

APRIL 1974

VLA MONTHLY PROGRESS REPORT

May 10, 1974

NATIONAL RADIO ASTRONOMY OBSERVATORY

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Narrative Report

Site and Wye Division

As of this date, seventeen contractors have received bid documents on IFB-VLA-34, Site Construction, Phase I, (bid issued 22 March, 1974). Shipments of used railroad ties, amounting to 44% of the requirements for Phase I, Site Construction, have been received. A well pump and appurtenances have been installed under Amendment No. 1 to Subcontract VLA-22. The 402 foot well has been test pumped and meets the water delivery requirements specified in the subcontract.

The status of the acquisition of land for Phase I, Site Construction, is as follows: Contract executed 1 May, 1974, for tracts 106E-1 and 106E-2 (final documents not yet received); special land use was granted on 16 April, 1974, by The Bureau of Land Management for tracts AE-6 and AE-7 (the permit was granted for one year; however, formal transfer of the land by the Secretary of Interior will occur before 17 April, 1975); permission was granted to the U. S. Government or its agents 15 March, 1974, to commence construction (the formal easement is still pending).

Antenna Division

An antenna presentation was made by representatives of E-Systems, Inc. at NRAO, Charlottesville, to representatives of both NSF and AUI on 4 April, 1974, and the design of the antenna was discussed. The design and detail drawings have been received, and a design review is in process. The structural portion of the drawing package is complete, and the required documentation, consisting of final design reports, alignment procedures, test and acceptance plan, and operation and maintenance manuals is in the process of preparation. E-Systems has been granted authorization to make prior procurement commitment for long-lead items in the amount of \$715,968 against \$870,275 provided under Amendment No. 4 to Subcontract VLA-6. The breakdown of the long-lead procurements is as follows:

Servo Systems	\$56,623.00
Elevation Gear Segments	15,264.00
Speed Reducers	154,321.00
Foundation Adapter Plates	4,312.00
Azimuth Bearings	33,762.00
Antenna Panels	170,480.00
Antenna Structures	<u>281,206.00</u>
	\$715,968.00

The specifications for the structural portion of the Assembly Building have been approved.

An acceptable reply has been received on the Focusing Feed Mount (RFP-VLA-29) and is undergoing technical evaluation.

### Transporter

Hydraulic analysis and component selection for the transporter is complete; however, the design and engineering phase of the transporter is somewhat behind schedule, but this is not expected to impede final delivery of transporter.

### Personnel

A Senior Designer, Philipp Hartline, has been added to the staff.

### Electronics Division

Verification of the corrected profile for the cassegrain subreflector is complete, and RFP-VLA-41 for two subreflectors has been issued and proposals solicited from nine companies. A prototype of the full 60 mm diameter waveguide transmission coupler is currently under fabrication; this is a significant design accomplishment owing to the following reasons: V.G.

1. The new coupler is two feet long in contrast to the eight foot length of the former design- -this size reduction requires a smaller manhole which should reduce station cost. ✓

2. A change in the array pattern will require the moving of far less couplers under the new coupler configuration- -the former coupler design was unable to pass the full range of waveguide frequencies, and this required an extensive relocating of couplers when a change was made in the array pattern. ✓

A meeting was held on 5 April, 1974, with staff representatives from Western Electric and Bell Telephone Laboratories, in which Western Electric agreed to furnish 135 meters of waveguide (free of charge) manufactured by them to satisfy our testing requirements at Greenbank for VLA sometime after 1 June, 1974. Western Electric is the only other source of waveguide, and as such, their price will be evaluated as soon as possible.

The preliminary design phase of the Delay and Multiplier Micro-controller has been completed, and work is complete on the final amplifier stage of the IF Receiver Block. The following prototype modules are nearing completion: 5 MHz Crystal Oscillator, Oscillator Multiplier, and Front End Frequency Converter. Proposals have also been received on the Cassegrain Feeds (RFP-VLA-32) and are undergoing technical evaluation.

The following staff members have been added: Stephen Maas, Electrical Engineer I; Harold Ward, Draftsman; David Weber, Electrical Engineer I.

