OPINION

On: Competition for the occupation of the academic position of "Professor" in higher education 4. Natural sciences, mathematics and informatics, professional field 4.4. Earth Sciences; Scientific specialty "Remote Sensing of Earth and Planets", published in the State Gazette no. 98 of 13.12.2019 for the needs of the "Remote Sensing and GIS" department of the Space Research and Technology Instituteat of the Bulgarian Academy of Sciences (SRTI-BAS) with the sole candidate Assoc. Prof. Dr. Georgi Jelev.

Prepared by: Petar Dimitrov, Assoc. Prof. in higher education 4. Natural sciences, mathematics and informatics, professional field 4.4. Earth Sciences; Scientific specialty "Remote Sensing of Earth and Planets".

The opinion was prepared in pursuance of Order No. 14 / 24.01.2020 of the Director of SRTI-BAS and Minutes No. 1 / 17.02.2020 of the meeting of the Scientific Jury.

1. Eligibility of the applicant

The applicant fulfills the conditions for occupying the academic position of "Professor" according to Art. 50 of the Rules for Implementation of the Law on the Development of the Academic Staff in the Republic of Bulgaria (LDASRB) in SRTI-BAS, Art. 2 item 4.4 of the Rules on the Terms and Conditions for Acquisition of Academic Degrees and Occupation of Academic Positions at the Bulgarian Academy of Sciences and Art. 29 of LDASRB. The candidate has a doctoral degree in 2013; has held the academic position of Associate Professor at SRTI-BAS for at least two years (from 2015 to the present); has submitted publications in specialized scientific journals equivalent to monograph work, which do not repeat the ones submitted for the acquisition of the educational and scientific degree "doctor" and for the occupation of the academic position "Associate Professor", as evidenced by the submitted author's reference for the fulfillment of the minimum national requirements; has presented other original research papers, publications, inventions and other scientific and scientific developments, as evident from the submitted author's references; meet the minimum national requirements and the minimum requirements of BAS for the respective field of higher education or professional field, as well as the requirements set by the SRTI-BAS. To my knowledget the applicant has no proven lawful plagiarism in his scientific work.

The applicant has provided all necessary documents and author's references proving his diverse scientific, including scientific-applied and scientific-teaching activity, as well as a reference to the original scientific contributions, to which he has attached the relevant evidence - copies of publications in full text.

The applicant has submitted a reference for the fulfillment of the minimum national requirements for occupying the academic position of "Professor", which shows that he also meets the minimum requirements of BAS, which are higher than the national ones. In group A he has 50 points in the required 50. In group B the candidate has 106 points in the required 100. In group D he has 240 points in the required 220. In group D he has 123 points in the required 120. In group E he has 234 points in the required 150.

2. Scientific research, applied science and scientific-teaching activity

The author's reference for the research activities includes 29 publications, with which the candidate participates in the competition for "Professor" and which are different from the publications presented when applying for "Associate Professor" (63 publicationa) and "doctor" (6 publications). Twelve of the publications have been referenced and indexed in world-renowned databases of scientific information, seven of them with Impact Factor or SJR (Scopus) index. Sixteen of the publications are in non-refereed peer-reviewed journals or in edited collective volumes. One publication is a book based on a dissertation thesis for the award of a doctoral degree. Twelve of the publications are in Bulgarian and the rest are in English. In seven of the publications the aplicant is a sole author. In addition, the applicant has participated at 23 scientific conferences and forums in the country and abroad with a report (presentation or poster) .

The applicant has provided a reference for the scientific and applied activity with which he applies for the competition. This activity includes participation in 5 national scientific or educational projects, 5 international scientific and educational projects, management of two national scientific projects, including raised funds of 20,000 BGN and one recognized application for a utility model.

In order to participate in the competition, the applicant submitted a reference with 61 citations (without autos citations) to his publications, 21 of them in publications in Bulgarian language and the rest in publications in English. The candidate's publications cited are 21.

The candidate is the scientific adviser of a PhD student and leads a course in Geoinformation Systems in Ecology (30 hours) at New Bulgarian University during the academic year 2019-2020.

3. Scientific and applied scientific contributions

The applicant identifies two main areas in which he has scientific and applied scientific contributions: 1. Remote and terrestrial monitoring of crops and 2. Development and transfer of Earth remote sensing technologies, geographic information systems (GIS) and ground methods for study of the natural environment. In the first area, the following contributions are defined: 1) A methodology for assessing the condition of crops has been developed and tested; 2) The efficiency of crop mapping on satellite images with different spatial resolution has been evaluated; 3) Estimation of the accuracy of determining the parameters of crops by means of a set of vegetation indices. In the second direction, the following contributions are defined: 1) A methodology for the application of satellite and terrestrial data in the study of land cover, geomorphological sites and tectonic processes has been developed; 2) Transfer of technologies for remote observation of the Earth during landscape-environmental monitoring on the territory of Bulgaria.

