

SERVICE CONTRACT No ECWMF/Copernicus/2021/CAMS2\_83\_METNorway/SC1  
implementing Framework Agreement No ECWMF/Copernicus/2021/CAMS2\_83\_METNorway

14 January 2022 | 11:19 GMT

This Service Contract is made on \_\_\_\_\_

- (1) The European Centre for Medium-Range Weather Forecasts, an inter-governmental organisation, governed by its Convention and associated Protocol on Privileges and Immunities, based at Shinfield Park, Reading, RG2 9AX, United Kingdom (“ECMWF”); and
- (2) The Meteorologisk Institutt, based in Henrik Mohns plass 1, PO 43 Blindern, 0313 Oslo, Norway, hereinafter referred to as “MET Norway” or the “Contractor”

In the terms of this Service Contract, ECMWF and the Contractor may each be referred to as a "Party" or, collectively as "Parties".

By the application of an authorised signature, the Parties each show their intention and willingness to be bound by the terms of this Service Contract, with effect from the date shown at Clause 2.1 below.

This Service Contract has been signed on behalf of each of the Parties by a duly authorised signatory on the date stated at the beginning of this document.

SIGNED for and on behalf of **ECMWF**:

DocuSigned by:  
*Dr Florence Rabier*  
68D2483A441443B...  
.....

**Dr Florence Rabier**

**Director General**

SIGNED for and on behalf of **MET Norway**:

DocuSigned by:  
*Lars-Anders Breivik*  
039A74A10100442...  
.....

**Lars-Anders Breivik (lars.anders.breivik@met.no)**

**Director of Research**

1. Subject Matter
  - 1.1 This Service Contract implements Framework Agreement **No ECMWF/Copernicus/2021/CAMS2\_83\_METNorway** (the "**Agreement**").
  - 1.2 Unless otherwise defined in this Service Contract, terms used in this Service Contract shall have the meaning given to them in the Agreement.
  - 1.3 The subject matter of this Service Contract is: **CAMS2\_83 - Regional evaluation & quality control (EQC)**
  - 1.4 The Contractor undertakes, in accordance with the terms set out in the Agreement and in this Service Contract and the annexes thereto, which form an integral part thereof, to perform the Services set out in Annex 1 (ECMWF's Specification for the Framework Agreement) In accordance with Annex A (ECMWF's Request for Service) and Annex B (Contractor's Tender for Service Contract).
  - 1.5 The terms of the Agreement are incorporated into and form part of this Service Contract, as varied and amended by the other provisions of this Service Contract.
2. Effect and Duration
  - 2.1 The Parties agree that this Service Contract shall take effect on and from **01/11/2021**.
  - 2.2 The duration of the performance of the Services shall not exceed **20 months**. Performance of the Services shall start from the date of entry into force of this Service Contract.
  - 2.3 The period of performance of the Services may be extended only with the express written agreement of the Parties before such period elapses.
3. Price
  - 3.1 The maximum total price to be paid under this Service Contract shall be **345,116.00 EUR (three hundred forty-five thousand one hundred sixteen euros and zero cents)**, which is broken down in detail in Annex C (Financial Annex) and/or Annex 2 (Contractor's Tender for Framework Agreement) and which shall cover all Services performed under this Service Contract.

### **Annexes A, B and C**

Annex A – ECMWF's Request for Service

Annex B – Contractor's Response to Request for Service

Annex C - Financial Annex

**ANNEX A - Request for Service**

ECMWF/COPERNICUS/2021/CAMS2\_83\_METNorway

[Copernicus.notices@ecmwf.int](mailto:Copernicus.notices@ecmwf.int)

Meteorologisk Institutt  
Henrik Mohns plass 1  
PO 43 Blindern  
0313 Oslo  
Norway

Attention: Lars-Anders Breivik, Director of Research

Dear Mr. Breivik,

**COPERNICUS SERVICES – CAMS2\_83**

I refer to the Framework Agreement between ECMWF and **METNorway** with reference above.

