FRONTEX

Ref. Frontex/OP/391/2020/DT

Terms of Reference

Single Framework Contract for
Satellite Imagery Provisioning

Content

1.   Terms and Definitions

Terms	Definition
Contractor	The successful Tenderer to whom the contract has been awarded (contract implementation phase)
Tenderer	Any economic operator preparing and submitting the tender (tendering phase).
Frontex Earth Observation Planning Officer	The Frontex Earth Observation Planning Officer (FEOPO) is a Frontex employee in charge of managing the provisioning of satellite images.
Satellite Imagery Provider (SIP)/ Subcontractor	Any commercial entity having an agreement with the Contractor and that can acquire, process and deliver satellite images to the Contractor or directly to Frontex.
Satellite imagery provisioning/ Satellite provisioning	The overall end-to-end process to be covered by this FWC that starts when the FEOPO sends a request for the provisioning of a Satellite Image to the Contractor and finishes when the Contractor or SIP sends a notification to Frontex stating that the image is ready for download and the subsequent downloading of the image from the SIP or Contractor infrastructure by Frontex.
Frontex/ Agency	European Border and Coast Guard Agency.
MD5	The MD5 algorithm is a widely used hash function producing a 128-bit hash value

2.   Abbreviations

AOI	Area of Interest
DEM	Digital Elevation Model
DSM	Digital Surface Model
EO	Earth Observation
EPSG	European Petroleum Survey Group
EUROSUR	European Border Surveillance system
FEOPO	Frontex Earth Observation Planning Officer
FTP	File Transfer Protocol
FWC	Framework Contract
GCP	Ground Control Point
KML	Keyhole Markup Language
MS	Multispectral
NRT	Near Real Time
PAN	Panchromatic
RfS	Request for Services
SIP	Satellite Imagery Provider
UTM	Universal Transverse Mercator
WGS84	World Geodetic System '84 reference coordinate system

3.   Background

3.1. Introduction to the European Border and Coast Guard Agency

Frontex, the European Border and Coast Guard Agency, promotes, coordinates and develops European border management in line with the EU fundamental rights charter and the concept of Integrated Border Management.

To help identify migratory patterns as well as trends in cross-border criminal activities, Frontex analyses data related to the situation at and beyond EU's external borders. It monitors the situation at the borders and helps border authorities to share information with Member States. Frontex supports the cooperation between law enforcement authorities, EU agencies and customs at sea borders. Vessels and aircraft deployed in its operations also collect and share information relevant to fisheries control, detection of pollution and compliance with maritime regulations. The Agency works closely with European Fisheries Control Agency (EFCA) and European Maritime Safety Agency (EMSA) to implement multipurpose operations.

Frontex focuses on preventing smuggling, human trafficking and terrorism as well as many other cross-border crimes. It shares any relevant intelligence gathered during its operations with relevant national authorities and Europol.

3.2. Situational Awareness Division

The Situational Awareness and Monitoring Division (SAM) is a key component of Integrated Border Management, thus enabling its implementation EU-wide by Frontex and by the national authorities of Member States forming the European Border and Coast Guard. SAM is therefore oriented towards operational actors and contributes by fulfilling their information and intelligence needs. The Division drives operational responses to challenges at the EU's external borders and supports decision-making on EU border management and border security, in particular when assessing Member States vulnerabilities. The Division is also increasingly working on its maritime dimension in line with the development of Coast Guard functions entrusted to the Agency. It mobilises and fuses a wide range of sources of information from human intelligence, image & geospatial intelligence, patrolling activities, and aerial surveillance.

3.3. Information Fusion Centre and EUROSUR

The Information Fusion Centre (IFC), an entity within SAM, is a provider of up-to-date, reliable and innovative information services and knowledge and technology driven capabilities in support of the SAM business units and partners. Its information services and capabilities are based on the fusion of a wide range of data amongst which earth observation data, vessel data and data from Frontex operational activities and provided to internal and external stakeholders via the EUROSUR Fusion Services.

EUROSUR is the information-exchange framework designed to improve the management of Europe's external borders. It aims to support Member States by increasing their situational awareness and reaction capability in combating cross-border crime, tackling irregular migration and preventing loss of migrant lives at sea.

The backbone of EUROSUR is a network of National Coordination Centres (NCCs). Each member state establishes an NCC, which groups the authorities responsible for border control in a given member state. The main role of the NCC is to coordinate the border surveillance activities on national level and serve as a hub for the exchange of information.

In addition to maintaining and sharing the situational pictures, Frontex also provides information collected from satellites and other surveillance tools at the European level. Member states can use such information to further improve their situational awareness. The collection of these services, called EUROSUR Fusion Services, facilitates access to state of the art technologies, help reduce the duplication of efforts by member states and reduces costs.

4.   Executive summary

This document is structured in a way to provide the Tenderer with an idea of the general process envisaged, roles and responsibilities of the engaged actors and the requirements to be met.

The general process, roles and responsibilities are described in section 4.1 "Service Business Model". Technical requirements are listed in chapters 5 and 6. Most of them are mandatory and some of them have Award Criteria associated, which can be checked in Annex I – Tender Specifications.

