INTERNATIONAL INSTITUTE FOR AERIAL SURVEY AND EARTH SCIENCES (ITC) ENSCHEDE,THE NETHERLANDS

# A SURVEY OF EDUCATION AND RESEARCH IN PHOTOGRAMMETRY AND REMOTE SENSING IN THE IRISH REPUBLIC, THE NETHERLANDS AND THE UNITED KINGDOM

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ISP COMMISSION VI

WORKING GROUP VI-1



FOURTEENTH CONGRESS OF THE INTERNATIONAL SOCIETY FOR PHOTOGRAMMETRY, HAMBURG 1980

## A Survey of Education and Research in Photogrammetry and Remote Sensing in the Irish Republic, the Netherlands and the United Kingdom

by

H. Hoschtitzky

#### Abstract

In the context of a world-wide inventory of education in Photogrammetry, Photo-interpretation and Remote Sensing, a survey was conducted for the Irish Republic, the Netherlands and the United Kingdom. The collected and analysed data comprise the educational programmes, instrumentation and staff of the various Institutes in the above mentioned three countries.

#### Résumé

Dans le contexte de l'inventaire à échelle mondiale de l'enseignement en Photogrammétrie, Photo-interprétation et Télédétection une étude a été effectuée pour la République Irlandaise, les Pays-Bas et le Royaume Uni. Les données rassemblées et analysées, comprennent les programmes d'enseignement, l'instrumentation et la personnel des divers Instituts dans les trois pays surmentionnés.

#### Zusammenfassung

Als Teil einer weltweiten Uebersicht von den Ausbildungsmöglichkeiten in Photogrammetrie, Photo- nterpretation und Fernerkundung wurden Daten von der Republik Irland, Holland und Grossbritannien gesammelt. Die analysierten Daten umfassen die Ausbildungsprogramme, Instrumente und Mitarbeiter der verschiedenen Institute von diesen drei Ländern.

#### Acknowledgement

The author would like to express his thanks to all those who contributed to the data collection by answering the questionnaire. A list of the participating Institutes is found in the Appendix (table III).

#### 1. Introduction

At the 13th International Congress of the ISP, Helsinki 1976, it was decided that the activities of the working-group VI-1 should be continued with the inventarisation on a world-wide basis of the educational facilities existing in Photogrammetry, Photo-interpretation and Remote Sensing.

The present survey was conducted based upon a questionnaire which was sent to institutes in Northern Ireland, the Netherlands and the United Kingdom.

When data in the questionnaires were incomplete or missing, other documents were used for completion.

#### 2. Courses at University and Technologist's level

Photogrammetry, Photo-interpretation and Remote Sensing is taught at a great number of Universities and other Institutes of Higher Learning in the three countries. It may form either the main part of the study-programme, a course module, or a part of a course module. The survey as such was not intended to distinguish between these three categories but to ascertain the total number of lecture hours, tutorials and practicals devoted to the theory and application of aerial photography and Remote Sensing techniques to mapping (see Appendix, table I).

The following table illustrates the number of Institutes with activities at University and Technologist's level (see table 1).

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Country	Insti	tutes	Gradua (appro:	tes/year ximately)
Irish Republic		2		40
Netherlands		4		690
England	38		2340	
Wales	2		120	
Scotland	8		470	
Northern Ireland	1		70	
United Kingdom total		49		3000
Total		55		3730

Table 1: Courses at University and Technologist's level with some components in Photogrammetry, Photo-interpretation and Remote Sensing.

At first sight this number of students graduating annually looks very high.

But one has to consider that most of the courses mentioned comprise of only a very few hours devoted to Photogrammetry, Photointerpretation and Remote Sensing. Thus only a very few of these graduates can be called specialists.

Table 2 indicates the number of graduates according to the lecture hours involved in the course programmes.

Country	0-20 <sup>hrs</sup>	20 <b>-</b> 50 <sup>hrs</sup>	50-100 <sup>hrs</sup>	more than 100 hrs or Research
Irish Republic	40	-	-	-
Netherlands	86	_	492 <sup>*</sup>	110
England	2050	183	20	87
Wales	105	-	10	5
Scotland	404	19	30	13
Northern Ireland	70	—	-	-
United Kingdom total	2629	202	60	105
Total	2755	202	552	215

Note: \*: specialists in Photo-interpretation and Remote Sensing.

Table 2

Number of graduates at University and Technologist's level according to lecture hours.

