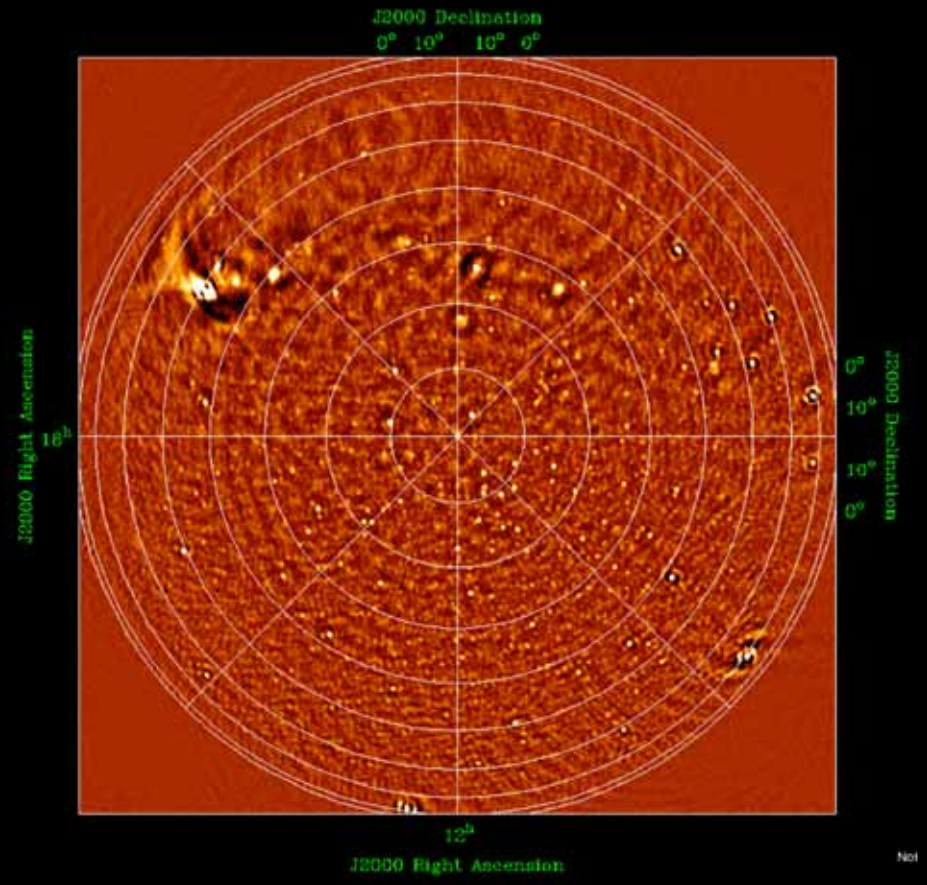
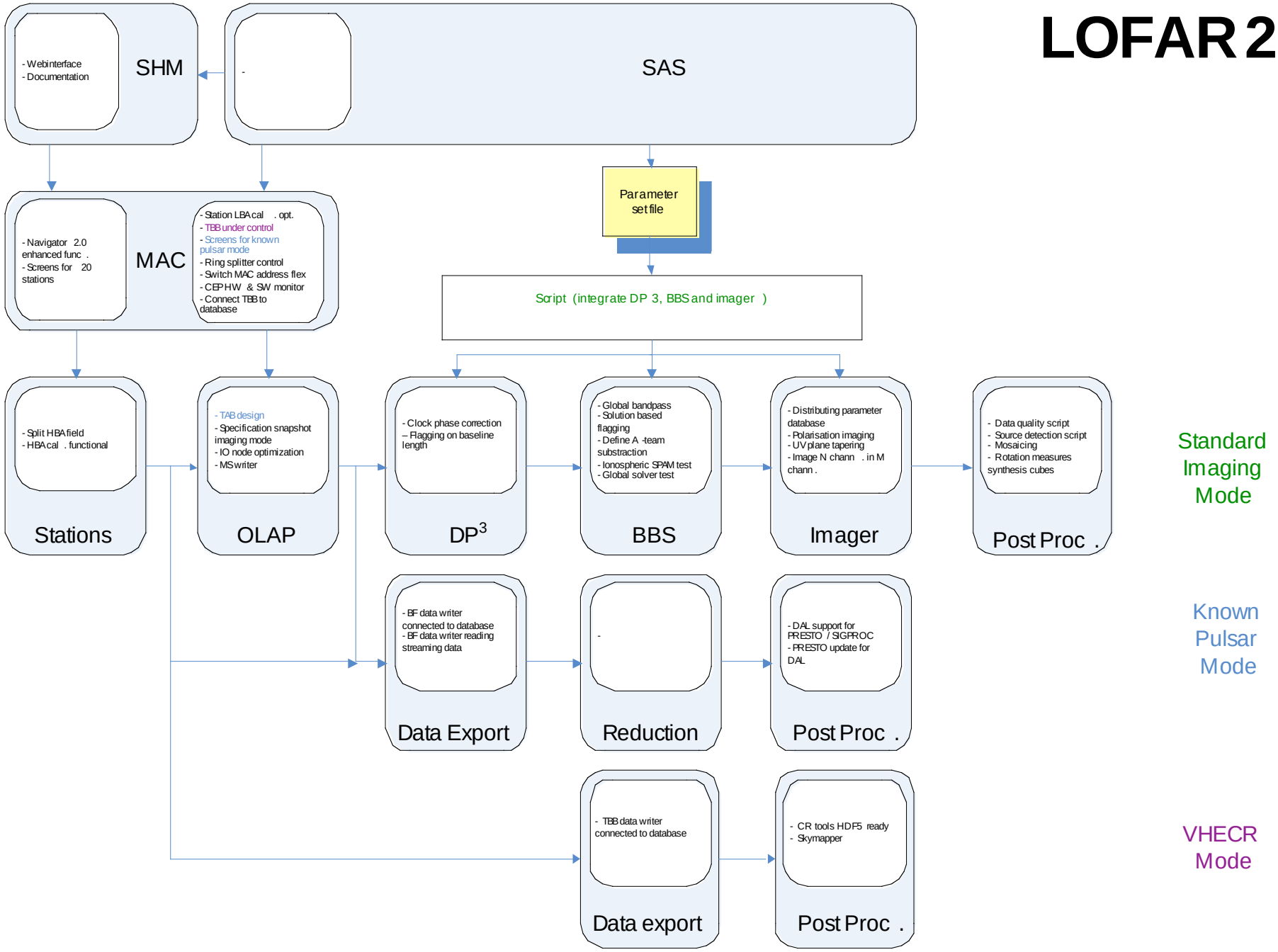
LOFAR Software and Roll Out Update

