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INSTITUTE OF
TERRESTRIAL
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MERLEWOOD



**Institute of
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ITE has administrative headquarters north and south, and the geographical distribution of its 250 staff in six Research Stations throughout Britain allows efficient use of resources for regional studies and provides an understanding of local ecological and land use characteristics.

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ITE NORTH

Edinburgh Research Station
(Admin HQ for ITE North)
Bush Estate
Penicuik
Midlothian EH26 0QB
Tel: 031 445 4343; Telex 72579
Fax: 031 445 3943

Banchory Research Station
Hill of Brathens
Glassel
Banchory
Kincardineshire AB31 4BY
Tel: 033 02 3434
Fax: 033 02 3303

Merlewood Research Station
Grange-over-Sands
Cumbria LA11 6JU
Tel: 05395 32264; Telex 65102
Fax: 05395 34705

ITE SOUTH

Monks Wood Experimental Station
(Admin HQ for ITE South)
Abbots Ripton
Huntingdon
Cambs PE17 2LS
Tel: 048 73 381; Telex 32416
Fax: 048 73 467

Bangor Research Unit
University College of North Wales
Deiniol Road
Bangor
Gwynedd LL57 2UP
Tel: 0248 370045; Telex 61224
Fax: 0248 355365

Furzebrook Research Station
Wareham
Dorset BH20 5AS
Tel: 0929 551518
Fax: 0929 551087

The ITE Research Marketing Officers for ITE North and South are based at Banchory and Monks Wood, respectively.

INSTITUTE OF TERRESTRIAL ECOLOGY

(NATURAL ENVIRONMENT RESEARCH COUNCIL)

ITE Project T02052m5

COUNTRYSIDE SURVEY 1990

**MAPPING THE LAND COVER OF GREAT
BRITAIN USING LANDSAT IMAGERY:
A DEMONSTRATOR PROJECT IN REMOTE
SENSING**

**QUARTERLY REPORT TO THE BRITISH
NATIONAL SPACE CENTRE**

MAY 1992

R M FULLER, A R JONES, G B GROOM, N J BROWN, & J M ULLYETT

Environmental Information Centre
Institute of Terrestrial Ecology
Monks Wood
Abbots Ripton
Huntingdon
Cambs PE17 2LS



INTRODUCTION

This is the seventh progress report, in the series covering this project. The reports have comprised Interim reports in December 1990 and January 1992, and brief quarterly reports in September 1990, May 1991, July 1991 and October 1991.

AIMS OF THE PROJECT

To compile a digital map of land cover in Great Britain: to make quantitative assessments of accuracy; to integrate the map with other data in a GIS environment, including demonstrator output.

METHODS

The methods were described in the First Interim Report.

SCHEDULE OF WORK

The schedule of work and progress to date are summarised in Figure 1. The following paragraphs give brief descriptions of the elements shown in Figure 1.

1. The sample-based field survey (to be used for validation) was successfully completed in late summer 1990.
2. The digitising of field survey maps at ITE Merlewood has been completed for about half of the 500-plus squares, with completion now expected in late summer 1992.
3. The image search and scheduling is now complete, and full coverage of Britain has been identified (Figure 2). It has been necessary to use two summer dates for all of Wales to complete cloud-free cover. The Shetlands may be classified using only summer data.
4. Image orders have been made to complete the stock-cover of Britain (Figure 2), with delivery expected within a month.
5. Class selection was completed and explained in detail in the second Interim Report (January 1992).
6. All scenes in stock have now been geometrically corrected and the summer and winter images have been made into composites.
7. Field reconnaissance has been completed for all stock-scenes, and the full reconnaissance will involve 3 further field-trips to south-west England, western Wales and southern Scotland. Comparisons of field

reconnaissance data with cover maps showed 83-86% success rates (scored field-by-field) in classifications (see January 1992 Interim Report).

8. Training and classification has been completed for scenes covering some 80% of Great Britain (Figure 2).
9. Accuracy assessment will compare data from the Countryside 1990, 1 km field-survey squares, in their digital form, with the corresponding section of cover map. Data are being delivered to Monks Wood, in ArcInfo vector format which is then converted to Laserscan Horizon format. We have agreed the target correspondence between the many field cover types and the 25 Landsat classes. Progress to date has compared 38 squares out of 67 squares which have been delivered. Initial assessments of the results show approximately 70% correspondence between field and Landsat maps. Differences are explained by many factors, including error in either survey, differences in target classes, differences of interpretation, spatial generalisation of field maps, geometric misregistrations, and the artificial 25 m quantisation imposed by raster data. It is expected that a fuller analysis will be completed for inclusion in the next report.
10. Building a mosaic of full GB land cover has continued, with the data stored as 100 km tiles (Figure 3). These are made as 'jigsaws' from the appropriate sections of each scene. As a scene-classification is completed, the sections are 'cut out' and stored in their 100 km tile. Building the mosaic will simply involve butt-joining the tiles.
11. Hard copy production has now provided a Spectrascan negative of the northern England scene as a summer-winter composite and a cover map of south-east England. Future outputs require a rationalisation of colours to reflect the similarities and differences between habitats and to maximise distinctions between key classes. New versions of the colour maps will be made once cover is complete.
12. GIS demonstration work continues using the 75 km x 50 km test area of cover-map centred on the Thames estuary. Various experiments will use overlaid thematic and topographic data which are currently being registered with the cover map.

