

The EVN MkIV Data Processor

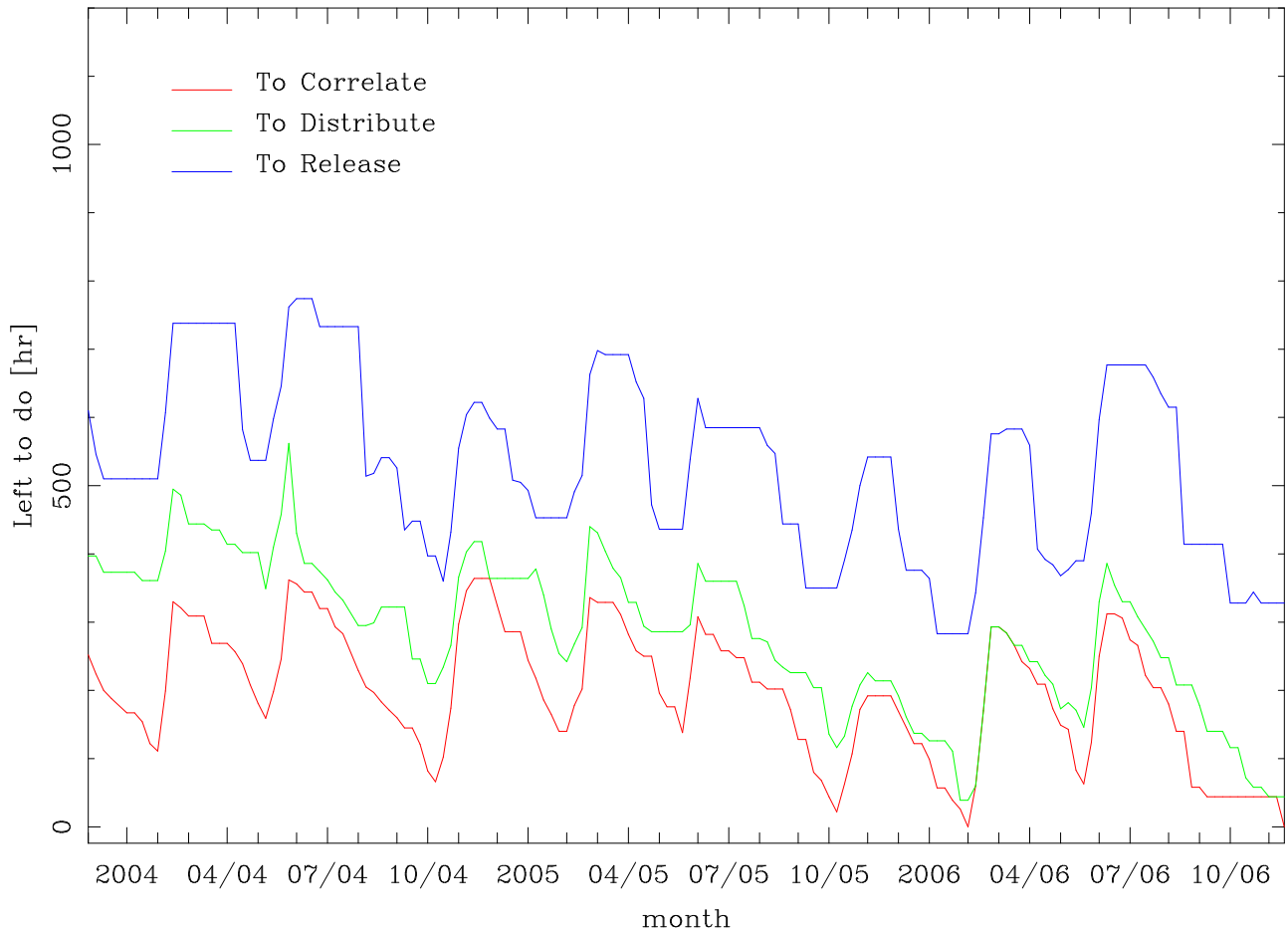
Bob Campbell

— JIVE —

- Operations & Throughput
 - Correlator Management Plots
 - Median Times to ...
 - Processing Factors
- Capabilities
 - Current
 - New / Future
- Disk Logistics

