SRT Memo #003

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To: SRT Group

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Subject: SRT focus

The SRT dish feed supports have slotted holes on one end to allow some focus adjustment. On the 10 foot dish the focal length was measured by stretching a wire across the aperture and measuring the dish diameter D and the distance from the wire to the dish vertex z. The focal length F is given by

$$D^2 / (16z) = 47.3 \pm 0.8"$$

The initial position of the feed was 45" from the vertex to the front of the inner C-band tube. Since the L-band phase center is about 1.5" in front of the C-band tube this initial position was about 3" out of focus.

We measured the Sun using the 25 point scan routine for various adjustments of the feed location made by adding to the feed supports at the edge of the dish. We obtained the following focus curve

distance to C-band tube (inches)	calculated focus error (inches)	Sun temperature k
44.5	-4.3	2193
47.7	-1.1	3234
48.7	-0.1	3438
50.6	+1.8	2570

Without extending the feed supports the maximum outward adjustment is about 46.7 which is still about –2.1 inches out of focus. For the best performance the feed supports should be extended about 2 inches. The theoretical focus curve depends on the dish f/D ratio and the illumination taper. For f/D of 0.4 and 15 dB edge taper the focus is about 6 dB at 1 wavelength and 1.5 dB at half a wavelength out of focus. Our measurements were made at 1420 MHz or a wavelength of 8.3".