Action Items from WIDAR Correlator Face-to-Face Meetings
July 20, 2007

Updated 12-12-07 MMM removed items listed as done

1. Testing of board prototypes – Penticton.
    a. Define directory structure and file names to be used for prototype testing. **Sonja.** *Directory structure not defined, yet. Will be added to test plan in May.*
    b. Develop "Station Board Output Data Reader" S/W. **Kevin** *Software implemented to listen to output data streams of the Station Board and write content to the files. User interface for "Station Board Listeners" has been added to the Station Board GUI. Need to develop more robust and elaborate version of this software, which will be used for the on-the-sky testing and later when the full correlator is installed).*
2. Delay Models
    a. For OTS testing MCCC and Station Board CMIB should be able to handle delay models received from the antenna SW (related to item 4). **Sonja.** *Software not yet implemented.*
3. Add DCAF to Backend or Server? (Skip if irrelevant). **Bill (?)** *On what platform it will execute is not yet specified, but it is shown as a software element following the CBE/FF.*
4. Define SW needed for OTS (RFS document). The VCI functionality (MCCC + Configuration Mapper) that is needed for the OTS will be defined in this document. **Bryan, Bill, Sonja** *Memo started on "Notes toward an RFS for the PTC software".*
5. Define, in detail, the functionality of Baseline Board and Station Board at the next level "up" from the MAH. Update CMIB Real Time SW RFS. Several other things raised in Sonja's slides 9-11 from Oct/Nov 2006 f2f. **Bruce, Sonja, Bill**. *In progress. CMIB MAH software is being reorganized. Reference is to Sonja's presentation on 10/31/2006 entitled "WIDAR Correlator Software Status".*
    a. Slide 9: Real-time software for station board above and beyond Module Access Handlers (MAH) needed for testing of Station Board prototype when initial tests are completed.
    b. Slide 9: Need to define board parameters and XML schema, at least for the "test" version of CMIB/GUI software. *Need to define board parameters (attributes). Same applies for the Baseline Board.*
    c. Slide10: Need to define XML Schema for communication between the GUIs and CMIBs
    d. Slide 10: Need detailed specification for the Intelligent Diff.
    e. Slide 10: Integrate all WIDAR subsystems in the WIDAR GUI (Backend).
    f. Slide 10: Is FORM assumed to be part of the correlator or is it part of an antenna?
    g. Slide 10: Integrate all utility (software) modules in the WIDAR GUI.
    h. Slide 11: Define format for the Correlator Backend output products (binary data format). **Michael, Martin** *In progress*
    i. Slide 11: Need to define priorities for further development of the Correlator Backend software. *Some progress. Needs further work.*
    j. Slide 11, CALC: Define user interface: content, format. *?? Calc does not have a user interface.*
    k. Slide 11, regarding content of delay models and tone extraction models is defined in the "VCI Protocol Specification". Need to include XML schema.

6. Regarding the implementation of sub-band delay tracking on antenna servers, specifically handling delta delays: Will they be sent to the MCCC? Answer: No work required now for this task (related to item 2 above) **(?)**
7. Determine number of cable spares that NRAO may wish to procure. **NRAO**.
8. Regarding the installation plan for WIDAR boards as they arrive. DRAO proposes to install "one sub-band correlator at a time". NRAO needs to comment on this, but seem to agree. **Mark, Michael**
    a. Impacts the number of Terminator Boards required.
    b. Alternative is wide band with smaller number of antennas (this is not a feasible option because too many terminator boards would be required).
9. Are more FORM boards needed in Penticton?
    a. Three more needed in Penticton to assure everything works okay? **Dave**
    b. NRAO to order another batch soon. **Revnell**. *Some deformatter boards with issues are available and will be suitable for what is needed. Only need CMIB interface and connections to the station card.*
10. Ten "astronomer-determined tests" have been left open in the OTS plan.
    a. Review proposed test suite before it is finalized **Romney, Michael**
    b. Perform long tracking run on a source to look for phase jumps. **Barry**
11. Regarding the setting of IP addresses on the FORMS, which are connected to Station Boards: Serial lines do not exist for these modules, and it is unclear how to set the IP addresses. **NRAO** *Need input from people who work on the network arrangement.*
12. MCCC protocol for communication with CBE/FF **– Martin, Sonja**. ***Sonja:*** *Draft in progress. Need to complete XML schema.*
13. Transfer work on Van Vleck correction algorithm to EVLA situation. **Fred Schwab, Michael**
14. Items from Bryan Butler's slide 11, Oct/Nov 2006 f2f.
    a. Adequacy of UVFits (carried over from long ago). **Michael, Brent.** *Decided that UVFITS is likely to be adequate for the critical OTS tests (i.e., those deemed as necessary to deciding if it is OK to proceed with full board production). However, it has not yet been decided if UVFITS or the ESDM will actually be used.*
    b. How do we handle Phasing Board (PB) data and Station Board data (non SDM data)? **Michael, Sonja, Bryan, Bruce.** *No decisions made. Needs attention.*
    c. Investigate data rate, format in database, etc for WIDAR Monitor data. **Bryan, Sonja.** *Needs attention.*
    d. CMIB communication with Monitor data base. **Bryan, Sonja**. *Address issues in previous item first.*
    e. CMIB communication with DCAF (through MCCC?). **Bill (?)** *Requires more analysis. Currently show CMIBs communicating SDM type data directly to PTC DCAF.*
    f. WIDAR – CPCC, PB, CBE/FF connection to DCAF? How many data paths are actually required? **Bill, Bryan (?)** *Needs attention*
    g. How much of DCAF code can be borrowed from ALMA? **Bryan**
15. EVLA Science Data Model (ESDM) → DCAF – Is this routed through MCCC? What data are passed back through M&C? (Wideband A/C, Correlator set up, times and durations)? **Michael** by February 2007 (?)
16. Produce formal written specification for Binary Data Format (BDF). Does the binary format drive the RTDD? (Provisional answer = yes). **Michael, Martin**. (same as 5h?)
17. Michael to send test data to Brent for "round-trip comparison check" of UVFits as routed through CASA and AIPS. **Michael**
18. Actions from Michael Rupen's slide 28/29 from Oct/Nov 2006 f2f. **(?)** *Should be slides 18/19.*
    a. BDF: Are subarrays OK for handling different integration times per sub-band?

