

# The National Centre for Environmental Data and Surveillance

## BUSINESS PLAN



ENVIRONMENT  
AGENCY

EA  
NCEOSSUMMARY

The National Centre for Environmental data and Surveillance was set up in April 1997 to support the Environmental Strategy Directorate by providing interpreted information on the state of the environment and the pressures acting upon it, and to act as the Agency's focus for the collation and interpretation of environmental monitoring data. The Centre will operate at the leading edge of environmental monitoring technology, and will be expected to attain external recognition as a national centre of excellence in this area.

This document sets out the business plan for the National Centre from 1997 to 2000. It details the purpose of the Centre, its services to internal and external clients, its relationships with other Agency functions and external organisations. The Centre's expanding collaborations and partnerships with European bodies in particular are described.

The document also details the Centre's management structure and staffing, the site accommodation, support services, financial resources, and proposed programme of work for the next three years.



## **CONTENTS**

1. Purpose of National Centre
2. Services Provided to Clients
3. Relationships with other Bodies
  - 3.1 Environment Agency Functions
  - 3.2 External Organisations
4. Management Structure and Staffing
5. Accommodation
6. Support Services
7. Proposed Programme of Work
8. Strategy for IT Development and Data Handling
9. Financial Resources

Appendix: 1997/98 Work Programme

## **1. Purpose of the National Centre**

The National Centre for Environmental Data and Surveillance is part of the Environmental Monitoring and Assessment Function, and will be the Agency's focus for the collation and interpretation of data into an integrated picture of the state of the environment and for the development of environmental monitoring techniques. The specific business objectives of the National Centre to achieve this overall purpose are as follows:

- a) collation of the Agency's internal environmental monitoring data in order to fulfil its statutory obligations;
- b) creation of an integrated picture of the state of the environment and the pressures placed on it, by relation of these data to other internal and external data sets;
- c) application of a consistent level of quality control across all the Agency's environmental data;
- d) establishment of a cost-effective range of methods for assessing the state of the environment;
- e) delivery of supra-Regional environmental monitoring and surveillance programmes;
- f) conversion of the data into meaningful information for the Agency, the DoE, the European Environment Agency, other international bodies and the public; and
- g) development of better and more effective environmental monitoring techniques.

The National Centre thus plays a key role in the Environmental Strategy Directorate by providing interpreted information on the state of the environment, and the pressures acting on it, to support the Directorate in its development of strategic direction to the Agency and in influencing the corporate planning process to allocate resources appropriately. As part of its role in collating internal and external data sets and researching better ways of monitoring the environment, the Centre will be expected to operate at the leading edge of environmental data and surveillance technologies, and establish itself as an international centre of excellence in these scientific disciplines. Responsibility for direction and management of relevant R&D programmes will be an essential component of the Centre's facilities required to achieve its overall purpose.

## 2 Services Provided to Clients

The Centre provides a range of services to its customers which can be summarised as:

Collation of internal statutory and operational monitoring data and external data, application of a consistent level of quality assurance to these data, their interpretation into an integrated picture of the state of the environment, and the development of more effective environmental monitoring techniques to improve the coverage of the integrated picture. The resultant outputs are meaningful environmental information for internal Agency customers, UK Government Departments, the European Environmental Agency, other international bodies, and the public. The Centre also provides specialist data treatment and monitoring/surveillance expertise to other Agency Directorates, and controls an environmental techniques R&D programme to underpin the quality of services and ensure that they remain in the forefront of scientific knowledge. This range of services provided are categorised as follows.

### (i) Collation of Internal Data

Compilation of Water based Directives compliance, OSPAR Red List Annex 1A and Bathing Water returns for reporting to DoE.

Collation of the Agency's national monitoring programmes; General Quality Assessment, Harmonised Monitoring and the National Marine Monitoring Programme, for external publication.

Collation of relevant operational chemical and biological monitoring data, and flood defence, water resources, waste regulation and contaminated land information.

