SUMMARIES

Janusz Dąbrowski: **Theoretical Basis for Geodesic Clusters** • Geomatics and Environmental Engineering 2011, Vol. 5, No. 2

Surveying like many other areas of economic life is subject to constant change and transformation. In recent years we can observe increased technological development which is noticeable by a progress in surveying equipment and software. This situation causes the continuing need to purchase newer and newer surveying equipment and the need for continuous further training. In addition, we see devastating market competition among small companies. Moreover, the inability to participate in large, long term projects by small businesses can lead to distortion of their financial stability and ultimately lead to bankruptcy.

The author of the article shows the way against the possible adverse changes that have occurred in recent years, which may contribute to the strengthening of small and medium surveying companies.

Keywords: surveying clusters, surveying services

Natalia Florencka: **The Content of Heavy Metals in the Alluvial Formations of Mountain Torrent** • Geomatics and Environmental Engineering 2011, Vol. 5, No. 2

This article presents the content of chosen heavy metals agglomerated in the sediment of bed sand-bank of the mountain torrent, taking into account the fraction volume (amount). Material was taken from several surveying points on the 1.1 km of stream length. Analyzed sediment was characterized by changeability of granulation and abundance of heavy metals. The highest content of chromium, copper, cadmium, nickel, lead and zinc was denoted in the finest fractions (<0.025 mm), whereas the lowest amount of zinc, chromium and copper was stated in the deposit with diameter 0.5–0.25 mm. High nickel concentration was stated in investigated alluvial material (III class of contamination), significantly higher than geological background of the sediments in Poland.

Keywords: heavy metals, mountain torrent, alluvia

Paweł Hanus: **Analysis of Circulation of Information in Local Surveying Documentation Centre** • Geomatics and Environmental Engineering 2011, Vol. 5, No. 2

In the paper an analysis of circulation of information in local (district) surveying documentation centre, with special attention to problem of period of time of performing the following activities. Analysis includes selected surveying works and course of following procedures of documentation centre connected with accepting documents delivered to the local centre as a result of performed works. A quantity analysis of works, taking into account their kinds, there also has been made. Analyses have been done on the basis of data taken from one of local centre, located in Małopolska region, from 2009.

Keywords: local surveying documentation centre, surveying works, circulation of information

Jakub Kolecki: **Small And Low-Cost Mobile Mapping Systems** • Geomatics and Environmental Engineering 2011, Vol. 5, No. 2

Nowadays acquisition of large amount of data for various mapping applications like creation of a terrain, building or a building part models is performed mainly using laser scanners or photogrammetric methods. From early nineties we observe more intensive development of a mobile mapping systems integrating various types of cameras not only with positioning systems like GPS, but also with inertial measurements units (IMU) and other geo-referencing sensors. Such mobile mapping devices have obviously very high prices, are large-sized and have usually very high weight. There are however some lightweight constructions basing on alternative solutions other then those met in expensive commercial systems. The researches conducted among many institutions in the world show that such systems may be in fact constructed using relatively inexpensive devices, available on the market. The accuracy demands could be satisfied for a bulk of mapping applications. This paper addresses the topic of low-cost mobile mapping systems. First of all a few examples of such systems will be presented, and then more detailed overview of geo-referencing technologies will be given.

Keywords: Mobile mapping, direct geo-referencing, GPS, IMU, digital compass sensor fusion

Małgorzata Mendela: **Analysis and Interpretation of Relative Displacements on the Mid-Sudetic Fault** • Geomatics and Environmental Engineering 2011, Vol. 5, No. 2

Geodynamic investigations conducted in the Sudety Mts. and the Fore-Sudetic Block indicate tectonic mobility of the local geological structures in the form of i.a. dispacement deformations. The re-

searches of the Mid-Sudetic Fault mobility conducted in the third segment of the measurement and control system allow to determine values of the relative displacements, registered i.a. by TM-71 crack gauges. The analysis and interpretation of relative displacements on the Mid-Sudetic Fault are based on data obtained from the TM-71 crack gauge placed in Janowice Wielkie (former uraniom galery). In this paper there are done linear trend analysis of relative displacements (Least Squares and robust *M*-estimation method), periodicity analysis (Fast Fourier Transform), detection of and analysis of episodic data disturbances to evaluate the Mid-Sudetic Fault mobility (displacement deformations of rock blocks).

Keywords: geodynamic activity, relative observations, crack gauge, fault deformation

Grzegorz Olejarz: **The Proposal of Realization the OGC Geospatial Web Services' Symbolization** • Geomatics and Environmental Engineering 2011, Vol. 5, No. 2

In the mining industry there is a lack of good standards of creating the mining maps. Such documents are usually issued by non-free software for commercial purposes. Main aim of this article is to analyze the possibilities free and open standards for style spatial data, in according to Polish law and norms. Achieving this goal was possible because of system using Web Services, also based on open software and standards.

This article presents installation and configuration of a geospatial service system based on free and open source software: GeoServer, PostGIS and OpenLayers. The sample vector mine data were converted and saved in the spatial database PostGIS and then they were published by using geodata server GeoServer as Web Map Service. Next there were created the portrayal styles of the mining maps elements. The main aim was the adaptation to Polish PKN norms: *Mapy górnicze. Umowne znaki granic* (*Mining maps. Conventional symbols of borders*) and *Umowne znaki podziemnych wyrobisk górniczych* (*Conventional symbols of underground excavations*). For these styles there were used SLD and SVG OGC standards. Last step was connected with creation of geospatial web services client using OpenLayers. It allowed to display maps just in web browser.

Keywords: OGC web services, INSPIRE, Spatial Data Infrastructure, Databases, WMS, Styled Layer Descriptor, GeoServer, OpenLayers, PostGIS

Bogdan Skorupa: **Study on GPS Phase Ambiguity Resolution Effectiveness with Use of LAMBDA De-Correlation Method** • Geomatics and Environmental Engineering 2011, Vol. 5, No. 2

Results of numerical tests focused on application of the LAMBDA de-correlation method for calculation of cycle ambiguities in GPS

phase measurement, have been presented. The calculations were made for observations within the band L1, registered in short, static measurement sessions. Correctness of the de-correlation method algorithm was tested on the basis of model sets of initial ambiguities of phase cycles in double differences, which were calculated with the assumption that GPS vector coordinates were not changed. Verification of the ambiguities was conducted using Integer Search Ratio test. Influence of the de-correlation method on size of search space of optimal ambiguity sets, was also examined. Moreover, comparison of the LAMBDA method effectiveness with classic algorithm used for calculation of phase cycle ambiguities in GPS measurements, was also presented. The testing calculations were conducted with use of RBS program developed in the Department of Geomatics of the University of Science and Technology in Krakow – Poland, as well as with use of the software from Internet NGS (National Geodetic Survey) service.

Keywords: GPS, ambiguity resolution, ambiguity decorrelation