

PROBLEMS WITH THE BONN 100 M TELESCOPE

I have attempted to put together a list of known problems or deficiencies with the 100 meter Effelsberg antenna. These notes are based on comments received from Phil Jewell, Darrel Emerson, Miller Goss, Dave Graham (MPI), Ivan Pauliny-Toth (MPI), and B. Grahl (MPI) as well as a discussion among Jon Romney, Phil Diamond, Wolfgang Batrla, and myself. Although these notes concentrate on what might be done differently to improve the performance, the general feeling is that it is really an excellent instrument.

- 1) Feed legs have excessive blockage.
- 2) Gregorian focus causes excessive blockage and may be responsible for large baseline ripple. Access to the prime focus receivers is awkward.
- 3) Pointing in the daytime is difficult. There is also hysteresis of about 5 arc seconds in the elevation pointing.
- 4) Original surface panels had to be replaced due to failure of the epoxy.
- 5) The tracking gear is not usable because it takes too long to change gears.
- 6) There are deviations of the surface by up to one centimeter from homology.
- 7) The original Gregorian subreflector and its mount were poor and degraded the telescope performance.
- 8) The original elevation drive system did not work well and one of the two drive motors had to be disconnected to avoid oscillations of the structure.
- 9) The Azimuth track cracked several years ago.
- 10) The maximum efficiency is only 46 percent. It is not clear whether this is due to the high aperture blockage of the feed legs or the short focal ratio which makes it difficult to properly feed the dish.

number of arguments for building a single dish. In decreasing order of importance:

- All our interferometer people are busy with the VLBA. We don't want to distract them now. Hiring more interferometer people is essentially impossible: all the good ones are taken by us or by other places like the AT.
- It is probably cheaper to operate. This may not be true if it were to be equipped with good focal plane array(s). Building something with high operating costs may well destroy the whole of NRAO since we would then not be able to do anything well, but rather we would be in an exaggerated version of the current situation of doing a number of things poorly.
- Byrd and Rockefeller may feel happier with a big single dish flanked by the flags of the US and of West Virginia. Only you can judge this one: given the irrational way this whole thing has gone, this may indeed be an important point. We should not destroy NRAO over a dispute between single dishers and interferometrists.
- We have not shown that an array can be easily used for spectral work. Now this could go both ways. The MMA must be an interferometric array and it must do spectral line well and simply. So we have to solve these problems. However, solving it now would be a big distraction from the VLA/VLBA.

I don't really want to support one or the other: the array wins easily on technical grounds but the other arguments for the single dish are quite strong. If the 300' have not fallen down, and if we were not in this terrible situation of having to build this new telescope while the VLBA is being built, and if it did not have to go in Greenbank, then I would be totally opposed to a big single dish. In the current situation, I cannot say that the choice is so obvious, but, I prefer the single dish option.

I do suggest that if we do build the single dish, we should find some way of setting up a group at Greenbank to work on advanced single dish techniques such as the use of focal plane arrays. Rick Fisher once suggested something like this at one of our workshops on future instrumentation long ago. We are building up Socorro to be the center of excellence in interferometry, so why not sell the idea of Greenbank as a center of excellence in single dish observations. Obviously, if this project goes ahead, NRAO will be at Greenbank for at least 25 more years, so we should attempt to do it properly.

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