This is a formal request for **METNorway** to provide services, under the terms of the Framework Agreement, in accordance with the Annex 1 specification and for the period of **1 November 2021 to 30 June 2023**.

Yours sincerely,

Jean-Noël Thépaut  
Director of Copernicus Services

# ECMWF Copernicus



## CAMS2\_83\_METNorway

# ANNEX 3B to the Framework Agreement Service contract 1

ISSUED BY: Michael Gauss, MET Norway
Date: 24 Nov 2021
Version: 1



Funded by the European Union

Implemented by



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### 1 Description of work

*The work to be carried out during Service Contract 1 corresponds to the first 20 months of the implementation plan of the main proposal (see Annex 2 to the Framework Agreement), i.e. the period 1 November 2021 to 30 June 2023.*

CAMS2\_83 deals with the Evaluation and Quality Control (EQC) of the regional models used in CAMS2\_40 (the Regional Service Provider) for forecasts and analyses of air pollution in Europe. The regional models, and the Ensemble, are evaluated against measurements regularly, and the results of the evaluation are published via web pages but also in quarterly and annual reports. The model evaluation is done against both *surface* and *above-surface* measurements. Furthermore, the uptake of *boundary conditions* (from the global CAMS product will) in the regional models is assessed, and possible issues are identified and conveyed to the modelling teams of CAMS.

The CAMS2\_83 project gathers experts in model evaluation both from the scientific and the technological side and builds, to a large extent, on existing tools which were developed in earlier CAMS projects but will evolve further during CAMS2\_83. Special emphasis is put on merging and harmonizing the evaluation tools into one web interface, a ‘one-stop shop’, where both users and providers can find information relevant to their work easily and in a timely manner.

Species to be evaluated are O<sub>3</sub>, NO<sub>2</sub>, SO<sub>2</sub>, CO, PM<sub>10</sub>, PM<sub>2.5</sub> and pollen, as provided by the Regional Service Provider. Statistics such as bias, normalized modified mean bias, root mean square error, correlation and fractional gross error are computed as a function of forecast hour and season, averaged over the CAMS regional domain, individual countries, and at site-level. In addition, metrics and diagrams suggested by FAIRMODE (Forum for Air quality Modeling) will be included in the evaluation during Service Contract 1. In regard to pollen, the availability of measurement data will determine whether or not the evaluation can be shown already for the pollen season of 2023, i.e. within Service Contract 1.

The annual evaluation reports include the EQC reports for the interim and validated reanalyses. During Service Contract 1, EQC reports will be delivered for the validated reanalyses of 2019 and 2020 and for the interim reanalyses of 2021 and 2022.

User engagement activities will occur on request within the allocated budget. In any case, user queries received through the Copernicus helpdesk will be handled in a timely manner, and input to the CAMS Knowledge Base and the URDB will be provided.

## 2 Main objectives to be reached

The main objectives of CAMS2\_83 are to:

- ensure a seamless transition of regional evaluation services from previous CAMS projects (in particular CAMS\_50 and CAMS\_84) and enhance them with new metrics (FAIRMODE) and new species to be evaluated against measurements (pollen);
- continuously evaluate the regional models of CAMS in near-real time against large volumes of surface and above-surface measurement data;
- check the uptake of chemical boundary conditions from the CAMS global product in the regional models;
- convey the results of the evaluation to both users and providers timely and in a convenient format, through comprehensive reports, a harmonized web interface, and different sorts of user engagement.

The main development during Service Contract 1 will be to:

- build a new evaluation service at MET Norway, to be operational by the end of Service Contract 1;
- include the above-surface evaluation and boundary condition assessment, as well as new chemical components, in the regional EQC reports (both quarterly and annual reports);
- implement FAIRMODE metrics in the evaluation.

