

Haystack Correlation Activities & Plans

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Current state of difx usage

- sporadic testing and intercomparison (with Mk4 hdw) of a wide variety of experiment types
 - mm VLBI
 - VLBI2010
 - geodetic
 - testbed (e.g. 500 MHz single channel via VDIF)
- operational use impeded by various software and hardware shortcomings

Recent Software Developments: *difx*

- tracked down 2nd scan (& alternating scans) failure after boot
 - for kernels newer than 2.6.18
 - XLRRead calls occasionally fail for read blocks >8 MB
 - likely a windriver bug
 - can work around by specifying readSize 8000000 in *vex2difx*
- testing of *difx* normalization with synthetic data files (good to $\leq 1\%$)

Recent Software Developments: *hops*

- investigated visibility amplitude discrepancies between the Mk4 hardware correlator and *difx*; memo posted on *difx2mark4* pages of *difx* Wiki
- significant upgrades to *fourfit* treatment of phasecal
 - multiple tones flexibly selected, coherently fit, with singleband delay removed to find mean phase of the band
 - user-specifiable pcal integration (and delay fit) time
 - finished memo on multitone mode!
- *hops*
 - “cleanup”
 - separate svn archive formed on vault; can also generate tarballs from it; suitable as a vendor branch
 - automated verification: nightly build of *difx* and *fourfit* and test of correlation through *fourfit*

Near-term Software Plans

- modify *difx2mark4* to do normalization, instead of using built-in *difx* option, so that both *fits/aips* and *fourfit* can be used on the same output
- modify MPI startup script and GUI for Haystack/USNO experiment flow
- *hops* – modify *fourfit* to allow
 - coherent combination of 4 cross-pols
 - ionosphere fitting across multiple bands

Current & Future Hardware

- currently system:
 - 2 x 1U dual motherboard servers
 - total of 16 cores
 - \approx 40% of VLBA's original system
 - + pair of high-performance desktop machines
- converting Mk5's to have faster NIC's
 - most are 100 Mb/s - one is even 10 Mb/s!
 - only 3 converted to gigE so far
 - slow performance (surprise!), but we've taken no serious effort to fine tune or even characterize with current setup
- plan is to buy \sim \$20K worth of hardware this summer
 - 3 or 4 current generation (Sandy Bridge arch?) servers
 - Infiniband switch + NIC's (or possibly 10 gigE)