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Directory of Research and Development

based on

Ordnance Survey Small Scales Digital Data

M. Visvalingam and G. H. Kirby

Produced by the CISRG on behalf of the Ordnance Survey

November 1987

List of CISRG reports:

Discussion Papers

1. Wade, P., Visvalingam, M. and Kirby, G.H. (1986)
   From Line Geometry to Area Topology, 48 pp.

2. Visvalingam, M. (1987)
   Problems in the Design and Implementation of a GKS-based User Interface for a Graphical Information System, 18 pp.

Special Issues

Visvalingam, M. (ed.) (1986)
Research based on Ordnance Survey Small-Scales Digital Data
Proceedings of a meeting held as part of the 1986 Annual Conference of the Institute of British Geographers (Reading, Jan 1986), 79 pp.

Visvalingam, M. and Kirby, G.H. (1987)
Directory of Research and Development based on Ordnance Survey Small Scales Digital Data, 38 pp.

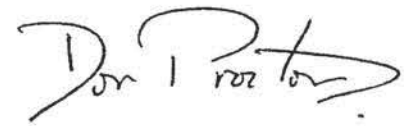
FOREWORD

Although Digital Topographic Data can be used to assist in the production of some Ordnance Survey (OS) maps it has been clear for some years that the justification for the capture of digital data has to be that users require it, and are willing to buy it. In order to achieve this situation it is necessary that users discover applications which make the data a desirable commodity and that OS design the structure and format of the data so as to satisfy as many potential customers as possible.

Both of these conditions depend on research activities. For this reason OS has been happy to support the collection of information for the first edition of this Directory. Ideally it should serve to promote an exchange of ideas between researchers in similar fields, to bring together possible partners for collaborative ventures, to avoid duplication of effort, to publicise applications for digital data and thus to enable OS to improve the data itself with experience gained.

During 1987 a digital version of Sheet 111 of the OS 1:50 000 series has been made available on an experimental basis. To await returns on this would have been an unacceptable delay so this Directory is to appear without any reference to it. Hopefully a further edition will be able to correct this. The more complete the Directory can become, the more it will be consulted and the better it can serve its objectives. All researchers who have not contributed yet are asked to do so; those who have are asked to provide updates.

Finally I would like to thank all those who have made this possible: firstly, of course, the Editors, Mahes Visvalingam and Graham Kirby of the Cartographic Systems Information Research Group (CSIRG) in the University of Hull, their various helpers on the production side, and, not least, all those who have contributed. Let us all endeavour to make the next edition even more useful.



D W PROCTOR
Head of Research
and Development
Ordnance Survey

Southampton
11 November 1987

C O N T E N T S

Editors' Notes

The compilation of this directory was sponsored by the Ordnance Survey. The aim is to publicise and promote research based on OS small scales digital data. We hope that researchers, administrators, managers and other users of research and the general public will find this directory of assistance in locating research partners, results and products. We also hope that it will help workers to avoid duplication of research and to identify gaps in research activity.

This directory includes not only on-going and completed research projects, but also a statement of research interests. The aim is to encourage dispersed researchers to form research 'clubs' on specific themes. Full addresses are included.

The entries are organised into three sections:

A : Academic Institutions

B : Government and Public Services

C : Private Sector, including private individuals

Within each section, items are ordered alphabetically by the name of the institution and then the name of the principal investigator. The numbering of items is continuous through all sections. The Name and Keyword Indices refer to these numbers.

At present the OS provides the following small-scale data in digital form.

1 : 625 000	Database (digitised from the Routeplanner Map for Great Britain)
1 : 50 000	Trial digital data set (digitised from Sheet 111 of OS 1:50 000 Mapping)
	Contours digitised from 1:50 000 series and/or digital terrain model on a 50m grid derived therefrom (Whole of Great Britain in hand, only Wales and SW England available Autumn 1987).

We would like to thank all those who have contributed to this directory in a variety of ways, especially Don Proctor of the Ordnance Survey for his support, Helen Lythgoe for her secretarial assistance, Andrew Colin and John Hayes for developing a sofware system for directory compilation and for assisting with the production of this volume during their summer vacations and to all those who have contributed entries. This directory will be periodically updated. Those wishing to contribute items should contact Mahes Visvalingam at the address provided in the title page.

G. H. Kirby and M. Visvalingam
November 1987

Academic Institutions

(Listed in Alphabetical Order)

1 **Institution:** University of Bath.
Name: Wise, Mr. S.M.
Department: South West Universities Regional Computer Centre (SWURCC).
Telephone: 0225 826018
Janet/PSS Address: SC_SMW@UK.AC.BATH.UX63
Research Interests:

I am undertaking a small project on behalf of some SWURCC users, to discover the 1981 electoral ward in which the respondents in their survey live.

