

Minutes of Plan meet of 3 Oct 2013 (follow-up of some pending topics from different areas) :

1. Documentation related :

1.1 Documentation : follow-up on level 2 (ITR) -- from 18 Sep & earlier : conversion of older reports : Check if test range is done. Check for other pending items across groups (e.g. power monitor?). FE group is to come back with which of these are ready to be converted to NTR and publications. ==> no update on test range; new ITRs : power monitor can be started; temp monitor can be taken up later; maybe work on spare for FE feed can be an ITR. To follow-up after 2 weeks to see if a list can be finalised.

1.2 Documentation : SoP for antenna base work -- from 18 Sep & before (SSK/ANR/HRB) : updated version to be made ready for installation of upgrade systems : doc for feeds (HRB) is still pending, inspite of repeated discussions !! ==> job not completed and HRB is now away for almost 3 weeks !! To follow-up after 3 weeks.

1.3 Follow-up on level 3 (NTR) -- pending for long : from 18 Sep, 28 Aug & before (SSK): to check status of report on design of OF system -- SSK to confirm. ==> no updates. To try again after 2 weeks !

2. FE & OF related :

2.1 Update on results from test range -- pending from 18 Sep & before (HRB/GSS/SSK) : (i) phase centre tests for 250-500 CDF : to report on expt with 10 to 20 mm height change in 250-500 feed on one antenna to see how much change in sensitivity is seen. Need short note summarising the results : to check if last measurement with reduced height has been completed and results ready for release. This is long overdue !! -- HRB to give update. ==> job not completed; still awaiting update. (ii) update on calculation (based on reference paper) of the expected deflection at 450 or 500 MHz and comparison with measurements to see if we are losing significant sensitivity -- GSS to come back with refined version more relevant for GMRT, and to see if further expts with 250-500 or 500-1000 feed are useful : cross check of results from code (0.3 dB for 0.5 lambda) wrt curves from Kildall paper and our 250-500 feed was to be reported -- to check if bug has been fixed. This is also long overdue -- GSS to give update. (iii) status of phase centre checking for ver1 550-900 CDF and CSIRO feeds -- waiting for results with new VVM set-up : results from tests of ver2 550-900 CDF. To check how long it will take to get test range functional (encoder problem). ==> no updates. To check again after 2 weeks.

2.2 RF dump tests for new feeds -- from 18 Sep & before (HRB/GSS/SSK/NK) (i) new data and results for 130-260, 250-500, 550-900 (HRB/SSK/NK) : (a) follow-up on discussion of current results : understanding of bad antennas for 250-500 band (e.g. C6, S2, S4) -- control expt with 3-4 bad antennas (with one good antenna)

tracking on-source and off-source to be completed for long duration (4-5 hr) test  
(b) getting some more data at night time (for both 250-500 and 130-260), following request by NK. It has been done for 130-260 and 250-500 -- waiting for feedback from NK.

==> NK has sent first round of results; needs some discussions and also follow-up with interferometric tests.

(ii) scheme for (re)calculation of expected values across the broad bands to be finalised (and added to measured curves) -- (SSK/GP/HRB) : to check follow-up from 28 Aug -- generating curves using constant value for QH and to check if data sheet for QH shows variation in value with frequency -- new plots to be sent out; to check if NF of the amplifier is changing with frequency and can be measured.

==> Tlna varn with freq is already incorporated into the model (measured values at 5 MHz step size are used); to try to model effect of main BPF and see what the theoretical curves look like.

Follow-up after 2 weeks, as feasible.

2.3 Follow-up on 550-900 MHz band filters -- from 18 Sep & before (ANR/SSK) :

(i) status of delivery from vendor and testing of prototype meeting full specs: was due in 1st week of September; to update status after last round of discussions

==> vendor is still struggling to get the job done -- waiting for a final set of PCBs and will come back in 2 weeks.

(ii) status update on in-house development work : status of testing prototype

for (a) modified for 15 MHz shift (b) second sub-band -- to confirm if the results match with specs or not, and if other 2 sub-bands can be send for prototype samples

==> confirmed that first 2 sub-bands match with the specs; second 2 sub-bands have been sent, will come in 10 days or so. To explore the possibility of combining these into a switched filter bank (Imran).

Follow-up after 2 weeks.

2.4 Total power detector for FE and common boxes -- from 18 Sep & earlier (ANR/SSK) :

follow-up on plans for final scheme : 20 dB coupler for CB and 10 dB coupler for FE (at final output) with common 20 dB amplifier (maybe Galli-52 instead of Sirenza)

-- sample unit ready and tested in the lab with 2 chans for 1 common box; lab monitoring of signals via MCM card now working :

(i) to confirm if values can be read from online system now

==> able to read and values are making basic sense; procedure in online needs to be streamlined (by JPK) -- will happen during the MTAC.

(ii) check status of two units installed on antenna (E2) -- both channels.

==> tested for 2 wave bands; testing will speed up after (i) is completed.

(iii) plans for building 70 units : most of the parts have been ordered; need to confirm about connectors and chassis

==> for all units of CB design, connectors are available; chassis work request has been given.

(iv) plans for prototype of the FE monitoring unit to be taken up for discussion

==> waiting for prototype PCBs to come back; small number of chassis also requested for; need to make sure about online monitor channel to be used (with JPK).

(v) plans for ITR on the work.

==> to start thinking about it now.

Follow-up on all items after 2 weeks.

2.5 FE power supplies at all antennas -- from 18 Sep & before (SSK/ANR) : Some antennas have FE supply (some are home made, some are the original supplies); other antennas use the ABR power supply which can lead to problems of overloading etc; only 5 antennas remain with shared supply and none are upgraded systems.

(i) solution 1 : update on plans for in-house completion of 5 supplies -- to check status of work on 2 units and plans for the remaining; also improved ripple performance.

==> no progress in this duration as people are busy with Lband spare feed.

(ii) short-term : plans for purchase of off-the-shelf supplies & scheme for usage. check if new enquiry has been floated and quotes have come.

==> 3 quotes received; folder should be processed by next week.

To follow-up after 2 weeks.

2.6 Fixing the non-working L-band feeds (short-term problem) -- from 18 Sep (SSK/ANR) : we have 32 feeds, 3 not working (1 dismantled for making drawings of new feed); all are device failures, but not able to put new device and tune it; now some LNAs have been successfully assembled by Gopi.

(i) check delivery date for toroids.

==> have arrived.

(ii) check performance of feed sent to W1.

==> working all right, with close to expected deflection.

(iii) status of completing one more feed (for E5?).

==> LNA tuning is still giving trouble -- only one new ckt is ready; new ckt is giving a lot of problem; now trying with old ckt (from failed FE units) by changing device (update from Gopi later that day and couple of days later : 4 old LNA units resurrected by changing the first stage device with new one and retuning ==> 2 antennas can be restored)

(iv) check status of alternate LNA designs : for OHMIC make, there was a problem of poor return loss -- mismatch problem? for MMIC ckt of Skyworks: PCB & chassis to be completed, while waiting for device to arrive.

==> not much time for work on OHMIC device, where matching ckt is needed -- may not be very useful.

for Skyworks MMIC : MOQ is 3000 nos ! trying to get a few samples from the vendor. Additionally to try and see if the design used for 550-900 can be modified for 1-2 GHz use -- to check the design done by Abhay Kulkarni.

To follow-up after 2 weeks.

2.7 Spares for L-band FE electronics -- from 18 Sep & before (ANR/SSK) : (check which of these items are complete and can be closed)

(i) RFCM-type card status (3 nos of old RFCM cards are ready) : check status of PCB design for the new (compact) card.

==> may have a PCB layout ready to send for fabrication in a week's time

(ii) noise gen : status of assembly & testing of new PCB.

==> assembly & testing yet to start.

(iii) post-ampl & phase switch : to update about the wiring & testing work.

==> 4 units wired and tested and ready.

(iv) timescale for integration : all components (except LNAs) for assembly of 3 feeds now ready; 2 feeds ready in workshop -- results from return loss tests to be updated; time scale for bringing to GMRT for integration with the electronics to be decided. To follow-up after 1 - 2 weeks.

Side item : Right now only 27 antennas working at Lband ! To try and fix at least 2 antennas by MTAC or restore with old feeds (upto 2 dB down in deflection)... plus new feeds are wanting LNAs ONLY !! (see latest update under item 2.6(iii))

2.8 Walsh switching arrangement in FE -- from 18 Sep and before (SSK/SC/PAR) : Some tests have been done on the bench by FE group; first draft of report has been circulated.

(i) to devise a simple test using Lband system + radiation from apex to demonstrate the working of the system

==> not done yet, but can be tried on any working Lband antenna (not necessarily broadband path).

(ii) plans for implementation in other systems e.g. 250-500 FE box

==> this needs to wait for the new RFCM card to be ready; phase switch is already there in the new ckt.

(iii) joint discussion with BE team for matching test in BE system.

==> this has been discussed with BE team and can move as their agenda items ; FE team to provide a sample stand alone phase switch unit to BE team.

Follow-up after 2 weeks, as needed.

2.9 Characterisation of new FE+OF systems -- from 18 Sep, 4 Sep, 28 Aug & before (PAR/SSK/DVL) :

(i) follow-up from the latest summary and trends for L-band results over the past few weeks : (a) all antennas with deflection less by 2 dB or more to be taken up

(~ 3 antennas with ~ 5 dB less) (b) similarly for antennas at 250-500 :

W1 & C4 repaired, W5 was due next -- completed (python work). FE wants the python config in E6 to be adopted for all antennas -- this needs to be discussed with mech group and finalised.

(ii) slope across 400 MHz : worst case antennas (~ 18 dB change) were to be checked at antenna base (C13, W1, S2...) -- new bandshape plots have been circulated; to be discussed for possible follow-up action.

==> many of these are reasonable; some of them show ripples; a few show slightly funny shape -- needs to be investigated; comparison with antenna base measurements to be done.

(iii) optimal settings of attenuator values to be communicated to control room; setting of attenuators to come from a set-up file (for memory of last setting); factor of 2 (due to control bit problem, will be solved in new MCM only) to be brought out explicitly in the values used by control room (mapping table to be implemented).

