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BYE 35547-65
24 February 1965

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MEMORANDUM FOR: Assistant for Operations, NPIC

SUBJECT: CPX ATF-91B (OXCART)

REFERENCE: USIB 8-65, NPIC Project No. 11016-5 TYPE I

1. In response to reference requirement, subject project (OXCART Mission NX-501 of 28 January 1965) was received in Photographic Analysis Group (PAG)/Geographic Military Division (GMD) on 15 February 1965. PAG/GMD was requested to evaluate the readout (exploitation) cycle to determine if any improvements were required so that recommendations could be made to OSA.

2. Plans and Development Staff (P&DS)/NPIC was requested to prepare and present a briefing on the NX-501 camera system (115-A) utilized in the CPX. OXCART cleared personnel from PAG, CIA/Photographic Intelligence Division (CIA/PID), Publications Division (PD), Collateral Support Division (CSD), Technical Intelligence Division (TID) and Production Services Division (PSD) attended the briefing at 1000 hours, 15 February 1965. Camera characteristics and data block information, INS data, and the NX-501 mission profile were presented. The film, for CPX exploitation, was received in PAG at 1400, 15 February 1965.

3. Only a limited number of PAG/GMD personnel are now OXCART cleared. The exploitation phase was conducted under the direction of Chief, GMD and exploitation personnel included [redacted] STAT, all of the Western Hemisphere Branch, GMD. A limited access (OXCART cleared) area was established in PAG/GMD/WHB for the exploitation phase. Exploitation of NX-501 included PAG/GMD, PD, and CSD personnel. PSD (Photo Lab) and TID (Mensuration and Plotting) support was provided. PID and P&DS personnel visited the WHB during the course of the readout and viewed/reviewed the film and precedures excercised by PAG/GMD.

4. The following report/exploitation phases were processed during the course of the readout and remarks, as considered appropriate, are provided for your information.

A. Reporting Procedures.

1) IPIR. It is considered that the present IPIR reporting procedures now utilized by PAG/GMD in the processing of manned and drone missions are entirely satisfactory for OXCART. NX-501, containing approximately 940 frames of photography along an approximate

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BYE 35547-65
24 February 1965

SUBJECT: CPX ATF-91B (OXCART)

975 nautical mile linear track (in two parallel parts), is comparable to a GT Mission. Had mission NX-501 been flown against Cuba, and had the two parallel tracks overlapped, it is estimated that approximately 90% of the island would have been covered, and a majority of the priority COMOR targets would have been observed under cloud/haze free conditions.

a) Equipment/Film/Personnel Requirements. It is considered that the 940 MC Light Table with associated B&L Zoom Microscope (Mono Mode) is the most satisfactory exploitation equipment. It is also considered that the Richardson Viewer might be utilized in conjunction with the 940 MC, however, geographic area and target density would govern its use. It is concluded that two copies of the "DP" should be provided for each mission accomplished. This requirement has a two fold purpose: one, it provides for the use of the 940 MC and the Richardson Viewer in conjunction with each other; and two, it provides an immediate means of constructing stereo pairs for more complicated and/or detailed "OB" readouts. (At present, NPIC does not have a stereo viewing capability for OXCART in its original roll form. The Fiber Optics System, however, should provide this capability. It is understood that NPIC will receive delivery on this equipment in the spring of 1965.). Based upon a very limited exposure to OXCART,(NX-501), it is judged that a mission over Cuba and similar in scope to NX-501 would take five two man PI teams approximately eight hours to readout the mission. (Two man team composed of one each 940 MC and Richardson Viewer.) Based upon continuing use of this system and experience gained by the photo analyst, the time frame should reduce to approximately five hours or approximate that of a present GT mission. One Editor, one 826 Operator and one CSD Analyst are ample support for an OXCART (GT-Type) mission. PSD and TID staffing on a standby basis is considered appropriate. Geographic area and an increase in target density based upon the geographic area would probably increase the need for PI, CSD and PD support.

2) MCI. Those procedures outlined in 1) above are considered appropriate for the production of an OXCART MCI with an increase in PD and CSD support to insure expeditious processing of report sheets and proofs.

BYE 35547-65
24 February 1965

SUBJECT: CPX ATF-91B (OXCART)

B. Target Reports.

1) IPIR/MCI reports as derived from OXCART materials would be similar in content and presentation as manned and drone reports, (GRC, GT, BS, etc.) with the exception of adding the x - y coordinate for each reported target utilizing the Universal Grid (Number One). The x - y coordinate shall be presented as a part of the photo data line entry. No change in the IPIR/MCI format is anticipated.

