

UWC West

Memorandum of Understanding Between



Danmarks
Meteorologiske
Institut



Vefurstofa
Íslands



Met
Éireann



Koninklijk Nederlands
Meteorologisch Instituut
Ministerie van Infrastructuur en Waterstaat

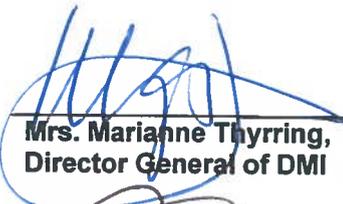
Danish Meteorological Institute,
Icelandic Meteorological Office,
Met Éireann on behalf of the Irish Department of
Housing, Planning and Local Government

and

Royal Netherlands Meteorological Institute

concerning the preparation towards a joint operational exploitation of
science-based short-term Numerical Weather Prediction including
ensemble prediction systems from 1st of January 2023 and the availability
of a suitable HPC infrastructure from the end of the second quarter of
2022

In witness of the following, the Parties have signed this MoU:



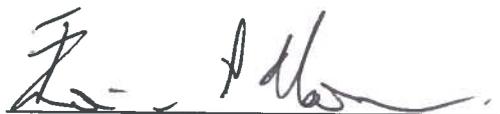
Mrs. Marianne Thyrring,
Director General of DMI



Mr. Gerard van der Steenhoven,
Director General of KNMI



Mr. Arni Snorrason,
Director General of IMO



Mr. Eoin Moran,
Director General of Met Éireann

The MoU is signed in four copies; one for each party

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INTRODUCTION

In order to facilitate a collaboration enabling a joint operational exploitation of a science-based short-term numerical weather ensemble prediction systems from 2023 onwards this Memorandum of Understanding (hereafter referred to as the "MoU") between the Danish Meteorological Institute (DMI), the Icelandic Meteorological Office (IMO), Met Éireann and the Royal Netherlands Meteorological Institute (KNMI) (collectively referred to as "the Parties") states the governance structure, decisions and principles for the implementation phase of the project concerning operational run of common NWP/EPS models.

RECITALS

ACKNOWLEDGING that provision and improvement of accurate information regarding climate, weather and water is increasingly important due to the changing climate and to reduce weather and water related threats to life, health, economy and property;

RECALLING that the Parties are all government entities with similar official duties providing important services to the public;

STRESSING that the Parties all desire to establish a long term collaboration and cooperate as equal partners in this area to the common strategic objective of increasing quality and service based upon their combined available resources;

STRESSING that the collaboration should be governed in the spirit of cooperation and aiming to be agile rather than bureaucratic;

RECOGNIZING that this collaboration enables the Parties to move forward with their combined ambition to produce common EPS models and related pre- and post-processing environments and thus keeping up to date with the advances in the meteorological field;

RECOGNIZING that the result of this collaboration must be an anchor point for further integration of the operational NWP/EPS within the entire UWC partnership from 2027 onwards;

RECOGNIZING the potential need to accommodate national operational applications in the field of operational weather forecasting within the common NWP production environment;

CONFIRMING their wish to recognize each other's unique authority and capabilities in order to learn from each other, and to state their understanding regarding certain joint activities in which they plan to engage;

CONFIRMING their wish to continue and expand existing collaborations;

IN CONSIDERATION of the mutual benefits anticipated from entering into this MoU the Parties agree as follows:

Article 1. Definitions and Abbreviations

MoU	means this Memorandum of Understanding.
EPS	means Ensemble Prediction System. Ensemble forecasting is a method used in numerical weather prediction. Instead of making a single forecast of the most likely weather, a set (or ensemble) of forecasts is produced. This set of forecasts aims to give an indication of the range of possible future states of the atmosphere.
INFORMATION	means any information exchanged or used under this Memorandum of Understanding, regardless of form, format or type.
ToR	means Terms of Reference and define the purpose and structures of a project, committee, or any similar collection of people who have agreed to work together to accomplish a shared goal. It presents the objectives, the role and responsibilities of the people involved.
UWC WEST	the members of the United Weather Centres West Collaboration program representing parties to this MoU.
NWP	means Numerical Weather Prediction. Numerical weather prediction (NWP) uses mathematical models of the atmosphere and oceans to predict the weather based on current weather conditions. A mathematical model usually describes a system by a set of variables and a set of equations that establish relationships between the variables.
PARTY	means any signatory to this MoU.
THE PROJECT	means the project that has been defined in article 2 that provides the basic facilities to enable the Parties to accomplish joint operational exploitation of common NWP/EPS models from 1 st of January 2023 and the availability of a suitable HPC infrastructure from the end of the second quarter of 2022
THIRD PARTY	means any person or other entity whose government or entity thereof is not a Party.

