**Introduction/Preamble**

National Meteorological Services (NMS’s) are required to provide short and medium range weather forecasts, warnings and alerts for their territory. Short range weather forecasts are made by means of numerical weather prediction (NWP) systems using a Limited Area Model (LAM). As the expertise and efforts required to develop and maintain a state-of-the-art LAM model for NWP are generally too extensive to be borne by a single weather service, the operational short-range LAM models in Europe are mostly being developed by consortia of collaborating NMS’s. HIRLAM (High Resolution Limited Area Model) was the first of these consortia on limited area modelling in Europe, established in 1985 in the Nordic countries and later extended with other members.

HIRLAM’s prime long-term goal is to provide its members with a state-of-the-art operational short and very short range numerical weather prediction system, and the expertise associated with it. The main application for the NWP system is the production of operational weather forecasts for the member services, with particular emphasis on the detection and forecasting of severe weather and services related to public safety. In the member services, the modelling system generally forms the basis of a wide range of national operational applications, such as aviation meteorology, road conditions predictions, oceanographic, wave and storm surge forecasting, and hydrological forecasting. Further applications involve e.g. regional climate modelling, air quality prediction, dispersion modelling and use of the model as a tool for atmospheric research.

In 2005, the strategic decision was made for HIRLAM to engage in a close code cooperation with the ALADIN consortium. The aim of this research collaboration is to develop and maintain a common, state-of-the-art mesoscale LAM model code for short-range numerical weather prediction, within the code framework of the ECMWF/Arpege Integrated Forecasting System (IFS). This common mesoscale analysis and forecasting system, which within HIRLAM is called HARMONIE, is intended to eventually replace the HIRLAM model in all of its applications. The terms of the HIRLAM-ALADIN collaboration have been formalized.
in the HIRLAM-ALADIN Collaboration Agreement, which is provided as a separate document.

The HIRLAM-ALADIN collaboration will be continued in the HIRLAM-C programme which is described in this MoU. In a Joint Declaration of the HIRLAM Council and the ALADIN General Assembly adopted in December 2014 (see Appendix 1 of Annex 1), the two consortia have agreed to work together with the aim of forming a single consortium at the latest by the end of 2020.

2. Definition of the HIRLAM-C programme

2.1 Definitions

The ALADIN-HIRLAM System, also called the NWP System, is defined as the complete code that is necessary for executing all configurations that are part of the agreed HIRLAM-ALADIN collaboration according to the HIRLAM-ALADIN Agreement. The ALADIN-HIRLAM System is composed of shared codes of four different types:

- the ALADIN Common Codes, defined as the codes jointly developed, maintained and owned by the ALADIN Consortium;
- the HIRLAM Common Codes, defined as the codes jointly developed, maintained and owned by the HIRLAM Consortium;
- the ALADIN-HIRLAM Common Codes, defined as the codes jointly developed and maintained by both consortia. A precise list of these codes will be set up and monitored during the lifetime of this MoU;
- other ALADIN-HIRLAM Codes that are either co-owned or owned by third parties and shared under relevant provisions of agreements concluded by either consortium or by Member(s) thereof with such third parties extending rights to both consortia.

A Configuration of the ALADIN-HIRLAM System is a subset of the ALADIN-HIRLAM Codes used by an ALADIN or HIRLAM Member or acceding Member for its own implementation. A Canonical Model Configuration (CMC) is a configuration of the ALADIN-HIRLAM System for which resources are provided by the ALADIN and/or HIRLAM members in order to perform regular code updates. This includes the required scientific and technical validation according to the state of the art of the latest research and development knowledge.

2.2 Scope and objectives of the HIRLAM-C programme

The primary purpose of the HIRLAM-C programme is to carry out research and development together with ALADIN partners in order to provide the members with a comprehensive mesoscale NWP system as the best suitable means of support for their operational short-range weather forecasting activities. Most of this work is carried out in close coordination with the ALADIN programme under well-aligned scientific and work plans.

There are many additional benefits that can be realised through application of the NWP system, or parts thereof, for purposes other than weather forecasting, in e.g. climate modelling.
activities, and modelling of other components of the Earth system (hydrosphere and biosphere). Such activities are important in their own right, but with limited resources being available, they will not be pursued within the scope of the HIRLAM-C programme.