Computer Division

The purchase order for the Synchronous Subsystem of the Continuum Computer has been forwarded to the Foundation for approval on 5/2/74. The Asynchronous Subsystem purchase order is in final preparation. Selection of the hardware for the Synchronous Subsystem has permitted the commencement of work regarding the assignment of detailed tasks to the minicomputers comprising this subsystem. Effort has also begun on the detailed development of software for the Asynchronous Subsystem of the Continuum Computer. Final selection of this subsystem has permitted the initiation of effort to determine a more detailed description of the overall system capability.

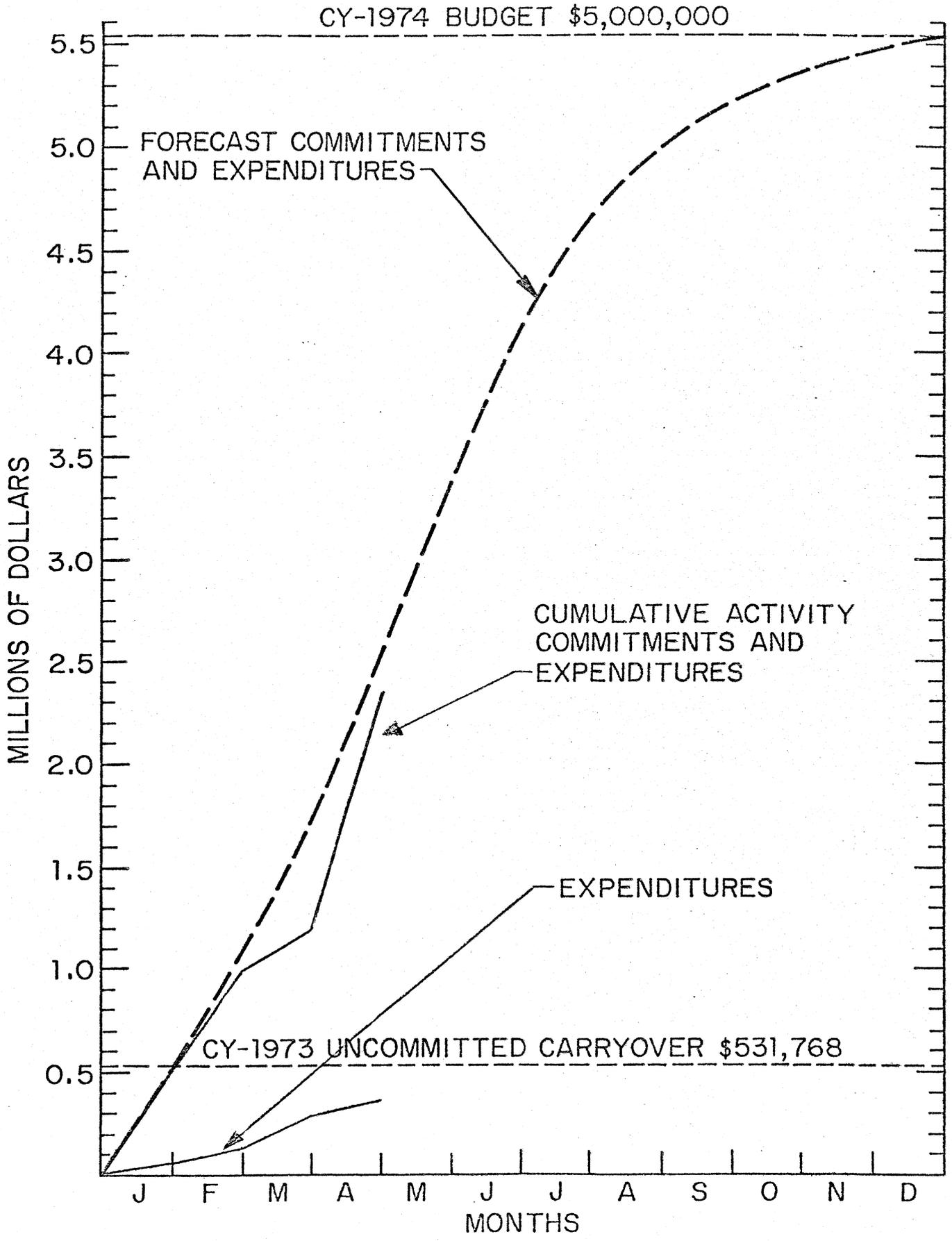
Project Management

Effort is continuing in obtaining government surplus rail for use on the Wye construction. Transfer from Mountain Home AFB of 6,900 feet of 70 lb. rail for the maintenance vehicle siding has been initiated; also, arrangements have been made with the Alaskan Railroad to share the available rail at the Crab Orchard Wildlife Refuge in Illinois.

