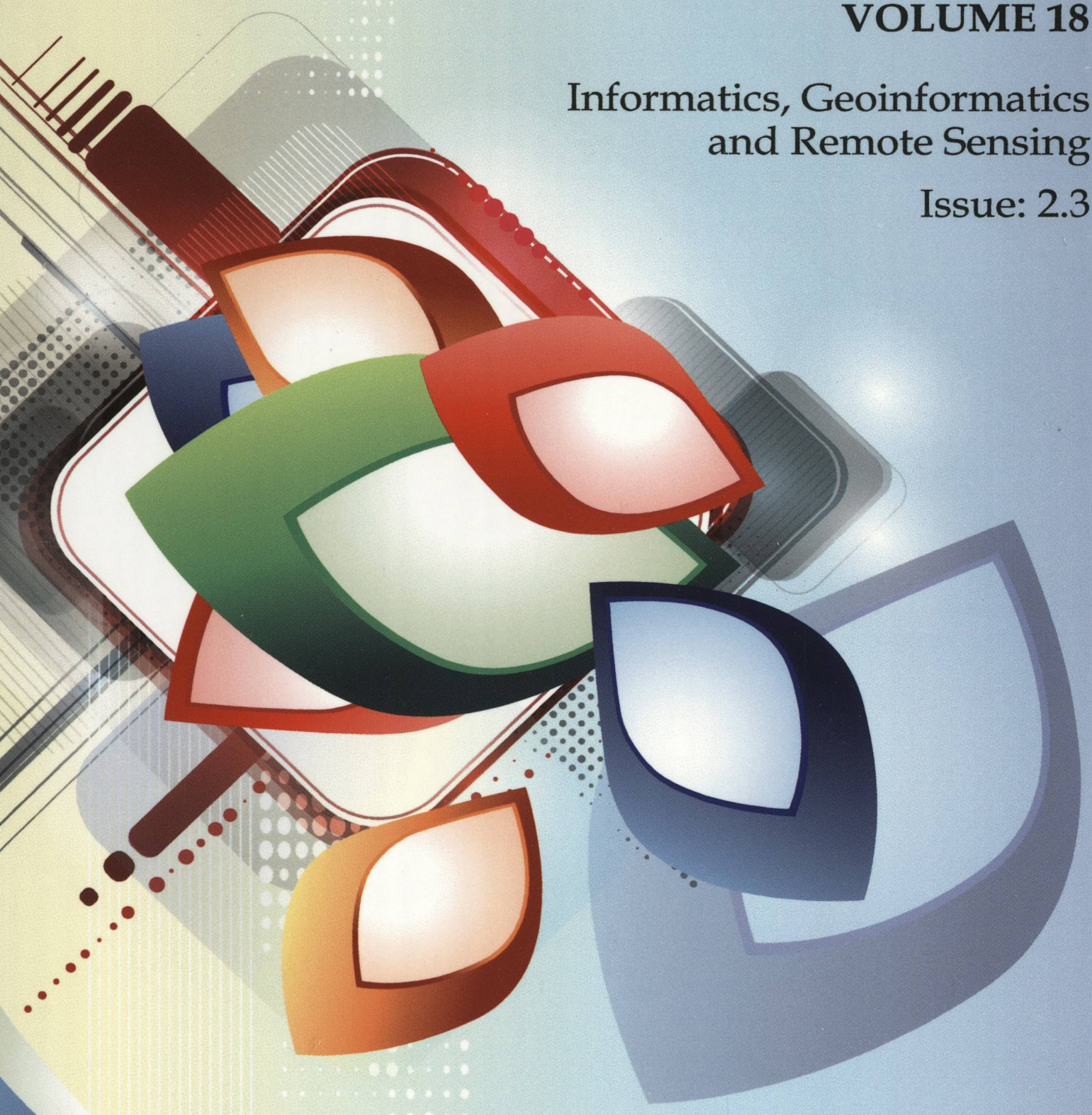


**18th INTERNATIONAL MULTIDISCIPLINARY
SCIENTIFIC GEOCONFERENCE
SGEM 2018**

**CONFERENCE PROCEEDINGS
VOLUME 18**

**Informatics, Geoinformatics
and Remote Sensing**

Issue: 2.3



**PHOTOGRAMMETRY AND REMOTE SENSING
CARTOGRAPHY AND GIS**

**18th INTERNATIONAL MULTIDISCIPLINARY
SCIENTIFIC GEOCONFERENCE
S G E M 2 0 1 8**

**CONFERENCE PROCEEDINGS
VOLUME 18**



**INFORMATICS, GEOINFORMATICS AND REMOTE SENSING
ISSUE 2.3**

PHOTOGRAMMETRY AND REMOTE SENSING

CARTOGRAPHY AND GIS

**2 July - 8 July, 2018
Albena, Bulgaria**

DISCLAIMER

This book contains abstracts and complete papers approved by the Conference Review Committee. Authors are responsible for the content and accuracy.

Opinions expressed may not necessarily reflect the position of the International Scientific Council of SGEM.

