



## OPINION

on dissertation work for the acquisition of educational and PhD degree

Author of the dissertation:

mag. Ekaterina Antonova Gospodinova

Thesis topic: "Concepts for the construction of distributed special purpose information systems"

Member of the Scientific Jury:

Prof. Ph.D. Andon Dimitrov Lazarov, VVMU "N. Vaptsarov" - Varna.

### **1. The relevance of the problem, developed in the dissertation, in scientific and applied scientific terms**

Control and measurement systems, combined with communication technologies, are the focus of modern automation and computing. These systems are also known as Distributed Control Systems, are used for process control and management, and are implemented with high-speed Programmable Logical Controller.

In this sense, the purpose of the dissertation is actual: the development of methods, algorithms and software for distributed information systems using IFSF (International Forecourt Standards Forum), which is in accordance with the following main tasks:

analysis of the basic parameters and characteristics of the LONWORKS® automated software platform for automated level measurements; software implementation and experimental study using IFSF communication standard; Designing and building interface and software for connection to the LONWORKS® automated level measurement platform using the IFSF communication standard; development of a distributed information system for continuous monitoring of the level of fuel tanks; development of software for monitoring and transmission of data at a gas station.

### **2. Degree of knowledge of the problem state and creative interpretation of the literary material**

The literature review provides a detailed description of computerized distributed systems with their structural components for process control, methods and technologies for measuring the basic performance and level of liquid fuels in tanks, their remote control and control using the IFSF protocol communication kit.

Software, organization, storage, usage and protection of data, the stages of development and integration with other management platforms, as well as the analysis of the impact of modern information technologies - mobile communications and cloud computing on the structure and technology distributed management systems are considered.

Automated fluid level measurement systems are analyzed in detail, and external variables are evaluated that affect the value of the final results and the accuracy of the measured values. Based

on the literature sources, technological assessments of the structural components of the automated measuring and control systems, the purpose and main tasks of the dissertation are formulated.

3. Conformity of the chosen research methodology and the set objective and tasks of the dissertation with the contributions made

In the dissertation the methodology for research and realization of automated distributed fluid management and control system is applied, which includes: analysis with the language of block-functional diagrams, algorithmizing and software of the basic functions of the level-measuring systems, realized in C ++, calculation of the main technical indicators, volume, level, temperature of the measured fluids, calibration, statistical analysis and evaluation of measurement errors. The methodology used is in accordance with the stated purpose and tasks of the dissertation.

#### **4. Scientific and scientific-applied contributions in the dissertation:**

##### **Scientific contributions**

1. A comparative analysis of modern technologies for the construction of automated systems for remote control, measurement and Internet data transmission is made, as well as an assessment of the standards for the construction of communications and data transmission protocols.
2. An assessment of the functionality and architecture of the LonWorks network platform and its components, compared to the implemented similar network platforms are suggested. A methodology for designing distributed automated information systems for measurement, control, timely and unobstructed access to the information database has been developed.
3. An expert evaluation of the IFSF software communication package has been made. Algorithm, software in C ++ and interface with network technology platform for automated leveling system LONWORKS ® and IFSF standard have been developed
4. An information and communication system has been developed using the IFSF protocol package, compatible with the TCP/IP protocol stack, the OSI model and having an autonomous operation protocol.

##### **Scientific and applied contributions:**

1. The software for a level-measuring system for filling stations has been developed in accordance with the regulations of the Ministry of Finance. The developed software supporting the IFSF communication standard is installed, tested on commercial premises.
2. Analytical expressions are proposed for calculations and experimental evaluation of systematic and instrumental errors in real systems. The measurement uncertainty has been analyzed. On the basis of a comprehensive analysis of the recorded errors, new calibration measuring tables have been developed.

#### **5. Evaluation of dissertation publications**

The results of the dissertation have been tested in 9 publications, 6 of which are in English. Two of the publications are in Impact Factor magazines outside the country. The number of publications and the authority of the publishers and conferences where they are presented reveal the author as a highly qualified and active researcher with quality publishing activity.

#### **6. Statement, recommendations and notes**

The purpose of the dissertation is achieved and the tasks accomplished. The presentation style is good, but lacks concreteness and sharpness in formulating the tasks in the different parts of the dissertation.

Instead of a targeted review of literature that addresses issues similar to those in the dissertation, the author looks at the history of creating distributed information systems for managing technological processes, organizing and storing data and information, multi-user computer information systems, software, etc. .n. A similar presentation is also provided in Part 2 - Data Transfer Analysis.

It is recommended that the author, when presenting research results, formulate a problem statement, methods or methodology for its solution and analysis. Few misspellings are made. Critical comments cannot affect the positive overall assessment of the thesis.

#### **7. Conclusion**

In conclusion, on the basis of the undoubtedly original results of scientifically applied value, I give my positive assessment of the dissertation work by offering to the dissertation magician Ekaterina Antonova Gospodinova to be awarded the educational and scientific degree "Doctor" in the doctoral program "Computer Systems and Technologies", in the professional field 5.3 "Communication and Computer Engineering".

JURY MEMBER: Prof. Dr.Sc. Eng. ... Подпис заличен .. (A.D. Lazarov)  
Чл.2 от 33ЛД

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Varna