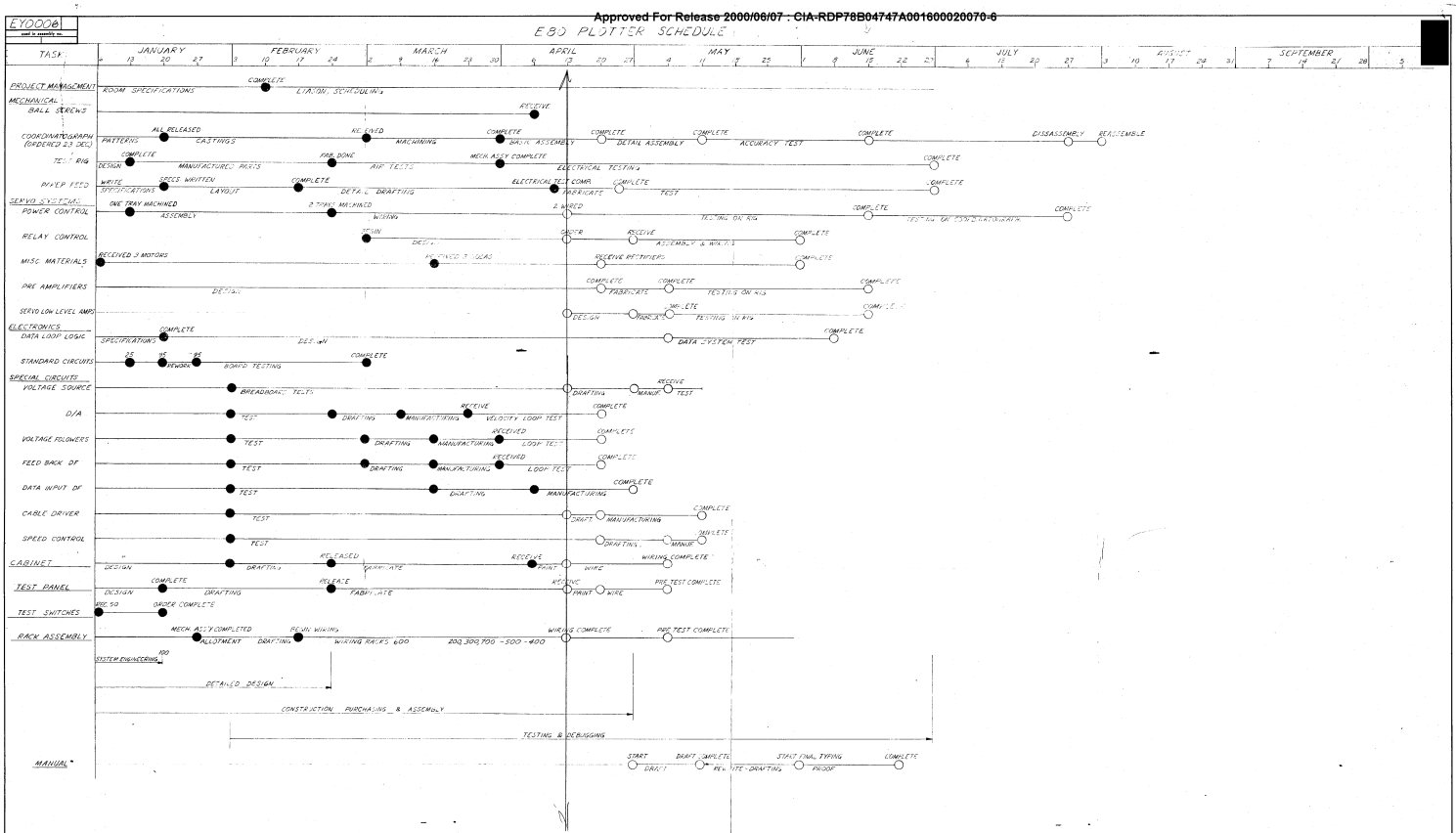
CONCORD CONTROLS - HIGH SPEED [illegible]
COORDINATOGRAPH - VARIOUS DRAWINGS

Approved For Release 2000/06/07 : CIA-RDP78B04747A001600020070-6

EY0006

E80 PLOTTER SCHEDULE



NOTE
THIS SCHEDULE SUPERCEEDS CY0035

25X1A [redacted]

PROJECT E-80

Data Format and Pin Assignments to 25X1A [redacted] I/O Connector

	25X1A [redacted] Bit No.	Plotter Bit Identification	Signal Voltage Binary ONE or ZERO	25X1A [redacted] 104 Connector Pin Assignment	
				Signal	Signal Return
Y DATA	0	.005"	1	A	E
	1	.010"	1	B	F
	2	.020"	1	C	H
	3	.040"	1	D	J
	4	.080"	1	K	P
	5	.160"	1	L	R
	6	.320"	1	M	S
	7	.640"	1	N	T
	8	1.280"	1	U	Y
	9	2.560"	1	V	Z
Y SIGN	10	PLUS	0	W	a
X DATA	11	.005"	1	X	b
	12	.010"	1	c	h
	13	.020"	1	d	i
	14	.040"	1	f	j
	15	.080"	1	g	k
	16	.160"	1	m	r
	17	.320"	1	n	s
	18	.640"	1	p	t
	19	1.280"	1	q	u
	20	2.560"	1	v	z
X SIGN	21	PLUS	0	w	AA
SPECIAL FUNCTIONS F1	22	Automatic Slowdown	1	x	AB
F2	23	Pen Up	1	y	AC
F3	24	Pen Down	1	AD	AJ
F4	25	Print	1	AE	AK
F5	26	These lines are		AF	AL
F6	27	coded as per		AH	AM
F7	28	CODED FUNCTIONS		AN	AT
F8	29	diagram below		AP	AU
OUTPUT ACKNOW-LEDGE				BU	BY
OUTPUT DATA REQUEST				BT	BX

25X1A

CODED FUNCTIONS

PLOTTER IDENTIFICATIONS	F8	F7	F6	F5
60-inch PAPER FEED	0	0	0	1
30-inch PAPER FEED	0	0	1	0
FULL SPEED PROCESSING	0	0	1	1
3/4 SPEED PROCESSING	0	1	0	0
1/2 SPEED PROCESSING	0	1	0	1
1/4 SPEED PROCESSING	0	1	1	0
RESET TO ZERO	0	1	1	1

Note: Binary ONE is zero volts with respect to signal return.

Binary ZERO is -3 volts with respect to signal return.

