

## Project description

### 1. Name of the project

**Electronic Document Management System of Accredited Testing Laboratory eLab**

### 2. Organization-developer

*Institute for Nuclear Problems of Belarusian State University (INP BSU)*

### 3. The estimated amount of investment (US \$), payback period

*Commercial offer: the sale of the product,*

*license costs – 5 000 \$ ÷ 50 000 \$.*

### 4. Description of the project, the essence of innovation, project development stage.

**Stage of development of the project** – ready for implementation.

**System eLab** is intended for the implementation and harmonization of the electronic document management of accredited testing laboratories in accordance with international ISO/IEC 17025, ISO 9001 and ISO 9004.

**System eLab** has a client-server architecture based on free software:

- Debian GNU/Linux,
- Web-server Apache,
- the Firebird database server,
- PHP application server.

The system runs under Windows and Linux operating systems. The work is carried out through the Internet in multiplayer mode, with the division of access rights by way of widespread browsers: Internet Explorer, Mozilla Firefox, Google Chrome, Opera etc.

**eLab specifications:**

- software system is open to modifications and completions by direct users,
- system includes a standard set of log forms of accredited laboratory and it is easily adjusted to the specifics of each individual laboratory,
- system runs on a secure server; it is not required to install some software on the client computer, it is sufficient availability of a standard browser,
- system can operate both on a local intranet, or the global Internet network,
- system can also operate on a local computer, e. g. for teaching,
- the structure of the system allows in the frame of a single installed copy of the product at the same time maintain the workflow of many laboratories and organizations, with different profiles.

**System eLab**, having a platform independence of server and client components, allows to:

- automate laboratory processes;
- significantly reduce the time to:
  - registration of samples and test results;
  - extract certificates of product quality;
  - search the appropriate entries in the laboratory journal;
- eliminate operator errors when creating documents;
- generate summary laboratory reports;
- increase lab productivity, quality of work and quality of monitoring of the works.

**Distinctive characteristics of the system eLab** are the following:

- ability to extend the functionality of the system;
- customizable user interface and the preservation of its current state;
- fast convenient system of sorting, filtering and retrieval of data;

- automatic update and display the current status of the sampling, simple insertion mechanism, editing, deleting records, editing multiple records simultaneously; validation of input data, the abolition of common mistakes;
- exclusion of input data duplication;
- automatic generation of output documents for reports in prescribed form;
- possibility for user to make changes to the templates of the final documents;
- exclusion of the human factor and related errors in records and output documents.

## 5. Competitive Advantages

Price of 2 - 3 times less than the cost of analogues.

Compliance with the requirements of free software, working under Windows and Linux. Ability to work through the Internet.

## 6. Results achieved

- eLab is implemented in the educational process of leading Belarusian universities: Belarusian State University, Belarusian State Technological University, Belarusian National Technical University. It is introduced in the Chemical-toxicological laboratory of the Minsk Drug Treatment Clinic.
- In 2012, the system eLab-Fuel (electronic document management system of the testing laboratory) put on combat duty in 202 Chemmotology Center of the Fuel for quality monitoring and management of specimens, measurements and passports of fuels and lubricants of the Belarusian Armed Forces.
- In 2013, eLab is been a basis of management of fuels of Belarusian branch of Russian company GazPromNeft.
- In 2014, it was completed contract number No.196847 for the development of requirements specifications for upgrading software of Integrated Information Control System of Gosatomnadzor of the Republic of Belarus with Pacific Northwest National Laboratory (USA). The prototype software eLab-Atom of Integrated Information Control System was developed.
- In 2015, it was developed content management system of educational and research portal eLab-Science, on the basis of which the educational and research portal of nuclear knowledge **BeINET** (Belarusian Nuclear Education and Training) <https://bsu.inpnet.net/belnet/index.php?l=en> was developed.

**Software eLab** is protected by four Certificates of the National Intellectual Property Center of the Republic of Belarus for registration computer program:

- No 051 "Laboratory information management system" (2008),
- No 677 "Electronic document management system of testing laboratory on control the quality of fuels for heat engines" (2014),
- No 683 "Software of control system of ionizing radiation sources" (2014),
- No 843 "Management system of educational and research portal" (2015).

## 7. The market and consumers

Accredited testing laboratories in various fields.

## 8. Proposed forms of cooperation

- Revision of the system to the needs of the customer, including translation into different languages (including Chinese).
- Sale of licenses and information support.
- Provide technical support.

eLab-Fuel system can be delivered "as is". eLab-Fuel system includes the following modules:

- "eLab Analyzer" for control of samples and quality control of fuels and lubricants;
- "eLab Refreshing" for control of fuel products reserves;
- "eLab Prices" for the calculation of the value of paid services provided by an accredited laboratory in the part of the test of lubricants and fuel.

