NATIONAL REPORT of FINLAND

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1. Introduction

The development of photogrammetry has been significant in Finland during this four year period 1980 - 1983. The most notable changes or developments can be seen in computer assisted photogrammetry and remote sensing. New equipment has been procured, specially analytical plotters and aerial cameras.

The photogrammetric quota in a mapping process has increased both in governmental and private applications. Research work has been very active and different kinds of post-graduate and supplementary occasions have been arranged.

In this period there have also been several festive celebrations, the most significant being the ISP Commission III international symposium held in 1982 arranged by Prof. E. Kilpelä. In 1981 the Finnish Society of Photogrammetry celebrated its 50 th anniversary and in 1983 a symposium was held in honour of Dr. h.c. K. G. Löfström's 80 th birthday.

The following information has been collected from the annual reports published by the national society.

2. Topographic operations

In Finland topographic maps are produced by 1) government organizations: The National Board of Survey, the Topographic Service of the Finnish Defence Forces and the National Board of Public Roads and Waterways 2) municipal surveying offices and 3) several private companies: Finnmap Oy, Soil and Water, Planmap, MT-Survey, Softmap, Erikoiskartta-Special Map, Intip Ltd, Land-Photo Finland Ltd, Blue-Sky, Aerial Oy, Lentokuva A. Närhi and Lentokuva H. Wallas.

The basis of the Finnish atlas is the Basic Map at the scale of 1:20 000 produced by the National Board of Survey (NBS). The Basic Map already covers the whole country and nowadays the work is map revision. The map is prepared at the scale of 1:10 000 and it is printed in six colours at the scale of 1:20 000. In North Finland the map is prepared at the scale of 1:20 000, printed in three colors, and is called the Topographic Map. This work is compiled by the Topographic Service of the Finnish Defence Forces (TS). These maps are revised at intervals of 5 to 20 years. NBS produced maps at the scale of 1:50 000 or less by reducing them photographically and giving them a a new cartographic presentation.

In 1979 the National Board of Survey started the production of the National Base Map at the scale of 1:5 000. This map consists of an orthophotomap and a boundary element. The annual production of this map is about 400 map sheets (each 2,5 x 2,5 km^2) and the aim is about 700 map sheets per year.

The base maps needed by municipalities for city planning and other purposes are usually produced by private companies and the municipalities carry out

only some field measurements and checkings themselves. In urban areas the city base map is usually at the scale of 1:500 or 1:1 000 and in other areas at 1:2 000.

The National Board of Public Roads and Waterways (NBRW) is making maps for road plans at the scale of 1:2 000.

The NBS is responsible for the cadastre map production and a huge part of cadastral mapping is done with simple field measurements at the scale of 1:1 000, 1:2 000 or 1:5 000.

In 1982 a new statute in large-scale mapping was given and in 1983 the NBS published a standard for large-scale maps and municipal surveying. The measuring classes, their precision, requirements, measuring methods and cartographic presentations were standardized. The distinguishing reformation lies in the fact that the land value rates the measuring class, method and precision reguirements.

During the years 1980 - 1983 many private companies have made several surveys abroad, especially in Libya, Nigeria and Saudi Arabia.

Aerial Photography

During this four year period four aircraft plus some hired aircraft have been available for aerial photography. The NBS has used its own Rockwell Turbo Commander 690 A propjet and hired Piper aircrafts. The private company Finnmap Oy owns a Partenavia Victor aircraft.

Three new aerial cameras have been procured in 1982 - 1983 two Wild RC-10A 15/4 UAg A and a lens 21 NAg II A for the other camera and one Zeiss Oberkochen RMK A2 15/23. Also 'older' cameras Zeiss Oberkochen RMK A 15/23 Pleogon A II, two RMK A 15/23 (Pleogon A) and two Wild RC-10 UAg plus a lens NAg have been used.

About 80 - 90 % of the emulsions used have been black-and-white panchromatic and the rest have been black-and-white and color infrared. The use of color emulsions for mapping and interpretation is increasing slowly.

