

Eurosur Fusion Services Service Catalogue

VERSION 3.2

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1. Introduction to Eurosur Fusion Services

The vision of Eurosur Fusion Services (EFS) is to support and add value to operational activities. EFS provides essential components to compile the European Situational Picture (ESP) and the Common Pre-frontier Intelligence Picture (CPIP) from a variety of sources, including platforms deployed under the Common Application of Surveillance Tools. All services provided are in line with the European Border and Coast Guard regulation and the Eurosur regulation.

A number of information services and data sources (external: institutional, commercial providers; internal: Frontex systems) are bundled together into customised and integrated services. These services are delivered to EU Member States and Schengen Associated Countries authorities and other partners via different communication channels, including the Eurosur network.

These services are defined based on user needs in the EU Member States, Schengen Associated Countries, and Frontex, and shall contribute to achieving strategic and operational objectives of border surveillance.

Based on the Delegation Agreement between Frontex and the European Commission from November 2015, selected EFS are now delivered in the framework of the Copernicus Programme.

2. Purpose of the Service Catalogue

The purpose of this Service Catalogue is to present a detailed information about services provided to customers by Eurosur Fusion Services.

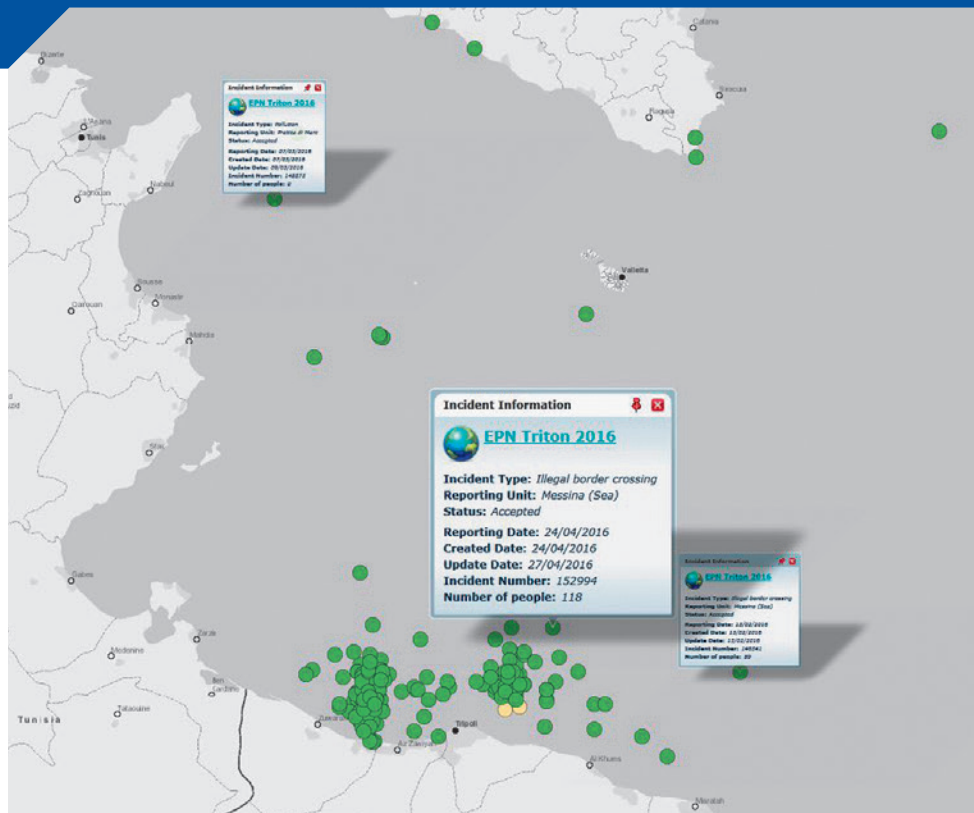
The Service Catalogue describes each service together with the information provided, technical prerequisites, and delivery channels for service provision.

The Service Catalogue is accessible for users who can request services listed in the catalogue by sending a service request form to Frontex. The service request should contain information facilitating the delivery of requested services. A detailed description of the process and information about necessary templates are included in Chapter 5.

3. Index of services

ID	Name of service	Description	Availability mode
S1	Incident Reporting	The service supports effective and efficient incident reporting for Joint Operations.	On request/ based on JO plan
S2	Vessel Monitoring and Tracking	The service provides a coherent situational picture of near real-time vessel traffic.	Permanent
S3	Tracking Vessels of Interest	The service provides situational awareness on vessels of interest.	On request
S4	Vessel Detection	The service provides detection of objects at sea using satellite-based radar correlated with AIS and LRIT.	On request
S5	Meteo	The service provides information on atmospheric and maritime conditions.	Permanent
S6	Visual Data Discovery	The service provides advanced visualisation of different operational data.	On request
S7	Maritime Simulation	The service computes probable vessel positions based on sea conditions and vessel parameters.	Permanent
S8	Satellite Imagery	The service provides optical satellite imagery.	On request
S9	Anomaly Detection	The service allows detection of atypical and suspicious behaviour of vessels.	On request
S10	Visualisation Tools	The service provides tools enhancing visualisation of data in JORA Visualisation Module.	Permanent
S11	Coastal Monitoring	The service provides imagery analysis on specific external coastal borders identified through risk analysis to support the operational assessment of illegal migration and cross-border crime-related activities.	On request
S12	Pre-frontier Monitoring	The service provides imagery analysis on specific pre-frontier areas identified through risk analysis to support the operational assessment of illegal migration and cross-border crime-related activities.	On request
S13	Reference Imagery/Mapping	The service is required for the current and future analysis of illegal migration and cross-border crime-related activities in hot spot areas identified through risk analysis.	On request
S14	Multipurpose Aerial Surveillance	The real-time aerial monitoring of the pre-frontier areas of interest.	On request
S15	Large Area Pre-Frontier Monitoring	Surveillance information about specific large areas (above 500 sq. km) that were identified as key migratory and/or cross-border crime areas.	On request
S16	Prodetect Service	Proactive detection activities based on a methodology (patterns-indicators) defined to deliver enhanced situational awareness and early warning detection capabilities.	On request
S17	Multi-source (MUSO) Migration Analytical Assessment	Initial analysis of a specific area, activity and/ or an organized criminal group associated with irregular migration or cross-border crime.	On request

4. Service details



General information

ID	S1
Name of the service	Incident Reporting
Classification	Limited

Service description and purpose

In accordance with the provisions laid out in the Agency's mandate, Frontex may coordinate Joint Operations with EU Member States, Schengen Associated Countries and third countries.

The Incident Reporting Service ensures efficient data collection, verification, processing, visualisation and dissemination during Frontex-coordinated Joint Operations. It can also cover other operational activities as requested by Member States, for example Presidency operations. The Service supports the European Situational Picture (ESP) data compilation processes. As part of the ESP creation and maintenance, the service provides Joint Operation incident reports to the Eurosur network within the scope of Eurosur application in a fast and secure manner.

It is a decision-support service available to users in order to enhance their situational picture and situational awareness, in support of constant monitoring and informed decision-making, specifically prior to planning of operational responses.

The service uses both the reporting module and JORA Visualisation Module (JVM).

Service delivery channels

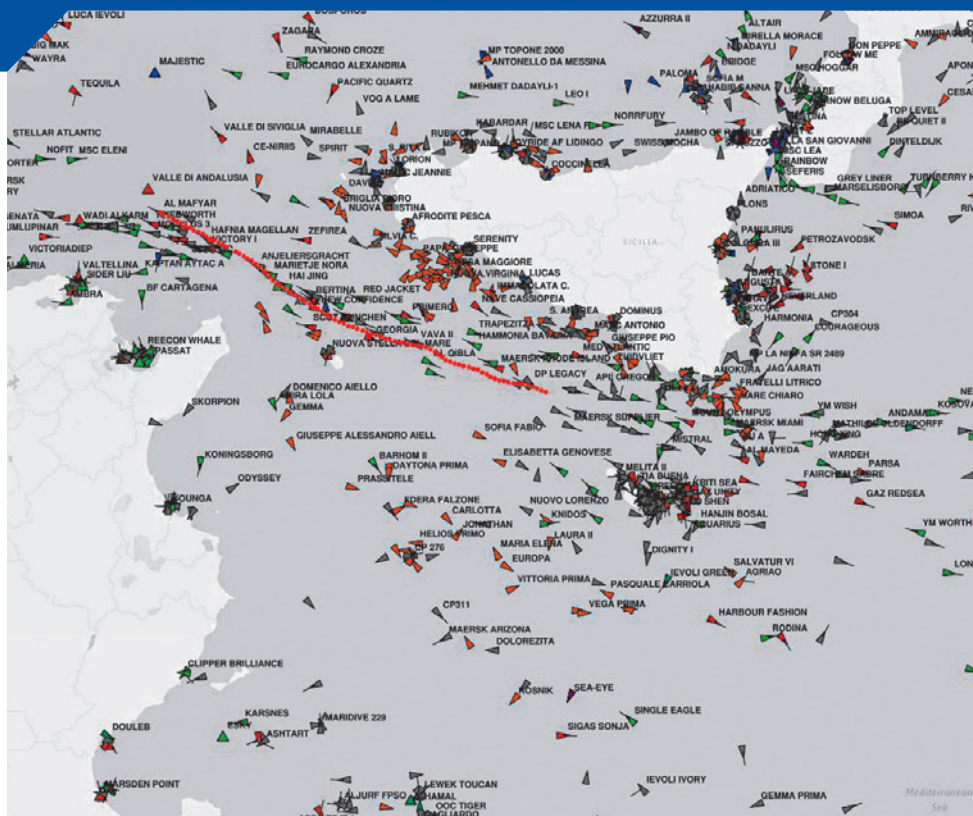
JORA
ECN application

Service availability

Availability mode	On request
Service hours	■ Technical infrastructure is available 24/7; ■ Operational implementation varies, depending on the specific Frontex Joint Operation.
Delivery time after activation/request	Immediate, upon approval

Training

Training may be provided upon request. A dedicated training environment that allows users to get familiar with the service is available as well, and may be tailored according to the customer's request.



