



LOFAR Astronomy Development: Plans and Priorities

*Million Source Shallow Survey (MS³) Meeting
19 March 2008*

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LOFAR Astronomy Development: Plans and Priorities

Outline

- **Motivations and goals**
- **Status of planning**
- **Upcoming discussions**

- Dec 07 Station procurement begins
- Feb 08 WAN hardware procurement begins
- Mar 08 WAN hardware selection
- Mar 08 CEP hardware procurement begins
- Apr 08 Rest of the hardware procurement begins
- May 08 CEP hardware selection
- July 08 Station roll-out begins
- Sept 08 CEP storage and offline cluster ready
- Dec 08 7 Remote stations and superstation ready
- Feb 09 20 NL + 3-4 EU stations online
- Dec 09 36-38 NL + 6 EU stations online

What system functionality can we reach by 2009?

What are the development priorities?

What are the commissioning priorities?

Do we have enough personnel to reach these targets?

Do we have the right personnel to reach these targets?

Overall goals

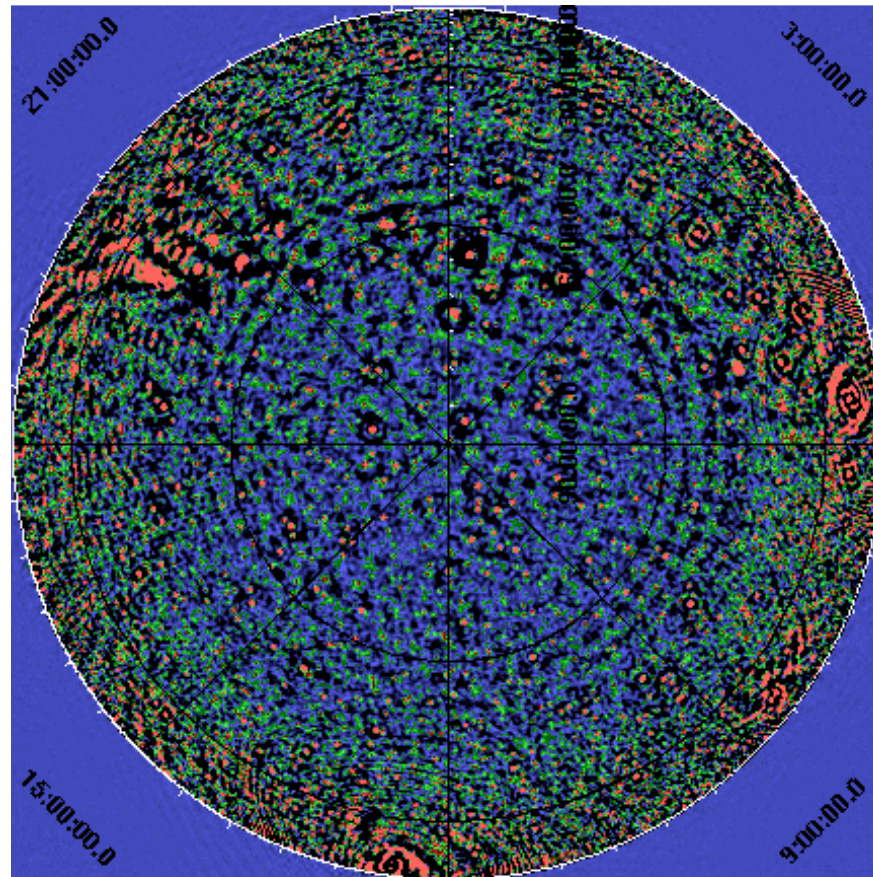
- Updated development tasks and priorities
- Detailed commissioning plan (for all modes)
- Clear work breakdowns and deliverables
- Realistic assessment of personnel needs

Functional target \Rightarrow Million Source Shallow Survey

Will need equivalent targets for other modes!

