

DEPARTMENT OF SURVEYING

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I. STAFF

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II. EQUIPMENT

II.1 Teaching and Research Laboratories

Surveying Laboratory - Practical and experimental courses in Surveying and Engineering Surveying are provided. A testing field of more than 100 signalised points, 10 measuring pillars and other measuring equipment are at the students' disposal.

Photogrammetry Laboratory - research laboratory focusing on analytical photogrammetry methods. Teaching photogrammetry subjects, graduate and Ph.D. theses.

Počúvadlo Field Campus - in the vicinity of Banská Štiavnica (Central Slovakia). The campus is used for training in basic surveying technologies. A field of more than 50 stabilised measuring points in the state coordinate system is at the students' disposal.

Gabčíkovo HS Field Campus - consists of a group of industrial structures (hydroelectric station, lock gates, turbines, etc.). Automatic measuring systems and control points for deformation measurement are installed. Practical and experimental courses and measurements for engineering surveying subjects are supervised there.

II.2 Special Measuring Instruments and Computers

More than 100 theodolites, levels, one special Trimble DiNi 12 precision levelling instrument, one special Trimble 3602 DR antifiare electronic tacheometer and other electronic tacheometers are at the students' disposal. They can use the Faculty's computer laboratories and multi-licence software as well as the Department's 14 computers and special software.

ORIENT analytical adjustment software is used for the resolution of single, n-pictures, and photogrammetric adjustment problems and is based on the principle of projective transformation (collinearity condition) of photographs into a reference system, where they are mutually adjusted (in a block) by means of the bundle method. This software was developed at the Vienna Technical University at the Institute for Photogrammetry and Remote Sensing. The Leica Digital Video Plotter (DVP) is a fully digital system. The DVP is a simple and inexpensive digital photogrammetric station with easy-to-learn software and low maintenance costs. It is an ideal instrument for educational institutions to demonstrate the principles of analytical and digital photogrammetry.

The equipment for testing and calibrating accelerometers was developed and constructed by the Department. Three lasers, 10 electronic tiltmeters and 16-channel registration equipment can be used for special engineering surveying courses, diploma theses and Ph.D. theses.

The CCD-based IL 2000 measuring system was constructed at the Department. The light trace or shadow illuminated by measured objects can be detected and processed by the system. The measuring range of the system is given as 0-100 mm. The 22.521 mm size of the CCD is magnified by an objective lens and diffuser. The system is used for conducting measurement tasks in special engineering surveying courses, diploma theses and Ph.D. theses.

III. TEACHING

III.1 Graduate Study

Subject	Semester	Hours Per Week		Lecturer
		Lectures	Seminars	
Surveying I	1	3 - 3		Š. Sokol
Surveying II	2	3 - 3		Š. Sokol
Surveying III	3	3 - 3		Š. Sokol
Surveying Camp	2	2 weeks		J. Ježko
Engineering Surveying	4	2 - 3		V. Staněk
Engineering Surveying	7	2 - 3		V. Staněk

Surveying in Building Construction	1	2 - 2	V. Staněk, G. Hostinová
Surveying for Water Management	4	2 - 3	G. Hostinová
Surveying for Engineering Construction	4	2 - 3	V. Staněk
GIS for Urban Management	9	2 - 1	P. Bartoš
Photogrammetry and Remote Sensing	6	2 - 3	P. Bartoš
Applied Analytical Photogrammetry	8	2 - 2	P. Bartoš
Measuring Systems in Engineering Surveying	9	2 - 2	A. Kopáček
Industrial Surveying	9	3 - 2	Š. Lukáč
Surveying Camp for Engineering Construction and Water Management	5	1 week	V. Staněk, G. Hostinová
B. Sc. Project	6	0 - 2	
Engineering Surveying Camp	9	2 weeks	A. Kopáček
Engineering Surveying Camp	4	2 weeks	V. Staněk
Special Seminar	10	1 - 6	
Complex Surveying Design	10	1 - 4	
Special Seminar	9	1 - 2	
Professional Practice	4	3 weeks	J. Ježko
Surveying in Civil Engineering	2	3 - 3	A. Kopáček
Graduate Theses	10	5 weeks	
Surveying in Underground Areas	8	2 - 2	A. Kopáček
Legislation of Geodetic Activities	10	2 - 1	Š. Lukáč
Photogrammetry and Remote Sensing	9	2 - 3	P. Bartoš
Photogrammetric Mapping and GIS	9	3 - 2	P. Bartoš
Geodesy, Cartography and Cadastre	5	3 - 2	P. Bartoš