Synopsis:

I have written a small Fortran 77 program to discover the ward in which each data point lies. An initial search is performed using the county boundaries, after which the wards within the relevant county were searched.

This software was developed for Brian Rogers and Mark Dowies of the MRC funded National Survey of Health and Development. Having derived the National Grid co-ordinates from the postcodes of respondents, they used the software to assign a 1981 electoral ward to each respondent. This application used the boundary files digitised by GIMMS on behalf of the Department of Environment and Scottish Development Department. The software may be used with restructured OS data.

Keywords: Administrative boundaries; Point-in-Polygon
Hardware used: ICL Series 39 Level 80
Software used/written:
Languages: FORTRAN 77 (program written by S.M. Wise)
OS Data in use:
Scale(s): 1:50 000
Area(s): Great Britain

Feature(s): Administrative Boundaries
Format in use: Vector

2 **Institution:** Birkbeck College London
Name: Finch, Ms. S.
Department: Geography
Telephone: 01 631 6481
Janet/PSS Address: A5163000
Project Title:
The Restructuring and Analysis of OS Digital Data for 1:50 000 Scale Sheet 76 Girvan
Synopsis:
Project to restructure digital data for OS 1:50 000 Series Sheet 76. A series of analytical procedures were to be carried out on the restructured data. The overall purpose of the project is to produce structured data which can be tested, and to trial the ARC/INFO system.

Collaborating/Funding Agency: Ordnance Survey
Project Duration: October 1985 to April 1986
Keywords: Restructuring; ARC/INFO
Hardware used: VAX 11/750; HP 7585B Plotter; Tektronix 4115B, 4107
Software used/written:
Languages: FORTRAN 77 by S. Finch
Packages: ARC/INFO
Libraries: IGL
OS Data in use:
Scale(s): 1:50 000
Area(s): Sheet 76 - Girvan
Feature(s): Roads; Streams; Coastline; Vegetation; Boundaries; Place names
Format in use: Vector

Results available:

Self-generated data:

Structured data has been supplied to OS under contract.

Reports:

Not yet available

3 **Institution:** Birkbeck College London
Name: Mounsey, Dr. H. and Colclough, Ms. J.
Department: Geography
Telephone: 01 631 6248
Janet/PSS Address: A5163000
Project Title:

BBC Domesday Project

Synopsis:

To commemorate the 900th anniversary of the Domesday Book, the BBC is collecting text, pictures and data, putting together a picture of Britain in the 1980's on interactive video disk. In order to map much of the data on this disk, some 500 very simple maps had to be produced very quickly. Birkbeck College, acting as contractors for this part of the project, obtained the 1:625 000 digital database from the OS, and loaded selected features (coast, main roads and cities) into ARC/INFO, a sophisticated GIS. Maps were then produced covering different parts of the country at various scales. The exercise is more fully described in a conference paper (see Reports)

Collaborating/Funding Agency: B.B.C.
Project Duration: October 1984 to February 1986
Keywords: video disc
Hardware used: VAX 11/750; HP 7585B plotter
Software used/written:
Languages: FORTRAN
Packages: ARC/INFO

OS Data in use:

Scale(s): 1:625 000
Area(s): Whole of Great Britain
Feature(s): All features in 1:625 000 database
Format in use: Vector

Results available:

Reports:

Mounsey, H. "Uses of the OS 1: 625 000 digital database : the Domesday experience", in Visvalingam, M. (ed.) Research based on Ordnance Survey Small Scales Digital Data, CISRG, University of Hull, 1986, 24 - 34.

4 **Institution:** University of Durham
Name: Blakemore, M. J.
Department: Geography
Telephone: 0385 64971 ext. 696
Janet/PSS Address: 000014000500/234263259159

Research Interests:

General teaching, postgraduate research using 1:625 000 data

Keywords: Data structures; Accuracy; Feature coding
Hardware used: AMDAHL V8; MTS Operating system

Software used/written:

Languages: FORTRAN 77; Pascal
Libraries: Calcomp

OS Data in use:

Scale(s): 1:625 000; 1:50 000 test tape
Area(s): Eastern England
Feature(s): All available features
Format in use: Vector

Feedback required from others:

Edge-matching results; Feature extraction results

5 **Institution:** University of Hull
Name: Kirby, Dr. G. H. and Visvalingam, Dr. M.
Department: Cartographic Information Systems Research Group (CISRG)
Telephone: 0482 465228
Janet/PSS Address: ghk@UK.AC.HULL.CS
Project Title:
Storage and Retrieval of Topographic Data using a Relational Database Management System
Synopsis:
This project was to transfer a part of the OS 1:625 000 digital map data into a database managed by a commercially available database management system (DBMS). RAPPORT was chosen.
The following topics were covered:
i) the techniques of such a transfer
ii) problems involved and suggested solutions
iii) the suitability of a relational DBMS for storage and retrieval of topographic data.

