

AUGUST 1974

VLA MONTHLY PROGRESS REPORT

SEPTEMBER 10, 1974

NATIONAL RADIO ASTRONOMY OBSERVATORY
VLA MONTHLY PROGRESS REPORT
AUGUST 1974

NARRATIVE

Site and Wye Division

The final report regarding the archaeological significance and the measures needed for mitigation of the large archaic site discovered near Station 634 of the southwest arm of the Wye has been received from Dr. Bussey. This report suggests that the site, a large stratified living area once occupied by members of the Cochise Culture, be excavated by systematic removal of the artifacts and mapping and recording of all pertinent information. The Archaeological Department of New Mexico State University submitted a proposal to perform this investigation for an estimated cost of \$54,000.00.

The Site Construction, Phase I, effort continues to progress smoothly with the following accomplishments during the past month:

1. the Antenna Assembly Building embankment has been brought up to grade;
2. all pipe casements for power, communications, and waveguide have been installed under the embankments to the antenna stations being installed under this contract;
3. all drainage culverts except the one under the maintenance spur have been installed;
4. The Borrow Site has been cleaned and watered in preparation for obtaining the fill needed to complete the embankment work;
5. the Ballast Pit has been shot and preparations made to begin crushing the rock to produce ballast and concrete aggregate.

The take-up of the rail at the Crab Orchard National Wildlife Refuge is complete, and the last four carloads of 90 pound rail, angle bars, spikes, bolts, and anchor plates are due to arrive in Socorro by early September.

Title II work made further progress this month, and the effort is now estimated at 90% complete. Design and the preparation of the drawings for the permanent site buildings and utilities were completed and will be issued for bid the first week of September.

A Request for Proposal covering a Prefabricated Service Building, which will provide 6,000 square feet of offices, shops and laboratories at the site, was issued for pricing on August 9, 1974. This building is to be constructed by April, 1975, and will provide space for the on-site staff until the summer of 1976.

Antenna DivisionAntenna

The Antenna Engineering Group has analyzed E-Systems' antenna design and finds that it meets all Project specifications.

An amendment has been issued to Subcontract VLA-6 authorizing fabrication of the first two antennas and twenty sets of foundation fittings. This amendment provides the balance of funds, \$626,382.00, required for fabrication of the first two antennas.

Contracts were issued during the month for the Focusing Feed Mounts for the prototype antennas as well as the support structure for the feeds.

Transporter

The Antenna Engineering Group has analyzed the E-Systems design of the transporter and found that it meets the Project's specifications.

An amendment has been issued to Subcontract VLA-10 authorizing the fabrication of one transporter. The amount to be authorized for payment of this fabrication is \$310,783.00.

The procurement of components for the hydraulic elements and equipment for the transporter is in progress. Orders have been placed for most items.

Antenna Assembly Building

E-Systems has awarded a contract for the building foundation, and it is anticipated that work will commence early in September.

Electronics Division

The design of the feed de-icer has been tested on the Cassegrain feed assembly for the 140' telescope at Green Bank and found to be satisfactory.

A detailed plan has been formulated for the electronic test system required for the single-dish tests scheduled for the first antenna in July, 1975. Procurement of the system's components has already commenced, and the electronic test system is scheduled for completion by early January.

Further testing of the first dewar after fitting the new "O" rings mentioned in last month's report has not yielded satisfactory results; a degree of outgassing greater than expected was encountered. This problem is being investigated on the second dewar which is now undergoing testing at Vacronics.

Progress on the electronic models associated with the front end unit is being accelerated; design of the up-converter pump is now complete.

The initial shipment of waveguide from the Fujikura Company has been tested at Green Bank and determined to be acceptable.

Design of the circuitry and software for the controller for the delay and multiplier system is proving a more time-consuming operation than initially envisaged. The completion of the design phase for this system originally scheduled for completion in August is now expected in November. However, progress continues in other areas of the delay and multiplier system, and preliminary system tests have been performed on the delay printed circuit cards during the past month.

