

**Memorandum of Understanding V**  
**among the National Meteorological and Hydrological Services of Central and South Eastern**  
**Europe**  
**for the RC LACE (Regional Cooperation for Limited Area Modelling for Central Europe)**  
**Programme**

**Paragraph 1 Introduction**

The National Meteorological Services of Austria, Croatia, the Czech Republic, Hungary, Poland, Romania, Slovakia and Slovenia, the Members of the RC LACE group, referred to as Members in this document, represented by their directors/general directors:

**a) recognizing**

- the great importance of the regional co-operation in the field of mesoscale numerical weather modelling in Central and South East Europe,
- the collaborative projects shared for use in operational forecasting, bringing substantial economic and social benefit to Members,
- the promotion of regular co-operation by World Meteorological Organisation, in particular in the field of high impact weather;

**b) considering**

- the co-operation in the field of mesoscale Numerical Weather Prediction (NWP) among the Members in Central and South Eastern Europe is well established,
- the high value of existing common operational applications and activities (e.g. in data pre-processing and ensemble forecasting) for local operational NWP,
- the objectives, membership and continuation of collaboration with ALADIN and HIRLAM partners is mutually beneficial;

**c) valuing**

- the network of scientists existing around NWP applications in Central and South East Europe performing the top-end scientific and technical achievements dedicated to high-level forecasting products,
- the success of RC LACE Programme in the period 2014-2020 visible in the scientific publications in high-end journals and success of local operational applications,
- the success of common operational products in the fields of observation pre-processing and limited area ensemble prediction.

**d) wishing**

- to facilitate research and development activities of RC LACE on the ALADIN System for the Central and South East European regions at world-class level,
- to contribute to maintenance and development of common operational activities in the different areas of NWP,
- to cooperate on technical activities needed for reaching the excellent level of operational applications of ALADIN System at Member Services;

- to contribute to the joint efforts and optimisation of common resources within the ALADIN-LACE-HIRLAM Consortium,
- to contribute to continuous common training activities for the scientific staff of the RC LACE members.

Have jointly decided as follows:

#### Paragraph 2, Purpose and objectives

- **The primary purpose of the RC LACE Programme is to share and efficiently use members' limited resources for continuous development of the common state-of-the-art NWP system and to support its operational use, and through that to contribute to the common endeavour within the ALADIN-LACE-HIRLAM Consortium and wider European NWP Community. To achieve that, RC LACE group will focus on the following objectives:**
- To continue participating on a common endeavour of all Members on all aspects of NWP starting from data monitoring and/or processing up to response to forecasters' and user requirements through modelling efforts.
- To guarantee a quality and reliability of outputs superior to that of the coupling model and better at least on specific points of interest to that of other LAM systems in the EUMETNET/SRNWP network.
- To achieve a continuous improvement of the quality of the products through research and development performed within RC LACE, measured using appropriate statistical scores and by the capacity to forecast high impact weather.
- To prioritize specific NWP oriented training through multi-national programmes, bilateral actions and fostering specific training actions for the whole RC LACE community.
- To contribute to advanced research and development efforts and participate in maintenance of the developed software and tools in coordination with ALADIN and HIRLAM partners.
- To further enhance the existing cooperation with research institutions and universities in developing interdisciplinary applications *with an aim to explore possible usage of such applications in operational context*.
- To explore new observation sources and assimilate as many sources of observational data available in the highest possible resolution, and advance operational high-resolution deterministic and ensemble applications.
- To actively participate in relevant EUMETNET Programmes.
- To contribute to the development and implementation of mainstream applications linked to natural disaster and crisis management, to the modelling of climate, air quality, hydrology, ocean and waves, as well as applications for the transport sector, the sustainable energy sector, etc.
- To approve on data policy and to establish and follow procedures for the exchange of additional (non-GTS, non-standard) observational data useful for the purpose of high-resolution data assimilation and verification.
- To work in common on any technical project with intention to diminish the costs involved in reaching the above-stated objectives.

- To explore the potential of new arising methods and approaches (e.g. AI and in particular machine learning) for the various disciplines of NWP.

