

Minutes of Plan meet of 4 Dec 2013 (follow-up of some pending topics from different areas) :

1. Documentation related :

1.1 Detailed design doc -- pending for long : from 20 Nov & 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 results were being compiled; should have results ready by now -- some updates are required ! ==> no updates; to be followed up later on, 2 weeks later.

1.2 Documentation : SoP for antenna base work -- from 20 Nov & before (SSK/ANR/HRB) : updated version for installation of upgrade systems was circulated : to check if there are any comments and matter can be closed or not. ==> this can be closed.

2. FE & OF related :

2.1 New LNA for 130-260 system -- from 20 Nov & before (VBB/SSK) : (i) Variation of gain and T_{sys} with temperature : tests show new LNA with 40-60 deg K varn in T_{lna} (cf old LNA with 150-200 K) for same variation of 50 deg K in env chamber; new data with 3 temperatures (chamber, inside FE box, inside LNA box) all looking slightly different (and not tracking); T_{lna} change is about 30-40 deg K; is there a gain change?; follow-up action items : (a) plot the T_{lna} at one freq as a function of time alongwith the ambient temp as a function of time (b) to give a step change to the system using the chamber and record the response (c) to try an expt where the temp monitor can be put on the LNA itself. ==> no updates as VBB just returned from leave; to be reminded to send an update. (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. There were some problems of repeatability reported on 30th Oct -- to check if these have been addressed or not. ==> this is fixed and matter can be closed. (b) online data from 3 antennas : W1 (130-260 FE box), W4 (250-500 FE box) and E2 (common box) was tested ok, and some long duration (8 hr) tests have been carried out on W1; need some data on W4 and E2; also 24 hr test was to have been done during Diwali break -- updates expected. ==> to try and schedule some of these long-term tests. Follow-up on all items after 2 weeks.

2.2 Mass production of 250-500 FE system -- from 20 Nov & before (ANR/SSK) : (i) testing of 15 installed feeds : FE group has been doing weekly plots & results, and deflection plots have been added to these : some data had been taken for C6 (showed different lines in each poln -- RFI or internal?) & S2 (noisy bandshape -- effect of TV line?) : color grey scale plots discussed -- there are clear signatures of TV line(s) at 175 and 540 + one more around 220 (this needs to be

checked) + military satellite + a few occasional bursts of RFI; to repeat similar tests at receiver room at OF output to compare with these antenna base measurements.
==> no updates; to remind PAR.

(ii) status of testing and installation of FE boxes : ten antennas fitted + 2 spare units ready and tested : update on procurement of standard connector (main delivery expected around 20 Jan) : to check if sample units have come and have been tested with the 2 nos of chassis made ready for integration.

==> wrong type came in 1st parcel; 2nd parcel with correct connector has not been received at NCRA (!).

(iii) 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 over plotted was sent :

(a) to compare slower roll-off on higher side with existing L-band sub-band filters discussion is needed.

==> roll-off is slow on high freq side cf to Lband; insertion loss is better; not clear if this will work well for us or not... put up one or two units and see the performance.

(b) 6 dB BW varies from 90 to 124 MHz : agreed to reduce 124 MHz to closer to 100 MHz with last round of redesign -- check if PCBs have come.

==> not yet received; may take week to ten days more.

(c) 2 units of the existing design were to be made ready and install on ch1 of 2 antennas, after checking that RFCM card will support the operation -- need an update on this.

==> small add-on card made to make it compatible with RFCM card. some chassis for the switches also to be made ready; most importantly, need to wait for the final, longer FE box before this can be done !

(iv) plans for notch filters in FE box for existing 250-500 antennas : notch filter at 540 (lumped ckt) -- one set installed in 2 antennas -- S2 & W4 -- in pol 1, in receiver room. Performance had been checked and found OK; to make units ready for all existing 250-500 FE systems, along with 175 MHz filters. Units for 3 antennas are available -- to check status of installation; check status of PCB order for remaining units (including more PCBs for 175 filter; update on chassis procurement.

==> W1 done for both filters both pols; ready to start the cyclic process of replacement for 3 more antennas using the 2 spare boxes; work on more 540 filters is ongoing; to initiate PCB order for 175 filters and required chassis order.

(v) status of other auxiliary items :

-- noise source, power splitter, directional coupler etc : sample unit has been assembled / integrated on the bench; integrated noise on/off testing done? when can it go on one antenna?

==> bench test yet to be done; going on antenna needs bigger FE box.

-- post amp : Hitite 740 new stock for 30 antennas available; to check if post amp has been tested with slow rise power supply.

==> not done yet.

-- power monitor : status update on trying modified scheme with detector followed by instrumentation amplifier.

==> back to old scheme with Galli as earlier results were due to problem with the Galli unit used !!!

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

-- RFCM card : check if PCB has been delivered (meanwhile, older version of new RFCM card can be used for layout testing purposes)

==> PCB is ready and will come end of this week.

(vi) status of lab integration of final version of 250-500 box : modelling shows that existing size of box is not adequate (inspite of double decking of chassis); deeper FE boxes are needed -- at least 10 cm (more like 15 cm)-- detailed work for this is on-going; meanwhile HSK confirmed that deeper boxes are possible (rear member in the cage can be removed to facilitate this) -- HSK to circulate existing drawing; also weight will go up : HSK to check the impact if total wt of all boxes goes up by 50%; sample box can be taken up as soon as FE has the dimensions clear.
==> finalisation of box dimensions and request for 2 samples to be made will happen by end of this week; meanwhile, email update from HSK confirms the following :

1. present depth of FE Box is 468 mm, can be increased up to 700 mm, hence 230 mm increase is possible -- FE needs only 150 mm at most, which is acceptable;
2. calculations related to increase in weight of FE boxes is in progress and will be circulated shortly; static and dynamic loading capacity of feed gearbox will be looked into, and CST capacity (1000 kg?) will be checked.

==> Follow-up on all relevant items 2 weeks later.

2.3 Directional coupler for 250-500 FE system -- from 20 Nov & 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 ordered. Need status update (if not covered under item 2.2)
==> drilling of holes see item 2.2; SMA order delivery likely by Jan; have some spares available. Follow-up after 2 weeks.

2.4 Status of improved 500-1000 MHz CDF -- from 20 Nov & 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 & cross-check were to be compiled and presented; also for ver1 dipole in ver2 cavity and ver2a / 2b dipoles in ver1 cavity. Initial results by HRB were discussed : it appears that dipole (rather than cavity) is the dominant member; best results appear to be for dipole 2b (triple sleeve dipole); 3 dB beamwidths indicate that dipole 2b in cone 1 (70 deg) or cone 2 (66 deg) gives best results. Follow-up action was as follows :

- (a) add comparison plot from earlier results as a cross-check
- (b) to check taper plots and actual E-H radiation pattern plots (for different freqs) for a more detailed comparison.

These items need detailed follow-up discussion.

(ii) also simulation results for denser mesh case (higher order basis functions): new simulations are with finer planes rather than higher order basis functions; this needs to be confirmed; also, 50 MHz shift that is seen needs to be understood.

(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 normalg 235/610 feed. Needed a spare 610 feed to be made ready using 550-900 LNA -- to check status of this.

(iv) to compare deflection results for new feeds with old 610 system (via 30to1) waiting for completed report to be sent out -- first round of results were shown and are quite useful; to extend the data beyond Aug 2013 to latest date and then

discuss again -- check if this is ready.

(v) to compare RL measurements for ver2 dipole in ver1 cavity (and vice versa?)
was waiting for C10 feed to come down -- see item (iii) above.

(vi) any new ideas? e.g. multi-ring feed option? -- postponed for the moment.

==> no discussion on any of the items; urgent follow-up is required -- to look into taking up in next meeting.

2.5 Signal flow analysis (SFA) related items -- from 20 Nov & 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 !

==> no update on this part.

(ii) plans for SFA of 250-500 system : analysis had started, and some lab tests had also been done; and all data required had been taken; first version of report is expected !

==> analysis is throwing some problem : bench results (dynamic range, gain and absolute pwr levels) for new system match with analysis, but those for existing system don't -- analysis gives much better results ! ANR to work with GP to cross-check. Follow-up after 2 weeks.

2.6 Filters at different stages of receiver chain -- from 20 Nov & 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. ckt for 2:1 and 4:1 versions assembled & tested -- 25 dB isolation achieved (changes from 25 to 17 dB with frequency for 8:1 switch); aim is to target integrated unit for 250-500 with 4 sub-band filters with integration of RFCM switch -- need status update on this.

==> this is ready and tested in the lab for ICON units; more units of switches need to be made for completing the test for the in-house units (PCB and chassis are available).

(ii) to follow-up on refinements of the scheme for each FE box : update on 250-500 system (first to be done), alongwith LPF from 1750 and above for HI band. sample PCB for 1750 LPF had come and was to be tested + other elements were to be assembled to produce the first unit for 250-500 system : 2 versions (1600 & 1750 MHz cut-off) assembled and tested; were to be installed in one antenna to check performance.

==> agreed to put at antenna base one after the other and obtain the plots for bandshape with and without filter, for Lband selection.

Follow-up on both items after 2 weeks.

2.7 Walsh switching arrangement in FE -- from 6 Nov & before (SSK/SCC/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) -- need update on plans for this.

==> not sure if this has been done -- need update from PAR.

(ii) plans for implementation in other systems e.g. 250-500 FE box (needs the new RFCM card to be ready?) -- to check if connector problem is resolved or an interim solution can be tried out to complete the integration : ckt had been

assembled with new opamp and old RFCM card and shown to work (?) -- need status update on this.

==> confirmed that this works; one PCB designed for incorporating patch card for level conversion for filter select, and new Opamp (OP37) for Walsh -- for present temporary PCB is ready and tested and will be used for 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) -- needed conversion to +/- 10 V switching arrangement : was to be completed and made available by now.

==> small patch card can be given to BE team by today.

==> email update from PAR on item (i); follow-up on all items after 2 weeks.

2.8 M&C for new FE systems with new MCM cards -- from 20 Nov & 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 -- matter is long overdue now !

==> no update on this. needs urgent follow-up !

2.9 OF systems -- from 20 Nov & 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 50 nos to be ordered. To check the status of placing the order and delivery date.

==> no update on this.

(ii) plans for extending the wideband OF link to beyond 15 antennas : agreed to start 15th antenna -- need status update on progres on this; problem of manpower for assembling : check if local person to be trained has started work; check plans for giving work orders to parties like Argus etc.

==> Argus had offered to send manpower on short-term for the assembly work at GMRT -- need a status update on this; also to see if any manpower can be found and trained.

Follow-up 2 weeks later.

2.10 Alternate fibre connectivity -- from 20 Nov (PAR/SSK) : Tata telecom has offer for 16 Mbps from E5 to from Kalyan to Nagar highway; Rs 8 lakhs per annum or so... to be discussed and follow-up after 2 weeks.

==> no discussion on this. to take up matter for separate discussion...

3. RFI related matters :

3.1 RFI from cable TV leakage -- from 20 Nov (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. Previous discussion showed inconclusive results; RFI team was to try out "sniffing" method, based on results from control room. More detailed discussion is needed.

==> no update -- PAR to be asked for email update; follow-up in meeting 2 weeks later.

3.2 Effect of military satellite RFI in 243 band -- from 20 Nov & 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) action items :

(a) report on prototype filter by FE group was to have been circulated -- still pending; need to check that this filter does not obstruct L-band, and then finalise plans for use in 2 antennas in receiver room.

==> TBC by FE group.

(b) plan to put in one channel of 2 antennas at 250-500 band, in the receiver room, avoiding the antennas which have 540 TV filters.

==> TBD as yet.

(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 -- overdue now!

==> SN is (still) on leave, so no updates.

==> Need updated from FE / RFI groups; follow-up after 2 weeks.

3.3 Radiation from CAT5 cable -- from 20 Nov & 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; material had arrived and sample cables were to be made and tested in controlled set-up and results reported -- need status update.