General information

ID	S2
Name of the service	Vessel Monitoring and Tracking
Classification	Limited

Service description and purpose

This service provides a coherent and complete situational picture of the commercial fleet based on collaborative data from ship reporting systems in accordance with internationally agreed frameworks. It provides users with information required to further monitor and track vessels of interest. The operational objective is to support the users with all the information available in Frontex systems related to the commercial and fishing vessels fleets. The service provides also historical data on movements of vessels up to 6 months back. Users can search, identify, and track vessels of interest with a search tool by providing IMO and MMSI numbers.

The service provides several layers:

Layer name	Description	Coverage
Vessel Position All	All Vessel Monitoring and Tracking layers combined.	Characteristic coverage of the individual data sources (TAIS, SATAIS and LRIT) apply. Data streams are fused and de-conflicted.
Vessel Position LRIT	Vessel positions received from the Long Range Identification and Tracking system.	By default EU LRIT Data Centre (DC) fleet is provided; global fleet coverage in a limited geographical area can be activated on demand.
Vessel Traffic TAIS	Vessel positions received from terrestrial Automatic Identification System receivers.	Combined EU Member States coastal AIS receiver stations network coverage.
Vessel Traffic SATAIS	Vessel positions received from satellite Automatic Identification System receivers.	Global coverage.
Vessel Traffic	Combined TAIS and SATAIS layers.	Coverage of TAIS and SATAIS apply, data streams are fused and de-conflicted.

Automatic Identification System (AIS)

Purpose	Collision avoidance and vessel monitoring.
Carriage requirements	Ships of 300 GT and upwards engaged in international voyages; cargo ships of 500 GT and more not engaged in international voyages; all passenger ships.
General reporting intervals	Position report: 2–10 seconds (underway)/3 minutes at anchor. Voyage and static information: 6 minutes.
Names of the overlays	1. Vessel Position All 2. Vessel Traffic TAIS 3. Vessel Traffic SATAIS 4. Vessel Traffic

Source of data: EMSA.

Long Range Identification and Tracking (LRIT)

Purpose	Global identification and tracking of ships.
Carriage requirements	Passenger ships, including high-speed passenger craft; Cargo ships, including high-speed craft, of 300 or more GT; Mobile offshore drilling units.
General reporting intervals	6 hours.
Names of the overlays	1. Vessel Position All 2. Vessel Position LRIT

Service delivery channels

- JORA Visualisation Module
- ECN application

Service availability

Availability mode	Permanent
Service hours	24/7

Training

Scenario-based training package is available and can be provided in Frontex or in requesting Member States.

Flag	Palau (PW)	
Vessel type	General cargo	
Latest location of the vessel	Coordinates	31° 11' 20.55" N 29° 44' 33.60" E
	Date/Time	11.05.2016, 04:22 UTC
Picture of the vessel		

Facts of the case

Latest information:

- The Vessel left Misratah port (Libya) on 27.02.2016 at 15:37UTC, with next port of call, Umag (Croatia).
- On 01.03.2016 when it was sailing to East, 162 NM West from Kali Limenes (Crete, Greece) it changed the port of destination to Tuzla (Turkey).
- Since 02.03.2016 at 09:51UTC when it was 28 NM from Kali Limenes (Crete, Greece), it changed the destination port to Kali Limenes port (Crete, Greece) and started to do suspicious movements until 03.03.2016 at 00:36UTC.
- On 03.03.2016 it has changed the destination port to Tuzla (Turkey) with estimated time of arrival on 06.03.2016 at 15:00UTC.

General information

ID	S3
Name of the service	Tracking Vessels of Interest
Classification	Limited

Service description and purpose

This service provides end-users with situational awareness on chosen vessels of interest.

Following a well-founded request to the FSC, including information on the reason for tracking of the vessel of interest, the service provides daily reports on the developments with regard to the vessel of interest. Major developments are presented in a form of situational reports, while minor updates are listed in a general daily messages sent out to the end users.

The service uses a range of different sources to compile a detailed report on current vessel activities. The sources include vessel position information, historical tracks, satellite optical imagery, intelligence received from various partners as well as information provided by the FSC Media Monitoring team to compose daily reports on the vessels of interest.

Service delivery channels

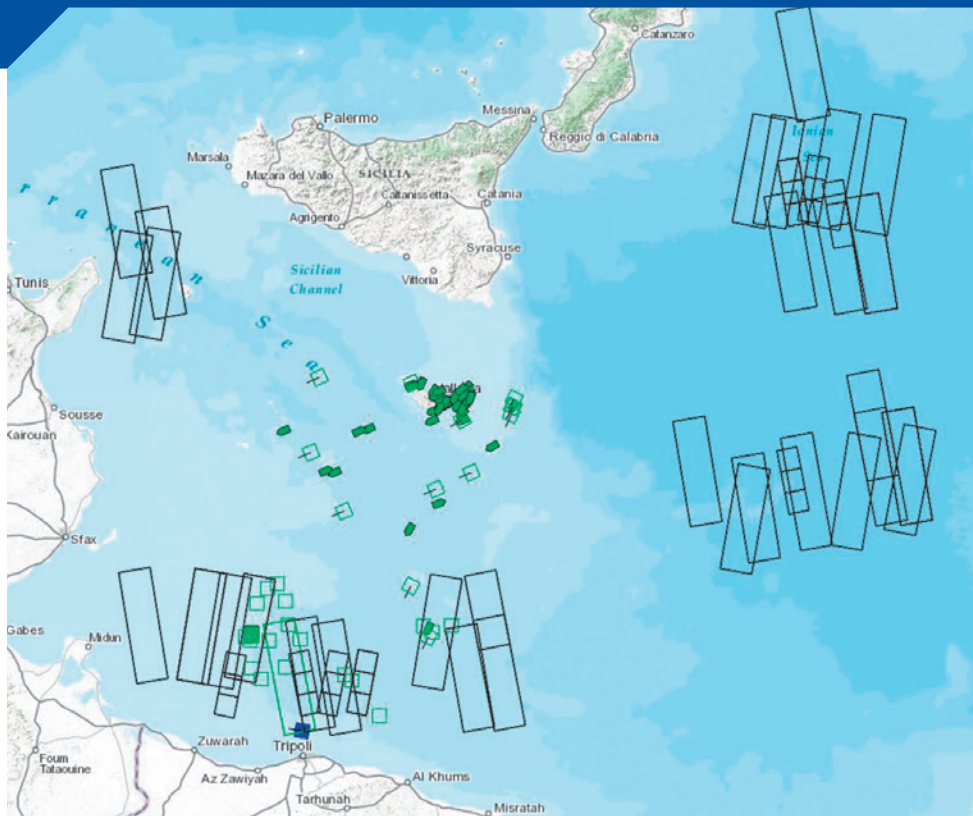
- Email
- Frontex One-Stop-Shop (FOSS)
- JORA Visualisation Module File Repository

Service availability

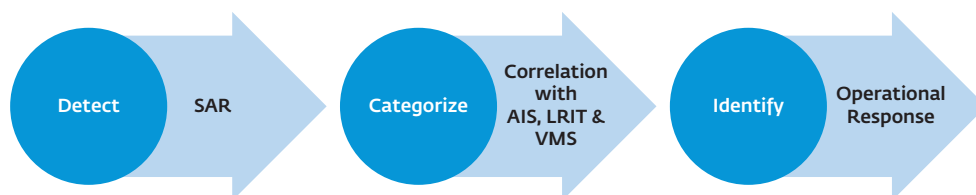
Availability mode	On request
Service hours	Reports are provided daily, 7 days a week.

Training

Not applicable.



NB SAR – synthetic aperture radar



General information

ID	S4
Name of the service	Vessel Detection
Classification	Limited

Service description and purpose

The operational objective of this service is to detect objects of interest at sea using Synthetic Aperture Radar mounted on satellites. The radar illuminates the earth and measures the reflected signal. Due to the nature of radar, it has a so-called 'all weather capability' and can be used day and night.

Objects detected at sea are correlated with available collaborative data from AIS and LRIT with an aim to categorise as many detections as possible automatically.

The outcomes of detections and any follow-up actions have to be reported to Frontex in a timely manner.

A Member State may request Frontex to include a follow-up as part of a Joint Operation activity. Frontex will consider the feasibility of such follow-up and upon separate arrangements may provide support to the visual identification of detected targets through assets taking part in Frontex-coordinated Joint Operations.

Before the service is implemented, and in cooperation with all the relevant partners, the Host Member State shall identify the VDS areas of acquisition which will be validated by Frontex.

The detections are displayed on the map together with additional information. Delivery of radar scan images themselves is normally out of scope of this service. Upon request clip images of detected objects may be delivered.

Following overlays are provided:

Layer name	Information provided
Detected objects	Near real-time information of all detections (available before automatic correlation process begins).
Categorised identified	Near real-time information of radar detections correlated with vessel positions based on SATAIS, TAIS and LRIT data streams (state of play at the moment of detection).
Categorised unidentified	Near real-time information of radar detections that could not be correlated with vessel positions based on SATAIS, TAIS and LRIT data streams (state of play at the moment of detection).
Acquired last 24h	Display of the areas scanned by satellite-based radar within the last 24 hours.
Acquisition plan next 72h	Display of the areas that will be scanned by satellite-based radar within the next 72 hours.
Acquisition plan all	Display of the areas that will be scanned by satellite-based radar for the current month.

Source of data: EMSA.

The coverage area is mutually agreed between requesting Member State and Frontex.

