to assist in preparing a preface for the OAK of Mission [redacted] on 6 May 196

- Information concerning bi spectral acquisitions and bi color viewing methods.

Several passes of Mission [redacted] are exposed in the bi-spectral mode of acquisition. Bi-spectral coverage refers to a technique of acquiring conjugate imagery with two cameras, each using a filter which has its peak transmission ~~near opposite ends~~ widely of the visible spectrum. In this case, a red filter was used on the ~~fwd~~ forward camera and a green on the ~~aft~~ aft. In acquiring photography in this manner, the density of images on the black and white records is related to the filters through which they were exposed.

25X1

25X1

To exploit the advantages of bi-spectral photography, the two black and white records can be analyzed individually with respect to the colors which the density represents. I.E., objects on the fwd (red filter) record which appear relatively light (low density) on the DP compared to the same image on the aft (green filter) record can be assumed to be reflecting in the red end of the spectrum. However, these conclusions cannot be accepted as absolute. The angle of the sun relative to the taking lens, atmospheric attenuation, exposure, and reproduction characteristics must also be considered. Even under optimum conditions, the color of an object can only be established as being warm (red or near red) or cool (green or toward the blue end of the spectrum).

In order to facilitate the readout of bi-spectral information, the photography can be viewed in a color mode referred to as "bicolor". Bicolor is a psuedo color generated from two colors of

the spectrum instead of ~~the~~ three, as is necessary for "natural" color. In order to create bicolor imagery, the black and white (DP) records from both cameras (~~forward~~ aft and aft panoramic) are projected onto a common surface, in register, through filters comparable to those used in the taking situation (fwd through red - aft through green). Information available by this technique will be similar in scope and value to that gained from the bi-spectral records viewed independently. However, the bi-spectral information becomes more readily apparent and a faster readout is possible. Red or warm tones will appear red or some variation thereof; green or cool tones will appear predominantly green.

The problem of employing the bicolor method of exploitation is that the images must be appropriately filtered and projected in register. The geometry of the KH-4B camera is such that the imagery must be rectified in order to be successfully registered over areas larger than approximately 0.1 x 0.1 mm.

NPIC is not currently prepared to produce color prints from the bi-spectral imagery on a production basis for the Community.

Although NPIC has one prototype bicolor viewing instrument, the ARES, available the center is not...

Bi Color

25X1

Several passes of Mission [redacted] were exposed in the bi-color or bi-spectral mode of acquisition. Bi-color refers to a technique of acquiring stereo photography with two cameras using filters having peak transmission near opposite ends of the visable spectrum. In this case, a red filter on the fwd camera and a green on the aft. In acquiring photography in this manner, the density of the black and white records is related to the filters through which they were exposed.

25X1

To exploit the advantages of bi-spectral (~~bi-color~~) photography, the two black and white records can be analyzed individually with respect to the colors which the density represents. I.E., objects on the fwd (red filter) record which appear relatively light (low density) on the DP compared to the same image on the aft (green filter)record can be assumed to be reflecting in the red end of the spectrum. However, these conclusions cannot be accepted as absolute. The angle of the sun relative to the taking lens, atmospheric attenuation, exposure, and reproduction characteristics must also be considered. Even under optimum conditions, the color of an object can only be established as being warm (red or near red) or cool (green or toward the blue end of the spectrum).

In order to facilitate the readout of bi-spectral information, the photography can be viewed via the bi-color technique. Bi-color is a psuedo color generated from two colors of the spectrum instead

of the normal three. In order to create bi-color imagery, the black and white (DP) records from both cameras are projected on to a common surface, in register, through filters comparable to those used in the taking situation (fwd through red - aft through green). Information available by this technique will be similar in scope and value to that gained from the bi-spectral records viewed independently . However, the bi-spectral information becomes more readily apparent and a faster readout is possible. Red or warm tones will appear red or some variation thereof; green or cool tones will appear as ~~such~~. predominantly green images.

