

*7-8 September 2009,
Vienna, University of
Economics and Business*

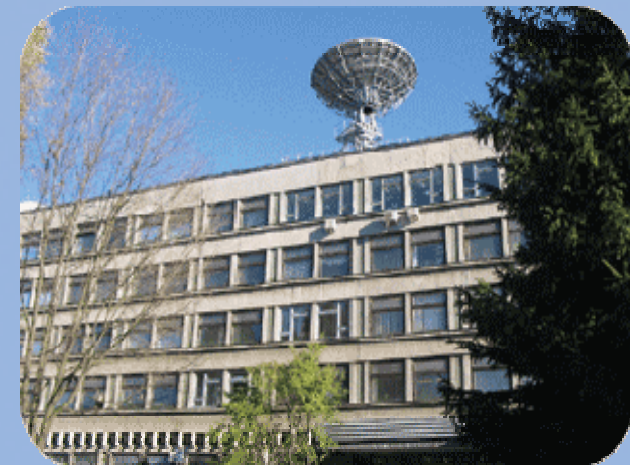
***NEW TECHNOLOGIES FOR REMOTE OBSERVATION AND
VERIFICATION OF ELECTRONIC VOTES:
FOUNDATIONS OF A BETTER E-VOTING SYSTEM***

S.Ablameyko, N.Kalosha, V.Lipen, D.Lipen,



Belarusian State University

Minsk, 2009



United Institute of Informatics
Problems of National Academy of
Sciences of Belarus

Our experience in the field of e-voting

- 1999-2000. Developing the model of e-polling for Central Election Comity of Belarus.
- 2003-2004. Developing the experimental sample for Kazakhstan. Patenting a state-scale e-voting framework. Developed solutions implemented in "Sailau" e-voting system (1446 stations).
- November, 2004. Experimental sample presented at PTS-2004 exhibition (Minsk).
- 2005-2007. Study of e-voting as a public information service.
- April, 2007. Presentation at E-Gov-07 (Prague).
- 2008. Started developing an experimental system based on new ideas.
- 2008. Presentation of the new approaches at EDem-08 (Krems).
- 2009. Further development; creation of a detailed model of the Web-portal and the verification server.
- **EDem-09, as second attempt to attract attention of European scientists to our proposals. Finding the partners for joint project. Finding the program or foundation for financial supporting efforts to complete Demonstration sample of e-vote system.**

Patents, diplomas, certificates of implementation.



Presentation of «Electronic Voting System» at PTS-2004 (Perspective Technologies & Systems, Minsk, 2004)



Current state of public elections

Voting modes:

- Voting by paper bulletins, e-voting using kiosks or voting machines.
- Voting by SMS, over the Internet at home or in the office.

Observations:

- EU citizens are losing interest in election events (40% participation).
- Paper bulletins are still widely used.
- **Disadvantages:** prolonged tallying, requires extensive human resources, subject to tampering.
- Results: citizens distrust electoral institutes, political apathy (examples: Russia, Belarus, Moldova).

Handwritten signatures used to confirm registration at the polling stations or given in support of presidential candidates or political parties invite counterfeiting on both sides as reliable verification of thousands of signatures is impossible.

Side effects of unreliable election technologies: unrest in Georgia, Kenya, Zimbabwe, Iran, Gabon and other countries. Authoritarian rulers encourage machinations to stay in power, and their political opposition uses flaws in the electoral system as pretext to denounce election results and incite violence.

E-voting: panacea or a source of new problems?

- India, Brazil, several USA states – used widely
- Russia – approbation of SMS and Internet voting
- Netherlands, Germany, Austria, Switzerland – active development & implementation
- Hungary – political parties oppose e-voting
- Estonia – 7% adoption rate
- Kazakhstan – 30% adoption rate
- Germany – electronic votes given in 2005 have been annulled in this year

Despite their disadvantages, paper ballots remain the most popular means of voting. **Why?**

- Electors are concerned about their privacy
- Electronic elections offer even less transparency compared to traditional paper ballot voting

