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29 JAN 1968

Ad Hoc Committee For J-3 Systems Capabilities
Minutes for Meeting #2
Date: 11 January 1968
Location: Westover AFB, Massachusetts
Prepared by: [redacted]
Attendees: [redacted]

Mr. Alkofer (EK)

[redacted]-Introduction

Polarization and Bi-Spectral experiments were performed with 1102. A quick analysis by the PET members revealed that there was some loss in sharpness when the polarizer filter was in use; however, there was no noticeable degradation as a result of the Bi-Spectral filters. Very good coverage and utilization of CORN targets was also indicated at the PET meeting. The Program Director is expecting CORN support to continue throughout the J-3 series in order that further system improvements can be evaluated. [redacted] indicated that continued support should be no problem. [redacted] mentioned that the two programs (1100's and [redacted]) are coordinating fairly well and that the Westover personnel should not be subjected to any undue burden.

[redacted]-1101

Nearly all of the analysis to date has been associated with system performance rather than system capability. The 1101 O.N.'s are presently at Westover and accessible to ITEK. The first test on 1101 was to determine that the slit change device did perform properly when commanded. The exposure tests that followed were to determine if a slit change over a given target would result in an increase or decrease in image sharpness. The exposure report will be ready for publication about the second week of February. A general discussion followed with regard to final drafts being reviewed by committee members prior to publication. In summary, [redacted] directed that operationally classified drafts be distributed to committee members for review and comments. [redacted] will contact each member about one week from distribution of drafts. If no significant criticism develops, [redacted] will submit drafts to Publication. If suggested improvements require discussion, the drafts will be held for review at the next committee meeting, if imminent, or a

special committee meeting will be called to resolve the issues. The purpose here is to insure that the community gets reports that are in a useable format. Every effort will be made to minimize delay in issuance of these reports. The System Capabilities Reports will be distributed in the same manner and with the same distribution as the EKIT reports. Classification and distribution of System Performance Reports will be discussed at a later date.

[redacted]-Filters

The various filters tested thus far resulted in little noticeable difference in imagery. A wider-band filter is scheduled for 1103 after which a report on filters will be published. [redacted] cautioned [redacted] to include data from all filter tests in the report to be issued. [redacted] reviewed the problems associated with development of glass filters. Bows inherent in gelatin filters led to the development of glass filters, since it was assumed that glass was more rigid. Initial lab tests indicated that the glass filters developed were not as good as the comparable gelatins because of substrates. More highly polished glass would solve this problem; however, because Wratten's have a .005-inch thickness, ITEK attempted to make glass filters of the same thickness. A thicker glass will be required for further polishing. The problem is optical as opposed to coatings; however, a harder coating is desired. The resident office wants glass filters as soon as possible, but will not apply more pressure at the present time. [redacted] circulated a filter designation and description that differentiates between ITEK and EK (Wratten) filters. See Attachment 1.

Alkofer--Summary-Project SUNNY

Attachment 2 contains three Figures that were presented in view-graph form by Alkofer. The bar graph in Figure #1 indicates the departure, in terms of stops of camera exposure, of the target design luminances from an "ideal" exposure. The criteria used for this ideal exposure are that the target design brightness be recorded at the point on the Type 3404 full process level curve where the maximum 1.6:1 resolving power occurs. [redacted]

Figure #2 indicates some major reasons for departures of more than ± 1/2 stop from the ideal recording of the target design luminance. Figure #3 is a plot of target design luminances, for a single target versus solar altitude. The circles indicate forward-looking camera data, while the triangles indicate aft-looking camera data. Reasons for some of the more significant departures in luminances for particular acquisitions are pointed out by the arrows. The solid curve is a computer prediction

for the luminance of a 25% reflection object on a clear day. The dashed curves are ± 1/2 stop from the solid curve.

[redacted]-HPL Density Measurements

At some point in time, Westover had agreed to make the HPL density measurements. [redacted] cited the following problems in performing these measurements at Westover or advantages for performing these measurements at NPIC.

