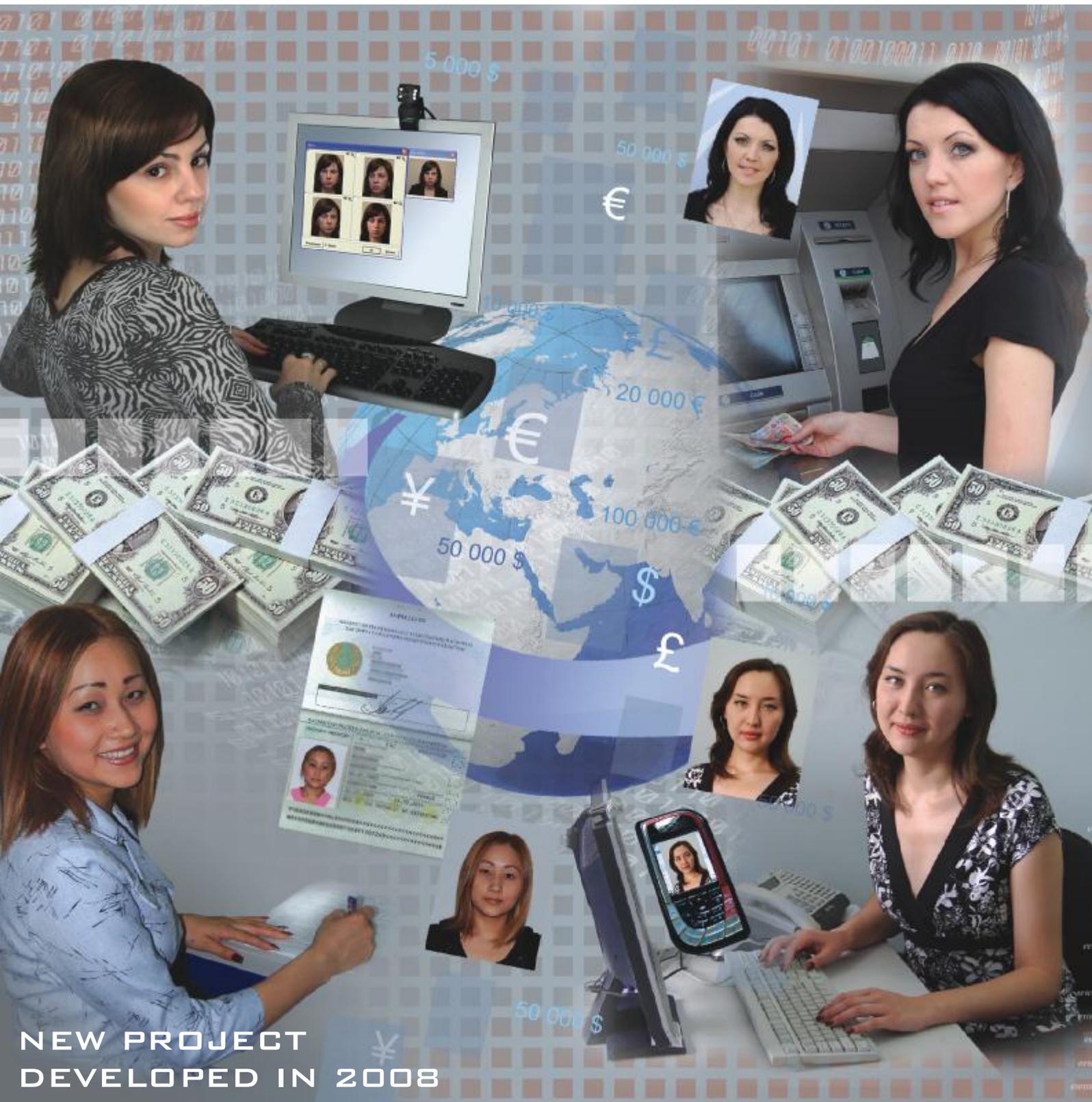