DEPARTMENT OF THEORETICAL GEODESY

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I.1 Teaching activities

The Department's teaching activity provides the theoretical background for geodesy as a science concerning the geometric shape of the Earth and its gravity field. This is accompanied by the theory of measurements, methods of positioning, data processing, statistical analysis and informatics. Both theoretical and practical aspects are considered, emphasising current and

future trends in geodesy. The Department covers education in subjects concerning geometric geodesy, physical geodesy, geodetic astronomy, satellite geodesy, statistical processing of measurements, geoinformatics and computer science.

II. EQUIPMENT

II.1 Teaching and Research Laboratories

Observatory for Geodetic Astronomy - A research laboratory oriented towards geodetic positioning methods using natural and artificial celestial bodies and their integration with terrestrial geodetic methods.

Laboratory for Geodesy and Metrology - A research and educational workplace directed at the development of terrestrial measurement methods and techniques, laboratory tests, calibration and comparison of geodetic instruments and devices.

Laboratory for Geoinformatics - Serves as a research and educational workplace focusing on applications of computer technologies for Geographical Information Systems and Land Information Systems.

The Modra-Piesok Geodynamic Reference Control Site is used for permanent positioning by the GPS method and for absolute and relative measurements of gravity acceleration as part of international geodynamic research projects. The permanent GPS observations at Modra-Piesok are included in the European Reference Frame that is used for construction and maintenance of geodetic networks in Europe.

II. 2 Special Measuring Instruments and Computers

Total station:	Topcon GTS-6
Electronic theodolite:	Wild T 2000
Electronic distance meters:	DI 2000, Di 5
GPS receivers:	TRIMBLE 4000 SSE, TRIMBLE 4000 SSi (two units), Geoexplorer II, MARCH IIE (two units)
Levelling instruments:	Wild Na 2000, Zeiss Ni 002 (three units)
Astronomical instruments:	Wild T4, Circumzenithal RIGTC 100/1000, Circumzenithal RIGTC 50/500
Gravity meters:	Worden (two units)
Laserinterferometric comparator:	LIK

III. TEACHING

III.1 Graduate Study

Subject	Semester	Hours Per Week		Lecturer
		Lectures	Seminars	
Computer Science	1	2	3	P. Černý
Geoinformatics	3	3	3	J. Chalachánová
Errors and Survey Adjustment Theory I.	3	3	2	J. Mičuda

Errors and Survey Adjustment Theory II.	4	2 – 2	J. Mičuda
Computer Programming	4	2 – 3	P. Černý
Physical Geodesy	5	2 – 2	M. Mojzeš
Geodetic Networks	5	3 – 3	E. Bučko
Land Information Systems	5	2 -2	J. Chalachanová
Geometric Geodesy I.	5	3 – 2	J. Mitáš
Geometric Geodesy II.	6	3 – 3	J. Mitáš
Field Education in Geodetic Controls	6	3 weeks	E. Bučko
Geodetic Astronomy and Space Geodesy I.	7	2 – 3	L. Husár
Geodetic Astronomy and Space Geodesy II.	8	3 – 2	J. Melicher
Specialised Field Education	9	2 weeks	L. Husár
Special Seminar	9	0 – 3	Dep.Theor.Geod.
Databases and Information Systems in Geodesy	10	2 – 2	J. Chalachanová
Complex Geodetic Project	10	2 – 2	Dep.Theor.Geod.
Geodetic GPS Technologies	8	2 – 2	E. Bučko, J. Hefty
Analysis of GIS Spatial Data	8	2 - 2	J. Chalachanová
Satellite Geodesy	9	2 - 2	J. Hefty
Geodetic and Satellite Technologies in GIS	9	2 - 2	E. Bučko, J. Hefty
Mathematical Methods of Data Processing	7	2 - 2	J. Hefty
Integrated Geodesy	8	2 - 2	J. Hefty, M. Mojzeš
Geoid Determination Theory	7	2 - 2	M. Mojzeš
Geodynamics	9	2 - 2	M. Mojzeš

