

## STATEMENT

For the competition for occupation of the academic position "associate professor"  
specialty "Robots and manipulators",  
professional field 5.2. "Electrical Engineering, Electronics and Automation",  
declared in the State Gazette №. 41 of 21.05.2019 for the needs of IICT-BAS,  
Department Embedded Intelligent Technologies  
candidate: Dr. Nayden Nedkov Chivarov  
Member of the Scientific Jury: Prof. Dr. Dimitar Nedelchev Karastoyanov  
Ground for the opinion: Order of the Director of IICT-BAS No. 183 / 19.07.2019.

### 1. General and biographical data

The only candidate in the competition is Dr. Nayden Nedkov Chivarov. He was born on 27<sup>th</sup> October, 1973 in Sofia. He graduated the Forestry Technical University - Sofia in 1997 as an engineer (master) in Forestry Mechanization. He defended his doctoral thesis in 2001 at TU-Vienna - Institute of Robotics on the topic "Robotics Tool Kit for Modular Mobile Robots". From 2012 to 2014 he was an Associate Professor at ISER-BAS, from 2015 until now he is an Associate Professor at the European Polytechnic University. From 2019 he was appointed as a programmer in the department "Embedded Intelligent Technologies" of IICT-BAS. The professional and organizational activity of the candidate is determined by the fact that from 2007 until now Dr. Chivarov has 42 publications on the competition topic, of which 13 are referenced in SCOPUS and 9 of the publications are with SJR, also a list of 7 citations is given for 5 of the presented articles. He has participated in 3 research projects (1 European and 2 national), from which he has managed 1. He is a member of IFAC Technical Committee 9.5 and the Bulgarian Society of Robotics. The Applicant is Owner and Inventor of Utility Model: Autonomous Personal Service Mobile Robot - Utility Model Registration Certificate: 2056.

The competition for associate professor was announced by the Scientific Council of IICT-BAS, for the needs of the section "Embedded intelligent technologies". It was published in the State Gazette, issue. 41 of 21.05.2019.

### 2. General description of the presented materials

In the competition for "associate professor" Dr. Nayden Nedkov Chivarov participated with a list of 10 scientific publications of a monographic nature, that have been referenced and indexed in the world-renowned scientific information database - Scopus, according to Art. 24, Paragraph 1 item 3 of ZRASRB. The work is in the field of "Service robots for elderly and disabled care and graphical user interfaces for their control". From these, 3 have 4 co-authors, 3 with 5 co-authors, 1 with 7 co-authors, 1 with 8 co-authors, 1 with 10 co-authors and 1 with 17 co-authors, members of a consortium of the 7th EC Framework Program project "SRS".

A list of 32 publications other than those of a monographic character was also provided. Three from them are articles in publications that have been referenced and indexed in the world-renowned scientific information database - Scopus. One of them is with 2 co-authors, 1 is with 4 co-authors and 1 is independent. The other 29 are in non-refereed peer-reviewed journals or in editions. Nine of the publications featuring Dr. Chivarov are with SJR.

A list of 7 citations of a total of 5 articles is given, all citations are in publications that are referenced and indexed in the world-renowned scientific information database - Scopus.

The candidate has also submitted a list of 3 projects with his participation as a team member: 1 under the EC program - COST and 2 projects with the NSF, in one of which Dr. Chivarov is the Leader.



It is presented also a document for protection of intellectual rights, - Useful Model Reg No 2056: Nayden Chivarov., Autonomous Personal Service Mobile Robot.

**The structural characterization of scientific publications justifies the following conclusions and assessments:**

- **The candidate participates in the competition for associate professor with sufficient number of publications, fulfilling the requirements of the law and additional requirements of IICT-BAS.**
- **The submitted works are devoted to scientific and applied problems in the field of the announced competition.**
- **There are both independent and co-written scientific papers, which show the ability to work in a team as well as independently.**

### **3. A general characteristic of the applicant's research and scientific and applied activities**

Of the main 10 publications presented with a monographic character and 3 + 29 other articles / reports, Dr. Nayden Shivarov is a sole author in 1, and in 22 he is the first co-author. The publications are on the competition subject. Articles and reports address the following groups of issues:

1. The 10 publications, presented as equivalent to a monographic work, are unified scientifically and thematically in the field of Service robots for elderly and disabled care and graphical user interfaces for their control - Articles №. 1-10.

2. A total of 32 articles and reports presented outside the monographic work are thematically divided in the following major scientific fields:

- Kinematics, Dynamics and Control of Robots № 18, 19, 20, 21, 23, 24, 25, 26, 32, 41;
- Multi-Functional Robotic Systems for Independent Living №, 11, 15, 16, 27, 28, 29, 30, 31, 40;
- Educational Robotics № 22, 33, 34, 35, 37, 38, 39;
- Mobile Robots №, 13, 36, 42;
- Sensor systems №. 14, 17;
- Interactive presentation of exhibits in museums № 12.

