Interoffice

National Radio Astronomy Observatory

Charlottesville, Virginia

To: K. Kellerman August 15, 1980

From: M. Balister

VLB ARRAY MEMO No. 16

Subject: Masers and VLBI Array

NRAO has built 4 K-band masers for use in receivers for Green Bank and Tucson. The most recent masers have approximately 500 MHz bandwidth, 30 dB gain, and are tunable over the 18-26 GHz frequency range. The JPL prototype for these amplifiers has operated on the 140' very reliably for two years and users have been enthusiastic about its performance.

Development work on a 40-50 GHz maser started two years ago. A single stage prototype amplifier has been successfully tested and a four stage version is currently being fabricated in Green Bank and will be tested shortly. The reliability of this maser is expected to match that obtained with the K-band maser.

It is anticipated that in a year or so that solid state sources will be available with sufficient power output and electronic timing range to replace BWOs and klystrons that are usually used to pump masers in this frequency range. When this occurs the maser reliability will be determined by the reliability of the cryogenics. Experience at Green Bank has shown that generally speaking the reliability of 4K systems is comparable to that of 20K systems. Since 4K systems are now widely used at Green Bank on the 140', we should get a lot of reliability data under operational conditions over the next few years.

MB/jm