

# Meetings :: KSP Synergy meeting (25 May 2007, Amsterdam)

<b>Date</b>	25 May 2007
<b>Location</b>	Amsterdam
<b>Participants</b>	C. Vogt, I. Snellen, Peter Barthel, A. Horneffer, B. Stappers, R. Fender, G. de Bruyn, L. Koopmans, H. Rottgering, L. Baehren, R. Wijers

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## Invitation

As Friday and thus, our meeting on KSP (observation) synergies draws closer, it is time to think about preparing a bit for the meeting. The meeting will be held on Friday, May 25, starting at 11am - 3pm in Amsterdam (Pannekoek kamer at the Pannekoek Instituut/UvA)

The main aim of this meeting is to identify where and when observation and (re-)processing time can be shared and/or optimised between the KSPs. A secondary goal would be to flag further synergies which should be discussed at a later meeting.

In order to achieve this, a little preparation from all of us might be necessary. I attach to this email a document which Michiel van Haarlem drafted a year ago concerning observation requests from each of the KSPs. It would be great if each KSP could check the numbers and update the document if necessary by Wednesday night and send their updates to me for further distribution. These summaries should contain the following points:

- Where on the sky
- What resolution (baselines)
- What frequencies, bandwidth and spectral resolution
- How long/deep individual observations and total observation time
- Scheduling constraints
- What processing steps are envisaged/final data products
- Calibration requirements (if any thoughts exist already)

## Agenda

<b>11.00</b>	Welcome + Intro (Wijers & Vogt)
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Setting the scene: Short presentations by the KSP concerning their observation proposal (detailing the points above)

<b>11.10</b>	EoR - de Bruyn
<b>11.20</b>	TKP - Fender

<b>11.30</b>	CR - Bühren
<b>11.40</b>	Survey - Röttgering
<b>11.50</b>	Discussion: Identify possible synergies
<b>12.30</b>	lunch
<b>13.30</b>	Discussion: Feasibility of identified synergies
<b>14.15</b>	Discussion: Where to go from here? - Realistic observation schedule
<b>14.30</b>	Discussion: Flag further synergies between KSP's (and foreign KSP's) to be explored at follow-up meetings
<b>15.00</b>	End of Meeting

## Notes from the presentations

### Introduction (Corina)

- goals of the meeting:
  - find synergies: primarily for observations
    - in the test phase
    - in the final production phase
  - why necessary to talk about:
    - total requested observation time adds up to unreasonable numbers
    - no need to reinvent the wheel
- software synergies to be coordinated via Michael
- switching of observation data (esp. with international partners); current existing plan is relative, but it is not clear where the absolute reference point is
- reminder of the requested details
  - spectral resolution: there is a difference between what is happening in BG/L and what ends up in the data product
- time table for meeting
  - setting the scene for the KSPs
  - identify a list of possible synergies
  - feasibility of synergies
  - where to go from here

### Epoch of Reionization (Ger)

- EoR Observing Plan
- definition of 3 subprojects
  1. A shallow survey of the Galactic halo:
    - claimed as minimum scientific output for the KSP → this is disputed, since this interferes with the goals of the other KSPs
    - at least 10 core + all available outer stations
    - 32 MHz bandwidth at CEP and 8 beams
    - 900 hrs for shallow survey
    - NCP observations using 10 beams times 3 settings times 3 hours at 96 MHz coverage
  2. a single beam survey of 3-5 EoR windows
  3. a deep multi-beam survey of 3-5 EoR windows

- selection of frequency bands and times should be worked out by the individual KSPs, using data available from CS-1
- hour angle - elevation plan plot for identifying observing windows (e.g. taking into account the minimum integration time)
- selection for low (polarized) galactic foreground

## Transients (Rob)

- radio sky monitor mode
  - zenith scanning
    - pointing: 8 locations at  $\langle m \rangle_{\Delta} = 53$  deg spaced by 3h in RA
    - baselines: core only
    - frequency: 30/120 MHz
    - bandwidth: 1 MHz, increasing to 32 MHz when possible
    - depth: 3h scans of 320 sec cycle (160 sec per frequency)
    - synergies: generated maps might be of use for other KSPs
  - galactic plane scanning
    - 4 locations in the plane
- targetted observations
  - Planets
  - Flare stars
- trigger response mode
- Piggybacking
  - explore possibilities to increase scanned parameter space
  - should be possible with most modes
- Pulsar All Sky Survey

## Cosmic Rays (Lars)

- alternative arrangement for usage of core @ UHEP

## Surveys

- Outcome of LC meeting (07/03/2007)
  - investigate a 10 SQR degree region deeper than proposed
  - half the sensitivity of the 120 MHz survey, but compliment the 200 MHz survey with a 120 MHz of original depth
  - Commissioning surveys / Local Sky Model
    - testing of calibration procedures
    - nice low frequency compliment of NVSS
- baselines: long
- frequency settings:
  - flexible
  - bandwidth  $\leftrightarrow$  integration time
  - spectral resolution: 10 khz over 4 MHz band
- Depth: flexible, but aim is Nx5 hours
- scheduling constraints: flexible, but ionospheric conditions such that reduced maps with PSF < 1.2 synthesized beam

