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NATIONAL
PHOTOGRAPHIC
INTERPRETATION
CENTER

TSG NEWSLETTER

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TCS-8511/73
JULY 1973
NO. 3
6 PAGES
COPY 104

Declass Review by
NIMA/DOD

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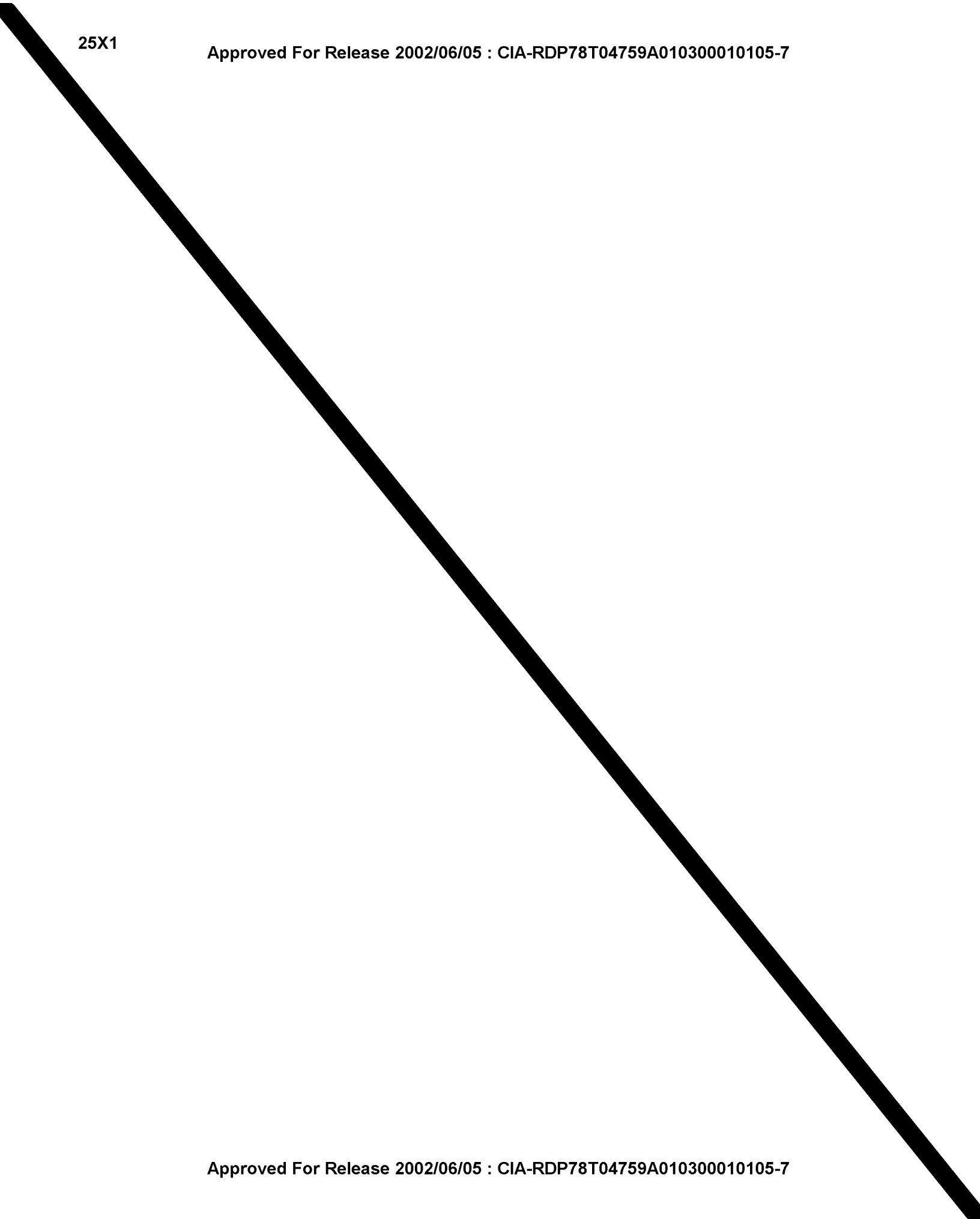
Approved For Release 2002/06/05 : CIA-RDP78T04759A010300010105-7



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This is the third issue of a newsletter designed to familiarize photo interpreters with the services, techniques, and equipments available to assist them in imagery interpretation problems. Should you have any comments or questions about items appearing in the newsletter, please contact [redacted]

25X1

SCOPE PROBLEMS

Many of the problems experienced with the P.I. optical equipment can be corrected easily by ESD Equipment Performance Branch personnel. Examples of problems which are common and which can be repaired immediately are:

a) Focus changes when zooming from high to low power.

b) Image separation while zooming from high to low power.

c) Images separating while rotating in mono.

d) Obvious mechanical defects and dirty lenses.