Collation of estimates of the quantities of chemicals entering the environment from IPC processes, and release of radionuclides into the environment.

### (ii) Acquisition of External Data

Acquisition of environmental monitoring data from other regulatory bodies such as Local Authorities, MAFF, SEPA.

Acquisition of environmental data sets from NERC, English Nature, CCW, RSPB, and other scientific, environmental and conservation bodies.

Acquisition of data from research institutes, surveillance satellites, and overseas centres of environmental expertise.

### (iii) Integrated Assessment

Processing of data to a consistent level of quality control and to a common GIS base.

Interpretation of processed data to form an integrated picture of the state of the environment and the pressures placed upon it.

### (iv) Environmental Surveillance and Supra-Regional Monitoring

Provision of synoptic overview surveillance programmes to enhance environmental data sets, and to meet specific customer requirements.

Co-ordination of national and supra-regional surveys of the environment.

Development and implementation of latest advances in remote surveillance technology.

Provision of expert advice on environmental data and surveillance to Agency functions.

### (v) Furthering the Science Base of Environmental Monitoring

Control and management the Agency's R&D programme of environmental monitoring techniques.

Dissemination and full exploitation of R&D projects' recommendations.

Maintenance of laboratory and instrument monitoring standards to meet environmental monitoring needs, and scoping new Directives' analytical requirements.

Provision of advice to assist in formulation of environmental monitoring policy.

Assistance to operational staff in the application of new monitoring technologies.



### **3      Relationships With Other Bodies**

#### **3.1    Environment Agency Functions**

The principal Environment Agency customer is the Environmental Monitoring and Assessment Function, which the National Centre is part of and reports directly to the Functional Head. Other internal customers are Pollution Prevention and Control; and the Flood Defence, Water Resources and FRCN Functions of Water Management. The Centre's interfaces with these functions cover Head Office policy units, Regional operational functions and other National Centres. PPC, Operations and Water Management Directorates are represented on the National Centre's Client Board. Major aspects of the Centre's relationship with these other Environment Agency Functions is summarised below, and the proposed work for these customers is detailed overleaf in Section 7.

##### **Pollution Prevention and Control**

- Assessment of eutrophic sensitive areas and validation of high natural dispersion areas for the Urban Waste Water Treatment Directive,
- Development of audit strategies for automatic sampling and analysis for the Urban Waste Water Treatment Directive,
- Support for development and validation of water quality models and for operational and audit aspects of pollution prevention and reaction to pollution incidents,
- Assessment of the nature of discharge mixing zones, identification of algal blooms, and
- Support for water quality assessment and management strategies,
- Assessment of remote audit of compliance with Nitrate Vulnerable Zone restrictions to agricultural land use,
- Development of techniques for identification of contaminated land by remote surveillance,
- Audit of compliance with landfill site licence requirements; and
- Support for fugitive releases / ambient air quality studies.

##### **Flood Defence**

- Surveillance of sediment transport/deposition for assessment of fluvial and tidal processes,
- Accurate mapping of floodplains and flooded areas,
- Surveillance of the extent and nature of wetlands,
- Assessment of intertidal vegetation; and
- Support for shoreline management and managed retreat studies.

##### **Water Resources**

- Surveillance of reservoir volumes,
- Support for drought management initiatives eg surveillance of domestic usage,
- Provision of base data for validation of climate change models; and
- Sensing of hydrogeological fractures.

##### **Conservation/Navigation**

- Assessment of the health of intertidal vegetation,
- Support for river habitat surveys,
- Classification of coastal zone and river corridor features,
- Assessment of river channel depth and flow; and
- Surveillance of sandbank and mudflat morphology.

Interaction with the rest of the Environmental Strategy Directorate will be by direct reporting relationships, and by regular interface with other National Centres in the Directorate to ensure that expertise from the Centres is directed to the benefit of all.

Liaison on PPC issues will be with Head Office policy units to develop appropriate techniques, principally as a series of agreed projects in their R&D topic area. Implementation of techniques and dissemination of expertise will be through direct Regional operational contacts and regional secondees to the Centre, or via the appropriate PPC National Centre or lead Region.