## 3 Work packages description

<b>Work package #</b>	WP CAMS2_8300	<b>Start/End date</b>	M1-M42
<b>Work package title</b>	Management and coordination		

### Main objectives

- Ensure a smooth workflow and timely provision of deliverables
- Ensure optimal collaboration between contractors

### Description of activities

Task 8301 : This WP has one task - management and coordination of the project team. The deliverables consist of quarterly implementation (progress) reports, annual implementation (progress) reports, preliminary financial forms (each year), and annual implementation plans. In addition, the key performance indicators will be updated with ECMWF after the first year of the project. To ensure that the progress of the project is in line with ECMWF's expectations, review meetings will be held with ECMWF about every 6 months. Regular meetings will also occur among the contractors of CAMS2\_83, at least once every quarter, and most probably by video-conferencing.

### Deliverables

#	Responsible	Nature	Title	Due
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D0.1.1-2022Q1 <sup>1</sup>	MET Norway	Report	Quarterly Implementation Report Q1 2022 (covering Jan/Feb/Mar 2022)	15/04/2022
D0.1.1-2022Q2	MET Norway	Report	Quarterly Implementation Report Q2 2022 (covering Apr/May/Jun 2022)	15/07/2022
D0.1.1-2022Q3	MET Norway	Report	Quarterly Implementation Report Q3 2022 (covering Jul/Aug/Sep 2022)	15/10/2022
D0.1.1-2023Q1	MET Norway	Report	Quarterly Implementation Report Q1 2023 (covering Jan/Feb/Mar 2023)	15/04/2023
D0.1.2-2021	MET Norway	Report	Annual Implementation Report for 2021	28/02/2022
D0.1.2-2022	MET Norway	Report	Annual Implementation Report for 2022	28/02/2023
D0.1.3-2021	MET Norway	Other	Preliminary financial form for 2021	15/01/2022
D0.1.3-2022	MET Norway	Other	Preliminary financial form for 2022	15/01/2023
D0.1.4-2023	MET Norway	Report	Implementation plan for 2023	30/09/2022
D0.1.5-2021	MET Norway	Other	Copy of prime contractor's general financial statements and audit report 2021	30/06/2022
D0.1.5-2022	MET Norway	Other	Copy of prime contractor's general financial statements and audit report 2022	30/06/2023
D0.1.6	MET Norway	Other	Updated KPIs (list, targets...) after review with ECMWF	30/11/2022

<b>Milestones</b>				
#	Responsible	Title	Means of verification	Due
M0.1.1	MET Norway	Progress review meeting with ECMWF / Payment milestones	Minutes of meeting	30/04/2022
M0.1.2	MET Norway	Progress review meeting with ECMWF / Payment milestones	Minutes of meeting	31/10/2022
M0.1.3	MET Norway	Progress review meeting with	Minutes of meeting	30/04/2023

<sup>1</sup> Deliverables (and Milestones) are numbered as per the following format DX.Y.Z (MX.Y.Z), where X is the WP number, Y is the task number and Z is the Deliverable (Milestone) number in this task. Deliverables delivered annually are numbered DX.Y.Z-yyyy, where yyyy is the year the Deliverable refers to (e.g. DX.Y.Z-2016, DX.Y.Z-2017). Deliverables delivered quarterly are numbered DX.Y.Z-yyyyQx, where yyyyQx is the quarter of the year the Deliverable refers to (e.g. DX.Y.Z-2016Q1, DX.Y.Z-2016Q2). The same numbering format is applied for Milestones.

		ECMWF Payment milestones	/		
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<b>Work package #</b>	WP CAMS2_8310	<b>Start/End dat</b>	M1-M42
<b>Work package title</b>	EQC of daily Regional Products		

#### Main objectives

- Issue quarterly reports on the performances of the CAMS regional models and the ensemble
- Include both surface and above-surface evaluation
- Assess the correct uptake of boundary conditions and compare performances between the regional and global models of CAMS

#### Description of activities

##### Task 8311 : Surface evaluation

Scores and graphs for the surface evaluation of the CAMS regional models and the Ensemble will be produced at Meteo France (until 2023) and MET Norway (from 2023 at the latest) and be included in the quarterly EQC reports of Task 4. They will also feed into the web interface of WP CAMS2\_8330.