Tenderers must be organizationally and technically capable of delivering both Service Types described in section 4.2. Tenderers shall submit their Technical Proposal and Financial Proposal taking into consideration all minimum technical requirements, as well as eligibility and selection criteria, outlined in Annex I – Tender Specifications. The Technical Proposal shall include explanations how the Tenderer fulfils the requirements (REQ-1 to REQ-32).

The contract will be awarded to the Tenderer who submits the most economically advantageous bid (the one with highest score) based on the price and technical criteria as described in Tender Specifications (Annex I).

The requirements described in this document are categorised according to the Requirements Priority Matrix below:

Must have	Requirements labelled as MUST are critical for the service. If even one MUST requirement is not provided, the service delivery should be considered not with the quality requested by this Framework Contract.
Could have	Requirements labelled as COULD are desirable but not essential. COULD improves the quality of the service. If the Tenderer will include such functionalities in the tender, they shall be implemented by the Contractor during the implementation phase.
Information	Requirements labelled as INFORMATION help to clarify the context or introduce a definition. They are part of the contract.

4.1. Service business model

The main objective of this Framework Contract is systematic access to the services of optical satellite imagery provisioning to support the achievement of the Frontex' operational objectives. "Satellite imagery provisioning" or "Satellite provisioning" is the overall end-to-end process to be covered by this FWC. The process comprises the following steps:
- Frontex submits a bulk order form specifying the maximum amount allocated for Satellite Imagery Provisioning within a month or quarter. Monthly orders will be submitted if larger demand for imagery is anticipated.
- A single "Satellite provisioning" process starts when the Frontex FEOPO sends a "Request for Services" (RfS) for the provisioning of an optical satellite image to the Contractor.
- The Contractor sends this RfS to Satellite Imagery Providers (SIPs) in order to receive "Service Offers".
- The Contractor evaluates received offers and submits the best one (in terms of the Service Type – see section 4.2) to Frontex for an acceptance.
- If the proposal meets Frontex' needs, the FEOPO sends the "Service Order" for realization of the offer.
- The process finishes when the Contractor sends a notification to Frontex stating that the image is ready for download and the subsequent downloading of the image from the infrastructure of SIP or the Contractor by Frontex.

The process is depicted in the following diagram and described in detail in the (REQ-1).
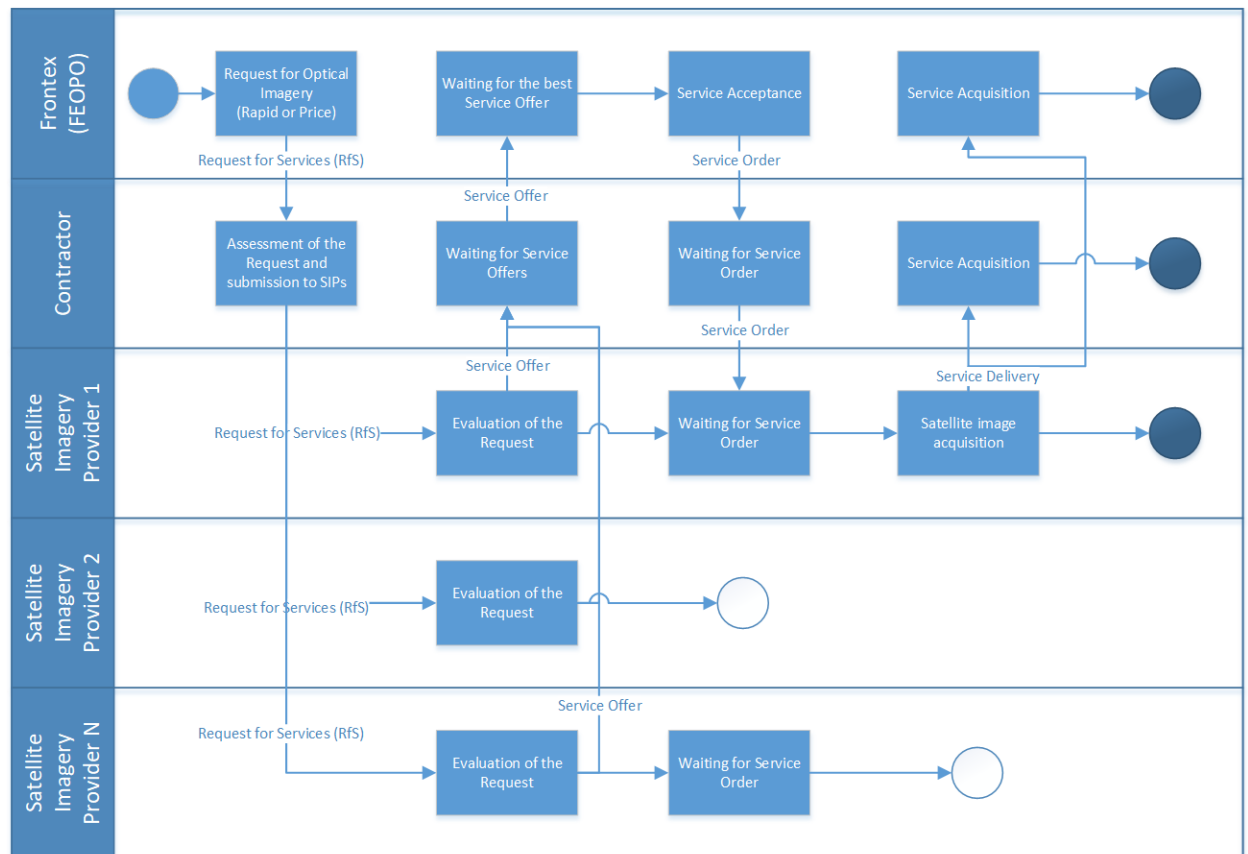
Figure 1 Diagram of service business model