### Paragraph 3, Council

- The RC LACE Council consists of the directors/general directors of each Member. Council member can be represented at a Council meeting by a mandated representative who is authorised to vote on decisions proposed in the meeting documents.
- Council is the overall authority of RC LACE. Council is chaired by its President, assisted by Vice President, elected among the Council members, for the period of two years, with one possible re-election for the President and without limitations for re-election for the Vice President. The terms of references for the President and the Vice President are appended (Annex 1).
- Council will meet in ordinary session at least once per year. It may meet in extraordinary session at the request of either the President or 1/3 of the Members.
- Council determines the policy of RC LACE, approves its budget and supervises the execution of the Programme. Council takes decisions on the strategic goals of the programme based on documents and reports of the executive and advisory bodies of RC LACE and independent reviewers.
- Council considers for approval any important document of RC LACE, like Strategy, Scientific Plan, Progress Reports, RC LACE Steering Committee (LSC) reports, Account of Incomes and Expenses Reports and Contracts.
- Council could demand the actions and advices from LSC and Management Group (MG) on matters of interest.
- Council takes decisions on the MG appointments.
- Council determines RC LACE membership issue in relation with international projects and organisations.
- Council decisions will be taken by consensus of all Members on any budgetary issue and on any possible amendment to the present Memorandum of Understanding (MoU). Council decisions on other matters will be taken by a simple majority of all Members. A vote by correspondence, requiring a simple majority of all Members, may be used to take decisions on minor issues.
- A representative of Meteo-France, RC LACE Programme Manager (PM), Chairperson of LSC, ALADIN-LACE-HIRLAM Programme Manager and other experts invited by the Council President may participate at the Council meetings but without voting rights.
- Members of the Council could invite their advisors to the Council Meeting.

### Paragraph 4, Management Group

Management Group is the executive body of RC LACE and comprises Programme Manager (PM), System and Code Coordinator (SCC), Data Manager (DM) and Area Leaders for at least upper air and surface data assimilation, dynamics and coupling, physics and surface parametrizations, ensemble forecasting and predictability, and applications and verification. Programme Manager is the chief executive officer of RC LACE. The terms of References of the Management Group members are appended (Annex 2). The Management Group is appointed by the Council for two years with the possibility for prolongation for additional

two years. If a Management Group member needs to be replaced before the term finishes, a temporary replacement can be proposed by the Council President (and/or) Vice President and become the new Management Group member after the vote of the Council (by correspondence). Members of the LACE Management Group can apply for positions in the common ALADIN-LACE-HIRLAM Consortium in their respective area. The application should be supported by the LSC and the Council through the signature of the candidate's NMS.

### **Paragraph 5, Steering Committee**

RC LACE Steering Committee (LSC) is the advisory body of RC LACE and it consists of a representative from each Member. The LSC representatives are delegated by Members. The LSC Member should not be at the same time the Management Group member. The LSC Chairperson is elected within the LSC members by a simple majority and for a period of two years with one possible re-election. The LSC evaluates all suggestions and ideas related to NWP issues at meetings held at least twice per year, once not later than one month before the Council meeting. The Management Group should participate at the LSC meetings (without voting right). In addition, Project Leaders being not members of the MG can take part in the LSC meetings (without voting right). At LSC meetings, the LSC members report on the status of their national operational implementations. The LSC Chairman reports the results of the LSC meetings to the Council and reports the outcome of the RC LACE Council meetings to the LSC. The Terms of References of the LSC are appended (Annex 3). Representatives of Meteo-France, non-LACE ALADIN and HIRLAM partners can take part in the LSC meetings as observers upon invitation.

### **Paragraph 6, Organisation of work**

RC LACE common work and actions are dedicated to the research, development, implementation and operational activities and products. Members contribute to the common work by sharing knowledge, experience, technical resources and manpower. The common research and development activities will be topic oriented. The topics follow the common ALADIN-LACE-HIRLAM scientific plan and programme to the greatest possible extent. The topics are distributed among the main areas that are (at least) upper air and surface data assimilation, dynamics and coupling, physics and surface parametrizations, ensemble forecasting and predictability, and applications and verification. The work is carried out in the following manner:

Scientific Strategy and Plan:

- Objectives are defined by the Scientific Strategy and executed via the Scientific Plan, which may include Projects.
- The Scientific Plan is developed in accordance with the common ALADIN-LACE-HIRLAM Plan including the Core Programs. The Scientific plan considers the

achievements and tools developed by ALADIN-LACE-HIRLAM Partners and ensures the activities for the implementation at RC LACE environment.

- The LSC proposes and presents Scientific Strategy and Plan to the Council for approval.
- MG is responsible for the execution of the Scientific plan, which is fulfilled by NWP teams and MG, either locally and/or in the form of research stays. The Scientific plan execution is reported by MG and evaluated by LSC twice a year. Overall status on the progress of RC LACE will be reported to the Council members by LSC also twice a year.
- Long term research, development and necessary training activities given by the Scientific Strategy are performed under the control and coordination of Area Leaders and other MG members when needed.