Collaborating/Funding Agency:
Ordnance Survey
Project Duration: July to December 1985 (Stage 2)
Keywords: Topographic data; RAPPORT; Relational DBMS; Data Retrieval
Hardware used: CDC 7600
Software used/written:
Languages: FORTRAN
Packages: RAPPORT
OS Data in use:
Scale(s): 1:625 000
Area(s): Wales
Feature(s): Administrative boundaries and area seeds
Format in use: Vector
Results available:
Reports:
Kirby, G. H., Wade, P. and Visvalingam, M. "Storage and

Retrieval of Topographic Data using a Relational Database Management System". Stage 2 Report, Ordnance Survey Contract on Computer Handling of OS 1:625 000 Digital Maps, April 1986.

Feedback required from others:

Related work using relational DBMS

6

Institution: University of Hull
Name: Visvalingam, Dr. M. and Kirby, Dr. G. H.
Department: Cartographic Information Systems Research Group (CISRG)
Telephone: 0482 465295
Janet/PSS Address: ghk@UK.AC.HULL.CS

Project Title:

Computer Handling of OS 1:625 000 Digital Maps

Synopsis:

The OS 1:625 000 digital data for administrative areas consist of feature-coded boundary segments, called links (which describe the geometry), and representative points, called area seeds (which carry the attributes of the area, such as its name). The aim of the project was to extract a complete description of hierarchically related area objects from these feature-coded map details. The project confirmed that the experimental OS database design (which considered the cost effective capture of data to be one of the most important requirements) was adequate in concept, structure and content for the extraction of polygons and their full topological and other attribute-based relationships. We have developed a systematic and efficient procedure for an exhaustive spatial search which will extract these relationships and encode them in a convenient intermediate form. This can be used for cross checking that the given attributes of areas are consistent and for identifying missing data and inferring these where possible.

Academic institutions **(6)**

Collaborating/Funding Agency:
Ordnance Survey

Project Duration: January 1985 to June 1985 (Stage 1)

Keywords: Data structures; Data processing; Data validation; Topology; Administrative areas

Hardware used: ICL 2960; Calcomp plotter

Software used/written:

Languages: FORTRAN 77 by P. Wade

Libraries: GINO-F

OS Data in use:

Scale(s): 1:625 000

Area(s): Wales

Feature(s): Administrative boundaries and Area seeds

Format in use: Vector

Results available:

Reports:

Visvalingam, M., Kirby, G. H. and Wade, P. "Extraction of a Complete Description of Hierarchically Related Area Objects from Feature-Coded Map Details". Stage 1 report, Ordnance Survey contract on Computer Handling of OS 1:625 000 Digital Maps, July 1985.

Wade, P. "Derivation of Hierarchic Area Objects from Feature-Coded Vectors" in Visvalingam, M. (ed.) Research Based on Ordnance Survey Small Scales Digital Data, CISRG, University of Hull, 1986, 61-70.

Wade, P., Visvalingam, M. and Kirby, G. H. "From Line Geometry to Area Topology". CISRG Discussion Paper 1, 1986, University of Hull, 46 pp.

Visvalingam, M., Wade, P. and Kirby, G.H. (1986) "Extraction of Area Topology from Line Geometry" in Blakemore, M. (ed.) Auto Carto London: international conference on the acquisition, management and presentation of spatial data, 14-19 Sept 1986, vol 1, 156 - 165.

Services on offer:

Data re-structuring and validation

Feedback required from others:

Interested in applications which require fully structured topographic data for areas.

7 **Institution:** University of Hull
Name: Kirby, Dr. G.H. and Visvalingam Dr. M.
Department: Computer Science
Telephone: 0482 465295
Janet/PSS Address: ghk@UK.AC.HULL.CS

Project Title:

Management of Digital Map Data using a relational database model.

Synopsis:

The project will investigate the need to:

a) ease update of the database;
b) maintain logical consistency of the database during update operations;
c) optimise performance of load, search and update operations;
d) minimize the size, and thus cost, of creation and maintainance of the database given the excessive projected requirements.