The problem of employing the bi-color method of exploitation is that the records must be appropriately filtered and projected in register. The geometry of the KH-4B is such that the imagery must be rectified in order to be successfully registered to areas larger than 1 x 1 mm. There is little or no value in the bi-spectral aspects of imagery in cloud or terrain shadow.

25X1

Bi Color

Several passes of Mission [redacted] were exposed in the ~~bi-color~~ or bi-spectral mode of acquisition. ~~Bi-color~~ Bi-spectral coverage refers to a technique of acquiring ~~stereo~~ conjugate imagery photography with two cameras using each which has its filters ~~having~~ peak transmission near opposite ends of the visible spectrum. In this case, a red filter was used on the fwd camera and a green on the aft. In acquiring photography in this manner, the density of images on the black and white records is related to the filters through which they were exposed.

25X1

To exploit the advantages of bi-spectral (~~bi-color~~) photography, the two black and white records can be analyzed individually with respect to the colors which the density represents. I.E., objects on the fwd (red filter) record which appear relatively light (low density) on the DP compared to the same image on the aft (green filter)record can be assumed to be reflecting in the red end of the spectrum. However, these conclusions cannot be accepted as absolute. The angle of the sun relative to the taking lens, atmospheric attenuation, exposure, and reproduction characteristics must also be considered. Even under optimum conditions, the color of an object can only be established as being warm (red or near red) or cool (green or toward the blue end of the spectrum).

In order to facilitate the readout of bi-spectral information, the photography can be viewed in a color mode referred to as ~~a~~ "bi-color" ~~technique~~. Bi-color is a psuedo color generated from two colors of the spectrum instead

three, as is necessary for normal color.

ILLEGIB

of the normal three. In order to generate bi-color imagery, the black and white (DP) records from both cameras (forward aft Panoramic) are projected on to a common surface, in register, through filters comparable to those used in the taking situation (fwd through red - aft through green). Information available gained by this technique will be similar in scope and value to that gained from the bi-spectral records viewed independently. However, the bi-spectral information becomes more readily apparent and a faster readout is possible. Red or warm tones will appear red or some variation thereof; green or cool tones will appear ~~as~~ predominantly green.

The problem of employing the bi-color method of exploitation is that the ~~records~~ images must be appropriately filtered and projected in register. The geometry of the KH-4B is such that the imagery must be rectified in order to be successfully registered, over

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[redacted]

NPIC is not currently prepared to produce color prints from the bi-spectral imagery on a production basis for the community.

