

**OPINION  
for dissertation  
for the acquisition of an educational and scientific degree “Doctor”**

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|-----------------------------|-------------------------------------------------------------------------------------------------|
| Area of higher education:   | 4. Natural Sciences, Mathematics and Informatics                                                |
| Professional field:         | 4.6. Informatics and Computer Science                                                           |
| Doctoral program:           | Informatics                                                                                     |
| Dissertation topic:         | Modeling and Automation of Standardized Information Security Management Systems                 |
| Author of the dissertation: | Toddor Velez Velez                                                                              |
| Scientific supervisors:     | Prof. Nina Dobrinkova, PhD                                                                      |
| Author of the opinion:      | Assoc. Prof. Krassimira Minkova Ivanova, PhD<br>Institute of Mathematics and Informatics at BAS |
| Based on:                   | Order of the Director of IICT No. 232/01.10.2025                                                |

The opinion has been prepared in accordance with the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria, the Regulations for its Application, and the Regulations on the Conditions and Order for Acquiring Scientific Degrees and Occupying Academic Positions at BAS and IMI-BAS, as well as based on the Decision of the Scientific Jury (Minutes No. 1/08.10.2025) regarding the distribution of activities among the members of the Scientific Jury under the procedure.

The main documents for the doctoral procedure have been submitted – the dissertation text with a declaration of originality, abstracts in Bulgarian and English, and the publications on which the dissertation is based, the order confirming the completion of the doctoral program, and a report on the fulfillment of the minimum requirements for obtaining the Doctoral degree (PhD).

**GENERAL DESCRIPTION OF THE DISSERTATION**

The dissertation is written in Bulgarian and contains 125 pages of main text, 60 pages of appendices, and concludes with a bibliography of 80 literature sources.

The “object of the research” are the standardized information security management systems and the possibilities for their improvement through the automation of their functionalities and management.

The “subject of the research” is the development of a model of an integrated platform that provides modeling and automation of information security management systems based on international standards.

The “goal of the dissertation” is the creation and experimental testing of a model of such a platform to achieve higher efficiency in the management and control of information security.



In the first chapter of the dissertation, “Standardized Information Security Management Systems”, the theoretical foundation of standardized information security management systems (ISMS) is presented. Definitions and the basic principles of information security, as well as protection methods, are examined. The main challenges are analyzed, with particular attention given to the role of the human factor. Special focus is placed on the role of international standards for building an ISMS. Existing software solutions are discussed, highlighting their limitations and emphasizing the need for a comprehensive, integrated, and automated approach. The chapter is well-structured, and the review of standards and their applications is comprehensive.

In the second chapter, “Modeling of a Platform for Management and Automation of Standardized ISMS”, standardized work processes are researched and analyzed, the functional and non-functional requirements for the platform are defined, and its characteristics are identified. A semi-formal approach is used, combining a description of requirement specifications with a model of UML diagrams. The modeling of the processes and requirements is detailed. Some of the requirement diagrams are overloaded and have unclearly defined requirements (e.g., in Fig. 18, “use of cryptography” is too specific as a definition but has an unclear context).

In the third chapter, Todor Velev presents his concept of the “document matrix” as the foundation of the platform for ISMS automation. The methodology for modeling, the conceptual architecture of the model, and a detailed description of each module are clearly outlined. The strengths include a comprehensive approach based on a service-oriented architecture, with an emphasis on operational efficiency and compliance with standards. As a weakness, the lack of real data to validate the model and the limited description of integration with external systems can be noted. Nevertheless, the author’s model and its potential for ISMS automation are convincingly presented.

In the fourth chapter the main contributions and conclusions of the dissertation are systematized, as well as directions for future research towards integration with artificial intelligence systems.

The dissertation is original and independently developed by the author. The sources used are correctly cited.

## **ASSESSMENT OF THE DISSERTATION ABSTRACT**

The abstract is presented in Bulgarian and English, in accordance with the law requirements. It adequately reflects the main goals, methods, and results of the research. It provides sufficient information to understand the significance of the development and successfully summarizes the author's key contributions.

## **CONTRIBUTIONS OF THE DISSERTATION**

The main contributions of the dissertation work include:

- **Scientific Contributions:** An algorithm and methodology for researching and modeling an automated information security management platform, integrating multiple international standards, has been created. An original theory of a “document matrix” as a basis for organizational management is presented.
- **Scientific-Applied Contributions:** A comprehensive system analysis of ISMS, standards, and existing software solutions has been performed. The main work processes and information flows for automation have been identified and analyzed. Functional and non-functional



requirements for the platform have been formulated. A specific model of a platform for ISMS' modeling and automating has been developed. The architecture of the platform is presented.

- **Applied Contribution:** Concept validation was performed through the execution of an industrial research project and practical implementation.

## **PUBLICATIONS AND OTHER ACTIVITIES RELATED TO THE DISSERTATION TOPIC**

Todor Velev presents three publications related to the dissertation topic, two of which are co-authored with the scientific supervisor, and in one is solo-authored. One is in a book series published by Springer – Studies in Big Data (with SJR), the second is in the proceedings of an international conference indexed in Scopus, thereby fulfilling the minimum requirements for acquiring the PhD degree. The third is also in the proceedings of an international conference. The publications reflect substantial elements of the dissertation research.

The two publications were presented at the international conferences, thus providing visibility for the presented results to a wider expert community. One of these publications has been cited.

The current development has been practically validated during the execution of a research project and has been successfully implemented in the operational activities of the National Institute of Meteorology and Hydrology.

## **CRITICAL NOTES**

Some of the notes were mentioned in the description of the chapter contents. On a more general level – in the flowchart language, a diamond is incorrectly used as a connector instead of its intended purpose as a conditional operator. In the second chapter, in the figures with diagrams, it seems odd for the platform to be depicted as a human figure. In the third chapter, in some of the figures describing platform modules, arrows are missing, which hinders comprehension. Isolated grammatical errors are observed, but overall, the text is grammatically sound and well-structured.

## **CONCLUSION**

The dissertation complies with the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria, the Regulations for its Application, and the Regulations on the Conditions and Order for Acquiring Scientific Degrees and Occupying Academic Positions at BAS and IMI-BAS for acquiring an educational and scientific degree “doctor” in a professional field 4.6. Informatics and Computer Science, doctoral program “Informatics”. Toddor Velev possesses theoretical knowledge and professional skills for conducting independent scientific research.

I give my positive assessment of the presented dissertation work and propose to the Honorable Scientific Jury to award **Toddor Velev Velev** the educational and scientific degree “Doctor” in area of higher education 4. Natural Sciences, Mathematics and Informatics; professional field 4.6. Informatics and Computer Science; doctoral program “Informatics”.

30.10.2025

Sofia, Bulgaria

Signature:

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