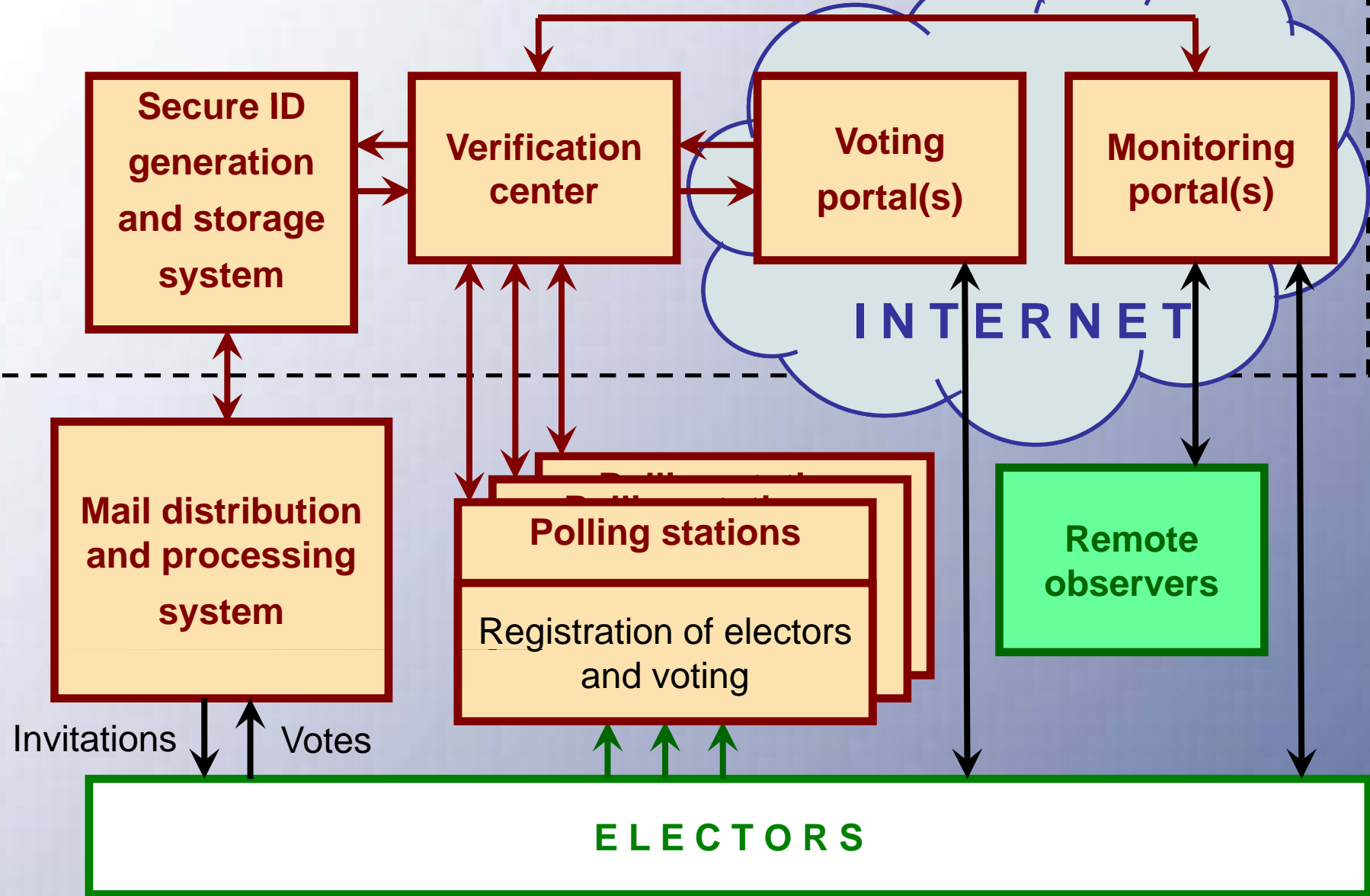
Neither paper ballots nor today's e-voting systems allow one to verify how his or her participation and individual vote contributes to the country-wide election results