V. RESEARCH PROJECTS

1. The Effects of Earth's Dynamics and Regional Atmospheric Processes in Continual Observations of the Central European GPS Network. VEGA Project 1/8252/01. Leader: Assoc. Prof. Ján Hefty, PhD.
2. Central European Regional Geodynamic Project II - CERGOP II, supported by the EU under the 5th Framework Programme. National coordinator: Assoc. Prof. Marcel Mojzeš, PhD.
3. UNIGRACE - Unification of the Gravity Network in Central and Eastern Europe. Supported by the EU under the INCO-COPERNICUS programme. National coordinator: Assoc. Prof. Marcel Mojzeš, PhD.
4. Geodetic Monitoring of Deformations of the Earth's Surface. VEGA Project 1/8251/01. Leader: Assoc. Prof. Marcel Mojzeš, PhD.
5. Research and Realisation of Geodetic Metrological System in the Slovak Republic. VEGA Project 1/7150/20. Leader: Assoc. Prof. Ernest Bučko, PhD.
6. Spatial Quality Standards for Design and Use of Geoinformation Databases. VEGA Project 1/8249/01. Leader: Peter Černý, PhD.

VI. COOPERATION

VI.1 Cooperation in Slovakia

1. Ministry of Transport, Post and Telecommunications of the Slovak Republic, Bratislava
2. Ministry of Agriculture, Bratislava
3. Ministry of the Environment, Bratislava
4. Authority of Geodesy, Cartography and Cadastre, Bratislava
5. Geodetic and Cartographic Institute, Bratislava
6. Research Institute of Geodesy and Cartography, Bratislava
7. Railways of the Slovak Republic, Bratislava
8. Air Traffic Control Administration of the Slovak Republic, Bratislava
9. Geophysical Institute of the Slovak Academy of Science, Bratislava
10. Faculty of Mathematics and Physics of Comenius University, Bratislava
11. Dionýz Štúr State Geological Institute, Bratislava

VI.2 International Cooperation

1. Warsaw University of Technology, Poland
2. FÖMI - Satellite Geodetic Observatory, Penc, Hungary
3. Technical University of Budapest, Hungary
4. Technical University of Vienna, Austria
5. Faculty of Mining and Geology, Mining University, Ostrava, Czech Republic
6. Institute of Cartography and Geodesy, Frankfurt am Main, Germany
7. Czech Technical University, Prague, Czech Republic
8. Technical University of Brno, Czech Republic
9. Technical University of Dresden, Germany
10. Department of Geodesy and Geomatics Engineering, University of New Brunswick, Fredericton, Canada

VII. THESES

VII.1 Graduate Theses

No.	Student´s name	Title	Supervisor
1.	A. Bíziková	Variation of Position of Celestial Objects due to Change in the Coordinate System	L. Husár
2.	A. Bobáková	Adjustment of Horizontal Geodetic Network	J. Mičuda
3.	R. Cabala	Analysis of Quality of Satellite Signal Reception in Permanent GPS Observations	J. Hefty
4.	K. Gulášová	Estimated Soil-Ecological Unit Map Processing Using MicroStation Geographics and Utilization of GIS in Thematic Maps Production	P. Černý
5.	Z. Haba	Analysis of Accuracy of the Transformation of the WGS 84 to a Local Horizontal System Using Cartographic Projection	J. Melicher
6.	A. Hamran	Testing of Accuracy of the MARCH II E GPS Receivers	E. Bučko

7.	A. Holič	Representation of Spatial Information in Geoinformation Databases	I. Mitášová
8.	D. Horkulič	Building Special High-Accuracy Horizontal Geodetic Networks	J. Mičuda
9.	J. Hurbánek	Digital Bar-Code Levelling in the Slovak Levelling Network	J. Mitáš
10.	M. Igondová	Comparison of Accuracy of GPS Network Using Variance Component Estimates	J. Hefty
11.	M. Izing	Utilization of Horizontal Geodetic Networks for Land Stability Monitoring	J. Mičuda
12.	D. Javorček	Analysis of Measurements and Determination of Constants of the Circumzenithal CZ 50/500	L. Husár
13.	J. Kadera	Accuracy of Position and Quality of the Data in Geoinformation Databases	I. Mitášová
14.	A. Krivušová	Simultaneous Latitude, Longitude and Azimuth Determination Using Horizontal Angle and Time Measurements	L. Husár
15.	E. Lučaníková	Analysis of Accuracy of GPS Baseline and Position Measurements with Respect to Observation time	J. Melicher
16.	S. Lukáčik	Utilization of Geoinformation for Spatial Decision-Making	I. Mitášová
17.	M. Maráková	Transformation of Rectangular Geocentric Coordinates to Geodetic Ones	L. Husár
18.	Z. Mošaťová	Horizontal Geodetic Coordinate Systems in Current Practice	J. Mitáš
19.	J. Papčo	Monitoring Tectonic Movements in the High Tatra Mountains	M. Mojzeš
20.	A. Pósfayová	Tidal Effects in Global Positioning System Observations	J. Hefty
21.	R. Prvonič	Analysis of Spatial Data-Structure for GIS	I. Mitášová
22.	Z. Roháčeková	Adjustment of Geodetic Network Using GPS and Terrestrial Data	J. Mičuda
23.	R. Šrojta	Updating and Collecting Spatial Data for GIS Using GPS Methods	I. Mitášová
24.	P. Šulko	Local Vertical Movements of the Surface of the Earth	J. Mitáš
25.	M. Tanáč	Calibration of Some Astronomical Instruments and Devices	J. Melicher