André W. Gunst



LOFAR 20


- Webinterface
- Documentation
SHM
-
SAS
Parameter set file
- Navigator 2.0 enhanced func .
- Screens for 20 stations
MAC
- Station LBA cal . opt.
- TBB under control
- Screens for known pulsar mode
- Ring splitter control
- Switch MAC address flex
- CEP HW & SW monitor
- Connect TBB to database
Script (integrate DP 3, BBS and imager)
- Split HBA field
- HBA cal . functional
Stations
- TAB design
- Specification snapshot imaging mode
- IO node optimization
- MS writer
OLAP
- Clock phase correction
– Flagging on baseline length
DP3
- Global bandpass
- Solution based flagging
- Define A -team substraction
- Ionospheric SPAM test
- Global solver test
BBS
- Distributing parameter database
- Polarisation imaging
- UV plane tapering
- Image N chann . in M chann .
Imager
- Data quality script
- Source detection script
- Mosaicing
- Rotation measures synthesis cubes
Post Proc .
Standard Imaging Mode
- BF data writer connected to database
- BF data writer reading streaming data
Data Export
-
Reduction
- DAL support for PRESTO / SIGPROC
- PRESTO update for DAL
Post Proc .
Known Pulsar Mode
- TBB data writer connected to database
Data export
- CR tools HDF5 ready
- Skymapper
Post Proc .
VHECR Mode

Subsystem	Task	Responsible	Week no.	
Station	Scale up bandwidth 48 MHz	Andre		
Station	Station HBA calibration functional	Stefan		
Station	Station LBA calibration verification	Stefan		
OLAP	Scale up bandwidth 48 MHz	John		
OLAP	TAB implementation	Jan-David		
OLAP	Optimize TAB processing	John		
OLAP	Optimize beamformed data writer (multiple beams)	Alwin		
OLAP	Port BGL getstats script to BGP	Martin		
OLAP	Measurement Set writer	Chris		
OLAP	Storage performance tests	Chris		
OLAP	Feedback from correlator to MAC/SAS	Martin		
OLAP	Make software more flexible (support any number of subbands)	John		
Offline	Global bandpass determination	Pandey		
Offline	Document ionospheric approach	Maaijke		
Offline	Ionospheric knowledge transfer	Maaijke, Joris, Marcel		
Offline	DP^3 offline clock phase correction impl.	Joris		
Offline	BBS solution based flagging	Joris		
Offline	Improve global sky model (shapelets, sources, interface LSM)	Bart		
Offline	Polarisation imaging	ATNF		
Offline	Image N chann. In M chann.	ATNF		
MAC/SAS	Station LBA calibration operational	Ruud/Pieter		
MAC/SAS	Coordinates centrally available (incl. database)	Ruud		
MAC/SAS	Conversion to ITRF	Ruud		
MAC/SAS	SAS interface upgraded	Arthur		
MAC/SAS	Update MAC for the new SAS interface	Ruud		
MAC/SAS	Scale up bandwidth to 48 MHz	Ruud		
MAC/SAS	Adaption station plot program for x statistics	Pieter		
MAC/SAS	Scaling cross correlation products	Ruud		
MAC/SAS	Ring splitter control	Ruud/Pieter		
MAC/SAS	BF data writer under MAC control incl. metadata stream to SAS	Ruud		
MAC/SAS	TBB data writer under control incl. metadata stream to SAS	Pieter Donker		
MAC/SAS	Define screens for known pulsar mode	Ruud		
MAC/SAS	Hardware and software monitor for central machines	Ruud		
MAC/SAS	Connect weatherstation to environmentController	Pieter		
MAC/SAS	Analyzing the log stream of BG/P	Ruud		
MAC/SAS	Develop screens for CEP	Arthur		
USG	Distributed images collected to an image cube	Ken		
USG	Image quality scripts	Evert		
USG	Image cube data product definition	Ken		
USG	Integration of source finding in imaging pipeline	John Swinbank		
USG	GSM database implementation	Bart, John Swinbank		
USG	Pulsar and cosmic data product + meta data definition	Michael, Ken		
USG	Online pulsar pipeline integration	Ken, John Swinbank		
USG	Offline pulsar pipeline integration	Ken, John Swinbank		
USG	PRESTO updates for DAL HDF5 BF data	Anastasia		
USG	CR post processing pipeline integration	Lars, Andreas		
USG	Near field imager	Lars		
USG	First implementation of RM synthesis tool	Sven Duscha		
USG	Prototype of Visit plugin	Joe		

- Step 4 is a delta on Step 3
- Lots of things from the field resulted in extra work

