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National Report

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Introduction

If one were to mention the three most important matters in the field of Finnish Photogrammetry during the years 1976-79, they would be the following.

The XIII International Congress of Photogrammetry Helsinki 1976, which is reported very fully in the Archives of ISP and is not therefore a subject of this report.

The explosive increase in foreign tasks for Finnish Photogrammetry, specially in developing countries in Africa and the Middle East.

Finally, the chairmanship of Working Group 3 of the ISP Commission III of Prof. Einari Kilpelä, which has not only given a lot of research work to many Finnish Photogrammetrists, but has also made the Finnish test field, Jämijärvi, well-known all over the World.

The governmental organisations which have photogrammetric production as a notable part of their activity, are the National Board of Survey, the Army Map Service and the National Board of Roads and Waterways. Organisations which have photogrammetric research as a considerable part of their work, are mentioned later in the chapter entitled Research.

There are several companies in the country which have Photogrammetry as one of their main activities. The most important ones are: Finnmap Oy, Kaavakartta Oy, Maa ja Vesi Oy, Mittaustekniikka Oy, Monikartta Oy and Tmi Erikoiskartta. Only one company, Geopolar Ky includes the production of photogrammetric equipment as a worthwhile part of its own total production.

Post-Congress work, publishing reports of the XIII ISP Congress, has been a big task for the relatively small national society during 1977-78.

Research

The Institute of Photogrammetry at Helsinki University of Technology has carried on research into numeric Photogrammetry. As already mentioned, the head of the Institute, Prof. E. Kilpelä, has been the chairman of the ISP Working Group: "Compensation of Systematic Errors of Image and Model Coordinates" and

therefore a significant part of the resources of the Institute have been used for this purpose.

Other research work at Helsinki University of Technology includes the investigations of image quality. The Institute's earlier measuring of geometric image quality with their horizontal goniometer has been continued. The calibration of the goniometer has made more accurate results possible. Other image quality research has involved the investigation of resolution of targets for aerial triangulation. The investigation of instrument calibration also has an important position in the research of the Institute.

The first notable instrument construction in the Institute was the above-mentioned Goniometer. This line of development, instrument construction, has also been carried on during the reported period.

The Geodetic Institute of Finland, a governmental research organisation, established a Department of Photogrammetry in 1977. The first head of this department is Prof. Juhani Hakkarainen. The very first research work of this department was the investigation of image quality in the sense of resolution specially in different parts of the visible spectrum, as well as the measuring of geometric image quality in conjunction with Helsinki University of Technology.

The Laboratory for Land Use at the Technical Research Centre of Finland has continued the line of investigations into Remote Sensing. The main field of operation is the interpretation of Landsat pictures for cartography, forest economy, geology, environmental purposes and planning of land use. The Centre has further investigated calibration of non-topographic cameras with a test field as well as the accuracy of aerotriangulation.

The common working group of the National Board of Survey, Helsinki University of Technology and Technical Research Centre, called MATEVA, has investigated calibration and automation of the photogrammetric mapping process.

The Department of Civil Engineering at Tampere University of Technology has investigated deformations of constructions using photogrammetric methods. Programming of numeric photogrammetry for non-topographic purposes as well as for aerial triangulation should be mentioned among other research. The use of holography for photogrammetric measurements is also a field of investigation.

The National Board of Survey has investigated various photogrammetric practical problems for their own production of maps as well as aerial pictures.

Organisations which have specially investigated Photointerpretation should be mentioned among the others. Most important are the Institute of Geography, the Faculty of Forestry, the Institutes of Geology and Mineralogy at Helsinki University, the Institutes of Geography, Geology and Geophysics at Oulu University and the Institute of Geography and Geology at Turku University. The big mining companies, Rautaruukki Oy and Outokumpu Oy have used photogrammetric research for the prospecting of minerals.

The Finnish economy is to a large extent dependent on forestry. In addition to university faculties of forestry there is a free organisation, the Forest Research Institute, which is of course an investigator and user of Photogrammetry and Remote Sensing in its own field. The forest owners have an organisation called TAPIO with the same kind of activity.

Education

The only high level education in Photogrammetry is given by the Department of Surveying at Helsinki University of Technology. Their annual intake of students is 40 - 50 but less than 5 students yearly choose Photogrammetry as the subject of their thesis for master's degree.

During the reported period there was only one person who completed his photogrammetric studies as far as the degree of Doctor of Technology. In this connection it can be mentioned, that the honorary degree of Doctor of Technology was granted in 1978 to U.V. Helava, a Finnish born citizen of the USA.

There is in Finland, as in other Scandinavian countries, a degree between that of master and doctor, a degree of Licentiate. During the reported period two persons completed the degree of Licentiate of Technology in photogrammetry.

