ECMWF Copernicus Procurement

Invitation to Tender

Copernicus Atmosphere Monitoring Service

Volume II

Provision of near-real-time satellite retrievals of CO_2 and CH_4

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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), Cop1, the Service consolidated many years of preparatory research and development to deliver a range of operational services. In its second phase (2021 – 2027), Cop2, 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 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 CO_2, CH_4 and N_2O net surface fluxes, allowing the monitoring of the evolution in time of these fluxes;

h) Climate forcing from aerosols and long-lived (CO_2, CH_4) 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 CO_2 and CH_4 for the global domain and emission hotspots.

This Invitation to Tender (ITT) is mainly targeting the CAMS service elements described under items (a), (b) and (k).

1.1 Definitions

Definitions specific for this ITT are defined below.

Global Service Provider: ECMWF is the provider of global products

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

2 Contract Summary

This ITT, entitled "Provision of near-real-time satellite retrievals of CO_2 and CH_4", is for providing support for the production of the Global Production System of CAMS operated at ECMWF, which delivers 3D distributions of greenhouse gases (CO_2 and CH_4) in the troposphere and stratosphere through the provision of timely satellite observations of CO_2 and CH_4. The Successful Tenderer shall provide timely CO_2 and CH_4 retrieval products from the Greenhouse gases Observing SATellite (GOSAT) and GOSAT-2 satellites as well as CO_2 and CH_4 retrieval products from the Infrared Atmospheric Sounding Interferometer (IASI) instrument onboard the Metop satellite platforms. The ITT targets organisations with considerable experience in the field of greenhouse gas satellite retrievals.

3 Technical Specification

3.1 General Requirements

Modules for atmospheric greenhouse gases and related physical processes have been integrated in ECMWF's Integrated Forecasting System (IFS), which forms the basis for the CAMS global data assimilation and forecasting system. The CAMS global data assimilation system is used to provide the Real-Time Global Products, the Forecast-only Global Products, and the Global Reanalysis Products. The extension of the IFS makes it possible (i) to use the detailed meteorological simulation of the IFS for the simulation of the atmospheric transport and removal processes of constituents, (ii) to use the IFS data assimilation system to assimilate observations of atmospheric composition, and (iii) to simulate feedback processes between atmospheric composition and weather. The IFS currently includes CO_2 and CH_4 as separate tracers.
The data assimilation of the IFS is based on the ECMWF 4-dimensional variational (4D-Var) formulation and assimilates a range of satellite observations of greenhouse gases in addition to the standard meteorological observations (see also: Massart et al., Atmos. Chem. Phys., 14, 6139-6158, doi:10.5194/acp-14-6139-2014, 2014 and Barré et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2020-550). The CAMS data assimilation system for greenhouse gases currently uses observations of CO_2 and CH_4 from the Thermal And Near infrared Sensor for carbon Observation (TANSO) instrument on board of the Japanese GOSAT satellite and from the IASI

instrument on board of the Metop satellites, and CH_4 from the TROPOspheric Monitoring Instrument (TROPOMI) on board of Sentinel-5p for its production of daily analyses, which form the initial conditions for the daily forecasts.
The central element of this ITT is the provision of XCO2 and XCH4 retrieval products from the GOSAT and GOSAT-2 satellites as well as XCO2 and XCH4 retrieval products from the IASI instrument onboard the Metop platforms.

3.2 Work package 52b10 – Provision of satellite retrieval data from GOSAT

The GOSAT satellites are research satellites and data are generally not available via the established operational data acquisition channels. Also, retrieval algorithms are still rapidly developing to achieve the required high accuracy for greenhouse-gas observations. In order to ensure the continuity of the service provision, this ITT asks for Level-2 retrievals of CO_2 and CH_4 from TANSO delivered within 1 day of the availability of Level-1 radiance data from the relevant Space Agencies (JAXA, NIES, ESA, or EUMETSAT). The Successful Tenderer shall provide column-averaged dry air mole fraction (XCO2 and XCH4) values with associated retrieval uncertainties, averaging kernels and the a priori information used in the retrieval for each individual satellite footprint. The quality of the retrieval values shall be competitive with international standards, such as are for instance available from the European Space Agency Climate Change Initiative (ESA-CCI; http://www.esa-ghg-cci.org). This quality shall be assessed against independent observations, such as are for instance available from the Total Carbon Column Observing Network (TCCON), and documented in annual reports. The Tenderer shall outline how to provide the required L2 products from the GOSAT-1 satellite from the start of the contract and how it will transition to L2 products from the GOSAT-2 satellite. A detailed timeline of this transition shall be provided.

Tenderers shall complete the relevant table in 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 each 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.