25X1 If you experience these or any other difficulties bring your problem and optics to the EPB optical shop. [redacted]

25X1 1540 Light Table problem? For Emergency repair call [redacted]

TEST AND EVALUATION BRANCH CONTRIBUTIONS TO NPIC EQUIPMENT DEVELOPMENT

The first photo shows the prototype Binocular Tube Magnifier undergoing tests to measure vertical misalignment of the eyepieces. Vertical misalignment is present in an optical device when the left and right fields of view do not overlap vertically to give comfortable binocular fusion. Eyestrain, headaches or excessive fatigue are likely effects on the user. Our measurements were used to convince the manufacturer that the misalignment needed correction before the magnifier would be acceptable.

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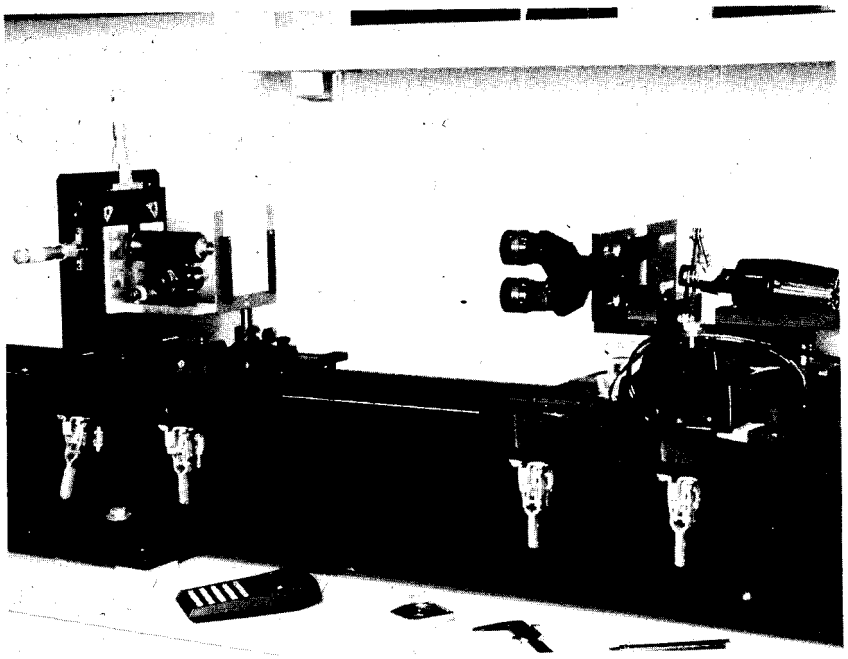

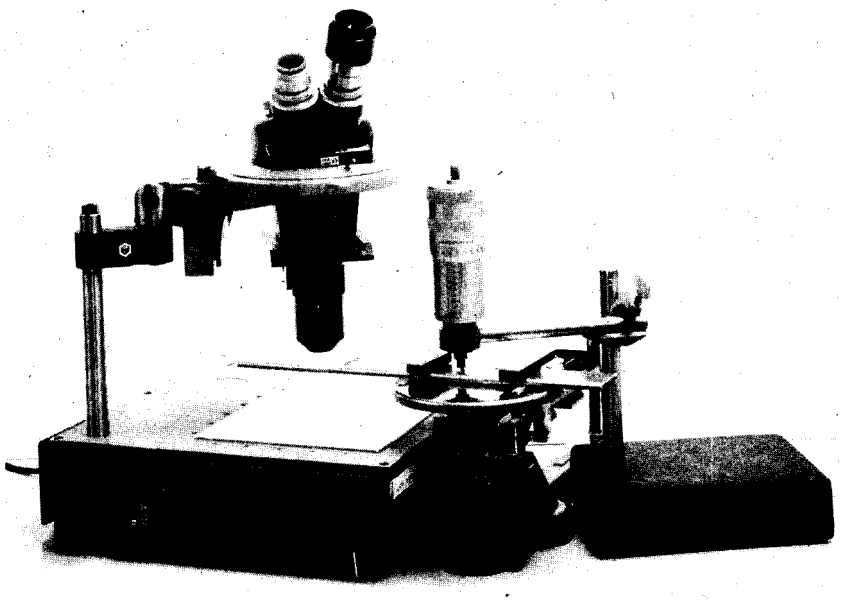

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25X1 The second photo shows a test set-up which was used to measure depth of field of the Zoom 240 with the prototype 120X Capability. The micrometer head just to the right of the optics is used to very precisely control the focus position of a resolution target. TEB's measurements show that moving the resolution target just 21 micrometers from the best focus position causes a 20% loss in resolution.