The Department of Civil Engineering at Tampere University of Technology also gives education in photogrammetry at university level, but of course the education for civil engineering is briefer than for surveying.

Photogrammetry is also a part of the programme at many other University Faculties which have already been mentioned in the preceding chapter.

Education in Photogrammetry at a lower level is given in the branches of land surveying at the State Institutes of Technical Education in Helsinki, Mikkeli and Rovaniemi and in the surveyor branches of vocational schools in Kajaani and Jyväskylä.

Post-graduate courses in photogrammetry are not only given by Universities, but also by several civil organisations. The highest level post-graduate lectures apart from those given by native experts are those by famous foreign lecturers. Prof. F. Ackermann, Prof. H. Ebner, Prof. G. Konecny, Mr. G. Ducher and Dr. U. Helava have all been guest lecturers during the reported period. The participation of Finnish photogrammetrists in foreign post-graduate courses as lecturers as well as participants has also been considerable.

Aerial Photography

During the four year period there have been two main producers of aerial photography with measuring cameras, the National Board of Survey and the company Finnmap. Both of them have their own aircraft for Photogrammetry. The third organisation, which also carries out measuring photography with its own aircraft, is of course the Army Map Service.

The yearly number of 230 by 230 mm negatives for the National Board of Survey is about 5 000 and for Finnmap about 9 000. The Army Map Service takes some 2 000 measuring pictures yearly.

During the reported period several thousand pictures were taken with smaller cameras for photointerpretation.

The emulsions used are about 80% panchromatic black and white and 10% colour. Infrared emulsions, either black and white or colour make up the remainig 10%.

There is no multispectral scanner in the country. Multispectral remote sensing is mostly done with Landsat material, but the Technical Research Centre has also

used a hired scanner for airborne remote sensing.

The annual output of positive contact prints has been 50 000 (230 by 230 mm) and 20 000 enlargements as well as about 7 500 diapositives for stereoplotting.

The National Board of Survey provided in 1979 a modern Orthophotoprinter Wild Avioplán OR-1. Therefore there will be a sudden increase in orthophoto production, which has been relative small with the old equipment during the reported period.

Aerotriangulation

Aerotriangulation is mostly solved either with independent models or a bundles of rays. At the beginning of the period the output in the country was about 2000 and in the end 4000 models per year.

The instruments used are mostly comparators. There are 6 photogrammetric comparator in the country. The computers used are mostly minicomputers, and therefore the solution of normal equations is also mostly carried out with iterative methods.

Production of Maps

During the period the annual output of stereomapping in scales bigger than 1:10 000 was about 1200 square kilometres. At the beginning of the period stereomapping in scales 1:10 000 or smaller was 15 000 and last year over 90 000 square kilometres, due to increasing foreign activity.

The annual output of photomosaics in scales bigger than 1:50 000 has been 10-10 000 km². The Institute of Geography at Oulu University compiled a photomosaic in scale 1:400 000 of the northern part of the country including some 150 000 square kilometres.

Photointerpretation

Photointerpretation for forestry, environmental purpose, cartography and purposes demanding equal accuracy has been something like 30 000 km² per year. The interpretation for Geology and Geography, often in small scales includes a much greater area yearly. The biggest user of geological interpretation is the governmental organisation the Geological Survey of Finland.

Non-topographic Photogrammetry

Non-topographic photogrammetry, practised by research organisations as well as private companies, has included architecture measurements, determination of volume of underground cavities or heaps of bulk raw material such as coal or gravel. Measurements of determination of construction elements have been one common use of non-topographic photogrammetry.

There were also some physiological measuring problems which were solved by photogrammetric methods.

Archeology is also worth mentioning in this chapter.

Activities of the National Society

The Finnish Society for Photogrammetry was founded in 1931 and its half century anniversary is therefore very near. The Presidents of the Society have been A. Rainesalo, R.S. Halonen. K. Löfström, K. Eranti, H. Lyytikäinen, K. Rainesalo, S. Härmälä and the sitting President E. Kilpelä.

Mrs Aino Savolainen, member of the Finnish Society has during these four years been the member of the ISP Council.

Every Commission of the ISP has a Finnish reporter and some of the members of the national society also participate in Working Groups of the ISP, among them the already mentioned WG III/3.

Publications

The national society's own publication which is written in English, "The Photogrammetric Journal of Finland" has been published once or twice a year as before.

During the period the textbook Schwidewsky, Ackermann: "Photogrammetrie" has been translated into Finnish by a working group under the responsibility of Prof. Kilpelä its chairman.

Some 30 papers written by Finns, in Finnish and foreign scientific publications, can be counted yearly from the annual reports of the national society.