POLICIES FOR THE LOFAR SURVEYS KEY PROJECT

Draft 3.0 GKM December 2008

1. PREAMBLE

1.1 LOFAR Surveys. LOFAR, the Low Frequency Array, is a next-generation radio telescope that will operate at frequencies from ~15 to ~240 MHz. Its unprecedented sensitivity, high angular resolution, large field of view and flexible spectroscopic capabilities will result in a dramatic improvement over previous facilities at these wavelengths.

An important goal that has driven the development of LOFAR since its inception is to explore the low-frequency radio sky by means of a series of unique surveys. Low-frequency radio telescopes are ideally suited for carrying out large-sky surveys, because of their large instantaneous fields of view and the all-sky nature of their calibration. The LOFAR Surveys Key Programme (LSKP) is one of several LOFAR Key Programmes that are defined as prime scientific goals for the LOFAR facility and prime drivers for its technical development.

1.2 A LOFAR Survey Key Program Team (LSKPT) has been set up to plan, conduct and exploit the LOFAR surveys. The tasks of this team will include:

1. Definition and prioritizing of the surveys with the aim of maximizing scientific return,
2. Development of tools for the analysis and reduction of the data to ensure optimum and easy scientific usage,
3. Processing of the data so that it is in publishable form
4. Initial scientific analysis of the survey results
5. Optimisation of the synergy between the LOFAR surveys and complementary surveys throughout the electromagnetic spectrum,
6. Carrying out initial follow-up observations based on the surveys.

The top priority of the LSKPT will be to ensure that the scientific integrity of the primary surveys is the highest possible: calibrations must be extensive and trustworthy. Moreover, the intent is that the suite of surveys be well enough designed and the data of sufficient quality so that it will have a long and productive lifetime.

1.3. Proprietary Data. The survey data will be generally released for public use after a proprietary period of 12 months after the data has been received in a calibrated and analysable form. Membership of the LSKPT will ensure early privileged access to the data. The proprietary rights of the LSKPT are granted as a result of contribution to LOFAR or the SKP. The contribution can be in the form of work in developing the project, association with a country or institute that provides funding for LOFAR, the addition of relevant scientific or technical expertise or other reasons.

2. MANAGEMENT STRUCTURE

The LOFAR Survey Science Team will consist of a core team and associated members who form scientific and technical Science Groups.
2.1. Core Team (CPs). Ultimate responsibility for all aspects of the LKPS rests with the Core Team (CT). The core team is the executive body of the LSKPT. Admission of all participants into the Team must be approved by the LSKPCT. The PI of the LSKP is also Chairperson of the Core Team. The CT meets about every three months, with additional telecons at appropriate intervals.

The core team will monitor the Science Groups (Section 2.2) and has the final responsibility for the survey design, data taking, reduction, production and dissemination of the source lists and ensuring that the data are published. An additional task of the core team will be to promote scientific usage of the surveys in a collaborative way. The current composition of the Core Team is listed in Table 1.

2.2 Science Groups (SGs) The SGs of the LSKP appointed by the Core Team will address specific scientific topics of the LSKP. A list of present SG topics is given in Appendix A. The function of these groups is to consider the complete flow of the data relevant to each SG including (i) relevant observational and theoretical preparation, (ii) survey planning, calibration and analysis, (iii) securing followup observations, and (iv) publication. The SGs will monitor scheduling, calibration, commissioning, analysis software, reduction relevant to their science or technical topics. A representative of each SG will be appointed to liaise with the Core Team. New SGs may be formed and existing SGs may be disbanded by the submission of a written plan to the PI. It is desirable that at least one member of the Core Team be associated with each SG. Some SGs can be multi-KP, containing members from the survey KPT and members from other KPTs, e.g. Transients, Cosmic Magnetism and Epoch of Reionization. Although each scientific topic will require individual planning, it may be desirable to form working groups of more than one science group for scientific technical or administrative reasons.

The SGs will meet regularly (if desirable via telecon) to monitor the impact of the results of commissioning on their respective projects and make detailed plans for follow up. The core team members of the sub-group will ensure that synergies between specific science followup activities needed for more than one scientific topic are exploited. The Core Team will organise plenary meetings of the whole science team at least once per year.