##### Task 8312 : Above-surface evaluation

Scores and graphs for above-surface evaluation will be produced at KNMI (with help from CNRS-LAERO) and be included in the quarterly EQC reports of Task 4. They will also feed into the IRA/VRA evaluation reports and the web interface of WP CAMS2\_8330.

##### Task 8313 : Effect of boundary conditions

Graphs illustrating the uptake of boundary conditions by the CAMS regional models will be produced at KNMI and be included in the quarterly EQC reports of Task 4.

##### Task 8314 : Production of quarterly EQC reports

In total, 6 quarterly EQC reports for the NRT forecasts and analyses will be produced at MET Norway over the course of Service Contract 1, with input from the three previous tasks, containing scores and graphs for each of the operational systems as well as the Ensemble. The reports will also contain comparisons of performance between the CAMS regional and global models, as well as illustrations of the uptake of boundary conditions by the regional models. Towards the end of Service Contract 1, the evaluation of pollen will be included, and, most likely much earlier, new metrics suggested by FAIRMODE will be used. The new Model Output Statistics (MOS), as recommended by CAMS\_63, will be included in the evaluation in 2023. It is not clear yet whether this will be done at the end of Service Contract 1 or at the beginning of Service Contract 2.

The first report will be issued in February 2022 and cover the period SON2021, while the last report of Service Contract 1 will be due in April 2023 and cover the period DJF 2022/23.

#### Deliverables

#	Responsible	Nature	Title	Due
D1.4.1-2021Q4	MET Norway	Report	Quarterly EQC report for the NRT forecasts and analyses, for each of the operational systems as well as the ensemble (for SON 2021)	28/02/2022
D1.4.1-2022Q1	MET Norway	Report	Quarterly EQC report for the NRT forecasts and analyses, for each of the	30/04/2022



			operational systems as well as the ensemble (for DJF 2021/2022)	
D1.4.1-2022Q2	MET Norway	Report	Quarterly EQC report for the NRT forecasts and analyses, for each of the operational systems as well as the ensemble (for MAM 2022)	31/07/2022
D1.4.1-2022Q3	MET Norway	Report	Quarterly EQC report for the NRT forecasts and analyses, for each of the operational systems as well as the ensemble (for JJA 2022)	31/10/2022
D1.4.1-2022Q4	MET Norway	Report	Quarterly EQC report for the NRT forecasts and analyses, for each of the operational systems as well as the ensemble (for SON 2022)	31/01/2023
D1.4.1-2023Q1	MET Norway	Report	Quarterly EQC report for the NRT forecasts and analyses, for each of the operational systems as well as the ensemble (for DJF 2022/2023)	30/04/2023

<b>Work package #</b>	WP CAMS2_8320	<b>Start/End date</b>	M1-M42
<b>Work package title</b>	EQC of regional (annual) reanalyses		

#### Main objectives

- Perform a detailed evaluation of the CAMS regional systems' interim and validated reanalysis results after these have been provided by CAMS2\_40
- Issue annual reports on the results from this evaluation, both for the interim reanalysis (spring each year, for the year before) and the validated reanalysis (autumn each year, for two years before)

#### Description of activities

Task 8321 : Evaluation of the interim reanalysis results from each regional model and the Ensemble

2 reports will be issued from this task by INERIS during Service Contract 1, containing the evaluation results from all regional models for the interim reanalysis for 2021 and 2022, respectively. The reports will be provided by the end of May in the year after the year they refer to. In addition to surface evaluation, the reports will also include an evaluation against above-surface evaluation provided by KNMI. The species to be evaluated are O<sub>3</sub> (daily max), NO<sub>2</sub> (daily max), SO<sub>2</sub> (daily mean), CO (daily mean), PM<sub>10</sub> (daily mean), and PM<sub>2.5</sub> (daily mean). Scores to be shown are bias, correlation and RMSE, averaged over the whole domain but also for regions (Northern, Eastern, Southern, Western Europe). Performances for representing the threshold exceedances are also assessed. FAIRMODE metrics will be definitely implemented during 2022 in the EQC report for IRA 2021.

