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3 SEP 1970

MEMORANDUM FOR: Director of Special Activities

SUBJECT : Evaluation of IRIS II Camera System

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REFERENCES : A. [ ] 2 July 1970  
B. [ ] 4 August 1970, Subject as above  
C. [ ] 6 August 1970, Subject as above  
D. 17 August Meeting - [ ]

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1. We have completed the requirement outlined in OSA request of 2 July 1970 [ ]. The results of this evaluation are contained in the attached TSG/APSD/IEB memorandum #131/70 to [ ] of your organization.

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2. At the 2 August 1970 meeting with [ ] it was mutually agreed that a detailed interpretability comparison of the test flights with recent operational missions was not necessary. The availability of duplicate positives of the test mission material was one reason for this decision.

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3. From a technical standpoint, we can say that the image quality of recent Old Head missions (IRIS II Camera/Cuba) and Giant Nail missions (IRIS II Camera/SE Asia) is comparable to that obtained from these test flights.

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[ ]  
Deputy Director  
National Photographic Interpretation Center

Attachment:  
As stated

Distribution:

- Copy 1 - D/SA w/att  
" 2 - NPIC/TSG w/att  
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" 4 - NPIC/IEG w/att  
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TSG/AFSD/TEB-131/70  
18 August 1970

MEMORANDUM FOR: D/H/OSA

ATTENTION:

THROUGH: Chief, Technical Services Group, NPIC

SUBJECT: Evaluation of Four IRIS II Special Flight Tests

REFERENCE: Your Message 3942

1. The following evaluation report is divided into three parts. The first part contains comments concerning the similarities of all four missions, the second part consists of the individual evaluations of each mission, and part three is a summary. Information obtained from 87 resolution target images constitutes the appendix.

2. Mission Similarities:

A. Camera Operation: Unit 8002 was used and operated properly on all four missions. Film metering, frame length, fwd-aft cycling, and data recording are good throughout. No significant scratches or base rubs were noted.

B. Exposure: All four missions appear to be slightly underexposed.

C. Vehicle Window: Double imagery associated with window junctions can be found on every frame. On the aft frames approximately ten degrees of scan are degraded at each junction while the fwd frames contain approximately eight degrees of degraded imagery per window junction. Also, the degradation is more severe on aft frames than on fwd frames.

D. Fwd/Aft Resolution: There is some variation in resolution between fwd and aft frames (noted in para. 3), however, the severe degradation noted on aft frames of past test missions from this system, is not present on any of these missions.

E. Processing: Minor plus density streaks associated with processing were noted on missions two and three. Processing

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TSS/APSD/IRB-131/70

SUBJECT: Evaluation of Four IRIS II Special Flight Tests

control data was not forwarded with the material and, although no major anomalies were noted, the processing should be considered a variable in the final analysis.

F. Atmospherics: Some areas of each mission were degraded by clouds including the resolution target range on test number three. There was however, sufficient cloud free coverage to enable a thorough evaluation of each mission.

### 3. ANALYSIS PER MISSION:

#### A. Mission Number One:

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(1) Image Quality: The quality is good throughout the mission. The best resolution target reading was [REDACTED] across track on fwd frame 231. There is no significant difference in quality between fwd and aft imagery.

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(2) Density Patterns: No extraneous density patterns (pressure marks, light leaks) were noted.

(3) Static: None.

(4) Banding: Density bands, one-eighth inch wide, transverse the width of the format in areas of uniform density.

#### B. Mission Number Two:

(1) Image Quality: The quality is variable, exhibiting poor resolution at the beginning with gradual improvement throughout the mission. The degraded imagery has an out-of-focus appearance. Imagery on aft frames is superior to that on fwd frames. The image quality is also variable across the width of each frame indicating a focus shift across the format. The best imagery is located along the edge closest to the data clock in both fwd and aft frames. The best resolution target reading was obtained from aft frame 322; [REDACTED] in both the along and the across track directions.

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TSG/AFSD/TEB-131/70

SUBJECT: Evaluation of Four IRIS II Special Flight Tests

(2) Density Patterns: None.

(3) Static: Three inch-wide bands of dendritic static patterns are located at 55 degrees right on fwd frames 198 and 299 and at 40 degrees left on aft frame 298. The anomaly is associated with an adjacent camera off/on in each area.

(4) Banding: Banding, similar to that noted on test one is present in areas of uniform density. These smaller bands are arranged in groups to form secondary bands approximately one inch wide. This phenomenon is most prominent on fwd frame 45. Fwd frame 15 contains an isolated case of excessively heavy banding from eight to twenty-eight degrees right.

