EVLA Hybrid Array

&

Transition Plan

Hybrid Array

- The Hybrid Array is the VLA with a mix of VLA & EVLA hardware and software
  - VLA antennas with EVLA antennas
  - VLA correlator with prototype WIDAR correlator
  - VLA correlator with WIDAR correlator subset
 - VLA correlator with full WIDAR correlator

Transition Plan

- The Transition Plan is the plan by which
  - Control of EVLA hardware is implemented as EVLA software
  - Control of VLA hardware is moved to EVLA-hosted software
  - With no significant periods of downtime on the array
- Hybrid Array operation ends when all VLA hardware and software has been replaced by EVLA hardware and software

Required Functionality

- Control of EVLA antennas
- Control of VLA Correlator
  - To do so via EVLA-hosted software requires the new VLA Correlator Controller
- Control of VLA antennas
- Science data archiving in VLA format
- Control of prototype WIDAR correlator
- Control of WIDAR correlator
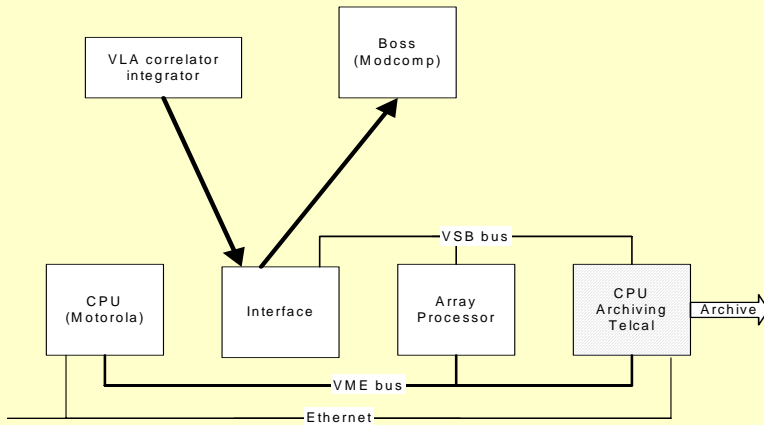- Science data archiving in EVLA format
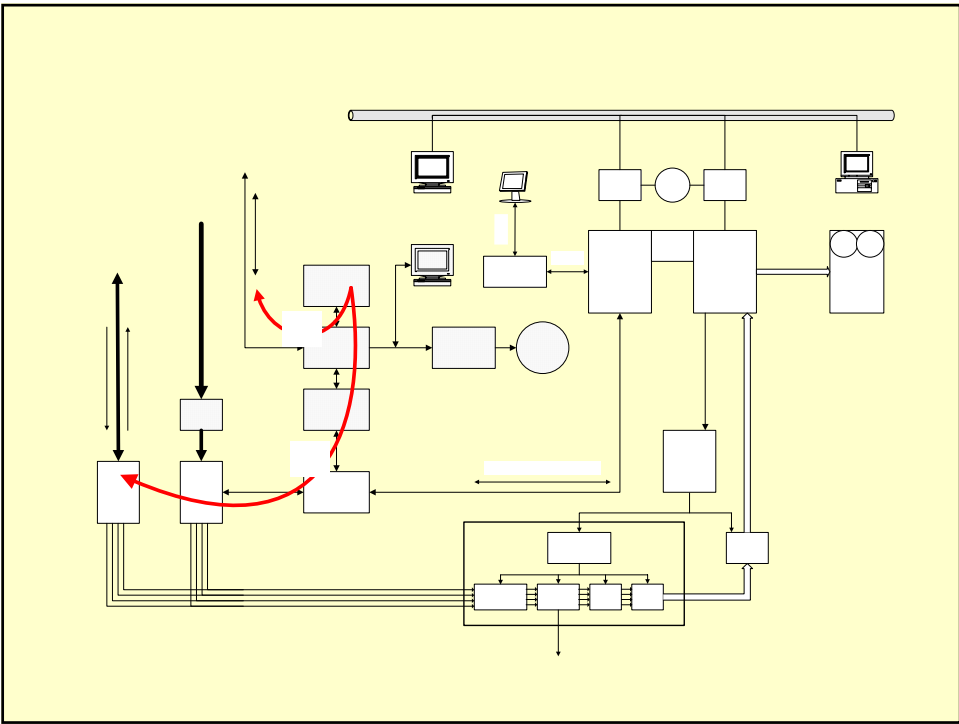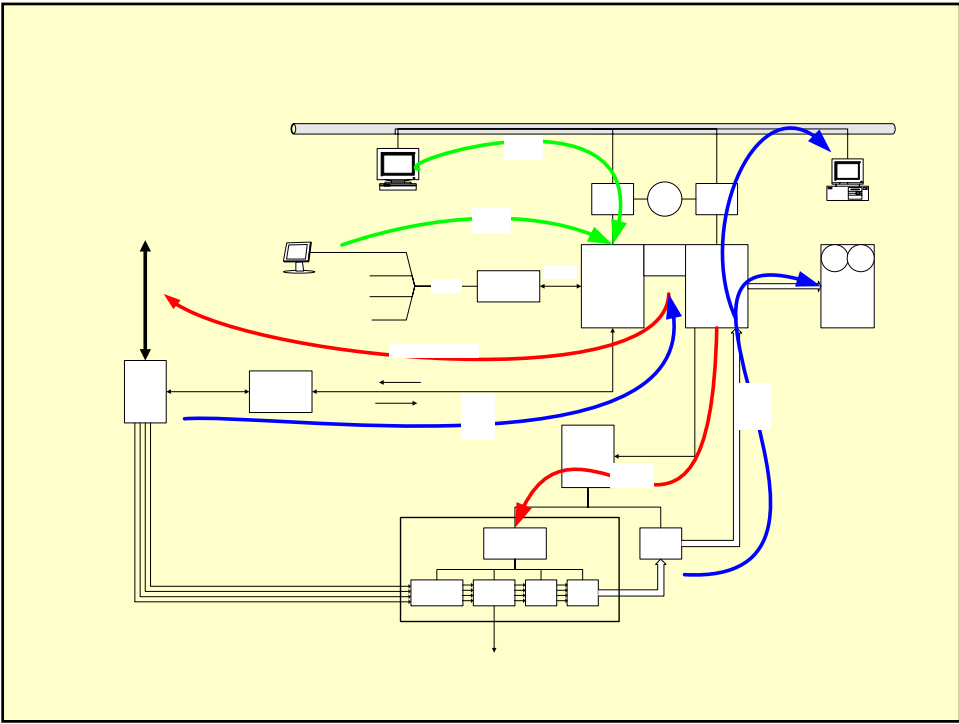
Waveguide
(to/frm antennas