==> no updates -- PAR to be reminded for follow-up.

4. Operations :

4.1 Mass production of Rabbit MCM cards -- from 20 Nov & before (CPK/SN) :

(i) 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 with sharing if no high voltage items are being monitored; quick check showed about 20 spare monitoring points after including current & projected estimates from OF and sentinel; to take final decision if OF & sentinel can share. Latest discussions showed that sharing is possible; to close the matter asap.

==> sharing is agreed upon and this aspect can be closed; to start working on demo of MCM card controlling sentinel system, then OF and then both simultaneously. Follow-up after 2 weeks to firm up the way forward.

4.2 Mass production of shielded box for MCM cards -- from 20 Nov & 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 -- if ordered, what is expected date of delivery.

==> order has gone, but need to check date of delivery; email update from HSK gives expected date of delivery as 13th Dec.

(ii) status of work on shielded connectors that 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 -- expected by Jan. To use existing connectors for the preliminary measurement -- status of this to be reported.

==> no update as PAR has to give input.

(iii) How to plan for the mass production? Ops 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. To check if this moving forward or not.

==> no updates -- need to check with Ops and Mech groups.

Follow-up 2 weeks later.

4.4 Development of M&C software -- from 20 Nov & before (JPK/RU/SN/NGK) :

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

==> kick-off meeting has happened; TCS to visit to better understand issues related to in-house protocol etc. domain experts from relevant groups have been identified. Follow-up after one month.

(ii) monthly update on in-house work.

==> scanning with 500 ms rate is working fine; there is high drop-out at 250 ms; 2 more features/commands implemented : sub-array and input from user.

Follow-up after one month.

5. Back-ends :

5.1 Documentations :

(i) Detailed design doc -- pending for long : from 20 Nov & before (BAK) : analog back-end was due sometime ago ! Hande was starting to make the first version.

Need status update on this.

==> first version has been sent; 2nd round update will happen after one round of discussion.

(ii) ITRs for analog back-end systems and digital systems to be taken up :

analog back-end : Sandeep and Mekhala to look into pkt corr -- first level draft is getting done, but not yet circulated; GPU corr needs to be started -- Reddy & Irappa to work on this with target of end-Dec -- need a status update of various activities.

==> first level draft by Sandeep & Mekhala getting done, but not yet ready for circulation.

Follow-up after 2 weeks to check progress.

5.2 Analog back-end for 8 antennas and beyond -- from 20 Nov & before (BAK) :

(i) Release of new 8 antenna (dual pol) system : some aspects of online control need to be refined -- appears that problem due to control PC reset without restarting MCMs -- NS has modified MCM firmware to take care of this problem now.

To check status and see if it can be closed.

==> it looks like this is now working reliably for the 16 ant set-up and may be closed.

(ii) appropriate attenuator settings for Lband & 250-500 done; 610 band yet to be finalised and released -- data had been taken and matter needs to be closed.

==> updated table has been circulated; a few iterations need to be done and then updated table + report can be circulated and matter could be closed then.

(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. Need to discuss updates and way forward for this.

==> no update on this as 3-way meeting still pending.

Follow-up on relevant items 2 weeks later.

5.3 Power equalisation schemes for new back-ends -- from 20 Nov and before (SSK/NSR/BAK/SRoy): Need updates on both of the following :

(i) option 1 : using detectors in GAB and local feedback loop -- monitoring set-up working; algorithm for computing the attenuation values being worked out by DKN and NSR. Status update required.

==> no major update as DKN is on leave.

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

(a) Scheme is working; to check if circulated SOP is all right -- bugs etc to be reported back; SRoy to look at SOP.

(b) Plans for implementation of user controlled 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 -- this is the current released mode.

(ii) repeatable at some interval specified by the user -- can it be script based?

(iii) automatic, should adjust in response to a stimulus in the input power -- needs a discussion.

(iv) should provide a reliable power monitoring scheme -- needs discussion.

Also, issues like logging of results etc to be discussed. Detailed discussion between SSK, SRoy and YG -- report from this to be discussed and plans finalised.

==> various modes discussed; agreed to have a document that spells out the main requirements (from user point of view) and possible solution options / techniques that can be taken up for discussion in Plan meeting for finalising the PoA.

Follow-up after 2 weeks.

5.4 Walsh modulation : prototype set-up on Roach board -- from 20 Nov (SCC/BAK) :

(i) to check if FE team has handed one unit to BE team -- see item 2.7

(ii) plans of BE team for implementing prototype scheme -- basic unit for switching using sq wave signal from GPIO pin tested ok; was to be put in main PoCo correlator and tested. SCC to provide status update.

==> switching design with noise source input being tested in PoCo correlator; couple of different options for testing discussed.

Follow-up after 2 weeks.

5.5 GPU corr (GWB-I) : release of 4 node, 8 input, 200/250/400 MHz version -- from 27 Nov & before (SHR/SSK/BAK) :

(i) 1.7 s time offset problem to be resolved. May need checking with long stretches of data to see if the problem shows up -- SHR & GSJ planning some tests -- need status and feedback from these.

==> it appears to be constant at around 1.6 sec or so; needs confirmation against GSB and then looking to possible causes.

(ii) update on code for providing basic beam modes (computational load is 3 to 10% of GPU compute time) : first version of process_psr pipeline for IA has been released (with basic SOP) -- to be tested !!; problem of threads not synchronised during the addition needs to be resolved (trial by moving out of phase shift kernel); need to discuss plans for PA bfr and load estimates for the same (for planning K20 design). **NEED A MAJOR UPDATE ON THESE ISSUES !**

==> current IA beam mode is a separate code that needs to be compiled and executed everytime -- SOP to be updated with this instruction; it adds all 8 inputs by default and has no GAC selection; SNR problem due to thread sync not solved yet -- SHR to check if new kernel (10% extra load) will solve or some other technique; for other features like IA + PA and GAC selection etc to aim for doing in full

polar code development.

(iii) 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? Appears that design of 400 MHz / 4 bit system is being moved to 620/720 m/cs; needs some change in 10 Gbe core due to change in OS. To discuss and move this agenda item accordingly.

==> this is agreed to move to the other agenda item... (major issues may be proper computations of delay and phases related to 4 bit samples)

(iv) 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; release for 4 node version, if 8 node version still giving problems; plans to test T620 m/c as a possible host node; also SHR will look into using one of the new DELL i3 m/cs as an option and place repeat order (if useful). agreed to try a bit more with the current master machine to see if it can be optimised to work; then shift to 620/720 m/c -- need status update on this.

==> crashing problem not seen when using 720 ==> older m/c not sufficient; may want to try with T7500 as host some time later. may think of an option where 620 is used as a host and also connected to 4 node correlator. to try once with old PC and more RAM.

In order to meet release target, some GUI changes are needed -- NSR to be asked to look into this and then release can be attempted, with right kind of host m/c.

==> Follow-up on relevant items next week; move others to relevant agenda items with appropriate follow-up time scale.

5.6 GPU corr (GWB-II) : release of 8 node, 16 input, 200/400 MHz version -- from 27 Nov & 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 -- pending for update from NSR/SSK. SHR is working with NSR on modifying the GUI (after solving the crashing problem).

==> GUI mods to be done after crashing problem with master node is solved.

(ii) plans for regular testing of this system to be worked out, once problem in 5.1(iv) above can be cleared...

==> crashing problem not seen when using 720 ==> older m/c not sufficient; may want to try with T7500 as host some time later. may think of an option where 620 is used as a host and also connected to 4 node correlator. to try once with old PC and more RAM.

In order to meet release target, some GUI changes are needed -- NSR to be asked to look into this and then release can be attempted, with right kind of host m/c.

Follow-up after 2 weeks.

5.7 Final online control for GPU corr -- from 20 Nov & 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 & DAS code. SSK to

report on this.

==> need some time to work through the code and fix the problem and then careful testing.

(ii) to check cause of problem for modes with more than 2K channels -- best done with raw voltage files ? thought to be due to counter data being sent in place of ADC data once every 4K data points -- will be eliminated in new integrated design for 8 / 4 bits.

==> new design with 800 MHz solves this problem -- will work for both 200 and 400 MHz BW modes (tested ok) up to 8K channels.

(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.

==> not discussed

Follow-up after 2 weeks.

5.8 8 antenna back-end tests and future plans -- from 27 Nov & earlier (DVL/YG) :

(i) report of efforts to summarise all the existing tests and results : report for Lband have been circulated; needs detailed discussion.

(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 GWB back-end in parallel with all GSB observations at Lband, 610, 325 and 243 bands -- this appears to be happening fairly regularly; need to have script in place for some automated analysis of GWB data.

==> no formal updates from DVL -- matter pending for long now; need to find a way to move forward.

5.9 Power and cooling requirements for projected back-end systems -- from 20 Nov and earlier (GSJ/BAK/RVS/YG) : some modifications have been made and some tests have been done and preliminary results circulted -- to discuss these and plan further activities; fan on and off to be tested; scheme for monitoring of processor temperature to be refined. Shelton and Ganla to provide status update on the tests being done.

==> not discussed as GSJ not present. to be followed up 2 weeks later.

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Minutes of Plan meet of 18 Dec 2013 (follow-up of some pending topics from different areas) :

1. Documentation related :

1.1 Documentation : follow-up on level 2 (ITR) -- from 27 Nov & earlier :

(i) conversion of older reports : Check if test range is done (appendix + inputs from Sanjit/PAR were pending).

==> no progress in getting the inputs from PAR -- tbc with follow-up

(ii) Check status of other (new) items : power monitor, temp monitor (later), filter designs, spares for 1420 feed etc. -- power monitor and filter design were agreed as the items to be taken up : to check if work has started for these ITRS.

==> 2 separate reports for 250-500 and 550-900 main + sub-band filters (notch filters later on) -- Sougata and Imran; power monitor with Gaurav : all of these are ready to start; others need some more time... target to complete by Jan end.

(iii) Also, can we look at which ITRs may be ready for conversion to NTRs?

==> no clear consensus

To follow-up on all items after 2 weeks.

1.2 Follow-up on level 3 (NTR) -- pending for long : from 27 Nov, 28 Aug & before (SSK): to check status of report on design of OF system -- SSK to confirm.

==> no progress here ! Keep trying (after 2 weeks) !!

2. FE & OF related :

2.1 Update on results from test range -- pending from 27 Nov & before (HRB/GSS/SSK) :

(i) phase centre tests for 250-500 CDF : to report on expt with 100 to 200 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. Was stuck due to stool problems, but one attempt was made with modified stool in last couple of weeks, but there was some other failure -- need a fresh update on this, as it is long pending.

==> agreed to try alternative method of cutting the support legs of one 250-500 feed cone to get the 100 mm reduced height, instead of trying to further reduce height of stool (as that fouls with some cable wrap assembly).

(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 -- integration routine and other problems now sorted out and result matching with Kildal paper; was ready to move to GMRT specific case of 250-500 to get efficiency factor as a function of freq over the band -- need updates on this.

==> need to port the data for the measured feed patterns for completing the calculations.

(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 (i) progress on getting encoder (ii) results from interim scheme that has been deployed (with 0.5 deg accuracy).

==> first attempts have been done -- some squint seen in E-plane pattern; to be cross-checked with another feed. meanwhile, to follow-up about encoder delivery. Follow-up on all items after 2 weeks.

2.2 RF dump tests for new feeds -- from 27 Nov & 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 expts with 3-4 bad antennas (with one good antenna) tracking on-source & off-source for long duration (4-5 hr) test : some new expts were planned -- to check if results are available for discussion.

==> PAR to take the follow-up.

(b) follow-up from analysis done by NK and plans for interferometric tests at 130-260. interferometric test has been done; awaiting results / update from NK.

==> waiting for updates from NK.

(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_{Ina} with freq incorporated; FE team to model the effect of the main BPF and see if the curves match better with data.

==> GP has done the calculations with BPF included and will give the data HRB for comparison with expt data.

