

ECMWF Copernicus Procurement

Invitation to Tender



Copernicus Atmosphere Monitoring Service

Products in support of users in the domain
of air quality policies

Volume II

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1 Introduction

Some of today's most important environmental concerns relate to the composition of the atmosphere. The increasing concentration of the greenhouse gases and the various aerosol-weather feedbacks are prominent but often uncertain drivers of climate change. Ozone distributions in the stratosphere influence the amount of ultraviolet radiation reaching the surface.

In the troposphere, aerosols, ozone and other reactive gases such as nitrogen dioxide determine the quality of the air around us, affecting human health and life expectancy, the health of ecosystems and the fabric of the built environment. The variable abundance of the reactive gases change the oxidation capacity of the atmosphere and control therewith also the abundance of long-lived greenhouse gases. The composition of the troposphere and the associated deposition fluxes are major components of the biogeochemical cycles of carbon, nitrogen and sulphur and iron, which effect the land- and marine eco systems. Dust, smoke and volcanic aerosols affect the safe operation of transport systems and the availability of power from solar generation, the formation of clouds and rainfall, and the remote sensing by satellite of land, ocean and atmosphere.

In the wake of the agreement signed in Paris at the UNFCCC's 21st Conference of the Parties (COP-21) in December 2015, the need to monitor and to inform about the effectiveness of mitigation efforts for anthropogenic emissions of key greenhouse gases has become more acute and prominent. With its global coverage (or regional in the case of geostationary platforms), Earth Observation has a decisive role to play within such a monitoring system, complementing ground-based observations, "bottom-up" estimates of the emissions (included in official reporting) and atmospheric transport modelling.

To address these environmental concerns there is a need for data and processed information. The Copernicus Atmosphere Monitoring Service (CAMS) has been developed to meet these needs, aiming at supporting policymakers, business and citizens with enhanced atmospheric environmental information.

Within its first phase (2015 – 2020), the Service consolidated many years of preparatory research and development to deliver a range of operational services. In its second phase (2021 – 2027) these services are further consolidated, improved and expanded to address all the existing and emerging societal needs related to the atmospheric environment. The CAMS service portfolio consists of the following service elements:

- a) Daily production of real-time analyses and forecasts of global atmospheric composition;
- b) Reanalyses providing consistent multi-annual global datasets of atmospheric composition with a stable model/assimilation system;
- c) Daily production of real-time European air quality analyses and forecasts with a multi-model ensemble system;
- d) Reanalyses providing consistent annual datasets of European air quality with a frozen model/assimilation system, supporting in particular policy applications;
- e) Products to support policy users, adding value to "raw" data products in order to deliver information products in a form more directly adapted to policy applications and policy-relevant work;
- f) Solar and UV radiation products supporting the planning, monitoring, and efficiency improvements of solar energy production and providing quantitative information on UV irradiance for downstream applications related to health and ecosystems;

- g) Greenhouse gas atmospheric inversions for CO₂, CH₄ and N₂O net surface fluxes, allowing the monitoring of the evolution in time of these fluxes;
- h) Climate forcing from aerosols and long-lived (CO₂, CH₄) and shorter-lived (stratospheric and tropospheric ozone) agents;
- i) Anthropogenic and natural emissions, based on inventory data and modelling, for the global and European domains;
- j) Observation-based emission estimates of atmospheric pollutants for the global and European domains;
- k) Observation-based anthropogenic emission estimates of CO₂ and CH₄ for the global domain and emission hotspots.

This Invitation to Tender (ITT) is mainly targeting the **CAMS service element described under item (e), focusing on supporting users in the air quality & emissions policy domains.**

1.1 Definitions

Definitions specific for this ITT are defined below.

Global Service Provider: ECMWF is the provider of global products

Regional Service Provider: The contractor selected through another ITT (CAMS2_40) for delivering Regional Production comprising air quality analyses, forecasts and reanalyses over Europe.

Regional Production System: the modelling and data assimilation infrastructure used to provide the CAMS regional analyses and forecasts of atmospheric composition.

Atmosphere Data Store (ADS): the ADS is the primary access to the numerical datasets included in the CAMS portfolio.

Interim Annual Assessment Reports (IAAR): these assessment reports are based on the reanalyses of European air quality produced annually by the Regional Service Provider using the Regional Production System and European air quality observations gathered with little delay after real-time from the European Environment Agency (EEA). These observations have not been subjected to detailed quality control by the participating countries.

Annual Assessment Reports (AAR): these assessment reports are based on the reanalyses of European air quality produced annually by the Regional Service Provider using the Regional Production System and European air quality observations officially reported by the countries to the EEA. These observations have been subjected to full quality control by the countries.

Ambient Air Quality Directive (AAQD): at the time of the publication of this ITT, ambient air quality monitoring is regulated in the European Union by the air quality directives 2008/50/EC and 2004/107/EC which cover 12 air pollutants. In April 2024, the European Parliament agreed on a unique new text for the revised Ambient Air Quality Directive, that should be adopted by Q42024. Policy products developed under this ITT will related to the revised AAQD.

National Emission Reduction Commitments Directive (NERCD): this Directive (2016/2284/EU) sets objectives in terms of national emissions totals for 5 pollutants (SO₂, NO_x, NMVOC, PM_{2.5}, NH₃) for 2020-2029. The Commission will review this Directive by the end of 2025, and in that perspective, consultation of stakeholders should start in the second half of 2024.

2 Contract Summary

The ITT entitled “Products in support of users in the domain of air quality policies” is about activities to deliver a range of products of the CAMS portfolio especially relevant for air quality monitoring and management Policy Users. These products are:

- Interim Annual Assessment Reports (IAAR) based on the Interim annual European air quality reanalyses and material in support of national reporting duties on air quality and threshold exceedances;
- Annual Assessment Reports (AAR) based on the annual European air quality reanalyses which make use of validated data, to serve as a reference document on the status of air quality in Europe;
- On-line tools that offer alternative forecasts of European air quality with reduced level of emissions, which allow assessing the effectiveness of possible temporary mitigation sectoral measures or of candidate measures as part of future policy developments;
- daily source-receptor calculations, which allow tracking the pollutants in the main cities in Europe (more than 70) according to the geographical or sectoral origin and chemical composition of their (or their precursors) sources;
- Yearly source-receptor analysis synthesising and highlighting the main air pollution drivers in the cities targeted by the daily analysis;
- quarterly reports about major air pollution episodes in Europe;
- dedicated studies designed to support the implementation of the European air quality legislation.

Therefore, activities implemented in this ITT’s framework focus on facilitating the design and implementation of European air quality and emissions policies, by supporting directly the European Commission’s Directorate General for the Environment (DG-ENV) and Joint Research Centre (JRC), as well as the European Environment Agency (EEA) and ensuring a close liaison with them. This work will build on all the relevant products and services in the CAMS portfolio in order to bring most relevant information to these stakeholders. It will also interface with the CAMS National Collaboration Programme, involving all the EU Member States and Copernicus cooperating states, which aims to facilitate the further development and implementation of air quality and emissions reduction policies.

Finally, the work comprises the organisation of annual workshops to gather the community of air quality Policy Users of CAMS in order to discuss and get some feedback on the products delivered under this ITT as well as more generally on other CAMS Regional and Global Products that are relevant for EU, national and local air quality policies.