Collaborating/Funding Agency: Ordnance Survey.
Project Duration: October 1987 to September 1988.
Keywords: Sheet 111; 1:50 000; relational databases
Hardware used: ICL 3980; VAX 8200
Software used/written:
Languages: Fortran 77
Packages: ICL CAFS; INGRES; Britton-Lee Database Machine

OS Data in use:

Scale(s): 1:50 000

Area(s): Sheet 111 - Sheffield and Doncaster

Feature(s): All

Format in use: Vector

Feedback required from others:

Relevent documentation produced by others on their experience with relational databases.

8 **Institution:** Kings College, London

Name: Lawrence, Mr. G.R.P. and Tatham, Dr. A.F.

Department: Geography

Telephone: 01 836 5454

Janet/PSS Address: 000005141000 UDFA040

Research Interests:

Using Ordnance Survey Small-Scales Digital Data as a teaching tool.

Feedback required from others:

Advice!

9 **Institution:** University of Leeds

Name: Hogg, Dr. J.

Department: Geography

Telephone: 0532 431751 ext. 557

Project Title:

Terrain Evaluation Using Geographical Information Systems Based on Linear Quadtrees and a relational database management system.

Collaborating/Funding Agency:

University of Leeds

Project Duration: Three years from October 1985

Keywords: Linear quadtrees; Remote sensing; Regional analysis; Data structures;

Knowledge-based GIS; Thematic mapping; Relational DBMS

Hardware used: VAX 11/750 (Unix); VAX 11/780 (Unix)

Software used/written:

Languages: C

Packages: INGRES

Other data in use: Raster scanned OS 1:10 000 maps

Feedback required from others:

Raster scanned polygonal data of separate features on a small scale OS map are required - heights, soils, vegetation, climate etc. to combine with MSS remote sensing data.

Results available:

Reports:

Hogg, J., Gahegen, M. and Stuart, N. (1986) "Evaluation of regional land resources using Geographic Information Systems (GIS) based on linear quadtrees", International Archives of Photogrammetry and Remote Sensing, 26(7), 2: 917 - 925.

Hogg, J. and Gahegen, M. (1986) "Regional analysis using Geographic Information Systems based on linear quadtrees". International Archives of Photogrammetry and Remote Sensing, 26(4), 113 - 124.

Gahegen, M. and Hogg, J. (1986) "A pilot Geographical Information System based on linear quadtrees and a relational database for regional analysis" in Diaz B.M. & Bell S.B.M.(eds) Spatial Data Processing using Tesseral Methods, NERC, Swindon, 213 - 231.

10 **Institution:** University of Leeds

Name: Hogg, Dr. J. and Stuart, N.

Department: Geography

Telephone: 0532 431751 ext. 557

Research Interests:

Application of Geographical Information Systems using linear quadtrees for regional evaluation of land resources

Keywords: Thematic mapping; Data structures; Knowledge-based Geographical Information Systems

Hardware used: VAX 11/750 (Unix)

Software used/written:

Languages: C

Other data in use: Raster scanned OS 1:10 000 maps

Remarks:

Neil Stuart, funded by a University scholarship for three years, has just begun his research project on the application of GIS using linear quadtrees for regional analysis of land resources. He has completed a review which is not yet available and has begun collecting data using a video digitiser and separate layers from the OS 1:10 000 map of Matlock.

11 **Institution:** University of Newcastle upon Tyne

Name: Parker, Dr. D.

Department: Surveying

Telephone: 091 232 8511 ext. 2447

Research Interests:

Development on a microcomputer of a graphical editing/ information searching package for spatial data: SLIMPAC Surveyors Land Information Management PACkage.

Collaborating/Funding Agency: Ordnance Survey, Longdin & Browning Surveys

Keywords: Data structures; Information searching; Graphical editing

Hardware used: Apricot; RM Nimbus

Software used/written:

Languages: Pascal

Packages: Superfile (Database), AUTOCAD

Libraries: GSX

Other data in use: OS large-scale digital data for parts of Tyne and Wear; Own field survey data

Remarks:

No small-scale data in use as yet. Would like small sample sets of both 1:50 000 and 1:625 000 for research.

Results available:

Reports:

Parker D., Rautenbach, A, Hosken, E., Ritchie, A. and others (1986) SLIMPAC: Surveyors Land Information Package, Edition 2.0. Department of Surveying, University of Newcastle upon Tyne, 16pp

12 **Institution:** North East London Polytechnic

Name: Dale, Dr. P. F.

