Technical Specification of AFIS System Implementation

Content

1. List of abbreviations

Abbreviation	Full name
BiH	Bosnia and Herzegovina
EU	European Union
IPA	Instrument for Pre-Accession Assistance
CPRC	Criminal Policy Research Center
ISM	Information System for Migration
SPS	Service for Foreigners' Affairs
MSB	BiH Ministry of Security
MVP/MIP	Ministry of Foreign Affairs of BiH
GP	Border Police of BiH
SA	Asylum Sector
SI	Immigration Sector
AFIS	Automated Fingerprint Identification System
ABIS	Automated Biometric Identification System
KPDG IS	Bosnia and Herzegovina State Border Crossing Control Information System
PRAG	Practical Guide to Contract Procedures for EU External Actions

2. End users

Pursuant to the relevant legislation, the ISM Competent Authorities are:

- Ministry of Security of Bosnia and Herzegovina
  - Service for Foreigners' Affairs
  - Asylum Sector
  - Border Police of Bosnia and Herzegovina
  - Immigration Sector
- Ministry of Foreign Affairs of Bosnia and Herzegovina

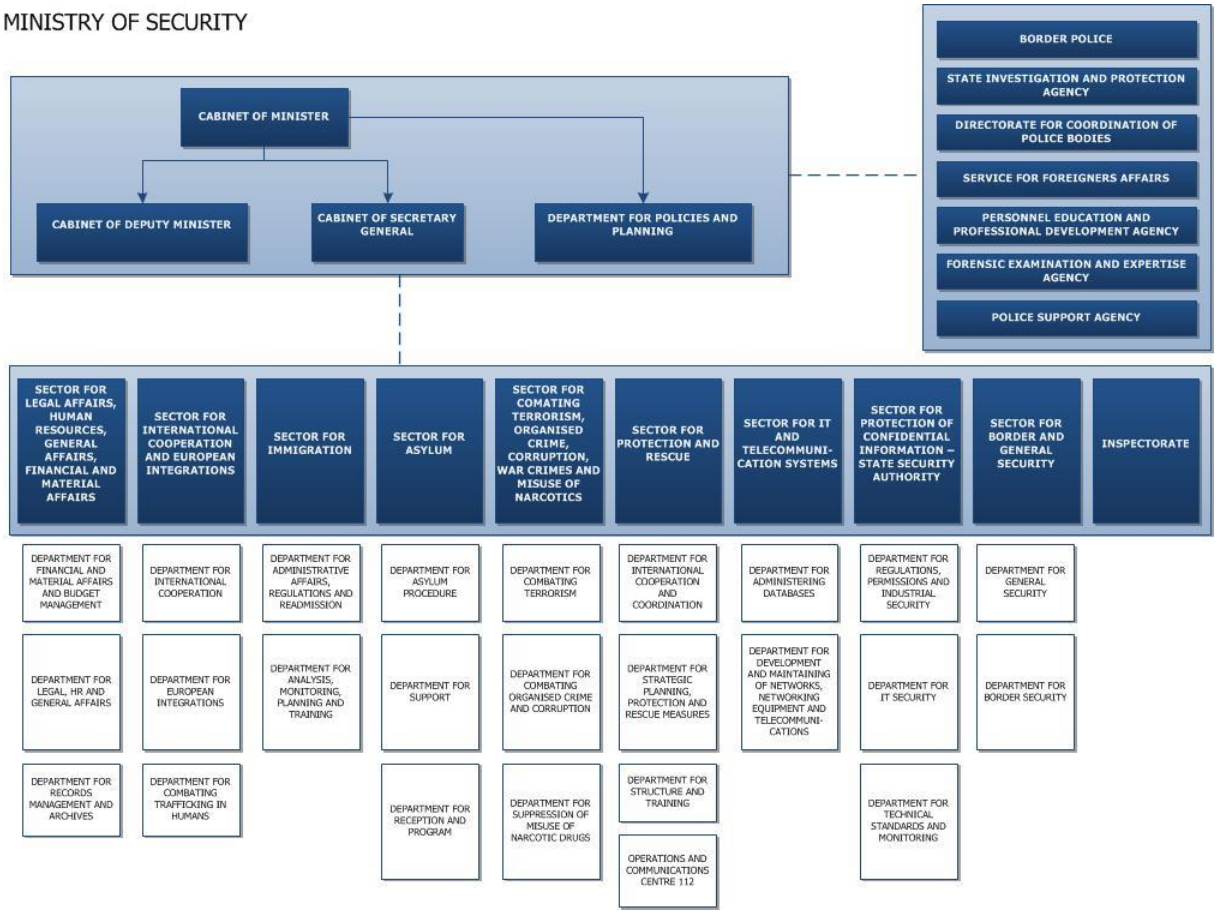
2.1 Ministry of Security of Bosnia and Herzegovina

The Ministry of Security of Bosnia and Herzegovina is responsible for:

- protection of international borders, internal border crossings and regulation of traffic at the border crossings of Bosnia and Herzegovina;
- prevention and detection of perpetrators of crimes relating to terrorism, trafficking in drugs, forgery of domestic and foreign currencies, trafficking in humans, and other crimes with international or inter-entity element;
- international cooperation in all areas within the competence of the Ministry (cooperation with INTERPOL, EUROPOL, SELEC, MARRI…);
- protection of persons and facilities;
- collection and use of data relevant to the security of Bosnia and Herzegovina;
- organization and harmonization of activities of Entity Ministries of Interior and Brcko District in performing security tasks of BiH interest;
- implementation of international obligations and cooperation in matters relating to civil protection, coordination of activities of entity civil protection services in Bosnia and Herzegovina and harmonization of their plans for natural or other disasters affecting the territory of Bosnia and Herzegovina, as well as adoption of programs and plans for protection and rescue;
- creation, monitoring and implementation of policy on immigration and asylum in Bosnia and Herzegovina;
- regulation of procedures and method of organization of the service dealing with the movement and stay of foreigners in Bosnia and Herzegovina;
- provision of support to the police authorities of Bosnia and Herzegovina;
- education and professional training of personnel in accordance with the needs of the police authorities of Bosnia and Herzegovina and other security services and agencies;
- forensic examination and expertise.

Within this Ministry, as an administrative organization, are: Directorate for Coordination of Police Bodies of Bosnia and Herzegovina, Border Police of Bosnia and Herzegovina, State Investigation and Protection Agency, Agency for Forensic Examination and Experise, Agency for Education and Professional Training, Police Support Agency and Service for Foreigners' Affairs.

Organizational structure



Asylum Sector

The Asylum Sector performs administrative and other professional tasks related to the execution and implementation of asylum policy and procedure in Bosnia and Herzegovina, coordinates the work of competent organizational units, performs tasks related to the preparation of laws and by-laws pre-drafts and drafts in this field, provides reception, accommodation and support for asylum seekers, monitors the situation regarding the achievement of European standards in this scope of work, performs analysis and reporting, as well as other tasks that by their nature are within the scope of work of this Sector.

Department for Asylum Procedure is responsible for:

- Conduct the interviews with asylum applicants in Bosnia and Herzegovina,
- Evaluate the decisions on the asylum application,
- Evaluate information on the country of origin of asylum applicants,
- Prepare draft decisions on asylum applications,
- Prepare decisions on termination or termination of status,
- Cooperates with the Court of BiH.

Asylum Support Division is responsible for:

- Receipt of asylum applications,
- Conduct the register of asylum applicants (which includes taking biometric data),
- Issuance of the identification documents (asylum seekers, persons with recognized refugee status or subsidiary protection),
- Undertaking activities on determining unique registration number for recognized refugees
- Takes activities related to issuing travel documents to recognized refugees,
- Keeps official asylum records,
- Issues certificates of fact from official records available to the Asylum Department
- Cooperation with all relevant institutions in Bosnia and Herzegovina

Department Admissions and Programs is responsible for:

- accommodating asylum seekers in the asylum center
- providing preconditions necessary for adequate work of asylum centre
- supervises the work of the asylum center

Immigration Sector

Sector Competences:

The Immigration Sector performs administrative and other professional tasks related to planning and implementation of immigration policy in BiH, performs tasks related to the preparation of pre-drafts and drafts of laws and by-laws in this field, as well as monitors the situation regarding the achievement of European standards in this area. Realizes the admission of BiH citizens acoording to the readmission agreements, accepts and accommodates foreigners who have been victims of trafficking in human beings, performs analysis and reporting, as well as other jobs and tasks that by their nature are under the competence of this Sector.

Departments:

- Department of Administrative Affairs, Regulations and Readmission
- Department of Analytics, Strategic Planning, Monitoring and Training

Sector for IT and Telecommunication Systems

Sector competences

The IT and Telecommunication Systems Sector is responsible for maintenance and troubleshooting of IT and network equipment; network administration; procurement of application softwares and their installation on computers; standardization of system software and equipment; introduction and implementation of data protection measures in the information system; creation and maintenance of web site and mail server; installing and adjusting required software solutions on users' workstations;

preventive maintenance and testing of installed computer, network and telecommunication equipment; detecting and repairing defects in installed equipment and installations; preventive maintenance of the uninterruptible power supply system; analysis of the database software operation.

Departments and their responsibilities:

Within the Sector for IT and Telecommunication Systems are two departments:

- Department for Development and Maintenance of Networks and Network Equipment and Telecommunications and
- Department for Database Development and Administration

The competencies of the Department for Development and Maintenance of Networks and Network Equipment and Telecommunications are:

- introduction and application of data protection measures in the information system, and harmonization of the achieved level of protection with the constant development of information technologies;
- creation and maintenance of the Ministry's website and mail server, and introduction and implementation of measures for protection of the website and mail server;
- installation and maintenance of telecommunication, radio relay and other equipment for the needs of the police bodies network;
- installing and updating operating systems, maintaining and troubleshooting information and network equipment failures, administering the network, instructing the work related to procurement of application software and its installation on computers.

The responsibilities of Department for Database Development and Administration are:

- designing and creating databases, defining ways and strategies for safe backing up of databases, making the actual back up and analyzing database development software;
- development of database software and their installation on computers, analysis of the operation of database management software, database administration, granting users the rights to access the data.

2.2 Ministry of Foreign Affairs of Bosnia and Herzegovina

Ministry of Foreign Affairs of BiH, as administrative body responsible for implementing the established BiH policy in accordance with the guidelines of the BiH Presidency, as such has certain competencies regarding the system of migration management in BiH, as well as in the area of visa and passport affairs it performs regular analysis of the work of BiH diplomatic and consular missions. Based on the monitoring of migration trends in Bosnia and Herzegovina, actions and activities are undertaken with other competent state bodies and institutions in preventing illegal migration and managing migration processes. These issues have become especially relevant in the context of Croatia's accession to the European Union and the assessment of the intensification of migration pressure on Bosnia and Herzegovina. The Ministry of Foreign Affairs of BiH deals with the issue of visas through diplomatic missions and consular posts.

Within the the organizational structure of Ministry of Foreign Affairs of BiH there is a Sector for International Legal and Consular Affairs which, through the Department for Visa and Passport Affairs, conducts administrative proceedings at the request of foreign missions, international organizations and citizens of other countries, regarding the issue of entry visa for BiH. One of the priorities in the work of the Ministry of Foreign Affairs of BiH is the fulfilment of obligations related to monitoring the effects of the Decision on visa liberalization, reducing the abuse of visa-free regime, i.e. encouraging BiH citizens to comply with the rules of visa-free regime, reducing the number of false asylum seekers, as well as the obligations from the Strategy in the area of migration and asylum.

Following the earlier established practice of approximation to the EU and Schengen standards in the field of visa issuance, and after reviewing the experience of the countries in the region, under the appropriate conditions, the Visa Decision introduced the possibility of entry and stay in BiH for up to 15 days without the obligation to obtain BiH visa beforehand for foreigners who hold a visa or residence permit in EU or Schengen countries. In order to regulate the visa regime of BiH with certain countries and to facilitate the travel to BiH for certain categories of citizens from those countries, as well as of our citizens traveling to those countries, the Ministry of Foreign Affairs of BiH is responsible for signing bilateral international treaties related to free visa regime with other countries, including the signing of visa waiver agreements for holders of diplomatic and official passports.

2.3 Border Police of Bosnia and Herzegovina

Pursuant to:

- Law on BiH Border Police („Official Gazette of BiH“ , no. 50/04, 27/07 and 59/09)
- Law on Border Control („Official Gazette of BiH“ , no. 53/09 , 54/10 and 47/14)
- Law on Asylum Asylum („Official Gazette of BiH“, no. 11/16 and 16/16) and Law on Foreigners („Official Gazette of BiH“, no. 88/15)

BiH Border Police tasks include:

- Enforcement of the Law on Surveillance and Control of State Border Crossing as prescribed therein,
- Ensuring the inviolability of the state border,
- Protection of human life and health,
- Preventing and detecting criminal offenses and misdemeanours, and detecting and finding their perpetrators
- Preventing illegal cross-border migration,
- Preventing and detecting other threats to public security, the legal order and national security.
- Performing border checks:
    - check of persons;
    - check of things;
    - check of the means of transport.
- In the area of border crossing GP BiH is authorized to use automatic technical devices for taking photos, recording and video surveillance, as well as to apply other technical tools for

recording and photographing events in the area of border crossing. Technical devices for photography, recording and video surveillance may be set to record also personal data and must be placed at a visible location.