1. HPL changes daily until the day prior to launch. CACTUS calculates frames (accuracy ± 2 frames) and approximate x-coordinate. Within the specified time, only arbitrary target descriptions could be provided Westover, and with only this information, Westover would have difficulty in locating targets. [redacted] indicated that PI's, OAK's and Polaroid prints available at NPIC would provide enough support for his micro-D group to complete the measurements within five days after receipt of ON's. [redacted] stated that Westover originally volunteered to do the job for convenience, and he agrees that it appears more expedient to perform the task at NPIC. [redacted] agreed that NPIC will supply micro-D information on IBM cards.

2. [redacted] agreed that pending TWX request from [redacted] arrangements will be made for PI's to analyze Bi-Spectral material to determine gains or losses indicated by 1102 Bi-Spectral data. [redacted] mentioned that snow and clouds affected some of the Bi-Spectral photography.

3. [redacted] stated that it is evident that all groups demonstrated fullest cooperation, and that he sees no problems with the handling of 1102 material. [redacted] said that he received an unusual amount of support from the ACIC.

[redacted]-Schedule

[redacted] presented a table of 23 items and associated time schedules required by [redacted] in order that data will be analyzed and Performance and Capabilities reports will be issued on schedule. Attachment 3 is a tentative 1102 schedule that was formulated. Attachment 4 is a blank schedule for 1103. Applicable dates for 1103 will be forwarded by TWX and will be referenced to item number and schedule column.

[redacted] The remainder of the meeting was an informal discussion. [redacted] decided that consideration should be given to establishing a sub-committee under the direction of this committee to review the status of pan geometry and to determine its applications to present and future requirements of the cartographic community.

The only problem encountered with 1102 engineering experiments was the absense of DP's that should have been prepared for ITEK. Westover has agreed to prepare these dupes. The problem is attributed to communications routing and will be solved for future missions by a TWX from [redacted]. A group of overlays for selected 1000 series missions will be requested for ITEK.

General Discussion--Regarding Experiments

[redacted] irculated a hand-out of current plans for systems capability effort. See Attachment 5. The following comments are being considered by the committee:

1. Alkofer and [redacted] will study best utilization of the polarization filter under the Red Dot contract.

2. [redacted] suggested that for comparison purposes SO-121 should be flown simultaneously with Kodachrome II in 1105.

3. [redacted] suggested that the Night SO-340 test will be extremely difficult to perform, and that perhaps a sun line test using 3400 or 3401 at minus solar elevation angles would be more fruitful. It was suggested that SO-340 be delayed until CORONA marking problem is somewhat solved.

4. [redacted] will investigate possibilities of a bread-board setup for PI's to use in viewing Bi-Spectral material. [redacted] also is checking equipment available at ITEK.

Members concluded discussion and viewed the domestic ON's.

[redacted]

Reviewed By: [redacted]

Minutes Approved: [redacted]

Chairman

Attachment 1

NEW FILTER DESIGNATION AND DESCRIPTION

~~For Secret~~

FILTER DESIGNATION	DESCRIPTION	NOMINAL SPECTRAL TRANSMISSION (50% T p+ (s))	NOMINAL FILTER FACTOR WITH 3404	NEAREST WRATTEN EQUIVALENT	AXIS OF POLARIZATION**
SF01	Long Wave Pass Orange	550	1.8	W/21	N/A
SF02	Long Wave Pass Orange-Red	580	2.3	W/23A	N/A
SF03	Long Wave Pass Red	600	2.5	W/25	N/A
SF04	Visual Band Pass Orange	570-680	3.1	None	N/A
SF05	Visual Band Pass Green	490-600	2.8	W/57	N/A
SF06	Long Wave Pass Yellow	530*	N/A***	W/15 + 1.0ND	N/A
SF07	Polarizer	Neutral	3.0	0.45 ND	0°
SF08	Polarizer	Neutral	3.0	0.45 ND	10°
SF09	Polarizer	Neutral	3.0	0.45 ND	20°

