

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, 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 a 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:	TRIMBLE5700 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. Application of Effective Methods for Solving Boundary Value Problems in Geodesy. VEGA Project 1/1433/04. Leader: Assoc. Prof. Marcel Mojzeš, PhD.
2. Monitoring and Analysis of Short-Term Variations in Positions Using Global Navigating Systems. VEGA Project 1/1033/04. Leader: Assoc. Prof. Ján Hefty, PhD.
3. Standardization and Inter-Operability of Geographical Information. VEGA Project 1/1035/04. Leader: Jana Faixová-Chalachanová, 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.	M. Beliansky	Analysis of the Processing of Digital Terrain Models	J. Chalachanová
2.	J. Bezručka	Ionosphere Modelling from Permanent GPS Measurements	J. Hefty
3.	J. Bokesová	Proposed Database Structure in Context of Building National Spatial Infrastructure	J. Chalachanová
4.	M. Both	Determination of GPS Differential Corrections by Surface Interpolation	J. Hefty
5.	M. Danišová	Using Tensors and Tensor Calculus in Geodesy	J. Janák
6.	B. Droščák	Joint Analysis of Angular Measurements in National Astronomical-Geodetic Network and National Trigonometric Network of the 1st Order Using GPS Measurements	J. Hefty

7.	Z. Fašková	Joint Processing of Terrestrial and Satellite Measurements	E. Gerhátová
8.	J. Furdek	Analysis of Gravity Mapping	E. Gerhátová
9.	L. Galbavý	Testing the Reliability and Integration of Heterogeneous Data for GIS	P. Černý
10.	J. Gallo	Dynamic Modelling of Objects in Geo-Space	J. Chalachanová
11.	D. Hanus	Accuracy Analysis of Distance and Position Measured by GPS Phase Measurements in Relation to Observation Time	J. Melicher
12.	Š. Kolštrum	Estimation of Parameters of Local GPS Network	E. Bučko
13.	L. Lubinová	Determination of Gravitational Disturbances in the Earth's Orbit Using Numerical Methods	L. Husár
14.	V. Murcin	Determination of Astronomical Deflections of the Vertical in the Sub-Tatra Region	L. Husár
15.	M. Petreková	Possibilities of Using Visual Modelling and Object-Oriented Analysis for Realisation of Complex Information Systems	J. Chalachanová
16.	P. Pitoňák	Effective Algorithms and Construction of Application Software Equipment	P. Černý
17.	P. Podolan	Evaluation of Repeated Measurements at the Hlohovec Baseline	E. Bučko
18.	M. Roháček	Terrain Correction and Its Practical Determination	J. Janák
19.	M. Šimek	Geometry on Curved Reference Surfaces in Geodesy	L. Husár
20.	J. Valach	Computer Subroutine for Generation of Errors with a Quasi-Normal Distribution	P. Černý
21.	M. Záhorská	Orientation of Geodetic Network Using Space Geodesy	J. Melicher

IX. PUBLICATIONS

IX.1 Journals

- [1] HEFTY, J. - KOVÁČ, M. - IGONDOVÁ, M.: Integration of Epoch-Wise GPS Measurement Campaigns into a Permanent Reference Frame. *Acta Geodynamica et Geomaterialia*. Vol. 1, No. 3 (135), 2004, pp. 125-131.
- [2] MOJZEŠ, M. - PAPČO, J.: The Analysis of GPS Measurements in the Tatra Mountains. *Acta Geodynamica et Geomaterialia*. Vol. 1, No. 3 (135), 2004, pp. 115-124.
- [3] ČUNDERLÍK, R. - MIKULA, K. - MOJZEŠ, M.: A Comparison of the Variational Solution to the Neumann Geodetic Boundary Value Problem with the EGM96 Geopotential Model. *Contributions to Geophysics and Geodesy*, Vol. 34, No. 3, 2004, pp. 209-225.
- [4] HEFTY, J. - IGONDOVÁ, M.: Activities of the EUREF Local Analytical Center at the Slovak University of Technology in Bratislava. *Geodetický a kartografický obzor*, 50 (92), 4-5/2004, pp. 79-90 (in Slovak)

