

STAT




A-1747B  
28 July 1971

U. S. Government

Gentlemen:

As requested, a detailed cost breakdown is provided for each of the three alternates proposed under our letter A-1747A dated 27 July.

Should further information be required, kindly contact  or the undersigned.

Very truly yours,



Supervisor, Contract Administration

WGB:eh

Enclosure: as stated

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Approved For Release 2005/06/23 : CIA-RDP78B05171A000400030053-2

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3.3 Specifications

MLT-1540-4 Light Tables which have been modified for a mensuration capability will meet the following specifications:

- X-Y minimum starting <sup>operating</sup> speed 0.005 in./sec. ± 10% - changed
- X-Y maximum speed > .250 in./sec.
- Time to attain set speed 0.5 to 1.0 sec.
- Time from release of control to stop 0.1 sec. or less - changed
- Speed of X travel of bridge equal to speed of Y travel of bridge within 10% - changed
- Variations in speed not to exceed 0.001 in./sec. or 5%, whichever is greater, <sup>at all</sup> speeds, of 0.015 in./sec. or more. - changed
- Control of carriage speed by speed control shall be approximately logarithmic with slow response at low speed. - changed
- X-Y speed control shall have no dead band, i.e., minimum speed shall occur at minimum setting of control. - Added
- X-Y direction switch shall be lever actuated. - Added
- Movement of microscope carriage and mount when locked in X and Y within the following limitations:

<u>Pressure Applied</u>	<u>Allowable Movement</u>
2 lbs.	.010"
4 lbs.	.020"

Measurement method is as follows:

- A specified force applied in plus direction
- Deflection gage zeroed with force applied
- Specified force applied in minus direction
- Deflection read with minus force applied.

Force for manual movement of carriage in X and Y directions will be as low as possible commensurate with the above requirements not exceeding 4 pounds.

- At any selected setting of the speed control the variation from that speed shall not exceed ±20% of that speed.
- It shall be possible to electrically drive the carriage <sup>when the motor is engaged</sup> stopping and starting in both X and Y shall not involve

When the optics carriage is in the motorized drive mode

specify "rudge capability"

when the optics carriage is in the motorized drive mod.

the disengagement or disengagement of clutches.

Alternative 1

1EG

Replaces x-y control card only - no other circuit changes - reclaims relays from present cards

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considers this a comparatively simple change:

a. no adv. eng.

b. low assay hours

c. low q.c. and prod. plan. time

- 1 - Is 80 hrs (10 days) of engineering really required?
- 2 - Would it really take the elec. assay person all day (8 hrs) to rewrite the card.
- 3 - The prod. tech. assay person is lethargic to say the least - does he take all day to pull the old card out and replace it with the new one.

4- the proj. admin. seems to be useful on alternates 1 and 3, which are simpler than alternate 2, but he is not required in alternate 2.

5- Even with using relays from the replaced card, total direct material is \$164, or approx. 2 1/4% of the total cost of a  table. These are expensive boards. STAT

$$\frac{2392}{25} = 96 \text{ ea } 1.14\%$$

$$\frac{8800}{100} = 88 \quad 1.17$$

$$\frac{12705}{150} = 85 \quad 1.13$$

$$\frac{16500}{200} = 83 \quad 1.10$$

6- for those shipping costs of \$2 ea. they should come by air express, at least, particularly since alternate 2 costs \$3.48 ea to ship a more involved fix.

Alternate 2

DIA

Adds drive sprockets and shaft supports to the chain driving the bridge - relocate fail-safe clutch - eliminates present sprocket and chain drive. Adds velocity sensing tachometers to x and y bridge motions - rewiring - replaces present x-y control card. Lever switch replaces trim tab button.

STAT  considers this a substantial electrical problem:

a. 438 hrs total of adv. eng.

b. 120 hrs engineering

c. 120 hrs eng. support

d. 56 hrs elec assay vs. 8 mech.

STAT  material in servo system alone

- 1- A total of 438 hours, or 11 work weeks, effort of adv. eng. delivery begins in 17 weeks. This is full time employment of one high priced man.
- 2-  $\frac{736 + 52}{46} = 17$  hrs each to assemble.
- 3- In alternate 1, replacing the x-y control board costs  in material plus whatever two relays cost, say a total of \$200 each. Mat'l in alternate 2 =  $\frac{600 + 11500 + 500}{46} =$   STAT
- 4- Shipping =  $\frac{160}{46} = \$3.48$  ea
- 5- fabrication time vs. mat'l costs other than control board costs  doesn't seem realistic. STAT

Alternate 3

DIA

2  
 Adds pinch lock on chain  
 manually operated by lever  
 handles - lock-out switch.

STAT  considers this a technically  
 complicated problem but simple  
 in execution once problem is  
 solved:

- a. 145 hrs. of adv. eng.
- b. 36 hrs. eng. support
- c. 8 hrs. prod. eng.
- d. Small fabrication & assay times

- 1- from descriptions this is a rather  
 simple mechanical problem and  
 145 hrs of adv. eng. is grossly  
 excessive
- 2- Shipping charges of \$2.17 ea for  
 a very few number of parts.