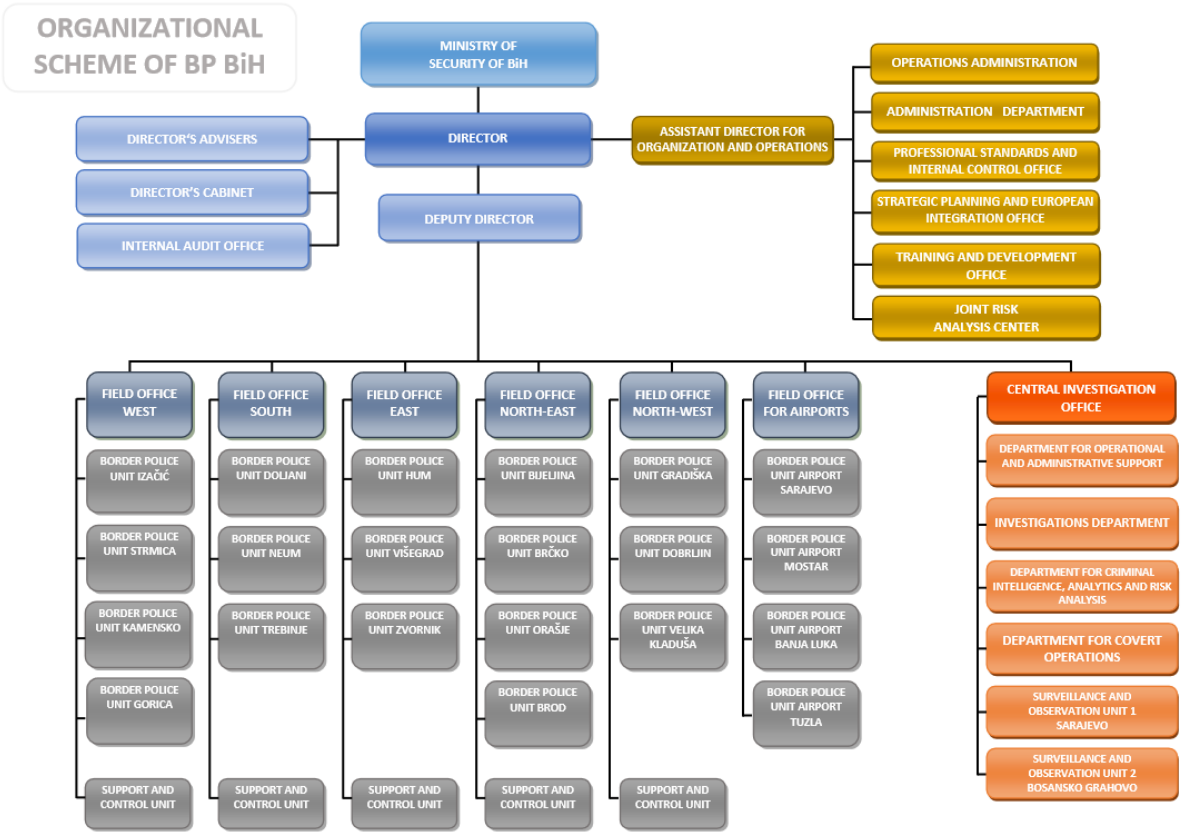
Organizationally, GP BIH is structured to ensure coordination of all activities at central, regional and local level by providing highly specialized services required for the tasks within its competence, as well as to ensure the exchange of information between central, regional and local organizational units, them being:

- Head Office
- Field Offices
- Units
- Central Bureau of Investigation
- Specialized Units
- Other organizational units defined by the Rulebook on Internal Organization.

Bosnia and Herzegovina is bordered by 3 neighbouring countries: the Republic of Croatia, the Republic of Serbia and Montenegro. The length of the BiH border is about 1550 km, of which about 905 km is the land border, 624 km is the river and sea border is about 21 km. 83 border crossings have been designated at the border with neighbouring countries (40 IBCs and 28 BCs for border traffic, 4 airports, 3 river ports and 8 railway border crossings).

In order to be able to carry out the above mentioned activities, the Border Police uses appropriate information systems which enable authorized persons to quickly and reliably carry out the verification of persons crossing the BiH state border.

Organizational structure



2.4 Service for Foreigners' Affairs

Service for Foreigners' Affairs, as an administrative organization with operational independence within the BiH Ministry of Security, is a leader in dealing with immigration, and has a unique approach to and action in addressing immigration issues throughout BiH and primarily deals with the supervision and control of the movement and stay of foreigners in BiH, which makes a significant contribution to the protection of BiH's security system, which is very demanding and complex.

Taking into consideration the EU standards in addressing migration management issues, one of the SFA's priorities is an establishment of balance a balance between effective migration management in BiH and respect for freedom of movement

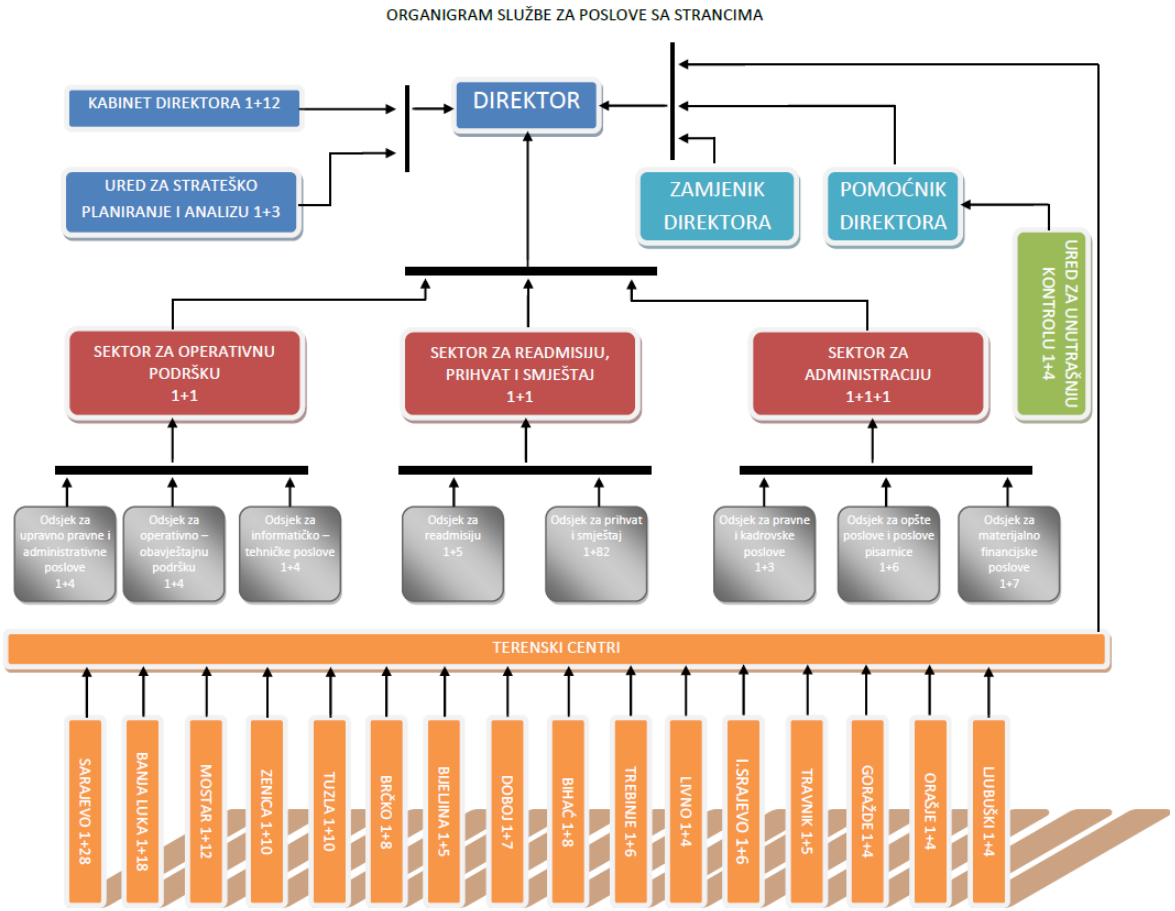
By performing operational-inspection and administrative-legal tasks, the Service controls the arrival of foreigners from the visa regime in BiH through the procedures of verification of invitation letters,

decides on the status of foreigners in BiH through granting or refusing foreigner's stay in the country, cancellation of stay, expulsion, placing under surveillance and forced the removal of foreigners from the country.

The Service conducts all necessary security checks prior to deciding on the invitation letter verification procedure, checks related to previously issued consent for issuing visas type 'D' and prior to deciding on request for temporary and permanent residence permit. Performing the necessary security checks in the process of verifying the invitation letters i.e. before the foreigner arrives to BiH, protects the BiH security system.

In order to contribute to the overall security system of BiH, through the operational work of the inspectors for foreigners, the Service, within its operational and inspection competencies, daily collects data on all types of irregular migration and irregular migrants, monitors and controls the stay of foreigners through their eventual misuse and illegal use of residence and the eventual threat to public order or national security of the country by certain categories of foreigners.

Organizational structure



3. Introduction

According to the Strategy on Migration and Asylum and the Action Plan 2016-2020 the long-term goal for Bosnia and Herzegovina is to develop a good quality system of migration and asylum at the national level, which is in line with European Union standards and which contains international refugee law, as well as active participation in policy definition and development of the immigration and asylum system at the regional level. Also, one of the 2016-2020 medium-term strategic goals is the improvement of the control system of entry and stay of foreigners in BiH, which as one of its activities includes the implementation of a system for collecting biometric characteristics of foreigners. The biometrics module should include the collection, transfer, storage and use of foreigners' biometric data in accordance with relevant legislation and should enable the reliable, secure and timely registration of certain categories of foreigners, as well as the identification of foreigners based on them. Also it is very important to note that during the year 2019 the improved version of ISM has been released into production environment and in this sense it is very important to take into account that the implementation of biometric module within the ISM should be done with the maximum possible integration. In addition, the implemented module of biometrics must be compatible with specific future projects that would use the collected biometric data (introduction of biometric residence card for foreigners, biometric visas ....) .

4. Relevant legislation

In order to prepare a technical solution for the development, implementation and integration of biometrics module in ISM, the relevant legislation is:

- Law on Foreigners (Official Gazette of BiH, no. 88/15);
- Law on Foreigners' Affairs Service (Official Gazette of BiH, no. 36/08)
- Law on Border Police of Bosnia and Herzegovina (Official Gazette of BiH, no. 59/09)
- Law on Asylum (Official Gazette of BiH, No. 11/16 and no. 16/16);
- Law on Border Control
- Law on Protection of Personal Data (Official Gazette of BiH,no. 49/06);
- Rulebook on the Content, Manner of Keeping and Using Official Records on Foreigners (Official Gazette of BiH, no. 51/16);
- Rulebook on the Central Database of Foreigners (Official Gazette of BiH, no. 19/17);
- Rulebook on Registration of Biometric Characteristics of Foreigners (Official Gazette of BiH, no. 55/16);
- Decision on visas
- Decision on designation of international border crossings in Bosnia and Herzegovina
- Other by-laws enacted pursuant to the aforementioned laws;
- EU regulations regarding the processing of biometric data;

It is important to note that it has been recognized the need for some legislation to be refined in order to enable complete use of the biometric module, specifically related to the multiple collection of biometric data from a forigner for different procedures, the biometric data storage time for different procedures and the like. In this regard, the activities on the modification of the legislation will be carried out paralel with the implementation of the biometrics module.

In order to solve the problem of multiple storage of biometric data in a future system, it must be designed in such a way that when the person is being processed for the first time in the ISM the prescribed biometric data are collected and stored in accordance with the procedure for the subject basis/process. When processing the same person on other bases/processes in the ISM, within 5 years from the day of the preliminary processing of this person, biometric data are used for the purpose of identifying that person and log of it is kept. If the same person is processed at ISM on other bases/processes 3 years after this person's previous processing, his/her biometric data is stored again in the system. If the second basis/process, according to which that same person is processed in the ISM, prescribes collection and storage of more biometric data than the previous basis/process, then system should allow the storage of additional biometric data for this person.

5. Current situation

During 2019 the ISM system version was released in the production and it has included all modules as an earlier version with the development of additional functionalities. **The biometric system in question must be an integral part of the ISM.**

The main features of the upgraded version of the ISM system are:

- Establishment of an information system in accordance with the existing legislation, in order to improve the control of the state border crossing and the control of the movement and stay of foreigners in BiH;
- Complete reengineering of the Central Database on Foreigners;
- Creation of electronic official records in accordance with the legislation as one application created on a single platform;