Department: Land Surveying

Telephone: 01 590 7722

Research Interests:

Interpolating contours at 1400, 1800, 2200, 2400, 2600 and 2800 feet to complete the contour range in 1:625 000 Data set 2

Keywords: Contour Interpolation; OS 1:625 000;

Hardware used: PRIME 750

Software used/written:

Languages: FORTRAN 77

OS Data in use:

Scale(s): 1:625 000

Area(s): Cumbria

Feature(s): Contours

Format in use: Vector

Feedback required from others:

Any

Remarks:

Results not yet available (currently a student project)

13 **Institution:** University College London
Name: Dowman, Dr. I.
Department: Photogrammetry and Surveying
Telephone: 01 387 7050 ext. 7226
Janet/PSS Address: dowman@ucl.euclid@janet
Research Interests:

Investigation of satellite data for topographic mapping including thematic mapper, SPOT and SAR. Productions of orthoimages and Digital Elevations Models (DEMs).

Keywords: Satellite images; Orthoimages; Topographic mapping; Digital Elevation Models; SPOT
Hardware used: I^2_S; KERN DSR1 analytical plotter; VAX 11/750
Software used/written:
Languages: FORTRAN; Pascal
Remarks:

No OS data in use at present. Will use OS 1:50 000 data for South Yorkshire.

14 **Institution:** University College London
Name: Muller, Dr. J.P
Department: Photogrammetry and Surveying
Telephone: 01 380 7227 (answer phone)
Janet/PSS Address: jpmuller@ucl.cs@janet
Project Title:

Real-Time 2½-D Vision Systems

Collaborating/Funding Agency:
Alvey MMI Directorate (SERC) with industrial partners

Project Duration: July 86 - June 89
Keywords: Stereo matching; SPOT; Map image matching; Digital terrain models
Hardware used: SUN 3/160C and SUN 3/75M workstations; Vaxstation II/GPX(VMS); Altek digitisers KERN DSR11 analytical plotter + CCDS Meiko MIMD Transputer system
Software used/written:
Languages: C; Occam
Packages: HIPS; LITES 2; PANACEA
Remarks:
OS data not yet in use. No results currently available. Will use OS 1:50 000 data for South Yorkshire.

15 **Institution:** Polytechnic of Wales
Name: Jones, Dr. C. B. and Cook, A. C.
Department: Mathematics and Computer Science
Telephone: 0443 405133
Project Title:
Automated Name Placement on the Ordnance Survey Route Planner Map
Synopsis:
The aim of the project is to provide software for placing point, line and area names on to the Ordnance Survey 1:625 000 scale Route Planner Map. The intention is to produce a rule-based system which can emulate the naming conventions currently in use by the Ordnance Survey as well as being flexible enough to be adapted to other types of map. A prototype system using conventional programming techniques has been developed and is described in Cook (1986). Work currently in progress is concerned with the application of logic programming techniques, implemented with the Prolog language. Considerable use has been made of rasterised data derived from the Ordnance Survey source data.

Collaborating/Funding Agency: Ordnance Survey and SERC
Project Duration: 3 Years
Keywords: Name placement; Expert systems; Logic programming
Hardware used: VAX 11/785; Westward Graphics terminals
Software used/written:
Languages: FORTRAN; Prolog; POP11
Libraries: GINO-F
OS Data in use:
Scale(s): 1:625 000
Area(s): Britain
Feature(s): All features in 1:625 000 database
Format in use: Vector and Raster
Results available:
Reports:

Cook, A. C. "A method of automatically annotating maps" in Visvalingam M. (ed.) Research Based on Ordnance Survey Small Scales Digital Data, CISRG, University of Hull, 1986.

16 **Institution:** Polytechnic of Wales
Name: Jones, Dr. C. B., Cook, A. C. and Abraham, I. M.
Department: Mathematics and Computer Science
Telephone: 0443 405133
Project Title:

The Storage and Display of OS 1:625 000 Data on a BBC Microcomputer

Synopsis:

The increasing availability of Ordnance Survey small-scale digital data is of great potential value to schools and home computer users. Because of the very widespread use of the BBC computer, this machine has been chosen for the development of a trial program to produce user-specified maps from the OS 1:625 000 data. In an attempt to circumvent the limited disk storage space, some effort has been devoted to compacting the

OS User Transfer Format, as well as producing feature-specific and generalised subsets of the data.

