

Recent difx & hops work

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VGOS processing

- program of steady improvements for ~8 years
 - commit 30-40 *hops* updates per year
- mk6 recordings
- maximize *snr* by combining all 4 pol. products
 - requires careful phase & delay offsets by channel, band, and polarization for maximum coherence
 - software (*fourphase*) written to automate this
- ionosphere extracted during fringe fit/search to find maximum likelihood peak
 - linear least-squares used at peak to find covariance matrix

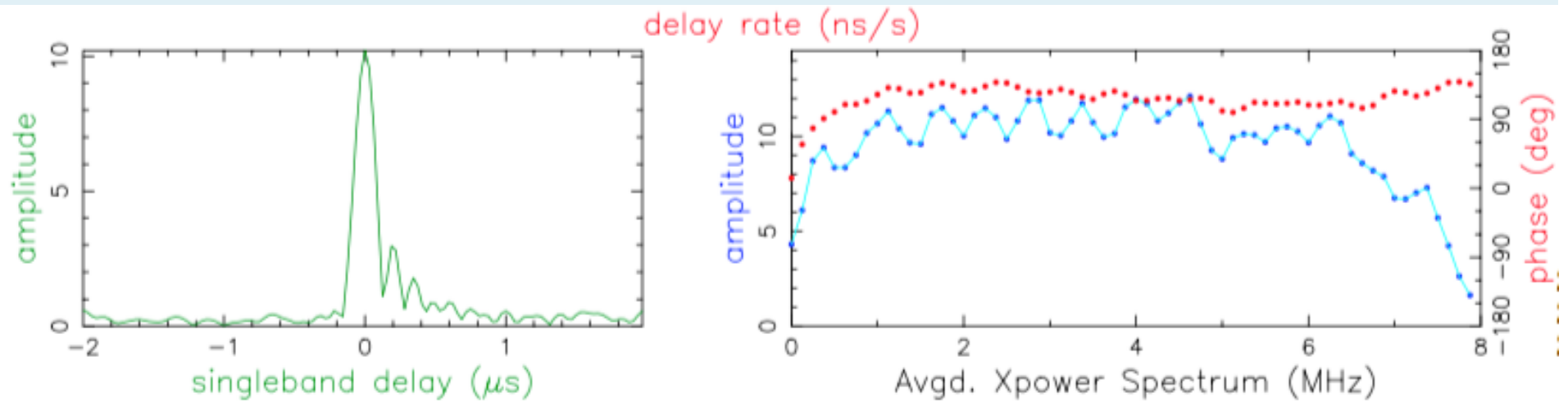
legacy vs. broadband

- rationale: terrestrial frame-tie

channel BW (MHz)	8	32
sample rate (MHz)	16	64
sideband	U/L mixed	L
LO fraction (MHz)	0.99	0.4
samples	real / 1 bit	complex / 2+2 bits
pcal spacing (MHz)	1	5
polarization	R	X & Y

- used 1.25 KHz FFT resolution to evenly divide 10 KHz and desired output resolution

an interesting artifact...



gathering family

- reassemble s/g data into a single Linux file, perhaps on a RAID disk
 - *gather*
 - *gather416*
 - *gather464*
- highly optimized for speed
 - heavily threaded
 - deep buffers
 - minimized data movement
- *gator* – master program to automate gathering

dqa

```
rjc@StationUnit0-mk6:~$ dqa /mnt/disks/2/0/data/v15209_wf_209-1403.vdif
```

```
opening /mnt/disks/2/0/data/v15209_wf_209-1403.vdif
scatter mode file version 2 block_size 9992168 pkts/block 1215
packet payload size 8224
read 3946906380 bytes
time span 2383419:0 --> 2383448:1739
legacy mode FALSE
vdif epoch 31
#chans 16
vdif version 1
station ID bdc
#bits/sample 2
complex mode
total data rate 1052.5 Mb/s
channel data rate 65.8 Mb/s
```

```
thread                2          0          1          3
number of packets (by thread):    125145    106920    123930    123930
number of packets out of order:    0         0         0         0
number of second jumps:           0         0         0         0
number of invalid/fill-frame:     0         0         0         0
rjc@StationUnit0-mk6:~$
```

documentation

- *mk6* utilities memo:

http://www.haystack.mit.edu/tech/vlbi/mark6/docs/Mark6_Uutilities.pdf

- *fourfit* doco links @:

<http://www.haystack.mit.edu/tech/vlbi/hops.html>

(working on a new page bringing all *fourfit* information into one place)