# R E V I E W

from Corr. Memb. Prof. Krassimir Todorov Atanassov, DSc, DSc, IBPhBME-BAS
on the competition for the academic position " Professor"
in the field of higher education "Technical Sciences", professional field 5.3. "Communication and Computer Engineering", scientific specialty "Information Technology and Cyber Security", for the needs of the the Defence Institute, announced by Order № 130 / 16.03.2021 of the Director of the Defence Institute and published in the State Gazette, issue 24 of 23.03.2021 with a single candidate

**Associate Professor Dr. Eng. Rosen Stankov Iliev,**
from "Professor Tsvetan Lazarov" Defence Institute

## 1. Papers submitted by the candidate which are accepted for evaluation by the reviewer

In the competition for the academic position "Professor" in the "Technical Sciences" field of higher education, professional field 5.3. "Communication and Computer Engineering", scientific specialty "Information Technology and Cyber Security", announced in the State Gazette, issue 24 of 23.03.2021, participated one candidate - Associate Professor Dr. Eng. Rosen Stankov Iliev. The candidate presents a total of 52 papers, all of them published after acquiring the academic position of "Associate Professor" in 2012.
The works can be classified as follows:

1) Monographs – 3;
2) Articles and reports – 36;
3) Research, studies and research projects - 13.

**Characteristics of scientific works**

The monographs are in Bulgarian and include the author's main habilitation thesis (II.2.1) and two co-authored works, in one of which the candidate being the first author (II.2.2) and in the other file being the second author (II.2.3).

The articles and reports are distributed as follows:

- Articles in periodicals – 12 (II.3.48, II.3.49, II.3.55, II.3.61, II.3.62, II.3.63, II.3.64, II.3.65, II.3.78, II.3.75, II.3.76, II.3.77);
- Papers at international scientific conferences – 22 (II.3.45, II.3.46, II.3.47, II.3.51, II.3.52, II.3.53, II.3.54, II.3.56 - II.3.60, II.3.66 – II.3.74, II.3.79);
- Reports from scientific sessions and seminars – 2 (II.3.44, II.3.50).

With respect to the language of the publications, 28 of the papers and reports are written in Bulgarian and 8 are written in English.

With respect to the number of authors, they are divided into:

- Self-authored publications – 10 (II.3.46, II.3.47, II.3.48, II.3.49, II.3.62, II.3.64, II.3.73, II.3.74, II.3.76, II.3.78);
- Joint publications – 26, where the candidate

- is the first author in 12 (II.3.45, II.3.51, II.3.55, II.3.57, II.3.58, II.3.61, II.3.63, II.3.65, II.3.66, II.3.70, II.3.71, II.3.77)
- is second author in 14 (II.3.44, II.3.50, II.3.52, II.3.53, II.3.54, II.3.56, II.3.59, II.3.60, II.3.67, II.3.68, II.3.69, II.3.72, II.3.75, II.3.79).

Two of the publications (II.3.76 and II.3.77) are in journals with SJR (Scientific Journal Rankings).

The other works of the candidate include one research (II.4.37), participation in 10 scientific projects (II.4.38 - II.4.47), one study (III.24) and one technical assignment (III.25).

The topics, the methodology and the tools for research and analysis in the works submitted for review, fully correspond to the announced competition and are directly relevant to the professional field 5.3. "Communication and Computer Technology".

All proposed works were developed by the candidate after receiving the ESD "Doctor" (2002) and after winning the competition for the academic position "Associate Professor" (2012), which is evident from the years of publication of the works and I accept them for review. I am not reviewing two of the included works (III.24, III.25) due to their classified nature, since I have not been granted access to them.

## 2. General specification of the research, the scientific-applied and pedagogical activity of the candidate

The research activity of Associate Professor Dr. Rosen Iliev is in the field of information and communication technologies, design and construction of automated information systems and data centers, systems for collaboration, creation of various models, methods, approaches and methodologies for supporting the management process and for the development of defence communication and information infrastructure. They are mainly related to the optimization of information processing activities to increase the efficiency of work and management processes.

Most of the presented works have a scientific and applied nature and are based on practical research and applied developments, prototypes and infrastructure solutions for the needs of defence.

The pedagogical activity of the candidate is mainly related to the management and training of postgraduates and doctoral students, with one of his doctoral students having defended his dissertation thesis very successfully in 2017 (I was a reviewer), and four students currently being in the process of training.

To summarize, Associate Professor Dr. Rosen Iliev is a researcher and implementer of scientific achievements in practice, and his qualities as an organizer and promoter of science are the result of his work as Secretary of the Scientific Council of the Defence Institute, and the doctoral training.