A large part of the applicant's scientific publications is focused on the application of remote sensing methods in the field of agriculture and in particular the assessment of the status and parameters of crops. These studies employ methods for extracting information from multi-spectral images obtained from various satellite sensors or drones. The studies are multidisciplinary and involve the collection and processing of large amounts of field data in agricultural fields sown with different crops - winter wheat, winter rapeseed, soybeans, maize. Of particular interest is the work of calculating and mapping the biophysical parameters of the crops using parametric and non-parametric regression models. These studies are being completed with a patent protected methodology for qualitative assessmant of crop state in which the applicant is a co-author. The applicant contributes to improving the methods of application of unmanned aerial vehicle data for crop monitoring.

Another aspect of the application of remote sensing methods in the field of agriculture in which the applicant is actively working is the identification of crops through the classification of multi-spectral satellite data with different spatial resolution. The benefit of using a new type of data from the PROBA-V satellite with a higher spatial resolution - 100 m has been demonstrated in the mapping of the main crop types in Bulgaria. The results of sub-pixel classification of crops at national

level are presented again using data from the PROBA-V satellite, which can be used to obtain statistics on the areas of the main types of crops at the administrative unit level. An interesting approach is to use training data obtained in turn by classifying high-spatial resolution images from the Sentinel-2 satellites. One classification approach presented is based on the use of correlation analysis to find similarities between time series of the NDVI index for different crops. In this way, the phenological characteristics of individual crops are taken into account, which allows them to be more easily separated from each other and more accurately mapped. The possibility of mapping crops with high spatial resolution by combining images of Sentinel-2 obtained at different dates during the growing season was also explored.

Another major part of the applicant's research is devoted to remote sensing methods for land cover mapping. A study is presented of the changes in the forest territories of selected key areas over an approximately 20-year period, showing the trends of increasing forest areas. Together with a large international team, the applicant participates in a thorough comparative analysis of various global and continental land cover products for selected areas of Europe. The results of this study are important to establish the reliability and accuracy of these products, which are becoming more widely used. Changes in land cover in karst regions of Bulgaria were also investigated using GIS. The candidate also has research in the field of recognition of circular geological structures by satellite images, analysis of deformations of the earth's surface and modeling of quaternary tectonic processes.

The applicant uses state-of-the-art remote sensing methods to analyze changes in the aquatory of the Studena reservoir in 2019, thus providing another source of independent and objective data regarding the crisis situation in the downturn at the reservoir level. It is charakteristic for the study that an automated approach is folowed using the MNDWI spectral index to separate water from land.

Also interesting are the applicant's review articles on the systematization of the large variety of drones and sensors for them, which are nowadays an increasingly important source of data for various fields of science and practice.

4. Other documents showing the applicant's contributions

The Assoc. Prof. G. Jelev's reference for created geoinformation products shows that he has created 7 databases with geospatial content in connection with his research and projects. He has participated or is involved in the governing bodies of BAS and SRTI-BAS. His executive positions include deputy director and member of the Scientific Council of SRTI-BAS, a member of the General Assembly (GA) of BAS and of the Commission for Young Scientists at the BAS GA. Until 2019, he was a member of the Expert Committee for the Astronomy, Space Research and Technology Department at BAS. Assoc. Prof. G. Jelev is a member of the Program Committee of the annual conference organized by SRTI-BAS "Space, Ecology, Security" from 2015 until now. He is also a member of the organizing committee of the conference "Protected Karst Territories - Legislation, Tourism, Monitoring 2019". The candidate also has editorial work in five proceedings of scientific conferences. He has participated in two juries for competitions for the academic post of associate professor, as well as in several exam committees. Assoc. Prof. G. Jelev has 9 popular lectures and public appearances.

5. Conclusion

Based on this examination of the documents submitted by the applicant, I believe that:

1. The applicant fulfills all formal requirements for occupying the academic position of "Professor", including the minimum national requirements and the requirements of BAS.

2. The contributions correspond to the field of higher education, the professional field and the scientific specialty of the announced competition (4. Natural sciences, mathematics and informatics, professional field 4.4. Earth Sciences; Scientific specialty "Remote Sensing of Earth and Planets").

3. The original works of the applicant show that he is a researcher with considerable experience and undoubted achievements in the field of remote sensing on Earth.

Давам положителна оценка на кандидата и убедено препоръчвам на Научното жури да предложи на Научния съвет на ИКИТ-БАН доц. д-р Георги Желев да заеме академичната длъжност „професор" в област на висше образование 4. Природни науки, математика и информатика, професионално направление 4.4. Науки за Земята; научна специалност „Дистанционни изследвания на Земята и планетите" в секция „Дистанционни изследвания и ГИС" към ИКИТ-БАН.

I give a positive assessment to the applicant and strongly recommend to the Scientific Jury to suggest to the Scientific Council of SRTI-BAS that Assoc. Prof. Dr. Georgi Zhelev takes the academic position of "Professor" in higher education 4. Natural sciences, mathematics and informatics, professional field 4.4. Earth Sciences; Scientific specialty "Remote Sensing of Earth and Planets" in "Remote Sensing and GIS" department of the SRTI-BAS.

13.03.2020   Prepared the opinion: /п/

Assoc. Prof. Dr. P. Dimitrov