3 Technical Specifications

3.1 General Requirements

Several of the requested services in the sections below shall make use of one or more air quality forecasting systems. These air quality forecasting systems must have the following characteristics:

- the domain covered must be at least (25°W-45°E, 30°N-72°N);
- the system’s horizontal resolution must be finer than or equal to 0.1° by 0.1°, or equivalent resolution in kilometres;
- transport and physical processes must be driven by ECMWF’s high-resolution operational meteorological forecasts (using the most recent available forecast, which will be provided by

ECMWF), either directly in the case of chemistry-transport models or by means of nudging or similar techniques;

- the system will use for the baseline the regional emissions datasets (other than fire) of the CAMS portfolio;
- the system will use fire emissions as well as chemical boundary conditions provided by the CAMS Global Service Provider (aerosol, reactive gases and greenhouse gases -if accounted for) using the most recent available products;
- the system must have the capability to forecast atmospheric pollutants regulated at the European and national levels in Europe (gases and particulate matter);
- the system must have an existing track record of providing daily forecasts with evidence of performance (quality, timeliness/completeness of the output...) as documented in peer-reviewed publications, reports or technical notes.

3.2 Work package 7110 – European Air Quality Annual Assessment Reports

This work package shall deliver assessment reports based on the (Interim) annual European air quality reanalyses, which will be themselves produced as part of the activities covered by the CAMS Regional Service Provider.

One interim reanalysis (available by the end of February each year for the previous year) and one reanalysis based upon validated surface observations (its timing depends upon availability of validated surface observations from the EEA) will be produced annually. The two reanalyses will cover key air pollutants (O₃, NO₂, SO₂, CO, PM₁₀ and PM_{2.5}) over the domain (25°W-45°E, 30°N-72°N) and with a horizontal resolution of 0.1° by 0.1°. Companion verification reports against surface observations will be produced together with each reanalysis dataset by the Regional Service Provider; these verification reports will complement the assessment reports produced as part of this workpackage.

The production of the reports shall be discussed and co-ordinated with the EEA, which is producing annually its own report.

3.2.1 Task 7111: Interim Annual Assessment Reports

The Successful Tenderer shall produce an Interim Annual Assessment Report (IAAR) every calendar year, which will describe the past year in terms of background concentrations of air pollutants in Europe based upon the Interim annual European air quality reanalysis dataset for the past year.

The IAAR shall be a reference document of high standard, attractive and comprehensive for non-expert readers, including text, graphics, infographics and statistical tables. For this, it will strictly follow a template that will be discussed and agreed with ECMWF. The design of the document shall facilitate broad communication and dissemination.

The final document shall be reviewed and proof-read, in order to meet similar standards as scientific peer-reviewed publications or official publications of the EEA. In addition, the IAAR shall have an executive summary of a few pages highlighting the main findings.

The IAAR shall document the situation for the main regulatory pollutants (ozone, NO₂, PM₁₀ and PM_{2.5}) in terms of concentrations and/or indicators and impact metrics for the whole of Europe and the entire year. Other pollutants and pollens shall be covered, but with less emphasis. The IAAR shall investigate and comment on the situation for the different seasons and at least a few sub-regions of Europe. Graphics and statistical tables (within the main text or in annex) shall support the text. A selection of the main significant adverse air quality episodes, particularly episodes extending over more than one

country, shall be analysed and commented upon, highlighting in particular the contribution from (or absence of) natural contributions to PM and chemical pollutants (dust, fires, sea salts...) or from long-range transported pollution from outside Europe.

The report should present informative analyses and outcomes that will help national experts in the Member States to describe air pollution patterns and driving factors (especially emissions sources) in the Member States as requested by the European AAQD.

The IAAR shall be delivered not later than three months after the release of the Interim annual European air quality reanalysis dataset. Unless there are delays with the production of the numerical dataset and evaluation report (by the Regional Service Provider and the provider of the regional evaluation and quality control (EQC) reports, respectively), the latest publication date for the IAAR is thus the end of May each year. Meeting this target date for delivery is of high importance because one of the main uses for the IAAR is to support EU Member States in completing their reporting duties to the European Commission, a process that has to be completed by the end of September annually. Tenderers shall explain in their proposal how the process of delivering the IAAR will be handled for delivering on time while adequately addressing the requirements mentioned above.

3.2.2 Task 7112: Annual Assessment Reports

The requirements are the same as for Task 7111 but will be based upon the annual European air quality reanalysis datasets, which are based upon validated surface observations. The Successful Tenderer shall deliver one Annual Assessment Report (AAR) during each year of the contract.

The AAR shall be a reference document of high standard, attractive and comprehensive for non-expert readers, including text, graphics, infographics and statistical tables. For this, it will strictly follow a template that will be discussed and agreed with ECMWF. The design of the document shall facilitate broad communication and dissemination.

The final document shall be reviewed and proof-read, in order to meet similar standards as scientific peer-reviewed publications or official publications of the EEA. In addition, the AAR shall have an executive summary of a few pages highlighting the main findings.

The AAR shall document the situation for the main regulatory pollutants (ozone, NO₂, PM₁₀ and PM_{2.5}) in terms of concentrations and/or indicators for the whole of Europe and the entire year, and in terms of evolution and trends compared to previous years. Analysis and comparison with emissions of those pollutants and precursors is also expected to document the consistency between trends in ambient air concentrations and emissions. Other pollutants and pollens shall also be covered, but with less emphasis.

The AAR shall be delivered not later than three months after the release of the Annual Regional Reanalysis dataset by the Regional Service Provider. The AAR is complemented by a verification report, which is delivered by the provider of the regional evaluation and quality control (EQC) reports. The AAR shall include an annex to indicate how much the assessment changed from the one provided in the IAAR for the same year, which was released between one and two years before; the origin changes should be investigated (changes in values due to the observations validation process; addition or removal of sites; changes in regional data assimilation systems).

Tenderers shall complete Volume III A as part of their bid, which shall include at least the deliverables and milestones for this work package already indicated in the tables below. Volume III A will be used by the Tenderer to describe the complete list of deliverables, milestones and schedules for this work

package. All milestones and deliverables shall be numbered as indicated. All document deliverables shall be periodically updated and versioned as described in the tables.

WP7110 Deliverables			
#	Type	Title	Due
D1.y.z-yyyy ¹	Report	Interim Annual Assessment Report for the year YYYY	Annually
D1.y.z-yyyy	Report	Annual Assessment Report for the year YYYY	Annually
D1.y.z	Report Dataset Service Other		
...			

WP7110 Milestones			
#	Title	Means of verification	Due
M1.y.z	Content and design template of the IAAR	Documentation submitted to ECMWF	M2
M1.y.z	Content and design template of the AAR	Documentation submitted to ECMWF	M4
M1.y.z-yyyy	Notification of the start of production of the AAR	Note submitted to ECMWF	Annually
...			

