

22nd January 1965
C. S. I. R. O.
Stowell Avenue
Hobart, Tasmania, Australia

Dear John

Thank you for your letter of the 13th and enclosures. I have always been interested in large dish type radio telescopes. They provide important astronomical data plus real engineering challenges. Much of my comments in the past have been critical because I thought both the designs and the methods of approach were poor. However, if the subject is to be taken up again in a rational and unhurried manner, I will try to offer constructive suggestions.

Mirror Surface

A very good theoretical dissertation with experimental confirmation upon the effects of mirror roughness is entitled "Effect of Aperture Distribution Errors on the Radiation Pattern", by John Ruze, Antenna Laboratory Memorandum AFRCRC, January 22, 1952. I recommend it as a starting point on mirror design.

Mirror Support

General considerations applicable to any design will be found on first three pages of memorandum by me entitled "Large Mirror Design", 12 March 1955, Appendix A-14-1 of AUI report on Steerable Radio Telescopes. These points can be used as a criterion for comparison of widely divergent designs.

Models

I strongly urge more time, money and effort be expended on working scale models. Much of the past difficulties have been caused by reliance upon the opinions of consultants with low index of expertness. General considerations relating to models may be found in my comments published in Stenographic Transcript of NASA Conference on Large Aperture Antennas, Washington, D.C., November 6, 1959, pages 117 & 118. Chairman Wallace L. Ikard. On pages 115 & 116 appears some interesting description of design of spars to support focal apparatus.

Reference LFSP/JWF/2

Under conclusions should be an item (aa) Windage. This is only hinted at in section (c) item (b) page 4. A simple formula for wind pressure on a flat surface is $P = V^2/300$ pounds per square foot, where V is wind velocity in miles per hour. For long thin cylinders multiply by 2/3 and for spheres by 1/2. Not only will the wind forces be large

but highly irregular in direction and magnitude due to gusts. This means large non-uniform horizontal forces must be dealt with. They will be high above the center of support. The idea has been studied somewhat by John M. Boyle, Naval Ordnance Testing Station memorandum TP2183 entitled "A proposal for a very large Antenna for Radio Astronomy, Space Communication and Long Range Radar", 17 February 1959. The design might be attractive on the back of the moon.

Please keep me on the mailing list. I suggest that this letter be circularized to the whole group.

Best regards

Grote
Grote Reber