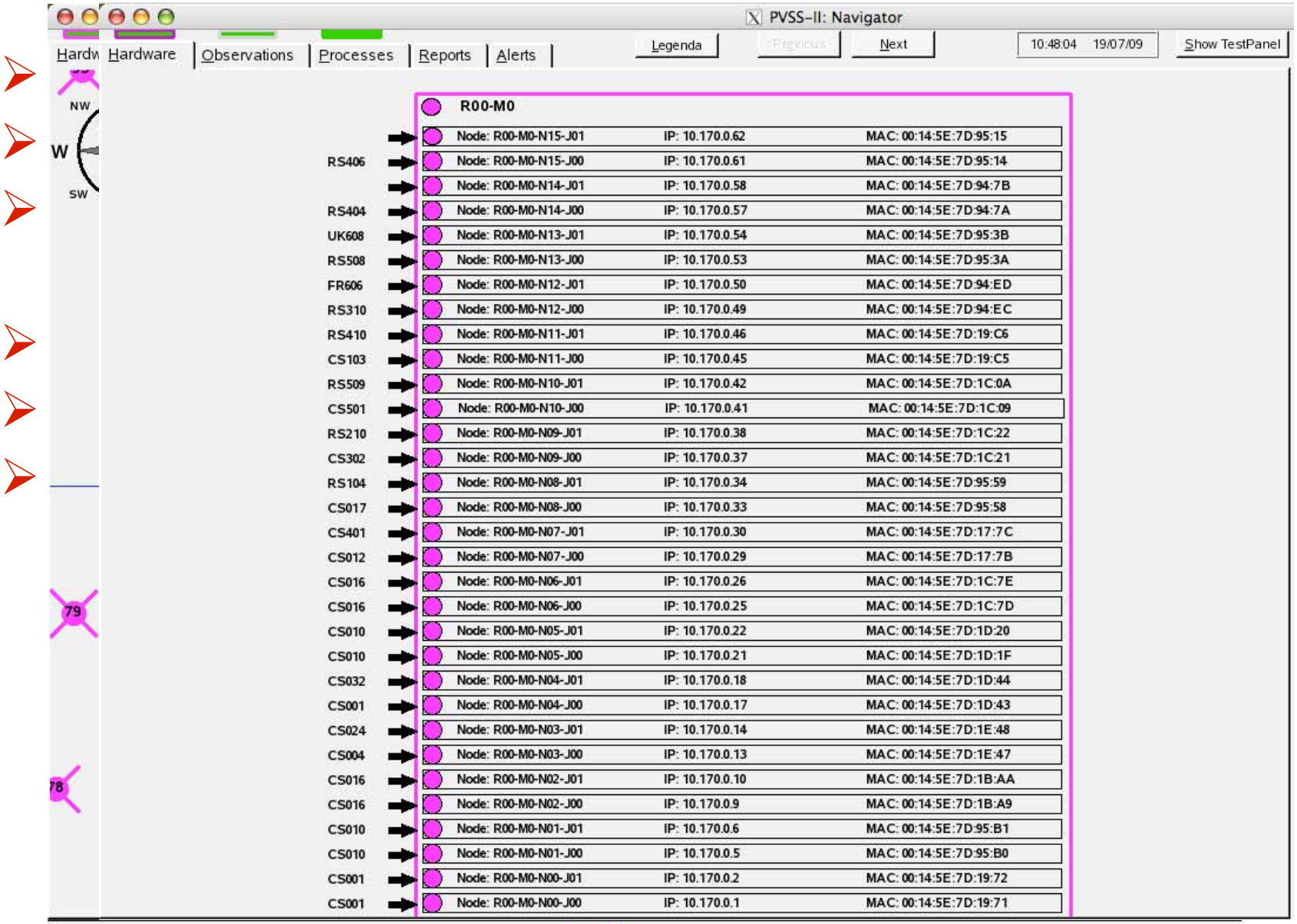
Main Focus Step 4

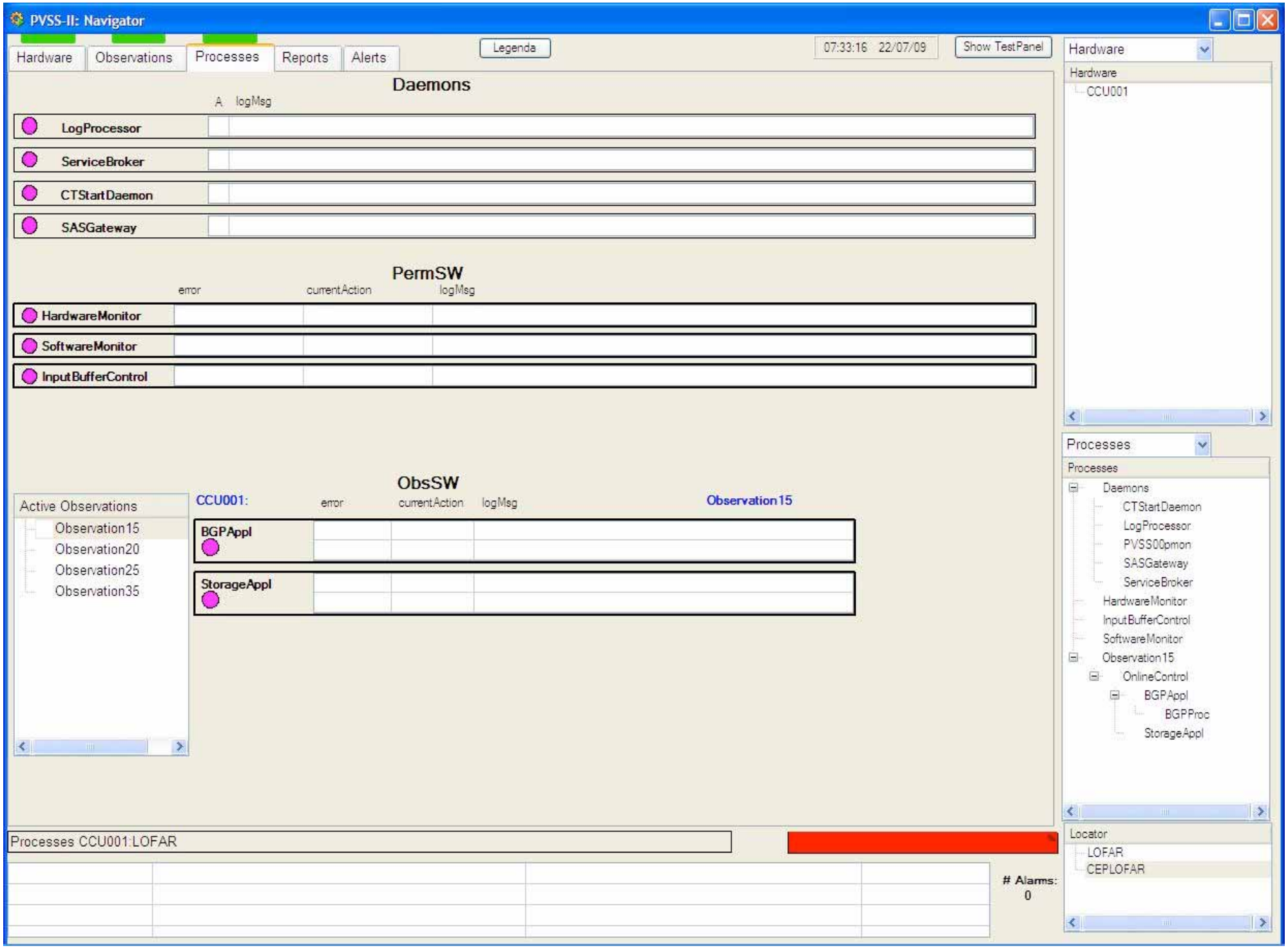
- Get pipelines ready for the observers
- Get all Step 3 software ready for the production system
- Test and solve bugs in present software (input from commissioners)
- No (main) functionalities added

