Meeting Date: 9-July-2003

<u>Participants:</u> <u>Australia:</u> W. Wilson <u>USA:</u> D. Kubo, B. Martin, P. Ho, J. Peterson, C.J. Ma, K. Umetsu <u>Taiwan:</u> H. Jiang, J. Han, W. Ho, T. Huang, P. Shaw, H. Wang, C.T. Li, M.T. Chen

Minutes Recorder: D. Kubo comments from this week, previous weeks comments

I.<u>New Action Items:</u>

AI-09July03-1: Chao-Te: The readout chips (140) will be delivered in September. Bob asked "how are these chips going to be tested in Taipei".

AI-09July03-2: Bob: Call site bidders to make sure they have all the necessary information (assigned by Paul Ho).

<u>AI-09July03-3:</u> Derek: The Hilo technical staff has been putting more effort into supporting the SMA Nov dedication. Determine what impact this has made to the delivery of the correlator.

II.Previous Action Items (still open):

AI-02July03-2: Ming-Tang/Chao-Te - It may be possible to provide noise injection without worrying about the use of the polarizer(?). It was asked that the necessary W/G transitions be fabricated for the prototype telescope. These transitions are to accommodate the parts which will be installed in a different order.

Ming-Tang - repeated noise coupler tests and measured 18-25 dB isolation (10 dB higher than OMT?). Indication is that this alternate scheme (for noise injection) will work. Still planning on doing the cold test of the phase shifter even though may not use it. Estimate 4 weeks before noise coupler is shipped to Hilo (for insertion into prototype).

Bob asked what the next steps should be (be prepared to answer this next week). John Payne is scheduled to try the optical noise injection approach in September.

AI-02July03-3: Bob - Paul Ho requested that the master schedule be reviewed and updated every 2 weeks. Pay particular attention to the items which have slipped.

III. Closed Action Items (as of this meeting):

<u>AI-02July03-1:</u> Derek - Determine what absorber material was used by Marki and forward to Jeff Peterson for assessment. Will this absorber dry out over time and lose effectiveness?

Absorber is Emerson Cuming MF-190, adhesive is 3M DP-640 epoxy. The MF-190 material is a magnetically loaded epoxide which is machinable. Water absorption rate is <0.3% per 24 hours. Jeff P. said that a similar but lighter material has been in use in the south pole for 5 years without noticeable degradation.

AI-26June03-1: Homin - Determine necessary interface details for 4U chassis to mount backplane, DC-DC converter, various I/O. Goal is to make a firm decision on whether to go with this box by July 17. Should place final order for boxes shortly after (qty of 9 + 2 spares?).

Since this solution appears workable, (I believe) we have decided to go with this enclosure. Derek commented that he liked this box and recommends that we go with it for the 7-element system. Will await Ferdinand's return before placing the final order.

Took pictures and will distribute to Derek and others to review. Box is not weather tight but that should be OK (because it resides under the platform). Still need to finalize backplane mounting details (and other details?).

AI-26June03-2: Chao-Te - Characterize Marki module 003 to verify latest modification (absorber hat over mixers) has not affect performance. If there is a problem we should tell Marki ASAP.

C.T. distributed preliminary test results. Suck out at 3.5GHz is indeed gone. Resonance spike at 3 GHz is still present (same as 002) but there is also one at 1.8GHz (didn't test below 2.0GHz on 002). Phase looks similar to 002. Overall the responsivity and phase look similar to 002.

Testing with LO hardware is done so synthesizers should be available now. CT is currently working on equalizer design for XY module. Will test Marki module next week. See Correlator topic for further discussions on this matter.

IV.<u>Miscellaneous Discussions:</u>

MMIC: Huei - It appears that all the paer work for the export is well on it's way. \$4k for export license. LNA packaging will take place after the chip is known to work, may need a design iteration.

Bob - export policies have gotten more restrictive. Issues with export license are OK. Continuing to follow up loose ends with e-mails.

<u>Receiver:</u> Ming-Tang - LNA tests in Hilo show that the spectrum (of the new JPL amps) looks OK. W-band CW source was broken so could not perform tone tests.

Phase shifter - waiting for cold test dewer (may not use this anymore).

7-element receiver schedule - Still waiting for waveguide pieces and 1 more cold head (have 1 right now). Decided to nickel plate the inside of the chamber instead of gold plate to save monies but ran into some problems with this change. Change in noise injection scheme does not delay schedule significantly.

Ming-Tang - LNA spares - delivery time is a few months for 40-50 LNA modules. Todd G's process is getting better so waiting to purchase spares is probably a good thing. Began tests of JPL LNA in Hilo. See about 5 dB of falling slope over the band which is much better than the prototype. Some or all of this slope may be caused by the downconversion mixer (old version). In fact Todd believes that the LNA should exhibit higher gain with higher frequency. Homin has modified the bias board for the higher Vg of the new LNAs.