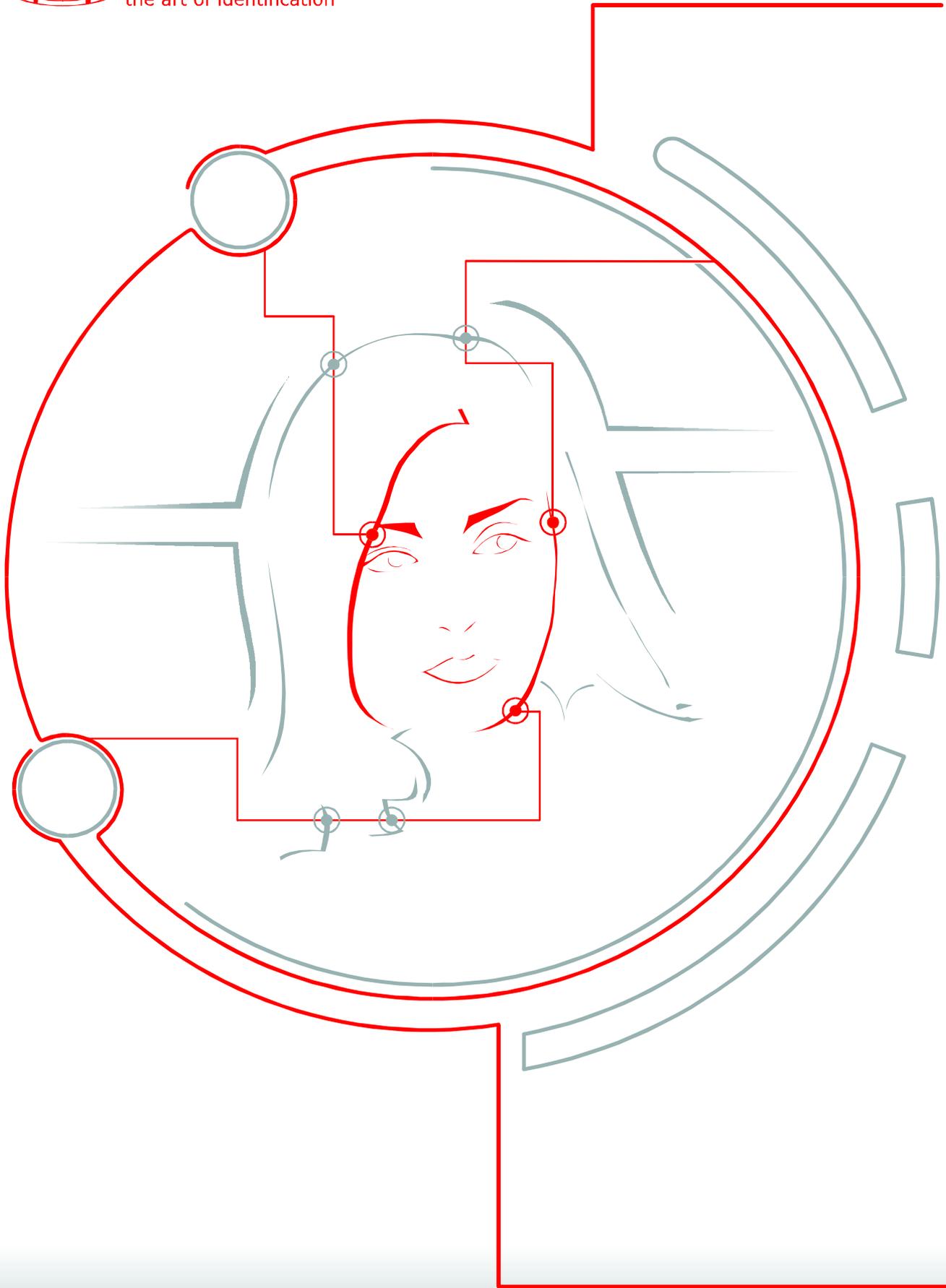NEW PROJECT
DEVELOPED IN 2008

