
G. S. RAKOVSKI NATIONAL DEFENSE COLLEGE

REVIEW

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of scientific works, presented in the competition for holding an academic position „Associate Professor“ for a serviceman, in higher education domain 5. Engineering studies, professional field 5.3 „Communication and Computer Engineering“, in Scientific specialty „Automated Systems for Information Processing and Control,”

for the needs of the scientific section „Doctrines, Concepts and Lessons Learned” in the Defence Advanced Research Institute at „G. S. Rakovski” National Defence College, as promulgated in order of the Minister of Defence of Republic Bulgaria № OX-460/16.05.2019 and announced in SG No. 51/28.06.2019

of the candidate Lieutenant colonel PhD. Eng. Zarko Ivanov Zdravkov, Chief Expert at the Strategic Planning Directorate of – Defense Headquarter, Ministry of Defense

1. Which of the submitted by the applicant papers are accepted for evaluation by the reviewer

The only candidate in the competition is Lieutenant Colonel Doctor Engineer Zarko Ivanov Zdravkov. He participated in the competition with a list of scientific production of 27 (twenty-seven) titles, out of a total of 439 (four hundred thirty-nine) pages, with 11 (eleven) of them being an author.

The submitted materials for the competition are scientific works as follows:

- A monograph 210 (двеста и десет) pages (№ 1);
- Methodology in volume 57 (fifty-seven) pages, co-authored (№ 27);
- Articles in scientific journals – 1 брой (10 стр.) co-authored (10 pp.) published in the Military Magazine (№ 5);
- Scientific reports in collections of international scientific conferences and sessions, as well as those with international participation held in our country – 13 issues (83 pages). Of these, 7 are self-contained (Nos. 9, 11, 18, 19, 20, 22, and 26) and 6 are co-authored (Nos. 6, 7, 10, 13, 15, and 25);
- Scientific Papers in Proceedings of Scientific Conferences and Sessions - 11 (79 pages). Of these, 3 are single-authored (Nos. 4, 14 and 21) and 8 are co-authored (Nos. 2, 3, 8, 12, 16, 17, 23 and 24).

The analysis of the publications submitted for review shows that the candidate's participation with reports in scientific conferences and sessions - national and with international participation - is predominant. Out of the total of 25 articles and reports, in 10 he is single author, in 13 of them the candidate is in the first place, and in 2 of them in the second place.

The materials offered are not used in the candidate's doctoral degree. Everyone is in the field of science and I accept them for review.

2. Common characteristic of the applicant's research, applied and pedagogical activities.

The reviewed materials cover the following thematic areas:

1. Information security;
2. Review, analysis and evaluation of technologies and tools for surveillance, control and protection of information in security and defense;
3. Information systems and technologies for databases and automated processes;
4. Establishment and development of automated security and defense information systems.

Research in the field of **Information Security** is related to: the application of the proposed models and methodologies related to information security (№ 2, 11, 12, 17, 18, 22, 26), testing of the security of the automated information systems (AIS) (Nos. 4 and 21) as a study of the dependence of NATO 's critical tasks on national information systems (Nos. 24).

The second direction **Review, analysis and evaluation of technologies and tools for monitoring, control and protection of information in security and defense** examines the problems related to the information security capabilities of the AIS in the Bulgarian Armed Forces, and for this purpose, appropriate technical and software tools and technologies for access control and data protection (Nos 3, 9, 8, 13, 14) are suggested. The strategy for information security in the C4I systems of the Bulgarian Army (No. 10), software for passive and active intelligence of the network environment of the automated information systems (No. 19 and 20), as well as technological opportunities for cyber operations (No. 23) are considered.

The third area includes the works related to "**Information systems and technologies for databases and automated processes**". Issues related to the relational database model are addressed in (Nos. 6, 7, and 15). A model of relational databases is proposed for planning the educational process in a military academy, based on formalizing the curriculum (No. 15). The possibilities of conducting a separate two-stage staff training of the formations for communication and information support with the means of distance learning (No 16) are considered.

The fourth area is dedicated to "**Building and Development of Automated Security and Defense Information Systems.**" The architecture of the information system for providing public access to the spatial data and services of the MoD is proposed (No. 5). The challenges of managing a project for the "Establishment of an Information System for the Public Access to Spatial Data and Services of the Ministry of Defense" (No. 25) are considered.