Information in the SGEM 2018 Conference Proceedings is subject to change without notice. No part of this book may be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, without the express written permission of the International Scientific Council of SGEM.

Copyright © SGEM2018

All Rights Reserved by the International Multidisciplinary Scientific GeoConferences SGEM

Published by STEF92 Technology Ltd., 51 “Alexander Malinov” Blvd., 1712 Sofia, Bulgaria

Total print: 5000

ISBN 978-619-7408-41-6

ISSN 1314-2704

DOI: 10.5593/sgem2018/2.3

**INTERNATIONAL MULTIDISCIPLINARY SCIENTIFIC GEOCONFERENCE SGEM
Secretariat Bureau**

E-mail: sgem@sgem.org | URL: www.sgem.org

ORGANIZERS AND SCIENTIFIC PARTNERS

- THE CZECH ACADEMY OF SCIENCES
- LATVIAN ACADEMY OF SCIENCES
- POLISH ACADEMY OF SCIENCES
- RUSSIAN ACADEMY OF SCIENCES
- SERBIAN ACADEMY OF SCIENCES AND ARTS
- SLOVAK ACADEMY OF SCIENCES
- NATIONAL ACADEMY OF SCIENCES OF UKRAINE
- INSTITUTE OF WATER PROBLEM AND HYDROPOWER OF NAS KR
- NATIONAL ACADEMY OF SCIENCES OF ARMENIA
- SCIENCE COUNCIL OF JAPAN
- EUROPEAN ACADEMY OF SCIENCES, ARTS AND LETTERS
- ACADEMY OF SCIENCES OF MOLDOVA
- MONTENEGRIN ACADEMY OF SCIENCES AND ARTS
- CROATIAN ACADEMY OF SCIENCES AND ARTS, CROATIA
- GEORGIAN NATIONAL ACADEMY OF SCIENCES
- ACADEMY OF FINE ARTS AND DESIGN IN BRATISLAVA
- TURKISH ACADEMY OF SCIENCES
- NIZHNY NOVGOROD STATE UNIVERSITY OF ARCHITECTURE AND CIVIL ENGINEERING, RUSSIAN FEDERATION
- BULGARIAN ACADEMY OF SCIENCES
- BULGARIAN INDUSTRIAL ASSOCIATION
- BULGARIAN MINISTRY OF ENVIRONMENT AND WATER

INTERNATIONAL SCIENTIFIC COMMITTEE

Informatics, Geoinformatics and Remote Sensing

- PROF. ING. ALEŠ ČEPEK, CSC., CZECH REPUBLIC
- PROF. G. BARTHA, HUNGARY
- PROF. DR. DAMIR MEDAK, CROATIA
- PROF. PETER REINARTZ, GERMANY
- PROF. JAN KAZMIERCZAK, POLAND
- PROF. DR. JÓZSEF ÁDAM, HUNGARY
- PROF. RUI MIGUEL MARQUES MOURA, PORTUGAL
- PROF. DR. ING. KAREL PAVELKA, CZECH REPUBLIC

- PROF. DR. MARCEL MOJZES, SLOVAKIA
- PROF. VADIM ZHMUD, RUSSIA
- ASSOC. PROF. DR MILAN HOREMUZ, SWEDEN
- ASSOC. PROF. KRYSZYNA JANUSZKIEWICZ, POLAND
- DR. TIBERIU RUS, ROMANIA
- DR. MARKO KREVS, SLOVENIA

