DEPARTMENT OF THEORETICAL GEODESY

Head of the Department:
Assoc. Prof. Ján Hefty, PhD.

Tel.: + 421 2 52925 476
Fax: + 421 2 52925 476
E-mail: hefty@cvt.stuba.sk

I. STAFF

Professors		
Ján Melicher, PhD.	+421 2 59274 348	jan.melicher@stuba.sk
Associate Professors		
Ernest Bučko, PhD.	+421 2 59274 534	bucko@svf.stuba.sk
Ján Hefty, PhD.	+421 2 59274 533	jan.hefty@stuba.sk
Marcel Mojzeš, PhD.	+421 2 59274 536	mojzes@svf.stuba.sk
Jozef Mičuda, PhD.	+421 2 59274 344	
Senior Lecturers		
Peter Černý, PhD.	+421 2 59274 343	cerny@svf.stuba.sk
Ľubomíra Gerhátová, PhD.	+421 2 59274 344	lubomira.gerhatova@stuba.sk
Ladislav Husár, PhD.	+421 2 59274 531	ladislav.husar@stuba.sk
Jana Chalachanová, PhD.	+421 2 59274 297	jana.chalachanova@stuba.sk
Juraj Janák, PhD.	+421 2 59274 537	janak@svf.stuba.sk
Lecturers		
Peter Korčák	+421 2 59274 342	korcak@svf.stuba.sk
Ľubica Valachovičová	+421 2 59274 342	lubica.valachovicova@stuba.sk
Ivana Ivanová	+421 2 59274 297	ivanova@svf.stuba.sk
Research Fellows		
Renáta Ďuráčiová, PhD.	+421 2 59274 297	galgon@space.vm.stuba.sk
Miriam Bunčiaková	+421 2 59274 270	kuchtova@svf.stuba.sk
Ivan Plánovský	+421 2 59274 538	planovsk@svf.stuba.sk
Technical Staff		
Miroslav Bednár	+421 2 59274 270	
Mária Eisenbergová	+421 2 59274 341	eisenber@stuba.sk
Katarína Igondová (secretary)	+421 2 59274 535	k_igondova@svf.stuba.sk
Doctoral Students		
Miroslava Igondová	+421 2 57294 339 (Mýtna ul., 4.p.)	igondova@svf.stuba.sk
Juraj Papčo	+421 2 59274 345	papco@svf.stuba.sk
Marián Kováč	+421 2 57294 339 (Mýtna ul., 4.p.)	kovac_m@pobox.sk
Vladimír Stromček	+421 2 59274 297	stromcek@svf.stuba.sk
Michal Hrčka	+421 2 57294 339 (Mýtna ul., 4.p.)	hrcka@svf.stuba.sk

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, and 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, Scintrex CG2
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. Chalachanová

Errors and Survey Adjustment Theory I.	3	3 – 2	J. Hefty
Errors and Survey Adjustment Theory II.	4	2 – 2	J. Hefty
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	M. Mojzeš
Geometric Geodesy II.	6	3 – 3	M. Mojzeš
Field Education in Geodetic Controls	6	2 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	Ľ. Gerhátová, J. Janák
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. 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.
3. Geodetic Monitoring of Deformations of the Earth's Surface. VEGA Project 1/8251/01. Leader: Assoc. Prof. Marcel Mojzeš, PhD.
4. 5th Framework Program: Contract No. EVK2-CT-2002-00140, "CERGOP-2/Environment". National coordinator: Assoc. Prof. Marcel Mojzeš, 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.	T. Bacigál	Least Squares Spectral Analysis and Its Applications in Geodesy	J. Janák
2.	J. Blaško	Quality Analysis of Differential Corrections for DGPS	J. Hefty
3.	D. Danko	Continuity Assessment of the Operation of Permanent GPS Stations	J. Hefty
4.	J. Ferko	Determination of the Geoid to Quasi-Geoid Differences in Slovakia	M. Mojzeš
5.	M. Hrčka	Analysis of a Long-Term Time Series of Position Variations	J. Hefty
6.	M. Húšťava	Specialised Database Analysis	J. Chalachanová
7.	M. Katrenčík	Use of the Global Positioning System (GPS) for Horizontal Geodetic Networks	J. Mičuda
8.	J. Maták	Determination of the 3-D Location of the Pillars of the Top of the Faculty Building, Using Spatial and Terrestrial Measurements	L. Husár
9.	V. Minarech	Use of Computation Mathematics for Determination of a Gravimetric Geoid	J. Janák
10.	M. Mrava	Determination of the Quasi-Geoid from Integrated Measurements in the Dubník Area	L. Husár