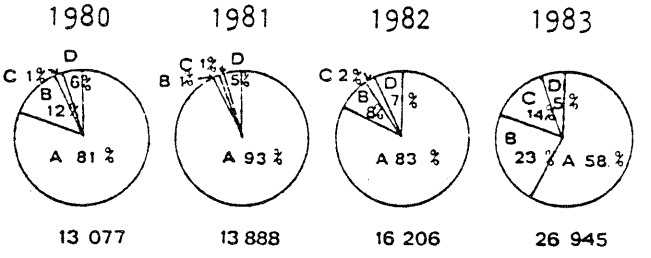
Table 1. Domestic Aerial Photography in 1983

Scale/Company /Emulsion	NUMBER OF PHOTOS												
	Finnmap				Land-Photo Finland				Blue Sky		MT-Survey	Aerial	Σ
	A	B	C	D	A	B	C	D	A	B	A	A	
≥ 1:10 000	1 697	17	506	6	165	-	870	10	300	-	100	120	3 791
≥ 1:20 000	598	137	150	94	270	-	1 050	20	-	4 200	-	-	6 519
≥ 1:35 000	80	1 755	2	600	270	40	1 160	130	-	-	-	-	4 037
< 1:35 000	-	-	-	-	10	40	-	-	-	-	-	-	50
Σ	2 375	1 909	658	700	715	80	3 080	160	300	4 200	100	120	14 397

Emulsions:
A = b-w panchr.
B = b-w infra
C = color
D = color infra

Scale/Company /Emulsion	NUMBER OF PHOTOS				
	NBS			TS	
	A	C	D	A	Σ
≥ 1:10 000	930	-	230	261	1 421
≥ 1:20 000	4 015	140	65	92	4 312
≥ 1:35 000	2 185	-	155	393	2 733
< 1:35 000	-	-	-	4 082	4 082
Σ	7 130	140	450	4 828	12 548

Aerial photography in Finland (annual output mentioned)



In Finland several private companies have been carrying out aerial photography with non-metric cameras specially for planning and forest mensuration and management purposes.

Table 2. Domestic Aerial Photography of Non-metric Cameras in 1983

Company	Emulsion	NUMBER OF PHOTOS	Company	Emulsion	NUMBER OF PHOTOS
Tmi Lentokuva Wallas	b-w infra?	3 287	Land Photo Finland	color	900
				col. infra	50
City of Helsinki	color	1 000			
	b-w	100	Tmi Lentokuva Närhi	b-w infra	788
Blue Sky	b-w	300	Aerial	color	250
	b-w infra	800			

Stereomapping

The NBS, the TS and the NBRW stereoplot annually about 10 000 km^2 at the scales of 1:5 000, 1:10 000 and 1:20 000. Private companies, (most important mentioned in the following table) plot annually about 2 500 km^2 domestic and foreign large-scale maps. This number also includes special types of maps. For example Erikoiskartta-Special Map makes most of the orienting maps used in Finland.

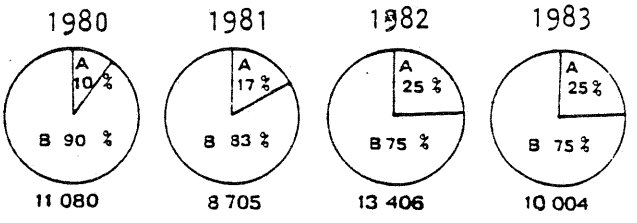
Table 3. Domestic Stereo Mapping (km^2) in 1983

Scale/Company	NBS	TS	NBRW	City of Helsinki	Finnmap	Soil and Water	Planmap	MT-Survey	Softmap	Special Map	Blue Sky	Σ
≥ 1: 500	-	-	4	22	19	4	21	7	14	11	-	102
≥ 1: 1 000	32	-	4	-	73	21	8	15	21	5	-	179
≥ 1: 2 000	189	9	613	-	84	228	110	206	122	26	1	1 588
≥ 1: 5 000	108	-	-	-	40	218	15	25	76	50	50	582
≥ 1: 10 000	5 230	-	-	-	-	-	-	23	-	600	-	5 853
≥ 1: 20 000	-	1 700	-	-	-	-	-	-	-	-	-	1 700
Σ	5 559	1 709	621	22	216	471	154	276	233	692	51	10 004

Foreign Stereo Mapping (km^2) in 1980 - 1983 (in total)

Scale/Company	Finnmap	Soil & Water	Planmap	Special Map	MT-Survey	Softmap	Σ
≥1: 1 000	286	71	-	34	17	18	426
≥1: 5 000	311	37	-	-	-	-	348
≥1: 10 000	2 795	150	554	200	-	-	3 699
≥1: 20 000	41 585	560	-	-	-	-	42 145
Σ	44 977	818	554	234	17	18	46 618

Stereomapping in Finland
(annual area in km^2 mentioned)



A = at the scale of ≥ 1: 5 000
B = at the scale of ≥ 1:10 000

In addition, it is worth noticing that the annual output of cadastral maps, most of them produced by field measurements, is about 500 km^2.