2.3. Composition and Balance. The composition of the Core Team and the leadership and composition of the Science Groups should broadly reflect the relative contributions in funding of a country to LOFAR or the SKP, balanced by the participation in other KPs. The need to optimise the scientific success of the project will be taken into account, when interpreting this guideline. A list of present members of the Core Team is given in Appendix B.

3. MEMBERSHIP;

To reflect the various scientific and technical contributions made to the LSKP, to ensure that sufficient return is given to these contributions and to optimise the scientific exploitation of the surveys, several categories of membership are envisaged, in addition to membership of the Core Team. These are:

3.1. Scientific Member. A member of the LSKPT will be appointed to one or more specific working group by the participating national LOFAR consortia. She/he will have access to the proprietary survey data in the scientific area of the SG and in collaboration with members of the
SG. Scientific members can be granted membership or provisional membership of the LSKPT by the Core Team.

3.2 Technical Member. Technical membership of the LSKP will be granted by the LSKPT in recognition of a substantial technical contribution to the development or implementation of the surveys. Technical membership will allow association of the members with specific SGs and recognition of the contribution as author of relevant science papers. The Core Team will ensure that the distribution of authors on survey papers reflects contributions by technical members, if necessary by requesting that authors from outside the SG are added to specific SG papers.

3.3. PhD and Postdoc Member. The participation of PhD students is of particular importance for the optimum scientific exploitation of the surveys. However, for PhD students there is particular need to protect the student in ensuring that she/he will be in a position to write first-author papers that can form parts of a thesis. Every PhD member must be associated with a scientific or technical member of the LSKPT. Before admitting a PhD student or postdoc to a particular SG, a written proposal should be made to the Chair of the SG, with a thesis plan, outlining how the research will fit in with those of others in the SG. Copies of the proposals should be sent to all members of the SG and members of the Core team. Any disputes will be settled by the Core team.

3.4. Collaborative Member. A SG may decide to collaborate with scientists external to the Team to accomplish some of the scientific goals of the SG. Collaborative members can include scientists with access to complementary telescopes or other facilities that are important for achieving the scientific goals of the surveys. Examples of collaborative tasks include followup observations of subsamples of the survey data and theoretical interpretation such as modeling. The collaborators will be admitted as collaborative members of the LSKPT for the relevant aspect of the data. Such collaborations and the admission of collaborative members must be agreed by all members of a SG. In addition, such collaborations must be approved by the Core Team, to ensure that they do not interfere with work by other SGs.

3.5. Provisional Membership. Provisional membership of the LSKPT or LSKPCT can be granted in anticipation of an agreement being signed between a specific country or institute and the LOFAR Project. If this agreement is not completed, provisional membership may be discontinued.

A list of current members of the LSKPT, with their status, is listed in Table 1. Any additional applications for team membership should be made in writing to the Chair of the Core Team, with appropriate justification and specifying the science topics and expected contributions.

4. STAGES IN SURVEYS ACQUISITION

It is intended that main KP surveys will commence after Phase 1 of the Netherlands LOFAR project has been completed and the facility has been commissioned. However, a suite of commissioning surveys will be an inevitable part of the commissioning process, in order to optimise the calibration and operating modes and investigate the effects of RFI and ionosphere on the data quality. The rules governing possible scientific exploitation of the commissioning surveys are the same as for the main surveys.
The primary LSKP is expected to take five years to complete, after a suitable commissioning phase and, with the addition of further elements in Europe, it is likely that the main surveys will motivate new surveys at higher resolution or better calibration.

5. PUBLICATION POLICIES

5.1. Initiation of research. Members of the LSKPT must notify the relevant SG and the Core Team on the initiation of any scientific project utilizing primary survey data that is expected ultimately to result in a publication.

5.2. Notice of publication or proposal. At least one month before submission of any manuscript for publication which utilizes core survey data, the submission plan must be publicized to all team members. By "publication", is signified submission either to a scientific journal or to any other public forum. A similar rule applies to submission of a proposal for followup resources (e.g. telescope time).

5.3. Authorship Composition. Any team member at any stage, of a research project may request that her/his name be added to the list of authors, with the presumption that permission will be granted if the team member has contributed significantly to the project or to the LSKP infrastructure. The Core Team may stipulate that a technical member of the team be added to the list of authors.

