MINISTRY OF DEFENSE

„PROF. TSVETAN LAZAROV" DEFENCE INSTITUTE"

Sofia, №2 "Prof. Tsvetan Lazarov" Blvd 2, fax: 02/92 21 808, http://di.mod.bg

R E V I E W

by Professor D.Sc. Eng. Hristo Ivanov Hristov,

"Prof. Tsvetan Lazarov" Institute of Defense,

1592 Sofia, 2 "Prof. Tsvetan Lazarov" Blvd., tel. +359 2 92 21851

regarding the competition for the academic position of

"ASSOCIATE PROFESSOR"

in the scientific specialty "Design and Construction of Automatic and Manned Aerial Vehicles"

within the professional field 5.5. "Transport, Shipping and Aviation",

in the higher education area 5. "Technical Sciences"

for Chief Assistant Professor, PhD, Engineer Atanas Jordanov Ganchev,
Chief Assistant at the Institute of Defense "Prof. Tsvetan Lazarov"

1. GENERAL DESCRIPTION OF THE SUBMITTED MATERIALS

Based on Order No. 285/13.05.2025 of the Director of the Institute of Defense "Prof. Tsvetan Lazarov" and the announcement in the State Gazette, Issue No. 29 of 04.04.2025, regarding the competition announced by the Institute of Defense for the academic position of **Associate Professor** in the higher education area 5. Technical Sciences, professional field (PF) 5.5. "Transport, Shipping and Aviation", for the needs

of the Institute of Defense, the documents of one candidate have been submitted – Chief Assistant Professor, PhD, Engineer Atanas Jordanov Ganchev, Chief Assistant at the Institute of Defense.

Attached to the application for participation in the competition, Chief Assistant Prof. Dr. Eng. Ganchev submitted the following documents:

- Personnel record;
- Creative curriculum vitae;
- Copy of the diploma for the acquired educational qualification degree "Master"
- Copy of the diploma for the acquired educational and scientific degree "PhD";
- Statement-declaration on the fulfillment of the minimum national requirements under Art. 2b, para. 2, para. 3, and para. 5 of the Development of Academic Staff in the Republic of Bulgaria Act (DASRBA) for holding the academic position of "Associate Professor";
- List of scientific publications, scholarly works, and other scientific and applied research;
- Published monographic work;
- Scientific research, publications, inventions, and other scientific and applied developments not previously submitted for the PhD degree;
- Abstracts of scientific publications, scholarly works, and other research papers in Bulgarian and English;
- Report on original scientific contributions;
- Copy of the documents from the most recent performance evaluation;
- Copy of a certificate of English language proficiency according to STANAG-6001;
- Copy of the security clearance for access to classified information;
- Electronic medium (CD) containing digital versions of the original documents;

- Statement-declaration on compliance with the requirements of the National Military University (NMU) for occupying the academic position "Associate Professor" under Art. 2b, para. 5 of the DASRBA, in accordance with Art. 30, item 7 (Appendix 5) of the Rules for Selection and Career Development of Academic Staff in NMU, reg. No. 683/27.09.2024, certifying participation in project implementation teams;

The total number of works submitted by the candidate for the competition is **15**, which can be classified according to Table 1 (DASRBA and the Rules for its Implementation) as follows:

1.1. Indicator A – 1 PhD dissertation and 4 related works, none of which are submitted for review – **50 points.**

Works and developments submitted for review:

1.2. Indicator C.3 – 1 monographic work – **100 points,**

1.4. Indicator D.8 – 13 articles and papers in non-refereed journals with scientific peer review or published in edited collective volumes, of which 12 are sole-authored and 1 co-authored – **245 points,**

1.5. Indicator D – 21 citations – **63 points**, as follows:

- **D.14** – 21 citations in non-refereed, peer-reviewed publications – **63 points**

1.6. Indicator E – 6 project participations – **10 points**, including:

- **E.18** – 1 national project, 4 Ministry of Defense projects, and 1 from the Institute of Defense – **10 points**

The candidate is participating in the competition with **15 scientific works and developments**, of which **15** are submitted for review. I accept all **15** for consideration and conclude that they contain scientific, applied-scientific, and practical contributions.

2. GENERAL CHARACTERIZATION OF THE SCIENTIFIC RESEARCH, APPLIED, AND TEACHING ACTIVITIES OF THE CANDIDATE

Chief Assistant Professor, PhD, Engineer Atanas Yordanov Ganchev has successively held the position of Chief Assistant in the Department of "Armament and Ammunition" within the Directorate of "Development of Armament, Equipment, and Logistics" at the Institute of Defense "Professor Tsvetan Lazarov," and later as Chief Assistant in the Department of "Scientific Research and Security and Defense Analysis" at the same institute.