Courses with substantial components in Photogrammetry, Photo-interpretation and Remote Sensing exist at the following institutes: University of Technology, Delft Internat. Inst. for Aerial Survey (ITC), Enschede Agricultural University, Wageningen (in Photo-interpretation) University College, London University of Newcastle upon Tyne North-East London Polytechnic School of Military Survey, Newbury University of Glasgow University of Wales

When computing the number of qualified professionals per unit area one has still to disregard the many foreign students embarking upon these specialised courses. This results in about 60 to 100 graduates with substantial training in Photogrammetry for the United Kingdom and about 10 in the Netherlands. Not all of them will work in Photogrammetry alone, but might also work in Land Surveying.

If one takes for each graduate a working period of 35 years one finds the following results for the Netherlands and the United Kingdom:

	1 specialist per								
	km <sup>2</sup>	inhabitants							
Netherlands	$110 \text{ km}^2$	38.000							
United Kingdom	80 km <sup>-</sup>	18.000							

#### Table 3

It should be noted that the table does not include Photo-interpretation specialists and disregards the fact that only a part of these graduates is working in Photogrammetry.

#### 3. Courses at Technician's level

Only a very few Institutes are running regular Diploma-courses for Aerial-survey Technician's. Most of the Technician's training is done "in-house" at the various mapping organisations. Photogrammetric Technician's Diploma courses are found at the ITC, Enschede and the School of Military Survey at Newbury. The number of graduates of the two courses together can be estimated to be about sixty per year, half of which is comprised of students from outside Europe.

If the number of Techncians is compared with that of the graduates at University and Technologist's level, the ratio appears to be out of proportion.

#### 4. Teaching staff, Instruments, Curricula and Research

Most of the teaching staff falls either under Civil Engineering or Geography Departments.

Departments of Surveying, Photogrammetry or Topographic Service exist only at those Universities and Colleges where the specialised courses in aerial surveys are given.

As far as instruments are concerned only two institutes (both in the Netherlands) mentioned an analytic plotter. Few departments reported having photogrammetric instruments with automatic coordinate registration devices. A highly significant percentage of the instruments is of the anaglyph type. Those instruments play an important role in training. A significant part of the analogue instruments is rather old and a large number of the instruments are of types which are no longer produced.

As far as tendencies in the contents of the courses are concerned, one sees that increased attention is being given to non-topographic applications and the application of Remote Sensing techniques. Furthermore, emphasis is being placed in digital data-processing.

Research topics were mentioned in some of the questionnaires. Most of the answers concentrated on the applications of Photogrammetry to Engineering and other non-topographic problems; some institutes mentioned projects in Remote Sensing.

#### 5. Conclusions

In 1968 it was estimated<sup>\*</sup> on a world-wide basis that there was one Photogrammetrist (Technicians included!) per 900 km<sup>2</sup>. For the Netherlands and the United Kingdom these figures are in the neighbourhood of one qualified specialist per 100 km<sup>2</sup>. These figures are based on the assumption

\* see Reference (3)

of a constant number of graduates per year.

However, one should not overlook the fact that only a part of the graduates is working in Photogrammetry shich makes the figure more likely to be about 1 per 200 to 300  $\text{km}^2$ .

At present there is no specialised Training in Photogrammetry and Remote Sensing in the Irish Republic.

A very small number of graduates at technician level is being trained at present compared with that of University level which leads one to the conclusion that there must be an increase in the number of trained technicians with a recognized diploma.

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### Education

## Degrees/Diplomas/Certificates

	England		ee/Dip]	loma/C	Certificate	Duration of	Photogra Remote	ammetry and e Sensing	Students		Source
	England	BA/ BSc CE	BA/ BSc Geogr.	HND C.E.	Others	(years)	lectures (hrs)	Tutorials/ Practicals (hrs)	per year	Remarks	of data
	Aston in Birmingham				MPhil/PhD	2-4	n.a.	n.a.	3	Full time Research	Q
	11	x						60	20		Q
	Birmingham	x					8	3	45		3
	11		х				8	16	50		3
	u.		х				40	60	2	optional	3
	Bradford	x					8	6	70		3
	Bristol		х				5	15	60		3
			х				12	29	8	optional	3
	Cambridge	x				3	4	8	150		Q/3
			х				3	8	85		3
-0	1		х				16	44	7	optional	3
tie:	City University, London	x				5	10	8	60		Q
rsi.	Durham		х				no	o data			6
ive	Hull		х				6	15	72		3
υn	Keele		х			3/4		36	25	Remote Sensing	Q
	Leeds	x					11	22	50		3
	u .				MSc.Eng.		15	30	ε		3
			х				11	30	10		3
	Leicester		х				10	10	33		3
	London, King's Sollege		x				4	3	30		3
	Imperial College	x					11	4	60		3
	"				BSc/MSc mining		6	3	35		З