3.3 Work package 7120 – Online sectoral source-apportionment tools

CAMS delivers daily information and forecasts about the impact of emissions from various sectoral sources on air pollutant concentrations. Macro sectors (industry, residential, road traffic, shipping, agriculture) are targeted. In particular CAMS operates an online air quality scenario web interface, called “Air Control Toolbox”, which allows assessing the potential impact of different anthropogenic emissions abatement measures on a daily basis (https://policy.atmosphere.copernicus.eu/daily_source_attribution/sector_apportionment.php?date=2024-08-05&tab=nav-act-tab) applied throughout the European domain. In its first and basic version, the custom emission scenarios are targeting primary pollutants and precursors through uniform Europe-wide reductions that are translated on the fly in terms of ozone and particulate matter pollution, therefore including the secondary pollutants.

Moreover, for about 70 large cities in Europe, another interface displays ozone and PM chemical regimes to assess the dependence of air pollutant concentrations to the evolution of sectoral emissions

¹ Deliverables (and Milestones) shall be 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 should be numbered DX.Y.Z-yyyy, where yyyy is the year the Deliverable covers/refers to (e.g. DX.Y.Z-2016, DX.Y.Z-2017). Deliverables delivered quarterly should be numbered DX.Y.Z-yyyyQx, where yyyyQx is the quarter of the year the Deliverable covers/refers to (e.g. DX.Y.Z-2016Q1, DX.Y.Z-2016Q2). The same numbering format shall be applied for Milestones. Continuous deliverables at higher frequency can be labelled in the same way as quarterly deliverables.

(https://policy.atmosphere.copernicus.eu/daily_source_attribution/sector_apportionment.php?date=2024-08-05&tab=nav-chemical_regimes-tab) . Finally, for the same cities, a series of charts shows forecasts of the potential impact of macro-sectoral sources on PM and ozone concentrations (https://policy.atmosphere.copernicus.eu/daily_source_attribution/sector_apportionment.php?date=2024-08-05&tab=nav-cities-tab) .

The Successful Tenderer shall provide and operate such interfaces and toolbox with at least the same functionalities as the existing ones. They will offer users a flexible framework to explore quantitatively the benefit of different levels of emissions reduction on a daily basis and to understand the relative weights of each sector in air pollutant concentrations. The tool shall rely on an air quality forecasting system as described in Section 3.1.

In a second stage, the tenderer will propose an evolution plan to improve the ACT interface, especially in terms of ergonomics, performance on a range of browser/platforms , maps and data downloading, etc.. Moreover, they will propose relevant evolutions of the toolbox to further increase uptake by policy users, and to account for possible requests expressed in the CAMS User Requirement Data Base (URDB). The evolutions shall include at the minimum:

- Update of the algorithms run by the tool to increase technical performance;
- Include possibility to select emissions reduction at the country level;
- Increase the number of targeted cities;
- Allow sub- sectoral reductions (considering that the sectors covered by the current tool are “macro-sectors”)

For the Air Control Toolbox, the forecast results shall be presented in terms of daily mean surface concentrations of at least O₃, and PM₁₀ in the form of graphics, showing absolute values as well as difference plots compared to the reference (unperturbed emissions). The toolbox shall also provide graphics showing the emissions of the various sectors for the European domain.

The tenderer will propose several options that could be implemented in the time line and budget frames set by the present ITT.

While the main functionality of the toolbox relies on the user specifying the emission reductions, the toolbox should also include the functionality for specific pre-sets that mimic emission reductions as part of specific international agreements. At a minimum, this pre-set functionality shall include the emission reductions agreed as part of the Gothenburg protocol (see also, <http://policy.atmosphere.copernicus.eu/GothenburgScenario.html>) and the NERCD, and additional scenarios that might become relevant, with respect to future revision processes.

The toolbox shall either be hosted on the CAMS website or in a single comprehensive web-based system, which will be embedded in the CAMS website. The Tenderer shall describe the chosen option. Technical support for the service shall be available on a next-working-day basis.

The Successful Tenderer shall describe the methodology employed and the system set up in a report, to be delivered less than three months after the start of the contract resulting from this ITT. By that time, the air control toolbox shall have started to be delivered on a daily basis. The report shall be written in a way that gives enough insight to the users of the service on the approach and its reliability.

A second report describing options for the evolution of the service will be delivered within a six months period after the start of the contract. Development of the service evolution will start once the workplan is agreed with ECMWF, and the updated version of the toolbox should be made available to users within the first 18 months of the contract.

Tenderers shall complete Volume III A as part of their bid, which shall include the deliverables and milestones for this work package already indicated in the tables below. Volume III C will be used by the Tenderer to describe the complete list of deliverables, milestones and schedules for this work package. All milestones and deliverables shall be numbered as indicated. All document deliverables shall be periodically updated and versioned as described in the tables.

WP7120 Deliverables			
#	Type	Title	Due
D2.y.z	Report	Methodology and system set-up of the CAMS Air Control Toolbox	M3
D2.y.z-yyyyQq	Service	Provision of the daily updated Air Control Toolbox Service over the past quarter	Quarterly
D2.y.z	Report	Description of planned service evolutions	M6
D2.y.z	Report Dataset Service Other		
...			

WP7120 Milestones			
#	Title	Means of verification	Due
M2.y.z	Implementation of Air Control Toolbox	Service publicly available through the CAMS website	As early as possible and latest M3
M2.y.z	Presentation of the priorities and the methods envisaged for the service evolution	Meeting with ECMWF management	M3
M2.y.z	Implementation of Air Control Toolbox evolution	Service publicly available through the CAMS website	latest M18
...			

3.4 Work package 7130 – Country source allocation service

CAMS provides a source allocation service, providing daily forecasts of source contributions and chemical composition of particulate matter for a set of capitals and cities in the European Union (<http://policy.atmosphere.copernicus.eu/DailySourceAllocation.html>). It aims at addressing specifically the characterisation of the sources that are contributing to air pollution levels at a given time. The relative influence of local and remote sources as well as the chemical composition of fine particulate matter is critical information to assess effectiveness of potential measures to be taken:

e.g., in the case of an episode where long-range transport from distant sources is prominent, local emission reduction measures may have only limited effect. Such calculations, also called source-receptor calculations, rely on regional air quality systems and the specific requirements for this ITT are described in Section 3.1

3.4.1 Task 7131: Daily forecasts of source contributions and impacts to air pollution in EU cities

The Successful Tenderer shall operate a regional source allocation system, which shall be run daily to forecast for the next four days the relative influence of reducing local air pollution sources versus reducing sources from outside the agglomeration for three regulatory pollutants (ozone, PM₁₀ and PM_{2.5}) and for at least all the cities covered in the current service (see https://policy.atmosphere.copernicus.eu/daily_source_attribution/country_impact.php?date=2024-08-05 and https://policy.atmosphere.copernicus.eu/daily_source_attribution/country_contribution.php?date=2024-08-05). Appropriate modelling approaches will be proposed to assess respectively the impact of emissions reductions in areas surrounding main cities and the weight (contribution) of those various sources on air pollutant concentrations in the targeted cities and the tenderer shall propose improvement of the web interface to facilitate interpretation and use of the modelling results by policy users. The tenderer In addition, this service shall provide information on the breakdown of pollutants according to the geographical origin of pollution (precursors in the case of ozone) and according to chemical composition in the case of PM₁₀.