C. Mission Number Three:

(1) Image Quality: The aft frames, which are slightly better than the fwd frames, exhibit fair to good quality throughout. There is evidence of a focus shift similar to that noted on mission two. Like mission two, the best imagery is located along the edge nearest the data clock on both fwd and aft frames. Clouds and haze degraded all resolution target images.

(2) Density Patterns: None.

(3) Static: There is a band of dendritic static patterns located at 40 degrees left on aft frame 10. A camera off/on occurred after frame 10. There is also a multitude of very small static patterns throughout every frame. They are most evident at the beginning of the mission and at times they appear in rows, similar to banding. The anomaly diminishes as the mission progresses and at the end it can only be detected with careful examination.

(4) Banding: Banding, one eighth inch wide, is present in areas of uniform density.

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TSG/APSD/IEB-130/70

SUBJECT: Evaluation of Four IRIS II Special Flight Tests

## D. Mission Number Four:

(1) Image Quality: The quality is good throughout. The resolution is comparable on fwd and aft frames and there is no evidence of a focus shift across the format. The best resolution target reading [redacted] across track on fwd frame 167.

(2) Density Patterns: None.

(3) Static: There is a 1.5 inch wide band of static located at 40 degrees left on aft frame 162 and a three inch wide band at 60 degrees right on fwd frame 163.

(4) Banding: Density bands, one-eighth inch wide are present in areas of uniform density.

4. SUMMARY: Each of the four test missions contained some good quality imagery. Test number one was the most consistent and is considered to be the best overall. The ground resolution reading [redacted] on test one was read at 15 degrees scan angle and equates to 137 lines per millimeter film resolution (nominal altitude). The charts in the appendix provide an indication of the ground resolution at the various scan angles. The severe degradation caused by the window junctions is particularly evident from the aft resolution readings. The cause for the wide variation in readings on the fwd frames is unknown.

[redacted]  
Chief, Applied Photo Science Division  
TSG/NPIC

Attachment: Appendix (Resolution Target Readings)

## Distribution:

Orig - Addressee, w/a

1 - NPIC/TSG/APSD/IEB, Chrono 8/70, w/a ✓

1 - 451919, w/a

NPIC/TSG/APSD/IEB/[redacted] (10 Aug 70)

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Spec Rest 0/Dir

AI:

Re: OSS request for  
evaluation of DRISTB.

1. IEG has now been  
tasked to evaluate,  
from photo-interpretation  
standpoint, the  
susceptibility of the  
take from recent  
operational flights  
and the four test  
flights as was requested  
by OSS on 4 Aug.

2. We would like  
an opportunity to  
do this evaluation.  
Conceding present

workloads we will  
need 3 weeks to  
complete job.

3. Recommend forward  
TSG study with  
covering memo stating  
PB evaluation will  
follow. (Draft attached.)

4. Please advise if  
we should proceed.

HH  
8/31

W. J. ...  
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6 AUG 1970

MEMORANDUM FOR: Director of Special Activities

SUBJECT : Evaluation of the IRIS II Camera System

REFERENCE : A. [redacted] 4 August 1970, Same Subject  
B. [redacted] July 1970

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1. In response to an OSA request of 2 July 1970 [redacted] NPIC photo-scientists have recently completed a technical analysis of film from four IRIS II test flights. [redacted]

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[redacted] of your office are scheduled to meet with NPIC representatives on 12 August 1970 to discuss the results of that analysis.

2. We have just received your memorandum of 4 August 1970 [redacted] which amplifies that request to include photo-scientist and photo-interpreter comments on the acceptability of take from recent operational flights as well as the four test flights.

3. NPIC suggests that the 12 August meeting would be an opportune time to discuss further with your representatives the details of this follow-on requirement, including its projected scope and time-frame. At this time, however, NPIC anticipates no obstacles to acceptance of this additional task.