4.2. Service Types

Imagery can be requested within the different Service Types as described in the table below.
Possible ordering scenarios are presented in section 5.1.1.

Service Types	
Rapid (Quickest acquisition)	For a "Rapid" Service Type the Satellite Imagery Provider offering the first possible acquisition opportunity and delivery time (fastest provision to Frontex), within a specified resolution class, shall be considered by the Contractor. The Contractor shall take into consideration the requirements and processing levels as requested in the Request for Services and according to the Terms of Reference. This service type should be carried out in conjunction with Rush satellite tasking lead time.
Price (Lowest expense)	For a "Price" based Service Type the Satellite Imagery Provider offering the cheapest opportunity, within a specific acquisition window and resolution class, shall be considered by the Contractor. The Contractor shall take into consideration the requirements and processing levels as requested in the Request for Services and according to the Terms of Reference.

5. Service Business Model requirements

5.1. Ordering

REQ-1	Satellite Provisioning process	Priority: Must

A single "Satellite Provisioning" comprises the following steps:
1. The FEOPO issues a "Request for Services" (RfS) to the Contractor (REQ-2).
2. The Contractor forwards the RfS to the relevant SIPs.
3. Within time depending on the Satellite tasking lead time (see section 0), the SIPs shall reply with a relevant offer (REQ-3).
4. The Contractor evaluates all received offers in terms of the Service Type, i.e. selects the best offer in terms of either acquisition and delivery time or price, or resolution (see section 4.2).
5. The Contractor sends the best offer to the FEOPO. If two of more offers are comparably good, the Contractor sends all of them to the FEOPO.
6. The FEOPO checks if the best offer meets Frontex' needs within maximum 1 hour.
7. If the Contractor does not receive a "Service Order" (REQ-4) from the FEOPO within 1 hour, the offered service for the on-going Satellite Provisioning was not accepted by the FEOPO.
8. The Contractor shall ensure that the selected SIP puts in place all the means to perform the satellite acquisition as: Feasibility, Tasking, Acquiring, Downloading, and Delivery of a satellite image.
9. The Contractor shall notify the delivery of the acquisition as soon as the product is available (REQ-5). To speed up the process, the SIP can also notify the FEOPO directly.
10. The FEOPO downloads the satellite image (REQ-6).

REQ-2	Request for Services	Priority: Must

A "Request for Services" is a notification based request (REQ-32).

This request will be sent to the Contractor as an Excel file.

A RfS shall contain, but is not limited to, the following parameters:
- Service Type – Rapid or Price (section 4.2);
- Satellite tasking lead time (section 0);
- Acquisition window (REQ-13);
- Area of Interest (REQ-15);
- The spatial resolution class (REQ-18);
- Delivery timeliness (section 6.3.1);
- Processing level (REQ-19);
- Bands combination (REQ-20);
- Format of the file (REQ-24);
- Maximum off-nadir angle.

A RfS can be sent any time during the Contractor Service Desk operational hours.

The Contractor shall be able to process this request as described in REQ-1.

The RfS template has been provided in Appendix I to the Terms of Reference.

REQ-3	Service Offer	Priority: Must

A "Service Offer" is a notification based request (REQ-32).

The Contractor shall reply with a "Service Offer" to a RfS.

The Contractor gathers offers from Satellite Imagery Providers (SIPs).

If the Contractor does not send a "Service Offer" it is considered that none of SIPs is able to fulfil the on-going RfS. The Contractor shall answer only if any of SIPs can meet or exceeds the parameters specified in the RfS.

The "Service Offer" shall contain at least, but is not limited to, the following information:
- Mission/Sensor;

- Spatial resolution;
- Off-nadir viewing angle;
- Image acquisition date and time;
- Percentage of the area covered by the satellite image against the AOI requested;

The Contractor shall be able to process this request and provide a "Service Offer" within the time depending on satellite tasking lead time (see section 0)

REQ-4	Service Order	Priority: Must

A "Service Order" is a notification based request (REQ-32).
The "Service Order" is submitted as an email confirmation by the FEOPO who approves the proposed "Service Offer". The "Service Order" binds Frontex and the Contractor for the provisioning of the satellite image, with exceptions mentioned in REQ-7 and REQ-21.
The Contractor shall be able to process this request.

