

## Minutes for AMiBA Engineering Telecon

Meeting Date: 13-Nov-2003

Participants:

Australia: Warwick Wilson

USA: M.T. Chen, T.H. Chiueh, Lei, Ted Huang

Taiwan: Paul Ho, Huei Wang, C.T. Li, H. Jiang, West Ho, Eugene Huang, Jeff Peterson

USA Dial-in = 1-800-653-5390, 6668081#

Outside USA Dial-in = 1 773 843 6301

Minutes Recorder: C.T. Li

[previous weeks comments](#)

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### I. New Action Items:

**AI-13Nov03-1:** Phillipe/Ted - Generate a report about platform end-fitting design.

**AI-13Nov03-2:** Ted - Explore the possible material as radome.

**AI-13Nov03-3:** T.H. Chiueh/Ming-Tang/Ferdinand/Ted - Discuss whether we are able to take on some of the site work ourselves or proceed with the general contractor.

### II. Previous Action Items (still open):

**AI-06Nov03-4:** T.H. Chiueh - Circulate a report about the burnt dish and how to avoid it in the future

T.H. Chiueh - Will come up with a more complete report. To estimate the angle, we will have a hot dish even 50 degrees from the sun, to focus the sun light onto the secondary support.

Ted - We're looking for some material (transparent to radio wave, but opaque to visible light) to cover the dish.

Jeff - CBI has some white plastic Gortex mounted on top of every dish. Might wanna check the system temperature change while putting a piece of material in front of feed. We could ask CSO/JCMT to see if they have a piece of spare expanded Teflon to try.

**AI-30Oct03-1:** Bob - Give RCUH a call, and ask Richard about the long term for CSO. Ferdinand will follow up on Nancy on the current space. Discuss with Ming-Tang and others about the idea to establish a permanent lab on the site.

T.H. Chiueh - Called the office rental company, but couldn't find the person in charge yet. Another possibility is CSO office.

Paul Shaw - 2000 per month is the target price for renting lab space (the 1<sup>st</sup> floor of former SMA building).

Paul Ho - SAO continued to maintain the position that the building is only for SMA work. Ideally we would like not to be in separate places because it makes so hard for staffs to work on things and run back and forth. The backup is that we will rent some space. Another solution is to have a trailer on top of mountains. Don't think that is very attractive either. First of all, living on top is not that easy to get approval. It is actually tiring to be on top. There are real good reasons for being downtown to do work.

**AI-23Oct03-2:** T.H. Chiueh and Bob - Sort out what to do next, and summarize what has been done so far (for prototype testing).

T.H. Chiueh, Bob - Will get together on Friday morning to discuss it.

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**AI-25Sept03-2:** Ming-Tang - Volunteered to review all the specs as much as we can, and collect them into one place so that we can look them up.

Ming-Tang - Don't have time to work on it right now, besides finding all the data collected in AMiBA web site. Found several areas with some testing specs, e.g. Ferdinand's calibration system has some tolerance specs.

T.H. Chiueh - Volunteer to work with Ming-Tang. Bob - Let's talk about more on Friday.

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

**AI-06Nov03-1:** Paul Ho - Find out the optimal date for Mike to do the software testing in Vertex.

Paul Ho - According to the email from Vertex, they can't do the software testing soon since they still can't move the platform until it's fixed. According to Phillippe, Bob Romeo is not ready to move until December. We will wait until he goes there and fix the platform.

**AI-06Nov03-2:** C.T./Homin - To check out all schedules (for components assembled in Taipei) to see whether we're late or not, to look at the man power as we project forward how many people we need.

Homin - We have interviewed one person. Looks like a suitable candidate. Ming-Tang is discussing with him about the salary.

**AI-06Nov03-3:** Ted - Talk to Phillippe and Ming-Tang about the necessary man power for platform re-assembling

Ted - After talking to Ming-Tang and Phillippe, we need to ask CMA about how many people are needed there for platform re-assembling. CMA is making the L brackets right now. Phillippe and I are working on the end-fitting design.

**AI-30Oct03-2:** Bob/Huei - Contact Paul Clenworld about some MMIC questions - 1) Whether the MMIC has to go back to the states for approval? 2) Whether the test period in Taiwan can be two years, instead of one? 3) What exactly is the checking business in Taiwan?

Paul Ho - Got a note from Clenworld on the Technology Control Plan. It turns out that the stuff does have to go back to the state department for approval. They're still concerned to have only one year as the period of testing in Taipei. One of thing we can do is only when you need the stuff, you ship it. Then you have a period of one year after shipping to test. Wasn't clear how to check things in Taipei.

**AI-30Oct03-3:** Phillippe/Bob - Summarize the meeting minutes, get more evaluation on platform and make a decision on what to do next

Paul Ho - There was some summary from Phillippe. That has been cycled through Bob Romeo in Tucson. They're more or less in agreement to proceed to fix, except that Romeo doesn't want to be responsible for the design of that fix (the end fixture).

Ted - At the moment, Phillippe and I will take care of the design. But we still need the help from CMA. We have a rough idea about how to fix it. Just sent some of 3-D model to Phillippe yesterday. He will put it into his analysis model.