Source-receptor forecasts will be made available daily to the users in the form of graphics not later than 08 UTC (0-48h) and 10 UTC (49-96h). At the minimum, the current functionalities shall be reproduced. However, the Tenderer is free to suggest change in the graphical presentation, as long as at least the same information is available (the current version is the result of interactions with users and meets several expressed user requirements). The Tenderer is invited to describe in the technical solution the user interface and the different graphical products, which will be made available daily to the users. This material shall either be hosted on the CAMS web site or in a single comprehensive web-based system, which will be embedded in the CAMS web site. The Tenderer shall describe the chosen option. Technical support for the daily produced material shall be available on a next-working-day basis.

The Successful Tenderer will describe the methodology employed and the system set up in a report, to be delivered less than three months after the start of the contract resulting from this ITT. By that time, the daily forecasts of source contributions to EU cities themselves shall have started to be delivered on a daily basis.

In a second stage, the tenderer will propose evolution plans to improve the daily source contribution service to increase uptake by policy users, and to account for possible requests expressed in the CAMS User Requirement Data Base (URDB). Evolutions shall include at the minimum :

- Improvement of the web interface to facilitate readability and interpretation of the results;
- Improvement of the methodology to better account for the actual city footprint;
- Increase of the number of targeted cities or develop alternative area-targeted approach;
- Comparison with observations of PM chemical composition as reported by some monitoring networks (e.g. ACTRIS);
- Integration of access to the SHERPA tool from JRC (see following).

The tenderer will propose several options that could be implemented in the time line and budget frames set by the present ITT.

A second report describing options for potential evolution of the service will be delivered within a six months period after the start of the contract. Development of the service evolution will start once the workplan will be agreed with ECMWF, and the updated version of the daily forecast of source contribution service should be made available within the first 18 months of the contract.

In addition, the successful bidder shall provide an annual report built upon the routine operations of the source-receptor calculations. For each of the cities covered by the service, the results from daily operations will be averaged over seasonal (DJF, MAM, JJA, SON) and annual timescales. This will allow providing source-receptor information for each season of the past year, as well as for the past year as a whole, in terms of local/non-local/other, of geographical origin of species/precursors and of chemical composition.

Discussions with the European Commission, particularly the Joint Research Centre, have indicated that the scientific aspects underpinning source-receptor calculations still require attention. As a result, work is on-going as part of the FAIRMODE initiative in order to compare methodologies, improve them where possible, identify limitations, and provide appropriate documentation and users' support. The Successful Tenderer shall reserve some resources to engage with the JRC and the corresponding activities in FAIRMODE in order to ensure that CAMS supports these investigations and remains at the best state-of-the-art and that it provides most relevant information to the users about applicability and limitations. In particular, comparability and consistency with the results provided by the SHERPA tool developed by the JRC² will be investigated, with the aim to allow users running or accessing the SHERPA tool directly from the CAMS website.

3.4.2 Task 7132: Quarterly air quality analysis reports

The Successful Tenderer shall use primarily the results from the source-receptor calculation service to provide specific information about air pollution patterns and large-scale/trans-boundary air pollution episodes that occurred in Europe during each quarter of the year. Results will be presented in the form of a detailed report, which is intended to support the concerned Member States' a posteriori case analysis and complement in particular the IAAR, which will be produced after the end of the year.

Other modelling results could be included to complement the results from the source/receptor calculations (task 7131), as long as the model(s) employed meet the requirements described in Section 3.1. The outputs from the CAMS global system and the CAMS fire emissions service should also be considered regarding long-range transported plumes of dust, fire, volcanic ash or pollution. Moreover, interpretation and analysis tasks related to air pollution events that occurred during the quarter shall benefit from interactions with national experts from the countries concerned by each specific event, using the contact and framework of the CAMS National Collaboration Programmes (NCPs), which are now in place with a majority of countries. The tenderer will consider how contribution from national experts involved in the NCPs can be used to strengthen the quarterly reports.

Each quarter, one specific situation (large scale episode or policy relevant event) will be investigated in a didactic manner with the CAMS tools (in particular ACT and the source allocation service) to

² <https://jeodpp.jrc.ec.europa.eu/eu/dashboard/voila/render/SHERPA/Sherpa.ipynb>

illustrate how these tools can be used to deal with policy-relevant questions. The steps for analysing the situation, raising relevant and reliable conclusions, and objectively documenting potential sources of uncertainties will be described in a note that will be published on the CAMS website or used as training or capacity-building material for user experts in the Member States.

Tenderers shall complete Volume III A as part of their bid, which shall include the deliverables and milestones for this work package already indicated in the tables below. Volume III C will be used by the Tenderer to describe the complete list of deliverables, milestones and schedules for this work package. All milestones and deliverables shall be numbered as indicated. All document deliverables shall be periodically updated and versioned as described in the tables.

WP7130 Deliverables			
#	Type	Title	Due
D3.y.z	Report	Methodology and system set-up for production of daily forecasts of source contributions to EU cities	M3
D3.y.z-yyyyQq	Service	Provision of the daily updated Source-Receptor Service over the past quarter	Quarterly
D3.y.z	Report	Description of various options for service evolutions	M6
D3.y.z-yyyy	Report	Annual report about the source-receptor calculations	Annually
D3.y.z-yyyyQq	Report	Quarterly air quality report	Quarterly
D3.y.z-yyyyQq	Note	Didactic description of the use of CAMS policy tools for pollution situation analysis	Quarterly
D3.y.z	Report Dataset Service Other		
...			

WP7130 Milestones			
#	Title	Means of verification	Due
M3.y.z	Implementation of Source Receptor service	Service publicly available through the CAMS website – Note submitted to ECWMF	As early as possible and latest M3
M3.y.z	Presentation of the priorities and the methods envisaged for the service evolution	Meeting with ECMWF management – Minutes of the meeting and PowerPoint submitted to ECMWF	M3
M3.y.z	Implementation of source receptor service evolution	Service publicly available through the CAMS website – Note submitted to ECMWF	latest M18
...			

3.5 Work package 7140 – Support to the implementation of the European legislation

In recent years, CAMS has become a trusted source of information for the main stakeholders for air quality policies at European level, namely DG-ENV, the JRC and the EEA. The revised AAQD that is bound to be adopted by the end of 2024, mentions explicitly CAMS as a valuable source of information to support the Member States in its implementation. The same holds for the emission mitigation regulations like the EU NERCD and Gothenburg Protocol of the UNECE Convention on Long-Range Transboundary Air Pollution, which is now under revision and which aims at defining optimized cost-effective emission reduction strategies. Finally, the Forum for Air quality Modeling (FAIRMODE) is a joint response initiative of the EEA and the JRC (chair) involving the Member States of the EU and the EEA; the scope of activities discussed in FAIRMODE relate very much to CAMS and several contractors and subcontractors of CAMS are naturally involved given their expertise.