## 3. Evaluation of the special preparation and activity of the candidate

Associate Professor Dr. Rosen Stankov Iliev has been working for over 30 years in the military-scientific and scientific field, in various scientific institutes and specialized units for construction and development of information and communication systems and technologies for the needs of defence, passing through almost all scientific positions to now. He holds managerial positions as a head of the scientific department “Information Technology”, head of

the "Information Systems" Sector, head of the "Communication and Information Systems and Information Protection" Department, head of program teams related to system analysis and design of functional subsystems in the field of construction and development of information and communication systems to support administrative activities and management, etc.

After completing his military engineering training in 1989 at the National Military University – Veliko Tarnovo, he graduated with honors his bachelor and master degrees at the Technical University - Sofia, specialty "Computer Systems and Technologies" and master degree in Communication and Information Systems at the Military Academy – Sofia. His development as a researcher includes defense of a doctoral dissertation in 2002 in the scientific specialty "Automated Systems for Information Processing and Control" and his promotion to the academic position of Associate Professor in 2012 in the same specialty. He completed several postgraduate qualifications in the field of information and communication technologies, and in 2000 he specialized in artificial intelligence at the Technical University - Sofia. He has a number of certificates related to the IT field: Training Certificate: "NMCC Operator's Training" (Northrop Grumman, The United States Air Force), Certificates of Achievement "Implementing and Managing Exchange 2003", "Administering Microsoft Share Point Portal Server 2003", Gold Certificate for High Professional Achievements as a System Engineer, Designer and Chief Designer of Automated Management Information System, and others.

Given his knowledge background and years of experience as a scientist and researcher in the field of military science and information and communication systems and technologies, I believe that Associate Professor Rosen Iliev has the necessary special training and necessary qualities and capacity to conduct scientific research and implement its application to practice.

## 4. Main scientific results and contributions

The scientific papers submitted for review can be sorted with respect to their applicability into the following groups:

*1) Approaches and models for improving information processing in automated control systems* – approaches and models with generalized nets related to communication MANET-networks and modelling of the measurement process in defense (II.3.52, II.3.53, II.3.54, II.3.56, II.3.66).

*2) Research related to information and communication systems technologies, data centers and cloud environments* – analysis of information capabilities, technologies and information protection (II.3.44, II.3.49, II.3.50, II.3.60), perspectives, requirements and solutions for setting up data centers (II.3.45, II.3.46, II.3.47, II.3.48, II.3.49, II.3.55, II.3.57), a generalized net model of operation of a system of data centers (II.3.74) and approaches to building them through cloud technologies (II.3.61, II.3.63).

The monograph (II.2.2) presents modern data centers, evaluates and draws conclusions from the study of the most used technological platforms for their construction, offers basic criteria for selecting a software platform for virtualization; a model for implementation of a system of data centers for the needs of security and defense is proposed, indicating operational, functional, technical, technological, informational, organizational, etc. requirements to it and its construction.

*3) Research related to integrated collaborative information environments and computer systems for decision support for crisis management* – analyses and decisions related

to collaborative environments are presented in (II.3.58, II.3.68, II.3.69, II.3.71, II.3.76, II.3.79), and in (II.3.67, II.3.70, II.3.72) solutions related to command and control systems are proposed. Research to support crisis decision-making has been carried out in (II.3.59, II.3.62, II.3.64, II.3.65, II.3.75, II.3.79), and a model of the process has been proposed in (II.3.77) of decision-making in crisis management, implemented through a generalized net.

The monograph (II.2.1) provides an analytical and critical overview of group work systems, offers an architectural approach to building and a method for evaluating decisions in the choice of technologies and software products, based on the use of intuitionistic fuzzy sets; A generalized net model of the decision-making process in building an environment for joint work has been developed, a model of an integrated information and communication environment for joint work has been proposed, with a practical focus on crisis management. As a reviewer of this work, I highly appreciate it.

*4) Hydrological modeling and support of water management* – systems for hydrological modeling are analyzed (II.3.73) and a generalized net model of the process of use and management of water resources is proposed (II.3.78).

The monograph (II.2.3) proposes models of hydrological processes, for the assessment of water resources and for the support of water management in drainage basins with the help of computer programs; simulation models of Bulgarian rivers for assessment and management of water resources have been developed; models of water balance of drainage basins have been implemented, solutions for supporting the management of water resources have been presented. By constructing a generalized net model of the decision-making process for water quality control and assessment, an opportunity is provided to simulate different situations and analyze the impact of a wide range of factors.

*5) Automated information systems and application programs for the needs of defense* – computer applications, subsystems and systems have been designed, developed and implemented, with applied innovative approaches and solutions for automated processing of information in the field of security and defense, adopted and implemented in armaments in defense structures; research works and research projects (II.4.37 - II.4.43) related to applications of modern IT solutions for the needs of defense are presented.