## 9. The project team

Laboratory of Analytical Research of INP BSU – 2 Ph.D., 2 researchers, 2 students.

## 10. 2-3 pictures

### Web-interface of eLab-fuel: Knowledge Base: Brands of test products

Each object corresponds to a plurality of test product brands, in accordance with the specifications.

The screenshot shows a web browser window displaying the 'Марки/сорта ГСМ' (Brands of Fuels and Oils) section. The interface includes a navigation menu on the left, a main data table, and a settings panel on the right. The table lists 16 items with their respective codes, object names, technical specifications (ТУ), brands, and remarks.

Код	Объект	ТУ	Марка	Примечания
1	топливо ТСМ	ТУ ВУ 300220696.045-2009	топливо судовое	
2	топливо ТСМ	ТУ ВУ 300220696.036	малосернистое маловязкое топливо судовое маловязкое	
3	АС-1	ТУ ВУ 100017108.003-2010	средство смазочное антикоррозионное АС-1	
4	растворитель для тех.целей	ТУ ВУ 300220696.042-2007	растворитель для технических целей марки "Л"	
5	топливо ТС дистиллятное	ТУ ВУ 300220961.003-2010	топливо судовое дистиллятное для морских дизелей	с изм. 1
6	топливо ТС дистиллятное	ТУ ВУ 300220961.003-2010 изм.1	топливо судовое дистиллятное для морских дизелей	
7	присадка НКГ	ТУ ВУ 390401182.020-2009	присадка НКГ марка "А"	
8	растворитель для пром.целей (опытн.образец)	ТУ ВУ 190690497.001-2011 опытн.образец	растворитель для промышленных целей (опытн.образец), марка М	
9	растворитель для пром.целей (опытн.образец)	ТУ ВУ 190690497.001-2011 опытн.образец	растворитель для промышленных целей (опытн.образец), марка Л	
10	бензин авиационный	ГОСТ 1012-72	авиационный бензин В-91/115	
11	неэтилированный бензин	ГОСТ 31077-2002	автомобильный бензин марки Нормаль-80 класс 2	
12	неэтилированный бензин	ГОСТ 31077-2002	автомобильный бензин марки Нормаль-80 класс 4	
13	неэтилированный бензин	ГОСТ 31077-2002	автомобильный бензин марки Регуляр-92 класс 2	
14	неэтилированный бензин	ГОСТ 31077-2002	автомобильный бензин марки Регуляр-92 класс 4	
15	неэтилированный бензин	ГОСТ 31077-2002	автомобильный бензин марки Премиум-95 класс 2	
16	неэтилированный бензин	ГОСТ 31077-2002	автомобильный бензин марки Премиум-95 класс 4	

This screenshot provides a detailed view of the selected item, 'АС-1'. It shows the object name, technical specification (ТУ ВУ 100017108.003-2010), and brand (средство смазочное антикоррозионное АС-1). The interface also displays the code, object name, and brand for other items in the list, such as 'растворитель для тех.целей' and 'топливо ТС дистиллятное'.

Код	Объект	ТУ	Марка	Примечания
1	топливо ТСМ	ТУ ВУ 300220696.045-2009	топливо судовое	
2	топливо ТСМ	ТУ ВУ 300220696.036	малосернистое маловязкое топливо судовое маловязкое	
3	АС-1	ТУ ВУ 100017108.003-2010	средство смазочное антикоррозионное АС-1	
4	растворитель для тех.целей	ТУ ВУ 300220696.042-2007	растворитель для технических целей марки "Л"	
5	топливо ТС дистиллятное	ТУ ВУ 300220961.003-2010	топливо судовое дистиллятное для морских дизелей	с изм. 1
6	топливо ТС дистиллятное	ТУ ВУ 300220961.003-2010 изм.1	топливо судовое дистиллятное для морских дизелей	
7	присадка НКГ	ТУ ВУ 390401182.020-2009	присадка НКГ марка "А"	
8	растворитель для пром.целей (опытн.образец)	ТУ ВУ 190690497.001-2011 опытн.образец	растворитель для промышленных целей (опытн.образец), марка М	
9	растворитель для пром.целей (опытн.образец)	ТУ ВУ 190690497.001-2011 опытн.образец	растворитель для промышленных целей (опытн.образец), марка Л	
10	бензин авиационный	ГОСТ 1012-72	авиационный бензин В-91/115	
11	неэтилированный бензин	ГОСТ 31077-2002	автомобильный бензин марки Нормаль-80 класс 2	
12	неэтилированный бензин	ГОСТ 31077-2002	автомобильный бензин марки Нормаль-80 класс 4	

## **11. Directions**

*Information technology for use in the chemistry, biopharmacy, nuclear energy and other fields.*

## **12. Contacts**

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