

# Geographic Information Systems Conference and Exhibition “GIS ODYSSEY 2017”

Conference proceedings (GIS Odyssey. CD-ROM)

4<sup>th</sup> to 8<sup>th</sup> of September 2017, Trento – Vattaro, Italy

**Scientific Committee:**

**Prof. Elżbieta Bielecka**, Military University of Technology, Warsaw, Poland  
**Prof. dr Vlado Dadić**, Institute of Oceanography and Fisheries, Split, Croatia  
**Prof. dr Karol Noga**, Rzeszów School of Engineering and Economics, Poland  
**Prof. dr Piotr Parzych**, AGH University of Science and Technology, Cracow, Poland  
**Prof. dr Bonawentura Maciej Pawlicki**, Cracow University of Technology, Poland  
**Prof. dr Oimahmad Rahmonov**, University of Silesia in Katowice, Poland  
**Prof. dr Katarzyna Sobolewska-Mikulska**, Warsaw University of Technology, Poland  
**Prof. dr Hrvoje Stančić**, University of Zagreb, Faculty of Humanities, Zagreb, Croatia  
**Prof. dr. Ana Stoeva**, University of Architecture, Civil Engineering and Geodesy, Sofia, Bulgaria  
**Prof. dr Grażyna Szpor**, Cardinal Stefan Wyszyński University, Warsaw, Poland  
**Doc. Dr Peter Blišťan**, Technical University of Košice, Slovakia  
**Doc. Dr Zvonko Gržetić**, Scientific Centre of Law & Informatics, Warsaw, Poland  
**Doc. Dr Pavlo Kolody**, Agricultural Academy in Dublany, Ukraine  
**Dr Agnieszka Dawidowicz**, University of Warmia and Mazury in Olsztyn, Poland  
**Dr Ryszard Florek-Paszkowski**, Kielce University of Technology, Poland  
**Dr Anita Kwartnik-Pruc**, AGH University of Science and Technology, Cracow, Poland  
**Dr Marco Vizzari**, University of Perugia, Italy

**Organising Committee:**

Chairman: **Davorin Kereković, Prof.**

Vice-Chairman: **Prof. dr Piotr Parzych**

Secretaries: **Dr Tomasz Adamczyk, Dr Agnieszka Bieda**

Members: **Dr Jarosław Bydłosz, Prof. dr Małgorzata Chomicz, Dr Małgorzata Gajos-Gržetić, Dr Anna Kowalczyk, Dr Sebastian Stach, Dr Agnieszka Zwirowicz-Rutkowska**

**The papers published in the Conference Proceedings GIS Odyssey 2017 have been given a favorable opinion by the Reviewers designated by the Scientific Committee.**

**Published by:**

Croatian Information Technology Society – GIS Forum

10 000 Zagreb, Ilica 191e, Croatia

Publication & Conference responsible person: Davorin Kereković, Prof. – GIS Forum Secretary