IV. RESEARCH TARGETS

Research activity focuses on the main departmental subjects, especially engineering surveying and photogrammetry. In engineering surveying, the main topics are measurement and prediction of deformations, optimization of design and measurement of local surveying control networks, and design and testing of automatic measurement systems. The results are applied in the construction industry (nuclear power plants, dams, bridges, etc.). Research activities in photogrammetry and remote sensing are focused on analytical photogrammetry and its application in architectural monument conservation, environmental protection, water management, and energy exploration.

V. RESEARCH PROJECTS

1. Research grant registration No. 1/8332/01: Integrated Measurement Systems of Data Collection and Data Processing for the Creation of Deformation Models of Building Structures and Rock Environments (2001-2003, P. Bartoš)
2. Research grant registration No. 1/0318/03: Integrated Measurement Systems for Monitoring Dynamic Deformations of Building Structures (2003-2005, A. Kopáček)
3. DAAD International project No. 7/2002: Application of Terrestrial Laser Systems in TLS in Industry in the Slovak Republic (2003-2004, A. Kopáček)

4. EEGECS Socrates project: European Education in Geodetic Engineering, Cartography and Surveying (2002-2003, A. Kopáčík)

VI. COOPERATION

VI.1 Cooperation in Slovakia

1. Department of Mining Surveying and Geodesy, TU Košice
2. Department of Surveying, TU Žilina
3. Research Institute of Geodesy and Cartography, Bratislava
4. Department of Geotechnics, STU Bratislava
5. Department of Engineering Geology, UK Bratislava
6. Institute of Geodesy and Cartography, Bratislava
7. Institute of Metrology, Slovak Academy of Sciences, Bratislava
8. Slovak Roads Office, Bratislava
9. Slovak Electrical Corporation, Trenčín
10. Slovak Institute of Technical Normalization, Bratislava
11. Geofos, Ltd., Žilina
12. Geological State Institute of Dionýz Štúr, Bratislava
13. SVP Banská Štiavnica, Danube River Basin, Gabčíkovo Factory
14. SE, Inc., Water Power Station Factory, VS Gabčíkovo
15. Chamber of Surveyors and Cartographers
16. Slovak Union of Surveyors and Cartographers
17. Department of Concrete Structures and Bridges, STU Bratislava
18. GEOTEAM, Ltd., Bratislava, Authorized Distributor of Trimble
19. GEOTECH, Ltd., Bratislava, Trade Agency and Service of Leica

VI.2 International Cooperation

1. Institute of National Surveying and Engineering Geodesy, TU Vienna, Austria
2. Institute for Photogrammetry and Remote Sensing, TU Vienna, Austria
3. Department of Surveying, Cartography and Descriptive Geometry, Politechnika Lodź, Poland
4. Institute of Geodesy and Geophysics of the Hungarian Academy of Sciences, Sopron, Hungary
5. Department of Geodesy, VUT Brno, Czech Republic
6. Department of Geodesy, TU Munich, Germany
7. College of Geoinformatics, University of West Hungary, Székesfehérvár, Hungary
8. Department of Engineering Surveying, TU Dresden, Germany
9. Department of Surveying, Mining – Geological Faculty, TU Ostrava, Czech Republic
10. Palacky University of Olomouc, Department of Mathematical Analysis and Mathematical Applications, Czech Republic