Follow-up on all items after 2 weeks.

2.3 Follow-up on 550-900 MHz band filters -- from 27 Nov & before (ANR/SSK) :

(i) comparison of product obtained from ICON with in-house effort and finalisation of plans : technical comparison of individual filter responses shows in-house design to be slightly better; but need to complete integrated unit for insertion loss etc before taking a final decision, including plans for mass production. To check if integrated in-house unit is ready.

==> PCB design done (simulated results are good) -- one sample gone to Argus for manufacture; will come in 2 weeks. Status check after 2 weeks.

2.4 Total power detector for FE & common boxes -- from 27 Nov & earlier (GP/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 SOP for reading from online and recording + interpreting (including calibration) has been checked by GP and if the matter can be closed.

==> not happened yet.

(ii) sample data from 2 units installed on E2 shows basic things are working ok: more sophisticated tests with on and off source tracking to be done (alongwith digital backend recording) -- check if tests done and results ready for discussion.

==> not done yet.

(iii) plans for building 70 units for CB : follow-up on status of mass production.

==> still waiting for chassis from w'shop, due to priority reasons.

(iv) plans for prototype of the FE monitoring unit : initial test results show that scheme may not be viable, but later problem was found in the particular piece of Galli ampl used (alternate options not required) -- to check if work is back on track now with the existing scheme and what is the current status.

==> 2 units have been tested and found giving identical performance as per expectations; to finalise now towards getting in a FE box in the lab and test and then to antenna with online interface (with help from JPK).

(v) plans for ITR on the work : to be initiated now?

==> can start now, as discussed in item 1 also.

Follow-up on all items after 2 weeks.

2.5 FE power supplies at all antennas -- from 27 Nov & 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 -- ripple has been reduced from 700 to 100 mv on sample unit (with bigger capacitor bank); status of assembly of units, including boxes from workshop.

==> boxes are now available for 10 nos; assembly work can start.

(ii) solution 2 : plans for purchase of off-the-shelf supplies & scheme for usage.

Check status of testing and acceptance of units, including RFI properties -- one unit was to be tested for RFI

==> RFI test appears to be OK (report will come shortly); can now complete the remaining 4 antennas (C0,C9,W3,W6) with these supplies.

(iii) to resolve whether it is better to have all supplies at the bottom, or some (in-house) on top and others (off-the-shelf) at bottom?

==> may need some more time to resolve this matter.

can revisit the matter after one month.

2.6 Fixing non-working L-band feeds (short-term problem) -- from 27 Nov & 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) W1, C3, E2, E5 have been fitted with newly assembled LNAs : to check their performance for stability and see if this item can be closed. Waiting for one more round of user tests (one antenna was down in 1st round of tests) before closing.

==> this can be closed.

(ii) Spares : greed to have 5 LNAs ready and available as spares : device available, PCBs ordered, chassis under request, gold plating of wire to be done again (but discreetly) -- need status update.

==> no progress on this; only one set is available as spares.

(iii) check status of alternate LNA designs :

(a) for OHMIC make -- not to be pursued further : item closed.

==> can be closed.

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

==> not broached with Argus.

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

==> ANR yet to explore and come back.

To follow-up open items after 2 weeks (after closing the others)

2.7 Spares for L-band FE electronics -- from 27 Nov & 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 with Argus for new (compact) RFCM card and assembly + testing of the same.

==> assembled under test; looks almost clear -- may know in next few days.

(ii) noise gen : PCB assembled; bench test completed; to integrate with one spare feed for final testing : status update needed.

==> no feed available for testing.

(iii) timescale for integration : all components (except LNAs) for assembly of 3 feeds now ready : check (a) progress on LNAs (1 spare set is now available)

(b) plans for integration of one unit, using the presently dis-assembled feed.

==> stuck for some time due to manpower shortage.

(iv) finalisation of plans for having total of 5 working spare feeds -- from mechanical to electronics.

==> no discussion on this, need input from Kale.

Follow-up on all items after 2 weeks.

2.8 Characterisation of new FE+OF systems -- from 27 Nov (PAR/SSK/DVL) :

(i) Summary of L-band results and performance :

(a) stability of power levels

(b) bandshape over 400 MHz : antennas with large (~ 18 dB) slope (C13, W1, S2...) to be checked and reported; ripples and funny bandshapes to be characterised and compared with antenna base measurements to try and identify source of problem.

==> one set of data taken about 2 weeks ago; Sanjit Rai is looking at it (along with Ramesh and Ankur) -- can check 2 weeks later.

(ii) Summary of 250-500 band performance :

(a) stability of power levels and bandshapes; variation from antenna to antenna.

(b) presence of RFI in the band (TV lines etc)

==> no further tests done so far.

(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, in coordination with Ops Group -- check if these have been completed.

==> FE/OF group to check and report back.

(iv) to characterise the recommended attenuator settings for different bands : completed for Lband, 250-500 and existing 610 -- only 130-260 / old 150 remaining to be characterised and values given to control room.

==> this has been done, but may need a cross-check.

To follow-up after 2 weeks, after some appropriate reformulation of items.

2.9 Releasing existing 610 MHz system as part of the wideband upgrade -- from 27 Nov (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) -- two sample units had been made ready; to check if these have been installed in antenna(s) with broadband path, alongwith required notch filters for TV line; also spares for mobile filters to be looked into.

==> by next week, ch1 of C8 and C12 will have FE box with broadband BPF + 2 notch filters : 540 TV and mobile bands. To check status next week.

2.10 New filters for Lband -- from 27 & 6 Nov (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 circulate a plot comparing old and new filters for full band BPF for a quantitative comparison.

Also, prototype design of new sub-band filter (with better insertion loss) has also been done -- need a detailed discussion to see how to proceed on this topic.

==> agreed to go ahead with the main BPF as a low priority job -- PCBs (stripline) does not need much work for assembly -- can be given for manufacture; new chassis will be needed; population can be done as and when a FE box comes down. Check status after one month.

2.11 Next Gen Common Box -- from 27 & 6 Nov (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 and produce a block diagram showing all the units to be incorporated (and then see when & how these items will be ready) -- to check if block diagram is ready for circulation.
==> matter not discussed... to be scheduled after some time, once FE box is more streamlined -- to revisit after one month.

2.12 Calibration scheme with radiator at apex of antenna -- from 27 Nov & 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 with parallel set-up on 2 antennas (SRoy to work with FE team on this) -- antennas to use had been identified; 2nd copy of crossed dipole was to be located for use and expt to be scheduled.

==> first test on C4 (new system) will happen in next few days (SRoy is kept informed).

(ii) finer aspects of variation of ampl and phase with various external parameters (DO to work with FE team on this) -- need an update on the status of this.

==> needs some follow-up.

(iii) plans for taking up other longer ranging goals to be discussed, including procurement of new broadband antenna; meanwhile feasibility of connecting noise source and radiating to be looked at by PAR -- need status update on this.

==> one broadband antenna has been identified can go ahead with this; noise src radiating is under control -- when needed.

Follow-up on relevant items after 2 weeks.

3. RFI related matters :

3.1 RFI testing of Miltech PC + ethernet switches for antenna base -- from 27 Nov and earlier (PAR/SSK/SN):

(i) update on testing new i5 Miltech PC (with peripherals using new shielded ports, connectors, cables + Rabbit card). 2 units are to be ordered by Ops Group with two changes as suggested from RFI test report (more screws on panels + panel mount pwrline filters instead of chassis mount) -- to check status of indent (and then move this item to Ops Group related matters).

==> enquiry has gone; not sure if quotation has come; to follow-up and respond.

(ii) integrated testing of PC + peripherals done : miltech i5 PC + shielded media converter + Rabbit card (with Akvira make shielded box) tests showed good performance -- new report with block diag and conclusions/recommendations has been circulated); mech group had ordered 2 shielded boxes for Rabbit with Akvira (with modified connector diagrams and different back plates for extra SPI port).

Action items : (a) to check delivery of new boxes (b) assembly and testing of full unit (only shielded 37 p D-type and power supply was awaited -- to use feed through arrangement for power supply).

==> units have come and being made ready -- will use feed through till D-type connector ready. Follow-up after 2 weeks.

3.2 RFI tests of ethernet switches for antenna base -- from 27 Nov & earlier (SN/BAK/SSK): Testing the available switches for RFI (as per 29 May discussion); plans for design of RFI box for ethernet switches : Status update on

(i) procurement & testing of switches : sample units from Cisco, HP, Dlink and DELL had come and were being tested for RFI -- status update needed on this.

==> all 4 makes have been tested for RFI : in unconnected power-on, some give RFI, others don't; with unshielded CAT5 cable + 2 PCs significant RFI see; comes

down significantly with shielded cables -- need to wait for some time for detailed study to be completed.

(ii) plans to use shielded eth adaptor that can be mounted on panel -- available from CAT5 work to be used for prototype testing.

==> this has been done...

(iii) design of RFI enclosure -- inputs for front panel design given to R. Lolap for completion of drawing; prototype was under fabrication in w'shop -- need status update.

==> no update on delivery date.

Follow-up on all items after 2 weeks.

3.3 Mobile phone RFI -- from 27 Nov & earlier (SSK/PAR) :

Progress on identifying the operators at and around E06, and in Nagar, Junnar directions : letter had been sent to BSNL, some follow-up action was on (tilting of transmitter vs changing to 1800); need to check if outcome is satisfactory or letter to higher authority is required.

==> dialogue with planning cell in charge of Pune; need to contact DGM Telecon for Ahmednagar circle (sits in Pune). can check after 2 weeks.

3.4 Follow-up on UPS RFI -- from 27 Nov & earlier (SSK/PAR/RVS) :

(i) procurement of units from Miltech (RVS) : RFI testing of 3 nos repaired 1 kVA units from Miltech showed significant RFI -- updated report comparing original Miltech 1 kVA test reports (with same load conditions) have been circulated; it has been agreed to reject the 1 kVA units. Miltech has offered improved version for 3 kVA unit -- this can be followed up.

==> Miltech person has promised to make a visit to see what can be done...

(ii) follow-up from RFI testing of Ador 3 kVA units -- 2 nos of tested and cleared units are in use : in C9 and C10. Is there a final report on both of these?

==> RFI team will check and get back.

(iii) Bigger units : agreed to order 2 nos of 4.5 kVA units with Ador, with possible option of split o/p with different isolation transformers. To check the loads and decide the split -- need status update on this.

==> indent is raised, with split output of 3 kVA and 1.5 kVA.

Follow-up on all action items after 2 weeks.

3.5 Discussion relating to Industrial RFI survey -- from 27 Nov & 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?) : follow-up action identified :

(i) map showing zones and villages / towns to be completed on new SoI map and sent to DIC office for NOC clearance decisions;

==> information has been shared with DIC office (not clear if map has been shared), one round of iteration may be needed with them on this.

(ii) plans for starting survey from around 1st Dec / 15th Dec with 2 teams (with extra manpower), lasting for one month, using SoI maps etc, to be finalised.

==> a form specifying the format and information needed for survey is being finalised with DIC office -- will be done by end of this month; survey likely to start in 1st or 2nd week of Jan.

Follow-up after 2 weeks.

4. Operations :

4.1 Development of M&C software -- from 27 Nov & before (JPK/RU/SN/NGK) :

(i) for GAB monitoring, first order test has been done and found ok; follow-up action of small changes requested by BE group to be completed and SOP to be released -- then item can be closed.

==> all items are completed and matter can be closed.

(ii) plans for modbus learning & testing : simple set-up of PC + Rabbit card with modbus for "hello world" level -- first test results should be available now.

==> busy with other activities, hence not taken up.

(iii) plans for EPICS testing : agreed to give one Rabbit card with associated details and code to TCS for testing; simple set-up of PC + EPICS talking to Rabbit (with our native protocol), to be set-up in our lab also. SN to provide status update on this.