#### Projects and responsibilities:

- When appropriate, the work can be organized in a Project. The role of the Project is to focus resources on a wider objective requiring high priority and/or on strategic interest for future. The ideas for possible Projects are collected by Management Group and discussed at LSC.
- Council approves Projects upon the recommendation by LSC.
- The Project description contains the leader, duration, main objectives and tasks, deliverables and milestones, risks, a proposal for measures to evaluate the project success, resources needed and distribution of tasks and commitments between Members.
- Projects that cover subject(s) from the common ALADIN-LACE-HIRLAM RWP are considered shared by all LACE members.
- There can also be Optional Projects focusing on additional activities. At least three RC LACE Members supporting the additional activity are necessary for an Optional Project to be treated as a RC LACE activity. The necessary resources to carry out Optional Projects and the participating Members contributions and its effect on the Members contributions to the budget will be clarified on each occasion.
- The Project lead is assigned to Members of the MG. If this is not possible, an appropriate candidate from Members NWP teams is selected. In the latter case a temporary assignment for the duration of the project including allowances scaled by the size of the Project have to be approved by LSC and Council.
- The required resources, e.g. the financing of the stays, Project leader allowances, remain coordinated by PM.
- The Project Leader reports on the Project progress to LSC in accordance with evaluation measures described in the Project proposal. The scientific reporting will remain as close as possible to the format of Area activities reports.
- The Project tasks, research and development actions are opened also to ALADIN-LACE-HIRLAM partners, SRNWP partners, research institutions and universities.

#### Paragraph 7, Budget

The following regular costs will be shared among the Members:

- a) Travel cost for research stays and research group stays, including SCC phasing stays at Meteo-France.
- b) Travel cost for common training and actions.
- c) Salary supplement or prime for the MG members and allowances for the Project leader (if not part of the MG)
- d) Meetings and travel cost for LSC Chairperson.
- e) Meetings and travel cost for the MG.
- f) Financial commitments to ALADIN-LACE-HIRLAM Programme, defined by ALADIN-LACE-HIRLAM MoU.
- g) Miscellaneous costs as accepted by the Council.
- h) Costs related to Projects are covered from the RC LACE Budget unless other sources of finances are ensured.

Other common RC LACE actions could be financed upon the Council decision. The annual contributions of the Members will be paid to the RC LACE Budget account established at ZAMG. The contributions will be paid according to the arrangement approved by the Council. The used currency will be Euro. The budget will be drawn by the PM every year, considered by LSC and approved by the Council. The scale of Members' contributions will be based on the Rules on RC LACE Budget Contribution (Annex 4). The Account of Incomes and Expenses Report will be presented to Council by PM at each Council meeting.

#### **Paragraph 8, Commitments of Members**

- The Members financially contribute to RC LACE based upon the financial rules (Annex 4) and scale of contributions approved annually by RC LACE Council.
- The Members take part at the Council and LSC and provide manpower to MG and project leader duties.
- The Members contribute in manpower and technical resources to the scientific, development, technical and administrative activities of RC LACE based upon the decisions made by the Council.
- The Members contribute to the Projects based on the RC LACE Scientific plan.
- The Members execute the work planned in the Projects with manpower and technical resources. The highest priorities are dedicated to the operational activities approved by the Council.
- The Members ensure the technical and administrative help for RC LACE staff and actions aiming to harmonize the applications quality, requiring regular updates of the ALADIN System versions, common verification applications and exchange of local data whenever necessary.

#### **Paragraph 9, Entry into effect, duration and amendments**

The RC LACE MoU V will take effect upon signature of all the Members on 1<sup>st</sup> of January 2021 and be of five year duration, ending on 31<sup>st</sup> of December 2025. The MoU duration can be extended by the decision of the Council taking into account the constraints by the ALADIN-LACE-HIRLAM MoU. Amendments will take the effect following the decision of the Council.

**Paragraph 10, Adhesion/Denunciation**

Any intention from additional National Meteorological and Hydrological Service to join RC LACE will be considered by the Council on case by case basis and in conformity with the ALADIN MoU. Similarly, any intention of a Member to withdraw from RC LACE will be considered by the Council.

RC LACE Programme may at any time be terminated by the council decision with at least two years notice.