Collaborating/Funding Agency: Ordnance Survey
Project Duration: 1 Year
Keywords: Microcomputer; Data compaction; Generalisation
Hardware used: BBC Microcomputer
Software used/written:
Languages: BASIC; Assembler
OS Data in use:
Scale(s): 1:625 000
Area(s): Britain
Feature(s): All features in 1:625 000 database
Format in use: Vector

17 **Institution:** University of York
Name: Halls, P. J. and Fletcher, Dr. R. P.
Department: Computing Service
Telephone: 0904 59861
Janet/PSS Address: PJH1@York or PJH@2342 90468168.30
Research Interests:

Provision of a general purpose cartographic service for University computer users combining OS and user map data; Integration of data processing tools with output display techniques

Keywords: Automated cartography; General-purpose Data Base techniques
Hardware used: VAX cluster; IBM PC's; RM Nimbus
Software used/written:
Languages: Various
Packages: Datatrieve/RDB; GINO-F; GKS; Simpleplot
Libraries: Various

Academic institutions **(17)**

OS Data in use:

Scale(s):	1:625 000; 1:25 000 Gazeteer
Area(s):	Great Britain outline map; Whole of Great Britain
Feature(s):	Coast
Format in use:	Vector
Other data in use:	DOE/SDD post 1974 Census boundary data; User's data

Results available:

Reports:

Halls, P. J. "User Guide to using the graphics facilities at York for automated map production"

Feedback required from others:

Availability of non-OS material, especially historical boundaries; Availability of much wider range of OS material in digital form

Remarks:

OS 1:25 000 Gazeteer data mounted as a general access database

Government and Public Services

(Listed in Alphabetical Order)

18 **Institution:** Grampian Regional Council
Name: Sprott, T. F.
Department: Physical Planning
Telephone: 0224 682222 ext. 2410
Project Title:
Possible Uses of OS Digital Data
Synopsis:
A feasibility study will be carried out on behalf of the Council into possible uses of OS digital data in the authority. The conclusions may become available during 1987.

Remarks:
No current research or development based on OS small scale digital data

19 **Institution:** Institute of Hydrology
Name: Moore, R. V.
Telephone: 0491 38800
Project Title:
Institute of Hydrology Hydrogeographical Database Project
Collaborating/Funding Agency:
NERC; Water Authorities
Project Duration: Ongoing
Keywords: GIS; Rivers; Terrain models; Hydrology; Digital mapping; Modelling; Engineering design; Database; Validation
Hardware used: IBM; GEC; SIGMEX
Software used/written:
Languages: FORTRAN
Packages: GKS
OS Data in use:
Scale(s): 1:50 000
Area(s): UK
Feature(s): Rivers

Format in use: Vector

Other data in use: Soils; Rainfall; Lakes; Urban; Forest

Results available:

Software: Validation of river networks

Self-generated data: Check with OS

Services on offer:

Advice on digitising rivers and handling digitising contracts

Publications:

Moore, R. V. (1983) "Digitising the UK River Network" in Weller B.B. (ed.) Auto Carto 6 : Proceedings of the 6th International Symposium on Automated Cartography, Ottawa, Canada, vol 2, pp 331 - 338

Moore, R.V., Morris, D.G. and Venn, M.W. (1984) "Towards a Codasyl Database for the UK River network", paper presented at the International Symposium on Spatial Data Handling, August 1984, Zurich, Switzerland, available from R. V. Moore.

Moore, R. V., Morris, D.G. and Wiltshire, G. E. (1985) "A hydrogeographical database as an aid to planning and design", Spatial Data Handling Conference, Zurich 1985.

20 **Institution:** The Macaulay Institute for Soil Research

Name: Wright, G. G. and Birnie, R. V.

Department: Peat and Forest Soils (Remote Sensing Unit)

Telephone: 0224 318611

Project Title:

Potato Classification in North East Scotland

Collaborating/Funding Agency:

Scottish Crop Research Institute

Project Duration: April 1984 - October 1986

Keywords: Remote sensing; Potatoes; Geographic Information Systems
Hardware used: PRIME 250; GEMS Image processor; WILD Aviotab TA
Software used/written:
Languages: FORTRAN IV
Packages: Gemstone
OS Data in use:
Scale(s): 1:625 000
Area(s): North East Scotland : Kincardine and Deeside District
Feature(s): Contours; Administrative boundaries
Format in use: Vector (converted to Raster)
Other data in use: LANDSAT MSS; In-house digitised maps including soils and potential water deficits
Results available:
Self-generated data:
Potato fields: their associated soil types and potential water deficits.

Publications: In preparation
Reports: In preparation

21 Institution: Ministry of Defence
Name: Harvey RE, Lt. Col. M.
Department: Directorate of Military Survey
Telephone: 01 890 3622 ext. 2188
Research Interests:
Digital capture and mapping of medium and small-scales maps
Keywords: Digital capture; Digital mapping
Remarks:
MoD are currently involved in the revision of their UK digital data file by capturing from the new 1:50 000 cover. This data, under the terms of an agreement, will be available

to OS for their use. MoD are keen to be involved in the setting of data standards and specifications.

