

**Annex II.1 to the Invitation to Tender  
Ref. Frontex/OP/433/2020/AH**

## **Terms of Reference**

**Lot 1: Entry Exit System Land Border Pilot in  
Bulgaria**

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## 1. Background and context

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The European Commission has proposed the establishment of an Entry-Exit System (EES)<sup>1</sup> to collect the identity and biometrics (alphanumeric, face, 4 fingerprints) of non-EU nationals, visa-required and visa-exempt travellers, crossing the borders of the Schengen area. The EES data will be used by the competent Member State authorities to provide border guards with precise information in a rapid and automated way while conducting border checks of non-EU nationals. This information shall account for, among others, the length of their authorized stay, information on who is overstaying, and evidence-based support to visa policy.

### 1.1. The Problem

The implementation of EES will influence the flow of passengers and the technology deployed at the border to collect the required data. This effect would most likely be more important in the EU land border crossings, which are a less controllable environment as compared with airports. Another additional difficulty of land border crossing is that many travellers arrive there inside vehicles. These reasons bring us to expect that the introduction of EES will have an important impact on the flow of passengers at land border crossing points.

The innovation pursued by the pilot defined in this document consist of assessing EES impact in selected border crossing situations. The need for these situations to be piloted derives from the fact that the EES is not yet in place and that its impact on the crossing processes in busy land border is still unknown.

### 1.2. Bulgaria land border pilot

Frontex has selected one specific case to assess EES impact, the processing of third country (adult) nationals in the EES while crossing the EU land border travelling by bus. To carry out this assessment, Frontex requests industry support for the project described in this document. This pilot will be hosted and supported by the Bulgarian border police with the assistance of other relevant Bulgarian national stakeholders (i.e. customs, interior ministry) and Frontex represented by the Research and Innovation Unit.

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<sup>1</sup> Regulation (EU) 2017/2226, 30Nov17, establishing an Entry Exit System.

## 2. Objectives

Frontex intends to purchase technical support to develop, install, operate and dismantle deployable stand-alone border control systems, capable to collect travellers' data relevant for EES, operating for a fixed time at EU land border crossing points. The systems deployed shall interface with the Host country national border control system. The coupling of both systems shall be a joint effort undertaken by the Contractor and the corresponding national Host authorities.

Lessons learnt in this Pilot, in terms of passenger flow management and technical solution developed, would be shared by Frontex with other Member States. If successful, the technical solution could be used to define a stand-alone border crossing check and EES registration 'core-system', which could be interfaced with other Member States' border check systems.

### 2.1. General Description

The Pilot will be developed in two phases, the first phase to be executed after the contract signature; second phase will be executed conditional to Frontex' positive assessment of the first phase results and subject to Frontex' explicit written request to proceed.

The technology to be developed in the pilot consist of the design of a 'core deployable border control and EES system' (thereafter 'core-system'); its manufacture, testing, deployment, user training, interfacing with Host country system, supporting operationalization for a fixed time period, as well as dismantling and disposing of the system after the duration of the Pilot as described below.

The core-system shall support the border crossing and EES registration (based on travel document; face and 4 finger prints) of Third Country nationals using a combination of self-enrolment kiosks and biometric gates. The secure linkage (closed connection) and communication with the national border control systems, performing border checks on all travellers and EES registration/verification on third country nationals, would be done jointly by the Contractor and the Host MS.

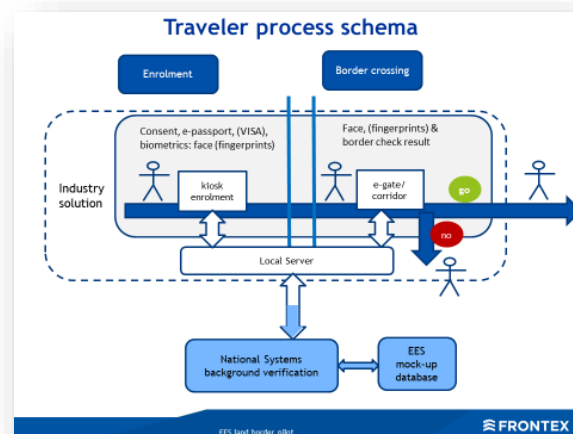


Figure 1 Traveller registration interactions with core-system

Figure 1 presents a 'notional view' of the solution set up to be tested in the pilot. This scheme shows the two steps of the solution: registration and border crossing of TCNs, the kiosk and e-gate interface with a local server and this local server interfacing with the Host Member State border control systems. The national system will also interact with a mock-up of an Entry, Exit System database.

