POLISH SOCIETY FOR PHOTOGRAMMETRY AND REMOTE SENSING (PTFiT)

NATIONAL REPORT 1996-2000

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ABSTRACT

The National Report of Poland describes the current state, undertaken activities and new development in photogrammetry and remote sensing during the period 1996-2000.

1. INTRODUCTION

The main factor that influenced the development of photogrammetry and remote sensing in Poland during the period 1996-2000 was taking the aerial photos covering almost the whole area of Poland. The aerial photos become relatively easily accessible. The state owned and private companies have purchased modern photogrammetric equipment and become proficient in photogrammetric digital technology. The state and local government have ordered production of orthophotomaps in different scales, as well as DTM for the needs of highway construction.

2. SOCIETY

Two main professional organizations for photogrammetry and remote sensing are active in Poland:
POLISH SOCIETY OF PHOTOGRAMMETRY AND REMOTE SENSING (PTFiT) - is the scientific section of POLISH GEODETIC ASSOCIACION (SGP). The activity of PSPRS began in 1930. In 1984 PSP took name PSPRS. The area of activity of PSPRS is Poland PSPRS continues the activity of PSP, which was interrupted in 1939.
The aims of PTFiT are:
a) Activity in the field of photogrammetry and remote sensing together with various technical applications,
b) Popularization and promotion of photogrammetric and remote sensing methods in different scientific and technical fields,
c) Exchange, publication and circulation of information within the country and abroad.

The supreme authority of the Society is the General Assembly. The General Assembly consists of all members of the Society, and every three years the President and, by the separate voting, the Council of the Society is elected.
The number of specialists in the Society is about 150. PTFiT is a member of the Main Technical Organization in Poland (NOT - it is federation of scientific, and technical associations).
Legislative basis of the professional activities of PTFiT is statues law issued 27 October 1932 (Dz.U.R.P. Nbr 94, poz.808) and amended 9 June 1982 (M.P. NR 17, poz.144).
Main Technical Organization (NOT) and Polish Geodetic Association (SGP) have established the awards (monetary grant) to the author of outstanding merit also on photogrammetry, photointerpretation or remote sensing.
POLISH GEOGRAPHICAL SOCIETY (PTG) - THE CLUB FOR REMOTE SENSING SPECIALISTS is active in Poland on the basic of PTG Statutes.
The objective of the Club is the activity on photointerpretation field particularly for searching geographical environment. The number of members of the Club is about 30. They are members of PTG.
Polish Society of photogrammetry and Remote Sensing and The Club for Remote Sensing Specialists of Polish Geographical Society established a common consulting body to improve the cooperation.
Actual changes in the professional activity of photogrammetry and remote sensing specialists as well as changes within the organization of associations will possibly change the number of members as PTFiT as The Club for Remote Sensing Specialists of PTG.

3. RESEARCH AND DEVELOPMENT

The following research projects have been undertaken at the research institutions

a) The University of Mining and Metallurgy (AGH) in Krakow
- Digital atlas of Krakow Province as a part of Malopolski Land Information System
- Orthophotomap 1:30000 of Krakow region compiled of the satellite and aerial images of various spatial resolution
- Application of satellite images for delimitation of the over-moisture areas within the 1997 flood
- Removal of topographic effect from remote sensing data for thermal inertia modeling
- Airport mapping using aerophotogrammetry
- Methods of digital maps and images improvement for spatial analysis within the Geographical Information Systems
- Application of Geographical Information Systems for modeling of expected environment degradation
- Remote sensing methods in monitoring of slopes in the open pits
- Digital Orthophoto as a base for updating of land information system for planning and for the decision support
- Recording of historical monuments with the use of non metric and digital cameras, digital stereoplotter VSD-AGH and other digital photogrammetry procedures, as an element of land information system
- Processing of digital images for the needs of recording of historic wall paintings
- Analysis of usability of small digital cameras for precise measurements
- Photogrammetric monitoring of performance of cooling towers
- Photogrammetric monitoring of performance of 80-meter high mining tower, and boring towers
- Improvements in photogrammetric determination of geometric parameters of constructions and industrial installations being requisites for safe use
- Surveying approach to decoration of cooling tower
- Methods of stay ropes tensity control and correction
- Analysis of methods of photogrammetry and remote sensing popularization in the XXI Information Society
- Analysis of trends of development in photogrammetry and remote sensing