- calibration: close to thermal noise
- data products: source catalog
- synergies: EoR and Transients
  
- Which surveys first: shallow survey from top-down in frequency
- List of northern fields: overlap with Transients observing regions? not yet checked
- long baselines for EoR? → up to 20-30 km, depending on possibility to do proper calibration (tomographic imaging of the ionosphere volume through which the observation is done), also to do subtraction of foreground sources

## Notes from the discussion(s)

Will the scheduling software be able to consider overlap in the submitted observations or is this something which needs to be done by the observers themselves? Some scheduling software is able to do this. Questions is however how the observation parameters need to be defined/provided to enable automatic combination.

Roll-out plans:

- 15 + 5 stations to be available by summer 2008
- distance to remote stations between 2-30 km

Coordination of the various observations and their execution strongly depends on the available infrastructure (including software); some of the required pieces can be identified based on the worked out processing pipelines. Relevant is also the development plan from the side of the project (station roll-out, central software capabilities).

Testing vs. science:

- Some KSPs already might get some initial science out of the commissioning work, whereas for other KSPs there is a rather clear separation between commissioning/testing and science operation.
- What about encountered results: are they about to be published and if so who should be credited?
- Should it be responsibility of the project to clearly draw a line between commissioning work and preparatory science of the individual KSPs?
- Need for discussion later on: who owns the science? → this is e.g. the above issue concerning certain types of surveys.
- also with commissioning there is the competition between e.g. general software development and dedicated pipeline development
- Discussion on publication rights and arrangements to be held in ARC, preferably until end of the summer (otherwise there will be considerable problems to get everyone together); it is not considered too likely that substantial science will come out of CS-1 – with the 15+5 setup in 2008 chances for serious observing are considerable
- keep in mind the timelines set by the available funding
- is there the need for some sort of accounting system
- suggestion to request from the KSPs an observation plan for 2008, which should be handed in until November 2007 (to be decided upon by the ARC by December)

What about coordination of requirements and priorities? To some degree an overview has been

compiled with the SEG and the USG, based on the available input from the KSPs.

- How to prioritize software development?
- Design of the post-processing cluster?

Possibility of sub-stations, to combine LBA and HBA observation? This might introduce additional flexibility in combining observations or have observations taking data in parallel in both frequency ranges.

Feedback from DCLA review:

- further identify synergies
- coordinate timelines

Not yet considered: international KSPs and their contribution/requirements.

## List of identified synergies

Start with synergies in final LOFAR: brief document discussion suggested synergies, including

- scheduling (common fields, bandwidth usage, etc.)
- required software (user software, central processing)
- compute power
- equal partner relationships
- main/minor relationships of observations

## Synergy areas in combination of observations

1. Targeted observations of known transient sources/pulsars in Survey fields [Ben]
2. Targeted observations of known transient sources/pulsars in EoR fields [Ben, Ger]
3. Pulsar surveys in EoR fields [Ben, Ger]
4. Pulsar surveys in Survey fields [Ben]
5. RSM fields & Deep Surveys → technical requirement: parallel handling of long and short baselines [Rob]
6. CR with Surveys LBA observations [Andreas, Huub]
7. CR with Transients LBA observations [Andreas, Ralph]
8. Galactic foreground for EoR from Surveys (30 MHz) and Transients (120 MHz) [Leon, Peter, Rob]
9. Nearby galactic and extragalactic Pulsars in Survey fields [Ben, Rafaella]

Persons listed in brackets [] are to provide names of the persons to actually take up the task to work out the synergies; information should be provided within 1 week notice.

## Synergy areas in processing

- Tied-array clock precision (on-line calibration) [Ben, Andreas]
- De-Dispersion module (CR/Pulsars) [Andreas]
- Databases: design & architecture [Lars, Bart, Vriend]
  - storage of event parameters
  - external databases to be queried by pipelines

- Polarization calibration [Ger]
- source finding and characterization [Huub] → some of this is computing infrastructure to be provided via USG
- Image differencing (Transients, Surveys, EoR) [Rob → James]
- Mosaicing aspects [Huub]

## Timeline

- **Aug 15**
  - 1-2 page reports on synergies for final LOFAR
- **Sep 01**
  - discuss and finalize the reports
  - ARC to discuss 2008 science verification policy and commissioning/science partition
- **Oct 01**
  - All KSPs (and international partners) submit proposals for early science/science verification
- **Nov 01**
  - Decision by body X on
    - 2008 time allocation
    - data/publication rights on 2008 timeline

## Action items

Item	Description	Responsible
01	Assign people to work out synergy areas in combination of observations	participants listed in brackets above
02	Assign people to work out synergy areas in processing	participants listed in brackets above

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Last update: **2011-10-19 11:31**