==> work is ongoing on both these items; to be finalised with online team later on.

(iv) is the power level too high for 250-500 system?

==> remains to be seen after some more testing.

(v) to characterise the recommended attenuator settings for 610 band -- this was due for completion last week.

==> not done yet.

To revisit relevant items after 2 weeks.

2.10 Releasing existing 610 MHz system as part of the wideband upgrade -- from 18 Sep (SSK/ANR) : Preliminary tests of existing 610 feed through the wideband path show that ~ 100 MHz usable bandwidth may be possible. To explore in detail if this is a feasible "bonus" that can be added to the phase-I u-GMRT : agreed that only RF filter needs to be changed; to confirm if lumped element boards are available for making new RF filter. To explore combination of 550-900 BPF + mobile band notch filter on one antenna as test case -- when can this be scheduled? Plan was to have one antenna one pol modification done in FE box of one of the broadband antennas.

==> new filter can be used, but chassis will be needed. can aim for 2 weeks time scale. To check status after 2 weeks.

2.11 New filters for Lband -- from 28 Aug 2013 (ANR/SSK) : Sample Lband full-band BPF had been designed -- has no slope with freq and better insertion loss. Q : should we develop prototypes for the Lband sub-band filters

using this approach. This needs to be taken up for discussion at a later point.  
=> some discussion on this, not clear if it has any real advantage; agreed to make a plot comparing old and new filters for full band BPF for quant comparison. Follow-up after 2 weeks.

2.12 Calibration scheme with radiator at apex of antenna -- from 18 Sep & before (SSK/PAR/SRoy/DO/YG): to follow-up on detailed discussion meeting in August : to schedule follow-up action appropriately, breaking the issue into smaller, more tractable parts : (i) testing of dynamic range of old vs new electronics (SRoy to work with FE team on this) (ii) finer aspects of variation of ampl and phase with various external parameters (DO to work with FE team on this) (iii) plans for taking up other longer ranging goals to be discussed; meanwhile feasibility of connecting noise source and radiating to be looked at by PAR.  
=> to try and have parallel set-up on 2 antennas -- one with old and one with new electronics; to look for broadband antenna for long-term; to try for noise gen test also. Follow-up the status after 2 weeks.

2.13 OF systems -- from 25 Sep, 18 Sep, 4 Sep & before (SSK/PAR) : Plans for further systems : component ordering for remaining items : all except thermo-electric cooler are in full quantity : update on ordering of balance units of thermo-electric cooler. no updates for a long time ! Follow-up next week needed !!  
=> PAR will close the matter today. To check next week and really close !!

### 3. RFI related matters :

3.1 RFI testing of Miltech PC + ethernet switches for antenna base -- from 14 Aug and earlier (PAR/SSK/SN):

(i) update on testing new i5 Miltech PC alone (and later with peripherals using new shielded ports, connectors, cables + Rabbit card). First report circulated, has 3 main suggestions : more screws on panels; panel mount pwrline filters instead of chassis mount; use without kbd & mouse OK. Tests using integrated kbd+mouse unit also show RFI; to report on follow-up with Miltech on these matters.

=> Miltech engineers visit last week was useful and report was shared with him and improvements were discussed; they are ok for the 2 changes in the next order of 2 PCs (tbd by Ops Group); only integrated mouse + kbd left unresolved.

(ii) integrated testing of PC + peripherals done : miltech i5 PC + shielded media converter + Rabbit card (with Akvira make shielded box) tests showed good performance (full details, alongwith block diagram, to be added to the report); can order 2-4 shielded box for Rabbit with Akvira (with modified connector diagrams). updated report with full details to be produced; modified drawing to be completed; follow-up action to be decided.

=> to check if updated report has been circulated; to work with Rajesh Lolap to complete the drawing mods and send the order to Akvira for 4 boxes to complete prototype work. Follow-up after 2 weeks.

3.2 RFI tests of ethernet switches for antenna base -- from 18 Sep & earlier (SN/BAK/SSK): update on testing the available switches for RFI (as per 29 May discussion); plans for design of RFI box for ethernet switches : some tests have been done and reports are awaited; some follow-up action needs to be taken up. Status of ongoing efforts for (i) procurement and testing of switches and (ii) design of RFI enclosure to be summarised. Was waiting for drawing to be completed by Rajesh Lolap for fabrication to start -- to update the status of this.

=> problem in getting shielded, panel mount eth connectors -- trying other parties;

to work with RL for completion of drawing. Follow-up after 2 weeks.

### 3.3 Mobile phone RFI -- from 22 Aug and earlier (SSK/PAR) :

(i) no progress on having more phone units with software loaded -- matter closed.

(ii) progress on identifying the operators at and around E06, and in Nagar, Junnar directions (follow-up with sending letters to BSNL etc).

==> letter to be finalised and sent !! Follow-up after 2 weeks.

### 3.4 Follow-up on UPS RFI -- from 18 Sep & earlier (SSK/PAR/RVS) :

(i) procurement of units from Miltech (RVS) -- Status of follow-up on repaired 1 kVA units from Miltech; status of order for 3 kVA unit from Miltech.

(ii) follow-up from RFI testing of Ador unit -- to check RFI results for 2nd unit from Ador and decide follow-up action for mass production (this is now linked to item on estimation of total power budget at antenna base !).

==> Miltech 1 kVA has been repaired during visit of Miltech and will be tested for RFI today. no updates on Ador related matter. Follow-up after 2 weeks.

### 3.5 Discussion relating to Industrial RFI survey -- from 18 Sep (PAR/SSK) :

revised docs (from 2009 and 2012 discussions) had been circulated by RFI group and were discussed in 5 June meeting (is the document too exhaustive?) : immediate follow-up action identified : RFI team has met DIC for conducting a joint survey -- summary of this meeting to be circulated; plans for starting survey from Oct with 2 teams (with extra manpower -- Amit Sawant available?), lasting for one month, using SoI maps etc, to be finalised.

==> work ongoing to make a map which clearly shows the zones and give a list of villages / towns in each zone. to get organised for trying to start by 21st Oct; yet to contact Amit Sawant (to make 2 teams). Check again after 2 weeks.

## 4. Operations :

### 4.1 Development of M&C software -- from 28, 14 & 7 Aug & before (JPK/RU/SN/NGK) :

(i) new things related to old software : new requirements from FE monitoring of temp and power : FE monitoring of all 64 channels from RFCM card to MCM card to Laptop via serial to USB converter; available as a file on the PC -- done by RU for FE group; also monitoring of all the channels at control room -- JPK looking into identifying the appropriate channel(s) -- job done for 6 signals, instead of 7 signals that are required (to check for completion and then close this item).

Temporary job can be done for monitoring of GAB points via Rabbit card; long-term task with changes in structures in online to be taken up during MTAC period.

==> From email update from SN & JPK : FE monitoring is tested and needs to be incorporated into ONLINE. For GAB monitoring, first order test has been done which is working OK. During MTAC period, the FE & Sentinel (3 phase MSEB/UPS) will be incorporated in ONLINE.

(ii) plans for modbus learning & testing : simple set-up of PC + Rabbit card with modbus for "hello world" level.

==> From email update from SN & JPK : SN will work with NS and JPK to get this set-up going.

(iii) plans for EPICS : simple set-up of PC + EPICS talking to Rabbit (with our native protocol), maybe with Subhro's help. Will be useful as a test set-up for TCS to work with later on.

==> From email update from SN & JPK : above set-up (in item (ii) above) can be used for the EPICS testing also, with participation from TRDDC colleagues as needed.

(iv) follow-up on interface of FE with new M&C system -- SN + SSK to report about plans for this.

==> From email update from SN & JPK : yet to report any progress on this.

(v) plans for ordering a few Miltech PCs (and take a final call later on); and populating a few antennas with Rabbit card (with or without PC) for testing.

==> no updates.

(vi) plans to organise larger discussions regarding major decision items

==> no updates.

To follow-up after 2 weeks as needed.

4.2 Identification of appropriate ethernet switches for antenna base (and GAB)

-- from 18 Sep & before (SN/PAR/BAK) : Ops group to work with Comp team and RFI group to plan for trying some of the 16/24 port switches for antenna base use :

(i) update on process of short-listing and comparison of specs, followed by indenting for suitable samples : quotes had been received for CISCO, HP, DELL and D-link -- check status of folders

(ii) appropriate RFI cabinet for the switch -- update on status of work and plans

==> no updates on these items. To follow-up after 2 weeks.

4.3 Identification of appropriate eth switch for central building -- from 18 Sep

(CPK) : Ops group feels we may need L3 with a high speed 40 Gbps connection to server (over IB). 2 possible models have been identified HP and Cisco (48 port, costing ~ 5 lakhs. To discuss possible follow-up options.

==> no updates on this item. To follow-up after 2 weeks.

4.4 Planning for proper space utilisation for new equipment at antenna base --

from 28 Aug, 31 Jul & before (SN/CPK/RVS) : long-term plans for proper utilisation of the space at antenna base. Follow-up on 14 Aug discussion on first report :

reducing space requirement by making MCM cards horizontal; check with electrical if isolation transformer can be moved somewhere else in the room; outcome from discussion about electrical consumption (2.6 kVA for new systems, 3.5 to 4 kVA for old + new systems) -- can this be reduced? Detailed discussion with RVS has taken place -- results to be summarised and discussed and follow-up action to be decided.

==> no clear updates, discussion still ongoing with RVS and others; need to check again after 2 weeks.

5. Back-ends :

5.1 Support for 250-500 MHz in new 8 antenna GAB -- from 4 Sep & before (NDS/BAK) : requires LO scheme going below the current 600 MHz; need plans for long-term solution. Two options to be explored :

(i) sig gen with eth control as default -- this can be done; to check if something other than web-based interface can be done. Maybe USB scheme developed earlier can be modified ?

==> agreed to be taken for in-house development

(ii) new LO generation circuit using new AD chip that can cover the full range -- to develop sample prototype to check. actual order not yet placed; comes with full PCB, only software has to be written.

==> some sample units are coming shortly; can be tried for GAB prototype.