In the context of the code cooperation with ALADIN, the HIRLAM consortium has committed itself to the following objectives which are shared with the ALADIN partners:

- Carry out joint research and development activities, on the basis of the ALADIN and HIRLAM strategic plans and related work plans, with the aim to provide a high quality operational short- and very-short-range (including nowcasting) deterministic and probabilistic analysis and forecasting code system, suitable for use on present high performance computing architectures.
- Carry out the necessary scientific and technical studies to define and maintain the ALADIN-HIRLAM System and its Canonical Model Configurations (CMC’s); the definition of the CMC’s will be monitored by the ALADIN and HIRLAM programme managers, the HIRLAM management group and the ALADIN CSSI.
- Contribute to the general maintenance of the codes necessary for the ALADIN-HIRLAM system (phasing under the coordination of Météo-France),
- Share scientific results, numerical codes, operational environments, related expertise and know-how.

In addition, the HIRLAM-C programme has the following objectives of its own:

- Ensure that the NWP system is optimally tailored for operational use as well as state-of-the-art and competitive, in a measurable way, with other modelling systems that could be available for production. In order to achieve this,
  - The NWP system shall be provided in the form of well-defined Reference systems for the HIRLAM and HARMONIE models, consisting of the shared NWP code, and of related configuration, submission monitoring and verification scripts, libraries and tools required for the use of the model in an operational NWP environment;
  - New versions of the HARMONIE Reference System and Canonical Model Configuration shall be provided by the programme only after comprehensive validation and quality control and benchmarking on several computer platforms, so that they satisfy user requirements in terms of technical and meteorological performance;
  - The Reference systems shall be run, routinely monitored and verified by the programme in a regular cycle (RCR) on one or more platforms and geographical domains;
- Explore options for further collaboration on operational activities and joint production in the main programme or in the form of optional projects.
- Provide and maintain a level of NWP expertise among the HIRLAM members, such that HIRLAM can be recognised as a centre of excellence in NWP in Europe.

2.3 Duration of the programme

The HIRLAM-C programme commences on 1 January 2016 and will run for 5 years until 31 December 2020. Optionally, the HIRLAM Council may decide to extend the programme
beyond this, for up to five more years. The programme may be terminated before the end of its term, provided the Council decides so and with at least one year’s notice. The Council shall review the terms of the programme at regular intervals, at least once every 3 years.

3. Membership

3.1 Members

Three types of memberships of the programme are distinguished:
- regular members, who fully contribute to the programme in terms of staffing, finances and computer resources, and who generally use the model for their operational activities
- acceding members, who wish to join the consortium but who are not yet able to fully contribute to the programme
- cooperating members, who contribute to research areas within the programme at a level of contribution agreed between them and the programme.

The regular members of HIRLAM-C are the participating meteorological services:
1. The Danish Meteorological Institute (DMI),
2. The Estonian Environmental Agency (ESTEA),
3. The Finnish Meteorological Institute (FMI),
4. The Icelandic Meteorological Office (IMO),
5. The Irish Meteorological Service (Met Éireann),
6. The Lithuanian Hydrological and Meteorological Service (LHMS),
7. The Royal Netherlands Meteorological Institute (KNMI),
8. The Norwegian Meteorological Institute (MET Norway),
9. The Meteorological State Agency of the Kingdom of Spain (AEMET),
10. The Swedish Meteorological and Hydrological Institute (SMHI).

At the time of writing of this MoU, there are no acceding members. The French Meteorological Service, Météo-France, is a co-operating member.

3.2 Accession and cessation of membership

New members may be allowed to join HIRLAM on application and depending on a unanimous decision by the Council. A new member will contribute through a subscription fee and by staff contributions to the programme at a level agreed by Council. There is also an entry fee corresponding to a share of the recent years’ development and common costs of the programme. New members must undertake to follow any agreements that HIRLAM has made with any other parties and that are still in force.

Potential new members who wish to join the consortium but who are not yet able to fully contribute to the programme can be granted the status of acceding member for a period to be determined by Council. An acceding member is given full access to the HIRLAM code and system for its own research and operational purposes (including commercial ones). An
acceding member does not yet have the obligation to contribute to the manpower and computer budgets of the HIRLAM programme. Its contribution to the yearly financial budget is set to 50% of the contribution of institutes of the same class (small or standard). Financial contributions paid during the accession period will be deducted from the entrance fee.