- [5] MOJZEŠ, M. - HUSÁR, L.- JANÁK, J.- PAPČO, J.- CZARNECKI, K.- BARLIK, M.- BOGUSZ, J.- WALO J.: Testing a Gravimetric Quasigeoid by Astronomical Measurements. Reports on Geodesy No.2 (69), 2004, pp.157-166.
- [6] MOJZEŠ, M. - PAPČO, J. - CZARNECKI, K.- WALO J.: Evaluation of Six Year GPS Epoch Campaign Measurements in the Tatra Mountains. Reports on Geodesy No.2 (69), 2004, pp.189-196.
- [7] CZARNECKI, K. - MOJZEŠ, M.: Geodynamics of the Tatra Mountains (WP10.5). Progress Report. Reports on Geodesy. WUT IGGA No.2(69), 2004, pp. 89-94.
- [8] HEFTY, J. - GERGÁTOVÁ, Ľ.- IGONDOVÁ, M.- KOVÁČ, M.- HRČKA, M.: The Network of Permanent GPS Stations in Central Europe as a Reference for CERGOP Activities. Reports on Geodesy No.2 (69), 2004, pp.115-123.
- [9] HEFTY, J.: GPS Data Analysis and the Definition of the Reference Frame (WP5). Reports on Geodesy, 2 (69), 2004, pp. 33-37.
- [10] HEFTY, J.: Geokinematical Modelling and Strain Analysis (WP7). Reports on Geodesy, 2 (69), 2004, pp. 51-54.
- [11] HEFTY, J.: GPS Data Analysis and the Definition of the Reference Frame, Activity Report April 2004 – September 2004. Reports on geodesy, 4 (71), 2004, pp.35 – 38.
- [12] HEFTY, J.: Geokinematical Modelling and Strain Analysis. Activity Report April 2004 – September 2004. Reports on Geodesy, 4 (71), 2004, pp.39 – 42.
- [13] KORČÁK, P. - ONDRÁŠIK, R. - VÁZAL, V.: Geodetic Monitoring of Neo-Tectonic Stability at Site of Planned Pumped-Storage Power Plant Ipeľ. Slovenský geodet a kartograf, 3/2004, pp. 23-31. ISSN 1335-4019 (in Slovak)
- [14] IVANOVÁ, I.: 18. General Assembly of CEN/TC 287 – Geographical Information. Normalizácia 6/2004, pp.23-25 (in Slovak)

IX.2 Books and Textbooks

- [1] HEFTY, J.: The Global Positioning System in Four-Dimensional Geodesy. Bratislava, STU, 2004, 112 p., ISBN 80-227-2027-5 (in Slovak)

IX.3 Conferences

- [1] MOJZEŠ, M.: New Cartographic Projection of Slovakia. In: Present Status and Development of Geodetic Networks. VUT Brno 2004, pp.75-84 (in Slovak)
- [2] HEFTY, J. - KOVÁČ, M.: Detections of Intra-Plate Movements in Slovakia and Their Role in the Realisation of Reference Systems. In: Present Status and Development of Geodetic Networks. VUT Brno, 2004, pp. 60 – 68 (in Slovak)
- [3] KOVÁČ, M.: Computer Processing of GPS Measurements in the Case of Combined Geodetic Networks. In: Juniorstav 2004, VUT Brno, p. 371 (in Slovak)
- [4] IGONDOVÁ, M.: Modeling of Troposphere and Ionosphere Based on Permanent GPS Observations. In: Juniorstav 2004, VUT Brno, p. 367 (in Slovak)
- [5] PAPČO, J.: First Results of GPS Measurement Campaign in the Tatra Mountains. In: Juniorstav 2004, VUT Brno, p. 377 (in Slovak)

- [6] KOVÁČ, M. - HEFTY, J.: Universal Software for Modelling, Processing and Adjustment of Heterogeneous Multi-Epoch and Permanent Geodetic Observations. Proceedings of the INGEO 2004 Conference. Bratislava, 2004. On CD, ISBN 87-90907-34-5.
- [7] CHALACHANOVÁ, J.: Using a Geo-Information Model for Revitalisation of an Agricultural Region. In: Land Consolidation. Chamber of Land Consolidation and Ministry of Agriculture, Nitra 2004 (in Slovak)
- [8] CHALACHANOVÁ, J. - GALLO, J.: Time-Space Geo-Information Systems. In: Activities in Cartography 2004, GÚ SAV Bratislava 2004, pp. 23-30 (in Slovak)
- [9] FAŠKOVÁ, Z. - GERHÁTOVÁ, Ľ.: Joint Processing of Terrestrial and Satellite Data. In: Proceedings of the MaGia Mathematical Seminar, Kočovce 2004, STU Bratislava, pp. 50-59.
- [10] JANÁK, J. - MIKULA, K. - MINARECH, V.: Multiscale Stabilisation Procedure for the Inverse Dirichlet Problem. In: Proceedings of the MaGia mathematical seminar, Kočovce 2004, STU Bratislava, pp. 61-67.