Aerial triangulation

At the moment aerotriangulation is most often solved with adjustment of indepent models (either with analog or analytical models) or of bundles of rays.

The NBS uses mainly independent model adjustment. Helsinki University of Technology (HUT) has made its own programs for on-line bundle adjustment for the

analytical plotter Kern DSR 1 and for the stereocomparator Zeiss Oberkochen PSK. Other governmental organizations use bundle adjustment, too. Most private companies use independent model adjustment.

Table 4. Domestic Aerial Triangulation in 1983

Adjustment method/Comp.	NUMBER OF MODELS/IMAGES								
	NBS	FGI	TUT	TS	Finnmap	Soil & Water	Special Map	Planmap	Σ
Strip	600	-	-	-	-	-	-	-	600
Indep.Models	3 315	-	-	26	580	-	-	300	4 221
Bundle	-	358	20	-	-	839	450	-	1 721
Σ	3 915	358	20	26	580	839	450	300	6 542

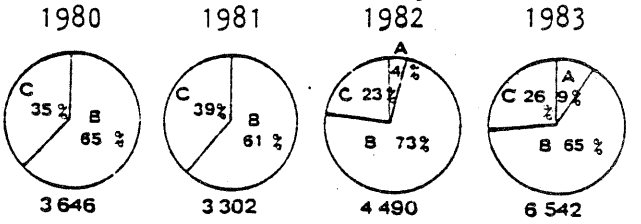
Foreign Aerial Triangulation in 1980 - 1983

Adjustment method/Comp.	NUMBER OF MODELS/IMAGES				
	TRC	Finnmap	Soil & Water	Planmap	Σ
Indep.Models	-	5 435	135	260	5 830
Bundle	500	45	1 062	-	1 607
Σ	500	5 480	1 197	260	7 437

TRC = Technical Research Centre of Finland

Aerial triangulation in Finland (annual number of models/images mentioned)

A = Strip Adjustment
B = Independent Model Adjustment
C = Bundle Adjustment



Along with stereomapping and aerial triangulation different kinds of photomaps, photomosaics and orthophotos have been produced at different scales and for different purposes in Finland and abroad.

The NBS owns a modern orthophoto printer Wild Avioplan OR-1. In 1983 most of the 5 800 orthophotos were used for the National Base Map.

Instrumentation

A new era in photogrammetric stereoinstrumentation has also begun in Finland. The use of analytical photogrammetry has increased considerably. In 1982 - 1983 six analytical stereoplotters were procured: four Kern DSR 1 and two Wild Aviolyt BC 1. Along with analytical plotters thirteen digital mapping tables have been bought: seven Wild Aviotab TA, three Aviotab TA 2, one Aviotab TA 10 and two Kern GP 1.

In Finland three Wild RAP, one Kern MAPS 200 and one Megagraphic 7000 computer aided mapping systems are in use. Many companies and organizations have equiped their existing analog plotters with digitizing equipment.

Table 5A.
Instrumentation in Stereomapping and Aerial Triangulation in 1983.

	NBS	NBRW	TRC	FGI	HUT	TUT	Tech. Institutes	City of Helsinki	Finnmap	Soil and Water	Special Map	Planmap	MT-Survey	Softmap	Others	Σ
Analog Stereoplotters:																
- Doppelprojector DP 1						1										1
- Autograph A 4															1	1
- Autograph A 7												1				1
- Autograph A 8	8	2			1		1		4	3		1	1			21
- Aviograph B 8 & B 8S	6				1		1		1						3	12
- Aviograph B 9					1											1
- Aviomap AMH		1														1
- Kern PG 1							1									1
- Kern PG 2											2			1		3
- Stereosimplex 11 C					1											1
- Ballplex plotter		3			2	1	6					1	2	1	5	17
- Topocart B	1								1							6
- Topocart C										1				1		2
- Stereoprojector 3M					1											1

Table 5B.