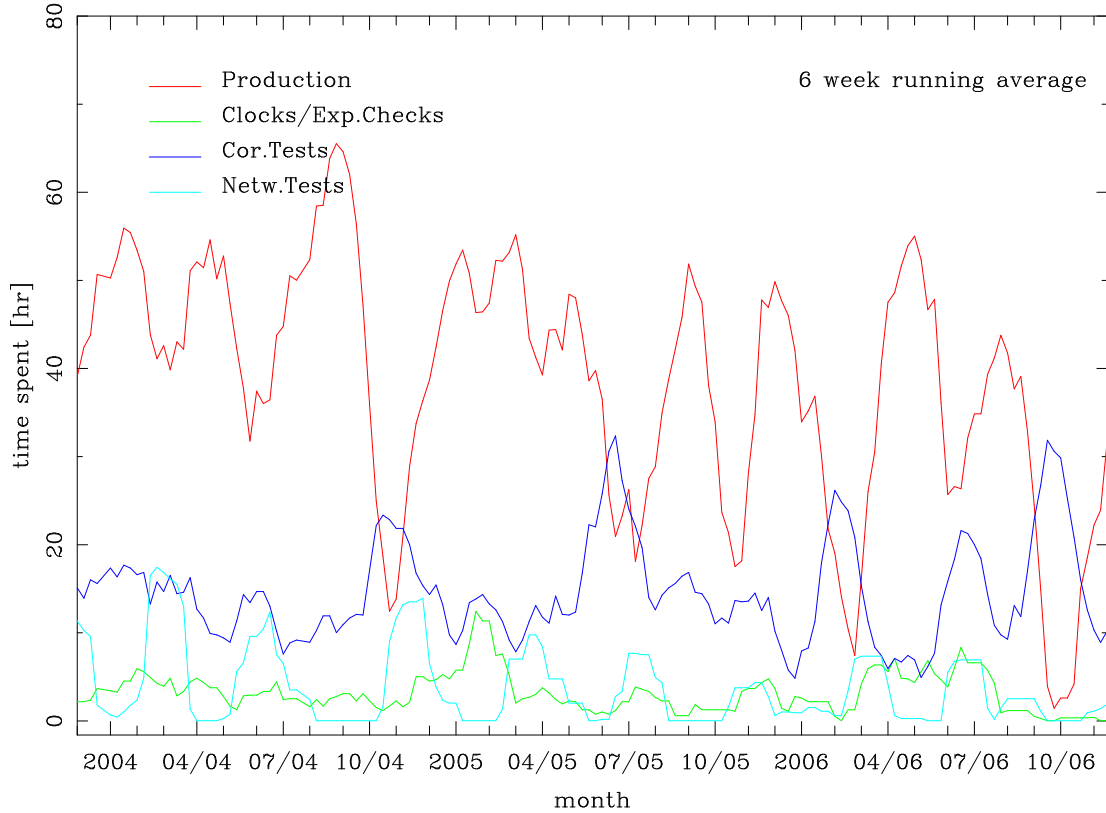
Evolution of Backlogs

Backlog equivalent observing hours