**Editors:**

**Dr Tomasz Adamczyk**, AGH University of Science and Technology, Cracow, Poland

**Dr Ewa Dębińska**, AGH University of Science and Technology, Cracow, Poland

**© Copyright**

Information Technology Society – GIS Forum, Croatia

**All rights reserved**

**International standard serial number:**

ISSN 2459-7627 Nacionalna knjižnica, Zagreb, Croatia

# CONTENTS

1. APPLICATION OF HUBER AND HAMPEL M-ESTIMATION IN ANALYSING OF REAL ESTATE PRICE VOLATILITY OVER TIME.....	7
<i>Tomasz Adamczyk</i>	
2. APPLICATION OF GIS TOOLS IN ANALYSING A ROAD NETWORK PROVIDING ACCESS TO CADASTRAL PARCELS IN THE PROJECT CONCERNING LAND CONSOLIDATION AND EXCHANGE .....	13
<i>Monika Balawejder, Ewelina Wójciak</i>	
3. APPLICATION POSSIBILITIES OF AUGMENTED REALITY IN ANALOG MAPS.....	22
<i>Michał Bednarczyk</i>	
4. RENEWABLE ENERGY IN THE SYSTEM OF SPATIAL PLANNING IN POLAND.....	28
<i>Agnieszka Bieda, Anna Bieda</i>	
5. VERIFICATION OF USABILITY OF LOW-COST UAV PHOTOGRAMMETRY IN COMPARISON WITH CLOSE-RANGE PHOTOGRAMMETRY IN THE CONTEXT OF DOCUMENTATION OF EARTH'S SURFACE.....	43
<i>Peter Blistan, Ľudovít Kovanič</i>	
6. ASSUMPTIONS OF THE DEVELOPMENT OF THE THEMATIC SERVICE OF THE AVERAGE PROPERTY TRANSACTION PRICES.....	52
<i>Tomasz Budzyński, Izabela Karsznia</i>	
7. DATA SOURCES AND ACQUISITION METHODS FOR 3D INDOOR NETWORK ANALYSES .....	60
<i>Piotr Cichociński</i>	
8. THE ISSUE OF THE LEGAL AND SURVEYING DIVISION OF AGRICULTURAL LAND ON SELECTED EXAMPLES IN POLAND AND ON THE INTERNATIONAL STAGE .....	67
<i>Agnieszka Cienciąła</i>	
9. USING GIS IN PIPELINE REPAIR PROCESS .....	76
<i>Antun Ćurković, Igor Mlinarić</i>	
10. SITUATION AWARENESS TOOLS SUPPORTING SOLDIERS AND LOW LEVEL COMMANDERS IN LAND OPERATIONS. APPLICATION OF GIS AND AUGMENTED REALITY MECHANISMS.....	85
<i>Mariusz Chmielewski</i>	
11. SATELLITE REMOTE OBSERVATION DATA DISSEMINATION FOR MOBILE DEVICES USING ESA HMA STANDARDS .....	95
<i>Andrzej Chybicki, Marek Kulawiak, Daniel Zinkiewicz</i>	
12. PRECISE POINT POSITIONING USING DIFFERENT ANTENNA PHASE CENTER CORRECTION MODELS – A COMPARATIVE STUDY .....	102
<i>Karol Dawidowicz</i>	
13. APPLICATION OF ARIMA MODELS IN REAL ESTATE MARKET FORECASTING.....	117
<i>Dorota Dejnia, Janusz Dąbrowski</i>	
14. ASSESSING LANDSCAPE FRAGMENTATION IN SARDINIA (ITALY): THE BARRIER EFFECT .....	126
<i>Andrea De Montis, Antonio Ledda, Vittorio Serra, Valentina Peddio</i>	
15. PHOTOGRAMMETRIC AND GNSS SURVEYS FOR THE KIELCE BOTANICAL GARDEN.....	136
<i>Ryszard Florek-Paszkowski</i>	
16. GEOSPATIAL TECHNOLOGIES IN BIOLOGY AND MEDICINE: ANALYSIS OF GIS REPOSITORY.....	146
<i>Małgorzata Gajos-Gržetić, Oimahmad Rahmonov, Sebastian Stach</i>	
17. VISUALIZATION OF SPATIAL DATA FROM NUMERICAL MODELS AND REAL-TIME STATIONS NETWORK USING GOOGLE MAP API V3.....	155
<i>Damir Ivanković, Vlado Dadić, Dalibor Jelavić, Ivan Vučić</i>	
18. INTEROPERABILITY AND GLOBALIZATION OF INFORMATION MODELS.....	161
<i>Maciej Kiedrowicz</i>	
19. GENERALIZED DATA MODEL IN DISTRIBUTED REGISTERS.....	171
<i>Maciej Kiedrowicz</i>	

20. THE ENVIRONMENT AND ROAD INVESTMENT PROJECTS – DO WE NEED TO CHOOSE BETWEEN THE TWO? A CASE STUDY OF THE ROSPUDA RIVER VALLEY IN POLAND.....	184
<i>Katarzyna Kocur-Bera</i>	
21. THE RESEARCH OF THE AGRICULTURAL LAND CONDITION BASED ON LANDSAT 8 AND SENTINEL-2 SATELLITES DATA MERGERS.....	191
<i>Pavlo Kolodiy, Maryna Pidlypna</i>	
22. ANALYSIS OF THE INFLUENCE OF THE QUALITY OF CADASTRAL DATA ON THE PROCESS OF SURVEYING WORKS IN POLAND.....	196
<i>Paweł Kotlarz</i>	
23. DYNAMIC PRESENTATION OF STATIC MAPS USING GIS AND JQUERY JAVASCRIPT TOOLS TAKING DATA OF SOIL MAPS IN POLAND AS AN EXAMPLE.....	203
<i>Karol Król, Barbara Prus</i>	
24. NON-AGRICULTURAL REAL ESTATE IN THE RESOURCES OF THE OLSZTYN BRANCH OF THE AGRICULTURAL PROPERTY AGENCY.....	213
<i>Krystyna Kurowska, Hubert Kryszk</i>	
25. SPATIAL PLANNING AS A TOOL FOR RURAL AREA MANAGEMENT.....	221
<i>Krystyna Kurowska, Ewa Kietlińska</i>	
26. GIS EMERGENCY SYSTEM.....	228
<i>Janusz Kwiecień</i>	
27. ANALYSIS OF SELECTED STANDARDS OF FLOOR AREA MEASUREMENTS ON THE EXAMPLE OF OFFICE PREMISES.....	235
<i>Robert Łuczyński, Paulina Kotarba</i>	
28. URBAN CROWDSOURCING: POTENTIAL AND CHALLENGES.....	247
<i>Gilberto Marzano, Mirosław Grewinski, Joanna Lizut</i>	
29. INFLUENCE OF PROGRESS IN SCIENCES AND TECHNOLOGY ON AGROECOSYSTEMS.....	254
<i>Renata Marks-Bielska, Marek Marks, Karolina Babuchowska, Bogumił Rychcik</i>	
30. APPLICATION OF DATABASES IN LANDSCAPE AUDIT FOR COMPREHENSIVE IDENTIFICATION AND ASSESSMENT OF POLISH LANDSCAPES.....	264
<i>Urszula Myga-Piątek, Katarzyna Pukowiec-Kurda, Michał Sobala, Jerzy Nita</i>	
31. GEOSTATISTICAL METHODS FOR GENERATING MAPS OF LEASED AGRICULTURAL LAND.....	275
<i>Marek Ogryzek, Krzysztof Rząsa</i>	
32. COMPARISON OF RESULTS OF THE DIGITAL CLOSE-RANGE PHOTOGRAMMETRIC IMAGING, TERRESTRIAL LASER SCANNING AND UAV PHOTOGRAMMETRY IN HARDLY ACCESSIBLE CASTLE RUINS.....	283
<i>Katarína Pukanská, Karol Bartoš, Janka Sabova, Peter Repáň</i>	
33. EVALUATION OF THE USEFULNESS OF TERRESTRIAL LASER SCANNING FOR MEASUREMENTS OF ICE STRUCTURES.....	295
<i>Edyta Puniach, Anita Kwartnik-Pruc, Paweł Cwiąkała</i>	
34. THE PROBLEMS OF PROPERTY VALUATION FOR THE PURPOSES OF DETERMINING THE ADJACENCY LEVY.....	305
<i>Izabela Rącka, Magdalena Szydłak</i>	
35. THE STANDARD OF LIVING IN CITIES IN THE LAST DECADE AND CITIES' SUBJECTIVE ATTRACTIVENESS RANKINGS IN POLAND.....	314
<i>Andrzej Rączaszek</i>	
36. INFLUENCE OF PUBLIC ROADS DEVELOPMENT ON THE CADASTRAL DATA.....	323
<i>Ernest Rymarczyk, Piotr Parzych, Jarosław Bydłoz</i>	
37. THE CONCEPT OF REGISTERING THE RIGHTS OBTAINED BY TRANSMISSION ENTREPRENEURS IN THE CADASTRE FOR THE PURPOSE OF BUILDING AND FUNCTIONING TRANSMISSION DEVICES – THE CASE STUDY IN POLAND.....	333
<i>Natalia Sajnog, Katarzyna Sobolewska-Mikulska</i>	
38. ACCURACY EVALUATION OF PRECISE MULTI-GNSS POSITIONING, IN THE REAL TIME USING RTK CORRECTIONS.....	341
<i>Zbigniew Siejka</i>	

