

**Annex II to the Invitation to Tender**

**Frontex/OP/1499/2018/RS**

# **Terms of Reference**

**Testing and Evaluation of a New Copernicus Service: Combined  
time/area imagery**

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## 1. Background and context

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On 10 November 2015 a Delegation Agreement was signed between the European Commission and the European Agency for the Management of Operational Cooperation at the External Borders of the Member States of the European Union (Frontex), transformed in 2016 into European Border and Coast Guard Agency, on the 'Implementation of the Border Surveillance Component of the Copernicus Security Service'.

The objective of the border surveillance component of the security service is to 'provide increased situational awareness when responding to security challenges at the external border through detection and monitoring of cross-border security threats, risk assessment and early warning systems, mapping and monitoring'.

Frontex is the entity entrusted by the Commission to act as the single entry/exit point for the acquisition, fusion and delivery of Border Surveillance Component of the Copernicus Security Service in the period of time 2016-2020.

### 1.1. Introduction

Copernicus activities of the Agency consist primarily on the provision of Copernicus services to Frontex operational units, other Maritime EU Agencies, and to Member States via existing Frontex operational IT systems but also on the activities related to the Evolution of these services, including the decision making process to select, test, and introduce new or improved Copernicus Services.

Development of New Services include the tasks addressing the development and testing of innovative ways to use Copernicus resources by either creating new services (following technology evolution and/or emerging users' needs) or by modifying existing services (on the basis of new knowledge derived from lessons learned through the use of current services).

New Services proving to have added value for operational purposes will be subsequently rolled out and incorporated into Frontex Copernicus Available Services Toolbox.

### 1.2. The Problem

To assess the feasibility of keeping an automated surveillance from the space, over specific wide maritime areas, where events considered of interest could be automatically detected, and presented to the end-user in the form of meaningful alerts.

Frontex will conduct a pilot project to explore a new Copernicus Service: the automatic exploitation of the spatial and temporal combination of different satellite images to detect objects/events of interest in designated maritime areas.

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## 2. Description and Scope of the tender

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The procurement defined in this document consists of the provision of technical expertise for the execution of a pilot project to test and evaluate the cost-efficiency of the New Copernicus Service described in this document, the test and evaluation would be carried out over a specified timeline.

### 2.1. General Description

During the pilot project the contractor shall observe from space two areas of interest defined by Frontex in the Mediterranean Sea; systematically capture wide area space-borne Synthetic Aperture Radar imagery; automatically search and detect Frontex defined objects/events of interest within these areas; automatically task electro optical high resolution imagery focusing on the located objects/events of interest, and automatically deliver to Frontex the high resolution imagery.

### 2.2. Evaluation Scenarios

Two maritime areas of interest (around 30,000 square miles) will be defined by Frontex in the Eastern and/or Central Mediterranean Sea and communicated to the successful contractor during the kick-off meeting. The contracted expertise requires the acquisition and automatic analysis of wide swath radar image of the defined areas (part of the service development shall consist of the fine tuning of optimal image size), the automatic search and identification on these wide swath radar images of pre-defined objects/events of interest (i.e. vessel's clusters, when possible including the correlation with AIS of the vessels in them), the automatic tasking with a minimum possible time gap of high resolution optical images of the detected objects/events of interest and the delivery to Frontex of this high resolution imagery.

### 2.3. Assignment

This tender consists of one single lot covering a number of steps and phases:

#### 2.3.1. Kick - Off Meeting

During the kick off meeting, which shall take place within two weeks of the contract's signature, after having discussion with the contractor, Frontex will decide on the specific details of the service provision. In particular, the two maritime areas of interest and an initial set of objects/events of interest will be communicated to the contractor.

#### 2.3.2. Set-up Phase

This three month-long phase consists in the preparation by the contractor, together with Frontex, of the necessary tasks to be able to carry out the new service test and its corresponding evaluation.

#### 2.3.3. Trial Phase

This three month-long phase consists of the actual provision of analysed imagery of the two Mediterranean areas of interest defined above.

#### 2.3.4. Assessment Phase

This one month-long phase consists of the evaluation of the results obtained, jointly performed by the contractor and Frontex, including the appraisal of the analysis tool used and, if needed, recommendations to roll out the new Copernicus service into production.

### 2.3.5. End users cooperation and uptake

Through Frontex, national authorities of the EU countries with border control and other law enforcement authority over the two defined areas of interest shall be actively engaged in the activities, providing their expertise and feedback during the set-up and the trial phase.