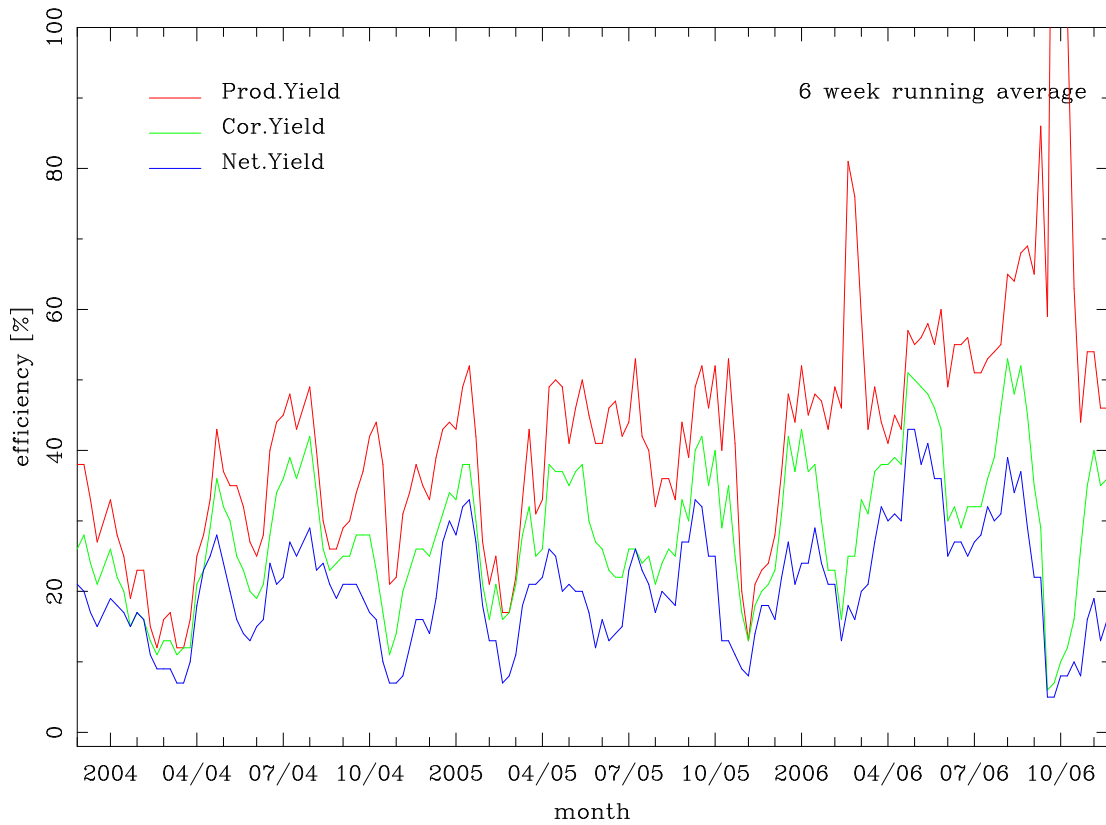


Work Division & Efficiencies

