DEPARTMENT OF DEFENSE
DEFENSE INSTITUTE "PROFESSOR TSVETAN LAZAROV"
Sofia 1592, "Professor Tsvetan Lazarov" Blvd. No.2, fax: 02/92 21 808, http://di.mod.bg

OPINION

by Associate Professor Doctor Eng. **Alexander Assenov Kolev**,

Defense Institute "Professor Tsvetan Lazarov",

Sofia 1592, "Professor Tsvetan Lazarov" Blvd. No. 2, phone: 02 92 21834

on the competition for occupying the academic position of "professor" for a military serviceman, in the field of higher education 5. "Technical sciences", professional direction 5.3. "Communication and computer technology", scientific specialty "Information technologies and cyber security", at the Defense Institute "Professor Tsvetan Lazarov", announced in the "State Gazette", no. 81/11.10.2022 in accordance with the order of the Minister of Defense No. OX-916/28.09.2022.

with the candidate:

Col. **Nikolay Todorov Stoyanov**, associate professor, doctor, deputy director of the Defense Institute "Professor Tsvetan Lazarov"

1. **General characteristics of the candidate's scientific-research, scientific-applied and pedagogical activities**

In the current competition for the occupation of the academic position of "professor" for a military serviceman, announced in the State Gazette, issue 81 of 11.10.2022, the only candidate is Col. Associate Professor Nikolay Todorov Stoyanov, Ph.D. The candidate's scientific production is a total of 3 monographs, 3 university textbooks, 1 study, 129 publications, 4 implemented scientific and applied developments (in 3 as a supervisor), 38 research projects (24 of them – international), 25 participations in organizational committees and publishing collectives, 35 reviews and other works of a scientific and practical nature.

For the period after his habilitation as an associate professor in 2014, 1 monograph, 1 chapter of a collective monograph, 3 published university textbooks, 1 study, and 41 articles and reports have been submitted for review. Publications in issues indexed in world-renowned databases including issues with SJR are 7, of which 2 are in Q1 (II.3.80, II.3.82), 1 is in Q3 (II.3.110) and 4 are in Q4 (II.3.75, II.3.100, II.3.101, II.3.102). Eighteen of the publications submitted for review are in Bulgarian, 21 in English and 2 in Ukrainian. Regarding the authorship of the materials submitted for review, 1 monograph of 334 pages has three co-authors, 1 chapter of a collective monograph is co-authored, 1 study is co-authored, 1 university textbook is co-authored, of the remaining publications 2 are independent works, in 9 the candidate is first.

The works presented in the quality of scientific research are in the field of the security of information and communication technologies for the needs of defense, the design and construction of automated information systems, cyber security systems, cryptographic approaches and software implementations, the

creation of mathematical, technical, experimental and other models and methods. His research is focused not only on the theoretical foundations and scientific foundations in the described areas, but also includes practical implementations of many of the diluted theoretical propositions.

Col. Prof. Dr. Nikolay Todorov Stoyanov is a researcher and implementer in the professional direction of the announced competition, popularizer of modern scientific trends and organizer of scientific forums. He is the scientific supervisor of 7 doctoral students, 2 of whom have successfully defended their dissertation.

The candidate participated as chairman, deputy. chairman and member of organizing committees of international scientific conferences. Participates in the editorial teams of 5 journals (one of them is the editor-in-chief Journal of Defense & Security Technologies, Print ISSN 2534-9805, e-ISSN 2534-9813), one of the journals is indexed in world famous databases (Advances in Military Technology, ISSN1802-2308).

The candidate has prepared reviews for 3 monographic works, as well as opinions and reviews for selection in competitions for holding the academic positions of "professor" and "associate professor". He was a member of the jury for awarding the educational and scientific degree "doctor" - 11 nos. in Bulgaria and 1 pc. in the Czech Republic.

2. Evaluation of the candidate's special training and activity
Col. Associate Professor Dr. Nikolay Todorov Stoyanov has been working in the military, scientific and military-scientific field since 1992 and until now, which includes various educational institutions and scientific institutes, as well as specialized units for the construction and development of information and communication systems and technologies for defense needs and information

protection systems. He holds leadership positions as a platoon commander, head of the Information Protection Department, associate professor at the Defense Institute and currently deputy director of the Defense Institute. In 2004, he defended his dissertation on "Models of protected interaction in computer systems for security and defense" and was awarded the scientific and educational degree "doctor". In 2014, he held the academic position of "associate professor" at the Defense Institute "Professor Tsvetan Lazarov".

The candidate has passed specializations and holds numerous certificates, the most important of which are: Administering Microsoft Share Point Portal Server 2003; Designing IT Platform Collaborative Applications with Microsoft Share Point 2003; Microsoft SQL Server 2005 for the Eexperienced Oracle Database Administrator; Gold certificate for high professional achievements as a systems engineer, security administrator and designer of an Automated Control System. Has a certificate of English proficiency (STANAG 6001) since 2005.

According to the attached documents, significant scientific and practical appearances of him are traceable after 2001.

The candidate's rich research and implementation experience has been realized in 4 implemented scientific and applied developments (in 3 of them as a leader), 8 projects (technical, system, work) for the needs of security and defense, national and international, 7 educational and methodological works (descriptions, manuals, studies, TID, TTZ, initial assignments, programs, methodologies, etc.), 35 reviews of scientific reports, articles and theses, 25 participations in organizing committees and publishing groups, participation in 24 international research projects (as supervisor of 3 of them, as scientific supervisor of 1 project).

I believe that the candidate possesses the necessary professional, research, entrepreneurial, promotion and personal qualities, which are necessary for

occupying the academic position of "professor" according to the announced competition.