WP52b10 Deliverables			
#	*Type*	*Title*	*Due*
D1.y.z-YYYY[1]	Data & report	Daily data provision and quarterly status report of GOSAT XCO2 and XCH4 retrievals including evaluation against independent observations.	Quarterly
D1.y.z-YYYY	Report	Evaluation of GOSAT-2 XCO2 data relative to GOSAT-1 XCO2 data	Xxxx[a]
D1.y.z-YYYY	Report	Evaluation of GOSAT-2 XCH4 data relative to GOSAT-1 XCH4 data	Xxxx[a]

[a] Tenderer to include a realistic due date in the Proposal

[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 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 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.

WP52b10 Milestones			
#	*Title*	*Means of verification*	*Due*
M1.1.1	Implementation of routine provision of XCO2 retrievals from GOSAT-2	Data available to ECMWF	Xxxx[b]
M1.1.2	Implementation of routine provision of XCH4 retrievals from GOSAT-2	Data available to ECMWF	Xxxx[b]

[b] Tenderer to include a realistic due date in the Proposal

3.3 Work package 52b20 – Provision of satellite retrieval data from IASI

The IASI instrument onboard the series of Metop satellites measures in the infrared part of the electromagnetic spectrum at a horizontal resolution of 12 km over a swath width of about 2,200 km. With 14 orbits in a sun-synchronous mid-morning orbit (9:30 Local Solar Time equator crossing, descending node) global observations can be provided twice a day. EUMETSAT operationally provides near-real-time (NRT) spectral L1 data and in collaboration with their Atmospheric Composition Monitoring – Satellite Application Facility (AC-SAF) also various L2 products related to atmospheric composition. However, not all L2 products required by CAMS are already available from EUMETSAT or the AC-SAF.
This ITT therefore asks for Level-2 retrievals of CO_2 and CH_4 from IASI onboard the Metop-B and Metop-C platforms delivered within 1 day of the availability of Level-1 radiance data from EUMETSAT. The Successful Tenderer shall provide column-averaged dry air mole fraction (XCO2 and XCH4) values with associated retrieval uncertainties, averaging kernels and the a priori information used in the retrieval for each individual satellite footprint. The quality of the retrieval values shall be competitive with international standards, such as are for instance available from the European Space Agency Climate Change Initiative (ESA-CCI; http://www.esa-ghg-cci.org). This quality shall be assessed against independent observations, where possible, and documented in annual reports.

Tenderers shall complete the relevant table in 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 each 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.

WP52b20 Deliverables			
#	*Type*	*Title*	*Due*
D1.y.z-YYYY	Data & report	Daily data provision and quarterly status report of Metop-B and Metop-C IASI XCO2 and XCH4 retrievals including evaluation against independent observations.	Quarterly

WP52b20 Milestones			
#	*Title*	*Means of verification*	*Due*
M2.y.z			

3.4 Work package 52b30 – User support and documentation of service

The objective of this work package is to provide support to users of the delivered products and services.

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) 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 (see example for the CAMS global reanalysis at https://ads.atmosphere.copernicus.eu/cdsapp#!/dataset/cams-global-reanalysis-eac4?tab=doc), 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.

Tenderers shall complete the relevant table in 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 each 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.

WP52b30 Deliverables			
#	*Type*	*Title*	*Due*
D3.y.z-YYYY	Other	Overview of contribution to CAMS Knowledge Base to document products and services requiring expertise specific to global greenhouse gas aspects developments	Annually
D3.y.z-YYYY	Report	Contribution to documentation of products and services based on global greenhouse gas aspects developments	Annually
…			

WP52b30 Milestones			
#	*Title*	*Means of verification*	*Due*
M3.y.z	…	…	…

…			

3.5 Work package 52b00 – 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. 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.
- Management of personal data and how this meets the requirements of Clause 2.8 and Annex 6 of the Volume V Framework Agreement.

Tenderers shall complete the relevant table in 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 each 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.

WP52b00 Deliverables				
#	*Responsible*	*Nature*	*Title*	*Due*
D0.y.z-YYYYQQ	Tenderer	Report	Quarterly Implementation Report QQ YYYY *QQ YYYY being the previous quarter*	Quarterly on 15/01, 15/04, 15/07 and 15/10
D0.y.z-YYYY	Tenderer	Report	Annual Implementation Report YYYY *YYYY being the Year n-1*	Annually on 28/02
D0.y.z-YYYY	Tenderer	Other	Preliminary financial form YYYY *YYYY being the Year n-1*	Annually on 15/01
D0.y.z	Tenderer	Report	Final report, including letter from	60 days after end of

			auditor specific to CAMS contract YYYY *YYYY being the last year of the contract*	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 *YYYY being the Year n+1*	Annually on 31/10
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	Six months after start of contract

WP52b00 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 September 2021 to 28 February 2024. The Tenderer shall provide a detailed implementation plan of proposed activities for the full period.