Service delivery channels

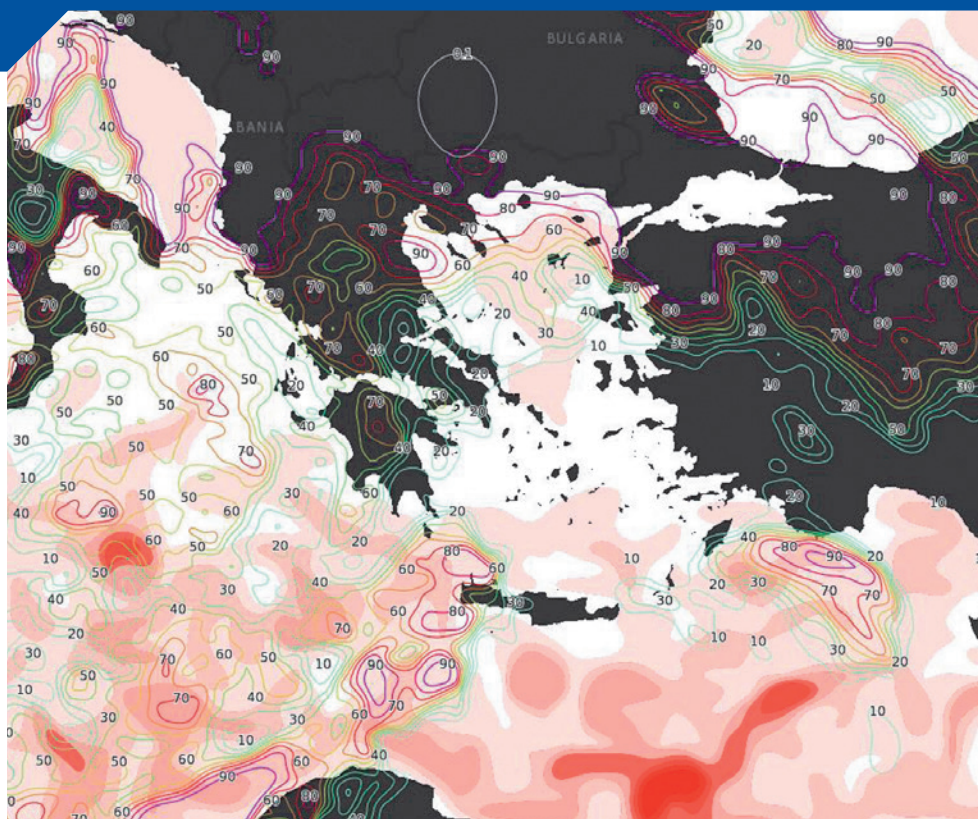
- JORA Visualisation Module
- ECN application

Service availability

Availability mode	On request
Service hours	■ Technical infrastructure is available 24/7; ■ Activations are planned on monthly basis and defined in a common acquisition plan.
Delivery time after activation/request	For the initial service setup, the activation time is until 10th of the preceding month.

Training

Scenario-based training package is available and can be provided in Frontex or in requesting Member States.



General information

ID	S5
Name of the service	Meteo
Classification	Limited

Service description and purpose

This service provides information about past, current and forecasted weather conditions, oceanographic conditions, state of the sea, tids, lightings, weather radar images (from national weather services) and radar forecast up to 2 hours.

The following information layers are accessible directly in the systems and available to all users:

■ Weather – Atmospheric forecast:

- Data displayed according to a chosen weather parameter;
- Data displayed per location: station-based (source from 5 170 locations) observing weather stations, supplemented by forecasts for 'virtual stations' in the area.

■ Weather – Maritime forecast:

- Data displayed according to a chosen weather parameter;
- Data displayed per location: Tidal data (tides and tidal currents) at the most impacted locations.

All the abovementioned groups of weather data – Atmospheric and Maritime forecast – are also available up to 7 days back¹.

¹ For the past data the forecasts overwrite each other.

For the periods covered (past, current and forecasted) the time intervals apply:

Temporal resolution maritime layers

3 hourly interval	3 hourly interval	6 hourly interval
- 168 hrs up to - 3 hrs	0 hrs up to + 72 hrs	+ 78 hrs up to + 168 hrs

The tidal data interval steps are every hour.

All the data is integrated into one single layer per each group.

■ Weather – observations and short-range forecast (atmospheric, maritime, radar, satellite):

● Lightning

The data presents the situation regarding the lightnings strikes.

It is available for up to 3 days back (72 hours), with interval steps every 15 minutes (every update contains lightning data over a period of 60 minutes).

● Radar reflectivity and 2h forecast

Live weather radar – radar reflectivity (translated to precipitations rates in [mm/h]), displayed up to 2 hours of forecast. It is available for up to 4 days back (96 hours), with interval steps every 15 minutes.

The weather radar images are available from single national weather services: Netherlands, UK/Ireland, France, Spain, Germany, Belgium, Switzerland, Denmark, Sweden, Norway, Finland, Poland.

● Live satellite images:

Satellite images come from geostationary satellites like Meteosat, GOES and MTSAT for visualisation purposes. They visualise the state of the clouds.

There are four new layers presenting the current satellite imagery:

- Satellite IR satellite_europe_ir (Infrared)
- Satellite IR original satellite_europe_ir_original (Infrared original)
- Satellite VIS satellite_europe_vis (Visual)
- Satellite VIS original satellite_europe_vis_original (Visual original)

The satellite images are embedded in the system directly up to 4 days back (for the last 96 hrs), with the timestamp available every 15 minutes.

■ Historical data – extended time range – historical data (long range)

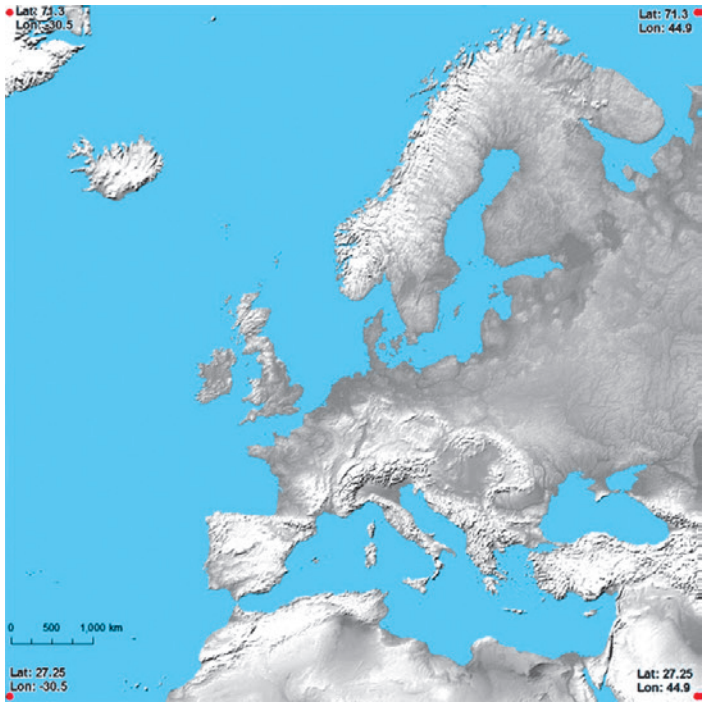
In addition to the data provided in the system back to the last 7 days (retrieved in hourly intervals), there is a possibility to request any data of interest at any historical moment/period of interest, for any area of interest, for up to a few years. This data can be provided on demand, after specifying the area, the moment/period in the past, the scenario of interest and type of data requested. Such products are delivered in formats of: data spreadsheets, time series, maps and tailored-expertise reports. The delivery time is dependent on the: period of time back in time, length of the period, the size of the area, the type of data.

The area covered:

Currently the service delivers meteorological data to all Schengen Area countries and borders with Third Countries (enlarging in this way the service provision also to the Common Pre-Frontier Intelligence Picture (CPIP)).

Longitude/Latitude:
-43°34'4.12" 17°7'33.26"
-43°34'4.12" 64°48'11.62"
42°45'56.47" 73°35'12.52"
42°45'56.47" 17°29'58.22"

The service is available within the extent of the map displayed:



Service delivery channels

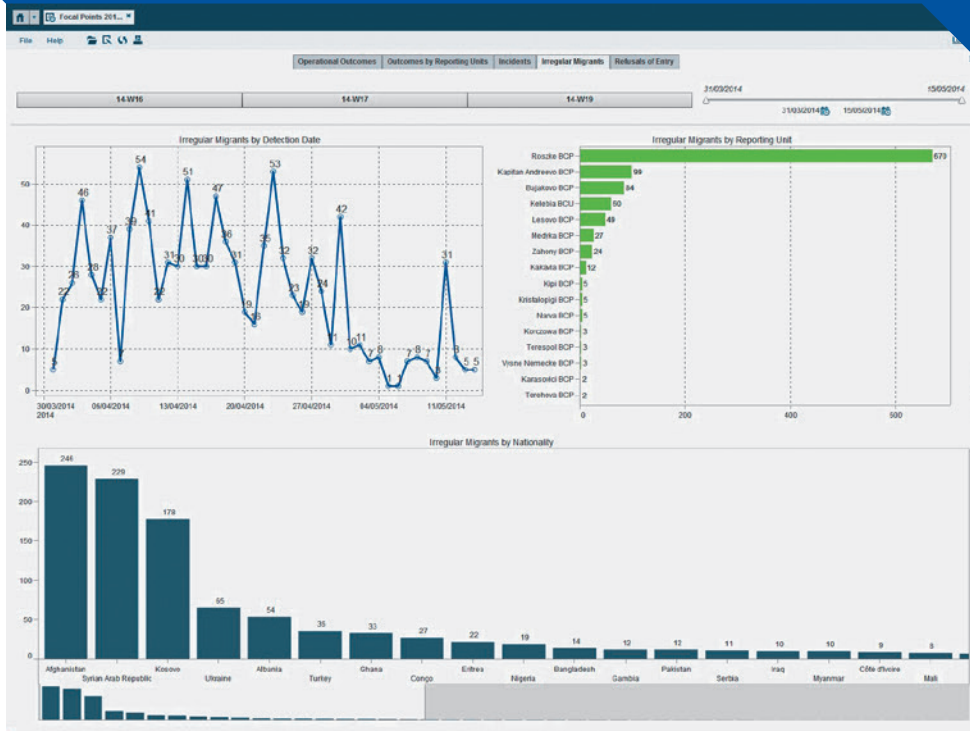
- JORA Visualisation Module
- ECN application

Service availability

Availability mode	Permanent
Service hours	24/7

Training

Scenario-based training package available and can be provided in Frontex or in requesting Member States.



General information

ID	S6
Name of the service	Visual Data Discovery
Classification	Limited

Service description and purpose

Visual Data Discovery Service provides an access to dynamic reports, which allow exploring operational data in an effective way based on specific user needs.

Users can request tailored reports containing requested data in line with their access rights.

Member States hosting Frontex-coordinated joint operations or participating in them can additionally be provided with web-based statistical reports regarding hosted operations and can monitor activities undertaken during Frontex-coordinated joint operations.

