

## Minutes of Meeting LOFAR Software

<b>Date:</b>	20070904
<b>Next meeting:</b>	20070911 11:00-12:00
	Paviljoen West Room
<b>Present:</b>	
Andre Gunst	Yes
Ronald Nijboer	No
Ruud Overeem	Yes
John Romein	Yes
Michael Wise	Yes

cc: Arthur Coolen, Jurjen Sluman, Pieter Donker, Chris Broekema, Martin Gels, Joris v. Zwieten, Marcel Loose, Adriaan Renting, Ger van Diepen, Max Avruch, Peter Boonstoppel, Michiel v. Haarlem, Jan Reitsma, Ger de Bruyn, Arno Schoenmaker, Hanno Holties, Corina Vogt, Jan Noordam, Joe Masters, Lars Bühren, Dion Kant

### **Remarks previous minutes**

- RUP should be spelled as RUB

### **Announcements**

- From this week on a descope discussion is started.
- Hardware procurement for the first 20 stations is planned in October
- CS1 data is moved to GRID based facilities
- The Oort room will be the new WSRT/LOFAR operations room
- A GRID meeting will take place at 24/25 September in Utrecht and a big GRID event is planned at 17 September.
- A new employee is working for AstroStream.

### **Action item overview**

ID	Date submitted	Description	Owner	Planned date	Status
38	20070704	Investigate if the OS of the input nodes can be lined up with the BG/L front node.	John/Chris	20070917	Open
40	20070710	Define stappen plan for the pulsar mode.	Michael	20070917	Open
41	20070710	Installation of CASA core tools on build environment.	Ruud	20070910	Open
42	20070828	Obtain higher level trigger algorithms from the cosmic ray KSP.	Michael	2007	

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### **Progress**

#### **Stations (André):**

Since no extra functionality is needed for Step 2, this step mainly comprises enhancing robustness. Current status:

Achieved since last meeting:

- An alternative HBA switch is chosen and ordered
- The HBA boards which should be reworked are removed from the field

Problems / current activities:

- The search to a replacement for the switches is ongoing. A couple of switches passes the humidity tests. However the amount of rework is significant. This week switches will arrive which can be integrated on the Front End units with less rework.
- Step 3: The control of the HBA beamforming and validation is ongoing.

Next actions:

- Step 2: Solve problems.

### **OLAP (John):**

Activities for Step 2 comprise integration with MAC (ongoing) and adding the ability to measure with higher bandwidth (done).

Achieved since last meeting:

- A paper about the ZOID communication software is submitted.
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Problems / current activities:

- Step 2: Integration MAC / OLAP is continuing (Martin). The remaining task is to solve bugs which pop up during testing.
- John inventoried the impact of going to multiple beams. That will have a severe impact on the current software if multiple beams are included in one and the same UDP packet. Currently four RSP boards send out data (of the current 4 uStations). The workaround is to define each beam in such a way that it comes from one RSP board. In this way maximal 4 beams can be made instead of the required 8.
- John is busy to integrate the input section functionality on BG/L. The remaining tasks is to get the kernel 100% stable and test for scalability. To do so it would help that the 12 microstations of CS010 have the same bandwidth as the current 4 microstations of CS010.
- Chris is clarifying why the storage section is currently working slow. This was done to get the specifications clear for the new storage nodes.
- Currently a lot of things in OLAP needs to be a multiple of other things. This should be made more flexible.
- Step 3: When one station stops sending data, OLAP gets confused (Chris).
- Step 4: John looked in the solution for multiple beams and multiple parallel observations. Enabling this is major change.
- Step 5: Peter is busy with making the 2<sup>nd</sup> core available in the ZOID communication software, so that the input bandwidth can be increased even more.

- Post CS1: In a plot of RMS against frequency, one of the subbands shows a periodic variation. It is unknown what causes this, and this has to be investigated / solved.
- Post CS1: Stopping an observation sometimes had a corrupt Measurement Set as a result. A workaround has been implemented, but a structural solution has to be realized. This has to be solved in the architecture of CEP-frame. If the current workaround is stable, this issue can be solved after Step 5 (=CS1).
- Post CS1: The CEPFrame framework is very developer unfriendly, and has some technical limitations. A work item to refactor CEPFrame will be added to the Work Breakdown as a mid term activity.

Next actions:

- Step 2: Solve problems that are related to Step 2.

### **Offline pipeline (Ronald):**

Activities for Step 2 are finished.

