

Implementing Pulsar Modes in VEGAS

During our meeting of 04-MAR-14 we discussed hardware/firmware (FPGA) efforts required to implement pulsar modes in VEGAS. The following major points were discussed . . .

- 1) Of all the proposed modes, those having 32 channels at any BW will be our lowest priority moving forward
- 2) In terms of actual GBT time allocation, our FAST4K mode far exceeds all other modes
- 3) It might be desirable to implement an equivalent FAST8K mode
- 4) Both the FAST4K (and possible FAST8K) modes are ONLY needed at 100MHz BW. Given the low-frequency issues with our VALON synthesizers, these modes would therefore need to be re-designed using an FIR Decimation approach.
- 5) All other modes (both Incoherent and Coherent) running at bandwidths of 100MHz and 200MHz will also require significant development efforts to implement FIR Decimation
- 6) Our raw sample, Time Domain modes currently have a latent bug which causes the data sent to GPU nodes 5-8 to be exact duplicates of those sent to GPU nodes 1-4. A new version "P06" has been built and remains to be tested and qualified by Paul Demorest
- 7) In the short term, all Incoherent and Coherent modes running at 800MHz and 1500MHz (1600MHz?) will be simply ported over to the existing VEGAS platform. A set of new 400MHz modes will require re-builds, while those running at 100MHz and 200MHz will require additional development as discussed in item 4) above
- 8) Looking down the road, it might be desirable to re-design all modes such that...
 - 8.1) The samplers (ADCs) would be made to operate at 3200MHz across the board for all modes and all bandwidths
 - 8.2) Tunable Digital Down Converters would be used to select BW and center frequency

One other item to note...

In your table summarizing all the different modes, you incorrectly indicated that a 32-channel 1500MHz Coherent mode has been Tested; however, at this time, no 32-channel FPGA personalities have been created.

11-MAR-14
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