

G	POST OFFICE BOX 2 REEN BANK, WEST VIRGINIA 24944 TELEPHONE ARBOVALE 444-3011	REPORT NO. <u>H79-7</u> contract No. <u>RAP-79</u> 4.1 PAGE <u>OF</u> DATE <u>Nov. 1968</u>
ROJECT	300 FT. DIA. HOMOLOGY RADIO TELES	COPE
UBJECT	POSITION REFERENCE PLATFORM	COST ESTIMATE
4.0 <u>co</u>	DST ESTIMATE	
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NATIONAL RADIO ASTRONOMY OBSERVATORY POST OFFICE BOX 2 GREEN BANK, WEST VIRGINIA 24944 TELEPHONE ARBOVALE 456-2011

H79-7 REPORT NO .-CONTRACT NO. ________ PAGE 4.2 7 DATE NOV. 1968

300 FT. DIA. HOMOLOGY RADIO TELESCOPE PROJECT:

SUBJECT: POSITION REFERENCE PLATFORM

COST ESTIMATE

4.1 GENERAL

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The following cost estimates are based on quotations received from manufacturers of instruments and components considered herein and on estimated design-assembly and check-out cost figures, which are in line with cost factors applied by the industry.

All costs are inclusive, a reasonable mark-up (overhead, G&A, profit); thus, the total estimate should come close to what should be expected if the system would be quoted by a suitable manufacturing concern.

4.2 COST OF "ALL OPTICAL" REFERENCE (3 arc. sec. system accuracy)

ITEM	DESCRIPTION	MATERIAL	ENGINEERING	LABOR	START-UP
1	Laser Auto Colli- mators by K&E 6 req'd.	\$66,000		~ ~	\$ 5,000
2	Optical polygon by Davidson Optronics l req'd.	13,000			1,000
3	Auto collimator se- lection matrix l req'd.	3,000	\$ 3,000	\$ 4,000	2,000
4	Auto collimater con- trol chassis 6 req'd.	7,000	1,000	3,000	1,000
5	Inductosyn Transduc- er Del-Electronics 2 req'd.	18,000			2,000
6	Inductosyn Translat- or 22 bits Nat.Binary (Fecker Div. of Owens Illinois) 2 req'd.	38,000 Y ∍-			2,000
0. R. Heine S.D.L.					S.D.L.

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SUBMITTED BY

APPROVED BY

J. MURADLIYAN

NATIONAL RADIO ASTRONOMY OBSERVATORY Post Office Box 2

GREEN BANE, WEST VIRGINIA 24944 TELEPHONE ARBOVALE 456-2011

H79-7 REPORT NO. CONTRACT NO. _______ PAGE 4.3 OF 7 DATE NOV. 1968

PROJECT: 300 FT. DIA. HOMOLOGY RADIO TELESCOPE

SUBJECT POSITION REFERENCE PLATFORM

COST ESTIMATE

ITEM NO.	DESCRIPTION	MATERIAL \$	ENGINEERING \$	LABOR \$	START-UP \$
7	Digital Readout 2 req'd.	\$ 1,200	\$ 1,400	\$ 800	\$ 400
8	Collimator temper. control systems 6 req'd.	7,200	2,000	3,600	2,000
9	Platform temper- control system l req'd.	3,000	3,000	2,000	1,000
10	Retransmission system (two axes)	1,600	1,000	1,200	600
11	Manual command station (two axes)	2,800	2,400	1,800	800
12	Platform position- ing servo (two axes)	12,000	2,000	2,000	1,200
13	Platform drive torque motors & tachometers (two axes)	7,000	2,000	2,000	1,000
14	Digital comparator 22 bits, Nat. Bin. (two axes)	6,000	3,000	4,000	1,000
15	Digital Zeroing 22 bits, Nat. Bin. (two axes)	6,000	3,000	3,000	1,000
16	Digital to analog con verter, 12 bits Nat. Bin. w. sign (two axes)	- 4,000	3,000	2,400	1,600
17	Mechanical/struct. parts	8,000	6,000	4,000	6,000
	SUBTOTAL	\$203 ,9 00	\$32,800	\$33,800	<u>\$29,600</u>
PREPARED	By O. R. Heine APPRO	OVED BY		MITTED BY	S.D.L