IX. PUBLICATIONS

IX.1 Journals

[1] GALGONOVÁ, R., HEFTY, J.: Deformation Field of the Earth's Crust Based on the Result of the Central Europe Geodynamics Project. Kartografické listy 9, 2001, pp. 31 - 44 (in Slovak).
[2] HEFTY, J.: Possibilities of Improving Velocity Estimates of the CERGOP Campaigns. Reports on Geodesy 2 (57), 2001, pp. 71- 81.
[3] HEFTY, J.: The Permanent Modra-Piesok GPS Station and Its Long-Term and Short-Term Stability. Slovak Journal of Civil Engineering 1-2, Vol. 9, 2001, pp. 31-37.
[4] HEFTY, J., GALGONOVÁ, R.: Determination of Regional Surface Deformation on the Basis of Epoch Observations of GPS Satellites. Contributions to Geophysics and Geodesy, Vol. 31, 2001, pp. 101-102.
[5] CHALACHANOVÁ, J.: Elevation Analysis of Estimated Soil-Ecological Units based on a Digital Terrain Model. Kartografické listy 9, 2001, pp. 101-104 (in Slovak).
[6] MELICHER, J.: Precision Analysis of Position and Length Determination By Global Positioning System's Phase Observation. Reports on Geodesy 5 (60), 2001, 9 pp.
[7] MOJZEŠ, M., SCHENK, V., SLEDZINSKI, J., VYSKOČIL, P.: New Geodynamic Project "Czech-Polish-Slovak cross-border studies and regional geodynamics". Reports on Geodesy 2 (57), 2001, pp. 101-106.
[8] MOJZEŠ, M.: Seminar on Metrology in Geodesy. Geod. a kart. obzor 11, 2001, p.299 (in Slovak).
[9] ROTHACHER, M., BEUTLER, G., WEBER, R., HEFTY, J.: High-Frequency Variations of Earth Rotation From Global Positioning System Data. Journal of Geophysical Research, Vol. 106, B107, 2001, pp. 13711-13738.

IX.3 Conferences

[1] BUČKO, E., KORČÁK, P., VALACHOVIČOVÁ, L.: Develoopment of Parameters of the Hlohovec Length Baseline. Proceedings of the Seminar "Metrology in Geodesy". Bratislava, 2001, pp. 91-96.
[2] BUČKO, E., MIČUDA, J., MITÁŠ, J.: Vertical Variation of the Hlohovec Length Baseline. Proceedings of the Seminar "Metrology in Geodesy". Bratislava, 2001, pp. 97-100.
[3] BUČKO, E., KORČÁK, P., KUCHTOVÁ, M., MITÁŠ, J.: Geodetic Monitoring of the Pumped-Storage Power Plant Ipeľ. Proceedings of Seminar at 9th Slovak Geodetic Days, Bratislava, 2001, pp. 87-92 (in Slovak).
[4] ČIŽMÁR, J., HÁJEK, M., CHALACHANOVÁ, J., MITÁŠOVÁ, I.: Cartography and Geoinformatics at the Slovak University of Technology in Bratislava. E-Mail Seminar on Cartography. Cartographic Education 2000-2001, Sofia, 2001, pp. 83-92.
[5] HÁJEK, M., CHALACHANOVÁ, J., ČERŇANSKÝ, J.: Integration of Sources of Spatial Data for an Agricultural Database. 4th Agile Conference on Geographic Information Science. Masaryk University Brno, 2001, pp. 760-767.
[6] HEFTY, J., KOMORNÍKOVÁ, M., BOGNÁR, T.: Applications of ARCH and GARCH Time Series Analysis Methods in Study of Earth Rotation. JOURNEÉS 2000, Paris, Sept. 2000. Observatoire de Paris, 2001, pp. 271-276.