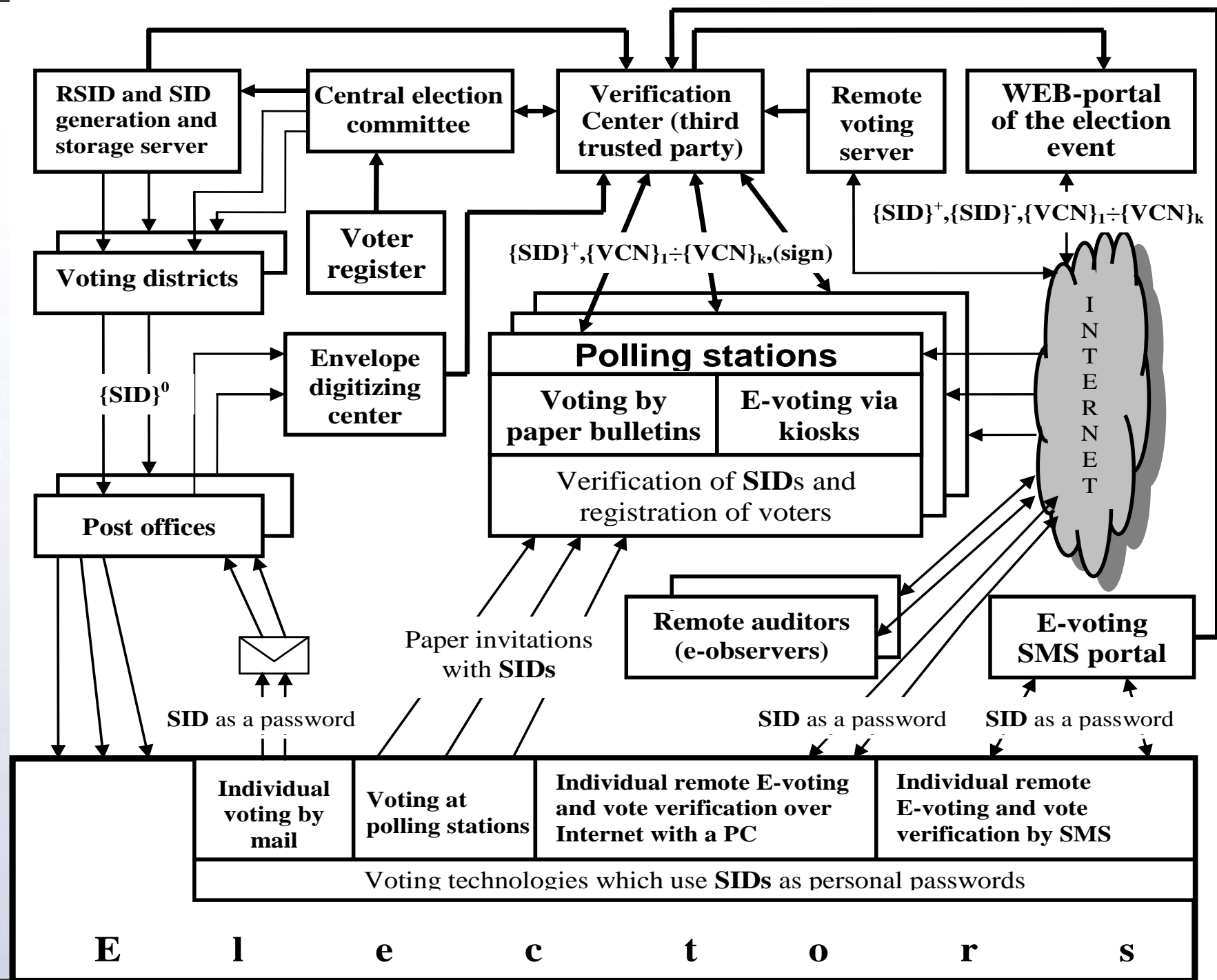
New foundations of e-voting systems:

- Independent outside system of electronic supervision
- Different modes of voting utilize a single secure identifier of the elector
- Elector registration data and anonymous voting results are recorded and presented on the Web portal after the election event
- Any elector can verify his or her registration at the election event as well as his or her vote
- Remote observers are able to monitor the election event and even tally the votes themselves