Acceeding members commit themselves to build up the required NWP capabilities and infrastructure base at home within the accession period. The HIRLAM management group provides Council with an assessment of the steps that need to be taken and the time and assistance required from full members for this capacity-building period.

The Council decides on the granting of the status of acceeding member, and the period of this status. This will be formalized in an agreement between the Council and the candidate for accession. In Council meetings, the progress of acceeding members towards achieving full membership status is regularly reviewed. The HIRLAM Council has the right to revoke the status of acceeding member, to grant the status of full membership, or to alter the accession period in exceptional circumstances.

The manner and process of payment of the entrance fee is to be settled during the accession period by negotiations between the acceeding member and the Council. If the acceeding member is able to actively participate in HIRLAM research and/or computer budget during the accession period, these activities should be counted as contributions to the entrance fee. Assessment of the amount of resources spent on HIRLAM research during the accession period will be done by the HIRLAM management group.

A member may cancel its membership by giving at least one year's notice to the Council Chairman. The rights and obligations concerning the use and ownership of the HIRLAM code continue, following the rules of this MoU and any other agreements made with HIRLAM and co-operating consortia prior to leaving the Programme. These rights only extend to the versions of the code released before the cessation of membership.

4. Steering of the HIRLAM-C programme

4.1 Steering bodies

The HIRLAM Council has the overall authority for the programme.

The HIRLAM Advisory Committee (HAC) advises and reports to the Council.

The programme manager (PM) has the executive responsibility of the programme and reports to the Council. The PM may be supported by a scientific secretary.

The project leaders are appointed to lead specific projects within the programme.

The HIRLAM management group (HMG) consists of the PM and the project leaders.

The detailed roles of all of these steering bodies are described below.
4.2 Steering documents

This Memorandum of Understanding (MoU) determines the basic structure and organisation of the programme and the commitments by the members. Co-operation agreements with other consortia as agreed by the Council are part of this MoU. The commitments and rights concerning the shared code with ALADIN are regulated in the HIRLAM-ALADIN Collaboration Agreement.

A scientific strategy meeting between the HIRLAM and ALADIN consortia will be held in the beginning of the MoU period. The resulting strategic research choices and the agreed joint research activities with ALADIN, respectively, will be detailed in:

(a) an updated HIRLAM Strategy 2016-2025 document, describing the high-level strategic and scientific goals to be pursued in the period 2016-2025, and the main deliverables of the HIRLAM-C programme.

(b) a common rolling work plan that shall be updated at least once per year. This plan covers the main scientific choices and foreseen developments for the MoU period (2016-2020), and will detail the tasks to be carried out in the coming year, with their associated staffing.

Before the start of each calendar year, the Council will agree on a budget with staffing, financial and computer resource commitments as well as the apportionment of the contributions between the members.

4.3 The HIRLAM Council

The HIRLAM Council consists of the Director-Generals of the participating regular and cooperating member institutes, or representatives nominated by them. Overall authority for the programme is vested in the Council. The HIRLAM Council shall normally meet twice a year. Co-operating consortia and acceding members, as well as ECMWF, are given a standing invitation to participate as observers. The Council may also invite observers from other organisations on a case-by-case basis. Acceding and co-operating members have no voting rights in Council.

Once a year, a joint meeting will be held of the HIRLAM Council and the ALADIN General Assembly.

The Council elects one of its members as chairman. The chairman may represent the programme between meetings and inform or liaise with the Council members as appropriate. The Council elects one of its members as vice-chairman, to act in replacement of the chairman if needed.

The Council monitors the progress of the programme and takes decisions on any overriding and principal issues. The steering documents need to be approved by the Council, as well as any changes in them that are subsequently made.

The Council appoints the following positions:

- The programme manager
- The project leaders
• The scientific secretary
• The HAC chairman
• The HAC vice-chairman

Council decisions shall be taken by simple majority except where explicitly stated otherwise in this MoU. The following issues require unanimous decisions:
• HIRLAM financial, computational resources and staffing commitments
• Changes to the MoU including its Annexes
• Accession of new members
• Co-operation agreements with third parties
• Dissolution of the consortium

4.4 HIRLAM Advisory Committee

The HIRLAM Advisory Committee (HAC) is an advisory body reporting to the HIRLAM Council. The HAC advises the Council and the programme manager on scientific, technical, financial and administrative matters related to the HIRLAM programme.

