

MARCH 1980

NATIONAL RADIO ASTRONOMY OBSERVATORY

MARCH PROGRESS REPORT

VLA PROGRAM

April 16, 1980

NATIONAL RADIO ASTRONOMY OBSERVATORY

MONTHLY PROGRESS REPORT

VLA PROGRAM

MARCH 1980

SYSTEMS INTEGRATION DIVISION

The array was scheduled for 61 percent of the time; 49 percent went to astronomical programs and the remaining 12 percent went to tests. The average downtime for the month was approximately 11.6 percent.

The maximum number of antennas used for an astronomical observing program during the month of March was 22. Antenna 8 was returned to operation on March 23. Antenna 22 was declared operational on March 13, 1980. Antennas 1 and 11 are currently unavailable for observation. Antennas 23 and 25 are in the shakedown stage. The test array consists of Antennas 3 and 5.

The furthest station on each arm occupied by operating antennas are currently located at a distance of 4.7, 10.5 and 17.2 km from the array center along the north, southeast and southwest arms respectively. Our longest astronomically usable baseline is approximately 24 km.

ELECTRONICS DIVISION

In the Front End area, the Front End for Antenna 8 was replaced in the antenna after having CTI cryogenics and cryogenic FET second stage amplifiers installed. Front End No. 26 was nearing completion, ready for first fringes in early April. The remaining primary construction tasks for the Front End group are the construction of Front Ends 27 and 28 and the cryogenic and paramp retrofits on antennas 1, 2, 3, 4, and 6.

The new Hewlett Packard 9845B desk top computer is now in place in the Front End Lab. This computer is available as a general design tool for all electronics engineers and will also be used to carry out automated testing on Front Ends.

An increase in reports of radio interference at the normal L Band observing frequency has led to an improved system of reporting and monitoring L Band interference. The array operator now has a standard form which is completed whenever interference is suspected. In addition, tests are underway to determine if the automatic radio interference monitoring system can be relocated in the Electronics Room in the Control Building.

The construction of the second half of the delay multiplier system for IF's B and D is progressing well. 70% of all printed circuit boards for the new system are now tested and ready for operation.

Acceptance inspection of the final batch of Japanese 60 mm waveguide was carried out during the month. All waveguide needed to complete the project is now on hand.

During the month, Zbigniew Nosal and Mark Jenkins joined the Electronics Division in the positions of Front End Engineer and Front End Technician respectively.

COMPUTER DIVISION

The additional memory for the DEC-10 has been received. Debugging of the problems with the equipment has prevented its being incorporated into the system as yet.

The program ANTOSOL which computes the antenna gains has been changed to use an iterative solution for the complex gains. Indications so far are that this is an improvement over the old algorithm.

In the synchronous computer area, the operating system in SPECTRE has been changed so that it can handle both spectral line and continuum data. This replaces the old method requiring a different operating system for the two observing modes.

The interim observing system for spectral line mode is currently being modified to allow the observer to select a subset of the total number of channels. This will allow observation with a larger number of antennas than at present when using the narrow filters.

ANTENNA DIVISION

Antenna Moves

Six antennas were moved during the month.

Outfitting

Antenna No. 26 was completed March 6, 1980. Antenna No. 27 outfitting was started March 11, 1980.

Major Overhaul

Antenna No. 1 painting still incomplete due to inclement weather.

Preventative Maintenance

Six months P.M. was completed on Antenna Nos. 9, 13, and 23.

Transporter No. 2

Assembly is 99% complete at the fabricators plant. All mechanical, hydraulic and electrical systems are checked out and the diesel engines have been operated. The Logic (electronic) system will be tested after reassembly at the site. The transporter will be partially disassembled and shipped to the site during the week of April 4, 1980.

SITE AND WYE DIVISION

Waveguide Installation

Installed approximately 7,070 feet of waveguide to AN 8. Trenched approximately 6,200 feet to 100 feet past AN 8. Installed manhole at AN 8 and 3 intermediate manholes.

Phase IV

Overall completion 99%. Track work on the West arm is 98% complete with modification work, required before final acceptance, just commencing. Main track work on the East arm is substantially complete to AE 8 and interchanges are 99% complete. All Antenna spur tracks have been installed. Round Place Construction has started final grading work. Electric work is 99% complete.

Phase V

Overall completion of the total contract is 86%. Track materials layed out to AW 9. Track rough layed to approximately 4,300 feet from AW 9. The first lift of ballast has been placed on the North arm on both tracks to AN 9. Work on the Maintenance vehicle spur is still 30% complete. Electrical work for the month consisted of pouring concrete pad for Antenna Transformers, setting transformers and testing primary cable. Electrical work is 87% complete.

PROJECT MANAGEMENT

General

Proposals for the Construction of the Visiting Scientists Quarters No. 3 and the VAX computer addition to the Library - Office Building were sent out to twelve concerns on March 7, 1980 with a due date of April 2, 1980.

The U.S. Tenth District Court of Appeals is considering the New Mexico State appeal on the Gross Receipts Tax case. No knowledge of a decision date is available.

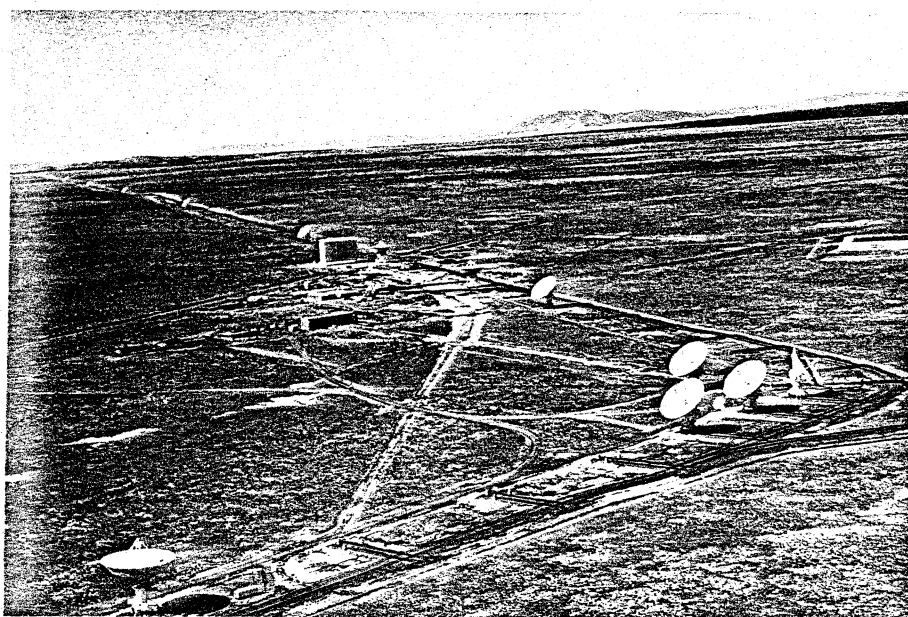
As of April fourth no approval has been received from GSA and the Defense Department concerning the transfer of 18,900 track feet of rail from Fort Sam Houston, Texas. Unless this rail can be released for take-up by April 20th the VLA will have to purchase commercial materials at an increased cost of at least \$43,000.00.

Personnel

The personnel changes as of March 31, 1980 are as follows:

Division	Budgeted 6/30/80 Level	2/29/80 Level	Additions	Reductions	3/31/80 Level
Site & Wye	10	10	0	0	10
Antenna Division	17	17	0	0	17
Electronics	52	50	1	1	50*
Site Management	6	5	0	0	5
Computer Division	17	14	1	0	15
Operations Division	12	11	0	0	11
Project Management	26	25	0	0	25*
TOTAL	140	132	2	1	133

*Does not include two part-time employees.



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Aerial View of VLA to West on 3/30/80. Showing Antennas on the West arm out to 17.2km. Antennas on West Arm in foreground. Buildings in center left.



p3/80/2

Aerial View of VLA to North on 3/30/80. Showing Antennas on North arm out to 4.7km. Buildings in foreground. Center of wye to right center.