==> follow-up with TCS -- handover of Rabbit card with demo has been done; same needs to be done for PC104 card (meanwhile JPK has made an emulator ready for testing of PC104 card) -- will be complete by next week. Will start work on installation of EPICS, CSS etc and try to be ready in time for first demo software that TCS may provide (while trying our own simple tests etc).

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

==> Naresh + Charu and Sougata will work on this; will have full set-up of FE + Common box, but will start with M&C of common box using Rabbit card; ...

(v) plans for ordering a few Miltech PCs (and take a final call later on) : 2 nos to be ordered by Ops Group (see item 3.1(i))

==> see above

(vi) plans for populating a few (5-6) antennas with Rabbit card (with or without PC) for testing. C3 was done and C6 was next -- need status update.

==> both C3 and C6 are complete; would like to try S3, W3... and also C8, C11 for prototype testing.

Follow-up on relevant items after 2 weeks.

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

-- from 27 Nov & 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 received for CISCO, HP, DELL & D-link -- update on orders & delivery of these.

==> all 4 makes of switches have come

(ii) RFI testing of switches as they arrive : DELL has been tested; D-link was next... need status update.

==> testing is going on (see item xxx above)

(iii) appropriate RFI cabinet for the switch -- update on status of work and plans (see also item 3.2 above)

==> see above...

Follow-up after 2 weeks.

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

from 6 Nov & 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 -- confirmed; electrical has confirmed that isolation transformer can be put above the rack; discussion about electrical consumption (2.6 kVA for new systems, 3.5 to 4 kVA for old + new systems) -- can this be reduced?

pending action items (SN was to follow-up with RVS and servo and report back) :

(i) joint measurements of load to be done by Ops and Electrical and reported.

What is the final conclusion from this?

==> current practical load is around 1 kVA, but projections are still reaching close to 3 kVA -- may need a meeting to resolve this.

(ii) current UPS is 1 ph to 1 ph unit; can be made 3 ph to 1 ph, but not clear if using extra space for this is worth it?

==> 3 ph to 1 ph has same footprint, but other "advantages" hence being preferred...

(iii) can we have single, shared UPS for both servo computer and rest of the ABR electronics? RVS & SKB to produce basic connection/wiring diagram for discussion.

==> may happen next week as both are on GCC duty !

(iv) how carefully does the load balancing for the 3 ph input to antenna shell needs to be done? not clear...

==> not clear...

To revisit the matters after 2 weeks.

5. Back-ends :

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

(i) 1.7 s time offset problem to be resolved. May need checking with long stretches of data to see if the problem shows up -- SHR & GSJ planning some tests -- need status and feedback from these.

==> confirmed with GSB tests that it is there, but reason is not clear; needs to be checked and understood.

(ii) update on code for providing basic beam modes (computational load is 3 to 10% of GPU compute time) : first version of process_psr pipeline for IA has been released (with basic SOP) -- to be tested, SOP needs to be updated with procedure for compilation etc. !!; problem of threads not synchronised during the addition needs to be resolved (trial by moving out of phase shift kernel); for other features like IA + PA and GAC selection etc to aim for doing in full polar code development.

==> noise source tests ongoing with new code with separate kernel... need to wait for this to happen for a formal release to be done for this mode.

(iii) 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; crashing problem localised to old m/c (to try once more with more RAM); to explore option where one T620 is used as host m/c with proper n/w connection; plan for release to be finalised.

==> after fair bit of discussion, agreed to merge GWB-I and GWB-II into a single release system with 4 nodes, 8 inputs, full polar + all beam modes, using the 4 other T7500 nodes as host machines. To rewrite the configuration and agenda items for next week's meeting !

5.2 GPU corr (GWB-II) : release of 8 node, 16 input, 200/400 MHz version -- from 4 Dec & 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 -- pending for update from NSR/SSK. SHR is working with NSR on modifying the GUI.

==> GUI work had started -- needs to be checked

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

==> see comment in 5.1 above

(iii) In order to meet release target, some GUI changes are needed -- NSR to be asked to look into this and then release can be attempted, with right kind of host m/c.

==> see comment in 5.1 above.

5.3 GPU corr : next gen improvements -- from 27 Nov & 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 are in the rack and wiring + cabling is complete, running with analog noise source; new code with 2 x 10 Gbe I/ + improved logic for assigning specific threads to each core + env variables : no packet loss seen and tested for 200 MHz / 8 bits and 400 MHz / 4 bits, 16 inputs and working ok; without separate host m/c and without online interface -- needs online to be free for testing.

==> no specific update on this.

(ii) improvements in GPU code using K20 card (SHR/SSK) : cross-check on FFT code (done and can be closed); calibrating MAC performance vs data reshuffle load (done and no further improvements look possible); looking at XGPU code (with Pradeep of nvidia) -- need status update on this; trying sample PA beamformer code to estimate load etc. -- need status update on this.

==> there is some possibility of nvidia taking this up, but needs closer follow-up.

(iii) 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? Appears that design of 400 MHz / 4 bit system is being moved to 620/720 m/cs; needs some change in 10 Gbe core due to change in OS. To discuss and merge this agenda item accordingly with item (ii) above.

==> the issues related to 4-bit are resolved; need further work on other aspects.

(iv) Layout and racks (GSJ/BAK) : layout diagram to be updated and long-term plan for racks to be initiated; agreed to purchase 2-4 standard racks urgently -- status update on order with President needed.

==> no further processing has happened and indent has yet to be raised (!) -- to be speeded-up to urgent status.

(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; can be checked and closed.

==> not discussed...

(vi) new purchase of Roach boards etc : follow-up on status of procurement.

==> file has gone to Mumbai and is awaiting further clarification on justification single party -- to be expedited.

(vii) also purchase of 4 more T620 machines to be carried out

5.4 8 antenna back-end tests and future plans -- from 4 Dec & earlier (DVL/YG) :

(i) report of efforts to summarise all the existing tests and results : report for Lband have been circulated; needs detailed discussion.

==> no report in meeting.

(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.

==> no report in meeting.

(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 !

==> no updates.

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

==> no updates.

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

==> no updates.

(vi) plans for running the new GWB back-end in parallel with all GSB observations at Lband, 610, 325 and 243 bands -- this appears to be happening fairly regularly; need to have script in place for some automated analysis of GWB data.

==> no updates.

5.5 SFP testing of final unit -- from 27 Nov and before (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. Follow-up with MTE for PCB details -- is it resolved now?

==> discussion ongoing with Vitesse... follow-up after 2 weeks.

5.6 RFI filtering -- from 27 Nov (KDB/BAK/YG) : to add the first version of the real-time RFI filtering block (after some modifications) into the packetizer (now done -- in one input out of two with different options like replace by median or by constant or by digital noise source sample or clip to threshold via s'ware registers) -- to report about performance of the same; and then to look into optimisation of resource usage.

==> most of the mods have been done and need a way to test it... follow-up after 2 weeks.

5.7 Next-gen time & frequency standards -- from 27 Nov & before (NDS/BAK) :

(i) completion of tests at GMRT and summary of the same by NDS & plans to visit NPL -- follow-up on plans for visit to NPL -- to confirm final dates.

==> visit fixed from 12th to 17th June; plans for nature of tests and things to be done there is getting finalised, including report of tests done so far.

(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) discussion with NPL about the tests to be done

(b) to circulate the detailed specs made by BE group to larger audience in NCRA.

==> (a) is ongoing; for (b) BAK to send the summary document made earlier to vlbi working group to solicit views and inputs;

Follow-up on all matters after 2 weeks (1st week of Jan)

6. Other items :

6.1 New python assembly design -- from 27 Nov (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. HSK to prepare a comparison report and discussion to be held -- still pending; discussion to be organised, following up on visit to E6 antenna.

==> no updates.

6.2 Jobs at TIFR -- from 27 Nov (HSK/SKG) : to follow-up on the following :
(i) update on status of our jobs at TIFR -- check status after collecting 120 nos:
60 more were under processing in December; to check date of delivery of these.
==> no updates.

6.3 Coexistence of 50-90 MHz RRI feed with 250-500 CDF on same face of turret --
from 27 Nov and before (HSK) : Mech group to check for possible solutions and
report back, after looking at the drawings (awaited from RRI). Update from mech
group from possibilities for reverse engineering.
==> no updates.

6.4 Problem of access to FE boxes with 500-1000 CDF feed -- from 27 Nov & 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, which are pending for long time now !
==> no updates.

6.5 Work orders for CSIRO feed with 2 parties -- from 27 Nov & before (HSK/JNC/ANR) :
(i) whether filling operation is over and new lab tests have been done on feed.
==> no updates.

6.6 Fabrication of 5 spare L-band feeds -- from 27 Nov & before (SSK/HSK) : to
finalise the plans for construction with the different vendors : Akvira, Physimech,
Fabromech)
==> no updates.

=====

Minutes of Plan meet of 26 Dec 2013 (follow-up of some pending topics from different areas) :

1. Documentation related :

1.1 Detailed design doc -- pending for long : from 4 Dec & 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

==> no updates; FE group to check and provide updates.

(ii) OF Tx to be started. Field measurements completed few weeks ago and were to be verified once more and then results were to be compiled; should have results ready by now -- some updates are required !

==> no updates; FE group to check and provide updates.

Follow-up next week or 2 weeks later.

2. FE & OF related :

2.1 New LNA for 130-260 system -- from 5 Dec, 20 Nov & before (VBB/SSK) :

(i) Variation of gain and T_{sys} with temperature : tests show new LNA with 40-60 deg K varn in T_{lna} (cf old LNA with 150-200 K) for same variation of 50 deg K in env chamber; new data with 3 temperatures (chamber, inside FE box, inside LNA box) all looking slightly different (and not tracking); T_{lna} change is about 30-40 deg K; is there a gain change?; follow-up action items : (a) plot the T_{lna} at one freq as a function of time alongwith the ambient temp as a function of time (b) to give a step change to the system using the chamber and record the response (c) to try an expt where the temp monitor can be put on the LNA itself. Pending updates from VBB for some time now.

==> discussed results in detail : some are 130-260 results, some are 250-500 results; agreed to have plots of T_{lna} , G_{lna} vs $T_{ambient}$ for both cases for one or two frequencies; also step change is not possible as chamber takes 1 min / deg; and also settling time appears to be 10-20 mins (for FE box and LNA box); hence, to try 10 deg steps with 30 min wait for settling time -- for 250-500 system.

(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)); work ongoing to study online data from 3 antennas : W1 (130-260 FE box), W4 (250-500 FE box) and E2 (common box) was tested ok, and some long duration (8 hr) tests have been carried out on W1; need some data on W4 and E2; also 24 hr test was to have been done during Diwali break -- updates expected.

==> to schedule on 24 hr run when there is no GTAC obs (e.g. Wed night) for getting simultaneous reading from all 3 antennas for follow-up; mass production has started; also agreed that since enough nos of cards are now ready, can install temp monitor in any FE or CB that goes up on antenna e.g. 250-500 being modified for notch filters...

Follow-up after 2 weeks.

2.2 Mass production of 250-500 FE system -- from 5 Dec & before (ANR/SSK) :

(i) testing of 15 installed feeds : FE group has been doing weekly plots & results,

and deflection plots have been added to these : some data had been taken for C6 (showed different lines in each poln -- RFI or internal?) & S2 (noisy bandshape -- effect of TV line?) : color grey scale plots discussed -- there are clear signatures of TV line(s) at 175 and 540 + one more around 220 (this needs to be checked) + military satellite + a few occasional bursts of RFI; to repeat similar tests at receiver room at OF output to compare with these antenna base measurements. ==> no new measurements / updates on this.

(ii) status of testing and installaton of FE boxes : ten antennas fitted + 2 spare units ready and tested : update on procurement of standard connector (main delivery expected around 20 Jan) : to check if correct sample units have been (re)delivered and have been tested with the 2 nos of chassis made ready for integration. ==> no update -- need to check with ANR.