11.	T. Németh	Relative Positioning Using Global Positioning System (GPS) with an Analysis of the Troposphere and Ionosphere	J. Melicher
12.	R. Pauli	Analysis of the Accuracy of Polynomial Transformations	J. Hefty
13.	V. Pelech	Use of Effective Algorithms in Applied Software Programming	P. Černý
14.	I. Predmerská	Adjustment of a Horizontal Geodetic Network	J. Mičuda
15.	V. Stromček	Proposed Object-Oriented Model of a System for Evidence and Administration of an Oil Conduit Network	Ľ. Gerhátová
16.	M. Tomko	Spatial Databases for Mobile GIS Applications	E. Bučko
17.	P. Zdráhal	Thematic Modelling of Land	J. Chalachanová

IX. PUBLICATIONS

IX.1 Journals

[1] VANÍČEK, P. – JANÁK, J. – FEATHERSTONE, W.E.: Truncation of Spherical Convolution Integrals with an Isotropic Kernel. Stud. Geophys. Geod., 47, 2003, pp. 455-465

[2] HEFTY, J. – DURACIOVA, R.: Stochastic Properties of Deformation Characteristics Obtained from GPS Site Velocities. Reports on Geodesy, 1 (64), 2003, pp.33-40

[3] PLÁNOVSKÝ, I. – HEFTY, J.: GPS Antenna Phase Centre Position: Precision, Accuracy and Time Variability. Reports on Geodesy, 2 (62), 2002, pp. 7-15

[4] CZARNECKI, K. - MOJZEŠ, M. - PAPČO, J. - WALO, J.: First Results of GPS Measurement Campaigns in the Tatra Mountains. Reports on Geodesy No.1 (64), 2003, pp. 41-46

[5] TENZER, R. – JANÁK, J.: Stokes-Helmert Scheme for Precise Geoid Determination. Revista Cartográfica 74-75, 2002, pp. 135-145

[6] HUSÁR, L.: Discussion about the Shape of a Mean Error Curve. Geodetický a kartografický obzor 49/91 No. 4, 2003, pp. 61-66 (in Slovak)

[7] IVANOVÁ, I. – CHALACHANOVÁ, J.: Data Quality – Principles, Assessment Methods and Documentation. Geodetický a kartografický obzor, Nos. 7-8, 2003, pp. 154-157 (in Slovak)

[8] HEFTY, J. – IGONDOVÁ, M.: Tidal Effects of Site Coordinates Determined by the Global Positioning System: Theory and Observational Evidence. 5th Slovak Geophysical Conference Abstracts. Contributions to Geophysics and Geodesy. Vol. 33, Special issue. 2003, pp. 81-82

[9] MOJZEŠ, M.: Transformation of Gravity Reference Systems. 5th Slovak Geophysical Conference Abstracts. Contributions to Geophysics and Geodesy. Vol. 33, Special issue. 2003, p. 78

[10] MOJZEŠ, M. – ČUNDERLÍK, R. – GERHÁTOVÁ, Ľ. – JANÁK, J. – PAPČO, J.: Test of the Accuracy of a Digital Elevation Model in the Area of Slovakia. 5th Slovak

Geophysical Conference Abstracts. Contributions to Geophysics and Geodesy. Vol. 33, Special issue. 2003, p. 79

[11] MOJZEŠ, M. – GERHÁTOVÁ, Ľ.: Test of the Accuracy of Detailed Gravity Mapping in the Area of Slovakia. 5th Slovak Geophysical Conference Abstracts. Contributions to Geophysics and Geodesy. Vol. 33, Special issue. 2003, p. 80

[12] GERHÁTOVÁ, Ľ. – MOJZEŠ, M. – JANÁK, J. – PAPČO, J.: A Closer Look at the Second Term of the Molodenskij Series. 5th Slovak Geophysical Conference Abstracts. Contributions to Geophysics and Geodesy. Vol. 33, Special issue. 2003, p. 83

IX.2 Books and Textbooks

[1] HEFTY, J. – HUSÁR, L: Satellite Geodesy, Global Positioning System. Bratislava, STU, 2003, 188 pp. (in Slovak)

