# R E V I E W

by

**Col. Assoc. Prof. Eng. Chavdar Nikolaev Minchev, PhD**
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of

Scientific Production Submitted in a Competition
for Academic Position of "**Associate Professor**"
Announced by **University "Prof. Asen Zlatarov" – Burgas**,
in Education Field 5. "Technical Sciences",
Professional Orientation 5.3. "Communication and Computer Techniques",
Specialty of "Computer Vision",
Promulgated in **State Gazette, Issue 5 / 17.01.2020**

## I. CANDIDATES.

Only one candidate has been submitted documents for participation in this competition:
- Chief Assistant Professor Engineer **Todor Pavlov Kostadinov**, PhD.

**Todor Pavlov Kostadinov** has acquired "Bachelor" and "Master" degree at the Technical University of Varna, specialty "Communication Engineering and Technology".

He has a PhD degree (doctorate) in Informatics, professional field 4.6. "Informatics and Computer Science", which certifies with a diploma issued on 06.12.2013 by the "Institute of Information and Communication Technologies" at the Bulgarian Academy of Sciences - Sofia, after successfully defending a dissertation on "Methods and algorithms for SAR and ISAR image processing".

II. SCIENTIFIC PAPERS AND PUBLICATIONS SUBMITTED FOR REVIEW IN THE COMPETITION.

Presented by the candidate Todor Pavlov Kostadinov scientific papers and publications can be classified as follows:

1. Monograph "Bistatic SAR / GISAR / FISAR Geometry, Signal Models and Image Algorithms". in English, Focus Wiley, 2014, ISBN 978-1-848-21574-0.

2. Scientific publications in publications at home and abroad, referenced and indexed in world databases with scientific information.

3. Scientific publications in publications at home and abroad in unreferred and indexed in world databases with scientific information, with scientific review or in edited collective volumes.

Point one - the monographic work is co-authored with equal participation and amounts to 192 pages with 2400-2500 characters per page, with a required minimum of 1800 characters per page. The monograph is a serious scientific study related to the algorithms for information processing in bistatic radar systems with synthesized aperture. The paper is in English and was published by Wiley in November 2013. It is available on Amazon on paper and as an e-book in Kindle format.

Point two - 9 scientific publications are presented, presented at international scientific forums abroad - Germany, Canada, Poland, China, Turkey; 3 number of scientific publications presented at international scientific forums in our country; 2 scientific publications in the foreign scientific journal "Novel Developments in Uncertainty Representation and Processing" published by Springer, Switzerland. All of these 14 publications are co-authored with equal participation of authors and are referenced and indexed in the global database Scopus.

Point three - 18 scientific publications are presented in publications at home and abroad, not referenced in world databases with scientific information, with scientific review or in edited collective volumes, all in English, of which:
- 1 publication at an international conference abroad (Radar 2012, Glasgow, UK), co-authored with equal participation;
- 12 publications presented at international scientific forums and publications in Bulgaria - 8 independent and 4 co-authored with equal participation;
- 1 article in a journal abroad "Journal of Applied Electromagnetism", Athens, Greece, 2013, co-authored with equal participation;
- 4 articles in magazines in Bulgaria - 3 independent and 1 co-authored with equal participation.

The scientific publications listed in points 2 and 3 mainly deal with various aspects of the issues related to information processing and simulation modeling of various processes in radar systems with synthesized aperture.

The use of synthesized aperture radar systems flourished in the first decade of this century and is a key component of the toolkit for effective control of airspace and the earth's surface. The opportunities for research in this field are expanding with each passing year and their application in various fields of science and practice is constantly growing.

In the current conditions of growing threat from local military conflicts and terrorist acts, the need for constant monitoring of objects in the airspace and on the land and sea surface is an indisputable fact. This is confirmed by the growing number of new projects worldwide, related to the preparation and implementation of activities to ensure prevention and protection against possible threats to human security and existence.

In this sense, the issues discussed in the presented publications are undoubtedly relevant and can even be said - modern.

## III. CITATIONS OF THE AUTHOR'S SCIENTIFIC PUBLICATIONS SUBMITTED FOR REVIEW IN THE COMPETITION.

Presented by the candidate Todor Pavlov Kostadinov citations of his scientific publications can be classified as follows:

1. Cited in scientific journals, referenced and indexed in world databases.

2. Citation in scientific journals, not referenced in world-famous databases, in monographs and collective volumes.

Point one - 26 citations are presented in a total of 9 publications with the author's participation of the candidate, all of these citations, as well as the titles themselves, are from scientific journals, referenced and indexed in world databases - Scopus.