(iii) 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 over plotted was sent; roll-off is a bit slow on the higher freq side compared to existing L-band sub-band filters; insertion loss is better; agreed to put up one or two units in antennas and check the performance :

(a) 6 dB BW varies from 90 to 124 MHz : agreed to reduce 124 MHz to closer to 100 MHz with last round of redesign -- check if PCBs have come and tested.

(b) 2 units of the exisiting design were to be made ready and install on ch1 of 2 antennas, after completion of small add-on card to make it compatible with RFCM card : some chassis for switches was pending; plan for integration with new box to be discussed.

==> need updates from Sougata / ANR; email updated from SSK : filter switching from RFCM card has been verified -- modifications to use those bits in progress; follow-up discussion needed.

(iv) plans for notch filters in FE box for existing 250-500 antennas : notch filter at 540 (lumped ckt) -- one set installed in 2 antennas -- S2 & W4 -- in pol 1, in receiver room. Performance had been checked and found OK; to make units ready for all existing 250-500 FE systems, along with 175 MHz filters. Units for 3 antennas are available -- to check status of installation (W1 was completed); check status of PCB order for remaining units (including more PCBs for 175 filter; update on chassis procurement; also possible issues with tuning of 175 filter.

==> 4 units fully assembled (1 BPF + 2 notch filters) and tuned and ready; waiting for 2 more 540 filters to complete 3 antenna system -- this can start now; also 175 notch filter tuning problem is solved; 540 notch filter PCBs have come, will start assembling now, waiting for delivery of chassis.

(v) status of other auxiliary items :

-- noise source, power splitter, directional coupler etc : sample unit has been assembled / integrated on the bench; integrated noise on/off testing on bench yet to be done; plans for integration with new FE box to be finalised.

==> no update; to check ANR.

-- post amp : Hitite 740 new stock for 30 antennas available; to check if post amp has been tested with slow rise power supply.

==> not done yet.

-- power monitor : status update on the older scheme with Galli amplifier : is it ready for integration in FE box?

==> ready to test in a FE box for final characterisation. there may be some problem regarding noise pickedup in feed through arrangement and may need to move to connectorised set-up (with SMA) -- tbc with ANR et al.

-- temp monitor : to check about doing final integrated testing.
==> this can now happen (see item above).
-- RFCM card : check if PCB assembled and tested? (meanwhile, older version of new RFCM card can be used for layout testing purposes) -- finalise layout in new FE box.
==> still under testing... will need a bit more time to resolve and confirm.
Follow-up on relevant items 2 weeks later.

2.3 status of lab integration of final version of 250-500 box (ANR/SSK/HSK) :
modelling shows that existing size of box is not adequate (inspite of double decking of chassis); deeper FE boxes are needed -- at least 10 cm (likely 15 cm); HSK confirms that this is possible : present depth is 468 mm, can be increased to 700 mm (also, rear member in the cage can be removed to further increase depth)
-- HSK to circulate existing drawing; also weight will go up : HSK to check the impact if total wt of all boxes goes up by 50% (capacity at turret; static & dynamic loading capacity of feed gearbox etc) :
(a) new dimensions of sample box to be finalised
==> 150 mm has been added to present depth of 468 mm (tbc); weight of empty box is 15 kg.
(b) to check if sample boxes supplied by w'shop
==> one unit has been given to the lab
(c) to start integration work
==> placement is going on...
(d) HSK to circulate existing drawing of turret and the first calculations about impact of weight increase.
==> email update from HSK : will get weight of integrated box from FE team and include in calculations; first hand drawing has been made (formal drawing to be made and circulated); calculation of static and dynamic loading is in progress; report will be ready in 15 days time.
Follow-up on all items after 2 weeks.

2.4 Directional coupler for 250-500 FE system -- from 5 Dec & 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 ordered. Need status update (if not covered under item 2.2); meanwhile can sample units be assembled with spare connectors that are available?
==> one sample is fitted in the sample final FE box; what about more? ANR to update status of connectors. Follow-up after 2 weeks.

2.5 Status of improved 500-1000 MHz CDF -- from 5 Dec (19 Dec) & earlier (HRB/GSS/SSK) :
there are 3 different versions of dipole (v1, v2a, v2b) and 2 versions of cone (v1, v2) in trial phase; 3 test feeds have been built using these :
ver1 : dipole v1 + cone v1 : RL is OK, deflection is not good & falls with freq
ver2a : dipole v2a + cone v2 (mesh?) : RL is good; deflection is OK & flat with freq
ver2b : dipole v2b + cone v2 (solid?) : RL is v. good; deflection is good but not flat
Follow-up action items are as follows :
(i) simulation results for different combinations of the above were carried out and discussed in detail : it appears that dipole (rather than cavity) is dominant for deciding the RL behaviour (and also H-plane taper?); cone appears important for E-plane taper; best results for RL and good beam pattern match over large freq range appear to be for dipole v2b (triple sleeve) with cone v1 (66 deg).
To discuss the possibility of testing dipole v2b + cone v1 combination in lab and on antenna.
==> this needs v2b dipole to be free -- can wait for new one to be ready; also

more FE boxes are needed (2 nos).

(ii) simulation results for denser mesh case (higher order basis functions): new simulations are with finer planes rather than higher order basis functions; this needs to be confirmed; also, 50 MHz shift that is seen needs to be understood; also explore default number of current elements in simulation (from 19 Dec meet) ==> discussion with WiPLD : increase in PolDeg columns may make a difference; to follow-up a bit more with them and finalise the strategy.

(iii) there is noticeable difference in simulated and measured RL curves which needs some study also.
==> reason for this is not clear; it appears that agreement was better for 250-500 CDF work...

(iv) to do deflection tests for ver2 with a rigid stool design (and with finer adjustment of the focus distance, if needed) and then bring down the ver2a feed and replace with normalg 235/610 feed (or with v2b dipole + v1 cone combination?). will need a spare 610 feed to be made ready using 550-900 LNA -- to check status and plans for this.
==> to try current ver2a with 1480 rigid stool (which is ready) to see if any change in beamwidth.

(v) to compare deflection and beamwidth results for new feeds with old 610 system -- first round of results were shown and are quite useful; to extend the data beyond Aug 2013 to latest date and take up for discussion -- is this ready?
==> updated plots shows stable behaviour for Aug to end Nov at 47 arcmin (when ver2b with 1280 stool was there) + plus some other details; will be useful to see ver2a with 1480 stool now.

(vi) to compare RL measurements for ver2 dipole in ver1 cavity (and vice versa?) was waiting for C10 feed to come down -- see item (iii) above.
==> this is sort of done and can be rechecked when v1 cone is mated with v2b dipole.

(vii) any new ideas? discussion of 19th Dec came up with following action items:
(a) get 2 more v2b dipoles fabricated
(b) try simulation of CDF250-500 scaled by factor of 2
(c) design Kildall ring feed at 750 MHz using v2b dipole
(d) design Dual-ring feed 550-900 MHz (initial BFRs can be made for 650 & 800 MHz)
(e) repeat Radiation pattern measurement @ 800 MHz (include notch filter) for CDF550-900 MHz (Cone v2, Dipole v2b).
==> (a) is already underway; (c) is being tried and then may (b); GS is looking at (e)
==> Follow-up on relevant items 2 weeks later.

2.6 Signal flow analysis (SFA) related items -- from 5 Dec & 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 !
==> no update -- SSK to provide response.
(ii) plans for SFA of 250-500 system : analysis had started, and some lab tests had also been done; and all data required had been taken; there were some problems in reconciling bench test results with analysis, for existing system -- to check if resolved, and if first draft report is ready for circulation.

==> all matters are resolved and report is being prepared.

Follow-up after 2 weeks.

2.7 Filters at different stages of receiver chain -- from 5 Dec & 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. ckt for 2:1 and 4:1 versions assembled & tested -- 25 dB isolation achieved (changes from 25 to 17 dB with frequency for 8:1 switch); aim is to target integrated unit for 250-500 with 4 sub-band filters with integration of RFCM switch; completed and tested for ICON units; to be done for in-house units (needs more nos of switches to be made ready).

==> 550-900 integrated in-house unit is waiting for the PCB to come (Imran); 250-500 is yet to design the master PCB (Sougata); to wait for further updates.

(ii) to follow-up on refinements of the scheme for each FE box : update on 250-500 system (first to be done), alongwith LPF from 1750 and above for HI band. sample PCB for 1750 LPF had come and was to be tested + other elements were to be assembled to produce the first unit for 250-500 system : 2 versions (1600 & 1750 MHz cut-off) assembled and tested; were to be installed in one antenna to check performance; was agreed to first test each of these (one after the other) at antenna base and obtain plots for Lband, with and without the filters -- check status of this.

==> no clear updates; need to revisit this with Ankur and SSK ?

Follow-up after 2 weeks.

2.8 Walsh switching arrangement in FE -- from 5 Dec & before (SSK/SCC/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) -- need update on plans for this : on track for testing in 1st week of Jan?

==> due to conflicting requirement of infrastructure set-up from other tests, this can be postponed to a bit later.

(ii) plans for implementation in other systems e.g. 250-500 FE box (needs the new RFCM card to be ready?) -- meanwhile, for old RFCM card usa, one PCB designed for incorporating patch card for level conversion for filter select, and new Walsh Opamp (OP37) -- temporary PCB is ready and tested and will be used for integration.

==> no clear update... ANR/SSK need to respond.

(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) -- needed conversion to +/- 10 V switching arrangement : was to be completed and made available by now : confirm is this is done and item can be moved completely to BE section.

==> this is confirmed, and can be closed.

Follow-up on open items 2 weeks later.

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

18 Dec (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) -- two sample units had been made ready; to check if these have been installed in antennas C8 and C12 with broadband path, alongwith required notch filters for TV line; also spares for mobile filters to be looked into.

==> C8 and C12 channel 1 is done with new BPF + 540 notch filter (no mobile

filter!) -- initial bandshape and deflection results need to be circulated by FE team -- to check these and decide follow-up action 2 weeks later.

2.10 M&C for new FE systems with new MCM cards -- from 5 Dec & much before (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 : some discussions have taken place -- need status update and plans from these and item can be moved to Ops section after that.

==> team involving persons from FE and Ops group has been formed to start work; details of what is being done need to be discussed -- follow-up on this after 2 weeks.

2.11 OF systems -- from 5 Dec & 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 50 nos to be ordered. To check the status of delivery of items.

==> expected 25th Jan.

(ii) plans for extending the wideband OF link to beyond 15 antennas : C8 has been completed (15th antenna); which is the next antenna?

==> C12 has also been completed (should be 16 antennas now).

(iii) problem of manpower for assembling : check if local person to be trained has started work; check plans for getting person from Argus to work at GMRT for 2 weeks.

==> email update from SSK : trying to get extra manpower for wiring from local sources; no update about trying to get manpower from Argus.

==> Follow-up on relevant items 2 weeks later.

2.12 Alternate fibre connectivity -- from 20 Nov (PAR/SSK) : Tata telecom has offer for 16 Mbps from E5 to from Kalyan to Nagar highway; Rs 8 lakhs per annum or so... to be discussed and follow-up after 2 weeks.

==> to take up for discussion.

3. RFI related matters :

3.1 RFI from cable TV leakage -- from 5 Dec (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. Previous discussion showed inconclusive results; RFI team was to try out "sniffing" method, based on results from control room. Recently, information has been collected from operators in Otur, Ale, Junnar and Belha; team is checking channels received at FE o/p in 150 and 235 bands; to check if on track for controlled expt to be done by end of Dec.

==> operators have given the information about their channels; some of these lines can be seen in RF o/p of broadband 130-260 systems; to be checked in 250-500 and then to try some localisation expt, including coordinated switch on/off with different operators. Follow-up after 2 weeks.