REQ-5	Service Delivered	Priority: Must

A "Service Delivered" is a notification based request (REQ-32).
The Contractor or the SIP shall issue this notification once the satellite product requested is ready to be delivered to Frontex.
This notification shall contain at least, but is not limited to, the following information:
- sFTP server or URL to download the image;
- Filename;
- Computed MD5 (optional).

From the delivery of this notification the Contractor or the SIP shall keep the file in its download service for at least 72 hours.
The Contractor shall be able to process this request.

REQ-6	Service Acquisition	Priority: Information

Upon receiving the "Service Delivered" notification, the FEOPO will start downloading the image package (REQ-27) and will verify its quality (compliancy, correctness, completeness, accuracy, etc.).
If the product is considered not compliant against the parameters requested, a Contractor may be asked to provide corrected product (if possible) or propose alternative acquisition. If the deliverable does not fulfil the requirements set in the RfS, it will result in a non-payment for the corresponding "Service Order".
The Contractor shall be able to process this request.

REQ-7	Provisioning Cancellation by FEOPO	Priority: Must

A "Provision Cancellation by FEOPO" is a notification based request (REQ-32).
The FEOPO can cancel free of charge a Satellite Provisioning activation up to 24 hours before the acquisition time without additional information for Short and Normal satellite tasking lead time.
The Contractor shall be able to process this request.

REQ-8	Provisioning non-delivery by the Contractor	Priority: Must

A "Provision non-delivery by the Contractor" is a notification based request (REQ-32).
Any non-delivery (including anomalies of satellite and ground stations) will result in a non-payment of the "Service Order" and the Contractor shall provide immediate replacement offer for the unfulfilled order.
In case the service order has been already placed, but the SIP didn't confirm the acquisition at the last moment, the Contractor shall propose immediate replacement service offer.

REQ-9	Contractor's Service Desk	Priority: Must

The Contractor's Service Desk shall be available to handle requests and offers in hours 09:00-17:00 (Warsaw time) of working days. The availability of the Service Desk 24 hours per day, 7 days per week, and 365 days per year will be considered advantageous.

Award criteria: SP Service Desk availability time
  - See section III of Annex I - Tender Specifications

5.1.1. Ordering scenarios

Scenario 1	Priority: Information
Frontex receives an emergency request for monitoring of specific coastal area. The FEOPO immediately prepares a "Request for Services" for the acquisition the next day and sends it to the Contractor. An image should be available for analysis as soon as possible.	
"Rapid" service type will be used with the "Rush" tasking lead time.	

Scenario 2	Priority: Information
Frontex receives a request for periodical monitoring of specific ports for vessels of interest. The FEOPO prepares a "Request for Services" 10 days before the first planned acquisition. As this is a speculative acquisition, the most cost effective solution will be requested.	
"Price" service type and VHR1.2 and VHR1.3 (0.5m-1.0m) resolution classes will be used with the "Normal" tasking lead time.	

Scenario 3	Priority: Information
Frontex receives an information that in a few days a group of migrants may be heading to a land border. The FEOPO prepares a "Request for Services" for the acquisition in 3 days. Due to small size of the objects of interest, the best image resolution is needed.	
"Price" service type and VHR1.1 ($\leq$ 0.4m) resolution will be used with the "Short" tasking lead time.	

5.2. Satellite tasking lead time

REQ-10	Rush	Priority: Must

"Rush" tasking is the most time-critical of all tasking modes and the satellite imagery provision process shall be executed in the fastest possible way. A "Service Order" will be submitted within 24 hours before requested image acquisition.

For this tasking lead time class, the FEOPO issues a RfS indicating the Rush tasking mode, usually the previous day before the requested acquisition. The RfS can be followed by a telephone call to the Contractor's service desk, to confirm this request and its urgency.

Within 6 hours, the Contractor shall reply with a "Service Offer" that includes the fastest available possibility for acquisition and delivery of the image.

If a satellite image is ordered under this class, it cannot be cancelled by the FEOPO (REQ-7).

The Tenderer is required to indicate the fastest possible provisioning possibilities indicating also the constraints (e.g. time to task the satellite in advance, time required for orthorectification) in the Technical Proposal. The Tenderer shall indicate which satellite missions can be tasked in this lead time.

The Tenderer shall specify the tasking cut-off times for each proposed satellite mission.

REQ-11	Short lead time	Priority: Must

In the "Short lead time" tasking mode sensing start time is between 24 and 96 hours from a "Service Order" submission, within specified "Acquisition window".

The Contractor shall reply to a RfS with a "Service Offer" within 24 hours, but not later than 48 hours before acquisition.

This request can be cancelled by the FEOPO (REQ-7).

The Tenderer shall describe its capabilities in respect to this provisioning class in the Technical Proposal.

REQ-12	Normal lead time (Routine tasking)	Priority: Must

In the "Normal lead time" tasking mode sensing start time is more than 96 hours from a "Service Order" submission, within specified "Acquisition window".

The Contractor shall reply for a RfS" with a "Service Offer" within 48 hours, but not later than 96 hours before acquisition.

This request can be cancelled by the FEOPO (REQ-7).