Instrumentation in Stereomapping and Aerial Triangulation- in 1983.

	NBS	NBRW	TRC	FGI	HUT	TUT	Tech. Institutes	City of Helsinki	Finnmap	Soil and Water	Special Map	Planmap	MT-Survey	Softmap	Others	Σ
Automatic Plotting Tables:																
- Wild Aviotab TA		3							1	2				1		7
- Wild Aviotab TA 2								1							2	3
- Wild Aviotab TA 10											1					1
- Kern GP 1								1		1						2
Computer Aided Mapping System:																
- Wild RAP									1	1				1		3
- Kern Maps 200										1						1
- Megagraphic 7000														1		1
Analytical Stereoplotters:																
- Kern DSR 1	1			1	1			1								4
- Wild BC 1											1				1	2
Stereocomparators:																
- Stecometer									1							1
- Zeiss PSK	1				1											2
Monocomparators:																
- Zeiss PK 1					1											1
- Kern CPM 1	1		1							1						3
- DBA-Comparator						1										1
- Ascorecord						1										1

Manpower

It is very difficult to state the exact number of people working in the field of photogrammetry, because very few surveyors do photogrammetric tasks only. The number of surveyors with a university degree in technology is appr. 100 and surveyors with a lower degree (technicians) approximately 400. There are approximately 60 stereo-operators in Finland.

3. Non-Topographic Operations

The use of special photogrammetry and terrestrial photogrammetry has been common for various purposes. The most common use of terrestrial photogrammetry is the determination of volumes and shapes of underground cavities etc.. Private companies Finnmap, MT-Survey and Soft Map have carried out most of the annual determination of 10 milj. m^3 in total.

The Tampere University of Technology (TUT) and the Technical Research Centre of Finland (TRC), too, have done several measurements of shape and volume.

Documentation of old buildings by using stereo pairs, facade drawings of buildings and other architectural measurements have been made at the HUT and at the TRC.

The Institute of photogrammetry at HUT owns four Zeiss Oberkochen terrestrial cameras: two SMK (base 40 cm and 120 cm) and two TMK cameras. The department of civil engineering at TUT has two terrestrial cameras: one Zeiss Jena terrestrial camera UMK and a new Wild P 32 terrestrial camera. There are also several non-metric cameras in use.

4. Remote Sensing Operations

Traditional photointerpretation still has a solid position in Finland although the use of satellite images has increased considerably. The number of aerial images used in interpretation is greater than of aerial images used in mapping.

Photointerpretation

Visual photointerpretation has been used in Finland for geological, forestrial and mapping purposes for several years already. The most important users in geology are the Geological Research Centre, industrial mining companies Outokumpu Oy and Rautaruukki Oy and the departments of geology at the universities of Helsinki and Turku. The annual interpreted area varies from 35 000 to 1,2 milj. km^2.

The National Board of Forestry, the Finnish Forest Research Institute, the departments of geography at the universities of Helsinki and Oulu among others apply interpretation for forestry over 13 000 - 19 000 km^2 per year.

The government organizations the NBS, the NBRW and the TS use interpretation for different mapping purposes from 32 000 km^2 to 100 000 km^2 per year. In foreign projects photointerpretation has been used for mapping, planning of land use and geology.

Table 6. Foreign Interpretation in 1980 - 1983

Year	Company	Scale	Area (km^2)	Purpose
1980	UH	1:400 000	300 000	Geology
1982	Finnmap	1: 4 000	310	Land-use
	"	1: 50 000	30 000	Mapping
1983	Finnmap	1: 6 000	1 340	Land-use
	"	1: 20 000	1 000	Forestry

UH = University of Helsinki, Department of Geology and Mineralogy

Remote Sensing

Remote Sensing has been used daily at the Institute of Marine Research and at the Finnish Meteorological Institute which have TIROS/NOAA receiving stations of their own. The Technical Research Centre of Finland has continued its investigations in Remote Sensing. Their main field has been in numerical interpretation of digital data. The annual area of numerical interpretation has varied from 6 000 to 12 000 km^2 a year.

These organizations, among others, have used Landsat, NOAA and Seasat imageries. In Finland the NBS is the national point of contact of the EARTHNET which is a suborganization of the European Space Agency (ESA).