3.2 Effect of military satellite RFI in 243 band -- from 5 Dec, 20 Nov & 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 algorithm for prediction (for user's) :

(i) filter related action items :

(a) report on prototype filter by FE group was to have been circulated -- still pending; need to check that this filter does not obstruct L-band, and then finalise plans for use in 2 antennas in receiver room -- filter operates upto 1 GHz only, need to discuss implication of this for tests.

==> to try a plan where this filter can be inserted in broadband path for a duration when 250-500 observations are being done; to check how many nos are available at present.

(b) plan to put in one channel of 2 antennas at 250-500 band, in the receiver room, avoiding the antennas which have 540 TV filters -- pending.

==> can be done as per above, in a coordinated manner.

(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 -- appears that Ops group is ready with a program and discussion with RFI group was pending.

==> PAR to provide test cases for checking algorithm by SNK and then appropriate longer term follow-up can be decided.

Follow-up on status after 2 weeks.

3.3 Radiation from CAT5 cable -- from 5 Dec & 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: sample cables were made and tested in controlled condition : shielded cable between switch and laptop shows reduction in RFI -- compiled report to be made ready; plans for further action to be discussed.

==> first report has been circulated that combines testing of switches and CAT5 cables; conclusion is that use of shielded cable makes significant difference to the discrete lines as well as to broadband RFI. Hence we can go ahead with a controlled expt in GMRT Conf room to quantify the improvement. To check detailed plan after 2 weeks.

4. Operations :

4.1 Mass production of Rabbit MCM cards -- from 5 Dec & before (CPK/SN) :

(i) status check on how many cards are ready now

==> 61 are ready now; 46 cards given to BE group (need 50 : 30 (+5) + 8 (2) + 5 for miscellaneous activities).

(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 with sharing if no high voltage items are being monitored; quick check showed about 20 spare monitoring points after including current & projected estimates from OF and sentinel; agreed that this a feasible solution and matter can be closed.

(iii) meanwhile, NGK has requested for a relook : to discuss once more and take a final call about total number of cards needed.

==> matter could not be taken up as many of the required persons were not present; to follow-up 1 or 2 weeks later.

4.2 Mass production of shielded box for MCM cards -- from 5 Dec & 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 -- units have arrived and are

under assembly and testing -- to report status of this work.

==> to make everything ready and put in the 37 pin shielded connectors as soon as they come and then do the test with dummy LED type loads.

(ii) status of work on shielded connectors that 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 -- expected by 10 Jan. To use existing connectors for the preliminary measurements -- status of this to be reported.

==> giving up on sample shipment; waiting for 25 pair order to come by 10th Jan.

(iii) How to plan for the mass production? Ops 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. To check if this moving forward or not. HSK to update about order with Akvira for prototype units. Need updates on these matters.

==> not much detailed discussion on this as SN not present; email update from HSK : 2 boxes delivered and handed over to Ops group on 11th Dec; plans for mass production can be finalised once these are tested and certified. Follow-up after 2 weeks.

4.3 Development of M&C software -- from 5 Dec, 27 Nov & before (JPK/RU/SN/NGK) :

(i) update on work with TCS (JPK/SN) : current status of PoC phase of work

==> one MCM card has been given to TCS and they have done initial integration; one PC104 card has to be given to them (basic commands tested and will be demo'd to them and then handed over); template for report format at end of PoC needs to be finalised -- this needs some feedback from stakeholders (us); to check about meeting with TRDDC for compatibility with spec driven format (this aspect can be included in the report).

(ii) monthly update on in-house work.

==> commands related to user and sub-array have been implemented and tested -- multiple-antenna communication is working; 8 antenna system tested with one sub-system per antenna being energised.

Follow-up after 2 or 4 weeks, as needed.

5. Back-ends :

5.1 Documentations :

(i) Detailed design doc -- pending for long : from 5 Dec & before (BAK) : analog back-end was due sometime ago ! Hande was starting to make the first version -- first version has been prepared; update will happen after one round of discussion -- to check status of this.

==> discussion is ongoing within the group and updated version will come shortly.

(ii) ITRs for analog back-end systems and digital systems to be taken up :

analog back-end : Sandeep and Navnath to look into GAB; pkt corr by Sandeep & Mekhala; GPU corr needs to be started -- Reddy & Irappa to work on this with target of end-Dec -- need a status update of various activities :

==> first level draft by Sandeep & Mekhala has been circulated -- needs to be studied; status of GPU corr doc -- work has started.

Follow-up after 2 weeks.

5.2 Analog back-end for 8 antennas and beyond -- from 5 Dec & before (BAK) :

(i) appropriate attenuator settings for Lband & 250-500 done; 610 band was being finalised -- updated table had been circulated; few iterations need to be done and

then updated table + report can be circulated and matter could be closed then.

==> Ganla to produce consolidated table for all bands and release.

(ii) 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.

==> BE needs : chassis drawings, PCB films (?) and circuit diagrams & specs.

(iii) to check status, plans and timescales for 16 antenna system

==> system is completed except for making all the connections. many of the other items are done for 30 antennas....

Follow-up after 2 weeks.

5.3 Power equalisation schemes for new back-ends -- from 5 Dec and before (SSK/NSR/BAK/SRoy): Need updates on both of the following :

(i) option 1 : using detectors in GAB and local feedback loop -- monitoring set-up working; algorithm for computing the attenuation values being worked out by DKN and NSR. Status update required.

==> DKN has taken the code from NSR and will be modifying it for his use.

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

(a) Scheme is working; to check if circulated SOP is all right -- bugs etc to be reported back; SRoy to look at SOP.

==> no updates.

(b) Plans for implementation of user controlled 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 -- this is the current released mode.

(ii) repeatable at some interval specified by the user -- can it be script based?

(iii) automatic, should adjust in response to a stimulus in the input power -- needs a discussion.

(iv) should provide a reliable power monitoring scheme -- needs discussion.

Also, issues like logging of results etc to be discussed. Agreed to have a document that spells out the main requirements (from user point of view) and possible solution options / techniques that can be taken up for discussion in Plan meeting for finalising the plan of action -- SRoy / SSK to update on this.

==> no direct updates ; email update from SRoy : one round of discussions has taken place and some follow-up action is planned; need the overall document to be worked out.

Need updates on some of the items and appropriate follow-up 1 or 2 weeks later.

5.4 Walsh modulation : prototype set-up on Roach board -- from 5 Dec (SCC/BAK) :

(i) to check if FE team has handed one unit to BE team -- see item 2.7

==> confirmed and upper item can be closed.

(ii) plans of BE team for implementing prototype scheme -- basic unit for switching using sq wave signal from GPIO pin tested ok; was put in main PoCo correlator and was being tested. SCC to provide status update.

==> SCC has received the modulator unit from FE group and is working on the integrated test.

Status check after 2 weeks.

5.5 GPU corr (GWB-II) : release of 4 node, 8 input, 200/250/350 MHz version -- from 18 Dec & before (SHR/SSK/BAK) (NOTE : GWB-I is existing released system !) : agreed to make 4 T7500 nodes with C2050/C2075 Fermi GPUs + remaining 4 T7500 nodes as host machines (to take care that these are the ones that transient pipeline uses presently so that sharing is possible); this should have ALL basic modes : total intensity and full polar IFR modes; IA + PA BFR modes with process_psr pipeline attached; full GUI support; to come up in trial code section without affecting the presently released mode.

(i) 1.7 s time offset problem to be resolved. May need checking with long stretches of data to see if the problem shows up -- SHR & GSJ planning some tests : confirmed with GSB tests that problem is there, but reason is not clear still.
==> no updates.

(ii) update on code for providing basic beam modes (computational load is 3 to 10% of GPU compute time) : first version of process_psr pipeline for IA has been released (with basic SOP), but is essentially not functional: to check if problem of threads not synchronised during the addition needs is now resolved by having a separate kernel (what is the additional compute time due to that?) moving out of phase shift kernel).
==> separate kernel option tested with noise source, but not yet with antenna; to check the loading later on.

(iii) development of 4/8 bit versions of the code, for allowing BW > 200 MHz to be released : needs change in FPGA design, as well as in GPU code : status update on this required, including plans for testing this mode.
==> change in FPGA design is done and one common design with parameter is available and GPU side only integer delay correction needs to be completed; and then test with sky signal.

(iv) modification GUI for supporting new modes, as well as having support for code in trial branch -- status and plans for this to be discussed.
==> agreed to do this as different versions (instead of trial and release) but with clear separation of directories, codes and set-up files; NSR is already looking at the work to be done.
==> Follow-up on appropriate matters next week.

5.6 Final online control for GPU corr -- from 5 Dec & 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 & DAS code. SSK to report on this -- can this be merged into appropriate item in 5.5 above?
==> BE team to discuss and get back on this.

(ii) to check cause of problem for modes with more than 2K channels -- best done with raw voltage files ? thought to be due to counter data being sent in place of ADC data once every 4K data points -- will be eliminated in new integrated design for 8 / 4 bits; also to check about spikes in channels that are power of 2.
==> no clear updates on this.

(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.
==> this should NOT be an issue in the new release; may need some testing on antenna signals.
==> Follow-up after 2 weeks.

5.7 8 antenna back-end tests and future plans -- from 5 Dec & earlier (DVL/YG) :

(i) report of efforts to summarise all the existing tests and results : report for Lband have been circulated; some follow-up has also occurred; needs detailed discussion to work out specific action items and also refinement of the report itself (see below also).

(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 long overdue !

(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 GWB back-end in parallel with all GSB observations at Lband, 610, 325 and 243 bands -- this appears to be happening fairly regularly; need to have script in place for some automated analysis of GWB data.

==> No specific updates on this, except that some background activity has been happening with DVL; YG to follow-up with DVL & restructure this item accordingly.

5.9 Power and cooling requirements for projected back-end systems -- from 5 Dec and earlier (GSJ/BAK/RVS/YG) : some modifications have been made and some tests have been done and preliminary results circulted -- to discuss these and plan further activities; fan on and off to be tested; scheme for monitoring of processor temperature to be refined. Shelton and Ganla to provide status update on the tests being done.

==> needs some follow-up discussion with Shelton and Ganla and the different schemes for monitoring the temperature. To follow-up after 2 weeks.

=====

Minutes of Plan meet of 26 Dec 2013 (follow-up of some pending topics from different areas) :

1. Documentation related :

1.1 Detailed design doc -- pending for long : from 4 Dec & 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

==> no updates; FE group to check and provide updates.

(ii) OF Tx to be started. Field measurements completed few weeks ago and were to be verified once more and then results were to be compiled; should have results ready by now -- some updates are required !

==> no updates; FE group to check and provide updates.

Follow-up next week or 2 weeks later.

2. FE & OF related :

2.1 New LNA for 130-260 system -- from 5 Dec, 20 Nov & before (VBB/SSK) :

(i) Variation of gain and T_{sys} with temperature : tests show new LNA with 40-60 deg K varn in T_{lna} (cf old LNA with 150-200 K) for same variation of 50 deg K in env chamber; new data with 3 temperatures (chamber, inside FE box, inside LNA box) all looking slightly different (and not tracking); T_{lna} change is about 30-40 deg K; is there a gain change?; follow-up action items : (a) plot the T_{lna} at one freq as a function of time alongwith the ambient temp as a function of time (b) to give a step change to the system using the chamber and record the response (c) to try an expt where the temp monitor can be put on the LNA itself. Pending updates from VBB for some time now.

==> discussed results in detail : some are 130-260 results, some are 250-500 results; agreed to have plots of T_{lna} , G_{lna} vs $T_{ambient}$ for both cases for one or two frequencies; also step change is not possible as chamber takes 1 min / deg; and also settling time appears to be 10-20 mins (for FE box and LNA box); hence, to try 10 deg steps with 30 min wait for settling time -- for 250-500 system.

(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)); work ongoing to study online data from 3 antennas : W1 (130-260 FE box), W4 (250-500 FE box) and E2 (common box) was tested ok, and some long duration (8 hr) tests have been carried out on W1; need some data on W4 and E2; also 24 hr test was to have been done during Diwali break -- updates expected.

