Minutes for AMiBA Engineering Telecom 20060525

Meeting Time: UTC 1:00, 20060525, (Taipei 9:00am, 20060525) (HST: 3:00pm, 20060526)
Regular Meeting Time: UTC 1:00 Every Thursday
Participants:
Australia: Michael
Hilo: Ted, Chia-Hao, Fabi.
MLO: C.T. (minute), Peter, Hiroaki, Patrick, Johnson, Ken, Fabi, Pierre
Taiwan: Homin, Eugene, Umetsu, Johnny, Kyle, Su-Wei
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- **Upcoming Milestone**
  - **First Image of AMiBA, for system check.**
  - **Target: Sun, without dishes, at least 5 receivers.**
  - **Target date: June 2, 2006**

- AMiBA current status:
  - Hexapod operation:
    - (0522) Patrick confirmed a problem from the symptom reported by CT. Seemed like hexapod did not like to stay in "Preset-mode" for too long. Patrick has reported the problem back to Vertex, and resolutions were being investigated. Termed backward transformation failure.
    - (0516) CT reported further problem in driving hexapod below 60 degrees in elevation. Michael advised on proper way of operation. CT confirmed that operation was initiated from ACU. Would try TCS. Patrick would check out this issue with CT on site.
  - Cold head compressors tripped, both.
    - (log0529) Pierre: Problem is likely from a failing ventilation fan in the compressor. (Please refer to the attached memo in this log) Ted and Johnson had replaced the fail compressor with the lab one. Update.
  - Grxmon did not function properly. Could not monitor multiple receivers under the correlator PC, nor the monitor PC.
    - (0521) The system seemed to be happy with the current configuration. No problem reported from the past week.
  - (0507) DRO & receiver overnight stability. Got measurement. DRO over night seemed OK in both phase and amplitude. MT urged everyone to look into what were the realistic numbers we were after. Would come back to this issue again.
  - 1.2 M dish fabrication:
    - (0521) Philippe spoke to Ong.
      - Another prototype would be made.
      - The mold had been machined again for better surface. Would be confirmed with measurement.
      - The dish surface would be measured right after being made, before extra epoxy or processing. The environmental temperature during the measurement would be monitored.
      - Philippe was concerned with the temperature effect. "…if the temperature variation is 10 deg.C, there may be a problem, For a 10deg, C temperature difference, the aluminum mold expands 144 microns at its edge, whereas the dish only expands about 40 microns. To that, we have to add expansion (local?) due to heat release generated during the curing process. this is difficult to quantify. But laying up the dish in a temperature controlled environment would certainly help."
      - Ong confirmed that for the previous dish, the supporting position (18 points) were accurately aligned. The deformation was unlikely from the supporting configuration.

            - As for aluminum deposit on the cfrp skin, it is not a problem as after curing there was always a layer of epoxy on top and at the bottom of the honeycomb/cfrp sandwich.
        - (0515) Patrick reported 1.2M dish data analysis result.
    - (0516) CT had reported several measurements on sun total power scan:
        - Total power detector saturation? Maybe the TP was toasted. Would investigate.
        - Output power variation, both correlated and uncorrelated were present. Further investigation, and guesstimation for impact and cure.
    - (0517) Second OT on platform Target date: End of May.
    - (0517) Large temperature variation in correlator. Major problem. Resolution to be investigated.
- Intermittent Problems:
    - (20060517) Too much activity and work load in correlator computer? Resolved with extra computer in the cone area? Monitoring computer under the hexapod, permanent or not?
    - (20060508) Hexapod backward transformation invalid? Cause unknow.
    - Compressor occasional trips. Cause unknown.
    - (20060504) ACU occasional crashes. Cause unknown. Reboot the machine would resolve the situation.
- Toward Sun Image:
    - (0525) Keiichi: Code modified for data piplines; also checking on the TS data for lag to visibility; also need to dereive baseline and time stamps of data.
- System Testing:
    - (0525) C.T.: the last interface board (data read out) would corrupt correlation or total power data. Correlator could only take data from 6 rxs. Need some time for debugging in Taipei.
    - (0525) Kyle: Swap the tp detector didn't help. The problem might come from the IF amplifier? Took it down to Hilo, haven't got a chance to debug it yet. IF power from Rx5 IF2 is about 20 dB lower. The problem might be from the LNA. Need update
    - Path length alignment.
        - (0521) Kyle reported his final conclusion on path delay compensation.
            - 10 different lengths of compensation cables are needed:

histogram

cable len (mm)	63	70	77	84	91	98	105	112	119	126	133	total
number	3	7	3	2	8	2	5	6	3	0	3	42

            - This solution is a compromise between residual delay difference and types of cable to order. We should be able to reduce the residual by fine-tuning the variable delay lines.
            - Delay measurement errors from LL (corr box 1) and RR (corr box 2) are correlated and sometimes exceeding the estimated measurement uncertainty. For example, the longest baseline 2-5 and 3-6 might have some systematic error. We will cross-check with the delay measurement from solar fringe.
            - If we want to measure the L/R difference more accurately for better performance of the L-R self correlator, we should measure the L/R swap at 1st section input. Currently only Ant3 was measured with this information. The 4m cable compensation is merely estimation for the other receivers.
            - Full report see: https://amibablog.asiaa.sinica.edu.tw/upload/060522-fringe-delay-report_v1.pdf
    - (0504) Testing Schedule (Kyle)
        - Determine delay difference and order IF compensation cable. (Kyle) Done
        - Test, assemble and install Ant7 (Rx7). (Johnson) Done
        - Install compensation cable and measure Ant7 delay with translation stage. (Johnson?) – *Late May or early June, one week. On going…..*
        - After compensation, measure fringe of each baseline as reference. (Johnson, Patrick, Hiroaki) – *June, two weeks. Need cables*
        - IF, LO monitoring. And phsw power difference, DC offset, noise property investigation. (CT) – *May, three weeks? Update?*