### 2.3.6. Activity Timeline

The procurement process is initiated in the first quarter of 2019, the project execution and assessment will take place along 2019 (planned contract duration is up to 12 months).

- Set-up Phase: June- Aug 2019
- Production and Delivery Phase: September-November 2019
- Assessment Phase: December 2019

## 2.4. Budget

The maximum budget earmarked for the contract is **500,000 Euro**.

Payment schedule for the provider:

- a. Advanced payment: after contract signature: 30%
- b. Payment of balance: end of evaluation phase and successful end of contract: 70%

## 2.5. Deliverables

### 2.5.1. Set-up Phase

- a. Project plan including a schedule and work breakdown structure
- b. Imagery acquisition plan (estimate 2 radar images per day; 3 optical images per day)
- c. Analysis Tools for Search & Rescue imagery correlated with Automatic Identification System
- d. Earth Observation (EO) tasking plan
- e. EO imagery reporting plan

### 2.5.2. Production and Delivery Phase

- a. Annotated EO very high resolution imagery (VHR<sup>1</sup>) of objects/events of interest automatically acquired (estimate 2 radar images per day; 3 optical images per day)
- b. Weekly summary of detections in the SAR imagery of the two Areas of Interest
- c. Weekly summary of automatic tasking of EO imagery acquisition
- d. Weekly summary of results of the automatic tasking procedure.

### 2.5.3. Assessment Phase

- a. End project report including evaluation and recommendations carried out by the contractor with the support and supervision of Frontex
- b. Description of algorithm(s) used for automatic detection of objects/events of interest in the SAR imagery and results obtained, including the AIS correlation process.
- c. Description of algorithm(s) used for tasking the EO satellites and results obtained
- d. Steps to convert the Pilot into an operational service, if needed.

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<sup>1</sup> Frontex uses mainly Very High Resolution images with a resolution better than 0.5 meter.

## 2.6. Deliverable formats and annotation

Imagery delivered to Frontex shall have the following formats:

- a. Optical imagery: Pansharpened, orthorectified, 3 bands; Format- compressed TIFF or JP2 with JPEG2000 compression.
- b. Georeferenced with Spatial Reference information. Ready to use in GIS systems.
- c. SAR imagery: Format- compressed TIFF or JP2 with JPEG2000 compression.

Imagery shall contain annotations helping the user identify the objects/ events of interest in the image, they may also contain additional comments based on the context and possible activity (i.e. text describing the type of vessel/ship and the number and size of the vessels in a cluster).

## 2.7. Venue

Services contracted under this tender procedure shall be performed in the Contractor's premises.

## 2.8. Experts description

The tentative equivalent effort of the contractor shall be not less than 2 FTE from the date of the kick-off meeting up to the scheduled finalization date of 30 November 2019.

Fundamental to the achievement of the contract's objective is the contractor's knowledge in the domain of Earth Observation, radar sensors, and imagery analysis. Therefore, the team of expert assigned to this service development should have demonstrable expertise (via CVs, publications, reports, etc.) in the following areas:

- Space technology
- Earth observation
- Vessels' Reporting Systems
- Radar sensors
- Optical sensors
- Imagery analysis

The curriculum vitae must contain information regarding the relevant experience of the expert in these fields and his/her role in any project or activity described must be clearly stated.

The expert shall also be in a position to fulfil the tasks described in these Terms of Reference without incurring in a conflict of interest with current or past employers, disclosing classified information, compromising or creating harm to third parties. The expert will be required to sign a 'declaration of confidentiality'.

## 2.9. Reporting and Meetings

The working language of this assignment is English and all the deliverables produced by the Contractor shall be produced in English. All documents shall be delivered in editable electronic form in MS Word (please note that all the accompanying drawings, tables, graphics and supporting data shall be provided in an editable source format agreed with Frontex).

The Contractor shall report to the assigned Frontex Point of Contact on a weekly basis, and ultimately to the Head of the Research and Innovation Unit on the progress of the work.

At least the following foreseen meetings are to be observed in the offer:

- Kick Off meeting to finalize and agree on the details of the tasks and time plan (to be held at Frontex premises in Warsaw)
- Monthly follow-up teleconferences to discuss work progress

- Final project meeting (to be held at Frontex premises in Warsaw.)

After each meeting, the contractor shall draft the minutes of the meeting and send them to Frontex for approval.