VLA PROGRAM

MAJOR SUBCONTRACT AND PURCHASE ORDERS PLACED

3/31/80

NUMBER P.O. SUBCONTRACT	VENDOR	ITEM DESCRIPTION	DATE PLACED	DOLLAR AMOUNT	DELIVERY DATE	CURRENT STATUS - ALL FIRM FIXED PRICE CONTRACTS EXCEPT WHERE NOTED
VLA-6 Amend. #21	E-Systems, Inc.	28 Radio Telescopes	10/18/73	\$ 18,156,054		Deliveries are complete, but final paper work must be issued.
VLA-256	New Mexico State University	Archaeological Excavation	9/20/77	\$ 107,000	2/20/79 Completion	\$91,245 invoice thru 2/29/80. Final reports expected in April 1980.
P.O. S-07990	AIL Division Cutler-Hammer	Parametric Amplifiers	9/21/78	\$ 212,800	Complete by 1/21/80	10 sets received. 1 set every 2 weeks to completion.
P.O. S-08085	AIL Division Cutler-Hammer	Parametric Upconverters	10/23/78	\$ 102,525	4/13/79 thru 8/13/79	8 units received. 4 units are at AIL for repair. 2 will ship in April. No further promises. 1 new production unit to ship w/e 4/11/80 and 3/month to completion.
P.O. S-08329	Contact Systems, Inc.	Various Wiring Modules	10/31/78 1/19/79	\$ 30,486		On schedule. NRAO owes them additional components for assembly.
VLA-323	Logemann Bros.	Transporter	1/17/79	\$ 788,758	2/15/80	New delivery schedule being negotiated.

3/31/80

VLA PROGRAM
MAJOR SUBCONTRACTS AND PURCHASE ORDERS PLACED

NUMBER P.O. SUBCONTRACT	VENDOR	ITEM DESCRIPTION	DATE PLACED	DOLLAR AMOUNT	DELIVERY DATE	CURRENT STATUS - ALL FIRM FIXED PRICE CONTRACTS EXCEPT WHERE NOTED
VLA-345 Amendment	G. C. Dean	Labor Hour (Waveguide Installation)	3/19/79	335,000	Two years completing 2/28/81	
VLA-346	Wm. A. Smith Contract- ing Co., Inc.	Phase V Construction	4/26/79	2,820,000	June, 1980	Work progressing satisfactorily.
P.O. S-09849	BWH/CVA Joint Ventures	A/E Service Phase V	5/16/79	39,000	June, 1980	
P.O. S-11603	DEC	Computer Maintenance	2/13/80	90,024	CY '80	Monthly expenditure rate estimated at \$7,500.
P.O. S-06827 Amendment #2	C.T.I. Cryogenics	Cryocooler	5/23/78	239,760	2/15/80	Complete.
VLA-325	Pacific Railroad Constructors, Inc.	Phase IV Construction	6/23/78	2,916,080	9/16/79	Should complete 5/30/80.
VLA-344 P.O. S-08595	Wheeler Construction Co.	Crushed Stone	1/08/79	668,660	Complete by	
P.O. S-11264	Floating Point Systems, Inc.	Array Processors	12/10/79	201,092	4/29/80	
VLA-354 P.O. S-11480	CASCO Fire Protec- tion Systems	Fire Protection System for VLA Site Buildings	2/20/80	57,840	6/09/80	
P.O. S-11481	Century Data Systems	Disk Drives	2/15/80	64,078	3/15/80	
P.O. S-11478	Digital Equipment Corp.	Computer Systems	2/27/80	74,635	9/2/80	

VLA PROGRAM

PROCUREMENT ACTIVITIES INITIATED

3/31/80

<u>RFP NUMBER</u>	<u>ITEM DESCRIPTION</u>	<u>ESTIMATED COST</u>	<u>ISSUE DATE</u>	<u>PROPOSAL/BID DUE DATE</u>	<u>SUBMISSION TO NSF DATE</u>	<u>AWARD DATE</u>	<u>CURRENT STATUS</u>
P.O. S-11731	Tape System	\$ 119,700	10/17/79	2/15/80	3/25/80		
VLA-355	Prefabricated Buildings	189,000	3/7/80	3/31/80			

NATIONAL RADIO ASTRONOMY OBSERVATORY

VERY LARGE ARRAY

STATUS AS OF MARCH 31, 1980

CY - 80

<u>PROJECT NUMBER</u>	<u>DESCRIPTION</u>	<u>ALLOCATION</u>	<u>EXPENDED MONTHLY</u>	<u>TOTAL EXPENDED</u>	<u>TRANSFER TO FIXED ASSETS</u>	<u>BALANCE CONSTRUCT. IN PROGRESS</u>	<u>TOTAL COMMITTED</u>	<u>TOTAL EXPENDED & COMMITTED</u>	<u>NET BALANCE</u>
11000	SITE/WYE	1,917,000	122,668	347,159	1,305	345,854	949,203	1,296,362	620,638
12000	ANTENNA	160,000	13,945	28,784	---	28,784	11,329	40,113	119,887
13000	ELECTRONICS	1,153,000	77,886	187,085	---	187,085	120,508	307,593	845,407
14000	COMPUTER	1,291,000	17,884	59,344	---	59,344	14,089	73,433	1,217,567
17000	PROGRAM MANAGEMENT	207,000	9,123	25,518	---	25,518	149	25,667	181,333
18000	COMMON COSTS	401,063	7,758	82,871	---	82,871	15,645	98,516	302,547
19000	CONTINGENCY	481,942	---	---	---	---	---	---	481,942
	TOTAL PROGRAM	5,611,005	249,264	730,761	1,305	729,456	1,110,923	1,841,684	3,769,321

Note: Project allocation for CY-80 consists of \$4,500,000 in new funding plus \$1,111,005 in prior year funds reallocated in February, 1980.