CONFERENCE PROCEEDINGS CONTENTS

SECTION PHOTOGRAMMETRY AND REMOTE SENSING

1. **A CASE-STUDY ON THE USE OF MIDDLE FORMAT CAMERA HASSELBLAD H6D-100C IN FRESCOS ANALYSIS**, PhD Eng. Jakub Stefan Markiewicz, M.Sc.Eng. Magdalena Pilarska, MA Rafal.Bienkowski, MA Agnieszka Kaliszewska, M.Sc.Eng. Slawomir Lapinski, Warsaw University of Technology, Poland.....3
2. **ACCURACY OF AERIAL PHOTOGRAMMETRY DEPENDING ON THE NUMBER OF UNNECESSARY MEASUREMENTS**, Ing. J. Broucek, Assoc. Prof. Rudolf Urban, Ph.D., Prof. Ing. Martin Stroner, Ph.D., Czech Technical University in Prague, Czech Republic..... 11
3. **AN INSAR PHASE NOISE SUPPRESSION USING COHERENCE MAPS**, Nina S. Vinogradova, Andrey V. Sosnovsky, Ural Federal University, Russia 19
4. **ANALYSIS OF VEGETATION INDICES OF URBAN VEGETATION IN ZAGREB (CROATIA)**, Assist. Prof. DSc. Andrija Krtalic, Tamara Ivelja, Ivan Racetin, University of Zagreb, Croatia.....25
5. **APPLICATION OF FRACTAL DIMENSION AND ENTROPY AS THE MEASURES FOR RECOGNIZING OFFSHORE VEGETATION ON AERIAL PHOTOGRAPHS**, Dr. Jerzy Mialdun, Dr. Magdalena Mleczko, Assoc. Prof. Marek Mroz, University of Warmia and Mazury in Olsztyn, Poland.....33
6. **AUTOMATION IN THE ASSESSMENT OF FOREST SUCCESSION DYNAMICS USING AIRBORNE LASER SCANNING DATA**, Dr. Marta Szostak, Assoc. Prof. Dr. Piotr Wezyk, Assoc. Prof. Dr. Geza Kiraly, Pawel Hawrylo, Adrian Bednarski, University of Agriculture in Krakow, Poland41
7. **COMBINING BOTH RPAS PHOTOGRAMMETRIC DATA AND TERRESTRIAL IMAGES FOR 3D MODELLING OF AN ARCHAEOLOGICAL SITE**, Ing. Tomas Janata, Ing. Bc. Eliska Housarova, Ing. Jaroslav Sedina, CTU in Prague, Czech Republic.....49
8. **COMPARATIVE ANALYSIS OF GEOSPATIAL DATA RECEIVED BY TLS AND UAV TECHNOLOGIES FOR THE QUARRY**, Assoc. Prof. Bartosz Mitka, Mgr Eng. Przemyslaw Klapa, Assoc. Prof. Izabela Piech, University of Agriculture in Krakow, Poland57
9. **COMPARATIVE ANALYSIS OF POINT CLOUDS OBTAINED BY TLS AND PHOTOGRAMMETRY**, Dr. Eng. Tadeusz Widderski, MSc. Eng. Karol Daliga, MSc. Eng. Dominika Chorazy, Gdansk University of Technology, Poland65

10. COMPARISON OF DIGITAL ELEVATION MODELS GENERATED WITH OPEN SOURCE SOFTWARE FROM VARIOUS SATELLITE IMAGERY, Ainur Yerzhankyzy, Yerkin Kakimzhanov, Anzhelika Kamza, Elmira Orynassarova, Eugene Levin, Kazakh National Research Technical University named after K. Satpayev, Kazakhstan.....	73
11. COMPARISON OF THE ACCURACY OF DIGITAL SURFACE MODELS CREATED IN PHOTOSCAN AND PHOTOMOD SOFTWARE, Assist. Prof. DSc. Andrija Krtalic, Assist. Prof. DSc. Dubravko Gajski, University of Zagreb, Faculty of Geodesy, Croatia	81
12. CROP MAPPING USING HYPERSPECTRAL DATA AND TECHNOLOGIES - A COMPARISON BETWEEN DIFFERENT SUPERVISED SEGMENTATION ALGORITHMS, Mohamad M. Awad, National Council for Scientific Research, Remote Sensing Center, Beirut, Lebanon	89
13. DETERIORATION OF MASONRY STRUCTURE INVESTIGATED BY A THERMAL CAMERA WITH A QUALITATIVE ASSESSMENT OF THERMAL IMAGE PROCESSING, Dr. Eng. Patryk Ziolkowski, Prof. Dr. Eng. Maciej Niedostatkiewicz, Assist. Prof. Dr. Eng. Jakub Szulwic, Gdansk University of Technology, Poland.....	97
14. DEVELOPMENT OF MONOSTATIC ANTENNA SYSTEM FOR W-BAND HI-RESOLUTION DOPPLER RADAR, Prof. Dr. TAKANO Toshiaki, Chiba University, Japan	105
15. EFFICIENCY OF THE RADAR IMAGES APPLICATION IN PROBLEMS OF ASSESSING THE DEFORMATION OF THE EARTH'S SURFACE IN THE CONDITIONS OF OIL & GAS PRODUCTION., Orynassarova Elmira, Kamza Anzhelika, Yerzhankyzy Ainur, Kakimzhanov Yerkin, Bektemirova Saule, Kazakh National Research Technical University named after K. Satpayev, Kazakhstan.....	113
16. FROM DIGITAL PHOTOGRAPHY TO A VIRTUAL 3D, Ing. Karel Pavelka Ing Bc. Eliska Housarova, Czech Technical University in Prague, Czech Republic....	121
17. HORIZONTAL ACCURACY ASSESSMENT OF PLANETSCOPE, RAPIDEYE AND WORLDVIEW-2 SATELLITE IMAGERY, Dino Dobrinic, Dr. Mateo Gasparovic, Assoc. Prof. Robert Zupan, University of Zagreb, Croatia.....	129
18. INVENTORY OF VARIOUS STAGES OF CONSTRUCTION USING TLS TECHNOLOGY, MSc Eng. Przemyslaw Klapa, Assoc. Prof. Bartosz Mitka, Mgr. Eng. Piotr Bozek, University of Agriculture in Krakow, Poland.....	137
19. LAND COVER MAPPING IN THE VICINITY OF DEBLIN AERODROME USING ESA'S SENTINEL-1A/B SATELLITE IMAGERY, Dr. Magdalena Mleczko, Assoc. Prof. Dr. Marek Mroz, Msc. Marek Dobek, Msc. Irene O'Mullony Pena, University of Warmia and Mazury, Olsztyn, Poland, Air Force Academy Poland, Poland	145