The proposed e-voting framework

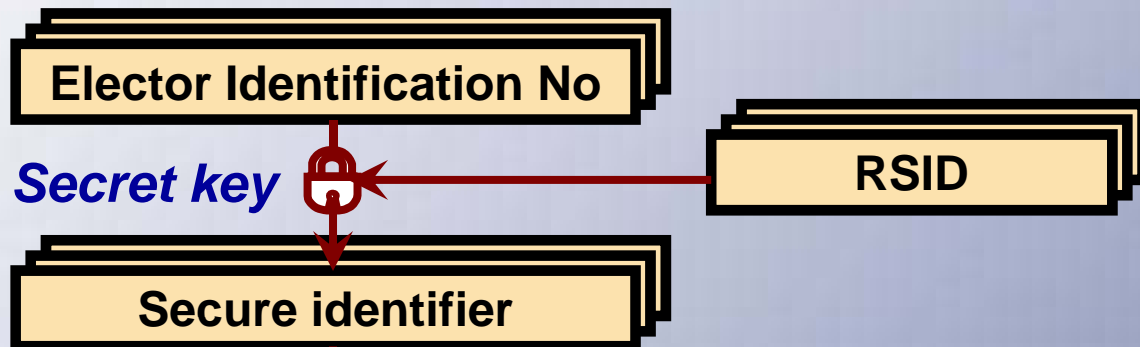
Outside system for supervision of voting events