NATIONAL RADIO ASTRONOMY OBSERVATORY

VERY LARGE ARRAY

STATUS AS OF MARCH 31, 1980

TOTAL PROGRAM

PROJECT NUMBER	DESCRIPTION	ALLOCATION	EXPENDED MONTHLY	TOTAL EXPENDED	TRANSFER TO FIXED ASSETS	BALANCE CONSTRUCT. IN PROGRESS	TOTAL COMMITTED	TOTAL EXPENDED & COMMITTED	NET BALANCE
11000	SITE AND WYE	26,555,230	304,569	24,430,792	11,500,799	12,929,993	1,490,491	25,921,283	633,947
12000	ANTENNA	22,721,203	18,259	21,892,874	17,940,920	3,951,954	708,403	22,601,277	119,926
13000	ELECTRONICS	17,982,546	158,501	16,812,299	7,913,761	8,898,538	322,674	17,134,973	847,573
14000	COMPUTER	6,111,066	19,764	4,200,220	2,874,739	1,325,481	671,891	4,872,111	1,238,955
16000	SYSTEMS INTEGRATION	201,022	---	201,022	200,965	57	---	201,022	---
17000	PROGRAM MANAGEMENT	2,098,809	9,123	1,917,328	1,782,795	134,533	149	1,917,477	181,332
18000	COMMON COST	2,100,371	7,758	1,782,179	1,699,307	82,872	15,645	1,797,824	302,547
19000	CONTINGENCY/RESERVE	481,942	---	---	---	---	---	---	481,942
	SUB TOTAL	78,252,189	517,974	71,236,714	43,913,286	27,323,428	3,209,253	74,445,967	3,806,222
30000	RETIREMENTS	(67,979)	---	(67,979)	(67,979)	---	---	(67,979)	---
	TOTAL PROGRAM	78,184,210	517,974	71,168,735	43,845,307	27,323,428	3,209,253	74,377,988	3,806,222

Note: Project allocation excludes \$325,811 withheld and paid directly to other agencies by the NSF in prior years.
Project allocation includes \$4,500,000 for CY-1980 Funding.

FINANCIAL STATUS REPORT
(in thousands)

As of: March 31, 1980

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Item	Program Ceiling	(A) Allocation to Date (C)		Un-Allocated Balance	Outlook (B)			(Over) Under Ceiling	Note
		Allocated	Expended and Committed		Estimate to Complete	Estimate Total			
ite and Wye	27,860	26,848	26,214	634	1,012	634	26,848	1,012	
ntennas	20,400	22,721	22,601	120	(2,321)	120	22,721	(2,321)	
lectronics	17,000	17,999	17,151	848	(999)	848	17,999	(999)	
omputer	4,850	6,111	4,872	1,239	(1,261)	1,239	6,111	(1,261)	
ystems Integration	400	201	201	-	199	-	201	199	
rogram Management	2,650	2,116	1,934	182	534	182	2,116	534	
ommon Cost	-	2,100	1,798	302	(2,100)	302	2,100	(2,100)	
Subtotal	73,160	78,096	74,771	3,325	(4,936)	3,325	78,096	(4,936)	
Contingency	2,840	482	-	482	2,358	482	482	2,358	
TOTAL	76,000	78,578	74,771	3,807	(2,578)	3,807	78,578	(2,578)	

NOTES: (A) Includes \$293K for site acquisition, \$15.7K for ECAC Study, and \$17.1K for NSF Ad Hoc Advisory Panel.
Allocated and Expended includes \$68K in assets which were retired in prior years.

(B) Estimate to complete is as of March 14, 1980.

(C) Includes \$4,500K in CY-80 Funding.

NATIONAL RADIO ASTRONOMY OBSERVATORY VLA ACTIVITY SCHEDULE

UPDATE DATE: 04/03/80