GIS demonstration will also examine procedures of pattern analysis. Measures of patch size, size frequency, perimeter length, fragmentation and isolation, boundary length, density and diversity are currently being defined which will be used to look at patterns in sample areas representing a variety of landscapes in Britain. Experiments in vector show the detail which can be obtained, but, in order to maintain the national scale of cover, simpler generalisations to provide summaries at 1 km square level are favoured.

The cover data will also be summarised, as 1 km grid data, recording broad distributions of landscape components. This summary will be used to develop the Countryside Information System, a microcomputer-

based, database for applications purposes. The data, combined with the ITE field survey summaries, will also improve cover-estimates derived from the latter, and allow sophisticated interrogation of the integrated datasets.

CONCLUSIONS

The rate of production continues to match original intentions. We expect the successful and timely completion of the project, with excellent levels of detail and accuracy.

FORWARD LOOK TO NEXT QUARTER

The aims for the quarter, May 1992 to July 1992 will be to:

1. complete classifications of 2 scenes - 202-025, 207-019 quadrant 3
2. extract 100 km squares of above data
3. geometrically correct and co-register scenes for Cornwall, north and south Wales, and southern Scotland (14 scenes - 6 summer-winter composites - see item 3. above)
4. complete field reconnaissance of Cornwall, north and south Wales
5. develop preliminary classification of Cornwall, north and south Wales
6. assess summer-only classification of Shetlands
7. develop raster-based measures of landscape pattern
8. compare a further 70 pairs of field and Landsat 1 km squares
9. refine analyses of 1 km comparisons

Figure 1. Planned schedule of activities and progress to date (black bars), May 1992.