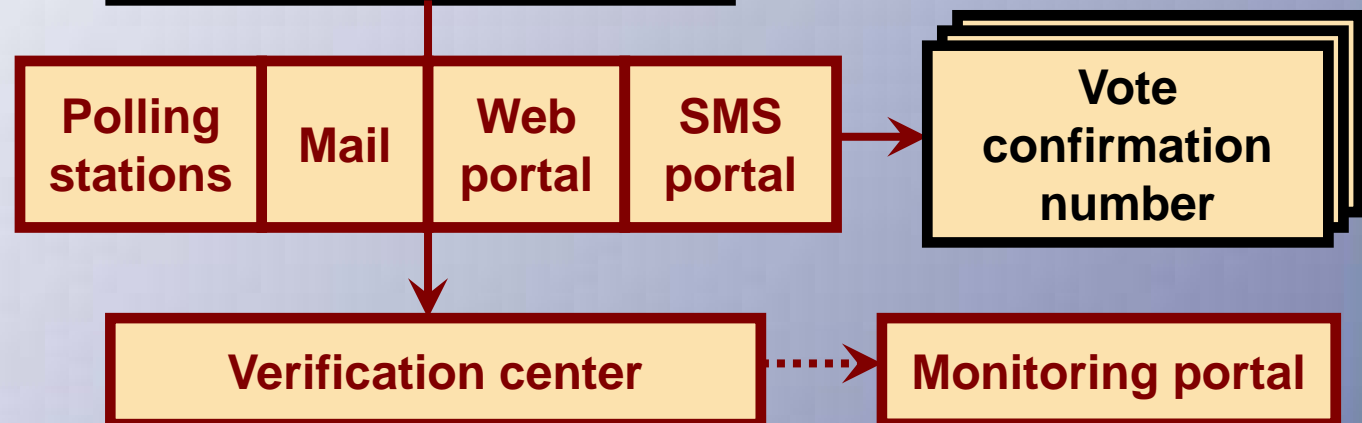


Data flow

Before the
voting day



On the
voting day

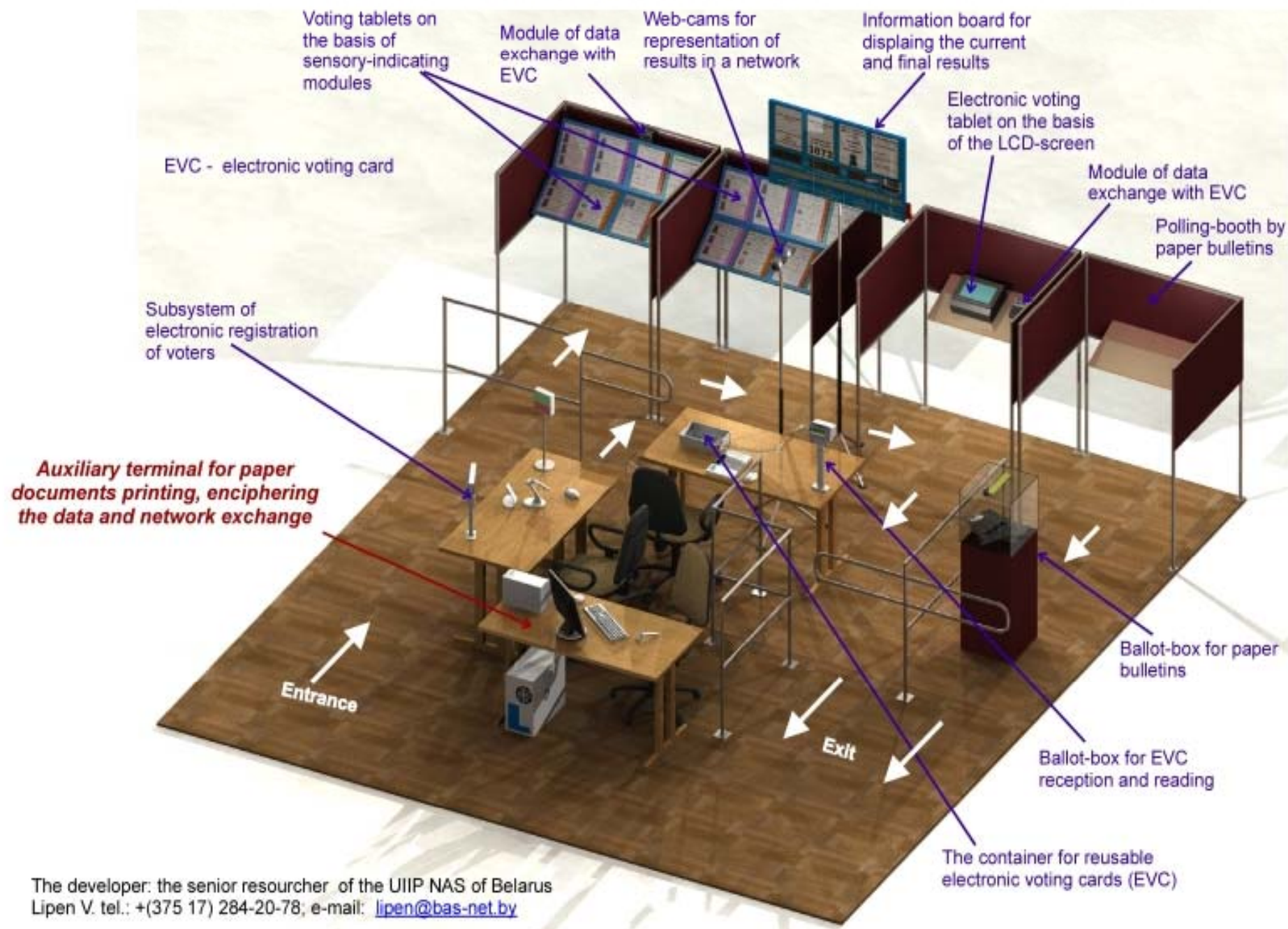


After the
election is
finished

Complete dataset



The project of electronic polling station with direct network announcement of current and final results



Experimental web-portal for remote monitoring of voting events

Rus

Eng

20 districts, 400 polling stations, 200 000 electors
<http://e-vote.basnet.by>



© Computer graphics laboratory of
UIIP, NAS of Belarus

Scientific head - Vitaliy Lipen,
lipen@newman.bas-net.by

Provides unrestricted remote monitoring
of voting events, verification of individual
votes and participation in election events.

