



Call for Tenders JRC/IPR/2021/OP/3195

FWC for Operating the CEMS "Hydrological Forecast Centre - Analytics and Dissemination" in support to the Copernicus Emergency Management Service (CEMS) /Early Warning Systems (EWS)

Open procedure

TENDER SPECIFICATIONS Part 2: Technical specifications

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TABLE OF CONTENTS

- 1. INTRODUCTION..... 3
 - 1.1 Background 3
 - 1.2 The Copernicus Emergency Management Service (CEMS)..... 3
 - 1.3 The CEMS European and Global Flood Awareness Systems (EFAS and GloFAS)..... 4
- 2. SCOPE OF REQUESTED SERVICE 5
- 3. WORK TO BE UNDERTAKEN 6
 - 3.1 Work Package 1: Set-up of service 7
 - 3.2 Work Package 2: Analysis and reporting of ongoing and forecasted floods 10
 - 3.3 Work Package 3: Service testing and analytics..... 12
 - 3.4 Work Package 4: Communication and user support 15
 - 3.5 Work Package 5: Knowledge and project management and implementation..... 18
- 4. GENERAL SPECIFICATIONS and REQUIREMENTS..... 24
 - 4.1 Language 24
 - 4.2 Place of work..... 24
 - 4.3 Meetings 24
 - 4.3.1 Kick-off Meeting..... 24
 - 4.3.2 Other Meetings 24

1. INTRODUCTION

1.1 BACKGROUND

Floods are the most frequent and costliest natural disasters worldwide. According to figures from the United Nations Office for Disaster Risk Reduction (UNISDR), in terms of occurrence floods accounted for 43% of all 7 255 disaster events recorded worldwide between 1998 and 2017. Most studies of climate change agree that the frequency of floods will increase further. In its Special Report published in October 2018, the Intergovernmental Panel on Climate Change (IPCC) pointed out that our world has already warmed by one degree above pre-industrial levels, and warned of the likely disastrous global and regional impacts of global warming beyond 1.5°C. Without rapid, far-reaching and unprecedented changes in all aspects of society, the world's top climate scientists warned, our world will exceed 1.5°C much sooner than we think, and significantly impact the likelihood of floods, heatwaves and droughts.

Copernicus, the EU's flagship programme for monitoring the Earth, is coordinated and managed by the European Commission. It consists of a complex set of systems that collect data from multiple sources: Earth observation (EO) satellites and in situ sensors, including ground stations, and airborne and sea-based sensors. Copernicus processes these data and provides users with reliable and up-to-date information through a set of services related to environmental and security issues.

Copernicus services address six themes - land, marine, atmosphere, climate change, emergency management, and security - and support a wide range of applications, including environment protection, management of urban areas, regional and local planning, agriculture, forestry, fisheries, health, transport, climate change, sustainable development, civil protection, and tourism.

This Tender relates to the Copernicus Emergency Management Service (CEMS) - one of the six core Copernicus services - and specifically supports the floods early warning and monitoring component of CEMS (namely the European and Global Flood Awareness Systems) through the continuation of the established CEMS Hydrological Forecast Centre - Analytics and Dissemination (DISS)¹.

1.2 THE COPERNICUS EMERGENCY MANAGEMENT SERVICE (CEMS)

The Copernicus Emergency Management Service (CEMS)² supports all actors involved in the management of natural or man-made disasters by providing geospatial data and images for informed decision-making. CEMS constantly monitors Europe and the world for signals of an impending disaster or evidence of one happening in real time. The service immediately notifies national authorities of its findings, or it can be activated on-demand, and offering the provision of maps, time-series or other relevant information to manage better disaster risk. CEMS products are created using satellite, in-situ (non-space) and model data. CEMS consists of two main components, as outlined below.

1) CEMS Mapping component:

The core character of CEMS Mapping lies in the provision, upon activation by Authorised Users, of timely and accurate information derived from satellite or airborne image data, during all phases of the disaster management cycle. The information generated can be used as provided (e.g. as digital or printed map outputs), or further combined with other data sources (e.g. as digital feature sets in a geographic information system) to support geospatial analysis and decision-making processes by disaster managers. The following three modules are in place:

¹ Formally known as the EFAS Dissemination Centre.

² <https://emergency.copernicus.eu/>

- **Rapid Mapping** addresses the on-demand, fast provision of geo-spatial information in support of emergency management activities immediately following an emergency event, and is based on the processing and analysis, in rapid mapping mode, of satellite and aerial image data of varying spatial and spectral resolution, and other geo-spatial raster and vector data sources.
- **Risk and Recovery Mapping** deals with the on-demand provision of geo-spatial information in support to emergency management activities during the phases of the disaster management cycle which are not related to the immediate response (i.e. not requiring rapid mapping delivery), in particular the prevention, preparedness and reconstruction phases.
- **Validation** is tailored to the on-demand verification of a sample of outputs produced by the above two mapping modes, support services, and the early warning services (see below). It includes external quality control, validation of thematic information content and comparison with alternative information sources related to the specific emergency context.

2) CEMS Early Warning and Monitoring component:

Here, the core character is the early warning, risk and impact assessment, and monitoring of specific natural hazards. Currently this component addresses floods, forest fires and droughts, as follows:

- The **European Forest Fire Information System** (EFFIS) monitors forest fire activity in near real-time (NRT), in Europe, Middle East and North Africa, and supports wildfire management at national and regional scales. Globally, the JRC leads development of the Global Wildfire Information System (GWIS).
- The **European and Global Drought Observatories** (EDO & GDO) provide drought-relevant information and early warnings for Europe and globally, publishing short analytical reports in the case of imminent droughts, and connecting drought data providers and users from global to regional levels.
- The **Global Flood Monitoring** product provides a continuous, NRT Sentinel-1 satellite-based, global monitoring of all major flood events.
- The **European and Global Flood Awareness Systems** (EFAS³ & GloFAS⁴) provide complementary flood forecast information to relevant stakeholders supporting flood risk management at national, regional and global level. Registered Users have access to the full functionality of EFAS & GloFAS.