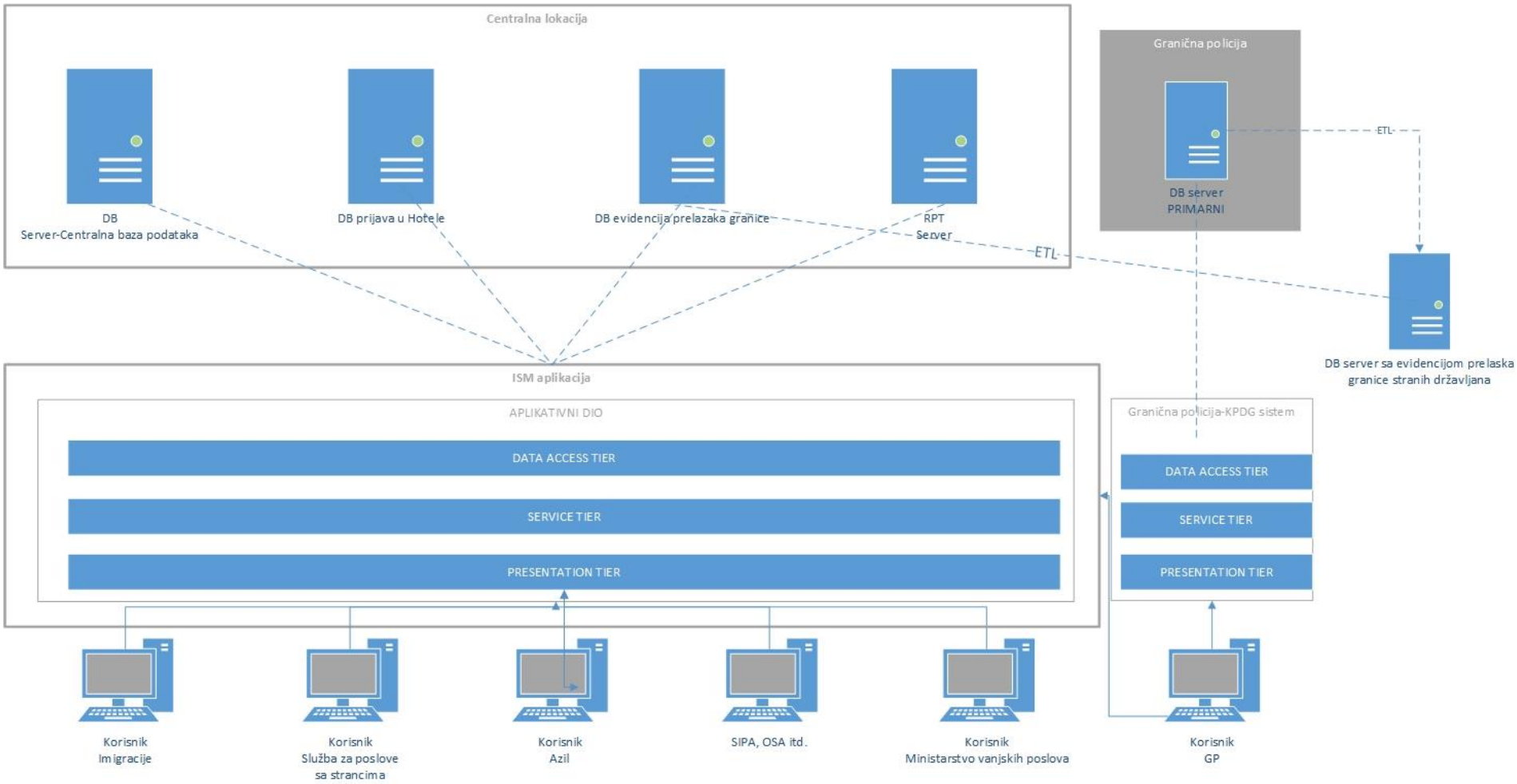
The subject system is a multi-user web based application that enables entry, modification and review of data related to the control of entry and stay of foreigners in BiH. The system enables the search of foreign persons entered into the system and the entry of new foreign persons, as well as the entry of data into official records maintained on the basis of the Law on Foreigners and the Law on Asylum, according to which a person's file was created, and in which it shall be possible to review the history of foreigners. Complete processes related to e.g. issuing visas, residence permits, intentions and applications for asylum are run through this system.

Within the project, a reporting subsystem (EUROSTAT, migration profile, additional specially prepared reports) was implemented.

The solution is based on the **Microsoft platform**, which includes the following technologies and tools according to the specified application areas:

Scope	Name of technology/tool	Manufacturer	Version
The operating system of all server elements of solution	Windows Server	Microsoft	2019 i 2016
RDBMS system	SQL Server	Microsoft	2017
Web server (web content management)	Internet Information Server (IIS)	Microsoft	10.0.14393.0
Development of application part of the solution	C #, .NET, Angular	Microsoft, Google	6.0, 4.6, 2.0

Upgraded system architecture



The Central location has the following databases:

- Central database on foreigners (includes all official records in accordance with legislation)
- Reporting base (RPT Server)
- Database with records of foreign nationals' border crossings (DB Server - border crossing records)
- Database with records of registration of stay of foreigners in accommodation provided by legal and natural persons (DB Server - hotel registration)

Description of the Central database on foreigners

- Central database on foreigners contains data from all official records (over 50 official records) by foreigner, users and associated access rights of users, the necessary codebook , actions logs of system, web services for data access from other security agencies.

Description of the reporting database

- This database is customized for reporting
- The source of the data is the Central database on foreigners, from which data customized to reporting are transferred to the reporting database through ETL processes
- The ISM application has access to this database . This module contains reports that are selected from the drop-down list. Each report can be searched according to different criteria. It can be sorted by columns for which sorting makes sense and can be exported to the XML, PDF, Excell and Word file formats.
- Reports are related to the migration profile, Eurostat reports as well as additional reports to retrieve data from the ISM system

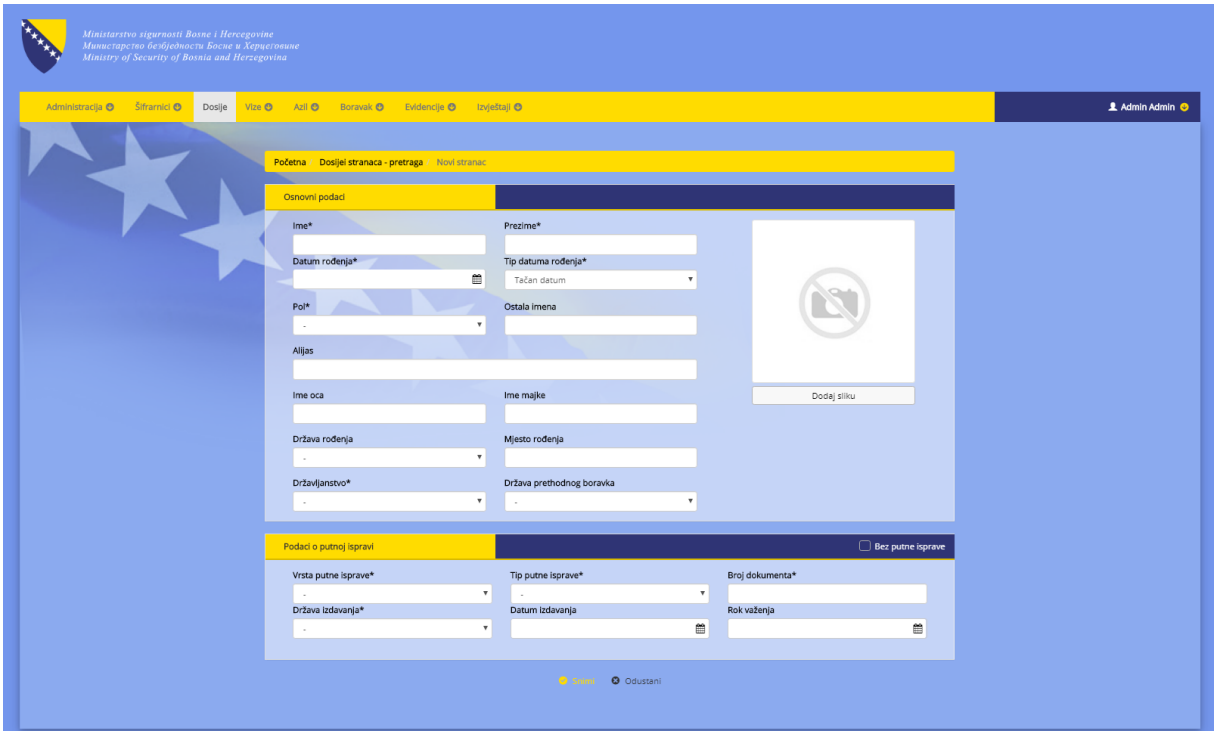
Description of the database with records of foreign nationals' border crossings:

- This database contains all data on the crossings of foreign nationals at the state border of BiH.
- The source of data is the existing BiH Border Police database for recording the crossings of state border (db server with records of state border crossings of foreign nationals)
- Through ETL processes at agreed time intervals, the data from the BiH Border Police database are transferred to this database.
- The ISM system has the right to read data

Description of the database with records of the registration of foreigners stay in accommodation provided by legal and natural persons

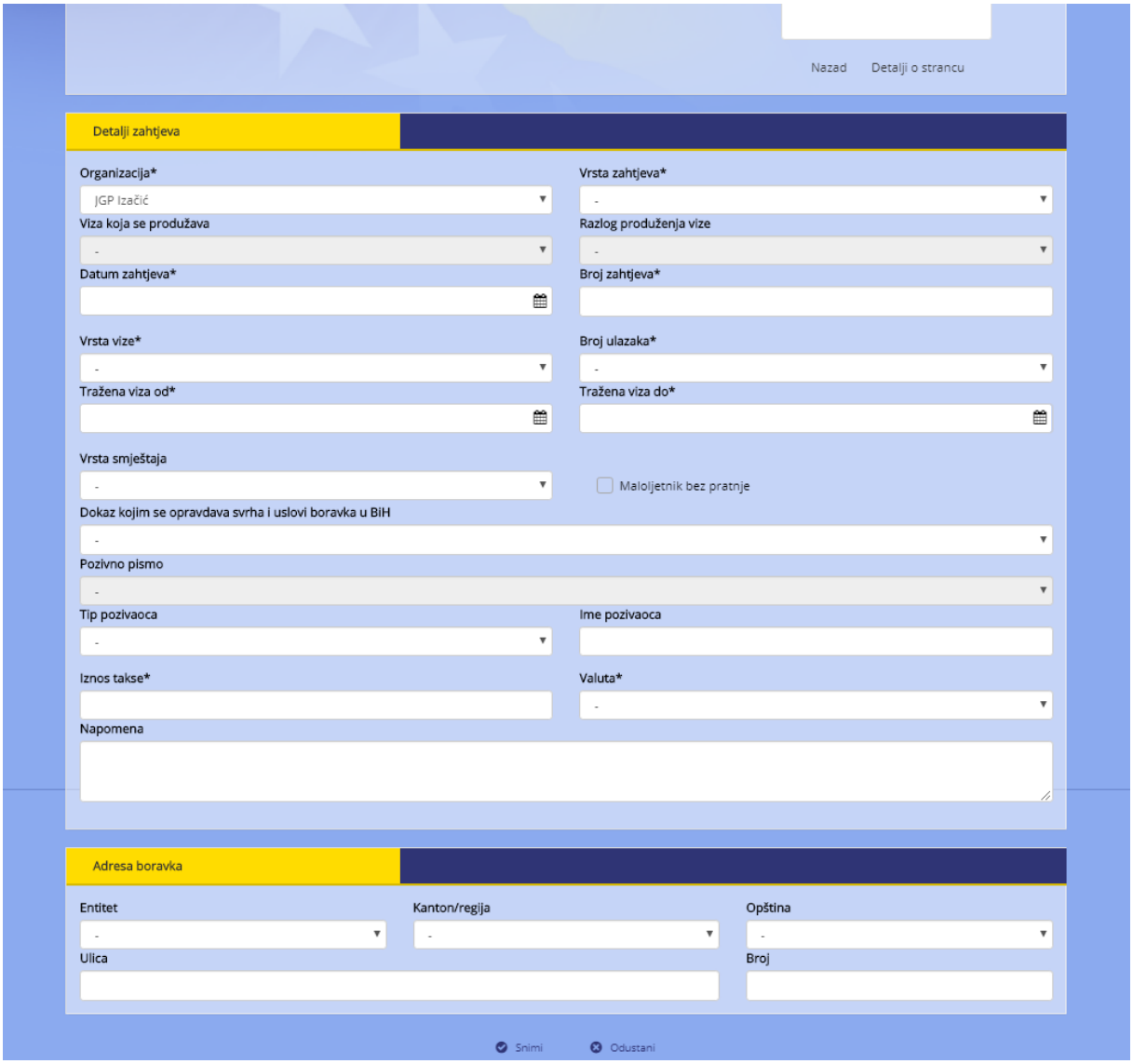
- This database contains all information on the stay of foreign persons in accommodation provided by legal and natural persons
- Data source are individuals and legal entities providing accommodation services
- The ISM system has the right to read data

An example of the layout of the ISM system screen (new foreigner entry):



An example of the layout of the ISM system screen (invitation letters records):

An example of the layout of the ISM system screen (record of visa application):



5.1 Current AFIS systems

At the moment, there is an AFIS system within the Service for Foreigners' Affairs that is available to all its field offices. The same system is used to register immigrants. For the existing AFIS system, two servers are used: PowerEdge R610 and ProLiant DL380p Gen8. The operating system on them is RedHat 5.7. One is DB server (Oracle) and ITF (Integrated Transaction Framework), the other does matching and verification. The fingerprint scanner models used are Crossmatch LSCAN, Futronic FS 60. Aforementioned biometric scanners ought to be usable in future AFIS system. The fingerprints are stored in WSQ format and are packaged in NIST version 0201.

When implementing the AFIS system in question, it is necessary to migrate data from the existing SPS biometrics system. During the implementation of the AFIS system, the competent institutions of BiH will make a decision from which records the biometric data

will be migrated. This data will then be packed in standardized NIST files, of the required quality, therefore enabling mass migration.

6. Objective, scope and expected results of the project

6.1 Project goal

The overall objective and purpose of this project is to implement biometrics modules in ISM.

7. Project management, methodology, implementation plan and delivery plans

7.1 Project management

A project such as the implementation of a biometric module cannot be managed without a strong methodological approach. Since project of introduction of biometrics involves the delivery of hardware equipment and software development, it is essential that the methodology puts focus on both components. Also, the delivery of hardware is a major logistical undertaking in itself, as ready-made kits for biometrics need to be delivered to approximately 120 locations (the exact number and list of locations is given in this document), being positioned throughout BiH and worldwide (diplomatic and consular offices of BiH)

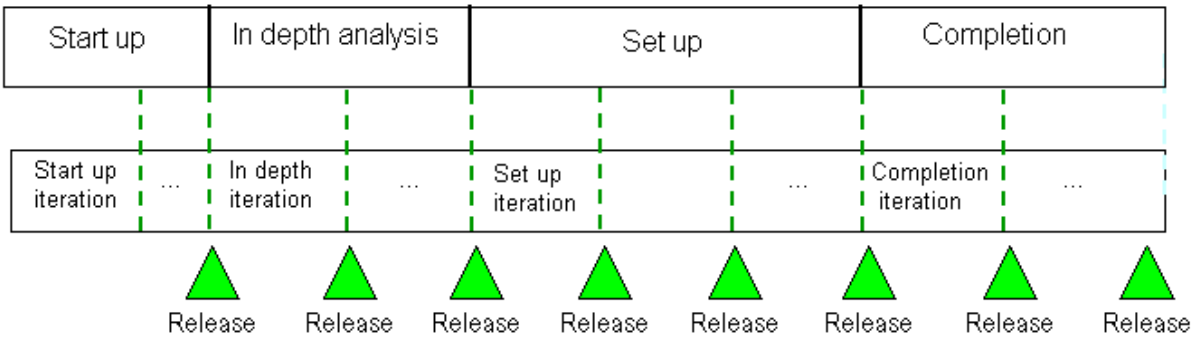
The aim of the required methodology for project management is:

- Improvement of project productivity and quality.
- Identifying cooperative communication methods between the different groups involved in design, development and evolution of the system.
- Identification of possible critical elements in order to initiate necessary interventions.