==> to schedule on 24 hr run when there is no GTAC obs (e.g. Wed night) for getting simultaneous reading from all 3 antennas for follow-up; mass production has started; also agreed that since enough nos of cards are now ready, can install temp monitor in any FE or CB that goes up on antenna e.g. 250-500 being modified for notch filters...

Follow-up after 2 weeks.

2.2 Mass production of 250-500 FE system -- from 5 Dec & before (ANR/SSK) :

(i) testing of 15 installed feeds : FE group has been doing weekly plots & results,

and deflection plots have been added to these : some data had been taken for C6 (showed different lines in each poln -- RFI or internal?) & S2 (noisy bandshape -- effect of TV line?) : color grey scale plots discussed -- there are clear signatures of TV line(s) at 175 and 540 + one more around 220 (this needs to be checked) + military satellite + a few occasional bursts of RFI; to repeat similar tests at receiver room at OF output to compare with these antenna base measurements.
==> no new measurements / updates on this.

(ii) status of testing and installaton of FE boxes : ten antennas fitted + 2 spare units ready and tested : update on procurement of standard connector (main delivery expected around 20 Jan) : to check if correct sample units have been (re)delivered and have been tested with the 2 nos of chassis made ready for integration.
==> email update from ANR : connectors not arrived yet; due in January.

(iii) 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 over plotted was sent; roll-off is a bit slow on the higher freq side compared to existing L-band sub-band filters; insertion loss is better; agreed to put up one or two units in antennas and check the performance :

(a) 6 dB BW varies from 90 to 124 MHz : agreed to reduce 124 MHz to closer to 100 MHz with last round of redesign -- check if PCBs have come and tested.

(b) 2 units of the exisiting design were to be made ready and install on ch1 of 2 antennas, after completion of small add-on card to make it compatible with RFCM card : some chassis for switches was pending; plan for integration with new box to be discussed.

==> email update from ANR :

item (a) : new PCBs arrived, assembled & tested and reduced BW of 106 MHz has been achieved; this can now be finalised.

item (b) : 2 units ready for assembly in the new FEB; add-on card ready & tested. email updated from SSK : filter switching from RFCM card has been verified -- modifications to use those bits in progress; follow-up discussion needed.

(iv) plans for notch filters in FE box for existing 250-500 antennas : notch filter at 540 (lumped ckt) -- one set installed in 2 antennas -- S2 & W4 -- in pol 1, in receiver room. Performance had been checked and found OK; to make units ready for all existing 250-500 FE systems, along with 175 MHz filters. Units for 3 antennas are available -- to check status of installation (W1 was completed); check status of PCB order for remaining units (including more PCBs for 175 filter; update on chassis procurement; also possible issues with tuning of 175 filter.

==> 4 units fully assembled (1 BPF + 2 notch filters) and tuned and ready; waiting for 2 more 540 filters to complete 3 antenna system -- this can start now; also 175 notch filter tuning problem is solved; 540 notch filter PCBs have come, will start assembling now, waiting for delivery of chassis.

(v) status of other auxiliary items :

-- noise source, power splitter, directional coupler etc : sample unit has been assembled / integrated on the bench; integrated noise on/off testing on bench yet to be done; plans for integration with new FE box to be finalised.

==> email update from ANR : integrated testing will be done with new FEB.

-- post amp : Hitite 740 new stock for 30 antennas available; to check if post amp has been tested with slow rise power supply.

==> not done yet.

-- power monitor : status update on the older scheme with Galli amplifier : is it ready for integration in FE box?

==> ready to test in a FE box for final characterisation. there may be some problem regarding noise picked up in feed through arrangement and may need to move to connectorised set-up (with SMA) -- tbc with ANR et al.
-- temp monitor : to check about doing final integrated testing.
==> this can now happen (see item above).
-- RFCM card : check if PCB assembled and tested? (meanwhile, older version of new RFCM card can be used for layout testing purposes) -- finalise layout in new FE box.
==> still under testing... will need a bit more time to resolve and confirm.
Follow-up on relevant items 2 weeks later.

2.3 status of lab integration of final version of 250-500 box (ANR/SSK/HSK) : modelling shows that existing size of box is not adequate (inspite of double decking of chassis); deeper FE boxes are needed -- at least 10 cm (likely 15 cm); HSK confirms that this is possible : present depth is 468 mm, can be increased to 700 mm (also, rear member in the cage can be removed to further increase depth)
-- HSK to circulate existing drawing; also weight will go up : HSK to check the impact if total wt of all boxes goes up by 50% (capacity at turret; static & dynamic loading capacity of feed gearbox etc) :

(a) new dimensions of sample box to be finalised

==> 150 mm has been added to present depth of 468 mm (tbc); weight of empty box is 15 kg.

(b) to check if sample boxes supplied by w'shop

==> one unit has been given to the lab

(c) to start integration work

==> placement is going on...

(d) HSK to circulate existing drawing of turret and the first calculations about impact of weight increase.

==> email update from HSK : will get weight of integrated box from FE team and include in calculations; first hand drawing has been made (formal drawing to be made and circulated); calculation of static and dynamic loading is in progress; report will be ready in 15 days time.

Follow-up on all items after 2 weeks.

2.4 Directional coupler for 250-500 FE system -- from 5 Dec & 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 ordered. Need status update (if not covered under item 2.2); meanwhile can sample units be assembled with spare connectors that are available?
==> email update from ANR : 2 units made ready and fitted in new FEB -- use old type-N connectors; new connectors expected soon -- chassis will be modified when that happens; SMA connectors (400 nos) have come. Follow-up 2 weeks later.

2.5 Status of improved 500-1000 MHz CDF -- from 5 Dec (19 Dec) & earlier (HRB/GSS/SSK) :

there are 3 different versions of dipole (v1, v2a, v2b) and 2 versions of cone (v1, v2) in trial phase; 3 test feeds have been built using these :

ver1 : dipole v1 + cone v1 : RL is OK, deflection is not good & falls with freq

ver2a : dipole v2a + cone v2 (mesh?) : RL is good; deflection is OK & flat with freq

ver2b : dipole v2b + cone v2 (solid?) : RL is v. good; deflection is good but not flat

Follow-up action items are as follows :

(i) simulation results for different combinations of the above were carried out and discussed in detail : it appears that dipole (rather than cavity) is dominant for deciding the RL behaviour (and also H-plane taper?); cone appears important for E-plane taper; best results for RL and good beam pattern match over large

freq range appear to be for dipole v2b (triple sleeve) with cone v1 (66 deg).
To discuss the possibility of testing dipole v2b + cone v1 combination in lab
and on antenna.

==> this needs v2b dipole to be free -- can wait for new one to be ready; also
more FE boxes are needed (2 nos).

(ii) simulation results for denser mesh case (higher order basis functions): new
simulations are with finer planes rather than higher order basis functions; this
needs to be confirmed; also, 50 MHz shift that is seen needs to be understood;
also explore default number of current elements in simulation (from 19 Dec meet)
==> discussion with WiPLD : increase in PolDeg columns may make a difference; to
follow-up a bit more with them and finalise the strategy.

(iii) there is noticeable difference in simulated and measured RL curves which
needs some study also.

==> reason for this is not clear; it appears that agreement was better for
250-500 CDF work...

(iv) to do deflection tests for ver2 with a rigid stool design (and with finer
adjustment of the focus distance, if needed) and then bring down the ver2a feed
and replace with normalg 235/610 feed (or with v2b dipole + v1 cone combination?).
will need a spare 610 feed to be made ready using 550-900 LNA -- to check status
and plans for this.

==> to try current ver2a with 1480 rigid stool (which is ready) to see if any
change in beamwidth.

(v) to compare deflection and beamwidth results for new feeds with old 610
system -- first round of results were shown and are quite useful; to extend the
data beyond Aug 2013 to latest date and take up for discussion -- is this ready?

==> updated plots shows stable behaviour for Aug to end Nov at 47 arcmin (when
ver2b with 1280 stool was there) + plus some other details; will be useful to see
ver2a with 1480 stool now.

(vi) to compare RL measurements for ver2 dipole in ver1 cavity (and vice versa?)
was waiting for C10 feed to come down -- see item (iii) above.

==> this is sort of done and can be rechecked when v1 cone is mated with v2b
dipole.

(vii) any new ideas? discussion of 19th Dec came up with following action items:

(a) get 2 more v2b dipoles fabricated

(b) try simulation of CDF250-500 scaled by factor of 2

(c) design Kildall ring feed at 750 MHz using v2b dipole

(d) design Dual-ring feed 550-900 MHz (initial BFRs can be made for 650 & 800 MHz)

(e) repeat Radiation pattern measurement @ 800 MHz (include notch filter) for
CDF550-900 MHz (Cone v2, Dipole v2b).

==> (a) is already underway; (c) is being tried and then may (b); GS is looking
at (e)

==> Follow-up on relevant items 2 weeks later.

2.6 Signal flow analysis (SFA) related items -- from 5 Dec & 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 !

==> no update -- SSK to provide response.

(ii) plans for SFA of 250-500 system : analysis had started, and some lab tests had also been done; and all data required had been taken; there were some problems in reconciling bench test results with analysis, for existing system -- to check if resolved, and if first draft report is ready for circulation.
==> all matters are resolved and report is being prepared.
Follow-up after 2 weeks.

2.7 Filters at different stages of receiver chain -- from 5 Dec & 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. ckt for 2:1 and 4:1 versions assembled & tested -- 25 dB isolation achieved (changes from 25 to 17 dB with frequency for 8:1 switch); aim is to target integrated unit for 250-500 with 4 sub-band filters with integration of RFCM switch; completed and tested for ICON units; to be done for in-house units (needs more nos of switches to be made ready).

==> 550-900 integrated in-house unit is waiting for the PCB to come (Imran); 250-500 is yet to design the master PCB (Sougata); to wait for further updates.

(ii) to follow-up on refinements of the scheme for each FE box : update on 250-500 system (first to be done), alongwith LPF from 1750 and above for HI band. sample PCB for 1750 LPF had come and was to be tested + other elements were to be assembled to produce the first unit for 250-500 system : 2 versions (1600 & 1750 MHz cut-off) assembled and tested; were to be installed in one antenna to check performance; was agreed to first test each of these (one after the other) at antenna base and obtain plots for Lband, with and without the filters -- check status of this.

==> no clear updates; need to revisit this with Ankur and SSK ?
Follow-up after 2 weeks.

2.8 Walsh switching arrangement in FE -- from 5 Dec & before (SSK/SCC/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) -- need update on plans for this : on track for testing in 1st week of Jan?

==> due to conflicting requirement of infrastructure set-up from other tests, this can be postponed to a bit later.

(ii) plans for implementation in other systems e.g. 250-500 FE box (needs the new RFCM card to be ready?) -- meanwhile, for old RFCM card usa, one PCB designed for incorporating patch card for level conversion for filter select, and new Walsh Opamp (OP37) -- temporary PCB is ready and tested and will be used for integration.

==> email update from ANR : walsh circuit with OP37 ready for two FEBs -- they are on general purpose PCBs; final PCB has been made and sent for fabrication; old RFCM card can be used for 250-500 MHz FEB with this add on card; spare RFCM cards are available.

(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) -- needed conversion to +/- 10 V switching arrangement : was to be completed and made available by now : confirm is this is done and item can be moved completely to BE section.

==> this is confirmed, and can be closed.
Follow-up on open items 2 weeks later.

2.9 Releasing existing 610 MHz system as part of the wideband upgrade -- from 18 Dec (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) -- two sample units had been made ready; to check if these have been installed in antennas C8 and C12 with broadband path, alongwith required notch filters for TV line; also spares for mobile filters to be looked into.
==> C8 and C12 channel 1 is done with new BPF + 540 notch filter (no mobile filter!) -- initial bandshape and deflection results need to be circulated by FE team -- to check these and decide follow-up action 2 weeks later.