1.3 THE CEMS EUROPEAN AND GLOBAL FLOOD AWARENESS SYSTEMS (EFAS AND GLOFAS)

In 1999, the European Commission's Joint Research Centre (JRC) started a research study for a European-scale flood forecasting system (EFFS), in collaboration with national authorities and experts from different EU Member States. During the disastrous floods in 2002 in the Elbe and Danube rivers, the Commission was confronted with a profusion of non-coherent flood warning information from different sources and of variable quality, complicating the planning and organization of aid. The EFFS developed at the JRC successfully provided ad-hoc simulations of the ongoing floods, and a forecast on how the flood-waves could be expected to travel down the Danube river. In response to this event, the JRC was assigned the task of further developing EFFS into a fully operational, European-wide flood-forecasting model.

The first developments towards such a European Flood Awareness System (EFAS) were initiated in 2003, together with experts from Austria, Czech Republic, Germany, Hungary, and Slovakia and using forecasts from the German weather service (DWD). In 2004, a collaboration agreement with the European Centre for Medium-Range Weather Forecasts (ECMWF) was signed, allowing the JRC to

³ www.efas.eu

⁴ www.globalfloods.eu

incorporate also ECMWF ensemble prediction data and its higher resolution deterministic forecast into EFAS in real-time. From 2005 to 2010, EFAS was tested in real-time mode, together with the newly established EFAS partner network, consisting of national and regional flood forecasting authorities, and later also with the European Commission's Civil Protection and Humanitarian Aid Operations department (DG ECHO). EFAS became part of the initial operations of CEMS in 2011, and it has been running fully operationally since autumn 2012.

Simultaneously with the above developments, the first efforts were made to expand the concept of EFAS to the global scale through the Global Flood Awareness System (GloFAS). GloFAS is a global hydrological forecast and monitoring system, which couples state-of-the-art weather forecasts with a hydrological model. With its global scale set-up, GloFAS provides downstream countries with information on upstream river conditions, as well as continental and global overviews. GloFAS has been running fully operationally as part of CEMS since April 2018.

The CEMS EFAS and GloFAS are currently executed by four separate Operational Centres:

- The **CEMS Hydrological Forecast Centre - Computation (COMP)** executes forecasts for EFAS and GloFAS and hosts the different data dissemination and visualization platforms.
- The **CEMS Hydrological Forecast Centre – Analytics and Dissemination (DISS)** provides a daily analysis of the hydrological predictions coming from the forecasting systems including the issuing of Flood Notifications to the end-users. Furthermore, it supports users with training and information as well as the management of communication tools (project internal communication between the different centres as well as with different user audiences).
- The **CEMS Hydrological Data Collection Centre (HYDRO)** collects historical and real-time river discharge and related data for its use in the CEMS early warning and monitoring systems EFAS and GloFAS, as well as EDO and GDO.
- The **CEMS Meteorological Data Collection Centre (METEO)** collects historical and real-time meteorological data for use in the CEMS early warning and monitoring systems for floods, droughts and wildfires (i.e. EFAS, EDO, and EFFIS, respectively).

2. SCOPE OF REQUESTED SERVICE

The scope of the requested service is the continuation of the already established, fully operational CEMS Hydrological Forecast Centre - Analytics and Dissemination (DISS) service (previously called the EFAS Dissemination Centre). Briefly, the role of DISS is as follows:

- To summarise and disseminate on a daily basis the hydrological situation in Europe and globally with regard to ongoing and forecasted flood events.
- To manage the EFAS and GloFAS partner network and provide user support via the organisation of EFAS and GloFAS end-user meetings and training.
- To test and provide feedback on new developments of EFAS and GloFAS.
- To host the communication platform for the CEMS flood early warning and monitoring service providers and the JRC, so that information can be exchanged easily.

This Call for Tender contains the following five work packages (WPs):

- **WP1:** This work package covers the set-up of the communication platform, training on products and procedures for the forecasters as well as setting up of the user support including the contacting of the entire EFAS partner network and updating the training material as well as the establishment of a quality control plan.

- **WP2 to WP4:** These work packages cover the service operation, with:
 - the analysis and reporting of ongoing and forecasted floods in Europe and globally, including the pre-tasking of satellite image acquisitions (WP2);
 - the service testing and analytics including performance assessment of EFAS and GloFAS, analysis of missed events and feedback on new products and developments (WP3);
 - user support activities, through the provision of a contact point, training material and sessions, and annual meetings (WP4);
- **WP5:** This work package covers the overarching knowledge and project management and implementation, including the establishment of the communication platform and issue tracking system for the CEMS flood early warning and monitoring service, meetings and final reports, the service quality assurance as well as the internal and final knowledge transfer (WP5).

The service requested by this tender is part of an overarching operational forecasting service. In that context, it must ensure a high service availability and timely and reliable delivery of the services and created products at fixed delivery times, 7 days a week.

3. WORK TO BE UNDERTAKEN

In order to continue the already established CEMS Hydrological Forecast Centre – Analytics and Dissemination (DISS) service, in accordance with the scope of the service and the technical requirements that are described in these Technical Specifications and in the accompanying Technical Annex (Annex A), the Contractor must carry out the necessary tasks and provide the expected deliverables for the work packages, which are detailed below.

All of the work described below for the work packages shall be issued through specific contracts, and performed in accordance with these Technical Specifications, Annex A and the Contractor's offer.

The following important points should be noted:

- All services offered by the Tenderer during the tender, are seen as an integral part of the offered service at the offered price, and no additional costs can be requested for service components exceeding the originally requested specifications.
- During the entire duration of the framework contract, it is the role of the Contractor to explore regularly possibilities for improving the service and to communicate proposals to the JRC. Changes shall only be implemented after mutual agreement with the JRC.
- Forecasts are to be analysed by a team of duty officers who are experienced in analysing probabilistic hydrological predictions (hazard and impact), as well as in including the meteorological situation in the evaluation process.

3.1 WORK PACKAGE 1: SET-UP OF SERVICE

This work package includes the setting up and implementation of all facilities and processes as well as the acquisition of knowledge needed for the near real-time (NRT) analysis and reporting of ongoing and forecasted floods along with the pre-tasking of satellite image acquisitions entailed in WP2; the analytical tasks of WP3; the user support of WP4; and the project management and implementation of WP5. The Contractor must propose and implement appropriate solutions for all the key tasks outlined below.