Below is a list of basic principles that provide the foundation for the methodology required :

- Dealing sistematically with risks from an early stage.
- Managing project requirements and limits.
- Readiness, from an early stage, to manage changes.
- Planning and development verification.
- Constant cost-benefit link control.
- Production of functional software as soon as possible.
- Consolidation of production, test and development architecture as soon as possible.
- Working together as one working group.

The quality of implementation is in the actual operating procedures, and not in the collection of documents. Proposed methodology is both iterative and gradual process. Iterative because the project evolves with a series of iterations (sequence of activities), which aim to progressively reduce the risk of failure, primarily from the risks defined as critical. (e.g. misunderstanding the request , ..).



Each iteration corresponds to a well-defined project plan. Each iteration has its own plan, goals and evaluation criteria. Management, analysis, design, codification and test activities take place at each stage of the iteration. The result of each phase is the delivery of one functional unit. The methodology is incremental, as the application is brought into the implementation phase gradually. Application and technological architecture design is the foundation for application development. Architectural consolidation happens when technical feasibility is guaranteed.

7.2 Plan of delivery, installation and commissioning of third party hardware, licenses and software

The project requires the delivery, installation, and commissioning of all hardware, licenses, and software. Locations for installation of delivered equipment are listed below. All equipment for the BiH Ministry of Foreign Affairs should be delivered to Sarajevo. The Ministry of Foreign Affairs of BiH will be responsible for sending of the equipment to the Diplomatic and Consular Offices by using diplomatic mail. All delivered equipment to the final location shall be installed and ready for use of biometric module without additional work by the employees of the institutions. This chapter will only refer to the name of the location, the address where the equipment shall be installed and put into operation.

BiH Ministry of Security

Name of institution	Full address
BiH Ministry of Security	Trg BiH 1, 71 000 Sarajevo Bosnia and Herzegovina

Ministry of Foreign Affairs of BiH

Name of institution	Full address

Embassy of Bosnia and Herzegovina in Australia	5 Beale Crescent, Deakin ACT 2600, Australia
Embassy of Bosnia and Herzegovina in Austria	Tivoligasse 54, A - 1120 Wien, Austria
Embassy of Bosnia and Herzegovina in the Kingdom of Belgium	Rue de l'Industrie 22, 1040 Bruxelles, Belgique
Embassy of Bosnia and Herzegovina in the Kingdom of Bulgaria	Aleksandar Zhendov 1, box 27 , 1113 Sofia , Bulgaria
Embassy of Bosnia and Herzegovina in Montenegro	Atinska 58, 81000 Podgorica
Embassy of Bosnia and Herzegovina in the Czech Republic	Opletalova 27, 110 00 Praha, Česka Republika
Embassy of Bosnia and Herzegovina in the Kingdom of Denmark	H.C.Andersens Boulevard 48-2tv, 1553 Copenhagen V, Danska
Embassy of Bosnia and Herzegovina in the Arab Republic of Egypt	42 El Thawra, St. El Dokki, Cairo, Egypt
Embassy of Bosnia and Herzegovina in the Republic of France	174, Rue de Courcelles, 75017 Paris, France
Embassy of Bosnia and Herzegovina in the Republic of Greece	Karneadu 25-29, 10675 Atina, Greece
Embassy of Bosnia and Herzegovina in the Republic of Croatia	Pantovčak 162A, 10000 Zagreb, Croatia
Embassy of Bosnia and Herzegovina in the Republic of India	E-9/11, Vasant Vihar, 110057 New Delhi, India
Embassy of Bosnia and Herzegovina in the Republic of Indonesia	Menara Imperium 11th floor, JL.H.R. Rasuna Said, Kav. 1, 12980 Jakarta, Indonesia
Embassy of Bosnia and Herzegovina and the Islamic Republic of Iran	No 4, 7th St, Iranzamin Ave, Shahreke Qods, Teheran, I.R. Iran
Embassy of Bosnia and Herzegovina in the Republic of Italy	Piazzale Clodio 12/int. 17, 00195 Roma, Italia
Consulate General of Bosnia and Herzegovina in Milan	Via Luigi Galvani 21, 20124 Milano, Italia
Embassy of Bosnia and Herzegovina in Israel	2 Kaplan St., Beit Yachin 64734, 10th Floor, Tel Aviv, Israel

Embassy of Bosnia and Herzegovina in Japan	3-29 Minami Azabu 5-chome, Minato.ku, Tokyo, Japan
Embassy of Bosnia and Herzegovina in Hashemite Kingdom of Jordan	SWEIFIEH, Said al-Mufti str. No.67, P.O.Box 850836 Amman 11185, Jordan
Embassy of Bosnia and Herzegovina in Canada	7 Blackburn Avenue, Otatawa, ON KIN 8A2, Canada
Embassy of Bosnia and Herzegovina in Qatar	P.O. Box 876, Doha, State of Qatar
Embassy of Bosnia and Herzegovina in the People's Republic of China	1-5-1 Ta Yuan, Diplomatic Office Building, 100600 Bejing, Chin
Embassy of Bosnia and Herzegovina in Kuwait	Bayan, Block 13, Street no.1, House 65 P.O.Box: 6131 Hawalli, 32036 Kuwait
Embassy of Bosnia and Herzegovina in Libya	Hasi Masoud, Siyahiya, Tripoli, Libya, PO Box 6946
Embassy of Bosnia and Herzegovina in Hungary	Verseghy Ferenc u. 4, 1026 Budapes, Hungary
Embassy of Bosnia and Herzegovina in Macedonia	20-ti Oktomvri br. 15, 1000 Skoplje, Republika Makedonija
Embassy of Bosnia and Herzegovina in Malaysia	JKR 854, Jalan Bellamy, Kuala Lumpur, Malaysia
Embassy of Bosnia and Herzegovina in the Kingdom of the Netherlands	Bezuidenhoutseweg 223, 2594 AL Den Haag, Netherland
Embassy of Bosnia and Herzegovina in the Kingdom of Norway	Drammensveien 105, 0244 Oslo Kingdom of Norway
Embassy of Bosnia and Herzegovina in the Federal Republic of Germany	Ibsenstrasse 14, D-10439 Berlin, Deutschland
Consulate General of Bosnia and Herzegovina in Frankfurt	Mendelssohn str 69, 60325 Frankfurt am Main, Deutschland
Consulate General of Bosnia and Herzegovina in Munich	Karl str. 60, 80333 Munchen, Deutschland
Consulate General of Bosnia and Herzegovina in Stuttgart	Olgastrase 97b, D-70180 Stuttgart, Deutschland
Embassy of Bosnia and Herzegovina in the Islamic	House No. 195-A, Street No. 10, Sector E-7,

Republic of Pakistan	Islamabad, Pakistan
Embassy of Bosnia and Herzegovina in the Republic of Poland	Humanska 10, 00-789 Warszawa
Embassy of Bosnia and Herzegovina in Romania	Strada Stockholm12, sector 1, Bucharest
Embassy of Bosnia and Herzegovina in the Russian Federation	Mosfiljmovskaja 50/1, 119 590 Moskva, Ruska Federacija
Embassy of Bosnia and Herzegovina in the Kingdom of Saudi Arabia	P.O.Box 94301, Al- Woroud Quarter, Ghazi Bin Qis street 10 11693 Riyadh, Saudi Arabia
Embassy of Bosnia and Herzegovina in the United States of America	2109 E St. N.W, Washington D.C., 20037 , USA
Consulate General of Bosnia and Herzegovina in Chicago	500 North Michigan Avenue, Suite 750, Chicago, IL, 60611
Embassy of Bosnia and Herzegovina in the Republic of Slovenia	Kolarjeva 26, 1000 Ljubljana, Slovenia
Embassy of Bosnia and Herzegovina in the Republic of Serbia	Generala Anrija 37, 11000 Beograd, Srbija
Embassy of Bosnia and Herzegovina in the Kingdom of Spain	Calle Lagasca, 24.2', Izq., 28001 Madrid, Espańa
Embassy of Bosnia and Herzegovina to the Swiss Confederation	Thorackerstr 3, 3074 Muri b. Bern, Switzerland
Embassy of Bosnia and Herzegovina in the Kingdom of Sweden	Birger Jarlsgatan 55/3, 11145 Stockholm, Sweden
Embassy of Bosnia and Herzegovina in the Republic of Turkey	Turan Emeksiz Sokak, No.3, Park Siteler 9/B, Gaziosmanpasa, Ankara, Turkiye
Consulate General of Bosnia and Herzegovina in Istanbul	Dikilitaş Mah., Yeni Gelin Sok. No:6, Kat 3, 34342 Beşiktaş, Istanbul, Türkiye
Embassy of Bosnia and Herzegovina in the United Arab Emirates	P.O. Box 43362, Abu Dhabi, U.A.E.
Embassy of Bosnia and Herzegovina in the United Kingdom of Great Britain and Northern Ireland	5 - 7 Lexham Gardens, London W8 5JJ, United Kingdom
Embassy of Bosnia and Herzegovina in Holy See	Piazzale Clodio 12 , int. 12, 00195 Roma,

	Italy

BiH Border Police

Name of institution	Full address
Sarajevo Head Office	N/A
Field Offices for Airports	N/A
Field Office Northwest	N/A
Field Office West	N/A
Field Office Northeast	N/A
Field Office East	N/A
Field Office South	N/A
Brcko International Border Crossing	N/A
Orasje International Border Crossing	N/A
Samac International Border Crossing	N/A
Brod International Border Crossing	N/A
Gradiška Border Police Unit	N/A
Gradiška International Border Crossing	N/A
Gradina International Border Crossing	N/A
Dobrljin Border Police Unit	N/A
Kostajnica International Border Crossing	N/A
Novi Grad International Border Crossing	N/A
Dubica border crossing	N/A
Border Police Unit Velika Kladuša	N/A
Velika Kladuša International Border Crossing	N/A
Border Police Unit Izacic	N/A
Izacic International Border Crossing	N/A

Ripac International Border Crossing	N/A
Border Police Unit Strmica	N/A
Strmica International Border Crossing	N/A
Border Police Unit Kamensko	N/A
Kamensko International Border Crossing	N/A
Prisika International Border Crossing	N/A
Waganj border crossing	N/A
Gorica Border Police Unit	N/A
Gorizia International Border Crossing	N/A
Osoja International Border Crossing	N/A
Doljani Border Police Unit	N/A
Bijača International Border Crossing	N/A
Doljani International Border Crossing	N/A
Zvirići International Border Crossing	N/A
Red Cross International Border Crossing	N/A
Orahovlje International Border Crossing	N/A
Gabela border crossing point	N/A
Border Police Unit Neum	N/A
Neum I International Border Crossing	N/A
Neum II International Border Crossing	N/A
Trebinje Border Police Unit	N/A
Ivanica International Border Crossing	N/A
Trebimlje International Border Crossing	N/A
Zupci International Border Crossing	N/A
Deleuša International Border Crossing	N/A
Klobuk International Border Crossing	N/A

Border Crossing Orahov Do	N/A
Border Police Unit Hum	N/A
Hum International Border Crossing	N/A
Metaljka International Border Crossing	N/A
Border Police Unit Visegrad	N/A
Uvac International Border Crossing	N/A
Ustibar International Border Crossing	N/A
Vardiste International Border Crossing	N/A
Border Police Unit Zvornik	N/A
Karakaj International Border Crossing	N/A
Sepak International Border Crossing	N/A
Bratunac International border crossing	N/A
Skelani International Border Crossing	N/A
Bijeljina Border Crossing	N/A
Rača International Border Crossing	N/A
Popov International Border Crossing	N/A
Border Police Unit Sarajevo Airport	N/A
Sarajevo International Airport (BC Insp.)	N/A
Sarajevo International Airport	N/A
Border Police Unit Tuzla Airport	N/A
International Border Crossing Tuzla Airport	N/A
Border Police Unit Banja Luka Airport	N/A
International Border Crossing Airport Banja Luka	N/A
Border Police Unit Mostar Airport	N/A
International Border Crossing Mostar Airport	N/A
Sarajevo, at the Headquarters, Central Investigation Office	N/A

Service for Foreigners' Affairs

Name of institution	Full address
Operational Support Division	Braće Mulića 38, Sarajevo
Sarajevo Field Center	Braće Mulića 36, Sarajevo
Field Center Banja Luka	Ivana F. Jukića 7/II, Banja Luka
Field Center Mostar	Kneza Višeslava BB, Mostar
Terrain Center Tuzla	Maršala Tita 36, Tuzla
Zenica Field Center	Mehmedalije Tarabara 15, Zenica
Field Center Brcko	Trg mladih 8, Brčko
Doboj Field Center	Nikole Pašića 5, Doboj
Field Center I. Sarajevo	Trg Ilidžanske brigade 2a, Istočna Ilidža
Field Center Bihac	Ulica V korpusa 14, Bihać
Field Center Travnik	Aleja konzula 5, Travnik
Field center Trebinje	Kralja Petra I Oslobodioca 40, Trebinje
Field Center Bijeljina	Neznanih junaka 73, Bijeljina
Livno Field Center	Matice Hrvatske BB, Livno
Field center Ljubuski	Kralja Zvonimira BB, Ljubuški
Orašje Field Center	III ulica 20, Orašje
Gorazde Field Center	Zaima Imamovića 5, Goražde
Temporary Center	Ušivak bb, Hadžići
Immigration center	Đenerala Draže Mihajlovića 16, Istočno Novo Sarajevo