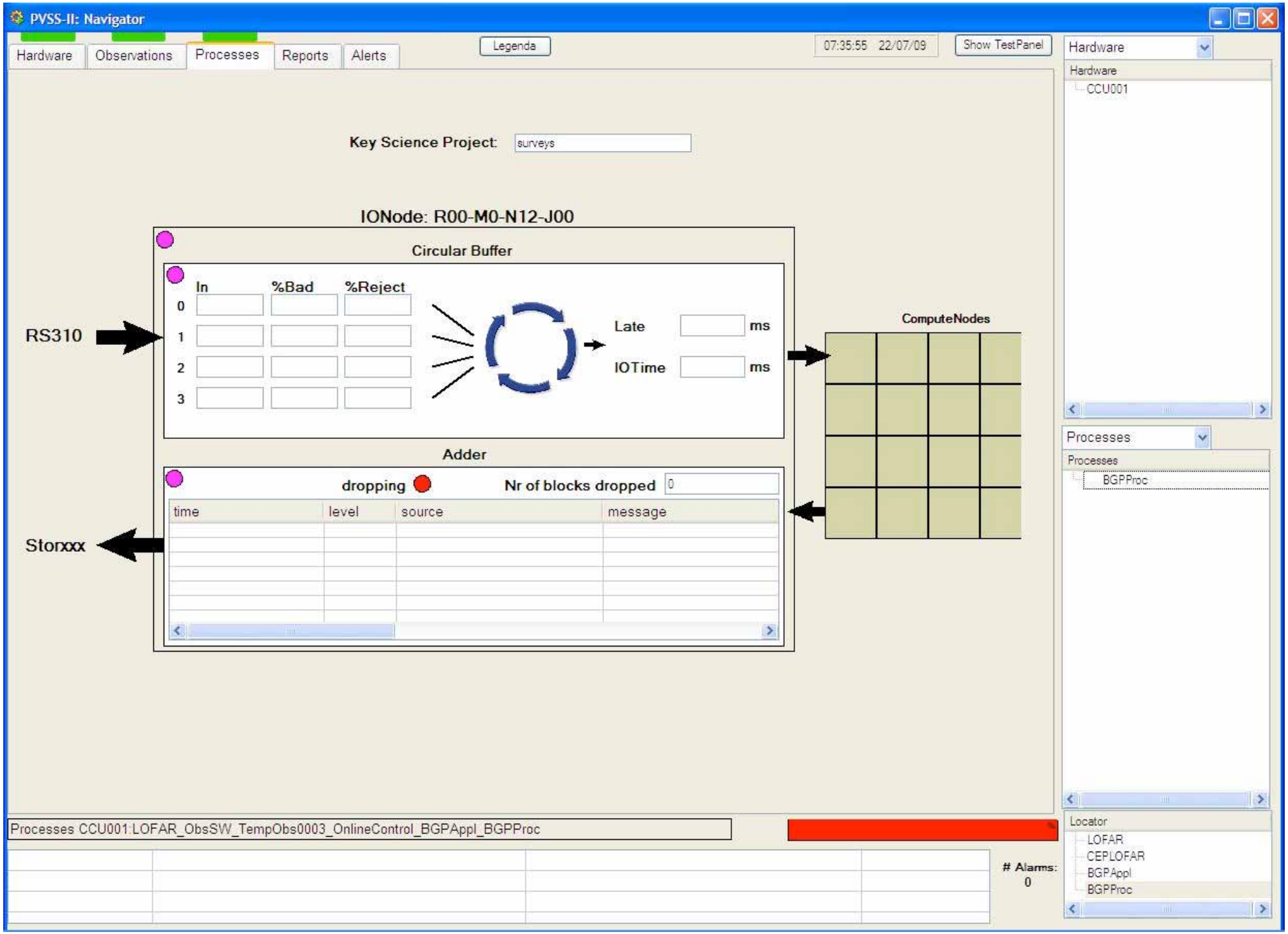
- Enhancements
- RSPdriver: scale up to 48 Mhz
- RSPdriver: support Serdes ring splitter
- TBBdriver: support updated TBB firmware
- TBBdriver: faster way of writing new firmware image.
- Env. Control: remote loading of new firmware
  - ☞Temperature control works great ...
- MAC: able to handle new SAS specification of observations.

- Commisioning issues
- RSPdriver: cable delays were not applied properly
- RSPdriver: HBA beams were sometimes ‘instable’
- TBBdriver: several issues during TBB busy weeks