1. Access to web-based and interactive Daily Situational Reports;
2. Access to web-based operational statistics;
3. Support to operational briefings;
4. Support to situation monitoring by visualising operational results and statistics on maps.

Service delivery channels

SAS Visual Analytics (requires an active JORA account)

Technical prerequisites

Generally, the consumer needs internet access to consume this service, interface-specific prerequisites are:

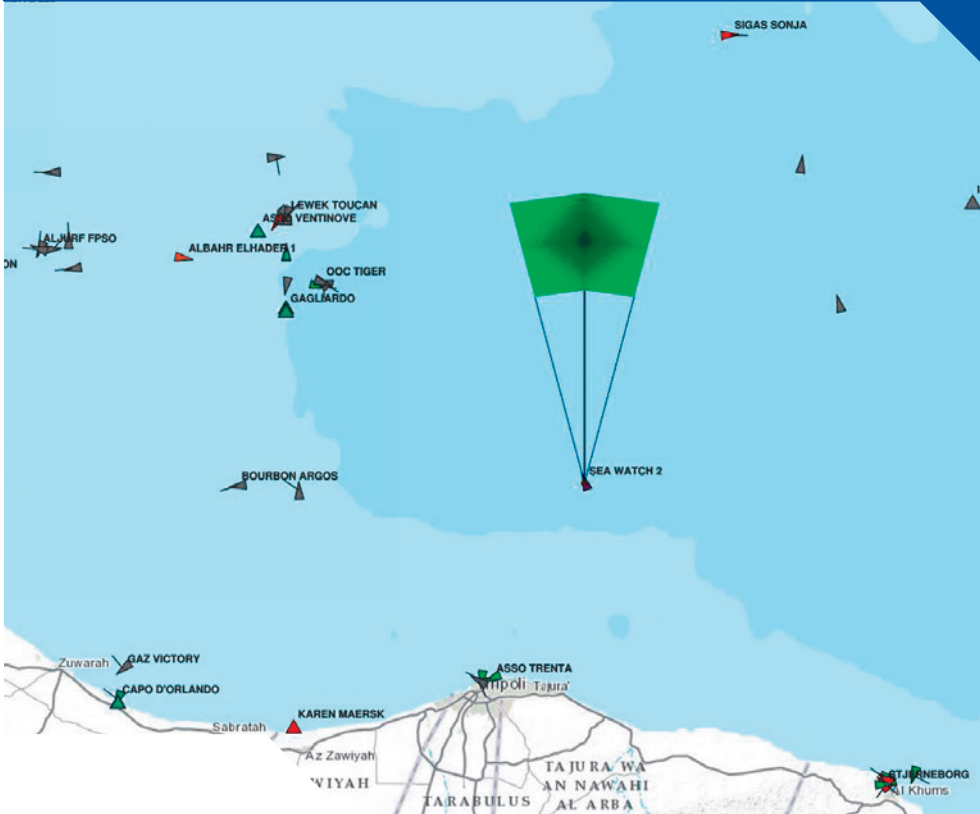
- VPN connection to Frontex network

Service availability

Availability mode	On request
Service hours	24/7
Delivery time after activation/request	Up to 4 working days

Training

Scenario-based training package is available and can be provided in Frontex or in requesting Member States.



General information

ID	S7
Name of the service	Maritime Simulation
Classification	Limited

Service description and purpose

The maritime simulation in the Maritime Simulation Module is performed in order to estimate a probable position of a vessel after some time from the moment of detection.

The Maritime Simulation Module (MSM) service computes probable vessel positions, based on the vessel's parameters and the sea conditions, such as: meteorological marine forecast, vessel specifications and voyage information. The simulation result is a location probability model.

The simulation results can be used for search and rescue operation planning and other situations when estimating of vessel positions sometime after detection is necessary (e.g. when a vessel with migrants is detected on a sea but there is no possibility to monitor the vessel trajectory).

Details:

Source

Vessel simulations are based on available data:

- meteorological sea conditions (marine forecast);
- vessel specifications;
- voyage information.

This data serves as input for probability model calculations that are run in order to estimate the most probable vessel position. It uses a particular tracking model that takes into consideration currents and weather data to compute a probability where a vessel position is forecasted in time. Sea conditions are described by current weather (wind) and sea parameters (waves, currents).

Information provided

As an outcome of these calculations a probability model is created and displayed as an image on the map. This image and all estimated calculations are saved and can be accessed any time, giving the possibility for each simulation to be further analysed. The user will be able to specify the location of the track (vessel of simulation), type of vessel, type of measurement and time period to be covered by the calculations. There is additional information calculated during any simulation: 'Estimated survival time' which corresponds to estimated survival time for people in water, considering the given sea conditions.

Service delivery channels

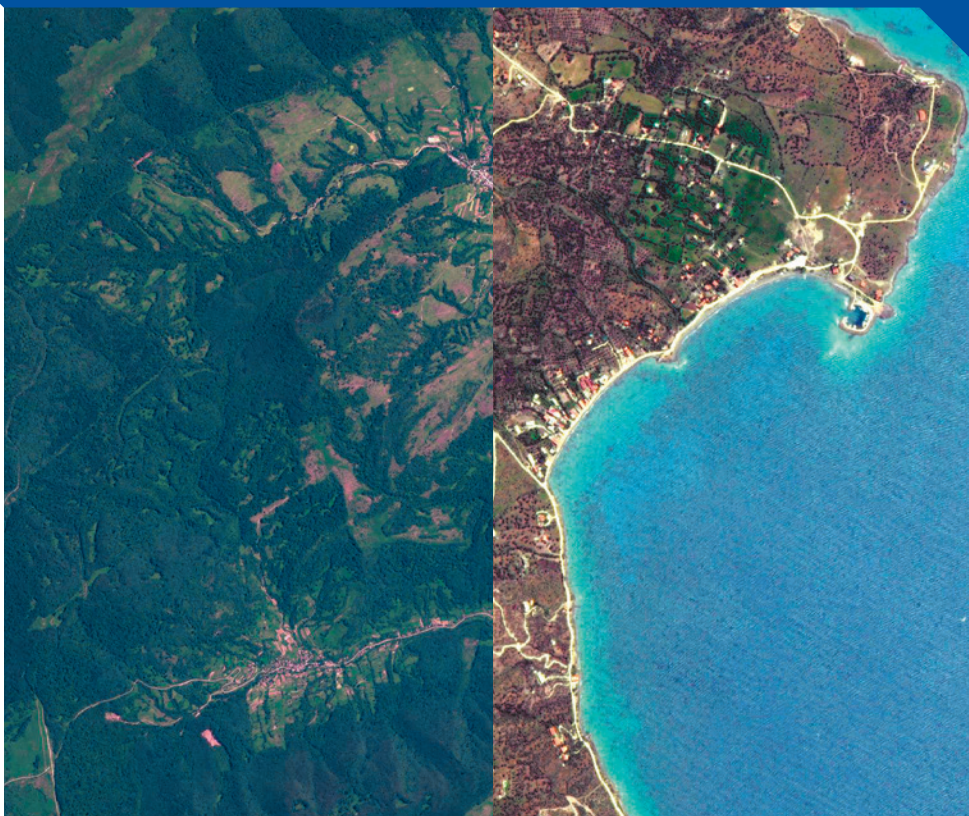
- JORA Visualisation Module
- ECN application

Service availability

Availability mode	Permanent
Service hours	24/7
Delivery time after activation/request	This service is permanently available.

Training

Scenario-based training package available and can be provided in Frontex or in requesting Member States.



General information

ID	S8
Name of the service	Satellite Imagery
Classification	Limited

Service description and purpose

This service provides end-users with optical satellite imagery in support of site monitoring (e.g. maritime areas, ports, coastlines or land borders) based on end-user requests. The service can also be used to validate intelligence information (e.g. arrival or departure of a boat in a port) as well as verifying the plausibility of information gathered from debriefing and other similar activities (e.g. mapping and identification of landmarks described).

Details:

Source	EMSA, EU SatCen, other suppliers
Information provided	Optical images over requested areas, upon request, may be provided with additional services (boats, ships, shelters, etc. detection). Images are delivered in Very High Resolution (50 cm) in panchromatic, RGB, and Bundle modes. Time of delivery is based on the request and the purpose of the image. Service is dependent on weather conditions – cloud coverage may limit or delay the time of delivery of images of particular areas. All details of the request should be closely agreed between requestor and Frontex.
Coverage	The optical imagery may cover pre-frontier areas as defined in the Eurosur regulation, such as land border between EU and third countries or coastal area of third countries. Detailed coverage is to be agreed on case-by-case basis.

Service delivery channels

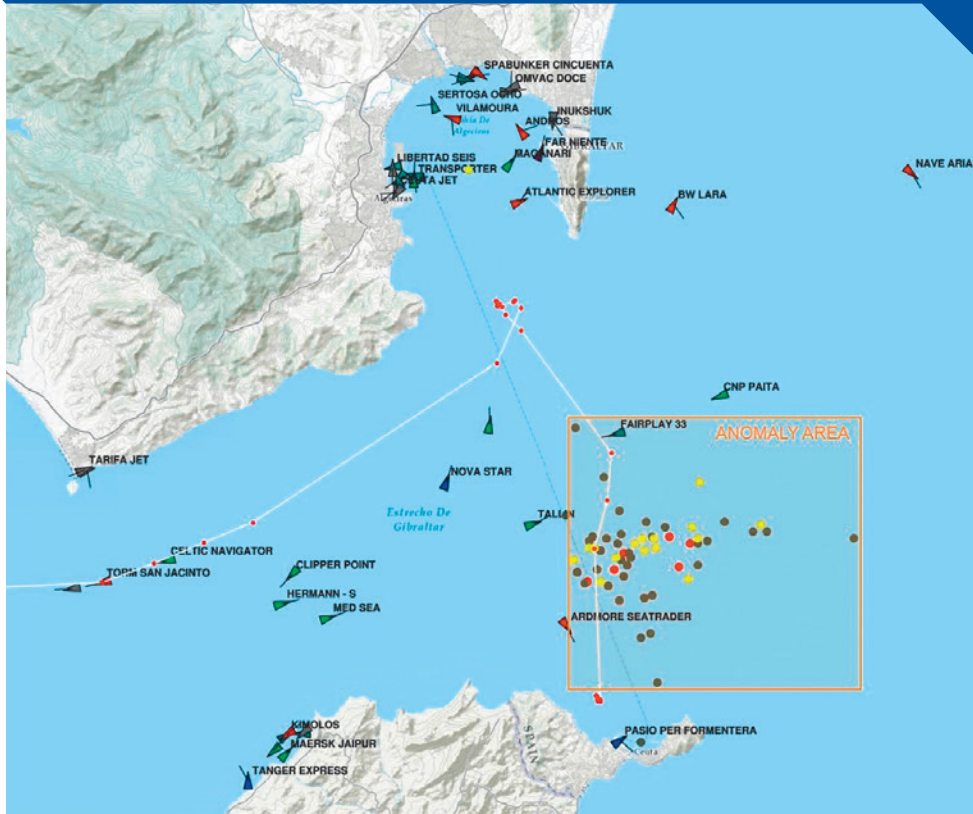
- JORA Visualisation Module
- ECN application

Service availability

Availability mode	On request
Service hours	Delivered during office hours, after delivery – permanently available to the requestor.
Delivery time after activation/request	The request needs to be lodged minimum 24 hours before the delivery.

