

12 METER MILLIMETER WAVE TELESCOPE

MEMO No. 201

National Radio Astronomy Observatory  
Tucson, Arizona

November 17, 1982

MEMORANDUM

TO: M. Balister  
FROM: J. Payne  
SUBJECT: 12 M Receivers

The attached sheet shows the receivers that will hopefully be available for the 12 M telescope on 1 February 1982. Some additional information is probably called for. Taking the receivers in the order they appear on the sheet:

1) The 31.4 GHz Receiver (9 mm Continuum)

This receiver will not fit the optics of the new antenna due to the low frequency and the dual feed system. (See Memo 79.) To be mounted on the new telescope the receiver has to be repackaged and changed into a single feed system. We will do this but with no sense of urgency, and the modified receiver will not be available for the first quarter's observing. Mark agrees with this.

2) 70-115 GHz Cooled Mixer Receiver

This old receiver will be mounted in its present form on the new telescope. There are considerable advantages to using an identical receiver with the old and new surfaces. The receiver will be updated (noise temp at 115 GHz improved by a factor of 2) in the spring of next year. The first group of 3 mm proposals will use the old version of the receiver, however. Note that all the fancy devices (fast beam switchers, polarizers, etc.) will not be available for some time on the new antenna.

3) 140-170 GHz Cooled Mixer

This existing receiver will mount on the new surface but will not be used in the first quarter. We plan to upgrade the receiver (dual channel, lower noise temp) during 1983.

4) 200-240 GHz Cooled Mixer

This is the old single channel receiver that needs work to be put in service. Before deciding whether to work on it we propose to wait a month to see how the new 200-300 GHz receiver is progressing.

5) 200-300 GHz Cooled Mixer

This is the new dual channel Archer/Moorey receiver that will replace (4). All our spare effort in Tucson will be put into this receiver over the next few months.

6) 0.3K Bolometer

The repackaging of the bolometer is going well. Systems tests are planned in the next two weeks and we hope to test the system on the telescope during January. I believe that the sensitivity of the system in the 1 mm band will not be a great improvement over the 200-300 GHz mixer receiver (maybe a factor of 2 or 3). However the ability to measure spectral indexes in real time, the ability to work in the 800 $\mu$  window, the combining of atmospheric windows and above all the potential for realizing arrays make the bolometer project exciting and well worth while.

Observing Schedule

Rick Howard and I have met with Mark Gordon and we have discussed a tentative observing start up based on all the proposals we have.

1st Feb. - 15th Feb.	3 mm
15th Feb. - 1st March	Bolometer
1st Mar. - 21st March	200-240 GHz Spectral Line
21st Mar. - 15th April	Bolometer.

This schedule has the following advantages:

- 1) It starts with a well proven simple receiver.
- 2) It gives us time to work on the 200-240 GHz receiver.
- 3) It satisfies all the highly ranked proposals, particularly those bolometer proposals that have been around for a long time.

This assumes that everything goes well with the telescope and electronics and we should discuss this with John Findlay to see if he agrees.

JP:mt

Attachment

c: H. Hvatum

12 M RECEIVERS

FREQUENCY (GHz)	AMPLIFIER TYPE	SYSTEM TEMP (K)	3dB BW	FEED TYPE	POLARIZATION	CAL VALUE	SWITCHING SYSTEM	REMARKS	PERSON
31.4	MIXER	600 DSB	1 GHz	HORN-LENS	DUAL LINEAR	10K	NUTATING SUBREFLECTOR	MODIFIED 36' RECEIVER FINISHED MARCH '83	FREUND
70-115	COOLED MIXER	280-500 SSB	1 GHz	HORN-LENS	DUAL LINEAR	10K	NUTATING SUBREFLECTOR	OLD 36' RECEIVER WILL BE UPDATED IN '83	PAYNE
140-170	COOLED MIXER	600-1000 SSB	500 MHz	HORN-LENS	DUAL LINEAR	5K	NUTATING SUBREFLECTOR	OLD 36' RECEIVER UPDATED IN '83	PAYNE
200-240	COOLED MIXER	700-1000 SSB	1 GHz	HORN-LENS	SINGLE LINEAR	5K	NUTATING SUBREFLECTOR	OLD 36' RECEIVER BACK UP FOR NEW 200-300	PAYNE
200-300	COOLED MIXER	500-1000 SSB	500 MHz	HORN-LENS	DUAL LINEAR	5K	NUTATING SUBREFLECTOR	INITIALLY AVAILABLE OVER 200-235. EXTENDABLE IN FUTURE TO 300 GHz AND LATER TO 345 GHz	ARCHER & MOOREY
0.8mm, 1mm, 2mm	0.3K BOLOMETER	SYSTEM NEP APPROXIMATELY $2 \times 10^{-14} \text{ WHz}^{-2}$	MATCHED TO ATMOS- PHERIC WINDOW	LENS - WINSTON CONE	UNPOLARIZED	5K	NUTATING SUBREFLECTOR	WAVELENGTH MAY BE SELECTED WITH FILTER WHEEL	PAYNE