Water Management technique development and approval will be with their Head Office policy unit or its National Centre, and specific studies by direct liaison with Regional operational customers.

### **3.2 External Organisations**

The Centre will liaise and build relationships with a variety of Government Departments, regulatory Agencies, Local Authorities, conservation and countryside bodies, and research organisations. Major aspects of the Centre's relationships with these organisations is as follows.

#### **Government Departments**

The DoE is the national focal point for relations with the European Environment Agency and is responsible for implementing European Directives monitoring programmes; and is thus the central contact for the Centre's reporting of Agency statutory monitoring and other international monitoring commitments. The DoE is also responsible for the national air quality monitoring networks. Other Government Departments have associated laboratories for environmental monitoring, eg CEFAS (MAFF) for the marine environment.

#### **Regulatory Agencies**

The Scottish Environmental Protection Agency and the Northern Ireland Environment and Heritage Service, together with the Environment Agency itself, are essential sources of information to be collated by the National Centre into a national environmental database. Methods will have to be established with these other Agencies for consistency of monitoring and exchange of information and expertise.

#### **Local Authorities**

Local authorities generate information on air quality, contaminated land and industrial pollution using a wide range of monitoring and data management techniques. They are responsible for the development of local air quality management plans and for progressing local sustainable development initiatives through "Agenda 21" projects. The Centre will liaise nationally on monitoring quality, national consistency and data transmission issues.

#### **Conservation/Countryside Bodies**

These organisations have valuable environmental information on protected areas (SSSIs, NNRs, ESAs, National Parks etc) and on populations and distributions of species and habitats. The organisations range from statutory bodies to trusts and charities and maintain their data in a variety of national and local formats, although the Institute of Terrestrial Ecology has produced co-ordinated national databases. The British Trust for Ornithology, the Royal Society for the Protection of Birds, and the Wildfowl and Wetlands Trust hold avian data sets. The Centre will liaise with these organisations to develop a co-ordinated national data archiving system.

#### **Research Organisations**

Many research councils, universities and private contractors operate in the environmental assessment field, NERC being the principal UK body and an important national source of its own and other organisations' information. Many of these are in regular contact with

the Centre, and their research associates are at times based on site at the Centre. Examples are Southampton Oceanography Centre, the Proudman Oceanographic Laboratory, Reading University Geography Department, the National Remote Sensing Centre and the British National Space Centre. The number of secondees and research students from Universities working at the Centre on topics of mutual interest is planned to expand.

#### **European Interfaces**

The Centre is building strong collaborative and partnership links with European environmental regulatory and research organisations. Working relationships established so far include:

- (i) The European Environment Agency's Environmental Information and Observation Network (EIONET), where the Centre will provide the national link for interchange of the UK's environmental information with the EEA and its Topic Centres.
- (ii) The Centre is funded by the EU to manage its STREAM network, designed to bring together industrial and research expertise to better exploit the potential of the water quality instrumentation market by European science and technology interests.
- (iii) The Centre Manager is the Agency's representative for EuroGOOS, the European unit of the Global Ocean Observation System, and plays a central role in its management committee.
- (iv) The Centre is progressing a number of collaborative and co-funded projects with the Centre for Earth Observation, at the EU's Joint Research Centre at Ispra, Italy. This work is contributing to the establishment of a co-ordinated European earth observation network to increase the value of earth observation data.

Contacts are being made with other European environmental regulatory bodies to build relationships and collaborate in areas of mutual interest, and with other EU thematic networks. The main ecosystems integrated network initiatives are:

TERI, Terrestrial Ecosystem Research Initiative,  
ELOISE, European Land-Ocean Interaction studies, and  
Aquatic and Wetland Ecosystems.