## 2.2. Core-system description

The core-system shall consist of a set of FOUR self-registration kiosks and TWO automatic border crossing e-gates. Kiosks shall read and verify e-travel documents, scan and register 4 fingerprints; e-gates shall read e-travel documents and scan and verify one fingerprint. Kiosks and gates shall be connected via a local server and local database managing the registration and flow of passengers. Data stored in the local database would only be retained for the duration of the processes necessary to finalize the border crossing and the interfacing with national and mock-up EES databases. In addition, 4 handheld devices shall support the core-system operation: one for mobile registration/ for verification; one for border control supervision; one for kiosks registrations supervision and one for corridor/e-gate supervision.

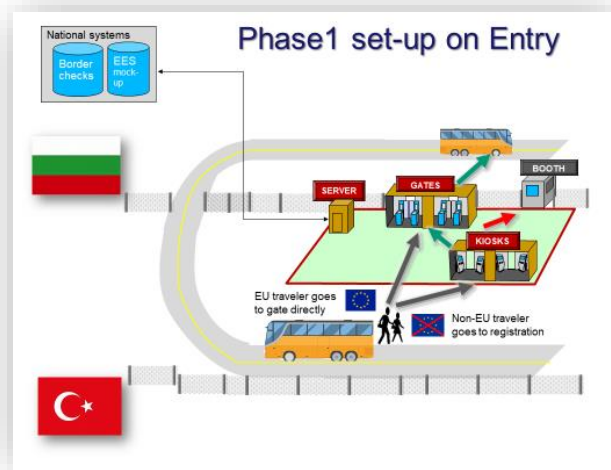


Figure 2 Notional view of the core-system set-up

The local server shall be connected, via Web services, with the relevant national border control systems. Figure 2 represents a notional view of the core-system deployment: kiosks, gates, local server, and the manned booth to deal with exceptions (e.g. minors accompanied by adults).



Figure 3 Pilot phases: Entry from Turkey (phase 1) and Exit to Serbia (phase 2)

Figure 3 provides a notional view of the connection between the two pilot phases. The optional Phase 2 of the pilot would consist of the setting-up of a core-system on Exit, in the BCP Kalotina, in the border of Bulgaria with

Serbia. A number of bus lines enter Bulgaria via BCP Kapitan Andreevo and cross the country directly to Serbia. The registration<sup>2</sup> of Third Country Nationals on the EES for both Entry and Exit in the same day will provide plenty of opportunities to test the system.

### 2.3. Use cases applicable for both ENTRY or EXIT

#### a. NOT registered Third Country citizen

- Traveller actions at the registration kiosk
  - Select language
  - Accept disclaimer
  - Present e-Passport for kiosk reading
  - Present VISA if asked by the kiosk
  - Let facial image to be taken
  - Register fingerprints
  - Reply to a questionnaire presented on screen
  - Move to gate or to manual check as directed by the kiosk
- [Vehicle drivers may be registered using the mobile registration/verification tablet \[operated by Host country\]](#)
- Core-system actions step 1
  - Read and check passport validity
  - Confirm traveller facial image matches with passport picture
  - Read and check VISA if required by the traveller's nationality
  - Ask for four fingerprint registration (the traveller is not yet in the EES)
  - Send traveller information to the registration supervision tablet
  - Send traveller information to local database and to national border control system
  - [Perform all legal border checks and EES control \[by Host country\]](#)
  - [Register traveller in the mock-up EES database \[by Host country\]](#)
  - Fetch national border checks and EES results
  - Send biometrics to the gates
  - Send border checks results to border control tablet
- Traveller actions at the gate
  - Proceeds to the gate
  - let facial image to be taken
  - let fingerprint to be read when asked by the system
- Core-system actions step 2
  - Confirms traveller face match with kiosk facial image
  - Confirms traveller fingerprint match with kiosk fingerprint
  - If there is a positive ID match and no 'hits', opens gate
  - Send traveller information to national border control system confirming the crossing
  - [Register traveller crossing in the EES mock-up database \[by Host country\]](#)