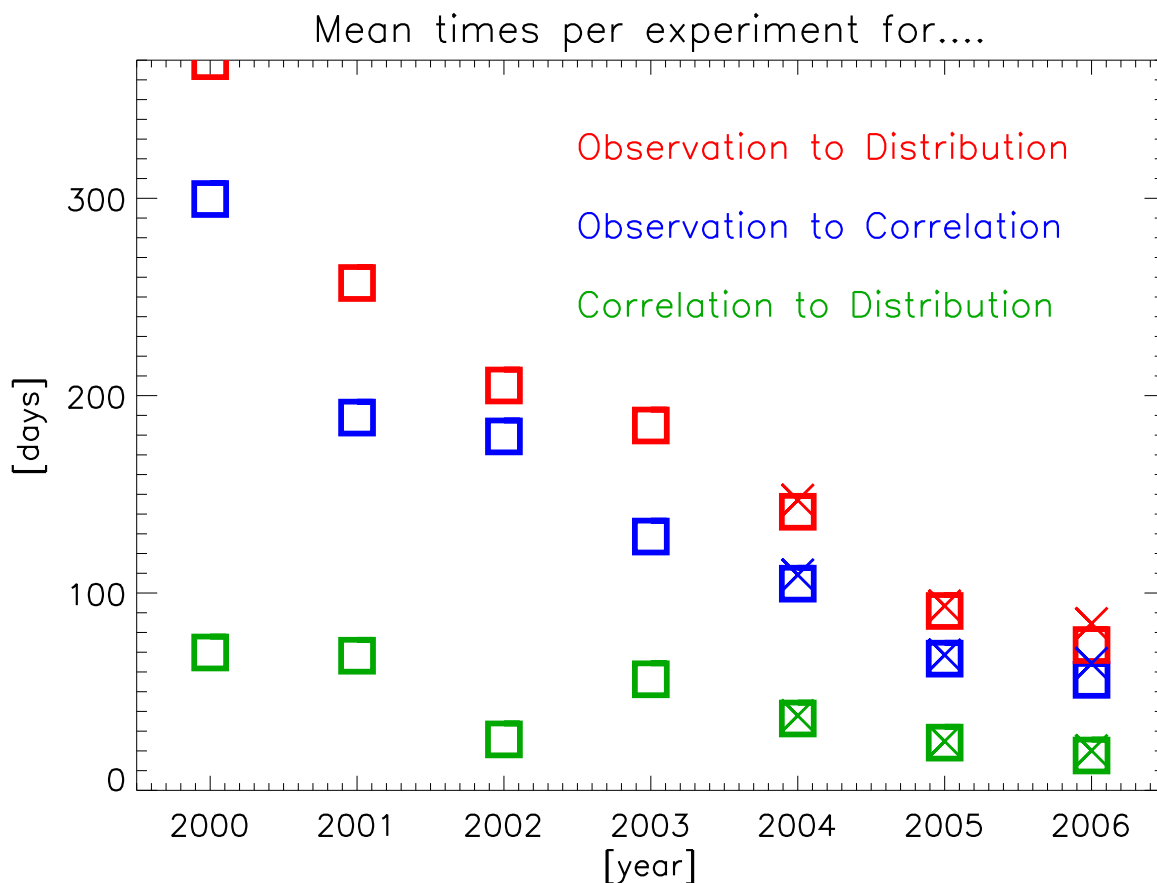
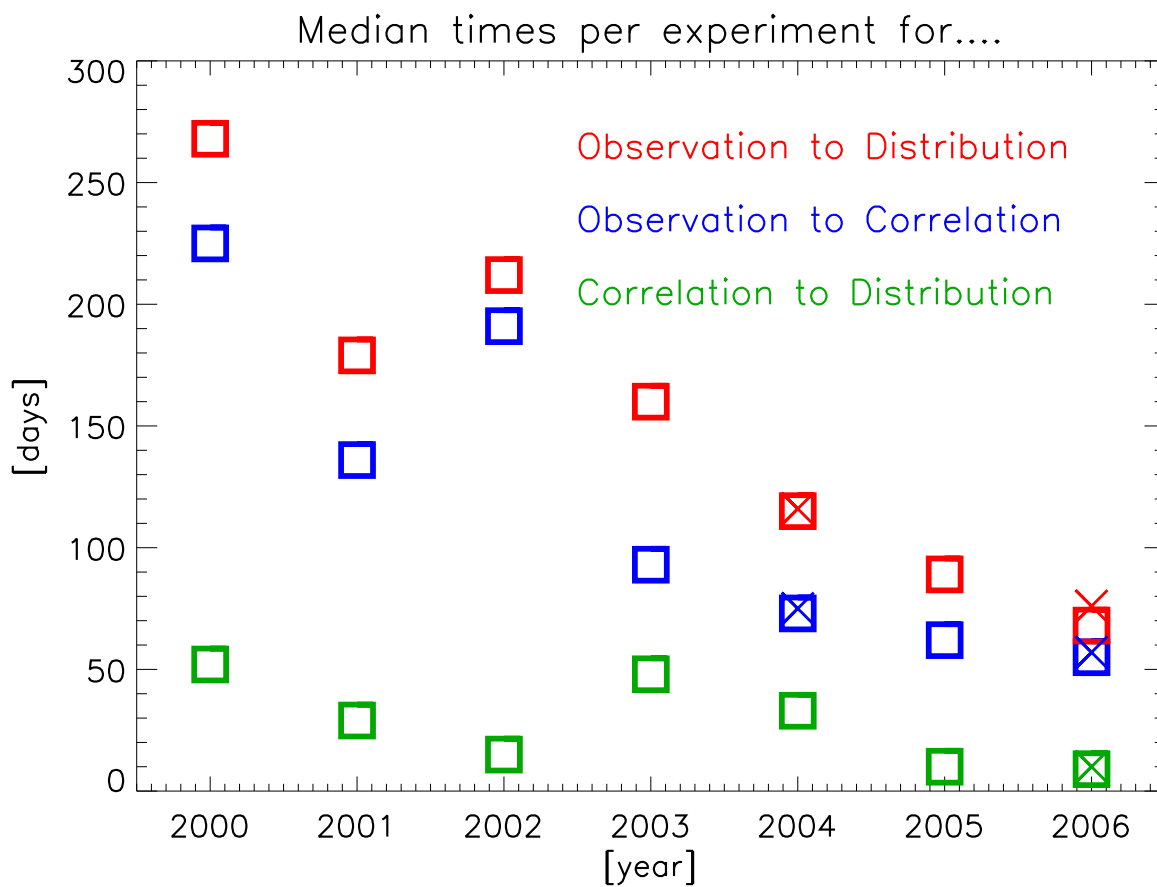
Work division correlator