- 20. QUALITY ASSESSMENT OF ORTHOIMAGES DERIVED FROM ACTION CAMERAS**, PhD Eng. Jakub Stefan Markiewicz, MSc. Eng. Magdalena Pilarska, MSc. Rafal.Bienkowski, MSc. Agnieszka Kaliszewska, MSc. Eng. Slawomir Lapinski, Warsaw University of Technology, Poland.....153
- 21. REMOTE SENSING DATA OF THE PEATLANDS AS BASE OF DETECTING RISK SOURCE FOR THE LINEAR INFRASTRUCTURE BUILDING IN SOUTH PART OF CRYOLITHOZONE**, Dr. Timopheyy Orlov, Dr. Olga Trapeznikova, Andrey Zverev, Sergeev Institute of Environmental Geoscience RAS (IEG RAS), Russia.....161
- 22. REMOTE SENSING METHODS FOR ESTIMATION OF URBAN HEAT ISLANDS ON THE EXAMPLE OF KRASNOYARSK CITY**, Alexandra K. Matuzko, Dr. Oleg E. Yakubailik, Institute of Computational Modelling SB RAS, Russia167
- 23. SPECKLE FILTERING IN SAR IMAGES USING MORPHOLOGICAL FILTERS**, Mariusz Mlynarczuk, Stanislaw Porzycka-Strzelczyk, AGH University of Science and Technology, Poland.....175
- 24. THE ANALYSIS OF THE DETERMINATION OF POINTS POSITIONS USING PHOTOGRAMMETRIC METHODS**, Dr. Eng. Tadeusz Widerski, MSc. Eng. Karol Daliga, MSc. Eng. Adrianna Barbasiewicz, Gdansk University of Technology, Poland.....183
- 25. THE ANALYSIS OF THE ACCURACY OF DIGITAL TERRAIN MODEL (DTM) OBTAINED FROM HIGH RESOLUTION GEOEYE-1 SATELLITE IMAGERY**, Msc. Marta Lalak, Msc. Marek Dobek, Dr. Adam Cieccko, Air Force Academy Poland, Poland.....191
- 26. THE EFFECTIVENESS OF SELF-CALIBRATION OF NON-METRIC DIGITAL CAMERA THAT USED ON UNMANNED AERIAL VEHICLES**, Prof. Dr. Sergey G. Mogilny, Prof. Dr. Andrei A. Sholomitskii, Oleksiy V. Martynov, Empire LTD, Ukraine.....199
- 27. THE EXAMPLE OF THE WIDE ANGLE LENS APPLICATION IN HISTORICAL BASEMENT REGISTRATION.**, PhD. Eng. Michal Kowalczyk, PhD. Eng. Jakub Markiewicz, Warsaw University of Technology, Poland.....211
- 28. THE MODEL VALIDATIONS THROUGH THE USAGE OF THE HIGH RESOLUTION REMOTE SENSING IMAGERY ON THE MARINE PROCESSES**, PhD. Angela Ivan, PhD Student Elena Vlasceanu, Dunarea de Jos University of Galati, Romania.....219
- 29. TECHNOLOGY OF PHOTOGRAMMETRICAL IMAGING AND PROCESSING OF THE SAMPLE SURFACE AIMED TO POROSITY DEFINITION**, Alexander STAROVOYTOV, Victor KOSAREV, Artur FATTAKHOV, Kazan (Volga Region) Federal University, Russia.....225

- 30. TIME - CHANGES DETECTION OF GEOGLYPHOS AND LINES, NASCA AND PALPA, PERU**, Ing. Bc. Eliska Housarova, Prof. Dr. Ing. Karel Pavelka, Bc. Robin Pflug, Czech Technical University in Prague, Czech Republic233
- 31. UAV IN TODAY'S PHOTOGRAMMETRY – APPLICATION AREAS AND CHALLENGES**, Dr. Pawel Burdziakowski, Gdansk University of Technology, Poland241
- 32. URBAN VEGETATION DETECTION BASED ON THE LAND-COVER CLASSIFICATION OF PLANETSCOPE, RAPIDEYE AND WORLDVIEW-2 SATELLITE IMAGERY**, Dr. Mateo Gasparovic, Dino Dobrinic, Prof. Dr. Damir Medak, University of Zagreb, Croatia249
- 33. USING 3D SCANNING TECHNOLOGY FOR DIGITIZATION OF HISTORICAL BUILDINGS**, Babuca Nicolae Ion, Calina Jenica, Calina Aurel, Babuca Ionela Daniela, Mihnea Marin, University Of Craiova, Romania.....257
- 34. USING MULTI-TEMPORAL AERIAL AND SPACE IMAGERY FOR COASTAL DYNAMICS INVESTIGATIONS AT KARA AND PECHORA SEAS, RUSSIAN ARCTIC**, Dr. Daria Aleksyutina, Anna Novikova, Dr. Alisa Baranskaya, Dr. Olga Shilova, Dr. Stanislav Ogorodov, Lomonosov Moscow State University, Russia265
- 35. USING SATELLITE IMAGES FOR DOCUMENTATION OF DAMAGES IN ALEPPO HISTORICAL CENTRE DURING CIVIL WAR**, Ing. Karel Pavelka jr., Prof. Karel Pavelka, Ing. Paulina Raeva, Czech Technical University in Prague, Czech Republic.....273
- 36. USING SATELLITE IMAGING IN CARTOGRAPHIC VISUALISATION OF BARK BEETLE DAMAGED FOREST**, Nikola Kranjcic, Denis Tezak, University of Zagreb, Croatia281