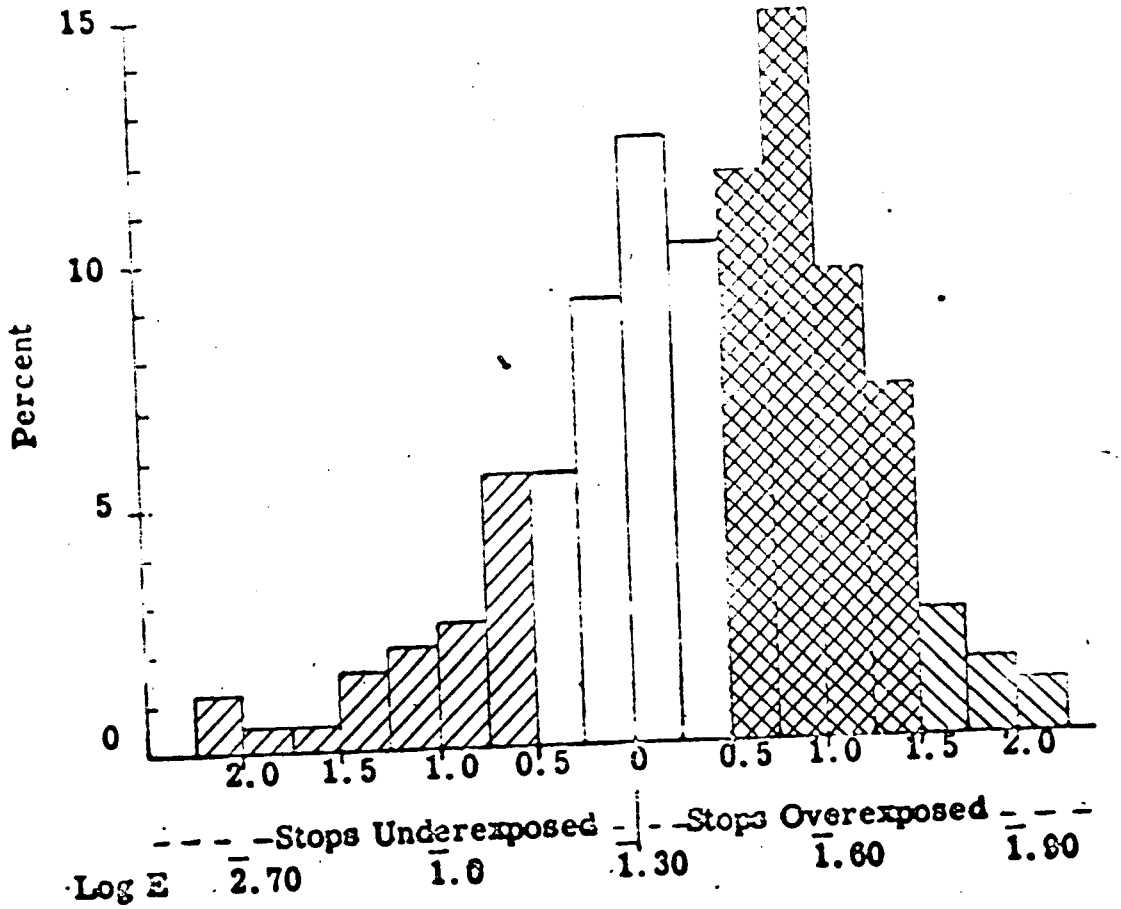
* - Actually 5% transmission as the base transmission will be 10%.