b) The Warsaw University of Technology
- The concept and the pilot experiment, concerning creation of GIS database for country planning of the selected region.
- Implementation of close range methods, particularly Moire topography, to orthopedic diagnosis and ergonomy. Project within the Governmental Research Program.
- Participation in PRONET CCE 'Multimedia Computer Based On-line Training and Support Service for Professionals in Countries of Central Europe. IV EU Frame Programme.
- Participation in EU Program on ' The European Geographical Soil Database 1:1000000.
- Participation in EU Project on 'Development of the Soil Digital database for the area of the Odra basin at the scale 1:250000.
- Application of GIS and Remote Sensing to planning and management of natural resources. Project in cooperation with Swedish Institute, Stockholm.
- Modellisation de la reflectance des sols cultives et son application a la teledetection et aux Systemes d'Information Geographique. Project within Leonardo da Vinci Programme, GDTA Toulouse.
- The use of radar imagery in Agriculture. Cooperation with the Agricultural Technical Academy, Olsztyn.
- Development of digital photogrammetric methods for documentation of architectural monuments and Studies on 3D buildings visualization.
- Involvement in DTM implementation in Poland.
- Use of Phodis OP for production of orthophotos to be utilized for different special applications.

c) The Warmijsko-Mazurski University in Olsztyn
- OEEPE Test "Automatic Orientation of Aerial Images on Database Information" (Automatic and Semi-Automatic Exterior Orientation Using Existing Vector Map Data; Matching orthoimages and direct determination of exterior orientation elements)
- OEEPE - ISPRS Test " Performance of tie point extraction in automatic aerial triangulation"
- Accuracy analysis of digital elevation model and orhophoto.
- Construction and testing of digital video-thermal system and study of possibility of its application in the technical and natural environment

- The procedure of creation of geographic information system for Olsztyn-Kaliningrad Economical Zone
- Usefulness of Coherence and Amplitude SAR data in Land Cover Mapping (COH-AMP)

d) Institute of Geodesy and Cartography in Warsaw, Photogrammetry Department
- Technology for scanning color aerial photographs on PS-1 Zeiss
- Technology for semi -automatic digital Aerial Triangulation with DGPS-data
- Technology for Digital Aerial Triangulation with DGPS data
- Technology for merging and contrast adjustment of orthophotographs
- Methods for automatic filtering of DEM - Ph.D. Thesis

e) Remote Sensing and Spatial Information Centre of the Institute of Geodesy and Cartography in Warszawa:
- Methodology of production of satellite image maps in scales 1:100 000 and 1:50 000 on the basis of IRS-1C PAN and LISS-III data (maps at the scale 1:50 000 have been produced by merging the high-resolution panchromatic data with multispectral data)
- Crop Condition Assessment System for Poland with the use of various satellite imagery (in collaboration with the Canada Centre for Remote Sensing)

4. EDUCATION

Photogrammetric education for geodesists and surveyors is given in Poland in the following three levels:
1) High school or technical college - for Survey Technicians
2) Post high school education of 4 years for Bachelor of Surveying (technology level)
3) University of 3.5 years for Engineer of Surveying and of 5 years for Master of Surveying.

The primary and middle level of photogrammetry is provided at 287 technical schools. The University education in the field of surveying and geodesy is provided at 2 technical universities and at 3 agricultural universities and at the military academy. There is one faculty devoted purely to geodesy and cartography, and others combine geodesy with environmental protection, meteorology or drainage other agricultural specializations. Yearly, about 500 students begin study in all above-mentioned universities. But only about 30 students specialize in photogrammetry and remote sensing, and only 15 students is graduated yearly. The scope of photogrammetric education is carefully adjusted to fulfill the needs of passive and active photogrammetrists. Also foreigners are educated at the university level. We have students from some Asiatic and African countries.
In the last years the curricula and laboratory training switched to fully analytical and digital methods. The developed at AGH digital stereoplotter VSD is easily available and allows for individual training in stereoplotting.
The photogrammetric and remote sensing university and research stuff is following: 6 professors, 5 associate professors, and 35 doctors.
The university studies in geology, cartography and geography include photogrammetry and remote sensing courses also.