Several aspects of CAMS are relevant in that perspective and the objective of this work package is to develop complementary policy tools and expertise fully dedicated to the implementation of the EU Directives. Three priority topics are identified for this ITT:

1. Quantification of natural dust contribution to PM air pollution events in Europe
2. Impact of wildfires on European air quality
3. Typology of ozone concentrations in European countries

Quantification of natural dust contribution to PM air pollution events in Europe :

The European Commission DG-ENV has developed specific guidelines in 2011 to support Member States with the assessment of the contributions of natural sources (especially dusts) in the PM concentrations they monitor and report, in order to eventually subtract this contribution from the exceedances of the PM limit values. These guidelines should be revised in the coming months, and CAMS forecasts and analyses of dust events based on both in-situ and satellite information and the CAMS global model, have reached a maturity level that makes them particularly relevant to be used in this context.

The tenderer will propose and implement a methodology to qualify and quantify the contribution of dusts when plumes impact air quality and PM levels over the defined CAMS European domain. This methodology will take stock of all available CAMS tools at the regional and the global scales combined to assess the dust contribution. Easy-to-use, automated and online tools shall be preferred.

The tenderer will describe in his proposal the methodological approach that they will aim at developing and they will detail how the proposed tool can effectively support the EU Member States for air quality reporting (for instance with a description of the web interface(s), tools, datasets or reports that will be delivered).

Impact of wildfires on European air quality

Wildfires have become a more and more sensitive topic with numerous regions everywhere in the world, particularly at mid- and high latitudes which have experienced devastating wildfire seasons. With temperature records broken almost every years and areas with increasingly dry vegetation, the situation is of particular concern in most European countries -from the Mediterranean area to the North of Europe.

CAMS provides up-to-date information on the location, intensity, and emissions of wildfires, vegetation fires and open burning around the world through its Global Fire Assimilation System (GFAS). This information is based on measurements from instruments on satellites that are able to detect the fire radiative power (FRP) of active fires, and uses to estimate the intensity and related emissions of fires. In addition, CAMS monitors the transport of smoke in the atmosphere by the winds and the smoke composition. That means, CAMS utilises observations of particulate matter and key trace gases (e.g., carbon monoxide) released into the atmosphere by burning vegetation. Some pollutants in smoke have a lifetime of a few weeks in the atmosphere and can be transported thousands of kilometres across the globe – at international and intercontinental scales.

Therefore, wildfires events occurring in Europe, but also in other continents can have a significant impact on European air quality, increasing the concentrations of several regulatory air pollutants (PM and its compounds but also global ozone, Benzo(a)pyrene, heavy metals..). CAMS can reliably support the assessment of those impacts.

The tenderer will propose and implement a methodology to qualify and quantify the contribution of wildfires on air quality in the European Union. This methodology will take stock of all available CAMS tools and information products at the regional and the global scales to be combined to assess the wildfires contribution. Easy-to-use, automated data flows and online assessment tools shall be preferred.

The tenderer will describe in his proposal the methodological approach he aims at developing and will detail final products that will be proposed to disseminate the results (web interface, online tools, databases, report, bulletin..).

Typology of ozone concentrations in European countries:

One of the main challenges European legislation has to deal with is tropospheric ozone. Despite ambitious objectives to reduce emissions of ozone precursors (NO_x, VOCs), concentrations of background global ozone has shown no reduction trends for several years. The revised AAQD will fix more restrictive long term objectives for threshold values for health and environmental protection (daily maximum of the 8-hours running average and AOT40 respectively) that are nowadays still far to be achieved in Europe.

Long range transport of ozone is one of the factors that could explain this situation. Several on-going initiatives^{3, 4} aim at describing and understanding its role, and its relative importance compared to precursor emissions and climate change. On the other side, CAMS observations and modelling data covering several years at the global and regional scales can now usefully complement such analysis with source allocation tools developed to assess the contribution of various geographical and sectoral sources to zone levels in Europe and European countries.

Using CAMS regional and global forecast and reanalyses, and relevant additional material, the tenderer will propose an analysis of ozone trends in various European countries and in the cities considered in the source allocation policy tools. Ozone levels and metrics relevant for health and environment will be presented and discussed with a focus on relative contributions of local sources, long range transport and climate penalty.

³ For example, the activities of the task force on hemispheric transport of the EMEP program that support the Convention on Long Range Transboundary Air Pollution.

⁴ Or the IGAC Tropospheric ozone assessment report (TOAR)

The tenderer will detail in their proposal how results will be disseminated (report, atlas, and interactive web tools to display the results).

The tables below provide the deliverables and milestones for the work package. Tenderers shall complete Volume IIIA as part of their bid, which should include the deliverables and milestones already indicated in the tables below and will form a preliminary version. Volume IIIA will be used by the contractor to describe the complete list of deliverables, milestones and schedules for this work package. All milestones and deliverables shall be numbered as indicated. All document deliverables shall be periodically updated and versioned as described in the tables.

WP7140 Deliverables			
<i>#</i>	<i>Type</i>	<i>Title</i>	<i>Due</i>
D4.y.z	Report	Quantification of natural dust contribution to PM air pollution events in Europe: Concept note describing the methodology and expected results	M3
D4.y.z	Report	Impact of wildfires on European air quality: Concept note describing the methodology and expected results	M3
D4.y.z	Report	Typology of ozone concentrations in European countries: Concept note describing the methodology and expected results	M3
D4.y.z	Proof of Concept	Quantification of natural dust contribution to PM air pollution events in Europe: prototype of the tool and the associated web interface	M12
D4.y.z	Proof of Concept	Impact of wildfires on European air quality: prototype of the tool and the associated web interface	M12
D4.y.z	Proof of Concept	Typology of ozone concentrations in European countries: prototype of the tool and the associated web interface	M12
D4.y.z-yyyy	Report	Quantification of natural dust contribution to PM air pollution events in Europe: yearly report	Yearly from M24 until M42
D4.y.z-yyyy	Report	Impact of wildfires on European air quality: yearly report	Yearly from M24 until M42
D4.y.z-yyyy	Report	Typology of ozone concentrations in European countries: yearly report	Yearly from M24 until M42
D4.y.z	other	Quantification of natural dust contribution to PM air pollution events in Europe: operational web interface	M24
D4.y.z	Proof of Concept	Impact of wildfires on European air quality: operational web interface	M24
D4.y.z	Proof of Concept	Typology of ozone concentrations in European countries: operational web interface	M24

WP7140 Milestones

#	Title	Means of verification	Due
M4.y.z			
...			

3.6 Work package 7150 - Interaction with users in the policy domain

Experience has shown that the community of Policy Users has specific needs and that dedicated workshops are needed to discuss these and follow up on corresponding development activities. The Successful Tenderer shall organize annual events dedicated to users in the policy domain. It shall also contribute to general user interaction activities by participating in and supporting user workshops (organised as part of the ITT on CAMS user interaction) and by providing the requirements gathered from users in the policy domain to the contractor for User Interaction activities for logging into the CAMS User Requirements DataBase (URDB, see Section 4.6). The CAMS products presented and discussed should not be limited to the ones produced as part of this ITT, but also cover all the other CAMS products that are relevant for European or national environmental policies and regulations.

3.6.1 Task 7151: Policy User workshop

The Successful Tenderer shall organize one Policy User workshop (1 to 2 days) each year to interact with CAMS Policy Users. The location and timing of these user workshops shall be agreed between the Successful Tenderer and ECMWF each year taking into account relevant key meetings and events of the European policy community and involving EU member states.