In 1983, he graduated from the Higher Air Force School "G. Benkovski" in Dolna Mitropoliya with a **Bachelor's degree**, qualification: **"Engineer in Aircraft Operation and Maintenance."** In 1998, he graduated from the "G. S. Rakovski" Military Academy with a **Master's degree** in "Command and Staff Operational-Tactical Air Force."

In 2018, at the Institute of Defense "Professor Tsvetan Lazarov," he defended a dissertation for the degree of **PhD** in the scientific specialty: **"Flight Dynamics, Ballistics, and Control of Aircraft,"** within the higher education area 5. "Technical Sciences," professional field 5.1. "Mechanical Engineering," on the topic: **"Minimization of the Negative Impact of Bird Strikes on Aircraft."**

The candidate's scientific, research, and applied activities are in the field of professional area 5.5. **"Transport, Shipping, and Aviation,"** with a multidisciplinary focus on the aerodynamics of aircraft and their structural elements, and the influence

of these factors on flight dynamics, stability, and control. His research activities can be classified as follows:

1. **Ornithological Safety**
    - Aircraft structure and strength;
    - Strength of power plants;
    - Aircraft control systems;
    - Bird deterrent systems in airport areas;
    - Crew procedures to prevent bird strikes;
    - Optimization of the "crew–aircraft" flight operation system to enhance flight safety.
2. **Unmanned Aerial Vehicles (UAVs).**
    - Design, operational characteristics, combat capabilities, navigation, communication, and logistical support.
3. **Materials Science** of structural elements of aircraft.
4. **Functional and Strength Characteristics** of mechanical elements in aircraft.
5. **Simulators and Models** for dynamic interaction and bird strike simulation on aircraft.
6. **Technical Documentation.**

Based on the analysis of the candidate's scientific, research, applied, and teaching activities, it can be concluded that he has been working and continues to work actively in the professional field 5.5. **"Transport, Shipping, and Aviation."** His development as a specialist is clearly supported by his research and applied contributions.

I consider the scientific, research, applied, and teaching activities submitted for review to be directly relevant to the announced competition.

3. ASSESSMENT OF THE CANDIDATE'S SPECIALIZED TRAINING AND ACTIVITIES

Chief Assistant Professor, PhD, Engineer Atanas Jordanov Ganchev presents **15 scientific works**, of which **15** are submitted for review. These include **1 authored monograph**, **13 papers**, **1 project**, and **21 citations**.

The 15 scientific works submitted for review provide a clear picture of the candidate's solid preparation, as well as his research and applied activities within the professional field. They characterize him as a competent and capable researcher.

Of the 15 scientific works and publications, the candidate is the **sole author of 13** and a **co-author of 2**.

This brief statistical overview, along with the information provided in Section 2, allows me to conclude that Chief Assistant Professor Ganchev possesses the required research experience and solid specialized training.

4. MAIN SCIENTIFIC RESULTS AND CONTRIBUTIONS

I assess that the candidate demonstrates solid methodological training, as evidenced by his publications.

In the monograph titled *"Some Aspects of Flight Operation for the Optimization of Ornithological Safety"*, Institute of Defense, Ministry of Defense, Sofia, 2025, ISBN 978-619-90024-9-0, relevant issues concerning the flight safety of aircraft are examined - specifically as a function of the "crew–aircraft" system, aimed at minimizing the adverse effects of bird strikes on aircraft.

The proposed set of approaches for improving ornithological safety enables a reliable, safe, and effective operation of aircraft. The monograph outlines ways to forecast

potential hazards with the goal of reducing the risk of bird collisions. Using a logical sequence, the author presents a modern understanding of the process of improving ornithological safety. The recommended measures are aligned with national and European environmental protection legislation and requirements for ecological balance.

The conducted research reflects originality and depth of analysis. Based on the optimization of models of the "Crew–Aircraft" system and the integration of new human-factor technological capabilities, the potential for solving problems associated with bird strike safety is substantiated. Rational solutions are proposed, tailored to the geographic and climatic characteristics of the environment and the morphological traits of bird species, with the aim of preventing in-flight incidents while preserving ecological balance.

The aviation system is presented as a complex structure consisting of multiple subsystems, each of which can be considered a complex system on its own. The core subsystem examined is the “Crew–Aircraft” system.

Through the selection of general and specific criteria, opportunities for optimizing the flight operation process are identified and classified. Safety, efficiency, reliability, and the precision of system functioning, crew workload, and reaction time are analyzed as key criteria.

The main factors influencing the research are systematically and convincingly outlined.

The presented monograph is an independent, in-depth scientific study with an open nature, laying a foundation for further research in this area. Its content is valuable for improving the professional training of flight personnel and for enhancing the cooperation between crews, flight controllers, aviation operators, airport services, and environmental organizations to achieve high levels of safety.