VI.2.1 Visitors to the Department

1. Kostelecký J. – Faculty of Civil Engineering, CTU Prague, Czech Republic, 2 days
2. Nevosád Z. – Faculty of Civil Engineering, VUT Brno, Czech Republic, 4 days
3. Zeman A. – Faculty of Civil Engineering, CTU Prague, Czech Republic, 2 days

4. Wunderlich Th. – Faculty of Civil Engineering and Surveying, TU Munich, Germany, 5 days
5. Weber Th. – Faculty of Civil Engineering and Surveying, TU Munich, Germany, 6 days
6. Schafer Th. – Faculty of Civil Engineering and Surveying, TU Munich, Germany, 6 days

VI.2.2 Visits of Staff Members and Postgraduate Students to Foreign Institutions

1. Kopáčik, A. – TU Munich, Germany, 3 days (February 2003)
2. Kopáčik, A. – WW FIG, Greece, 5 days (May 2002)
3. Kopáčik, A. – Department of Geodesy, Faculty of Civil Engineering VUT Brno, Czech Republic, 1 day
4. Korbašová, M. – Department of Mathematical Analysis and Mathematical Applications, Palacky University, Olomouc, Czech Republic, 1 week (June 2003)
5. Kubanka, P. – ANGERMEIER INGENIEURE GmbH, Giebelstadt, Germany, 1 year (2002-2003)
6. Kyrinovič, P. – TU Munich, Germany, 1 month (July 2003)
7. Lukáč, Š. – WW FIG, Paris, France, 5 days (May 2003)
8. Lukáč, Š. – Poland, 4 days (March 2003)
9. Zámečnicková, M – TU Munich, Germany, 2 months (March and July 2003)
10. Zámečnicková, M – Riegl Laser Measurement Systems GmbH, Horn, Austria, 3 months (April – June 2003)

VII. THESES

VII.1 Graduate Theses

No.	Student's Name	Title	Supervisor
1.	Bc. Marián Uhrin	Data Acquisition by Digital Photogrammetry for a Cliff Renovation Project	P. Bartoš
2.	Bc. Eliška Hrbíková	Comparison of Analytic Methods of a Ray Beam and Direct Linear Transformation	P. Bartoš
3.	Bc. Ladislav Bednár	3D Data Acquisition for the Creation of a GIS Spatial Base by Digital Photogrammetry	P. Bartoš
4.	Miroslav Hubočáni	Redrawing a Digital Photo by 2 DVR System	P. Bartoš
5.	Bc. Terézia Krausová	Concentration of a Point Field by Aero-Triangulation	P. Bartoš
6.	Bc. Mária Kožárová	Inspection of the Geometric Parameters of Building Structures	V. Staněk
7.	Bc. Andrej Révay	Deformation Measurements of the Soil Embankment of the Hriňová Waterwork	V. Staněk
8.	Bc. Marián Súva	Monitoring the Geodetic Stability of the Čierny Váh Pumped Storage Hydro-Plant	V. Staněk
9.	Bc. Peter Kompiš	Monitoring the Geodetic Stability of a Highway Bridge during Its Operation	V. Staněk
10.	Bc. Martin Bodor	Problem of Staking Out Activities during Highway Construction	V. Staněk
11.	Bc. Branislav Šajmír	Elimination of the Systematic Effect of Environment on the Levelling	Š. Sokol