22 **Institution:** The Royal Commission on the Ancient and Historical Monuments of Scotland

Name: Reynolds, Ms. D. M.

Department: National Monuments Record of Scotland

Telephone: 031 225 5994

Project Title:

Computerisation of the National Monuments Record of Scotland

Synopsis:

At present, a manual system consisting of a topographically based card index and a set of 1:10 000 maps is used to provide basic information on archaeological sites and monuments in Scotland. Each record contains the following information:- NGR, Region, District, County, Parish, Site Name, Site Classification, together with any bibliographic references, archive references and field reports. All these details will be stored on a mainframe data base using STAIRS. Information will ultimately be available in catalogue form but there is also potential for cartographic plotting, and this will be explored in due course. RCAMS has an obligation to supply OS with information on antiquities for mapping purposes at all scales although this will be provided in hard copy in the immediate future. Work on gazetteers, feature lists and administrative boundaries from any map scale and methods of indexing map collections would all be of interest.

Project Duration: Continuous

Hardware used: IBM 3033 (OSMVS operating system); IBM Displaywriter; IBM PC

Software used/written:

Packages: STAIRS

Feedback required from others:

Any work on digitising gazetteers, feature lists and administrative boundaries.

Remarks:

Possible uses of OS data are being explored

23 **Institution:** Scottish Development Department
Name: Downie, C.
Department: Graphics Group
Telephone: 031 556 8400 ext 4256 or 031 244 4256
Synopsis:

Awaiting the issue of two feasibility studies on
a) "Computerisation of the Air Photographs Register", and
b) "Computerisation and Digitisation for Central Site Graphics in the Scottish Office".
OS small scale digital data would form the basis of this work.

24 **Institution:** South West Water
Name: Hooper, B. D.
Department: Operations Planning
Telephone: 0392 219666 ext. 2510
Project Title:

Control of Pollution Act (COPA) Maps

Synopsis:

South West Water are collaborating with the Water Research Centre to develop a pilot digital mapping system based on specially digitised large-scale data. If, in the future, operational systems do develop on a regional basis then a small-scale mapping system could provide a higher level of access for management purposes. Such a system could involve the integration of a 1:50 000 digital mapping database with data abstracted from the large-scale operational systems. It could support many of the Authority's interests, such as river catchment management information and administrative boundaries.

Collaborating/Funding Agency: Institute of Hydrology (IOH)
Project Duration: Ongoing
Keywords: Water courses; Effluent discharge; Licenses
Hardware used: VAX 11/785
Software used/written:
Packages: McDonnell Douglas (ARC) GDS
OS Data in use:
Scale(s): 1:50 000
Area(s): South West Water region
Feature(s): Water courses
Format in use: Vector
Other data in use: Water Quality Archive data from South West Water

25 Institution: Southern Water Authority
Name: Curry, D. S.
Department: Engineering (Sussex Division)
Telephone: 0273 606766
Research Interests:
Application of digital mapping and OS digital maps to underground asset mapping

Feedback required from others:
General experience on digital mapping, cost, suitability etc. before deciding whether to move to digital mapping and digital records

26 Institution: Staffordshire County Planning Department
Name: Openshaw, Ms. C. E. and Hancock, M. D.
Department: Research Section
Telephone: Stafford 3121 ext. 7355

Research Interests:

Use of digital boundaries to search databases; Presentation of census and other computer data bases for areas of interest

Keywords: GIMMS; Search; Locate; Presentation

Hardware used: Calcomp 9600 digitiser; IBM PC; IBM 4381 mainframe; Calcomp 1051 plotter

Software used/written:

Packages: CHODIG (Digitising package written by University of Manchester run on IBM PC); GIMMS

OS Data in use:

Scale(s): 1:50 000 to 1:10 000

Area(s): Specific areas of interest within Staffordshire

Results available:

Publications:

Openshaw C.E. & Hancock M.D. "The use of the GIMMS *LOCATE command with in house digitised maps". An article in the GIMMS User conference and Workshop proceedings (April 1986).

Feedback required from others:

General interest in how others have actually used digital data

27 **Institution:** Suffolk County Council

Name: Wiseman, P. G.