D
Racks

File: /users/bsahr/EVLA/architecture_design/hybrid_array/VLA_correlcntrlr.vsd
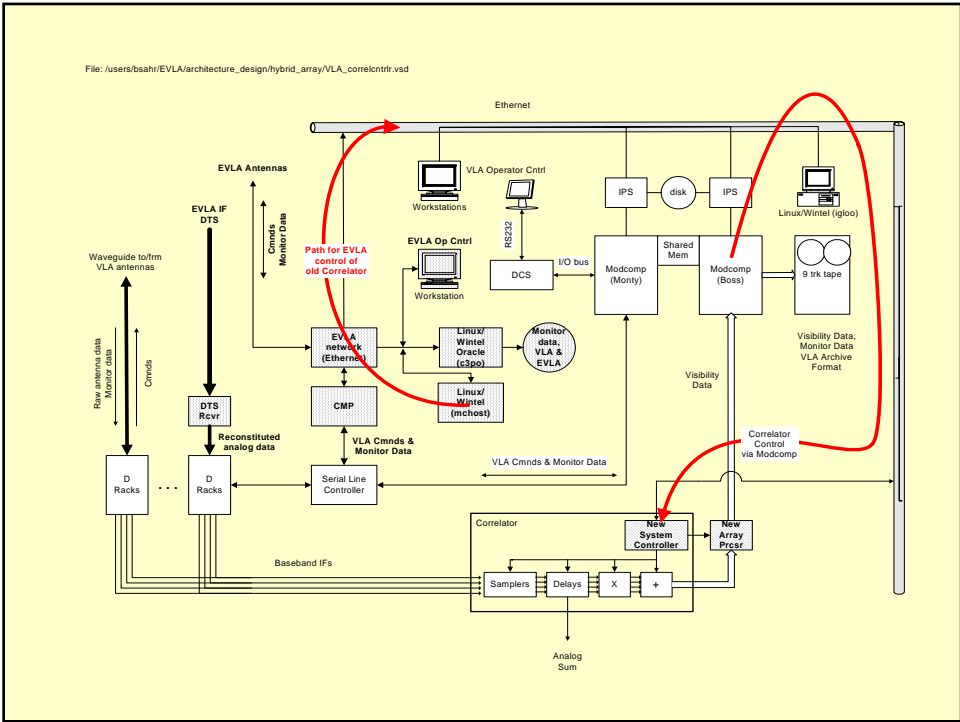
New Correlator Controller
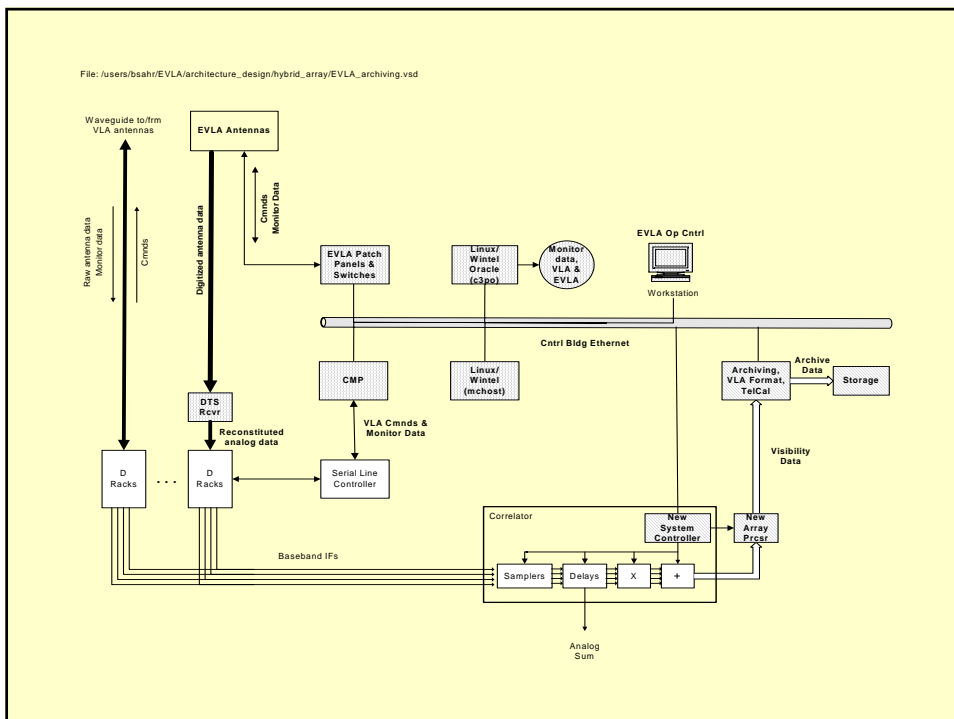
New Correlator Controller

- Phase I
  - Replaces present correlator controller (including the FPS array processor)
  - Provides visibility data to present, Modcomp-based VLA monitor & control system
  - Accepts commands over the Ethernet
- Phase II
  - Add a 2nd CPU card to handle archiving & Antsol/Telcal functionality
  - Allows for parallel operation of Modcomp-based VLA software and Linux/Wintel-based EVLA software
  - Can retire the Modcomps without disturbing the EVLA

File: /users/bsahr/EVLA/architecture_design/hybrid_array/EVLA_archiving.vsd

Waveguide to/frm VLA antennas

EVLA Antennas

Raw antenna data / Monitor data

Cmnds

Digitized antenna data

Cmnds / Monitor Data

EVLA Patch Panels & Switches

Linux/ Wintel Oracle (c3po)

Monitor data, VLA & EVLA

EVLA Op Cntrl

Workstation

Cntrl Bldg Ethernet

CMP

Linux/ Wintel (mchost)