Achieved since last meeting:

- Joris implemented the analytical beam model of Sarod in BBS
- Joris and Pandey are busy to make deeper images with the BBS pipeline

Problems / current activities:

- Adriaan has written a flagging library. This will probably be tested by Hanno Spreuw.
- Stefan de Koning has made a flagging Python script based on median clipping which seems to work satisfying. This script will be translated to C++ by Adriaan.
- Data reduction tools are needed and gets a higher priority driven by the needs of BBS. Adriaan has finished working on combining multiple Measurement Sets and reducing the data of the Measurement Sets by integration. The MSs seems ok, but the AIPS++ table browser cannot deal with them. Sarod was able to deliver this functionality with Glish. Ger v. D. will be asked to port this to C++.

Next actions:

- Continue with step 3 activities.

### **SAS + MAC + SHM (Ruud):**

Activities for Step 2 are ongoing. Integration with OLAP and adding functionality to SAS + MAC + Navigator to control OLAP, are the main activities.

Achieved since last meeting:

- The ACC layer is modified. With this modification, stopping OLAP is no longer an issue.
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Problems / current activities:

- Step 2: Integration with OLAP / ACC is ongoing (Ruud).

- Max looks at all the collected station data and tries to find characteristics of the data for SHM analysis.
- This week the stations will be upgraded by Arthur and Ruud with the released PVSS environment which is compatible with the software written to replace the property agent.
- ACC software needs to be rewritten slightly.

Next actions:

- Solve the problems related with Step 3.

## **User Software (Michael):**

Achieved since last meeting:

- The data access layer, CASA core tools and a couple of Python scripts are merged in one package. Due to a few build problems with some Python bindings the package is not completely operational yet.

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Problems / current activities:

- Joe will take care of the software to read the TBB data (necessary for Step 3)
- Together with Ben and Jason a first specification has been made of the tied array beamformer output format in such a way that a convenient connection can be made with the pulsar software.
- Post CS1: Joe Masters is busy with handling the streaming data coming out of the correlator and writing this into HDF5 format or Measurement Sets. The first library is done and needs to be tested (cannot read from the socket yet).

Next actions:

- Solve the problems that are related with the Step 3 activities.

## ***Software integration***

Achieved since last meeting:

- Meeting with transients was held 24 August 2007.

Problems / current activities:

- Marcel is almost done with the conversion to Subversion. The only remainder is the RUB tool which is partly rewritten for Subversion. This is currently under test.
- Based on the meetings with the various KSPs, the software plan will be updated.

Next actions:

- Step 2+: A test program will be initiated to verify the functioning of the LOFAR software in a more structured way. In OLAP it is possible to store the raw station data and feed this into the pipeline later on. This makes it possible to define a standard data set, which can be applied to the pipeline as soon as major software changes have been taken place.

## Decisions

ID	Date submitted	Decision
02	20061220	Every Step will start with a Kick-off meeting, in which the complete software team participates.
<del>03</del>	<del>20061220</del>	<del>The project team starts immediately with the preparations of the next CDR in order to preserve progress of the CS1 realization</del>
04	20070116	This meeting will take place every week on Tuesday 11:00. The existing software team meeting with all developers will stop to exist.
05	20070130	Step 1 will be changed to 16 subbands instead of 32 subbands.
06	20070130	Step 2 will contain a multiple node BBS. 6 $\mu$ Stations/Station will be postponed. Instead of this, 32 subbands measurements will be realized.
07	20070206	Step 1 will support 160 MHz observations. The other steps will support 200 MHz as well.
08	20070424	Step 2 will support 16 subbands @ 200MHz and 24 MHz at 160 MHz
09	20070424	During the rest of step two, OLAP will only support observations during the weekend.
10	20070522	The number of subbands per Measurement Set is set to 6 or 8 default.
11	20070522	Scheduler activities will be preferably activated in Q4 2007.
12	20070522	Procure, three Local Control Units to accommodate 12 microstations in CS010 in a quick way.
13	20070529	Integrate version numbers in all software.
14	20070529	Distinguish the software between a production version and an engineering version (partly now already the case).
15	20070605	All developed software under CVS will be transferred to Subversion. The main reason for this is that Subversion supports the integration of version numbers in the executables. In this way you can always retrieve which software is used for a certain build. First the impact of the transfer will be investigated by Marcel.
16	20070619	Marcel Loose will be the librarian of the LOFAR software. The available time for this will be shared with his BBS work.
17	20070710	The known pulsar survey mode will be the next mode to support (not in its full extent but partly on-line and off-line).
18	20070710	The temporarily off-line part of the known pulsar mode pipeline will not be under control of SAS/MAC. This will be put under control of SAS/MAC as soon as that software is available in the on-line part of the system.
19	20070814	Joe Masters makes the routine to read in the TBB data.

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## Table round

- Next week John is not able to meet.