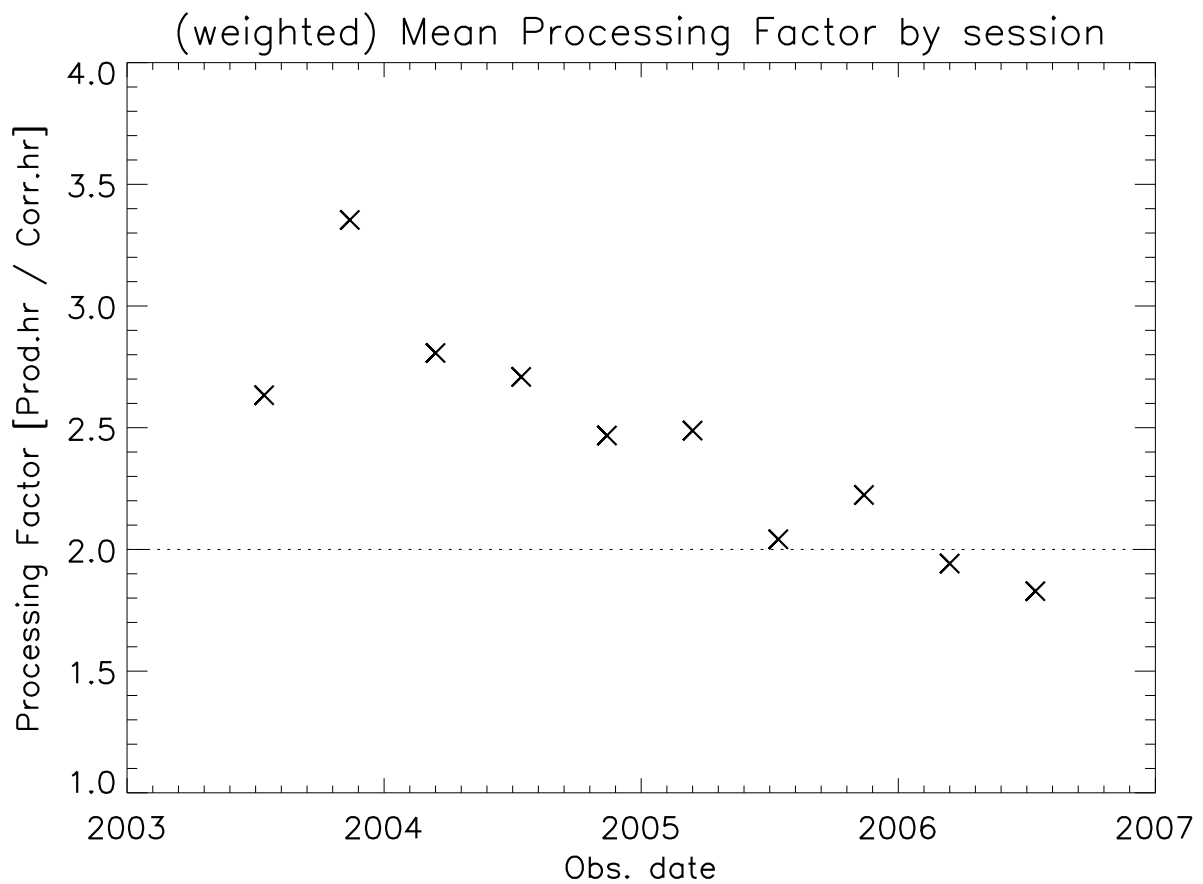
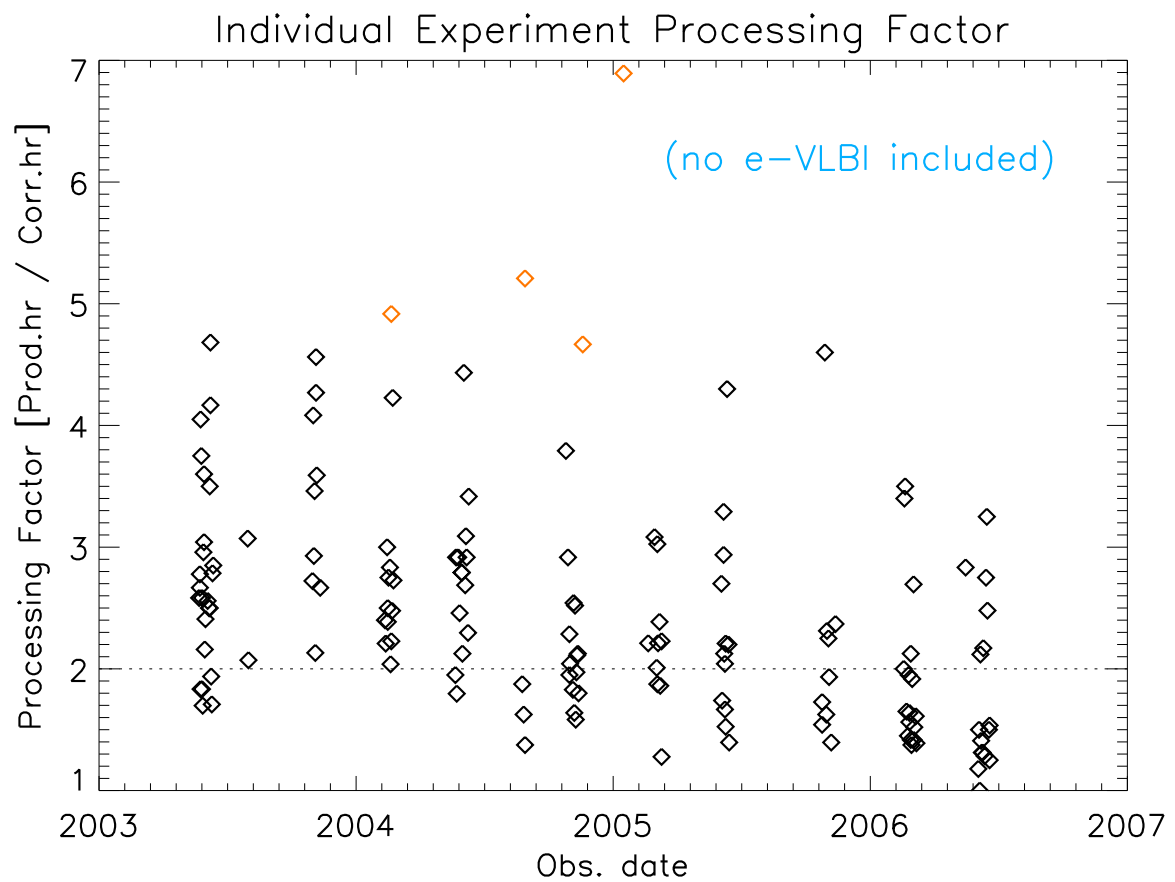
Correlator Efficiency