Article 2. Purpose, Objectives and Duration

1. This MoU with annexes describes the purpose and general objectives agreed by the Parties for their cooperation and the terms and conditions under which they will cooperate to achieve these purposes and objectives.
2. The main purpose of this collaboration is to enable the Parties to accomplish joint operational exploitation of a science-based limited-area Numerical Weather Prediction system, including ensemble prediction and the related pre- and post-processing activities from 1st of January 2023 and the availability of a suitable HPC infrastructure from the end of the second quarter of 2022.
3. In addition to the stated purpose of this cooperation, it is anticipated to integrate this operational NWP/EPS activity within the entire UWC partnership after 2027.
4. In the context of this cooperation, the Parties are committed to the following general objectives which are shared with the UWC partners:
 - a. Based on a common implementation of the shared ALADIN-HIRLAM NWP System ("HARMONIE-AROME") make the model data available for post-processing purposes.
 - b. Use a common domain for the NWP/EPS system.
 - c. Use a robust common IT (HPC) infrastructure for the operation of the NWP/EPS system.
 - d. Carry out joint development activities, on the basis of the ALADIN-HIRLAM strategic plans, with the aim to provide high quality forecasts.
 - e. Keep pace with the growing need for computational capacity to capture a quality improvement in NWP forecasting in the best possible cost-efficient and energy efficient manner.
5. This MoU shall enter into force on the date it is signed and covers the implementation phase until the MoU is replaced by any other agreement between the Parties, or until terminated unanimously by the Parties.
6. This MoU contains the governing principles for the cooperation. Agreements and contracts made under this MoU should reflect these principles and also be interpreted in light of this MoU. The MoU is supplemented with an Annex listing the agreements and contracts made under this MoU.

Article 3. Governance, organization and responsibilities

1. The Parties intend to organize their collaboration as described in detail in the annex to this MoU.

The organization consist at least of:

- a. the UWC West Council (the Council)
 - b. the UWC West Steering Committee (SC)
 - c. the Project Group (PG), managed by the Project Manager (PM)
2. The Council, consisting of the Director Generals from each of the Parties, will exercise executive-level guidance and oversight for the Project. The Council elects a chair from its members. The chair is elected for 1 year. In exercising its executive-level guidance and oversight of the Project, the members of the Council representing parties to this MoU will perform functions including, but not limited to:
- a. Reviewing progress towards accomplishing the purposes and objectives of the Project.
 - b. Approving the periodic Project plan and business case.
 - c. Decide on the periodic Project budget.
 - d. Consulting on any matters that affect the Project and resolve any issues raised by the SC members.
 - e. Decide the ToR for the SC.
3. Under the Council the established Steering Committee (SC) will provide a forum for discussions, consultations, and decisions on Project matters (e.g. staffing, scope) and provide recommendations to the Council. The SC shall allocate and monitor resources, ensuring that the PG members are given enough time to work on the Project and that other experts from their institute may give contributions to the PG work. Further procedures and tasks of the SC are stated in the ToR of the SC.

The SC consists of one person from each Party. Each Party appoints its member. The SC is a multidisciplinary body, staffed by persons at a high management level with the necessary mandates, reporting directly to their respective Director General. The SC appoints the chair from its own ranks for a period of two (2) years. The period may be extended by decision of the SC.

Decisions of the SC will be made by consensus, and those decisions affecting the execution of this MoU will be documented in serially numbered and dated decision memoranda. The SC may change the content of the Annexes to this MoU.

4. The Project manager (PM) reports directly to the SC, and will manage the Project on behalf of the Parties in accordance with this MoU. The procedures and tasks for the PM are listed in the annex to this MoU.
5. The established Project Group (PG) consists of different Working Groups with tasks specified in the ToR of the PG. The PG is multidisciplinary with one or two experts appointed by each party. The ToR for the PG is listed in the annex to this MoU.
6. The chair of the SC and the PM are preferably employed by different Parties.