** - Axis of polarization measured from the long dimension of the filter.

*** - This filter is for use with color films.

[redacted] Attach. 2 Fig. 1

Percentage Frequency
Distribution of Recommended
Exposure Changes for
1000-Series Acquisitions



Within 1/2 Stop of
Desired Exposure

Overexposed but within
System Capability to Compensate

Overexposed Beyond System
Capability to Compensate

Underexposed Beyond System
Capability to Compensate

More Than
.5 Stops
Under

38% In Cloud
Shadow

25% at a Solar
Altitude of
20° or Below

More Than
.5 Stops
Over

30.5% Snow or Snow
Surround

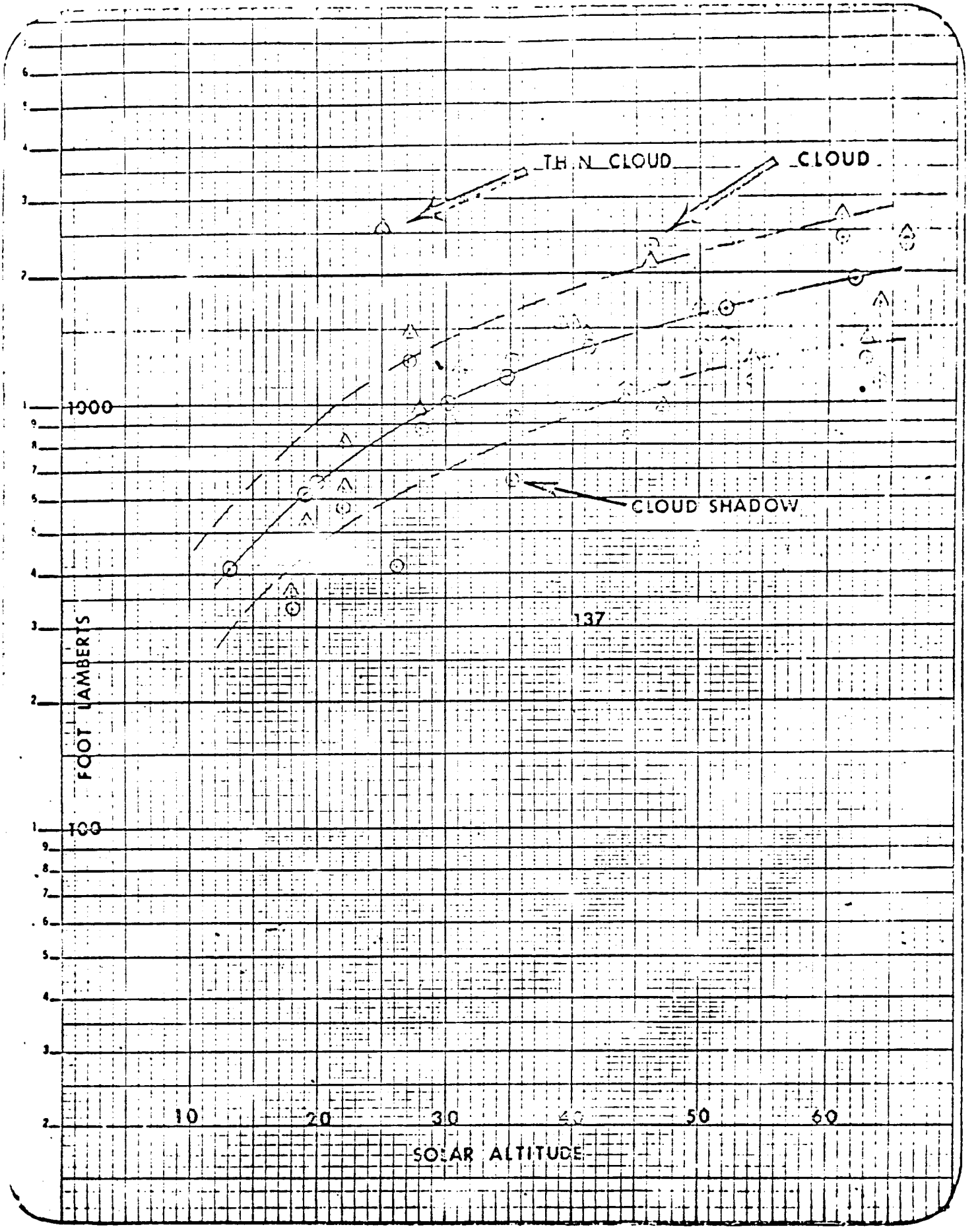
29.1% Cloud Cover or
Partial Cloud
Cover