2.10 M&C for new FE systems with new MCM cards -- from 5 Dec & much before (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 : some discussions have taken place -- need status update and plans from these and item can be moved to Ops section after that.
==> team involving persons from FE and Ops group has been formed to start work; details of what is being done need to be discussed -- follow-up on this after 2 weeks.

2.11 OF systems -- from 5 Dec & 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 50 nos to be ordered. To check the status of delivery of items.
==> expected 25th Jan.
(ii) plans for extending the wideband OF link to beyond 15 antennas : C8 has been completed (15th antenna); which is the next antenna?
==> C12 has also been completed (should be 16 antennas now).
(iii) problem of manpower for assembling : check if local person to be trained has started work; check plans for getting person from Argus to work at GMRT for 2 weeks.
==> email update from SSK : trying to get extra manpower for wiring from local sources; no update about trying to get manpower from Argus.
==> Follow-up on relevant items 2 weeks later.

2.12 Alternate fibre connectivity -- from 20 Nov (PAR/SSK) : Tata telecom has offer for 16 Mbps from E5 to from Kalyan to Nagar highway; Rs 8 lakhs per annum or so... to be discussed and follow-up after 2 weeks.
==> to take up for discussion.

3. RFI related matters :

3.1 RFI from cable TV leakage -- from 5 Dec (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. Previous discussion showed inconclusive results; RFI team was to try out "sniffing" method, based on results from control room. Recently, information has been collected from operators in Otur, Ale, Junnar and Belha; team is checking channels received at FE o/p in 150 and 235 bands; to check if on track for controlled expt to be done by end of Dec.

==> operators have given the information about their channels; some of these lines can be seen in RF o/p of broadband 130-260 systems; to be checked in 250-500 and then to try some localisation expt, including coordinated switch on/off with different operators. Follow-up after 2 weeks.

3.2 Effect of military satellite RFI in 243 band -- from 5 Dec, 20 Nov & 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 algorithm for prediction (for user's) :

(i) filter related action items :

(a) report on prototype filter by FE group was to have been circulated -- still pending; need to check that this filter does not obstruct L-band, and then finalise plans for use in 2 antennas in receiver room -- filter operates upto 1 GHz only, need to discuss implication of this for tests.

==> to try a plan where this filter can be inserted in broadband path for a duration when 250-500 observations are being done; to check how many nos are available at present.

(b) plan to put in one channel of 2 antennas at 250-500 band, in the receiver room, avoiding the antennas which have 540 TV filters -- pending.

==> can be done as per above, in a coordinated manner.

(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 -- appears that Ops group is ready with a program and discussion with RFI group was pending.

==> PAR to provide test cases for checking algorithm by SNK and then appropriate longer term follow-up can be decided.

Follow-up on status after 2 weeks.

3.3 Radiation from CAT5 cable -- from 5 Dec & 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: sample cables were made and tested in controlled condition : shielded cable between switch and laptop shows reduction in RFI -- compiled report to be made ready; plans for further action to be discussed.

==> first report has been circulated that combines testing of switches and CAT5 cables; conclusion is that use of shielded cable makes significant difference to the discrete lines as well as to broadband RFI. Hence we can go ahead with a controlled expt in GMRT Conf room to quantify the improvement. To check detailed plan after 2 weeks.

4. Operations :

4.1 Mass production of Rabbit MCM cards -- from 5 Dec & before (CPK/SN) :

(i) status check on how many cards are ready now

==> 61 are ready now; 46 cards given to BE group (need 50 : 30 (+5) + 8 (2) + 5 for miscellaneous activities).

(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 with sharing if no high voltage items are being monitored; quick check showed about 20 spare monitoring points after including current & projected estimates from OF and sentinel; agreed that this a feasible solution and matter can be closed.

(iii) meanwhile, NGK has requested for a relook : to discuss once more

and take a final call about total number of cards needed.

==> matter could not be taken up as many of the required persons were not present; to follow-up 1 or 2 weeks later.

4.2 Mass production of shielded box for MCM cards -- from 5 Dec & 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 -- units have arrived and are under assembly and testing -- to report status of this work.

==> to make everything ready and put in the 37 pin shielded connectors as soon as they come and then do the test with dummy LED type loads.

(ii) status of work on shielded connectors that 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 -- expected by 10 Jan. To use existing connectors for the preliminary measurements -- status of this to be reported.

==> giving up on sample shipment; waiting for 25 pair order to come by 10th Jan.

(iii) How to plan for the mass production? Ops 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. To check if this moving forward or not. HSK to update about order with Akvira for prototype units. Need updates on these matters.

==> not much detailed discussion on this as SN not present; email update from HSK : 2 boxes delivered and handed over to Ops group on 11th Dec; plans for mass production can be finalised once these are tested and certified.

Follow-up after 2 weeks.

4.3 Development of M&C software -- from 5 Dec, 27 Nov & before (JPK/RU/SN/NGK) :

(i) update on work with TCS (JPK/SN) : current status of PoC phase of work

==> one MCM card has been given to TCS and they have done initial integration; one PC104 card has to be given to them (basic commands tested and will be demo'd to them and then handed over); template for report format at end of PoC needs to be finalised -- this needs some feedback from stakeholders (us); to check about meeting with TRDDC for compatibility with spec driven format (this aspect can be included in the report).

(ii) monthly update on in-house work.

==> commands related to user and sub-array have been implemented and tested -- multiple-antenna communication is working; 8 antenna system tested with one sub-system per antenna being energised.

Follow-up after 2 or 4 weeks, as needed.

5. Back-ends :

5.1 Documentations :

(i) Detailed design doc -- pending for long : from 5 Dec & before (BAK) : analog back-end was due sometime ago ! Hande was starting to make the first version -- first version has been prepared; update will happen after one round of discussion -- to check status of this.

==> discussion is ongoing within the group and updated version will come shortly.

(ii) ITRs for analog back-end systems and digital systems to be taken up :

analog back-end : Sandeep and Navnath to look into GAB; pkt corr by Sandeep & Mekhala; GPU corr needs to be started -- Reddy & Irappa to work on this with

target of end-Dec -- need a status update of various activities :

==> first level draft by Sandeep & Mekhala has been circulated -- needs to be studies; status of GPU corr doc -- work has started.

Follow-up after 2 weeks.

5.2 Analog back-end for 8 antennas and beyond -- from 5 Dec & before (BAK) :

(i) appropriate attenuator settings for Lband & 250-500 done; 610 band was being finalised -- updated table had been circulated; few iterations need to be done and then updated table + report can be circulated and matter could be closed then.

==> Ganla to produce consolidated table for all bands and release.

(ii) 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.

==> BE needs : chassis drawings, PCB films (?) and circuit diagrams & specs.

(iii) to check status, plans and timescales for 16 antenna system

==> system is completed except for making all the connections. many of the other items are done for 30 antennas....

Follow-up after 2 weeks.

5.3 Power equalisation schemes for new back-ends -- from 5 Dec and before (SSK/NSR/BAK/SRoy): Need updates on both of the following :

(i) option 1 : using detectors in GAB and local feedback loop -- monitoring set-up working; algorithm for computing the attenuation values being worked out by DKN and NSR. Status update required.

==> DKN has taken the code from NSR and will be modifying it for his use.

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

(a) Scheme is working; to check if circulated SOP is all right -- bugs etc to be reported back; SRoy to look at SOP.

==> no updates.

(b) Plans for implementation of user controlled 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 -- this is the current released mode.

(ii) repeatable at some interval specified by the user -- can it be script based?

(iii) automatic, should adjust in response to a stimulus in the input power -- needs a discussion.

(iv) should provide a reliable power monitoring scheme -- needs discussion.

Also, issues like logging of results etc to be discussed. Agreed to have a document that spells out the main requirements (from user point of view) and possible solution options / techniques that can be taken up for discussion in Plan meeting for finalising the plan of action -- SRoy / SSK to update on this.

==> no direct updates ; email update from SRoy : one round of discussions has taken place and some follow-up action is planned; need the overall document to be worked out.

Need updates on some of the items and appropriate follow-up 1 or 2 weeks later.

5.4 Walsh modulation : prototype set-up on Roach board -- from 5 Dec (SCC/BAK) :

(i) to check if FE team has handed one unit to BE team -- see item 2.7

==> confirmed and upper item can be closed.

(ii) plans of BE team for implementing prototype scheme -- basic unit for switching using sq wave signal from GPIO pin tested ok; was put in main PoCo correlator and was being tested. SCC to provide status update.

==> SCC has received the modulator unit from FE group and is working on the integrated test.

Status check after 2 weeks.

5.5 GPU corr (GWB-II) : release of 4 node, 8 input, 200/250/350 MHz version -- from 18 Dec & before (SHR/SSK/BAK) (NOTE : GWB-I is existing released system !) : agreed to make 4 T7500 nodes with C2050/C2075 Fermi GPUs + remaining 4 T7500 nodes as host machines (to take care that these are the ones that transient pipeline uses presently so that sharing is possible); this should have ALL basic modes : total intensity and full polar IFR modes; IA + PA BFR modes with process_psr pipeline attached; full GUI support; to come up in trial code section without affecting the presently released mode.

(i) 1.7 s time offset problem to be resolved. May need checking with long stretches of data to see if the problem shows up -- SHR & GSJ planning some tests : confirmed with GSB tests that problem is there, but reason is not clear still.

==> no updates.

(ii) update on code for providing basic beam modes (computational load is 3 to 10% of GPU compute time) : first version of process_psr pipeline for IA has been released (with basic SOP), but is essentially not functional: to check if problem of threads not synchronised during the addition needs is now resolved by having a separate kernel (what is the additional compute time due to that?) moving out of phase shift kernel).

==> separate kernel option tested with noise source, but not yet with antenna; to check the loading later on.

(iii) development of 4/8 bit versions of the code, for allowing BW > 200 MHz to be released : needs change in FPGA design, as well as in GPU code : status update on this required, including plans for testing this mode.

==> change in FPGA design is done and one common design with parameter is available and GPU side only integer delay correction needs to be completed; and then test with sky signal.

(iv) modification GUI for supporting new modes, as well as having support for code in trial branch -- status and plans for this to be discussed.

==> agreed to do this as different versions (instead of trial and release) but with clear separation of directories, codes and set-up files; NSR is already looking at the work to be done.

==> Follow-up on appropriate matters next week.

5.6 Final online control for GPU corr -- from 5 Dec & 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 & DAS code. SSK to report on this -- can this be merged into appropriate item in 5.5 above?

==> BE team to discuss and get back on this.

(ii) to check cause of problem for modes with more than 2K channels -- best done with raw voltage files ? thought to be due to counter data being sent in place of ADC data once every 4K data points -- will be eliminated in new integrated design for 8 / 4 bits; also to check about spikes in channels that are power of 2.

==> no clear updates on this.

(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.

==> this should NOT be an issue in the new release; may need some testing on antenna signals.

==> Follow-up after 2 weeks.

5.7 8 antenna back-end tests and future plans -- from 5 Dec & earlier (DVL/YG) :

(i) report of efforts to summarise all the existing tests and results : report for Lband have been circulated; some follow-up has also occurred; needs detailed discussion to work out specific action items and also refinement of the report itself (see below also).

(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 long overdue !

(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 GWB back-end in parallel with all GSB observations at Lband, 610, 325 and 243 bands -- this appears to be happening fairly regularly; need to have script in place for some automated analysis of GWB data.

==> No specific updates on this, except that some background activity has been happening with DVL; YG to follow-up with DVL & restructure this item accordingly.

5.9 Power and cooling requirements for projected back-end systems -- from 5 Dec and earlier (GSJ/BAK/RVS/YG) : some modifications have been made and some tests have been done and preliminary results circulted -- to discuss these and plan further activities; fan on and off to be tested; scheme for monitoring of processor temperature to be refined. Shelton and Ganla to provide status update on the tests being done.

==> needs some follow-up discussion with Shelton and Ganla and the different schemes for monitoring the temperature. To follow-up after 2 weeks.

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