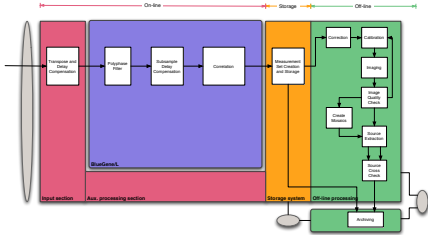
Practical benefits:

- Detailed development and commissioning plan
- Define priorities for Standard Imaging Pipeline
- Experience scheduling LOFAR observations
- Better requirements on processing and storage needs
- Produce a first GSM
- "Dress rehearsal" for operations

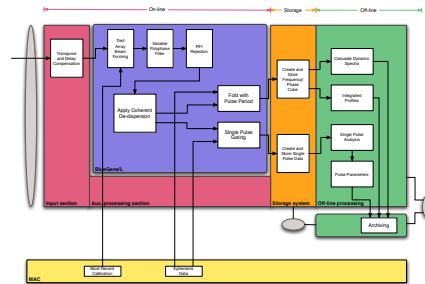


(Yatawatta, Sept 07)

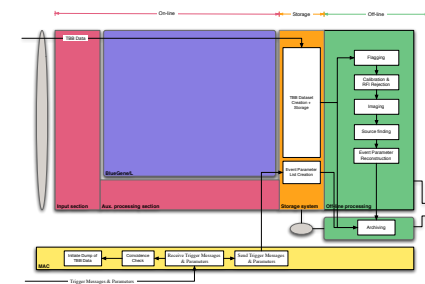
Standard imaging



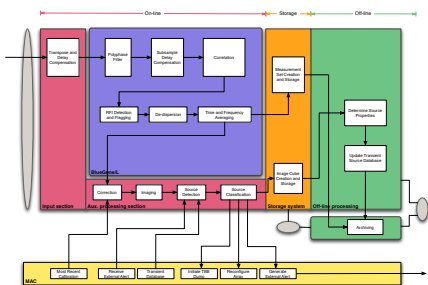
Known pulsars



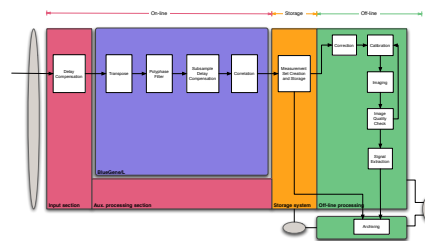
VHECR



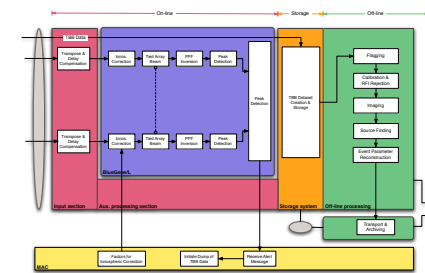
Transient detection



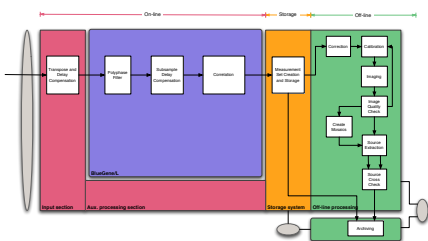
EoR



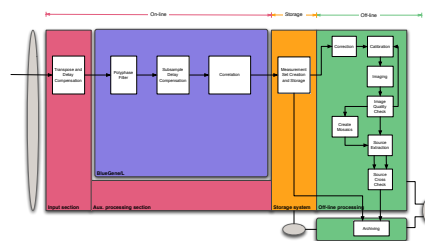
UHEP



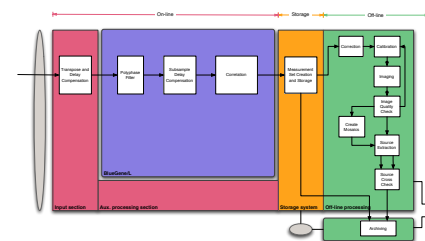
Pulsar surveys



HECR



Thunder-storm



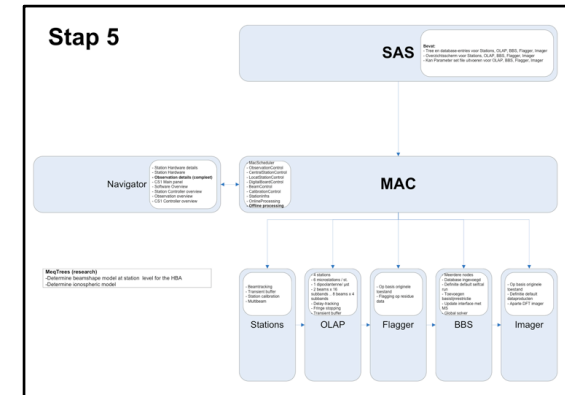
Integrated software plan

- Based on original KSP science requirements
- Includes all LOFAR development
 - *Complete component inventory*
 - *Infrastructure and pipeline development*
- Accounts for full development life-cycle
 - *Design, Specification, Implementation*
 - *Integration, Testing*