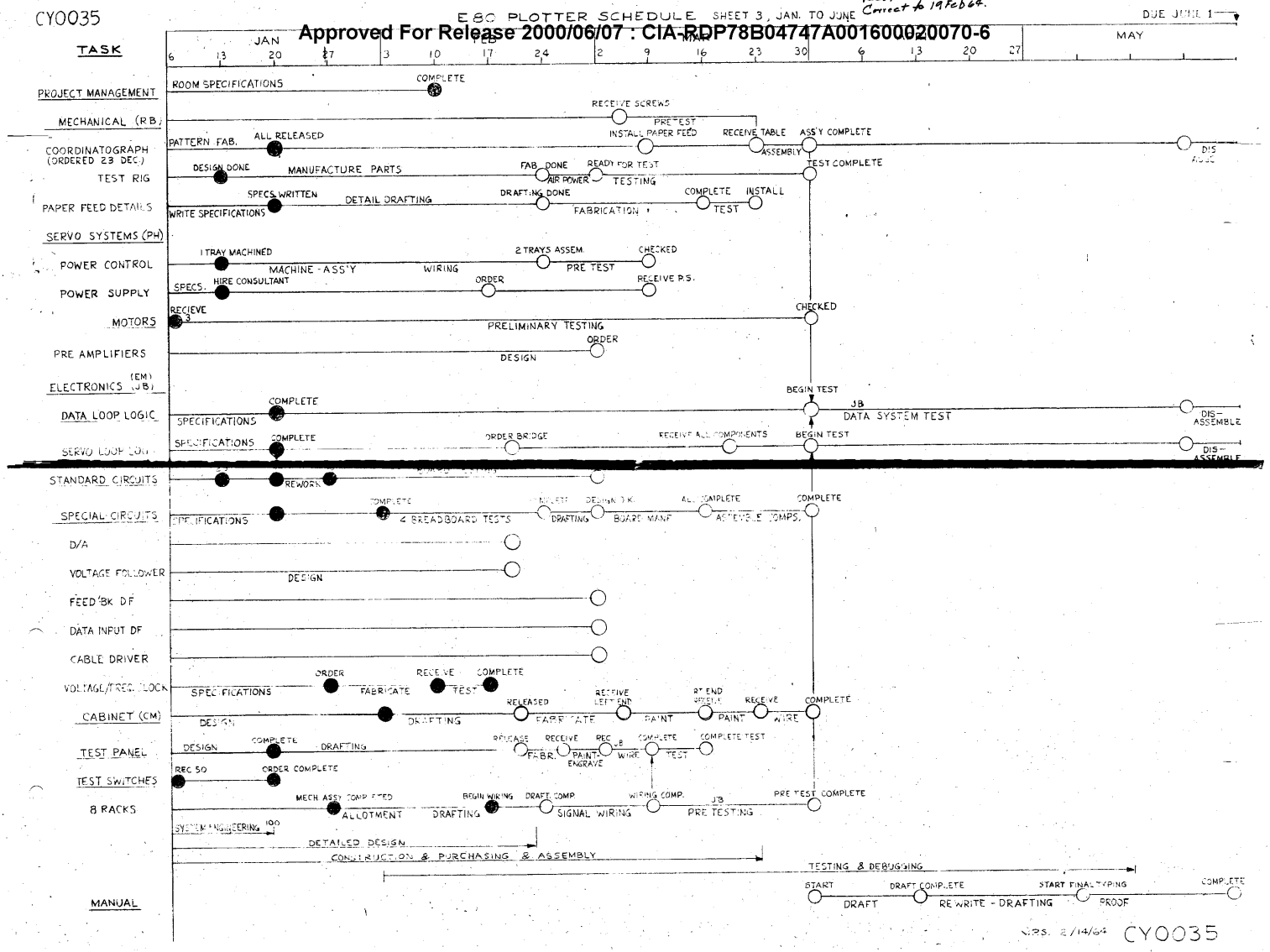
25X1A [redacted] JB 4-15-64 BJ0002

CY0035

E&C PLOTTER SCHEDULE SHEET 3, JAN. TO JUNE

Rec'd 24 Feb 64. Correct to 19 Feb 64.

DUE JUNE 1



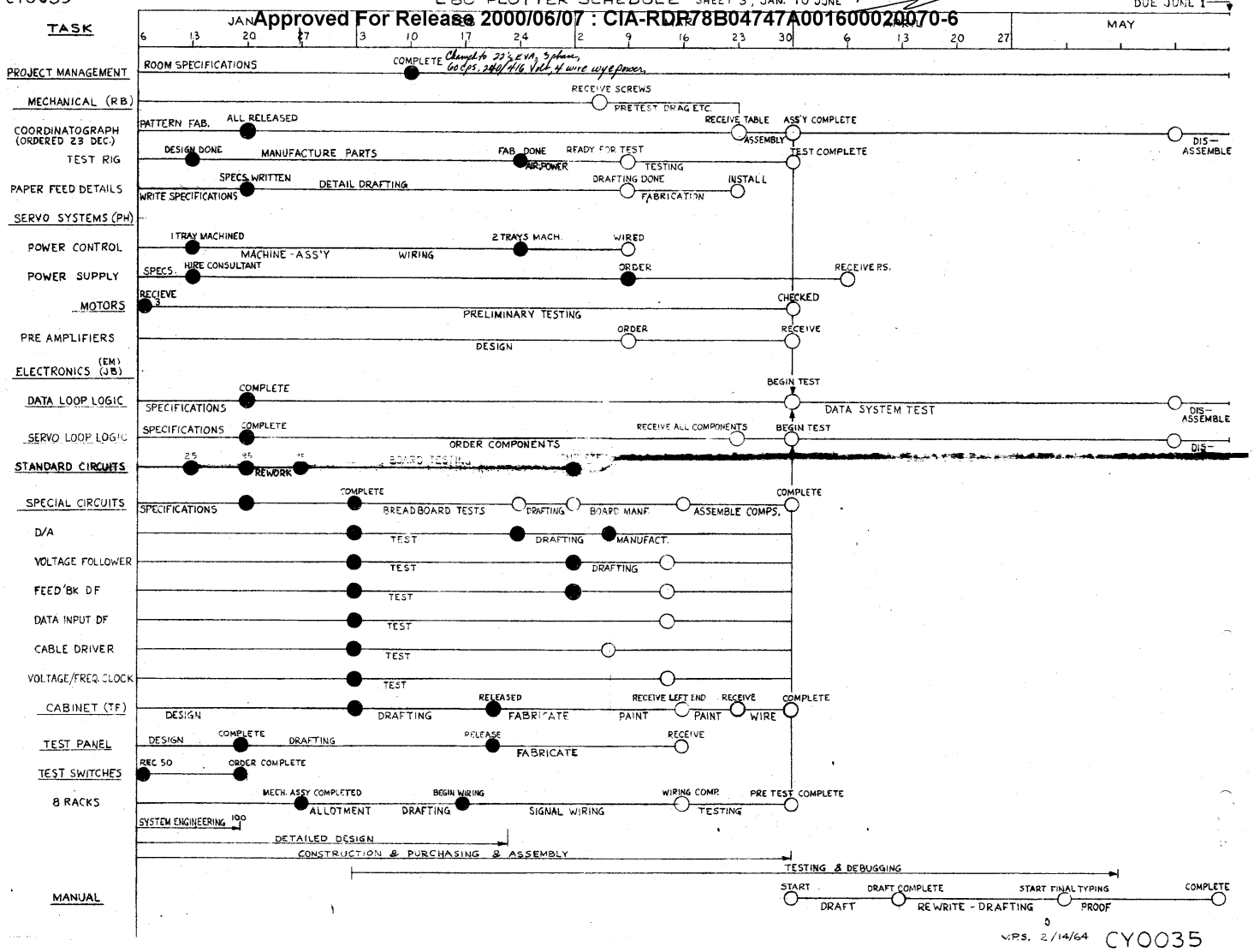
S.P.S. 2/14/64 CY0035

CY0035

E80 PLOTTER SCHEDULE SHEET 3, JAN. TO JUNE

Revised 13 March 64

DUE JUNE 1



W.P.S. 2/14/64 CY0035

THE DEVELOPMENT OF A PRECISE AUTOMATIC CARTOGRAPHIC PLOTTER

by

L. V. STREES
U. S. NAVAL OCEANOGRAPHIC OFFICE
Washington 25, D. C.

Presented by L. V. Strees
at the
INTERNATIONAL CARTOGRAPHIC ASSOCIATION
TECHNICAL CONFERENCE

Frankfort/Main
Germany

and

Presented by R. J. Beaton
at the
AMERICAN CONGRESS ON SURVEYING AND MAPPING
and AMERICAN SOCIETY OF PHOTOGRAMMETRY
TECHNICAL MEETINGS

St. Louis, Missouri

September 1962

Approved For Release 2000/06/07 : CIA-RDP78B04747A001600020070-6

ABSTRACT

Considerations leading to the development by the U. S. Naval Oceanographic Office of an automatic digital plotter capable of plotting discrete points or the scribing of continuous curves to an accuracy of ±0.005-inch over a plotting area of 60 x 60 inches will be presented.

The plotter design and integration of an electronic digital computer to provide an automatic cartographic plotting system for nautical chart preparation will be discussed.

Automatic plotters in general, their future application and impact on cartographic concepts will be briefly outlined.

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THE DEVELOPMENT OF A PRECISE AUTOMATIC CARTOGRAPHIC PLOTTER

INTRODUCTION

Automation, or more precisely, automatic control has been properly called a "Second Industrial Revolution". Its impact and effect in many industrial fields is well known to us all and is now a matter of history. Although automation has been late in arriving in the field of cartography, there can be little doubt that it will be playing an increasingly important role in our cartographic procedures.

Some of us may feel, and in fact even argue, that cartography is an art of human creativeness and as such does not lend itself to automation. Since this may be partly true, then it should be logical for us to ask; "Why do we need automation and what is its place in cartography?".

Rather than attempt a discussion of these questions for the general field of cartography, which certainly would be extremely interesting, it may be more fruitful if I limit my comments to a more narrow field of cartography, - that of nautical charting.

A NEED FOR AUTOMATION

Because a nautical chart is one of the marine navigator's most essential and reliable aids, it is natural that in its historical development it has reflected new and changing techniques in marine navigation. As these navigational techniques have become more complex, the need to portray new and additional information on our nautical charts has become mandatory.

To illustrate this point, let us consider one of the more widely used electronic navigation systems - the so-called "Hyperbolic System". In this system synchronized signals are transmitted from two stations, and the difference

in distance from these two stations is determined by using the elapsed time interval between receipt of each of the two signals or their "phase difference". The locus of positions on the earth spheroid for which this time difference is the same, is a "line of position". If three or more transmitting stations are used in pairs, then the ship's location on the earth spheroid will be determined as the intersection of two "lines of position", one line for each pair of stations.

Traditionally lines of position for electronic navigation have been constructed by the cartographic draftsman who plotted discrete points of the curve and then drew a smooth continuous curve through them. This is still the system that we employ. Because of the characteristics of these curves and the accuracy required in their drafting, an average chart requires the plotting of nearly 4000 points. As the necessity to incorporate "hyperbolic" navigation curves on charts increases, it becomes apparent that more rapid and efficient means of preparing these curves without sacrificing accuracy is needed. The most promising solution to this problem appears to be the construction of these curves by an automatic control system.