CARTOGRAPHY AND GIS

- 37. ACCURACY ASSESSMENT OF COLLECTED IN THE TOPOGRAPHIC OBJECTS DATABASE BY THE RESISTANT TO OUTLIERS METHODS**, Ph.D. Marek Slusarski, MSc Magdalena Jurkiewicz, University of Agriculture in Krakow, Poland291
- 38. ANALYSIS OF THE AVALANCHE RISK IN THE FAGARAS MOUNTAINS**, Dr. Slave Camelia, Dr. Diana Vasca-Zamfir, University of Agronomic Science and Veterinary Medicine - Bucharest, Romania299
- 39. ANALYSIS OF THE FLOODS RISK IN A SECTOR FROM THE DANUBE DELTA USING GIS TECHNOLOGIES**, Banescu A., Prof. Dr. Georgescu L.P., Prof. Dr. Rusu E., Assoc. Prof. Dr. Murariu G., Dunarea de Jos University of Galati, Romania307

- 40. ANCIENT STONE CIRCLES IN THE NORTHERN POLAND**, Dr. Agnese Kukela, Prof. Dr. Valdis Seglins, M. sc. art. Baiba Lazdina, University of Latvia, Latvia315
- 41. APPLICATION OF UNMANNED AERIAL VEHICLES FOR SURVEYING WORKS IN OPENCASTS**, Specialist Natalya Mikhaylova, JSC SUEK, Russia.....321
- 42. BIM, GIS AND CAD(ASTRE) UNDER THE CURRENT CHALLENGES**, Assoc. Prof. Dr. Eng. Ana-Cornelia Badea, Prof. Dr. Eng. Gheorghe Badea, Lect. Dr. Eng. Doina Vasilca, PhD. Stud. Eng. Andreea Iliescu-Cremeneanu, Lect. Dr. Eng. Dragos Badea, Technical University of Civil Engineering, Romania.....329
- 43. CARTOGRAPHIC ROAD RISK ANALYSIS AND HIGH RISK SPOTS ON CROATIAN ROADS**, Adam Vinkovic, Eleonora Kucic, Prof. Dr. Stanislav Franges, Assoc. Prof. Dr. Robert Zupan, University of Zagreb, Croatia337
- 44. CONCEPTUAL FOUNDATIONS OF ENVIRONMENTAL LANDSCAPE AND ECOLOGICAL FRAMEWORK OF MOSCOW**, Prof. Viacheslav Nizovtsev, Phd. Natalia Erman, Institute for the History of Science and Technology of the RAS, Russia345
- 45. DETECTION AND MAPPING GROUND DISPLACEMENT USING SENTINEL-1 TOPS FOR IASI COUNTY**, PhD student Eng. Macarof Paul, Professor Dr. Eng. Stasescu Florian, Gheorghe Asachi Technical University of Iasi, Romania.....353
- 46. EVALUATION OF AGRICULTURAL LAND EXPLOITATION INTENSITY BASED ON BIG DATA**, Polina V. Koroleva, Dr. Dmitry I. Rukhovich, Georgiy A. Suleiman, Prof. Dr. Dmitry A. Shapovalov, Prof. Dr. Andrey L. Kulyanitsa, Dokuchaev Soil Science Institute, Russia361
- 47. FIELD SURVEY WITH THE USE OF MOBILEMAPPER 50 RECEIVER FOR EFFICIENT CREATION OF DEBLIN AIRPORT MAP**, Dr. Adam Cieccko, Eng. Pawel Rotmanski, Dr. Grzegorz Grunwald, MSc. Marek Dobek, Dr. Dariusz Tanajewski, University of Warmia and Mazury, Poland369
- 48. FLOOD RISK ASSESSMENT IN DATA SPARSE REGIONS: THE USE OF QUESTIONNAIRES TO COLLECT HISTORIC FLOOD DATA – A CASE STUDY FOR THE RIVER MOUSTIQUES IN HAITI**, MSc. Hanne Glas, Prof. Dr. Greet Deruyter, Prof. Dr. Philippe De Maeyer, Ghent University, Belgium377
- 49. FRACTAL GEOMETRY APPLIED IN COMPUTER GRAPHICS MODELLING FOR ASSESSING FOREST PLANT SYSTEMS FROM THE MOTRUROVINARI COAL BASIN**, Lect. Dr. Roxana Cuculici, Assoc. Prof. Dr. Constantin-Razvan Oprea, Assoc. Prof. Dr. Iuliana Vijulie, Assoc. Prof. Dr. Gabriela Manea, Lect. Dr. Iulian Sandulache, University of Bucharest, Romania.....385