Task 1 - Set-up of the communication platform

The platform shall act as a “**virtual office space**” for all operational CEMS flood early warning and monitoring service providers and the JRC, and allows different ways of communication between the different actors. The platform must have at least the following features: capability to store and share documents; chat function; voice conversations; web conferencing; conference call; as well as an issue software and project tracking system that allows the automatic generation of project diaries, and lastly a survey software for the conduction of regular surveys.

The following minimum requirements must be met:

- Web conferencing allowing the organisation of large web conferences with minimum 250 participants.
- Conference calls must be possible with a minimum of 10 connections.
- The functionality of the solution for project and issue tracking and documentation must be equivalent to market solutions such as JIRA and Confluence⁵ or other with similar functions, and shall allow for a minimum of 250 users.
- The solution is capable of integrating with a Git repository management system.
- The communication platform must be cross-platform, including at least MS Windows and Linux or equivalents.
- Secure connection and privacy of communication are ensured.
- The communication platform shall be operated on a guaranteed 24-hours-a-day, 7-days-a-week basis.
- A disaster recovery system for the platform must be in place.
- The functionality of the survey platform must be equivalent to market solutions such as SurveyMonkey or others with similar functions.

The Contractor shall carry out the following steps:

- Set up the communication platform for the CEMS flood early warning and monitoring service providers and the JRC as well as technical points of contact for Copernicus and the ERCC.
- Provide training and support for using the platform and its functionalities, to the users of the platform.
- Keep the user profiles up to date.
- Keep the system up to date by regularly monitoring content, issues, and access.

Note that issues with the platform that have been highlighted must be addressed and solutions proposed within one working day.

⁵ www.atlassian.com

Task 2 - Introduction to EFAS partner network and ERCC

The Contractor shall carry out the following step:

- Contact the existing **EFAS partner network** and the **ERCC Duty Officers** to introduce themselves as the new service provider for EFAS and GloFAS.

Task 3 - Development of training material

The Contractor shall carry out the following steps:

- Develop a **training programme for ERCC duty officers** that is tailored to their needs and ensure the correct and efficient use of EFAS and GloFAS information in their daily operation and during crises. The material should be intuitive and always accessible to the ERCC, so that knowledge can be refreshed at any time and new duty officers can familiarise themselves with the systems.
- Update existing product information on the EFAS and GloFAS websites, **training material** and production of **user guide material** (e.g. user manuals, factsheets, etc.) tailored to the needs of the respective user community (e.g. EFAS partner, general EFAS user, GloFAS user), that ensures the correct and efficient use of EFAS and GloFAS information.
- Produce a comprehensive **internal training document** for forecasters on internal and external procedures based on existing documentation and on what has been discussed during the training sessions (see Task 5 below).

Task 4 - Set up of Quality Control Plan

The Contractor shall carry out the following step:

- Set up a **Quality Control Plan** with the targets mentioned in WP5, and also as offered during the Tender procedure.

Task 5 - Training on EFAS / GloFAS products and procedures

The Contractor shall carry out the following steps:

- **Study** in detail all the **technical documentation on existing products and established procedures** that will be provided to the successful tenderer to familiarise the staff and forecasters in particular with the technical aspects of the EFAS and GloFAS websites, the content of these websites in terms of information layers, daily forecasting results, and daily analysing and reporting procedures, including pre-tasking of satellite image acquisitions.
- After studying the documentation - reach out to the JRC (or the previous Contractor) to receive further information on anything essential for the execution of the service that is not yet understood. This should be delivered in the form of short **virtual training sessions**.

Note that descriptions of EFAS and GloFAS products and reporting procedures are available on the websites of EFAS³ and GloFAS⁴.

Deliverables, acceptance criteria and schedule of Work Package 1:

#	Deliverables:	Time (months):
1	<p>"Virtual office space"</p> <p>Quality acceptance criteria:</p> <ul style="list-style-type: none"> • Platform operates on a 24-hours-a-day, 7-days-a-week basis. • Minimum requirements and added-value functionalities from tender are activated. • All user profiles are up to date. • Service availability of at least 97%. • Space (content, issue and access) is monitored. 	T6
2	<p>Communication to EFAS partners and ERCC</p> <p>Quality acceptance criteria:</p> <ul style="list-style-type: none"> • A welcome letter is sent out to every EFAS partner and the ERCC. • The letter clearly describes the new Contractor, point of contact, contact coordinates, duration of (expected) service and any other issues. 	T6
3	<p>Training material</p> <p>Quality acceptance criteria:</p> <ul style="list-style-type: none"> • Training material is designed according to the needs and as offered during the tender procedure. • The material targets user needs, is comprehensive, of high quality and easy understandable. 	T6
4	<p>Quality Control Plan</p> <p>Quality acceptance criteria:</p> <ul style="list-style-type: none"> • Designed to cover all relevant service components as specified in this document, Annex A and the offer. • Updated and optimised proactively and in accordance with the JRC. • Continues monitoring of performance in relation to target times (see WP5). • Non-compliance with the targets is reported immediately to the JRC and resolved as soon as possible. 	T6
5	<p>Internal training on EFAS / GloFAS products and procedures</p> <p>Quality acceptance criteria:</p> <ul style="list-style-type: none"> • All members of the forecasting team acquire all necessary knowledge on products and processes to assure a high-quality service performance. • Procedure is in place to train new forecasters. • Internal training material is documented on the central communication platform, and kept updated. 	T6

3.2 WORK PACKAGE 2: ANALYSIS AND REPORTING OF ONGOING AND FORECASTED FLOODS

This work package includes the analysis of ongoing and forecasted floods in Europe as well as globally. It furthermore includes the pre-tasking of satellite images of the CEMS rapid mapping component.

Task 1 - Analysis and reporting of ongoing and forecasted floods in Europe (EFAS domain)

The **EFAS map viewer**, with its twice-daily updated forecasts and flood monitoring information, as well as other publicly available information from national or regional hydro-meteorological authorities or media, represent the main information sources to analyse the ongoing and forecasted floods in Europe. The information is compiled semi-automatically through a web application in the overview of the ERCC (for an example, see Annex A, Section 2.3). Furthermore, EFAS Flood and Flash Flood Notifications are sent to EFAS partners via a web application with pre-filled Flood Notification templates. The criteria for sending EFAS notifications can be found on the EFAS website⁶, and sample EFAS Flood Notifications can be found in Annex A (Section 2.3.1). Note that the criteria for Flood Notifications may be modified during the Contract depending on model upgrades.