Point two - no citations are presented in scientific journals, not referenced in world-famous databases, in monographs and collective volumes.

The citations of scientific papers presented by the candidate with his author's participation are made in prestigious international publications with authority in the scientific community, which is also an indicator of the quality of scientific production.

IV. PARTICIPATIONS IN RESEARCH PROJECTS.

The applicant declares and certifies with documents his participation in research and educational projects as follows:

1. Participation in 1 international project:
   - NATO collaboration linkage grant ESP. EAP. CLG. 983876, Modelling and observation of geological disasters in Caucasus region – Armenia by applying the interferometric synthetic aperture radar system (InSAR), on the NATO program for environmental safety (ESP).

2. Participation in 7 national projects:
   - Support for the creative development of doctoral students, post-doctoral students and young scientists in the field of computer science, BG 051PO001-3.3.04 / 13, University "St. Cyril and Methodius ", total value BGN 567,542, financed by the European Social Fund;
   - H 07/46 of 02.09.16, Analytical approach for real-time predictability research in virtualization mode, Research Fund, Germany;
   - VAT 02/50/2010 15.12.2010 r. of Sofia University "St. St. Kl. Ohridski" - NIS, financed by the National Science Foundation (2010-2013), BGN 195,000;
   - Detection, evaluation of the parameters of weak GPS signals: DTC 02-28 / 2009, NID, Sofia University;
   - BG16RFOP002-1.005-0037, SCORTEL Ltd., topic "Development and testing of a prototype of an innovative module for operational control and updating of production schedule in open production in a changing production environment in real time", BGN 464,947;
   - DFNI-I-02-5 / 2014, Intercriteria analysis - a new approach to decision making;
   - Contract №1 / 2017, "Modernization of the navigation equipment" (2017) - TP Burgas of the State Enterprise "Port Infrastructure".

3. Participation in 7 university projects:
   - "Study of methods for three-dimensional scanning of objects" (2016);
   - "Studies of real-time operating systems with a view to their application in computerized devices (2012);
   - „Modeling and optimization of the work and communication of processes in multitasking systems (2013);
   - "Modeling of linear systems in extreme conditions" (2014);
   - "Formalization, abstraction and virtualization of cyber systems in real time" (2015);
   - "Modeling of mobile application systems and intelligent management tools" (2016 - 2018);
   - "Intelligent tools for knowledge extraction and processing" (2019).

## V. SCIENTIFIC AND PRACTICAL CONTRIBUTIONS.

The candidate's **scientific contributions** as a result of his research work and publication, according to the reviewer, can be summarized as follows:

1) The mathematical processes of observation of objects using a bistatic radar system are described and the basic definitions of the multi-static aperture synthesis are presented.

2) Theoretical models and software for receiving signals with linear frequency modulation, Barker code, GPS, DVB-T, etc. are presented.

3) An analytical approach for geometric determination of the resolution of the bistatic monitoring systems has been developed.

4) Algorithms for reconstruction of images of the observed objects from the complex radio-hologram at direct and reverse synthesis of the aperture of the radar system are proposed.

5) Innovative decision-making approaches are applied in the presence of complex input data and a large number of evaluation criteria based on fuzzy sets and generalized networks.

The candidate's **practical contributions** as a result of his research work and publication, according to the reviewer, can be summarized as follows:

1) Hardware and software components of a complex information and communication system for management, monitoring, diagnostics and visualization of the processes related to the operation of SAR and ISAR systems have been designed.

2) The hardware part of a complex information-communication system is assembled, meeting the requirements for work in a specific aggressive environment with continuous operation.

3) A comparative verification of the theoretical model with data from a practical experiment was performed and experimental data were processed using algorithms to determine the size, speed and mass of the experimental object.

4) Uses innovative approaches to improve the accuracy of the navigation and tracking system of the monitored objects.

5) Development and implementation of additional software for troubleshooting and optimization of the complex information and communication system.

## VI. TEACHING ACTIVITY.

The candidate Todor Pavlov Kostadinov, has conducted lecture courses and exercises with students in the Bachelor's and Master's degrees and has participated in the development of curricula in the following disciplines:

- Engineering design;
- Computer networks;
- Wireless networks;
- Signals and systems;
- Communication equipment;
- Multimedia systems and technologies;
- Modern information technologies;
- Network administration;
- Computer vision.

The candidate is the author of two guide books:

1) "Guide for laboratory exercises on signals and systems", 2019.
2) "Guide to specialized practice for design, simulation and manufacture of printed circuit boards on electronic devices", 2020.