The Tenderer shall describe its capabilities in respect to this provisioning class in the Technical Proposal.
The Tendered shall specify if Service Order submission in longer time before acquisition (e.g. a week, a month) causes any price reductions.

REQ-13	Acquisition window	Priority: Must

The satellite image provision process shall then be executed within a specific time frame meaning from a specific date to a specific date (for example from dd/mm/yyyy to dd/mm/yyyy).

In the "Normal lead time" tasking, acquisition can be scheduled in regular intervals (for example every week, every fortnight, etc.).

6.   Technical requirements

6.1. Area of interest and coverage

REQ-14 Service coverage	Priority: Must

The potential Area of Interest (satellite image footprint) by this service is worldwide.

However the focus is on the European external borders (land and water). The Agency foresees a focus of "Satellite Provisioning" over Mediterranean Sea, Baltic sea, Black Sea, and Atlantic Ocean near the coasts of Morocco, Canary Island as well as in the context of the European pre-frontier as: Northern Africa, sub-Africa, Western Asia, Eastern European land borders, and Southeastern Europe.

Award criteria: Service coverage
- See section III of Annex I - Tender Specifications

REQ-15 Area Of Interest	Priority: Must

This parameter defines the Area of Interest (AOI) that the satellite image shall cover on the surface of the Earth. The selected SIP can make use of more than one satellite image to cover this area (i.e. mosaic). The Contractor and SIPs shall be able to process this information taking into account at least one of the following formats:
- KML/KMZ file (preferred);
- Esri Shapefile zip file;
- List with coordinates in Latitude/Longitude of vertices defining a polygon.

Minimum orderable area should depend on the spatial resolution class (see REQ-18) and can't be larger than:
- 100 km^2 for VHR1.1, VHR1.2 and VHR1.3 classes;
- 300 km^2 for VHR2 class.

Award criteria: AOI – Minimum orderable area
- See section III of Tender Specifications (Annex I)

REQ-16 Minimum AOI coverage	Priority: Must

If the minimum coverage parameter is not specified, it is 100%. If the minimum coverage cannot be achieved, the Contractor shall nevertheless take the SIP's offer into account. The expected coverage percentage shall be indicated in the Service Offer and the provision might still be requested with a Service Order when the Service Offer is the best in terms of other criteria or operational needs demand for it.

6.2. Products

6.2.1. General requirements

REQ-17 Missions and sensors	Priority: Must

The type of sensors requested in this framework contract is passive (also called optical).

As long as compliant with the scope of this contract, there are no restrictions about number and types of the satellite missions to be included. Frontex' intention is to have access to as many satellite missions as possible through the single Contractor to support various operational needs.

The Tenderer shall provide detailed information on the supported missions and information about the relevant products that can be delivered associated with each mission.

The Tenderer shall describe in the Technical Proposal which sensors can be provided for this FWC.

The Tenderer can also propose the missions or constellations which are not yet operational, but which will be in its offer after spacecrafts launch. Additional points will be awarded for access to planned missions.

The Tenderer claiming access to envisaged constellations shall provide at least intention agreement with the SIP – operator of the constellation.

Award criteria: Missions and Sensors
- See section III of Annex I - Tender Specifications

REQ-18 Spatial resolution classification	Priority: Must

The Agency refers to a spatial resolution class for very high resolution satellite optical images.

The spatial resolution classes are defined as follows:
- Very High Resolution class 1.1, VHR1.1 (res ≤ 0.4m);
- Very High Resolution class 1.2, VHR1.2 (res = 0.5m);
- Very High Resolution class 1.3, VRH1.3 (0.5m < res ≤ 1.0m);
- Very High Resolution class 2, VHR2 (1m < res ≤ 4m);

If needed, the Agency can precisely specify within the RfS (see **Error! Reference source not found.**) the aximum spatial resolution to be provided, for example 0.75 m. In this case only equal or higher spatial resolution can be accepted. The Tenderer is required to present and describe the available spatial resolution classes in the Technical Proposal together with related satellite missions.

REQ-19 Processing levels	Priority: Must

Most often Frontex will request optical imagery in orthorectified processing level with all corrections applied. However, in special cases a different processing level can be requested.

The Tenderer shall be able to deliver products in the following processing levels and corrections applied:
- Georectified (Ortho-ready):
  - Radiometrically corrected
  - Internal and external sensor distortions corrected
  - Band alignment applied
  - Projection to a geographic coordinate system applied (GCPs shall be used if possible)
- Orthorectified:
  - Georectified + topographic corrections applied using DEM/DSM

The Tenderer shall describe the processing levels available and the corrections applied to the delivered products for each mission, if relevant.

If a satellite mission has different processing levels than provided above, they shall also be presented.

The Tenderer shall also identify the impact of specific processing for each of the Service Types and Delivery timeliness in the Technical Proposal.

REQ-20 Bands	Priority: Must

The Tenderer shall be able to deliver the following band options:
- Panchromatic (PAN) - Products include only one band usually with the highest resolution in greyscale.
- Multispectral (MS) - Products include all available multispectral bands, and at least Red, Green, Blue and Near Infrared.
- Pan-sharpened
- Bundle (MS + PAN)

Moreover, the Tenderer shall be able to deliver various band and processing levels combinations, for example: Orthorectified + Bundle, Orthorectified + Pan-sharpened.