11.2% At Solar Altitude
of 60° or Above

Attach. 2 Fig. 2

[redacted]

Attach. 2 Fig. 3



Attachment 3

Item Number	ITEM	Responsibility		Leave A/P	[redacted]	Arrive NPIC	Arrive WAFB	Arrive ITEK	Leave ITEK	COMMENTS
1.	Edge Traces (On MIF's)	WAFB	S					1-26		At ITEK: PET + 14 days
			A				1-11			WAFB requires 4 days.
2.A.	Site Manning Report	WAFB	S							At ITEK: Recovery of secon
			A					1-[illegible]		bucket + 14 days.
B.	"Fisheye" Phots	WAFB	S							At ITEK: Recovery of secon
			A					1-11		bucket + 7 days.
3.	Scan "A" T.U. Samples	WAFB	S				1-13	1-21		At ITEK: PET + 14 days.
			A							
4.	Actual "A" T.U. Processed Samples	[redacted]								Delivery to ITEK duri[illegible] Pe
5.A.	Processing Summary Report							1-11		At ITEK: Recovery of secon
B.	Dmax Dmin Portion							1-22		bucket + 28 days.
								1-14		Delivery to ITEK during Pe
6.	D.P's (Domestic)	NPIC	S				1-11	1-15		At ITEK: PET + 6 days.
			A							
7.	HPL (Priority) Target Density Scan	NPIC	S			1-21		1-3[illegible]		At ITEK: PET + 14 days
			A							NPIC needs ON's
8.	40 X Enlargement of MIP Frame	NPIC	S					2-26		At ITEK: Recovery of
			A				1-11			second bucket + 28 days.
9.	Mission Coverage Plots (Domestic and Foreign)	NPIC	S					1-15		At ITEK: PET + 6 days.
			A							
10.	Attitude Data	NPIC	S				1-2[illegible]	2-15		If date is met, info can
			A							be included in CR- Report
11.	Past Index Material	NPIC	S					2-15		
			A							
12.	Performance Estimate	A/P	S							At ITEK: Recovery of
			A					1-3		second bucket + 7 days.
13.	SRV Tape Recorder Data	A/P	S							At ITEK: Recovery of
			A					1-3		second bucket + 7 days.
14.	Ephemeris	A/P	S							At ITEK: Recovery of
			A					1-3		second bucket + 7 days
										(2 copies mains and 1
										copy NPIC)
15.	Summary Report	ITEK								[illegible] months after CR-4
			A							2nd bucket recovery.
16.	System Capability Reports (Experiments)	ITEK	S							[illegible] weeks after 2nd
			A							bucket recovery or 2 month
										after receipt of data

S-Scheduled Date
A-Actual Date

[redacted]

Attachment 4

[redacted]

[redacted]

Attachment 5

SECRE[redacted]

CURRENT PLANS FOR SYSTEMS CAPABILITY EFFORT

11 JANUARY 1968

SECRET/[redacted]

FLIGHT	TEST	DESCRIPTION
CR-1	FILTER EXPOSURE	21, 23A, 25 1⅓ STOP RANGE; DENSITY COMPARISON
CR-2	BISPECTRAL POLARIZER SO-230	W/25 + SF-05 POLOCOAT, 20° ANGLE "FASTER" 3404 TYPE FILM
CR-3	BISPECTRAL WIDE BAND FILTER SO-380	W/25 + SF-05, OPERATIONAL WRATTEN NO. 12 ULTRATHIN BASE FILM
CR-4	SO-180 NIGHT	COLOR INFRARED FILM SO-340 (TRI-X TYPE EMULSION)

TENTATIVE

CR-5	KODACHROME II	HIGH RESOLUTION COLOR FILM
CR-6(CR-7)	POLARIZER THROUGH FOCUS	PRINTER, PROPER AZIMUTH STEPPED GLASS FILTER

