

SUMMARY OF HABILITATION THESIS

ACHIEVEMENTS IN SCIENTIFIC RESEARCH REGARDING THE IMPACT OF MODERN TOPO-GEODETIC TECHNIQUES AND TECHNOLOGIES ON URBAN DEVELOPMENT, THE ENVIRONMENT AND SOCIETY

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Abstract

This habilitation thesis, entitled "*Achievements in scientific research regarding the impact of modern topo-geodetic techniques and technologies on urban development, the environment and society*", summarizes the main results of my academic, scientific and publicistic activity in the field of geodetic engineering.

All the results presented in this paper are included as time after the public presentation of the doctoral thesis and until now.

In the first part of the habilitation thesis are presented aspects related to my professional training, as well as the evolution of my university career both from a didactic and scientific point of view, because a university teacher must combine in perfect harmony the didactic and research activity. The teaching profession involves a permanent training, development and documentation so that it can offer to those it teaches (students) a broad and innovative perspective on the field they teach.

Participation in various scientific events and continuing education sessions, affiliation to national and international professional and scientific societies (Romanian Surveyors Union - Vice President, Romanian National Society for Soil Science, International Federation of Surveyors etc.), study visits abroad, collaborations in the field of education and research with teams from other universities in the country, as well as collaborations with the socio-economic environment have contributed essentially to a thorough knowledge of the higher education and research system in the country.

During my professional activity I have developed four scientific books, three course materials and three practical guides, which have been published with ISBN in CNCSIS publishing houses and that have been approved by the Department Council, the Scientific Council and the Teaching Council of UASVM Cluj-Napoca.

The results of the research were materialized by publishing a number of 27 ISI indexed scientific articles, of which 8 ISI articles with impact factor, 98 scientific articles published in journals indexed in international databases (BDI). I also had the position of manager/responsible for the partner in two projects, as well as member in four other projects.

Professional prestige also results from the Web of Science statistic, where I have the Hirsch index = 4, from the Google Scholar statistic, where I have the h-index = 7 and the i10-

index = 6 (September 2020), as well as from the Research Gate platform where I have a score of 16.73 (September 2020).

The second part of the habilitation thesis includes the description of the results obtained following the research activity carried out after obtaining the PhD title. The main research directions focused on the use of modern topo-geodetic techniques and technologies such as: terrestrial laser scanning technology, UAV photogrammetry, GNSS technology, GIS etc., in various applications and concrete studies that have an impact on urban development, environment and implicitly of society. A first research direction presented in this thesis is the use of Geographic Information Systems (GIS) in various fields of activity such as: local public administration, land administration and real estate advertising and valuation.

The main functions of a geographical information system are: data collection, data storage, data management, data exploitation through analysis, synthesis and rendering in suggestive and easily interpretable forms. Based on these GIS applications, digital maps can be created, which can then be supplemented with new information, complex spatial analyzes can be performed and letric deliverables can be obtained.

The second direction of research, presented in this thesis, is the use of UAV (Unmanned Aerial Vehicle) technology in topo-geodetic works, a technology that in recent years has begun to be widely used primarily due to the many advantages it offers, such as: high degree of accuracy, ensuring high efficiency and productivity, mapping large areas of land, including in hard to reach areas etc.

A third direction of research is the use of terrestrial laser scanning technology (TLS) for 3D modeling of various objectives for the digital preservation of historical monuments, conservation of various buildings, as well as for monitoring land in mining areas.

In the third part of the habilitation thesis is presented the career development plan both from a didactic and scientific point of view. Regarding the didactic activity, I proposed the elaboration/re-editing of didactic materials (courses, guides for practical works) that would be in accordance with the novelties in the field of geodetic engineering, and regarding the teaching means, modern means of information transmission are required (multimedia, collaborative learning, e-learning, web-based learning etc.).

Research directions will be developed so that together with future collaborators/partners we can access research grants launched in national or international competitions, and the dissemination of research results will be achieved by publishing scientific articles in prestigious ISI or BDI journals.

The training and preparation of future specialists is a necessity that higher education must perceive as an essential priority, both by allocating the necessary time to transmit such knowledge and by the ability to select and transmit values and knowledge that can contribute to a substantial manner in the training of high-performance specialists. It is true that we now focus on short-term goals, and our teaching activity is evaluated on what we do now, but I am personally convinced that the strategy I have proposed and want to apply in courses, practical works, in other direct activities or indirect requirements with students, will have effects not only in the short term, but also in the long term, and the work results will emerge in bright careers of former graduates, future specialists.