Navigator software

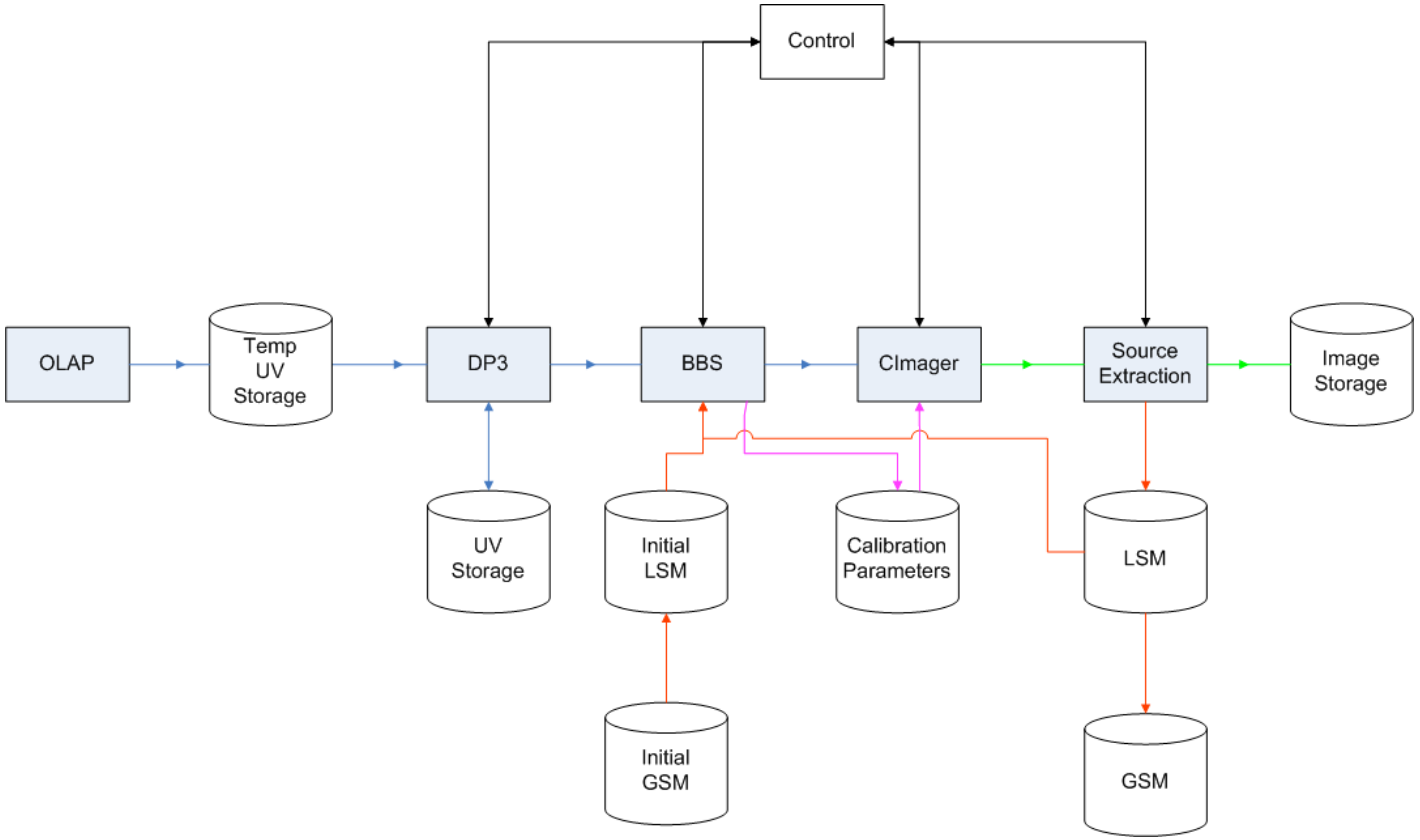



PVSS-II: Navigator
Hardware
Observations
Processes
Reports
Alerts
Legenda
07:33:16 22/07/09
Show TestPanel
Daemons
A logMsg
LogProcessor
ServiceBroker
CTStartDaemon
SASGateway
PermSW
error
currentAction
logMsg
HardwareMonitor
SoftwareMonitor
InputBufferControl
ObsSW
CCU001:
error
currentAction
logMsg
Observation15
Active Observations
Observation15
Observation20
Observation25
Observation35
BGPAppl
StorageAppl
Hardware
Hardware
CCU001
Processes
Processes
Daemons
CTStartDaemon
LogProcessor
PVSS00pmon
SASGateway
ServiceBroker
HardwareMonitor
InputBufferControl
SoftwareMonitor
Observation15
OnlineControl
BGPAppl
BGPProc
StorageAppl
Processes CCU001:LOFAR
Alarms:
0
Locator
LOFAR
CEPLOFAR


PVSS-II: Navigator
Hardware
Observations
Processes
Reports
Alerts
Legenda
07:35:55 22/07/09
Show TestPanel
Hardware
Hardware
CCU001
Key Science Project:
surveys
IONode: R00-M0-N12-J00
Circular Buffer
In
%Bad
%Reject
0
1
2
3
RS310
Late
ms
IOTime
ms
ComputeNodes
Adder
dropping
Nr of blocks dropped
0
time
level
source
message
Storxxx
Processes
Processes
BGPProc
Processes CCU001:LOFAR_ObsSW_TempObs0003_OnlineControl_BGPAppl_BGPProc
Alarms:
0
Locator
LOFAR
CEPLOFAR
BGPAppl
BGPProc

- Support for 48 MHz
- Whole sample delay compensation works
- TAB implementation
- Optimization of TAB processing in progress
- Beamformed datawriter optimized (mult. beams)
- Optimize MS writer
- MAC/SAS interface