Evolution of Experiment Processing Times



Evolution of Processing Factor



Correlator Capabilities

Available / Tested:

- 1-, 2-bit sampling;
- Cross-polarization
- ≤ 2048 frequency points per SB/pol
- Full-correlator integration times down to 1/4 sec
- Total observed data rates up to 1 Gbps
- Oversampling ($2,4 \times$ Nyquist \rightarrow 500 kHz SBs)
- > 16 station correlation (via multiple passes)
- Improved 2-bit van Vleck correction
- e-VLBI operation
- Phase-cal detection

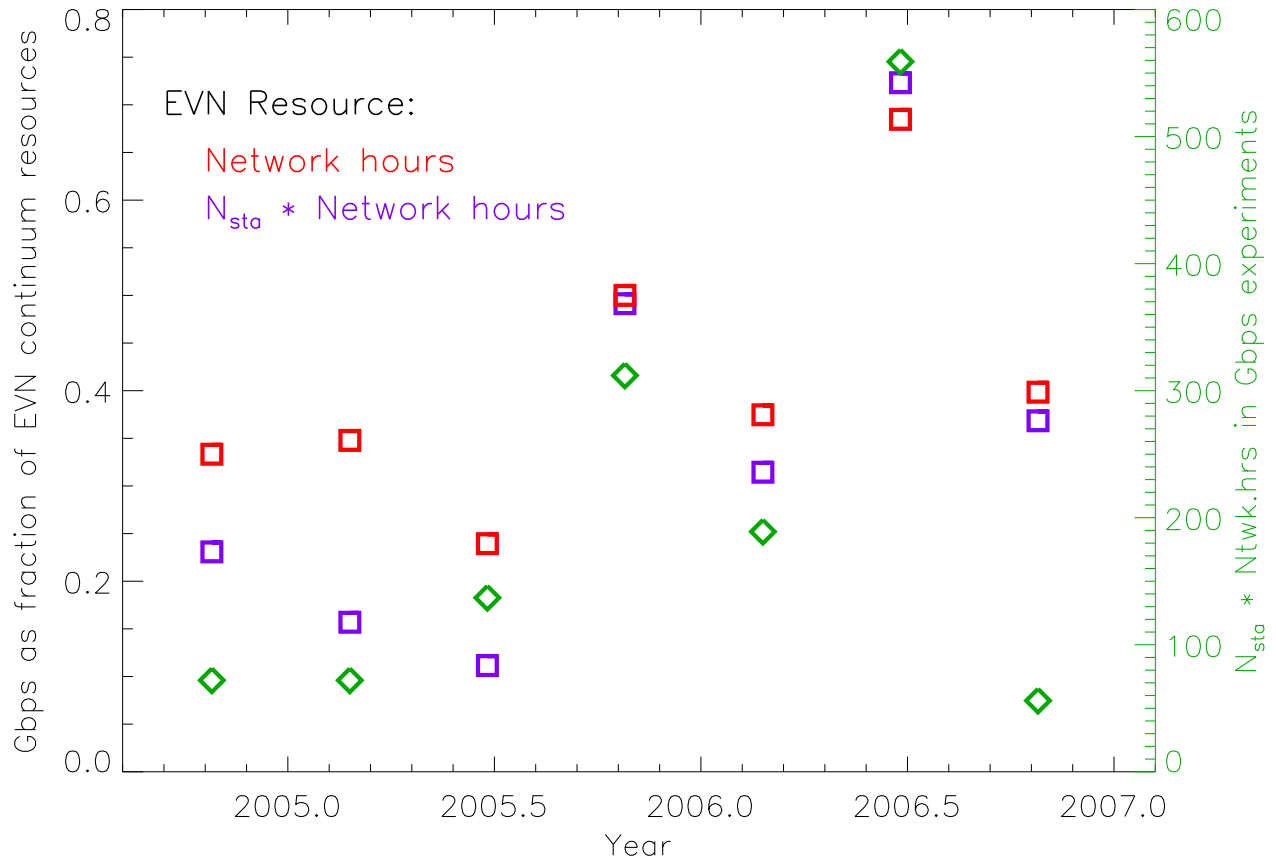
New / Tested:

- Updated *a priori* model
- Improved *UVW*s
- Correlation of 2 MERLIN out-stations

Underway / Not Fully Tested:

- Recirculation (time-sharing correlator for low-BW SBs)
- Mark 5B (double spectral resolution via global validity)