- 50. GEOGRAPHIC INFORMATION MAPPING OF FLOOD ZONES FOR SUSTAINABLE DEVELOPMENT AND URBAN LANDSCAPE PLANNING**, Vera Kuznetsova, Elza Kuznetsova, Aliya Kushanova, Nizhnevartovsk state University, Russia393
- 51. GEOINFORMATION DATABASE IS THE BASIS OF CREATION OF VIRTUAL MUSEUMS ON HISTORICAL WATERWAYS OF RUSSIA**, Prof. Viacheslav Nizovtsev, Phd. Natalia Erman, Prof. Vera Shirokova, Phd. Nadezhda Ozerova, Institute for the History of Science and Technology of the RAS, Russia.....401
- 52. GEOVISUALIZATION METHODS FOR CULTURAL AND HISTORICAL SIGHTS**, Assoc. Prof. Dr. Robert Zupan, Adam Vinkovic, Prof. Dr. Stanislav Franges, Kristina Bedrica, University of Zagreb, Croatia.....409
- 53. GIS AND REMOTE SENSING FOR URBAN PROTECTED GREEN AREAS**, PhD Student Eng. Andreea Iliescu-Cremeneanu, Assoc. Prof. Dr. Eng. Ana-Cornelia Badea, Lect. Dr. Eng. Doina Vasilca, Prof. Dr. Eng. Gheorghe Badea, Lect. Dr. Eng. Dragoş Badea, Technical University of Civil Engineering, Romania.....417
- 54. GIS SYSTEM TO PREDICT FOREST FIRES CAUSED BY LIGHTNING ACTIVITY: CONCEPTUAL BASE**, Assoc. prof. Nikolay V. Baranovskiy, Dr. Elena P. Yankovich, Assoc. Prof. Dr. Svetlana Yu. Karanina, Dr. Andrey V. Karanin, Mrs. Marina Yu. Belikova, National Research Tomsk Polytechnic University, Russia425
- 55. GRAPHICS COMPLEXITY OF TACTILE MAPS AND USER STUDY**, Radek Barvir, Dr. Alena Vondrakova, Dr. Veronika Ruzickova, Palacky University Olomouc, Czech Republic.....433
- 56. IDENTIFICATION OF CLIMATE PHENOMENES WHICH ARE INFLUENCING THE TOURISM ACTIVITY IN SUREANU MASSIF AREA**, PhD. Stud. Eng. Florina Voicu, Lect. Dr. Eng. George Emanuel Voicu, 1 Decembrie 1918 University of Alba Iulia, Romania441
- 57. INVESTIGATION OF CHANGES IN DEM, CONSTRUCTED FROM TIME TO TIME DATA FROM THE SEABED**, PhD student Anzhelika Kamza, Assoc. Prof. Dr. Eugene Levin, Assoc. Prof. Irina Kuznetcova, PhD Stud. Ainur Yerzhankyzy, PhD Stud. Elmira Orynassarova, Satbayev University, Kazakhstan.....449
- 58. LOWERING ENVIRONMENTAL IMPACTS BY LAND USE PLANNING**, Prof. dr. eng. Maricel Palamariu, Assoc. Prof. dr. eng. Ildiko Tulbure, Lect. dr. eng. Alexandra Dreghici, University of Agricultural Sciences and Veterinary Medicine Cluj Napoca, Romania.....455
- 59. MAP OF AMBULANCE ACCESSIBILITY OF MOUNTAINOUS AREAS WITH USE OF GEOGRAPHICAL INFORMATION SYSTEMS, SUSKI DISTRICT, POLAND.**, Dr. Pawel Kroh, Msc ing. Aleksandra Orkisz, Pedagogical University of Cracow, Poland463

