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635 PROGRESS REPORT

Period Covered: December 1966

Document No.: OD-140

A. PRESENT STATUS

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Unit has been completely assembled mechanically and reviewed by the customer's technical representative. We at [redacted] [redacted] have also had our first good look at the design and have been able to assess many of the operational features.

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Primary among the comments that our people and the customer's technical representative have made is the awkward position which the operator must assume when using the [redacted] versatile micro-scope. We have considered various approaches to the remedying of this problem. The most expedient and that which we feel is also the best from the standpoint of cost and ultimate operator satisfaction is to add a special eyepiece extension assembly on the microscope. This was proposed with a cost estimate on 12-30-66. It was considered a valid change-in-scope because the equipment specifications established the equipment configuration.

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The modification proposed completely eliminates the problem without making compromises in other areas of the instrument design. From a purely optical standpoint there is no observable deterioration in field of view or image quality.

DECLASS REVIEW by NIMA/DOD

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In general our initial evaluation of the design has been favorable. We feel that the instrument will serve as a very valuable tool and with the exception of the problem with the microscope, will be comfortable and efficient to use.

Photographs #871, 872, and 873 enclosed show the completed unit with its integral elevating table as it was shown to the customer's technical representative on 12-22-66.

B. PROBLEM AREAS

1) Difficulty in viewing through microscopes while in seated position. - This has been discussed in some detail above.

2) Tracking Light Sources: - Experimentation with the tracking light sources has uncovered a number of problems. The supports for the master magnets have interferences with themselves and with parts of the spool support castings at certain positions on the format and depending on which rhomboid assembly is in use. A concentrated effort will be made to modify the design in this area to simplify the use of the sources and extend their range of operation over the format. The most logical approach appears to be to shift the pivot point of the master magnet support to a point under the axis of rotation of the rhomboid. This however has attendant problems because the length of the rhomboid arms differ and the available space under the rhomboid is severely restricted by the clearance area needed for the "finder wires" on the microscope.

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However, a modification of this basic idea is underway and it is hoped that a suitable design will be arrived at shortly.

3) Various mechanical interferences were discovered, these fortunately can be relatively easily eliminated.

4) Elevating handwheel torque: - The torque required to elevate the table was found to be rather high and rotating the handwheel was found to be particularly inconvenient and fatiguing while in a seated position. This is really a basic problem relating to the amount of energy that must be delivered to the table in a practical interval of time. Assuming we want to raise the table at a rate of one foot per minute, even with a gear train of 100% efficiency, this would still require the operator to exert a 3 or 4 pound force on a 6 inch handwheel while turning the crank at a rate of 180 RPM. When we multiply this by the reciprocal of the efficiency of the gear train and sliding ways, the torque required becomes uncomfortably large for a seated operator. Thus it has been decided to add a small motor to completely relieve the operator of this chore.

C. PROJECTED WORK FOR JANUARY

The changes resulting from the initial evaluation will be incorporated. The electronic assembly will be completed and the unit put into operating condition.

It is hoped that approval of the microscope modification will be received so that the design and fabrication can get underway.

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D. SUMMARY OF CORRESPONDENCE

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1) Visit by customer's representative to [redacted] on 12-22-66. - E.D. visited [redacted] to review the progress on the development and obtain his first look at the completely assembled unit (from the mechanical standpoint). E. D. was concerned with the position of the eyepieces on the microscope and the high handwheel torque. [redacted] indicated that both these problems would be investigated.

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2) Letter and quotation from [redacted] to Contracting Officer dated 12-30-66, [redacted]

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E. FINANCIAL REPORT

Financial report for the month of December is attached.

Prepared by:

[redacted]

Project Engineer

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RW:mj

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