### **4. Scientific-research and applied contributions of the applicant**

I find justifiable, argumentative and confirmed by the scientific papers (articles and reports) with which the candidate participates in the "Associate Professor" competition, several groups of contributions in different fields.

#### **A. Publications equivalent to monograph work:**

1. Development, research and prototyping of a service-oriented robot ROBCO 18 for assisting the elderly and disabled - № 3, 4;
2. Development and research of a web-based user interface designed to provide user-friendly control of robots to assist the elderly and disabled - No. 2;
3. Development, research and prototyping of the remote-controlled service robot ROBCO 17 - № 1, 5;
4. Development, research and prototyping of an intelligent modular service mobile robot controllable via Internet ROBCO 12 - № 6, 8;
5. Research and development of a graphical user interface for controlling a multifunction shadow robotic system for independent living of the elderly, based on "Windows 7" for Windows based tablet and "iOS" for Apple iPad - No. 7,9;
6. Identification of the essential characteristics of the theoretical solutions of Mobile Assistive Technologies, - № 10.



## **B. Publications beyond the equivalent of monograph work:**

1. Development, research and prototyping of Intelligent Modular Service Mobile Robot for Elderly Care "ROBCO 11" - № 28, 29;
2. Development, research and prototyping of ROBCO Phoenix - Educational Articulated Robot - № 35, 37;
3. Design, development and characterization of ROBCO Mobile mini-robots - № 13, 42;
4. Modernization of ROBCO SCARA educational robot - № 33,41.

I consider contributions to be of mostly scientific - applied character. In some of contributions, there are scientific and / or applied elements. I evaluate the candidate's contributions positively and comply with the requirements of the normative documents on this point.

## **5. Significance of contributions to science and practice**

Presented scientific - applied contributions are of important social impact. The developed, researched and prototyped service robots and graphical user interfaces for their control are essential for the development and enrichment of the theory and practice of high-tech robotic systems for elderly and disabled care. The created multi-channel control allows elderly and disabled to choose their preferred intuitive control method: via joystick, virtual joystick, gestures or voice commands for their "robot assistant", which allows easy interaction between humans and "robot".

In addition to the 10 related publications of monographic nature, Dr. Nayden Chivarov has presented 3 + 29 other articles / reports. A list of citation, projects and Utility Model is provided. The candidate's dissertation is defended at TU-Vienna and approved in Bulgaria by the Higher Attestation Commission. Therefore, it can be considered that the contributions of Dr. Nayden Chivarov have received the necessary recognition from the national and international scientific community.

## **6. Critical remarks and recommendations**

I have no critical remarks to dispute the applicant's key scientific - applied contributions. The high level of some of the obtained results enabled their publication and citation in SJR editions and intellectual property rights protection with a utility model: Autonomous Personal Service Mobile Robot. I would recommend a broader participation in research projects on the subject of the competition as a team member and as a project leader.

Critical remarks can be made regarding some gaps in the layout of several publications, as well as the layout of some material.

In summary, the more significant gaps in the application materials are:

- The topics and results of the 3 listed competitive projects, won with the participation of Dr. Chivarov as a member and leader of the teams, were not enough described,
- It would be advisable to protect some of the scientific and applied solutions and results achieved by patent applications,
- There are poorly presented copies of figures and descriptions of some publications,
- There are minor gaps in the bibliographic description of some sources and in the lists of publications,
- Contributions declared are too fragmented, which makes them numerous, it is better to consolidate them,

Despite the critical remarks and omissions (which are not material to the overall assessment), I believe that the decisions and contributions formulated are proof that the applicant is fully prepared for the academic position of Associate Professor.



## CONCLUSION

I believe that in terms of volume and quality, the applicant's research and application activities **satisfy the requirements of the Law and Regulations ZRASRB and PPRASRB**. The quantitative indicators of the IICT-BAS Regulations for the occupation of the academic position of Associate Professor are covered, most of which are exceeded. Therefore, I give my positive vote for the academic position of "Associate Professor" by Dr. Nayden Nedkov Chivarov.

**The application complies with the requirements of the ZRASRB, RAPRASRB and other internal normative documents. This gives me the conviction to propose to the Honorable Members of the Scientific Jury to vote for the assignment of Dr. Nayden Nedkov Chivarov to the academic position of Associate Professor in the specialty "Robots and manipulators", professional field 5.2. Electrical, Electronics and Automation,,**

12<sup>th</sup> August, 2019  
Sofia

Member of the Scientific Jury:

*(Prof. Dr. ~~D~~imitar Karastoyanov)*

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