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<sup>2</sup>The registration described in this point and elsewhere in the document refers to registration of travellers' data in the mock-up EES database for the duration of this Pilot project. This registration follows and allows the application of the processes described in the Regulation (EU) 2017/2226 of 30 November 2017 establishing the Entry/Exit system.

- Additional inspection of traveller documents and status [performed by Host country]

**b. ALREADY registered (in the Pilot) Third Country citizen**

- No kiosk action required by the traveller
- Traveller actions at the gate
  - Proceeds to the gate
  - Present e-Passport for gate reading
  - let facial image to be taken
  - Present fingerprint when asked by the system
- Vehicle drivers may be verified using the mobile registration/ verification tablet [operated by Host country]
- System actions step 1
  - Read and check passport validity
  - Confirm traveller face matches with document picture
  - Send traveller information to national border check system
  - Perform all legal border checks and EES control [by Host country]
  - Check traveller VISA status and confirm validity [by Host country]
  - Confirm traveller biometrics match with mock-up EES database biometrics [by Host country]
  - If traveller is not registered in EES, direct traveller to registration kiosk
  - Fetch national border checks and EES results and send them to the border control tablet
- System actions step 2
  - If there is a positive ID match and no 'hits', gate opens
  - Send traveller information to national border check system confirming the crossing
  - Register traveller crossing in the in the mock-up EES database [by Host country]
- Additional inspection of traveller documents and status [performed by Host country]

**c. EU citizen: e-passport or EU e-national ID holder**

- No kiosk action required by this traveller
- Traveller actions at the gate
  - Proceeds to the gate
  - Presents e-passport or e-national ID
  - Lets facial image to be taken
- Vehicle drivers may be verified using the mobile registration/verification tablet
- System actions step 1
  - Read and check passport/ID validity
  - If passport/ID is not EU, direct traveller to registration kiosk
  - If passport/ID is not an electronic document, directs traveller to manual check
  - Confirm traveller face matches with document picture

- Send traveller information to national border check system
  - Perform all legal border checks [Host country]
  - Fetch border check results and send them to the gate and to the border control tablet
- System actions step 2
  - If there is a positive ID match and no ‘hits’, gate opens
  - Send traveller information to national border check system confirming the crossing

**d. Exceptions management**

- Traveller fails to complete registration at the kiosk
  - Kiosk instructs traveller to move to the manual check
- Traveller document not authenticated or identity is not verified by the gate
  - gate instructs traveller to move to the manual check
- Traveller identity has a hit in the national, European border control systems
  - Border control officer managing border control tablet directs traveller to manual check