THE AUTOMATIC CARTOGRAPHIC PLOTTER

In an automated system, as in the manual construction of curves, two basic operations are required. First, we need a set of instructions and secondly a means of interpreting and performing these instructions. Inasmuch as the first operation is a straightforward mathematical procedure, we need not concern ourselves with it here. Instead we shall concentrate on the latter operation which is more complex and upon which the efficiency and quality of our desired product depends. Let us therefore examine some of the characteristics of plotters designed to draw curves.

Plotters which have the capability of drawing continous curves can be separated into two broad classifications. In the first class are the analogue plotters; in the second the digital plotters. Included in the analogue category are those plotters in which the movement of the plotting point is linked to a mechanical, electrical device or analogue voltage circuits which simulates the mathematical function of which the curve is the graph. Included in the digital category are those plotters in which the movement of the plotter point between two locations is controlled by instructions to the plotter in the form of digital data. Analogue plotters generally require a specialized programming device for each class of curves and hence are limited in versatility. Because of the nature of mechanical and electrical devices, they are also limited in accuracy. Thus, it appears that for cartographic applications, where versatility and accuracy are of paramount importance, the digital type of plotter is the more desirable.

Accordingly, an examination of available digital plotters led us to the conclusion that if we were to automate cartographic operations, we needed an automatic digital plotter designed specifically for that purpose. [redacted] 25X1A

[redacted], was awarded a contract to 25X1A design, and is now in the process of assembling for the U. S. Naval Oceanographic Office such a plotter - the E-51 Automatic Cartographic Plotter.

This plotter is designed to be a fully automatic cartographic plotter that may be used in a wide variety of cartographic operations employed in the preparation of nautical charts. One of the unique requirements, in addition to its ability to plot points to a positional accuracy of ±0.005 inch (0.127 mm) is the scribing on coated plastics of continuous second or higher order curves to the same accuracy standard.

Before presenting some of the plotter design considerations, it may be well to note some pertinent fundamental concepts from the field of geometry which enabled us to simplify the design of a continuous curve plotter and still maintain the required accuracy. One such concept, which for lack of a better descriptive name, I shall call the "polygonal path approximation of a curve." For well-behaved curves it is possible to select a finite number of discrete points of the curve and connect these points with line segments (Figure 1). It is further possible to select these points so that for the line segment connecting two points the maximum of the minimum distances between the segment and arc does not exceed a selected tolerance. Thus we are assured that a polygonal path so selected does not depart from our desired curve by an amount that exceeds the selected tolerance.

Recognizing that we can approximate our desired curves by polygonal paths we can now return to some design considerations of this plotter. The plotter will need only to travel sequentially to each vertex of our polygonal path in a straight line. For this type of operation, linear digital interpolation is used. The E-51 plotter would receive its logical command instructions in digital form, thus providing the increment in each axis which is required to arrive at the next point. The first step in its operation is to divide the required motion in each axis into smaller increments. These steps can be fed into the servomechanisms of the machine one at a time in a manner which keeps the system on the required line at all times. Such a technique has been found desirable because the control equipment associated with the plotter is simplified. Also, the plotter can deviate from its command position by no more than the required tolerance. It should be noted that, because of the inertia of the scribing head and sequence of command instructions, the plotter in the line scribing mode of operation does not completely stop at each vertex, but rather continues around

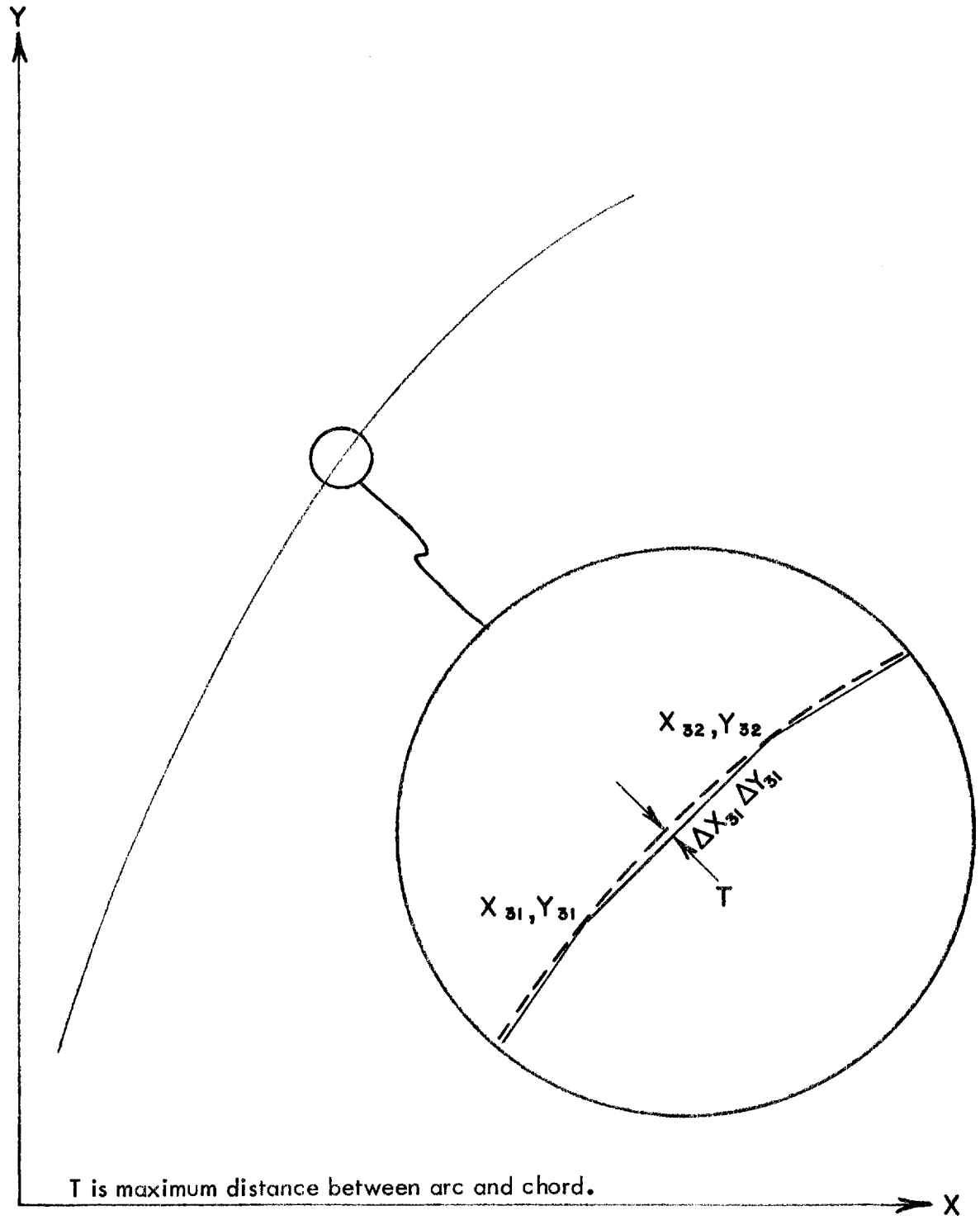

Fig. 1 - Straight Line Approximation of a Curve Segment

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the vertex. This is desirable since it produces a "curve" which has a smooth appearance. On the other hand, while it is operating in the discrete point plotting mode of operation, it will stop at the required increment and drop the marking point.

Figure 2 is the E-51 Precision Digital Coordinatograph in the process of assembly. The overall dimensions are approximately 8 x 8 x 4 feet, and it weighs about 7,500 pounds. From the picture one can get some idea of the sturdiness needed to maintain the stability necessary for accurate performance over extended time periods. The plotting surface, which is 60 x 60 inches in dimension, is constructed of honeycomb aluminum upon which is bonded a hard rubber sheet. A vacuum flattening system is provided on the plotting surface to hold the plotting sheet or photographic film in place. The Project Engineer is shown adjusting the mechanical print head - one of the three interchangeable heads that the plotting head will accept. The other two interchangeable heads are the scribing and photographic projection heads.

The mechanical print head, after is has been brought to a desired location by the plotter drive will automatically print programmed numbers consisting of a dot and three digits at a rate of 600 numbers per hour. Details of the mechanical print head are shown in Figure 3. The photographic print head will project (at programmed locations) from 70 mm roll film negatives containing digits, symbols, and letters onto photographic film placed on the plotting surface. It will expose these items at a rate of 400 per hour.

The E-51 plotter can accept appropriate commands through either a punched paper or magnetic tape reader. Figures 4 and 5 are the magnetic tape reader and the electronic logic circuitry of the director.

