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Approved For Release 2004/03/26 : CIA-RDP78B04747A002200020036-7

99265
14 JAN

25X1 [redacted]

[redacted]

[redacted]

C E R T I F I E D

Ref: 635-OD-107

10 January 1966

Post Office Box 8031
Southwest Station
Washington, D.C. 20024

25X1 Subject: [redacted] Progress Report - December 1965
Project 635

Gentlemen,

In accordance with contract provisions on the above project, we are enclosing three (3) copies of [redacted] Progress Report on Project 635 for the period December 1965. Also included are two (2) copies of our Financial Report for the period from inception through 30 November 1965.

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Very truly yours,

[redacted]

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Executive Vice President

DECLASS REVIEW by NIMA/DOD

LHB/de
Enc: 1) 3 P.R. w/635-CD-001
2) 2 F.R.

Cert. #743932

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[redacted]

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[redacted]

[redacted]

20 December 1965
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REW:rf

NOTES ON MEETING

Date: 17 December 1965

25X1 Attendants: [redacted] E.D. and T.G.M. (Customer)

25X1 At: [redacted] Facilities

25X1 At meeting [redacted] reviewed status of 635 project. The following notes are deemed pertinent.

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Power Assist

25X1 [redacted] requested that the type of power assist used be the same as that to be used on other designs. E.D. indicated that he thought this would be all right, but he would like to see a breadboard set up where he could compare the performance of the two drives. 25X1 [redacted] said that a breadboard would be set up to demonstrate the performance of at least the electrical type power assist. 25X1 [redacted] indicated that this would be ready early in January.

Film Loading and Transporting System

Film loading and transporting system was described and was found to be acceptable by customer (E.D.). Minimum film separation will be 1 5/8 inches with 1 11/16 inches more likely. (Current figure looks closer to 1 3/4 inches - R.E.W., 1/4/66.)

Glass Leveling

25X1 [redacted] described the method by which the microscope will be aligned to the film plane. [redacted] proposal called for leveling provisions on the glass. Present design uses a rigidly mounted glass with provision for adjusting the microscope. 25X1

Instrument Height and Viewing Posture

Layouts showing position of the microscope were shown and the operator's viewing position discussed. E.D. urged that height of instrument be kept as low as possible and distance between front of unit and viewing, and edge of viewing area as short as possible.

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[redacted]

[redacted]

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In respect to the elevating table, customer wants a distance of 22 to 36 inches (adjustable) from underside of instrument to floor (assuming a 22 inch distance from underside to eyepiece.

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635 PROGRESS REPORT

Period Covered: December 1965

Document No.: OD - 105

Dated: 5 January 1966

PRESENT STATUS

The Preliminary Design and Engineering phase of the program is essentially complete and the final layout is under way.

The purpose of this phase was to define all the essentail areas of design and performance and obtain an overall view of the instrument prior to detailed layouts. Brief descriptions of the major design features are given below.

A) Main Construction

A single aluminum casting serves as the base of the instrument. Mounted on this casting are the glass film viewing plates, the light sources, the rod supports for "Y" motion and the spool support bars. All of the components of the drive assembly are mounted on an aluminum base plate bolted to the bottom of the casting. The microscope is supported on a four legged spider formed from two side castings and a machined square cross bar.

B) Film Spool Location and Loading

The film spools are located at the rear of the instrument permitting the viewer to get very close to the front edge of the format. The driving spindles for the film spools are

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on the center supports rather than on the outer supports, as shown in the proposal. This we feel, simplifies the design, and permits an easier adjustment of the outer support spindles to accommodate different sizes of film.

The film is loaded by first withdrawing the outer support spindle (by depressing a button in the end) to a detent position. The spindle remains locked in this withdrawn position allowing the operator to use both hands to hold the film spool. The film spool is slipped onto the end of the driving spindle and then with one hand supporting the film the operator releases the outer spring loaded spindle (by again depressing the button) permitting it to enter and support the outer end of the spool.

