NGVLA Workshop 2 DTS Take Aways

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Data Digitization and Transmission I

- EVLA and ALMA DTS Designs Reviewed
  - Must improve digitization design for NGVLA
- Fiber Optic Links
  - Incorporation of several styles are possible, and likely
    - Home grown, leased, …
    - Cost per kilometer needed
  - Engineering need not wait for requirements to produce multiple high level diagrams to address possibilities and focus attention
  - ADI (Hittite) sampler installed in some EVLA modules are not being used to their potential. May be practical for NGVLA research.

Data Digitization and Transmission 2

- Care is needed in the selection of front end and digitization bandwidths to avoid unnecessary complexity and cost
- At high frequencies, front end and digitization bandwidths can be very large (~50 GHz)
    - For consideration – do not digitize and process all of the spectrum
        - Spirited discussion between Science and Engineering ensued
        - Science must make a compelling case for full digitization
- When digitizing large bandwidths, 3 or 4 bits is sufficient even in the presence of RFI

Data Digitization and Transmission 3

- RF over fiber was explored
  - Shorter links from antennae to central sites warrant analog over fiber consideration for NGVLA
- Integrated digitization efforts using unformatted data streams being developed at CDL
    - Integrated receiver packages perform all necessary RF-to-baseband, analog-digital, and copper-fiber conversions
    - Compact, field replaceable, low power units minimize digital hardware
    - Unformatted serial data streams greatly reduce complexity of FPGAs
- State of A/D technology and what improvements can be expected in the next 5 years reported on by Analog Devices

Data Digitization and Transmission 4

- Develop in-house, or rely on industry?
  - Benefits and shortcomings for either view
  - Consider on a case to case basis

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