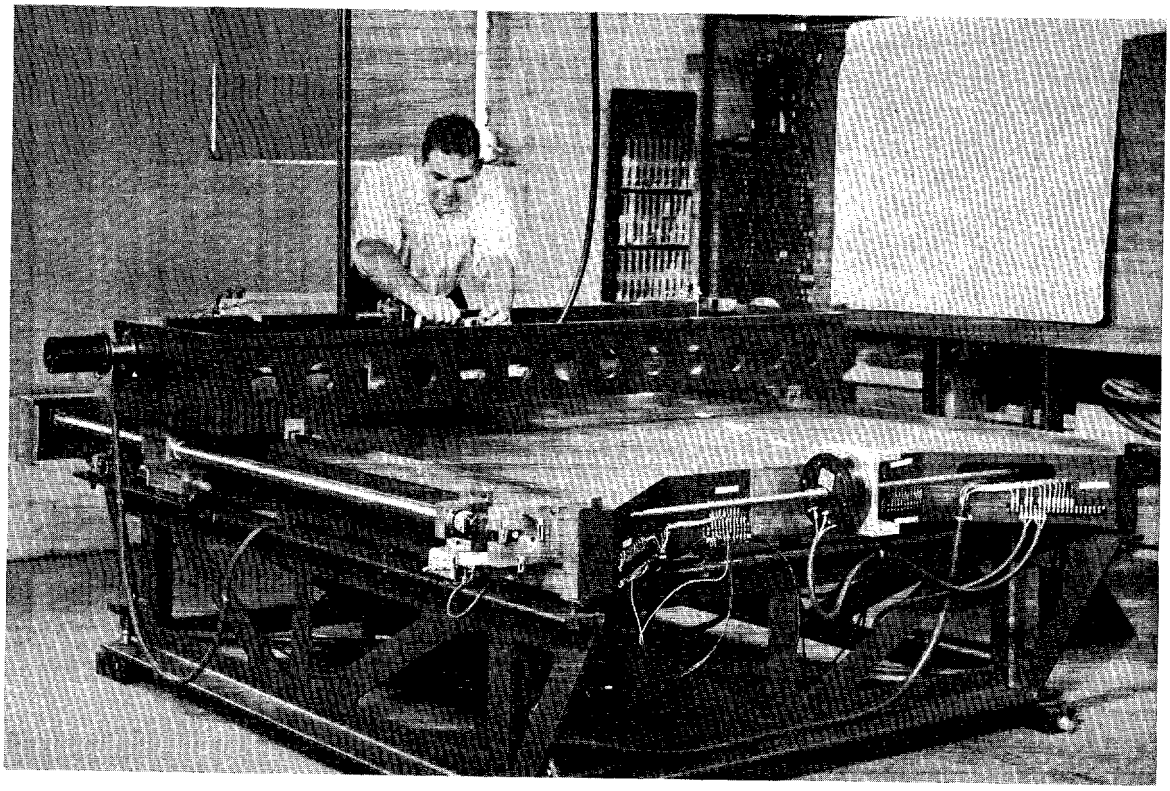

Fig. 2 - E-51 Precision Digital Coordinatograph in the Process of Assembly

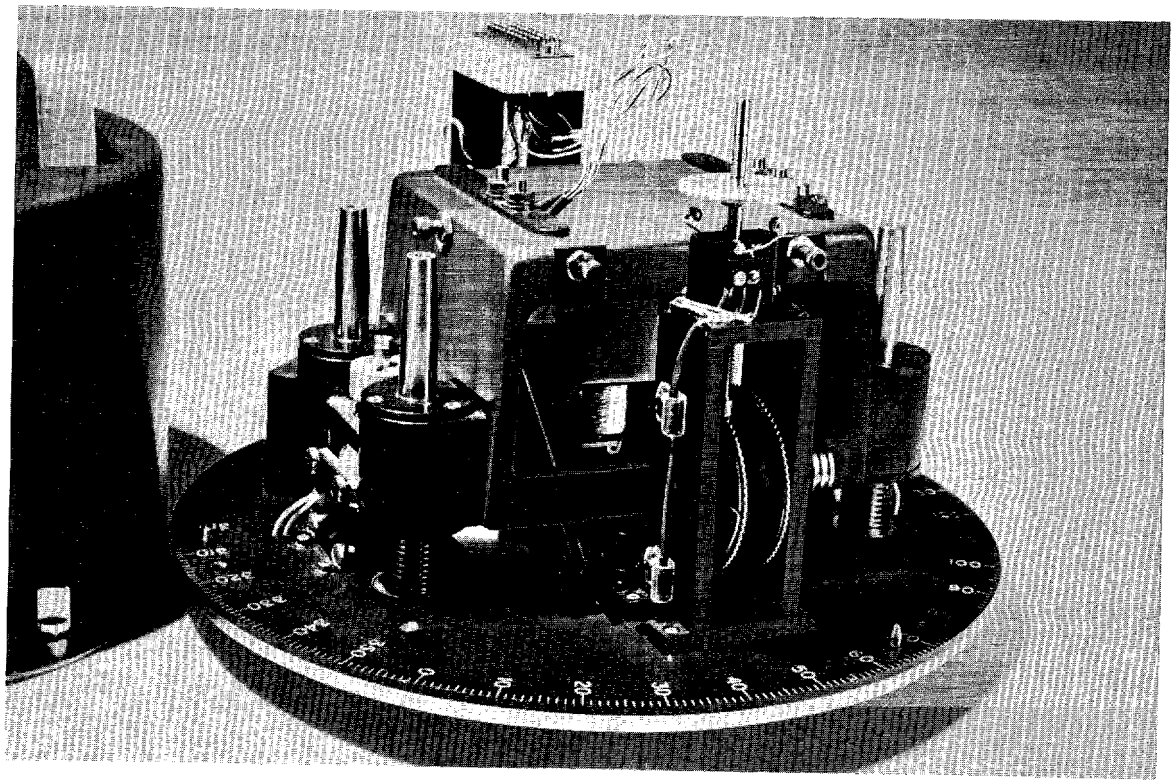

Fig. 3 - Automatic Program Controlled Mechanical Print Head

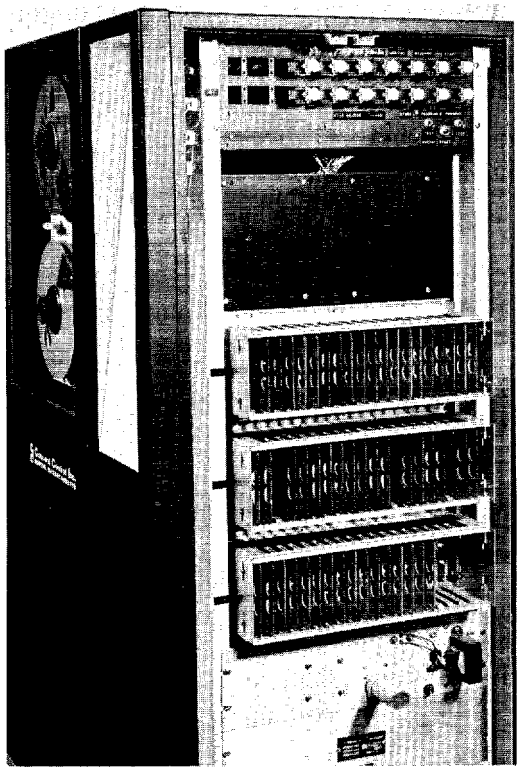

Fig. 4 - Magnetic Tape Input Unit with Side Panel Removed for E-51 Automatic Plotter

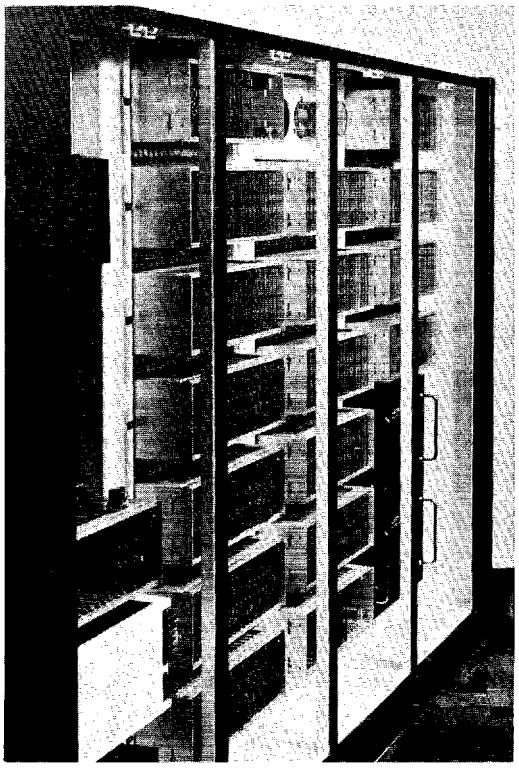

Fig. 5 - Director Unit with Side Panels Removed to Show Electronic Control Circuits for E-51 Automatic Plotter

AUTOMATED CARTOGRAPHIC OPERATIONS

With the development of the E-51 Cartographic Plotter, automated techniques as applied to nautical cartography is now a practical possibility. As mentioned earlier, the preparation of hyperbolic lines of position is one of the cartographic operations of nautical charting which lends itself to automatic control. A typical sequence of automated operations involved in their preparation will be briefly outlined. There are two distinct phases, data prepration and then the actual plotter scribing. The data preparation phase is principally performed on a high speed electronic digital computer such as the IBM 7070/1401. In this machine the necessary mathematical computations and logical instructions are performed and result in the preperation of a magnetic tape record in the proper format for the plotter input. This tape contains both the sequential plotter commands and the increments of each polygonal-path approximation that the plotter will be required to scribe. Following the programmed input, the scribing head moves, in sequence, to each successive vertex of the polygonal-path approximation for the curve. This procedure would be repeated for each curve which is programmed to appear on a manuscript. The scribed manuscript is now available as a "negative" from which the color separation press plates can be made.