Task 8322 : Evaluation of the validated reanalysis results from each regional model and the Ensemble

2 reports will be issued from this task by INERIS during Service Contract 1, containing the evaluation results from all regional models for the validated reanalysis for 2019 and 2020, respectively. The first report will be provided in January 2022, while the second one will be provided in October 2022. In addition to surface evaluation, the VRA reports (except the first one) will also include an evaluation against above-surface evaluation provided by KNMI. The species to be evaluated are O<sub>3</sub> (daily max), NO<sub>2</sub> (daily max), SO<sub>2</sub>, CO, PM<sub>10</sub> (daily mean), and PM<sub>2.5</sub> (daily mean). Scores to be shown are bias, correlation and RMSE, averaged over the whole domain but also for regions (Northern, Eastern, Southern, Western Europe). Performances for representing the threshold exceedances are also assessed. FAIRMODE metrics will be definitely implemented during 2022 in the EQC report for VRA 2020.

<b>Deliverables</b>				
<i>#</i>	<i>Responsible</i>	<i>Nature</i>	<i>Title</i>	<i>Due</i>
D2.1.1-2021	INERIS	Report	Annual EQC report for the interim reanalysis for 2021, for each of the operational systems as well as the ensemble	31/05/2022
D2.1.1-2022	INERIS	Report	Annual EQC report for the interim reanalysis for 2022, for each of the operational systems as well as the ensemble	31/05/2023
D2.2.1-2019	INERIS	Report	Annual EQC report for the validated reanalysis for 2019, for each of the operational systems as well as the ensemble	31/01/2022
D2.2.1-2020	INERIS	Report	Annual EQC report for the validated reanalysis for 2020, for each of the operational systems as well as the ensemble	31/10/2022

<b>Milestones</b>				
<i>#</i>	<i>Responsible</i>	<i>Title</i>	<i>Means of verification</i>	<i>Due</i>
M2.1.1-2021	INERIS	IRA 2021 model data available from Regional Service Provider	Model database at INERIS	31/03/2022
M2.1.1-2022	INERIS	IRA 2022 model data available from Regional Service Provider	Model database at INERIS	31/03/2023
M2.2.1-2019	INERIS	VRA 2019 model data available from Regional Service Provider	Model database at INERIS	30/11/2021
M2.2.1-2020	INERIS	VRA 2020 model data available from Regional Service Provider	Model database at INERIS	31/08/2022

<b>Work package #</b>	WP CAMS2_8330	<b>Start/End date</b>	M1-M42
<b>Work package title</b>	Provision of web-based evaluation graphics		

<b>Main objectives</b>
<ul style="list-style-type: none"> <li>● Maintain a web interface showing evaluation of CAMS regional model and Ensemble results daily (for the past day, past week, and past 3 months) and averaged over the regional model domain</li> <li>● Maintain a web interface showing evaluation of CAMS regional model and Ensemble results per season (for the past 8 seasons: DJF, MAM, JJA, SON, ...), averaged over the regional model domain, but also at country- and (measurement)site-level</li> <li>● Provide quarterly updated reports about uptime statistics of the web interface</li> </ul>

- During a transition phase of about 18 months, harmonize the different visualizations developed during previous CAMS projects (CAMS\_50, CAMS\_61, CAMS\_84) in AeroVal, to be embedded in the CAMS website.

#### Description of activities

Task 8331 : Evaluation for the past day, past week and past 3 months of the NRT regional analyses and forecasts

Maintenance of daily updated evaluation graphics and provision of quarterly reports about uptime statistics during the last 3 months. This task will deal with all near real time evaluations for the whole domain.