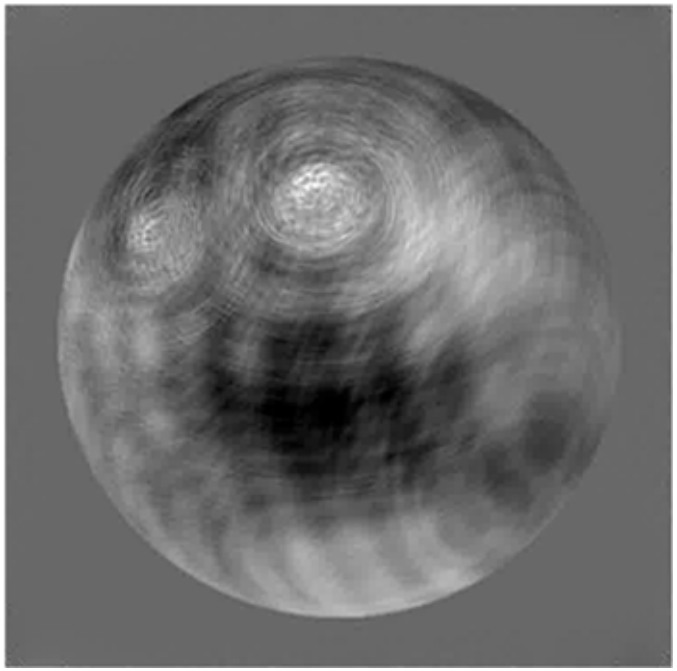
Standard Imaging Pipeline



Standard Imaging Pipeline

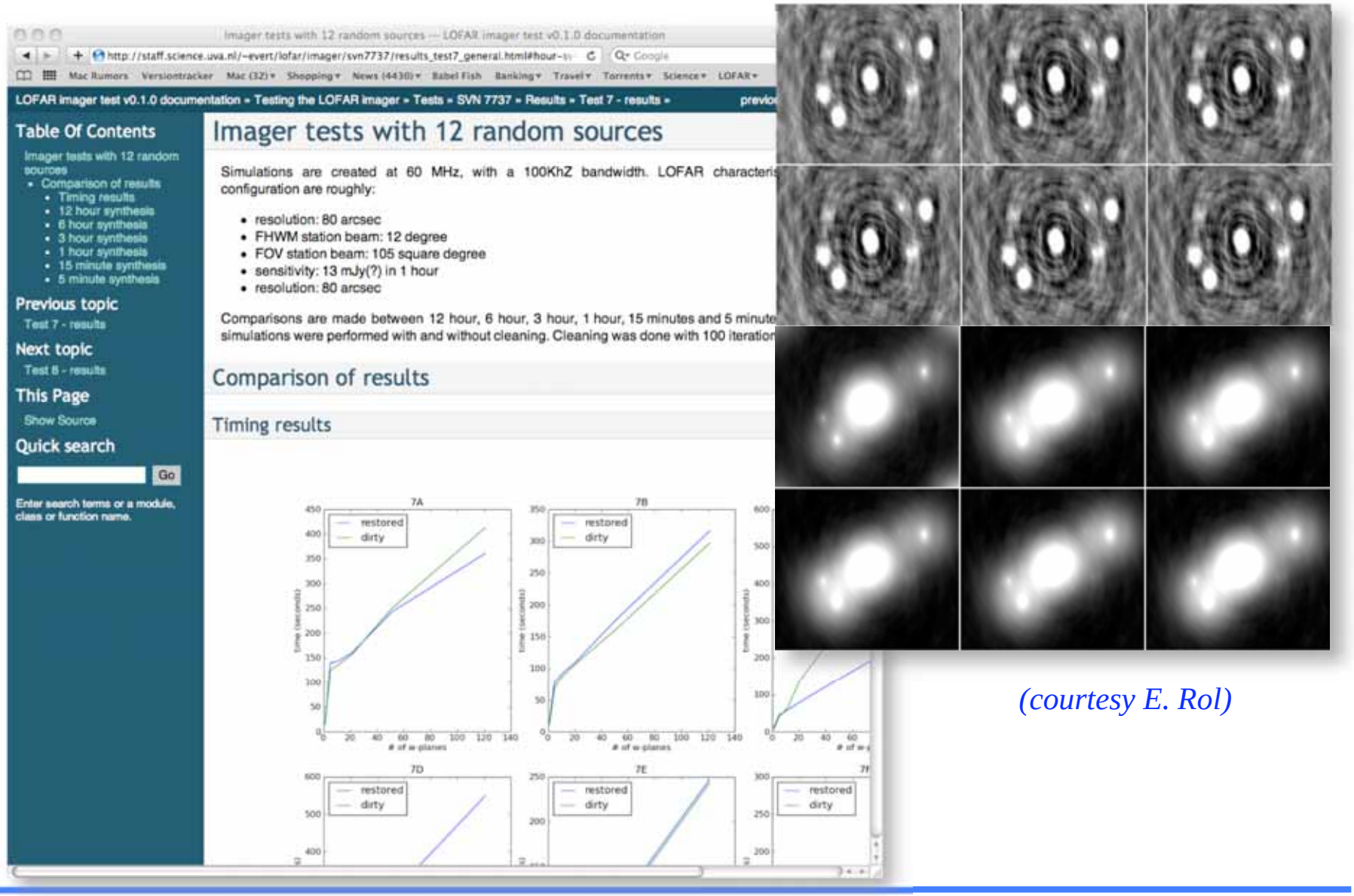
Achieved in Step 3

- Integration of DPPP, BBS, and MWImager, Source detection, and GSM database into single pipeline
- Ionosphere: documentation and knowledge transferSolution based flagging in BBS
- Source spectral index model in BBS updated
- GSM database established and populated
- Polarization imaging capability available
- Ability to image N channels in M channels
- Updates to MS storage manager
- Initial set of imager validation tests produced
- Support in MWImager framework for CASA imager and Cimager
- *Clock phase correction in DPPP*
- *Support for shapelet source models in BBS/GSM*
- *GSM/LSM connection layer*
- *Global bandpass correction*



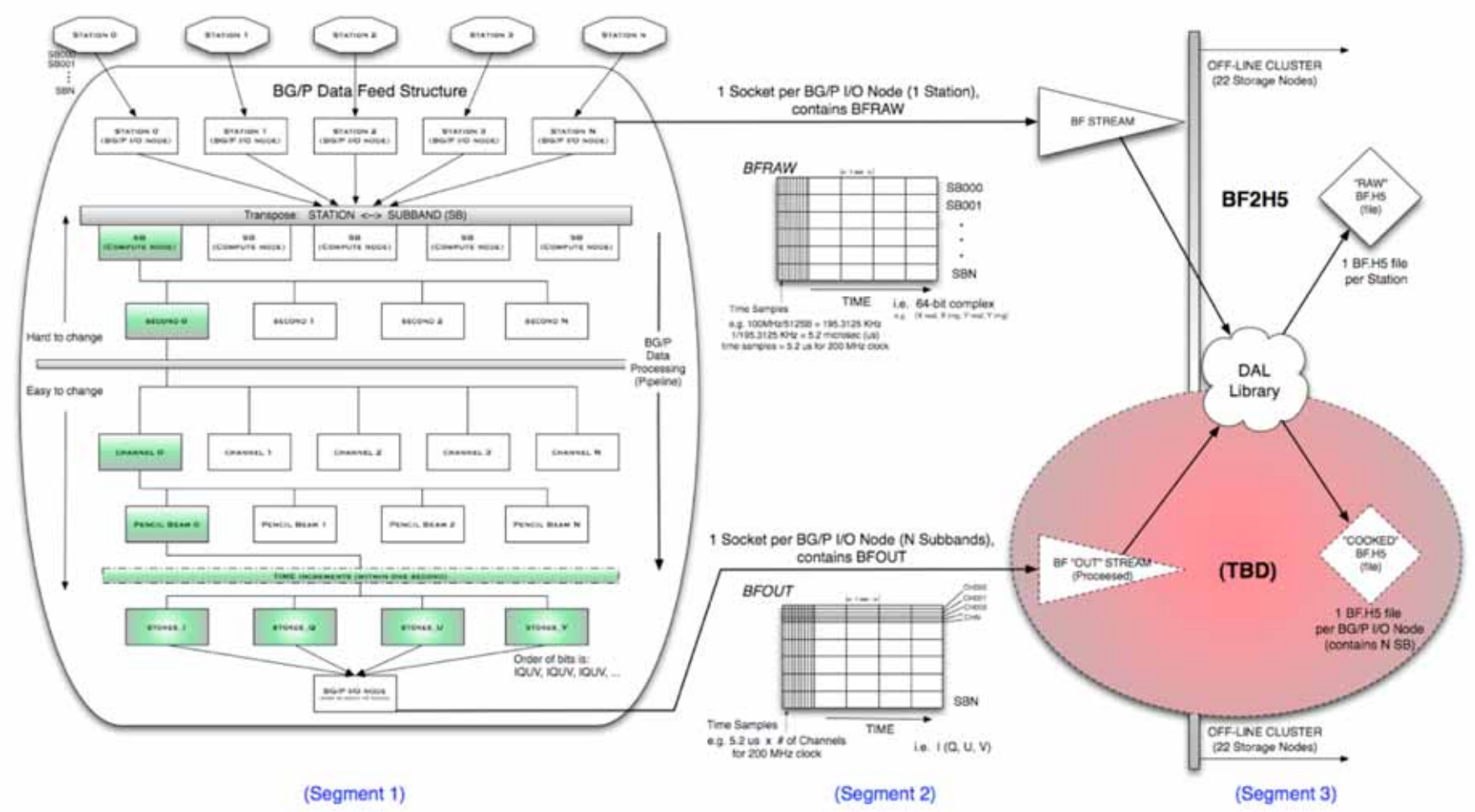
L2007_03463, 48 sub-bands

Imager Testing and Validation



(courtesy E. Rol)

