

OPINION

by Professor Dr. Pavel Borisov Penev,
Space Research and Technology Institute - BAS
Sofia 1113 Acad. Georgi Bonchev "bl. 1

of the thesis of Georgi Petev Georgiev

on "Research for the implementation of personal aviation transport in urban environment"
presented for the degree of Doctor and in the specialty "Dynamics, ballistics and flight control
of aircraft" (Management of personal aviation in urban areas)

1. The relevance and importance of the scientific problem being developed

According to the world's leading scientists, political scientists, and analysts, human and social life is a series of crises, conflicts, and peace that gives birth to new crises and conflicts.

The current tendency for the majority of the world's population to live and work in urban areas, as well as the emergence and development of metropolitan areas, creates crisis and conflict situations in many places in the world, mainly of social, transport and environmental character. From this point of view, one of the possible crisis situations in major cities is the one caused by significantly increased car traffic and related congestion, as well as the resulting urban pollution. Another aspect of the problem under consideration is the financial losses from traffic congestion, the human casualties of car accidents and the significant deterioration in the quality of life of urban dwellers.

These crisis situations require the provision of effective mobility in large urban areas, which implies the introduction of innovative solutions to prevent these situations, including the introduction of urban air mobility (UAM). In this regard, in recent years, a number of well-known aviation companies have considered the development of the third dimension by creating personal unmanned aerial vehicles (UAVs) for the carriage of people powered by electric motors and capable of vertical take-off and landing. At the same time, the introduction of such passenger drones requires solving problems of different nature, which the doctoral student successfully identifies and offers adequate solutions. From this point of view the scientific problem developed by the magician. Georgi Georgiev, related to the implementation of personal aviation transport in urban environment, is relevant, significant and of great scientific and applied importance.

I do not know in Bulgarian science that a dissertation with similar problems has been developed and protected.

The topic of the dissertation corresponds to the main content of the research.

The main positive aspects of the thesis are the following:

- foresight analysis (ie forecast-analytical study) of the feasibility of urban aviation mobility; suitable approaches have been developed to integrate aviation mobility in urban environments;
- The thesis is that personal aviation and urban air mobility are promising projects not only for our country but also for many other countries;
- Missions are simulated using the Mission Planner software product

UAV copter, with studies conducted for two European cities Plovdiv and Ingolstadt (Germany); in the bibliography of the dissertation, including 115 information sources, more than 100 are from the Internet. The doctoral student's problem is obviously new and up-to-date, without enough specialized literature on the subject.

On the basis of the foregoing, I consider that the problems studied and developed in the work are relevant, relevant and of major scientific importance to the theory and practice of urban air mobility.

2. Evaluation of scientific results and contributions to the dissertation.

The main scientific results and contributions to the dissertation are as follows:

- methodology for foresight analysis of the development of urban aviation mobility has been developed;
- methodology for integration of urban aviation mobility into urban environment in different size and urban development of residential areas is justified;
- the structure of an urban aviation mobility system is proposed; the characteristics of different aircraft contributing to the realization of urban aviation mobility are analyzed;
- the factors influencing the flight simulation studies providing urban aviation mobility have been formulated;
- simulations of flights on different city routes were performed by setting the parameters of the drones.

The scientific results and contributions obtained by the doctoral candidate enrich the problems of urban aviation mobility and outline specific directions for its improvement.

The results are logically derived from the research done in the thesis.

The development is multidisciplinary in nature and can be used by experts from ministries and agencies in urban aerial mobility planning, by academic staff at higher education institutions and scientific institutes, in the development of problems and in training related to the subject.

In my opinion, the author's participation of M.Sc. Georgi Georgiev in receiving the scientific and applied scientific contributions in the dissertation, which are his personal work.

3. Critical remarks and recommendations

In my dissertation I have a critical note and recommendation, expressed as follows:

at least one of the 6 tasks assigned for the dissertation work should be defined or at least edited and correspond to the last applied contribution received, related to the requirements for adaptation and necessary changes of the environment and architecture of the buildings required by the urban air mobility; the title of Chapter III, "Methodology for Integrating Aviation Mobility in Urban Environment", is identical to that of point III.2 of the same chapter, which is not the case.

In my opinion, a number of texts in the development need to be cited for the author's apparatus used.

These critical remarks and recommendation do not detract from the merits of the thesis of a magician. Georgi Georgiev, in which significant problems of the theory and practice of urban air mobility were researched and developed.

4. Conclusion

The thesis, developed by Master Georgi Petev Georgiev, is thorough completed work with scientific and applied scientific contributions and fully complies with the requirements of the Academic Staff Development Act of the Republic of Bulgaria and the Rules for its application to the dissertation for the acquisition of the educational and scientific degree "Doctor".

5. Assessment of dissertation work

In view of the foregoing, I believe that the dissertation developed by M.Sc. Georgi Petev Georgiev, must be given a positive evaluation.

Reviewer:
Prof. Dr. (P. Penev)

01/16/2020

Sofia