

5 December 1966

DEVELOPMENT OBJECTIVES

Declass Review by NGA.

ADVANCED STEREO RHOMBOID PROTOTYPE MODEL II

1. INTRODUCTION. These Development Objectives describe the requirements to be met in the design and fabrication of a Model II Advanced Stereo Rhomboid Prototype for converting the [ ] Zoom 70 Stereomicroscope into a high-power microstereoscope.
2. CONCEPT. A Model I advanced rhomboid has been developed and is currently in production; however, its usefulness is somewhat limited by its external configuration, which restricts the range of motion of the objective lenses. This development is to eliminate that restriction and incorporate advanced features directed toward expanding the basic concept and creating a more versatile design.
3. REQUIREMENTS.
  - 3.1. Configuration. The rhomboid must fit on any [ ] Zoom 70 Stereomicroscope that has been modified to take rhomboids fitted with a dovetail slide--presently used to replace the older clip-on version. The external configuration must allow 90° rotation of the Zoom 70 power pod in either direction within its support ring. (1)
  - 3.2. Image Separation. The separation between the optical axes of the two objective lenses must be adjustable. In the "X" direction (parallel to viewer's eye base), the maximum separation must be no less than 14 inches and the minimum separation no more than 2 inches. In the "Y" direction (perpendicular to the eyebase), a maximum separation of at least 10 inches in Y is required. Care must be exercised that these large separations are obtained with a minimum addition of bulk; i.e., the units must be as compact as possible when not used at their maximum separation. A telescoping (collimated) system or equivalent alternative should be considered. (3)
  - 3.3. Objective Magnification. Interchangeable sets of objective lenses shall be supplied to provide 1X, 2X, and 3X objective magnification. These objectives must be parfocal and should be designed for quick attachment and removal. (2)
  - 3.4. Monoscopic Viewing. The reflecting prism of the rhomboid attachment must be mounted so that it can be easily removed from the optical path to permit the Zoom 70 to be used as a stereomicroscope without the rhomboid attachment being removed; however, the field of

OPTICAL SWITCHING FROM TO STEREO (15)

view of the basic Zoom 70 must not be compromised. It is not mandatory for the instrument to remain in focus when changing from monoscopic to stereoscopic viewing, but a set of monoscopic objectives, equivalent in performance and magnification to the stereoscopic objectives, must be provided. These objectives must also be designed for rapid attachment and removal.

3.5. Image Rotation. Independent, 360° optical image rotation shall be provided in each separate optical path of the rhomboids. The proposal should state: (1) the type of image rotation element contemplated, (2) the error in optical centering that will occur in one total 360° rotation, and (3) the manner in which this error will be measured. NO COMP.

3.6. Resolution. Mounted on a Zoom 70, using the standard 10X eyepieces, and at 3X zoom setting, the attachment must provide the following resolution:

- a. 3X objective = 400 lines/mm NO COMP.
- b. 2X objective = 300 lines/mm
- c. 1X objective = 150 lines/mm

3.7. Field of View. The rhomboid attachment must not restrict the field of view of the basic Zoom 70 at any magnification value. With the 1X objective, the field of view shall be the same as the values listed on page 10 of  Catalog # 53-70-01-01, with proportional limits for the 2X and 3X objectives. NO COMP.

3.8. Focusing. The left optical path of the rhomboid must incorporate an individual focus adjustment. NO COMP.

3.9. Optical Performance. The optical performance (aberrations) of the rhomboid must not degrade the normal performance of the Zoom 70. The optical system must be designed to permit maximum total light efficiency. The proposal must state the predicted efficiency at all magnifications and describe the system by which this efficiency will be measured.

3.10. Miscellaneous.

3.10.1. Construction. This instrument shall meet the highest commercial standards of microscope construction.

3.10.2. Production. The proposal must include an estimate of production costs for an additional 100 units (in increments of 25). Manufacturing drawings to commercial standards and with sufficient detail to permit quantity production by any competent manufacturer must be supplied with the prototype.

3.10.3. Carrying Case. The proposal must include cost for supplying a carrying case for the instrument.

3.10.4. Instruction Manual. An instruction manual describing proper installation and use of the rhomboids shall be provided. This manual shall conform to the requirements listed in Specification No. DB-1003.

3.10.5. Documentation. Contractual documentation, which conforms to the requirements listed in Specification No. DB-1001, shall be provided.

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