The HAC consists of a representative from each of the members and co-operating members. The national representatives shall in general not be HIRLAM scientific staff or HMG members. HAC meetings shall generally be held twice annually. A joint meeting between the HAC and the ALADIN Policy Advisory Committee (PAC) will be held once per year.

The programme manager takes part in the meetings. Acceding members have a standing invitation to send a representative to HAC meetings. Co-operating consortia and ECMWF participate as observers. Representatives from other organisations, such as the programme manager of the EUMETNET/C-SRNWP programme, may be invited as observers.

The responsibilities of the HAC are:
(a) To prepare and advise the Council on principal decisions and developments within the programme.
(b) To support and advise the Programme Management on scientific, financial and organisational issues in connection with monitoring the progress or scrutinising the plans made by the programme.
(c) To coordinate with the PAC on the preparation of advice on common policy issues for decision by the HIRLAM Council and ALADIN General Assembly.
(d) To discuss and prepare the strategy of HIRLAM taking into account any results from external reviews.
(e) To coordinate a regular assessment of user needs and satisfaction in respect to operational products in the member countries, and provide appropriate feedback to the HIRLAM management group for response or action.
(f) To monitor the expenses and staffing in the programme and examine the annual financial and staffing budget and report to the HIRLAM Council.
(g) To assist in the preparation of the Council agenda.
(h) To prepare and advise the Council on new projects in the programme.
In order to ensure an adequate representation of member institutes’ interests in the HAC on all of the above issues, member institutes can elect to appoint their representative from a research or operational background on an alternating schedule.

4.5 External and scientific reviews

An external review of the programme shall be done when considered appropriate by Council. The tasks of the review shall be specified by the Council and may concern scientific, technical and/or organisational issues. It will be carried out by a group of external experts who are proposed by the HAC and appointed by the Council. The members are selected based on personal competence. The scientific plans of the programme shall be subjected to review by external experts at least once within the duration of the programme.

5. Programme organisation

5.1 Programme manager and scientific secretary

The programme manager has the overall executive responsibility of the programme and reports to the Council. The programme manager is responsible for the implementation of the programme following the guidelines by the HAC and in liaison with the HIRLAM member institutes, and ensures that priority issues of the programme are attended to in the projects. The programme manager leads the HIRLAM management group and has the overall authority for the core group (see section 5.3) and regular staff. He or she represents the programme in the governing bodies and external contacts. The programme manager shall be affiliated fulltime with one of the member institutes. The programme manager may be supported by a (part-time) scientific secretary.

Specifically, the programme manager is tasked to:

a) Take every action necessary to ensure an efficient accomplishment of the programme objectives;

b) Lead and co-ordinate the work of the HIRLAM management group; Lead the work of the core group personally or through another management group member; Prepare programme work plans and co-ordinate the research activities with those of the cooperating consortia.

c) Prepare, in collaboration with the management group and the ALADIN consortium, a scientific strategy and rolling work plan; The plan shall reflect the guidance from the HIRLAM Advisory Committee and from the ALADIN PAC, and shall be revised at least annually.

d) Submit the rolling work plan and budget for examination by the HAC and approval by the Council on an annual basis;

e) Report about the common activities and co-ordinate the programme reporting to the governing bodies and for other purposes as needed;

f) Ensure that, at any time, a HIRLAM and HARMONIE Reference system, and a HARMONIE Canonical Model Configuration, are defined and available for
operational implementation at the participating meteorological institutes, and keep overall supervision of the evolution of these Reference Systems and Configurations.

g) Keep an account of all income and expenditure for the programme, and provide a statement to the Council each year;
h) Keep a record of the human resources contributed by the participating institutes;
i) Ensure that user feedback or other information on user satisfaction which is obtained from the HAC or by means of other contacts, is taken into proper account when setting priorities within the programme.

j) Keep frequent contacts with the participating institutes to ensure good communication, encourage participating scientists and co-ordinate work in the different projects;
k) Co-ordinate the regular maintenance of the scientific and technical documentation and of the HIRLAM web site (at the time of signature of this MoU, this is registered as www.hirlam.org);
l) Represent the programme in negotiations with outside bodies.