Article 4. Financial Provisions

1. Each Party shall cover its own costs and expenses with respect to its activities under this Mou.
2. In kind contributions, in form of man hours, will be negotiated and stated in the Project Plan. The negotiated man hours are binding to the parties.
3. Common cost, i.e. cost the projects incurs as a whole and which cannot be assigned directly to any Party, shall be shared between the Parties according to the principle that DMI, KNMI and Met Éireann pay equal shares and that IMO pays a portion that is one third of the amount payed by any of the three larger countries. The distribution of common costs are as follows: DMI, KNMI, Met Éireann: 30% each; IMO: 10%.
4. During the yearly preparation of the Project budget, the Common costs will be determined and distributed in accordance with the agreed cost share, unless explicitly decided and stated otherwise in the project budget. Budget expenditures will be evaluated once every three months. Costs for the PM, consisting of direct salary costs + 25% overhead, and travel costs, are common costs shared by the parties.
5. The SC will propose a Project budget. The budget will be decided by the Council on a yearly basis. The Project budget will follow the calendar year (1st of January - 31st of December).
6. Under exceptional circumstances a supplementary budget can be proposed by the SC and decided upon by the Council during the fiscal year.

Article 5. Liability

1. For liability arising out of, or in connection with, activities undertaken in performance of official duty in the execution and for the benefit of the Project, the following provisions will apply:
 - a. Each Party waives all claims against the other Parties for damage of any kind caused by one of the Parties' personnel or contractors. If, however, such damage results from wilful misconduct or gross negligence of a Party, its personnel or contractors, the costs of any liability will be borne by the Party alone.
 - b. Claims from third parties for damage of any kind caused by one of the Parties' personnel or contractors will be processed by the most appropriate Party, as determined by the Parties. The cost incurred in satisfying such claims will be borne by the Parties each paying a reasonable amount of the claim, as decided by the Parties. If, however, such damage results from wilful misconduct or gross negligence of a Party, its personnel or contractors, the costs of any liability will be borne by the Party alone.

- c. Should the Parties not be able to agree upon a reasonable amount of any liability from claims from a third Party, the claim will be shared in accordance with the agreed shares for the common cost.
2. Claims arising under any contract awarded under this MoU will be resolved in accordance with the provisions of that contract.

Article 6. Intellectual Property Rights and Data policy

1. National models: Any production of a national model will not affect the Intellectual Property Rights (IPR) for these models.
2. Data policy for the joint NWP production: Each one of the participants in the cooperation can use the data generated in the common NWP production according to its national policies.

The collaboration on NWP production means that some model output is common to DMI, IMO, KNMI and Met Éireann, and the Parties will have common ownership and IPR to these products which the parties can exploit independently from each other.

The raw model output is licensed separately under the organisations licenses, meaning no common data policy is required.

3. National observations: DMI, IMO, KNMI and Met Éireann all have obligations related to national observations. These obligations include quality control, archiving and distribution of the data. But there will also be a number of national or other observations which are not part of the free international exchange of observation data and which may have restriction on their use. Such data available to any of the institutes and which have a potential to be used for the common production shall be available to the parties for the models included in the common production and research connected with the common production. The parties shall respect the restrictions on those data thus the availability for common production does not have any implications on the redistribution of the observation data.
4. Access to the common model data: It must be ensured that all external parties and, when applicable, the commercial arms of DMI, IMO, KNMI and MET Éireann get access to the common model data at the same time in order to secure a level playing field.

Article 7. Confidential Information, duty of confidentiality

1. The Parties understand and agree that the exchange of Information under the auspices of this MoU may result in the exchange of Information that is stated as confidential by the disclosing party and must be kept confidential.
2. Information which is shared between the Parties in this collaboration shall be treated according to the information acts for the public sector in the respective countries.
3. If a Party by law is required to disclose any of the above mentioned types of Information, that Party will notify the originating Party as soon as this is apparent.
4. Joint press statements or other public announcements outside the cooperation should be agreed at the appropriate level. All Parties can, however, in general terms, refer to the cooperation under this MoU on their webpage or in other publications.

Article 8. Voting procedures

1. The basic principle for decisions made by the governing bodies under the MoU is unanimity.

Article 9. Dispute resolution

1. Any dispute between the Parties arising out of the interpretation or the execution of this MoU shall be settled by mutual agreement of the Parties.
2. Disputes shall be settled according to the principle of subsidiarity, meaning that any dispute is to be settled at the level where it occurs, and if not solved there lifted to the next appropriate level, with the members of the Council being the final body for dispute resolutions.
3. Dispute resolutions under any contract awarded under this MoU will be resolved in accordance with the provisions of that contract.