#### 4. Management and Staffing

The National Centre is part of the Environmental Monitoring and Assessment Function, and the Head of the National Centre reports to the Head of Environmental Monitoring and Assessment, who is responsible to the Director of Environmental Strategy and Chief Scientist. The Centre's role within the EMA Function and the management reporting relationships is shown in the Organisational Chart in Appendix 1.

The National Centre will be accountable to a Client Board comprised of representatives of its major internal and external customers and interfaces. The terms of reference of the Board are:

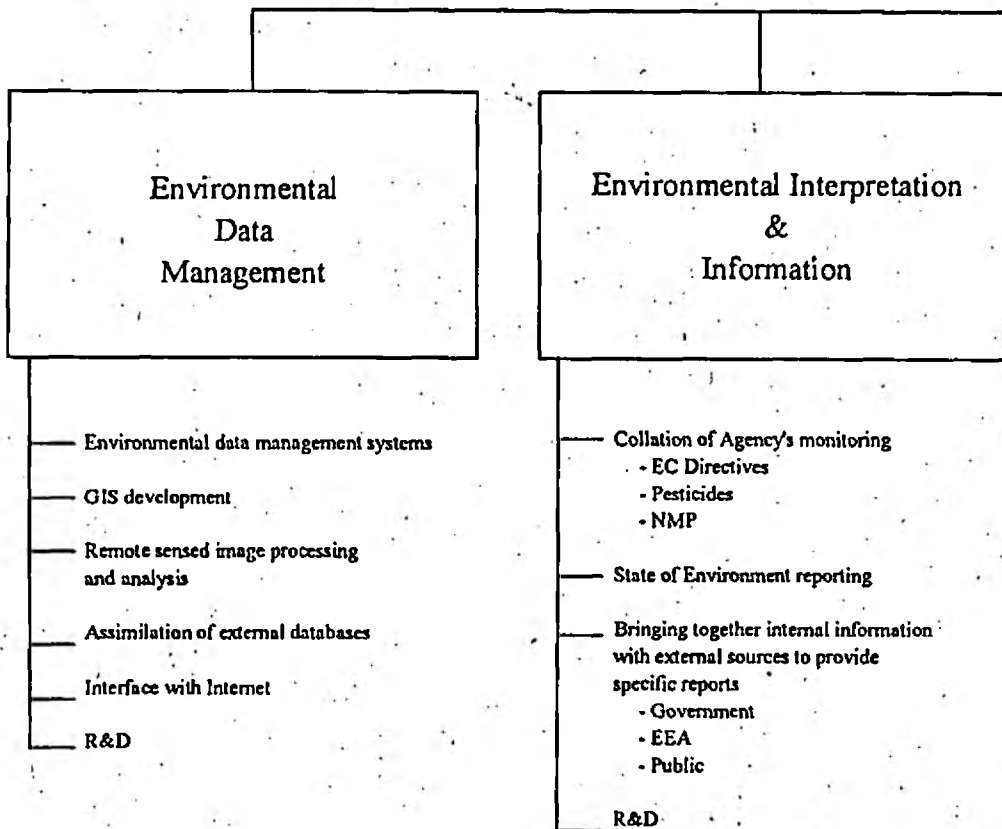
- to agree technical work programmes, resolve competing priorities and resource requirements;
- to represent key customers of the Centre, with its membership reviewed to broadly match its client base and income streams;
- to approve financial allocation and functional apportionment within the Corporate Planning process;
- to be responsible for ensuring that delivery of benefits to the Centre's customers is achieved;
- to ensure that the Centre operates within its terms of reference and that links, synergies or SLAs with other national Centres and business areas are fully realised;
- to agree, monitor and report on all output performance measures to the Centre's customers and the business as a whole; and
- to ensure that adequate progress and review meetings take place, and to produce an annual report for review by Directors in September.

The Client Board will be chaired by the Director of Environmental Strategy and Chief Scientist and will comprise of the following:

- Head of Environmental Monitoring and Assessment;
- PPC (Policy) representative;
- Water Management (Policy) representative;
- Area Manager representing integrated operations;
- External advisor (NERC); and
- Representatives of other external organisations; eg SEPA, English Nature, Universities.