Task 8332 : Seasonal evaluation (DJF, MAM, JJA, SON) for the past 8 (fully elapsed) seasons

Maintenance of daily updated evaluation graphics and provision of quarterly reports about uptime statistics during the last 3 months. This task will deal with seasonal evaluations (last 8 quarters plus the quarter that has started, up to the present day), on country and site level.

Task 8333: This task will run in parallel with the first two tasks and is about the development of the AeroVal web interface, which will replace the evaluation pages developed in earlier projects into one harmonized web interface to be embedded in the CAMS website.

#### Deliverables

#	Responsible	Nature	Title	Due
D3.1.1-2021Q4	MET Norway	Online graphics & report	Quarterly report showing examples and documenting the relevant KPIs for evaluation graphics for the past day/week/3 months/past 8 quarters of the NRT FC/AN (contract start to Jan 2022)	28/02/2022
D3.1.1-2022Q1	MET Norway	Online graphics & report	Quarterly report showing examples and documenting the relevant KPIs for evaluation graphics for the past day/week/3 months/past 8 quarters of the NRT FC/AN (contract start to Apr 2022)	31/05/2022
D3.1.1-2022Q2	MET Norway	Online graphics & report	Quarterly report showing examples and documenting the relevant KPIs for evaluation graphics for the past day/week/3 months/past 8 quarters of the NRT FC/AN (contract start to Jul 2022)	31/08/2022
D3.1.1-2022Q3	MET Norway	Online graphics & report	Quarterly report showing examples and documenting the relevant KPIs for evaluation graphics for the past day/week/3 months/past 8 quarters of the NRT FC/AN (contract start to Oct 2022)	30/11/2022
D3.1.1-2022Q4	MET Norway	Online graphics & report	Quarterly report showing examples and documenting the relevant KPIs for evaluation graphics for the past day/week/3 months/past 8 quarters of the NRT FC/AN	28/02/2023

			(contract start to Jan 2023)	
D3.1.1-2023Q1	MET Norway	Online graphics & report	Quarterly report showing examples and documenting the relevant KPIs for evaluation graphics for the past day/week/3 months/past 8 quarters of the NRT FC/AN (contract start to Apr 2023)	31/05/2023

<b>Milestones</b>				
<i>#</i>	<i>Responsible</i>	<i>Title</i>	<i>Means of verification</i>	<i>Due</i>
M3.1.1	Meteo-France	Implementation of daily evaluation graphics for the past day, past week and past 3 months of the NRT regional analyses and forecasts (continuation from CAMS_50.II)	Graphics available via CAMS website via Meteo France	30/11/2021
M3.1.2	MET Norway	Implementation of daily evaluation graphics for the past day, past week and past 3 months of the NRT regional analyses and forecasts (complete and fully operational)	Graphics available via CAMS website via MET Norway (AeroVal, fully operational)	30/04/2023
M3.2.1	Meteo-France	Implementation of daily updated graphical presentation of NRT analyses and forecasts site-level evaluation statistics for the past 8 quarters (continuation from CAMS_50.II)	Graphics available via CAMS website via Meteo France	30/11/2021
M3.2.2	MET Norway	Implementation of daily updated graphical presentation of NRT analyses and forecasts site-level evaluation statistics for the past 8 quarters (complete and fully operational)	Graphics available via CAMS website via MET Norway (AeroVal, fully operational)	30/04/2023
M3.3.1	MET Norway	Implementation of daily evaluation graphics for the past day, past week and past 3 months of the NRT regional analyses and forecasts (prototype)	Graphics available via CAMS website via MET Norway (AeroVal, prototype)	30/04/2022
M3.3.2	MET Norway	Implementation of daily updated graphical presentation of NRT analyses and forecasts site-level evaluation	Graphics available via CAMS website via MET Norway (AeroVal, prototype)	30/04/2022

		statistics for the past 8 quarters (prototype)		
M3.3.3	MET Norway	Decision on where to run the evaluation scripts once AeroVal goes from 'prototype' to 'fully operational'.	Outcome of discussions available on request	31/07/2022