Article 10. Amendment

1. This MoU may only be amended in writing by the Council. The amendments shall be dated and listed in the Annex mentioned in Article 2 to this MoU.

Article 11. Withdrawal and termination

1. Any Party can, without cause, withdraw from the Project and terminate its involvement in the activities set out in this MoU. Such withdrawal can only be effectuated at the completion of a fiscal year (31st of December).
2. The withdrawing Party shall notify the other Parties of its desire to withdraw without delay and the matter will be subject to immediate consultation among the Parties to enable a full evaluation of the consequences to the project as a whole.
3. If, after the consultation, a Party considers it necessary to withdraw, the following procedure will apply:
 - a. the withdrawing Party will notify the other Parties in writing of its decision to withdraw at least 3 months in advance of the year that the withdrawal will become effective;
 - b. the withdrawing Party will continue its participation, financial and otherwise, until the effective date of withdrawal;
 - c. at the request of the other Parties, the withdrawing Party will take all necessary actions within its control to ensure that the Project can be continued by the remaining Parties;
 - d. the withdrawing Party will be liable for two types of costs:
 - I. its share, in accordance with the agreed shares for the common cost, of the project cost expended under this MoU up to the effective date of withdrawal; and,
 - II. all direct costs arising as a result of the withdrawal, including the cost of any contract termination or modification caused by the withdrawal; the Parties will endeavour to keep all direct costs of withdrawal as low as possible;
 - e. the total contribution by any withdrawing Party, including withdrawal costs, will in no event exceed the amount the withdrawing Party would have contributed had it remained in the Project; and
 - f. the withdrawing Party shall not take part in the preparation and the decision concerning the budget for the coming fiscal year.
4. In the event of a unanimous decision to terminate the Project, the Parties shall consult to decide upon the appropriate course of action, including terms or procedures to resolve any remaining issues or obligations. The Parties shall continue to fulfil their obligations up to the effective date of termination. The Parties will jointly meet the cost of termination in accordance with the agreed shares for the common cost.

Article 12. General provisions

1. Fulfilling the provisions of this MoU is subject to national laws and regulations.
2. None of the Parties shall have the authority to act on behalf of or to obligate any other Party (financially or otherwise) without a decision from the Council.
3. If a Party becomes unable to fulfil the provisions of this MoU, it will promptly notify the other Parties. The Parties will immediately commence consultations. If the result of the consultations is not acceptable to all Parties, then the effect will be as if the Party at hand had given notice to withdraw according to Article 11 and the procedures described therein will apply.
4. This MoU does not affect the Parties responsibilities towards their employees.
5. The Parties shall aim at using the most environmentally friendly solutions available, such as green power.

Article 13. Additional Parties

1. In the event that new parties (all of which must be members of the UWC consortium) wish to join the collaboration, the Parties to this MoU shall consult on that matter.
2. If all Parties agree to the addition of a new party to join the collaboration, the Council shall negotiate the terms for such entry.
3. The results of the negotiations shall be stipulated in an accession agreement, which should be signed by all Parties. The accession agreement shall be attached as an Annex to the MoU.

ANNEXES

Terms of Reference

SC:

In exercising its decision making-level guidance and oversight of the Project, the SC will perform functions including, but not limited to:

- a. Review progress towards accomplishing the purposes and objectives of the Project.
- b. Select the Project Manager
- c. Propose the Project budget.
- d. Resolve issues raised by the PM or PG.
- e. Conduct financial oversight of Project efforts to ensure compliance with the financial section of this MoU and the business case for the Project.
- f. Approve Project expenditure and allocation of resources according to the approved Project plan and business case. Follow up on the allocated resources, making sure that the PG members are given enough time to work on the Project and that other experts from their institute may give contributions to the PG work.
- g. Approve PM-recommended plans to manage the Project.
- h. Approve changes and deviations from the Project plan.
- i. Approve risk assessments and decide on appropriate risk responses.
- j. Approve contracts.
- k. Consult on any matters that affect the Project and resolve any issues raised by the UWC West Council members.
- l. Ensure that the necessary communication between the Project's organization and external parties is carried out.

The members of the Steering Committee will meet at least once a year. The chair of the SC will have weekly communication with the PM and is responsible for involving the rest of the SC when necessary.

