

for appendix

NATIONAL RADIO ASTRONOMY OBSERVATORY
Green Bank, West Virginia

March 5, 1962

MEMO TO: JWF, FDD, HH, CMV, DH, MV, NW, HJC

Attached is a draft of a proposed development program for the very large telescope. Some such statement as this will be submitted to NSF this week (probably tomorrow) as justification for our 1964 budget. I would like to have as much comment and discussion on this as possible, before it is submitted. To this end, there will be a meeting at 2:00 PM today - Monday - in the upstairs conference room. Please be there if you can. Anyone who has comments but can't get to the meeting should please give me his comments some time today - preferably before 2:00 PM.

DSH

we never got the \$3M - but this was "formal" beginning of VLA project, & in fact the program outlined was generally carried out.

DRAFT, March 5, 1962

VERY LARGE RADIO TELESCOPE ~~1964 budget~~

Three million dollars is requested for the first phase in the development of a very large radio telescope. Some work has already begun, in a small way, on this project, and more will be undertaken in FY 1963 with the antenna design money in that year's budget. By FY 1964 development will have progressed to the point where some construction should be started.

Development of a very large radio telescope will proceed approximately as follows:

Phase I -- Now through FY 1964

- * 1) Establish performance requirements for the telescope.
- * 2) Select the telescope configuration which will best meet the performance requirements.

Some work has been done on these aspects, using the recommendations of the NSF Advisory Panel on Radio Telescopes as the starting point. Minimum requirements are: a one minute of arc beam at 21 cm; usability to some higher frequency, probably 10 cm; a configuration which will allow later expansion to give still higher resolution. At present a cross array of large antennas is considered to be the most promising telescope configuration. Before finalizing performance requirements and telescope configuration the advice of radio astronomers throughout the country must be obtained, and both performance specs and telescope configurations must be thoroughly studied for technical feasibility.

- 3) Engineer (design and detail) the elements of the telescope.
- 4) Design electronic components of the telescope -- receivers, data handling system, telescope control system, phase stabilization and monitoring.
- * 5) Select a site -- Green Bank may not be suitable. Green Bank and other possible sites must be investigated.

6) In connection with (5), study atmospheric effects at cm wavelengths.
This is already in progress, under the direction of Dr. Orhaug. As soon as sufficient information about atmospheric effects at Green Bank has been obtained, the same experiments will be done at other possible sites.

7) In connection with (2), (4) and (5), study phase stability in
atmosphere, from standpoint of a) maintenance of coherence over long base-
lines, and effect on resolution resulting from partial loss of coherence;
and b) phase stability of signals transmitted along long path lengths parallel
to the earth's surface.

A 8) Build small number of elements of the telescope and their associated
electronics. A portion of the telescope will be built which will be a very
useful instrument in itself and will also test all techniques, equipment,
and structures before proceeding to construction of the full telescope.

Phase II -- FY 1965 or 1966 and beyond

1) Construct full telescope by expanding the portion built in Phase I.
No estimate can be given now for the cost of Phase II, but it will certainly
be tens of millions.

this became the H B interferometer