Fabrication is now complete on the servo tester which will provide control of the antenna pointing during the testing of the antenna. The unit is presently being tested before being made available to E-Systems in September.

Delay has occurred in the delivery of the monitor and control system by Metric Systems; the August delivery has been changed to September.

Computer Division

Further progress has been made in the assignment of detail tasks to the four minicomputers which make up the synchronous computer subsystem.

Effort also continues on the systems analysis effort commenced several months ago by the cognizant members of the Computer Division's programming staff to determine the software requirements of the asynchronous computer subsystem.

Project Management

Effort continues in the task of obtaining Government surplus rail for use on the Wye. Disposition of the rail at the Redstone Arsenal and Holloman Air Force Base is still unknown. The shipment of rail from Mountain Home Air Force Base only awaits the arrival of railroad cars at the Base.

Planning of the logistics for relocating personnel to the VLA Site and for commencing operations in New Mexico is progressing. Final negotiations are underway with New Mexico Tech for leasing office space on the campus.

Planning for the procurements associated with the next four antennas has commenced within the past month.

The proposed subcontract for electric power was submitted to the Socorro Electric Cooperative for their acceptance. They have requested that any further action on the subcontract be held in abeyance until the results of their on-going rate study are in and their proposed rate changes are approved by the New Mexico Public Service Commission. They stated that this should be accomplished before the start of 1975 and would not affect their ability to deliver power as required for the Project.

Major Procurements

Purchase Order No. 51771 was placed for 10,000 cross ties in the amount of \$70,000.00.

Personnel

The personnel changes which have occurred on the VLA Project during the month of August are delineated in the table below:

<u>Division</u>	<u>Previous Level</u>	<u>Additions</u>	<u>Reductions</u>	<u>Current Level</u>
Site and Wye	3	0	0	3
Project Management	11	0	0	11
Antenna	4	0	0	4
Electronics	28*	2	1	29
Computer	<u>4</u>	<u>4</u>	<u>0</u>	<u>8</u>
Totals	50	6	1	55

*Includes four employees on part time status.

EXHIBIT A

Scenes depicting various selected activities associated with the Site Construction, Phase I, effort are reflected in the following photographs:



(p8-1) 8-14-74: VLA Site showing a view on the Southwest Arm of the Wye where a 2' - 0" layer of unsatisfactory earth had to be removed before construction of the railroad embankment could commence.

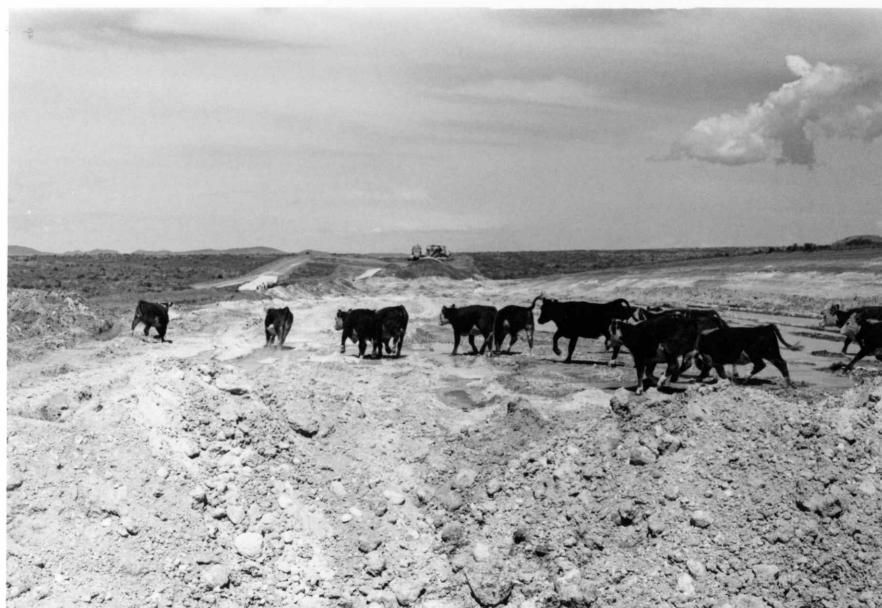


(p8-2) 8-14-74: Northeastern view of the Southwest Arm of the Wye at the VLA Site showing embankment operations.