From the characterization of the applicant's scientific production made so far, it can be concluded that the publications in these fields are in the scientific specialty of the announced competition "Automated systems for information processing and control".

3. Opinion on the presence or absence of plagiarism.

The results of Lieutenant Colonel Zdravkov's scientific work are innovative and up-to-date. Citations are reflected correctly and co-authorship is properly cited. During my work as a member of the scientific jury, I didn't receive neither anonymous nor written signals concerning plagiarism in the competitor's

publications.

4. Evaluation of the applicant's pedagogical training and activities.

The pedagogical preparation and activity of Lieutenant Colonel Dr. Zdravkov can be characterized as a combination of research, implementation and pedagogical activity in the creation, operation and basic protection of AIS.

The aspiration of the applicant to use his scientific achievements in the educational process is evident in the development of his monograph "Designing secure automated information systems". It is 210 pages in size, meets the requirements and is a complete work. As a result, a methodology for designing a protected AIS is proposed. The methodology was verified by developing an example of an organization's secure AIS design. The materials developed by the applicant have been used in the process of training students and post-graduate students, as in the „G. S. Rakovski” National Defence College and at other universities. They are at a high pedagogical level, which helps the successful learning of the material taught by the students.

In his teaching activity, the applicant has conducted active and purposeful pedagogical activity in the following disciplines:

- Course four semesters of CCNA (Cisco Certified Network Associate) of "CISCO" network academic program "CISCO" Academy "D. S. Rakovski ”for the period 2000 - 2009;
- SCTM 223 Course “Designing Automated Information Systems” at NBU, Master's Degree, for the period 2005-2017;
- SCTM 237 "Critical Information Infrastructure Protection" course at NBU, Master's Degree, 2015-2019.

Dr. Zdravkov's many years of teaching experience have been proven by official notes.

He speaks English (level 2-2-3-2 NATO STANAG 6001) and Russian.

5. Key scientific results and contributions.

The main contributions to the work of Dr. Zdravkov can be defined as the adaptation, improvement and further development of existing knowledge, methods and technologies for solving specific problems and applying the results obtained in practice. Studies have been carried out, the objectives are clearly stated, the tasks are formulated and the limitations of the study are defined through the imposed restrictive conditions and assumptions. The findings summarize and prove new facts or confirm existing ones. Contributions have

been made to enrich existing knowledge.

The results and contributions are mainly scientifically applied, applied and educational and methodological in nature.

1. Scientifically-applied contributions.

1.1 The application of information systems and technologies and protection means (№ 1, 3, 8, 9, 10, 13, 14, 19, 20, 23, 25) is analyzed and substantiated and software and protection technologies and technologies are proposed of AIS information (Nos 8, 13, 19, 20, 21);

1.2 Information structures (No.11) and software applications for automation of modeled processes have been proposed, and original, innovative, constructive and invariant models have been developed for: information security (No.2, 10, 12, 18, 22); for relational databases (Nos. 6, 7, 15, 17); as well as a model for examining adequacy processes (No.11);

With this group of results, existing knowledge is enriched, new constructions are created and scientific results are put into practice.

1.3 The architecture of the information system for providing public access to the spatial data and services of the MoD is proposed and the implications for the object of the critical information infrastructure for risk assessment (Nos. 5 and 26) are defined, cyber technologies are justified and classified. (No 23)

1.4 The technological capabilities for conducting cyber operations and the models for controlling access to AIS (Nos. 3 and 23) are analyzed..

2. Applied contributions.

2.1 Information security methodologies have been developed for: designing secure automated information systems (No 1), penetration testing of automated information systems and access control (No 4), testing of security of automated information systems (No 21), identification of the consequences for a critical information infrastructure object (No 26), as well as a risk assessment methodology (No 27), applying scientific results in practice;

2.2 A methodology for examining the dependence of NATO critical tasks on national information systems has been proposed and a map of national communication and information systems working for NATO critical missions has been developed (No. 24);

2.3 The experience in the development and implementation of regulations and systems of information protection in automated control systems of the Bulgarian Army has been systematized (No 10, 25).

3. Educational and methodological contributions.

3.1 3.1 A methodology for conducting a separate two-stage staff training of communication and information support units with the tools for distance learning has been developed (No16);

3.2 The possibilities of applying a model of relational databases for planning the educational process at the „G. S. Rakovski” National Defence College are examined (No15).