   b. BDF: Do we need flags/times from WIDAR per sub-band or per channel?
   c. BDF: Are we happy with phase bins?
   d. BDF: How do we handle lost lag frames?
   e. BDF: Are we happy with one data stream?
   f. BDF: Should subscan headers go through the correlator?
   g. SDM: Is there a spot for everything we need?
   h. Separate spigots OK?
   i. SDM, Correlator vs M&C: How much goes straight through the correlator?
   j. SDM, Correlator vs M&C: How much gets sent back from the correlator to M&C?
   k. Post-processing: Can we use CASA to translate for AIPS?
   l. Post-processing: How do we get information from the Monitor Archive (e.g. gain tables)?
   m. Post-processing: Ensure that multiple SDMs get filled to single measurement set (MS)
   n. Data rates: What are the trade-offs between visibilities and flags/times/weights?
   o. Data rates: What are the bottlenecks?
   p. IDCAF-2: SDM or UV-FITS?
19. Establish a Correlator Output Team to investigate transfer of data to archive (visibility data only) **(?)**
20. M&C to periodically check configuration queue for "dangling configurations". **Bill.** *Item has been added to the "Notes toward an RFS …" memo.*
21. Need to trigger Correlator Model discovery by command over VCI. **Bill, Sonja**. *A reference to this item has been added to the RFS draft. The software is not yet implemented.*
22. GUI or visualization tool will be required to analyze the correlator model file. **Bill, Sonja (?)** *Has been added to the RFS draft.*
23. Develop a new query (request) command for correlator to find out if there are sufficient resources to carry out an additional observation. Such a command would have to include a trigger time. **Sonja, Bill**. *Has been added to the RFS draft. Software not yet implemented.*
24. Create t_{map} = time at which a new configuration is to be processed. Add this parameter to the activation trigger command. **Sonja, Bill**. *Has been added to the RFS draft. Software not yet implemented.*
25. Testing of MCCC interface
   a. Send the format required for models to Socorro. **Sonja**
   b. Generate messages from prototype executor to Sonja in Penticton. **Barry**
   c. Carry out tests. **Sonja**. *Needs to be added to the RFS draft. Software not yet implemented.*
26. Complete status and alerts document. **Bryan**.
27. Write a document that combines NRC-EVLA Memo 27, the correlator system network, and the CBE and CPU processing. **Brent** (September 2007).
28. Document the plans to implement EVLA Prototype Archive. **Benson**
29. Account for SCSI cables in cable tray system in correlator room. **NRAO, Gerrard**.
30. NRAO to address question of what action to take when generators become overloaded. **Broilo.** *Depends on the total EVLA load and transition load. We know the antenna load now (~28 kW), but the correlator load is still a 200kW unknown. Also depends on if we try to observe through power outages.*
31. Put MIB into generator system. **Broilo, Koski**. *Tentative plan developed.*
32. Add power-up of HVAC blowers to Brent's start-up sequence. **Brent**.
33. Provide a "secure display" of CPCC status to EVLA operators via direct Ethernet fiber to control room. **Bill (??)**
34. Determine the location of archive equipment (in or out of correlator room)? **NRAO**.