- (p8-3) 8-26-74: VLA Site view of trench excavation for drainage piping at Station 154 + 00 on the Southwest Arm of the Wye.



- (p8-4) 8-26-74: View of the VLA Site's Southwest Arm of the Wye at Station 159 + 00 at end of the first construction contract (note the double utilization of water used in the compaction work).



- (p8-5) 8-26-74: VLA Site view of the Southwest Arm of the Wye at Station 37 + 23 showing the site prepared for the Antenna Assembly Building at the left and the Master Foundation Pad at the right.



- (p8-6) 8-26-74: View of the VLA Site's Station 31 + 00 on the Southwest Arm of the Wye showing the construction yard and offices.



(p8-7) 8-26-74: VLA Site view showing the unloading of rail and fittings from Crab Orchard Wildlife Refuge.



(p8-8) 8-26-74: View of the Quarry Site showing a pile of loose rock after blasting was completed.



VLA-NRAO
Procurement Activities Initiated

Note: Dates in parenthesis indicate planned time of completion.

RFP Number	Item Description	Estimated Cost	Issue Date	Bid Due Date	Submission to NSF Date	Award Date	Current Status
VLA-41	Subreflector	\$50,000	4/19/74	5/17/74	Not submitted to NSF	6/1/74	Purchase order placed for 2 each. Within NRAO contractual authorization.
VLA-47	Cryogenic Refrigeration System	\$75,000	5/8/74	6/1/74	Not submitted to NSF	7/18/74 and 7/26/74	Two purchase orders awarded within NRAO contractual authorization.
VLA-61	Antenna Feed and Rack Support Structure	\$66,000	7/1/74	7/25/74	Not submitted to NSF	7/31/74	Purchase order awarded within NRAO con- tractual authorization.
VLA-65	Site Construction Phase 2	\$2.2 to \$2.6 M					Advance construction announcement mailed out 8/6/74 and ad for Commerce Business Daily sent to NSF 8/5/74.
VLA-66	Prefab. Service Building	\$150,000 to \$180,000	8/9/74	9/17/74	Expect to sub- mit to NSF on 9/6/74		
PO 51830	Cross Ties	\$80,000	none	none	8/30/74		

Major Subcontracts and 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 - All firm fixed price con- tracts except where noted.</u>
VLA-1	NMIMT	Interference Project	12/7/72	\$16,032	12/31/73	Final billing for Dec. - Total \$13,690.12 Release of Claims sent May 31, 1974. Cost reimbursable subcontract.
VLA-2	Limbaugh Engineers	Prelim. Soils Investigation	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	\$907,782	3/15/74 12/31/74 1/15/75	Title I - Completed Title II - 91% completed Title III - Work in progress in conjunction with VLA-34. Fixed Price Plus Cost Reimbursables. \$814,600 expended to date.
VLA-6	E-Systems, Inc.	28 Radio Telescopes	10/18/73	\$17,288,107	7/31/74	Design has been essentially completed by scheduled date of July 31, 1974. Amendment No. 7 authorized start of fabrication August 22, 1974.
VLA-7	Metric Systems Corp.	Digit. Comm. System	11/15/73	\$76,846	8/12/74	Delivery late - slipped to September 30, 1974.
VLA-10	E-Systems, Inc.	Antenna Transporter	1/30/74	\$393,396	7/31/74	Design has been essentially completed by scheduled date of July 31, 1974. Amendment No. 3 authorized start of fabrication August 22, 1974.
44234	Fujikura Cable Works	1.25 km of TE ₀₁ Mode Wave- guide/258 Couplers	3/8/74	\$54,860	6/10/74 50M* 8/10/74 600M 9/10/74 600M	Authorization for duty free entry has been received. First shipment has been received. Second shipment in transit.
VLA-14	Comtech Lab., Inc.	(6) 4.75 GHz Parametric Amplifiers	3/14/74	\$84,000	7/31/74	Contract completed.