Training

Scenario-based training package is available and can be provided in Frontex or in requesting Member States.



General information

ID	S9
Name of the service	Anomaly Detection
Classification	Limited

Service description and purpose

This service provides end-users with close to real-time notifications about abnormal behaviour of vessels on the sea. The user can define an area for detecting suspicious behaviour of vessels and the type of anomaly to be detected. When requested anomalies are detected, notifications (alerts) are displayed on the map in the JORA Visualisation Module. The catalogue of available anomalies is currently under development.

Details:

Source	EMSA (AIS, LRIT)
Information provided	This service provides detailed information about a vessel which raised an alert, including location, name of the vessel, type of anomaly, etc. Currently operational anomalies include: ■ Anchorage – an alert is raised when a vessel stands still for a predefined period of time in a predefined area; ■ In area – an alert is raised when a vessel is entering a predefined area; ■ Out area – an alert is raised when a vessel is leaving a predefined area; ■ Distance to shore – an alert is raised when the distance between a vessel and a shore is shorter than predefined; ■ Sudden change of speed – an alert is raised when a vessel is rapidly changing speed within a predefined time period; ■ Rendezvous at sea – an alert is raised when a distance between two vessels in a predefined area is shorter than predefined distance. This service is based on AIS and LRIT reports sent by the vessels. The requestor is obliged to provide all necessary details regarding particular anomaly in the service request form.

Service delivery channels

- JORA Visualisation Module
- ECN application

Service availability

Availability mode	On request
Service hours	Delivered during office hours, after delivery – permanently available to the requestor.
Delivery time after activation/request	The request needs to be lodged minimum 24 hours before the delivery.

Training

Scenario-based training package is available and can be provided in Frontex or in requesting Member States.



General information

ID	S10
Name of the service	Visualisation Tools
Classification	Limited

Service description and purpose

This service provides geospatial information and additional tools to enable an individual situational picture set-up. The components of the service can be displayed on top of a map for operational planning, asset allocation and risk analysis purposes. The tools include:

- A set of world base maps², including:
 - **World Topo Map** – administrative boundaries, transportation routes, water and physiographic features to a scale of ~1:72,000.
 - **World Imagery** – one metre or better satellite and aerial imagery in many parts of the world and lower resolution satellite imagery worldwide.
 - **World Shaded Relief** – surface elevation portrayed as shaded relief.
 - **World Navigation Charts** – a digital version of the Operational Navigation Charts (ONC) to a scale of 1:1,000,000.
 - **Nautical Charts Tiled** – nautical map.
 - **Basemaps with adjusted properties** – for a maximum zoom, for visualisation of dark or bright elements on the map.
- A drawing tool enabling:
 - Drawing points, lines, and shapes on top of the map, including their measurements.
 - Adding text on top of the map.
 - Importing and exporting KML files with drawings attached.

² A base map is a map or chart showing certain fundamental information, used as a base upon which additional data of specialised nature are compiled or overprinted. Also, a map containing all the information from which maps showing specialised information can be prepared.

- Tools enabling maps configuration, file exporting, and printing.
- Information tool and legend tool providing additional information on layers dedicated to other services.
- OpsChat chat tool allowing for real time information exchange between users involved in operations, including drawing capabilities.

This service also provides additional geographical information layers that can be displayed on top of a map for operational planning, asset allocation and risk analysis purposes. The following information is provided:

Operational and administrative information

Operational areas	As defined in the JO Operational Plan
National Frontex Point Of Contact (NFPOC) information layer	Displaying the location of NFPOC in MS and additional attributes such as contact details, etc.
National Coordination Centres (NCC) information layer	Displaying the location of NCC in MS and additional attributes such as contact details, etc.
Border Crossing Points locations layer	Displaying all border crossing points to Schengen area.

Service delivery channels

- JORA Visualisation Module

Service availability

Availability	Permanent
Service hours	24/7

Training

Training services are not needed; all necessary information will be distributed via detailed release notes.

14 Mar 2016

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FXGS16001 N011 K09 (First Impression Report)

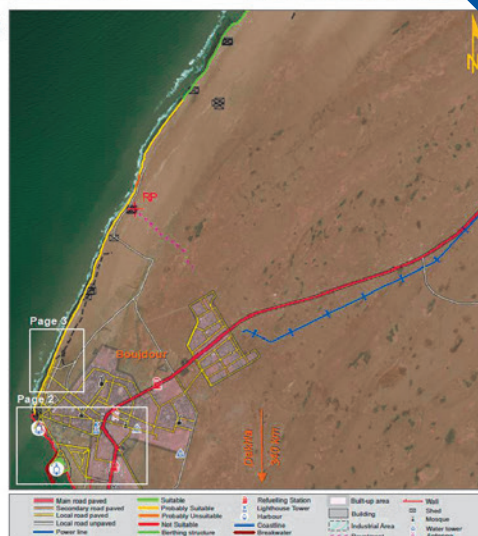


External Ref:
2016 023 FRONTEX

Cap Boujdour/Bojador Possible Embarkation Area Western Sahara

Coastal Monitoring

Period from 01 Mar 2016 to 14 Mar 2016



Pleiades-1, 14 Mar 2016
Acquisition Time: 12:01:54Z

RP: 26°10'04"N 014°28'40"W

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14 Mar 2016

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FXGS16001 N011 K09 (First Impression Report)



The two images above, on 01 Mar 2016 and 14 Mar 2016, show the main infrastructure of the new Boujdour harbour, located approximately 6 km south from the RP and was described in the previous product.

The harbour has notable boat activity related to the fishing industry. The comparison between the 01 Mar 2016 image and 14 Mar 2016 reveals that the number of small skiffs has slightly decreased during the monitoring period from 350 to 327. A significantly higher decrease in the number of fishing vessels is also noted, from twenty-seven to sixteen. Minor vehicle activity has been observed on the 14 March 2016 image, with a few utility vehicles located in the vicinity of the harbour gate and other parking areas. One possible refrigerated trailer was also identified.

IA Comment: The slight decrease in the number of skiffs is probably related to the very similar sea state to what it was on 01 Mar 2016, which is an indirect indicator of the fishing activity in the area.

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General information

ID	S11
Name of the service	Coastal Monitoring
Classification	Limited

Service description and purpose

The purpose of the Coastal Monitoring service is to supply the NCC and Frontex with surveillance information on specific external coastal borders on a regular, reliable and cost-efficient basis.

The monitored areas are identified through risk analysis to support the operational assessment of illegal migration and cross-border crime-related activities. The assessment is carried out mainly based on three imagery analysis activities:

- Intelligence validation;
- Change detection;
- Change analysis.

The objects of interest (OOI) are specifically defined by the requestor for each activation. The main OOI that are required to be analysed taking into consideration their status, type, location and associated changes are:

- Vessels including wooden boats, rubber boats and speed boats, within the AOI;
- Vehicles (key focus on transportation means);
- Makeshift camps (tents);
- Law enforcement/military activity within the identified area (embarkation points, safe-houses, etc.) and directly or indirectly influencing the level of irregular migration and cross-border crime activities (patrols, checkpoints, etc.);
- Irregular migration and cross-border crime indicators specific to the employed Modi Operandi within the Area of Interest;
- Infrastructure which could be utilised for the manufacturing, modification or repair of boats.

Overview of key attributes and requirements for the Coastal Monitoring Service:

AOI (Max)	50 sq. km (10 km × 5 km)
Planning lead time (Min)	5 working days – in exceptional cases the time between the tasking acceptance and the imagery acquisition could be reduced to 1–2 working days
Update period (Min)	5 days – the acquisition frequency should be tailored to the needs of the requestor and could range from the foreseen 5 days to up to a monthly revisit
Surveillance tools	VHR optical and SAR

Requestors of the service receive, following each imagery acquisition, a First Impression Report (FIR), the associated compressed imagery and by request the vectorised objects of interest and key infrastructure. Requestors can also request a Briefing Note summarising and in more depth analysing the intelligence obtained after a series of FIRs.

- A First Impression Report, referred in some documents as Fast Delivery, is a fast analytical product created by the EU SatCen in response to a tasking issued by Frontex. These products are normally pdf documents of 2–4 pages (maximum 8 pages) including analysis and description of the requested Location (LOI) (or exceptionally over an AOI) supported with descriptive text, collateral information and basic vector information. These products are delivered usually 56 hours after the reception of the image.
- A Briefing Note, referred in some documents as Complete Delivery, is an analytical document over a Location (LOI) or Area of Interest (AOI) containing descriptive text, collateral information, vector information, sources and several images, describing not only the objects of interest but also the 'environment' where this is located. The content is detailed information on the situation observed on images.
- The imagery provide together with both the FIRs and BNs is in GMLP2000 format and the relevant vectors digitalised at 1:5 000 scale.

The service is delivered 'on demand' and can be requested by the NCCs through the Eurosur Fusion Services. The service is regularly requested by the Risk Analysis Unit (RAU) in order to support joint analysis activities conducted with Member States and Schengen Associated Countries.