Can follow-up both items after 1 month.

5.2 Power equalisation schemes for new back-ends -- from 25 Sep & before

(SSK/NSR/JPK/BAK): Discussion on implementation of pseudo-ALC to be taken up  
=> discussion about possible modes,  
(i) on demand  
(ii) repeatable at some interval specified by the user  
(iii) automatic, should adjust in response to a stimulus in the input power  
(iv) should provide a reliable power monitoring scheme  
digital power equalise also discussed; need a overview document on the planned activities and details of the way forward. To follow-up after 2 weeks and check.

5.3 GPU corr status -- from 25 Sep & before (SHR/GSJ/SSK/BAK/DVL) :  
updates on following items, pending from last discussion :

(i) release of 4 node, 8 input, 200/250/400 MHz version (SHR/SSK/BAK):

(a) 1.7 s time offset problem to be resolved.

=> not checked yet.

(b) starting problem : often comes up with split behaviour of fringes only for 4 antennas on each FPGA board; also some bad bandshapes are traced to FPGA boards.

=> to check if it shows in the newly released version of the code

(c) update on code for providing basic beam modes (computational load is 3 to 10% of GPU compute time) -- waiting for completion of process\_psr pipeline

=> SSK to look into it and see what can be done.

(d) to start testing 400 MHz BW mode -- how best to conduct these tests?

=> need some changes in the main code to handle 4 bits etc...

(e) to move data collection to additional host node -- is that possible now (along with polar mode release)

=> basic tests with 3 modes total I single pol and dual pol and full polar have been tested from a separate area -- to integrate into trial area of main code branch and test fully.

(ii) release of 8 node, 16 input, 200/400 MHz version (SHR/SSK/GSJ/BAK) : 8 nodes with C2050/C2075 GPUs and one host m/c now connected to the new IB switch (subset of this works as the 4 node, 8 input system in item(i) above). Pending issues :

(a) to finalise the analog signal connection : agreed to start with 8 ant dual pol and then convert to 16 ant one pol -- to ensure analog connections are ok for this.

(b) plan for testing and release etc to be finalised -- GUI to be modified for both kinds of systems.

=> items agreed upon, action needs to start.

(iii) update on testing K20 card (SHR/SSK) : XGPU code, reshuffle algorithm, new optimisations from nvidia etc. : to discuss note circulated by SHR; plans for follow-up discussion with nvidia.

=> no updates; to find a way to move forward.

(iv) plans for work on 4 new DELL machines (GSJ/SHR) : stand alone 2 x 10 Gbe I/O + corr tests on the R720 and T620 machines to be done. Fedora17 to be tried? Do we need an extra switch? clock source? GPS source? Layout diagram to be updated and long-term plan for racks to be initiated.

=> need 1 16-port 1Gbps and work is ongoing to get GPS, for clk source would like to use a sig-gen; 8 port IB switch is available....

(v) procurement of accessories like network cards, disks, cables etc to be looked into -- to finalise the type and quantities

=> 4 nos of dual 10 Gbe NIC cards is in process; no other major requirement at present.

To follow-up relevant items next week, others 2 weeks later.



5.4 8 antenna back-end tests and future plans -- from 18 Sep (DVL/YG) :

(i) report of efforts to summarise all the existing tests and results : should be ready by now; DVL to update status.

(ii) plans to extract consolidated results and conclusions from the above -- phase wraps, ripples in passband, spikes / RFI in passband, variation of self power levels (with time and across frequency), level of correlation coeffs etc : initial update circulated by DVL -- to be discussed and follow-up action firmed up.

(iii) report on results from Lband test data for imaging of point sources and extended sources (including comparison with GSB) and further plans : to confirm if position shift is due to self-cal or not. To fold in results from tests of 18th Sep -- update is needed !

(iv) plans for further testing with 110 / 200 MHz BW signals at LBand.

(v) plans/strategy for tests at 250-500 and also 610 -- some long tracks to be tried out.

(vi) plans for running the new back-end in parallel with all GSB observations at Lband, 610, 325 and 243 bands : SOP with appropriate settings etc. -- this needs to be formalised asap with a few more additions.

==> no direct updates on this; to do a final cross-check on this, and take up next week as needed.

5.5 SFP testing of final unit -- from 22 Aug, 7 Aug & 24 July or so (KDB/BAK) : SFP+ side working fine for both Cu and Opt; XAUI CX4 side is still flaky -- may still be marginal in timing. Update required from new tests after fresh inputs from vendor.

==> no response from MTE -- YG to probe? Follow-up after 2 weeks.

5.6 New item : Walsh modulation discussed briefly.

To be followed up actively, from 3 weeks later onwards.

5.7 New item : RFI filtering : to add the first version of the real-time RFI filtering block (after some modifications) into the packetizer design -- should be possible. To follow-up after 3 weeks.

Naming : GWB

6. Other items :

6.1 Jobs at TIFR -- from 18 Sep (HSK/SKG) : to follow-up on the following :

(i) update on status of our jobs at TIFR -- check status of collecting the pending jobs (how many are remaining?), and finishing in NCRA workshop of jobs already collected.

==> 125 out of 180 are ready for pick-up; remaining after December. Follow-up after 2 weeks.

6.2 Coexistence of 50-90 MHz RRI feed with 250-500 CDF on same face of turret -- from 18 Sep and before (HSK) : Mech group to check for possible solutions and report back, after looking at the drawings (awaited from RRI). Follow-up action with RRI required.

==> YG to follow-up further with Uday at RRI. Meanwhile, we can try reverse engineering to get the dimensions. To check status after 2 weeks.

6.3 Problem of access to FE boxes with 500-1000 CDF feed -- from 18 Sep & before

(HSK) : Update on new solution being designed by Mech group -- test was to be done : trial run in dummy area, followed by test at actual height -- to update results of these tests.

==> no progress on this yet. To check again after 2 weeks.

6.4 Work orders for CSIRO feed with 2 parties -- from 18 Sep & before (HSK/JNC/ANR) :

(i) whether filling operation is over and new lab tests have been done on feed.

==> new silver epoxy material has come, but work has not yet been done. To check after 2 weeks.

6.5 Fabrication of 5 spare L-band feeds -- from 18 Sep & before (SSK/HSK) : to check about

(i) faulty unit from Akvira Engg has come back and tested in FE lab?

==> repaired unit was tested and not found ok in RL ; replacing of 4 ribs with those from original #32 made it work.

(ii) latest status of orders on other 2 parties (Physimech, Fabromech)

==> both units are in GMRT w'shop, can be handed to FE lab for testing.

To follow-up both after 2 weeks.

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MoM of Plan meet of 23 Oct 2013 (follow-up of some pending topics from different areas) :

1. Documentation related :

1.1 Documentation : follow-up on level 2 (ITR) -- from 3 Oct & earlier :

conversion of older reports : Check if test range is done. Check status of other (new) items : power monitor, temp monitor (later), filter designs, spares for 1420 feed etc... to see if list can be finalised. Also, can we look at which ITRs may be ready for conversion to NTRs?

==> test range has appendix pending -- can check after 2 weeks; FE group will start on the other items. Overall follow-up after 2 weeks.

1.2 Documentation : SoP for antenna base work -- from 3 Oct & before (SSK/ANR/HRB) :

updated version to be made ready for installation of upgrade systems : doc for feeds (HRB) is still pending, inspite of repeated discussions !! Long gap of 3 weeks due to HRB being away.

==> no updates, even though HRB is back. To be checked next week !

1.3 Follow-up on level 3 (NTR) -- pending for long : from 3 Oct, 18 Sep, 28 Aug

& before (SSK): to check status of report on design of OF system -- SSK to confirm.

==> no progress. urged SSK to find the time for it. Follow-up after 2 weeks.

2. FE & OF related :

2.1 Update on results from test range -- pending from 3 Oct & before (HRB/GSS/SSK) :

(i) phase centre tests for 250-500 CDF : to report on expt with 10 to 20 mm height change in 250-500 feed on one antenna to see how much change in sensitivity is seen. Need short note summarising the results : to check if last measurement with reduced height has been completed and results ready for release. This is looong overdue !! -- HRB to give update.

==> no updated; SSK / GSS to talk to HRB about it. Follow-up after 2 weeks.

(ii) update on calculation (based on reference paper) of the expected deflection at 450 or 500 MHz and comparison with measurements to see if we are losing significant sensitivity -- GSS to come back with refined version more relevant for GMRT, and to see if further expts with 250-500 or 500-1000 feed are useful : cross check of results from code (0.3 dB for 0.5 lambda) wrt curves from Kildall paper and our 250-500 feed was to be reported -- to check if bug has been fixed. This is also loong overdue -- GSS to give update.

==> GSS has located a better (more accurate) routine for doing integration -- will try to release and test code by next week. Follow-up after 2 weeks.

(iii) status of phase centre checking for ver1 550-900 CDF and CSIRO feeds -- waiting for results with new VVM set-up : results from tests of ver2 550-900 CDF. To check how long it will take to get test range functional (encoder problem).

==> encoder order gone, will take some time; meanwhile, alternate scheme with graduated Al strip + webcam implemented and tested with Pune Univ student project. Can be used as an interim solution and work can resume.

Follow-up on all items after 2 weeks.

## 2.2 RF dump tests for new feeds -- from 3 Oct & before (HRB/GSS/SSK/NK)

(i) new data and results for 130-260, 250-500, 550-900 (HRB/SSK/NK) : (a) follow-up on discussion of current results : understanding of bad antennas for 250-500 band (e.g. C6, S2, S4) -- control expt with 3-4 bad antennas (with one good antenna) tracking on-source and off-source to be completed for long duration (4-5 hr) test ==> data taken for 8 antennas 250-500 band for 6 hrs and results will be released soon.

(b) follow-up from analysis done by NK and plans for interferometric tests at 130-260. ==> no updates.

(ii) scheme for (re)calculation of expected values across the broad bands to be finalised (and added to measured curves) -- (SSK/GP/HRB) : curves now being done with constant QH value and with variation of  $T_{lna}$  with freq incorporated; FE team to model the effect of the main BPF and see if the curves match better with data.

==> yet to be done and checked.