The sharing of the available rail at Crab Orchard Wildlife Refuge of 13-15 miles of track, ideally suited for use as wye track at the VLA site, is the result of a GSA determination that the track "frozen" by AUI through the Foundation was subject to a prior request by the Alaskan Railroad. AUI, with the Foundation's assistance, was able to work out an agreement with the Alaskan Railroad whereby the available rail would be shared- -VLA will receive 3,222 tons of rail and fittings.

Plans are being formulated for the manning of the site- -approximately 39 people are expected to be staffing the site by December, 1975. Accommodations are being planned to meet the needs of the asynchronous computer in Charlottesville for the period from March, 1975 to September, 1976; the hardware requires approximately 1,200 ft<sup>2</sup>, plus room for thirteen offices manned by eight programmers, one operator, three spectro-line people, and one scientific advisor.

VLA-PROJECT REPORT  
EXPENDITURES AND COMMITMENTS  
CY-1974 CUMULATIVE ACTIVITY



VERY LARGE ARRAY  
 Status as of April 30, 1974  
 Summary

<u>Project No.</u>	<u>Description</u>	<u>Allocation</u>	<u>Monthly</u>	<u>Expended</u>	<u>Committed</u>	<u>Total</u>	<u>Balance</u>	<u>Outstanding Obligations Pending</u>	<u>Major Procurements Pending</u>	<u>Net Cumulative Free Balance</u>
11000	Site and Wye	884,030	5,382	87,677	103,111	190,788	693,242	43,611		649,631
12000	Antenna System	2,451,950	6,307	28,975	1,420,943	1,449,918	1,002,032	63,184	907,636	31,212
13000	Electronic System	1,459,488	21,575	156,509	417,144	573,653	885,835	240,844		644,991
14000	Computer System	427,000	3,981	16,863	-	16,863	410,137	281,095		129,042
16000	System Integration	-								
17000	Project Management	309,300	11,485	62,745	9,674	72,419	236,881	119,696		117,185
	<b>TOTAL - VLA</b>	<b>5,531,768</b>	<b>48,730</b>	<b>352,769</b>	<b>1,950,872</b>	<b>2,303,641</b>	<b>3,228,127</b>	<b>748,430</b>	<b>907,636</b>	<b>1,572,061</b>

## VLA-NRAO

Major Subcontracts & Purchase Orders Placed

<u>Number P.O./ Subcontract</u>	<u>Vendor</u>	<u>Item Description</u>	<u>Date Placed</u>	<u>Dollar Amount</u>	<u>Delivery Date</u>	<u>Current Status</u>
VLA-1	NMIMT	Interference Project	12/7/72	\$16,032	12/31/73	Final billing for Dec. - Total \$13,690.12 Question of extension
VLA-2	Limbaugh Engineers	Prelim. Soils Investigat.	1/9/73	\$57,031	7/9/73	Contract closed - Work completed
VLA-4	Bechtel, Inc.	Waveguide Install. Study	7/16/73	\$73,500	12/31/73	Contract completed - Release of Claims dated 3/27/74 Total - \$72,057.82
VLA-5	BWH/CVR Joint Venture	E/A Title I & II	6/17/73	\$844,572	3/15/74 11/1/75	Title I - Completed Title II - 60% Completed
VLA-6	E-Systems, Inc.	28 Radio Telescopes	10/18/73	17,280,775	4/18/74  4/18/81	Design - Current contract totals \$1,252,597 which includes detail design, assembly structure and advanced procurement of servo system elevation gear segments, speed reducers Delivery of Antennas 26, 27, 28
VLA-7	Metric Systems Corp.	Digit. Comm. System	11/15/73	\$76,846	6/10/74	Design logic completed, 90% of purchased parts acquired or on order - initial design review com- pleted - on scheduled delivery.
VLA-10	E-Systems, Inc.	Antenna Transporter	1/30/74	\$393,396	6/30/74  3/30/75	Design/Review - Design concepts being definitized, cost & delivery estimates being evaluated. Ship assembly No. 1 - No drawings or assembly drawings until completion of analysis and layout efforts. No delays or problems noted.
44234	Fujikura Cable Works	1.25 KM of TE <sub>01</sub> Mode waveguide/258 couplers	3/8/74	\$54,860	6/10/74 50M* 8/10/74 600M 9/10/74 600M	Import licenses and duty free entry applied for.

