

National Radio Astronomy Observatory
Charlottesville, Virginia

To: W. Horne

August 19, 1974

From: B. E. Turner

25 METER - MILLIMETER WAVE TELESCOPE

MEMO # 10

Subject: Proposals to Manufacturing Firms to Build Test Surface Plates for the
25 m. Telescope

At the meeting in Greenbank on August 15, 1974, we discussed the need for test surface plates to be built soon by manufacturers. One reason for getting action on this soon is the recent proposal by Findlay (copy attached) which is that we construct the backup structure, simulated or actual intermediate structure, and a small portion of the surface panelling in Greenbank. This structure would also be tested there. At the August 15 meeting, this proposal was in principle accepted and will be carried out, on a roughly 2-year time scale, if funding allows it.

A possible bottleneck, or at least an area in which we need actual answers in practice as soon as possible, is that of the fabrication of surface plates. Von Hoerner's recent suggestion (copy attached) is that we go to 55" x 22" plates, to alleviate the accuracy problem. This suggestion was accepted in principle at the August 15 meeting.

Having adopted a size, and because of Wong's recent measures on our two existing 72" plates (built by Philco-Ford), we are now in a position to specify to industry precisely what we expect they can achieve in surface-plate manufacture. Smith's and Wong's measures (see two attached copies) show that

a) in one original 72" plate, an rms of only 1.3 mil (manufacturing tolerance + dead weight deformation) was achieved, and only 2.5 mil in the other plate.

b) in plate #1, which was stress released by temperature-cycling during manufacture, and which was subsequently handled with care, there was no measurable deterioration of the surface accuracy over the interval 1972 December to 1974 July.

c) a thermal deformation of 1.4 mils rms/^oF was found for plate #1, which was painted white.

Based on these results, and on our need for a timely and definite response from industry, I propose that we approach both Philco_Ford and Rohr (and others possibly) with a proposal to build us two test plates that have dimensions

National Radio Astronomy Observatory
Charlottesville, Virginia

To:

From:

2.

Subject:

of roughly 55" x 22" *, have an rms surface error (manufacturing error + dead weight deformation) not exceeding 1.6 mil, and have a rate of thermal deformation not exceeding 1.4 mil/°F. The two memoranda of Wong can be offered as substantiating our claim that these specifications are achievable.

We should solicit a statement from these firms as to whether the specifications they can meet are independent of the shape of the plate. For example, plates near the telescope apex are more tapered than those forming the outer ring; perhaps the accuracy of machining is affected by larger taper, and we do not have any experience on this aspect on the basis of our original test plates, which were not tapered. If there is any question on this point, we should consider having the firm(s) build both a tapered and a non-tapered plate.

It could be pointed out to Rohr that this proposal supercedes our present request to them for suggestions as to what they can do in plate manufacture. That request has not produced any response as yet, anyway.

* W.-Y. Wong is working on the detailed dimensions of the surface plates. He has all the information on this.

cc: S. von Hoerner
W.-Y. Wong
G. Peery
D. S. Heeschen
H. Hvatum
J. W. Findlay