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STATEMENT

by Prof. Dr. Rumen Zdravkov Kishev

from Bulgarian Ship Hydrodynamics Centre at IMSETCHA-BAS,
member of the Scientific Jury appointed by order № 301/09.12.2019 of the
Scientific Secretary of the Institute of Oceanology - BAS
and in accordance with the decision of the Scientific Jury meeting as per
Protokol № 1 from 20.12.2019

on the PhD thesis of Eng. Konstantin Iliev Shterev

„Remotely Operated Vehicle for a Continental Shelf Research”,

submitted for obtaining a PhD degree
in the field of higher education: code 4 "Natural sciences, mathematics and
informatics", professional field: 4.4 "Earth sciences",
doctoral program in Oceanology

1. Theme and relevance of the problem considered in the thesis

The development and utilization of autonomous or remotely controlled submersibles is an essential element in the development of "blue" technologies that accompany the acquisition of marine spaces and make them an environment of industrialization and habitation. This topic is embedded in the European Development Programs, which makes the topic of the dissertation very relevant.

The concept of the autonomous underwater vehicle developed in this thesis is intended for application in oceanographic research, but its modified variants could be used in a wide range of maritime operations, extending the functions of ships, platforms and port facilities by expanding their ability to operate in specific maritime conditions, in particular their use as sensors for underwater damages and problems, as well as other specific missions.

2. Evaluation of the doctoral student's results and contributions

The main results achieved in the development of the dissertation can be distinguished in the following areas:

- Creating a complete system architecture of the submarine vehicle and defining the problems for effective construction of the basic structural elements
- Developing innovative technical solutions
- Creation of a prototype and validation of the preset design parameters in real operational conditions

During the development process, the initial goal was successfully achieved - to create an apparatus with efficiency higher than the existing ones, both in terms of technical parameters and in terms of cost.

It is obvious from the overall presentation of the work that the pretender has extensive knowledge in the field of underwater technologies and skills for their practical application.

In all of the listed areas, the applicant has demonstrated excellent knowledge of the nature and goals of the research and has selected and implemented adequate modern methods that guarantee the reliability of results and compliance with the methodological standards imposed in these areas of research.

The exhibition is concise, despite the variety of material presented. The material is properly illustrated.

There is every reason to assert that the work on developing the thesis is a purely personal achievement of the doctoral student.

The main contributions to the dissertation are formulated accurately and clearly, fully reflecting the results achieved, and the text of the paper contains sufficient evidence of originality and novelty, which I accept.

3. Assessment of author's publications related to the PhD thesis

The candidate has presented a total of 3 scientific publications dedicated on the thesis' problems, published in referred scientific sources, as well as one popular science film included in the world-renowned series X on the National Geographic TV channel. Several local press appearances have been noted to publicize the results of the development. From the presented materials it is evident that the applicant has extensive knowledge of problems, which are not studied in details in university courses and therefore have been acquired during the course of doctoral studies. Most of the publications are standalone, which proves the author's contribution to the development of the topic.

4. Critical notes

The dissertation is developed at a high level and it is difficult to find comments on its specific implementation. The material is very well presented, arranged and illustrated, the findings are clear and precise, the claims - well-founded. A good knowledge of the problem as well as of the mathematical apparatus for its practical solution is demonstrated.

I have the following insignificant comments about the work:

1. Editorially - given the specifics of compiling the text of the dissertation in English language, there are inaccurate translations of terms in the Abstract (for example, Bulgarian terms for "propeller blade" and "screw" are not correctly used, etc.), and most of the figures and tables in the Abstract are in English.
2. The work is largely technologically oriented, but would benefit from incorporating elements of ship hydrodynamics, for example in the design of the propulsion system, and in particular the propeller, and in determining the interaction (resistance) of the apparatus-umbilical cord system, modeling of steered motion of the apparatus - again in relation to the propulsive system, etc.
3. In the Abstract, the author's publications on the dissertation theme are not listed, which normally is required.
4. The applicant has neglected to emphasize one of the basic qualities of his work - the versatility of the solutions, which gives opportunities for modifying device for different purposes
5. The final part lacks a vision for future development (for example, use in tandem or a system with a higher degree of autonomy based on high-speed data exchange and artificial intelligence, etc.)

The comments made do not in any way affect the quality and importance of the dissertation.

The author of this statement declares that he has been not engaged in joint publication, research or project activity with the doctoral student and thus is not in conflict of interest.

5. Conclusion

The dissertation sets out clear goals and tasks that the doctoral student undoubtedly achieved and fulfilled. It is indisputable that the applicant has a thorough knowledge of the relevant specialty and ability for independent scientific and applied research.

The dissertation contains scientific and applied results which represent an original contribution in the field of marine technologies.

The Abstract is consistent with the content of the dissertation. Claims for scientific contributions are justified and in line with what has actually been achieved.

The dissertation under review is undoubtedly a creative achievement which, as a topic, realization and scientific contributions and summaries, has its undisputed importance for the development and application of autonomous submarine vehicles in a wide range of marine operations.

There is every reason to claim that the work of developing a dissertation is a purely personal work of the doctoral student.

The dissertation development has already found practical application and is expected to be further developed in the future.

All of the above gives me a reason to convince the honorable members of the Scientific Jury to award to Eng. Konstantin Iliev Shterev the educational and scientific degree "Doctor" in the field of higher education code 4 "Natural sciences, mathematics and informatics", professional field: 4.4 "Earth Sciences", Doctoral Program in Oceanology

17.02.2020

Reviewer:

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