Film is threaded through the nylon rollers and across the top of the viewing glass to the front of the instrument. To reduce the force required by the operator to pull the film from the spool, a neutral, or free wheeling position is provided for in the film spool reversing gear boxes. Having threaded the film to the front of the instrument, the operator attaches it, with a clip, to a rod which runs across the short dimension of the format. The rod is carried on cables and pullies, and can be made to travel down and under the instrument by manually turning a crank on the side of the unit. When the rod, with film attached, has been cranked to the rear of the instrument, the operator removes the clip (which is permanently attached to the rod) and attaches the film to the lower spool. The crank is turned a little further which moves the rod up and out of the way of the film path. Film may be threaded from the lower to the upper spool by reversing the above procedure. A separate threading mechanism is provided for each film, of course.

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C) X and Y Motions of Microscope

The versatile microscope is mounted on a four legged spider and is permitted to travel 6 inches in the Y direction (away from the observer) on recirculating ball bushings and rods. 12 inches of motion in the X direction is achieved by using four recirculating ball plates surrounding a precision ground square rod. This arrangement differs from that proposed, however, we feel that it will result in a sizeable reduction in friction without any sacrifice in rigidity or accuracy.

The separation between format edges is currently 1 3/4 inches.

D) X and Y Motion Control

A two speed concentric knob position adjustment is provided on both axes. The outer knob drives a worm which turns a worm wheel; on the worm wheel shaft there is a friction wheel (pulley in case of X axis) which bears against the ball bushing rod. This is the coarse adjustment. The scale factor is approximately 1 inch/revolution. The inner knob shaft moves the worm axially and gives the fine adjustments. The range of fine adjustment is 1/2 inch and the scale factor is approximately 1/16 inch per revolution. A release lever is provided to remove the pressure of the friction wheel (or relieve cable tension in the case of the X drive) so that the microscope may be moved freely by hand.

E) Film Drive

Control of each film position will be accomplished with a single handwheel as proposed.

The proposed gear drive using unidirectional and slip clutches will be used.

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An electro-mechanical power assist will be incorporated. This is different from the purely mechanical assist proposed, however, we feel that it will be more satisfactory from both standpoint of cost and performance. It has the added advantage that both films may be driven independently at the same time, which is not practical with the mechanical type assist. The selected approach uses a low cost, high torque, universal motor as the power source. Each motor is geared to its film drive through an electromechanical clutch which when deactivated, permits the film to be transported purely mechanically. A photoelectric error sensing device detects relative motion between the handwheel and the film drive shaft and generates a signal which when amplified is used to operate the motor to keep the load in synchronism. A similar system on another instrument (603) will be used to investigate the design further.

The design of the speed changing and spool reversing gear boxes is somewhat different than shown in the proposal. Rather than putting in - and taking out of mesh various gears, all speed changing and reversing gears are kept in mesh and positive acting mechanical clutches are used to select the desired gear train path. These clutches are operated by mechanical push-pull linkages.

F) Film Holddown

Film holddown will be accomplished with glass pressure plates, as proposed. Platens will be automatically raised during film transport by a linear actuator (tradename "Polynoid"). Each format will have a platen and controls on front panel will permit operator to manually raise and lower platens if he so desires. Platens will be removeable for ease of film threading and for cleaning purposes.

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G) General Illumination

The general illumination will be obtained from two cold cathode flourescent light sources. These sources have the brightness, uniformity and dimming characteristics as stated in the proposal. Consideration was given to the use of commercial lamps which are readily available and relatively very economical. Due to the short delivery schedule and the fact that the sizes of the commercial lamps available were not optimum this approach was abandoned.

H) Alignment of Microscope

Alignment of the microscope plane of travel and optical axis to the film plane will be somewhat different than that proposed. The glass viewing plane will be mounted rigidly to the main casting. The same surface as is used to support the glass will also be the mounting surface for the ball bushing rod assemblies which guarantees that the Y carriage will move parllel to the glass. The ball bushing holders will be shimmed as necessary during assembly to insure that the square X guide is also parallel to the viewing plane. Two separate adjustments will be provided to adjust the microscope optical axis so that it is perpendicular to the film plane.