## Education

### Degrees/Diplomas/Certificates

	England (continuation)	Degr	ee/Dip]	Loma/C	ertificate	Duration of	Photogra Remote	mmetry and Sensing	Students		Source
		BA/ BSc CE	BA/ BSc Geogr.	HND C.E.	Others	study (years)	lectures (hrs)	Tutorials/ Practicals (hrs)	per year	nemarks	of data
	London, Queen Mary College	x					10	4	35		3
	11		х				10	10	35		3
	University College	x					3	3	32		3
	11	x					24	94	4	optional	3
			х				4	8	55		3
	п		х				35	26	4	optional	3
	11				MSc Dast Grad	1	300	420 + project	8	PhD possible	Q
	n n				Post-Grad. course in Land Surv.		20	60			3
	Manchester	x					14	21	62		3
ies	11	x					10	-	75	optional	3
sit	Newcastle upon Tyne	x			<b>D</b> · J ·		6	-	50		3
ver	n				Dipl. in Highway Eng		10	30	18		3
Un.	'1		x				15	9	15		3
	11		х				10	20	6	optional	3
	11				BSc Surv.	3	90	140	8	MSc, PhD possible	Q
	Nottingham	x					5	8	48		3
	11	x					16	8	11	optional	3
	Oxford				BSC Eng. Science		8	16	1	optional	Q/3
	11		x				8	16	20	optional	Q/3
	Reading				BSc Est.Man.		4	12	12		3
											(

### Education

## Degrees/Diplomas/Certificates

		Degr	ee/Dip	loma/C	Certificate	Duration of	Photogra Remote	mmetry and Sensing	Students		Source
	England (continuation)	BA/ BSc CE	BA/ BSc Geogr.	HND C.E.	Others	(years)	lectures (hrs)	Tutorials/ Practicals (hrs)	per year	Remarks	of data
	Salford	x					4	?	30 (?)		Q
	11				MSc High- way Eng.		30		о	not given this year	Q
	Sheffield	x				3	17	?	80		Q
	11	x				3	22	?	5	optional	Q
	П				MA Land- scape Arch.		12		20		Q
10	Southampton		x				3	6	65		3
tie:	Surrey, Guildford	x					10	40	50		3
niversit	11				MSc High- way Eng.		10	5	10		3
	Sussex, Brighton	x			MSc Highway		2	12	25		3
ñ	''				Eng.		15	21	4		3 -
	York				Housing & Revitalis- ation		n	o data			
	Bolton Inst. of Technology				Degree in Civ.Eng. (CNAA)	4	no	o data	30		Q
es	11			х		3	no	o data	20		Q
leg	11				ниD Building	3	no	o data	20		Q
. Cul	Bristol Polytechnic				BSc Val.& Est.Man.		1(	) (?)	40		Q
Techn	"				HNC Land Surveying		20	) (?)	10		Q

### Education

## Degrees/Diplomas/Certificates

		Degr	ree/Dip	loma/C	ertificate	Duration of	Photogra Remote	ammetry and e Sensing	Students		Source
	England (continuation)	BA/ BSc CE	BA/ BSc Geogr	HND C.E.	Others	(years)	lectures (hrs)	Tutorials/ Practicals (hrs)	per year	Remarks	of data
	Ewell Tech.College, Surrey				HNC Eng.		8	3	40		3
	n				HND Build.		8	6	16		3
	Hatfield Polytechnic	x					appr	· 10	60		Q
	u .			x			appr	. 10	30		Q
	Kingston Polytechnic, Surrey		x				nc	data	12		Q
	Lanchester Polytechnic, Coventry	x					appr	· . 4	40 (?)	optional	Q
	Polytechnic of Central London	x					33	6	60		Q
Ì	"	x					72	24	3	optional	Q
	North East London Polytechnic				BSc Surv.	3	120	to 180 (?)	40		Q
seges					Diploma Land Surv.	21/2	nc	o data	32		Q
Colle	n				HNC Photogr	2 (part- time)	·nc	o data	2		Q
al	n	x					6		6		3
nic	ч 1			х			6	6	20		3
lech	Portsmouth Polytechnic				BSc (Science	3	90	150	15	incl. Remote Sensing	Q
L	"		х			3	30	30	50		Q
	Sheffield Techn. College	x					10	20	23		3
	••			x			4	8	30		3
	Royal Military College, Shrivenham	x					7	30	20		Q
	Sunderland Techn. College	x					6	9	25		З

