Formation of a system providing automated technological processes

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Abstract. The presented work analyzes the physical and technological processes occurring at different levels of enterprise functioning. The results obtained allowed the authors to form a system that would allow managing technological processes at various stages of production. The automated system "Vesta" was taken as a basis, which provides a stable technological and physical process. The authors describe the process of functioning of this system and new opportunities that open up for the successful functioning of physical and technological regional processes.

1. Introduction
Technological and physical processes occurring at enterprises always have a certain sequence and stages, which allows you to systematize the entire process of enterprise functioning and get the set result. However, in recent years, issues related to the formation of a system for the functioning of enterprises are moving to a new level of development; this is the introduction of automated, digital and intelligent technologies that make it possible to increase the efficiency and quality of the technological process. This practice is found in all spheres of activity, including in the state veterinary supervision, which makes it possible to most clearly define the necessary parameters and assess their change.

State veterinary supervision is the work of bodies that carry out management activities aimed at preventing both animal diseases and preserving the safety of food products by detecting non-compliance with legislation in the field of veterinary medicine.

The main function of the veterinary supervision structure is the analysis, processing, collection, formation of information about various objects, phenomena, processes, subjects. Currently, every activity in its field requires perfection and modernization of information collection [1]. This is primarily due to the use of software products and current computer technologies [2].

Another important function of veterinary and supervisory structures is the fulfillment of their powers and obligations [3]. That is why there was a need to use up-to-date means of communication and processing of the received information. Incoming information should flow logically and together from one system to the next according to the plan and control of employees. A single information space is needed for this chain [4].

In this regard, there is an urgent need to create a unified state information space in the field of veterinary medicine, which will allow solving one of the key tasks in ensuring the food and biological security of the country – ensuring the tracking of all livestock products.
2. Materials and methods
To date, there are already a number of information products that are officially registered and used in the context of state information technologies [5]. Such information systems are "Argus", "Mercury" and "Vesta", they serve as the basis of the traceability system.

As a strategy for the development of veterinary and supervisory authorities of any particular region, we propose to consider in more detail the automated system "Vesta".

The main purpose of the automated Vesta system is to automate data collection, analysis and sending information about laboratory studies of the products provided. It is possible to diagnose not only food products, but also the quality of animal feed, animal medicines and much more. Thanks to the Vesta system, product quality control, implementation of state programs, timely monitoring of food security monitoring and the epizootic situation will be carried out. The main capabilities of the new automated Vesta system are shown in figure 1.

**Figure 1.** The main features of the automated Vesta system.

The Vesta system includes a number of subsystems designed for use by various users:

- Research department;
- Administrator;
- Sample acceptance department;
- Reporting;
- Subsystem of territorial administrations;
- Openvesta subsystem - free access without authorization.
The operation of the Vesta system is possible for any research laboratory, regardless of its affiliation and forms of ownership (laboratories of diagnostic orientation, veterinary and sanitary expertise, laboratories related to food safety, etc.).

The automated system is designed to work:

- Management bodies in the field of veterinary medicine and other supervisory bodies;
- Veterinary control laboratories;
- Laboratories of veterinary and sanitary examination;
- Territorial administrations;
- The central office of the Rosselkhoznadzor;
- Laboratory clients.

The developer of the automated system is the Federal State Budgetary Institution "VNIIZHT" Federal Center for Animal Health Protection, Vladimir.

Any client of the system has at his disposal a certain number of tasks implemented in this program. The Vesta system is currently implemented in the form of a web application, namely, a computer that has access to an Internet connection is needed for work (figure 2). The work is done from a regular web browser, that is, the client does not need to install anything at his workplace.

To work, it is recommended to install only the Mozilla Firefox browser version 3.0 or slightly higher. At the beginning of the work, the client needs to enter the address in a certain address bar, then his name and password, which are given to him when registering in the program (figure 3) [6-9].

![Figure 2](image-url) General scheme of the automated system operation.

![Figure 3](image-url) The process of the automated system operation.
Explanation of the drawing [10-12]:

- The samples are sent to the research laboratory, where the primary data is entered. The laboratory staff enters all the necessary information, and then distributes the research into functional departments;
- Samples are sent to the appropriate departments. Samples are distributed according to the assigned department, all necessary studies are carried out, and the results obtained are entered into the program;
- The obtained results are submitted for acceptance for the formation of certificates, protocols;
- Processing of results;
- Generating reports.

3. Results
The health of the majority of the population and its well-being depend on the reliability of the conducted samples and research results. Therefore, any mistake or inaccuracy of data can pose a threat to people's lives, spoil the image of the enterprise, industry and even the region. In this regard, it is important to introduce an automated system, thanks to which full control will be exercised over the laboratories carrying out the research process [13-18].

Figure 4 shows the main advantages that an automated system carries for the successful management of veterinary and supervisory authorities in the region.

| The automated system "Vesta" will allow: |
|-----------------------------------------|
| Association of State Veterinary Supervision structures in the region |
| Create a single centralized database of laboratory research results of supervised products with the ability to access up-to-date information at any time for generating reports, quickly searching and analyzing information, providing information services for laboratory customers |
| Reduce labor, material and financial costs for documentation, minimize errors, thanks to the availability of ready-made forms for entering information, as well as checking the data entered by the user |
| To carry out centralized control over the implementation of state programs, as well as monitoring of food safety and epizootic monitoring |
| Accounting for all stages of research |
| Reduce the time for processing laboratory reports |

Figure 4. The results of the application of the automated system in the technological process.
Thanks to this system, full and high-quality control over compliance with and implementation of state policies will be carried out, timely monitoring of food security will be carried out, as well as monitoring related to epizootic safety, which will improve the work of veterinary and supervisory authorities of the region.

4. Discussion
Automation of technological processes is the replacement of human physical labor by the work of special devices that provide this control.

Automation of production processes helps to increase labor productivity many times, thereby increasing its safety, environmental component, improving product quality and making more rational use of production resources, including human potential.

Automation and management of technological processes and production facilities contributes to the successful development of both enterprises and industries and regions:

- Technological solutions based on the use of electronic equipment and software supply are aimed at: improving the quality and competitiveness of manufactured products;
- Reduction of energy costs;
- Cost reduction;
- Reduction of the number of personnel involved in production;
- Growth of production volumes;
- Expansion of sales markets.

In modern realities, it has been proven more than once that the use of automated control tools optimizes production processes and reduces costs, which has a positive effect on the activities of enterprises.

5. Conclusion
The introduction of an automated system will allow:

- To unite the structures of state veterinary supervision in the region, which will strengthen control over the work and timely performance of duties;
- Create a single information space where laboratory results of the study will be stored;
- The ability to access up-to-date information for the formation of laboratory reports at any convenient time;
- Quick search, analysis of the necessary information;
- Providing high-quality and reliable information services to laboratory customers.

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