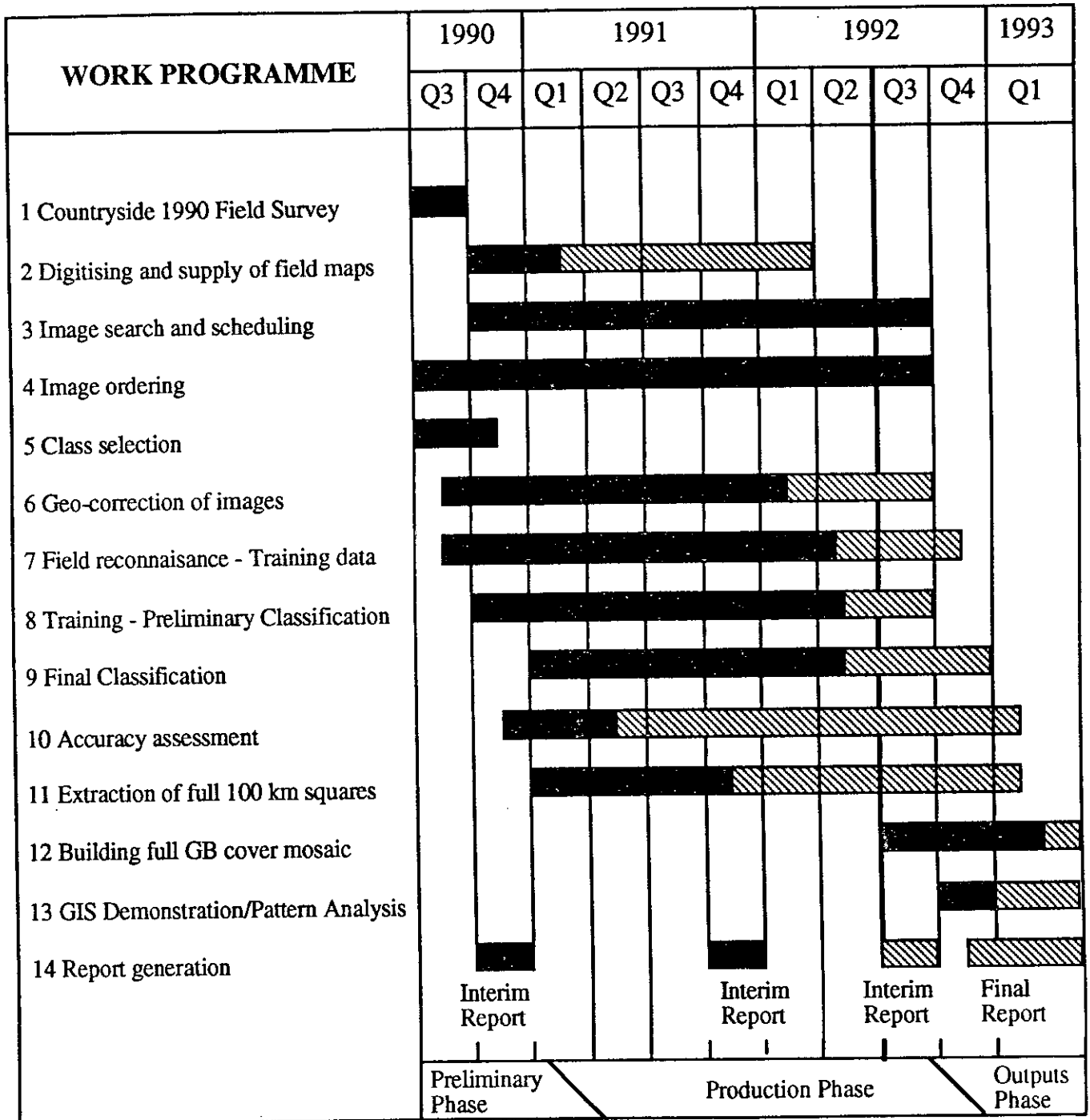


Figure 2. Status of image acquisition and data processing, May 1992

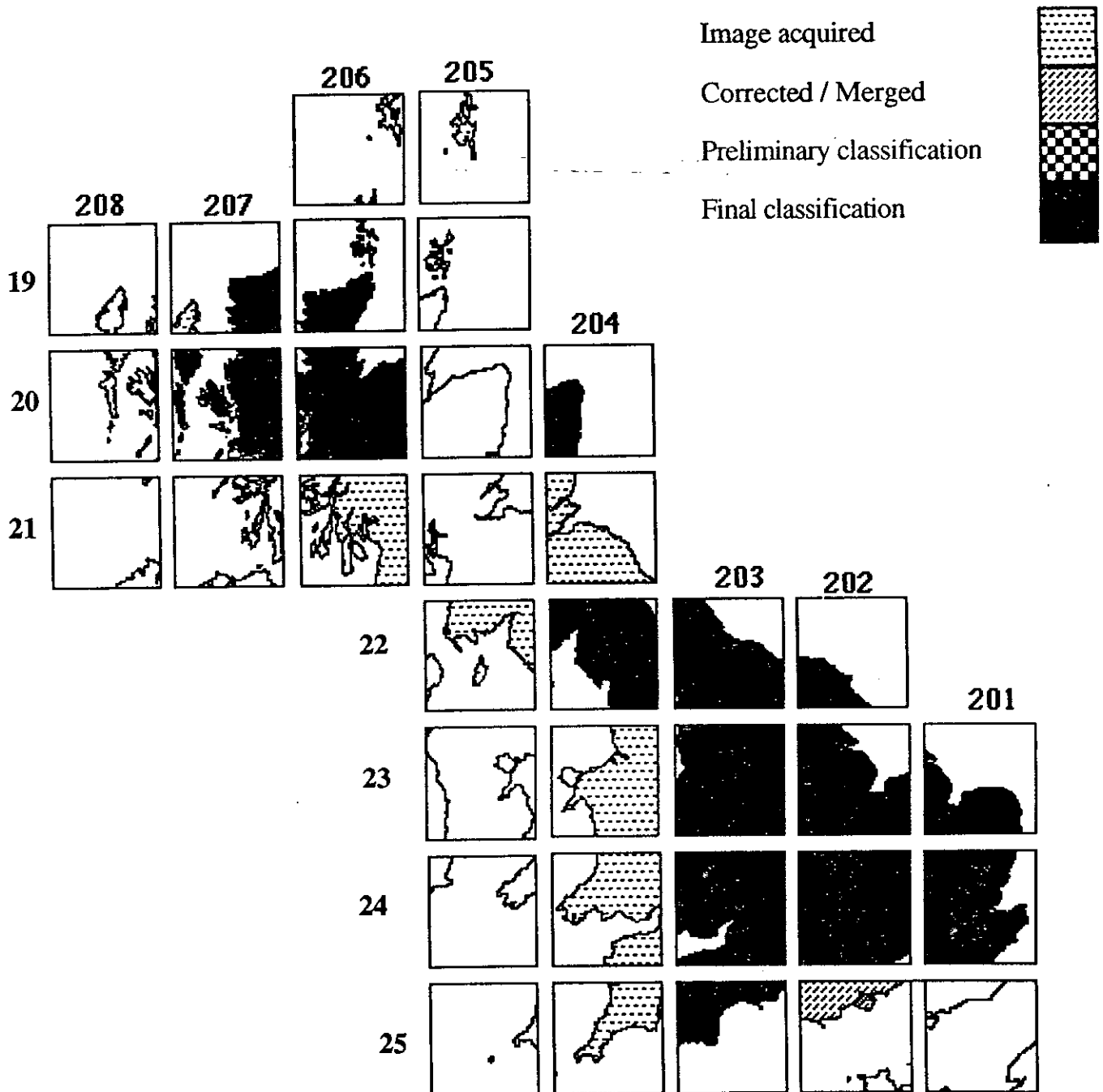


Figure 3. Status of 100 km square of land cover information, May 1992.