5. APPLICATIONS

5.1 Aerial photographs

In the years 1995 - 1998 the entire territory of Poland has been covered with new aerial photographs. The aerial photography campaign was a part of a PHARE sponsored LIS for Poland project. Out of 312 000 sq. km of the country's territory about 283 000 sq. km have been covered in the scale 1: 26 000. Additionally, largest cities have been photographed in the scale 1: 5 000. For taking the photos the modern aerial cameras like RC-20, RC-30, LMK-2000, LMK-3000 with focal length 152 mm and FMC have been used. End lap was 61% and side lap from 25% to 33%. Photographs were taken mostly in North - South direction (for South part of Poland the fly direction was East-West) with the use of CCNS navigation system supported by GPS technique for precise navigation. Aerial photographs have been taken on Kodak Aerochrome MS 2448 color diapositive aerial film from high 4200 m. Aerial films have been developed on the HOSTERT Fotomata Aerial Film Processor using EA-5 and AR-5 process. The aerial photos are stored in Documentation Center in Warsaw and distributed mainly in a digital form.

5.2 Aerotriangulation

Aerotriangulation based on digital photos scanned with resolution 1000-2000 dpi was mostly used. Control points were surveyed by GPS method. For adjustment of aerotriangulation the following software were used: PAT-MR INPHO, Intergraph Image Station and Bingo. Technology has been implemented and applied by a few photogrammetric companies.

5.3 Orthophoto projects

Several orthophoto projects have been accomplished with the use of PHARE and other photos. They range from producing large-scale color orthophotomaps for a town (ex. Warsaw, Katowice) in scales 1:1000, 1:2000 from aerial photos 1:5000, orthophotomaps 1:5000 from aerial photos 1:26 000 (Krakow, Opole), and orthophotomaps 1:10 000 from photos 1:26 000 for rural areas as well as well as orthophotomaps in scale 1:30 000,1: 50 000 (Warsaw, Krakow) generated from satellite images. Orthophotomaps were produces in digital form using mostly Image Station software. DTM for orthophoto production was generated automatically with use of the MATCH-T software or created basing on existing topographic maps

5.4 Topographic database

The pilot project for two objects located along Vistula River has been accomplished. One object located in Central part of Poland in relatively flat area covers 78 sheets of map in scale 1:10 000, while second object was located in Southern part of Poland in rather hilly area and cover 64 sheets of map 1:10 000. The project comprise: digital orthophotomaps generation, digitizing contents of topographic maps in scale 1:10 000, creation of DTM basing on contour lines from maps 1:10 000 and creation of data base for attributes related to the map features. The contents of topographic maps was up-dated basing on generated orthophotomaps. Finally, the topographic database, comprising spatial and descriptive data, was created.

5.5 Creation of a DTM

The DTM for several objects with different grid density and accuracy were created. The DTM were created mostly for projected highway routes and for orthophoto generation. In Poland, the standard for DTM is in a preparatory stage, so accomplished project are experimental in character.

5.6 Close range applications

Close range photogrammetry methods were used mainly for architecture monuments documentation purposes and for surveying shape and deformation of industrial objects. For taking photos the metric cameras, semi-metric or non-metric as well as digital cameras were used. The photos taken in analog form were scanned and then processed using analytical and digital methods. Some example of close range application is shown on poster at national exhibition.

6. BIBLIOGRAPHY

During period 1997-2000 there were published some 200 scientific and technical papers.
In 1994 it was agreed among Polish Society for Photogrammetry & Remote Sensing, Polish Geographical Society - Club for Remote Sensing, cartographic and photogrammetric sections of the Committee for Geodesy of Polish Academy of Science and Cartographic Section of Polish Geodetic Association, that and editorial series “Archives of Photogrammetry, Cartography and Remote Sensing” is being established for the use by those organization to publish various materials, also those papers which are presented during pertinent symposia and conferences in Poland.

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