\*Dates represent on board American carrier at Yokohama - Allow (2) weeks to POE, Oakland, Calif.

## VLA-NRAO

Major Subcontracts & Purchase Orders Placed

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VLA-14	Comtech Lab., Inc.	(6) 4.75 GHz Parametric Amplifiers	3/14/74	\$84,000	6/7/74 No. 1 & 2 6/24/74 No. 2 & 3 7/15/74 No. 4 & 5	2 units for use in 300' Green Bank 4 units for use in VLA Ant. 1 & 2 VLA commit- ment for 4 units only - \$56,000
VLA-16	AIL	UP-Converters	3/14/74	\$57,054	4/23/74 2 units 6/25/74 4 units	2 units for use in Green Bank 4 units for use in VLA Ant. No. 1 & 2 - VLA commitment for four units only - \$45,120
VLA-22	Rogers & Co., Inc.	Water Supply Well	2/22/74	\$19,500	5/15/74	Amendment No. 1 written to include submersible pump, motor starter and lightning arrestor.

## VLA-NRAO

Procurement Activities Initiated

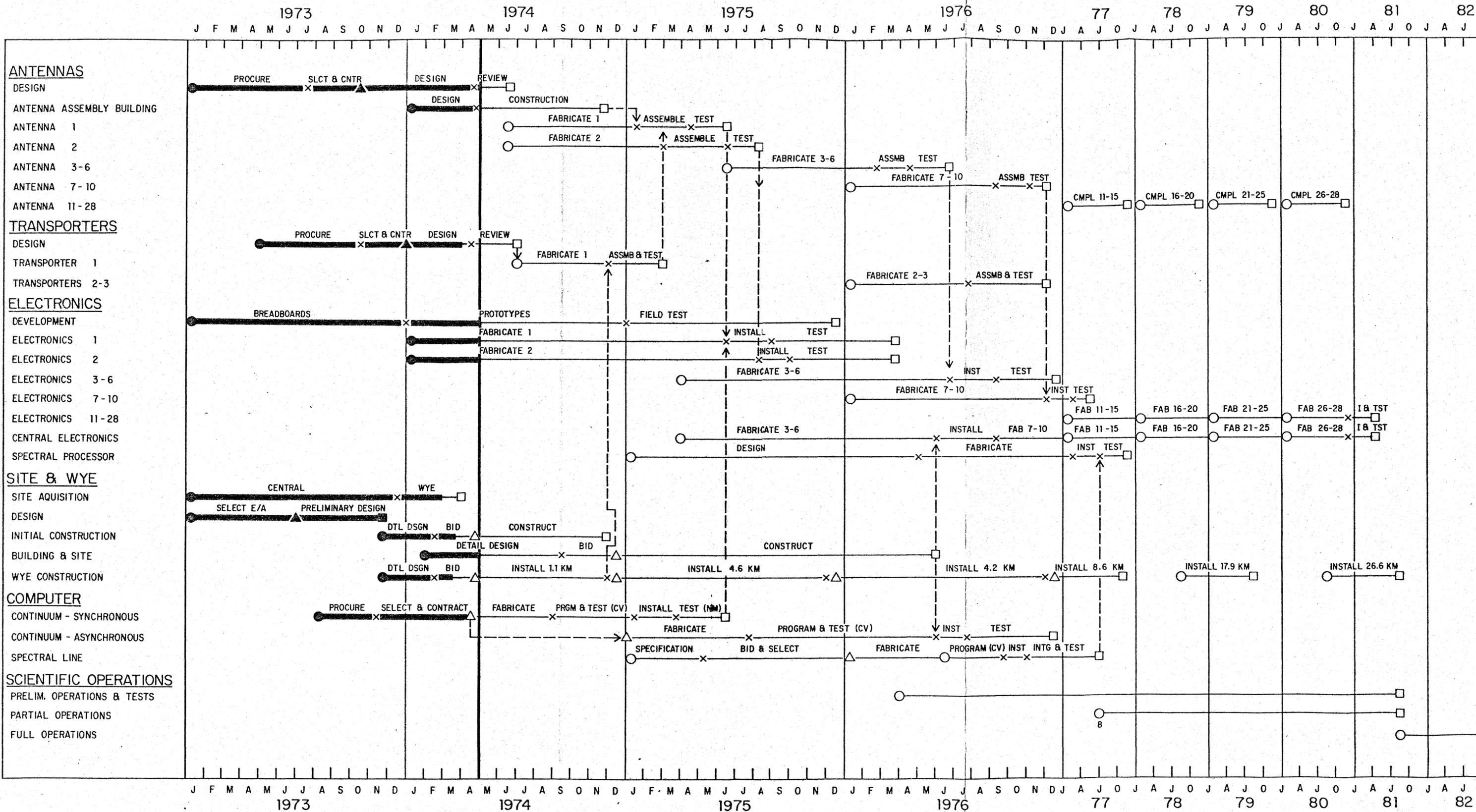
Note: Dates in parenthesis indicate planned time of completion