Follow-up on all after 2 weeks.

## 2.3 Follow-up on 550-900 MHz band filters -- from 3 Oct & before (ANR/SSK) :

(i) status of delivery from vendor and testing of prototype meeting full specs: whether he has delivered anything or not.

==> no updates.

(ii) status update on in-house development work : to confirm if all the 4 sub-bands are working ok and compare with full BPF. FE team to explore the possibility of combinind these into a switched filter bank.

==> basic bandwidth specs are met; to check difference in roll-off on the 2 sides (log-log plot etc); to make individual chassis for each sub-band and hook-up with the switch chassis into a n/w and do overall test and characterise the performance.

Follow-up after 2 weeks to take a final decision on this item.

## 2.4 Total power detector for FE and common boxes -- from 3 Oct & earlier (ANR/SSK) :

follow-up on plans for final scheme : 20 dB coupler for CB and 10 dB coupler for FE (at final output) with common 20 dB amplifier (maybe Galli-52 instead of Sirenza) -- sample unit ready and tested in the lab with 2 chans for 1 common box; lab monitoring of signals via MCM card now working :

(i) to confirm if procedure for reading from online has been streamlined by JPK.

==> basic set-up is working and values can be seen in online display, but some initial set-up is required. Alternate arrangement to get table values from online and then run a program to convert to power values (using calibration formulae) worked out by GP and JPK.

(ii) check status of testing of 2 units installed on E2 after (i) is done.

==> sample data shows things are working; more sophisticated tests with on and off source tracking planned (alongwith digital backend running).

(iii) plans for building 70 units for CB : need to confirm about chassis; timeline for completion of the units to be discussed.

==> sample chassis had alignment problem; correction has been told (better to give a drawing); mass production can start as the chassis start coming.

(iv) plans for prototype of the FE monitoring unit : check if prototype PCBs have come and have been tested; status of chassis request; online monitor channel to be checked (with JPK).

==> PCBs have come and are being populated for testing.

(v) plans for ITR on the work.

==> can wait till FE part is tested.

Follow-up after 2 weeks.

## 2.5 FE power supplies at all antennas -- from 3 Oct & before (SSK/ANR) : Some

antennas have FE supply (some are home made, some are the original supplies); other antennas use the ABR power supply which can lead to problems of overloading etc; only 5 antennas remain with shared supply and none are upgraded systems.

(i) solution 1 : update on plans for in-house completion of 5 supplies -- to check status of work on 2 units and plans for the remaining; also improved ripple performance.

==> ripple reduced from 700 to 100 mv by increasing capacitor bank; to check about assembling the units, including boxes from workshop.

(ii) short-term : plans for purchase of off-the-shelf supplies & scheme for usage. check if order has been placed.

==> order has gone about 2 weeks ago.

Follow-up after 2 weeks.

2.6 Fixing the non-working L-band feeds (short-term problem) -- from 3 Oct & before (SSK/ANR) : we have 32 feeds, 3 not working (1 dismantled for making drawings of new feed); all are device failures, but not able to put new device and tune it; now some LNAs have been successfully assembled by Gopi.

(i) update on how many antennas fitted with newly assembled LNAs and check performance of those feeds (W1, C3, E2, E5 etc ?).

==> upto E5 done, but may still be having some problems.

(ii) discuss plans for how many LNAs we should have ready and available as spares.

==> to keep a target of 5 spares at any time.

(iii) check status of alternate LNA designs :

(a) for OHMIC make, there was a problem of poor return loss -- matching ckt being made?

==> no updates, work tbd.

(b) for MMIC ckt of Skyworks: MOQ was 3000; trying to get a few samples from vendor.

==> no response to request for sample units; will try with Argus also.

(c) third option agreed upon : to try and see if design used for 550-900 can be modified for 1-2 GHz use -- to check the design done by Abhay Kulkarni.

==> no clear update; to check and confirm and decide whether to follow this option or not.

Follow-up after 2 weeks.

2.7 Spares for L-band FE electronics -- from 3 Oct & before (ANR/SSK) : (check which of these items are complete and can be closed)

(i) RFCM-type card status (3 nos of old RFCM cards are ready) : check status of PCB design for the new (compact) card.

==> Pune vendor not able to make the PCB (too dense) -- now sent to Argus -- may work out ok.

(ii) noise gen : status of assembly & testing of new PCB.

==> PCB assembled, but no spare feed available to do the testing. Agreed to first test on the bench and then integrate with feed.

(iii) timescale for integration : all components (except LNAs?) for assembly of 3 feeds now ready; 2 feeds ready in workshop -- results from return loss tests to be updated; time scale for bringing to GMRT for integration with the electronics to be decided.

==> LNAs still to be made ready; feeds : Physimech not ok as drawings not ok; Akvira : repaired unit now gives -10 to -14 dB over the band after some work on the probe contacts. Old ridges in the new feed gives better than -15 dB RL.

One set of ridges to be remade by Akvira. To converge on Akvira option (==> 1 feed) and then see what needs to be done with Physimech.

Follow-up after 2 weeks.

2.8 Walsh switching arrangement in FE -- from 3 Oct and before (SSK/SC/PAR) :

Some tests have been done on the bench by FE group; first draft of report has been circulated.

(i) to devise a simple test using Lband system + radiation from apex to demonstrate the working of the system (on any antenna).

==> no progress on this.

(ii) plans for implementation in other systems e.g. 250-500 FE box -- needs only the new RFCM card to be ready (as final phase switch is already there in the new ckt) can be coupled with exercise of assembly of final 250-500 FE box in the lab?

==> integration is waiting for connector problem to be resolved. to try an interim solution for the connector to complete the integration.

(iii) joint discussion with BE team for matching test in BE system : FE team to provide a sample stand-alone phase switch unit to BE team (item can be moved to BE section after that).

==> not done yet, but there is no fundamental problem; can check after 1-2 weeks.

Follow-up after 2 weeks.

2.9 Characterisation of new FE+OF systems -- from 9 & 3 Oct & before (PAR/SSK/DVL) :

(i) follow-up from the latest summary and trends for L-band results over the past few weeks : (a) all antennas with deflection less by 2 dB or more to be taken up

(~ 3 antennas with ~ 5 dB less) (b) similarly for antennas at 250-500 :

W1, C4 & W5 repaired, which antenna is next?

==> waiting for update.

(ii) slope across 400 MHz : worst case antennas (~ 18 dB change) were to be checked at antenna base (C13, W1, S2...); results from new bandshape plots show few antennas have significant ripple & few have funny bandshape -- these need to be investigated, with comparisons with antenna base measurements.

==> some more test data has been taken; waiting for update.

(iii) settings of optimal attenuator values by control room : since 2 dB step size will remain for some time (till new MCM is used), settings in online files to be changed accordingly; look-up table or file arrangement with recommended attenuation setting for each band to be made available in control room asap -- check if these have been completed.

==> 2 dB related aspect appears to have been fixed; aspect of reading settings from a file and implementing needs to be taken up with Ops team.

(iv) is the power level too high for 250-500 system? -- to be ascertained after some more testing.

==> to be clarified.

(v) to characterise the recommended attenuator settings for 610 band -- this was due for completion end of September.

==> done; now only 130-260 / old 150 is remaining to be given to control room.

Follow-up on relevant items next week; others 2 weeks later.

2.10 Releasing existing 610 MHz system as part of the wideband upgrade -- from

3 Oct (SSK/ANR) : Preliminary tests of existing 610 feed through the wideband

path show that ~ 100 MHz usable bandwidth may be possible as part of phase-I u-GMRT.

Agreed that only RF filter needs to be changed to new 550-900 BPF (alongwith mobile band notch filter) -- chassis was to be made ready so that unit can be installed

in one channel of one antenna (with broadband path) : to check status of this work.

==> two sets are ready, can be one ant both channels or two ants, one chan each; to decide and do by next week.

Follow-up after 2 weeks, or earlier if needed.

2.11 New filters for Lband -- from 3 Oct (ANR/SSK) : Sample Lband full-band BPF

had been designed -- has no slope with freq and better insertion loss. Not clear

if it has any real advantage over existing system -- agreed to make a plot comparing old and new filters for full band BPF for a quantitative comparison.

==> tbd shortly. follow-up after 2 weeks.

2.12 Next Gen Common Box -- from 25 Sep (ANR/SSK) : Like 250-500 FE box, final version of Common Box needs to be assembled and tested : final power & temp monitor, interface to Rabbit card, choice of a fresh RFCM card, new arrangement for power supply distribution -- FE team to make a list of changes; plans for making one prototype to be finalised, to be scheduled after 250-500 FE box sample is done.

==> agreed to make a block diagram that puts all items needed and then see when and how these items will be ready and available for integrating sample box.

Follow-up after 2 weeks.

2.13 Calibration scheme with radiator at apex of antenna -- from 3 Oct & before (SSK/PAR/SRoy/DO/YG): to follow-up on detailed discussion meeting in August :

to schedule follow-up action appropriately, breaking the issue into smaller, more tractable parts : (i) testing of dynamic range of old vs new electronics (SRoy to work with FE team on this) (ii) finer aspects of variation of ampl and phase with various external parameters (DO to work with FE team on this)

(iii) plans for taking up other longer ranging goals to be discussed; meanwhile feasibility of connecting noise source and radiating to be looked at by PAR.

To check status of item (iii) : agreed to try and have parallel set-up on 2 antennas -- one with old and one with new electronics; to look for broadband antenna for long-term; to try for noise gen test also.

==> no action has happened, but all are within reach; broadband antenna to be indented; meanwhile, spherical dipole antenna with cone generator has arrived -- to be tested (will be used for isolation measurements).

Follow-up on all items after 2 weeks.

2.14 OF systems -- from 9 Oct, 25 Sep, 18 Sep, 4 Sep & before (SSK/PAR) : Plans for further systems : component ordering for remaining items : thermo-electric coolers for 10 antennas needs to be ordered -- number of spares to be decided and order to be placed.

==> need 3 per antenna ==> 30 + 10 spares ==> 40 nos to be ordered.

Follow-up next week to see if a conclusion can be reached.