4.2 Deliverables and milestones

Deliverables should be consistent with the technical requirements specified in section 3. A deliverable is a substantial, tangible or intangible good or service produced as a result of a project. In other words, a deliverable is an outcome produced in response to the specific objectives of the contract and is subject to acceptance by the technical contract officers at ECMWF. When defining deliverable please **consolidate their numbers** against a specific deadline, where possible. CAMS is a fully operational service and timely delivery of services is essential. The tenderer shall therefore ensure that the proposed due dates of deliverables and milestones are realistic and achievable, i.e., the Tenderer shall consider dependencies, such as the source of original data, and assess the risk accordingly. All contract reports 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.

Each Deliverable shall have an associated resource allocation (person-months and financial budget, resource type: payroll only). The total of these allocated resources shall amount to the requested budget associated with payroll.

Milestones should be designed as markers of demonstrable progress in service development and/or quality of service delivery. They should not duplicate deliverables. Apart from the payment milestone review meetings, all foreseen meetings shall not be classified as milestones but listed in a separate overview table for each work package.

4.3 Acquisition of necessary data and observations

The Successful Tenderer shall acquire the relevant observational data sets needed for the provision of the CO_2 and CH_4 retrieval data. ECMWF has regular contact with the main Space Agencies and can offer support for any issues related to data access.

4.4 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. All communication activity must be agreed with the ECMWF Copernicus Communication team in advance. This includes, but not exhaustively, communication planning, branding and visual style, media outreach, website and social media activity, externally facing written and graphic content and events. Agreed activity would also need to be evaluated and reported on, once complete, so that success measures and KPIs can be provided to the European Commission.

4.5 Support for user engagement and training activities

While user engagement and training activities are not part of the scope of this ITT, the Tenderer shall accommodate for eventual needs in providing technical and scientific expertise in support of these activities. The bidder shall specify in the bid the experts intended to be allocated to provide this support.

Requests to support activities may be raised on for example:

- Contribute with content specific input to training, education and capacity building material: development and/or review of learning resources in the domain of the contract, participation in train-the-trainer events and MOOCs;
- Contribute with content specific input to user-oriented communication material such as slides, story maps and user testimonials;
- Contribute to and attend User Uptake workshops and stakeholder meetings. Presentations in your mother tongue may be asked to be provided;
- Input to the URDB with user requirements (cf. template as provided during the negotiation process) as well as sharing needs and aspirations as raised by potential new user communities;

An indicative maximum budget of 5,000.- EUR shall be allocated in the pricing table to accommodate for these needs. This shall be paid as a cost-reimbursement against a fixed fee rate/day. Details on the expected activities and the budget shall be refined during the negotiation/contract preparation phase.

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 WP5230 deliverable lists:

WP52b30 Deliverables

#	Type	Title	Due
D3.y.z-YYYY	Other	Input to CAMS URDB - YYYY	Checked by ECMWF annually in November
…			

4.6 Data and IPR

The successful Tenderer shall make the output of their work available on a server accessible by ECMWF using standard protocols such as FTP or HTTPS. The successful Tenderer will have to agree with ECMWF on the data formats to be used. ECMWF will only accept data in formats that follow internationally recognised standards. Such standards must be open (i.e. non-proprietary), managed by a recognised international standardisation body (e.g. ISO, WMO, OGC, etc.), or any de-facto standard. Open source software should also exist that can read and write files of these standards. Serialisation formats (e.g. NetCDF) should be supported by standard schemas and conventions.

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.

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.

Section	*Page Limit*
Executive Summary	2
Track Record	2 (for general) and 2 (per entity)
Quality of resources to be Deployed	2 (excluding Table 1 in Volume IIIB and CVs with a maximum length of 2 pages each)
Technical Solution Proposed	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)
Management and Implementation	6 (excluding Table 3, Table 5, Table 6 and Table 7 in Volume IIIB) + 2 per each Work package description (Table 4 in Volume IIIB)
Pricing Table	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, and the current state of monitoring and forecasting of global greenhouse gases in the atmosphere.

An exhaustive and detailed description of the proposed technical solution for all work packages described above, including any ramp-up or mobilization phase, shall be given. The Tenderer shall indicate its proposal for providing the Level-2 CO_2 and CH_4 products, including the acquisition of Level-1 data, the proposed retrieval algorithm and its required input, and the expected data provision (e.g., data format, timeliness, delivery mechanisms).