### Education

## Degrees/Diplomas/Certificates

## with component courses in Photogrammetry and Remote Sensing

		Degr	ee/Dip]	Loma/C	ertificate	Duration of	Photogra	ammetry and e Sensing	Students		Source
-	England (continuation)	BA/ BSc CE	BA/ BSc Geogr.	HND C.E.	Others	(years)	lecture: (hrs)	Tutorials/ Practicals (hrs)	per year	Remarks	of data
	Wigan Technical College	x					20	10	40		3
	U			x			12	9	30		3
	Willesden Tech. Coll. London				HND Build.		12	3	24		3
					Dip.Est. Man.		9	3	20		3
S	Kingston College of Further Education				HNC Phot(? HNC Cart(?		r r	no data no data			6 6
ollege	Oxford College of Technology				Cert. in Cartogr.	1		some			З
ical Col	School of Military Survey, Newbury				Post Grad.		97	160	28		3
hnic	"				Pr.Air. Surv.Tech.			500	6-10		3
Tecl	11				Int.Air. Surv.Tech.			300	6-10		3
	11				Adv.Air Surv.Tech.			700	6-10		3
	Wales	•							<u></u>	999 - Hannes Harley and San	-
	Aberystwyth		x				12		100		Q
10	11		x				84		10	optional (?)	Q
ties					BSc Env.Sc.		15		15		Q
versit	Swansea		х		Post Grad.	1	60	0-120 (?)	5 (?)		Q
Univ					dipl. Cart.		ر				

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### Education

## Degrees/Diplomas/Certificates

		Degr	ree/Dip	loma/C	ertificate	Duration of	Photogra Remote	mmetry and Sensing	Students		Source
	Scotland	BA/ BSc CE	BA/ BSc Geogr	HND C.E.	Others	study (years)	lectures (hrs)	Tutorials/ Practicals (hrs)	per year	Remarks	of data
	Aberdeen		x				10	20	80		3
					MSc Ecology		3	9	7		3
	n				MSc Reg. Res.		10	20	16		3
	Dundee	x					5	-	30		3
	Edinburgh	x					12	18	no data		3
	11		х			4		92	30		Q
	"				MA Geogr.			54	6		Q
	Glasgow	x					9	12	45		3
ies			х		Roat Crod	4	120	200	6		Q
rsit	11				diploma	1	220	200	3	-	Q
ive	11	]			M.Appl.Sc.	2	220	200	4	PhD possible	Q
- n	St. Andrews				MA Geogr.		5	25	20		3
	Stirling				Env. Sc.		36	40	13		Q
	Strathclyde	x					3		80		3
	11				MSc Highway		10	2	6		3
•	Paisley College of Technology	x				4	10		50		0
Coll	n				Degree Land Econ.	4	6		50		Q
lechn.	11				(RICS students)		З		20		Q

