

Date: Thu, 11 Mar 1999 12:04:59 +0100
 To: rwade@rl.ac.uk, B.Ellison@rl.ac.uk, jwebber@nrao.edu,
demerson@nrao.edu,
jpayne@nrao.edu, avaccari@nrao.edu, rfreund@nrao.edu, lazareff@iram.fr,
wild@iram.es
 From: Roy Booth <roy@oso.chalmers.se>
 Subject: Receiver meeting, Tucson Feb 22
 Cc: belitsky@oso.chalmers.se

Dear Colleagues,

I promised to circulate a list of points raised at our receiver discussion in Tucson. I know that Bob Brown has precied the discussion from Feb 23 but I think it is still worth beginning our informal discussion with this document. The name of the European Receiver team coordinator will be announced soon and I hope that he will coordinate the European side of the discussion.

Notes from Receiver Group meeting Tucson, Feb. 22, 1999

I note the friendly atmosphere, which prevailed during the meeting and the clear wish to collaborate on LSA receivers. It was suggested that the collaboration would be enhanced by occasional exchanges of engineering staff.

The points picked up from the discussion are listed below. I hope this can be a starting point for further discussions.

1. Frequency bands. We took as a starting point the bands defined on the Wooten et al MMA memo, table 3, except that we will regard the band 33-50 GHz as an add-on and it will not share the otherwise common dewar.
2. There will be a single large dewar taking all the receivers and it is understood that in the event of failure (problems in a given receiver, the whole dewar will be exchanged for a spare which will be maintained at 4K on the site.
3. Receivers will be produced at more than one institute and industrial production/assembly will be studied e.g. the Dutch are keen to build a prototype (and possibly the whole production) at 650 GHz; Chalmers/Onsala is interested in the frequency range 300-400 GHz.
4. The receivers will be modular in form and have common interfaces, connectors, etc. The standards for interfaces, common components, connectors, etc. will be defined by a team: B. Lazaref, J. Payne and W. Wild, after some further discussion.
5. Backshorts should be avoided (as should all extra adjustable components) but probably cannot be ignored, especially for the highest frequencies.
6. Polarisers. Linear polarisation will be the norm and there will be two orthogonally polarised receivers per frequency channel. $\frac{1}{4}$ -wave plates will be introduced at certain spot frequencies across the range, when the linear Stokes parameters will be measured by cross correlating the resulting circular channels. Attention will be paid to polarisation calibration.

7. SIS mixers will be used throughout the 9 receivers in the common 4K dewar. Attention will be given to the need for an adjustable magnetic field, which will probably be required in array junction.
8. If possible, the dewars will be designed and the UK has teams which are interested to study the dewar design by cryogenic modelling techniques.
9. L.O. Photonic LOs will be considered and groups are encouraged to work on the problem of photodetectors at mm wavelengths. Groups have been identified in the UK and Germany, nb a strong group exists in Tucson!
10. Even if the LO power at the high frequencies is weak, it may still be possible to use the photonic scheme by using a fixed LO at the RF frequency, amplifying and mixing down the photonic LO through the chain down to a lower frequency when it might have sufficient power.
11. Multipliers should not be ruled out and a hybrid scheme could be considered by using a single fundamental and tapping off and amplifying various harmonics.
12. Optics verification. It was felt that the beam patterns of its RX should be verified cold. Onsala is building a mixer/beam measuring test system for FIRST and will consider modifying it for the LSA/MMA receivers. IRAM has such a system also.
13. Radiometer phase correction with a 183 GHz system will be considered.
Work is continuing on Chajnantor with systems built through the OSO/Cambridge collaboration. If this scheme is successful, the mounting of the 183 Rx on the individual LMA antennae must be considered.
14. Worries were expressed about the proposed calibration scheme(MMA memo ?) since it involves radiation of the cal signal through a hole in the sub reflector.
Will this cause baseline ripple?
- 15 Bandwidth v. IF noise. The IF amplifier noise problem should be investigated.
Fall-back position - 4-8GHz IF.

Regards,

Roy

Professor R. S. Booth	tel: +46 (0)31 772 5520 (direct)
Onsala Space Observatory	772 5525 (secretary)
S-439 92 Onsala	772 5500 (exchange=)

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Sweden fax: +46 (0)31 772 5590
