

**MASSACHUSETTS INSTITUTE OF TECHNOLOGY**  
**HAYSTACK OBSERVATORY**  
 WESTFORD, MASSACHUSETTS 01886  
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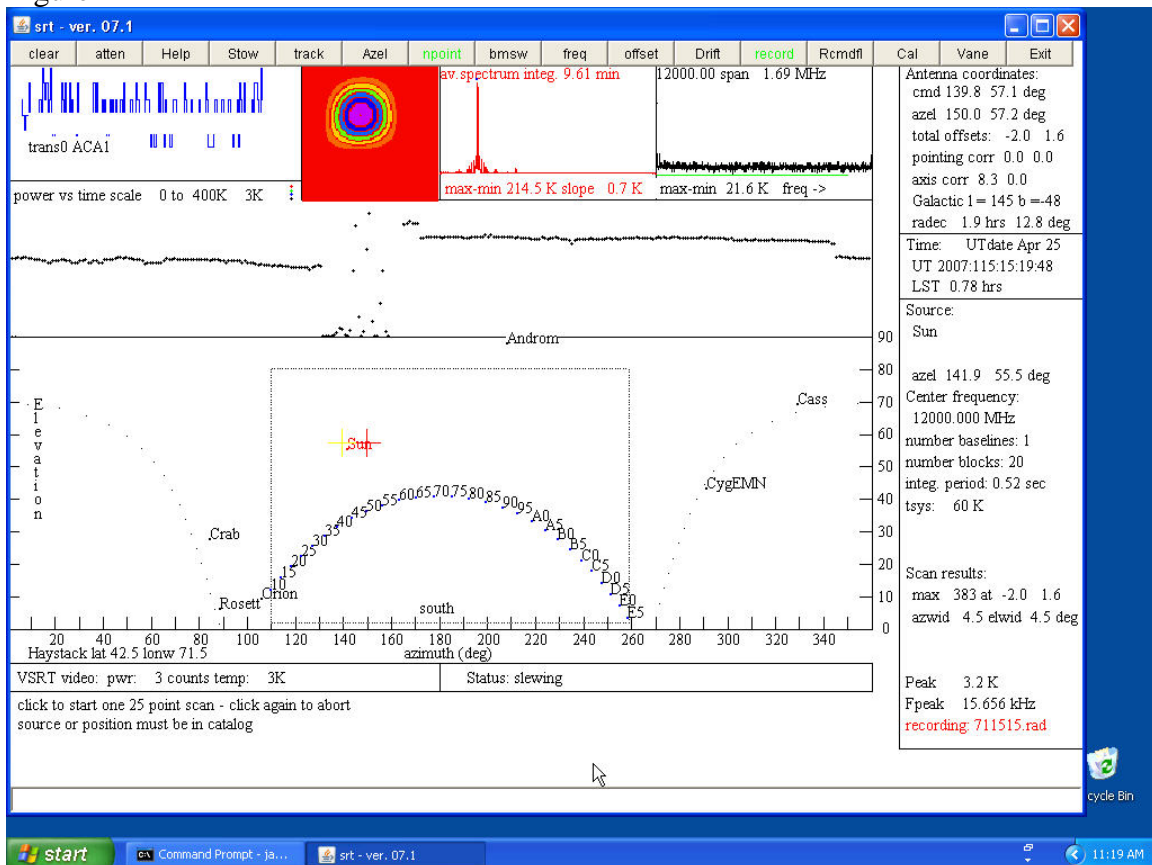
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To: VSRT Group  
 From: Alan E.E. Rogers  
 Subject: Sample data from short baseline

The 2-axis mount described in memo #9 was used to point 2 dishes in the same direct in the sky with a pointing accuracy of about 1 degree. The pointing accuracy is currently limited by the stiffness of the hardware. (The performance is adequate unless there is a substantial wind).