The default and the most often requested combination will be Orthorectified + Bundle (MS + PAN).

The Tenderer shall describe available band combinations and how different band options and processing levels can be combined and the impact of specific processing for Delivery timeliness.

6.2.2. Quality of the data

REQ-21 Cloud coverage	Priority: Must

For all types of tasking, the cloud coverage over the requested AOI shall not exceed the threshold of 30%.

In case an image was acquired with cloud coverage exceeding this threshold, Frontex has a right to reject this image and the Contractor/SIP shall not deliver the data and the service shall not be charged to Frontex.

However, if the cloud coverage is above this threshold, a quicklook of an image shall be sent to the FEOPO for evaluation, because a specific point of interest may be visible. In such case, the FEOPO can request production and delivery of the image.

The Contractor can indicate in the "Service Offer" that, based on the cloud cover forecast, the chance for cloud coverage in expected threshold is not probable. In this case, the FEOPO can approve cancellation of the acquisition without any charges.

The FEOPO can specify higher or lower percentage of cloud coverage in a "Request for Services". The Tenderer shall indicate price reduction or increase in such cases.

REQ-22 Orthorectification	Priority: Must

Orthorectified products shall have a digital elevation model (DEM) or digital surface model (DSM) applied to normalize for topographic relief with respect to the reference ellipsoid. By default, the SRTM DSM 30 m (or equivalent) shall be used if not specified otherwise.

Moreover, a DEM/DSM at a scale appropriate to the resolution of the images can be requested.

The Tenderer shall specify and describe higher resolution DEMs/DSMs which can be applied by each SIP. Additional points will be awarded if SIPs are able to provide imagery orthorectified using high resolution DEM/DSM.

Award criteria: Orthorectification DEM/DSM
- See section III of Annex I - Tender Specifications

REQ-23 Geolocation accuracy	Priority: Information

The Tenderer shall provide the achieved geolocation accuracy without ground control points. The Tenderer shall also indicate if this accuracy is immediately available for products delivered for each of the Service Types and Delivery Classes.

For images where georectification with GCPs is possible, the Tenderer shall ensure a geolocation accuracy better than 10 m for products delivered for each of the Service Types and Delivery Classes.

The Tenderer shall also describe the impact of this processing for each of the Service Types and Delivery Class in the Technical Proposal.

6.2.3. Data Type

REQ-24 Satellite image format	Priority: Must

By default, satellite images shall be delivered in GeoTIFF format with the following features:
- MS sensors: 4 bands, Bundle (MS + PAN)
- PAN sensors: 1 band, Bundle (PAN)
- Radiometric resolution: 16 bit pixel depth
- Internal TIFF compression: Lossless (LZW, LZ77)
- Default image projection: UTM
- Default image datum: WGS84
- Dynamic Range Adjustment: OFF

Geographic coordinate system WGS84 (EPSG code: 4326) might be requested in the RfS.

The Tenderer shall specify additional file formats (e.g. *.jp2) and compressions (e.g. JPEG2000, JPEG, JPEG_YCbCr, NONE) which are supported for the delivery of satellite images. Additional points will be awarded for compressed file format only if imagery from all proposed missions can be delivered in this format.

The Tenderer shall also describe the impact of specifying not default processing parameters for each of the Service Types and Delivery Class.

Award criteria: Satellite image format
- See section III of Annex I - Tender Specifications

REQ-25 Metadata	Priority: Must

The Frontex Earth Observation platform is based on Esri ArcGIS software. Currently ArcGIS Desktop and Server are in version 10.7.1 and ArcGIS Pro is in version 2.6. ArcGIS mosaic datasets and image services are used for imagery cataloguing and displaying.

For maximum support of Frontex architecture, the satellite image products metadata should be in the format supported by the ArcGIS software. The list of supported "Satellite sensor raster types" is available at the Esri website[1,2]. The metadata for supported platforms shall contain at least the metadata listed in the "Key Metadata" tab of "Raster Dataset Properties" displayed in ArcGIS software, e.g.:

As not all existing satellite missions are supported by ArcGIS, therefore metadata shall be provided in the native structure of the SIP in XML format and contain at least: sensor name, product name, acquisition date, cloud cover and off-nadir angle.

The Tenderer shall specify if satellite missions in the offer have metadata supported by ArcGIS. Additional points will be awarded if all offered missions are supported in ArcGIS.

Award criteria: Metadata
- See section III of Annex I - Tender Specifications

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[1] http://desktop.arcgis.com/en/arcmap/10.7/manage-data/raster-and-images/satellite-sensor-raster-types.htm

[2] https://pro.arcgis.com/en/pro-app/help/data/imagery/satellite-sensor-raster-types.htm

REQ-26	Metadata adaptation	Priority: Could

In case a satellite mission metadata is not supported by ArcGIS software, the SIP – operator of the satellite - could develop metadata format compliant with Esri ArcGIS standards and liaise with Esri to include support for its mission in the future releases of ArcGIS.