12.	Bc. Vladimír Sabo	Efficient Determination of a Refraction Coefficient Using Distance Measurement	Š. Sokol
13.	Bc. Branislav Chrappan	Automated Determination of Areas	Š. Sokol
14.	Bc. Veronika Kollárová	Measurement and Processing of 2D Geodetic Networks	Š. Sokol
15.	Bc. Jozef Kubinec	Testing Universal Measurement Stations	A. Kopáčik
16.	Bc. Vanda Kadlečíková	Exploitation of Terrestrial Laser Systems in Engineering Surveying	A. Kopáčik
17.	Bc. Marek Róka	Exploitation of the RTK GPS Method for Staking Out Building Structures	A. Kopáčik
18.	Bc. Daniel Turcár	Exploitation of Electronic Sensors for Deformation Measurement of Structures	A. Kopáčik
19.	Bc. Radoslav Čuban	Long-Term Monitoring of the Bridge on Kapucinska Street	G. Hostinová
20.	Bc. Peter Ružička	Geodetic Monitoring of Selected Structures of a Nuclear Power Plant	G. Hostinová
21.	Bc. Ivan Tajzler	Calibration of Geodetic Instruments	J. Ježko
22.	Bc. Zuzana Uhrínová	Exploitation of Digital Levelling Instruments by Vertical Deformation Measurements of Bridges	J. Ježko
23.	Bc. Martin Lekýr	Accuracy Testing of Levelling Instruments for Precise Levelling	J. Ježko
24.	Bc. Mariana Würflová	Testing of Non-Reflected Integrated Instruments	J. Ježko

VII.2 Bachelor Theses

No.	Student's Name	Title	Supervisor
1.	Bad'ura Juraj	Trigonometric Determination of Differences in Elevation	A. Villim
2.	Bednár Kamil	Determination of Spatial Displacements by Intersection Photogrammetry Method	M. Fraštia
3.	Bergl Oliver	Determination of Spatial Point Position	P. Vybíral
4.	Bruna Miroslav	Analytical Solution of the Directional Parameters of a Communication Axis	M. Korbašová
5.	Faix Radoslav	Adjustment of a 2D Experimental Network	P. Vybíral
6.	Gášpar Marek	Quality Verification of Levelling Instruments for Technical Levelling	P. Kyrinovič
7.	Heriban Stanislav	Parameters and Estimating Precise Characteristics Estimation of an Elevation Network	A. Villim
8.	Hnát Miloslav	Trigonometric Determination of the Elevations of Building Structures	M. Rojkovičová
9.	Hornák Pavol	Testing Electronic Theodolites	J. Ježko
10.	Horník Ján	Determining Spatial Coordinates of Points by Direct Linear Transformation	V. Gregor
11.	Hostinová Anna	Deformation Measurements of Building Structures	V. Staněk
12.	Hudák Rastislav	Determination of a Point Position from Measured Angles and Distances	Š. Sokol

13.	Hudec Roman	Photogrammetric Concentration of a Point Field (Primary Data Acquisition from Analogue Photos)	A. Samuhelová
14.	Chlepková Miroslava	Stability Monitoring of Small Bridges	G. Hostinová
15.	Igaz Peter	Design of Road Direction	M. Zámečníková
16.	Jánov Ondrej	Comparison of Analytical Methods of Intersection Photogrammetry with Ground Stereophotogrammetry	P. Bartoš
17.	Just Stanislav	Processing Bridge Control Measurements	M. Bajtala
18.	Kadlečková Martina	Calibration of Non-Metric Digital Camera	M. Fraštia
19.	Kačířeková Dagmar	Digital Photogrammetry and Its Exploitation for Documentation of Remains	A. Samuhelová
20.	Kavulič Milan	Adjustment of Elevations by Trigonometric Levelling	Š. Lukáč
21.	Koval' Ondrej	Application of Free Station Principle for Geometric Levelling Method	A. Villim
22.	Kubiček Tomáš	Calibration of Non-Metric Analogue Camera	M. Fraštia
23.	Kubasák Tomáš	Reductions of Measured Quantities	A. Villim
24.	Kuchtiak Marek	Determination of the Flatness of a Vertical Wall	M. Korbašová
25.	Lahučký Tomáš	Application of a Statistical Model Using Deformation Measurements	M. Bajtala
26.	Lesayová Lenka	Determination of Spatial Deformations by the Ground Stereophotogrammetry Method	M. Fraštia
27.	Meszáros Marek	Spatial Intersections	J. Ježko
28.	Novák Miloš	Determining the Shape of a Rectifying Rail by the Straight Line Method	M. Korbašová
29.	Pastor Pavol	Area Measurement	P. Vybíral
30.	Pavlišin Michal	Photogrammetric Concentration of a Point Field (Primary Data Acquisition from Digital Photos)	A. Samuhelová
31.	Perončík Juraj	Creation of Spatial Model of Building Structure	P. Kyrinovič
32.	Ondrejko Jozef	Traverse Accuracy Analysis of Line Structures	Š. Lukáč
33.	Polt'ák Michal	Data Acquisition and Creation of Digital Technical Map	M. Bajtala
34.	Ščepán Daniel	Trigonometric Determination of Lengths	J. Ježko
35.	Sleziak Tomáš	Theoretical and Practical Aspects of Exploitation of Distance Measurement Parallax Method	Š. Lukáč
36.	Sučík Matej	Stability of Levelling Instruments for Precise Levelling	P. Vybíral
37.	Suchán Igor	Adjustment of Levelling Network by the Parametric Method	Š. Lukáč
38.	Susko Roman	Comparison of Accuracy of Selected Types of Levelling Instruments	Š. Lukáč