3. **Main scientific results and contributions**

I accept the claim for the contributions proposed by the candidate as substance and application according to the submitted documents.

I define the obtained results and contributions as enrichment of existing knowledge and application of scientific achievements in practice. The main results are grouped into several areas.

A. Information security approaches, models, architectures, research and best practices

Research has been carried out in the field of information protection. Approaches to risk management, testing and evaluation of information security in computer systems are proposed. The results of the research are summarized in a published monograph [II.1.6].

Information security, computer networks, and approaches to testing and analyzing the security of computer systems, as basic theoretical positions, are presented in published university textbooks [II.1.3, II.1.4, and II.1.8].

Research has been done on existing models for protecting information in emerging cloud architectures [II.3.71, II.3.88].

An analysis of the possibilities of information protection in different types of systems - university environments, state administration, and systems used by law enforcement bodies has been carried out in a series of publications [II.3.73, II.3.75, II.3.79, II.3.80, II .3.82, II.3.90, II.3.94].

In a scientific and practical aspect, the proposed approaches and models have been tested and implemented in a number of scientific research projects [II.4.24, II.4.30, SPIDER (Appendix 2, section II.4)].

B. Cryptographic methods and mechanisms

Cryptographic methods and mechanisms are the main component of the information security system. Quantum computing and processes have been cited as one of the greatest challenges facing modern cryptography. Studies of how these technologies will impact cryptography are made in [II.3.70].

To improve cryptographic systems in order to overcome the so-called "quantum factor", attention is focused on evaluation approaches for new cryptographic schemes and algorithms and on new approaches for generating cryptographic keys. The research focus is on creating new "quantum-resistant" cryptographic schemes usable in security and defense systems. The research and the obtained results are published in [II.3.72, II.3.81, II.3.100, II.3.105].

C. Cyber Security and Cyber Defense

Approaches to design and construction of various cyber architectures, analysis and design of cyber security architectures, multi-layer model for cyber security with application in critical information infrastructures are analyzed [II.2.11, II.2.12, II.3.76, II.3.78, II .3.92, II.3.93, II.3.95]

An analysis and evaluation of the cyber security of critical infrastructure systems, security and defense systems and administrative information systems has been carried out. The main types and types of critical infrastructure from the point of view of cyber security are defined [II.3.85].

A model and method for evaluating critical infrastructures is proposed, based on research conducted in the Republic of Bulgaria under the general leadership of NATO [II.3.89].

Proposed multilayer model for cyber security of critical information infrastructure [II.3.92].

A study of approaches used for analysis and assessment of cyber security at the strategic, operational and tactical (technical) level, in a national scope, as

well as the various organizations such as NATO and the EU, was carried out. [II.1.5, II.1.7, II.3.77, II.3.78, II.3.86, II.3.87, II.3.93, II.3.99, II.3.103, II.3.104].

Ways and approaches for modeling cyber processes and cyber secure interactions in information systems, approaches for testing vulnerabilities, threats and countermeasures against cyber attacks have been researched, the results are published in [II.3.84, II.3.95, II.3.96, II.3.97, II.3.98, II.3.99, II.3.101, II.3.107, II.3.108, II.3.110.

Cyber security has been researched in emerging system concepts and technologies for ways of organizing communication and computer networks, increasing computing power, ways of storing distributed data. The research is presented in [Internet of Things and Internet of Military Things – II.3.83, II.3.91, Blockchain –II.3.102, Situational Awareness – II.3.106, II.3.109].
The received scientific and scientific-applied contributions have been approved in the projects MAMA (departmental - MOE), ECHO (international H2020), FORESIGHT (international H2020), CyRADARS (NATO SPS), CyNET (international - MES), CyberTwin (international - MES), PYTHIA (International PADR) and SOLOMON (International PADR).

4. **Evaluation of the significance of the contributions for science and practice**

In the attached documents, the candidate demonstrates his high scientific training, knowledge, skills and scientific achievements. In the list of works proposed for participation in the competition, participation as a team member or leader in a significant number of international and national research projects and other works of a scientific-applied nature is noted. The high assessment of contributions is due to the presence of 7 publications indexed in world-renowned databases.

Fifty six citations are presented, of which 26 are in scientific publications, referenced and indexed in world-renowned databases with scientific information or in monographs and collective volumes and 30 citations in monographs and collective volumes with scientific review.

5. Critical notes on the presented works

Upon careful review of the candidate's presented scientific production, I did not note any errors and inconsistencies that would affect the available high level of scientific and scientific-practical content and layout. I recommend that the candidate expand his activity in the training of doctoral students by applying his extensive experience of participation and management of scientific research projects in the field of cyber security.

6. Conclusion

Everything presented so far allows me to give a positive assessment of the materials for participation in the competition. The attached materials and documentation fully meet the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria and the Rules for its Implementation in its part for scientific production with contributions and applicability in the research and teaching process for occupying the academic position of "professor" in the field of higher education education 5. "Technical sciences", professional direction 5.3. "Communication and computer engineering", scientific specialty "Information technology and cyber security".

7. Evaluation of the candidate

Having carried out a careful analysis of the presented scientific works in terms of significance, content of scientific and scientific-applied contributions, I

express my **positive** opinion about the scientific activity of Col. Assoc. Doctor Nikolay Todorov Stoyanov.

I recommend to the respected members of the current scientific jury and the Scientific Council of the Defense Institute **to vote for** the award of the academic position "professor" in the field of higher education 5 "Technical sciences", professional direction 5.3 "Communication and computer engineering", scientific specialty " Information technologies and cyber security", by Col. Assoc. Dr. Nikolay Todorov Stoyanov.

Jury member: /S/

Associate Professor Doctor Eng. Alexander Kolev