

**MASSACHUSETTS INSTITUTE OF TECHNOLOGY**  
**HAYSTACK OBSERVATORY**  
*WESTFORD, MASSACHUSETTS 01886*

September 1, 2001

*Telephone: 978-692-4764*  
*Fax: 781-981-0590*

To: SRT Group

From: Alan E.E. Rogers

Subject: Preliminary single dish performance of new SRT

Using the sum for absolute calibration and vertex noise for a “running” calibration I obtained the following:

Frequency (MHz)	T <sub>90</sub> (K)	T <sub>45</sub>	T <sub>stow</sub>	Ant beamwidth (deg)
1612.2	89	88	200	5.5
1420.6	82	81	195	6.0

Calibration assumed 50% aperture efficiency for the 7.5 foot dish. The second stage contribution to the receiver noise is estimated to be about 20 K and the third stage (following the long cable from the preamp) contributes about another 5 K.

An estimate of the noise contributions are as follows:

T <sub>spill</sub>	20 K
T <sub>CMB</sub>	3 K
T <sub>atm</sub>	5 K
ATF-54143	30 K
Feed loss	5 K
2 <sup>nd</sup> stage	20 K
3 <sup>rd</sup> stage	5 K
Total	88 K

The 2<sup>nd</sup> and 3<sup>rd</sup> stage noise can be reduced by about 15 K by replacing the mini-circuits VAM-6 used in the second stage with another amplifier with higher gain and lower noise. This improvement will be tested and may be incorporated in an update of the PC board. Another change being considered is bringing out the input to the LNA and the output of the helix feed so that an optional cavity filter can be inserted in front of the LNA. Figure 1 shows a sample spectrum from the new receiver.

The spectrum contains a RFI signal from the motherboard in the receiver so that consideration is now being given to filtering the A.C. cable and only using fiber optics to communicate with the receiver. This approach would be similar to that used for the Deuterium array except that a perforated cover rather than a solid cover would be used to allow convection cooling.