5.2 Projects, project leaders and HIRLAM management group

The HIRLAM programme encompasses a range of research areas. In order to focus the work and to ensure that resources are allocated effectively, a number of projects will be identified within the programme. Each project will have specific objectives and targets, following the Strategy document. The projects may be of definite periods shorter than the whole programme and new projects may be set up as required and subject to Council approval.

Each project shall have a project leader assigned and working most of the time in that capacity. The project leaders manage the day-to-day activities within the project and coordinate the work of core group members and regular staff allocated to the project. The project leaders prepare the plans in their area and ensure that reports are made on their progress. One of the project leaders shall be assigned the responsibility for the maintenance and development of the HIRLAM and HARMONIE Reference systems and Canonical Model Configurations, in close cooperation with staff having similar responsibilities within ALADIN.

More detailed arrangements and instructions shall be prepared by the programme manager.

Project leaders may be recruited from outside of the institutes or the member nations. They are employed by or through a member institute, and have their salaries reimbursed by the Programme according to their share of full time and the salary scales in the budget.

The HIRLAM management group (HMG) consists of the programme manager and the project leaders. The HMG decides on priorities and organises the work, following guidance by the HAC and Council. The HMG has the collective responsibility to plan the work of core group members and to utilise the expertise of core group and regular staff in the most efficient way. The coordination of research and development plans and activities with ALADIN takes place within meetings of the HMG and the ALADIN Consortium. The programme manager and project leader responsible for the Reference system are tasked with the coordination with ECMWF, Météo-France and the ALADIN consortium on the planned evolution of the codes. This alignment takes place mainly in the context of the regular IFS-Arpege coordination.
meetings, meetings with the Météo-France phasing coordinator on the preparation of phasing activities, and the IFS scalability programme board.

5.3 HIRLAM core group

In order to address high-priority research issues or urgent problems effectively, and to support the Reference systems, a core group is designated with staff allocated to priority tasks identified by the HMG. Core group activities may be related to high-priority novel developments, but also to ensuring and enhancing the quality of the already developed NWP system. Scientific and technical problems that turn up in the Reference systems or in a Reference system installation in a member institute shall be addressed primarily by the core group. Furthermore, the core group will carry out routine verification and document the performance of the Reference system.

Core group members work either full time or half-time in the HIRLAM programme and they shall be managed by the HMG. They will report directly to the programme manager or to a HMG member designated by him/her who will assign them to the appropriate projects. Each member institute will supply or fund core group members according to the annual budget. The positions are filled in agreement between the programme manager and the head of research (or equivalent) in each institute. The appointments shall run for one year at a time.

Core group members may either be assigned directly by the member institute, or hired through funding via the HIRLAM budget. If a member cannot supply a full time person or two half-time persons, core group members may be hired at other institutes instead.

5.4 HIRLAM regular staff

The main research and development work is carried out by regular research staff from the member institutes. Regular staff members shall in principle be allocated to the programme at least on a half time basis.

5.5 Optional projects

The programme may be extended with optional projects for activities in which not all HIRLAM members can or wish to participate. A close co-ordination between optional project and the rest of the programme is likely to be of advantage, but the level of steering from the programme shall be decided on a case by case basis for each project. Each optional project shall bear its own cost in terms of finances, staff and computer resources. The implications for the work of the programme, both in terms of additional load and in terms of contributions to the programme, shall be clarified on each occasion. The Council decides on the establishment or cessation of optional projects.

5.6 Code Architects
The possibility exists to assign within the HIRLAM and ALADIN consortia one or more Code Architects. The HIRLAM/ALADIN Code Architect(s) (CA) shall technically assist the ALADIN and HIRLAM PM's in supervising the definition and evolution of (a part of) the common ALADIN-HIRLAM codes. The ALADIN and HIRLAM PM's can formulate a proposal for assigning a CA position. The work done by the CA, will be reported to HAC and PAC.