### Education

### Degrees/Diplomas/Certificates

Northern Ireland	Degree/Diploma/C BA/ BA/ BSc BSc CE Geogr.	Certificate Others	Duration of study (years)	Photogra Remote lectures (hrs)	ammetry and e Sensing Tutorials/ Practicals (hrs)	Students per year	Remarks	Source of data
Queen's Univ., Belfast "	x x			sc 10	ome 10	no data 70		Q 3
Irish Republic			- 	• •		•		•
University College Dublin	x		4	15		30		Q
College of Technology, Dublin		Cert./Dipl.	2/3	nc	o data	8		Q
Netherlands			-	•		-		
University of Technology, Delft Intern. Inst. for Aerial	Ir. Geod. Sc.		5	120	80	10		Q
Survey and Earth Sciences (ITC) Enschede	MSc Photogramme	etry	1½ *	200 + 1	chesis	6–8		Q
	Post Grad. Dipl	l. Photogr.	1	380	600	30		Q
	Technologist "	ч	1	370	600	40	incl. students of Dutch mapping or- ganisations	Q
	MSc Cartography	7	1½ *	son	ne	2		Q
	Post Grad. Dip:	l. Carto.	ì	sor	ne	15		Q
	Technologist "		1	Sor	ne	10		Q
	Northern Ireland Queen's Univ., Belfast " Irish Republic University College Dublin College of Technology, Dublin Netherlands University of Technology, Delft Intern. Inst. for Aerial Survey and Earth Sciences (ITC Enschede	Northern Ireland   Degree/Diploma/G     BA/ BSc CE   BA/ BSc Geogr.   HND C.E.     Queen's Univ., Belfast   x     "   x     Irish Republic   x     University College Dublin   x     College of Technology, Dublin   x     Netherlands   Ir. Geod. Sc.     University of Technology, Delft   Ir. Geod. Sc.     Intern. Inst. for Aerial   MSc Photogramme Post Grad. Dipi Technologist "     MSc Cartography Post Grad. Dipi Technologist "	Northern Ireland   Degree/Diploma/Certificate     BA/ BSc   BA/ BSc   BA/ BSc   HND BSc   Others     Queen's Univ., Belfast   x   x   x     Irish Republic   x   x   x     University College Dublin   x   Cert./Dipl.     College of Technology, Dublin   Cert./Dipl.     Netherlands   Ir. Geod. Sc.     University of Technology, Delft   Ir. Geod. Sc.     Intern. Inst. for Aerial Survey and Earth Sciences (ITC) Enschede   MSc Photogrammetry Post Grad. Dipl. Photogr.     Voite Cartography Post Grad. Dipl. Carto.   Technologist " "	Degree/Diploma/Certificate Duration of study   BA/ BSC CE BA/ BSC Geogr. HND C.E. Others Duration of study   Queen's Univ., Belfast " x x Image: Center of the state of the study Image: Center of the state of the study   Queen's Univ., Belfast " x x Image: Center of the state of the study Image: Center of the state of the state of the study Image: Center of the state of the st	Degree/Diploma/Certificate Duration of study (years) Photogra Remote study (years)   Queen's Univ., Belfast " x 0 10   Queen's Univ., Belfast " x 10   Irish Republic x 10   University College Dublin x 4 15   College of Technology, Dublin Cert./Dipl. 2/3 nc   Netherlands Ir. Geod. Sc. 5 120   University of Technology, Delft Ir. Geod. Sc. 5 120   Intern. Inst. for Aerial Survey and Earth Sciences (ITC) Enschede MSc Photogrammetry Post Grad. Dipl. Photogr. 1 380   MSc Cartography Post Grad. Dipl. Carto. 1 370 370   MSc Cartography Post Grad. Dipl. Carto. 1 sor	Degree/Diploma/Certificate Duration of Study (years) Photogrammetry and Remote Sensing   Northern Ireland BA/ BSC CE BA/ C.E. HND C.E. Others Photogrammetry and Remote Sensing   Queen's Univ., Belfast " x some Iectures Practicals (hrs) Tutorials/ (hrs)   Queen's Univ., Belfast " x some 10 10   Irish Republic x 4 15 -   University College Dublin x 2/3 no data   Netherlands Ir. Geod. Sc. 5 120 80   University of Technology, Delft Ir. Geod. Sc. 5 120 80   Intern. Inst. for Aerial Survey and Earth Sciences (ITC) Enschede MSc Photogrammetry Post Grad. Dipl. Photogr. 1 380 600   MSc Cartography Post Grad. Dipl. Carto. Technologist " 1 370 600	Degree/Diploma/CertificateDuration of of studyPhotogrammetry and Remote SensingStudentsNorthern IrelandBA/ BSC CEBA/ BSC CEDA/ CEOthersOthersPhotogrammetry and rutorials/ (years)StudentsQueen's Univ., Belfast "xSomeno data"x101070Irish Republicx415-University College Dublinx4415-Survey and Earth Sciences (ITC) EnschedeIr. Geod. Sc.512080NetherlandsIr. Geod. Sc.51208010Mice Cartography Post Grad. Dipl. Carto.11/2 **30060030Mice Cartography Post Grad. Dipl. Carto.130060030Mice Cartography Post Grad. Dipl. Carto.1some1010	$\begin{array}{c c c c c c c c c c c c c c c c c c c $

### Education

### Degrees/Diplomas/Certificates

	Netherlands (continuation)	Degree/Diploma/Certificate	Duration of study (years)	Photogrammetry and Remote Sensing lectures Tutorials/ (hrs) Practicals (hrs)	Students per year	Remarks	Source of data
Universities, Technical Colleges	Intern. Inst. for Aerial Survey and Earth Sciences (ITC) Enschede	Post Grad. Dipl. Aer. Photo- graphy Technologist " " " Dipl. Data Proc. in Phot. Technician's Dipl. Photogr. Technician's Dipl. Carto. Post Grad. Dipl. Geology MSc Geology Post Grad. Dipl. Geomorph. MSc Geomorphology Post Grad.Dipl. Geomorph. MSc Soil Survey Technologist Dipl. Forestry Post Grad. Dipl. Forestry MSc Forestry Post Grad.Dipl. Rural Surv. MSc Rural Survey Post Grad. course Remote Sensing	1. 1 ½ 1 1 1½ * 1 1½ * 1 1½ * 1 1½ * 1 1½ * 1 1½ * 1 1½ * 1 1½ * 1 1½ * 2 months	260 540 260 540 appr.50 800 220 600 some 24 <sup>***</sup> 40 <sup>***</sup> 24 <sup>***</sup> 40 <sup>***</sup> 32 <sup>***</sup> 40 <sup>***</sup> 32 <sup>***</sup> 80 <sup>***</sup>	20 1-2 30 15 30 2 15 2 20 4 5 30 3 15 1 15 1	incl. students of Dutch mapping or- ganisations	<i>Q Q Q Q Q Q Q Q Q Q</i>