60. MONITORING OF BANK LINE CHANGES USING GEODETIC AND REMOTE TECHNIQUES , S.E. Korkin, E.A. Korkina, V.A. Isupov, D.A. Kugusheva, Nizhnevartovsk state University, Russia.....	471
61. MULTILAYER FOREST COVER MAP AS A BASIS OF FOREST REGENERATION DYNAMICS ESTIMATION , V. A. Ryzhkova, I.V. Danilova, I.A. Mikhailova, M. A. Korets, Institute of Forest of the Siberian Branch of the Russian Academy of Sciences, Russia.....	479
62. NEEDS AND POSSIBILITIES IN THE AREA OF METHODS AND TOOLS FOR EMPLOYEES' AGE MANAGEMENT IN COAL MINE , Dr. Andrzej Wieczorek, Silesian University of Technology, Poland.....	487
63. NEW BATHYMETRIC MAP OF THE TARN ZELENÉ KEŽMARSKÉ PLESO (HIGH TATRAS) , RNDr. Juraj Kapusta, Mgr. Martin Izsoff, Ing. Slavomir Celer, Mgr. David Tomko-Kralo, Constantine the Philosopher University in Nitra, Slovakia	495
64. OBTAINING INFORMATION USING UNMANNED AERIAL VEHICLES , MSc. Michal Ogradniczak, Dr. Karol Szuniewicz, Dr. Szymon Czyza, Dr. Iwona Cieslak, University of Warmia and Mazury in Olsztyn, Poland	503
65. ON THE STRUCTURING OF HYDROGEOLOGICAL MAPS USING GEOINFORMATION SYSTEMS , L. Shagarova, M. Muratova, V. Cheredov, U.M. Ahmedsafin Institute of Hydrogeology and Environmental Geoscience, Kazakhstan.....	511
66. PHOTOGRAMMETRIC METHODS FOR DIGITAL HEIGHT MODELS , Lecturer PhD. Eng. Dragos Badea, Assoc. Prof. PhD. Eng. Ana Cornelia Badea, Prof. PhD. Eng. Gheorghe Badea, Lecturer PhD. Eng. Doina Vasilca, PhD. Stud. Eng. Andreea Iliescu Cremeneanu, Technical University of Civil Engineering, Romania...	519
67. RECONSTRUCTION OF ALPINE LAKE IN DRY MORAINIC LAKE BASIN (DOLINA ZELENÉHO PLESA VALLEY, HIGH TATRAS, SLOVAKIA) , RNDr. Juraj Kapusta, Prof. RNDr. Juraj Hresko, PhD., Constantine the Philosopher University in Nitra, Slovakia.....	527
68. SATISFACTION OF EUROPEAN CITIZENS IN THE CONTEXT OF ECONOMIC INDICATORS , Msc. Karel Macku, Palacky University Olomouc, Czech Republic.....	535
69. SELECTED ASPECTS OF CREATING HISTORIOGRAPHICAL MAPS USING GIS , Ing. Tomas Janata, PhD., Czech Technical University in Prague, Czech Republic.....	543
70. SEMI-AUTOMATIC FLOOD DETECTION USING HISTORIC SATELLITE IMAGERY , Prof. Dr. Greet Deruyter MSc. Hanne Glas, MSc. Thomas Piette, Ghent University, Belgium	551

71. SOCIO-DEMOGRAPHICAL INDICATORS OF AN ELECTRONIC ATLAS OF SOCIO-DEMOGRAPHIC DEVELOPMENT OF THE REGIONS OF THE REPUBLIC OF KAZAKHSTAN , Gulnara Nyussupova, Kenespaeva Laura, Roza Karagulova, Oketay Saginbay, Gaukhar Aubakirova, Al-Farabi Kazakh National University, Kazakhstan.....	559
72. SPATIAL ANALYSE OF CADASTRAL MAPS , Peter Kysel, Bc., Lubica Hudecova, MSc., PhD., Marek Bajtala, MSc., PhD., Slovak University of Technology in Bratislava, Slovakia.....	567
73. SPATIAL CONFLICTS IN AREAS PARTICULARLY ATTRACTIVE TO TOURISTS , Dr. hab. Lewandowicz Elzbieta, Uniwesity Warmia and Mazury in Olsztyn, Poland.....	575
74. STANDARDS IN GEOSPATIAL INFORMATION MANAGEMENT AND SPATIAL DATA INFRASTRUCTURES , Prof. Dr. Eng. Gheorghe Badea, Assoc. Prof. Dr. Eng. Ana-Cornelia Badea, PhD. Stud. Eng. Andreea Iliescu-Cremeneanu, Lect. PhD. Eng. Doina Vasilca, Lect. Dr. Eng. Dragos Badea, Technical University of Civil Engineering, Romania	583
75. STUDY OF DISPROPORTIONS OF TERRITORIAL COMMUNITIES DEVELOPMENT ON THE BASIS OF GEOINFORMATION MONITORING OF THE POPULATION'S QUALITY OF LIFE , Associate Professor, Ph. D. Olga V. Mashkova, Senior Lect. Ph.D. Roman S. Molikeych, Assist. Lect. Natalia V. Omelchenko, Postgrad. Stud. Hanna J. Napadovska, Ukraine.....	591
76. THE CLIMATE TEST – THE FIRST STEPS TOWARDS AN AUTOMATED METHODOLOGY TO EVALUATE THE CLIMATE RESILIENCE OF NEW URBAN DEVELOPMENT PROJECTS , MSc. Hanne Glas, Prof. Dr. Greet Deruyter, Arne Debruyne, Ghent University, Belgium	599
77. THE CONCEPT OF USING THE GIS SYSTEM IN UNDERGROUND MINING , PhD Student, MSc. Eng. Dorota Palka, Assoc. Prof. Dr. Eng. Jaroslaw Brodny, Silesian University of Technology, Poland	607
78. THE CREATION AND SIGNIFICANCE OF A TOURIST GEOPORTAL ON THE EXAMPLE OF A SELECTED LOCAL COMMUNE , DSc. Jerzy Chmiel, MSc. Anna Fijalkowska, MSc. Lukasz Jedrzejewski, MSc. Piotr Szydal, Warsaw University of Technology, Poland.....	615
79. THE CREATION OF CARTOGRAPHIC DATA FOR REPLICAS OF OLD GLOBES , Ing. Jan Havrlant, PhD., Ing. Milan Talich, PhD., Ing. Klara Vackova, PhD., Research Institute of Geodesy, Topography and Cartography, Czech Republic.....	623