Service delivery channels

- First Impression Reports and Briefing Notes
 - ECN application
 - E-mail (limited FIRs and BNs)
- Imagery and vectors
 - JORA Visualisation Module
 - ECN application

Service availability

Availability mode	On request
Service hours	Technical infrastructure is available 24/7
Delivery time after activation/request	1 working day after imagery reception (First Impression Report) 2 working days after imagery reception (Briefing Note and Digital Geospatial Information (DGI) package) Delivery times can be significantly reduced for high priority requests

Training

Training will be coordinated by Frontex and provided on a regular basis as well as upon request by EU SatCen.



Ghat Probable Migration Hub Libya

Pre-frontier Monitoring

Initial Analysis



	Built-up area		Building		Industrial - Manufacturing		Sports ground
	Power line		General Repair		Industrial - Utilities		Transportation station
	Antenna		Refueling Station		Building		Main road paved
	Water tower		Hospital		Building under construction		Local road paved
	Mosque		School		Power substation		Industrial - Manufacturing
							Warehouse

Pleiades-1, 15 Mar 2016
Acquisition Time: 10:15:37Z

RP: 24°57'46"N 010°10'30"E

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15 Mar 2016

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EXGS16002 N023 I001 (First Impression Report)



The compounds 1 image from 15 May 2016 (**Frame 8**) show (2)ah, a town near the Algerian border. No visible indications of irregular migration activity and no notable infrastructure changes have been observed. The comparison with the GeoEye-1 image of 09 Nov 2015 (**Frame 4**) revealed no significant changes in the infrastructure. However, a few locations are observed with variations in the level of vehicle activity. **Inserts 1** shows a high density of parked vehicles in the vicinity of a compound with a multi-story building. **Inserts 2** shows variation of the number and type vehicles inside of a well secured compound with a rectangular shaped building. **Inserts 3** shows a high density of parked vehicles in the vicinity of a compound with a multi-story building. **Inserts 4** shows a high density of parked vehicles on vacant land in the vicinity of a historical site. Multiple types of vehicles, containers, human activity and temporary shelters are visible also (see Picture 6). **Pictures 5 to 8** show ground views from Ghaf town at different times.

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2 of 3

General information

ID	S12
Name of the service	Pre-frontier Monitoring
Classification	Limited

Service description and purpose

The purpose of the Pre-frontier Monitoring service is to supply the NCC and Frontex with surveillance information on the pre-frontier area (focused on the land portions of the pre-frontier area) on a regular, reliable and cost-efficient basis.

The monitored areas are identified through risk analysis to support the operational assessment of illegal migration and cross-border crime-related activities. The assessment is carried out mainly based on three imagery analysis activities:

- Intelligence validation;
- Change detection;
- Change analysis.

The objects of interest (OOI) are specifically defined by the requestor for each activation. The main OOI that are required to be analysed taking into consideration their status, type, location and associated changes are:

- Vehicles (key focus on transportation means);
- Makeshift camps (tents);
- Law enforcement/military activity within the identified area (embarkation points, safe houses, etc.) and directly or indirectly influencing the level of irregular migration and cross-border crime activities (patrols, checkpoints, etc.);
- Irregular migration and cross-border crime indicators specific to the employed Modi Operandi within the Area of Interest;
- Infrastructure which could be utilised as safe houses.

Overview of key attributes and requirements for the Pre-frontier Monitoring Service:

AOI (Max)	100 sq. km (10 km × 10 km)
Planning lead time (Min)	5 working days – in exceptional cases the time between the tasking acceptance and the imagery acquisition could be reduced to 1–2 working days
Update period (Min)	5 days – the acquisition frequency should be tailored to the needs of the requestor and could range from the foreseen 5 days to up to a monthly revisit
Surveillance tools	VHR optical and SAR

Requestors of the service receive, following each imagery acquisition, a First Impression Reports (FIRs), the associated compressed imagery and by request the vectorised objects of interest and key infrastructure. Requestors can also request a Briefing Note summarising and in more depth analysing the intelligence obtained after a series of FIRs.

- A First Impression Report, referred in some documents as Fast Delivery, is a fast analytical product created by the EU SatCen in response to tasking issued by Frontex. These products are normally pdf documents of 2–4 pages (maximum 8 pages) including analysis and description of the requested LOI (exceptionally over an AOI) supported with descriptive text, collateral information and basic vector information. These products are delivered usually 5–6 hours after the reception of the image. The delivery time of the products has been modified from 4 hours, as indicated in previous documentation, to 5–6 hours to include the time required for the downlink and transfer to the EU SatCen.
- A Briefing Note, referred in some documents as Fast Delivery, is an analytical document over a Location (LOI) or Area of Interest (AOI) containing descriptive text, collateral information, vector information, sources and several images, describing not only the objects of interest but also the 'environment' where this is located. The content is detailed information on the situation observed on images.
- The imagery provide together with both the FIRs and BNs is in GMLJP2000 format and the relevant vectors digitalised at 1:5 000.

The service is delivered 'on demand' and can be requested by the NCCs through the Eurosur Fusion Services. The service is regularly requested by the Risk Analysis Unit (RAU) in order to support joint analysis activities conducted with Member States and Schengen Associated Countries.

This service permits the request of border permeability studies. If requested the user will receive a report and maps describing the extent to which specific border areas permit (or restrict) illegal migration and cross-border crime on foot or in vehicles. These studies take into account the topography, the land cover along the border and the existing surveillance infrastructure.

Service delivery channels

- First Impression Reports and Briefing Notes
 - ECN application
 - E-mail (limited FIRs and BNs)
- Imagery and vectors
 - JORA Visualisation Module
 - ECN application

Service availability

Availability mode	On request
Service hours	Technical infrastructure is available 24/7
Delivery time after activation/request	1 working day after imagery reception (First Impression Report) 2 working days after imagery reception (Briefing Note and Digital Geospatial Information (DGI) package) Delivery times can be significantly reduced for high priority requests.

Training

Training will be coordinated by Frontex and provided on a regular basis as well as upon request by EU SatCen.



General information

ID	S13
Name of the service	Reference Imagery/Mapping
Classification	Limited

Service description and purpose

VHR satellite imagery and vectorised data covering specific third-country areas identified through risk analysis. This imagery is required for current and future analysis of illegal migration and cross-border crime related activities.

Overview of key attributes and requirements for the Reference Imagery/Mapping Service:

AOI (Max)	2 500 sq. km (50 km × 50 km)
Planning lead time (Min)	Several weeks
Update period (Min)	Annual or biannual
Delivery time	Weeks after imagery reception (to be agreed bilaterally for each activation). The delivery time should take into consideration the area, scale and density of features requested.
Deliverables	■ GDB of annotated features (ESRI-compatible) ■ MPK for product visualisation ■ Metadata file in XML ■ Compressed imagery in JP2 ■ Report in PDF (optional) or MapBook (optional) ■ Objects of relevance: ● Hydrography ● Topography ● Infrastructure, with an emphasis on the following types: – Transportation; – Communications; – Governance; ● Population activities ● Land cover ■ Vectors will be delivered at least at the below scales: ● 1:5 000 – Population Activities ● 1:25 000 – Transportation Network – Land Cover – Hydrography – Physiography

The above indicated planning lead time of the service has been modified from 2 weeks, as indicated in previous documentation, to several weeks. This attribute has been updated based on the experience gained in 2015. Due to the more strategic nature of these services an extended planning lead time allows for a better preparation of the request for service and for a more cost-effective implementation (with no impact to the user requirements). In exceptional situations the planning lead time for specific services could be shortened.

The service is delivered 'on demand' and can be requested by the NCCs through the Eurosur Fusion Services. The service is regularly requested by the Risk Analysis Unit (RAU) in order to support joint analysis activities conducted with Member States and Schengen Associated Countries.

Service delivery channels

- Imagery and vectors
 - JORA Visualisation Module
 - ECN application

Service availability

Availability mode	On request
Service hours	Technical infrastructure is available 24/7

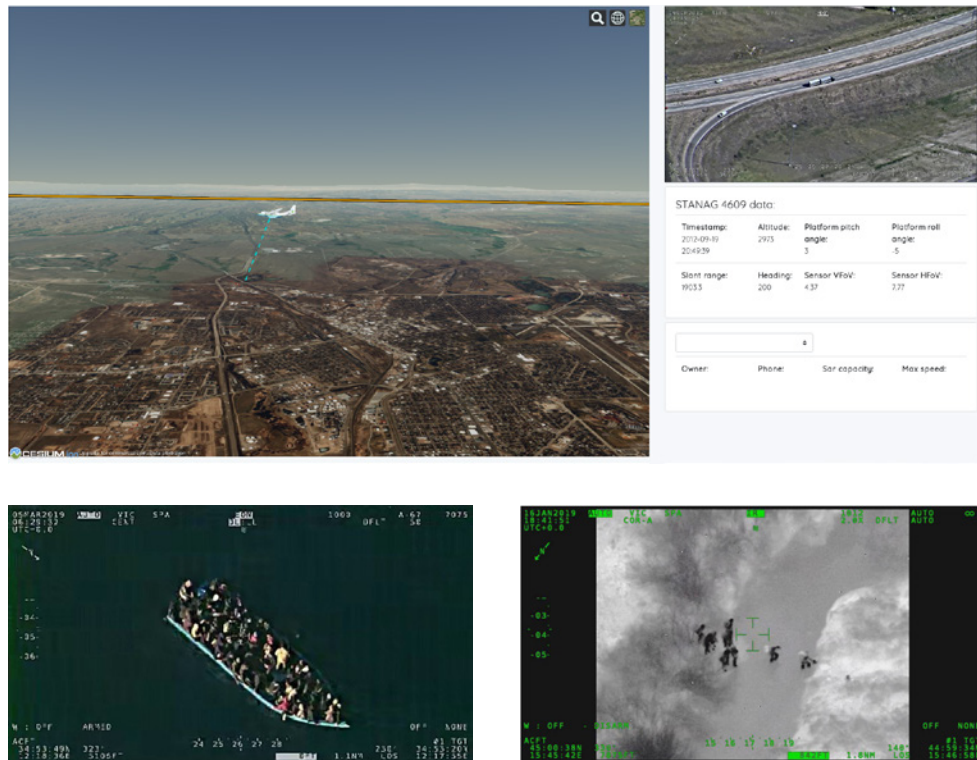
Service availability

Delivery time after activation/request

Weeks after imagery reception (to be agreed bilaterally for each activation). The delivery time shall take into consideration the area, scale and density of features requested. Delivery times can be significantly reduced for high priority requests

Training

Training will be coordinated by Frontex and provided on a regular basis as well as upon request by EU SatCen.