The analysis of the scientific papers and materials submitted for review gives me grounds to group the obtained results and contributions mainly into two categories:

– *Enrichment of existing knowledge* – the monographs (II.3.1, II.3.2, II.3.3), publications of original generalized network models (II.3.53, II.3.54, II.3.56, II.3.66, II.3.74, II.3.76, II.3.77, II.3.78), the proposed solutions and approaches (II.3.51, II.3.52, II.3.65) and the approaches published in Springer (2020) for building a system of data centers through cloud technologies (II.3.63) and for obtaining sensory information by unmanned means from the site of an eventual crisis (II.3.75).

– *Application of scientific achievements in practice* – the rest of the publications are included here (II.3.44, II.3.45, II.3.46, II.3.47, II.3.48, II.3.49, II.3.50, II.3.55, II.3.57, II.3.58, II.3.59, II.3.60, II.3.61, II.3.62, II.3.64, II.3.67, II.3.68, II.3.69, II.3.70, II.3.71, II.3.72, II.3.73, II.3.79).

The review of the scientific publications clearly shows the participation of the candidate, as most of them are self-written, and the rest are coauthored by two authors.

## 5. Assessment of the significance of the contributions with respect to science and practice

The overall scientific production of Assoc. Prof. Dr. Rosen Iliev, as an author or co-author, includes 84 publications (articles and scientific reports) in Bulgarian and international publications in Bulgarian (64 copies) or in English (20 copies), as 32 of these are self-written and in 24 – Iliev is the first author. One publication is in an impact factor (IF) journal, and two are in an SJR journals. The candidate participates in 5 international projects and in 6 national research projects, being the manager of one of them and the deputy manager of another one, as well as in the development of 15 system, technical, etc. projects related to the construction and development of information infrastructure and corporate information systems; participates in the organizing committees of scientific conferences and as a reviewer of conference communications.

It is important to note that most of the scientific publications and theoretical studies of Assoc. Prof. Dr. Rosen Iliev are based on his practical experience gained through the design and implementation of 16 applied science developments, which include software applications, information subsystems, computer prototypes. etc., intended for the needs of defense.

From the presented materials it is evident that the candidate has participated in the development of 26 studies, descriptions, assignments, programs, methodologies, etc., related to the construction of automated information systems, data centers, communication and information environments for collaboration, operational centers, etc.

Associate Professor Dr. Rosen Iliev participates independently or in cooperation in the development of several major information systems in the field of defense, which are implemented for operation, one of which received a gold certificate. From his participation in international and national research projects under research programs and from the implemented scientific and applied developments, it is evident that he has achieved serious results and contributions in hydrological modeling of river drainage basins, construction of information environments for shared work, systems for decision support, information protection, construction of data center systems, computer modeling for population prevention in natural hazards, etc.

## 6. Evaluation of the personal participation of the candidate in the contributions

The presented scientific papers and materials of associate professor Dr. Rosen Stankov Iliev are clearly written, in a solid logical style. The proposed approaches, models, solutions, etc. are clearly defined and are preceded by research and comparative analyzes. The tools used are well formulated and show personal style in the presented publications. From the analysis of the scientific production of the candidate his knowledge and experience in the research work stand out. His participation as a leader of scientific teams and in the training of doctoral students, the professionalism of his work, of which I have personal impressions, gives me reason to consider that the above listed contributions belong personally to the candidate.

## 7. Critical remarks on the reviewed publications

From the analysis of reviewed scientific papers and materials, stylistic remarks can be made regarding the layout of the literature (lack of alphabetical order of the authors) of some of the publications, for example in (II.3.51, II.3.53).

I recommend Associate Professor Dr. Rosen Iliev to focus on publication in foreign journals with impact factor and SJR and to sources of greater scientific visibility and opportunity for citation.

## 8. Personal impressions

I have known Assoc. Prof. Iliev since the beginning of the century, when he was my student at the Technical University. Back then, I saw in him a purposeful specialist with a broad culture and high potential for scientific activity. The current procedure is another step in his academic development, while I expect him to prepare soon a second doctoral dissertation for the degree of "Doctor of Science".

## 9. Conclusion

All of the above justifies my positive evaluation of the materials for participation in the competition, and my recommendation to the respected members of the Scientific Jury, and then to the respected members of the Scientific Council of the Bulgarian Defense Institute "Professor Tsvetan Lazarov" to vote positively for awarding Assoc. Prof. Dr. Rosen Stankov Iliev the academic position "Professor" in the Professional Area 5.3. "Communication and Computer Technology".

20 June 2021 Reviewer: /S/

(Corr. Memb. Prof. Krassimir Todorov Atanassov, DSc DSc)