REQ-27	Image package	Priority: Must

The image package is a compressed file which contains the satellite image (REQ-24) and the image metadata (REQ-25).
The image package is uploaded to the delivery service by the Contractor or SIP for download.
The Contractor shall deliver the package in one of the following formats: Zip, Tar, 7zip.

6.3. Information exchange

6.3.1. Delivery timeliness

REQ-28	NRT <3h delivery time	Priority: Must

For this delivery class, the image product shall be delivered within 3 hours from sensing stop. This is the default. This delivery timeliness will be always selected for Rush satellite tasking lead time and most often for Short and Normal lead time.
In case the acquisition is outside of a ground station coverage, the time is counted from the moment a satellite enters the visibility cone.
To shorten delivery time, the satellite imagery product can be made available at the SIP's side, without prior transferring to the Contractor.
The Tenderer shall specify if imagery from all offered satellite missions can be delivered in this timeline.

As Frontex will be most often requesting imagery in this delivery class, only this class will be evaluated in the Financial Proposal.

REQ-29	<24h delivery time	Priority: Must

For this delivery class, the image product shall be delivered within 24 hours from sensing stop. This delivery timeliness may be selected for Short and Normal tasking lead times.
The Tenderer shall specify if imagery from all offered satellite missions can be delivered in this timeline.

6.3.2. Service Interface

REQ-30	Download protocols	Priority: Must

In order to download a satellite image, the Contractor or SIP has to implement a sharing method based on the secure File Transfer Protocol (sFTP).
Support for direct download links from an https website will be advantageous.

Transfer via File Transfer Protocol (FTP) is prohibited by Frontex ICT due to security vulnerabilities and this products delivery method can't be used.

Award criteria: Download protocols
- See section III of Annex I - Tender Specifications

REQ-31	Additional Download protocols – cloud storage	Priority: Could

If the Tenderer supports delivery to cloud storage services (e.g. Microsoft Azure, Amazon Web Services), the Tenderer is invited to specify its capabilities.

REQ-32	Notification	Priority: Must

The communication between the Contractor and the FEOPO are triggered by a Notification (see REQ-1).

At the initial stage of the project these notifications will be implemented by e-mail.

If the Contractor has its own information system for submitting notifications, this system can be used by Frontex instead of e-mails.

REQ-33	Notification improvement	Priority: Could

In the course of the contract the Agency reserves the rights to change the notification mechanism for parts of or all the steps described in REQ-1 to enable an automation of this process.

For example the Agency might request the Contractor to call a web service implemented by the Agency in order to execute the "Service Delivered".

This new communication mechanism will be based on Service Oriented Architecture, a web service based on either, REST or SOAP protocols.

For this enhancement a plan has to be agreed between the Contractor and the Agency in a written form.

6.3.3. Communication network

REQ-34	Communication network	Priority: Must

The minimum bandwidth for the network connection between the Contractor or SIP and the Agency end point shall be 100 Mbit/s. The Agency can request any time to upload representative data for testing the downloading on the Contractor's or SIP's download service to assess the transfer rate.

REQ-35	Communication between FEOPO and SP	Priority: Must

The FEOPO and the Contractor's Service Desk (REQ-9) communication protocols are, but not limited to:
- Dedicated e-mail address;
- Direct phone number.

The Tenderer shall describe the realization of this communication channels in the Technical Proposal.

6.4. License and distribution

REQ-36	Distribution policy	Priority: Must

The satellite images delivered under this FWC will be provided to Frontex with the right of onward distribution on a non-commercial basis within the boundaries of the EUROSUR legislative framework as stipulated in the European Border and Coast Guard regulation (Reg. 2019/1896)

REQ-37	Distribution policy of derived products	Priority: Must

Derived products of the satellite images delivered under this contract are owned by Frontex and can be distributed to all users of the EUROSUR Fusion Services as stipulated in Reg. 2019/1896. The Tenderer shall describe its compliancy in the Technical Proposal.

REQ-38	Sharing to other parties	Priority: Must

Frontex may share the satellite images delivered under this contract to other parties, for example Agency suppliers, to further analysis and derive additional products (both vector or raster data).

REQ-39	Number of users	Priority: Information

The number of users will not exceed 50 per image.

6.5. Reporting

REQ-40	Reporting (quarterly)	Priority: Must

The Contractor shall create a report on a quarterly basis listing all requests with the following information:
- Images requested;
- Images delivered;
- Satellite Imagery Provider (SIP) of each image;
- Service Type;
- Resolution class;
- Tasking lead time;
- Delivery timeliness class.

REQ-41	Reporting (operational)	Priority: Could

The Contractor should create a report for each activation.
The report shall include:
- Images delivered;
- Copy of the notification exchanged for each request;
- Compliancy with the requirement.

REQ-42	Reliability	Priority: Could

The Contractor should provide to Frontex a Delivery Reliability Report of each tasked SIP. The Delivery Reliability shall present the number of services requested in comparison with services delivered and accepted. The threshold for the Contractor to be considered reliable enough (minimum requested) for providing this service to the Agency is 90%. The Contractor should deliver 9 images as requested out of 10 in the agreed format and on time.
For each image acquired the FEOPO shall update the reliability level of the Contractor.
The Contractor can request to reset the reliability level on a ground of a justification where an improvement of its services has been introduced. The Agency has the rights to accept or reject the request.