1] Sun scan

Figure 1



Shows a screen capture of a 5x5 point raster scan on the Sun. Note the false color 2-D contour plot of the beam along with the best fit max power, pointing offsets and azimuth and elevation beamwidths. The data from the scan was also captured by recording a radiometry file and the results are printed below:

\* STATION LAT= 42.50 DEG LONGW= 71.50

\* yr:day:hr:mn:sc Az\_deg El\_deg DAz\_dg DEl\_dg MHz Pwr Source

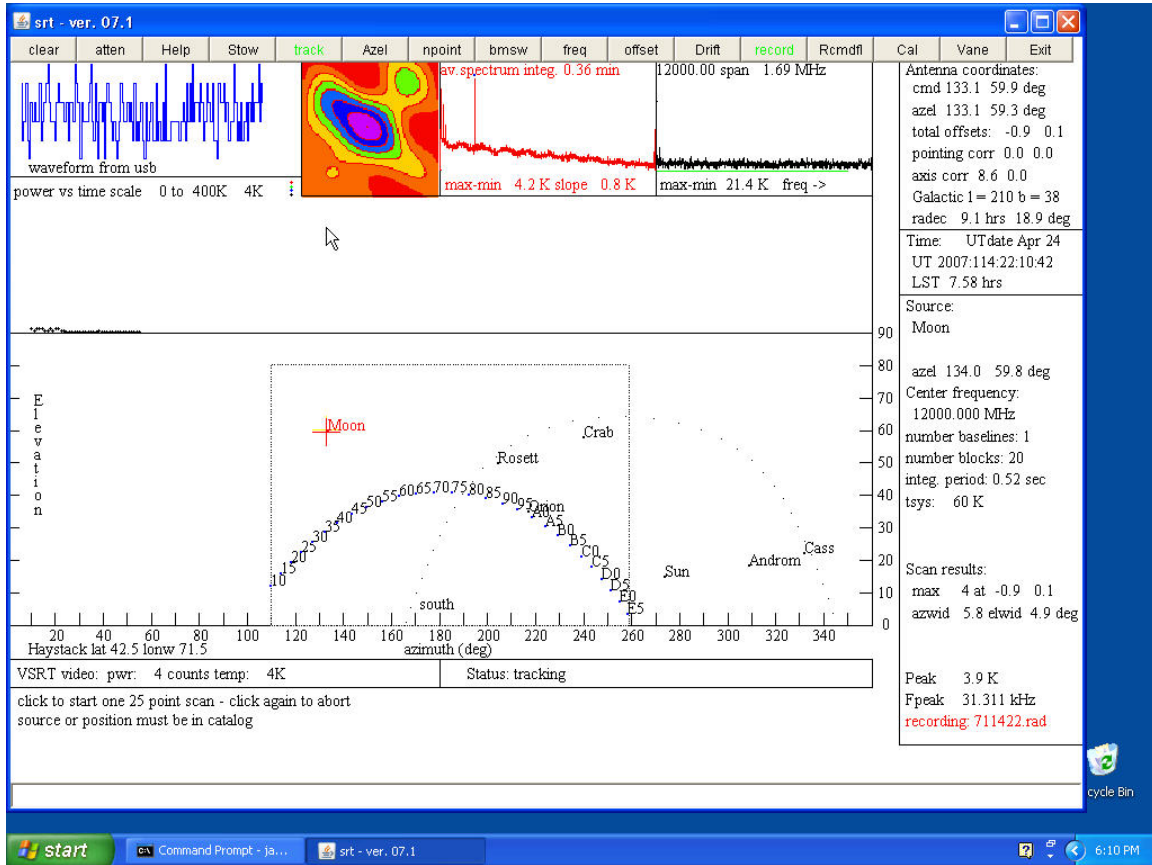
2007:115:15:14:30	139.4	54.4	0.0	0.0	12000.00	205	Sun
2007:115:15:14:32	139.4	54.4	0.0	0.0	12000.00	210	Sun
2007:115:15:14:33	139.4	54.4	0.0	0.0	12000.00	210	Sun
2007:115:15:14:35	139.4	54.4	0.0	0.0	12000.00	207	Sun
2007:115:15:14:57	131.1	50.3	-8.7	-5.0	12000.00	2	Sun
2007:115:15:15:07	136.6	50.3	-3.9	-5.0	12000.00	3	Sun
2007:115:15:15:15	140.8	50.3	0.0	-5.0	12000.00	2	Sun
2007:115:15:15:21	143.5	50.3	3.9	-5.0	12000.00	3	Sun
2007:115:15:15:29	147.7	50.3	7.8	-5.0	12000.00	6	Sun
2007:115:15:15:56	133.0	53.0	-7.8	-2.5	12000.00	9	Sun
2007:115:15:16:02	135.8	53.0	-4.1	-2.5	12000.00	25	Sun
2007:115:15:16:10	139.9	53.0	0.0	-2.5	12000.00	21	Sun
2007:115:15:16:18	144.0	53.0	4.1	-2.5	12000.00	5	Sun
2007:115:15:16:26	148.2	53.0	8.2	-2.5	12000.00	4	Sun
2007:115:15:16:55	132.0	55.8	-8.2	0.0	12000.00	20	Sun
2007:115:15:17:03	136.1	55.8	-4.4	0.0	12000.00	197	Sun
2007:115:15:17:11	140.2	55.8	0.0	0.0	12000.00	328	Sun
2007:115:15:17:21	145.7	55.8	4.4	0.0	12000.00	57	Sun
2007:115:15:17:29	149.9	55.8	8.8	0.0	12000.00	3	Sun
2007:115:15:17:58	132.7	57.2	-8.8	2.5	12000.00	16	Sun
2007:115:15:18:06	136.9	57.2	-4.7	2.5	12000.00	262	Sun
2007:115:15:18:14	141.0	57.2	0.0	2.5	12000.00	368	Sun
2007:115:15:18:24	146.5	57.2	4.7	2.5	12000.00	48	Sun
2007:115:15:18:32	150.7	57.2	9.4	2.5	12000.00	3	Sun
2007:115:15:19:03	132.8	59.9	-9.4	5.0	12000.00	4	Sun
2007:115:15:19:11	136.9	59.9	-5.1	5.0	12000.00	98	Sun
2007:115:15:19:19	141.0	59.9	0.0	5.0	12000.00	195	Sun
2007:115:15:19:29	146.6	59.9	5.1	5.0	12000.00	12	Sun
2007:115:15:19:39	152.1	59.9	10.1	5.0	12000.00	3	Sun