The Contractor shall carry out the following steps:

- **Analyse** twice daily (including weekends and bank holidays) the **EFAS forecast** results on the EFAS website, also taking account of auxiliary information such as weather forecast information and data from the CEMS Hydrological and Meteorological Data Collection Centres (HYDRO and METEO).
- **Monitor ongoing flood events** through analysing the information provided in the National Flood Monitoring layer (EFAS website) and other publicly available (national) information, ~~and the media (such as FloodList⁷, Twitter, etc.)~~.
- Hold daily briefings with the forecaster team and if necessary other EFAS Centres, to discuss the overall hydrological situation. Following the briefings, the Contractor shall draft a **summary report (ERCC overview)** and distribute it to the ERCC, the JRC and the other EFAS Centres via the automated reporting tool in the EFAS website (see Annex A, Section 2.3). A sample ERCC report is shown in Annex A (Section 2.3.2).
- Send **EFAS notifications** to the EFAS partners, the ERCC, the JRC and all EFAS operational centres in case the criteria for Flood Notification are met.

Task 2 - Analysis and reports of ongoing and forecasted floods outside Europe (GloFAS domain)

The **Global Reporting Tool (GRT)** is a web application that pre-compiles automatically information coming from various sources, such as Floodlist, GloFAS, CEMS Rapid Mapping and in future also from the CEMS Global Flood Monitoring as well as other media information (Twitter, etc.). The GRT represents the main tool to analyse ongoing and forecasted floods globally. The pre-compiled information on the GRT needs to be checked on a daily basis and modified if necessary. The verified information is then automatically published through an API to the Global Disaster Alert and Coordination System (GDACS)⁸, the GloFAS website and other users. A short description of the GRT and its workflows can be found in Annex A (Section 3.3.1).

The Contractor shall carry out the following step:

- Analyse and verify daily (including weekends and bank holidays) the global ongoing and forecasted flood situation using the **Global Reporting Tool**, which allows the analysis of

⁶ www.efas.eu/en/efas-notifications

⁷ ~~www.floodlist.com~~

⁸ www.gdacs.org

information coming from various sources, such as (but not limited to) FloodList, GloFAS, CEMS Mapping activations and the news media.

Task 3 - Pre-tasking of satellite image acquisitions

The process of providing accurate and timely geospatial data of disaster events can be greatly improved through the “pre-tasking” of satellite image acquisitions, whereby an early warning system is used to initiate data collection before a hazardous event has occurred, rather than waiting for a tasking request from a national authority. The background and objective of the CEMS pre-tasking workflow - which was developed in 2016 to integrate EFAS into the CEMS Rapid Mapping workflow - is described on the main EFAS website⁹, and is also summarised in Annex A (Section 2.3.3).

The Contractor shall carry out the following steps:

- **Notify the CEMS Rapid Mapping team** of a potentially upcoming high impact event at European or global level according to the standardized workflow established (see Annex A, Sections 2.3 and 3.3) with all the required information for the pre-tasking.
- **Inform the EFAS partner** (for Europe only) of the pre-tasking activity, and the possibility to activate the CEMS Rapid Mapping Service through the national Authorised User through a standardized workflow.

Deliverables and schedule of Work Package 2:

#	Deliverables:	Time (months):
1	<p>EFAS analytical service including flood notifications and ERCC overview reports</p> <p>Quality acceptance criteria:</p> <ul style="list-style-type: none"> • EFAS Flood Notifications <ul style="list-style-type: none"> • are based on a guaranteed twice-daily analysis (on a 365-days-a-year basis) of the EFAS forecasts • When the EFAS Flood Notification criteria are met, a Flood Notification is sent out without fail and within target times (see WP 5). • Flood notifications are always sent before the daily EFAS overview. • Automatically generated information has been verified by forecaster, and if necessary manually corrected (this includes also the correct spelling of administrative names and email addresses). • ERCC overview reports: <ul style="list-style-type: none"> • Overview reports are produced on a guaranteed 7-days-a-week, 365-days-a-year basis. • Overview report is available before target time (see WP 5). • Automatically generated information has been verified by forecaster, and if necessary manually corrected (this includes also the correct spelling of administrative names). • Reports are up-to-date and do not contain copy/paste errors. 	From T7 until the end of the contract.
2	<p>Global Flood Reporting</p> <p>Quality acceptance criteria:</p> <ul style="list-style-type: none"> • Analysis of globally ongoing and forecasted floods is done daily (on a 365-days-a-year basis), including all sources available. 	From T7 until the end of the contract.

⁹ www.efas.eu/en/pre-tasking

#	Deliverables:	Time (months):
	<ul style="list-style-type: none"> Automatically generated information has been verified by forecaster and if necessary manually corrected or completed. Reports are published on GDACS before target time (see WP 5), and information is kept updated throughout the event. 	
3	<p>Pre-tasking of satellite image acquisitions</p> <p>Quality acceptance criteria:</p> <ul style="list-style-type: none"> Pre-tasking is done based on EFAS and GloFAS forecasts. The established workflow for pre-tasking is followed. Follow-up questions related to this activity are responded to without delay. 	From T7 until the end of the contract.

3.3 WORK PACKAGE 3: SERVICE TESTING AND ANALYTICS

Feedback on the flood forecast and service performance enables the CEMS Hydrological Forecast Centre - Computation service and the development teams to verify case studies and validate skill scores and the overall performance of the system, as well as to shape future developments. DISS is responsible for the analysis of feedback on Flood Notifications, annual user surveys, missed event reports, new system developments and large-scale flood events.