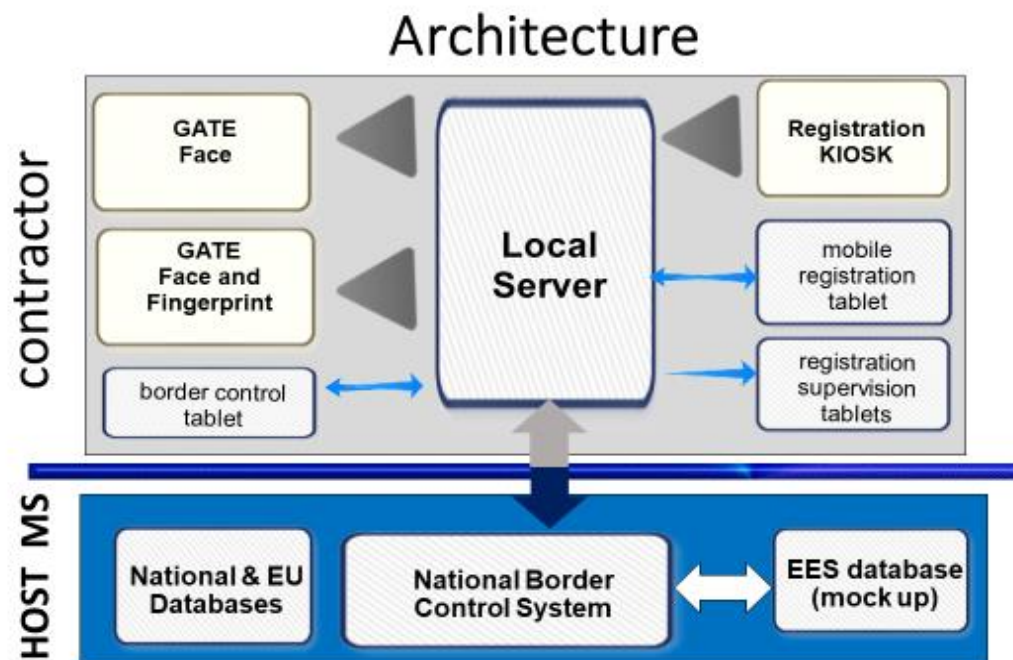
### 3. Requirements

#### 3.1. Architecture

##### a. Design

The core-system shall be a stand-alone set of hardware and software capable of interacting with the travellers crossing the border and, simultaneously, with the national border control IT systems using Web services.

Figure 4 Notional view of core-system set-up



The core-system Web services is a fundamental element of this Pilot. This Web service should follow SOAP protocol. It will allow for the border control authorities to use traveller information to carry out all mandatory border control checks, relevant part of the information for Third Country (TC) travellers will be included in a mock-up EES database. This database will be developed and managed by the Member State.

The Web services development shall be a joint effort between the Contractor and the Host Member State, to be started at the kick-off meeting.

##### b. Volume of exchanges between core-system and Host MS border control system

VOLUME OF EXCHANGES	
Number of users involved	~100, 000 per month
Volume of Data	~ 500 Kbits record size
Number of requests per minute	~20
Maximum response time	Query - 100 ms Reply - 1 sec

### 3.2. Applicable standards

#### a. document reading applicable standards

DOCUMENT SCAN	
MRZ reading	ISO/ IEC 7505; ISO IEC 18013; BSI TR-03135-p2; ICAO 9303; or equivalent
RFID-chip reading	ISO/IEC 14443-2 (A and B); ISO/IEC 14443-3 (MIFARE® Classic Protocol); ISO/IEC 14443-4; or equivalent
EU Member States National IDs	Where available and accepted, meeting applicable national standards.

#### b. facial image applicable standards

FACIAL IMAGE	
ENROLMENT	ISO/ IEC 19794-5 ; BSI TR-03121 -3.1 ; or equivalent
STORAGE	ANSI/NIST-ITL 1-2011 (or newer)

#### c. fingerprint applicable standards

FINGERPRINT	
ENROLMENT	ISO/ IEC 19794-2 ; BSI TR-03121-p3; or equivalent
VERIFICATION	Version 2.0 (or newer) of the NIST Fingerprint Image Quality (NFIQ)
STORAGE	ANSI/NIST-ITL 1-2011 (or newer)

### 3.3. Functional

#### a. Registration kiosks tasks

- Enrol authorized Third Country travellers for EES registration
- Read Third Country national e-travel documents (including VISA when required)
- Confirm eligibility of the traveller to be registered (age, nationality, etc.)
- Perform optical and electronic checks to assess authenticity and validity of the travel document
- Capture traveller biometrics (face and 4 fingerprints)
- Conduct biometric verification of traveller identity match with document facial image
- Exchange traveller alphanumeric data and biometrics (face and 4 fingerprints) with the national border control system
- share traveller data with the gates and registration supervision tablet
- Quality thresholds for successful verification as well as processes timeouts shall be adjustable