\* NPOINT max 385 at -2.0 1.6

2007:115:15:20:07	139.6	57.2	-2.0	1.6	12000.00	368	Sun
2007:115:15:20:08	139.6	57.2	-2.0	1.6	12000.00	370	Sun
2007:115:15:20:10	139.6	57.2	-2.0	1.6	12000.00	368	Sun
2007:115:15:20:11	139.6	57.2	-2.0	1.6	12000.00	375	Sun
2007:115:15:20:13	139.6	57.2	-2.0	1.6	12000.00	366	Sun
2007:115:15:20:14	139.6	57.2	-2.0	1.6	12000.00	368	Sun
2007:115:15:20:16	139.6	57.2	-2.0	1.6	12000.00	368	Sun
2007:115:15:20:17	139.6	57.2	-2.0	1.6	12000.00	367	Sun
2007:115:15:20:19	139.6	57.2	-2.0	1.6	12000.00	366	Sun
2007:115:15:20:20	139.6	57.2	-2.0	1.6	12000.00	372	Sun
2007:115:15:20:22	139.6	57.2	-2.0	1.6	12000.00	372	Sun
2007:115:15:20:23	139.6	57.2	-2.0	1.6	12000.00	368	Sun
2007:115:15:20:25	139.6	57.2	-2.0	1.6	12000.00	375	Sun

## 2] Moon Scan

Figure 2 is a screen capture of a 5x5 point scan on the moon. The power is not calibrated but should be weaker than the sun by the ratio of brightness temperatures since the angular size of the Sun and moon are about the same. The radiometry data is shown below:



\* STATION LAT= 42.50 DEG LONGW= 71.50

\* yr:day:hr:mn:sc Az\_deg El\_deg DAz\_dg DEl\_dg MHz Pwr Source

2007:114:22:04:15	131.7	59.3	0.0	0.0	12000.00	9	Moon
2007:114:22:04:17	131.7	59.3	0.0	0.0	12000.00	9	Moon
2007:114:22:04:18	131.7	59.3	0.0	0.0	12000.00	8	Moon
2007:114:22:04:20	131.7	59.3	0.0	0.0	12000.00	8	Moon
2007:114:22:04:49	121.7	53.8	-9.7	-5.0	12000.00	3	Moon
2007:114:22:04:59	127.2	53.8	-4.3	-5.0	12000.00	3	Moon
2007:114:22:05:07	131.4	53.8	0.0	-5.0	12000.00	3	Moon
2007:114:22:05:15	135.5	53.8	4.3	-5.0	12000.00	2	Moon
2007:114:22:05:25	141.0	53.8	8.5	-5.0	12000.00	3	Moon
2007:114:22:05:56	123.4	56.6	-8.5	-2.5	12000.00	3	Moon
2007:114:22:06:04	127.5	56.6	-4.5	-2.5	12000.00	2	Moon
2007:114:22:06:12	131.6	56.6	0.0	-2.5	12000.00	3	Moon
2007:114:22:06:22	137.2	56.6	4.6	-2.5	12000.00	3	Moon
2007:114:22:06:30	141.3	56.6	9.1	-2.5	12000.00	2	Moon
2007:114:22:07:01	123.4	59.3	-9.1	0.0	12000.00	4	Moon

2007:114:22:07:09	127.6	59.3	-4.9	0.0	12000.00	3 Moon
2007:114:22:07:19	133.1	59.3	0.0	0.0	12000.00	7 Moon
2007:114:22:07:27	137.2	59.3	4.9	0.0	12000.00	2 Moon
2007:114:22:07:37	142.7	59.3	9.8	0.0	12000.00	3 Moon
2007:114:22:08:11	123.2	62.1	-9.8	2.5	12000.00	3 Moon
2007:114:22:08:19	127.4	62.1	-5.3	2.5	12000.00	4 Moon
2007:114:22:08:29	132.9	62.1	0.0	2.5	12000.00	3 Moon
2007:114:22:08:39	138.4	62.1	5.3	2.5	12000.00	3 Moon
2007:114:22:08:49	143.9	62.1	10.6	2.5	12000.00	3 Moon
2007:114:22:09:24	122.7	64.8	-10.7	5.0	12000.00	3 Moon
2007:114:22:09:34	128.2	64.8	-5.8	5.0	12000.00	2 Moon
2007:114:22:09:44	133.7	64.8	0.0	5.0	12000.00	3 Moon
2007:114:22:09:55	139.2	64.8	5.8	5.0	12000.00	3 Moon
2007:114:22:10:05	144.7	64.8	11.7	5.0	12000.00	3 Moon
* NPOINT max	6	at	-0.9	0.1		
2007:114:22:10:39	133.1	59.3	-0.9	0.1	12000.00	3 Moon
2007:114:22:10:40	133.1	59.3	-0.9	0.1	12000.00	3 Moon

### 3] Calibration using absorber vane (see memo #9)

The units of power need to be multiplied by a calibration constant and divided by the objects solid angle to derive the brightness temperature in Kelvin. A 6 inch diameter absorber was observed at a distance of 36 feet to give a power reading of  $13 \pm 5$ . From this measurement the calibration is given by

$290\pi(0.4\pi/180)^2/13 = 3.4 \pm 1.6 \times 10^{-3}$  so that the power of 3 on the moon corresponds to  $170 \pm 65$  K and 383 Sun corresponds to  $21,800 \pm 8000$  K.