2) Detailed reporting as derived from OXCART materials would be similar in content and presentation as is now accomplished by the NPIC. Greater system resolution, (one foot ground target resolution) at peak operating efficiency coupled with optimum weather conditions will provide, however, an increase in detail of reporting and an attendant increase in report processing time.

C. GAB Orders/Support.

1) There are two means presently available for the ordering of GAB's. An x - y coordinate can be utilized in requesting photo lab support (GAB orders and/or stereo pairs) and/or an acetate overlay can be prepared by the PI/GAB analyst to accompany the GAB order. Based upon the limited experience gained in the subject project, the acetate overlay method is judged to be the most accurate and timely and is preferred by the PI, PD/GAB and PSD/Photo Lab personnel.

2) The final preparation of Briefing Boards, Vu Graphs and report attachments from OXCART materials is the same as now utilized by the NPIC.

D. Universal Grid (Number One).

1) The utilization of the Universal Grid presents no serious problems to the PI. However, it is noted that the technique as now designed leaves something to be desired and efforts by P&DS/PAG should be exercised in an effort to devise a new system and/or refine the present system.

2) The present system, utilizing the Universal Grid Template, relies upon the registration and orientation of the template upon the upper point of the lower of the two small triangles imaged in the data block frame. These small triangles, indicators for the principal point of the frame, are faint and in some observed instances almost indistinct.

BYE 35547-65
24 February 1965

SUBJECT: CPX ATF-91B (OXCART)

3) All references to this method are based upon the frame being oriented so that the data block and title information are readable. (This orientation is in reverse of the line of flight). For the frames of the camera system (115-A) on which the data block appears to the left of the frame, (Aft exposure), the grid template is positioned with the intersection of x-0/y-12 registered on the uppermost point of the lower triangle nearest that frame. The template is oriented by making the abscissas of the template parallel to the edges of the film. (Curved imagery edge precludes alignment along template "Y" line edge). X - y coordinates are then read "right and up" beginning from the lower left corner of the template. For those frames having corresponding data block and title information to the right of the frame, (Forward exposure), the same procedure as outlined above is used except that the intersection of x-92/y-12 is registered on the upper most point of the lower triangle nearest that particular frame. Again x - y coordinates are read "right and up" using the lower left corner of the template as a starting point.

4) As previously stated, the above system poses no serious problems to the PI. However, in instances where minute target imagery is being indicated for reporting and/or TID mensuration it may cause difficulty due to the manner in which the PI must "eyeball" the alignment of the grid template in registration and orientation upon the small, faint triangle and then the orientation of the template by making the abscissas of the template absolutely parallel to the edge of the film.

E. Photo Interpretability.

1) Photo interpretability for mission NX-501 is judged to be from good to excellent, (based upon those standards (quality) necessary to accomplish an IPIR/MCI report). No detailed effort has been made to judge the technical quality of the photography and no comparative materials (GT-Type) are available to PAG, over the test area for this purpose. However, both cultural and man-made targets appear generally sharp with only minor degradation noted in the extreme oblique areas. Optical and photo enlargements up to approximately 40x were accomplished with good to excellent results. Stereo pairs (contact scale) were reproduced and reviewed under various B & L Zoom Stereomicroscope enlargement factors with good to excellent

BYE 35547-65
24 February 1965

SUBJECT: CPX ATF-91B (OXCART)

results. Image characteristics remained sharp and target/installation detection, recognition and identification results were excellent. There are three basic means of obtaining stereo coverage: (a) 50% forward overlap between successive scans by the aft camera; (b) 50% forward overlap between successive scans by the forward camera; and (c) 62% forward overlap between successive aft and forward cameras. All means of stereo were processed and evaluated with good to excellent results obtained.

2) It was noted in the imagery that some areas appeared soft and in some instances blur was encountered. No attempt by PAG to isolate and define this soft and blurred imagery has been accomplished, however, it appears to be attributal to IMC difficulties. This may have been caused, in part, by the near constant change in indicated ground speed, (displayed in knots as a part of the photo data block information), and the inability of the IMC system to react to these constant changes. Judgement on the technical aspects and attendant quality of the mission will be left to P&DS and TID to report, however.

