

ELECTRONIC VOTING SYSTEM: EXPERIENCE OF CREATION AND NEW PROJECTS

**S.Ablameyko, V.Lipen,
United Institute of Informatics Problems
National Academy of Sciences of Belarus
Surganova str., 6. 220012 Minsk, Belarus
lipen@newman.bas-net.by**

Abstract

Some positions of the concept of providing the social information services are announced. The results of information society technologies development are presented including the technologies of electronic voting, transparent sizing of total outcomes of voting in the mode of TelePresence. The questions of new information technologies implementation are considered within the framework of joint projects.

1. Implementation of information society technologies

The State scientific organization "United Institute of Informatics Problems, National Academy of Sciences of Belarus" (UIIP NAS of Belarus) is carrying out fundamental and applied research in the fields of information technology, computer science, applied mathematics, computer aided design and some other attached fields. It is a leading IT organization in Belarus. In the framework of the State program «Electronic Belarus» the Institute took part in several projects in the field of information society technologies including "e-government" projects.

The development of electronic voting (EV) technologies were initiated in UIIP on the end of the 90-th. It was based on the use of electronic electoral lists. The main engineering solutions were realized as the test mockup of EV-stations. The protocols and voter's invitations marked with unique barcodes were automatically produced. In 2003 the technology and experimental sample of electronic voting system were handed over to Republic of Kazakhstan and formed the basis for the automated voting system "Sailau", installed in 1446 polling stations of Kazakhstan. The technology and structure of a system are protected by the patent of the Eurasian Patent Organization № 006712 [1] and patent of Kazakhstan KZ № 16125. The applicants: UIIP NAS of Belarus and Central Electoral Comity of Kazakhstan [2]. In 2004 experimental sample of electronic polling station, designed in UIIP, was presented on the exhibition PTS'2004 in Minsk and awarded with diploma. Detailed information and photos are placed on the UIIP site [3]. The results of the authors' developments on this theme are accessible via Internet [4, 5].

2. The concept of social information services providing

The concept of creating the system of social information services takes into account that the great part of population is not able to have an authorized network access to integrated governmental information resources. To let this people also be able to have an access to the resources the set of regional Stations of Information Service (SIS) should be organized. It could be considered as the means of multi-access to integrated resources. In such a station all set of an information services can be submitted to individual clients of SIS. Besides, the group respondent's service is possible in such an approach.

Electronic services could be provided also as remote interactions by use of certified equipment of SIS. It could be considered as the most economic way of implantation of "one window" principle. At the same time, the staff of SIS should have the rights to identify the respondents and to produce legally certified documents in electronic and paper form, concerning the authority of different official departments.

The equipment of SIS can include computer terminals for the client to obtain the information and electronic forms in the cases when authorization of the person is not required. For the clients of SIS, which are not experienced in computer, the information kiosks with touch panels can be placed. If the authorization should be provided the client have to show the identification document to the officer of SIS to be authorized and to get information service.

Creation of the set of SIS should provide the extension of electronic document circulation. As the result the expenditures of time for social information service will be minimized. The activity of similar Centers of service of the population in Republic of Kazakhstan and Moldova confirms their high performance. The structure of proposed system is represented on figure 1.

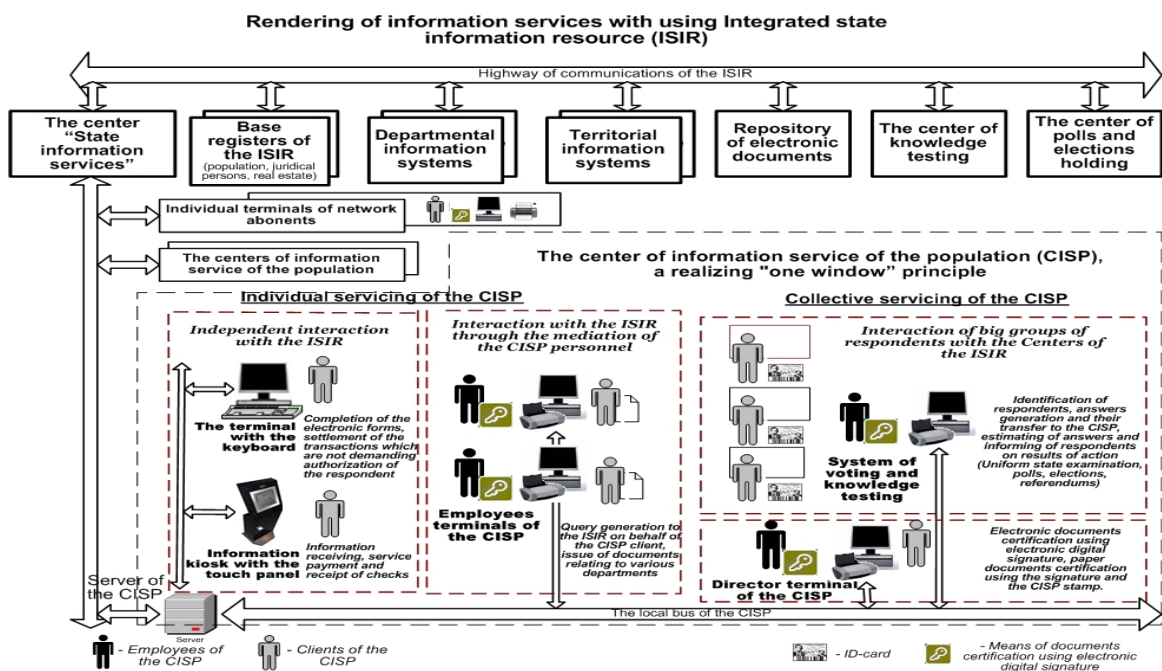


Figure 1. The structure of the system of providing the social information services

The means for individual services are on the left and center fragments of the scheme. Certificated system for the service of great groups of the respondents is shown on the right side. It could be governmental services like interrogations, elections, referendums, remote testing of knowledge, etc.

3. The experience of E-Voting systems creation

The EV- technology includes the following automated procedures:

- Actualization of the electronic electoral registration lists on a polling station, printing the personal invitations with bar-code and printing information bills;
- Identification and registration of the persons arriving to polling station with personal invitations or ID-cards;
- Fixing the codes of nominated candidates, parties or answers on referendums questions in nonvolatile memory of “electronic bulletin”;
- Automated calculation of the voting results (distributions of voices) and its announcing on the indication board and also verbally by speech synthesizer;
- Printing the ciphered voting protocols and check protocols proclaimed on polling stations;
- Network transmission of “electronic protocols” of the election to the server of controlling organization;
- Sizing up the election results by the computer of central organization.

Automated polling station could be realized as the set of special devices or could be based upon standard personal computer, supplied with laser printer, reader of bar-code and indication boards. The voting is realized with the help of “electronic bulletin” (5-15 p. in each polling station) and information plane-table and/or booklets. Portable “electronic bulletins” and booklets could be used also for “home voting”.

The A4-size sheets (from 1 to 8) placed on the plane-tablet surface displays for voters full set of the referendum’s questions, the information about the candidates and parties to be voted, including the pictures, emblems, numbers, etc. The transmission of the data from the “electronic bulletin” to the EV-station memory module is accomplished with the help of “electronic ballot box”, which also may contain the thermo-printer to issue the ticket. This thermo-printer also could print the results of individual voting of all the voters.

The continuous showing on two indication boards of the number of persons who were registered and persons, who executed the voting circle, does not permit to “throw in” the voices of the persons who did not come for election. Automatic formation of election protocols guarantees the reliability of the results on a polling station. Each voter could check up personally how his voice was registered in the check protocol. Coding the results of voting by crypto program eliminates possible intentional changing of voting results. Certified by digital signature the protocols of election are transmitted through subscribed lines as open mapping to the central computer for verification of results and sizing up the election. These measures reduces the number of paid staff, minimizes the influence of the human factor on election results.

In the periods between voting companies the equipment of polling stations could be used for knowledge tests at schools. In comparing with other EV-systems like “Nedap” or the

systems, using touch-screen, the price of proposed system is several times less. The process of voting is simple and does not need a special training of the voters. The volume of the information, represented on the large-square plane-table, is much bigger, than on the touch-screen or on the ballot paper.

4. Proposals for joint projects

Within last several years the authors developed the extended version of the electronic voting technology “Electronic finish” providing the possibility of network observation in real-time TelePresence mode on the background of data gathering from electoral districts and rendering the total election outcomes. The “transparency” of the election procedures and results sizing up are provided. The special technology of final election resulting with remote network control by the organization being the election legality and reliability guarantor for conflict regions is developed. The special architecture of polling station equipment and rules of e-voting results representation in the network should be provided for realization of these abilities.

Presented EV- technology and systems have a number of advantages in comparing with known systems represented in materials of the II World E-Voting Forum [6], in the set of patents and in well-known articles by Ted Selker [7] and Rebecca Mercuri [8]. We could propose the EV-technology and systems for joint development and implementation in cooperation with famous European scientific centers like Austrian computer society.

The collaborative developments in frameworks of international projects could help to create a demonstration sample of e-voting system following the requirements of OSCE and UN, and will enable to apply for the patents of international standard. The experimental sample and technology of electronic voting could be represented on the international exhibitions and forums as the result of mutual activity. The implementation of designed technologies can be handed to other states and bodies under the recommendation of OSCE or UN.

5. References

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