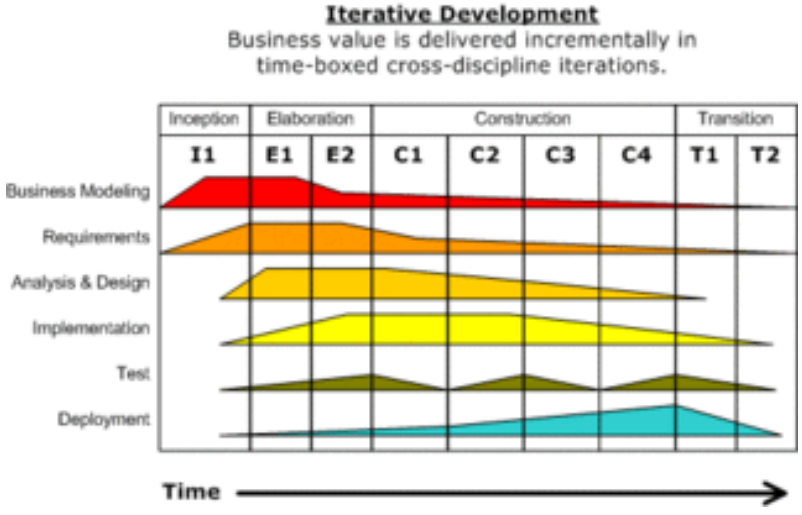
Asylum Sector

Name of institution	Full address
Azilantski centar Delijaš, Trnovo bb	Trnovo bb, Kanton Sarajevo
Azilantski centar	
Sektor za azil	Trg BiH 1, 7100 Sarajevo

7.3 Methodology for development and implementation of ISM system upgrade with biometric module

Since the biometrics module will be an integral part of the ISM system, certain upgrades to the ISM system will be needed to support biometrics operation. A description of the ISM system upgrade request is given in this document, while this chapter describes the required development and implementation methodology. **The requested business process analysis refers to the upgrade the ISM system with the required functionalities, the integration of ISM system and applications with the AFIS system and the development of applications for collection and check of biometric data (all described in this document).**

The goal of the project is to upgrade a system that currently contains numerous subsystems and modules, and shall be achieved by applying an already proven method called Rational Unified Process (RUP). RUP is an iterative, incremental method that allows early and timely risk management, based on best practices in software development and as such extensively used in the world of software development.



Modern agile methods do not resist or oppose RUP, but naturally complement it and their elements will be encountered throughout the project. Agile methods prescribe short and fixed iterations with a minimum of detailed planning, the planned set of activities does not change during one iteration, key users unavoidably participate in the work of the project team ona daily basis, team meetings are short but daily, and parts of the system are often integrated.

The planned iterations on the project will be shorter than is usual with the RUP method itself. This shall also achieve good risk management and frequent reconciliation of end users with the implementer, both at the operational level and through continuous monitoring of system development progress, early and frequent integration of system parts to eliminate errors resulting from parallel development, early risk attack etc. Development by the RUP method takes place through four phases, which may consist of one or more iterations.

Each phase ends with a well- defined milestone - a point at a time when certain critical decisions must be made, and therefore the major goals of the stages must be achieved. Iteration is a complete development cycle that results in the delivery, internal or external, of an executable product, a subset of the final product, which thus grows incrementally from iterations.

The stages, their main goals and disciplines that play a key role in the given phase are:

- **Initiation phase**: The aim of the phase is to reach an understanding between *stakeholders* about the objectives and scope of the project. A project vision, project activity plan, business process modeling, basic *use case* model, inventory and risk assessment etc. are being built.

- **Development phase**: The aim of the phase is to lay down the basic architecture of the future system to provide a stable basis for most development activities in the next phase. The architecture follows from an analysis of the most important requirements and an insight into the project's risks. The stability of the architecture is proven by building an architectural prototype, the so-called *proof of concept* .

- **Construction phase**: The aim of the phase is to complete the development of the system. This phase is in a way a manufactory process, where the emphasis is on managing resources and controlling activities to optimize product costs, plans and quality. At this stage, the elements of agile development will be most prominent. The iterations will be short, the functionalities in them agreed upon in advance, the communication extremely dynamic.

- Transition Phase: The goal of the phase is to ensure that the software is ready for delivery to the end user. Includes final product testing activities in preparation for delivery, and final customizations based on customer feedback. The most attention is paid to fine-tuning, configurations, installation and user issues.

Each phase in a project begins with the presentation of a Phase Plan: what will happen during that phase in the project, what is the goal of the phase, which iterations in the phase are expected, what are their planned deliveries, what resources are participating in the phase, major disciplines and the like. Each phase of the project concludes with presenting the results achieved during that phase and preparing common views on the plan for the next phase. These are primarily activities that will be handled by project managers on the client and the contractor side. Intense cooperation with the client at all levels is expected throughout the project. The contracting authority appoints a key user, who has the mandate to independently decide on all details regarding the requested solution and is responsible for determining priorities in the project, especially those concerning the list of functionalities being implemented. Business analysts work with key users and other business process representatives to produce functional specifications and other documentation needed for development at a relatively high level of details. The active involvement of key user in the work of the project team will enable the rapid implementation of the solution without over-documenting all

the details before the development activity. Detailed specifications will be finalized at the end of deliveries in the form of documentation of the completed situation. The chief system architect defines the system architecture through collaboration with the entire team. Given that system architecture is usually one of the biggest risks in development projects, the chief architect ensures, through decisions about technologies that will be implemented in implementing solutions, that these risks are removed early and to establish a system architecture that will not only enable smooth operation of the system but also future development in the post-project phase. Other members of the project team are deployed to smaller teams and tasked with implementing and testing individual parts of the system with the aim of parallel development of several functionalities. In this way, by scheduling project activities, requested functionalities and all resources on the project through iterations incremental system growth is enabled: continuous integration of the delivery version at the end of each iteration enables the Client to see all the functionalities implemented up to that given moment, thus reducing the risk of misunderstanding between contractors and contracting authorities regarding the expected functionalities of the system.

7.4 Business/Workflow Analysis

This document contains information collected during the snapshot of the current state of business/work processes and serves as a guideline to bidders in order to create the best possible offer. During the implementation of the required system the bidder is in any case bound to perform a detailed snapshot of the current condition and operation of business processes that will be covered by the phases of the implementation, and all in accordance with the Technical Description, technical specification of functional and non-functional system requirements **that are mandatory. The requested business process analysis refers to upgrade the ISM system with the required functionalities, the integration of ISM systems and applications with the AFIS system, and the development of applications for collection and check of biometric data, the development of applications for offline collection of biometric data (all described in this document) . The analysis of business processes should not last longer than 3 months, where, in addition to the Contractor, will participate the representatives of the end users involved in the project.**

The success of the development or implementation of applications i.e. business information systems largely depends on the understanding and detailed description of the business processes being computerized as well as of the functional specifications based on them. In doing so, it is first and foremost necessary to identify the key information (documents) that initiate or generate business processes and their subsequent flows through the organization.

According to the international practices, the software projects based on functional specifications that are made without a clear understanding of the business processes which are being computerized, on average:

- last longer and are by up to 60% more expensive compared to projects with quality functional specifications
- result in up to 40% bigger use of internal resources that the company has allocated for collaboration with contractors.

The above mentioned lead to conclusion that a well-defined project task, which contains a detailed record of business processes in the scope of the project and functional requirements, saves time and ensures the optimal use of resources engaged in the project of development and implementation of the future system. Within the project of system development and implementation, as an integral phase of the development methodology, a detailed snapshot and analysis of business processes will be conducted and the functional specification of the new system will be developed. The operations within this phase will be performed at the location of the ISM system users.

The analysis will proceed according to the following stages:

- Review of existing documentation
- Snapshot of current work mode (AS-IS models)
- Conduct of qualitative analysis of recorded processes
- Development of functional specifications of software solution

Review of existing documentation

In order to become more familiar with the process covered by project, interior design, strategy and commitments, it is necessary to review the documents related to the organization of business, as well as existing information systems and hardware infrastructure. Subsequently, process modeling and data acquisition required for functional specification will start.

Snapshot of existing mode (AS-IS models)

In the process of recording the existing mode of business processes covered by this project assignment (AS IS), the interviews wuth the the named process owners will be conducted in order to obtain a clear and transparent picture of the actual running of the business processes. The results of the snapshot are presented in a unique, standardized graphical language, as a prerequisite for sequential analysis and optimization of the process. At this step it is very important to record the actual state of the process (as it is currently performed) and not what the process should be in the Owner's opinion. Considering the later step of developing the functional specification of the system for support and automation of recorded business processes, at this stage all necessary elements for the complete functional specification (input and output documents and their attributes, used IT systems, performance requirements, organizational roles and authorities, data classes, security requirements,…) are collected and entered.

Conducting qualitative analysis of recorded processes

Recorded AS IS processes are subject to analysis, aimed at finding "weak points" in the processes (non-value producing functions, inefficient process interfaces, organizational breakages, lack of application support, redundant data). The result of the analysis is a list of weaknesses in the process, for which improvement measures are defined in the optimization process. Based on the results of the analysis, proposals will be made for optimized future (To-Be) business process models in accordance with the future implementation of the system. The To-Be model proposals will be aligned

with the process Owners and will represent an upgraded and optimized version of the As-Is process that will maximize efforts to meet the performance expectations of the new system.

Optimization eliminates weaknesses in the process resulting in:

- Standardization of activities
- Reduction of the number of non-value producing functions
- Understandable data transfer thanks to shared databases
- Elimination of organizational breakdowns
- Reduction of the total execution time of the activity

Development of functional specification of software solution

After collecting all the necessary information in the previous stages, a functional specification document of the new system containing the defined requirements of the business processes Owner and legal and contractual obligations shall be produced. During the drafting period, the preliminary versions will be sent to end users for corrections and comments.

The functional specification for each recorded business process will include:

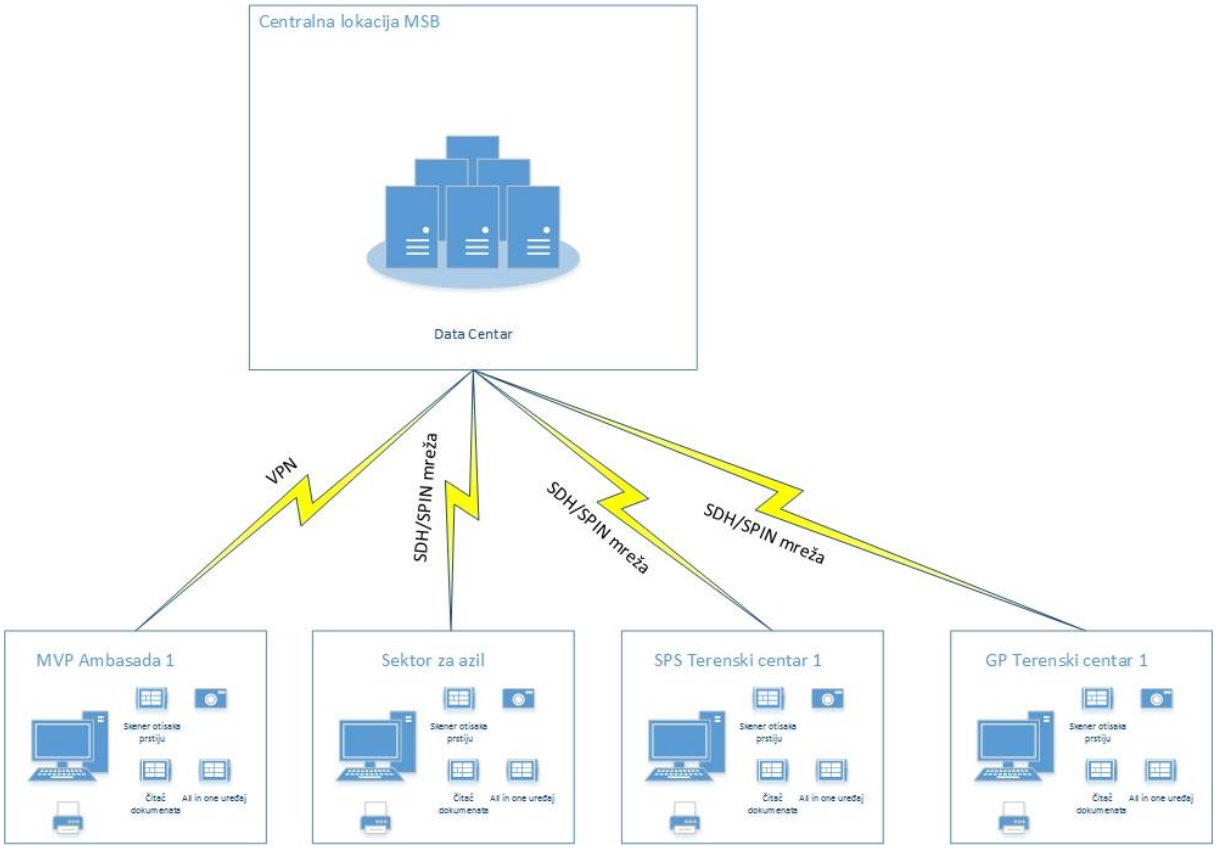
- Model (graphical representation) and process description
- List of requested application functionalities, ranked by priority
- Users of the future system, their roles and authorities
- Input and output data and interactions with other systems
- Other requirements such as required system availability, security restrictions, required performances,…

Following the formal acceptance of the functional specifications, the implementation phase shall begin.