35. Get CMIB server. Compact PCI crate in each control rack with room for at least 3 CPUs each will be sufficient. **NRAO**.
36. Modify fiber-input boxes for Station racks to accept input from sides, not from the top. **NRAO, Gerrard (?)**.
37. Fundamental timing signals for correlator: Use signals from redundant timing sources instead of splitting one signal. **Brent, Jackson (?)**
38. NRAO to pay for overhead cable trays. **NRAO, Gerrard**
39. Ensure that the installation of optical fibers is actually included in installation plan. Is it all right to place them in same cable trays as the Ethernet cable (consider physical damage potential)? **NRAO, Gerrard**.
40. Provide a 60 sec warning to RPMIB from fire discharge system before discharging. Consider implications and action to take on correlator shut-down, etc. **Brent**.
41. NRAO to provide "external timecode" generator board for prototype tests. **Jim Jackson**.
42. NRAO to consider sending people to DRAO or to participate remotely in prototype testing. **Mark**
43. "Wire-up" (placement) of Phasing Boards. **Brent, Dave (?)**
44. Determine if testing of 10Gbit Ethernet is a requirement for DRAO. Cost is $5000. **Brent**
45. Consider the suggestion of an "early test" (before OTS) of Station and Baseline Boards on VLA antennas. This could entail risk to the first prototype boards and would only be carried out after DRAO has completed all the lab testing. **Brent**.
46. Is it necessary to purchase a large number of Terminator Boards or can resistors be mounted on the Fanout Boards instead? They could be removed if necessary. The cost of a contract to build all the terminator boards is $US 40K. If the correlator configuration will not be changed, then the resistor solution is adequate. NRAO to raise objections if this solution is not adequate. **NRAO, Gerrard (?)**
47. Update Correlator Room Specification for running ground wires between rack frames and then one row/end 13 ground to room ground cable (?) **Brent**.
48. Produce a more formal checkout list for the station board. **Dave**
49. Train HW and SW engineers on JIRA to get them to start using it to enter bugs and enhancement requests. **Bryan, Sonja**
50. Revisit the decision to go with compact PCI. **Brent** (no action required - keep open)
51. Discuss the high- to mid-level design of the interaction between the NRAO EVLA software (OPT and M&C). Should be a discussion between NRAO, NRC, and UMan on the design of the messaging, content of the messages, etc. **Sonja, Bill, Bryan, Brent, Roger** - soon (week of April 23?)
52. Set up a more complete network of CMIBs. Could be done at NRAO with minimal monetary cost (of order $700). Need 10-20 CMIBs in the system to test the networking. **NRAO - Bruce, Kevin, Bryan**
53. Get extra memory for the CMIBs in Penticton (make them 256 MB like the ones in Socorro). DRAO. **Dave**
54. Determine if rack testing without the full complement of boards is OK. **Brent**
55. Test executor and build system needed by November of 2007. **Kevin**
56. Hold a testing workshop. Venue? Scope? Topics? When? (not later than 3 weeks before the shipment of the PTC). **Brent, Simon, Mark** (same as item 42?)
57. Review overall support status (software) of 16 antennas for June 2009. **Mark**
58. Complete JTAG testing on the station board. **Dave**
59. Decide on who is responsible for fixing correlator boards in the long term. Determine the plan for knowledge transfer from Penticton to Socorro. **Mark, Peter**
60. Investigate need/possibility of a load-test on the correlator power plant. **Brent, Bob, Guy (?)**

61. Ensure software is ready for the RTDD when it is needed. **Del Rizzo, Sonja**
62. Hold a meeting to determine if "correlator smarts" reside in configuration mapper, VCI, or observation preparation tool. **Bryan, Sonja**
63. Write RFSS document for board start up and test (BIST). **Brent**
64. Get Michael in touch with Bill P. on sniffer software. **Brent**
65. Resolve copyright status. **Peter, Gareth**
66. Provide access to SW in document series. **Simon, Roger**
67. Finish work on board state machine. **Bruce**
68. Develop names for CMIB. **Kevin, Bruce**
69. Develop correlator RFI testing plan. **Michael, Brent**
70. Define format for phased array output (10 Gb ethernet). **Michael, Revnell** (by end of 2007)
71. Determine how ALMA does aggregation. **Martin, Michael**
72. Get a MIME validator to test Martin's stuff. **Martin**
73. Revisit decision on requirement to complete critical OTS tests before large scale procurement. **Mark, Peter, Brent, Dave, Rick, Michael**
74. Assign resource to develop dump trigger and delay tracking algorithm (information in programmer's guide, specification done). **Bryan, Bill, Sonja**
75. Incorporate eMerlin narrow band mode in OTS plan. **Simon, Michael**
76. Define unique IDs for baseband and spectral elements in BDF. **Martin**
77. Determine who is responsible for HW and SW testing of PTC (see Michael's presentation from April 2007 f2f). **Mark, Claire**
78. Prioritize software to support OTS test (Bill's document). **Bryan, Bill, Sonja**
79. Hold SDM/BDM discussion with ALMA/CASA. **Michael**
80. Contact Fred Schwab for stitching and sub-band normalization. **Michael, Bryan**
81. Create user friendly interface for test version of FORM boards. **Sonja, Bruce, Revnell**
82. Send 3 more FORM boards to Dave. **Revnell** (already knows). Same as item 9?

Bold font identifies responsible person(s)
Italic font describes status.
List will be updated monthly. Completed items will remain on list for one month prior to removal.