



OPINION

ВИСШЕ УЧИЛИЩЕ ПО ТЕЛЕКОМУНИКАЦИИ И ПОЩИ	
Вх. №	
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СОФИЯ	

From: Assoc. Prof. Ivaylo Chenchov, PhD, eng.

Higher Education Institution: University of Telecommunications and Post

Doctoral Program: “Information Technologies, Communication Networks and Cybersecurity”

Field of Higher Education: 5. Technical Sciences

Professional Field: 5.3 Communication and Computer Engineering

Regarding: Dissertation for awarding the educational and scientific degree “Doctor”

in professional field: 5.3 Communication and Computer Engineering
doctoral programme: “Information Technologies, Communication Networks and Cybersecurity”

Department of Information Technologies, UTP

Author of the dissertation: Assist. Todor Gospodinov Gospodinov

Dissertation topic: “Study of the Possibilities for Data Transmission and Management in Crisis Situations in the Republic of Bulgaria”

Grounds for submitting this opinion: participation as a member of the Scientific Jury for the defence of the dissertation, in accordance with Order № 3-УПА-206 of the Vice-Rector for Academic Affairs of UTP.



1. Brief information about the doctoral candidate

Education:

Магистър – Българска филология

Master's Degree – Bulgarian Philology

Konstantin Preslavsky University of Shumen, 1995

Specialisation: Bulgarian Language and Literature

2. General characteristics of the submitted dissertation

The dissertation of MSc Todor Gospodinov Gospodinov examines the possibilities for reliable data transmission and management in crisis situations through the use of mobile cellular networks. The topic is developed within the professional field “Communication and Computer Engineering” and corresponds to the profile of the doctoral programme. The structure of the work includes an introduction, five main chapters, summaries, conclusions and formulated contributions. The author uses a combined approach including theoretical analysis, simulation modelling and experimental measurements. The exposition is logically consistent and the terminology used is technically correct. The presented tables, graphs and figures support understanding of the results. The relationship between the theoretical assumptions and the practical experiments is clearly demonstrated. The work shows a systematic approach to the studied issues and meets the requirements for a doctoral dissertation.

3. Relevance of the dissertation and degree of familiarity with the researched scientific problem

The topic of the dissertation is of high social and scientific importance, especially in the context of increasingly frequent natural disasters and emergencies. Ensuring a resilient telecommunications infrastructure is a key factor for effective crisis management. The doctoral candidate demonstrates good knowledge of the architectures of modern mobile networks and of processes related to radio coverage and quality of service. An analysis of national and international early warning practices has been conducted. The literature used includes both contemporary and classical sources covering the period 2001–2024. The approach to the problem is interdisciplinary and combines engineering and organisational aspects. The author demonstrates a high level of competence in the subject area.

4. Evaluation of scientific and applied contributions

The scientific-applied contributions are aimed at developing methodological foundations, criteria and models for assessment and analysis of radio coverage and communications in crisis situations. The applied contributions are related to experimental validation, analysis of real events and formulation of practical solutions and recommendations with potential for direct implementation. I classify them as follows:

Scientific-applied contributions

- 1) A comprehensive methodological framework has been developed for assessing the resilience of radio coverage and quality of service in crisis situations, including integration of radio environment parameters and network load.
- 2) Models and methodologies for analysis and simulation modelling of radio coverage applicable under high-risk and emergency conditions have been developed and adapted.
- 3) Procedures and criteria for processing, interpreting and optimising measurement data have been developed, including planning of experimental measurements and evaluation of the effectiveness of early warning systems.

Applied contributions

- 1) Experimental studies and empirical analyses of radio coverage have been conducted in various environments, including real crisis situations in Bulgaria.
- 2) Practical models and scenarios for optimisation of radio coverage and improvement of communication resilience under emergency conditions have been developed.
- 3) Applicable recommendations for mobile operators and institutions aimed at improving the effectiveness of communication systems in crises have been formulated.

5. Evaluation of publications related to the dissertation

The publication activity of the doctoral candidate fully corresponds to the thematic focus of the dissertation. The four presented publications cover analyses of radio coverage in mountainous and coastal regions, as well as conceptual models for communications in crisis situations.

Real measurement data and specialised software tools are used in the publications, which gives high practical value to the results. Some of the publications have been presented at international scientific forums, which increases their scientific significance. There is clear thematic unity between the publications and the dissertation. The author demonstrates consistency and progressive development of results. The methodology is correctly applied. The presentation is clear and well structured. The publications contribute to dissemination of the results within the scientific community and meet the requirements for awarding the educational and scientific degree “Doctor”.

6. Evaluation of the dissertation abstract

The abstract of the dissertation “Study of the Possibilities for Data Transmission and Management in Crisis Situations in the Republic of Bulgaria” clearly and systematically presents the main scientific results and applied aspects of the research. It accurately formulates the relevance, subject, object and objective of the research, emphasising the importance of mobile communication networks and early warning systems (BG-Alert, eCall and Advanced Mobile Location) for crisis management. The abstract adequately reflects the use of the WCDMA Spreading and Modulation simulation model in Matlab Simulink and the developed algorithms for analysis of bit error rate (BER) under different signal-to-noise ratio scenarios. The main experimental studies conducted in urban, mountainous and coastal environments are presented, demonstrating the practical orientation of the work.

The scientific, scientific-applied and applied contributions are clearly distinguished and logically related to the objectives and tasks of the research. The results have been validated through publications in the UTP annual proceedings and participation in the international conference TIEM 2023. The structure of the abstract fully corresponds to the structure of the dissertation and allows quick orientation in the content of the five main chapters. The exposition is technically precise and uses correct terminology consistent with the professional field “Communication and Computer Engineering”.

In conclusion, the abstract fully fulfils its purpose, presents reliably and concisely the main results of the dissertation and meets all requirements for public presentation of doctoral research.

7. Conclusion regarding plagiarism

After reviewing the dissertation and the associated publications, a justified conclusion can be made that there is no plagiarism. The analysis of structure, sources and presentation demonstrates correct citation of references and clear distinction between original work and borrowed theoretical concepts. The experimental results, simulation analyses and interpretations are original and directly related to the research conducted by the doctoral candidate.

The publications show consistency and a clearly traceable personal scientific position. No indications of improper use of external texts, data or results without appropriate citation have been identified.

Therefore, both the dissertation and the four publications comply with academic ethics and good scientific practice and do not contain elements of plagiarism.

8. Critical remarks, recommendations and questions

Despite the high quality of the dissertation, some opportunities for future development can be noted. It would be useful to expand the analysis towards cybersecurity and data protection in crisis communications. It is recommended to include additional scenarios based on 5G standalone architectures and edge computing. Expanding the scope of experimental measurements would increase the generalisability of the results.

Questions to the doctoral candidate

1. What are the main limitations of the proposed simulation models when applied to national telecommunications networks?
2. How does the author assess the role of 5G standalone architectures for communication resilience in crises?
3. How can the developed methodologies be integrated into national early warning systems?

9. Conclusion

The dissertation represents a completed, scientifically grounded and practically oriented research study. The objectives and tasks have been fully achieved. The results have high practical value. On this basis, I consider that the dissertation meets the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria, its implementing regulations, and the regulations of the University of Telecommunications and Post for awarding the educational and scientific degree “Doctor”. I therefore give a positive evaluation of the dissertation and propose that the respected members of the Scientific Jury award MSc Todor Gospodinov Gospodinov the educational and scientific degree “**Doctor**” in professional field 5.3 “Communication and Computer Engineering”, doctoral programme “Information Technologies, Communication Networks and Cybersecurity”.

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