### Table II

### Equipment for Photogrammetry and Remote Sensing

land	Dept.	Analyt. Instr, Analogue Instr. (excl. Ana-	Anaglyph Instr.	Compa- rators	Approx. Instr.	Recti- fiers	Came:	ras	R.S. Equip-	small instr.	
		glyph Instr.)					eri	err	ment		source
							0	4			of data
ton in Birmingham	C.E.	2						2		yes	Q
rmingham	C.E.							2		yes	3
0	Geogr.				1					yes	3
adford	C.E.	1								yes	3
vistol	C.E.	1 (?)		1 (?)				1 (?)		?	3
11	Geogr.		1			1	1			yes	6
mbridge	C.E.	1	1	2					?	yes	Q
11	Geogr.	1	1	1			1			yes	3
ty University, London	C.E.	1	1	1				1	no	yes	Q
Irham	Geogr.	1	1							yes	3
11	Geogr.	1								yes	3
eele	Geogr.								yes	yes	Q
eds	C.E.		1							yes	3
	Geogr.	1	4							?	6
eicester	Geogr.									yes	3
verpool	Geogr.									yes	3
ondon, Imperial College	mining						1			yes	3
Kings College	Geogr.									yes	3
Jniversity College	Geogr.									yes	3
н	phot.& surv.	9		3	1	1		5		yes	Q
ugh <b>boroug</b> h	C.E.							1		ves	3,0
Inchester	C.E.	1	2	2 (?)				2		ves	3/6
	:			1						V	
	land ton in Birmingham rmingham " adford istol " mbridge " ty University, London rham ll ele eds " icester verpool ndon, Imperial College Kings College Jniversity College " "	landDept.ton in BirminghamC.E.rminghamC.E."Geogr.adfordC.E.istolC.E."Geogr.mbridgeC.E."Geogr.ty University, LondonC.E.rhamGeogr.llGeogr.eleGeogr.edsC.E."Geogr.icesterGeogr.verpoolGeogr.ndon, Imperial CollegeGeogr.University CollegeGeogr.ughboroughC.E.nchesterC.E.	land Dept. Analogue Instr. Analogue Instr. (excl. Ana- glyph Instr.) ton in Birmingham C.E. 2 rmingham C.E. 2 Geogr. adford istol C.E. 1 C.E. 1 (?) "Geogr. mbridge C.E. 1 (?) "Geogr. 1 ty University, London rham C.E. 1 (?) "Geogr. 1 ty University, London rham 1 ele eds C.E. 1 Geogr. 1 deogr. 1 geogr. 1 Geogr. 1 Geogr. 1 icester verpool ndon, Imperial College Jniversity College Geogr. yniversity College Jniversity College Surv. 9 ughborough nchester C.E. 1	landDept.Analogue Instr. (excl. 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## Equipment for Photogrammetry and Remote Sensing

(continuation)

