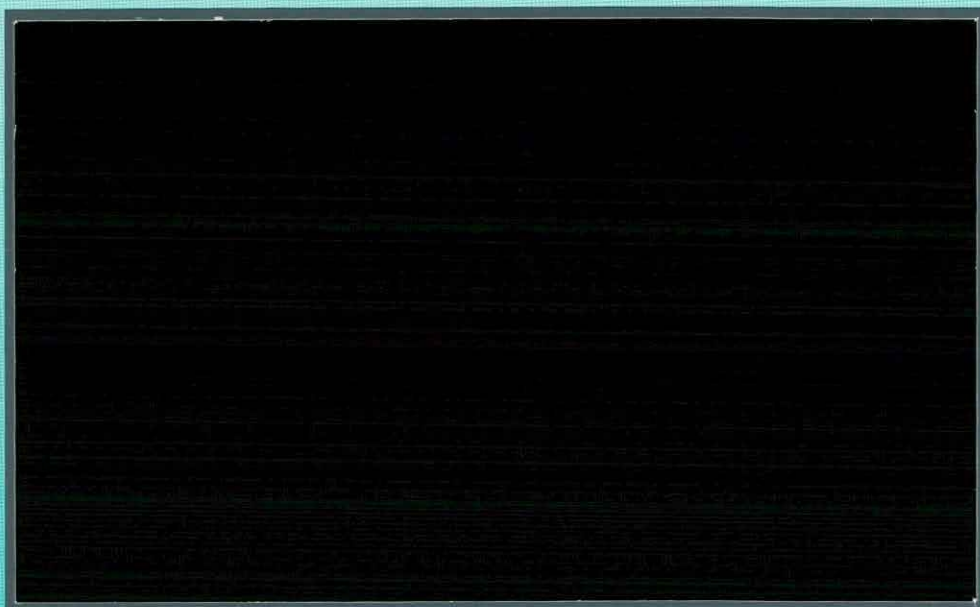


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INSTITUTE OF  
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Institute of  
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Ecology





**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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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)

Project T02025M5

Quarterly Report to the British National Space Centre

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  
October 1991

R M Fuller, A R Jones, G B Groom & A G Thomson

Environmental Information Centre  
Monks Wood Experimental Station  
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## INTRODUCTION

This is the fifth progress report, in the series covering this project. The reports have comprised an Interim report in December 1990 and brief quarterly reports in September 1990, May 1991 and July 1991; a second Interim Report will follow in December 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 Figures 1 & 2. 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 c. 40 squares; the remaining 470 have had all linear features digitised, with completion now expected in summer 1992.
3. The image search and scheduling has again recorded no new scenes of significant interest, since the last quarterly report. The situation remains that we are essentially awaiting acquisition of new winter data (October to March ideally) to fill gaps in coverage.

Even without any new acquisitions, summer-winter coverage is 95% complete, with the remaining 5% being imaged on one or other date. A satisfactory conclusion will not be constrained by data-shortages, as single images can be used in those regions where multi-date composites are not available.

4. Image orders for this year have been delivered and existing stock covers 80% of Britain (see fourth Quarterly Report). Because of substantial overlap between scenes, this represents about two-thirds of final image-requirements.

5. **Class selection** (including a consultative exercise) identified a hierarchical classification, offering, at the one extreme, very simple distinctions (eg land and water), right down to the final list of 25 target classes. Additionally the subclass data, of some 70 cover types, is resident in archive for specialist consultation. The adopted classification will be explained in detail in the second Interim Report.
6. All scenes in stock have now been **geometrically corrected** and the summer and winter images have been made into composites.
7. **Field reconnaissance** (for 'training' the classifier and preliminary checks of accuracy) has been completed for all stock-scenes, excepting the south-coast fringe. This represents about three-quarters of all intended field reconnaissance. The data showed 83-86% success rates (scored field-by-field) in classifications to-date.
8. **Training and classification** has been completed for scenes covering some 80% of England, 30% of Wales and 10% of Scotland (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. Sample data have been delivered to Monks Wood for initial developments of methods. The data were supplied in ArcInfo vector format which has been successfully converted to Laserscan Horizon format. We have agreed the target correspondence between the many field cover types and the 25 Landsat classes. A procedure is being developed to recode the field cover-classes to corresponding Landsat classes before raster-conversion for comparisons with Landsat cover-maps.

Developing an optimal method is vital to satisfactory progress with a procedure which is to be repeated 500+ times. We expect a successful conclusion to the methodological developments by the end of 1991. After this, the job becomes a repetitive procedure, undertaken as batch-processing, with limited interactive work.

10. **Building a mosaic of full GB land cover** has continued, with the data stored as 100 km tiles. 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. This very striking scene is available for display with cover maps, including that 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 produced during the coming winter.
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.

The data are also being summarised, as 1 km grid data, recording broad distributions of landscape components in an ORACLE database. This will be used to develop a user-accessible dataset, microcomputer-based, 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.