Known Pulsar Pipeline



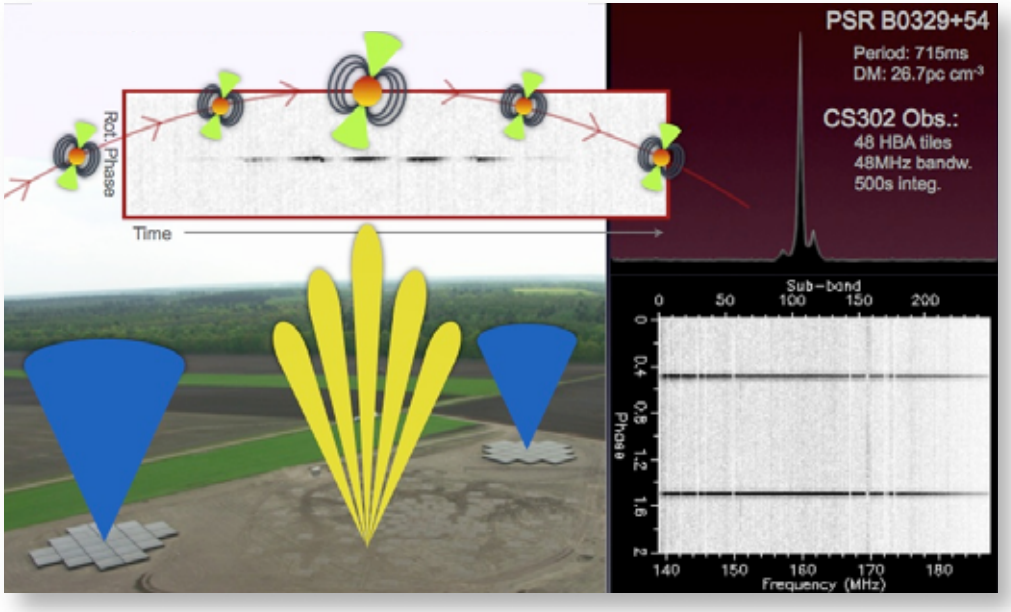
(courtesy A. Alexov)

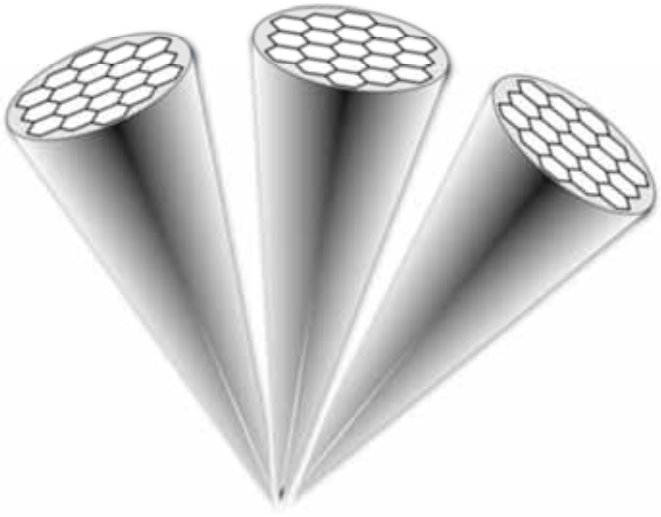
LOFAR beam-formed data flow

Known Pulsar Pipeline

Current Status

- Optimized TAB module
- Currently being tested
- Streaming version of HDF5 BF data writer working
- BF data format updated