<b>Work package #</b>	WP4 CAMS2_8340	<b>Start/End date</b>	M1-M42
<b>Work package title</b>	User support and documentation of service		

#### Main objectives

- Detailed documentation of CAMS2\_83 products
- Answering user queries in a timely manner
- Keep track of user requirements
- Contribute to user engagement activities

#### Description of activities

Task 8341 : Collect and update documentation of statistics used in this contract. Formulas for how they are calculated and which data are used.

Documentation as to how we calculate scores and which data we use will be collected and kept up to date and be available to/at the CAMS Knowledge Base. This will also include the new (FAIRMODE) statistics.

Task 8342 : Answer user queries as they are raised (e.g. through Copernicus Helpdesk at ECMWF / JIRA)

User queries about CAMS2\_83 products and services, received through the Copernicus Helpdesk, will be answered in a timely manner by relevant CAMS2\_83 contractors.

Task 8343 : Collect input for the User Requirements Data Base (URDB)

Here we will make sure that any CAMS2\_83-relevant user requirement that comes to our attention will be conveyed to CAMS\_94 and the User Requirements Data Base.

Task 8344 : User engagement activities

This task accommodates for eventual needs in providing technical and scientific expertise in support of user engagement and training activities.

#### Deliverables

#	Responsible	Nature	Title	Due
D4.1.1-2022	MET Norway	Other	Contribution to CAMS Knowledge Base to ensure up-to-date information about products and services covered under this contract, status 2022.	30/06/2022
D4.1.1-2023	MET Norway	Other	Contribution to CAMS Knowledge Base to ensure up-to-date information about products and services covered under this contract, status 2023.	30/06/2023
D4.3.1-2022	MET Norway	Other	Input to CAMS URDB - 2022	30/11/2022

<b>Milestones</b>				
<i>#</i>	<i>Responsible</i>	<i>Title</i>	<i>Means of verification</i>	<i>Due</i>
M4.1.1	MET Norway	Plan for how to update CAMS Knowledge Base established	e-mail exchange can be made available	31/01/2022
M4.2.1	MET Norway	Plan for how to handle user queries established	e-mail exchange can be made available	31/12/2021

#### 4 Recapitulative table of deliverables and milestones (in chronological order)

The Recapitulative table of deliverables and milestones have been submitted as a separate MS Excel file in attachment to Annex 3B.

## Annex C – Financial Annex

Service Contract 2021/CAMS2\_83\_METNorway/SC1

### 1 Introduction

To implement the working relationship between ECMWF and the Contractor, the following provisions shall apply in addition to Clause 2 (Operation of Services) and Clause 4 (Finance).

Annex C specifies the practical specifications to verify the performance of the contract and lays down the agreed payment plan as part of Annex 3 - Service Contract.

For the purpose of this Annex, the following words and phrases shall have the following meanings:

“Accept” and “Acceptance”	shall refer to the process, whereby ECMWF satisfies itself that something meets the agreed expectations and “Notice of Acceptance” shall be written confirmation of Acceptance, from ECMWF to the Contractor;
“Cost Reimbursement”	shall mean that the Price to be paid for Services is the actual and acceptable costs and expenses associated with the Services (See Clause 4 of Framework Agreement), claimed at rates which have been agreed between the Parties in advance;
“Pre-Agreed Price”	shall mean that the Price to be paid for Services has been agreed between the Parties in advance and will be paid, as agreed, subject to acceptance of the Deliverables and subject to audits against costs and expenses submitted in Annex 2.