8. Technical solution for the development, implementation and integration of biometric modules in the ISM system

This chapter describes the technical solution for the development, implementation and integration of biometric module in the ISM system. Complete hardware equipment, software licenses and third party software shall be described in detail as well as the ISM system upgrades necessary for its full integration with the biometric module. During the implementation, the Bidder is obliged to take into account all requirements stated in this document and to deliver the complete system on a turnkey basis (which includes delivery of all specified equipment to defined locations, installation, configuration and commissioning of equipment, ISM system refinement, AFIS integration with ISM system, testing of the complete system, system setup, education and training of personnel, delivery of all necessary user and technical documentation as well as support during the warranty period). As stated earlier in the document, part of the equipment is delivered to 120 locations in BiH and worldwide, so it is important to include in the offer all costs of delivery, configuration and commissioning of the equipment to the final locations of the users. Below is a block diagram of a future solution

8.1. Block diagram with basic elements of the solution



The fully implemented solution will consist of two parts:

- Central system located at the location of the data center of the Ministry of Security of BiH
- Remote Sites of the Asylum Sector, Border Police of BiH, Foreigners' Affairs Service and Ministry of Foreign Affairs of BiH

Central location

The central location will host a central AFIS system with all its elements. The ISM system is already at the same location and entire integration of the two systems will take place in a central location .

Also, in a future system upgrade, there will be a Disaster Recovery site for the AFIS system at Banja Luka site, where a replica of the central location shall be created. Disaster Recovery location must operate in so-called Active-Active mode i.e. if the central location stops working, the system must not shut down and the user must not notice that a problem has occurred. It also means that both systems must be in production and process transactions at the same time, thus allowing the immediate transfer of work from site to site while minimizing the percentage of potential transaction loss. In other words, the offered AFIS system, through a future upgrade, must be able to extend its operation to the Disaster Recovery site.

Remote locations

Remote locations are all locations of institutions that shall use the AFIS system. The list of all locations is provided in this document. All remote locations are directly connected to the central location via SDH/SPIN network or VPN connection. Each remote location will be equipped with a desktop computer, biometric data collection set (fingerprint scanner and document reader, photo camera, canvas in case there is no white background for taking photos, printer if none exist on the site, barcode scanner depending on needs). For each location in this document, a concrete list of the equipment will be provided. Also, for certain remote locations, as provided within this document, a mobile set, that will have the same functionality as the desktop set, shall also be delivered.

8.2. AFIS system

This chapter describes the required AFIS system. All AFIS related functionalities listed in this document must be implemented. The offered AFIS system must have a centralized interface for web services. Those web services are used by systems (in the case of this project, the ISM system with upgraded components) for fingerprints entry, search and the like. The AFIS system stores a set of biometric data. Certain AFIS systems also contain so-called demographic information about a person in addition to biometric data, however, in the case of this project, the AFIS system shall only store biometric data on the collected fingerprints, while demographic data shall be within the ISM system and through the integration of the two systems the data shall be interconnected. The use of

biometric data is based on the fact that fingerprints are universal and unique and that there are no two persons who have identical fingerprints. It is also much harder to change or forge biometric data than standard ones. For this reason, the introduction of AFIS would provide a powerful tool for managing, creating and search of biometric data. Offered AFIS system must also have possibility, through the future upgrade, to enable additional checking (matching) using the taken photo. This means that when fingerprints are collected the photo is also taken to be combined into a searchable template that is later used for identification (the capacity of identification using only the fingerprints or the capacity of identification using a combination of fingerprints and photographs).

The basic terminology used in the world of biometrics is:

- Enrolment: The process of obtaining a biometric sample (fingerprint) from an individual. The sample represents the input value for the biometric enrolment process. The primary result will usually be a digital image produced by the appropriate device, in most cases a fingerprint scanner. The image needs to be converted by AFIS in order to create a unique biometric template suitable for storage and processing on a computer. This process is known as biometric feature extraction.
- Verification: The process of verifying a person's identified identity by comparing the entered biometric data with the biometric reference data contained in the AFIS system. The matching process uses input in the form of a person's credential, which shall be scanned fingerprints. AFIS shall verify the entry by comparing it with the person's existing identity information. From this perspective, verification is closely linked to the one-to-one verification method (1:1). The verification relies on the results of the comparisons established by AFIS.
- Identification: The process of discovering a unique record in order to identify an individual. In technical terms identification involves searching biometric data in order to restore the reference biometric identifiers that can be attributed to the individual. Identification usually relies on the search of biometric data and for this reason it relies on the one-to-one concept (1:n). Identification consists of matching one person's data to the entire data set.
- Decision Making: The manual process of identifying a person.
- Extraction: algorithmic selection of pattern structures (minutia-papillary lines) that characterize a single fingerprint. A single set of these structures (minutiae-ridges) is called fingerprint pattern.

Unique identifier

Since biometric features, such as fingerprints, are unique, it is possible to use biometrics to create a reliable unique identifier (this document states that there is also an unique foreigner’s ID within the ISM system, thus having the unique identifier on the AFIS side as well greatly facilitates the integration). This method works by combining biometric and demographic data for each person in the system. Only such combination will always be unique: a number of people with the same first and last name will always be different based on their individual fingerprints. The AFIS system must verify and guarantee the uniqueness of these unique identifiers. This feature provides the basic functionality required for the biometric data comparison process. Activities such as adding comparing, searching, updating, deleting fingerprints, or integrating with other systems all rely on this functionality.

Enrollment

Enrollment refers to the addition of a new record to AFIS system. This process involves the collection and digitization of fingerprint data. Competent institutions will accomplish this task through a fingerprint scanner as well as a software interface (frontend) to the AFIS system, and a camera. Demographics for people whose biometric data shall be entered, will already exist in many situations. Enrollment always includes verification (the verification described below) to prevent identity duplication. A person who wants to enroll must be present at the location. After collecting the enrollment data, the AFIS will continue to encode this information i.e. by automatically creating templates from raw image data. At the end of the coding process, biometric and/or demographic data shall become part of the AFIS system. Then the data will be available for the verification process using biometric templates or demographics.

Verification

Verification refers to defining the connection between input data and data contained in the AFIS system. Its purpose is to confirm the identity (or non-identity - positive or negative biometric requirement) of some entity. The input using the verification process can in principle be biometric or demographic data or a combination of both. Sets for the collection of biometric data. When fingerprints serve as input, typically a " fingerprint search " means seeking a level of similarity between a set of fingerprints and at least one database record that stores digitized information on fingerprints. In most cases, this comparison will be fully automated and will use input and reference data, both of which are in the format of a fingerprint template. If there is no verification, the input of biometric data is "invalid" in the sense that the link to the reference is unknown: we do not know whether the "person X" whose data is entered is actually "person X. Verification is a decision-making process or helps to make a decision on such issues. If verification confrims the identity of the person, we have "hit". "Hit" in this case means that the AFIS system detected synchronization with the input data. The ideal is to have one hit and that the system returns this hit with absolute certainty of 100 percent. Due to the limited data sources (image), it shall not always be possible to achieve 100% accuracy. The system can also return the hit list i.e. the choice of possible matching with the input data. Such situations shall require a decision of the operators.

Precision and efficiency (the effort required to achieve a high level of precision) depends on a variety of factors, of which only the most relevant are listed below :

- Power of software (implemented in the algorithm " AFIS")
- Power of hardware
- Quality of data: data created during registration should always be of the highest quality that can be achieved , otherwise, the quality shall be the limiting factor in optimizing the verification process.

Like in other processes, increasing the effectiveness of verification shall always limit its efficiency. If very high degree of reliability and precision is needed, it shall take more resources than working with less precision. Adding stronger hardware (more and/or faster servers) is an obvious way of addressing this request . The offered " AFIS" must support hardware upgrades in terms of scaling i.e. additional hardware shall ensure proportionally better performance.

The trashold is another important parameter by which the verification process can be configured and adjusted. By definition, trashold is a numerical value or a set of numerical values that indicate boundaries in making decisions. If the security requirements are high, it is logical to use a high threshold. This means that the system will report a match i.e. HIT if the level of consistency between the input and reference data is at least as high as the threshold. In practice, a high threshold will reduce the number of false admissions. At the same time, configuring a high threshold will increase the number of false rejections (false FNMR). Which threshold is appropriate depends on the process and requirements. Data quality is very important because high data quality helps to reduce false rejections and false admissions even if the threshold value is high.

Verification 1: 1

1: 1 verification refers to the process of comparing a biometric entry with a single reference. The reference is in the form of a fingerprint template that can also be combined with a photo of the face in the AFIS system. This reference belongs to a person previously enrolled in the AFIS system for whose identity the claimant claims to be his/her. In other words, the system will directly compare the input fingerprints of a potential person's individual record, creating a "Hit" or " No Hit". The result is likely to be accurate and can be increased by using high data quality and a high threshold value. Example:

Live scanning: In most cases, verification will be a "live" process that requires the applicant to be present at the site. This person will provide biometric input by placing his/her finger on the fingerprint scanner.

Verification 1: n

This application scenario refers to the reliable disclosure of individual identity in the AFIS system. Using this way of verification we look for a difference between the entry, on one side, and all data in the AFIS system on the other side. If AFIS manages to find such a difference, this difference will make the data entry unique. Verification 1:n differs from verification 1:1 in the following:

- Identification achieved by using the 1:n verification mode typically uses very large amounts of data
- The error rate at 1:n verification tends to be higher than with 1:1 verification.

In practice, a verification 1:n means that the biometric data input set (template) will be matched against all records (templates) in the AFIS system. The result can be one hit, several hits (hit list) or no hit.

In addition to the above mentioned, the offered AFIS system **must** have following functionalities:

- The offered AFIS system must support smooth use from all locations listed in this document (approximately 200 locations)
- The fingerprint scan time of 1:N verification should be no longer than 7 seconds
- AFIS delivery must include perpetual licenses for all 200 locations(regardless of the number of users per location), plan to support AFIS enrolment of 1,000,000 individuals without additional licensing, regardless of the number of prints collected, possibly new locations or new records would be additionally licensed without re-licensing previously purchased licenses.
- The AFIS database license must be durable, supporting uses from 200 locations, regardless of the number of users at those locations, with no additional cost to users.
- The delivered AFIS system must be web based i.e. it must have open interfaces where it is accessed by other applications through web services in order to use the functionalities of AFIS (e.g. new record entry, data export, data import, records search...)
- When implementing an AFIS system, it must support full two-way integration with the ISM system and its biometric component as described in this document
- The offered AFIS system must support the installation and operation on standard hardware platform with the Windows frontend system and Linux backend operating system
- The delivered AFIS system must have possibility to be installed and used on the hardware platform described in the Hardware Structure chapter
- The offered AFIS system must have possibility to add new hardware resources in case of need for larger resources to process matchings.
- The offered AFIS must, among other things, provide through its web services the following functionalities: permanent deletion of record, entry of a new record, update of an existing record, verification and addition to record, verification and entry of record, search and entry of a new record
- The offered AFIS system must have a solely software-based fingerprint matching system, with no proprietary hardware for processing and no matching accelerators hardware.
- Fingerprint technology must comply with the standards: ISO / IEC 19794-2 and ISO / IEC 19794-4
- The offered AFIS system must be fully compatible with the offered fingerprint scanner
- The offered AFIS system must be fully compatible with the offered photo camera
- The offered AFIS system must have the functionality of export, import of biometric data and their search
- When implementing the AFIS system in question, it is necessary to migrate data from the existing SPS biometrics system. During the implementation of the AFIS ystem, the competent institutions of BiH will make a decision from which records the biometric data will be migrated. This data will then be packed in standardized NIST files, of the required quality, therefore enabling mass migration.
- When processing the same person on other grounds/ processes in the ISM, within 5 years from the day of the preliminary processing of that individual, biometric data are used for the

purpose of identifying the person and keeping a log of it. If the same person is processed in the ISM on other grounds/processes after 3 years of previous processing, his/her biometric data is stored again in the system. If the second ground/process, by which the same person is being processed in the ISM, prescribes the collection and storage of more biometric data than the previous ground/process, then the system should enable the storage of additional biometric data for that person.

- Specialized Fingerprint processing
- Sequence checking
- Automatic Correction of Error (ACE)
- Incorrect Candidate Elimination (ICE)
- Miss Analysis
- The biometric matching system shall implement a mechanism be tolerant to "fingers not in sequence" acquisition:
    - in order to detect any error at the enrolment level, the fingerprint biometric system shall have an integrated cross finger matching feature: matching of all fingers against all fingers regardless of their position i.e. matching a right forefinger against ALL fingers of the database (matching the forefinger against the left middle finger, ring finger etc…)
- The biometric matching system shall perform fingerprint orientation independent matching:
    - in order to be tolerant with enrolment mistakes, the fingerprint biometric matching system shall be able to match a fingerprint against a rotated fingerprint regardless of the angle difference, from 0° to 360°
- The offered AFIS system must have possibility of deleting data in accordance with the rules for the personal data retention.
- The offered AFIS system must have an option, in the future upgrade, to work at Disaster Recovery (DR) location at Banja Luka, in a way that data entered at the central location in Sarajevo are automatically entered at Banja Luka, and in case of the central (primary) location in Sarajevo crash, the AFIS system must continue to work without interruption so that the user carry on with his/her their daily activities. The Disaster Recovery location must work in so called Active-Active mode i.e. if the central location stops working, the system must not shut down and the user should not notice that a problem had occurred. This also means that both systems must be in production at the same time and process transactions, thereby allowing the immediate transfer of work from site to site while minimizing the percentage of potential transaction loss. The fingerprint matching system shall not use any proprietary hardware or firmware and rely on a 100% software solution allowing the Customer to use their preferred material
- The Customer IT services shall be able to replace defective material easily without contacting the system provider
- The fingerprint matching system shall not use any third party database.
- The offered AFIS system must have the possibility to add multiple versions of biometric data for one person, such as if a longer period of time has elapsed since the last biometric data collection and new data should be collected. It is also important that the offered AFIS system has the possibility to define for certain sets of already collected biometric data that they are inactive and the like.