6. Assessing the significance of contributions to the science and practice.

From the analysis of the **scientifically-applied**, applied and **educational and methodological contributions** of the work of Lieutenant Colonel Dr. Eng. Zdravkov, the professional knowledge of the problems and the appropriate combination of the research activity with the teaching and methodological one are evident, which leads to concrete and useful for the practice and the educational process solutions. The submitted papers for the review of the candidate have a completed form and have achieved the scientific and applied scientific contributions, which are specified in point 5. They are the theoretical basis for the creation of regulatory documents, program applications and AIS.

The works are covered in the teaching activity of the applicant and may form the basis of further research.

I accept the candidate's scientific results and contribution as his personal work.

The applicant has proven a total of 32 (thirty-two) citations, in which most of the results of the review materials were found.

7. Assessment of what degree the contributions are made by the applicant.

The candidate submitted a total of 27 works in a volume of 439 (four hundred thirty-nine) pages for review. 268 (two hundred sixty-eight) pages were developed by himself, and 171 (one hundred and seventy-one) were co-authored. Separation protocols have not been applied to the collective works and the applicant's personal participation is determined in proportion to the number of all authors. However, in general, the contributions of Lieutenant Colonel Zdravkov can be considered significant.

The scientific and applied contributions for which the applicant is applying are his personal work. To a large extent, they enrich and further develop individual areas of information technology related to information security, AIS modeling and processes, and the creation of methodologies for the use of models.

The works are covered in the teaching activity of the applicant and may form the basis of further research.

I accept the candidate's scientific results and contribution as a personal matter of his.

The applicant has proven a total of 32 (thirty-two) citations, in which most of the results of the review materials were found.

8. Critical remarks about the reviewed works.

I have the following critical comments on the submissions and publications submitted for review:

1. There are no dividing protocols for the individual contributions of the applicant in the proposed collective publications. I recommend that Lieutenant Colonel Dr. Eng. Zdravkov, in future team work, require such protocols.

2. The number of publications in magazines is small. Bearing in mind the excellent command of English at SANAG 2232 level and Russian, the experience gained so far and his good theoretical background, I recommend that the candidate direct his future activity to publications in magazines national and international ones, as well as to give more great importance for publishing their papers in foreign scientific forums of international scientific importance.

These critical remarks do not call into question the value of the scientific, applied and methodological contributions received.

9. Personal impressions and other issues on which the reviewer believes he should take a stand.

I have known the candidate since 2000, when he was appointed as an Associate of Science degree in Defence Advanced Research Institute, at G. S. Rakovski National Defense College, Sofia. During his training, as a student at G. S. Rakovski National Defense College in 2003-2005 I was his teacher and scientific leader in the development of the thesis.

The candidate, Colonel Zdravkov, is distinguished by his professionalism, organization and thorough work and research. His lasting interest in research contributes to the development of high value scientific works.

I think he is a well-established scientist, respected and respected among his

students and colleagues and has established himself as a good teacher and methodologist. She is actively working for her scientific and methodological growth, which is illustrated by the fact that 15 of the 27 publications were developed after receiving her doctorate degree in 2005.

10. Conclusion.

Considering the overall research and teaching activity of the applicant and the positive evaluation of his contributions and results, I believe that the only participant in the competition Lt. Col. Dr. Zarko Ivanov Zdravkov fully complying with the requirements of the Act on the Academic Staff Development in Republic of Bulgaria and the Regulations governing the application of the Act, implementation and Rules for the development of the academic staff at G. S. Rakovski National Defense College.

I suggest the honorable members of the scientific jury to vote for the award of the scientific title "Associate Professor" and submit a proposal to the Scientific Council of Defence Advanced Research Institute, Lieutenant Colonel Dr. Eng. Zarko Ivanov Zdravkov, to be elected and take an academic position "Associate Professor" Doctrines in the in higher education domain 5. Engineering studies, professional field 5.3. Communication and Computer Engineering, in the specialty "Automated Systems for Information Processing and Control " for the needs of the scientific section "Doctrines, concepts and lessons learned" of the Defence Advanced Research Institute.

11. Candidates' evaluation.

To the only candidate in the contest Colonel Dr. Eng. Zarko Ivanov Zdravkov I give a **positive evaluation**.

Reviewer

13.12.2019 г.

(Assoc. Prof. Eng. Veselina Aleksandrova, PhD)