### 3. RFI related matters :

3.1 RFI testing of Miltech PC + ethernet switches for antenna base -- from 3 Oct and earlier (PAR/SSK/SN):

(i) update on testing new i5 Miltech PC alone (and later with peripherals using new shielded ports, connectors, cables + Rabbit card). First report had 3 main suggestions : more screws on panels; panel mount pwrline filters instead of chassis mount; problem with kbd & mouse -- all of these discussed with Miltech and party is ready to fix first 2 items in new order of 2 units (tbd by Ops Group).

==> Ops group to get the details of the changes and send modified enquiry request.

(ii) integrated testing of PC + peripherals done : miltech i5 PC + shielded media converter + Rabbit card (with Akvira make shielded box) tests showed good performance (full details, alongwith block diagram, to be added to the report); can order 2-4 shielded box for Rabbit with Akvira (with modified connector diagrams). updated report with full details to be produced; modified drawing to be completed; order to be sent to Akvira.

==> report yet to be updated; discussion with Rajesh Lolap for updating the CAD

diagram -- expected to happen by end of this week -- if ok, then request mechanical to place order for 4 nos.

Follow-up after 2 weeks.

3.2 RFI tests of ethernet switches for antenna base -- from 3 Oct & earlier (SN/BAK/SSK): update on testing the available switches for RFI (as per 29 May discussion); plans for design of RFI box for ethernet switches : some tests have been done and reports are awaited; some follow-up action needs to be taken up. Status of ongoing efforts for (i) procurement and testing of switches (ii) getting shielded panel mount eth connectors (ii) design of RFI enclosure -- drawing to be completed with Rajesh Lolap and fabrication to start.

==> (i) one switch from D-link has come and is under test (ii) very few companies that give filtered and shielded eth connectors -- instead, planning to use the shielded eth adaptor that can be mounted on a panel (iii) all necessary inputs have been given for Rajesh Lolap, except for the front panel -- to be completed soon and then prototype to be fabricated in workshop based on this drawing.

Follow-up after 2 weeks.

3.3 Mobile phone RFI -- from 3 Oct & earlier (SSK/PAR) :

(i) no progress on having more phone units with software loaded -- matter closed..

(ii) progress on identifying the operators at and around E06, and in Nagar, Junnar directions (follow-up with sending letters to BSNL etc). -- letter to BSNL to be finalised and sent !

==> action pending with YG ! Follow-up after 2 weeks.

3.4 Follow-up on UPS RFI -- from 3 Oct & earlier (SSK/PAR/RVS) :

(i) procurement of units from Miltech (RVS) -- Status of RFI testing of repaired 1 kVA units from Miltech; status of order for 3 kVA unit from Miltech.

(ii) follow-up from RFI testing of Ador unit -- to check RFI results for 2nd unit from Ador and decide follow-up action for mass production, including possibility for 4.5 kVA unit from Ador (this is now linked to item on estimation of total power budget at antenna base !).

==> RFI test of 3 nos of new 1 kVA units showed significant RFI -- need comparison with original Miltech 1 kVA unit for same load conditions.

Ador units : we may have got 3 nos of 3 kVA (1 + 2) -- RFI group to confirm how many they have tested and what is the comparison.

RVS has checked with Ador and they are ready to make 4.5 kVA unit in same size and with same RFI properties. to check with RVS if we can order 2 nos of 4.5 kVA units

Follow-up after 2 weeks.

3.5 Discussion relating to Industrial RFI survey -- from 3 Oct & before (PAR/SSK) :

revised docs (from 2009 and 2012 discussions) had been circulated by RFI group and were discussed in 5 June meeting (is the document too exhaustive?) : immediate follow-up action identified : RFI team has met DIC for conducting a joint survey -- summary of this meeting to be circulated; map showing zones and villages / towns to be completed; plans for starting survey from Oct 21 with 2 teams (with extra manpower -- Amit Sawant available?), lasting for one month, using SoI maps etc, to be finalised.

==> map work : 90% is completed; once done, information will be sent to DIC's office, so that they can fold this into the NOC form clearance; actual survey may start a bit later, say around 1 Dec. Confirmation about availability of Amit Sawant will be decided by end of this week.

Follow-up after 2 weeks.



#### 4. Operations :

##### 4.1 Development of M&C software -- from 3 Oct & before (JPK/RU/SN/NGK) :

(i) new things related to old software : new requirements from FE monitoring of temp and power : FE monitoring of all 64 channels from RFCM card to MCM card to Laptop via serial to USB converter; available as a file on the PC -- done by RU for FE group; FE monitoring of all (7 nos ?) channels in control room has been tested and needs to be incorporated into ONLINE, alongwith 3 phase AC points (JPK).

==> confirmed that FE power and temp monitoring (7 chans) are all working in online with proper calibration conversion factors; 3 phase AC monitoring will be completed within a week by SNK.

(ii) for GAB monitoring, first order test has been done and found ok; follow-up action needs to be decided.

==> this is almost complete for getting the temp and power values in online; waiting for calibration values to be supplied.

(iii) plans for modbus learning & testing : simple set-up of PC + Rabbit card with modbus for "hello world" level -- SN to update status of effort with NS & JPK.

==> work not started yet, but plans are in place and will start next week.

(iv) plans for EPICS : simple set-up of PC + EPICS talking to Rabbit (with our native protocol), maybe with Subhro's help. Will be useful as a test set-up for TCS to work with later on.

==> agreed to give one Rabbit card with associated details and code to TCS for testing; to make parallel set-up in GMRT lab for this work.

(v) follow-up on interface of FE with new M&C system -- SN + SSK to report about plans for this.

==> no movement on this item.

(vi) plans for ordering a few Miltech PCs (and take a final call later on); and populating a few antennas with Rabbit card (with or without PC) for testing (see also item 3.1(i)).

==> 2 PCs with latest RFI mods to be ordered (see 3.1(i)) by Ops Group. no update on plans for putting new hardware in antennas.

(vii) plans to organise larger discussions regarding major decision items.

==> nothing here.

(viii) Update on PoC work with TCS.

==> enquiry has gone, waiting for their quotation.

Follow-up on relevant items next week; rest after 2 weeks.

##### 4.2 Identification of appropriate ethernet switches for antenna base (and GAB)

-- from 3 Oct, 18 Sep & before (SN/PAR/BAK) : Ops group to work with Comp team and RFI group to plan for trying some of the 16/24 port switches for antenna base use :

(i) update on process of short-listing and comparison of specs, followed by indenting for suitable samples : quotes had been received for CISCO, HP, DELL and D-link -- check status of folders

==> orders placed with HP, DELL, D-link.

(ii) appropriate RFI cabinet for the switch -- update on status of work and plans

==> see item 3.2

Follow-up after 2 weeks.

##### 4.3 Identification of appropriate eth switch for central building -- from 3 Oct,

18 Sep (CPK) : Ops group feels we may need L3 with a high speed 40 Gbps connection to server (over IB). 2 possible models have been identified HP and Cisco (48 port, costing ~ 5 lakhs. To discuss possible follow-up options.

==> this may take about 2 months to mature; can check after one month.

4.4 Planning for proper space utilisation for new equipment at antenna base -- from 3 Oct, 28 Aug & before (SN/CPK/RVS) : long-term plans for proper utilisation of the space at antenna base. Follow-up on 14 Aug discussion on first report : reducing space requirement by making MCM cards horizontal; check with electrical if isolation transformer can be moved somewhere else in the room; outcome from discussion about electrical consumption (2.6 kVA for new systems, 3.5 to 4 kVA for old + new systems) -- can this be reduced? Detailed discussion with RVS has taken place -- results to be summarised and discussed and follow-up action to be decided.

==> RVS confirmed isln transf can be put above the rack to save some space; joint measurement planned between electrical and ops group yet to happen; not clear if the UPS is a 1 ph input and 1 ph output or 3 ph input with 1 ph output; can we have a single UPS in the antenna room for both servo computer and the rest of the electronics? how carefully does the load balancing for the 3 ph input to antenna shell needs to be done? SN to discuss with RVS (and with servo as needed) and come back with feedback.  
Follow-up after 2 weeks.

## 5. Back-ends :

5.1 GPU corr (GWB) : release of 4 node, 8 input, 200/250/400 MHz version -- from 9 Oct & before (SHR/SSK/BAK) :

(i) 1.7 s time offset problem to be resolved.

==> no updates. may be worth checking if long stretches of data during last few weeks show anything?

(ii) starting problem : often comes up with split behaviour of fringes only for 4 antennas on each FPGA board; also some bad bandshapes are traced to FPGA boards; to check if it shows in the newly released version of the code.

==> one Roach board has been replaced, as it had some (other) flaky behaviour.

(iii) update on code for providing basic beam modes (computational load is 3 to 10% of GPU compute time) -- waiting for completion of process\_psr pipeline : SSK to update the status.

==> no progress on this since 15 Sep time -- needs to be put into the schedule; can we have an estimate of the PA beamformer load and requirements?

(iv) to start testing 400 MHz BW mode -- how best to conduct these tests? need some changes in the main code to handle 4 bits etc... when can this be done?

==> code for 4 bit data is there in offline version; to check how best to try this and come back with possible options. may need new FPGA design or may be able to merge both the designs.

(v) to move data collection to additional host node and release the following 3 modes : total I single pol and dual pol and full polar (which have been tested from a separate area -- to integrate into trial area of main code branch and test fully and release.

==> trial area now has code which does this for both 4 node and 8 node correlator; this code works fine for all the modes for 4 node corr; but it crashes for 8 node version at the psrdada level -- can happen due to matmon or recording turned on. To try a few different tests to see what happens.

(vi) fix naming convention as GWB-I

==> this is done now.

Follow-up on relevant items next week.

5.2 GPU corr : release of 8 node, 16 input, 200/400 MHz version -- from 9 Oct &

before (SHR/SSK/GSJ/BAK) : 8 nodes with C2050/C2075 GPUs and one host m/c now connected to the new IB switch (subset of this works as the 4 node, 8 input system as GWB-I above). Pending issues :

(i) to finalise the analog signal connection and RF cabling work : agreed to start with 8 ant dual pol and then convert to 16 ant one pol -- to check if completed.