Once agreed, the Successful Tenderer will propose one or more potential venues easily reachable by public transport where the event might take place. The Successful Tenderer will draft a programme including presentations as well as discussions with the Policy Users. The Successful Tenderer can use their own creative input to define the exact format of the workshop. The budget proposed for the organization of the CAMS Policy User workshops must include all aspects: venue hire, tea/coffee and lunch breaks for all attendees, engagement, and the organization of the event itself. In the case of a 2-day workshop, covering dinner and accommodation costs of participants is not mandatory. It is not expected that travel costs of participants shall be covered other than possibly for some invited speakers. The Tenderer can use an indicative number of 40 attendees for each event to estimate the budget, which has to be covered under the present contract. Given the current pandemic and its impact on travel, the Tenderer shall also indicate how it would address the option of virtual workshops in case significant travel restrictions are in place at the time of the foreseen workshops.

The Successful Tenderer must take minutes from the meeting and deliver a report not later than one month after each workshop. Workshop reports shall be approved by ECMWF before finalisation and publication.

3.6.2 Task 7152: Contribution to wider CAMS user interaction activities

The Successful Tenderer shall also take part in the general CAMS user workshops, when requested by ECMWF, sending at least one participant to present updates of Policy Products and gather related user requirements and feedback.

Two meetings will be organised annually as part of ITT on User Interaction activities. It is expected that presentations and discussions in these user workshops can cover in principle all different aspects of European, national and regional/local policies, and it is thus essential that the Successful Tenderer of this ITT is actively involved.

Moreover, dedicated meetings with EU policy bodies (DG ENV, Joint Research Center, European Environment Agency) will be organised annually by ECMWF to review fitness for purpose of the CAMS2_71 products and data, where the successful tenderer shall present progress of work. The successful tenderer will prepare minutes of those meetings, eventually including an action plan to deal with European Commission’s recommendations.

The tables below provide the deliverables and milestones for the work package. Tenderers shall complete Volume IIIA as part of their bid, which should include the deliverables and milestones already indicated in the tables below and will form a preliminary version. Volume IIIA will be used by the contractor to describe the complete list of deliverables, milestones and schedules for this work package. All milestones and deliverables shall be numbered as indicated. All document deliverables shall be periodically updated and versioned as described in the tables.

WP7150 Deliverables			
#	Type	Title	Due
D5.y.z	Report Dataset	...	
D5.y.z-yyyy	Note	Minutes of the annual meeting with EU bodies	Yearly

WP7150 Milestones			
#	Title	Means of verification	Due

3.7 Work package 7160 – User support and documentation of service

The objective of this work package is to provide support to users of the delivered products and services and to improve dissemination and uptake of the CAMS2_71 products and data by the policy users.

ECMWF has established a centralised Copernicus Service Desk to provide multi-tiered technical support to all users of CAMS data, products, tools and services. The Service Desk handles user queries through a ticketing system and distributes these queries to specialists when needed. Dedicated staff at ECMWF provide basic support in the form of self-help facilities (FAQs, Knowledge Base, online Forum, tutorials etc.) as well as individualised support on technical queries related to the Atmosphere Data Store (ADS), data formats, data access etc. In addition, ECMWF staff provide specialised scientific support to address questions related to its industrial contributions to CAMS, e.g. in the areas of global forecasting of atmospheric composition.

All CAMS contractors are expected to contribute to the delivery of multi-tiered technical support for the data and/or services they provide. Such specialised user support shall take the form of direct response to individual user queries via the Service Desk facility, as well as contributions to FAQs, Knowledge Base, and user guides. Contractors may also be requested by the CAMS Service Desk to contribute to support questions in the online Forum.

Tenderers shall describe the level of user support service on Service Desk tickets as a specific Key Performance Indicator (KPI- see below) with a target value of 80% of the assigned specialised user queries being resolved within 15 days after being informed by the CAMS Service Desk.

Tenderers shall also address development of user guides. Documentation of the CAMS services is an integral part of the service provision and is directly linked to the Atmosphere Data Store. The technical

and scientific specification of each service shall be documented in the CAMS Knowledge Base as linked from the Atmosphere Data Store, and, if more detail is required, in reports that will be available to users through the CAMS web site. The successful Tenderer shall therefore produce documentation describing in detail the methodologies and products they deliver for this ITT. The documentation in the Knowledge Base shall be targeted at the general external user community, while the additional detailed reports shall address the needs of expert users.

This work package will be initiated with a complete review, carried out by the successful tenderer, of the policy web pages (<https://policy.atmosphere.copernicus.eu>) and associated documentation, available on both CAMS knowledge Base and on policy webpages. An action plan to update and improve readiness and consistency of the website and the associated documentation will be proposed to ECMWF and implemented in the 6 first months.

Tenderers shall complete Volume IIIA as part of their bid, which shall include the deliverables and milestones for this work package already indicated in the tables below. Volume IIIA will be used by the Tenderer to describe the complete list of deliverables, milestones and schedules for this work package. All milestones and deliverables shall be numbered as indicated. All document deliverables shall be periodically updated and versioned as described in the tables.

WP7160 Deliverables			
#	Type	Title	Due
D6.y.z-YYYY	Report	Overview of contribution to CAMS Knowledge Base to document products and services requiring expertise specific to CAMS air quality policy support service	Annually
D6.y.z-YYYY	Report	Documentation of CAMS air quality policy support service elements	Annually
D6.y.z	Other	Update of the website and associated documentation	M6
D6.y.z	Report Dataset Service Other		
...			

WP7160 Milestones			
#	Title	Means of verification	Due
M6.y.z	Meeting review: website and associated documentation	Meeting held with ECMWF; Minutes of the meeting	M3
...			

3.8 Work package 7100 – Management and coordination

The following management aspects shall be briefly described in the bid:

- Contractual obligations as described in the Framework Agreement Clause 2.3 on reporting and planning.
- Meetings (classified as tasks and listed in a separate table as part of the proposal):
 - ECMWF will organise annual CAMS General Assemblies within EU member states. The successful Tenderer is expected to attend these meetings with team members covering the various topics that are part of this ITT.

- ECMWF will host monthly teleconference meetings to discuss CAMS service provision, service evolution and other topics. The Prime Investigator appointed by the successful Tenderer will represent the successful Tenderer in such meetings.
- ECMWF will organise six-monthly project review meetings (linked to Payment milestones).
- Tenderers can propose additional project internal meetings (kick-off meeting, annual face-to-face meeting and monthly teleconferences) as part of their response.
- Quality assurance and control: the quality of reports and Deliverables shall be equivalent to the standard of peer-reviewed publications. The final quality check of the deliverables should be made by the prime contractor (contents, use of ECMWF reporting templates for deliverables and reports (Microsoft Word), format, deliverable numbering and naming, typos...); all reports in this project shall be in English. Unless otherwise specified the specific contract Deliverables shall be made available to ECMWF in electronic format.
- Communication management (ECMWF, stakeholders, internal communication).
- Resources planning and tracking using the appropriate tools.
- Implementation of checks, controls and risk management tools for both the prime contractor and subcontractors.
- Subcontractor management, including conflict resolution, e.g. the prime contractor is responsible for settling disagreements, although advice/approval from ECMWF may be sought on the subject.
- A list of subcontractors describing their contribution and key personnel shall be provided, as well as back-up names for all key positions in the contract. The Tenderer shall describe how the Framework Agreement, in particular Clause 2.9 has been flowed down to all their subcontractors.
- Personal data management (name, ID and contact details of prime contractor's data controller in line with Clause 2.8).