5.7 Information exchange within the programme

An official HIRLAM web site will be maintained, where all the relevant information about the NWP system and the HIRLAM programme is published. The site contains among others a data and monitoring portal, the scientific and technical documentation of the NWP system, and the official HIRLAM publications. A joint HIRLAM-ALADIN Newsletter is published regularly.

6. Commitments by members

6.1 Staff

Each member shall provide core group staff and additional regular staff, at least up to their minimum commitment as detailed in the annual staffing budget. The members shall ensure sufficient staffing in the priority areas. Only work that is part of the work plan or that is regarded as necessary for the programme by the programme manager is taken into account as HIRLAM contribution. Member institutes shall commit themselves to precise deliverables and staff allocations defined in the projects as agreed with the programme manager and defined in the projects in the annual work plan. If there are changes of staff or other circumstances delaying the work, it is the responsibility of the member institute to make every effort to replace the staffing to carry out the allocated tasks.

6.2 Computer resources at ECMWF

Member institutes contribute a percentage of their national computer resources at ECMWF (the level of which is based on GNI) to a HIRLAM pool, which is added to HIRLAM Special Project resources and used for experimentation and for testing of the Reference system. The percentage to be applied is established yearly in the budget. Resources required for operational applications are to be organized separately.

6.3 Other costs borne by the members

Costs for travel of regular staff and core group staff attending workshops, working weeks and incidental visits shall be borne by their home institutes. Likewise, costs for participation in HAC meetings shall be paid by the individual members. The programme manager may decide to cover the costs of visits by staff members or other experts on a case-by-case basis. The local costs of organising workshops will be met by the institute hosting them. The HMG shall
consider these aspects when planning such meetings, to ensure an equitable distribution of costs over the duration of the Programme. The expenses of invited outside experts for workshops organized by HIRLAM shall be paid by the programme. The ALADIN workshop and the HIRLAM All Staff Meeting will be organized as a joint meeting once a year, on an alternating schedule between HIRLAM and ALADIN partners as host. The HIRLAM and ALADIN programmes will both make a financial contribution to the host institute, to help them meet the organizational costs of this yearly meeting. The amount of this contribution is defined each year in the HIRLAM and ALADIN budgets.

6.4 Shared programme costs

The following costs shall be shared among the institutes participating in HIRLAM and including the co-operating members:

(a) Salary of the programme manager
(b) Salary costs of the project leaders
(c) Costs of travel and subsistence of management group members for attending HIRLAM meetings or other meetings where it is required to represent HIRLAM, as agreed with the programme manager.
(d) Travel and subsistence costs for the HAC chairman that are additional to the ones needed for the normal national representation in the HAC itself
(e) Finance for inviting or hiring, at times and when necessary, experts from outside or within the consortium to provide specific expertise
(f) Travel and subsistence costs for external reviewers
(g) Secretarial costs
(h) Contribution to the organizational costs for the ALADIN Workshop and HIRLAM All Staff Meeting. The responsibility for organizing this event will alternate between HIRLAM and ALADIN member services.

The Council may request an audit of the HIRLAM accounts.

6.5 Apportionment of contributions and budget procedures

The shared programme costs shall be covered by direct contributions from the participating institutes. The apportionments are based on principles of solidarity and equality. HIRLAM regular and acceding members are divided into standard members and smaller members. The assignment is decided by the Council and is valid for the duration of the membership in the programme, unless there are exceptional circumstances. Members have rights and obligations which are equal for all members except for the following considerations:

- Smaller members pay a reduced amount compared to standard members.
- Staff contributions include an element of size of the member institute.
- There is a minimum level of staff contribution below which it is not considered meaningful to participate in HIRLAM.
- Acceding members are not obliged to contribute to staffing or computer resources. Their contribution to the financial budget is set to 50% of the contributions of members of the same size category.
• Co-operating members contribute at a level negotiated between them and Council.

The following implementation rules are applied to take into account cases where there are big differences of resources between the HIRLAM member institutes.

- The contributions from co-operating members are negotiated separately each year.
- For financial contributions, smaller members pay an amount which is \( \frac{1}{9} \) of that of standard members. The remaining amount, after contributions from co-operating members and smaller members, is paid by all standard members in equal shares.
- For staff contributions, there is a basic contribution for smaller members and another larger one for standard members. The contribution for standard members is graded roughly according to GNI but not necessarily proportionally. Staff contributions shall be reviewed every year in connection with setting up the annual budget but the total number shall be consistent with requirements and extent of activities in the programme. The staff number shall be rounded to the nearest half time equivalent.