In the last 5 years the candidate has been a diploma supervisor of 11 graduates - students from different technical specialties.

Given the interdisciplinary nature of the teaching content taught by the candidate, it should be noted the depth of his knowledge in the various fields of science, which are combined and visible in his research work.

## VII. COMPLIANCE WITH THE MINIMUM REQUIREMENTS FOR TAKING THE COMPETITION POSITION.

Table 1 shows the degree of fulfillment of the minimum requirements for holding the announced competitive academic position "Associate Professor" at the University "Prof. Dr. Asen Zlatarov "- Burgas by the candidate Ch. Assistant Professor Dr. Eng. Todor Pavlov Kostadinov, in accordance with:

- art. 24 of the Law on the Development of the Academic Staff in the Republic of Bulgaria;

- minimum national requirements for holding the academic position of "associate professor" in a professional field 5.3. "Communication and computer equipment", introduced by the "Regulations for the implementation of the Law on the Development of Academic Staff in the Republic of Bulgaria";

- minimum university requirements for holding the academic position of "associate professor" in a professional field 5.3. "Communication and computer technology", introduced by the "Regulations on the terms and conditions for obtaining scientific degrees and holding academic positions at the University" Prof. Dr. Asen Zlatarov "- Burgas";

- declaration submitted by the candidate Ch. Assistant Professor Dr. Eng. Todor Pavlov Kostadinov;

*Table. 1. Degree of fulfillment of the minimum requirements for holding the announced competitive academic position "Associate Professor" by the candidate Ch. Assistant Professor Dr. Eng. Todor Pavlov Kostadinov.*

| Groups of indicators | Contents by indicators | Minimum required number of points for "associate professor" ( Government / University) | Achieved number of points from the candidate |
|---|---|---|---|
| A | Indicator 1 | 50 / 50 | **50** |
| Б | Indicator 2 | - / - | - |
| В | Indicator 3 or 4 | 100 / 100 | **204** |
| Г | Indicators 5-11 | 200 / 300 | **324** |
| Д | Indicators 12-15 | 50 / 100 | **260** |
| E | Indicators 16- | - / 100 | **110** |

## VIII. REMARKS AND RECOMMENDATION.

As a reviewer, I have a note related to the publications proposed for review - it is mandatory that any text in scientific publications that is not the work of the author's team is marked as a citation and its original source is correctly indicated in the references to the publication.

I allow to myself to make the following two recommendations to the candidate:

1) It is necessary for the applicant to strive for more participation in international scientific, research and educational projects, including the Erasmus+ program.

2) I recommend the candidate to include in his future author's activity the creation of textbooks on the disciplines taught by him.

## IX. PERSONAL IMPRESSIONS OF THE CANDIDATE.

My personal impressions of the candidate Chief Assistant Dr. Engineer Todor Pavlov Kostadinov are that he is an excellently trained specialist, calm, persistent, purposeful and hardworking.

He knows how to work in a team, manages to share his ideas and evaluate the positive results achieved by his colleagues.

The candidate speaks English and German fluently.

Given the interdisciplinary nature of his research and teaching work, it should be noted the depth of the candidate's knowledge in different fields of science, which are combined in his research.

## X. FINAL COMPREHENSIVE ASSESSMENT.

In his research work, the candidate Ch. Assistant Professor Dr. Eng. Todor Pavlov Kostadinov has skillfully applied classical, modern and original approaches, skillfully used in the theory and practice of SAR and ISAR systems.

The presented publications are characterized by in-depth analytical, scientific and applied results and are the result of serious research work by the candidate.

The proposed analyzes, algorithms and built models are logical, justified and useful, complementing and further developing the scientific achievements in the chosen subject area. The implementation of the selected hardware and software solutions shows knowledge of the subject and reveals the possibilities of the candidate for creative use of the potential of modern information technologies.

The candidate Todor Pavlov Kostadinov covers and in some indicators largely exceeds the minimum national requirements for holding the academic position of "associate professor" in the professional field 5.3. "Communication and computer technology", introduced by the "Regulations for the implementation of the Law on the Development of Academic Staff in the Republic of Bulgaria".

The listed facts, as well as my personal impressions of the qualities of the candidate, give me grounds in conclusion to form my overall positive assessment and to propose to the esteemed Scientific Jury the candidate Ch. Assistant Professor Dr. Eng. Todor Pavlov Kostadinov **to be ranked first** in the announced competition for the academic position of "Associate Professor".


10.08.2020
Shumen

REVIEWER:

Col. Assoc. Prof. Eng.          Chavdar Minchev