<u>RFP Number</u>	<u>Item Description</u>	<u>Estimated Cost</u>	<u>Issue Date</u>	<u>Bid Due Date</u>	<u>Submission to NSF Date</u>	<u>Award Date</u>	<u>Current Status</u>
VLA-29	Focusing Feed Mounts	\$60,000	3/15/74	(5/1/74)	3/20/74 RFP (5/18/74 Recom. of award	(6/1/74)	Sterling-Detroit Co. submitted only bid. We are in process of obtaining cost break-down and requestor is evaluating proposal.
VLA-32	Cassegrain Feeds	\$160,000	3/12/74	4/15/74 4/29/74 "L Band" only	3/13/74 RFP (5/18/74) Recom. of award	(6/1/74)	Proposals received from four companies. Requestor is currently in process of evaluating bids.
VLA-34	(IFB) Initial Construction - Site	\$500,000	3/22/74 Advance Notifi- cation (4/22/74) Bid issue	(5/16/74)	(6/5/74) Recom. of award	(6/19/74)	Proposals were solicited from 12 sources. Bids are due May 16, 1974.
VLA-03	Continuum Computer	\$1,070,000	9/13/73	11/19/73 3/19/74 Final	5/2/74 for Synchronous Computer		Purchase order 045312 for synchronous computer submitted to NSF for approval on 5/2/74. Purchase order for synchronous computer is being prepared.
VLA-41	Subreflector	\$50,000	4/19/74	5/17/74	Expect to submit to NSF by 5/24/74	6/1/74	Proposals solicited from 9 companies.
VLA-47	Cryogenic Refrigeration System	\$75,000	5/8/74	6/1/74	Expect to submit to NSF by 6/14/74	7/1/74	Proposals solicited from 6 companies.

NATIONAL RADIO ASTRONOMY OBSERVATORY  
VLA ACTIVITY SCHEDULE

UPDATE DATE: 01 MAY 1974

12/1/73



ABBREVIATIONS

ASSEMBLE - ASSMB	CH-VILLE - CV	INSTALL - INST	PROGRAM - PRGM
COMPLETE - CMPL	DESIGN - DSGN	INTEGRATE - INTG	SELECT - SLCT
CONTRACT - CNTR	DETAIL - DTL	NEW MEXICO - NM	

SYMBOLS

○ START OF A PHASE	△ CONTRACT AWARD
× END OF AN ACTIVITY	□ END OF A PHASE

1	18 FEB. 74	FINANCIAL PLAN 3-5-13-10	→
REV. #	REV. DATE	REVISION	