VIII. OTHER ACTIVITIES

VIII.1 Special Lectures

- [1] BARTOŠ, P.: Monitoring Geodynamic Processes with Integrated Measurement Systems. 6th International Geotechnic Conference, Bratislava, 2003 (in Slovak)
- [2] BARTOŠ, P.: Contribution on the Accuracy of Digital Photogrammetry. 15th Cartographic Conference – Geoinformation of Cartography, Zvolen, 2003 (in Slovak)
- [3] KOPÁČIK, A.: Study Materials of the Geodesy and Cartography Program in the Slovak Republic and Their Compatibility with EU Programs. 39th International Information Days, Brno, 2003 (in Slovak)
- [4] KOPÁČIK, A.: Loading Tests of Highway Bridges in Slovakia. 11th International Conference of Deformation Measurement. Greece, Santorini, FIG Commission 6 (in English)
- [5] KOPÁČIK, A.: FIG Standards Network – Commission 6 Activity. FIG Regularly Held Commission 6 Session. Greece, Santorini, 2003 (in English)
- [6] KORBAŠOVÁ, M.: Mathematic - Statistical Problems of Data Processing of Connecting Measurements in Surveying. International Symposium on Modern Technologies, Education and Professional Practice in the Globalizing World, Sofia, Bulgaria, 2003 (in English)
- [7] LUKÁČ, Š. – ONDRIŠ, L. – RUSINA, V. – BUZÁSI, J.: Hydrostatyczne i pendametryczne systemy pomiarowe zakładu pomiarów Slowackiej akademii nauk i ich praktyczne wykorzystanie. Problemy automatyzacji w geodezji inżynierskiej. Warszawa, 2003 (in Polish)
- [8] LUKÁČ, Š. – ŽÁK, M. – HARDOŠ, J.: Deformation Measurements of the Most Important Structures in Slovak Nuclear Power Plants. Working Week FIG – Paris 2003. TS 22-Surveying in Industry and Construction (in English)
- [9] LUKÁČ, Š.: The Profession of Surveyor in the EU Countries. 11th Slovak Geodetic Days. Bratislava, 2003 (in Slovak)
- [10] ROJKOVIČOVÁ, M.: Application of the Indirect Determination of the Geometric Parameters of an Atypical Crane Rail in the Gabčíkovo Hydraulic Structure. International Symposium on Modern Technologies, Education and Professional Practice in the Globalizing World, Sofia, Bulgaria 2003 (in English)
- [11] SAMUHELOVÁ, A.: Photogrammetric Documentation of St. Catherine Alexandria Church. International Symposium on Modern Technologies, Education and Professional Practice in the Globalizing World, Sofia, Bulgaria, 2003 (in English)
- [12] SAMUHELOVÁ, A.: Reconstruction of Building Structures by Analytical Photogrammetry Methods - CONECO – Application of the Latest Information in Science and Technology for Reconstruction of Building Structures, Bratislava, 2003 (in Slovak)
- [13] SAMUHELOVÁ, A.: Photogrammetric Documentation of St. Catherine Alexandria Church. 15th Cartographic Conference – Geoinformation of Cartography, Zvolen, 2003 (in Slovak)
- [14] ZÁMEČNÍKOVÁ, M. – KOPÁČIK, A.: Terrestrial Laser Systems. 11th Slovak Geodetic Days, Bratislava, 2003 (in Slovak)