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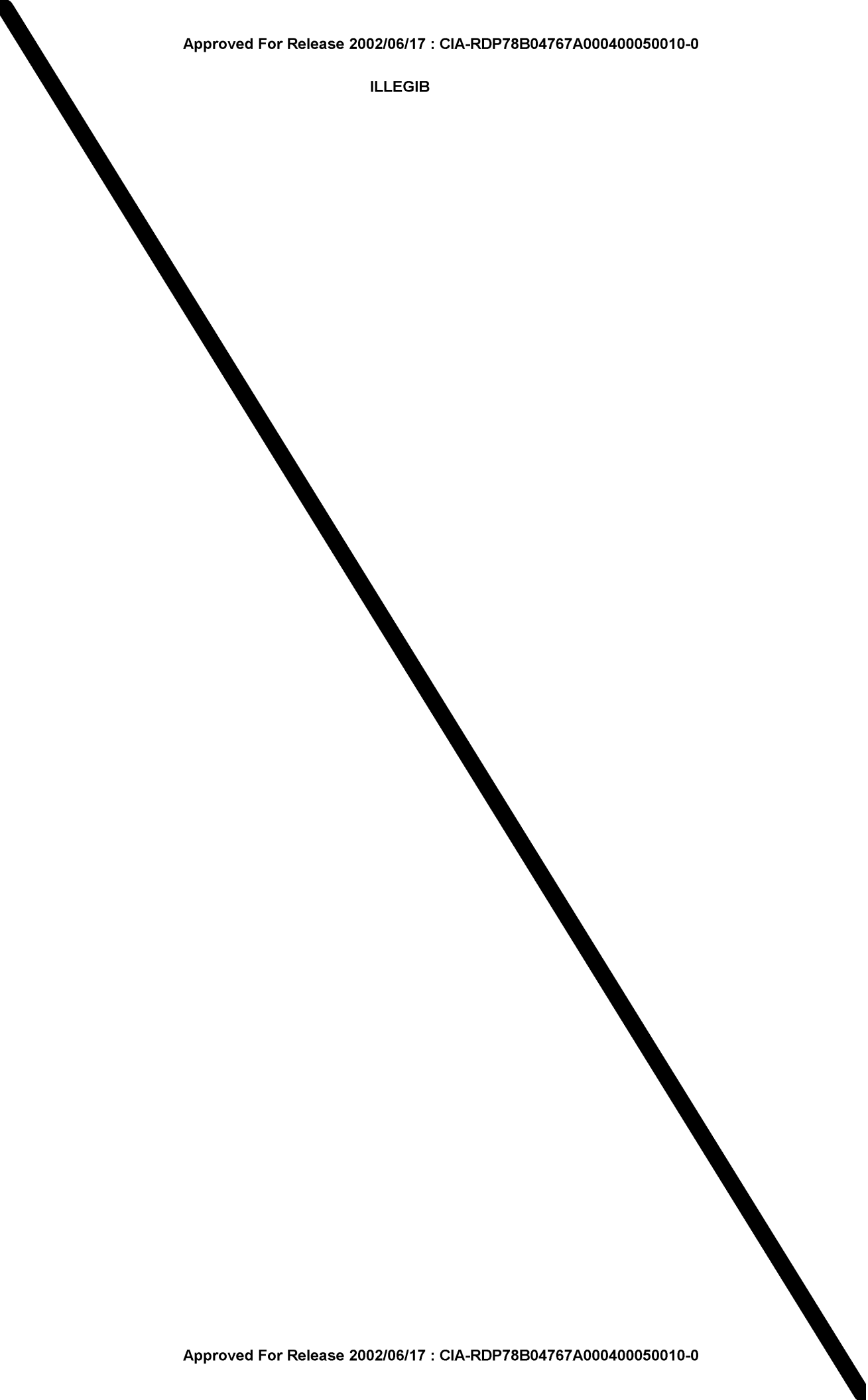

TOP SECRET

25X1

25X1

D R A F T
1 May 1968

MEMORANDUM FOR: Deputy Director, NPIC

SUBJECT: Exploitation of Bicolor Imagery

With the prospect of the next scheduled KH-4 mission 25X1 being partially (approximately 30 passes) programmed to result in photography with a capability of producing bicolor imagery the following actions will be implemented.

a. A paragraph will be included in preface of the OAK and OAK Supplement describing the nature of ~~bicolor~~ bi spectral acquisitions and its technical aspects for the reconstruction of bicolor imagery. This statement on the nature of bicolor is being developed by Technical Services and Support Group in coordination with IEG.

b. The bicolor reconstruction capability of the film covering each target will be indicated by the code "BC" in the photo reference line immediately following the pass number 25X1

25X1

The following will be included in the preface to explain the significance of BC in the photo reference line.

"BC (bicolor) indicates that the target is covered on a pass which was programmed for the bi-spectral mode of operation. However, this does not mean that individual targets can be perceived as bicolor since atmospherics, defilade, and other obscurations may degrade the image(s) to the extent that bicolor cannot be reconstructed. Also, reconstruction is possible only with imagery from both cameras." 25X1

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Note:

The above statement on the explanation of the code "BC" is still subject to further refinement.

HH