5. Research and Development

In the following there is a short presentation of the research and development work done in different organizations and companies

Helsinki University of Technology (HUT)
Institute of Photogrammetry

- Compensation of systematic image and model errors
- Simultaneous adjustment of photogrammetric and geodetic observations
- Detection of gross and systematic errors and theri elimination
- Photogrammetric on-line triangulation in an analytical plotter
- Modification of a Wild Aviograph B 8 into an analytical plotter
- Digital image processing
- Calibration of aerial cameras with a goniometer
- Production of digital elevation models with photgrammetric methods
- DLT- transformation

- An investigation into the possibilities of calibrating non-metric cameras
- Investigations of image resolving power
- Recursive estimation methods in photogrammetric computation
- Use of color films in large-scale mapping
- Several order studies in the fields of analytical and terrestrial photogrammetry

Tampere University of Technology (TUT)
Department of Civil Engineering

- Simultaneous adjustment of geodetic and photogrammetric observation
- Photogrammetric control point extension
- Test field calibration of close range cameras
- Photogrammetric and geodetic measurements of construction elements

University of Helsinki (UH)
Department of Geology and Mineralogy
Department of Geology and Paleonthology
Department of Forest Mensuration and Management

- A project on the structural geology in the Lake Ladoga - Bothnian Bay zone
- The procession of Landsat-imagery and their interpretation in quatenary geology and in land use
- The use of satellite imagery in the survey by stands

University of Oulu (UO)
Department of Geology
Department of Geophysics
Department of Geography

- Investigation into the suitability of Remote Sensing methods for geology
- The origin and properties of glacial landforms in North Finland SOMA-project financed by the Academy of Finland and supervised by Prof. R. Aario

University of Joensuu (UJ)
Department of Physics

- Suitability of aerial cameras in a long period (with HUT and FGI)
- A goniometer has been planned and constructed for small-format cameras

Technical Research Centre of Finland (TRC)
Laboratory of Land Use

- Forest Inventory
  - monitoring regeneration fellings by satellite imagery
  - timber inventory based on satellite imagery
  - satellite imagery in forest taxation in northern Finland
  - estimation of deciduous thickets with satellite imagery
- Geology
  - digital image processing of Landsat, geophysical and other data for mineral exploration
- Mapping
  - digital methods for processing Landsat image mosaics
- Water resources
  - remote sensing methods for snow mapping and runn-off prediction
- Vegetation mapping
  - vegetation mapping based on Landsat digital data
- Numerical Methods in Remote Sensing
  - digital image processing methods and software
  - numerical interpretation of digital data
  - photogrammetric methods for digital images
- Bundle block adjustment methods

National Board of Survey (NBS)
Photogrammetric Division

- Development of production methods of the National Base Map 1:5 000
- Analysis of requirements on image processing hardware and software
- Development of a pre-processing program of satellite imagery has been continued (with TRC)
- Digital processing of satellite photomosaics (with TRC and TS)

Finnish Geodetic Institute (FGI)

- Calibration of aerial cameras and investigations of image guality
- Changes in temperature of aerial cameras (with NBS)
- The accuracy of MTF determination method developed in Finland
- On-line photogrammetric triangulation
- Application of analytical photogrammetry to the height determination of gravity points
- Accuracy features of terrestrial models

National Board of Forestry (NBF)

- Automation of the plotting of forestrial maps using the software the NBS has developed
- Vegetation mapping based on numerical interpretation of Landsat-imagery (with TRC)

Institute of Marine Research (IMR)

- Development of TIROS/NOAA receiving station (with TRC)
- Improvement on TIROS/NOAA imagery used in the daily ice service in the interest of maritime commerce
- Use of Landsat imagery and aerial photography in the determination of ice drifting

National Board of Waters (NBW)

- Depth relations of waterways have been surveyed using aerial photographs
- Aerial triangulation has been used in surveying the depth relations of waterways using aerial color photography

City of Helsinki
City Surveying Department

- Topographic mapping using 6 x 7 cm^2 images
- Generation of a graphical data base using the Kern DSR 1

Private companies

Finnmap Oy

- Further development of SysScan, the interactive mapping system based on digital stereoplotting: improvement of the registration system, pre-processing of collected data, linking the processes of photogrammetric and field mapping, information transformation from stereo digitized form into map sheets
- Development of digital stereoplotting software

Geopolar

- Development of the registration system AND-3 for analog plotters has been continued
- New equipment has been developed to use a Zeiss Jena Topocart plotter as a mono comparator