This approach was selected over that originally proposed because it was felt that the ultimate assembly time would be less and the alignment more accurate.

I) Human Factors Engineering

Various human factors parameters were investigated and a design arrived at which we feel is a good compromise between ease and comfort of operation, and desired performance and economy of manufacture.

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[redacted] [redacted]

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One of the major problems is the large distance from the eyepieces to the film plane. This, coupled with the height of the main assembly (which has been kept at a minimum), requires that the operator sit on the edge of a stool and lean over the table slightly, as was shown in [redacted] proposal. This may be found to be an uncomfortable position for long microscope viewing sessions, but we do not see what additional improvements can be made.

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The distance from the forward edge of the format to the front of the instrument has been kept as small as possible to permit the operator to get close.

The film transporting handwheels have been located on either side of the instrument with the shaft parallel to the spool axis. This we feel is the best position because it gives the operator the feel that there is a direct correspondence in amount and direction of rotation and motion of the film spools. It also allows the two small sloping front panels to carry the electrical controls which must be visible from the front of the instrument.

The two small front panels will contain the following controls:

Right Control Panel

Main Power Switch
Pilot Light
Light Intensity (Right Format)
Manual Platen Control Switch
Hi-Intensity Light Switch (Right Side)

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Left Control Panel

Main Fuse
Power Assist - ON-OFF Switch
Light Intensity (Left Format)
Manual Platen Control Switch
Hi-Intensity Light Switch (Left Side)

The X and Y motion control knobs are located on the forward legs of the microscope mount. The scale factors are chosen to give one revolution for full traverse of the field of view at lowest power on coarse and at highest power on fine.

J) High Intensity Traveling Light Sources

Each format will contain a high intensity traveling light source. The source will be magnetically coupled through the film support glass and holddown platen to magnets held on arms attached to the microscope mounting base. The size of the illuminated area will be approximately 1/2 inch in diameter.

PROBLEM AREAS

The only engineering problem area of any significance is in the design and operation of the magnetically coupled traveling light sources. The problem arises because of two factors; one the distance between the master and slave necessary to accommodate the clearance for the holddown platen when in its raised position is fairly large to obtain good magnetic coupling and two, the Design Objectives require the source to travel to the very edge of the format.

This problem is currently being approached from two directions. One is an attempt to find an equally economical method of articulating the traveling sources, and the other is an effort to find a particular magnetic coupling configuration which will work satisfactorily.

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[redacted]

[redacted]

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Work on the final layout is proceeding in spite of this problem on the assumption that a suitable solution requiring minimum change will be found shortly.

PROJECTED WORK FOR MONTH OF JANUARY

It is planned to complete 80% of the layout and to finish detailing of the main casting. Detailing of the casting will be accelerated because of the long lead time necessary for subcontract manufacture of patterns, casting, and finishing.

A complete power assisted drive assembly will be available for demonstration. This will be the same type of system we intend to use in the design.

SUMMARY OF CORRESPONDENCE BETWEEN [redacted] AND CUSTOMER

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25X1 [redacted] letter #1176 to Contracting Officer informing him of receipt of damaged [redacted] microscope. 25X1

Telecons (2), 12/22/65 between [redacted] and ED - First 25X1
25X1 from [redacted] to ED to inform him that Railway Express Agency representative had inspected damaged equipment and made a report.
25X1 - Second from ED to [redacted] to instruct [redacted] to hold 25X1 microscope until further notice and send copy of REA Report.

25X1 [redacted] letter #1189, 12/27/65 to Contracting
25X1 Officer with [redacted] Agency Report.

Meeting between ED, TGM and [redacted] 12/17/65, at 25X1
25X1 [redacted] Notes enclosed.

FINANCIAL STATUS

Financial Report for November is enclosed.

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