

NATIONAL RADIO ASTRONOMY OBSERVATORY
TUCSON, ARIZONA

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To: Working Group

*25 Meter Millimeter Wave Telescope
Memo # 113*

From: M. A. Gordon

Subject: Miscellaneous Observations

1. Findlay's Memo 110

I'm pleased that we are all thinking about the sequence of things to do in regards to the 25-m telescope. John's suggestions are welcome. Even though most of these had already been included in the PERT analysis, there were a few new ideas which we had overlooked. I hope that each of us will examine the PERT analysis carefully for logic and completeness. If you need blueprints, I'm sure that JoAnn Nance will supply them.

2. Possible Misconceptions

In reading through recent 25-m memoranda, I detect a number of items which may not be understood--either by writers or by me. Here are 3 of my convictions.

A. Barring unforeseen breakthroughs in understanding standing waves, the principal receiver position of the 25-m telescope will be prime focus, and not Cassegrain. Millimeter-wave astronomy is uniquely rich in spectral lines, and most millimeter-wave observations will be of this kind. Because of the baseline problem, observers will value the lower magnification and fewer reflecting surfaces characteristic of prime focus over the lower noise temperatures achievable at Cassegrain. MPI, which has the only existing homology telescope, has abandoned spectroscopy from the Gregorian focus. The problem is not the magnitude of the reflected waves, but their rapid variability which foils all attempts at canceling them.

B. The 25-m telescope will be operated with the door open (to some extent) in daytime. As experience with the 36-ft shows, it is always possible to find daytime sources in directions which avoid sunlight on the telescope surface. Astronomers will continue to resist avoidable signal loss, such as occurs when looking through radome door sections.

C. Astronomers will operate the telescope with the astrodome door open in as high winds as can be tolerated. Because of the scientific richness of mm-wave work, the original specification for the 36-ft telescope (doors closed at winds above 10 mph) is much too confining. In some directions relative to the wind we now work door-open up to 35 mph average, 50 mph peak. A major shortcoming of the 36-ft is, hence, that telescope drive torque is inadequate by a factor of 20. We now have a peak torque of 5000 ft-lbs, whereas we need at least 100,000 ft-lbs. Designers: please bear this need in mind!

3. Wind Measurements at the 36-ft

I think the suggestion by Sebastian and Woon-Yin, that wind measurements be taken in and out of the astrodome, to be an excellent alternative to wind-tunnel testing. In principle, a device could be constructed to measure wind vectors in and out of the door as a function of telescope azimuth. A major problem is that there is absolutely no manpower available at Tucson to build this device. Hein, can Green Bank or Charlottesville do it?

4. Procurement and Management

Dale Webb and I met with Jack Lancaster, Jay Marymor, and Bill Horne to explore alternative methods of handling the 25-m project. Dale has prepared a summary memo, which will be distributed.

The problem is manpower and money. We are unable to do things in the most efficient manner until design money appears. (A full-time project manager, for example). Design money is expected in FY 1981.

Owing to these circumstances, we will proceed with the foundation design and soil testing on a piecemeal basis as planned. I hope that we can let a contract for soil testing by spring 1979.

c: D. E. Hogg
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