# Minutes for AMiBA Engineering Telecon

Meeting Date: 06-Oct-2005

Participants:
Australia:
USA: Joshua, Johnson, Ted, Chia-Hao, Patrick, Locutus, M.T., Pierre, Philippe, Hiroaki, Paul H.
Taiwan: Homin, C.T., Kyle, Po-I
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Minutes Recorder: Kyle

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## I. New Action Items:

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

(29/Sep/05)
**Ted** – Routing cable from ground up to platform. (See Site)
(08/Sep/05)
**Pierre** – Interlocking mechanism between the hexapod and the shelter. (See Shelter)
(04/Aug/05)
**Po-I/Ted** – Design a sturdy optical telescope mount (including fixure of the CCD). (See Mount)
(07/Jul/05)
**Pierre** – Top priority to improve the shelter. (See Shelter)

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

## IV. Miscellaneous Discussions:

Platform:
**Ted –** We measured the platform in many different orientations with photogrametry. There are 18 different ones plus 3 repeating ones. The data is under analysis. We want to take 3 more facing south. Philippe will compare the photogrametry results with the ANSI model.
(29/Sep/05)
**C.T.** – Can we modify the receiver hole covers to be able to hook the harness?
**Philippe** – I will spend some time to look into the safety issues of operation.
**C.T.** – I would like to ask the science team to finalize the configuration of 7-element receiver locations.
(22/Sep/05)
**Ted** – The cables will be mounted under the platform. I have some weight information and Joshua can order standard cable trays directly.
(11/Aug/05)
**Paul** – Kyle, organize a separate meeting in Taipei with some engineers to sort out the issues with laser measurement system.

Shelter:
**Pierre –** I can take care of the hardware part for interlocking, but Vertex needs to take care of the software part. We can discuss it in the telecon with Vertex this afternoon.
**Pierre** – About hiring a civil engineer to inspect our shelter, we lack the drawings and documents. Will ask ASFI for them. The cost for the engineer to come and check is around 10k.
**M.T.** – ARL engineers will be on our site starting Nov. Please also try to use their help.
(29/Sep/05)
**Pierre** – I have received most parts needed to work on shelter motor improvment. I will go to Hilo in Nov and implement the 3-button control box for the shelter (open, close and E.stop).
**Pierre** – Fabric is becoming more and more a problem.
**Ted** – New lift cable is not installed yet because the pulley and tower need to be modified. It will take 1 to 2 weeks.

Mount:

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**Po-I –** The structure of the new optical telescope mount still needs to be verified. Patrick will show me pictures and explain his concerns.
**Patrick** – How about using adjustable screws on the mount to help future alignment. Were we to use shims, it will be difficult and probably more dangerous to do alignment on the platform.
**M.T.** - I am against adjustable screws. It is not so reliable and adds complexity to the mount. Shimming should be adequate for the alignment purpose.
**Ted** – I have reserved the option to use adjustable screws on the mounting of receivers. We can also choose not to use it.
**Po-I** – I will modify my drawings and send it to Homin for review and then sned it to Ted so he can have it made in Hilo.

Patrick – I have sent out a list of problems to discuss with Vertex. Two examples:

1. Motion stalling: Stephan does not know the cause. It is not a serious problem now. However, no one knows the cause can be an indication of a more serious problem.
2. Program track: It does not work!

**Patrick –** We tested the mount after Stephan left. It's mostly ok. However, there's one instance the mount moved past all software limit and stopped at hardware pre.lim el=28.9deg (checked by HPC).
**Patrick** – We also tried to identify the error contributed by the optical telescope tilt. We took images at several azimuth angle at el=70deg. We'll analyze the result. The images were took with startrack on.
**Patrick** – We checked program track functions. Stephan found a problem and fixed it. We will further test it.
(25/Aug/05)
**Patrick** – Some temperature sensors have loose wires that need to be soldered. Someone onsite or in Hilo can do it.
**Hiroaki** – I have circulated some questions about initialization of the pointing schedule and got some comments back. I will implement them and send the subroutine to Michael and it will be integrated into "a_boss".

Site:
**Ted –** Sent more information to cable tray comapny, including cable type, travel range, weight, temperature range, and etc. We'll have more discussion. Our temporary plan is to support the cables from the center of platform with bungee cord.
**M.T.** - We need more engineering mind to help solve the cabling problem.