A somewhat different cartographic procedure which also lends itself to automation is the portrayal of water depths by soundings. Water depths are shown by numbers which represent depths at their locations. The basic source from which the soundings are obtained is a hydrographic survey smooth or fair sheet. This smooth sheet represents the graphical result of a field hydrographic survey operation, therefore, it contains soundings in excess of those needed on published nautical charts. It is one of the tasks of the nautical cartographer to make a selection of the critical and representative soundings. In the conventional procedure the cartographer examines the smooth sheet and selects those soundings which he wishes to have appear on the published chart. In the final drafting operations, these depth numbers are transferred onto another manuscript. At present, a tedious procedure using printed

"stick-up" numbers is employed to show the soundings. Because of the nature of the type "stick-up" operations, a constant edit of the manuscript is necessary to avoid mistakes and omissions. Although we do not feel that is is possible yet to automate the decision functions that the cartographer uses to make the sounding selections, the procedures employed to prepare the sounding sheet can be readily automated by using the photographic projection head of the E-51 system.

Construction of the sounding sheet by automation requires only that the location of each desired sounding be digitized - that is, to associate with each sounding the numbers (digits) which uniquely locate and identify that sounding. The two-dimensional rectangular coordinate system is ideal for this requirement..

In a practical procedure the cartographer would select the soundings he wished to appear on the published chart. He would indicate the soundings selected by special marking on the smooth sheet. The coordinates of the selected soundings would then be measured and recorded together with the sounding number on punched paper tape - a form which can be processed by a high speed electronic computer. The computer can perform scale changes, map transformations, etc., with this data and prepare a coded tape program which will command the E-51 plotter system. The plotter may then be operated in the photographic-type placement mode of operation. In this mode, the photographic projection head is used and unexposed photographic film is placed on the plotting surface. The plotter is then programmed to move to the proper location and project the image of a programmed sounding value on the photographic film fastened on the plotting surface. This sequence of operations would be repeated until all the sounding items had been exposed. The exposed film, after photographic development, provides a film positive showing the soundings in the proper type style and location.

SUMMARY

The development of the E-51 Automatic Cartographic Plotter now makes the automation of many cartographic operations a practical possibility. I have touched upon only a few of the many applications that the E-51 plotter will have at the U. S. Naval Oceanographic Office. We have yet to utilize the full potentialities of modern high speed electronic computers in controlling automated cartographic systems and storing data for graphic expression. The E-51 plotter together with associated electronic computers, provides a powerful combination which will enable us to continue to meet the ever-increasing need of the maritime community for accurate and timely charts. Our results to date have been extremely encouraging and I feel that soon we can report that automation has arrived in nautical cartography.

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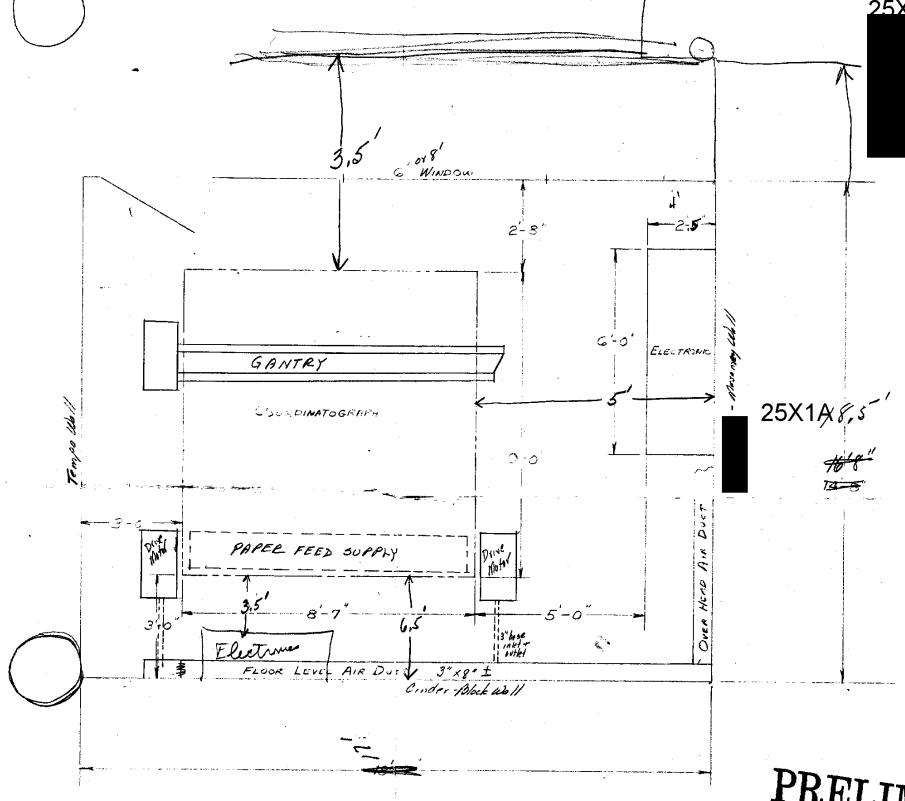
CY0032
used in assembly no.

[redacted]

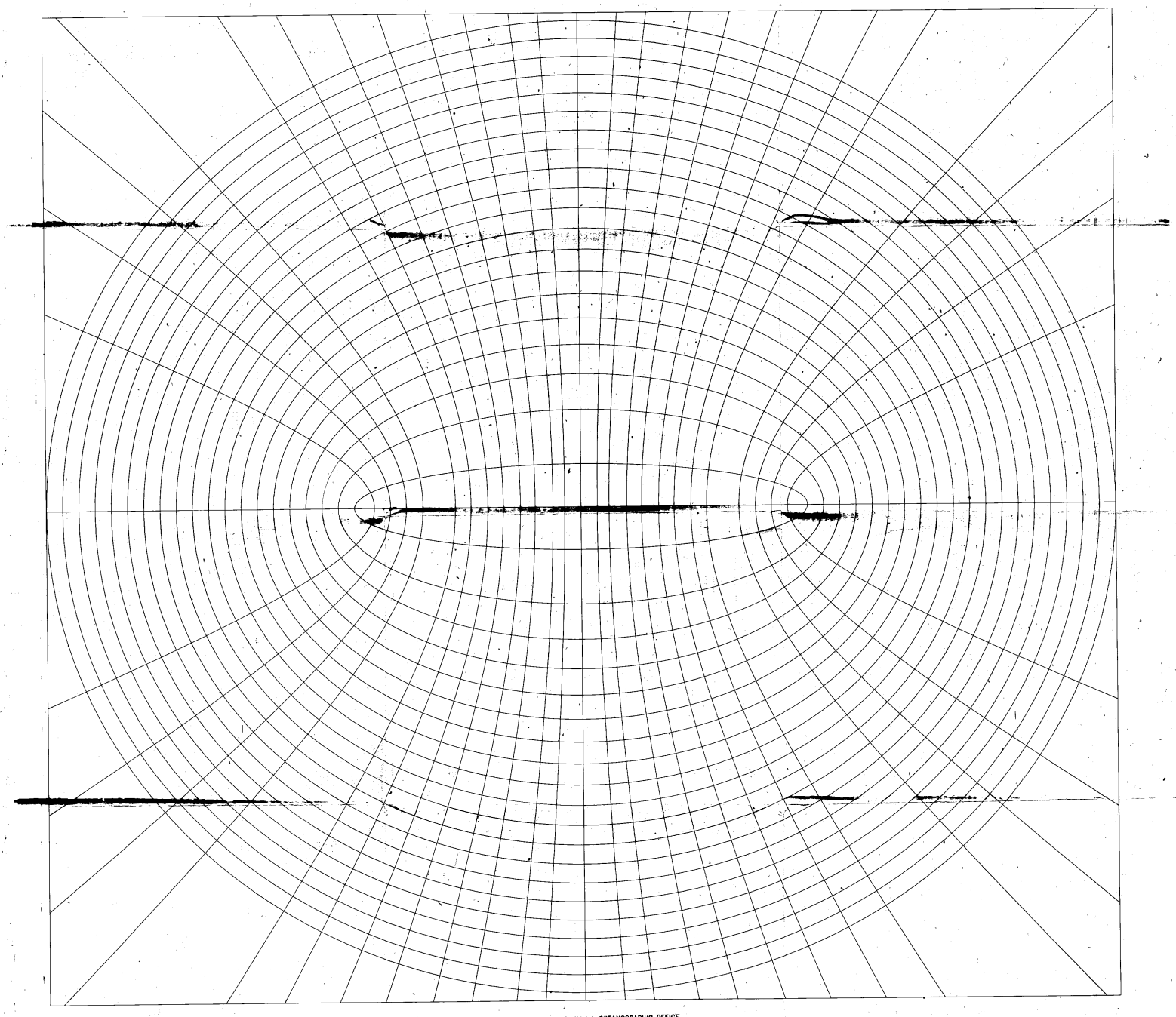
25X1A

25X1A



PRELIMINARY

g				finish			
f					item	material - description - manufacturer	part no.	qua.
e				tolerances not otherwise specified				
d				decimal ± fractional ±		PROPOSED ROOM LAYOUT		
c				angular ±		[redacted]	scale 1/2"=1'	dr. C.T.F.
b							date 1-15 64	
a							eng.	ch.	app.
rev. no.	change	app.	date				CY0032	