PREPARED BY J. MURADLIYAN -

Natio	ONAL RADIO ASTRONOMY OBS Post Office Box 2 Green Bank, West Virgini telephone arbovale 454-2011	ERVATORY 24944		REPORT NO CONTRACT N PAGE 4.4 DATE NO	H79-7 RAP-79 7 v. 1968
PROJEC	CT: 300 FT. DIA. H	OMOLOGY RAI	DIO TELESCOPE		
SUBJEC	T: POSITION REFER	ENCE PLATE	ORM COS	T ESTIMAT	E
4.2.	1. <u>SUMMARY</u> :				
	 Material Engineering Labor Start-up/Che 	ck-out		\$203,800 32,800 33,800 29,600	
	TOTAL COST OF RE	FERENCE PL	ATFORM	\$300,000	
4.3 ITEM	<u>COST OF COMBINATI</u> (5 arc. sec. syst	ON OPTICAL em accuracy MATERIAL	-GRAVITY REFER Y) ENGINEERING	LABOR	FORM START-UP
NO.	DESCRIPTION	\$	\$	\$	\$
1	L a ser a uto colli- mators by K&E 6 req'd.	\$ 66,000			\$ 5,000
2	Optical polygon by Davidson Optronics l req'd.	13,000			1,000
3	Auto collimator control chassis 6 req'd.	7,000	1,000	3,000	1,000
4	Pendulous tilt sen- sor by Kearfott l req'd.	7,000			2,000
5	Force Balance ac- celerometer by Kearfott l req'd.	5,000			2,000
6	Rate gyro by Kearfott l req'd.	14,000			3,000
REPARED	BY O. R. Heine APPI	ROVED BY		AITTED BY	S.D.L.

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NATIO	NAL RADIO ASTRONOMY OBSE Post Office Box 2 Green Bank, West Virginia telephone arbovale 456-2011	RVATORY 24944		REPORT NO. Contract No Page <u>5</u> of Date <u>Nov</u>	H79-7 . <u>RAP-79</u> 7 . 1968
PROJECT: 300 FT. DIA. HOMOLOGY RADIO TELESCOPE					
SUBJECT	POSITION REFE	RENCE PLATF	ORM CO	ST ESTIMAT	E
ITEM NO.	DESCRIPTION	MATERIAL \$	ENGINEERING \$	LABOR Ş	START-UP \$
7	Tilt sensor signal conditioner l req'd.	\$ 600	\$ 1,100	\$ 700	\$ 300
8	Accelerometer signal conditioner l req'd.	600	1,100	700	300
9	Gyro control and sig- nal conditioner l req'd.	- 2,000	2,000	1,000	1,000

4,000

9,400

16,000

1,200

5,000

1,400

6,000

1,400

2,000

1,000

4,800

800

2,000

1,000

2,000

400

600

800

1,200

10

11

12

13

14

15

16

puter

l req'd.

Vernitron 2 req'd.

Servo receiver

Digital readout

2 req'd.

2 req'd.

1,600 1,000 1,200 Re-transmission system (two axes) 2,800 2,400 1,800 Manual command station (two axes) Platform position-12,000 2,000 2,000 ing servo (two axes)

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17 Platform drive tor-2,200 1,200 600 400 que motors and tachometers (two axes)

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SUBMITTED BY

S.D.L.

J. MURADLIYAN

Signal analog com-

Synchro transmitter

incldg. housing, by

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NATIONAL RADIO ASTRONOMY OBSERVATORY

Post Office Box 2

GREEN BANK, WEST VIRGINIA 24944

TELEPHONE ARBOVALE 456-2011

REPORT NO. H79-7 CONTRACT NO. RAP-79 PAGE 4.6 OF 7 Nov. 1968 DATE _

300 FT. DIA. HOMOLOGY RADIO TELESCOPE PROJECT:

SUBJECT: POSITION REFERENCE PLATFORM COST ESTIMATE

ITEM NO.	DESCRIPTION	MATERIAL \$	ENGINEERING \$	LABOR \$	START-UP \$
18	Digital comparator 20 bits Nat.Binary (two axes)	\$ 5,000	\$ 3,000	\$ 3,000	\$ 1,000
19	Digital zeroing 20 bits Nat.Binary (two axes)	6,000	3,000	3,000	800
20	Digital to analog converter, l2 bits Nat. Bin. w. sign (two axes)	4,000	3,000	2,400	1,600
21	Platform Temp. Control l req'd.	3,000	3,000	2,000	1,000
22	Collimator Temp. Control 6 req'd.	7,200	2,000	3,600	2,000
23	Mechanical/struc- tural parts	8,000	6,000	4,000	6,000
	SUBTOTAL	\$197,600	\$45,600	\$37, 600	\$36,400
4.3.1 SUMMARY: 1. Material \$197,600 2. Engineering 45,600 3. Labor 37,600 4. Start-up/Check-out 36,400 TOTAL COST OF REFERENCE PLATFORM \$317,200 Say \$320,000					
				·····	
	O. R. Heine			S.	D.L.

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NATIONAL RADIO ASTRONOMY OBSERVATORY POST OFFICE BOX 2 GREEN BANK, WEST VIRGINIA 24944 TELEPHONE ARBOVALE 454-2011 DATE NOV. 1968

PROJECT: 300 FT. DIA. HOMOLOGY RADIO TELESCOPE

SUBJECT: POSITION REFERENCE PLATFORM

COST ESTIMATE

4.4 COMPARISON

Both systems would work equally well; however, the "all optical" system would be more accurate and would also cost less than the "gravity/optical" system.

The material cost for the "all optical" system would be higher than for the combination "gravity optical" system, but would have only 17 basic components vs. 23 for the second system, which would require less engineering and labor and hence results in a lower systems cost.

The second system would be easier to install and check-out than the first system. This would result in a lower telescope assembly and check-out cost which should be considered in the preparation of the cost summary for the entire telescope system.

It is estimated that these cost savings would amount to approximately \$20,000.00.