General information

ID	S14
Name of the service	Multipurpose Aerial Surveillance (MAS)
Classification	Limited

Service description and purpose

The Multipurpose Aerial Surveillance (MAS) service allows for the real-time monitoring of the pre-frontier areas of interest, whereas the surveillance data is made available to the requestors immediately during the operation.

A real-time video and information stream is provided by sensors installed on Frontex aerial platforms (i.e. airplane, Remotely Piloted Aircraft System - RPAS) and transmitted directly to the European Monitoring Room (EMR) at Frontex and partner coordination centres in the European Union.

The European Monitoring Team (EMT), operating in the EMR at Frontex, ensures a continuous assessment of the situation in the surveillance area due to the direct connection to the aerial assets. The expertise of the members of the team ranges from migration management, to law enforcement, search and rescue, and fisheries control, what allows for appropriate response and information dissemination to the relevant authorities for their follow-up.

The primary aim of MAS is to support the Agency, EU entities and the national authorities of the MS/SAC in the surveillance and monitoring activities within the area of interest (AOI) focusing on the EU pre-frontiers. Surveillance activities within national territorial waters of EU MSs can be performed only upon request and/or authorisation provided by the competent national authorities. The AOI is agreed on in cooperation with the requesting Member State.

The Multipurpose Aerial Surveillance supports users engaged in maritime and land surveillance activities, aimed at combating illegal migration and cross-border crime. Moreover, the Multipurpose Aerial Surveillance service regularly detects boats in distress, triggering search and rescue operations. In 2018 only, approximately 5 559 people were rescued thanks to search and rescue operations launched following MAS notifications.

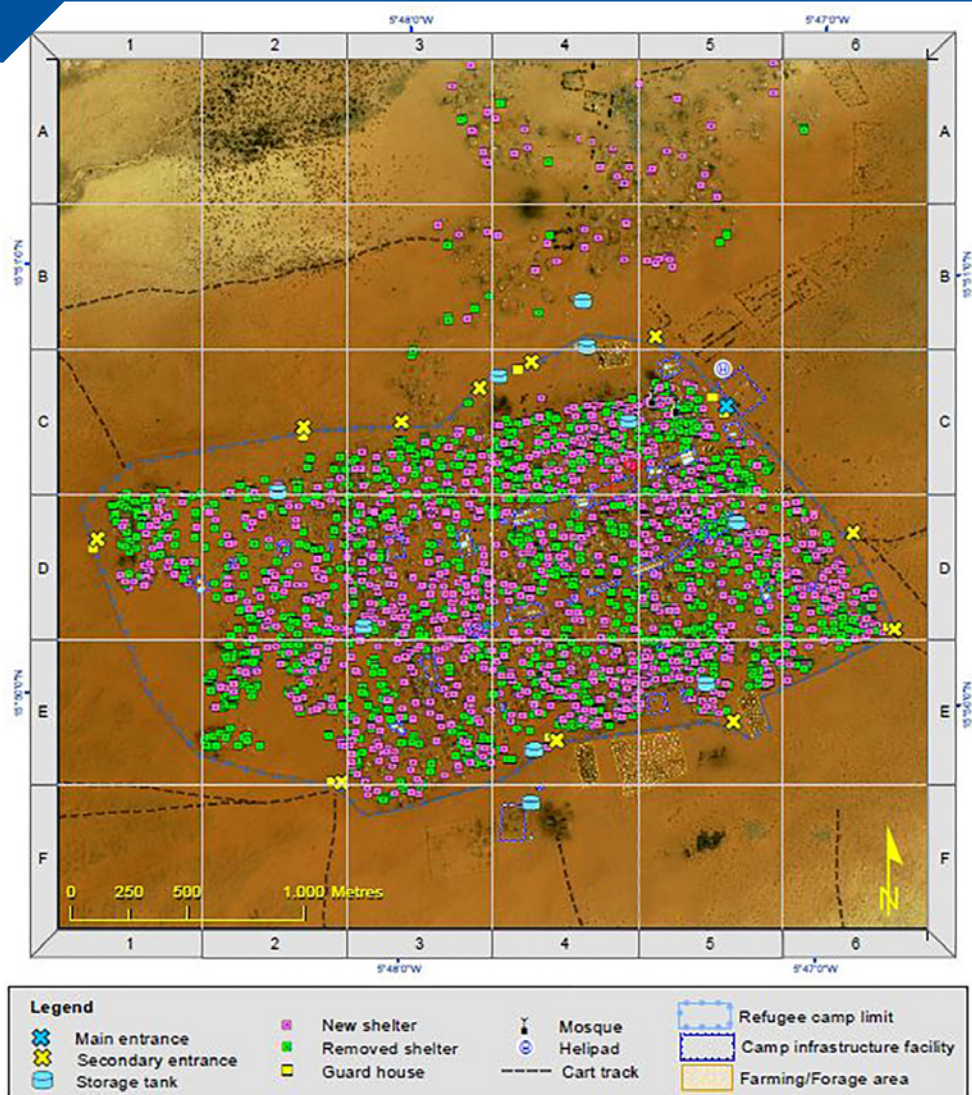
Service availability

The service is delivered in accordance with the provisionally agreed planning between the requesting authorities and Frontex. Any MAS asset is deployed at a specific base airport for a defined period of time, performing flight missions usually on daily basis, following a schedule agreed between the EMT and the requestor. In case of standby, the readiness of the service is 2 hours for requests received from 08:00 to 20:00, and 4 hours for requests received from 20:00 to 08:00. In case of relocation, the new base airport will be reached within 6 calendar days, in order to prepare and implement all the logistics and operational requirements.

Service delivery channels

Dedicated graphical user interface visualizing data streaming coming from encrypted communication channel.

The image displays the overall situation of a refugee camp. Change detection (number of tents in dynamic) is based on imagery acquired during two different days, almost one year distance in between. The total number of shelters has slightly reduced. There is activity inside the camp with internal relocation of tents. Activity is detected north of the refugee camp with new shelters being installed or removed.



General information

ID	S15
Name of the service	Large Area Pre-Frontier Monitoring
Classification	Limited

Service Description and Purpose

The purpose of the Large Area Pre-Frontier Monitoring service is to supply the National Co-ordination Centres (NCC) and Frontex with surveillance information about specific large areas on a regular, reliable and cost-efficient basis. This service delivers a combination of coastal/pre-frontier monitoring with reference mapping capabilities over large areas (above 500 sq. km) that were identified through risk analysis as key migratory or cross-border crime areas.

In order to support the strategic and operational assessment of illegal migration and cross-border crime related activities, the assessment is based on three main imagery analysis techniques: intelligence validation, change detection and change analysis.

Due to the fact that this Service is a combination of Reference Mapping capabilities supported by a Briefing Note and Pre-Frontier Monitoring Services, the deliverables vary depending on the phase of the service:

Reference Mapping activity:

- Geodatabase of annotated features
- Compressed imagery in JPEG 2000 format
- Report in PDF or MapBook (optional)

Objects of relevance:

- Hydrography
- Topography
- Infrastructure, with an emphasis on the following types:
 - Transportation;
 - Communications;
 - Governance;
- Population activities
- Land cover

Vectors will be delivered at the scales of at least:

1:5.000

- Population Activities

1:25.000

- Transportation Network
- Land Cover
- Hydrography
- Physiography

The Large Area Pre-frontier Monitoring service is to be delivered to the requestor following the completion of the entire package (Briefing Note, imagery and vectors).

Key attributes and requirements for the Large Area Pre-frontier Monitoring service

Target (size)	Area of Interest	Planning lead time	Delay after capture of image/data	Update period	Hours of the day	Surveillance tools
Infrastructure, roads, tracks, demarcations, human activity	above 500 sq.m	2 weeks	4–8 weeks	Yearly (on demand)	irrelevant	VHR optical VHR SAR
Possible follow-up with S11 & S12	10 km × 10 km	1 week	QuickRep: 3 hrs FIR: 6 hrs BN: 24 hrs (on demand)	1–14 days	irrelevant	VHR optical VHR SAR

Service delivery channels

- Imagery and vectors
 - JORA Visualisation Module
 - ECN application
- e-mail (limited BNs)

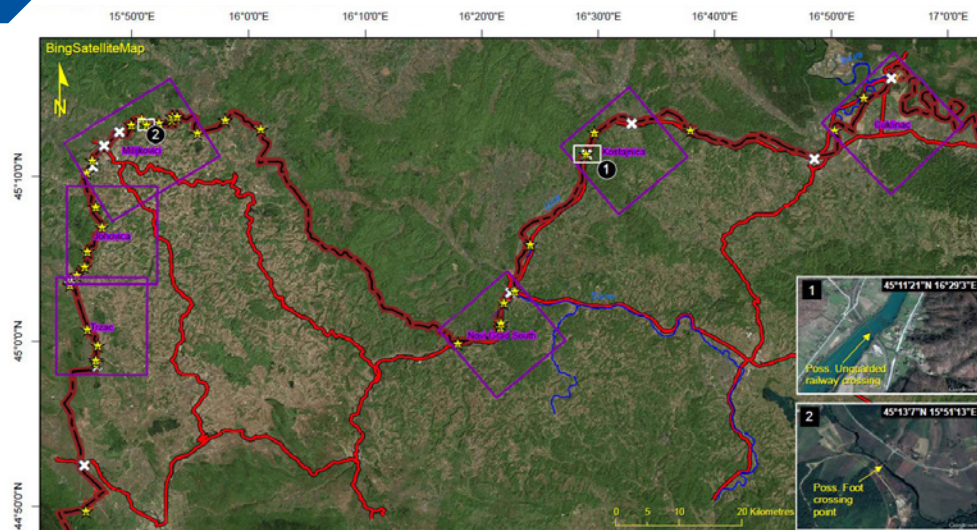
Service availability

Availability mode On request

Training

Trainings are provided on regular basis, as well as upon request.