### 2 Payment Plan

Work packages and tasks will be covered under the following payment method:

- **Pre-Agreed Price:** All activities

### 3 Payment Plan

The payment plan as laid down in the table below has been agreed for Service Contract [1]:

						Duration	Amount (EUR)			
Overall Price Framework Contract (maximum)						42 months	599,984.00			
Price Service Contract 1						20 months	345,116.00			
Payment Milestone number	Payment method	Anticipated date of payment Milestone completion	Period of activities / Milestone covered	Activities and Deliverables covered by payment Milestone	Full value of activities covered (EUR)	Payment amount (EUR)	Percentage	Cumulative budget (EUR)	Anticipated review time (days)	
1 *	PAP	01/11/2021	Payment at contract signature	Payment covering price of activities covered under PM 1 (25%) to be deducted from PM2		86,279.00	25%	86,279.00	N/A	
2	PAP	31/08/2022	T0 + 10	All activities, Deliverables and Milestones up until 31.08.2022	199,068.00	112,789.00	33%	199,068.00	45	
3	PAP	30/06/2023	T0 + 20	All activities, Deliverables and Milestones up until 30.06.2023	146,048.00	146,048.00	42%	345,116.00	45	
For payment at contract signature: * ECMWF reserves the rights to re-claim the payment on a pro-rata basis in case the contractor fails to perform as defined in the contract						TOTAL	345,116.00	100%		



## Payment procedure

### Contract performance verification

Performance of contractual activities will be verified by ECMWF on:

- *a continuous basis* on receipt of the relevant Deliverables and delivery of services respecting the agreed manner and submission dates as specified in Annex B, and
- *a quarterly basis*, on receipt of the Key Performance Indicators (KPI) report and the specified service provision. The KPI report is part of the Quarterly Report shall be submitted using the template as provided by ECMWF.
- *on a Milestone basis*. The performance will be verified based on completion to ECMWF's satisfaction of all related tasks, activities and Deliverables as specified under the Contract to achieve the Milestone. ECMWF shall assess the Milestone completion on the basis of the progress of the work, fitness for purpose of deliverables, and quality of documentation. The performance will be verified based on completion to ECMWF's satisfaction of all related tasks, activities and deliverables as specified under the Contract to achieve the payment milestone. ECMWF shall assess the payment milestone completion on the basis of the progress of the work, fitness for purpose of deliverables, and quality of documentation.

The Contractor shall notify ECMWF by email as soon as the Contractor considers that the payment milestone has been reached. The Payment Milestone Notification shall provide adequate justification of the milestone completion.

A dedicated review meeting with the Contractor or other form of communication with the Contractor may be carried out to assess [milestone completion and/or any outstanding activities]. A plan for the review meetings is specified in Annex B.

For the last Service Contract within the Framework Contract, final payment is subject to the acceptance of the Final Report as specified in Clause 2.3.4.1 and using the template as provided by ECMWF.

### Notice of Acceptance

Based on ECMWF's verification of the contract performance for the periods and milestones concerned, ECMWF sends a Notice of Acceptance or notice of the need for the Contractor to take some form of remedial action.

The Contractor will receive a Notice of Acceptance or a notice of the need for remedial action within the "Anticipated review time" as indicated in the payment plan table.

Reception of the Contractor's Payment Milestone Notification counts as the effective start date for the review. In case of a need for remedial action, the anticipated review time remains the same but counting from the date that the Contractor notifies ECMWF that all remedial actions have been closed and is ready for review.

The Contractor may only submit an invoice for the provision of operational services covered in that quarter on or after receipt of Notice of Acceptance of the same.

## Invoice

The invoice must comply with the specifications as laid down in Clause 4.5 and must be accompanied by a copy of the Notice of Acceptance from ECMWF and respecting the payment plan as presented above.

The invoice shall be sent to the following email address: [finance@ecmwf.int](mailto:finance@ecmwf.int). Please indicate in the email subject the contract name and payment number.

For **Pre-Agreed Price payments (payment 1, 2 and 3)**, the maximum price and the period covered by the payment are specified in the payment plan as described above. Prices shall respect the specifications as laid down in Clause 4.2.4. and Clause 4.2.5 of the Terms and Conditions.