Furthermore, the chair is responsible for:

- Distributing draft documents internally in the SC for comments, suggestions and feedback.
- Ensuring that all comments and feedback is adequately addressed among the members of the SC.
- Ensure that the deadlines for submission are met.

Decisions made by the SC shall be unanimous and documented in the minutes. If documents are circulated members of SC will be given a deadline to approve the document and approval should be given in writing (e-mail).

If the deadline is not met, approval will be obtained by utilizing the "silent procedure". This implies that a draft is approved unless any member raises an objection to it before the deadline.

The SC reports directly to the UWC West Council.

The SC will have physical meetings, videoconferences and written correspondence whenever needed.

PM:

The Project Manager (PM) is responsible for overseeing and managing the cost, schedule, performance requirements and the technical aspects of the Project.

The PM will perform functions including, but not limited to:

- a. Monitor progress according to the approved Project plan, regularly advising the SC on this progress, and apprising the SC of significant issues and problems as they arise.
- b. Manage the financial aspects of Project efforts to ensure compliance with the approved Project business case and financial section of this MoU.
- c. Prepare periodic progress reports as requested by the SC.
- d. Ensure that the necessary internal communication in the Project's organization is carried out.
- e. The PM manages the PG and will distribute the work and responsibilities among the members of the PG.

The PM and the SC (chair) will have weekly videoconferences. Furthermore, there will be physical meetings, videoconferences and written correspondence with the SC whenever needed.

The PM reports directly to the SC.

PG/WG:

The Project Group carries out the project and is responsible for the content aspects of the project. The PG consists of several working groups (WG) that each are chaired by one of its members. The WG consists of one or two experts from each NMS, and is composed so that the group is multidisciplinary, and able to merge and complement their respective competences in order to support the various investigations and work that must be carried out during the implementation stage. The WG can use the resources in their own NMS to perform specific work packages or to solve separate tasks that are identified in the project plan.

Various working groups can be set up to work on specific work packages according to the competences and workload needed.

The PG carries out the necessary work packages that lead to a model and IT infrastructure that is suitable for a joint operational exploitation of a science-based short-term numerical weather ensemble prediction systems as described in Article 2 of this MoU.

The work packages for the PG are:

- Experience gathering from similar international collaborations (experience on lessons learned from MetCoop, the DMI/IMO cooperation, HIRLAM cooperation and ECMWF)
- Analysis of requirements for operationalization of HPC and common NWP systems based on the interests and activities of the individual NMS's.
 - Governance for NWP cooperation and HPC usage

- Redundancy plan and back up
 - Consider issues of pre- and post-processing
- Prepare and execute the process for the acquisition of the IT infrastructure
 - HPC capacity and configuration requirements
 - Datacenter facilities
 - Data communication facilities
- Implement the IT infrastructure and make it operational ready
- Risk Assessment

More work packages may be added if this is decided by the SC.

In addition will the PG also contribute to the management documents, i.e. the project plan.

The Project Manager (PM) will distribute the work and responsibilities among the members of the WG. The work of the WG consists of:

- Drafting documents with relevant background information for the recommendations.
- Distributing the draft documents internally in the WG for comments, suggestions and feedback.
- Ensuring that all comments and feedbacks are adequately discussed among the members of WG. If consensus regarding the content of the documents cannot be reached the dissenting opinions shall be loyally reflected in the final drafts.
- Ensuring that all members of WG approve the final draft of the documents.
 - As a rule, members of WG will be given a deadline to approve the documents and approval should be given in writing (e-mail).
 - If the deadline is not met, approval will be obtained by utilizing the "silent procedure". This implies that a draft is approved unless any member raises an objection to it before the deadline.
- Ensure that the deadlines for submission are met.

The chair of the WG and the PM will have weekly videoconferences. Furthermore, will there be physical meetings, videoconferences and written correspondence whenever needed.

The PG shall present written documentation concerning the tasks as decided. The documentation shall be in English.

The chair of the WG reports directly to the PM.

Technical Annex, a feasibility study

Technical Annex that covers the technical and financial feasibility of a common model and IT infrastructure focusing on the model domain, the NWP configuration (ensemble) and the IT infrastructure.

Document reference: '*MoU UWC West - Technical Annex 201806015*'

Amendment to this MoU:

This annex contains the approved amendments to this MoU.

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Accession agreement

This annex contains the accession agreements (Article 13.3 9) for new members of UWC West.

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Agreements and contracts made under this MoU

This annex contains the agreements and contracts made in light of this MoU (Article 2.6).

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