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**Signatures**

by the representatives of the National Meteorological and Hydrological Services

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18. Dez. 2020



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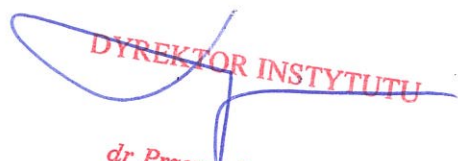
by the representatives of the National Meteorological and Hydrological Services

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### [Annex 1: Terms of references of RC LACE President and Vice President](#)

RC LACE President and Vice President are elected among the members of the Council.

The duties of the president are:

- Chairing the Council session.
- Organizing the Council session together with the Programme Manager and the local host.
- Representing the Members and taking all correspondence with international organisations and National Meteorological and Hydrological Services.
- Representing RC LACE at any written documents like contracts and invoices.
- Monitoring the work of Programme Manager.
- Ensuring the contacts between Council and RC LACE executive and advisory bodies.
- The duty of the Vice President is to replace the President in case of her/his absence or if mandated by the President.

### [Annex 2: Terms of References of the Management Group](#)

#### **Terms of References of Programme Manager**

Programme Manager (PM) is a full-time position. PM acts under the responsibility of the Council. In the period between the Council sessions, PM acts under the responsibility of the Council President. PM is the head of the Management Group. The duties of PM are:

- PM is responsible to the Council for the execution of the RC LACE Programme.
- PM is responsible for the preparation of Scientific Plan in harmonisation with the Management Group based on advices from the LSC.
- PM is responsible to coordinate the work plans and actions of RC LACE Management Group.
- PM is responsible to coordinate the implementation of the Project deliverables at Member services.
- PM is responsible for resource planning and coordination together with the Management Group.
- PM is coordinating Projects that are not related to a single area and not coordinated by a single Area Leader or Project Leader.
- PM is responsible for elaboration of solutions for existing problems.
- PM contributes to the preparation of longer term scientific and/or technical strategies of the RC LACE Programme.
- PM organises, together with the President and the local host, the sessions of the Council and will provide reports to the Council about the RC LACE Programme execution.
- PM prepares the Annual Budget and will survey contributions and expenses.
- PM seeks for additional funding with special emphasis on EU funds.

- PM is responsible for running administration of the RC LACE Programme.
- PM is the contact point in the relations between RC LACE and the NWP partners and participates at ALADIN-LACE-HIRLAM meetings.
- PM is coordinating common scientific actions with the ALADIN-LACE-HIRLAM programme.
- PM is responsible for representing the RC LACE Programme at NWP meetings or will deputise this responsibility among other MG members.
- PM can also execute duties in the common ALADIN-LACE-HIRLAM Consortium for which there is an overlap in duties.

### **Terms of References of Area Leader**

The RC LACE Area Leader (AL) is a three-quarter-time position unless stated otherwise in the contract. AL acts under the responsibility of PM. The duties of AL are:

- AL is responsible for the preparation of the Scientific Plan together with the Programme Manager.
- AL designs, organizes and leads research activities that belong to the designated area.
- AL organizes the individual and group research stays or working days/week (together with the Programme Manager).
- AL collects ideas and proposes Projects and defines scientific, technical and organisational background for the Projects.
- AL can be responsible for one or several Projects at the same time. AL is responsible for coordinating the scientific work belonging to his/her area of research, for supervision of the RC LACE scientists work on associated topics and performs a scientific surveillance of relevant issues in order to accomplish the Scientific Plan and contribute to its future evolution.
- AL presents the progress reports on the tasks to the RC LACE Steering Committee.
- AL leads Projects and coordinates the dedicated manpower and other means necessary for the Projects fulfilment.
- Together with the PM, AL plans and coordinates Project operational deliverables.
- AL ensures the implementation of the relevant research developments to the ALADIN System in coordination with the System and Code Coordinator.
- AL participates in inter-consortia coordination activities.
- AL can deputise RC LACE PM during the short time period, upon PM or RC LACE President request, approved by RC LACE President.
- AL may transfer a part of the responsibilities for certain research activities in the designated area to a Project Leader if approved by LSC and Council.
- AL can also execute duties of the equivalent AL in the common ALADIN-LACE-HIRLAM Consortium if there is an overlap in duties..