Intip Ltd + Land Photo Finland Ltd

- Development of micro processor assisted IRU and a navigation site using video technique suitable for a Hasselblad camera in stereo oblique photography.
- The development of a mobile color processor EA-5

Softmap

- Development of a minicomputer based interactive large-scale mappin system MONIKA and of a utility mapping system (JOHTOMONIKA)

Outokumpu Oy

- Development of digital image processing for use in ore prospecting

6. Education

University level education in photogrammetry is centred on the Helsinki University of Technology and its department of Surveying. Annually appr. 40 students start their studies at the department. The calculated time to be able to take a Master of Science degree is four and a half years. In their third year the students must choose at least two subjects for advanced studies. At the moment the subject of photogrammetry consists of twelve compulsory or optional courses. Fourteen theses have been completed in photogrammetry during this four year period.

University level education is also given at Tampere University of Technology in the department of civil engineering. They offer fundamentals of photogrammetry and remote sensing and special courses in determination of forms and transformations.

Fundamentals in remote sensing are also given in the departments of geophysics, geology, geography and forestry at the University of Helsinki, in the department of construction at the University of Oulu and in the departments of geology, geophysics and geography at the University of Turku and in the Åbo Academy.

Education in photogrammetry on a lower level (technicians) is given in the branches of surveying of the State Institutes of Technical Education in Helsinki, Mikkeli, Rovaniemi and Vaasa.

In 1980 and 1982 a course was arranged for stereo-operators. This education consisted of theoretical lectures, training with instruments and practical training. The courses lasted seven months.

Table 6. Education in Finland in 1980 - 1983

Place	Year 1980			Year 1981			Year 1982			Year 1983		
	1	2	3	1	2	3	1	2	3	1	2	3
HUT	8	520	349	11	652	286	8	530	187	12	694	199
TUT	6	122	136	5	118	78	5	118	80	5	118	74
UH	5	162	298	7	172	276	5	125	271	5	120	340
UO	2	134	110	3	204		1	94		2	132	40
UT+Åbo Akademi	1	20	10	2	50	29	2	52	31	2	78	80
Institutes of Techn. Education	8	672	200	8	672	200	8	672	200	8	672	200
Stereo-operator-course	1	675	10	-	-	-	1	1031	10	-	-	-

1= number of courses
2= total amount of lectures + training
3= total number of students

Post-graduate and supplementary education has been offered at the universities, in government organizations and in several societies. There have been nineteen guest lectures in this period.

Time	Lecturer/country	Subject
29.2.1980	Dr. F. Ackermann/FRG	"On the Effect of Geodetic Map Projection on Blocktriangulation"
29.2.1980	Dr. D.C. Brown/USA	"Satellite Doppler Positioning by Short Arc Method"
27.3.1980	Mr. C. Vigneron/France	"On the Analytical Plotter and Remote Sensing Equipment of Matra"
1.9.1980	Dr. A. Grün/FRG	"Reliability Aspects"
3.9.1980	Dr. A. Grün/FRG	"Precision and Reliability Aspects of Modern Aerial Triangulation"
29.9.1980	Dr. R. Waibel/Switzerland	"On the Philosophy of Aerial Cameras"
29.9.2980	Mr. A. Rohrbach/Switzerland	"On Wild's Most Recent Equipment"
25.9.1981	Dr. G. Konecny/FRG	"Development of Photogrammetric Instruments and Its Future"
25.9.1981	Dr. K. Torlegård/Sweden	"Development of Non-Topographic Photogrammetry and Its Future"
1982	Dr. F. Hilwig/Netherlands	"On Satellite Imagery and Their Interpretation"
23.3.1983	Dr. F. Doyle/USA	"The Potential for Topographic Mapping from Space"
23.3.1983	Dr. K. Albertz/FRG	"Digital Bildverarbeitung und Ihre Bedeutung für die Photogrammetrie"
14.4.1983	Dr. R.-P. Mark/GDR	"Das Gerätesystem des VEB Carl Zeiss Jena zur Fernerkundung der Erde"
4.10.1983	Dr. D. Frazer/Australia	"Remote Sensing in Australia"
16.11.1983	Dr. F. Ackermann/BRD	"High Precision Digital Image Correlation"
12.12.1983	Dr. J. Klaver/Switzerland	"Hardware ans Software from Kern"
25.3.1983	Dr. F. Doyle/USA	"Combination of Digital Carthographic Data with Remote Sensing Data"
25.3.1983	Dr. F. Doyle/USA	"Digital Map Production of U.S.G.S."
16.11.1983	Prof. dr. F. Ackermann/FRG	"The Use of Auxiliary Data in Aerial Triangulation"

The participation of Finnish photogrammetrists in symposia, congresses, meetings and thematic days abroad (as members and as lectures) has been considerable.