8.3. Integration of AFIS system with ISM system, ISM system upgrade

This chapter provides basic information regarding the integration of the biometric module with the ISM system. These are given as a guideline/framework to the bidders, while the final specification of the works will be defined after the business/workflow analysis has been completed, the final functional specification has been created and the end users have adopted it. **The biometric system in question must be an integral part of the upgraded version of the ISM.**

According to the legislation, the use of the biometric module can be divided into two cases:

- Collection of foreigner's biometric data in accordance with the Regulations on Registration of Biometric Characteristics
- Identification of foreigner through 1:1 and 1:N comparison of biometric data, in accordance with legal regulations.

Collection of foreigner's biometric data and 1:1 and 1:n identification of biometric data in accordance with legislation

In accordance with the Rulebook on the registration of biometric characteristics of foreigners ("Official Gazette of BiH", number 55/16) the authorities responsible for the collection of biometric data of foreigners are:

- The Ministry of Foreign Affairs of Bosnia and Herzegovina is authorised for collection of biometric data in the process of issuing visas in diplomatic and consular missions of Bosnia and Herzegovina in the process of applying for a residence permit in BiH through these missions.
- The Border Police of Bosnia and Herzegovina is authorised for collection of biometric data in the visa isssuing process at the border.
- The Service for Foreigners' Affairs is responsible for collection of biometric data in a procedure of determining the identity of a foreigner, or from the foreigner who is illegally staying in BiH or who has been expelled from BiH or has been placed under surveillance or is in the process of issuing a certificate of stay, as well as from a foreigner in the process of granting a residence permit in BiH.
- Ministry of Security - The Asylum Sector is responsible for collecting biometric data in the asylum application process in BiH.

The collection of biometric data, in the sense of the above mentioned Rulebook, means taking of photographs and fingerprints, as well as signatures, using appropriate technical tools.

To give bidders a better picture of how the biometrics module will work, several scenarios have been considered about at which point biometric data shall be collected from the foreigners (**whether one or all of the scenarios will be implemented depends on the results of the business analysis and end-user needs analysis, as well as the final functional specification**). Regardless which scenario will be implemented i.e. how the ISM will be upgraded, the upgrade must be based on an existing ISM system (Microsoft Windows Server platform, SQL server, Microsoft development environment) and must follow the logic and business processes currently implemented within ISM.

No matter which scenario is used, the initial step in the ISM system is to search for a foreigner i.e. finding if already exists in the ISM system so he/she is not entered twice. The foreigenr search is a basic and starting point for entering data ona foreigner. In order to make the entry, you must first search for foreigners. Searching for a foreigner is the first step, whether it is a data entry or an operational check of a foreigner for specific purposes, it is not possible to click the "Add foreigner" button unless a check has been carried out.

The main search engine allows you to search for foreigners according to the following criteria:

Foreigner ID - Search for foreigner by foreigner's ID

Name - Search by part of the foreigner's name entered

Surname - Search by part of the foreigner's surname entered

Birth Date - Search for foreigner by date of birth

Gender - Search for foreigner by gender

Citizenship - Search for foreigner by citizenship

Document category - Search for foreigner by document /travel document category

Document type - Search for foreigner by document /travel document type

Document number - Search for foreigner by document /travel document number

Issuing country - Search for foreigners by document/travel document country of issue

Expiration date - Search for foreigner by expiration date of the document/travel document

Search in: list of values (Search in ISM, Search of border crossings, Search for online residence registrations).

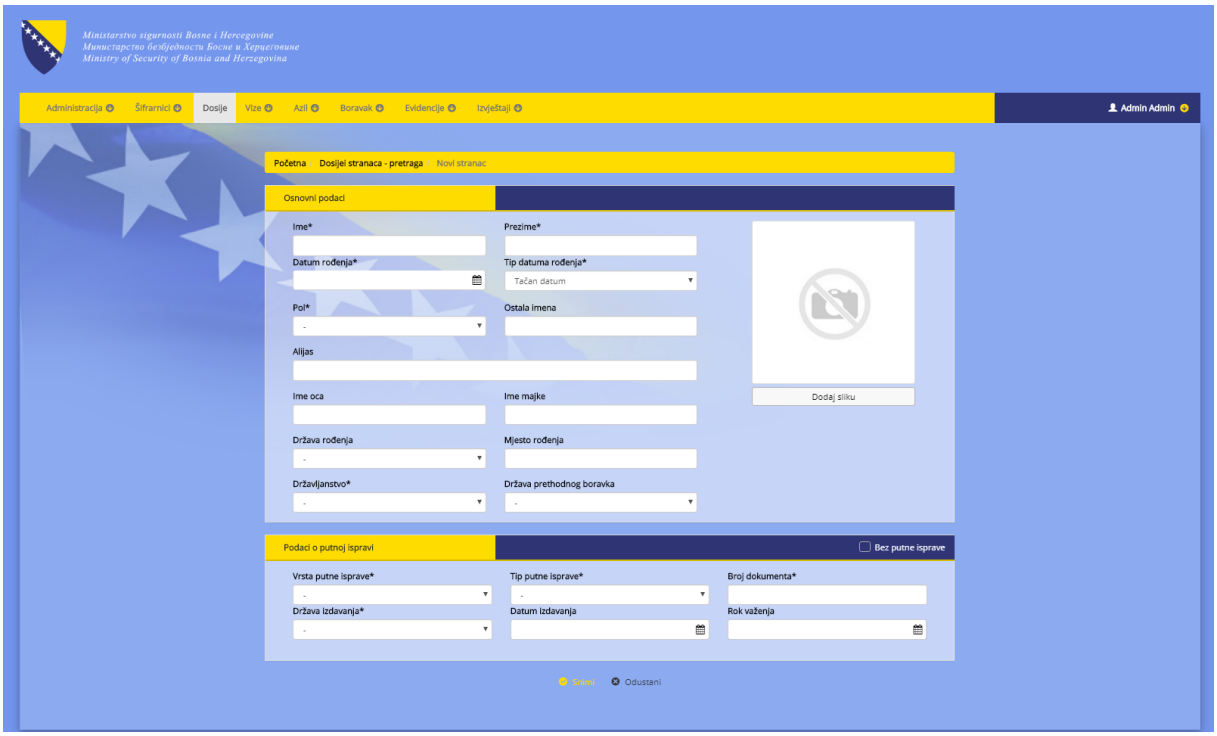
After entering the search parameters and clicking on the "Search" button, tables with search results are visible. The first table shows the foreigners whose data exactly match all the search parameters. The second table shows foreigners whose data match only some of the search parameters.

If there are search results, a "Select" button will be visible in each row in the table. Clicking on that button displays the file of the selected foreigner. Besides these two search results tables, an "Add foreigner" button is displayed. Clicking on this button opens a form for entering a new foreigner. The "Add foreigner" button can only be clicked when a search is completed.

The new foreigner entry form is automatically filled in with the search parameters entered, from the foreigner search form.

By filling in the form and clicking the button "Save", the data is saved to the database, if they are valid. In this step, a foreigner ID number is also generated .

The new foreigner entry form looks as on this image:



It is important to note that even when entering a new foreigner (i.e. when saving data), a check is made whether the foreigner with the entered data exists in the database, i.e. if a foreigner already exists, the entered data is merged with the data of the found foreigner.

If the foreigner with the entered data does not exist, a new foreigner ID is generated.

After successful saving of data, the "Foreigner File" form opens. Click on "Cancel" button displays the foreigner search form.

The considered scenarios for using the biometric module are as follows (both scenarios need to be implemented):

- Initial identification of a foreigner is done through fingerprint verification, verification is done within the AFIS system using the application described in this document and in case of a hit, the foreigner file is opened. If there are no hits, a form for entering a new foreigner file into the ISM system opens or the system reports that there are no search results without entering a new file.
- Initial identification of a foreigner is done with existing search, and in the case of hit, if biometric data are not previously collected and if for the given procedure it is requested (e.g. an application for a visa or an application for residence), the collection is done using described application . This part is related to new foreigners or to foreigners who have already gone through the ISM system before, but for whom biometric data are not collected.

It is important to note that regardless of which scenario the user uses, it is necessary to closely link the existing ISM system and application for identifying foreigners and entering biometric data in such a way that one system can be opened through the other system and vice versa without the need for additional logging or re-entering of data .

Also, it is important to note that the unique identity of foreigners within the ISM system is based on the foreigner ID, so it is obligatory to make a link between the foreigner whose prints are stored in the AFIS system and that same foreigner whose data is stored in the ISM system.

As part of the upgrade of the ISM system to work with the biometric module, it is necessary to develop a special application (developed on the existing Microsoft platform and compatible with a minimum of Windows 8 and Windows 10.) that will be installed on all end users workstations and used for collection of biometric data (fingerprints, signatures, and photos) and for the initial identification of the foreigner. Some of the functionalities that this application must have is as follows (the list is provided as a guideline to the bidders, while the final set of functionalities will be defined after the business process analysis has been completed and the final functional specification has been confirmed):

- Must be developed on an existing Microsoft platform and compatible with a minimum of Windows 8 and Windows 10
- Must fully follow the logic of the existing ISM system in the domain of search methods, data entry, process logic and the like.
- It is also necessary to create an additional application for the mobile set, which will have an option to work in an offline mode i.e. the possibility of complete process of biometric data collection when no central location is available, and once that communication is established, data synchronization should be performed. When creating the application, special attention should be put on integration and subsequent synchronization with the ISM system, in order not to impair the integrity of the work and the integrity of the data. During the initial system analysis, this application will be further specified.
- Must be fully integrated with the ISM system and the AFIS /ABIS system
- Must be integrated with the SDK fingerprint scanner, signature collection device, camera and barcode reader.
- Integration with the document reader (depending on the location). That integration implies that after scanning the travel document, data from the MRZ zone is automatically printed at the proper form boxes.
- Must be integrated with the advanced functionalities of the fingerprint reader SDK (fake finger, quality of the collected fingerprint, etc.)
- Must have functionality (besides integration with fingerprint scanner SDK) of fingerprint sequence selection.
- Must have functionality (besides integration with the fingerprint scanner SDK) of displaying what is the last of the fingerprints collected
- Must have functionality (besides integration with the fingerprint scanner SDK) of notifying that a particular collected finger is false or wrongly positioned
- Must have functionality (besides integration with fingerprint scanner SDK) of displaying the quality of each fingerprint collected
- Must have the functionality of automatic or manual use of the fingerprint collection sequence
- Using the authentication mechanism (system administrator), there has to be the possibility to manually set the quality threshold for the collected fingerprints and the threshold for determining whether the collected fingerprint is false or not

- Must have the functionality (besides integration with the fingerprint scanner SDK) of displaying one image of collected fingerprints, segmentation of collected fingerprints, and quality of each individually collected fingerprint.
- Must use the existing ISM database for storage (in addition to storing collected fingerprints in AFIS system)
- It must use the user credentials and rights of the existing ISM system and in accordance with these credentials different versions of the application will be open to the users (whether for identification only or identification and entry, depending on how many fingerprints are taken, etc.)
- Must have two-way integration with the ISM system (sending data to and receiving data from the ISM system).
- Must have the possibility to enter basic data on foreigner in order to generate foreigner's ID through integration with the ISM system and create a file within the ISM system in order to be able to collect biometric data and link to the foreigner's file.
- Must have possibility of search for foreigners using only a fingerprint as well as printing the search results with links for access to complete files within the ISM system without the need for additional logging on the ISM system.
- It must have functionality to subsequently collect biometric data from foreigners who are already in the ISM system
- It was earlier stated which institutions and in which situations collect biometric data. In some institutions, one person receives requests (e.g. for residence), performs the search for a foreigner, entry of a foreigner and collection of biometric data, whereas in some institutions one or more persons receive requests, performs search and entry of basic data on foreigner while others collect the biometric data from foreigners. In this regard, it is important to develop mechanisms for the application to have an option to operate in the specified modes (e.g. creating a specific receipt upon receiving a request that would contain a bar code or QR code which would be scanned with a reader for identification purposes during the collection of the biometric data).
- Using a mass deploy tool, it must have possibility to be installed from one central location to all remote locations in BiH and worldwide. This installation applies to new versions of the application, upgrades, new device drivers and the like.

Consider the fact that in accordance with the Decision on determining the international border crossings in Bosnia and Herzegovina where visas can be issued there are border crossings at which they issue visas by using ISM Visas module, while at the same border crossings the identification of foreigners can be made through biometrics. The list of border crossings at which visas are issued is given below:

- Orasje International Border Crossing,
- Gradiška International Border Crossing,
- Izacic International Border Crossing,
- Kamensko International Border Crossing,
- Gorica International Border Crossing,
- Bijača International Border Crossing,

- Brod International Border Crossing,
- Rača International Border Crossing,
- Karakaj International Border Crossing,
- Hum International Border Crossing,
- Klobuk International Border Crossing,
- Doljani International Border Crossing
- Sarajevo Airport International Border Crossing,
- Banja Luka Airport International Border Crossing,
- Tuzla Airport International Border Crossing,
- Mostar Airport International Border Crossing.

In addition to the above application, it is also necessary to upgrade the ISM system with new functionalities (the list is given as a guideline to the bidders, while the final set of functionalities will be defined after the business process analysis has been completed and the final functional specification has been confirmed):

- All upgraded functionalities must be on existing platform and source code (Microsoft platform Windows Server, SQL server, Microsoft development environment)
- Single sign on functionality for authenticated users, coming from the aforementioned application for biometric data collection, for which there will be no need for re-authentication
- Improved administration module for managing of users and their rights when using the application
- Refined foreigner's file to display the collected biometric data
- Refined foreigner entry form and foreigner search form in order to be integrated with the document reader (depending on the location). This integration implies that after scanning the travel document, data from the MRZ zone is automatically printed in the appropriate fields on the specified forms. Improving the form for searching and entering a foreigner with a bar code reader so that the bar code can be read from the certificates issued from the ISM system and those data transferred to certain parts of the form. It is necessary to develop the integration for at least one of the commercial browsers (Internet Explorer, Chrome or Mozilla Firefox).
- Modification of Visa module as well as temporary and permanent residence modules to print a photo on the visa and residence stickers.
- Modification of the forms printed from the ISM system so that a photo of an foreigner can be displayed on them (about 20 forms)
- Creating a two-way integration mechanism for integration with application for biometric data collection
- Improvement of the system for logging actions related to the collection and search of biometric data.