Tenderers shall complete Volume IIIA as part of their bid, which shall include the deliverables and milestones for this work package already indicated in the tables below. Volume IIIA will be used by the Tenderer to describe the complete list of deliverables, milestones and schedules for this work package. All milestones and deliverables shall be numbered as indicated. All document deliverables shall be periodically updated and versioned as described in the tables.

WP7100 Deliverables				
<i>#</i>	<i>Responsible</i>	<i>Nature</i>	<i>Title</i>	<i>Due</i>
D0.y.z-YYYYQQ	Tenderer	Report	Quarterly Implementation Report QQ YYYY QQ YYYY being the previous quarter	Quarterly on 15/04, 15/07 and 15/10
D0.y.z-YYYY	Tenderer	Report	Annual Implementation Report Part 1 YYYY YYYY being the Year n-1	Annually on 28/02
D0.y.z-YYYY	Tenderer	Other	Annual Implementation Report Part 2 YYYY YYYY being the Year n-1 (incl. Preliminary financial report)	Annually on 15/01
D0.y.z	Tenderer	Report	Final report, including letter from auditor specific to CAMS contract YYYY YYYY being the last year of the contract	60 days after end of contract
D0.y.z-YYYY	Tenderer	Report	Draft Implementation plan YYYY YYYY being the Year n+1	Annually on 28/02
D0.y.z-YYYY	Tenderer	Report	Finalised Implementation plan YYYY	Annually on 31/10

			YYYY being the Year n+1	
D0.y.z-YYYY	Tenderer	Other	Copy of prime contractor's general financial statements and audit report YYYY YYYY being the Year n-1	Annually
D0.y.z	Tenderer	Other	Updated KPIs (list, targets...) after review with ECMWF	One year after start of contract

WP7100 Milestones				
#	Responsible	Title	Means of verification	Due
M0.y.z-Px	Tenderer	Progress review meetings with ECMWF / Payment milestones	Minutes of meeting	~ Every 6 months

4 General Requirements

4.1 Implementation schedule

The Framework Agreement will run from 1 January 2025 to 30 June 2028 with all proposed developments to be finalised before 31 December 2027. Only operational service provision and operational support shall continue during 2028. The Tenderer shall provide a detailed implementation plan of proposed activities for the full period.

4.2 Deliverables and milestones

The Tenderers shall provide the list of deliverables and milestones (cf. ITT Volume IIIA “Pricing and deliverables”, Excel spreadsheet “Deliverables List”) for each Work Package. All deliverables and milestones must be consistent with the activities and objectives described in Section 3 of this ITT Volume II:

- A deliverable is a substantial, tangible or intangible good or service produced as a result of a project (see also the deliverable definition in this ITT Volume V Clause 1.2 and Clause 3.2). In other words, a deliverable is an outcome produced in response to the specific objectives of the contract and is subject to acceptance by both ECMWF’s Technical Officer (TO) and Contract Management Officer (CMO).
- Milestones should be designed as markers of demonstrable progress in service development and/or quality of service delivery (see also the milestone definition in this ITT Volume V Clause 1.2). They should not duplicate deliverables and shall not attract the budget under Volume IIIA “Pricing and deliverables”, Excel sheet “Deliverables List”.

The following shall apply to the deliverables and milestones:

- The deliverables and milestones should be consistent with the technical requirements specified in Section 3.
- When defining deliverables, please assign clear due dates to each of them.
- All contract reports and deliverables shall be produced in English.
- The quality of reports and deliverables shall be equivalent to the standard of peer-reviewed publications and practice.
- Unless otherwise specified in the specific contract, deliverables shall be made available to ECMWF in electronic format (PDF/Microsoft Word/Microsoft Excel or

compatible) via the Copernicus Deliverables Repository portal. See also Section 4.7 in what regards the data provision.

Volume IIIA “Pricing and deliverables” (cf. Excel sheet “Deliverables List”) of this ITT shall be used by the Tenderer to describe the complete list of deliverables, milestones and schedules for each work package (due dates). Please note that:

- All deliverables and milestones shall be numbered as per the following format DX.Y.Z (for deliverables) and MX.Y.Z (for milestones), where X is the WP number, Y is the task number and Z is the deliverable or milestone number in this task. Deliverables delivered annually should be numbered DX.Y.Z-yyyy, where yyyy is the year the deliverable covers/refers to (e.g. DX.Y.Z-2016). Deliverables delivered quarterly should be 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 shall be applied for the milestones. Continuous deliverables at higher frequency can be labelled in the same way as quarterly deliverables.
- Each deliverable shall have an associated resource allocation and price (cf. column I “Nb of PM allocated” and column J “Estimated price”), while the only resource type to be considered is “payroll” (the total of these allocated resources and prices shall therefore amount to the total price associated with payroll in Volume IIIA spreadsheet “Costs and Prices”). Milestones should not have such associated resource allocation, unless otherwise agreed.
- Deliverables can be bundled/grouped when their due dates fall **within the same payment period**.
- The Tenderers shall provide a due date for each proposed deliverable and milestone (in accordance with those indicated in Section 3):
 - The Tenderers shall ensure that the proposed due dates of deliverables and milestones are realistic and achievable. **Any dependencies on input data (whose origin must be specified) shall be detailed and also accounted for in the risk table.**
 - It is advised to schedule the submission/completion of the last deliverables and/or milestones associated to a Payment Milestone not later than 15 days before the expected date of completion of the said Payment Milestone (i.e. when all deliverables have been submitted by the contractor and all milestones have been completed by the concerned parties).

4.3 Acquisition of necessary data and observations

The Regional Service Provider will provide the data from the (Interim) annual European air quality reanalyses needed for this tender. The Global Service Provider will provide the boundary conditions, and other global air pollutant concentration fields (dust, ozone..) and the fire emissions from the Global Products needed for this tender.

4.4 Operational aspects and quality control

For the elements covered by this ITT, which have a time-critical dimension (air quality scenario toolbox described under workpackage 7120 and source allocation services described under workpackage 7130), timeliness and completeness of production, technical/scientific quality of the products and availability of them are the key operational dimensions. The Tenderer shall describe how these

critical aspects are addressed in the Technical Solution proposed and how the performance will be monitored (see also section 4.8 on Key Performance Indicators)

4.5 Data and IPR

It is a condition of EU funding for CAMS that ownership of any datasets developed with CAMS funding passes from the suppliers to the European Union via ECMWF. Ownership will pass from the date of creation of the datasets. Suppliers will be granted a non-exclusive licence to use the datasets which they have provided to CAMS for any purpose.

All software and products used by the successful Tenderer to produce the CAMS datasets will remain the property of the successful Tenderer, except for those components which are acquired or created specifically for CAMS purposes, with CAMS funding, and which are separable and useable in isolation from the rest of the successful Tenderers' production system. The identity and ownership of such exceptional components will be passed to the European Union via ECMWF annually. The successful Tenderer will be granted a non-exclusive licence to use them for any purpose.