Items not in current plan

- Detailed commissioning plans
- Needs of new KSPs
- Offline user analysis tools

- Staged roll-out for each mode
- Align with hardware roll-out timelines
- Design readiness and mode complexity
- Core infrastructure and natural upgrades
- Balance KSP priorities
- Maximize early science



Phase 0

Specification: interfaces, data products, prototypes

Phase 1

Manual operation: basic data taking, science analysis using prototype pipelines

Phase 2

Offline operation: automated operation, science pipelines running on LOFAR post-processing cluster

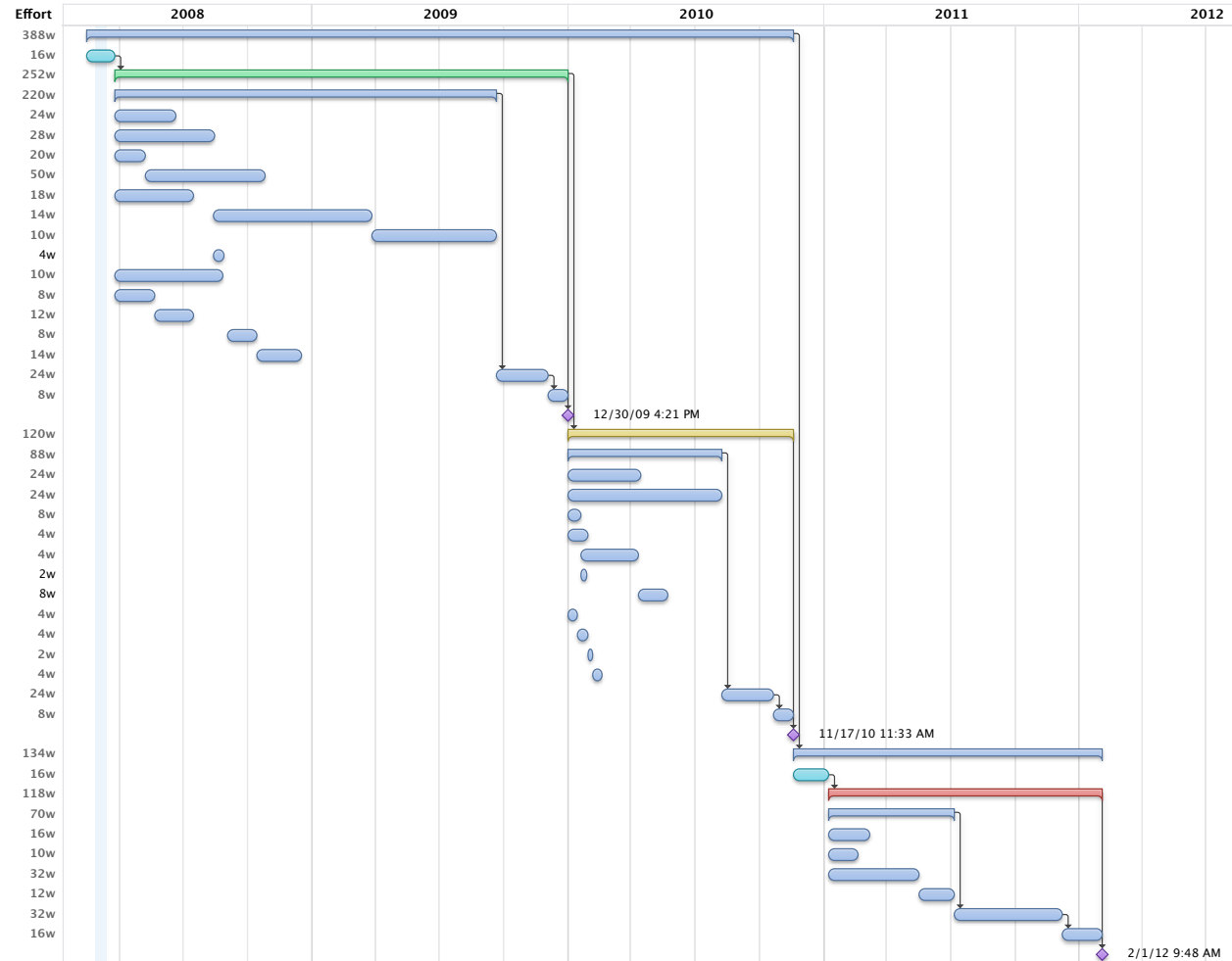
Phase 3

Online operation: automated operation, science pipelines processing streaming data on BG/L