#### b. Local server tasks

- Interface with kiosks, gates, and national border control system
- Exchange traveller registration data with the national border control system using Web services
- fetch border checks results, and EES control results when required from the national border control system
- Maintain a local database with enrolled travellers information (for the duration of passengers' processing)
- Send decisions based on the border checks and EES results to the gates and the border control tablet
- Quality thresholds for successful verification as well as processes timeouts shall be adjustable

c. Verification Gate tasks for EU and registered Third country citizens

- Read travel document and assess traveller category: either registered Third country, or EU citizen
- For Third country citizen, confirm travel document validity, registration in the EES database, and confirm person identity based on both facial image and one fingerprint
- For EU citizen confirm travel document validity and traveller identity using facial image in document
- Exchange traveller data with the national border control system using Web services
- Fetch border checks results, and EES control results when required. Send decisions to border control tablet
- Positive identification and no 'hits' from checks or EES opens the gate
- No positive identification or 'hit' in checks or EES, redirects traveller to manual border control

d. Data management

- As part of the self-registration process at the kiosk, travellers will be asked to agree on the use of their personal data for the purpose of the Pilot, if rejected they would be directed to manual check
- Retention of traveller's data in the local data base shall be limited to the duration of the processes necessary for crossing the border and interfacing of the hardware with the national/mock-up EES systems.
- Fully anonymized statistics on traveller interactions with the kiosk and the gate shall be collected
- All server transactions with the kiosk, gate, tablets, and national system shall be logged and timestamped - (NATIONAL SYSTEMS to store)

e. Data Protection

- Data shall be stored on the local server/database no longer than necessary - that is for the duration of the processes required for travellers to cross the border and the systems to interface allowing gates to open.
- Personal data shall not be stored in nor transferred outside EU/EEA and it shall not be stored in nor transferred to a cloud service (including any personal data processed as part of fault management / troubleshooting / technical support)
- Personal data management documentation (including description of categories of data collected and processed as part of fault management / troubleshooting / technical support) and detailed description of security measures and communication channels shall be provided to Frontex as part of the tendering procedure
- The contractor (technology / software provider) shall not have access to the personal data of travellers while it is stored in the local database or passes via the local server. The data of travellers shall only be transferred to the relevant national authorities via a securely established Web service connection.
- Information received from national systems shall not to be stored locally after the implementation of the action.

### 3.4. Non-Functional

a. Languages

- kiosk and gate interfaces shall offer at least the following language options to the traveller: Bulgarian, English, Turkish, Serbian

b. User experience

- reaction time for any traveller/kiosk or traveller/gate interaction shall be under 5 seconds
- 90 percent of all registrations in the kiosk shall be completed in under one minute
- each traveller interaction with both kiosk or gate shall be re-tried up to three times before interrupting the process and sending the traveller to manual check
- both gate and kiosk shall provide feedback to the traveller during any delayed or repeated interaction
- feedback to the traveller in the reading of his/her fingerprints shall be provided finger by finger

c. Availability

- the core-system shall be in operation for not less than 95 percent of the pilot operation time

- any disruption on the correct functioning of a core-system element shall be solved in 24 hours, by either repairing or replacing the non-functioning element
- Contractor's technical support shall be made available in the deployment sites, during the day from 08:00 to 17:00 every day of the week. Outside this time period technical support shall be provided within 4 hours.

d. Scalability

- The 'core-system' shall be able to manage the concurrent deployment of at least two additional core-systems kiosks or gate sets in the same location to scale up the system capabilities
- Scaling up will require from the Host the provision of additional electric power, physical security, and extra broadband connection to the Web (wireless or cabled)

e. Security

- Both kiosks and e-gates shall be able to recognize and block common presentation attacks
- The contractor shall use software development practices and quality control mechanisms ensuring that the resulting solution is free of anomalies and known vulnerabilities
- The core-system shall be able to encrypt all the communications, between its elements and those with the national system, and also to encrypt all the data at rest in the local server and local database
- Encryption of the communication shall use TLS 1.2.