Task 1 - Performance assessment of the CEMS flood early warning and monitoring service

The Contractor shall carry out the following steps:

- Design, and send out at the beginning of each year, a **tailored user survey** for each of the systems, that allows the EFAS and GloFAS user community to provide in-depth feedback on at least: the previous year's satisfaction in terms of (a) the overall service, (b) skill, model performance and trust, (c) training and resources, (d) new products and developments, and (e) the future developments and collaboration.
- Analyse in the first quarter of each year the performance of the CEMS flood early warning and monitoring service, based on at least: (a) feedback on the EFAS Flood Notifications and missed events; (b) the annual EFAS and GloFAS user survey; and (c) operational experiences at DISS. The resulting **Annual Performance Report** shall cover (as a minimum) the following items:
 - Analysis of the performance of the **forecasting chain** (analysis time, interpretation of results, sending of notifications – EFAS only, pre-taskings, etc.).
 - Analysis of all the **feedback** received **on** (all three types of) **EFAS Flood Notifications** in terms of accuracy (space, timing and magnitude), the hit-ratio and other information that can be extracted from the feedback form.
 - Summary of the analysis on missed events in Europe.
 - ~~Analysis of the missed events for GloFAS, based on the events reported through Task 2 in WP3.~~
 - Detailed analysis of the **annual user surveys** (for EFAS and GloFAS) by the Contractor.
 - Possible improvements** of the systems or forecasting procedures.

It should be noted that, whereas the feedback collection on the EFAS Flood Notifications is automatised, the EFAS and GloFAS annual surveys need to be designed and sent out by the Contractor.

The results shall be written up in a concise report, and communicated to all CEMS flood early warning and monitoring Contractors and the JRC, for further development purposes.

Task 2 - Event-based assessment of EFAS flood forecasting performance and use

Once a year the DISS shall **analyse in depth a selected flood event** to evaluate the performance and use of EFAS. The report shall include the following aspects / sections:

- Brief introduction of the EFAS flood forecast service.
- Description of the flood event, including study area, meteorological situation (this part is covered by the CEMS METEO), evolution of the flood and the related impacts.
- Hydrological analysis of the in situ observations (this part is covered by the CEMS HYDRO).
- Public information on the flood event.
- Detailed description of the EFAS forecast and related information.
- Partner feedback on the EFAS Flood Notification (if available).
- Detailed verification of the EFAS forecast information and the EFAS service performance.

The report is intended to support the EFAS development in improving the system from a modelling, post-processing and communication point of view. An example of a recent report is available on the EFAS website¹⁰ and the latest template will be provided.

The Contractor shall carry out the following step:

- Provide once a year a specific assessment report on one major flood event. The report shall address all of the aspects mentioned above. The flood event to be assessed shall be proposed by the Contractor, for mutual agreement with the JRC.

Task 3 - Analysis of missed events in Europe

An understanding of why a system has failed its designed purpose, provides valuable information not only for understanding the systems limitations, but also for highlighting areas for future improvements. For this reason, the possibility to report through the EFAS website a missed event, has been recently implemented.

The Contractor shall carry out the following step:

- On receipt of a **missed event report**: investigate the possible reason that the event was missed by the forecasting system, including recommendations on improvements (if possible), and share this analysis with COMP, JRC and the reporting EFAS partner.

Task 4 - Testing of and feedback to new EFAS/GloFAS products and developments

COMP and the JRC are in charge of the development of new products and system improvements. Before these are adopted in the operational service, they need to be thoroughly tested. The Contractor shall carry out the following step:

- Test and provide **feedback to new products and developments**. This feedback shall be provided throughout the development process, to ensure that user needs are addressed, as well as at the final stage to ensure the correct implementation and full functionality of the final development. Testing shall also include, where necessary, an evaluation of the new product and development using the raw model output data or the validation with hydrological and meteorological in-situ data, as obtained by the CEMS HYDRO and METEO.

Deliverables and schedule of Work Package 3:

¹⁰ www.efas.eu/en/report/assessment-report-flood-events-northern-spain-december-2019

#	Deliverables:	Time (months):
1	<p>Annual EFAS and GloFAS user surveys</p> <p>Quality acceptance criteria:</p> <ul style="list-style-type: none"> • Content of the surveys is updated every year to assure the relevance of each question, and all relevant service and product components are covered. • Style is user-friendly and visuals are in line with the CEMS style. • Surveys are conducted on a yearly basis. • Results of the survey are archived on the central communication platform. • All the relevant communities are invited (and reminded) to participate. 	Every January
2	<p>Missed event analysis</p> <p>Quality acceptance criteria:</p> <ul style="list-style-type: none"> • Analysis includes all relevant components and makes use of external information to investigate the cause for a missed event. • Report includes a Section with ideas on how the missed event could have been avoided. • Results are summarised in short reports (1-2 pages) and shared with the COMP, JRC and the reporting EFAS partner. 	From T7 until the end of the contract
3	<p>Testing of and feedback to new EFAS/GloFAS developments</p> <p>Quality acceptance criteria:</p> <ul style="list-style-type: none"> • The Contractor follows the planned release schedule of COMP to assure available resources for upcoming testing and feedback endeavours. • Testing and feedback are coordinated between both of the Hydrological Forecast Centres as well as with the Hydrological and Meteorological Data Collection Centres where necessary, resulting in a collaborative and efficient finalisation and optimisation of the new development, with regards on functionality and user needs. • Feedback is documented on central communication platform and raised issues are logged and followed up through an issue tracking system. 	From T7 until the end of the contract
4	<p>Annual event-based assessment report</p> <p>Quality acceptance criteria:</p> <ul style="list-style-type: none"> • The Contractor has proposed a range of potential flood events that could be analysed, selected in agreement with the JRC. • The Contractor coordinates with the other involved Operational Centres to receive their contribution. • The analysis and report contains all requested parts and information, and is of high content and writing quality (similar to peer-reviewed article). • Copernicus report template shall be used. • The report will be published on the EFAS website, and promoted through the 	Once every year

#	Deliverables:	Time (months):
	CEMS Communication service.	
5	<p>Annual Service quality assessment report</p> <p>Quality acceptance criteria:</p> <ul style="list-style-type: none"> Covers a whole calendar year. The analysis and report contains all requested parts and information, is of high content and writing quality (similar to peer-reviewed article). Copernicus report template shall be used. Individual sections of this report, such as the results of the user surveys as well as the evaluation on the EFAS Flood Notifications, shall be published on the respective websites and promoted through the CEMS Communication service. 	End of Q1 every year

3.4 WORK PACKAGE 4: COMMUNICATION AND USER SUPPORT

This work package focuses on user support activities, through the provision of a contact point, training material and sessions, and annual meetings.