39. THE MUNICIPALITY'S ROLE IN SUSTAINABLE RURAL DEVELOPMENT IN POLAND.....	346
<i>Katarzyna Sobolewska-Mikulska</i>	
40. THE PROCESS OF CONVERTING THE RIGHT OF PERPETUAL USUFRUCT TO PROPERTY RIGHT IN POLAND .....	353
<i>Katarzyna Sobolewska-Mikulska</i>	
41. ESTIMATION OF THE SCALE OF THE PROBLEM CONCERNING THE EXISTENCE OF NON-RESIDENT LANDOWNERS IN LAND CONSOLIDATION WORKS IN POLAND.....	359
<i>Małgorzata Stańczuk-Gałowiczek</i>	
42. ANALYSIS OF TRANSACTION PRICES OF RESIDENTIAL PREMISES LOCATED IN THE VICINITY OF TRANSPORTATION ROUTE.....	368
<i>Kinga Szopińska, Małgorzata Krajewska</i>	
43. THE DILEMMAS OF IMPLEMENTING THE INSPIRE DIRECTIVE .....	379
<i>Grażyna Szpor</i>	
44. LANDSCAPES ALONG THE URBAN-RURAL-NATURAL GRADIENT: TYPOLOGIES, SIMILARITIES, CONTIGUITIES.....	385
<i>Marco Vizzari, Sara Antognelli</i>	
45. IMPLEMENTATION OF INSPIRE COMPLIANT SPATIAL MARINE DATA AND METADATA MANAGEMENT CATALOG USING GEONETWORK.....	393
<i>Ivan Vučić, Damir Ivanković, Vlado Dadić</i>	
46. THE INTEGRATION OF NUMERICAL AND RASTER DATA FOR ENGINEERING TASKS.....	399
<i>Roman Węgliński, Kamil Kowalczyk, Tomasz Ogórek</i>	
47. THE 3D MODEL OF WATER SUPPLY NETWORK WITH APPLICATION OF THE ELEVATION DATA....	409
<i>Beata Wieczorek, Anna Sobieraj-Żłobińska</i>	
48. POINT CLOUD IN ARCHAEOLOGICAL AND HISTORICAL SURVEY .....	418
<i>Beata Wieczorek, Anna Sobieraj-Żłobińska, Adam Tryzna</i>	
49. THE SHARE OF LAND BELONGING TO NON-RESIDENT OWNERS IN A VILLAGE INTERSECTED BY A MOTORWAY - CASE STUDY.....	427
<i>Justyna Wójcik-Leń, Żanna Stręk</i>	
50. THE ISSUE OF VALUATION OF REAL ESTATE LOCATED ON MINERAL DEPOSITS .....	436
<i>Monika Zielińska</i>	