Archiving, VLA Format, TelCal

Archive Data

Storage

DTS Rcvr

Reconstituted analog data

VLA Cmnds & Monitor Data

Visibility Data

D Racks ... D Racks

Serial Line Controller

Correlator

New System Controller

New Array Prcsr

Baseband IFs

Samplers | Delays | X | +

Analog Sum

Milestones, Near Term

- mid-June 2004 — First Fringes on Ant 13 at L band (done)
- mid-July 2004 — Routine test observing using Ant 13 (VLA Operators controlling the antenna)
- mid-July 2004 — Ant 13 moved into the array, 2 IFs, Bands L, X, K, & Q usable
- Early Sept 2004 — Ant 14, first fringes
- Late Sept 2004 — Ant 14 moved into the array
- Late Sept 2004 — Ant 16, begin retrofit to EVLA design, full production electronics
- Q4 2004 — Inclusion of EVLA antennas in VLA observing (on a regular basis)

Milestones, Mid-term, Revision
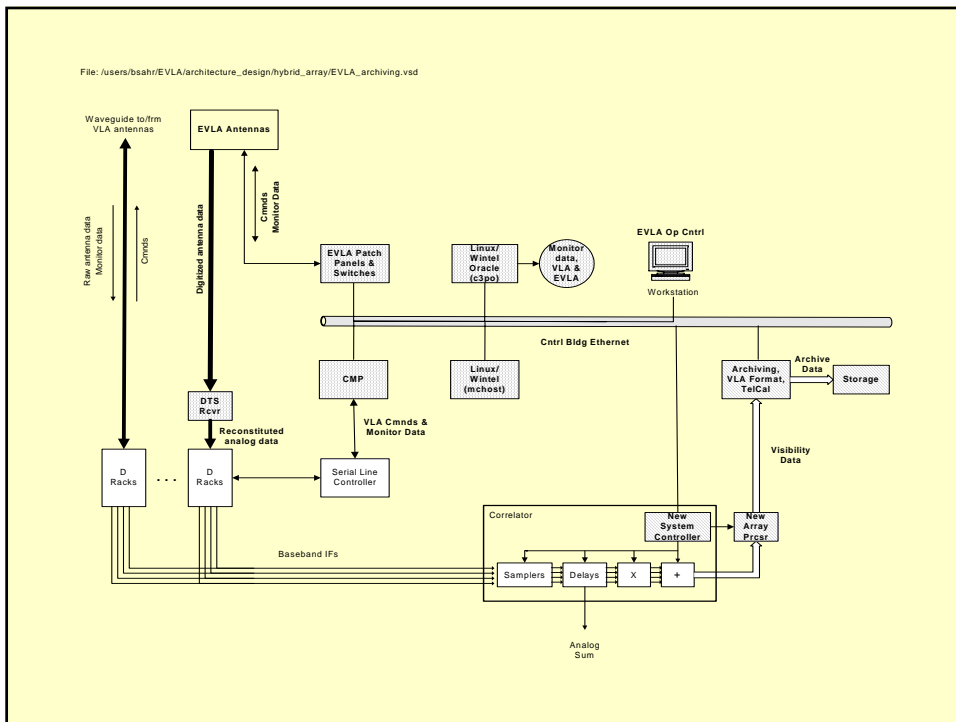
- Q1 2005 — Control of new VLA Correlator Controller by Modcomp hosted software
- Q1 2005 — WIDAR Correlator PDR (3/29-3/30/2005)
- Q2 2005 — Control of new VLA Correlator Controller by EVLA-hosted software
- Q3 2005 — Archiving and Telcal functionality added to new Correlator Controller
- Q4 2005 — Control of VLA antennas by EVLA-hosted software
- End of Q4 2005 — Modcomps retired

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D Racks ... **D Racks**

Serial Line Controller

Correlator

New System Controller

New Array Prcsr

Baseband IFs

Samplers | Delays | X | +

Analog Sum

Milestones, Long Term

- Q1-Q2 2006 — Assembly, HW tests, On-Sky tests of prototype WIDAR correlator at VLA site
- Q2 2006 — WIDAR Correlator CDR (6/19-6/20/2006)
- Q4 2007 — Acceptance of WIDAR Correlator subset
- Q4 2007 — Science data archiving, EVLA format
- Late Q4 2007 — Start of "shared-risk" observing with WIDAR Correlator subset

Milestones, long term

- End of Q4 2008   Turnover of full WIDAR Correlator

- End of Q4 2008   Earliest possible date to retire the VLA Correlator

- Q3 2010   Last VLA antenna retrofitted to the EVLA design

    End of Hybrid Array Operations

- Late Q2 2012   Last EVLA receiver installed