F. TID Mensuration.

1) TID/TAB statement of Mission NX-501 115A camera test film.

a) The INS recorder was operated during the camera operation, however, it did not operate according to specifica fications.

b) The V/H signal from which altitudes must be determined gave gross differences of plus or minus 20,000 feet from the programmed altitude.

c) The V/H signal operated as if there was no variation in velocity or height although the ground speed indicator showed a considerable variation during the flight.

d) The ground speed as recorded by the INS tape did not agree with the ground speed recorded on the film.

e) The clock was recording in local time rather than Greenwich Civil Time as required.

BYE 35547-65
24 February 1965

SUBJECT: CPX ATF-91B (OXCART)

f) An attempt was made to correlate all the parameters necessary for the reduction of the data requested on Project 11016-5. This proved fruitless since the large altitude variations attained from the V/H signal gave highly suspect answers.

g) Since no complete correlation of data was available between the film and the INS tape the probability of gross errors exists in any answers derived from this mission.

h) The latitude and longitude recorded on the film was also in error, therefore no correlation could be made in this fashion.

i) Further testing of the data derived from this mission may allow mensuration studies in the future but no data for publication is available at this time.

G. Camera Data Block/Title Block.

1) Data available on the format data block includes: (a) Time Track (Frequency marks); (b) Clock Time (with two sweep second hands operating showing exact and/or approximate exposure time for the aft and forward firing sequence; (c) Vertical Indicator; (d) Latitude-Longitude; (e) Ground Speed (Knots); (f) "Write-in" Data (Mission Number, Date, Camera Serial No., etc.); (g) Caged Status; (h) V/H Status; (i) "Principal Point" Indicators - Vertical; and, (j) Left and Right Frame.

2) PAG processing (exploitation) of the mission positions the photo analyst in respect to the flight line, that is, facing the direction of flight. This analyst to mission relationship places the data block and its information in reverse. This causes only minor difficulties except when an x - y coordinate must be derived. The analyst then must go to the other side of the 940 MC and compute his reporting/mensuration coordinates. The tenuous method of coordinate derivation precludes the analyst computing them from the "PI" side of the table. Perhaps some consideration could be given to changing the present reverse presentation to read right from the analyst position.

3) The principal point indicators, triangles, are quite faint. Effort should be made to enhance their readability.

BYE 35547-65
24 February 1965

SUBJECT: CPX ATF-91B (OXCART)

4) Write-In Data is not readily readable. Efforts should be made to select a high contrast background material on which the write-in data is more readily readable and also seek more even illumination in the data block chamber.

5) Latitude-Longitude presentation in plain text vice a binary presentation is excellent and exceedingly helpful to the PI/CSD analyst.

H. INS and V/H Sensor Indicators (Mag Tape).

1) Only a very limited exposure to PAG of the INS and V/H Sensor Indicators program print-out was accomplished during the NX-501 exploitation phase. However, the plot accomplished by TID utilizing both the INS and Visual methods are considered very satisfactory. No trouble utilizing the plots was experienced, however, PAG does not have a "feel" for plot "timing requirements" for the two methods employed by TID in support of NX-501, (INS and Visual Plotting).

2) The title block; mission, date, classification, etc. -- no problems experienced with its utilization. The information is printed large, clear and is concise in its presentation.

5. SUMMARY.

A. The pre-operational introduction into new programs and systems and their availability to the rank-and-file photo analyst is considered a "boon" to the exploitation phase of the operation. In all too few instances have the photo interpreters, mensuration analysts and collateral and other support personnel had an opportunity to use, test and exploit new-type systems/collections prior to their operational deployment. The NX-501 exercise is considered highly beneficial and productive in its application. It provided a means to test our present, standard, reporting systems and our on-line exploitation equipment. No major difficulties were experienced in its processing. The lack of an on-line stereo viewing capability and the difficulty experienced in the application and orientation of the Universal Grid in respect to the principal point indicators and the film edge were the most noticeable.

B. Photo interpretability is judged to be good to excellent with some indication of image degradation noted in the mission. Correction of

BYE 35547-65
24 February 1965

SUBJECT: CPX ATF-91B (OXCART)

this apparent image deficiency and realization of the one foot ground target resolution factor indicated by the system specifications will of course materially affect the exploitation of imaged detail.

C. The programming of "OXCART" in an operational area such as Cuba would be a more realistic exploitation exercise than was Mission NX-501. The availability of a data base in depth and the reporting of COMOR targets in detail would prove more effective and would constitute a more refined gauge for comparison of present operational systems and OXCART.

STAT

Colonel, USA
Assistant for Photographic Analysis, NPIC

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