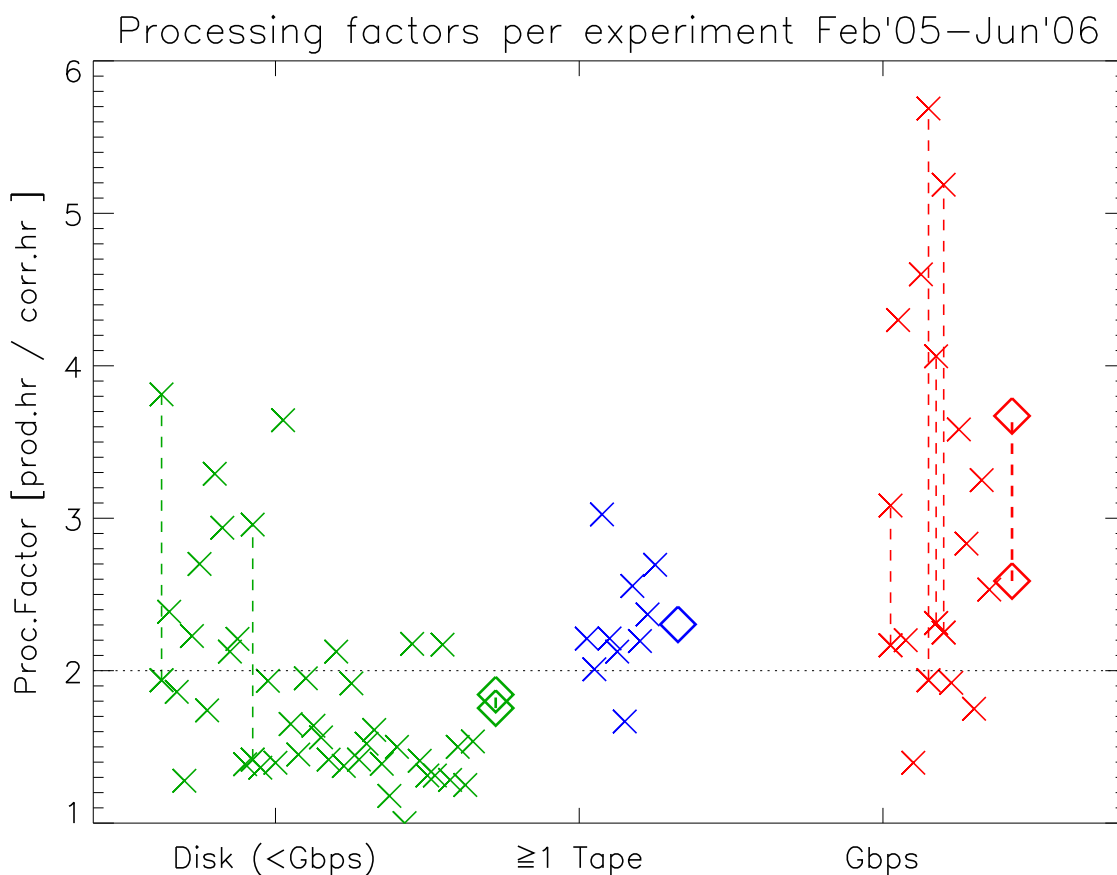
Gbps Observations in the EVN



- 1st three sessions: few Gbps stations
- Absolute load variation:
 - N_{exp} in session
 - popular line frequency-bands scheduled?

Gbps Consequences

- Processing factor increase (more re-dos)
 - Diagonal Weights (16 MHz SB BW)
 - DMM Byte Slips (64 tracks)
 - Recording Problems (video-cable interference)



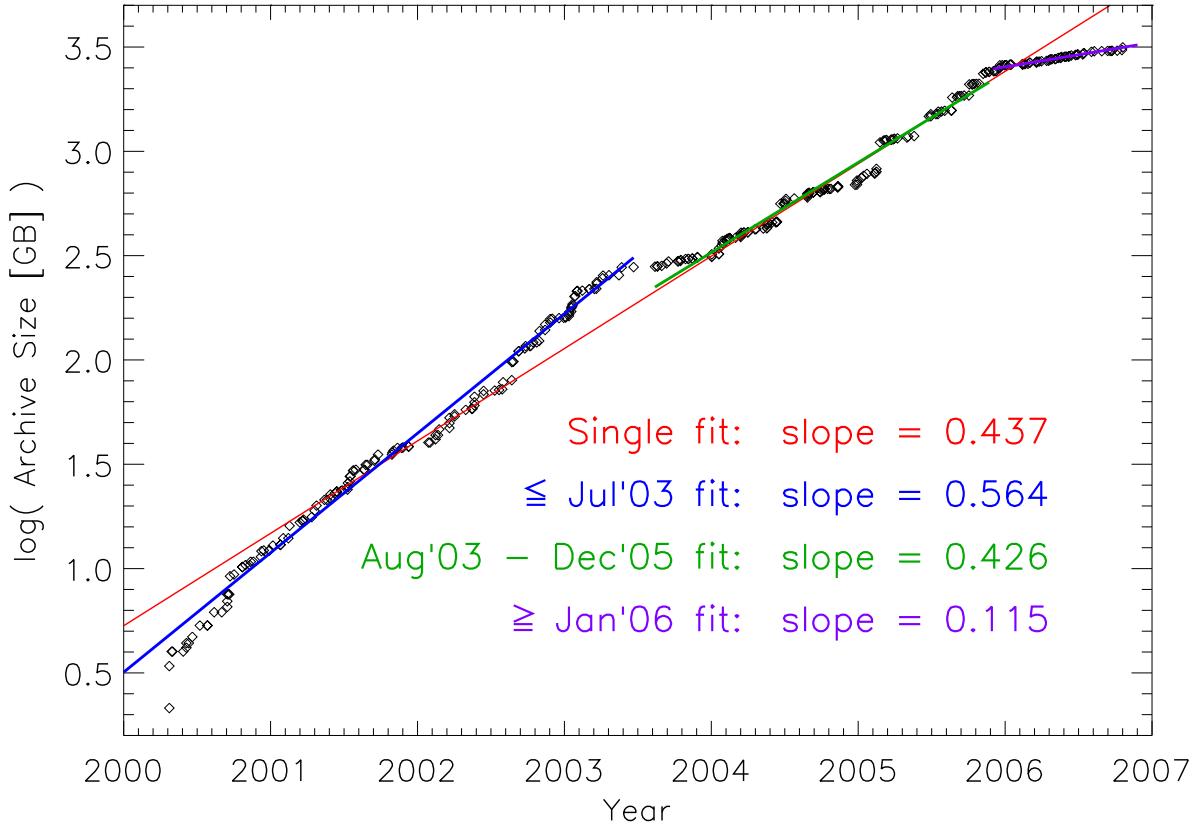
- Field of View limitations ($N_{sb} \cdot N_{pol} \geq 16$)
 - Bandwidth-smearing <10% limit ($B = 8000$ km):