The image displays the map composition of the analysed border segment. The area was assessed for Border Crossing Points (BCPs) and locations where illegal crossings could possibly take place. The analysis was conducted using Open Source (OS) imagery and then cross referenced using Digital Globe's Secure Watch service. Six areas larger than 100 km sq. were selected in areas with a higher likelihood of illegal crossings taking place.



General information

ID	S16
Name of the service	Prodetect Service
Classification	Limited

Service Description and Purpose

This service consists in detection of locations and activities of interest over key migratory or cross-border crime areas, taking into consideration identified indicators and patterns. The monitored areas are identified through risk analysis to support the operational assessment of illegal migration and cross-border crime related activities. The assessment is carried out based on four main imagery analysis techniques: correlation analysis for specific indicators of interest, intelligence validation, change detection and change analysis.

This service, by definition, requires as a follow-up the launch of Pre-frontier or Coastal Monitoring services over the locations or areas of interest identified. Additionally, other EFS services can be activated, such as Multipurpose Aerial Surveillance service or vessel monitoring and tracking in case a High Risk Vessel of interest is identified.

Requestors of the service initially receive a ProDetect Assessment Report where main Points of Interest and Locations of Interest are identified and assessed regarding the patterns and indicators given. A ProDetect Assessment Report (DAR) has similar cataloguing as the First Impression Report (FIR). If a follow-up of the service is requested, after subsequent validation by the Service Managers, Coastal and/or Pre-frontier Monitoring services will be delivered over the Locations of Interest (LOI). Thus, following each imagery acquisition, a First Impression Reports (FIRs), the associated compressed imagery and vectorised objects of interest and key infrastructure are delivered. Requestors can also request a Briefing Note (BN) summarizing and analysing the intelligence obtained after a series of FIRs.

- A First Impression Report is a fast analytical product (2–4 pages pdf document), including analysis and description of the requested LOI (exceptionally over an AOI) supported with descriptive text, collateral information and basic vector information. These products are delivered usually 5–6 hours after the reception of the image. The purpose of the product is punctual analysis, monitoring of activity and change detection analysis of the specific LOI's (10×10 Km max.).

- A Briefing Note is an analytical document over a Location (LOI) or Area of Interest (AOI) containing descriptive text, collateral information, vector information, sources and several images, describing not only the objects of interest but also the “environment” where this is located. The content is detailed information on the situation observed on images. The purpose of the product is punctual analysis, monitoring of activity and change detection analysis of the specific LOI's (10×10 Km max.).
- The imagery is provided together with both the FIRs and BNs.

The ProDetect service is to be delivered to the requestor following the completion of the entire package (report, imagery and vectors).

Key attributes and requirements for the ProDetect service

Target (size)	Area of Interest	Planning lead time	Delay after capture of image/data	Update period	Hours of the day	Surveillance tools
Detection of activities: Human activity, transportation means, infrastructure, patterns	100×10 km	2 weeks	1 weeks	1 months	irrelevant	VHR optical VHR SAR
Follow-up with S11 & S12	10×10 km	1 week	QuickRep: 3 hrs FIR: 6 hrs BN: 24 hrs (on demand)	1–14 days	irrelevant	VHR optical VHR SAR

Service delivery channels

- Imagery and vectors
 - JORA Visualisation Module
 - ECN application
- e-mail (limited FIRs or BNs)

Service availability

Availability mode	On request
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Training

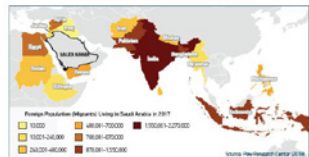
Trainings are provided on regular basis, as well as upon request.



Overall, Covid-19 restrictions will have an impact on the overall number of migrant workers in Saudi Arabia, but are unlikely to have an effect on those who are already in the country seeking to fill the employment gaps. This could result in greater challenges for migrant workers entering Saudi Arabia due to having to enter the country and work legally by taking them more vulnerable to human rights violations. See Appendix 6 for an expanded description of Saudi Arabian 'subsistence' reform efforts.

Routes and Vulnerabilities

Human smuggling routes into Saudi Arabia largely consist of two methods of entry. The first is through smuggling networks utilizing legal means via the Hajj system, which regularly include the largest concentration of migrant workers entering Saudi Arabia. These smuggling networks exposed to most of the high concentration migrant worker origin countries, including those from South and Southeast Asia. Migrants arriving from South and Southeast Asia are often traveling through Iran and Pakistan. They are then escorted by recruiting agencies in Pakistan. In many instances, the smuggled worker is forced to pay back the agency costs first, sometimes leading to a prison stay.¹⁶



East African migrants are often faced with a much more difficult journey resulting in Saudi Arabia. Ethiopians, who make up the largest concentration of East Africans being smuggled into Saudi Arabia, go through extreme hardships. This involves a long and arduous journey through the Red Sea region of western Djibouti and then travel across the northern coast of the Gulf of Aden to the coast of Yemen. Once in Yemen, they are often smuggled across the Red Sea to the coast of Saudi Arabia. From there, a new network of traffickers takes over and move them across the Red Sea to the coast of Saudi Arabia into western Yemen.¹⁷

Once in Yemen, trafficked migrants must navigate north through an unforgiving and hostile region of Yemen that has been subjected to war, disease and famine for nearly a decade. Moreover, the most common route through Yemenian territory traveling along the Red Sea coast through Hodeida to the Saudi Arabia border, however, increasingly has been closed since the Houthis took control of the port in 2015. This has led to the development of other routes, but these routes are also subject to significant risks. The impact of the following page reports these routes with an overlay of statistically significant conflict hot spots in Saudi Arabia.



Geospatial and Qualitative Analysis of Migration: Trends, Factors, and Solutions

General information

ID	S17
Name of the service	Multi-source Migration Analytical Assessment
Classification	Limited

Service Description and Purpose

This service provides a socio-economic baseline and initial analysis of a specific area, activity and/or an organized criminal group associated with irregular migration or cross-border crime activities.

It is based on multiple sources such as imagery intelligence (IMINT), geospatial intelligence (GEOINT), open source intelligence (OSINT), human intelligence (HUMINT), and social networks analysis (SOCMINT), cutting edge predictive tools and capabilities, as well as earth observation analysis methodologies.

The service uses state of the art tools and capabilities, such as Earth Observation analysis capabilities, Social Networks Analysis and Text mining - based on main languages (regional sources) related to the topic.

Due to the specific characteristics of these strategic analytical reports only those requests associated with significant and high-level strategic analytical activities are taken into consideration.

The valuable information contained in the final report is feasible to serve as the base to request other services like Pre-frontier Monitoring, Coastal Monitoring, Large Area Pre-frontier Monitoring etc.

Key attributes and requirements for the Migration Analytical Assessment

Target	Area of Interest	Planning lead time	Delay after capture of image/data	Update period	Hours of the day	Surveillance tools
Socio-economic indicators, organized crime, existing and emerging illegal migration	Ad hoc	2 weeks	Final Draft: 60 days Peer review: 10 days Total time: 80 days	irrelevant	irrelevant	VHR optical VHR SAR

Service delivery channels

- Imagery and vectors
 - JORA Visualisation Module
 - ECN application
- e-mail

Service availability

Availability mode	On request
-------------------	------------

Training

Trainings are provided on regular basis, as well as upon request.

5. Ordering procedure

The Service Desk (efs@frontex.europa.eu) is the single point of contact for receiving service requests, requests for changes, reporting bugs and IT incidents (malfunction). The Service Desk operator is the first line of contact. They register service requests and redirect them to competent Service Managers for further handling, or in case a bug or IT incident is reported – troubleshoot or restore failed services as quickly as possible while keeping users informed about their requests at agreed intervals. They may also be approached in case of questions or for assistance in filling in the Service Request Form properly.

The Service Desk is operational 9:00–17:00 CET during working days (excluding weekends and Frontex holidays) and can be contacted via email: efs@frontex.europa.eu

6. Technical prerequisites

In order to access the services described in this catalogue, the users need to have internet access. The specific interface prerequisites are:

1. JORA

- Minimum requirements:
 - Windows XP (or higher), and Internet Explorer 7 (or higher) installed;
 - Microsoft Silverlight installed (minimum version: 5.0);
 - Minimum suggested internet speed for JORA Dashboard: 2–4 Mbps
- The HTTPS protocol will be the only one used to access the application.
- The system supports the following internet browsers: Internet Explorer 7.0 and higher (9.0 is recommended), Firefox 3.5 and Google Chrome 4.0.
- Default settings for browser:
 - Java Script should be turned on
 - SSL and TLS should be turned on
- Internet Explorer: browser should be set to a standard mode (not to compatibility mode).

2. ECN application

- According to Eurosur network specifications.

7. Glossary

AIS	Automatic Identification System
AOI	Area of Interest
BCP	Border Crossing Point
BCU	Border Crossing Unit
BN	Briefing Note
CPIP	Common Pre-Frontier Intelligence Picture
DAR	Prodetect Assessment Report
DGI	Digital Geospatial Information
ECN	Eurosur Communication Network
ECWMF	Centre for Medium Range Weather Forecasts
EMR	European Monitoring Room
EMT	European Monitoring Team
ESP	European Situational Picture
EU	European Union
FIR	First Impression Report
FOSS	Frontex One-Stop-Shop
FSC	Frontex Situation Centre
Frontex	European Border and Coast Guard Agency
GEOINT	Geospatial Intelligence
HUMINT	Human Intelligence
ICC	International Coordination Centre
IMINT	Imagery Intelligence
JO	Joint Operation
JORA	Joint Operations Reporting Application
JVM	JORA Visualisation Module
LCC	Local Coordination Centre
LOI	Location of Interest
LRIT	Long Range Identification and Tracking
MAS	Multipurpose Aerial Surveillance
NCC	National Coordination Centre
NFPOC	National Frontex Point of Contact
OOI	Object of Interest
OSINT	Open Source Intelligence
RAU	Risk Analysis Unit
RPAS	Remotely Piloted Aircraft System
SAR	Synthetic Aperture Radar
SATAIS	Satellite Automatic Identification System
TAIS	Terrestrial Automatic Identification System
VHR	Very High Resolution
VMS	Vessel Monitoring System



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