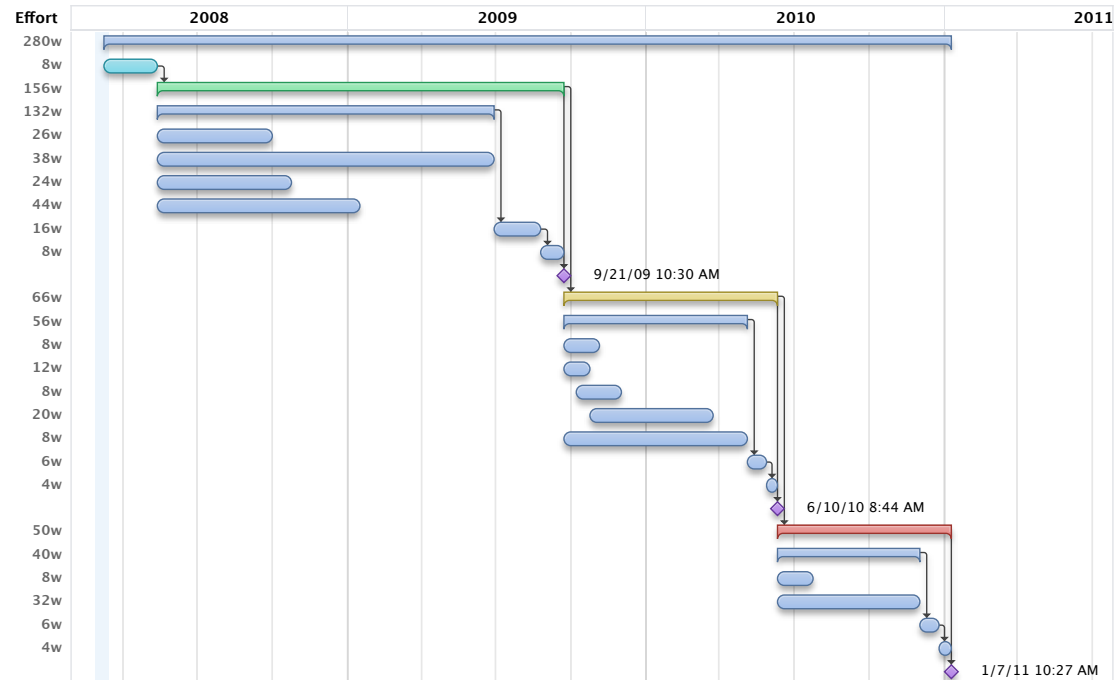
Task

- 1) Standard Imaging
 - 1.1) Planning
 - 1.2) Phase 1
 - 1.2.1) Development
 - 1.2.1.1) MAC/SAS
 - 1.2.1.2) OLAP
 - 1.2.1.3) Data and metadata products
 - 1.2.1.4) BBS
 - 1.2.1.5) Ionospheric Models
 - 1.2.1.6) Sky Models
 - 1.2.1.7) BBI
 - 1.2.1.8) Pipeline interface development
 - 1.2.1.9) Offline Flagger
 - 1.2.1.10) Quality Control
 - 1.2.1.11) Source detection and extraction
 - 1.2.1.12) Source list cross-checks
 - 1.2.1.13) Mosaicing
 - 1.2.2) Testing
 - 1.2.3) Support Activities
 - 1.3) Phase 1 Complete
 - 1.4) Phase 2
 - 1.4.1) Development
 - 1.4.1.1) MAC/SAS
 - 1.4.1.2) OLAP
 - 1.4.1.3) BBS
 - 1.4.1.4) Ionospheric Models
 - 1.4.1.5) BBI
 - 1.4.1.6) Pipeline interface development
 - 1.4.1.7) Visualization of calibration solutions
 - 1.4.1.8) Quality Control
 - 1.4.1.9) Source detection and extraction
 - 1.4.1.10) Source list cross-checks
 - 1.4.1.11) Mosaicing
 - 1.4.2) Testing
 - 1.4.3) Support Activities
 - 1.5) Phase 2 Complete
- 2) Real-time Calibration
 - 2.1) Phase 0
 - 2.2) Phase 3
 - 2.2.1) Development
 - 2.2.1.1) MAC/SAS Development
 - 2.2.1.2) OLAP Development
 - 2.2.1.3) BBS Development
 - 2.2.1.4) Real-time Calibration Database