4.6 Communication

The successful Tenderer shall support ECMWF in its communication activities for the CAMS services, where they are related to the activities described in this ITT. Examples are contributions to the Copernicus State of the Climate report, CAMS web site news items, and CAMS brochures and flyers.

4.7 User requirements

As part of the CAMS user interaction, user requirements are continually collected in a User Requirements Database (URDB) in a structured and traceable way. This URDB tracks all requirements emanating from a wide variety of user fora, surveys, user support and direct interactions between service providers and their users. The entries of the URDB are analysed on a regular basis in terms of user requirements per domain, importance and feasibility. This analysis constitutes the basis for distilling, filtering and translating user requirements into technical specifications for the Service and its evolution.

The successful Tenderer shall provide input to the User Requirements Database (URDB) regarding user requirements that are directly related to activities covered by this ITT. The successful Tenderer shall also support ECMWF and the contractor of User Interaction activities with the analysis of relevant user requirements in the URDB.

The following deliverables are thus to be added to the WP7160 deliverable lists:

WP7160 Deliverables			
<i>#</i>	<i>Type</i>	<i>Title</i>	<i>Due</i>
D6.y.z-YYYY	Other	Input to CAMS URDB - YYYY	Annually in November
...			

4.8 Data sets

It is not expected that this contract will deliver datasets to be served through the Atmosphere Data Store (ADS).

4.9 Key performance indicators

Contractors shall report to ECMWF on a set of Key Performance Indicators (KPIs) suitable for monitoring various aspects of service performance. These will be used in the overall monitoring of the CAMS programme for which the following KPI categories have been identified:

- KPI1 Service availability
- KPI2 Products usage
- KPI3 Products quality
- KPI4 User support
- KPI5 User statistics
- KPI6 Service audience
- KPI7 User engagement
- KPI8 User satisfaction
- KPI9 Contracts
- KPI10 Deliverables
- KPI11 Data usage

The table below provides the template to be used by the Tenderer to describe the KPIs, relevant for this ITT, together with performance targets, delivery schedules and explanations, if needed. Please note that the listed KPIs form part of the overall set of KPIs comprising the full CAMS service portfolio; the successful Tenderer therefore might have to provide KPI values for a KPI in support of services outside this ITT.

All KPIs shall be labelled and numbered as indicated. All KPIs shall be periodically updated as described in the tables. Tenderers shall provide preliminary versions of the completed tables as part of their bid.

The list of KPIs shall be reviewed with ECMWF in the second year of the contract and updated if necessary.

Service availability KPI #	KPI Title	Performance Target and Unit of Measure	Frequency of Delivery	Explanations / Comments
KPI_71.1.2	Server or webAPI uptime	95%	Quarterly	Percentage of uptime vs total time for the data servers (running average over the past calendar year).
KPI_71.1.3	Completeness of production for each product	95%	Quarterly	Percentage of outputs delivered vs expected for each product defined in the SPP (running average over the past calendar year). This percentage is computed in terms of data volume

KPI_71.1.4	Timeliness of production for each product	90%	Quarterly	Percentage of products delivered completely and on time if delivery time is specified in the SPP (running average over the past calendar year).
KPI_71.5.1	Number of users segmented by main service product lines		Quarterly	
KPI_71.5.2	Number of active users by main service product lines		Quarterly	
KPI_71.5.3	Number of new users		Quarterly	
KPI_71.5.4	Number of users per country		Quarterly	
KPI_71.5.5	Number of active users per country		Quarterly	
KPI_71.5.6	Number of new users per country		Quarterly	
KPI_71.6.6	Policy audience		Annual	Total number of citations or uses in reports or documents done by institutional or policy entities to respond to EC regulations/laws (EU and national level). Note: this is difficult to track because of lack of bibliometric tools such as the ones which exists for scientific literature; many policy uses may actually be omitted. Also, policy uses of the Service's products may not systematically end up in a publicly available document (but rather in internal

				notes supporting public decision).
KPI_71.10.1	% of deliverables delivered on time or with short delay	90%	Quarterly	

5 Tender Format and Content

General guidelines for the Tender are described in Volume IIIB. Specific requirements to prepare the proposal for this particular tender are described in the next sub-sections.

5.1 Page Limits

As a guideline, it is expected that individual sections of the Tenderer's response do not exceed the page limits listed below. These are advisory limits and should be followed wherever possible, to avoid excessive or wordy responses.

<i>Section</i>	<i>Page Limit</i>
<i>Executive Summary</i>	2
<i>Track Record</i>	2 (for general) and 2 (per entity)
<i>Quality of resources to be Deployed</i>	2 (excluding Table 1 in Volume IIIB and CVs with a maximum length of 2 pages each)
<i>Technical Solution Proposed</i>	2 + 3 per Work package (Table 2 in Volume IIIB, the section on references, publications, patents and any pre-existing IPR is excluded from the page limit and has no page limit)
<i>Management and Implementation</i>	6 (excluding Table 4 and Table 5 in Volume IIIB) + 2 per each Work package description (Table 3 in Volume IIIB)
<i>Pricing Table</i>	No limitation

Table 1: Page limits

5.2 Specific additional instructions for the tenderer's response

The following is a guide to the minimum content expected to be included in each section, additional to the content described in the general guidelines of Volume IIIB. This is not an exhaustive description and additional information may be necessary depending on the Tenderer's response.

5.2.1 Executive Summary

The Tenderer shall provide an executive summary of the proposal, describing the objectives, team and service level.

5.2.2 Track Record

The Tenderer shall demonstrate for itself and for any proposed subcontractors that they have experience with relevant projects in the public or private sector at national or international level. ECMWF may ask for evidence of performance in the form of certificates issued or countersigned by the competent authority.

5.2.3 Quality of Resources to be Deployed

The Tenderer shall propose a team that meets at least the following requirements:

- A senior team member (Prime Investigator) with more than 5 years of experience in managing activities related to this ITT;
- At least two additional senior team members with more than 5 years of experience on performing activities related to the various aspects of this ITT.

These team members shall be involved in the activities of this ITT at a minimum level of 10% of their total working time. The successful Tenderer shall also appoint a Service Manager, which will be its primary contact for contractual delivery and performance aspects.

5.2.4 Technical Solution Proposed

The Tenderer is expected to provide a short background to the proposed technical solution to demonstrate understanding of the solution proposed. This should include background of the Tenderer's understanding of the Copernicus Atmosphere Monitoring Service, the current state of forecasting of global atmospheric composition and regional air quality, and the current state of building comprehensive and consistent data sets of emissions.

An exhaustive and detailed description of the proposed technical solution for all work packages described above shall be given. The Tenderer shall indicate which air quality forecasting systems it intends to use and how it will acquire the relevant input data. The Tenderer shall describe the proposed method for producing air quality scenario toolbox and the source allocation services. The Tenderer shall describe the validation methodology. Finally, the Tenderer shall describe how they will deliver the potential service evolution aspects.

5.2.5 Management and Implementation

As part of the general project management description, and in addition to the guidance provided in Volume IIIB, Tenderers shall consider the elements described in section 3.8 above. Note that costs associated with fulfilling WPO requirements shall not exceed 10% of the total price of the Tender.