DEVELOPMENT AND STATE OF PHOTOGRAMMETRY, REMOTE SENSING AND GIS IN LITHUANIA

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ABSTRACT

The National Report of the Lithuania submitted by the Lithuanian Committee for Photogrammetry and Remote Sensing outlines activities and development in photogrammetry, remote sensing, GIS, digital mapping, education and research during the period 1996 - 2000. The involvement of various organisations is described including governmental institutions, non-government organisations, private companies, consultancy services and users. Collection of information has been made sending questionnaires to organisations involved in photogrammetry or remote sensing, GIS, summarising material from various professional meetings, seminars, conferences, published papers and personal knowledge of activities. In Lithuania during the congress period resulting rapidly changes of techniques with render help of foreign supporters there has been made considerable changes applying automated digital systems that give new possibilities for mapping.

1. INSTITUTIONS

The Lithuanian Society for Photogrammetry and Remote Sensing is the adhering body to the International Society for Photogrammetry and Remote Sensing and is a not-profit organisation as well as is not funded by any institution, existing solely for the purpose of advancement the profession knowledge in the field of Photogrammetry and Remote Sensing, GIS. The National Society was founded in 1992 and has currently about 20 members. This rather small membership is characteristic of a small country, which for many years was incorporated to Soviet Union and photogrammetric practice was determined by the Russian Survey. The number of private companies and other institutions active in photogrammetry has not increased considerably during the last years (currently 8). Photogrammetry and Remote Sensing applications are rather limited in Lithuania, because of finance stage in a small country. After restoring the Independence in 1990, Lithuania has gained support from several countries of the Europe (Switzerland, Norway, Swedish, Denmark, France, etc.) for development photogrammetry.

Vilnius Gediminas Technical University has been organised the annual Republican as well as every two years International conferences “Civil Engineering and Geodesy” where investigate Photogrammetry, Remote Sensing, GIS application techniques, theoretical approaches with publishing proceedings. Journals “Geodesy and Cartography” and “Land Planning and Reclamation” are scientific issues where can be included the achievements of photogrammetry science in Lithuania.

2. PHOTOGRAMMETRY, REMOTE SENSING, GIS

The main photogrammetric - cartographic institution is the private joint - stock company Institute of Aerophotogeodesy situated in the town Kaunas. There stereophotogrammetric mapping has been carried out by Leica analytical photogrammetric instruments *SD 2000*, processing of aerial triangulation networks has been done using software *PATB-RS GPS.* Two Digital Photogrammetric Workstation *Intergraph SOCET SET (Helava-Leica Gde Systems)* are used for production of digital orthophoto maps, for renewal topographical maps, etc. Nowadays digital orthophoto maps at a scales of 1: 10 000 and 1:50 000 cover about 80% of Lithuania’s territory.

The National Centre of Remote Sensing and Geoinformatics (State Enterprise GIS-Centre) was established in 1992. Fields of activity: digital cartography, GIS databases, GIS software, consulting and training. There by use software *Arc/Info, Arc/Info NT, ArcView, GeoVektra, EasyTrace, Erdas* Imagine have been created such products:

- Georeference database *GDB200;*
- Digital database of Lithuania satellite map at scale 1:50000 (*LTDBK50000-V*);
- Digital orthophotos *ORT10LT*;
- Digital relief information (at different scales);
- Digital elevation models (DEM’s);
- Large scale databases.

The joint private company Lithuania-Iceland HNIT-BALTIC GeoInfoService (HB-GIS) was founded at the end of 1993. Sphere of companies activity are introduction of GIS systems, consultation, production activity for exploitation of communication networks, application GIS in cadastre and real estate registration, GPS usage in geodesy or photogrammetry. There are working 28 high qualification specialists in the digital cartography and GIS fields. HB-GIS is distributor of software *ARC/INFO*^{TM}*, SDE*^{TM}*, ARCVIEW*^{TM}, *GeoVektra* and representative of ESRI Inc. (Redlands, USA), software developers for satellite images analysis and treatment *TRIMBLE* Navigation (Sunnyvale, USA) and *ERDAS* (Atlanta, USA), *HNIT hf*. (Iceland). Hardware is local computer network, working stations *SUN, Hewlett-Packard UNIX* and *PC Pentium II/III*; geodetic instruments *Pathfinder Pro XRS GPS, Wild T1000.*

The private company CAD&F ProjectService mostly is working for preservation of architectural heritage. There on the basis of terrestrial photography are established 3D reference digital models for various architecture monuments using *CAD-Sprit* system, etc. The photogrammetric station *SD -2000* and computerised *Wild* autograph *A8* have been implemented for compiling photogrammetric, GIS projects in Lithuania and other countries. There was constructed the digital map of city Vilnius for old town region on the basis of aerial photography at a scale of 1:3 500 .

In Geodesy Institute of Vilnius Gediminas Technical University had been established the digital photogrammetry laboratory. There by use aerial photographs at a scale of 1:6 000 have been constructed basic digital reference map at a scale of 1:1000 for city Vilnius. The laboratory is equipped by two computerised Wild autograph *A8*, etc. Aerial triangulation has been carried out by computerised *Stecometer* under use of Norwegian software *NLHBUNT*. The computerised photogrammetric instruments stereosimplex *IIc* and stereocomparators *Steco 1818* are devoted for education and training.

The private company ALNA is the leading information technology company in Lithuania and provides the software design services, computer hardware maintenance, GIS training. ALNA is oriented to design, to integrate the complex of information systems as well as it is representative of Z/I Imaging corporation (combined the Intergraph Photogrammetry and Remote Sensing subdivision with Carl Zeiss Photogrammetry and Aerial Reconnaissance subdivision).

3. EDUCATION

The extensive changes have been done in educational structures during last ten years of Lithuania independence. Three universities (Vilnius Gediminas Technical University, Agriculture University, State University) provide full or partial education in photogrammetry. Trainining in photogrammetry is the concern mainly in the Faculty of Environment Engineering at the Vilnius Gediminas Technical University. There about 50 students of Geodesy and Real Estate Cadastre specialities take up respective studies for Dip. Eng. and MSc. degrees each year. During the last time two doctoral theses in photogrammetry have been accepted. Photogrammetry is also taught in other three technical schools in the country.

The Surveying education in Lithuania should be improved by implementing of new technologies, particularly in the field of Digital Photogrammetry and Remote Sensing, acquiring of Photogrammetric Digital Workstations and contemporary literature, gaining knowledge in the well-known institutions.