IX.3 Conferences

[1] KENYERES, A. – BOSY, J. – BROCKMANN, E. – BRUYNINX, C. – CAPORALI, A. – HEFTY, J. – JIVALL, L. – KOSTERS, A. – POUTANEN, M. – FERNANDES, R. – STANGL, G.: EPN Special Project on Time Series Analysis, Preliminary Results and Future Prospects. EUREF Publication No. 10, eds. J.A. Torres and H. Hornik, pp. 72-75

[2] HEFTY, J. – KÁRTIKOVÁ, H. – KOVÁČ, M.: Methods of the Analysis of the Results of Permanent GPS Station Measurements. Proceedings of GPS Data Processing conference, Brno, 2003, pp. 16-22 (in Slovak)

[3] GERHÁTOVÁ, Ľ. – HEFTY, J.: Integration of GPS and Terrestrial Measurements. In: Proceedings of GPS Data Processing conference, Brno, 2003, pp. 83-87 (in Slovak)

[4] HEFTY, J.: Tidal Variations of Station Coordinates Observed in a Regional GPS Network. Journees 2001 Systemes de reference spatio-temporels. Brussels, Observatoire Royal Belgique, 2002, pp. 201-206

[5] MOJZEŠ, M.: Test Accuracy of Detailed Gravity Surveys in the Area of Slovakia. Proceedings of workshop on Analytical Representation of Potential Field Anomalies for Europe (AROPA). Munsbach Castle, Luxembourg 2003, pp. 105-108

[6] MOJZEŠ, M. – HEFTY, J. – PAPČO, J. – GERHÁTOVÁ, Ľ.: Realization and Processing of Measurements on the Hlohovec Baseline. In: Proceedings of the GPS Data Processing conference, Brno, 2003, pp. 88-96 (in Slovak)

[7] CHALACHANOVÁ, J.: Conceptual Model of the Kočín Geo-Data and Its Application in Agriculture. In: Proceedings of conference on Info-Systems for Agriculture and Forestry, SEČ 2003, Czech Republic, p. 100 (in Slovak)

[8] TENZER, R. – NOVÁK, P. – JANÁK, J. – HUANG, J. – NAJAFI, M. – VAJDA, P. – SANTOS, M.: A Review of the UNB Approach to Precise Geoid Determination Based on the Stokes-Helmert Method. Honoring the academic career of Petr Vaníček. Ed. M. Santos. Department of Geodesy and Geomatics Engineering, Technical Report No. 218, University of New Brunswick, Fredericton, N.B., Canada, 2003, pp. 132-176

[9] MIKUŠKA, J. – MARUŠIAK, I. – JANÁK, J. – PAŠTEKA, R.: Distant Terrain and Its Effect on the Bouguer Gravity Anomaly. Proceedings of the 1st Workshop on International Gravity Field Research, Graz, 2003, pp. 59-69

[10] HEFTY, J. – IGONDOVÁ, M. - GERHÁTOVÁ, Ľ – KOVÁČ, M.: Modeling the Troposphere and Ionosphere Using Continuous GPS Observations. In: Proceedings of the conference on the Importance of Spatial Methods for Today's Geodesy. SvF STU, Bratislava, 2003, pp. 139-146 (in Slovak)

[11] MOJZEŠ, M. - HUSÁR, L. - JANÁK, J. - PAPČO, J.: Comparison of Astronomic and Gravimetric Vertical Deflections in the Tatra Mountains. In: Proceedings of the conference on the Importance of Spatial Methods for Today's Geodesy. SvF STU, Bratislava, 2003, pp. 63-72 (in Slovak)

[12] MELICHER, J.: Spatial Geodesy in the Second Half of the Twentieth Century. In: Proceedings of Conference on the Importance of Spatial Methods for Today's Geodesy. SvF STU, Bratislava, 2003, pp. 9-26 (in Slovak)

[13] HUSÁR, L.: Inertial Coordinate Systems in Geodesy. In: Proceedings of Conference on the Importance of Spatial Methods for Today's Geodesy. SvF STU, Bratislava, 2003, pp. 103-111 (in Slovak)

[14] IVANOVÁ, I. – CHALACHANOVÁ, J. – VALACHOVIČOVÁ, Ľ. – FENCÍK, R.: Notes on Particular Geoinformatic Technical Terms. In: Proceedings of Seminar on Geographic Information – Terminology in Norms ISO (2002-2003), Geographic Institute of the Slovak Academy of Science, Bratislava 2003, pp. 59-62 (in Slovak)