- 80. THE EFFECTS OF USING WEB MERCATOR PROJECTION INSTEAD OF THE MERCATOR PROJECTION FOR REPRESENTING ROMANIA ON MAPS**, Lect. Dr. Eng. Doina Vasilca, Assoc. Prof. Dr. Eng. Ana-Cornelia Badea, PhD Student Eng. Andreea Iliescu-Cremeneanu, Prof. Dr. Eng. Gheorghe Badea, Lect. Dr. Eng. Dragoş Badea, Technical University of Civil Engineering, Romania635
- 81. THE NEW DIGITAL MAP OF SALTED SOILS OF SOUTH SIBERIA IN RUSSIA**, Dr. Galina I. Chernousenko, Natalia V. Kalinina, Dr. Dmitry I. Rukhovich, Dokuchaev Soil Science Institute, Russia643
- 82. THE RISK ASSESSMENT OF UNDERGROUND UTILITY NETWORKS DAMAGE WITH USING FUZZY INFERENCE**, Ph.D. Marek Slusarski, MSc Natalia Justyniak, University of Agriculture in Krakow, Poland.....651
- 83. THE SPECTRAL FINGERPRINTS OF TOPOGRAPHICAL PATTERN OF THE NEAR-CASPIAN "BAER'S MOUNDS" TERRITORY AND AUTOMATIC SEARCH OF SIMILAR LANDFORM REGIONS IN THE WORLD**, Dr. Kharchenko S.V., Assoc. Prof. Dr. Kazakov S.G., Prof. Dr. Bolysov S.I., Lomonosov Moscow State University, Russia.....659
- 84. THE USE OF GIS IN THE DELIMITATION OF THE SURFACE WATER BODIES (HOMOGENEOUS HYDROGRAPHIC BASINS)**, Prof. PhD Gabriela Biali, Prof. PhD Petra Schneider, Gheorghe Asachi Technical University of Iasi, Romania.....665
- 85. THE USE OF GIS TECHNOLOGIES IN THE STUDY OF AGRICULTURAL DEVELOPMENT OF THE REGION**, PhD Sarkisov Arshavir, Bohadorova Assoc. Prof. PhD Larisa, PhD Stud. Bohadorova Viktoriia, Kherson State University, Ukraine673
- 86. THE USE OF MODERN TECHNOLOGIES IN THE GEOSPACE 3D VISUALIZATION**, Dr. Alena Vondrakova, Radek Barvir, Prof. Vit Vozenilek, Dr. Jan Brus, Palacky University Olomouc, Czech Republic.....681
- 87. TOPO-CADASTRAL AND GEOSPATIAL ANALYSIS OF THE STRUCTURE OF THE FUNCTIONAL FUND AND PROCEDURES FOR CHANGE OF THE LAND USE CATEGORY**, PhD Student Mihai Simon, Prof. PhD Cosmin Popescu, PhD Loredana Copacean, Prof. PhD Luminita Cojocariu, Banat University of Agricultural Sciences and Veterinary Medicine King Michael I of Romania from Timisoara, Romania689
- 88. TOURIST MAP OF GEOSPATIAL DISTRIBUTION OF RIVNE OBLAST IN UKRAINE AS A MEANS FOR ACTIVATING TOURIST FLOWS**, Dr. Prof. Ivan Voloshyn, PhD Stud. Pavlo Kucher, Docent Andriy Kukhtiy, Senior Researcher Yuliya Chykailo, Docent Volodymyr Khudoba, Lviv State University of Physical Culture, Ukraine697

- 89. USE OF GIS TECHNIQUE FOR HYDROLOGICAL MODELING OF SHEET EROSION**, Prof. PhD Gabriela Biali, Lecturer Dr. Paula Cojocaru, Gheorghe Asachi Technical University of Iasi, Romania.....705
- 90. USE OF SENTINEL-2 DATA FOR FOREST INVENTORY**, Lect. Dr. Catalina Cristea, Assoc. Prof. Dr. Andreea Florina Jocea, Military Technical Academy, Romania713
- 91. USING OF THE SPECTRAL GEOMORPHOMETRIC CHARACTERISTICS FOR AUTOMATIZED CLASSIFICATION OF LANDFORMS (ON THE EXAMPLE OF AUSTRALIA)**, Senior Researcher Kharchenko S.V., Prof. Dr. Bolysov S.I., Lomonosov Moscow State University, Russia.....719
- 92. VARIABLE – RATE NITROGEN APPLICATION IN WHEAT PRODUCTION ON THE BASIS OF SATELLITE IMAGES ANALYSIS TO INCREASE YIELD AND REDUCE ENVIRONMENTAL RISKS**, Dr. Jakub Elbl, Dr. Vojtech Lukas, Dip. Ing. Antonin Kintl, Assoc. Prof. Dr. Jindrich Kynicky, Dip. Ing. Martin Brtnicky, Mendel University in Brno, Czech Republic725