        - 2nd OT installation and verification. (Patrick, Ken) – *On going*
        - Remove 1st OT and install 60cm dishes. Dish/Rx alignment with TP from sun. (??) – *Late June or early July? Two weeks.*
        - Planets! (??) – *July.*
- Hexapod testing:
    - (0522) Extensive discussion on CoR (center of rotation), subtended angle, and pointing errors.
        - OT tilt correction will not change the relative CoR distance from the targeted star. The OT tilt correction merely moves the star and CoR closer to or further away from the CCD center.
        - Zero correction puts the CoR and star far off the CCD by about 0.5deg – a relative alignment error between PT and hexapod rotation axis.
        - OT tilt correction with hexapod move the CoR and star roughly10' from CCD center
            - Remaining OT tilt is around 10arcmin?
            - Perfect correction means the CoR is at center of CCD and the star appears randomly away from CoR with 1~2 arcmin distance. Pointing errors?
            - Distance between target star and CoR is the pointing error, exluding the remaining OT tilt.
        - To focus
            - Remove the pointing error at hexpol=0, then the target star would be on the CoR.
            - Any error after introduction of polarization is the pointing error at different hexpol value.
        - No need to shim the OT for further testing. Sounds great.
    - (0427) Star pointing OK. (0427) Tracking OK. (0504) Polarization test, OK, data analysis was coming, together with interpolation table (Patrick).
- Site:
    - (0526) Pierre reported:
        - COMPRESSORS OUTSIDE ENCLOSURE. Done.
        - SHELTER NEMA 4 ENCLOSURE. Mostly done. Waiting for the flood light bulbs.
        - LIVING CONTAINER: Re-wiring. Done.
        - CHANGE 50 A CIRCUIT BREAKERS FOR THE COMPRESSORS.
            - Wire size AWG 8/4, locked rotor 22A ➔25Amps CB need 6. Pending on part delivery.
        - GROUNDING: Next time.
            - Gounding of the cone:
            - Grounding of the platform (hook to copper plate)
            - Grounding of the shelter
            - Grounding of the fence
        - TRANSFORMER FILTER, Hook & check. Done
        - New ethernet switch installed. Next time.
        - Tiltmeter installed. Next time.

    - (Log0524) Ted reported the control container leakage has been worked on by the Aloha machine. Should be fixed now. Would see in the next raining season.
    - (0504) Firewall (John & Homin), struggling
    - (0504) No update on emergency power generator (Pierre & Ted)
        - (0526) Vendor was working on an enclosure. Need a schedule.
    - (Log0530) container door damaged. Please kept door closed before fixed.
    - (0526) Hexapod transformer would be moved out of the control room. A concrete pad would be made in the near future first. (Ted & Pierre.)
    - Few more tasks or issues need to be discussed or taken care of:
        - Automate the weather station
        - A Site PA system (Over internet?)
        - Lighting protection?
        - A shelter operation procedure. Need fee back from members
        - Fabric replacement (Long term, but important.)
        - Ground shield, feasibility study, may contract to Bill and ARL

        - Supporting cone insulation?
        - Platform covers for drop-thru holes (CFRP, strong structure)?
        - A stair way up to the platform – might have to order an off-the-shelf model and modify it?
        - Crane?
- Calibration:
- RX/IF/LO:
    - (0525) Johnson: finished rx-7 lab testing, would installed on platform in the coming week.

- Correlator:

- Software update:

- Dish:
    - (0511) Philippe proposed 2 ways of reducing the weight:
        - Reduce the thickness of the main dish, but this will be a big problem for the fabrication as the mold is already made. In any case the gain in weight would be marginal.
        - change the structure of the baffle: replace the plain carbon fiber by a composite sandwich, similar to the dish. I already discussed this with Dr.Ong and he said it would be feasible. This would be a substantial gain in weight.
        - Regarding the supporting of the 1,2-m dish on extra points of the platform, this is not straightforward at all, as every location will induce a different behavior to the dish, due to the deformation pattern of the platform. I still need to quantify a few positions to see how they compare.
        - Need more details about the supports UNDER the dish from Ong, but I am still waiting for these details. It may be that we could add an extra structure from the brackets supporting the receiver, depending on the clearance there is.
    - (0504) 1.2 M dish structural support. MTC expresses concern on 1.2M dish mounting mechanism. MTC to ask Philippe to look into this issue.
    - (0504) No update on dish cover.

- Some lingering ideas (Need further sharpened…)
    - (0511) Kyle proposed another run of photogrammetry.
    - (0511) Proty addressed data storage on site.

- Upcoming events:
    - AMiBA Technical Review: June 30, 2006, ASIAA (Taipei)

Traveling Schedule to Hilo	
Chia-Hao Chang	May 2 - June 16 (Hilo)
Ted Huang	May 11 - June 12 (June 13 – 24 to NRAO VLA)
Johnson Han	May 11 - June 13
Ken Chen	May 16 -
Patrick Koch	May 17 - June 12 (June 13 – 24 to NRAO VLA)
Hiroaki Nishioka	May 17 - June 12
Homin Jiang	June 1 – 8 (May 28 – 31 to Orlando)
Locutus Huang	June 6 – July 5
Mark Birkinshaw:	June 5 -11
Katy Lancaster:	June 6 -11
Keiichi Umetsu	June 9 – July 3

ASIAA Hawaii: http://pmo.asiaa.sinica.edu.tw/Hilo%20office/

AMiBA Website: http://amiba.asiaa.sinica.edu.tw/

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Please contact MTC for managing this mailing list