**M.T. -** I am thinking about placing another office container on site inside our fence area (next to storage) and convert the visitor building to a 3-bedroom sleeping unit.
**C.T.** - Can we put it on top on the storage container?
**M.T.** - It is an option. We need to ask container company for more information.

(11/Aug/05)
**M.T.** - Open issues in general on site:
(1)spare parts for the mount. Philippe will be in charge of it.
(2)helium lines and cables routing to the platform
(3)lightning protection
(4)emergency generator
(5)how do people access the platform. Cherry-picker, ladder?
(6)camping car, accomodation on site?

Receiver:
**Johnson –** We have tested the circular polarizer from Millitech. The relative phase shift is 90deg with very little variation across frequency. It is almost too good to be true. We'll check more carefully before doing cryogenic tests.
(29/Sep/05)

**Pierre** – 1-to-4 cold head power distribution box is finished in the lab. Need to more receivers to be connected and tested if it really works to cool down four Rx. If it work, then we can ship it up to ML.
(15/Sep/05)
**Eugene –** The tests were done with noise coupler installed and seems to be higher than the earliest measurements done on Rx1 without a noise coupler. We need to repeat the test on Rx1 with noise coupler to see whether it increased the temperature or not.
(04/Aug/05)
**M.T.** - Todd Gier is working on our LAN. We will have complete 28 LNAs some time.
For spare LAN, as Prof. Huei Wang suggested, we may consider sending the chips to Wisewave for packaging.
(07/Jul/05)
**Johnson** – We expect to ship Rx5 and Rx6 in mid Aug after IF/LO is finished.
(09/Jun/2005)
**Pierre** – Two quick fixes to the LNA power supply card.

1. Reverse the protection diode instead of removing it should provide a protection at 3V.
2. The polarized capacitor at output is reversed and I suspect it is dead. They should be replaced.

LO/IF:

(29/Sep/05)
**Johnson –** Last week we found two PIN switches not working according to their current consumption. We need to send them back for repair.
(08/Sep/05)
**Eugene** – Johnson reported the modules in Hilo need two hours after switch on to reach stable performance. I think it indicated thermal isolation and the device need time to heat up and establish equilibrium. I think the thermal link should be improved to protect the devices.

Correlator:
**C.T. -** I want to test one baseline with eletronically-tuned attenuator for LO to balance the power between phase states. One concern is if the control has some delay (like we found in prototype testing with a PIN attenuator in 21GHz LO), then the sheme would not work.
C.T. - On the other hand, I have measured IF spectrum in Hilo. I found the 1/f noise with knee around 1kHz. Therefore we should push our phase switch speed to at least ~2kHz.
M.T. - I have heard all the other CMB experiments having phase switch around 4kHz. It's probably a good number to adopt.
C.T. - We inspected the correlator enclosure and will ship it to Hilo soon. Po-I needs to go to Hilo in about two weeks to make preparations for installation.
(29/Sep/05)
**C.T. -** We got three comments from the workshop:

1. automatic gain control (AGC) of IF power
2. LO power balance in phase switch
3. thermal stablize the correlator and IF

**Homin** – Software to control VGA is ready. Once we have the total power detector reading, we can close the loop.
**M.T.** - Our problem is that VGA has different gain and phase response under different control voltage. Can we really use it to do AGC?
**C.T. -** Derek suggested to put some temperature sensors in the correlator box. We will discuss about it in more detail.

Calibration System:

(29/Sep/05)
**Kyle –** I will circulate the test results presented in the workshop for more comments. And we also need to discuss the next step of the calibration system.
(18/Aug/05)
**Kyle** – Pierre found a quote for the motion controller and the PC/104.
**M.T.** - We should discuss it offline. There should be another person to work on this part since Pierre will be working on the shelter part. There may be some changes to the design and so we should hold on the ordering.

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1.2m dish:

(29/Sep/05)
**Philippe –** Paul S. Said he will organize a telecon with Along this week or next week.
**Ted** – We probably want to add some cover on the dish, so we need to ask Along to leave this possibility of the baffle.
**Philippe** – We can discuss it with Along in the telecon, but we need to specify more clearly what we need.

Misc: