

# Minutes for AMiBA Engineering Telecon

Meeting Date: 13-Oct-2005

Participants:

Australia:

USA: M.T., Hiroaki, Paul H.

Taiwan: Homin, C.T., Kyle, Po-I, Joshua, Edward, Ted, Chia-Hao, Patrick, Locutus, Pierre

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Minutes Recorder: Kyle

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## I. New Action Items:

Philippe/Ted - Photogrametry analysis. (See Platform)

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

(29/Sep/05)

**Ted** - Routing cable from ground up to platform. (See Site)

(08/Sep/05)

**Po-I/Ted** - Design a sturdy optical telescope mount (including fixture 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):

**Pierre** - Interlocking mechanism between the hexapod and the shelter. (See Shelter)

(04/Aug/05)

## IV. Miscellaneous Discussions:

Platform:

**M.T.** - Philippe is working on analysis of ~20 orientations of photogrametry results.

**Ted** - The equipment is returned. We have also sent a few data set to the company for advice. They think the camera positions can be more spread out but should be ok. We are working on analysis and still need some time.

(06/Oct/05)

**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** - One year ago we asked Manfred to add a few relays and software in PLC to indicate mount is in parking position. At first it did not work and was disabled. I assume it is fixed now. We need to test its function whether the relay is closed when the mount is parked when next time I am in Hilo.

**Pierre** - I am working on improving the shelter. I plan to go to Hilo in November.

**M.T.** - A contract with ARL is being worked out now. We'll try to get them to come to Hilo in early Nov. They will stay for quite a some time.

**Pierre** - I have sent a mail to ASFI for calculations and detailed drawings.

(06/Oct/05)

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**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.

(29/Sep/05)

**Pierre** - I have received most parts needed to work on shelter motor improvement. 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:

**Po-I** - I have updated all figures of the optical telescope mounting bracket and sent to Homin and Ted. I will send it to MT as well. There is only minor modification.

**Homin** - The design should be finished. Po-I and Ted are getting quotes both from Taipei and Hilo.

**Ted** - I went with Hiroaki to do some mount testing. We encountered an ACU problem but later it was solved by MT and Hiroaki by reset everything along with PLC.

**MT** - We had a telecon with Vertex last Thu. Two major problem is noted. (1) program track; (2) interpolation table. We'll wait for a new version of software to come.

**MT** - Hiroaki tested the stalling problem Patrick reported before and it was indeed gone as Stephan claimed.

**MT** - Michael has some communication with VA about network between ACU and TCS. I will forward the email to people who are interested in.

**Hiroaki** - Michael has incorporated my subroutine into a boss for automatic pointing schedule generation. There was some error messages and Michael said he would look into it but may require some time.

**Hiroaki** - I will also do some analysis on the current pointing data.

(25/Aug/05)

**Patrick** - Some temperature sensors have loose wires that need to be soldered. Someone onsite or in Hilo can do it.

### Site:

**Ted** - I got a reply from Igus (a cable tray company). They will provide some photos and samples for our evaluation on running cables along jackscrews.

**Ted** - After talking to Kyle, there seems no need for a receiver in the central hole and we can use it to route cables. Pierre suggested that we put fixtures both on top and bottom of the cables from ground up to platform center.

**MT** - I am looking for a 2nd container on site. Whether it should be for sleeping or for office, we should make a decision soon.

**MT** - As for a new car, we seem to have reach a consensus. We also need emergency generator and lightning protection.

**Pierre** - I will talk to a electrician in Hilo about emergency generator when I am in Hilo.

(06/Oct/05)

**M.T.** - We need more engineering mind to help solve the cabling problem.

(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) accomodation on site -> 2nd container for sleeping? Or visitor building for sleeping and 2nd container for office?

(7) a new car

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### Receiver:

**CT** - Johnson circulated his report on Millitech circular polarizer.

**MT** - Can we really install it even if it survives the cryogenic test? It doesn't seem to fit in. It would make life easier if we don't need the noise coupler, but we do.

**Kyle** - Perhaps we can consult Millitech to custom made a phaseshifter with square waveguide that is similar to AT's design. Considering their success in this phaseshifter, they might be able to meet our requirement with a square w/g. Pierre - A friend in IRAM asked about the noise figure performance of the LNA we are using.

**Kyle** - According to JPL's test data, they should have noise temperature about 40~60K, but we don't have instrument to verify it. What we have is system temperature measured by Johnson which includes loss before the LNA. The most up to date value is about 80K. If the difference from LNA direct measurement is only because of the loss before the LNA, then the loss could be as large as 2~3 dB, which we don't expect to have. I have asked Johnson to measure the loss of all components before the LNA together, but the feedhorn is difficult to estimate.

(06/Oct/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:

**CT** - We are digging into the correlator error messages problem now. Hopefully I will get some answers from Warwick.

(06/Oct/05)

**C.T.** - I want to test one baseline with electronically-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 scheme would not work.

**C.T.** - I will increase the phase switch speed to 2kHz or 4kHz to beat the 1/f noise in our system.

**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

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2. LO power balance in phase switch
3. thermal stabilize 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:

**Kyle** - I will put together a schedule when the calibration should be online and when we should really push to finish the 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.

### 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: