

APRIL 1975

VLA MONTHLY PROGRESS REPORT

MAY 10, 1975

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NATIONAL RADIO ASTRONOMY OBSERVATORY

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NARRATIVE

SITE AND WYE

The Title II effort, Detailed Design Services, is complete except for the tasks required by Amendment No. 8 to Subcontract VLA-5; the adjustment of the grades along the arms of the Wye is complete, as well as, the profile sheets and the waveguide layout plan.

Phase II construction, Subcontract VLA-65, is well underway (estimated 13.0% complete) as demonstrated by the following:

- a. Excavation of the sewage lagoons have been completed--most have been fine graded; percolation tests have been performed on the bottoms, and the results indicate a soil cement lining on the bottoms is not required.
- b. The force main piping to the sewage lagoons has satisfactorily passed the pressure test; the manhole bottoms have been poured, and the block work is proceeding.
- c. The footings for both the Cafeteria and the Control Buildings have been completed--the stem walls are estimated 60-65% complete.
- d. Approximately 50% of the steel columns are in place in the Control Building.
- e. The subgrade work for the parking lots and road are complete, as well as, the drainage swale.
- f. The Control Building elevator casing has been installed in the elevator pit.
- g. Below slab plumbing and conduit runs are being installed in both the Cafeteria and the Control Building.
- h. The 15 kV Wye power lines from CW-5 to CW-9 have been installed and backfilled.

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## ANTENNA DIVISION

### Antenna

The first group of antenna assembly mechanics from E-Systems arrived at the VLA Site on April 29th; foundation locations have been verified, and the first antenna sub-assemblies are in process. The trial assembly of Antenna No. 2 has been completed, and final painting is essentially complete. Shipments of various parts for Antenna No. 1 have been arriving at the Site--a majority of the parts are expected to be available at the Site by early May with the parts for Antenna No. 2 scheduled to follow. The inspection tests for the gear reducers for Antennas No. 1 and No. 2 commenced on April 29th. The azimuth bearing and gear for Antenna No. 1 is ready for inspection testing. The elevation gear segments have been inspected and accepted. Factory tests of the servo systems for Antennas No. 1 and No. 2 were conducted in mid-April, and the servo systems have been accepted. The focusing feed mounts for Antennas No. 1 and No. 2 have been tested and accepted--arrival of these parts at the VLA site is expected in May.

### Transporter

The transporter trucks have been received at the Site and have been mounted on the rails in the Assembly Building--the frame has been assembled and secured to the trucks. All major transporter components are available at the Site and in the process of being mounted on the Transporter. The Transporter has been moved clear of the Assembly Building in order that antenna assembly may commence.

## ELECTRONICS DIVISION

### Front End Subsystem

On April 15, the Front End system for Antenna No. 1 was shipped from Charlottesville to the VLA Site. Recent front end tests have shown no diode failures since the introduction of DC blocks into the switched lines, but it is too soon to be certain the problem has been solved at this stage. Otherwise the remaining work required for the No. 1 front end consists of tests to determine the best levels for bias voltages, pump power levels, etc. Assembly of the No. 2 front end is almost complete, but no tests have yet been made. Nine Frequency Converter modules which are used with the front end and two improved versions of the Bias module were completed and tested during the past month.

### Local Oscillator Subsystem

A Control module for the Vertex Room has been designed and tested and is complete except for the circuitry to interface with the Monitor and Control

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system. Changes in some of the existing modules have been made to cause the oscillators at the antennas to return to lock automatically after a dropout.

Tests to compare the phase of the 600 MHz Oscillator signals in the control station and antenna racks are in progress using a simulated waveguide run. Problems of sporadic disturbances which cause the loops to drop out of lock have been found and, thus far, the stability of operation has not been sufficient to allow a long-period phase comparison to be made. These problems may result from overly critical dependence on the correct adjustment of certain signal levels in the system and indicate further design modifications are required. Although there is no reason to believe any basic problems exist in the design of the oscillator, modems and waveguide area of the system, it is likely that for at least another month there will continue to be some uncertainty on the extent of the modifications required before adequate reliability and performance is obtained.

#### Control and Monitor Subsystem

A few minor problems continue to be found in the Monitor and Control system, but we are rapidly approaching a point where procurement of these modules for the next four antennas can be started.

#### Waveguide Subsystem

Preparations are being made to lay the first 1.25 km along the Southwest arm during May and June. System tests using the modems and a simulated waveguide run have revealed a faulty transmit-receive switch in the TRG modems, and these have been returned to the maker for repair and readjustment. It is hoped this readjustment will also improve the signal level handled at the 1dB compression point. The Westinghouse modems have just been brought into operation and initial tests indicate a signal handling capacity better than the TRG modems by several dB.

