altitude (ft)	531,034	520,498
Local Sun Time	1321	1110
Solar Elevation (deg-min)	54-43	45-28
Exposure (sec)	1/602	1/484
Filter	W25	W25
Vehicle Ground Track Azimuth (deg-min)	164-17	161-0
Processing	Dual Gamma	Dual Gamma

Handle Via
~~Talent KEYHOLE~~
Control System Only

[redacted]



Handle Via
~~Talent KEYHOLE~~
Control System Only

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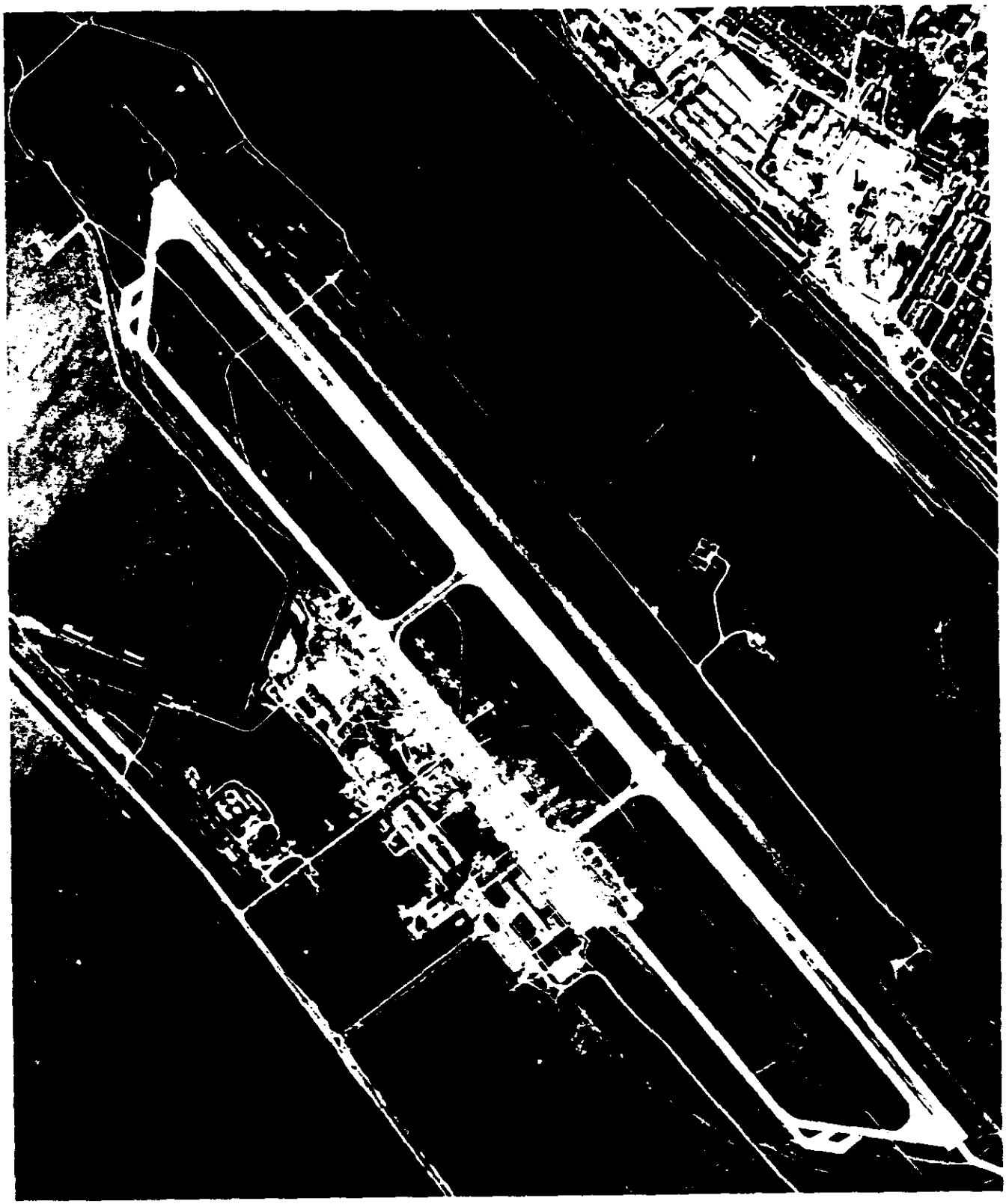
Handle Via
~~Talent-KEYHOLE~~
Control System Only

[redacted]



Handle Via
~~Talent-KEYHOLE~~
Control System Only