References:

1. ABLAMEYKO, S., LIPEN, V.,
Electronic voting systems: experience
of creation and new projects, in: 5th

Operation modes:

- Display and verify voter registration
- Display the numbers of votes given in support of different candidates and the respective voting confirmation numbers (VCNs)
- Display the numbers of votes given in support of different political parties and the respective VCNs
- Display the numbers of votes given in favor of different choices in a referendum and the respective VCNs

Confirm

Operation modes still in development:

1. Display the full list of individual elector codes generated by the

Verification of elector registration

To main page

Individual elector codes registered
at district **4** polling station **4**
Total: **458**

Individual elector codes *not*
registered
at district **4** polling station **4**
Total: **42**

Rus

Eng

District No: **4**
Polling station No: **4**

Confirm

Noi.o.	Invitation number	Verification code	Voting mode
1	0001	3176460771	kiosk
2	0002	4035012337	bull
3	0003	1637196956	e-net
4	0004	3270469286	kiosk
5	0005	3520108579	kiosk
		8570106369	kiosk
		7473693051	bull
		1800375889	post
		7985812341	sms
		0139739229	sms
		9052200266	kiosk
		1773787654	sms

Noi.o.	Invitation number	Verification code
1	0011	9644624335
2	0027	5546495023
3	0031	9717918169
4	0041	9198512090
5	0049	2746077652
6	0066	7547848261
7	0079	1692185859
8	0082	4466171504
9	0098	0787416022
10	0099	3962784816
11	0109	3485755913
12	0154	6567846256

Invitation to take part in the election event

Минск Нововиленская 7 кв 4

Аббасов М.С.-О.

Центральный избирательный округ №001
Участок №001

1



Уникальный код избирателя:
4565465444 001 001 1158

Votes given to different candidates

[Back to main](#)

Numbers of votes given in support of different candidates, district **7**, polling

station **7**

[Rus](#)

[Eng](#)

District No: **7**

Polling station No: **7**

[Confirm](#)

Candidate No	Full name	Votes received
01	Васечкин Т.Г.	39
02	Иванов И.И.	94
03	Липень В.Ю.	41
04	Максимов М.И.	65
05	Михайлов М.М.	79
06	Никитин Н.Н.	9
07	Николаев В.М.	7
08	Сидоров С.С.	19
09	Степанов К.И.	14
10	Фролов Ф.Ф.	28
11	Против всех	32
12	Не голосовал	18
Total:		445

Individual vote verification

List of voting confirmation numbers (VCNs) given in support of candidate **Максимов М.И.**

District **7** , polling station **7**

Back

Rus

Eng

Noi.o.

Voting confirmation number

1

0929

2

1046

3

1111

4

1122

5

1315

6

1394

7

1736

8

2420

9

2567

10

2577

11

2590

12

2812

2958

3006

3186

3484

3555

3676

3750

3760

3819

For SMS vote verification dial 4936.

Web-portal: e-vote.basnet.by

Your vote confirmation number:

007 007 **1046**

Votes given to different political parties

[To main page](#)

Number of votes received by party , district **7**, polling station

Rus

Eng

District No: **7**

Polling station No:

[Confirm](#)

Party No	Name of the party	Votes received
1	Демократическая	1040
2	Единая	171
3	Коммунистическая	72
4	Либеральная	366
5	Народная	173
6	Национально-Патриотическая	525
7	Свободная	605
8	Социалистическая	532
9	Трудовая	807
10	Христианская	1752
11	Экологическая	876
12	Против всех	1519
13	Не голосовал	392
Total:		8830

Votes given in a referendum

Number of votes given in favor of different choices in the referendum

[To main page](#)

2. Centralized testing

Rus

Eng

district , polling station

Choose the relevant question of the referendum:

- ☐ Are you in favor of Belarus joining the European Community? (1. Joining the EC).
- ☒ Are you in favor of university admission based on the results of centralized testing? (2. Centralized testing).

District No:

Polling station No:

[Confirm](#)

Choice No	Full answer	Votes received
1	За	44257
2	Против	53457
3	Воздержался	17663
4	Не голосовал	62369
Total:		177746

End of the presentation

Thank you for your attention.

UIIP of NAS Belarus, Surganov str.,6
Phone: 375(17) 284-20-78 Vitali Lipen
E-mail: Lipen@newman.bas-net.by
URL: www.uiip.bas-net.by/rus/lab214