SUMMARIES

Maciej Bajorek, Marek Kulczycki, Marcin Ligas • **A Comparison of Iterative Methods of the Cubic Rate Convergence in the Problem of Transformation between Cartesian and Geodetic Coordinates** • Geomatics and Environmental Engineering 2014, Vol. 8, No. 2

The problem of transformation between Cartesian and geodetic (ellipsoidal) coordinates occurs often in day-to-day geodetic practice. Thus, from years it attracts interest of many scientists and practitioners. Despite the fact that many algorithms of the conversion exist to this day one may still observe new methods and approaches to the problem. In this work a comparison as to the efficiency of iterative methods of the cubic rate convergence to the solution of "latitude equation" in three representations has been presented. Two of them are polynomial representations (quartic equations) and one is in the form of an irrational equation. A comparison has been performed on two ellipsoidal height intervals: from –10 km to 10 km, from 10 km to 36 000 km and from 0° to 90° for the latitude.

Keywords: Cartesian coordinates, geodetic coordinates, quartic equation, iterative methods

Karol Firek, Rajmund Oruba, Aleksander Wodyński • **Classification of Building Structures of Mining Plants with Regard to Calculating Property Tax** • Geomatics and Environmental Engineering 2014, Vol. 8, No. 2

Classification of building structures located in mining plants with regard to calculating property tax meets with difficulties arising from the imprecise and inconsistent legislation. As a consequence, significant discrepancies in the calculation of the tax due arise, resulting in numerous lawsuits and additional high costs. In the case of assets of mining plants, this particularly refers to mine workings and objects located under the surface of the ground. The article presents the legal basis and the criteria for the classification

of objects located in mining plants, with regard to an analysis in the legal, construction and process engineering aspects.

Keywords: classification of building structures of mining plants, property tax

Mateusz Ilba • **Support for Create 3D Computer Graphics Images in GIS Systems Using Externals Renders Algorithm** • Geomatics and Environmental Engineering 2014, Vol. 8, No. 2

An analyses of 2D and 3D GIS systems need an appropriate presentation of the results work. Should be presented in three-dimensional graphics environment. Nowadays, more and more attention is given to highlighting the analyzed problem and aesthetic form of presentations. The paper will be present possibilities of presenting the results of 3D analysis in the form of generated 2D images. We will discuss these possibilities for example advanced ArcGIS program work with a typical CAD graphics program Cinema4D. Programs were selected in respect of the best functionality and extended functions imaging of three-dimensional models. During the preparation of this article was tested GIS application GRASS and Geomatica. They are support visualization of 3D data but have worse functionality of the selected program. Program Cinema4D was recognized the best typical CAD program from available AutoCAD, Maya, Microstation, 3ds Max, Blender. Compared to other available applications, the differences are slight. They differ in the user interface. A method of generating images and rendering algorithms in all cases are based on the same principle. The aim of the discussion is to decide whether a typical graphics program may help, in the visualization process, powerful analytical tool which is the application of ArcGIS.

Keywords: ArcGIS, rendering, Cinema4D, 3D visualization, 3D graphics

Monika Mika • **Examination of the Capabilities of Some Models of Hand GPS Receivers for Purposes of Creation of Thematic Maps** • Geomatics and Environmental Engineering 2014, Vol. 8, No. 2

Depending on the purpose, GPS receivers can be classified as: navigational, (which is characterized by low accuracy of the

order of 2–10 m with WASS / EGNOS), geodetic (with accuracies of centimeters) and special (accuracy of less than a centimeter). With the increase of the accuracy of such a receiver, its price and range of applications grow.

The subject presented in this paper concerns the cheapest and the least accurate GPS receivers groups, which are mainly used for navigational purposes or simplified GIS studies. However, they have a number of useful functions that can be used in geodesy for the tasks associated with obtaining data for updating and even the creation of thematic layers of modern maps.

The aim of this paper is to discuss in this context the three types of hand-held GPS receivers: GPSmap 76, GPSmap 62st (Garmin) and GPS Nautiz x7 (Handheld) with examples of their applications.

Keywords: handheld receivers GPS, GPSmap 62st, GPSmap 76, GPS Nautiz x7

Robert Oleniacz, Mateusz Rzeszutek • **ODetermination of Optimal Spatial Databases for the area of Poland to the Calculation of Air Pollutant Dispersion Using the CALMET / CALPUFF Model** • Geomatics and Environmental Engineering 2014, Vol. 8, No. 2

This paper presents a methodology for the preparation of three-dimensional spatial data and land use data for the purpose of modeling pollutant dispersion in the ambient air using a group of geophysical preprocessors of the CALMET / CALPUFF modeling system and the GIS software. Some space information data sources available to Poland were specified and their characteristics and availability were discussed. Particular attention was turned to the SRTM3 and GTOPO30 elevation data as well as the CLC2006 and GLCC land use data, for the preparation of computational grids of different resolutions. Groups of programs which can be used in order to form computational grids based on the above-mentioned databases were identified. The discussed spatial data preparation procedure was used for the area of the city of Krakow and the surrounding area. As a result of the conducted activities, processed information on the terrain in the adopted computational area, possible to be used

in the calculation of a three-dimensional meteorological grid (CALMET) and in the calculation of pollutant dispersion in the ambient air (CALPUFF) was obtained.

Keywords: air pollution, atmospheric dispersion models, CALMET / CALPUFF, spatial database, SRTM3, GTOPO30, CLC, GLCC

Agnieszka Pęska • **The Role of the Surveyor in Real Estate Delimitation Run during Administrative and Court Procedure** • Geomatics and Environmental Engineering 2014, Vol. 8, No. 2

The aim of the presented article is to explain and describe the role of the surveyor in delimitation of a real estate in administrative and legal proceedings. This two-stage procedure, whose purpose is the location of boundaries course, is an important and difficult problem in contemporary surveying.

The paper discusses the problems of the administrative procedure, with particular regard to the scope of activities performed by a surveyor, who plays many roles. Among them one can indicate the function of the representative body of the public administration, conducting the proceedings on the real estate delimitation, a specialist in the field of surveying, mediator or quasi-judge, before who boundary settlement can be concluded. It also presents situations where it is acceptable to carry a case of delimitation before a common court. In such proceedings, the surveyor is an expert in the field of surveying, and his opinion is a very important, crucial evidence.

Keywords: real estate, real estate delimitation, parcel, cadastre, land register

Małgorzata Słota • **Advanced Processing Techniques and Classification of Full-waveform Airborne Laser Scanning Data** • Geomatics and Environmental Engineering 2014, Vol. 8, No. 2

This article presents an overview of advanced processing techniques of full-waveform airborne laser scanning data. The well known processing methods, such as signal decomposition or correlation techniques, could not be sufficient for the processing of strongly deformed or complex reflected echo data.

The first part of this paper describes the advanced processing techniques. The radiometric calibration procedure and advanced waveform decomposition methods, as well as algorithms for the detection of weak and overlapping echoes are presented.

The second part focuses on the possibility of point cloud classification improvement based on full-waveform data. The usefulness of particular full-waveform parameters in the classification process is described.