The financial contribution from each participating institute is estimated in advance for each year. The contributions to the HIRLAM budget are paid annually, via bilateral financial arrangements between the meteorological institute of the country of the programme manager and the contributing meteorological institute.

The budget shall be drawn up by the programme manager each year, for consideration by the HAC and approval of the Council. The currency of the budget shall be Euro. Invoicing will take place in the beginning of March each year, with settlement two months thereafter, in the beginning of May.

7. Proprietary rights to the HIRLAM and shared ALADIN-HIRLAM systems and products

7.1 Use of the codes by the members

The members of HIRLAM own the HIRLAM common codes and system jointly. According to the HIRLAM-ALADIN Agreement, HIRLAM members co-own with ALADIN the ALADIN-HIRLAM Common Codes, and they have rights to use the ALADIN-HIRLAM third party codes. As a result, they have full rights to use the ALADIN-HIRLAM System for their own requirements.

7.2 Use of the codes for research purposes

The programme manager is authorised to consider requests from scientific or technical research groups for access to the HIRLAM model code for non-commercial research purposes, taking into account the provisions of agreements on shared third party codes. Access is granted under the conditions stated in Annex 2 for the HIRLAM common codes.

The HIRLAM Council may allow access by a third party to the HIRLAM model code, or elements thereof, on a case by case basis, provided such access is compliant with agreements on shared third party codes. The software shall be protected against unauthorised access by any further outside party, taking into account, when appropriate, relevant provisions of agreements on shared third party codes.

Access to the ALADIN-HIRLAM Common Codes follows the conditions stated in the HIRLAM-ALADIN Agreement.

7.3 Use of products for commercial purposes

The commercial exploitation of the HIRLAM system within the European Economic Area, and the distribution of revenue arising from such exploitation, is done in accordance to ECOMET rules.

HIRLAM members are free to distribute forecast products based on the HIRLAM system, in real-time, to bodies outside the European Economic Area, provided only that they notify the HIRLAM Council in advance and that provisions of agreements with other consortia, as listed in section 7.1 and in the HIRLAM-ALADIN Agreement, are respected. All such arrangements shall be consistent with the provisions of Resolution 40 of WMO CG-XII.

For the ALADIN-HIRLAM shared System and forecast products based on them, exploitation aspects are covered in the HIRLAM-ALADIN Agreement (provided as a separate document).

8. List of annexes

Annex 1: Conditions for use of the HIRLAM System, or parts thereof, for scientific or technical non-commercial research purposes by users outside the HIRLAM members and cooperating meteorological institutes
Annex 2: Definitions and acronyms.
9. Signatures

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9 December, 2015
HIRLAM MoU: Annex 1

Conditions for use of the HIRLAM System, or parts thereof, for scientific or technical non-commercial research purposes by users outside the HIRLAM Members and co-operating meteorological institutes

1. The user shall not pass on or sell the HIRLAM system, or parts thereof, to any third party without the written consent of the HIRLAM Council. This restriction also applies to distribution over electronic networks such as the Internet.

2. The user shall not pass on or sell meteorological or climatological products based on the HIRLAM system, or parts thereof, to any third party.

3. All results of research carried out with software developed within the HIRLAM Programmes and the co-operative effort with Météo-France shall be made available to the HIRLAM community, including Météo-France.

4. In any publication resulting from the research carried out, the origin of the HIRLAM system or parts thereof shall be acknowledged by the following text: “The HIRLAM System was developed by the HIRLAM Programme group, a co-operative Programme of the national weather services in Denmark, Estonia, Finland, Iceland, Ireland, Lithuania, the Netherlands, Norway, Spain and Sweden.” If the research was linked with any part of the co-operative effort with Météo-France, the sentence shall then be: “This research was carried out with software developed in the framework of the cooperation between the HIRLAM Programme group, a co-operative project of the national weather services in Denmark, Estonia, Finland, Iceland, Ireland, Lithuania, the Netherlands, Norway, Spain and Sweden, and Météo-France”.

