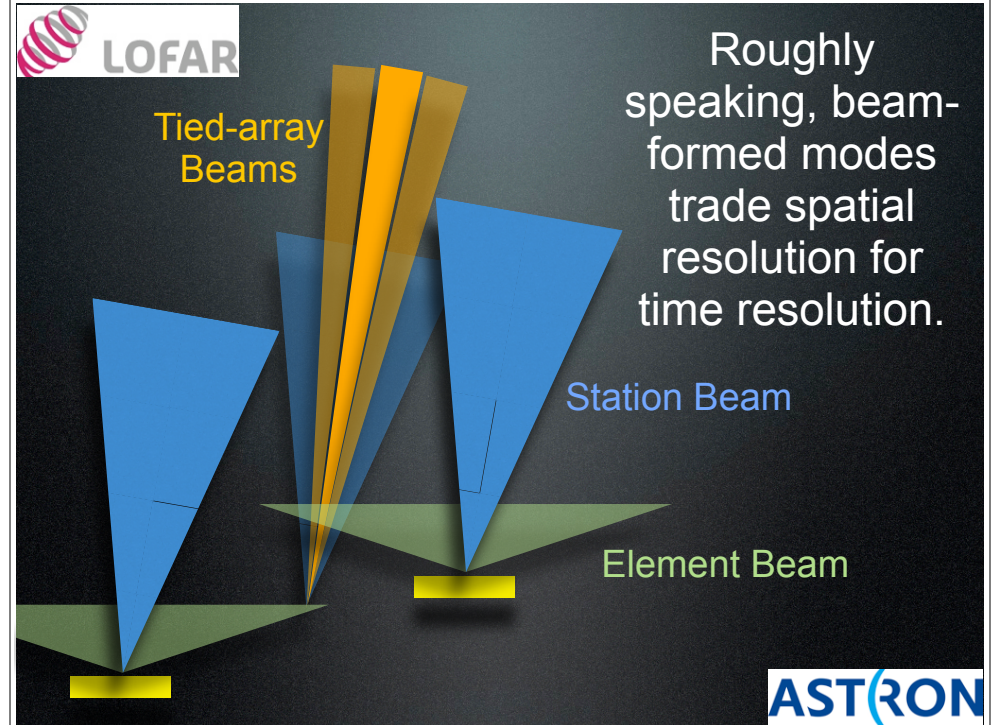
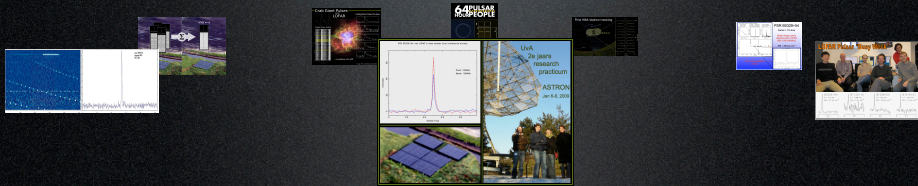


Status of the LOFAR Pulsar/ Beam-Formed Pipeline

Jason Hessels on behalf of
LOFAR Pulsar Working Group
ASTRON HPC Group



LOFAR Technical Status Meeting
May 18th, 2009



Pulsar/Beam-formed Pipeline

Some scientific applications

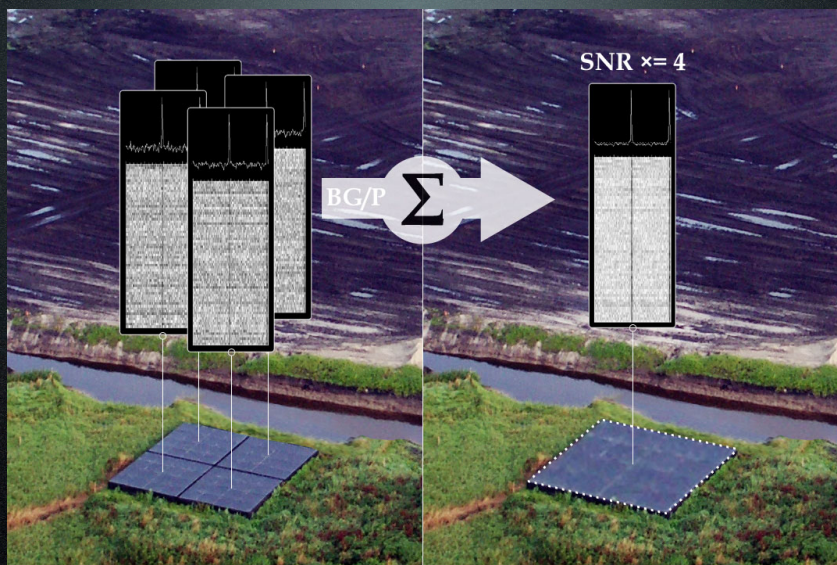
- Known pulsars - channelization, Stokes, dedispersion, folding, RFI excision.
- Pulsar/fast transient survey - channelization, dedispersion (10,000 trial DMs), RFI excision, searching.
- Planets, Sun, flare stars - channelization, RFI excision, dynamic spectra.



Beam-formed modes

...there are many possible.

Mode	Description	Data Rate	FoV (sq. deg.)	Res. (deg.)	Sens. (norm.)
Incoherent (par. imaging)	Stations added without proper phase correction.	2-250 GB/hr	12,5	2	6,0
Tied-array	Stations added properly in phase.	Up to 23TB/hr	0,2	0,03	36,0
Single Station	For projects with high time, but lower sensitivity requirements.	2-250 GB/hr	12,5	2	1,0
Superstation	Interesting balance of sensitivity and FoV.	Up to 23TB/hr	9,0	0,2	12,0
Fly's Eye	Maximize total FoV for bright transient survey.	Up to 8TB/hr	450,0	2	1,0



Prototype tied-array mode

Need to optimize for many beams and solve pointing issues... not to mention proper calibration!

Pulsar/Beam-formed Pipeline

Known and possible issues with the data

- Autocorrelation dips - bad news for single pulse searches et cetera.
- Metadata - only “tangentially” available, and mostly unchecked for validity.
- File format - currently written as just a simple binary file without header.
- Clocks - we know little about the clock and have yet to try combining multiple stations.



Pulsar/Beam-formed Pipeline

Commissioning People

Pulsar Working Group (Stappers, Hessels, van Leeuwen, Hassall)	Define requirements, operational modes, test data for scientific quality,
Jan David Mol	Tied-array mode
John Romein	Optimization on BG/P
Alwin de Jong	HDF5 writer
Anastasia Alexov	Post BG/P pipeline
Ashish Asgekar	LOFAR/Pulsar Support Scientist

Pulsar/Beam-formed Pipeline

Conclusions

- Most things still need to be done by hand, but a rough “pipeline” is in place.
- Automation is high on the priority list in addition to increasing functionality.
- One can observe known pulsars and make dynamic spectra for e.g. planets, the Sun, and flare stars.
- “Pulsar Busy Week 3” is June 2-6th, 2009.