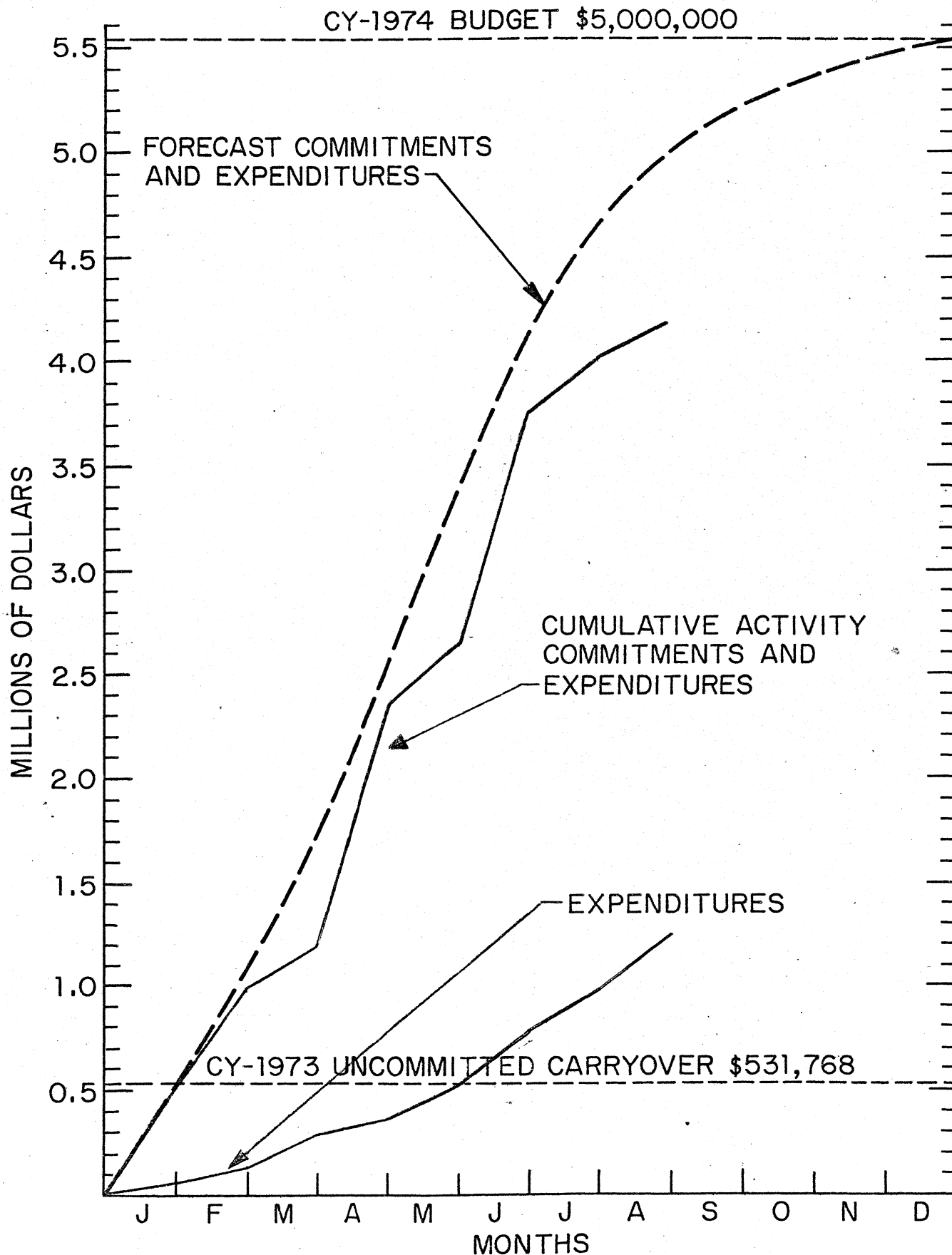
*Dates represent on board American carrier at Yokohama - Allow 2 weeks to POE, Oakland, California.