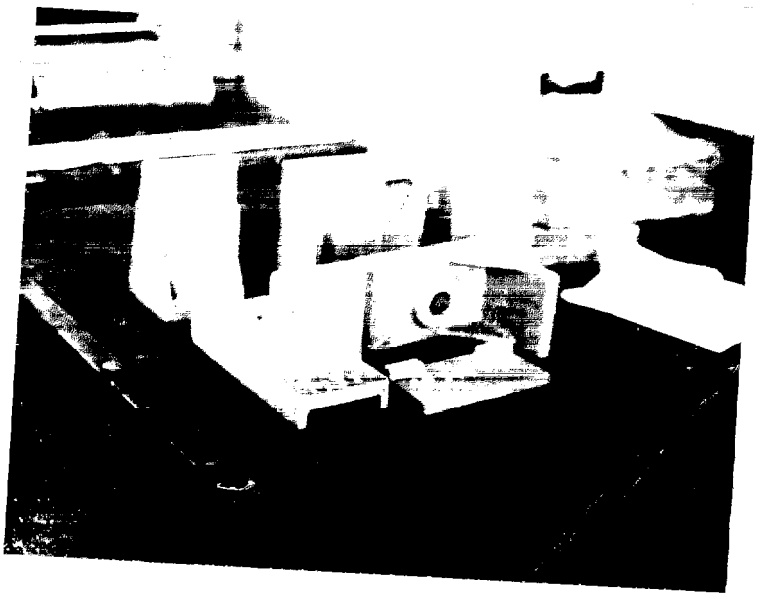
U. S. NAVAL OCEANOGRAPHIC OFFICE
WASHINGTON 25, D. C.