==> this is complete.

(ii) plan for testing and release etc to be finalised -- GUI to be modified for both kinds of systems : confirm if this is done & can be closed.

==> GUI is getting ready; needs some more work for picking up correct exes for different modes.

Follow-up after 1 or 2 weeks.

5.3 GPU corr : next gen improvements -- from 9 Oct & before (SHR/SSK/GSJ/BAK) :

New improvements needed for finalising the design for the full 32 ant, dual pol system :

(i) plans for work on 4 new DELL machines (GSJ/SHR) : m/cs to be put in a rack; stand alone 2 x 10 Gbe I/O + corr tests on the R720 and T620 machines to be done (new ideas discussed during nvidia meeting to be tried out).

Fedora17 to be tried? PPS distribution to be worked out; extra 16-port, 1 Gbps switch is needed.

==> m/cs in rack, wiring is going on; eth and RF cables are getting made; PPS distribution board is getting ready; Roach boards to feed are there with available connections from spare GAB ports.

(ii) improvements in GPU code using K20 card (SHR/SSK) : cross-check on FFT code; calibrating MAC performance vs data reshuffle load; looking at XGPU code (with Pradeep of nvidia); trying sample PA beamformer code to estimate load etc.

==> action items discussed, need follow-up..

(iii) Layout and racks (GSJ/BAK) : layout diagram to be updated and long-term plan for racks to be initiated.

==> 2-4 racks to be purchased urgently; layout diagram may need to wait till AC and cooling issues are understood better.

(iv) procurement of accessories like network cards, disks, cables etc to be looked into -- to finalise the type and quantities : 4 nos of dual 10 Gbe NIC cards is in process; no other major requirement at present.

==> need to finalise the number of Roach boards. Present estimate made by the BE group appears to be reasonable.

To follow-up after 1-2 weeks, as needed.

5.4 8 antenna back-end tests and future plans -- from 3 Oct (DVL/YG) :

(i) report of efforts to summarise all the existing tests and results : should be ready by now; DVL to update status.

(ii) plans to extract consolidated results and conclusions from the above -- phase wraps, ripples in passband, spikes / RFI in passband, variation of self power levels (with time and across frequency), level of correlation coeffs etc : initial update circulated by DVL -- to be discussed and follow-up action firmed up.

(iii) report on results from Lband test data for imaging of point sources and extended sources (including comparison with GSB) and further plans : to confirm if position shift is due to self-cal or not. To fold in results from tests of 18th Sep -- update is needed !

(iv) plans for further testing with 110 / 200 MHz BW signals at LBand.

(v) plans/strategy for tests at 250-500 and also 610 -- some long tracks to be tried out.

(vi) plans for running the new back-end in parallel with all GSB observations at Lband, 610, 325 and 243 bands : SOP with appropriate settings etc. -- this

needs to be formalised asap with a few more additions.  
No updates provided; this needs to be followed up.

5.5 SFP testing of final unit -- from 22 Aug, 7 Aug & 24 July or so (KDB/BAK) :  
SFP+ side working fine for both Cu and Opt; XAUI CX4 side is still flaky -- may  
still be marginal in timing. Update required from new tests after fresh inputs  
from vendor.

==> to follow-up with MTE to get information from the PCB design !! YG to check  
with Rakesh Mehta. Follow-up after 2 weeks.

5.6 RFI filtering -- from 3 Oct (KDB/BAK/YG) : to add the first version of the  
real-time RFI filtering block (after some modifications) into the packetizer  
design and check the performance.

==> modified to work with sync signals and split to separate MAD computation  
and clipping sections and is getting ready for integration into packetiser design.  
To follow-up after 2-4 weeks.

5.7 Next-gen time & frequency standards -- from 22 Aug & before (NDS/BAK) :

(i) completion of tests at GMRT and summary of the same by NDS & plans to visit  
NPL -- to check about response from NPL.

==> YG has sent a reminder to Sen Gupta but no response yet.

(ii) follow-up from the visit of Symmetricom -- a summary note about learnings  
and minutes from the visit was to be circulated, including comparison table etc,  
before circulating kinds of specs are required for our system.

==> a note with comparison of various units has been prepared by Navnath; need  
to understand which parameters are more important etc; different users are happy  
with the different makes they have bought and using; can we have a small group  
to look at this matter to freeze the specs, and it can become a single party  
quote, if needed.... this needs to be followed-up.

To check status after 2 weeks.

## 6. Other items :

6.1 New python assembly design -- from 3 Oct (HSK/SSK) : FE group wants the  
python configuration in E6 to be adopted for all antennas -- this needs to be  
discussed with mechanical group and finalised.

==> email update from HSK : comparison report between old and new python designs  
will be prepared and circulated, so that an appropriate decision can be taken.

Follow-up after 2 weeks.

6.2 Jobs at TIFR -- from 3 Oct (HSK/SKG) : to follow-up on the following :

(i) update on status of our jobs at TIFR -- check status of collecting the pending  
jobs (how many are remaining?), and finishing in NCRA workshop of jobs already  
collected.

==> email update from HSK : There were 180 nos pending; 100 had been received and  
80 nos are now completed and will be collected by 10th Nov. Can check 2 weeks  
later to see if this matter can be closed.

6.3 Coexistence of 50-90 MHz RRI feed with 250-500 CDF on same face of turret --  
from 3 Oct and before (HSK) : Mech group to check for possible solutions and  
report back, after looking at the drawings (awaited from RRI). Follow-up action  
with RRI required; meanwhile, mech group to look at possibilities for reverse  
engineering.

==> email update from HSK : not able to get the drawings from RRI, inspite of YG writing to colleagues there; mech group is taking up reverse engineering effort. Follow-up after 2 weeks.

6.4 Problem of access to FE boxes with 500-1000 CDF feed -- from 3 Oct & before (HSK) : Update on new solution being designed by Mech group -- test was to be done : trial run in dummy area, followed by test at actual height -- to update results of these tests.

==> email update from HSK : no progress, though task in on the list of jobs. To check again after 2 weeks.

6.5 Work orders for CSIRO feed with 2 parties -- from 3 Oct & before (HSK/JNC/ANR) :

(i) whether filling operation is over and new lab tests have been done on feed.

==> email update from HSK : removing of old epoxy is proving to be difficult and is taking time; hope to start application of new epoxy by next week; follow-up after 2 weeks.

6.6 Fabrication of 5 spare L-band feeds -- from 3 Oct & before (SSK/HSK) : to check about

(i) faulty unit from Akvira Engg has come back and tested ok now?

==> email update from HSK : almost repaired and good test result obtained by replacing with old ridges ; now trying with new ridges.

(ii) latest status of orders on other 2 parties (Physimech, Fabromech)

==> email update from HSK : both received at site and small modifications being done.

=====

Minutes of Plan meet of 30 Oct 2013 (follow-up of some pending topics from different areas) :

1. Documentation related :

1.1 Detailed design doc -- pending for long : from 9 Oct & before (SSK/BAK) : follow-up on subsystems to be converted : (i) OF Rx system to be completed (Satish Lokhande) -- hardcopies had been collected; doc to be made ready (ii) OF Tx to be started. Field measurements completed few weeks and were being compiled; should have results ready by now -- some updates are required !  
==> all the data has been collected; needs some time for compilation; can check after 2 weeks.

1.2 Documentation : SoP for antenna base work -- from 23 Oct & before (SSK/ANR/HRB) : updated version to be made ready for installation of upgrade systems : doc for feeds (HRB) is still pending, inspite of repeated discussions !! Long gap of 3 weeks due to HRB being away. To check if this can be closed.  
==> draft report discussed, needs a few modifications in terms of items not really needed and also giving references to other reports that describe the procedures required here. To check again after 2 weeks.

2. FE & OF related :

2.1 New LNA for 130-260 system -- from 9 Oct & before (VBB/SSK) :  
(i) Variation of gain and Tsys with temperature : tests show new LNA with 40-60 deg K varn in Tina (cf old LNA with 150-200 K) for same variation of 50 deg K in env chamber; test to be done with temp monitor on / close to new LNA to compare with other results. New data had been taken -- results to be presented.  
==> earlier data not yet analysed; new data has been taken with 3 location temp measurements; both can be looked at as soon as results are circulated.  
(ii) update on scheme for fitting two temp monitors (one for LNA, one for box) in 130-260 MHz FE box for tests on bench followed by antenna tests : lab test with manual readings had been done (showed 15 deg temp difference between LNA body and FE box (open)) -- update on work with Ops group to get readings from :  
(a) USB MCM program in the lab -- continuous display now works and how to store data was being explored.  
==> work ongoing, some problems experienced with repeatability of data values during continuous monitoring. needs investigatios.  
(b) online data from 3 antennas : W1 (130-260 FE box), W4 (250-500 FE box) and E2 (common box) was tested ok, and long duration tests during daytime were to be carried out.  
==> some 8 hr data has been taken only for E2; some plots also shown --results look reasonable; to aim for 24 hr run on Diwali day for temp; need some data for W4; to put the spare CB on W1 after testing for MCM monitoring.  
To follow-up all items after 2 weeks.

2.2 Mass production of 250-500 FE system -- from 9 Oct & before (ANR/SSK) :  
(i) testing of 15 installed feeds : FE group was sending weekly plots & results -- and deflection plots have been added to these : to discuss what is being done

about identifying problematic antennas and what is being done to tackle these problems (e.g. S2 and C6 ?)

==> some tests done for C6 and S2 : shows interesting results : specific lines for C6 (different in each poln) and noisy bandshape in S2 -- to make grey scale plots to check details like whether lines are RFI (C6) and effect of TV line (in S2).

(ii) status of testing and installation of FE boxes : ten antennas fitted + 2 spare units ready and tested : update on procurement of new connector -- follow-up on (a) effort to shift to standard connector available in market : has order been placed, have samples been procured?

==> samples will come after 4-5 weeks; meanwhile main order is being processed.

(b) modifying the new chassis for the same -- drilling etc.

==> few chassis drilling will be done to match the sample connectors; remaining to be decided later on.