7.   Language

The working language of the Agency is English. All the communication and documentation, both in paper and electronic form and any other deliverables, shall be in English (U.K.) and shall adhere to a high standard appropriate for technical documentation, with no ambiguities and no mistakes in grammar or spelling. All members of the Contractor's staff allocated to this contract shall speak and write in English at European level of language B1.

8. Documentation and record retention

Technical documentation, whenever applicable, shall apply UML and automated tools for document generation.

Frontex requires that all the documents created in the course of the project maintain a high quality. The following criteria shall be adopted when producing the necessary documentation:

- A clear and appropriate document structure, i.e. the document must be organised into chapters, sections, subsections etc. in a clear and logical way.

- Compliance with a writing style that supports a consistent structure, form and style of documents.

- Completeness of documents, i.e. the complete presentation of the entire scope of the described issue without any omission.

- Consistency and coherence of documents, i.e. ensuring mutual accordance of all types of information and lack of logical contradictions of information between the submitted documents or between parts of the same document.

- Proper identification of its title, scope, authors, reviewers, related dates, status, versions, history log, audience, quality or acceptance criteria (if the document is subject to acceptance).

The documentation shall be delivered both in editable electronic format and pdf.

The Contractor shall implement and maintain in perfect order an electronic repository of the technical documentation produced throughout of contract duration. This documentation shall be well organised, identified, kept up-to-date, and marked with its actual status (draft, rejected, approved). The repository shall be either hosted at Frontex or fully accessible (including its backup copies) from Frontex and the access privileges shall be given to users approved by Frontex.

9.   Acceptance criteria

The acceptance for the deliverables referring to the relevant Order Form shall be confirmed by Deliverable Acceptance Form signed by Frontex Project Manager (*Appendix 2*), and submitted together with the invoice (point I.6.3 of Annex III Draft Contract).

10.   Test Campaign

The test scenarios will cover selected Service Types offered by the Tenderer in the Technical Proposal and include the entire business process satellite provisioning and selected technical requirements as described in the table below:

Number	Name	Passing criteria	Reference requirement	Pass
	Service Offer	Complete as requested and provided within the allowed time frame	REQ-3	yes/no
	Service delivered	Complete as requested and provided within the allowed time frame	REQ-5	yes/no
	Area of interest	Covered as defined	REQ-15 & REQ-16	yes/no
	Spatial resolution class	As requested in the Request for Services or better	REQ-18	yes/no
	Satellite tasking lead time	As requested in the Request for Services	REQ-10, REQ-11, REQ-12	yes/no
	Product processing level	As requested in the Request for Services	REQ-22	yes/no
	Bands	As requested in the Request for Services	REQ-20	yes/no
	Satellite image format	As requested in the Request for Services	REQ-24	yes/no
	Metadata	Complete as described in the requirements section.	REQ-25	yes/no
	Image package	Complete as described in the requirements section.	REQ-27	yes/no
	Download protocols	As per requirement.	REQ-30	yes/no
	Communication between FEOPO and SP	Timely and pro-active communication between the tenderer and Frontex as described in the Satellite Provisioning process.	REQ-1	yes/no
	Reporting	Complete as per requirement	REQ-40	yes/no

Appendix 1 – Request for Services (RfS) template

<table>
<tr><td colspan="6" align="center"><h2>Satellite Imagery Provisioning
REQUEST FOR SERVICES (RfS)</h2></td></tr>
<tr><td>ACTIVATION ID</td><td></td><td>AREA OF INTEREST</td><td></td></tr>
<tr><td>SERVICE TYPE</td><td></td><td>RESOLUTION CLASS</td><td></td></tr>
<tr><td>ACQUISITION WINDOW</td><td>FROM: DD/MM/YYYY</td><td>TO:</td><td>DD/MM/YYYY</td></tr>
<tr><td>PROCESSING LEVEL</td><td></td><td>BANDS</td><td></td></tr>
<tr><td>DELIVERY TIME</td><td></td><td>TASKING LEAD TIME</td><td></td></tr>
<tr><td>COMMENTS AND SPECIAL INSTRUCTIONS</td><td colspan="3"></td></tr>
<tr><td>DATE OF THE REQUEST</td><td>DD/MM/YYYY</td><td>NAME AND SIGNATURE OF THE REQUESTOR</td><td></td></tr>
</table>

Appendix 2 – Deliverable Acceptance Form

Model of Deliverable Acceptance Form

FOR ORDER FORM No ……

Original document - duly signed - to be attached to the invoice

TASK / DELIVERABLE DESCRIPTION:

PROVISIONAL ACCEPTANCE:

TASK / DELIVERABLE is ACCEPTED / REJECTED:

To be filled in by Frontex:

Official responsible for acceptance (in block capitals):	
Date and signature	
Official responsible for final validation (in block capitals):	
Date and signature	