 $\underline{\rm LO/IF:}$ Visited lab and saw hardware. Assemblies look about ½ complete. Looks to be on schedule.

<u>Correlator:</u> C.T. tested 003 module, see closed AI-26June03-2 above. Results look good which is fortunate because Marki has delivered 16 modules as of Monday. Design of these 16 modules is identical to SN003 engineering module. Plan to keep the 16 production modules in Hilo until we integrate the DC amplifiers to them, then they will be sent to Taipei.

Derek - Having Peter concentrate on finishing up the assembly of the 1st Section IF plug-in modules. We are planning to align and test them next week using the CSO VNA. Also working in parallel to generate the mechanical drawings for the mockup quad-pack frames. Dayton Jackson understands what we are doing and has made some design recommendations. Once we have the frame together with the 16 modules and dummy power dividers (4 front/ 4 rear) we will forward the detailed drawings and photos to Ted in Taipei.

55 DC amplifier modules are currently being fabricated at Dayton Jackson in Hilo. The final revision DC amplifier board should be delivered to Hilo next week. We will hand stuff 2 boards and outsource the rest.

Derek asked whether each of the 55 modules should be carefully characterized when in fact the overall system response for each baseline is what needs characterization. C.T. said he will characterize each module whether the data will be used in the end or not. Jeff P. heavily recommended performing at least rudimentary tests of each module to verify functionality. Troubleshooting at the final integration level is very time consuming.

Derek - Marki 003 module, Marki added 4 pieces of solid absorbers over each of the mixers. This seemed to eliminate the suckout at 3.5 GHz. We are awaiting CT's detailed tests to make sure this is indeed the case, and whether the responsivity (& phase) at the higher frequencies (13-18 GHz) have been compromised. See new AI above.

Platform/Mount: Bob - CMA is proceeding full steam. Center section is almost done and expecting 100% assembled by this weekend. Testing next week, shipping will be delayed by 1 week. Does no affect Vertex schedule. Ted has received the test samples and will have them analyzed.

Vertex - Assembly with platform will take place in the middle to late August. No schedule update.

Bob - Bob was at CMA this morning. Things are moving along. CMA does not report any schedule slips but looks like (to Bob) that CMA is about 1 week behind. Had a telecon with Vertex today. No new surprises, they sorted out the problems with the jack (screw?) measurements. Imbed(?) ring is estimated to arrive in Hilo on August 13.

Paul Ho asked whether any testing is being done by CMA and Vertex to verify the hardware matches the modeling (simulations). Bob said CMA is providing material samples to ASIAA for analysis. In particular, to test the strength of the inserts. Bob will ask Vertex if they can provide something similar.

<u>DC Power Distribution:</u> Homin - Made a small change with grounding and improved the noise by a small amount. Will send out test results.

Homin - Performed preliminary noise tests of converter using low freq spectrum analyzer. See about -90 dBm at 130 kHz.

Enclosures: See closed AI-26June03-1.

<u>Site Issues/Network:</u> Bob - Bidding is in process. One more bidder was added to the list for a total of 4 or 6. No updates to report.

Bob - MOU has been signed by ASIAA.

<u>Dishes:</u> Ted - 60cm measurements look OK. There are still some questions about some measurements definitions. Bob - Will ship the 2 dishes to Hilo at the end of next week. Beam pattern and crosstalk tests will be performed on the prototype. Plan to proceed with the manufacture of the remaining 5 dishes.

Ted - Dr Ong measured the dishes after assembly. His measurement method(?) was a little bit different than what Ted understood was to be done. Ted will talk to them. Bob asked what was asked to be measured? What was actually measured? Ted - measured data has some points out of spec near the perimeter of the dish but the RMS falls within spec. What should be done next?

2-Element Prototype Issues: Derek - Cleaned up correlator box before taking up to ML last week. Phase switch signals are now connectorized at the box interface (no more clip leads). Added 4 IF signal tests points on the side of the box so can easily monitor power of each receiver channel with power meter. Received 5.0688 and 6.0000 MHz TTL oscillators and currently mounting on PCB. Will take up to ML tomorrow to lockup the 2 version2 non-laser cut readout chips. Should be more stable.

Derek - Generated phase switched CW tones to sum with the independent IF noise sources. Drove Meridian at about -1 dBm, Marki at -10 dBm to produce the same RMS. CW signal was reduced by about 50 dB in comparison to the noise. Overall SNR of both the Meridian and Marki modules were quite similar (keeping in mind that Meridian drive was ~9 dB higher). Offset issue with 3 levels of demod (1 software) seems to be solved. Preparing correlator box to take back up to ML tomorrow.

<u>Schedule:</u> Paul Ho - SMA dedication is Nov 20. The funding agencies will be present and it would be nice if we could show them some significant items such as the site foundation, mount and platform. Is it possible to accelerate some of these items by a few weeks?

Bob - Schedule has several slipped items (see new AI above).