Approved For Release 2000/06/07 : CIA-RDP78B04747A001600020070-6

BACK OF PHOTO

This is the plotter at the machine shop. The gantry is in the background

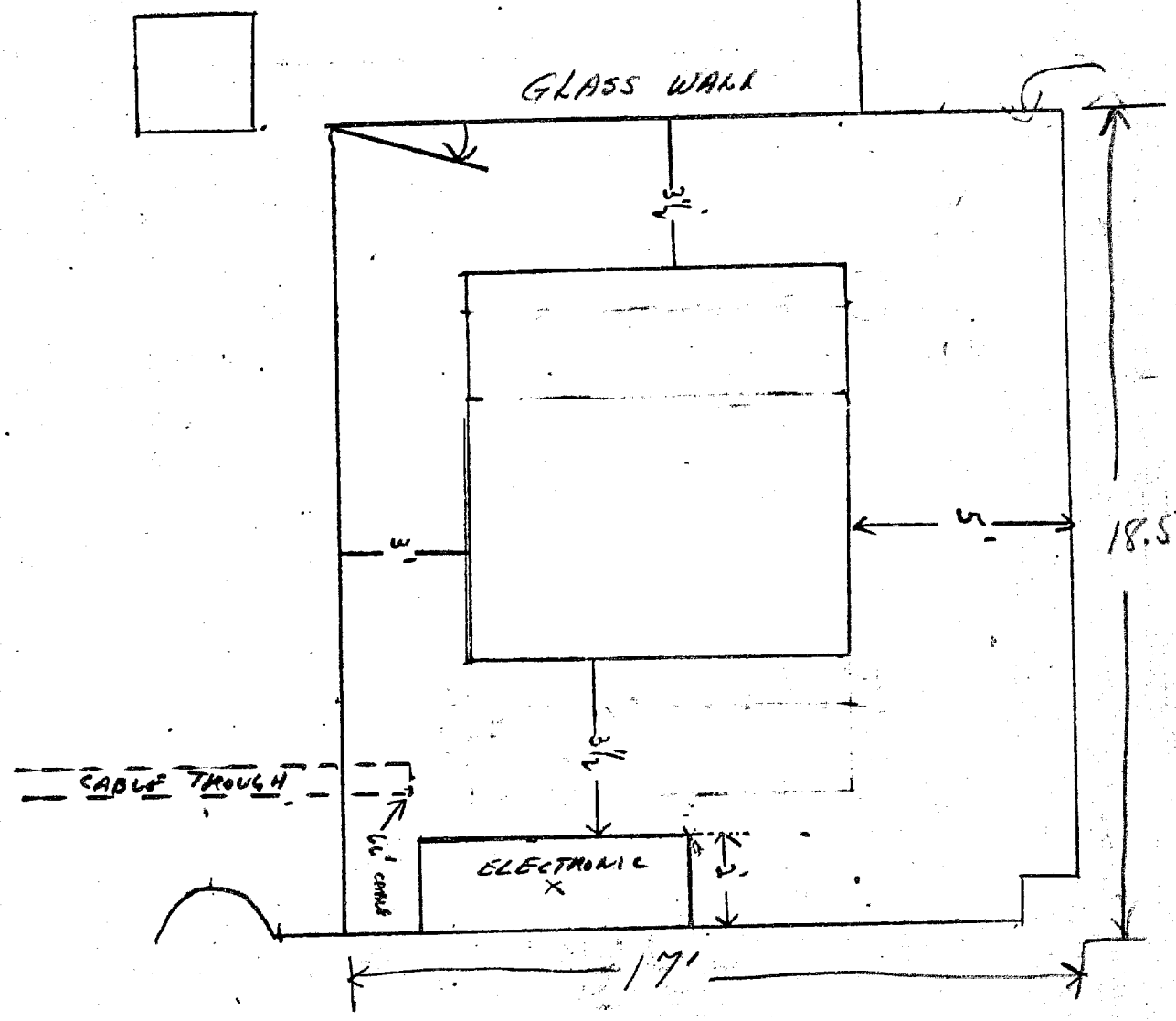
4/64



BACKSIDE OF PHOTO
↓
Motor mount castings 2/64

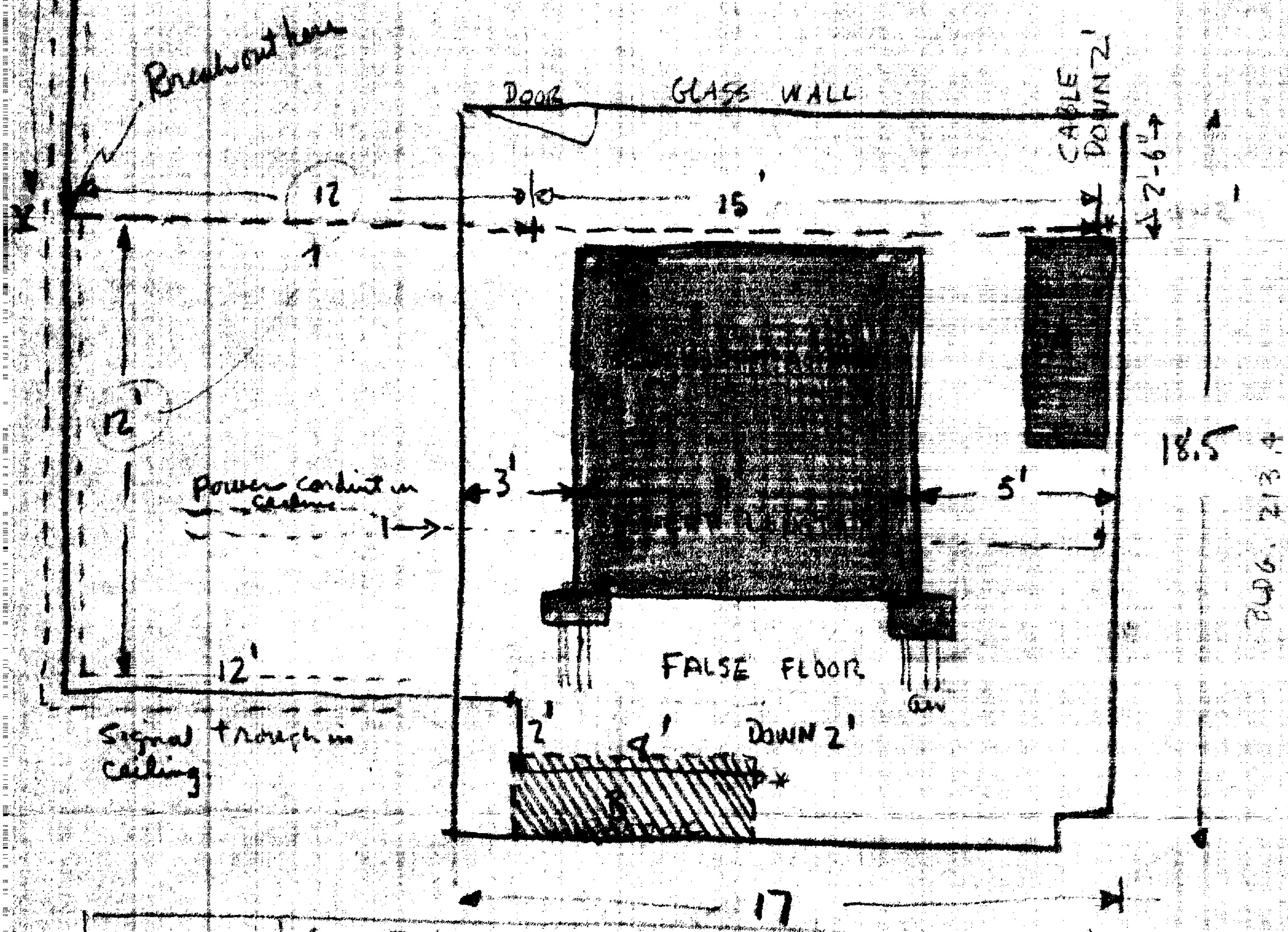
Motor housing castings 2/64

9/22/64



2/3 4

Plan A, the original one, allows for shorter cable lengths and also places the unit nearer the door and glass window. The question is can the signal duct be pierced to allow a trough to start from point X across to position A rather than B?



Signal Cable	Computer to point X		Total
Plan A	30'	12 + 15 + 2	59'
Plan B	30'	12' + 12' + 2' + 5' + 2'	66'

* cabinet signal connector is a Winchester MRAC-104S

$\frac{1''}{4}$ = 1 foot approx

Rec'd 6 Oct 64

25X1A

[redacted]

25X1A [redacted]

PROJECT E-80 25X1A

Data Format and Pin Assignments to [redacted] I/O Connector

	25X1A [redacted] Bit No.	Plotter Bit Identification	Signal Voltage Binary ONE or ZERO	25X1A [redacted]104 Connector Pin Assignment	
				Signal	Signal Return
Y DATA	0	.005"	1	A	E
	1	.010"	1	B	F
	2	.020"	1	C	H
	3	.040"	1	D	J
	4	.080"	1	K	P
	5	.160"	1	L	R
	6	.320"	1	M	S
	7	.640"	1	N	T
	8	1.280"	1	U	Y
	9	2.560"	1	V	Z
Y SIGN	10	PLUS	0	W	a
X DATA	11	.005"	1	X	b
	12	.010"	1	c	h
	13	.020"	1	d	i
	14	.040"	1	f	j
	15	.080"	1	g	k
	16	.160"	1	m	r
	17	.320"	1	n	s
	18	.640"	1	p	t
	19	1.280"	1	q	u
	20	2.560"	1	v	z
X SIGN	21	PLUS	0	w	AA
SPECIAL FUNCTIONS F1	22	Inhibit Slowdown	1	x	AB
F2	23	Pen Up	1	y	AC
F3	24	Pen Down	1	AD	AJ
F4	25	Print	1	AE	AK
F5	26	These lines are coded as per CODED FUNCTIONS diagram below		AF	AL
F6	27			AH	AM
F7	28			AN	AT
F8	29			AP	AU
OUTPUT ACKNOW-LEDGE				BU	BY
OUTPUT DATA REQUEST				BT	BX

25X1A

CODED FUNCTIONS

PLOTTER IDENTIFICATIONS	F8	F7	F6	F5
60-inch PAPER FEED	0	0	0	1
30-inch PAPER FEED	0	0	1	0
FULL SPEED PROCESSING	0	0	1	1
3/4 SPEED PROCESSING	0	1	0	0
1/2 SPEED PROCESSING	0	1	0	1
1/4 SPEED PROCESSING	0	1	1	0
RESET TO ZERO	0	1	1	1

Note: Binary ONE is zero volts with respect to signal return.

Binary ZERO is -3 volts with respect to signal return.

[redacted] 4-15-64 BJ0002

NEGOTIATED CONTRACT (SUPPLIES AND SERVICES)

REQUISITION OR OTHER PURCHASE AUTHORITY	CONTRACT/TASK ORDER NO. 3784

[redacted]

ISSUING OFFICE 25X1A

NAME	ADDRESS
25X1A [redacted]	Post Office Box 8043 Southwest Station Washington, D. C. 20024

CONTRACTOR

NAME	ADDRESS
25X1A [redacted]	

CONTRACT FOR	AMOUNT
Engineering Consulting Services	$ 7,500.00

APPROPRIATION AND OTHER ADMINISTRATIVE DATA

SS/LB ROUTING
3/26
Ch 8 CKH 3/25
D/Ch 7 wh 3/25
BSS
SS
CA

This negotiated contract is entered into pursuant to statutory authority and any required determination and findings have been made.

This contract is entered into, by and between the United States of America, hereinafter called the Government, represented by the Contracting Officer executing this contract, and above named Contractor who is an ☐ Individual, ☐ Partnership, ☐ Corporation, incorporated in the State of ______________, hereinafter called the Contractor.

The parties hereto agree that the Contractor shall furnish the facilities and deliver all supplies and perform all the services set forth in the attached Schedule, or Task Orders, issued hereunder, for the consideration stated therein.

The rights and obligations of the parties to this contract shall be subject to and governed by the terms and conditions on the reverse hereof, attached Schedule and General Provisions. To the extent of any inconsistency between the Schedule and General Provisions, and any specifications or other provisions which are made a part of the contract by reference or otherwise, the Schedule and the General Provisions shall control. To the extent of any inconsistency between the Schedule and the General Provisions, the Schedule shall control.

The Contractor represents (a) that it ☐ is, ☐ is not, a small business concern. For this purpose, a small business concern is a concern that (i) is not dominant in its field of operation and, with its affiliates, employs fewer than 500 employees, or (ii) is certified as a small business concern by the Small Business Administration. (See Code of Federal Reg., Title 13, Ch. II, Part 103, 21 Fed. Reg. 9708, which contains the detailed definition and related procedures.), (b) that it ☐ has, ☐ has not, previously been denied a Small Business Certificate by the Small Business Administration, and (c) if offeror is a regular dealer, it also represents that all supplies to be furnished hereunder ☐ will, ☐ will not be manufactured or produced in the United States or its territories or possessions by a small business manufacturer or producer; and, further, makes the representations regarding contingent or other fees, set forth on the reverse hereof.

IN WITNESS WHEREOF, the parties hereto have executed this contract as of 15 March 19 65.

SIGNATURES *(Type or print all names under all signatures)*

CONTRACTOR [redacted]	THE UNITED STATES OF AMERICA
BY 25X1A ___ *TITLE*	BY 25X1A [redacted] *CONTRACTING OFFICER*

WITNESSES *(In case of corporation, witnesses not required, but certificate on the reverse must be completed.)*

NOTICE

This material contains information affecting the National Defense of the United States within the meaning of the Espionage Laws, Title 18, U.S.C. Secs. 793 and 794, the transmission or revelation of which in any manner to an unauthorized person is prohibited by law.

CONFIDENTIAL
(When Filled In)

GROUP 1
Excluded from automatic downgrading and declassification

SECURITY NOTE

This contract and correspondence relating thereto must be handled in strict accordance with classified handling and storage instructions furnished the contractor under separate cover by the procuring activity.

NOTE: Contractor, if a corporation, should cause the following certificate to be executed under its corporate seal, provided that the same officer shall not execute both the contract and the certificate.

CERTIFICATE

I, _____, certify that I am the _____ of the corporation named as Contractor herein; that _____, who signed this contract on behalf of the Contractor, was then _____ of said corporation; that said contract was duly signed for and in behalf of said corporation by authority of its governing body, and is within the scope of its corporate powers.