- Biometric data are stored at certain official records in accordance with the Rulebook on content, method of keeping and use of official records on foreigners. In those records, this data is called personal data of a special category foreigner. All records listed in the Rulebook are part of the ISM system. As part of this project, the above records need to be upgraded so they can contain biometric data (the fingerprints, as previously stated, in these records will

be kept in the image format, while the fingerprints for comparison will be kept in the AFIS system). The records keeping the biometric/special category foreigner data are:

  - Records of foreigners who have applied for a visa and foreigners who have been issued visas
  - Records of foreigners who have applied for a residence permit through BiH diplomatic-consular offices
  - Records of foreigners who have applied for visa and foreigners who have been issued visas at the border
  - Records of foreigners with established identity
  - Records of foreigners who have applied for a visa extension and foreigners whose visa has been extended
  - Records of foreigners whose visa has been revoked with the expulsion measure imposed
  - Records of foreigners who have applied for residence, who have been granted permanent or temporary residence permit
  - Records of foreigners whose residence has been cancelled with the pronounced expulsion measure
  - Records of foreigners who have been issued the decision on the expulsion
  - Records of foreigners imposed with the decision on placement under surveillance and who are subject to surveillance
  - Records of foreigners who have been granted a certificate of stay.
  - Records of travel documents for refugees
- Refinement of the service for verification of visa, residence permit, residence records at the Border Police System (KPDG IS) in order for the service to receive an image from the ISM system, as well as refinement of those services on the ISM system side to restore the image of a foreigner.
- Improvement of the ISM system report module with new reports. It is estimated that approximately 20 new reports will need to be created where each will have a minimum of 20 print and search parameters

It is important to note that the upgraded ISM system works in the way “one natural person one file”, i.e. it cannot happen that there are multiple files for one person, regardless of identity number. The complete upgraded ISM system is based on the principle that records are recorded for one natural person/file (it does not matter if one person submitted one or more visa applications, or sought asylum, etc., that person will always be referred to the same dossier with the possibility that one person has one or more identities that can appear without a rule in the records). One foreigner ID is always linked to one foreigner file, regardless of the foreigner identity number. This means that the very process of creating an foreigner file that includes biometric data must be upgraded .

8.4. Functional Requirements

General

- Entire ISM system upgrades and integration of AFIS and ISM systems must be fully compatible with the existing ISM system described in this document and must be developed on the same platform.
- Border Police BiH will use the system in question on the second line of checks
- All eventually new codebooks must fit into the existing ISM system
- All upgraded functionalities, where technologically possible, must be capable of operating under the https protocol
- The web interface must support the world's most popular Internet web browsers, if they are web-based upgrades, or if the upgrades are created as desktop applications they must be compatible with a minimum of Windows 8, 8.1 and Windows 10.
- System architecture must be based on object-oriented models and concepts.
- The graphic design of the upgraded functionalities must accompany the design of the current ISM system (an example of the ISM system screen given in this document)

8.5. Non-functional requirements for upgrading a ISM system with a biometric module

During the implementation, industry standard guidelines should be followed, including but not limited to:

- Scalability - the ability of a system to scale up and down to support different numbers of users and transactions. Upgraded functionalities must be able to scale horizontally (by adding more servers) and vertically (by increasing the capacity of existing hardware)
- Flexibility and adaptability - The system will have a high level of flexibility and adaptability in case of environment changes. Such adaptability will enable future system configurations and adjustments in an easy and acceptable way
- Reliability - the ability to perform given functions within given conditions in a given time
- Reusability - Reusability of software components
- Availability - implies use by any user through available communication channels
- Data sharing and interoperability - data sharing with other systems must be possible
- The system must have the possibility of future functional upgrades in order to enable the exchange of data with EURODAC and other EU systems in the field of migration, visas and asylum, as well as other international institutions in the way that EU member states do.

- Security - implemented upgraded functionalities must have, as an integral part, modules and technologies that meet security requirements such as physical security, repair, authentication, authorization, communication, data security and data access, audit, etc.
- Robustness
- Fault resistance
- Sustainability - Easy modifications and upgrades
- Ease of use - easy to understand and quick to accept
- The upgrade must be based on an existing ISM system (Microsoft Windows Server platform, SQL server, Microsoft development environment) and must follow the logic and business processes currently implemented within ISM.
- Easy delivery of new versions of the application - possibility of centralized deploy of new application versions
- Since the ISM system will be active during the implementation of the biometric module, it is very important that any work on the biometric module does not jeopardize at all current operation and functionality of the ISM system. It is used 24/7/365 and any system shutdowns should be under strictly controlled and predefined conditions. The eventual downtime of the existing ISM system must not exceed 15 minutes.
- Since it is a very sensitive and security significant system, it is not allowed to take the source code of the existing system and bring it outside the safe premises of the MSB. Source code and technical documentation will only be available at the MSB premises and it is not possible to be taken out of those premises. This means that all development and refinement of the existing ISM system will be carried out at the central location of the MSB in Sarajevo, under constant supervision of the MSB authorized persons. MSB will provide all necessary working conditions (workspace, access to servers, network...). Also, under no circumstances will remote access to MSB infrastructure be allowed. The same conditions apply to the warranty period.

9. System Testing and Adjustment

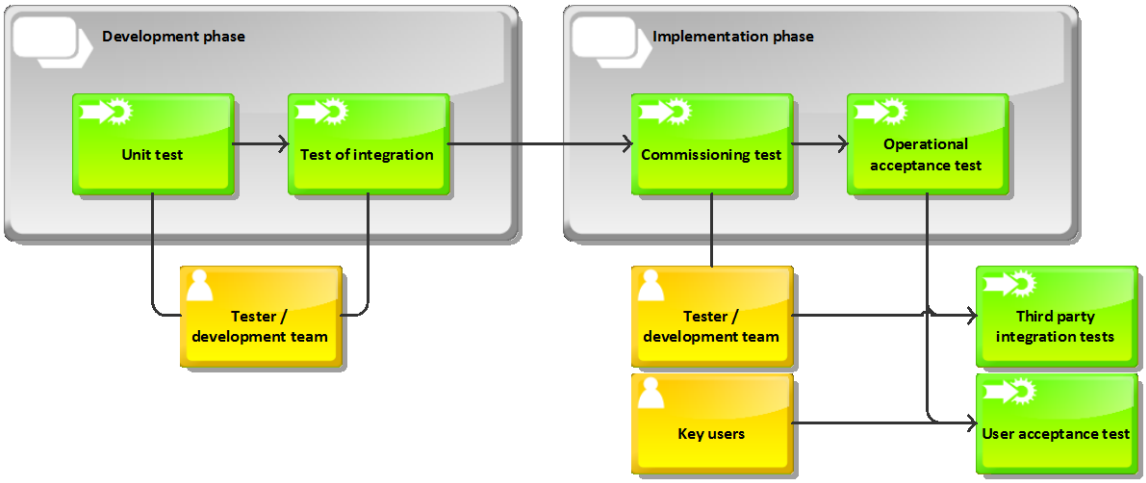
After certain parts of the biometric module have been delivered (according to the established development methodology), those functionalities must be ready for use. The first testing is to be performed by the Bidder, after which the teams of users and the Bidder shall perform joint testing. The Bidder shall make all necessary adjustments to the delivered units until the new system is fully functional and in accordance with the project task. Well-designed test plans, test scenarios and test reports must be created also. Experts in charge of the testing process will interact closely with the rest of the project team, primarily with the project manager, business analysts and the development team. Testing activities shall be undertaken during the development phase and shall continue during the testing (stabilization) phase.

The purpose of the test process is:

- Fulfillment of functional requirements.
- Satisfaction of user needs.
- Implementation in accordance with functional and technical specifications.
- Work in a way that shall be described in the user instructions and technical instructions

Test Methodology

The following image describes a set of activities that are performed during testing



Testing will include the following types of tests:

- Development phase:
    - Tests of individual units after sprints
    - Integration Test - a test that describes the integration of certain components into one meaningful functional unit
- Implementation phase
    - Test at system startup
    - Integration with possible 3rd party systems, tools and software
    - Compatibility test
    - Performance test
    - Test under load
    - Security test

10. User Training and User Documentation

The performance parameter in the overall project implementation is the subsequent usability of biometric module by the user, and therefore user training should be considered a key part of the implementation. Each delivery of certain functionalities should include an indispensable segment - a user training in operating the system.

In order to better understand certain functionalities of the system, the primary training of users should be planned at the user's location (except for users in diplomatic and consular missions for which the training shall be conducted online) and the primary training should be conducted in smaller groups with special attention paid that knowledge is transferred clearly and precisely to the users i.e. that they are 100% trained to operate the system. It is important to note that a smaller group means a group of less than 20 users and that it is necessary to train 1500 end users.

For userss from diplomatic missions and consular posts, depending on availability, the trainingshall be provided at the MFA in Sarajevo, or as an online training for the staff who are unable to physically attend training in Sarajevo. In the case of online training, it is necessary to provide a platform for such type of training with created content. The training must be in one of the official languages in BiH

For better quality primary training, the user documentation must be provided to users prior to conducting the training and must be clearly and accurately written to make it understandable to all users of the system. The user documentation must cover all the functionalities of the system and must be organized in accordance with the rights of users in the system. User documentation must be submitted in paper and electronic form and shall be in one of the official languages of BiH

11. System Administrator Training and Technical Documentation

System administrator training is a very important component in the later usability of the implemented system. In order to better understand certain functionalities of the system, the primary training of administrators should be planned at the site of the user and it should be carried out in groups with system administration. It is important to note that it is necessary to educate 50 system administrators and that the training for administrators should not last less than 7 days. Training must be in one of the official languages in BiH

After conducting the primary training, it is necessary to provide customer support services (phone, e-mail, skype) for the administrators where the established team is always available and ready to answer any additional questions about the administration and use of the system within one year from the beginning of its use.

For better quality primary training, user documentation for administrators must be provided to administrators before conducting the training and must be clearly and accurately written to make it understandable to all system administrators. User documentation for system administrators must cover all system functionalities, must be submitted in paper and electronic form and must be in one of the official languages of BiH.

In addition to the user documentation for administrators, complete system technical documentation must be supplied. Technical documentation must be submitted in paper and electronic form and it must be in one of the official languages in BiH, and include at least:

- Design and description of system architecture
- Database schema and description of how to keep scanned and created documents
- UML diagrams and detailed description of implemented business processes
- System maintenance procedure
- Backup procedure for the complete system.
- Detailed description of installed equipment, software and services performed
- Report on functional and non-functional testing of all system components

Within the offer for the training of system administrators it is necessary to take account of and plan a 5 working day study visit to the manufacturer of AFIS solutions for for 10 system administrators. The visit should also include a tour visit of some location where AFIS system with all its components is set in the production environment.

12. Warranty period

Guarantee services must be provided for the implemented and requested functionalities of the system as well as the hardware and software supplied. This chapter describes the required warranty conditions for the implemented ISM system upgrades, while the warranty conditions for the necessary hardware and software infrastructure are given along with the hardware specification in Chapter 12. The implemented system will operate in accordance with the implemented functionalities and for a period of 1 (one) year, counting from the date of signing of PAC (Provisional Acceptance Certificate), and during the warranty period all error fixes in the system must be provided free of charge.

The warranty period will include:

- Free debugging within implemented and requested functionalities
- Provision of an online help desk for users and system administrators during working hours (since some of the users of the biometric module are the BiH diplomatic and consular posts, by working hours means working hours of the time zone where they are located). The Bidder is required to have a Help Desk tool available on the Internet and it must be localized in one of the official languages in BiH

Organization of the warranty period

The target time for correction of reported faults should not exceed:

Security Level 1: until resolved with a reaction time of up to 2 hours

Security Level 2: within 1 business day with a reaction time of up to 4 hours

Security Level 3: within 3 business days with a reaction time of up to 8 hours

Priority	Description
Security level 1	A catastrophic system crash, with the system unable to support business processes
Security level 2	A serious system crash, but the system can still be used to support business processes. This can also be a Security level 1 issue, but with a documented workaround
Security Level 3	A problem that is not serious and does not affect the business process

Fault Reporting

After noticing irregularities or shut down of the system, users shall report. End users will provide a list of their employees who can report incidents. In order to report an incident, the user must provide the following information:

- Contact information for the person reporting the incident (name, surname and phone number)
- Request details (fault description, level of importance, location)
- Who else was notified of the incident

The Bidder's Technical Support issues a ticket containing the following information:

- Who received the request
- Day, month, year and time of request
- Who submitted the request
- Who else was notified of the request
- Who is in charge of solving the problem

Once the problem has been resolved, the bidder will notify the user (in writing) with the following information:

- Start time of troubleshooting
- End time
- The person responsible for solving the problem
- Problem description
- Time spent on problem solving

In addition to the web application, there must be two other ways to report a malfunction, interference or request:

- by email
- by calling the duty phone number

13. Licenses

Since module for biometrics shall be used on max 120 physical locations, with 1500 end users and in this respect it is needed to deliver all the necessary server licenses, potential additional licenses for use of certain functionalities for hardware, AFIS server and user licenses, licenses for 200 locations for collection of biometric data, regardless of number of users. All delivered licenses must be premanent, i.e. with no time limit and no additional or hidden costs .

14. Copyright and Intellectual Property Protection

All generated documentation, changes to the application code (other than third-party software) and other types of electronic or hard copy information, that arise during the contractual relationship, become the permanent property of the MSB, which reserves the right to make modifications and changes.

All information provided through documentation, application code, access to databases or otherwise, owned by the institutions involved in the project, may not be used by the contractor outside the contractual scope and is obliged to protect from an unauthorized use. The aplicative program code may be available to the executor only in the designated environment authorized by the institutions involved in the project, with the obligatory signed statements on information protection.