f. Documentation

- The core-system shall be fully documented, with the documentation covering:
  - Architecture design, including the rationales for choices
  - Data flows
  - Installation procedure
  - Administration and troubleshooting
  - API to be used by the national system (to be jointly agreed between Contractor and Host)

g. Dismantling and disposal of equipment

- Any fully anonymized statistical data should be extracted from the equipment after completion of the Pilot project and immediately deleted from the hardware.
- The Contractor is responsible for the safe dismantling and removal/disposal of the hardware one month after the completion of the Pilot at the latest.
- Any further possible cooperation between the Contractor and Member State shall be done separately from this Pilot Project's framework.

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## 4. Work plan and methodology

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### 4.1. First phase

#### a. Timelines of the milestones

- A “live demonstration” test of the core-system solution shall be organized by the Contractor on the Contractor’s premises within two months after contract signature;
- Frontex must confirm the readiness of the presented solution (live demonstration results) as successful prior to the deployment at the BCP;
- Deployment activities of the core system in the BCP will be completed within one month of the acceptance (as above);
- After a successful “acceptance test” is completed at the deployment site, the Pilot of three months shall commence;
- Unless the execution of the second phase is requested, the Contractor shall dismantle the equipment within one month maximum.

#### b. Activities

- Activities in this phase comprise the design, manufacture, testing, deployment, users training, and support to a first core-system operation for a period of 3 months, counted after acceptance test after deployment;
- Components of the core-system-BG (4 kiosks, 2 gates, server, local database, 4 handheld devices, and the software and secure communication, between the components and the national border control system, to make the system work) to be installed in the BCP, either on a space provided by the Host country or inside conditioned containers provided by Frontex;
- The contractor shall work in cooperation with the Host MS authorities to ensure a secure, efficient communication between the core-system and the national border control systems, including a mock-up EES database, or the real EES database, when appropriate.

#### c. Deliverables

- ‘Project plan’ including a detailed schedule and work breakdown structure presented to Frontex at the kick-off meeting;
- ‘Live demonstration’ of the combination kiosk/ gate working in the contractor premises requiring Frontex acceptance that the solution to be implemented by the contractor is in accordance with the awarded technical offer. One week before starting the first core-system deployment;
- ‘Acceptance test’ at the deployment site, proving that the solution already deployed is in accordance with the awarded technical offer;
- Training of the operational and technical staff of the Host member state on the operation of the ‘core-system’;
- The ‘core-system’ operation support and maintenance along the first phase timeline;
- Statistics and reports.
- A first ‘core-system’ deployed and functional for ENTRY in BCP Kapitan Andreevo.

### 4.2. Second phase (Optional)

#### a. Timelines

- The Second Phase would start on Frontex' written request after a positive assessment of previous phase results (as soon as results can be assessed). Indicatively within maximum one month of the completion of the first phase;
- The Contractor shall have one month to deploy the solution as required for the second phase;

**b. Activities**

- Activities in this phase comprise the manufacture, testing, deployment, user training, and support to a second core-system operation for a period of 3 months;
- Components of the core-system (of 4 kiosks, 2 gates, a local server, local database, 4 handheld devices, software and communications between these elements and the local server as well as between the server and the national border control system)
- Core-system to be installed in the designated BCP, either on a space provided by the Host country or inside conditioned containers provided by Frontex.
- The deployment site shall be BCP Kalotina for piloting EXIT from Bulgarian territory.

**c. Deliverables**

- The two 'core-system' operation support and maintenance along the second phase timeline;
- New batch of Member State staff trained on the operation of the 'core-system';
- Statistics and reports
- A second 'core-system-BG' deployed and functional for EXIT in BCP Kalotina.

### 4.3. Pilot schedule

Time schedule for the pilot activities:

**a. Contract signature ( $T_0$ )**

- Intended to take place in Quarter 4 of 2020

**b. Kick - Off Meeting & Field visit to BCPs**

- $T_0 + 2$  weeks, the Contractor, Frontex and the Bulgarian authorities will jointly decide specific details of the service to be provided, discuss the Project Plan presented by the Contractor, and will visit both BCPs to assess options for the planned deployments.