$$N_{sta} \leq 8: \quad N_{\nu} \leq 128, \quad \text{FoV} \leq 49''5$$

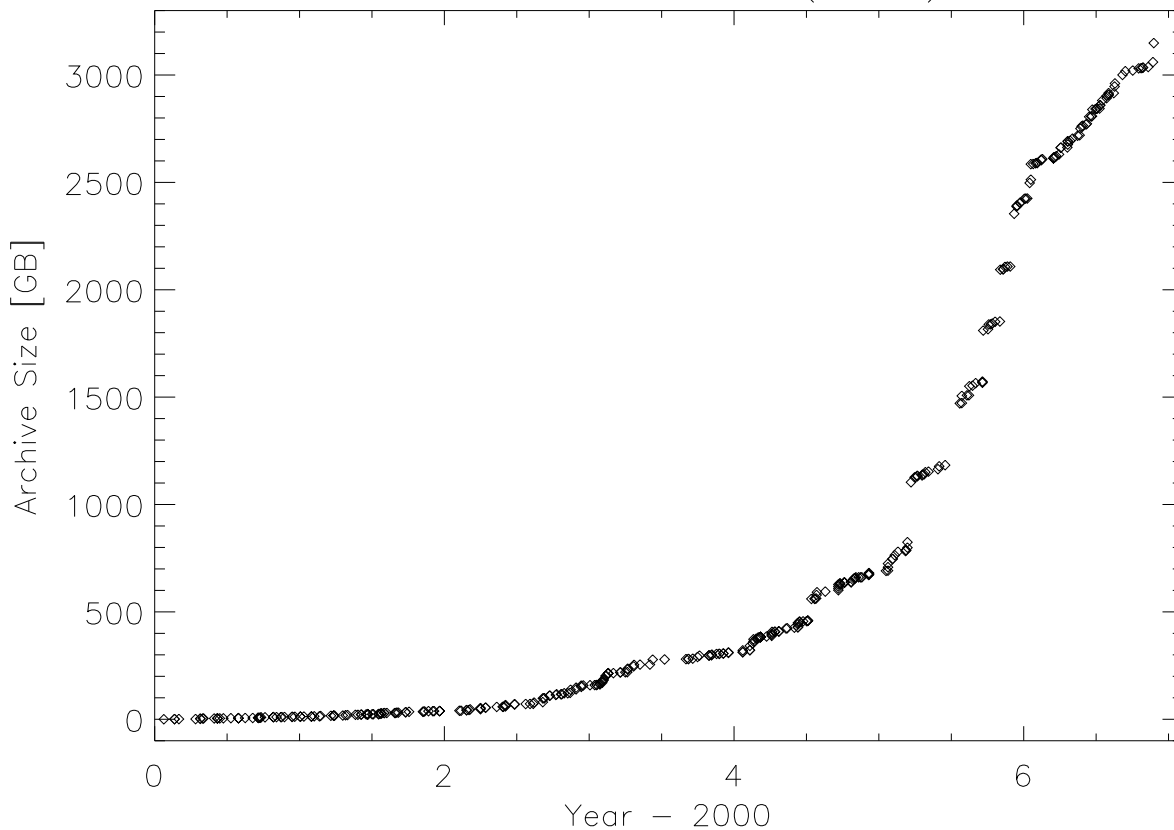
$$N_{sta} \geq 9: \quad N_{\nu} \leq 32, \quad \text{FoV} \leq 12''3$$

EVN Archive Growth

EVN Archive Growth (log)



EVN Archive Growth (linear)



Disk Flux

EVN (recycle within 2 sessions):

Session Pair	In [TB]	Out [TB]	Bal.	Cum.
3/03→2/04	22.00	30.52	+8.52	+8.52
1/04→3/04	63.69	86.31	+22.62	+31.14
2/04→1/05	111.52	69.89	-41.63	-10.49
3/04→2/05	122.53	100.67	-21.86	-32.35
1/05→3/05	140.58	142.31	+1.73	-30.62
2/05→1/06	176.99	152.93	-24.06	-54.68
3/05→2/06	211.85	303.37	+91.52	+36.84
1/06→3/06	191.05	133.36	-57.69	-20.85
2/06→1/07	303.63			

VLBA (<30 d turn-around [pre-position]):

Session	to NRAO		to EVN		Bal.	Cum.
	JIVE	STAs	JIVE	STAs		
3/05	27.84	15.73	33.56	3.31	+6.70	+6.70
1/06	31.60	5.06	30.22	0.00	+6.44	+13.14
2/06	4.96	16.48	23.86	0.00	-2.42	+10.72
3/06	24.00	0.00				