13. This is the fifth progress report to DTI/BNSC. An Interim Report in December 1991 will greatly expand the summary details given here. It will record the final choice of cover types, their descriptions, exact status of image processing, results of field-checks, accuracy/calibration measures, and GIS work.

## CONCLUSIONS

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

## FORWARD LOOK TO FIFTH QUARTER

The aims for the fifth quarter (1 October 1991 to 31 December 1991) will be to:

1. complete classifications of 2 Scottish scenes and one English scene
2. extract 100 km squares of above data
3. finalise methods for comparisons of Landsat classifications and field survey maps
4. define preliminary definitions of 'pattern' and devise strategy for analysis
5. produce detailed Interim Report

## LIST OF FIGURES

Figure 1. Planned schedule of activities and progress to date (black bars), 15 October 1991.

Figure 2. Status of data processing, 15 October 1991.

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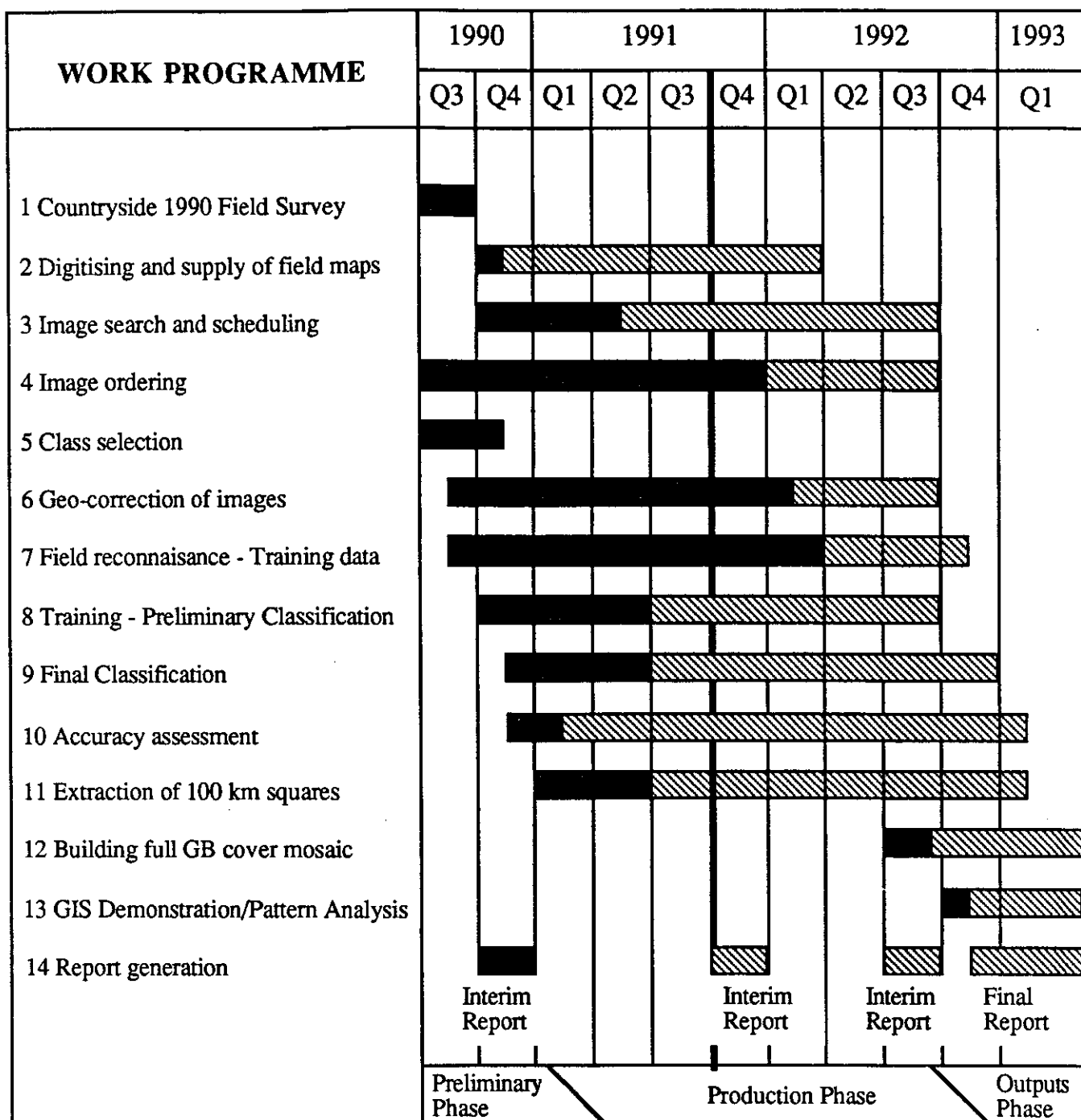




Figure 2. Status of data processing, October 1991