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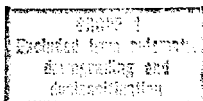
[redacted]  
Captain, USN  
Acting Director

National Photographic Interpretation Center

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NPIC/ODIR [redacted]

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4 August 1970

MEMORANDUM FOR: Director, National Photographic Interpretation Center

ATTENTION: Mr. Art Lundahl

SUBJECT: Evaluation of the Iris II Camera System

REFERENCE: [ ] 2 July 1970

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1. As you are aware the last of the Iris II cameras was declared operationally ready in the recent past. These cameras have been used operationally by the Air Force at OLS 19 and 20 for several months. There has also been a great deal of flight testing performed at OSA Detachments G and H. The message traffic relating to evaluation of mission take has indicated varying aperiodic deficiencies; i.e., mis-framing, mis-metering, variations in density and exposure, image smearing, image motion, etc. The flight tests performed at Detachment G have been aimed toward identifying the causes of these anomalies with the objective of correcting whatever problems were susceptible of solution. The mis-metering and mis-framing problem has been largely corrected by redesign of the camera electronics. A new automatic exposure control is in work which is designed to overcome exposure anomalies. The apparent image motion and image smear remain. The camera manufacturer feels that these are caused by vehicle vibration, and has proposed a new vibration isolation system which, it is said, will correct the anomalies.

2. In a recent series of tests OSA has attempted to verify whether vehicle vibration, or some other source of vibration or motion, is the cause of image motion and image smear. In this

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regard, film from four different Iris II test flights, utilizing four different combinations of mounts and pins, is presently at NPIC undergoing evaluation. It is requested that NPIC comment, both from photo-science and photo-interpreter standpoints, on acceptability of take from recent operational flights and the four test flights in question; and advise OSA of specific areas of deficiencies and the impact of these on overall interpretability. This evaluation will assist OSA in determining whether improvements to be gained from further testing or from procurement of the proposed vibration isolation system would justify the expense involved.

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Brigadier General, USAF  
Director of Special Activities

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CLASSIFIED MESSAGE

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2	D/M/O5A	10
3	D/M/O5A	11
4	D/O5A	12
5	D/O/O5A	13
6	D/EO/O5A	14
7	EO/O5A	15
8	SAS	16
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ROUTINE		OPERATIONAL IMMEDIATE

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1. A SPECIAL FLIGHT TEST HAS JUST BEEN CONCLUDED INVOLVING IRIS II SENSORS IN WHICH CASE FOUR FLIGHTS WERE INVOLVED AND APPROXIMATELY 1,000 FEET OF FILM WERE EXPENDED FOR EACH FLIGHT. SUCH FILM WAS PROCESSED AT [REDACTED] AND IS BEING FORWARDED IN FOUR SEPARATE PACKAGES FOR YOUR ANALYSIS. PACKAGES WILL BE IDENTIFIED TO REFLECT FLIGHT NUMBERS 1, 2, 3, AND 4.

2. REQUEST EACH FLIGHT BE EVALUATED BY NUMBER ON AN INDIVIDUAL BASIS AND THEN A COMPARISON OF ALL FLIGHTS TO INDICATE WHICH FLIGHT PRODUCED THE BEST PRODUCT.

3. REQUEST THE ANALYSIS IN DETAIL TO INCLUDE SPECIFIC COMMENTS RELATIVE TO EVIDENCE OF MOTION/VIBRATION. COMPARATIVE FOM AND AFT RESOLUTION, RESOLUTION ALONG TRACK AND LATERAL, WITH SPECIFIC RESOLUTION AT DESIGNATED POINTS; I.E., NADIR, 20, 40, 60 DEGREES OFF TRACK, ETC. ANY EVIDENCE OF BLURRING, SWARMING, ETC. LIKEWISE, LOOK AT THESE SAME POINTS, SPECIFIC

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	ROUTINE	OPERATIONAL IMMEDIATE	INITIALS

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COMMENTS RELATIVE TO HIS-FRAMING, HIS-METERING, SCRATCHES,  
DENSITY MARKS, ETC.

4. IN ESSENCE WE ARE HIGHLY DESIROUS THAT THIS ANALYSIS  
BE IN GREAT DETAIL BUT NOT LIMITED TO JUST THAT STATED ABOVE.  
IT WOULD BE MOST APPRECIATED IF THIS PROGRAM COULD BE HANDLED  
ON AN EXPEDITED BASIS SO THAT APPROPRIATE FURTHER ANALYSIS  
WITHIN ADIC CAN BE ACCOMPLISHED AT THE EARLIEST. PLEASE  
PROVIDE THIS INFORMATION TO ☐ ONLY. WOULD APPRECIATE  
ESTIMATE OF COMPLETION AND EXPECTED DATE OF RECEIPT OF DATA.

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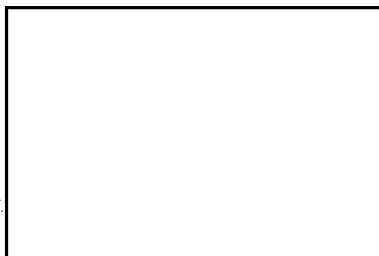
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