

Size of Antenna Elements for the VLB Array

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During the past few months, several people have pointed out the sensitivity limitations of the VLB Array, and have questioned the choice of 25m as the element size. This problem is particularly acute for spectral line observations.

Our original specification of 25m for the antenna size was predicated on the assumption that the array would use a modified VLA type antenna, and that the cost of any modification to the dimensions would be incommensurate with the increased collecting area.

Since that time, our thinking has evolved toward a completely new wheel and track design, although we have somewhat arbitrarily retained the 25m size. Using normal scaling laws, the collecting area of a 25 meter antenna would be 44% greater at the expense of a 63% increase in cost. W. Y. Wong has suggested that for "suitably small" deviations, the correct scale factor might be considerably less, since the only significant increase is that due to the increased cost of materials.

Because both the cost of a 25m WYW antenna, and the appropriate scaling factor are uncertain, it is probably appropriate at this time not to consider the antenna dimensions as fixed. Although I suspect in the end we will still end up with 25m, at a very minimum this will have to be more thoroughly justified in terms of cost-performance tradeoffs.

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