Task 1 - CEMS EFAS and GloFAS user management and support

The Contractor shall carry out the following steps:

- **Communicate with the users** (of EFAS and GloFAS) in case of questions, clarifications or any other issues. In particular, provide a comprehensive answer to end-users in case questions regarding forecasts arise. In case the user is not fluent in English, the Contractor shall make use of the language skills within the team to answer in another language more convenient for the user. Note that technical issues related to the web interfaces (issues with visualization, user accounts, etc.) shall be addressed by COMP.
- Manage the communication and management of the EFAS **conditions of access** document¹¹.
- Adopt existing workflows for EFAS partner management, and use where applicable established templates for the communication (e.g. first communication to new EFAS partner).
- Take actions to **expand the existing EFAS partner network and the GloFAS user community**, following the proposed strategy of the Tender and as agreed with the JRC.
- Keep updated, throughout the Framework Contract, the product information on the EFAS and GloFAS websites, **training material** and **user guide**, as developed under WP1 (Task 3), and in accordance with the user needs (ERCC duty officer, EFAS partner, EFAS user and GLOFAS user).

For the current EFAS partners and the GloFAS user community, see Annex A (Sections 2.1 and 3.1).

Task 2 - EFAS partner training

The Contractor shall carry out the following steps:

- Undertake **short-term visits to new EFAS partners** to provide one full day of **training** to assure the good understanding of the service components, the available products and the usage

¹¹ www.efas.eu/en/become-efas-partner

by the EFAS partner. Physical visits shall be coordinated with the CEMS HYDRO and METEO.

- Provide **online training** to new EFAS partners, to assure the good understanding of the service components, the available products and the usage by the EFAS partner. Online training shall be coordinated with the CEMS HYDRO and METEO.

Task 3 – EFAS/GloFAS webinars

The Contractor shall:

- Set up and hold **EFAS/GloFAS webinars** for the EFAS partners/GloFAS community (up to 200 participants). Each webinar should be around 40-50 minutes long (20-30 mins. presentation, 20 mins. for questions) and be held in English. The topics of the webinars should be previously agreed with the JRC. Where necessary, input shall be requested from and coordinated with COMP and / or HYDRO and METEO. The webinars should be recorded, edited and published on the respective website (EFAS website³; GoFAS website⁴).

Task 4 - Training of the ERCC duty officer

The Contractor shall carry out the following steps:

- Undertake short-term visits to the ERCC in order to provide a **face-to-face training** session to ERCC Duty Officers tailored to their needs, and ensure the correct and efficient use of EFAS and GloFAS information in their daily operation and during crises.
- Provide **online training** to ERCC Duty officers tailored to their needs, and ensure the correct and efficient use of EFAS and GloFAS information in their daily operation and during crises.

Task 5 - Organise the EFAS Annual Meeting

The Contractor shall:

- Organise and moderate the 2 days long **EFAS annual meeting** for all EFAS partners and the CEMS flood early warning and monitoring team (ca. 150 participants). This includes pre-reservation of hotel rooms as well as the organisation of the venue, lunch and coffee breaks, print outs of agenda and badges, poster boards, welcome desk, etc. Note that the location of the meeting shall be decided on a year-to-year basis (depends on the location of the future Contractors of the CEMS floods early warning and monitoring service, which are not known at this given moment). Support of the local hosts shall be provided in case the meeting is organised at the facilities of the JRC or at one of the other Contractors of the CEMS floods early warning and monitoring service.

Task 6: Organise the GloFAS Annual Meeting

The Contractor shall:

- Organise and moderate the 2 days long **GloFAS annual meeting** for up to 150 participants. This includes pre-reservation of hotel rooms as well as the organisation of the venue, lunch and coffee breaks, print outs of agenda and badges, poster boards, welcome desk, etc. Note that the location of the meeting shall be decided on a year-to-year basis. Support of the local hosts shall be provided in case the meeting is organised at the facilities of the JRC or at one of the other Contractors of the CEMS floods early warning and monitoring service.

Task 7 - Regular content contributions to the EFAS and GloFAS websites

The Contractor shall carry out the following steps:

- Contribute regularly (on average once per month) to the content of the EFAS and GloFAS website with **short articles (0.5 - 1 pages)** of interest to the EFAS / GloFAS user community,

such as (but not limited to): summaries of events which EFAS and GloFAS have forecasted, results of the performance report and the detailed assessment report, summaries of the EFAS and GloFAS Annual Meetings and also other attended meetings, as well as on provided training and webinars, etc. The contributions shall be prepared in a way that additional editing is not needed.

- Publish **news items** on the EFAS or GloFAS websites, or other Copernicus communication channels, e.g. new EFAS partners or prominent GloFAS users, meeting announcements, etc.

Deliverables and schedule of Work Package 4:

#	Deliverable:	Time (months):
1	<p>CEMS Flood user management and support</p> <p>Quality acceptance criteria:</p> <ul style="list-style-type: none"> • If necessary, the Contractor is answering questions to the EFAS and GloFAS users, also in one of the other languages available within the team. • The EFAS Partner network and the GloFAS user community have grown during the execution of this Contract. • The training material developed under WP1 (D3) and the EFAS/GloFAS product information on the websites are updated throughout the Framework Contract after new development releases, and also based upon user feedback (especially during training sessions). 	From T7 until the end of the contract
2	<p>EFAS partner training</p> <p>Quality acceptance criteria:</p> <ul style="list-style-type: none"> • New EFAS partners have been proactively contacted and dates for training sessions have been mutually agreed upon. • The training is comprehensive and targeted to the special needs of the new EFAS partner. • Copernicus layout templates are used for any communication on the CEMS flood early warning and monitoring service. • Mission reports clearly describe the purpose, location, date, participants and highlight the most relevant points of the meeting for the service and are shared with JRC 2 weeks after the meeting. 	From T7 until the end of the contract (on average twice a year)
3	<p>EFAS / GloFAS webinars</p> <p>Quality acceptance criteria:</p> <ul style="list-style-type: none"> • Lead the preparation of the webinar material with input from the contributing Operational Centres. • Send invitation to the whole user community at least 4 weeks in advance, and remind 1 week and 1 hour before the start of the webinar. • Present and moderate webinar. • Record and edit each webinar (ideally slice them into shorter videos, and cut out anything not needed to improve the quality and length). • Upload edited webinar no later than two weeks after the webinar on the 	From T7 until the end of the contract (three times a year)