_____ (Corporate Seal)
(SIGNATURE)

CONTRACTOR'S STATEMENT OF CONTINGENT OR OTHER FEES

The Contractor represents: (a) that he ☐ has, ☐ has not, employed or retained any company or person (other than a full-time bona fide employee working solely for the Contractor) to solicit or secure this contract; and (b) that he ☐ has, ☐ has not, paid or agreed to pay to any company or person (other than a full-time bona fide employee working solely for the Contractor) any fee, commission, percentage or brokerage fee, contingent upon or resulting from the award of this contract, and agrees to furnish information relating thereto as requested by the Contracting Officer. (Note: For interpretation of the representation, including the term "bona fide employee," see General Services Administration Regulations, Title 44, Secs. 150.7 and 150.5(d), Fed. Reg. Dec. 31, 1952, Vol. 17, No. 253.)

TERMS AND CONDITIONS

1. SELLER'S INVOICES -- Invoices shall be prepared and submitted in triplicate unless otherwise specified. Invoices shall contain the following information: Contract number, Order number (if any), Item number; contract description of supplies or services, sizes, quantities, unit prices, and extended totals. Bill of lading number and weight of shipment will be shown for shipments made on Government bills of lading. The Contractor or his authorized representative will sign ONLY the original (ribbon typed copy, if typed). When the invoice is signed or receipted in the name of a company or corporation the name of the person signing, as well as the capacity in which he signs, must appear. For example: "John Doe Company, by John Smith, Secretary," "Treasurer," or as the case may be.

2. LABOR INFORMATION -- Attention is invited to the possibility that wage determinations may have been made under the Walsh-Healey Public Contracts Act providing minimum wages for employees engaged in the manufacture for sale to the Government of the supplies covered by this contract. Information in this connection, as well as general information as to the requirements of the act concerning overtime payment, child labor, safety and health provisions, etc. may be obtained from Wage and Hour and Public Contracts Division, Department of Labor, Washington 25, D. C.

3. DISCOUNTS: In connection with any discount offered, time will be computed from date of delivery of the supplies to carrier when delivery and acceptance are at point of origin or from date of delivery at destination or port of embarkation when delivery and acceptance are at either of those points, or from date correct invoice or voucher (properly certified by the Contractor) is received in the office specified by the Government if the latter date is later than the date of delivery.

4. SAMPLES: Samples of items, when required, must be submitted within the time specified and at no expense to the Government. If not destroyed by testing, they will be returned at Contractor's request and expense, unless otherwise specified in the Schedule.

5. GOVERNMENT-FURNISHED PROPERTY -- No material, labor, or facilities will be furnished by the Government unless otherwise provided in the Schedule.

6. AGENTS -- Contracts signed by an agent must be accompanied by evidence of his authority.

7. ALTERATIONS -- Any alterations in this contract made by the Contractor must be initialed by both the Contractor and Contracting Officer.

8. MISTAKES -- Contractors are expected to examine the drawings, specifications, circulars, schedule and all instructions pertaining to the supplies or services. Failure to do so will be at the Contractor's risk. In case of mistake in extension of price the unit price will govern.

ARTICLE I - SCOPE OF WORK:

The Contractor shall provide such Architectural and Engineering services as may be set forth in specific Tasks under this Contract.

ARTICLE II - PERFORMANCE OF SERVICES:

The extent and character of the work to be done by the Contractor under this Contract shall be subject to the supervision, direction, control and approval of the Contracting Officer or his authorized Technical Representative.

ARTICLE III - PERIOD OF PERFORMANCE:

The Contractor shall furnish services as set forth in this Contract at such times as may be required by the Contracting Officer or his Technical Representative during the period 22 March 1965 through 30 June 1965.

ARTICLE IV - COMPENSATION/FUNDING:

There is hereby obligated for the aforesaid services an amount of SEVEN THOUSAND FIVE HUNDRED DOLLARS AND NO CENTS ($7,500.00) covering services to be performed during the period 22 March 1965 through 30 June 1965. The obligated amount is, as indicated, an estimated amount, it being understood that complete reimbursement for the aforesaid services by the Contractor shall be reimbursed in accordance with the following rates:

CATEGORY	RATES PER HOUR
Partner	$10.30
Sr. Designer	6.80
Designer	5.90
Draftsman	5.20
Stenographer	4.80

OVERTIME RATES:

The Contractor will notify the Technical Representative when overtime rates are required and secure his prior authorization for payment of such rates. When overtime payments are authorized, reimbursement shall be in accordance with the following rates:

NAME OF CONTRACTOR

[redacted]

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CATEGORY	RATES PER HOUR
Partner	$10.30
Sr. Designer	9.20
Designer	7.83
Draftsman	6.79
Stenographer	6.18

MATERIALS:

Any materials furnished by the Contractor at the request of the Technical Representative of the Contracting Officer shall be at net cost to the Contractor.

RECORDS:

The Contractor agrees to make available at the office of the Contractor at all reasonable times during the period of performance hereunder and for three (3) years thereafter any of the Time Records for inspection or audit by the Contracting Officer or his duly authorized representative.

PAYMENTS:

The Contractor shall be reimbursed hereunder in accordance with ARTICLE 5, Section F of the attached General Provisions.

GOVERNMENT-FURNISHED EQUIPMENT:

Government owned equipment in the Contractor's possession shall be maintained, controlled and accounted for in accordance with ARTICLE 2, Section F of the attached General Provisions.

ARTICLE V - TRAVEL:

Travel expenses shall be reimbursed as follows:

a. Necessary travel expenses actually incurred by employees of the Contractor in performance of work under this Contract.

b. Travel by automobile for required travel of employees of the Contractor under this Contract shall be reimbursed at a rate not to exceed TEN CENTS ($.10) per mile and such reimbursement shall be considered in lieu of the actual costs of such travel.

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NAME OF CONTRACTOR [redacted]

NOTICE

This material contains information affecting the National Defense of the United States within the meaning of the Espionage Laws, Title 18, U.S.C. Secs. 793 and 794, the transmission or revelation of which in any manner to an unauthorized person is prohibited by law.

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c. Subsistence expenses actually incurred by employees of the Contractor while in a travel status under this Contract shall be reimbursed at a rate not to exceed TWENTY DOLLARS AND NO CENTS ($20.00) per day.

ARTICLE VI - SECURITY REQUIREMENTS:

The association of the Sponsor with the work to be performed under this Contract is classified CONFIDENTIAL. The employees of the Contractor involved in this work will be exposed to documents, materials and information that are security classified up to and including TOP SECRET. Accordingly, only such employees of the Contractor as have been approved by the Contracting Officer in writing may be assigned to this work. No security classified material may be removed from the Sponsor's premises nor shall the Contractor generate any written records pertaining to such security classified material nor orally disclose same to any other person(s) (including other Contractor officials and/or employees) without specific written authorization from the Contracting Officer.

The provisions of the "Security Requirements for Contractors" and the "Contractor's Secrecy and Security Agreement", copies of which have been furnished to the Contractor, are incorporated herein by reference and made a part of this Contract.

When it is deemed necessary to disclose classified information to a subcontractor to accomplish the purposes of this Contract, the Contractor shall request permission of the Contracting Officer prior to such disclosure. Upon the granting of permission, the Contractor shall cause to be inserted in all subcontracts under this Contract a provision similar to this article.

ARTICLE VII - FIXED PRICE TASKS:

Notwithstanding the provisions for time and material rates set forth above, it is mutually understood and agreed that in the event a proposed Task is found to have known parameters which can be fully defined, a firm fixed price will be negotiated to cover the said task.

NAME OF CONTRACTOR [redacted]

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(SCHEDULE)	PAGE 4 OF 4 PAGES CONTRACT/TASK ORDER NO. 3784

Task No. 1

STATEMENT OF WORK:

The Contractor shall provide such consultant services concerning installation, environmental and operational problems for the specialized systems and equipment located at [redacted] Naval Weapons Plant, Washington, D.C. as may be requested by the Technical Representative of the Contracting Officer.

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GENERAL PROVISIONS:

The General Provisions cited on the Contract signature page shall consist of Section(s) A & F, attached hereto and made a part hereof.

The Contractor shall comply with the General Provisions, Section(s) A & F, attached hereto and made a part hereof. In the event of any discrepancy between the General Provisions and the Schedule, the latter shall apply.

INVOICE INSTRUCTION:

On all invoices submitted under this Contract, the Contractor shall include the sponsor approved mailing address for payment.

SAFETY DEPOSIT BOX CLAUSE:

The Contractor will store all security classified material in connection with this Contract in a safety deposit box accessible only to security authorized personnel.

NAME OF CONTRACTOR [redacted]

25X1A

NOTICE

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FORM 3-58 1412a

(12-41)

C O N F I D E N T I A L

INTERNAL INFORMATION

Reqn. Office NPIC
Cost.Center # 5155-1200
Amount: $7,500.00

MAILING ADDRESS FOR CONTRACTOR

25X1A [redacted]

25X1A ATTN: [redacted]

CONTRACTING OFFICER'S MAILING ADDRESS:

25X1A [redacted]

Classified CONFIDENTIAL internally and externally - AGENCY STERILE

U.S. Government non-traceable check.

C O N F I D E N T I A L