		r	(001101)			1		1		4		•
England		Dept.	Analyt. Instr. Analogue Instr.	Anaglyph	Compa-	Approx.	Recti-	Came	ras	R.S.	small	
	England		(excl. Ana-	Instr.	rators	Instr.	fiers	al		Equip-	instr.	
			glyph Instr.)					erj	eri	ment		source
	T	<b> </b>						0				of data
	Newcastle upon Tyne	Surv.	3	2	1	1	1		1	no	yes	Q
	Nottingham	C.E.	1	1		1					yes	3
	Oxford	surv.&		1				2			ves	3/0
es	Reading	C.E.									yes	3
iti	Salford	C.E.		1					1		yes	3/Q
vers	Sheffield	C.E.	1		2	1			2	access to equipment	yes	Q
Uni	Southampton	Geogr.									yes	3
	Surrey, Guildford	C.E.	1	1							yes	3
	Sussex, Brighton	Geogr.									yes	3
	York	Arch.	1						1		ves	6
							ļ					<u> </u>
	Bolton Inst. of Technology	C.E.		1					1		yes	Q
	Brighton Techn. College	C.E.		1							yes	Q/3 <sup>*</sup>
	Bristol Polytechnic	Surv.		1							yes	Q
	Ewell Techn. College, Surrey	Build.E.									yes	3
5	Hatfield Polytechnic	C.E.	1	1							yes	Q
lep	Kingston Polytechnic, Surrey	Geogr.	1								yes	Q
Col	Lanchester Polytechn. Coventry	C.E.		1	1			1	1		yes	Q
I I I	Polytechnic of Central London	CE Unit	1	1	1	1			1		?	9
nica	North East London Polytechnic	Land Surv.	7	7	З	2	1	1		hired	yes	Q
le ch	Portsmouth Polytechnic	Geogr.	2	1		1					yes	Q
Ŀ		C.E.									ves	Q
	ж)	'note: ac	cording to the	questionna	aire, no	, facilitie:	, s exist fo	, or pho	togra	mmetry.	<b>U</b> · -	
F										- 1		

Table II

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### Table II

### Equipment for Photogrammetry and Remote Sensing

(continuation)

	England	Dept.	Analyt. Instr, Analogue Instr. (excl. Ana-	Anaglyph Instr.	Compa- rators	Approx. Instr.	Recti- fiers	Camer:	as	R.S. Equip-	small instr.	
			glyph Instr.)					aeri	teri	ment		source of data
	Sheffield Technical College	C.E.									yes	3
[ 	Royal Military College, Shrivenham	C.E.	2	1					1		yes	Q
ni ca eges	Sunderland Techn. College	C.E.									yes	3
echr olle	Wigan Technical College	C.E.									yes	3
Ϋ́ Τ	Willesden Techn. Coll., London	Build.E.									yes	3
70	Kingston College of Further Education	Gen. studies			no	data						6
here	Oxford College of Technology	?			no	data						3
QtI	School of Military Survey, Newbury	Air Survey	4	18	2	2	1	2			yes	3
ន	BKS Survey Ltd.			<b></b>	no	data		·····		<u></u>		-
tion	Directorate of Overseas Surveys				no	data						-
y i sa	Clyde Surveys Ltd.		Equipment	normally us	sed for p	roduction,	, but avai	ilable f	for	yes	yes	Q
rve gan	Hunting Survey Ltd.		experime	ental work.	• no	data					I	-
su	Ordnance Survey				no	data						-
						And the second se		- <b></b>			<b></b>	<b>4</b>
	Wales			A	<b>.</b>	<b></b>						
1 2 2	Aberystwyth	Geogr.	2	2							yes	Q
Unive sitie	Swansea	Geogr.	5	1		2	2			yes	yes	Q

Table II

Equipment for Photogrammetry and Remote Sensing

	Scotland	Dept.	Analyt, Instr, Analogue Instr. (excl. Ana- glyph Instr.)	Anaglyph Instr.	Compa- rators	Approx. Instr.	Recti- fiers	Cameras terr terr	R.S. Equip- ment	small instr.	source
	Aberdeen	Geogr.	1 (?)					1(?)		ves	6
1	Dundee	C.E.								ves	3
	Edinburgh	Geogr.	4 (?)				1		ves	ves	0
ies	Glasgow	Geogr.	5	5	2	1	1	2	ves	ves	0 0
sit	St. Andrews	Geogr.							U .	ves	3
ver	Stirling	Earth &								yes	Q
Uni	Strathclyde, Glasgow	C.E.	1	1						yes	3
Tech. coll.	Paisley College of Technology	C.E.	1	1				1	no	yes	Q
	Northern Ireland							<b>L</b>	<b>L</b>	L	
ver- ies	Queen's University, Belfast	Geogr.	1							yes	Q
Uni sit	н	C.E.	1							yes	3
			<u> </u>							l <u></u>	
	Irish Republic										
Univ.	University College Dublin	C.E.		1				1	no	?	Q
Tech. coll.	College of Technology, Dublin	Geo Surv.	2	2	1		1		no	yes	Q

