

Interoffice Memorandum

CALIFORNIA INSTITUTE OF TECHNOLOGY

To: M. Ballister

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From: Alan Moffet

Mail Code: 105-24

(818) 356-4977

Subject: Maser Reliability in the DSN

I promised to give you some information about the experience JPL has had with the maser systems used in the DSN, for comparison with the NRAO information used in the VLBA planning process. Bob Stevens of JPL has given me a report on the reliability of the DSN masers. It covers the years 1967 through mid-1983 and is based on 1 980 000 hours (!) of maser operation.

The mean time between failures (MTBF) has varied between 500 and 8000 hours, but a typical number for recent years has been 1200 hours. There are significant differences in performance among the reports from the three DSN stations, suggesting that maintenance practices are not uniform and that MTBF's of about 3000 hours could be achieved.

Helium contamination is the most frequent cause of maser failure, accounting for about 60% of all cases. Compressor troubles account for only about 10% of all failures. The principal recommendation from the JPL experts is that both the gas and the compressor oil must be carefully decontaminated before the system is allowed to cool down.

A workshop on maser maintenance was held this fall at Tidbinbilla. I will try to obtain a copy of the proceedings for you when they are published.