

BSHeeschen:

I have just recently revised this schedule

JWFindlay

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NRAO Equipment Schedule - 1959

1. 140 Foot Telescope: Construction on the site and in the contractor's shops is proceeding satisfactorily. The telescope is due for completion in the fall of 1960.

Budget Figure for cost \$5,740,000

2. 85 Foot Telescope. Erection is completed and the telescope and three receivers are now being used. Regular observing started on March 1st 1959.

Design specifications are:

Equatorial Mount:

Focal Length: 36 feet.

Sky Coverage: 6<sup>h</sup> east to 6<sup>h</sup> west hour angles at all declinations, except where limited by horizon, where sky coverage is from horizon to horizon.

Surface: Solid surface; deviations from paraboloid less than  $\pm 1/8$  inch.  
Pointing Accuracy: Better than two minutes of arc.

Slew Rates: 20°/min. about either axis.

Scan Rates: .05°/min. to 5° min., about either axis, continuously variable; rate accuracy  $\pm .1\%$  of top speed.

Track Rates: Sidereal and solar rates, synchronous motor drive.

Total Cost \$310,000

3. Receivers: Three receivers are now available and have been installed and are in use on the 85-foot.

- a) TWF Receiver - noise compensated Dicke system (Eben-Knight Corp.)

Frequency: 8000 mc) Other frequencies in range.

Bandwidth: 1000 mc) 7.3 - 10.3 Kmc and other bandwidths available by arrangement.

Time Constants: 1, 2, 5, 10, 20, 40, 80, 160, 320, 640 sec.

Zero stability: Probably better than 0.1° K/hr.

N Noise figure: 10 db. max.

Total cost \$73,710

- b) L-Band Receiver - D.C. Comparison or total power (ALL)

Frequency range: 1170 mc - 1430 mc.

IF frequency: 33 mc.

IF bandwidth: 6 mc.

Comparison bandwidth: 1 mc.

Signal bandwidths: 30 kc, 200 kc, 1 mc.  
Time Constants: 1, 5, 20, 60, 180 sec.  
Total power gain stability: 0.1% over several hours.  
No provision (as yet) for frequency scanning.

Total cost \$30,337

The above specifications, for both receivers, are design specifications. Both receivers are completed and tests indicate that both receivers meet or exceed the above specifications.

- c) narrow bandwidth, frequency scanning H-line receiver is being obtained as quickly as is feasible. It will be available in the fall of 1959.
- d) An S-band receiver, similar to 3a above, will be available in the fall of 1959.
- e) A 440 Mc total power receiver - Bandwidth 5 Mc. Stable to 0.1%.

Built at NRAO. Cost not known.

- 4. Feeds: Concentric 21-cm and 3-cm horn feeds, already available, (Jasik Lab.) are used initially with the 85 foot. The L-band horn has VSWR 1.35:1 from 1170 mc to 1450 mc. The X-Band horn has VSWR 1.2:1 from 7.4 Kmc to 10.3 Kmc. Simultaneous X-Band and L-Band observations are possible with these feeds. A feed for 440 mc to be used simultaneously with the other two has been built.
- 5. Digital Output System: A digital output system, which has been named DAPTIS, is being built for NRAO (Control Equipment Corp.). The system will print out on an electric typewriter the instantaneous hour angle, declination, and sidereal time, on command or automatically at regular intervals. The system uses Farrand 12" inductosyns, and will give polar and declination shaft positions with an accuracy of a few seconds of arc. Additional circuitry, to allow the printing of frequency and receiver output, is being developed. The whole system should be ready by September 1st 1959.
- 6. 12-Foot Antenna: A 12-foot paraboloid, good to 3-cm wavelengths, is available. It is on an alt-azimuth mount. This dish will be used primarily for experiments on antenna feeds, feed supports, patterns, spillover, etc. but could be available for other work if there is any need for it.

7. Corner Reflector Interferometer: This consists of two non-steerable corner reflectors, designed for solar system observations, with characteristics:

Antenna dimensions: 38' x 38' x 50'

Baseline: 2,000 ft.

Gain: Approximately 10 db per antenna

Frequency range of basic reflector: 15-50 mc (with extension to 100 mc. if desired)

Antenna beam declination: 0°

Beamwidth: 1/2°

Built by NRAO

Total cost \$1,500

8. Research and development at the Observatory.

- a) The large horn antennas: A horn antenna, 120 feet long is being built for measurements of the absolute flux from Cas A on frequencies around 1400 mc.
- b) Receiver development: A program of receiver development, including work on parametric amplifiers, is now starting at the Observatory.
- c) Work has not yet started, but is planned and will begin as soon as staff becomes available, on the planning and instrumentation of radio-astronomical experiments from space vehicles.