1. FILTER EVALUATION

- BASIC OBJECTIVE: SEE WHAT DIFFERENCES OCCUR IN OPERATIONAL PHOTOGRAPHY WITH THE WRATTEN NO. 12, 21, 23A, AND 25 FILTERS

A. SUBJECTIVE EVALUATION

B. MTF ANALYSIS OF IMAGE QUALITY

C. TRADEOFF BETWEEN EXPOSURE TIME AND ATMOSPHERICS

2. EXPOSURE ANALYSIS

- BASIC OBJECTIVE: DETERMINE:

1. IF SLIT CHANGED PROPERLY
2. IF WE EXPOSE PROPERLY
3. COMPARISON BETWEEN TARGETS AND TERRAIN DENSITIES

A. SUBJECTIVE EVALUATION

B. DENSITY VERSUS FREQUENCY ANALYSIS

C. EXPOSURE ANALYSIS WITH HIGH PRIORITY TARGETS

D. COMPARISON OF TARGETS AND TERRAIN DENSITIES

3. BISPECTRAL PHOTOGRAPHY

- BASIC OBJECTIVE: TEST THE OPERATIONAL FEASIBILITY OF OBTAINING BISPECTRAL PHOTOGRAPHY FROM MISSION PHOTOGRAPHY

A. SUBJECTIVE ANALYSIS OF TARGETS WITH RESPECT TO TONAL DIFFERENCES, (NPIC)

B. OBTAIN GOOD BISPECTRAL PRINTS

C. IMAGE QUALITY ANALYSIS OF SF-05 IMAGERY

D. TEST BEST METHOD OF OBTAINING BISPECTRAL IMAGES

4. POLARIZER FILTER

- BASIC OBJECTIVE: DETERMINE THE EFFECTIVENESS OF A POLARIZER AS A HAZE-CUTTING FILTER

  A. IMAGE QUALITY ANALYSIS

  B. ATMOSPHERIC EFFECTS AS A FUNCTION OF SOLAR ALTITUDE AND AZIMUTH

  C. DETERMINE EFFECTIVE FILTER FACTOR

  D. SUBJECTIVE ANALYSIS OF TONAL RENDITION

5. SO-230

- BASIC OBJECTIVE: COMPARE SO-230 WITH 3404 IN AN OPERATIONAL MISSION

  A. FILM SENSITOMETRIC CHARACTERISTICS (FOG, GAMMA, SPEED, FILTER FACTORS)

  B. FILM IMAGE QUALITY ANALYSIS (MTF, RESOLUTION)

  C. SUBJECTIVE EVALUATION OF FLIGHT FILM

  D. SYSTEM RESOLUTION

  E. TONE REPRODUCTION COMPARISON

6. SO-380

- BASIC OBJECTIVE: TEST SO-380 IN THE SYSTEM

  A. FILM SENSITOMETRIC CHARACTERISTICS (FOG, GAMMA, SPEED, FILTER FACTORS)

  B. FILM IMAGE QUALITY ANALYSIS (MTF, RESOLUTION)

  C. SUBJECTIVE EVALUATION OF FLIGHT FILM

  D. SYSTEM RESOLUTION (MTF/AIM)

  E. LAB CHAMBER TESTS

  F. LIMITED DIMENSIONAL STABILITY ANALYSIS

7. SO-180

- BASIC OBJECTIVE: OBTAIN MISSION PHOTOGRAPHY WITH CAMOUFLAGE COLOR FILM

  A. SUBJECTIVE ANALYSIS OF INFORMATION CONTENT

  B. TONE REPRODUCTION ANALYSIS

  C. RELATIVE IMAGE QUALITY (RESOLUTION, MICROPHOTOGRAPHS)

8. NIGHT PHOTOGRAPHY

- BASIC OBJECTIVE: DETERMINE IF ACTIVITY CAN BE DETECTED AT NIGHT

  A. SUBJECTIVE ANALYSIS

  B. STATIC ANALYSIS

  C. THEORETICAL ANALYSIS OF NIGHT DETECTION CAPABILITY