VLA-NRAO

Major Subcontracts and 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 - All firm fixed price con- tracts except where noted.</u>
VLA-16	AIL	Up-Converters	3/14/74	\$57,054	7/21/74 2 units 9/21/74 4 units	Received three. Other three units on schedule.
VLA-22	Rogers & Co., Inc.	Water Supply Well	2/22/74	\$17,932	6/14/74	Closed. Well has been completed. Release of Claims signed June 14, 1974.
VLA-29	Sterling-Detroit	Focusing Feed Mounts	6/17/74	\$86,174	3/1/75	Subcontract was increased by \$19,994 by Amendment No. 1 to cover tooling.
VLA-34	Burn Construction Co.	Initial construction	6/17/74	\$605,000	1/15/75	Contract awarded and construction is underway.
VLA-43	Modular Computer Systems	Synchronous Computer	6/24/74	\$248,616	9/15/74	Contract awarded - delivered July 10, 1974.
VLA-44	Digital Equipment Corp.	Asynchronous Computer	6/17/74	\$767,308	1/15/75	The contract has been signed and returned and Amendment No. 1 has been written exercising Option No. 1.
VLA-62/ PO51771	John Phariss	Cross Ties	8/27/74	\$70,000	11/29/74	P.O. awarded.
VLA-52/ PO51770	NMIMT	Equipment and Equipment Operator	9/6/74	\$9,500	8/15/75	Blanket P.O. awarded for Sept. 1, 1974 through Aug. 31, 1975.

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



VERY LARGE ARRAY
Status as of August 31, 1974

		Summary CY-1974						Outstanding Obligations Pending	Major Procurements Pending	Net Cumulative Free Balance
<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>			
11000	Site and Wye	944,030	5,694	241,532	595,799	837,331	106,699	22,624	-	84,075
12000	Antenna System	2,451,950	8,211	68,207	1,607,500	1,675,707	776,243	40,328	716,725	19,190
13000	Electronic System	1,459,488	37,764	719,488	474,617	1,194,105	265,383	159,375	-	106,008
14000	Computer System	427,000	8,398	40,498	268,499	308,997	118,003	53,734	-	64,269
16000	System Integration	-	-	-	-	-	-	-	-	-
17000	Project Management	249,300	16,376	147,717	5,306	153,023	96,277	65,698	-	30,579
TOTAL - VLA		5,531,768	76,443	1,217,442	2,951,721	4,169,163	1,362,605	341,759	716,725	304,121