Department: Highways

Telephone: 0473 55801 ext. 6307

Research Interests:

A corporate group of officers within the County authority are assessing possible applications for mapping and location referencing

Keywords: Mapping; Location referencing

Hardware used: ICL 2900; Prime

Remarks:

No original research, only investigation of user needs

Private Sector, including private individuals

(Listed in Alphabetical Order)

28 **Institution:** C.A.C.I

Name: Harris, D.; Pettigrew, Ms. K.

Department: Market Analysis Division

Telephone: 01 404 0834

Project Title:

A Subroutine Library to Support the Basic Operations Required for Management of Fully Structured Cartographic Data

Synopsis:

The aim of this software development project is to design a data model for structured cartographic data, and to develop a subroutine library to support basic operations upon such data. The intention is that this will provide a single data access method to be incorporated into all CACI digitising, mapping and cartographic analysis software. Although OS small scale data is not currently being used, one major objective of the project is that it should be compatible with OS small scale digital data standards, and capable of representing all such data without loss of information. The subroutine library is expected to be made commercially available if there is sufficient interest.

Project Duration: July 1985 to June 1986

Keywords: Digital cartography; Data structures; Data management

Hardware used: VAX 11/780 (VMS version 3.5)

Software used/written:

Languages: FORTRAN

Results available:

Software: Expected to be available September 1986

Reports:

Harris, D. and Pettigrew, K. (1986) "AEGIS, A practical experience in data management" in Blakemore, M. (ed.) Auto Carto London: international conference on the acquisition, management and presentation of spatial data, 14-19 Sept 1986, vol 2, 520 - 528

29 **Institution:** Gems of Cambridge Ltd.
Name: Allan, J.
Telephone: 0223 323818
Project Title:
General Development Work on Geo-Information Systems
Synopsis:
Raster/vector conversion and vice-versa for combining remotely sensed data and digital map data

Collaborating/Funding Agency:
Cambridge University
Project Duration: Indefinite Period
Keywords: Raster/Vector conversion; Remote sensing Geo-Information Systems
Hardware used: Gemstone Image Processing System; VAX; Prime
Software used/written:
Languages: FORTRAN; Assembler
Packages: Gemstone
Libraries: Internal
Other data in use: Satellite/Aerial imagery
Results available:
Services on offer:
System available now
Feedback required from others:
How users see remotely sensed data to be of use to them. What type of output required? What type of applications require the combination of remotely sensed and digital map data?
Remarks:
No OS data in use as yet. Once system is developed, would use any data that corresponds to available remotely sensed data.

30 **Institution:** Hunting Surveys Ltd.
Name: Keir, K.
Department: Mapping

Telephone: 01 953 6161 ext. 256

Research Interests:

Not database users, but have many interests arising from their work as surveyors and digitising contractors

Keywords: Data capture; Digital updating; Data enhancement; Data structures; Generalisation; Drafting

Hardware used: Intergraph; PDP-11; IBM-compatible PCs; VAX 11/750; Ferranti plotters; Benson plotters; Ferranti, Altek and Houston digitisers; I^2S; Photogrammetric 3D digitisers

Software used/written:

Languages: FORTRAN 77

Packages: Intergraph; DMS (own); MICROMAP (own);

Results available:

Services on offer:

Research services; Digitising services (2D, 3D, non-graphic attributes); Data acquisition services (land/air/marine survey, thematic mapper)

Feedback required from others:

All state-of-the-art developments; Commercial contracts

31 Institution: SysScan UK Ltd.

Name: Pearce, N. J.

Department: Technical Support

Telephone: 0344 424321

Synopsis:

SysScan are developing products for the geographical information systems market. They are especially interested in techniques for automatic capture of map-based information by use of their range of document scanners, developments in vectorisation of scanner data, direct use of raster data and the use of pattern recognition techniques, all of which are current areas of research work. Other areas of development

concern systems where both raster and vector data can be displayed and handled simultaneously, and the combination of vector map data with raster remote sensed images.

32 **Institution:** Welldrill Ltd.
Name: Baldwin, J. C.
Department: Systems
Telephone: 0276 76666
Research Interests:
Potential use of digital data for combination with oil and gas exploration maps

Keywords: Coastlines; Boundaries; Geophysics; Geology; Exploration; Mapping
Hardware used: VAX 11/750; Calcomp digitiser; Calcomp plotter; Pericom graphics VDUs
Software used/written:
Languages: FORTRAN 77
Packages: ECHO (A digitising and mapping package for geophysicists)
Other data in use: Coastline data provided by clients
Results available:
Software: ECHO a software package offering a wide range of facilities for digitising and mapping, including map projections, contouring and 3D visualisation.
Services on offer:
Bureau and consultancy services
Remarks:
OS data not yet in use

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