(iii) status of testing and installation of modified Common Boxes : 8 antennas fitted with mixture of 2 combinations : newer Hitite + Hitite scheme and older Sirenza + ECG scheme + 2 spare units : check status of readiness of 2 spare units (one was ready, second was going on). No updates since 9 Oct.

==> only broadband amplifier needs to be put into 2nd box to make it fully ready; will be done now and made ready.

(iv) plans for sub-band filters for 250-500 MHz system -- update on testing of sample units and results from these to be discussed; updated report with all 4 sub-bands plotted was to have been sent by Sougata last week -- to confirm if this has been sent, and whether we can go ahead with ok for mass production? To discuss and finalise plan of action.

==> overplotted results show (i) roll-off on higher side is more (as seen in 550-900 filters also) to circulate results for L-band sub-band filters for comparison; (ii) vary in 6 dB BW from 90 to 124 MHz. Agreed to reduce 124 to close to 100 with last round of redesign (iii) to make two units of existing filters ready and install on ch1 of 2 antennas (to make sure that RFCM card will support the operation).

(v) status of other auxiliary items :

-- notch filter at 540 (lumped ckt) -- one set installed in 2 antennas -- S2 & W4 -- in pol 1, in receiver room. To check performance of data seen in GPU corr.

==> filters were in ch 2 : now being moved to ch 1.

-- noise source, power splitter, directional coupler etc to be assembled into one unit for integrated noise on/off testing in the lab were on track for completion : whether problem of chassis height difference has been resolved? what about plans for going to antenna?

==> height mismatch solved for sample unit; all chassis will need this modification at the time when hole drilling is done; sample unit is ready to be assembled.

-- post amp : status of Hitite 740 new stock found in lab + items being purchased to be updated -- update on plans for assembling without slow rise power supply.

==> new stock of Hitite has come -- will take care of 30 antennas for all bands; sample slow rise supply from OF system will be taken and tried in FE box and later mass production can be done.

-- power monitor : status update on getting PCB and making prototype ready.

==> FE team to complete testing and give tested units for the FE box, meanwhile give some dummy chassis units for layout work.

-- temp monitor : to check about doing final integrated testing.

==> units are available for integration into the box.

-- RFCM card : update on debugging of new card (note : it is needed for making the phase switch work for these wave bands).

==> PCB has been given to 2nd vendor; meanwhile older version of new RFCM card can be used for layout work.

(vi) status of lab integration of final version of 250-500 box : this was due quite some time ago.

==> plan is to do it within the next 2 weeks.

To follow-up on all items after 2 weeks.

2.3 Directional coupler for 250-500 FE system -- from 25 Sep & before (ANR/SSK) :

(i) update on plans for mass production : PCBs for full system had been received; drilling of holes in chassis was waiting for finalisation of connector; SMA connectors had been indented. Need status update.

==> covered under item 2.2 above... follow-up after 2 weeks.

2.4 Status of improved 500-1000 MHz CDF -- from 9 Oct & earlier (HRB/GSS/SSK) : there are 3 different versions : ver1 ( ), ver2a ( ), ver2b ( ) in circulation right now.

(i) simulation results for ver1, ver2a, ver2b for consistency and cross-check were to be compiled and presented; also ver1 dipole in ver2 cavity and ver2a / 2b dipoles in ver1 cavity. Some results had been circulated by HRB -- to be discussed and follow-up action to be decided.

==> summary of RL, 3 dB widths for E and H (and the difference from them) looked at; conclusions and follow-up items are as follows : (a) to add a comparison plot from the earlier results as a cross-check (b) RL results show that the dipole (rather than the cavity) is the dominant member and that best results are for dipole 2b (triple sleeve dipole) (c) 3 dB beamwidths show that case of dipole 2b in cone 1 (70 deg) or in cone 2 (66 deg) gives the best results; need to check taper plots and actual radiation pattern.

(ii) also simulation results for denser mesh case (higher order basis functions)

==> all new results are with dense mesh.

(iii) repeat deflection tests for ver2 with a rigid stool design (and with finer adjustment of the focus distance, if needed) and then bring down the ver2b feed and replace with normal 235/610 feed.

==> feed has not been brought down as no working spare feed is available -- need to try to put 550-900 LNA in old feed and make functional -- check next week.

(iv) to compare deflection results for new feeds with old 610 system (via 30to1) waiting for completed report to be sent out.

==> useful plots; need to extend beyond Aug 2013 to latest values to check consistency of beamwidths.

(v) to compare RL measurements for ver2 dipole in ver1 cavity (and vice versa?)

==> waiting for C10 feed to come down.

(vi) any new ideas? e.g. multi-ring feed option?

==> postponed for the moment.

Follow-up after 2 weeks, with HRB to send simulation results within a week.

2.5 Signal flow analysis (SFA) related items -- from 9 Oct & before (GP/ANR/SSK)

(i) SFA for OF system to be discussed, including addition of the scheme of 10 dB attn + 20 dB ampl -- SSK was to complete review of doc by Ankur and release the same after internal discussions; this is significantly overdue now.

==> data is taken, work going on to integrate into the report.



(ii) plans for SFA of 250-500 system : analysis had started, and some lab tests had also been done; to check current status.

==> all data is taken; trying to finalise the report.

Follow-up after 2 weeks.

2.6 Filters at different stages of receiver chain -- from 9 Oct & before (SSK) :

(i) scheme for filters at antenna base : 3 type of ckts being designed using the new device : 2, 4, 8 way switches with different possible applications : (a) notch filter bank switching in rx room (b) filter bank switching inside FE box (c) rcvr room monitoring. To check status of PCB manufacturing.

==> PCBs collected yesterday; have problem with PTH holes !

(ii) for antenna filter switching prototype with existing switches (with old PCBs) was to be assembled and checked -- this may not be required now; can be closed after following item (i) for some more time.

==> kept pending for now; till item 2.6(i) is clear.

(iii) to follow-up on refinements of the scheme for each FE box : update on 250-500 system (first to be done), alongiwth LPF from 1750 and above for HI band.

==> sample PCB for 1750 and above LPF has come.

Follow-up on all items after 2 weeks.

2.7 M&C for new FE systems with new MCM cards -- from 9 Oct & much beore (SSK/PAR/CPK/SN) :

Follow-up on action items from the joint meeting -- SSK & SN to provide latest update on matters, and problems if any.

==> No updates on this; to tackle again after 2 weeks.

2.8 OF systems -- from 23 Oct & before (SSK/PAR) : Plans for further systems :

(i) component ordering for remaining items : thermo-electric coolers for 10 antennas needs to be ordered -- it was decided 40 nos to be ordered. To check the status of placing the order.

==> agreed to indent 50 nos.

(ii) plans for extending the wideband OF link to beyond 15 antennas : are we ready to resume installation?

==> agreed to resume with 15th antenna; can do one in 1-2 months kind of time scale; bottle-neck is manpower for assembling !

Follow-up after 2 weeks to see if work can be streamlined.

3. RFI related matters :

3.1 RFI from cable TV leakage -- from 9 Oct (PAR/SSK) : This could be a bigger

problem than boosters etc : tests had been planned to see how much is the leakage as a function of frequency and then see if operators can be requested to change

the frequency or improve their set-up; results on 2 tests to be reported : 1st

one at control room of operator and 2nd at some distance away to see which channel and operator is the culprit. Further tests had been done at N'gaon. Need update

on the results and conclusions.

==> results not compiled yet; also need to do some more visits and experiments..

also need to follow-up lines seen in the spectrum at present. To check status after 2 weeks.

3.2 Effect of military satellite RFI in 243 band -- from 9 Oct & before

(PAR/SSK/SN) : follow-up action on testing for saturation effects, decision about appropriate location of switchable filter, possibility about control room (ops

group) being able to come up with predictions for user's observations. Status update on two action items :

(i) report on prototype filter by FE group was to have been circulated; plan to put in one channel of 2 antennas at 250-500 band, in the receiver room.

==> to be done; can choose 2 antennas different from 540 filters (also to make sure that the satellite filter does not obstruct L-band.

(ii) Ops group to investigate and come up with algorithm to use in control room, after getting the relevant data from PAR. SN to update on the latest status, including plans for testing the algorithm being developed.

==> no update -- SNK to check and see.

Follow-up after 2 weeks.

3.3 Radiation from CAT5 cable -- from 18 Sep & earlier (SSK/PAR): Follow-up on action from 3 Apr discussions : to install shielded CAT5/CAT6 cable in conference room as trial and finalise the scheme for all other public places in the building: order had been placed for cable & connectors -- to check if material has arrived and plans for implementation.

==> material has arrived, but yet to reach GMRT; will make a few cables and measure in controlled set-up; and then plan to install in public places.

Follow-up after 2 weeks for more detailed plans.

3.4 RFI testing of LED lights for GMRT labs & building -- from 25 Sep (PAR/SSK/RVS) :

Electrical group has indented for LED tube lights (samples had been tested to be RFI free by the RFI team) that will be installed -- a plan for systematic RFI testing of these installations needs to be worked out. RFI teams recommendation was to install in recreation hall for initial tests -- to follow-up on status.

==> units have come and tests have been done; the 5 W LED still found ok; but a 7 W LED has also come, but gives RFI (!) -- these will need to be used at Pune campus. Tubelights have just come and need to go through same kind of test.

Follow-up after 2 weeks.

#### 4. Operations :

4.1 Mass production of Rabbit MCM cards -- from 9 Oct, 25 Sep & before (CPK/SN) :

(i) status of testing of cards to be updated (58 nos had been completed by 25 Sep)

==> no new cards have been made.

(ii) to complete the work for deciding how many more MCM cards are needed -- SN to report on the discussion about whether OF and sentinel can share on MCM card.

==> OF is ok if no high voltage items are being monitored. Quick check of the total number of monitoring points : ~ 28-30 by OF and ~12-15 by sentinel ==>

20 or so spare lines (from total of 64). Need to find a way for taking a final decision. YG to check with individual parties, and bring up the matter again after 2 weeks.

4.2 Monitoring of 3-phase power at each antenna -- from 9 Oct & before (SN/RVS) :

Ops group has successfully tested the scheme, including online monitoring, on one antenna (C8); test on full set-up at W3 with both MSEB & genset included had been done and were fine; modification in online for setting alarm was to be completed; plans for further work to be discussed.