5. Access to the HIRLAM system shall be for a period of three years from the date of signing this agreement.

6. The license is for the user while at the specified affiliation. The license is rescinded if the user leaves that affiliation and all installed HIRLAM components have to be removed. Instead a new application may be made.

7. The HIRLAM community and Météo-France shall have full proprietary rights to any software developed directly as a result of the research involving the HIRLAM system.

8. The HIRLAM programme does not guarantee the correctness of the system in any sense, nor do they accept responsibility for the maintenance or updating of the system. (Applicable for HIRLAM software made available by full member institutes only.)

9. The HIRLAM Programme accepts no responsibility for damage, financially or otherwise, caused by the use of the system or parts thereof. (Applicable for HIRLAM software made available by full member institutes only.)

Name Affiliation Date

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MoU = Memorandum of Understanding, this entire document including the signatures by members.

NWP = Numerical Weather Prediction including data assimilation, forecast model, post-processing and probabilistic modelling

LAM = Limited Area Modelling = Modelling in a fixed area less than global or hemispheric and where boundary conditions are handled, usually flow-dependent from a host model

HIRLAM = High Resolution Limited Area Model; refers to the HIRLAM Programme in this MoU except where explicitly stated otherwise

HIRLAM-C Programme = the programme defined by this MoU

ECMWF = European Centre for Medium Range Weather Forecasting

IFS = Integrated Forecasting System. The NWP modelling system as developed by ECMWF in co-operation with Meteo-France.

The ALADIN-HIRLAM System, also called the NWP System = the complete code that is necessary for executing all configurations that are part of the agreed HIRLAM-ALADIN collaboration according to the HIRLAM-ALADIN Agreement. The ALADIN-HIRLAM System is composed of shared codes of four different types:

- the ALADIN Common Codes, defined as the codes jointly developed, maintained and owned by the ALADIN Consortium;
- the HIRLAM Common Codes, defined as the codes jointly developed, maintained and owned by the HIRLAM Consortium;
- the ALADIN-HIRLAM Common Codes, defined as the codes jointly developed and maintained by both consortia. The definition of these codes will be monitored during the lifetime of this MoU;
- other ALADIN-HIRLAM Codes that are either co-owned or owned by third parties and shared under relevant provisions of agreements concluded by either consortium or by Member(s) thereof with such third parties extending rights to both consortia.

Configuration of the ALADIN-HIRLAM System = a subset of the ALADIN-HIRLAM Codes used by an ALADIN or HIRLAM Member or acceding Member for its own implementation.

Canonical Model Configuration (CMC) = a configuration of the ALADIN-HIRLAM System for which resources are provided by the ALADIN and/or HIRLAM members in order to perform regular code updates. This includes the required scientific and technical validation according to the state of the art of the latest research and development.

HARMONIE = HIRLAM – ALADIN Research on mesoscale Modelling for NWP In Euromed. Name of the non-hydrostatic mesoscale canonical model configuration developed
by HIRLAM in the code collaboration with ALADIN within the code framework of IFS/Arpege.

HARMONIE Reference system = The quality-assured HARMONIE Canonical Model Configuration of the latest release of the ALADIN-HIRLAM Common Codes, together with the related configuration, submission monitoring and verification scripts, libraries and tools required for the use of the HARMONIE model in an operational NWP environment. The Reference System is defined and maintained by the HIRLAM management group. It should be suitable for operational use as decided by the HIRLAM programme manager following agreed criteria.

RCR = Regular Cycle of the Reference system, a continuous data assimilation-forecasting cycle with the Reference system with the recommended and agreed settings (assimilation frequency, observation usage, resolution, time-step, domain, selected physics parametrizations and model options, etc.). For each full release of the HARMONIE Reference System, one or more HIRLAM members are requested and selected to run the RCR as their operational HARMONIE NWP system.

WMO = World Meteorological Organisation

NMS = National Meteorological Service as defined by their WMO membership

C-SRNWP = Coordination in Short Range Numerical Weather Prediction - a EUMETNET programme for coordination of short range NWP activities among its members.

EUMETNET = European Meteorological Network - a European network to organise cooperative programmes

GNI = Gross National Income (as used for calculating contributions to other international programmes or organisations as e.g. ECMWF).