**c. Live demonstration test in contractor premises**

- $T_0 + 2.5$  months. Assessment of one set kiosk/ gate

**d. The Pilot Phase One**

- Starts after 'acceptance test' on deployment site, ideally, at  $T_0 + 3$  months, duration 3 months

**e. Optional Phase Two**

- Subject to Frontex' request, shall start no later than  $T_0 + 6$  months and have a duration of 3 months

### 4.4. Venue

Services contracted under this tender procedure shall be provided in two Bulgaria external border crossing points: BCP Kapitan Andreevo and BCP Kalotina.

### 4.5. Working environment and conditions

The deployment of the solution locations are under the control of the national Host authorities, all necessary works and installations for the 'core-system' deployment need to be agreed with the Host.

The Contractor is responsible for the logistics including but not limited to: addressing customs and potential import issues, obtaining the necessary clearances. Frontex will put the Contractor in contact with a designated Frontex and Host National Point of Contact (PoCs) responsible for the Pilot activities in the field.

The Host will provide physical space for the equipment deployment, reliable, continuous supply of electricity, and broadband network connectivity, both wired and wireless, to support continuous 'core-system' operation.

Contractor and Host MS shall work together on the definition of core-system access to the national border control system defining and agreeing the set of services to be called and the formats to be used in the interaction between both systems.

#### 4.6. Expert's team

Fundamental to the achievement of the contract purpose is the Contractor's knowledge in the domain of capturing, processing, analysis of biometric data and associated technologies. The tenderer is requested to detail the roles and responsibilities of each member of the proposed team. The tenderer will also indicate how the proposed team is qualified and consistent to carry out the given project to ensure the availability of technical and functional skills during the project lifetime.

##### a. Expertise required

The tenderer must provide a team of experts possessing, as a group, the following set of expertise, competence and technical skills:

- Project management
- Experience in biometric capture and use in border control (i.e. facial image capture, fingerprint capture)
- Experience in Machine Readable Travel documents use in border control (i.e. e-passports, national e-IDs)
- Automatic border control hardware (i.e. kiosks, gates)
- IT and secure communication proficiency.

##### b. Expertise evidence

Evidence of team capacity must be provided by the submission of CVs of its members. The CVs shall include information on the projects in which each team member has taken part during the last 3 years, and their specific role on each of these projects. The following minimum skills shall be drawn from the team member CVs:

Project manager shall have at least 5 years' experience on actual project management addressing topics aligned with the subject matter of this tender:

- The PM shall be proficient in the use of project management tools, risk management, stakeholder's management, communication, and resources management.

Minimum 3 technicians in the team will have demonstrable experience in system integration (hardware and software) enabling the use of biometrics for border control. As a minimum, these technicians shall have participated on 2 similar projects to the subject of this tender, carried out during the last 3 years:

- The staff proposed shall have demonstrable expertise on systems to capture and exploit facial images and fingerprints. Be proficient in the use of tools for the verification and validation of Machine Readable Travel documents. Have experience in the deployment and exploitation of automatic border crossing equipment and on secure communications.

## 4.7. Reporting and Meetings

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

Typical statistics to be registered by the contractor shall include but not be limited to: collection of facial image quality, fingerprints quality, number of tries of biometric enrolments needed until success, number of not completed enrolments, registration time spent, time between kiosk and e-Gate, FPR (false positive rate) and FNR (false negative rate) both in Kiosk and e-Gates, facial image and fingerprint thresholds used.

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

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

- One Kick-Off meeting (to be held in the Host Member State)
- Field visits to the deployment BCP(s) to ensure that the configuration and location of the 'core-system' to be deployed fits in the available space, allow for travellers queuing and for border control officers' supervision (to be held in the Host Member State)
- Solution acceptance meeting (to be held at Contractor's premises)
- End of phase 1 and end of phase 2 meetings (to be held in Host Member State)
- Final project meeting (to be held at Frontex premises in Warsaw.)

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