5.4. Authorship Order. The initiator of a paper will decide initially on the authorship order. A multi-tier approach is recommended in establishing the order of authorship. For example, the first tier would include those that have made the most substantial contributions to the paper and those that have made the LOFAR SKP possible. The second tier could include other members of the science team, in alphabetical order. Co-authors that are dissatisfied with the order of their authorship should inform the initiator of the paper.

5.5. Resolution of disputes. A representative of the Core Team will mediate in case of disputes about authorship. A dispute will ultimately be resolved by majority vote of the Core Team.

5.6. Sanctions
5.6.1. If a paper using the proprietary data is submitted without due notice or against the advice of the Core team, the CP may ask the submitters to withdraw the paper or inform the editor of the relevant journal and request that the paper be withheld.

5.6.2. The Core Team may decide to delay the submission of a manuscript that is judged not to be ready for publication for technical, scientific or other reasons.

5.6.3. Any Team Member who submits for publication results based on proprietary survey data without notifying colleague Team Members and the Core Team or who violates other regulations of the LSKP may be barred from further access to the Survey data by the CT.

5.7. Collaborations with non-Team members. Prior to the public release of the data archive or the publication of the relevant portions thereof, non-team members may request to conduct research with, or otherwise make use of, limited portions of survey data, in collaboration with team members. Such a request will be distributed to the whole team and adjudicated on by the
Core Team. The collaborating team member will be responsible for protecting the scientific integrity of the LSKP and the data rights of other team members.

6. FURTHER GUIDELINES

The LSKPT may develop more detailed guidelines concerning the above, as they deem appropriate. A copy of these guidelines would be available from the Chair of the LSKPT and should be read and agreed to by each team member.

APPENDIX A. PRESENT TOPICS FOR SCIENCE GROUPS

The SGs comprise members of the LSKPT working on various scientific areas connected with the LOFAR surveys. SG topics as of December 2008 comprise:

(i) *Topics devoted to aspects of the main drivers for the surveys:*

A1. The highest redshift radio sources  
A2. Clusters and cluster halo sources  
A3. Star forming galaxies at moderate and high redshifts  
A4. AGN at moderate redshift

(ii) *Other topics that the surveys can address*

B1. Detailed studies of low-redshift AGN:  
B2. Nearby galaxies  
B3. Gravitational lensing  
B5. Large-scale cosmological effects and baryonic oscillations.

(iii) *Trans-KP topics:*

C1. Variability of radio sources (a joint SG together with the Transient Key Project)  
C2. Magnetic fields in clusters (a joint SG together with the Cosmic Magnetism Key Project)

(iv) *Technical topics:*

D1. Technical and scientific issues in carrying out surveys with LOFAR on > 100km baselines

APPENDIX B. PRESENT COMPOSITION OF CORE TEAM

<table>
<thead>
<tr>
<th>Name</th>
<th>SGs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peter Barthel (NL)</td>
<td>A2,A4,B1</td>
</tr>
<tr>
<td>Philip Best (UK)</td>
<td>A1,A2,A4(Chair),B1</td>
</tr>
<tr>
<td>Gianfranco Brunetti</td>
<td>A3</td>
</tr>
<tr>
<td>Marcus Bruggen (Germany)</td>
<td>A3(co-Chair)</td>
</tr>
<tr>
<td>Krzysztof Chyzy (Poland)</td>
<td>A1</td>
</tr>
<tr>
<td>Matt Jarvis (UK)</td>
<td>A1, A2,A4,B4</td>
</tr>
<tr>
<td>Matt Lehnert (France)</td>
<td>A2(Chair)</td>
</tr>
<tr>
<td>George Miley (NL)</td>
<td>A1(Chair), A3,A4,B1,B4</td>
</tr>
<tr>
<td>Rafaella Morganti (NL)</td>
<td>B1 (Chair)</td>
</tr>
<tr>
<td>Huub Röttgering (NL)</td>
<td>A1,A2,A3,A4</td>
</tr>
<tr>
<td>Ignas Snellen (NL)</td>
<td>A4,B1</td>
</tr>
</tbody>
</table>

1 Prior to ratification of agreement between LOFAR Project and the respective national partners.