#### Delay and Multiplier Subsystem

The construction of the System Controller which interfaces to the computer has been completed. Initial testing has gone very well and hardly any problems were found. System tests of the Delay and Multiplier System under control of the computer have commenced.

### COMPUTER DIVISION

#### Asynchronous Subsystem

Several major features of the CANDID command languages were implemented during this report period; for example, storage management, array allocation

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and de-allocation, and DEFINE capability--a capability permitting blocking of instructions which can be referenced by name as routes. The format routines for the data base have been completed, and work has already begun on the access routines. A set of graphic routines utilizing the graphic features of the ADDS Terminals allowing low resolution line graphics and crude 5 or 9 level gray scale mapping have also been completed.

The mathematical and logical specifications for the applications scheduled to begin implementation in May are essentially completed and integrated into the Project book. Other major additions to the Project book involved the completion of the planning section and hardware description section in Volume 1. Since the DICOMED device is available, the simulation project on the IBM360/65 has commenced again with newly organized programs permitting the addition of capabilities to modify sampling and weighting--a set of production runs testing the effects of various samplings and weightings are in process.

#### Synchronous Subsystem

A major portion of the effort this report period was spent as follows: familiarization with the characteristics of the revision "F" ModComp operating subsystem; connection of the 19.2 Hz clock interrupts into the subsystem, as well as incorporation into the program system and testing of the software require for them; attachment of the Delay Multiplier system interface into the subsystem and operational tests were performed using a loop connector to connect the input and output; testing of the connection to the Delay Multiplier system; writing test programs to utilize the Delay Multiplier system to investigate the IF system; writing specifications for the monitor point limit checking programs.

#### PROJECT MANAGEMENT DIVISION

Major effort this report period involved setting up the initial operations at the Socorro office and equipping the service building at the Site.

The first shipment of electronic equipment from Charlottesville and Green Bank has been completed--most of the equipment has been set up in the Service Building.

Bus service has been established between Socorro and the Site, approximately 15 people are using the service.

The purchase order for the take-up of the Holloman AFB rail is complete, and the rail has been received at the VLA Site. The take-up of the rail at the Lincoln Ordnance Depot has commenced, and bids have been received for the take-up of the rail at the Redstone Arsenal.

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# Personnel

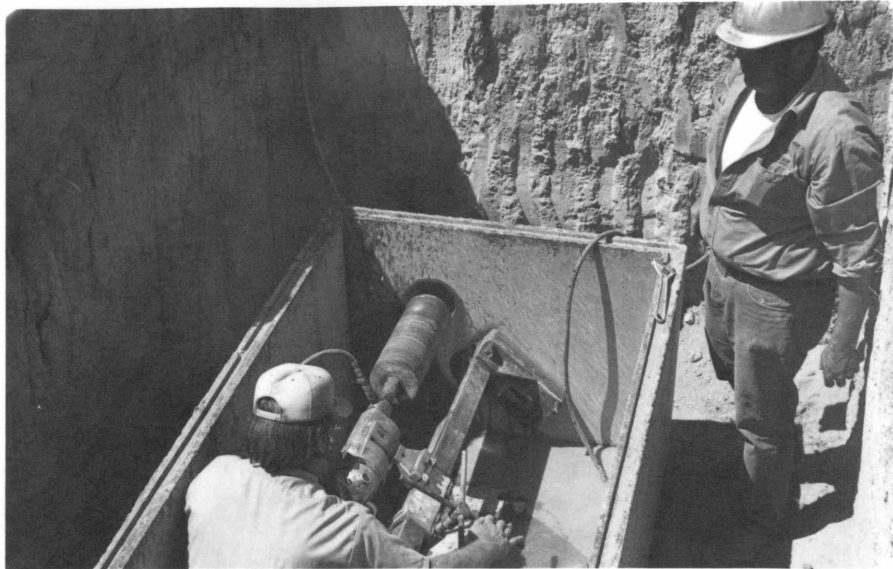
During April, six staff members relocated to New Mexico, and seven new employees were added to the New Mexico staff. The personnel changes which occurred on the VLA Project during the month of March are delineated in the following table:

<u>Division</u>	<u>Previous Level</u>	<u>Additions</u>	<u>Reductions</u>	<u>Current Level</u>
Site and Wye	6	0	0	6
Project Management	10	3	0	13***
Antenna	4	2		6
Electronics	28	2	0	30*
Computer	13	0		13**
Systems Integration	<u>1</u>	—	—	<u>1</u>
TOTALS	62	7	0	69

\* Includes two part-time people.

\*\* Includes one part-time person.

\*\*\* Includes one part-time person.



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Coring Manhole Wall for Waveguide Installation



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Start of Control Building Walls