The effect of this relatively small depth of field on the development of the PI Stage Reticle is currently being considered. The graduations marks on the prototype reticles are .001'' (25 micrometers) above the film plane so that the marks and imagery may not be in suitable focus at the same time.

NPIC DUPLICATION GUIDELINES GIVEN TO PROCESSING CENTERS

TSG has recently completed an updated version of the NPIC Duplication Guidelines. The intent of these guidelines is to insure the PI of receiving the best possible product. These guidelines recommend the reproduction parameters (densities, contrasts, quality, etc.) for all satellite photography received at NPIC. These guidelines have evolved through the years from objective and subjective testing of the photo product. Interpreter's inputs to new products and procedures have also contributed significantly to these guidelines. All processing facilities supplying reproductions to NPIC generally follow the recommendations outlined in the NPIC Guidelines.

DUPLICATION IMPROVEMENT BETTER FILM FOR THE PI

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TSG would like to express many thanks to the Building [redacted] PIs that participated in the now completed duplication improvement project. The objective of this combined TSG/ Processing Facility project was to investigate PI preference of density and contrast for reproduction of individual target types. Secondly, we intended to recommend modification of the duplication system if PI preferences indicated such action was necessary. The test plan included PI analysis of different target types at varied density and contrast levels. The study concluded that the PIs are generally being supplied duplicates of optimum density and contrast when

25X1

targets do not have extreme highlights. However, PIs are generally receiving lighter than preferred duplicates of targets that have extreme highlights (e.g., aircraft scenes). Based on this study greater consideration will be given to the reproduction of imagery having extreme highlight areas.

STAR EXPOSURE TECHNIQUE FOR CAMERA CALIBRATION

A camera, to be used for precise mensuration purposes, can be calibrated from a photograph taken of the stars. No special equipment is needed and the procedure of photographing the stars is relatively simple. It can be performed by anyone with some general knowledge of photography. The star photograph must be made on a night when moonlight, haze or clouds do not obscure the smaller magnitude stars. The film should be developed, examined for proper exposure, and then forwarded with the data sheet to TSG, Photogrammetry Division, for calibration.

A calibration is good only for the particular camera and lens combination used in making the star exposure. If several lenses are to be used with a camera, or if a lens is used with different cameras, it is necessary to calibrate each camera-lens combination. Once calibrated, it is imperative that the camera and lens serial numbers be supplied with all operational film. This is the only way of referencing the correct calibration data in exploiting the photography.

The cone angle of the lens must be 10^{o} or larger to use the stellar method of calibration. This is equivalent to about a 300mm lens on a 35mm camera or a 500mm lens on a 70mm camera and represents about the maximum focal length that can be used. Cameras with longer focal length lenses having cone angles less than 10^{o} must be calibrated by another method.

The basic procedure for stellar exposures is as follows:

(1) Load camera with TRI-X panchromatic film.
(2) Place camera on a stable platform with lens pointing up.
(3) Cover lens and lock the shutter open.
(4) Remove cover from lens, fog the film, and recover lens.

(5) Uncover lens for 60 seconds with lens wide open and focused at infinity.
(6) Cover lens for 30 seconds.
(7) Uncover lens for 12 seconds with lens wide open and focused at infinity, record time.
(8) Cover lens and close shutter.
(9) Advance to next frame and repeat steps (3) through (8).
(10) Complete data sheet (Figure 1).

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25X1

25X1

Figure 1

STAR EXPOSURE DATA SHEET

Camera Make: _____
Camera Serial No. _____
Lens Serial No. _____
Focal length of lens: _____
Date of photography: _____
Latitude of camera station: _____ degrees _____ minutes
Longitude of camera station: _____ degrees _____ minutes
Elevation of camera station above Sea Level (within 50 feet) _____
Barometer (if available) _____ inches of mercury
Temperature (if available) _____ degrees

FRAME NO.	f-STOP	TIME* (within 1 min.) at beginning of 12 second exposure.

*Specify Zulu, Local Time Zone, Daylight Savings.

25X1