#	Deliverable:	Time (months):
	respective website.	
4	<p>ERCC duty officer training</p> <p>Quality acceptance criteria:</p> <ul style="list-style-type: none"> ERCC has been proactively contacted and dates for training sessions have been mutually agreed. The training is comprehensive and targeted to the special needs of the ERCC. Copernicus layout templates are used for any communication on the CEMS flood early warning and monitoring service. Mission reports clearly describe purpose, location, date, participants and highlight the most relevant points of the meeting for the service and are shared with JRC 2 weeks after the meeting. 	From T7 until the end of the contract (once a year)
5	<p>EFAS and GloFAS Annual Meetings</p> <p>Quality acceptance criteria:</p> <ul style="list-style-type: none"> Annual meetings are announced 3 months before date. All logistics have been organised in a timely manner. Meeting agenda has been coordinated and optimised for an interactive and participative meeting. Meeting moderation is adequate and participative. Presentation on the “CEMS Hydrological Forecast Centre – Analytics and Dissemination”. Meeting minutes of the annual meetings are finalised within one month after the meeting, and sent to the JRC for approval. 	Each meeting once a year
6	<p>Regular contributions to the EFAS and GloFAS web sites.</p> <p>Quality acceptance criteria:</p> <ul style="list-style-type: none"> The contributions are written in excellent English. The contributions require no further editing. The contributions are delivered in regular intervals. The contributions are produced in a proactive way and published online after confirmation by JRC. 	From T7 until the end of the contract

3.5 WORK PACKAGE 5: KNOWLEDGE AND PROJECT MANAGEMENT AND IMPLEMENTATION

This Work Package focuses on the overall management and implementation of each Specific contract, including general requirements, a common communication platform and issue-tracking system, reports and meetings, internal training and plans for monitoring the performance reporting.

Task 1 - Specific contract management

Specific contract management is to be accurate, punctual and professional.

The Contractor shall carry out the following steps:

- Ensure the availability of a responsible person of the service 24-hours-a-day, 7-days-a-week, 365-days-a-year.
- Manage immediately issues that put at risk the continuation of the operational service.
- Answer written requests from the Contracting Authority **within a maximum of two working days** (for technical issues) and a **maximum of four working days** (for administrative/management issues).
- Prepare for each Specific contract a **service implementation plan**, outlining the activities and milestones. Milestones must be markers of demonstrable progress in service development, product delivery and/or service quality and product delivery. Each Work Package's deliverables must be considered. The implementation plan must include a listing and description of the risk and risk mitigation strategy.

Task 2 - Internal training of EFAS / GloFAS products and procedures

The Contractor shall carry out the following steps:

- Follow the work of COMP regarding new developments (changes of the system, visualisation, new products, etc.) to **update accordingly and in a timely manner the documentation of products and forecasting procedures**.
- Understand the impact of updates and communicate the change and consequences to the forecaster team.
- Provide comprehensive **training to all new forecasters** joining the team.
- Review every 6 months that all **forecasters are up to date** with the procedures and that training material is up to date. If necessary the Contractor shall refresh training with all forecasters and update training material.

Task 3 - Management and use of “virtual office space”

The Contractor shall carry out the following steps:

- Ensure daily **management of communication platform** (set up under WP1) for the CEMS flood early warning and monitoring service including tasks such as performance monitoring, user-name and password assignments, disk space allocations, and follow up of pending issues.
- Issues with the platform shall be addressed within 1 working day and solutions proposed.
- Ensure up-to date project documentation, e.g. through maintaining the project diary and issue tracking system, provision of training on the system, documentation on system and all executed tasks, reports on performance assessments, email exchange with EFAS / GloFAS user and ad hoc reporting request if required by the Contracting Authority.

Task 4 – Final Report

The Contractor prepare and deliver:

- Specific contract **Final Report**: The final report documents the entire course of the Specific contract, including technical, organisational and administrative issues. It must consist of:
 - An executive summary (using non-technical language and targeting upper level management)
 - A brief description of the specific contract including the tasks and scientific and technical deliverables.

- Key Performance Indicators as indicated in the Quality Assurance Plan (see Task 6).

Task 5 - Meetings

The Contractor shall carry out the following steps:

- **Kick-off meeting:** at the beginning of each specific contract with the aim to secure a fully shared understanding of the Specific contract, expectations and to clarify any doubts or issues between the Contractor and Contracting Authority
- **Progress review meetings:** If required, during on-going specific contracts, quarter-annual progress meetings between the Contractor and Contracting Authority may be requested and are to be held via video-conference, in order to assess the status, risks and actions. In this regard, the Contractor must ensure the preparation and provision of the required material for the review process (datasets, documentation), and is to provide answers and clarifications, as well as provide recommendations to ensure the timely delivery.
- Participate every 3 months in a **cross-centre meeting** between all the contractors of the CEMS flood early warning and monitoring service. The meeting is held via video-conference and is intended to update each other on the achievements of the previous quarter and the planning for the next one, with the intention to be aware of the projects overall work progress and in order to harmonise actions between the Operational Centres.
- Participate in **briefings** and ad hoc meetings with the CEMS early warning services, to clarify issues, report on the data collection performance and collect feedback from the early warning services computational centres and other users.

Task 6 – Service quality assurance

The Contractor shall carry out the following steps:

- **Track issues** and document the service operations with tools agreed in WP1 (Task1).
- Provide and implement a **Quality Control Plan** for the different tasks against which the quality acceptance criteria for the final products will be assessed. Quality control will include at least:
 - Implementation of targets / **key performance indicators (KPIs)**:

i)	Comments are written every day in the forecaster diary regarding morning check and afternoon check: > 95% on time.
ii)	ERCC overview (Task 1 WP2) sent before target times (working days: 08.30; weekends and bank holidays: 10:00): > 98% before target time.
iii)	Flood notifications (Task 1 WP2) sent before target times (working days: 08.25 CET and 14.00 CET; weekends and bank holidays: 09.25 CET and 14.00 CET): > 98% before target time.
iv)	Analysis and reports of ongoing and forecasted floods outside Europe (Task 2 WP2) are being checked and approved before target times (working days as well as weekends and bank holidays: 15.00 CET): > 98% before target time.
v)	Pre-tasking of satellite images (Task 3 WP2) is being executed before target times (working days as well as weekends and bank holidays: 15.00 CET): > 98% before target time.

vi)	User questions received are replied (Task 1 WP4): > 95% replied within 1 working day.
vii)	Issues are assigned and tracked (Task 3 WP5): > 99% issues are assigned within 3 working days.
viii)	Service availability of communication platform: > 97%.
ix)	Number of regular contributions to the EFAS and GloFAS websites (Task 7 WP4): At least 1 contribution per month for EFAS and GloFAS.