VIII.2 Commercial Activities for Firms and Institutions

1. Measuring Horizontal Displacements of Structures of the Ružín Dam
2. Highway Bridges – Measuring Displacements and Deformations (Liptovský Peter, Súčianka)
3. Staking Out Network of the Sitiny Tunnel in Bratislava
4. Project of Long-Term Geodetic Measurements of the Branisko Highway Tunnel
5. Project of Long-Term Geodetic Measurements of the D1-201 Highway Bridge at the Behárovce – Branisko Highway Section
6. Project of Long-Term Geodetic Measurements of the D1-202 Highway Bridge at the Behárovce – Branisko Highway Section
7. Project of Long-Term Geodetic Measurements of the D1-203 Highway Bridge at the Behárovce – Branisko Highway Section
8. Project of Long-Term Geodetic Measurements of the D1-211 and D1-212 Highway Bridge at the Behárovce – Branisko Highway Section
9. Project of Long-Term Geodetic Measurements of the D1-202 Highway Bridge at the Branisko - Široké Highway Section
10. Project of Long-Term Geodetic Measurements of the D1-204 Highway Bridge at the Branisko - Široké Highway Section
11. Project of Long-Term Geodetic Measurements of the D1-205 Highway Bridge at the Branisko - Široké Highway Section
12. Project of Long-Term Geodetic Measurements of the D1-207 Highway Bridge at the Branisko - Široké Highway Section
13. Project of Long-Term Geodetic Measurements of the D1-208 Highway Bridge at the Branisko - Široké Highway Section
14. Project of Long-Term Geodetic Measurements of the D1-209 Highway Bridge at the Branisko - Široké Highway Section
15. Project of Long-Term Geodetic Measurements of the D1-210 Highway Bridge at the Branisko - Široké Highway Section
16. Project of Long-Term Geodetic Measurements of the D1-211 Highway Bridge at the Branisko - Široké Highway Section
17. Long-Term Monitoring of Displacements and State of Tension of the I-96 Girders on the Bridge over the Flooding Area of Váh D61 Highway Nové Mesto nad Váhom – Chochoľná
18. Measurement and Evaluation of the Vertical Displacements of the Zemplínska Šírava Dam
19. Measurement and Evaluation of the Spatial Deformations of the Bukovec Dam
20. Measurement and Evaluation of the Vertical Deformations of Some Filling Stations (Čičarovce, Moľva, Ptrukša, Boľ, Július, Ladislav, Pavlovo, Streda n/B., Hraň)
21. Stability Monitoring of the Plague Pillar for the Metropolitan Office in Kremnica
22. Project – Partial Monitoring System of the Geological Aspects of the Environment in the Slovak Republic in Cooperation with the Geological State Institute of Dionýz Štúr in Bratislava (Harmanec, Ducové, Banská Štiavnica, Demjata)

VIII.3 Conferences and Workshops Organised

1. Summer School – Workshop on Modern Instrument Techniques for Field Work (May 2003, Počúvadlo)
2. 11th Slovak Geodetic Days (December 4-5, 2003, Bratislava)