VERY LARGE ARRAY

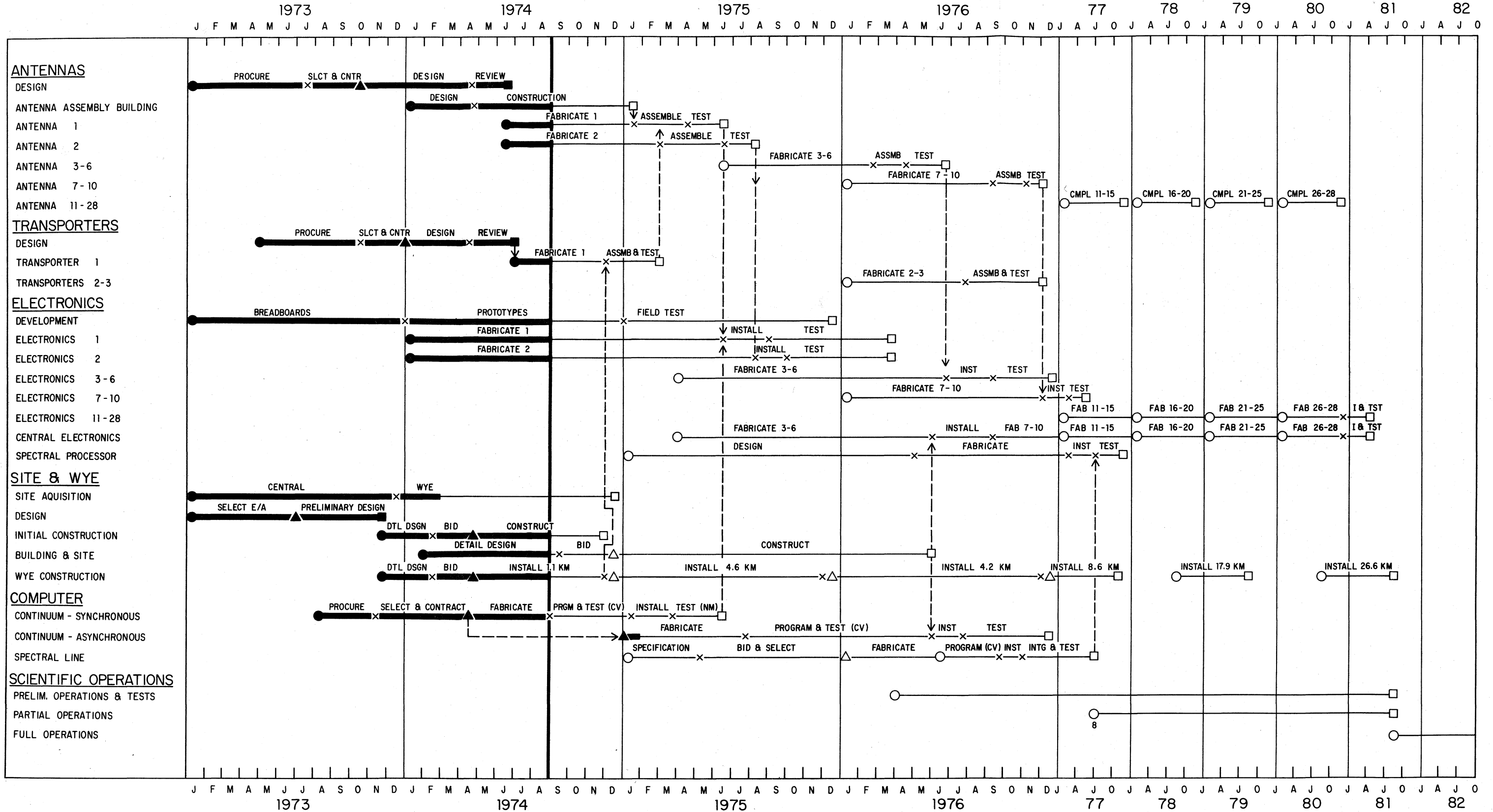
Status as of August 31, 1974

Summary
CY-1975

<u>Project Number</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	500,000		39,112	181,689	220,801	279,199			279,199
12000	Antenna System	-		-	-	-	-			-
13000	Electronic System	-		-	-	-	-			-
14000	Computer System	1,000,000		378	766,930	767,308	232,692			232,692
16000	System Integration	-		-	-	-	-			-
17000	Project Management	2,000,000		-	-	-	2,000,000			2,000,000
TOTAL - VLA		3,500,000		39,490	948,619	988,109	2,511,891			2,511,891

NATIONAL RADIO ASTRONOMY OBSERVATORY
VLA ACTIVITY SCHEDULE
12/1/73

UPDATE DATE: 01 SEPTEMBER 1974



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

2	01 SEPT. 74	ANT. BLDG. AND SITE ACQ.
1	18 FEB. 74	FINANCIAL PLAN 3-5-13-10
REV. #	REV. DATE	REVISION