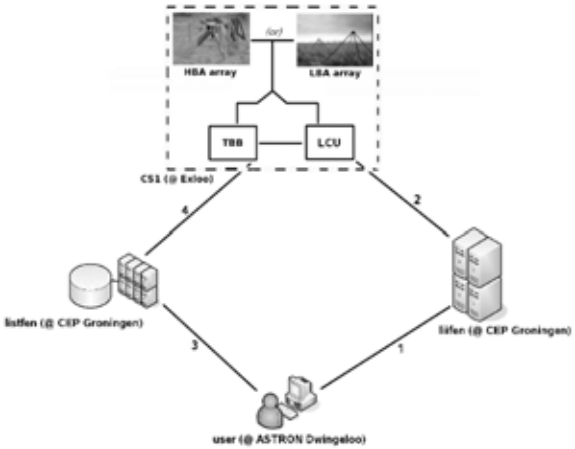




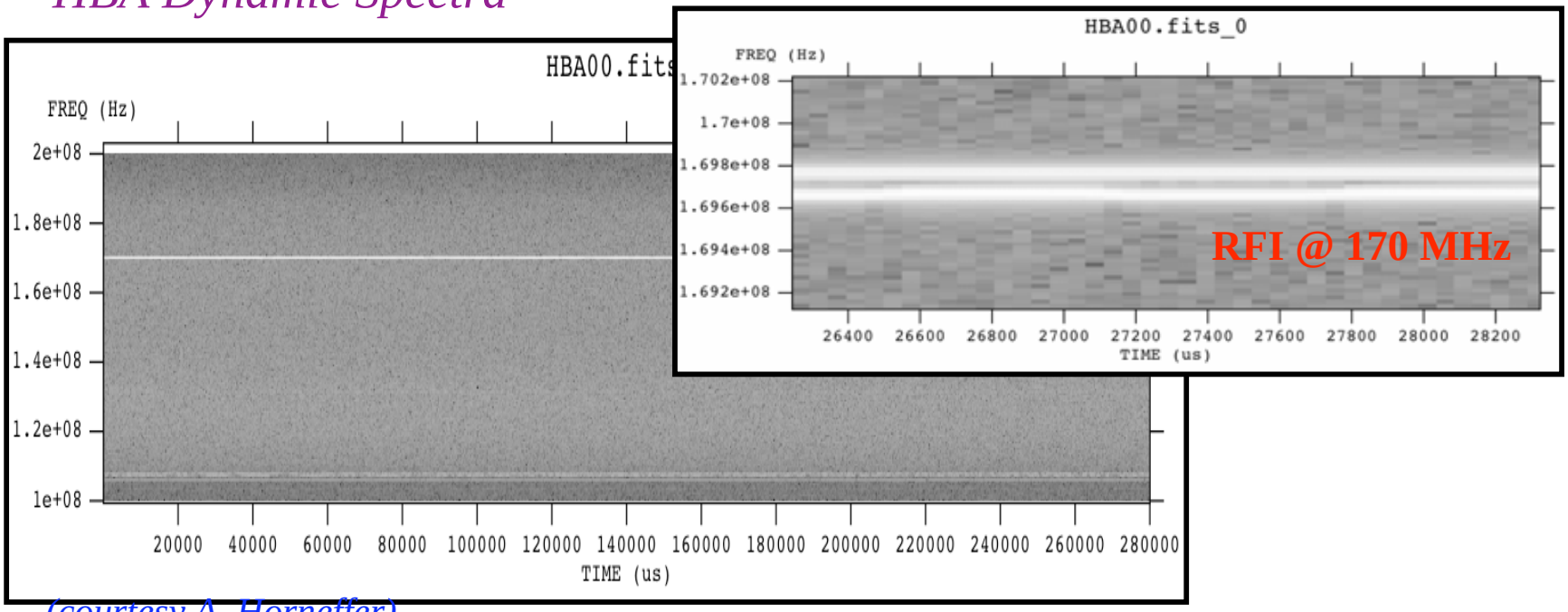
VHECR Pipeline

Achieved in Step 3

- Memory leak in TBB data writer fixed
- Extensive updates to TBB data writer
- Scripts to initiate TBB dumps
- First version of SkyMapper completed

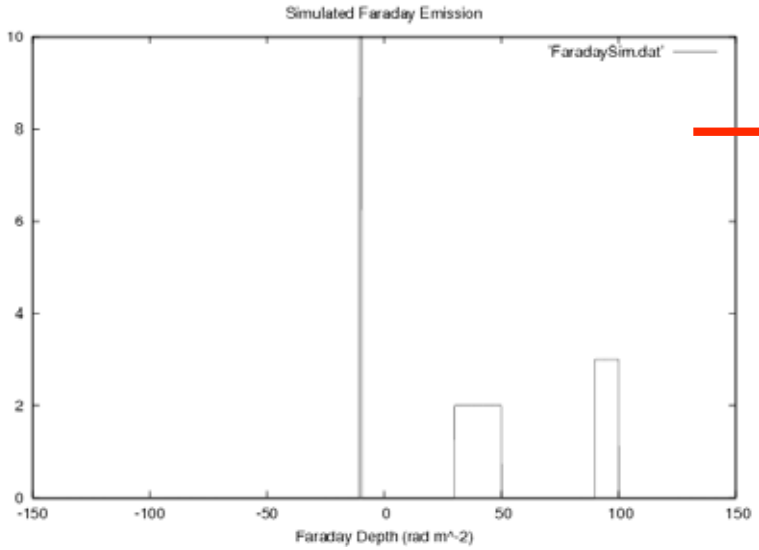


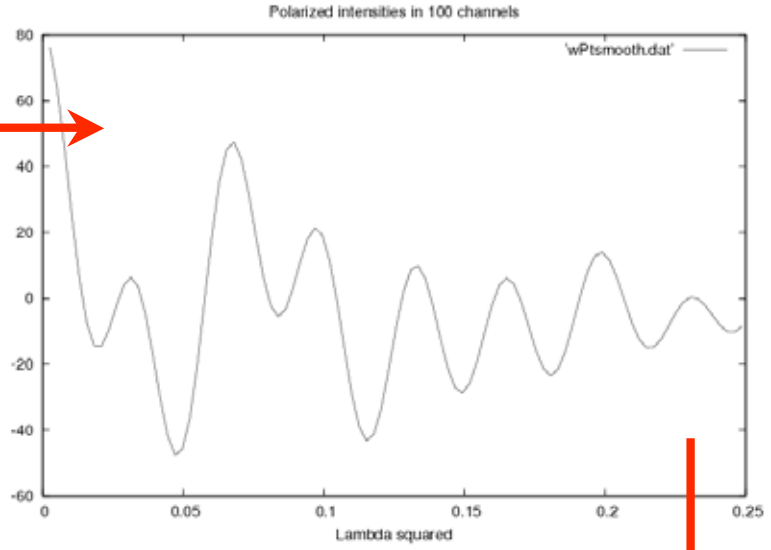
HBA Dynamic Spectra

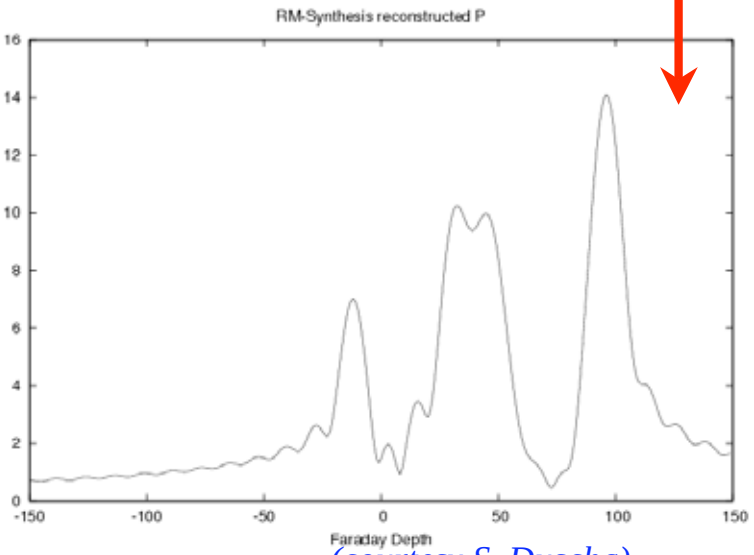


(courtesy A. Horneffer)

RM Imager







(courtesy S. Duscha)

Current Status

- Classical RM-synthesis as described by Brentjens and de Bruyn (2005) is fully implemented.
- Forward transform allowing simulated RM cubes as input for creating polarized emission images is implemented
- RM Clean is still being implemented
- Currently being tested

ASTRON

Roll Out Status

Station/Item	Cabinet	LBA	HBA	Fibre	CEP connection	Validated
CS302						
RS307						
RS503						
RS106						
RS208						
CS030						
CS401						
CS021						
CS032						
RS306						
CS301						
CS501						
RS509						
RS103	beton					
CS201						


RS106

RS208


CS501

CS301

Effelsberg