 - 2.2.2) Testing
 - 2.2.3) Support Activities
 - 2.3) Phase 3 Complete



Standard Imaging

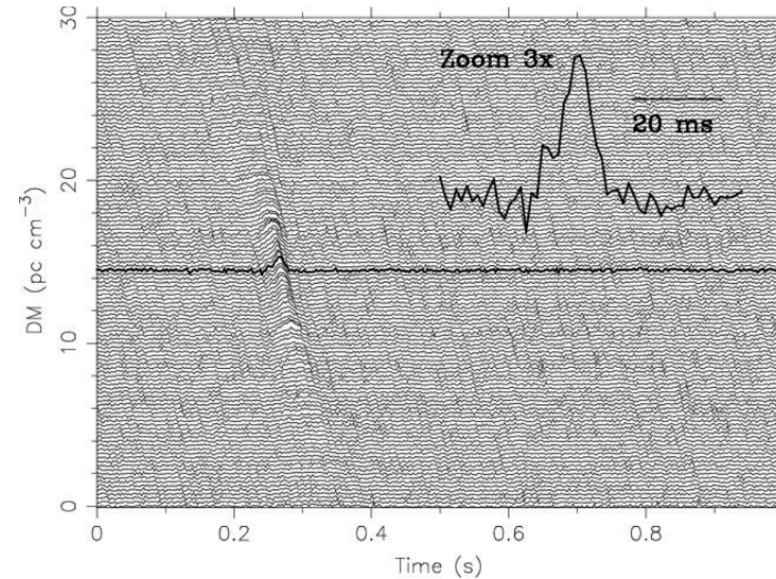
- Task
- 1) Known Pulsars
 - 1.1) Phase 0
 - 1.2) Phase 1
 - 1.2.1) Development
 - 1.2.1.1) MAC/SAS
 - 1.2.1.2) OLAP
 - 1.2.1.3) Data and metadata products
 - 1.2.1.4) Post Processing
 - 1.2.2) Testing
 - 1.2.3) Support Activities
 - 1.3) Phase 1 Complete
 - 1.4) Phase 2
 - 1.4.1) Development
 - 1.4.1.1) MAC/SAS
 - 1.4.1.2) OLAP
 - 1.4.1.3) Data and metadata products
 - 1.4.1.4) Post Processing
 - 1.4.1.5) Ephemeris Database
 - 1.4.2) Testing
 - 1.4.3) Support Activities
 - 1.5) Phase 2 Complete
 - 1.6) Phase 3
 - 1.6.1) Development
 - 1.6.1.1) MAC/SAS
 - 1.6.1.2) OLAP
 - 1.6.2) Testing
 - 1.6.3) Support Activities
 - 1.7) Phase 3 Complete



Known Pulsars

For today

- Focus on standard imaging
- Focus on technical issues
- Identify critical items
- Look for useful overlaps



Coming soon

- | | |
|---------|--|
| Apr 08 | Tied-array and non-imaging modes |
| Jun 08 | Long baselines and enhanced imaging |
| Sept 08 | Astrophysics with E-LOFAR workshop |
| Dec 08 | 7 Remote stations + superstation ready |
| Feb 09 | 20 NL + 3-4 EU stations online |