[7] HEFTY, J., PLÁNOVSKÝ, I.: GPS Antenna Phase Centre Position - New Problem of Metrology in Geodesy. Proceedings of the Seminar "Metrology in Geodesy". Bratislava, 2001, pp. 143-152 (in Slovak).
[8] HEFTY, J., GERHÁTOVÁ, Ľ., KÁRTIKOVÁ, H., PLÁNOVSKÝ, I.: Accuracy of Determination of Geocentric Coordinates Using Permanent GPS Stations. Proceedings of Conference at 50th Anniversary of Estabillishment of the Department of Surveying at SUT. Bratislava, 2001, pp. 263-272 (in Slovak).
[9] HEFTY, J., GERHÁTOVÁ, Ľ., KÁRTIKOVÁ, H.: Significance of Permanent GPS Stations in the Construction of the Geodetic Reference Frame. Proceedings of the Conference "Geodetic Network 2001" in Podbanské, Bratislava, 2001, pp. 36-46 (in Slovak).
[10] HUSÁR, L.: Calibrating of Theodolites. Proceedings of the Seminar "Metrology in Geodesy". Bratislava, 2001, pp. 131-136 (in Slovak).
[11] KUCHTOVÁ, M., MITÁŠ, J.: Metrological Support of Lengths at the Department of Theoretical Geodesy of SUT in Bratislava. Proceedings of the Seminar "Metrology in Geodesy". Bratislava, 2001, pp. 137-142 (in Slovak).
[12] JANÁK, J., MOJZEŠ, M.: Testing the Quasigeoid of Slovakia. Proceedings of the Conference "Geodetic Network 2001" in Podbanské, Bratislava, 2001, pp. 47-53 (in Slovak).
[13] MELICHER, J.: From Several Metres to Several Milimeter's Uncertainty. Proceedings of Conference at 50th Anniversary of Estabilishment of the Department of Surveying at SUT. Bratislava, 2001, pp. 227-232 (in Slovak).
[14] MELICHER, J.: Shift in Focal Distance and Its Effect on the Determination of Certain Parameters of Geodetic Instruments. Proceedings of the Seminar "Metrology in Geodesy". Bratislava, 2001, pp. 115-122 (in Slovak).
[15] MIČUDA, J., KORČÁK, P.: Methods of Calibrating Electronic Distancemeters on the Hlohovec Length Baseline. Proceedings of the Seminar "Metrology in Geodesy". Bratislava, 2001, pp.101-104 (in Slovak).
[16] MITÁŠOVÁ, I., IVÁNOVÁ, I., CHALACHANOVÁ, J.: Data Quality in Geoinformation Databases. Proceedings of the Seminar "Tasks of Geodesy and Cartography in the Formation and Administration of the Main GIS Database", Trenčín, 2001, pp. 37-44 (in Slovak).
[17] MOJZEŠ, M., GERHÁTOVÁ, L., ČUNDERLÍK, R.: Accuracy of Gravity Mapping of 1:25000 in Slovakia. Proceedings of the Seminar "Spatial Reference Frame in Czech Republic - Administration and Updating", Brno, 2001, pp. 80-85 (in Slovak).
[18] MOJZEŠ, M.: Calibration of a Relative Gravimeter. Proceedings of the Seminar "Metrology in Geodesy". Bratislava, 2001, pp. 153-162 (in Slovak).
[19] MOJZEŠ, M.: New Cartographic Projection of Slovakia. Proceedings of the Seminar "Tasks of the Geodesy and Cartography in the Process of Formation and Administration of the Main GIS Database", Trenčín, 2001, pp. 75-82 (in Slovak).
[20] MOJZEŠ, M.: Global Vertical Datum and the Possibilities for it's Realization. Proceedings of the Conference "Geodetic Network 2001" in Podbanské, Bratislava, 2001, pp. 125-128 (in Slovak).
[21] MOJZEŠ, M.: Current Tasks of Metrology in Geodesy. Proceedings of Seminar at the 9th Slovak Geodetic Days, Bratislava, 2001, pp. 55-58 (in Slovak).
[22] VANÍČEK, P., JANÁK, J., HUANG, J.: Mean Vertical Gradient of Gravity. Proceedings of the Gravity, Geoid and Geodynamics 2000 IAG International Symposium, International Association of Geodesy Symposia, Vol. 123, Springer-Verlag 2001, pp. 259-262.