Paul Ho - The action item is still on going exactly how to fix the platform. We have to get some report from Vertex as to what they're doing. They're going to do some wiring. They're waiting this particular fix. This particular fix will require us to loosen the platform, and re-bolt.

**AI-30Oct03-4:** Bob/Ferdinand - Come up with a scenario whether it is feasible or not to work on the site excavation by ourselves.

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Paul Shaw - Ferdinand sent out an email few days ago about the budget and some quotes. According to him, the budget is almost 90% accurate. Asked him to give us a complete quote from Ludwig with break-down and time table so that we can proceed.  
Paul Ho - The idea is to break down the excavation, concrete... that we can fund each item and proceed right away.

Paul Ho - There was a note from Ferdinand on the site situation. Taisei has a bid about 664K. Ludwig will come in about 526K. Ferdinand's budget total is about 418K for the site work. These bids are a little higher than what we're imagining. The next drawback is to do the rental, do the work by ourselves. Ferdinand reported that he has two workers who are ready to go. He can rent the necessary equipment. The problem is the supervisor. Based on the numbers on the table, surely looks like Ludwig is the better way to go than Taisei. The next question to ask is whether we wanna go with Ludwig or we can try to save some money by doing some of the stuff ourselves. The danger of doing things ourselves is mainly because we don't have enough people. We need to know how much money we actually save by doing that.

Ferdinand - What I need from Taisei is detailed numbers - how much his projection on the excavation. That is only thing we can save, maybe also the electrical, because I got one electrical quote from Mo-Key. The big advantage is that we could go with general contractor. They have reasonable numbers right now. Decent and reasonable firms come in with consistent number. My proposal is I will talk to Taisei and Ludwig more detail about their quotes. Then we can see how they come out with that number.

Paul Ho - I'd like to drive this into a conclusion in turn of making a decision, specifically against doing ourselves, we like to make sure that if we go ahead just contract out, we're all happy to do that. You can back me up with some information as to your analysis on potential trap of trying to do it ourselves.

**AI-18Sept03-1:** Bob - Re-visit the testing of phase shifter in a month.

Ming-Tang - Finally got the cryogenic cold test dewar together and running. All the necessary components are in place. We have some test data (dummy and phase shifter at 90 degree, at 15K and room temperature). However, the dielectric slab in phase shifter fell off during the cool down.

### **IV. Miscellaneous Discussions:**

#### MMIC:

Huei - Will complete the document for MMIC control, send it back to Paul Clenword, and follow up the testing.

#### Receiver:

Homin - Has finished two sets of receiver electronics. The testing looks good so far.

#### LO/IF:

Eugene - Found one of the frequency doubler has some low frequency oscillation. Will return that unit back to EE dept. for repair. The other unit works well. We will use it with the 1<sup>st</sup> production receiver.

#### Correlator:

C.T. - Sent around an updated schedule and man power list for correlator components. Based on Warwick's suggestion, we can proceed the PCB design for data acquisition first, then review the circuit within FPGA later on. That will speed up the development a little bit. Still looking at early Feb 2004 as a suitable time for correlator integration and testing.

Warwick - Will send those correlator control PCBs to Taipei soon, as well as some instruction about installing the control softwares.

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C.T. - Wisewave just finished the packaging of Triquint MMIC amplifiers, and will ship it soon. Maybe we can start assembling the custom power divider module in the last week of November. Integration and Testing probably starts in early Feb. next year.

### Platform/Mount:

### Calibration System:

Ferdinand - Plan to go up with T.H. Chiueh and the new student on Friday morning to do the first test on the calibration system.

### DC Power Distribution:

Homin - Done!

### Enclosures:

Homin - The design of enclosure is pinned down. Joshua has ordered another 5 sets. Asked Joshua to buy DC converter modules for 2 or 3 enclosures.

### Site:

### Dishes:

Ted - Will take a look at the burnt 60-cm dish and contact Along for repair or replacement.

### 2-Element Prototype Testing:

T.H. Chiueh - Lei, Ferdinand, and I went up to the summit to test the noise injection. Still have room for improvement since the power is low. According to Ferdinand, it's due to the coupling problem. Will come up and test again next week.

Kyle - Took out the dishes and measured the sun fringe. Increased (emphasized) the high frequency power by inserting extra equalizers. When we connected correlators to the same power dividers, i.e. have the same IF, RF, two fringes did not coincide. We didn't see that much difference when we connected them to different IF pathes, i.e. one is connected to IF1 of 2 receivers, the other one to IF2.

Mike - We ran experiment with noise source on carriage before. That gives very predictable fringes. It seems to me that would be the best way of diagnosing these problems. Now we do have very clean, strong signal, and there is no other confusing factors, like source size or beam size. With long travel, you could get many fringes, and you now can get your bandpass and delay quite accurately.

Kyle - The fringe of sun with dishes could be regarded as a template for other sun fringes with dishes. We did try to measure the fringe envelop with dishes. We put two phase shifters into IF pathes to shift the relative phase between two receivers. We can sample the envelop at discrete position. The result looks quite consistent with no-dish fringe.

### Schedule:

Homin - The 1<sup>st</sup> production receiver is ready to ship. However, we need to set up the lab and necessary equipments to test it.