In Finland foreign students have the possibility to study at the universities by special request. There are also different kinds of grants available for foreign students.

7. Publications

The most important periodical publishing articles on photogrammetry and remote sensing is 'Photogrammetric Journal of Finland' (PJF). It is normally published once a year. There is also a periodical 'Surveying Science in Finland' which is published twice a year and consists of articles on different branches of surveying.

There are six series publications in Finland:
1) Reports of the Institute of Photogrammetry, HUT
2) Publication Series A and B, (Technical Research Centre of Finland)
3) Publications of Finnish Geodetic Institute
4) Reports of Finnish Geodetic Institute
5) Reports of the Department of Geodesy and Photogrammety, TUT
6) INSKO (=Continuing Engineering Education Centre)

The text books which are published in Finland:

1) Schwidefsky & Ackermann, Fotogrammetria |Photogrammetrie|. Otakustantamo, Espoo, 1978, (translated into Finnish).
2) Salmenperä, Fotogrammetrian perusteet |Fundamentals of Photogrammetry|. TTKK, 2d Edition, Tampere, 1983
3) Salmenperä. Fotogrammetrinen pistetihennys |Photogrammetric Control Point Extension|. TTKK, Tampere, 1981/1
4) Lyytikäinen, Kuvatulkinta |Photointerpretation|. TKY n:321, Espoo, 1972
5) Sorjonen & Hakkarainen, Valokuvauksen luennot. |Lectures on Photography|. TKK, Espoo, 1971
6) INSKO, Valokuvauksen teoreettisia perusteita |On Theoretical Fundamentals of Photography|. Ed. in Insko, Helsinki, 1982
7) Leppänen, Kartoituksen prosessitekniikka |On Large Scale Mapping Process|. TKY n: 801, Espoo, 1974

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8. Professional Subjects

The Finnish Society of Photogrammetry celebrated its 50th anniversary on the 25th of September, 1981. The chairman of the society has been Mrs. Aino Savolainen. The number of members was 220 at the end of 1983. Prof. Einari Kilpelä has been the chairman of the ISP Commission III. The Commission III arranged an international symposium on 'Mathematical Models, Accuracy Aspects and Quality Control' in Otaniemi in June 7. - 11., 1982. 122 participants took part in the Symposium from 23 different countries. Mrs. Aino Savolainen has also been the chairman of the ISP financial commission.

The Finnish representatives of the Organisation Européenne d'Etudes Photogrammétriques Expérimentales (OEEPE) are deputy director general, Dr. h.c. S. Härmälä and Prof. E. Kilpelä. Director of geodetic and photogrammetric department M. Jaakkola has been the chairman of the Commission C, which has a working group "Optimal Emulsions for Large Scale Mapping".

Prof. S. Poso is the vice president of IUFRO's working group S4.02.05 "Inventories Aided by Remote Sensing".

Several photogrammetrists, geologists and foresters have taken part in international working groups and projects.

9. Addresses

9.1 Organization other than education and research

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9.2 Education and research organizations

THE FINNISH FOREST RESEARCH INSTITUTE
Unioninkatu 40 A
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FINNISH GEODETIC INSTITUTE
Ilmalankatu 1 A
00240 Helsinki 24

THE GEOLOGICAL SURVEY OF FINLAND
Kivimiehentie 1
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HELSINKI UNIVERSITY OF TECHNOLOGY
Institute of Photogrammetry
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HELSINKI STATE INSTITUTE OF TECHNICAL EDUCATION (HTOL)
Abrahaminkatu 1-5
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INSTITUTE OF MARINE RESEARCH
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NATIONAL BOARD OF WATERS
Water Research Department
PL 250
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TAMPERE UNIVERSITY OF TECHNOLOGY
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TECHNICAL RESEARCH CENTRE OF FINLAND
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