## Terms of References of the System and Code Coordinator

System and Code coordinator (SCC) is a three-quarter-time position unless stated otherwise in the contract. SCC acts under the responsibility of Programme Manager. The duties of the SCC are:

- SCC is responsible to phase the agreed part of the developed code to the reference library of the ALADIN System during a stay at Meteo-France related to phasing period, the length and timing as agreed with Meteo-France.
- SCC collects the validated code developments from RC LACE scientists (Area Leaders) and verify that the coding standards of IFS/ARPEGE/ALADIN are respected.
- SCC advises other members on structural changes in the code of the higher cycles in the library (using input from the ALADIN-LACE-HIRLAM Integration officer whenever appropriate).
- SCC provides support during porting of new developments for each Member in a balanced way controlled by Programme Manager (using input from ALADIN coordinator for Networking Activities whenever appropriate).
- SCC can visit RC LACE Members regarding the phasing issues under the PM supervision.
- SCC can refuse the phasing of pieces of the code that are too far from the coding standards or developed on obsolete library cycles and advises the code developer on further procedure under PM supervision.
- SCC is responsible to maintain the WWW page of RC LACE using input from the Council, MG and LSC.
- SCC can also execute equivalent duties in the common ALADIN-LACE-HIRLAM Consortium if there is an overlap in duties.

## Terms of References of Data Manager

The RC LACE Data Manager (DM) is a three-quarter-time position unless stated otherwise in the contract. DM acts under the responsibility of PM. The duties of the DM are:

- DM is responsible for the common planning and technical work with measured data needed by the data assimilation area and operational deliverables and products.
- DM plan and actions are adjusted to the plan and actions in the area of data assimilation.
- DM leads activities related to the organisation of observational databases.
- DM assists in installation of upgrades of the data assimilation suites at Member services.
- DM ensures the technical background for the observational data exchange.
- DM is involved in the development and the maintenance of the Observation Pre-processing for RC LACE (OPLACE) system.
- DM can also execute equivalent duties in the common ALADIN-LACE-HIRLAM Consortium if there is an overlap in duties.

### Annex 3. Terms of References of RC LACE Steering Committee

#### **Terms of References of RC LACE Steering Committee**

The responsibilities RC LACE Steering Committee (LSC) are as follows:

- Evaluation of all the aspects of Programme activities.
- Propose Strategy and present it to the Council for approval.
- Evaluate Scientific plan and advise Management Group in planning process.
- Evaluate Project proposals according to the Strategy and priorities of the Members.
- Evaluate the progress of Projects and possibly advise the modification or termination of Project.
- Evaluation of voluntary contributions through local research and development activities.
- To prepare report about quality of the RC LACE Programme that is presented by LSC Chairman during the Council session.
- To verify the execution of commitments to the ALADIN-LACE-HIRLAM Programme.
- LSC will meet twice per year and act as the main forum that would evaluate all suggestions and ideas related to the NWP issues of the RC LACE Programme.
- LSC may invite some experts out of RC LACE community to LSC meetings in order to present NWP related achievements.
- LSC may invite RC LACE Project Leaders to LSC meetings in order to present project related achievements.

#### **Terms of References of RC LACE Steering Committee Chairperson**

The responsibilities of RC LACE Steering Committee (LSC) Chairperson are as follows:

- To organise and chair the LSC sessions.
- In periods between LSC sessions to follow the work of the Management Group.
- In periods between LSC sessions to distribute and coordinate the expertise work of LSC members.
- To report the quality and progress of the RC LACE Programme to Council.

#### **Terms of References of RC LACE Project Leader**

The responsibilities of RC LACE Project Leaders (LPL) are as follows:

- To organise and lead the work related to a specific project for the time of the duration of the project.
- To report on the achievements of the project deliverables and milestones to the concerned Area Leader(s) on regular basis

- To presents the progress of the Project to the RC LACE Steering Committee (if invited to it in person or remotely).
- To ensure the exchange of scientific and technical knowledge needed for the project execution, including organizing meetings (in person or remotely).
- To check that all the actions and tasks related to the project are accounted for in the relevant work plans and in the RC LACE budget.
- To perform other coordination and execution duties as defined in a specific project.

#### **Annex 4: Rules on RC LACE Budget Contribution**

The RC LACE Members contribute to RC LACE Budget according to the following rules:

- The Budget contribution is based on Economic indicator Gross National Income (GNI) averaged for the previous three years.
- The distribution is updated every year upon the three subsequent years ending with the last year, issued by the World Bank: Development Indicators database.
- Budget contribution tables are approved by Council, by consensus of all Members.
- Budget contribution can not be less than the ALADIN-LACE-HIRLAM flat rate contribution, nor more than 50% of the total RC LACE Budget.
- The Budget contributions are paid upon the Invoice issued by RC LACE, represented by RC LACE President.
- The deadline for the Budget contribution is 30<sup>th</sup> April of the actual year.