**FACE EXPERT BANK
INTEGRATED SYSTEM (FEBIS)**

MULTIFUNCTIONAL BIOMETRIC SYSTEM FOR BANKS

Your Recognition Choice™

ASIA
SOFTWARE
the art of identification

FACE EXPERT BANK INTEGRATED SYSTEM (FEBIS)

MULTIFUNCTIONAL BIOMETRIC SYSTEM FOR BANKS

FEBIS IS AN INNOVATION IN THE WORLD OF TECHNOLOGY

FACE EXPERT BANK INTEGRATED SYSTEM (FEBIS) is a multifunctional biometric system for bank client and employee identification based on innovative facial recognition technology.
FEBIS enables the creation of a central database to be performed automatically. The system's database includes personal data (first/last name, date of birth, etc.) and graphical data (photo images) of clients and allows client identification, whilst serving them in any of the bank branches during such processes as issuing plastic cards, opening accounts, withdrawing cash or any other bank service.

Modern methods for structuring and analysing huge amounts of biometric data, unique coding solution and wide recognition of biometric data are the core of the system which shows high accuracy and speed rates within the search results of multimillion record databases in live mode. FEBIS meets the standards of any country or organisation and supports the work of an unlimited number of offices.

FEBIS MEANS FLEXIBILITY IN A COMPLEX SOLUTION

FEBIS includes a range of subsystems that provide internal and external security for bank activities and increase the protection level of confidential information and the loyalty of banking customers.

The basic system consists of the following components:

FEBIS-Credit is an automatic facial recognition information search system that increases the quality of service provided by the banks, lowers the risk of unserviced loans banks and prevents fraud. This system is a special software unit for the use of bank credit committees. FEBIS-Credit enables the automatisation of the identification process and formation of a database that includes customers' personal details (first/last name, date of birth, etc.) and their graphical data (facial images).

FEBIS-ATM is a biometric identification system for debit and credit card holders based on facial recognition. FEBIS-ATM provides highly reliable protection against unauthorised use of credit and debit cards in cash machines and prevents frauds that involve cash machines.

FEBIS-Remote Control is a biometric system for client identification, which uses the bank's services via the Internet **(FEBIS-Internet Banking)** or cell phones **(FEBIS-Mobile Banking)**. The services that are available via the Internet are constantly growing and improving. FEBIS-Remote Control enables the secure management of financial resources (accounts, deposits) of bank customers and the safe execution of banking operations conducted through the Internet.

FEBIS-LOGON is an access control system for computer resources on the basis of facial recognition technology that enables accurate and immediate user identification and provides reliable security against unauthorised access to PC/server equipment. Strict determination and differentiation provide information security for each hierarchical level of the bank's internal activities.

Implementation of the FEBIS solves a wide range of threats to banking security. The system's progressive structure allows for continuous improvement of the system by functional expansion of each subsystem or the introduction of new systems unrelated to core banking needs. For example, **GATE KEEPER** is a biometric system for multifunctional access control and management at the bank premises and the bank's outside territory. This system enables access rights for each employee to be regulated.
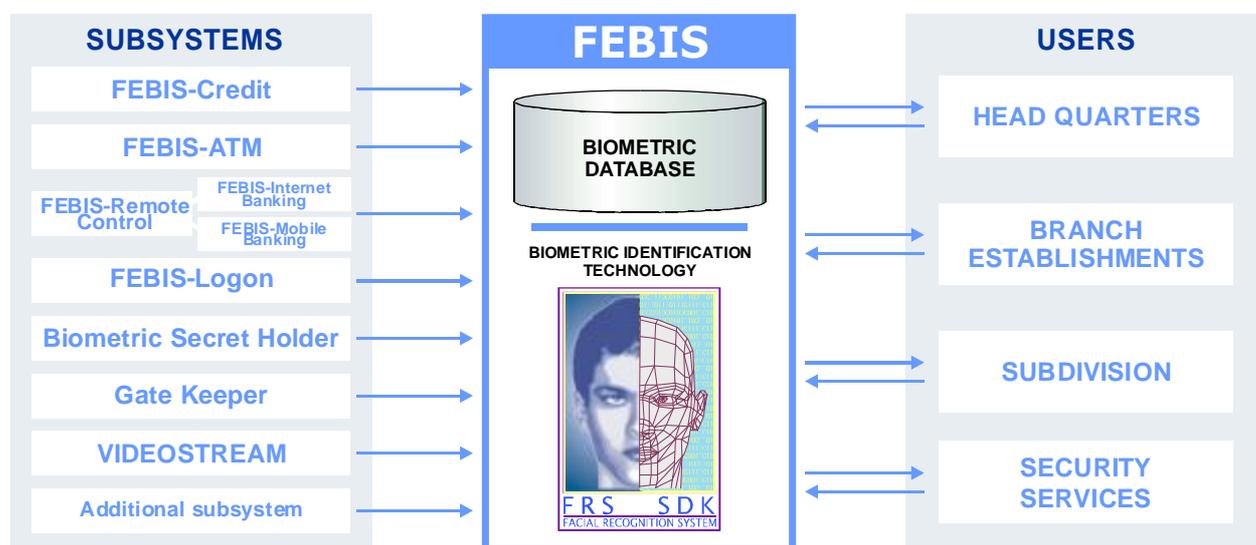
VIDEOSTREAM is another biometric operational search system aimed at conducting video surveillance accompanied by a function of identification of each facial image caught by the camera. VIDEOSTREAM accurately identifies wanted people when they pass through the system's video surveillance area. Also, the system can automatically notify authorised officials (security service or law enforcement agency) about the location of the identified person.

BIOMETRIC SECRET HOLDER was developed specially to provide high security levels for safe deposit boxes. Access control to safe deposit boxes is provided after the installation of a centralised station, equipped with a digital camera. Access to personal safe deposit boxes is granted only to customers registered in the system.

Each System of FEBIS is a final product ready for use and provides highly efficient security on internal and external levels and the protection of confidential information and valuables for banks. FEBIS products can be used as a complex security system or for additional protection. FEBIS security software and information resources that work on the basis of a unified core generate the functional integrity of FEBIS. The system can be adapted or modified for any bank meeting its needs and request.

FEBIS bank security system

SUBSYSTEMS	FEBIS	USERS
FEBIS-Credit		**HEAD QUARTERS**
FEBIS-ATM	**BIOMETRIC DATABASE**	
FEBIS-Remote Control / FEBIS-Internet Banking / FEBIS-Mobile Banking	**BIOMETRIC IDENTIFICATION TECHNOLOGY**	**BRANCH ESTABLISHMENTS**
FEBIS-Logon		
Biometric Secret Holder		**SUBDIVISION**
Gate Keeper		
VIDEOSTREAM	F R S S D K	**SECURITY SERVICES**
Additional subsystem	FACIAL RECOGNITION SYSTEM	

BASIC FUNCTIONS:

- **Employee and client registration in the system.**
- **Database formation.**
- **Facial identification.**
- **Information verification.**
- **Regulation of access rights.**
- **Report formation.**

FEBIS SYSTEM CAPACITY

The creation of a new security system or the modernisation of an existing security system for the business sector is a pledge of its future successful development. In organising banking activities, the question of security is a significant one. The security system reliability of operation at each level and for each banking activity is a necessity and an important condition. Currently, biometric systems developed for law enforcement agencies are gaining a solid share of the security systems market for the commercial, public and private sectors.

The basis for the FEBIS is a high efficiency facial recognition technology developed specially for the Ministry of Internal Affairs (MIA) of the Republic of Kazakhstan and the Ministry of Internal Affairs (MIA) of the Russian Federation based on requests for a solution to fighting crime and terrorism.
In order to test the technology, a state inter-departmental commission was created in Kazakhstan. A specific area was created for testing operational information searches by the MIA department in Russia.

Image encoding time	0.26 seconds
Retrieval rate	1.66 million images per second
Percentage of automatic encoding	99.95%
Speed of automatic input	500 thousand images per 24 hours

Identification in automatic mode:

Recommended application: identification of applicants in the process of issuing documents or plastic cards in order to recognise wanted persons and preventing the issue of duplicate documents and/or plastic cards.

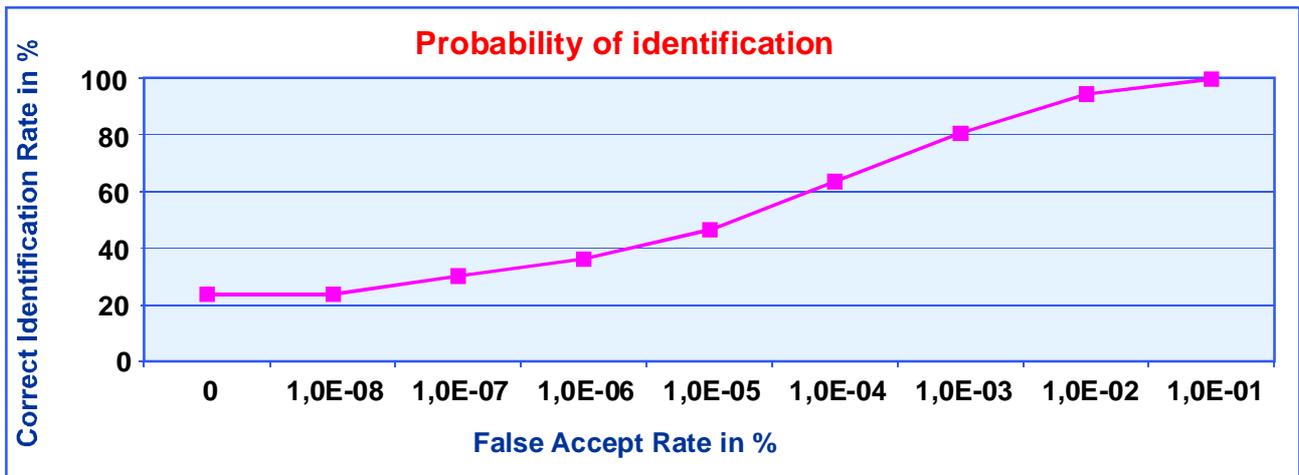**Testing yielded the following system characteristics:**

Figure1. Probability of Identification

False Acceptance Rate (FAR) in %	0	1,0E-08	1,0E-07	1,0E-06	1,0E-05	1,0E-04	1,0E-03	1,0E-02	1,0E-01
Acceptance Rate (CIR) in %	23,8	23,8	30,2	36,1	46,3	63,3	80,5	94,4	99,8

Table 1. False Acceptance Rate (FAR) and Correct Acceptance Rate (CIR)

Figure 1 shows the characteristics of subject identification accuracy recording Correct Acceptance Rate (CIR) and False Acceptance Rate (FAR).

For example, tests showed that an 80.5% correct identification rate can be achieved with a probability of 1 error out of 100,000 images.

The figures in *Table 1.* **show the Test Results on the basis that only one image of a person is available for retrieval.**
If a set of different images of the same person are available for retrieval (for example, a series of images captured by an access control camera), the Correct Identification Rate (CIR) will be equal to 100% and False Acceptance Rate (FAR) will be no more than 1.0E–06.

Identification in expert mode:

Recommended application: identification in the process of investigative operational activity of law enforcement agencies in criminal investigation and combating violence and terrorism.

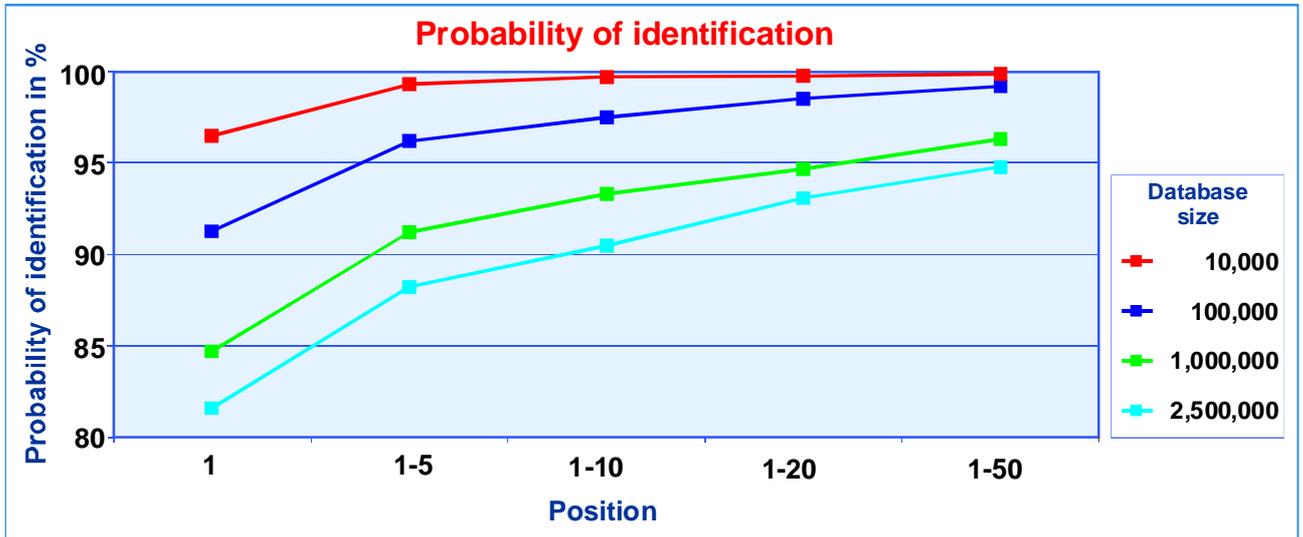**Testing yielded the following results:**

Figure2. Probability of identification depending on database size.

Data Base size	Position				
	1	1 - 5	1 - 10	1 - 20	1 - 50
	Probability of identification				
10,000 images	96.5	99.3	99.7	99.8	99.9
100,000 images	91.3	96.2	97.5	98.5	99.2
1,000,000 images	84.7	91.2	93.3	94.7	96.3
2,500,000 images	81.6	88.2	90.5	93.1	94.8

Table2. Probability of Identification against database size.

This mode automatically extracts an image list, ranked by degree of similarity between the input image and the database images.

The decision making is performed by an expert.

Table 2. shows that with a sample database size of 1,000,000 images, the Probability of Identification is as follows:

84.7% - probability of true identification being in 1st place on the priority list.
91.2% - probability of true identification being in the first 5 images on the priority list.
93.3% - probability of true identification being in the first 10 images on the priority list.
94.7% - probability of true identification being in the first 20 images on the priority list.
96.3% - probability of true identification being in the first 50 images on the priority list.

The technical characteristics were based on Intel Xeon/ 3 GHz/ 2 Gb RAM using MS Windows 2000/XP.

Operating with customers

The system easily integrates with the bank's information systems such as CRM (Customer Relationship Management). One of the system's functions is the automatic formation and maintenance of customer Personal Files. This function can be used in 2 ways:
1.   The biometric customer personal form can be "tied" to a customer Personal File.
2.   The biometric customer personal form can be used as a customer Personal File.

Biometric customer personal form

Each customer is registered in the system after his/her application to any of the bank's branches or subdivisions. A biometric customer personal form is formed for each client (for private or business accounts). The biometric customer personal form consists of personal data (first/last name, date of birth, etc.) and photo image. The FEBIS biometric customer personal form includes and enables access to personal customer information (full and accurate information, customer portfolio, event journal, customer accounts in other banks, other addresses, operational profits and expenses, counter-agencies, etc.)

Once formed, the biometric customer personal form can be supplemented during the active period of serving that customer (opening personal or settlement accounts, credit history, card issuing, etc.).

Received data automatically forms a centralised customer database that is accessible for branches and subdivisions of the bank, depending on regulations for access rights.
During the use of the system, a database of the bank's customers or people who have at any time applied to the bank is formed.

The system enables the formation of a database at local and remote levels by forming a unified biometric database with regulated access rights for different bank establishments.

The system allows a working structure to be set up with local and remote databases with respect to regulated access rights for different bank subdivisions and/or branch establishments, during the process of formation of the unified database. A unified database of clients (loan borrowers) can be

formed in the central server of the Bank Association or any other organization that represents the common interests of the bank. Access rights (full or partial access) to each client's information will be determined by the bank's employee who forms or edits the biometric customer personal form of the client. For example, there is the possibility of forming a data base of clients who represent a particular risk group (debtors, fraudsters, people who don't repay loans).

Principle of system's operation
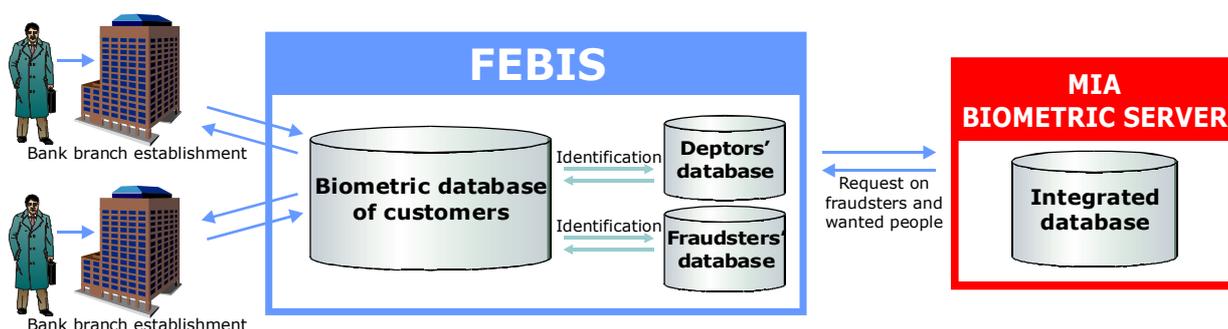
This scheme shows the principles of the system operation.

FEBIS is an information search and retrieval system that permits the fulfillment of search processes using different bank databases through biometric facial recognition.
After making an application to the bank, each client is checked through the databases in order to retrieve a credit history and reach an accomplished authentication process. Personal data (first/last name, date of birth, etc.) or facial image can be used as the search settings and the search process is accomplished instantly.

Databases can be set under the conditions of a "signal list". In the case, when the facial image of an applicant coincides with the facial image of a person belonging to a risk group or there is no similar facial image or personal data (last/first name, etc.), an alarm signal automatically activates warning the security agency operator, who makes an appropriate decision. In specific cases, an applicant identification search request can be done through the databases of law enforcement agencies.

Access rights to conduct any financial bank operation are granted only in cases when personal and biometric data coincide completely.
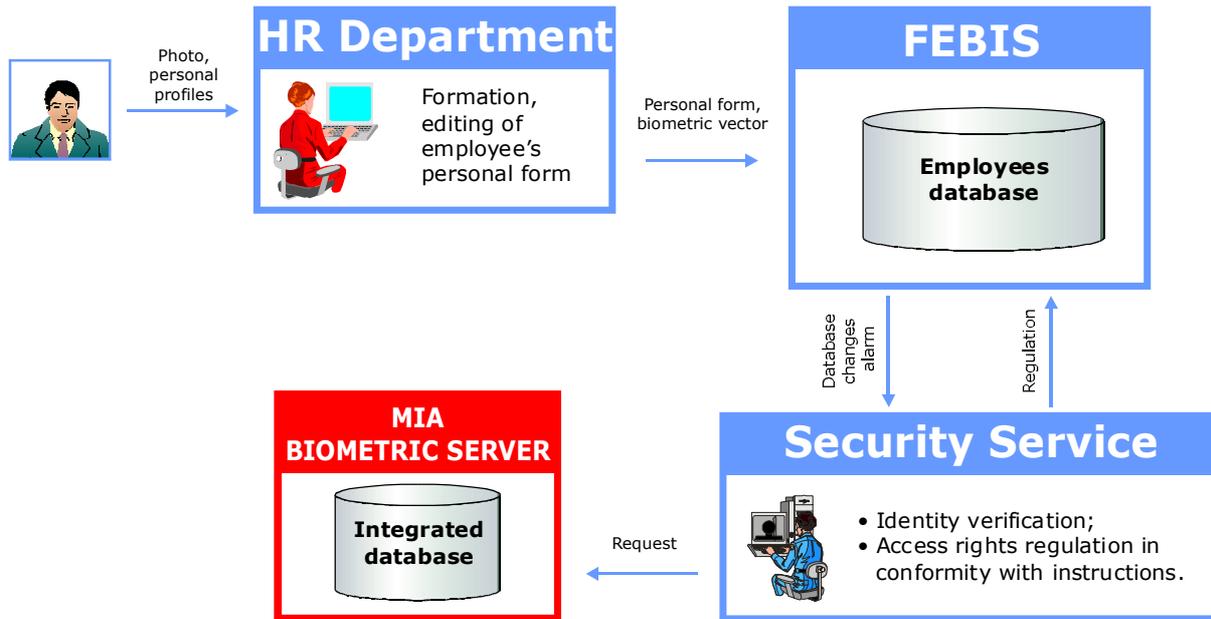
Operating with employees

All bank employees are registered in the FEBIS and a biometric employee personal form is formed for each employee that contains biometric and personal data (last/first name, etc.).