The other scientific works demonstrate scientific, applied, and practice-oriented contributions that enrich and advance the knowledge in field 5.5. “Transport, Shipping, and Aviation”, including:

1. Classification of main processes, factors, and interdependencies within the “crew–aircraft” system during bird strikes, with recommendations for crew actions in such situations, optimizing aviation safety under ornithological risk [II.1.1, II.2.1, II.2.3, II.2.7, II.2.8, II.2.9, II.2.10, II.2.12].
2. Criteria for determining zones in the aircraft structure with varying degrees of risk during bird strikes [II.1.1, II.2.1, II.2.12].
3. Engineering methodology for calculating penetration speed based on geometric and dynamic characteristics of structural elements, bird mass, and impact angle [II.1.1, II.2.2].
4. Methodology for assessing the damage impact on the aircraft structure after bird strike to evaluate the potential for accident prevention [II.1.1, II.2.7].
5. A bird strike model for aircraft structural elements that assists crews in making optimal decisions post-impact, enhancing flight safety [II.1.1, II.2.7].
6. Methodology supporting crew decision-making after a bird strike, including a proposed procedure to optimize crew response for accident prevention [II.1.1, II.2.9].
7. Results identifying high-risk zones in the aircraft structure in the event of a bird strike [II.1.1, II.2.9].
8. Analysis of a substantial database on bird–aircraft collisions, classified by various criteria [II.1.1, II.2.1].
9. Unmanned aerial systems (UAS) and UAVs - state of the art, tactical and technical requirements, application of UAS and UAVs for the needs of the Air Force, technologies for countering the UAV threat [II.2.4, II.2.5, II.2.6, II.2.11, II.2.13, II.3.1, II.3.2, II.3.3, III.1, III.2, III.3.3, III.5].

10. Development and improvement of the process of flight training and pilot training [III.4, III.6, III.7].
11. Building-up of airworthiness of aviation equipment [II.2.2, III.6, III.7].

Statistically, the candidate has made a significant personal contribution to these results. Therefore, the obtained scientific results and contributions are, to a large extent, the personal work of the candidate.

The candidate meets the minimum point requirements across indicator groups for the academic position of “Associate Professor” in Field 5. Technical Sciences, 5.5. “Transport, Shipping, and Aviation”, in accordance with Table 1 (ZRASRB and the relevant Implementation Rules). His scientometric indicators meet the requirements of ZRASRB and its implementation regulations.

Indicator Group	Indicators	Requirements for Academic Position "Associate Professor"	Candidate's Points
A	Indicator 1	50	**50**
C	Indicator 3	100	**100**
D	Sum of Indicators from 5 to 11	200	**245**
E	Sum of Indicators from 12 to 15	50	**63**
F	Sum of Indicators 16 and beyond	-	**10**
Σ		400	**468**

5. SIGNIFICANCE AND APPLICATION OF CONTRIBUTIONS

The aforementioned scientific, applied-scientific, and practical contributions of the candidate are significant for the development of field 5.5. "Transport, Shipping, and Aviation."

The candidate has disseminated and presented the results of his research at scientific forums in Bulgaria and abroad.

The scientific output, by topic and focus, includes:

- **Ornithological safety**,
- **Design and structural strength of aircraft**,
- **Design and strength of power units**,
- **Flight control systems**,
- **Bird deterrence systems in airport zones**,
- **Crew actions to prevent bird-aircraft collisions**,
- **Optimization of the flight operation process of the "crew – aircraft" system to improve flight safety**.

It also covers:

- **Unmanned Aerial Vehicles (UAVs)** – design, operational characteristics, combat capabilities, navigation, communication, and logistical support,
- **Materials science related to aircraft structural elements**,
- **Functional and strength characteristics of mechanical components of aircraft**,
- **Simulators and emulators for dynamic interaction and modeling of bird-aircraft collision processes**,
- **Technical documentation**.

7. CONCLUSION

Chief Assistant Professor Dr. Eng. Atanas Jordanov Ganchev possesses in-depth knowledge and a creative approach in the professional field 5.5. "Transport, Shipping, and Aviation," and has solid specialized training.

Based on the scientific results and contributions in the candidate's works, I recommend that the esteemed Scientific Jury elect Chief Assistant Professor Dr. Eng. Atanas Jordanov Ganchev to the academic position of Associate Professor at the Defense Institute "Prof. Tsvetan Lazarov", in the professional field 5.5. "Transport, Shipping, and Aviation", within the higher education area 5. "Technical Sciences".

Sofia
04.06.2025

Prof. D.Sc. Eng. /s/ Hristo Ivanov Hristov