### Table II

Equipment for Photogrammetry and Remote Sensing

	Netherlands	Dept.	Analyt. Instr. Analogue Instr. (excl. Ana- glyph Instr.	Anaglyph Instr.	Compa- rators	Approx. Instr.	Recti- fiers	aerial Came:	ras Lu u u u	R.S. Equip- ment	small instr.	source
n. Colleges	University of Technology, Delft Internat. Inst. for Aerial Survey and Earth Sciences (ITC), Enschede	Geod. Phot., A.Ph.& Carto	4	-	-	some **		-	-	no	yes	Q
niversities, Tech	11	Nat.Res. Surveys Urban	27 <b>*</b>	14	2	5 + 24 <sup>**</sup>	2	3	1	yes	yes	Q
	" Agricultural University,	Surv. & Integr. Surv.										
	Wageningen	Surv. Soil Sc.	2	1			1		1	access to equipm.	yes	Q
	State University Utrecht	Geogr.	1	• 1	-	2	-		-	(regular- ly used)	уев	Ŷ

\*) incl. instr. for Orthophotography

\*\*) ITC Stereotrainers

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#### Table III

### Staff for Education and Research in Photogrammetry and Remote Sensing

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### (data based upon questionnaire only)

	England	Dept.	Professors lecturers	Assistants for teaching	Research staff	Technicians	Aux. pers.	Total
	Aston in Birmingham	C.E.	1		8	2	2	13
	Cambridge	Eng.	2	-	-	1/2	part.	2½
	City University, London	(Surv.&	4	3	2	1	1	11
	Keele	Geogr.	1	-	1	_	-	2
ies	London, Univ. College	Phot.& Surv.	6	-	5 <b>*</b>	3	1	15
rsit	Newcastle upon Tyne	Surv.	5		1 <b>*</b>	1	1	8
Unive	Oxford	Surv.& Geod.		no	data			
- - -	Sheffield	C.E.	1	2 (part-time)	2 <b>*</b>	21	-	7
	Bolton Inst. of Technology	C.E.	2			1		3
	Bristol Polytechnic	Surv.	1	-	-	1	-	2
	Hatfield Polytechnic	C.E.	З		1	1		5
	Kingston Polytechnic, Surrey	Geogr.	1	-	-	1	-	2
səgə	Lanchester Polytechnic, Coventry	C.E.	1	_	_	1	_	2
ll€	Polytechnic of Central London	CE Unit	2		-	1	-	3
al Cc	North East London Polytechnic	Land Surv.	5			2	1	8
licé	Portsmouth Polytechnic	Geogr.	2	1	1	1	-	5
Techr	Royal Military College, Shrivenham	C.E.	1	1	2	1		5
Others	Cl <b>yde Sur</b> vey Ltd.	-			6			6

\*) Post-grad. students

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#### Table III

### Staff for Education and Research in Photogrammetry and Remote Sensing

### (data based upon questionnaire only)

	Wales	Dept.	Professors lecturers	Assistants for teaching	Research staff	Technicians	Aux. pers.	Total
er- es	Aberystwyth	Geogr.	1		1	1		3
Univ siti	Swansea	Geogr.	2	-	-	1	-	3
	Scotland	<b>-</b>	• · · · · · · · · · · · · · · · · · · ·	••••••••••••••••••••••••••••••••••••••		<b>*</b>		
	Edinburgh	Geogr.	2		1	2	1	6
ver ies	Glasgow	Geogr.	6		4 <b>*</b>	5	4	19
Uni sit	Stirling	Earth & Env. Sc.	5	2	4	2	1	14
Tech. Coll.	Paisley College of Technology	C.E.	2	-	-	1	_	3
	Northern Ireland					<b></b>		
Univ.	Queen's Univ., Belfast	Geogr.	2	-	2	3	-	7
	Irish Republic							
Univ.	University College Dublin	C.E.	1	-	-	1	1	3
Tech. Coll.	College of Technology, Dublin	Geo-Sur.	3	2		1		6
	Netherlands		<b>.</b>	•	9	*		
Univer- sities	University of Technology, Delft	Geod.	3					3

#### Table III

### Staff for Education and Research in Photogrammetry and Remote Sensing

	Netherlands (continuation)	Dept.	Professors lecturers	Assistants for teaching	Research staff	Technicians	Aux. pers.	Total
olleges	Internat. Inst. for Aerial Survey and Earth Sciences (ITC), Enschede	Phot., A.Ph.& Cart.	36	19	5 <b>***</b>	19 _	5	84
ch. C	п	Nat.Res. Surveys	32	3		2	6	43
ies, Te		Urban S. & Integ. Surveys	16	1			3	20
it	Agricultural University,	Min.Expl.	5			1	2	8
ers	Wageningen	Surv.	1	1		1½		3½
∖ir	11	Soil	1	1				2
O <sup>L</sup>		Physics	1 **	1				2
	State University Utrecht	Geogr.	1	1				2

(data based upon questionnaire only)