The employee biometric form is a basic electronic document that allows the administration department to set or change the range of employee rights such as accessing the bank's territory and premises, banking information resources, account formation, bank financial operations, client relation regulation, calculation of working hours for each employee, etc. The biometric employee personal form is automatically maintained during the entire period that the employee works at the

bank. This allows the administration department, the security service and other authorised bank officials to identify violations of labour discipline, use of position for personal needs, activities that don't match with bank interests, etc.

FEBIS principal of operation for hiring, promoting and firing employees

Photo, personal profiles →

HR Department

Formation, editing of employee's personal form

Personal form, biometric vector →

FEBIS

Employees database

Database changes alarm ↓   Regulation ↑

MIA BIOMETRIC SERVER

Integrated database

← Request

Security Service

• Identity verification;
• Access rights regulation in conformity with instructions.

Employees work scheme in regard to use of FEBIS

Request →
Granted ←
Rejected ←

FEBIS

• Access control with reference to the personal settings;
• Formation of the events journal.

Premises and bank's outside territory

Information resources

Operational activities

HR Department

Working time and attendance control

Security Service

Control of events
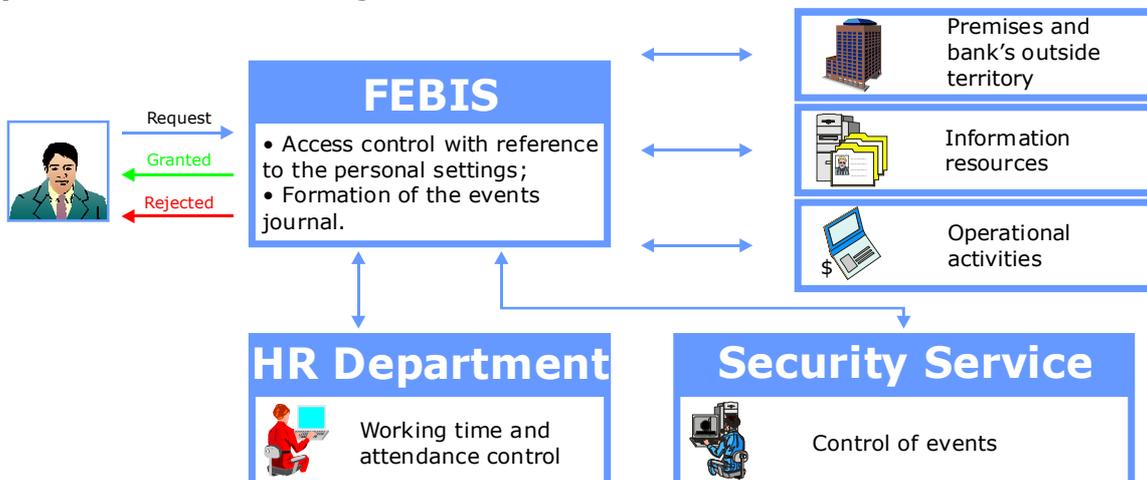
FEBIS – FUNDAMENTAL TRUST

The use of facial recognition technology is mutually beneficial for banks and for their customers.

FEBIS is a reliable tool for the protection of confidential information and customer valuables.

● Biometric data (facial image) is a unique characteristic that cannot be stolen, forgotten or lost contrary to other identifications, passwords, PIN-codes, etc.
● Access to personal data is impossible without the assistance of the owner (customer) who is registered in the system.
● Customer opportunities to obtain services in any of the bank's branches and other bank subdivisions no matter of territorial affiliation.
FEBIS enables high security levels and raises the efficiency level of the bank's activities.
● The formation of a reliable notification system against client and/or employee activities that don't follow the bank's interests.
● Creation of a system against fraudsters.
● Increase of bank service quality by automation of facial recognition processes of customers and employees.
● Operating 24 hours/7 days a week/365 days a year non stop allowing the bank to operate in real-time all over the world.
● Formation of any types of reports about each customer instantly.
● Opportunity to meet the standards and requests of any country and/or particular organisation.
● Competitive advantage contrary to other banks.

The advantages brought by the use of facial recognition technology are obvious. The innovative technology that is the core of the FEBIS has been highly valued by the authorities of law enforcement agencies after using the technology for the purposes of public and national security. The flexibility and reliability of the FEBIS is fundamental for the stability and successful growth of any bank.