IX. PUBLICATIONS

IX.1 Journals

- [1] JEŽKO, J., et al.: Calibration of Horizontal Circles of Theodolites. Geodetic and Cartographic Horizon, Vol. 50/91 (in print, in Slovak)
- [2] JEŽKO, J.: Some Knowledge Gained from Calibration of Horizontal Circles of Geodetic Instruments. Slovak Surveyor and Cartographer, Vol. VIII, No. 2., Chamber of Surveyors and Cartographers, Bratislava 2003, pp. 18 – 23 (in Slovak)
- [3] KOPÁČIK, A.: Book Review. Kašpar, M. – Pospíšil, J. – Štroner, M. – Křemen, T. – Tejkal, M.: Lasers Scanner Systems in Civil Engineering. VEGA 2003, 111 pp. Geodetic and Cartographic Horizon, 12/2003 (in Slovak)
- [4] STANĚK, V.: Book Review. Kašpar, M. – Voštová, V.: Lasers in Civil Engineering and Instrument Navigation. ČKAIT Information Center 2003, 148 pp. Geodetic and Cartographic Horizon, 1/2003, p.16 (in Slovak)
- [5] STANĚK, V. – KOPÁČIK, A.: A Surveyor – Cocreator of Successful Breakthrough in the Observation Tunnel of the Višňové Tube. In: Slovak Surveyor and Cartographer. Bratislava 2/2003, pp. 13-17 (in Slovak)

IX.2 Books and Textbooks

- [1] KOPÁČIK, A.: Inertial Measurement Systems. Bratislava. Monograph. SUT 2003, ISBN 80-227-1884-X, 98 pp. (in Slovak)
- [2] SOKOL, Š. et al.: Preparation, Management and Organization of Buildings. Handbook. VERLAG DASHOFER, Bratislava, 2003, ISSN 1335-8626 (in Slovak)
- [3] SOKOL, Š., JEŽKO, J.: Geodetic Instrument Techniques in Civil Engineering. Civil Engineering Tables – Mechanical Equipment. A - Project, 2003, ISBN 80-227-1893-9 (in Slovak)
- [4] SOKOL, Š. – JEŽKO, J. – BAJTALA, M.: Geodesy Training in the Field. SUT Bratislava, 2003, ISBN 80-227-1893-9, 141 pp. (in Slovak)

IX.3 Conferences

- [1] BARTOŠ, P.: Monitoring Geodynamic Processes with Integrated Measurement Systems. In: New Methods in Geotechnic Engineering, Bratislava, 2003 (in Slovak)
- [2] BARTOŠ, P.: Contribution on the Accuracy of Digital Photogrammetry. 15th Cartographic Conference – Geoinformation of Cartography, Zvolen, 2003 (in Slovak)
- [3] BARTOŠ, P.: Photogrammetric Methods of Data Acquisition. In: Activities and Tasks of Licensed Surveyors and Cartographers. Bratislava, Chamber of Surveyors and Cartographers 2003, pp. 73-82 (in Slovak)
- [4] KOPÁČIK, A.: Study Materials of the Geodesy and Cartography Division in the Slovak Republic and Their Compatibility with EU Programs. 39th International Information Days, Brno, ČSVTS Geodesy Brno, 2003 (in Slovak)

- [5] KOPÁČIK, A.: Loading Tests of Highway Bridges in Slovakia. 11th International Conference on Deformation Measurements. Greece, Santorini, FIG Commission 6, pp. 583 – 589 (in English)
- [6] KOPÁČIK, A.: Deformation Measurements of Building Structures. In.: Activities and Tasks of Licensed Surveyors and Cartographers. Bratislava, Chamber of Surveyors and Cartographers 2003, pp. 155-164 (in Slovak)
- [7] KOPÁČIK, A – ZÁMEČNÍKOVÁ, M.: Terrestrial Laser Systems. 11th Slovak Geodetic Days, Bratislava, Chamber of Surveyors and Cartographers, 2003, pp. 89-98, ISBN 80-969049-7-3 (in Slovak)
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