==> alarm software has been programmed; could do one round of testing; can start mass production for all antennas -- items have to be purchased and start installing in antennas... SN to come back with a time scale. Follow-up after 2 weeks for detailed plans.

4.3 Mass production of shielded box for MCM cards -- from 9 Oct & before (CPK/PAR/SN/HSK): RFI test report of Akvira vs Physimech showed Akvira is better and this has been selected.

(i) status of ordering 2-3 more boxes from Akvira (need drawing to be updated?)

==> CAD m/c is having some software problem.

(ii) status of work on shielded connectors that these are required for antenna usage of MCM cards: waiting for 10 nos of sample versions of D-type, and also for 37 pin D-type 25 pairs to come.

==> PO for sample numbers has to go out.

(iii) How to plan for the mass production? RFI group to report on discussions with Mech group and finalise drawings for 2 types of box : with and without provision for SPI port on chassis + 1 serial port on each box; aim to place final order on Akvira. RFI group to complete 2 more prototype units, and then hand over the matter to Ops group; budget for final mass production to come from Ops group.

==> All agreed to the above; can proceed only when drawing is ready...

To check status after 2 weeks.

4.4 Development of M&C software -- from 23 & 9 Oct & before (JPK/RU/SN/NGK) :

(i) update on work with TCS (JPK/SN) : plans for next phase of work

==> TCS would like to get one Rabbit and one PC104 card -- can give Rabbit first and then PC104 later on. m/c and space needed for testing when the prototype is ready need to be identified.

Follow-up after 2 weeks.

(ii) status update on in-house development

==> control part tested in C3 antenna both with terminal and GUI; one second monitoring is tested; state m/c has been implemented and tested, including for power shutdown; GUI developed by Naresh, can be used for online and database; list of commands made to check once used more / less frequently; tune rcvr for new version had been developed. Follow-up after one month.

## 5. Back-ends :

### 5.1 Documentations :

(i) Detailed design doc -- pending for long : from 9 Oct, 25 Sep & before (BAK) :

analog back-end was due sometime ago ! Hande was starting to make the first version. Need status update on this.

==> Work in progress; can check after 2 weeks.

(ii) ITRs for analog back-end systems and digital systems to be taken up : pkt corr, GPU corr, beamformer designs etc. BE group to look into this and report plans.

==> pkt corr SCC is working on it; need to look at GPU corr etc.

Follow-up after 2 weeks.

### 5.2 Analog back-end for 8 antennas and beyond -- from 9 Oct & before (BAK) :

(i) Release of new 8 antenna (dual pol) system : some aspects of online control need to be refined -- BAK to look into more streamlined control set-up and report plans.

==> no updates on this.

(ii) appropriate attenuator settings for Lband & 250-500 done; 610 band yet to be finalised and released.

==> data has been taken; may get finalised by next week.

(iii) status of work for having i/p side RF filters : to confirm plans with FE

group for sharing mass production units; to check status of 8:1 switch : agreed that it is ok with FE group to share the designs, provided BE team is ok with the performance specs; ok to include BE requirements in order of PCBs and components (cost sharing to be worked out accordingly);

however, BE group to take care of mass assembly separately, as it will be done with in-house manpower by FE group for their filters.

final configuration and layout of 8:1 switch to be done as part of finalisation of the PIU, requiring filter chassis etc.

==> to take this up separately.

Follow-up on all items 2 weeks from now.

5.3 Power equalisation schemes for new back-ends -- from 9 Oct and before (SSK/NSR/BAK/SR): Need updates on both of the following :

(i) option 1 : using detectors in GAB and local feedback loop -- status update on completion of monitoring set-up, code for getting the values and applying the feedback etc -- new MCM program was under test : status update needed.

==> Naresh has finished his part; JPK and DKN are working on getting things finalised.

(ii) option 2 : using correlator self outputs and computing gain corrections :

(a) Scheme is working; to check if circulated SOP is all right.

==> email update from SSK : SOP circulated and in use; bugs / problems to be reported back.

(b) Plans for implementation of pseudo-ALC mode : issue of timescales of the loop, kind of useful outputs that it can produce etc. 4 modes of operations had been discussed (see MoM of 3 Oct 2013) :

(i) on demand

==> email update from SSK : this is the current mode.

(ii) repeatable at some interval specified by the user

==> email update from SSK : this can easily be put into a script, based on desired time scale (SRoy and SSK to discuss the details for this).

(iii) automatic, should adjust in response to a stimulus in the input power

==> email update from SSK : needs to be discussed and thought through

(iv) should provide a reliable power monitoring scheme

==> email update from SSK : bandmon is most reliable... -- this needs some discussion

SSK & NSR were to come back with detailed scheme of implementation.

S Roy joined the Plan meet discussion and agreed to be part of the team from the astronomer's side.

==> YG's post facto suggestion : SRoy, SSK & YG to discuss about items (ii), (iii) & (iv) sometime within the next 7-10 days, and come back with concrete plans.

==> Follow-up discussion in Plan meeting after 2 weeks.

5.4 Walsh modulation : to develop prototype set-up on Roach board -- from 3 Oct onwards (SCC/BAK) :

(i) to check if FE team has handed one unit to BE team

==> not confirmed.

(ii) to check plans of BE team for implementing prototype scheme.

==> SCC is working on checking FPGA for input pin and for the block that will do the modulation.

Follow-up after 2 weeks.

5.5 GPU corr (GWB-I) : release of 4 node, 8 input, 200/250/400 MHz version -- from 23 Oct & before (SHR/SSK/BAK) :

(i) 1.7 s time offset problem to be resolved. May be worth checking with long

stretches of data to see if the problem shows up.

==> no work done on this.

(ii) starting problem : often comes up with split behaviour of fringes only for 4 antennas on each FPGA board; also some bad bandshapes are traced to FPGA boards; one Roach board has been replaced -- to check and report if problems occur or not.

==> needs to be checked.

(iii) update on code for providing basic beam modes (computational load is 3 to 10% of GPU compute time) -- waiting for completion of process\_psr pipeline : SSK to update the status. This is now urgently required for completion ! Also, need have an estimate of the PA beamformer load and requirements...

==> email update from SSK : process\_psr pipeline near completion for IA, needs some work on GPU code side (with SHR) + system time (2 days) for testing; after that can move to PA mode (post facto query from YG : why is completion of process\_psr pipeline tied to estimating the compute load of IA or PA modes?)

(iv) to start testing 400 MHz BW mode -- how best to conduct these tests? need some changes in the main code to handle 4 bits etc...

code for 4 bit data is there in offline version; to check how best to try this and come back with possible options. may need new FPGA design or may be able to merge both the designs.

==> nothing has been done; no updates.

(v) to move data collection to additional host node and release the following 3 modes : total I single pol and dual pol and full polar (which have been tested from a separate area -- to integrate into trial area of main code branch and test fully and release. code had been made ready; to check about problem of crashing of 8 node version.

==> no update for 8 node version; agreed to release at least for 4 node version.

(vi) ITR for this work needs to be taken up.

==> no updates.

Follow-up on relevant items next week.

5.6 GPU corr (GWB-II) : release of 8 node, 16 input, 200/400 MHz version -- from 23 Oct & before (SHR/SSK/GSJ/BAK) : 8 nodes with C2050/C2075 GPUs and one host m/c now connected to the new IB switch (subset of this works as the 4 node, 8 input system as GWB-I above), with analog connections 8 ant dual pol done.

Pending issues :

(i) plan for testing and release etc to be finalised -- GUI to be modified for both kinds of systems : confirm if this is done & can be closed.

==> needs to be checked and updated; email from SSK : will check and update.

(ii) plans for regular testing of this system to be worked out.

==> needs to wait for some time till problem in 5.5(v) can be resolved.

5.7 Final online control for GPU corr -- from 9 Oct & before (SSK/JPK/NR/DVL) :

(i) status of full GUI compatibility : update on sideband flag support and issue of net\_sign[] to be resolved : needed some change in GPU code. SSK to report on this.

==> email update from SSK : GPU code ALSO needs to be changed (in addition to DAS code) : will discuss with SHR about the changes to be made. Need follow-up after 2 weeks to see if matter can be closed out.

(ii) to check cause of problem for modes with more than 2K channels.

==> email update from SSK : work yet to start; best would be to test with offline mode, using test raw voltage files -- discussion ongoing to provide these files.

Can check status after 2 weeks.

(iii) follow-up on long-term items like provision for control of FPGA and other peripherals (like sig generator) for different modes -- details of existing provisions to be discussed and plans for final configuration to be finalised.

==> no updates.

### 5.8 8 antenna back-end tests and future plans -- from 3 Oct (DVL/YG) :

(i) report of efforts to summarise all the existing tests and results : should be ready by now; DVL to update status.

(ii) plans to extract consolidated results and conclusions from the above -- phase wraps, ripples in passband, spikes / RFI in passband, variation of self power levels (with time and across frequency), level of correlation coeffs etc : initial update circulated by DVL -- to be discussed and follow-up action firmed up.

(iii) report on results from Lband test data for imaging of point sources and extended sources (including comparison with GSB) and further plans : to confirm if position shift is due to self-cal or not. To fold in results from tests of 18th Sep -- update is needed !

(iv) plans for further testing with 110 / 200 MHz BW signals at LBand.

(v) plans/strategy for tests at 250-500 and also 610 -- some long tracks to be tried out.

(vi) plans for running the new back-end in parallel with all GSB observations at Lband, 610, 325 and 243 bands : SOP with appropriate settings etc. -- this needs to be formalised asap with a few more additions.

==> No updates provided; this needs to be followed up to see how best to move forward !

### 5.9 Power and cooling requirements for projected back-end systems -- from 9 Oct and much earlier (BAK/RVS/YG) : some modifications have been made and some tests have been done and preliminary results circulated -- to discuss these and plan further activities.

==> RVS has circulated some results; need better clarity on understanding the same; fan on and off to be tested; need a way to monitoring the processor temp... GSJ to look into this aspect. Follow-up after 2 weeks.

=====