- o Monitoring target achievements: Each target will be monitored and reported/visualised regularly. JRC has access to the performance monitors.
- o Issue-tracking in case of non-achievement: As soon as set targets are not met, the issue must be reported and tracked through the issue tracker. Issues must be addressed within one working day and a plan for solving the issue presented.
- The Contractor must adapt the Quality Control Plan in case issues are arising or new products are being added. Also, the Contractor shall continuously assess the products and deliverables against the quality control plan in case of operational tasks and before delivering products and reports to the JRC.

Task 7 - Knowledge transfer / handover documentation

The Contractor shall:

- Ensure that the knowledge necessary for the service to be continued smoothly, uninterrupted and without deterioration of quality is transferred to the Contracting authority. The Contractor must prepare meticulously a complete handover documentation and contribute proactively to a timely and smooth **handover of the services** in case of termination or upon expiry of the Contract.

Deliverables and schedule of Work Package 5:

#	Deliverable:	Time:
1	<p>Project management, including service implementation plan, kick-off meetings, virtual progress meetings and briefings, and internal training.</p> <p>Quality acceptance criteria:</p> <ul style="list-style-type: none"> • The Contractor and in particular the project management shall be available, responsive and problem-solving. • Service implementation plan: <ul style="list-style-type: none"> • A service implementation plan needs to be prepared for every Specific contract. • The plan is shared with the JRC 1 week before the kick-off meeting, for the purpose of finalizing the plan during the kick-off meeting. • The service implementation plan shall be kept up-to-date throughout the Contract. • Kick-off meetings: 	From T0 onwards

#	Deliverable:	Time:
	<ul style="list-style-type: none"> • Meeting is held within one month after signature of each Specific contract. • Service implementation plan is presented and finalised • Meeting minutes shall be complete, and documented on the central project communication platform within 2 weeks after the meeting. • Progress meetings and briefings: <ul style="list-style-type: none"> • Meeting date is mutually agreed on by Contractor and JRC. • Contractor shall prepare for the meetings according to the task description (including an updated service implementation plan). • Meeting minutes shall be complete, and documented on the central project communication platform within 1 week after the meeting. • Internal training on EFAS / GloFAS products and procedures: <ul style="list-style-type: none"> • In-house training material on products and procedures is comprehensive, accurate, user-friendly and always up-to-date. • All new forecaster have received extensive training and are familiar with all products and procedures. • All forecasters are kept informed on updates in products and procedures. • All training documentations are stored on the central communication platform, accessible to all CEMS flood early warning and monitoring Contractors and the JRC. 	
2	<p>Management and use of “virtual office space”.</p> <p>Quality acceptance criteria:</p> <ul style="list-style-type: none"> • Communication platform with all its integral parts is up and running, and accessible on a 24-hours-a-day, 7-days-a-week for the CEMS flood early warning and monitoring service except for downtime due to maintenance. • User support to CEMS flood early warning and monitoring service members is provided. 	From T0 onwards
3	<p>Quarter-annual cross-centre meetings (virtually, usually 1-2 hours).</p> <p>Quality acceptance criteria:</p> <ul style="list-style-type: none"> • Coordinate between Operational Centres to fix a date, set up and moderate the virtual meetings. • Contractor shall prepare for those meetings a progress report. • Meeting minutes shall be complete, and documented on the central project communication platform within 1 week after the meeting. 	Every 3 month from T0
4	<p>Service quality assurance.</p> <p>Quality acceptance criteria:</p> <ul style="list-style-type: none"> • Includes KPIs as requested and any additional offered during tender process. • Comply with the agreed quality assurance targets at all times. 	From T0 onwards

#	Deliverable:	Time:
	<ul style="list-style-type: none"> • Document KPI's on the web-based project documentation platform and update regularly according to the time span of each KPI. • Error diagnostic and issue tracking is done meticulously. • Periodically revise quality assurance targets and if necessary, make suggestions to improve those. Improvements shall only be adopted after confirmation by JRC. 	
5	<p>Final report.</p> <p>Quality acceptance criteria:</p> <ul style="list-style-type: none"> • Report follows standards laid out in in the Technical Specifications of the Framework Contract. • Report includes links to all deliverables made during the project. • Report includes a Quality Control Plan (QCP), showing that the QCP was monitored and applied continuously during the execution of the project and that the QCP covers all aspect relevant for the execution of the project. • Report includes a Section on project management, and a statement on intellectual property rights (IPR) as outlined in the Framework Contract. 	At the end of every specific contract
6	<p>Knowledge transfer/handover documentation.</p> <p>Quality acceptance criteria:</p> <ul style="list-style-type: none"> • Documentation and information are complete and accurate, and have been delivered in a timely manner. 	On request (the last specific contract)

4. GENERAL SPECIFICATIONS AND REQUIREMENTS

4.1 LANGUAGE

The language of all deliverables and reports must be English. All written and spoken communications must by default be in English.

4.2 PLACE OF WORK

The execution of work is to be performed at the Contractor's premises.

4.3 MEETINGS

4.3.1 KICK-OFF MEETING

The Kick-Off Meeting shall be held within one month after signature of each Specific contract, the aim of which is to secure a fully shared understanding of the Specific contract, expectations and to clarify any doubts or issues between the Contractor and Contracting Authority. At the same time, Technical Specifications and procedural issues are discussed to render the project workflow and communication as clear and efficient as possible.

All kick-off meetings will take place at the JRC Ispra site in Italy, unless mutually agreed otherwise. The Contractor is responsible for providing the draft minutes within two weeks after the meeting for approval by the Contracting Authority.

4.3.2 OTHER MEETINGS

Other meetings, if required, are specified in the specific contracts and / or decided and mutually agreed on an ad-hoc basis.

Where needed the Contracting Authority retains the right to request a meeting at a venue and date that will be mutually agreed at any time during the contract.

In case issues between the Contractor and a data provider cannot be solved through phone or video conference, short visits at the Contractor's premises may be required.