The core areas of the National Centre's activities can be set out as shown in Table 1 and the approved complimented structure of 21 posts relating to these activities is shown in Appendix 2. It is expected that this complemented staff resource will be reinforced with secondees from other Directorates/Regions/Areas, and externally funded University PhD/Case researchers.

**Table 1: Core Areas of Work**



Environmental  
Technology Projects  
&  
Surveillance

Planning  
&  
Customer Liaison

— Supra Regional monitoring and  
surveillance programmes

— Projects  
- R&D  
- Regional

— Development of Monitoring Techniques

— Report to customers

— Corporate planning

— Liaison with external and internal  
customers

— R&D

Topic Leader

## 5. Accommodation

The National Centre is based on the NRA's Instrument and Marine Surveillance (IMS) and part of the Toxic and Persistent Substances (TAPS) Centres. The National Centre will be located at the IMS Centre's site at Twerton, Bath. This location was selected because the Twerton office is owned by the Agency, is close to the Centre's major customers at Rio House, Bristol, and houses the majority of the Centre's staff (ie the 16 staff from IMS) thus minimising relocation costs.

The office accommodation at Twerton is owned by the Environment Agency and is in a generally good state of repair. Some internal rearrangement of the accommodation will be necessary to convert existing workshop facilities into office accommodation. Allocation of costs for this work was made in the set-up costs of the Business Case approved by Directors on the 4th February 1997. The building maintenance budget of £38K p.a. is currently held by the South West Region and will need to be transferred to the National Centre, who will then pay for any maintenance costs through a SLA with Head Office Personnel Services. It should be borne in mind, however, that the Twerton office building is of a 1960's prefabricated construction, incurs a relatively high level of maintenance, and some recognition should be made of long term remediation possibilities, which could extend to rebuilding on the present site.

6. Support Services

Support services will be provided via the appropriate Head Office Department. The support services required by the National Centre are:

- Personnel Services for staffing, day-to-day management, training, health and safety and building management will be provided by Head Office. South West Region has a building maintenance budget of £38K which will be transferred to Head Office.
- CIS. IT support for standard business systems and UNIX will be provided by Head Office CIS via an agreed SLA. Specialist Scientific Systems will be supported directly through contracts with system suppliers. The cost of this support is estimated to be £80K.
- Finance. Financial accounting will be through the Head Office Finance Manager. Salaries will be administered by the payroll system at Anglian Region. Section 9 deals with Financial Resources in more detail.
- Procurement and day-to-day Financial Management Accounting. Initially, it is proposed that this service be supplied by the South West Region and that an appropriate SLA be drafted. The intention subject to further discussion with H.O. procurement is that through a similar SLA the provision of this service will eventually be provided by H.O.

Internal adjustment of the current budget to pay for Head Office support will be required. It is anticipated this will be cost neutral to the Agency, reflecting a monetary transfer from one cost centre to another.

## **7. Proposed Work Programme**

As stated in Section 4 the National Centre's work programme will be agreed by a Client Board comprising its principal internal and external customers and interfaces. The following programme is a best estimate of how an agreed programme might be structured although it does, of course, include ts of approved and on-going items.

### **National Centre's Work Programme - 1997/00**

#### **A. Integrated Environmental Data Co-ordination**

1. Maintain/update "Snapshot" on Internet.
2. Update Paris Commission and Annexe 1A data.
3. Populate National Marine Monitoring Plan database.  
Provide expertise for reporting, development of the plan.
4. Interpret marine data to form 'opinion' and recommend policies,  
including issues relating to North Sea.
5. Extend national pesticides database.
6. Update EC directives, GQA databases, when available.
  - i) Bathing Waters
  - ii) Dangerous Substances
  - iii) Habitats
  - iv) Shellfish
  - v) Surface water Abstracts
  - vi) UWWTD
  - vii) Freshwater fish
7. Provide summary National environmental data from Centre's systems  
to all Agency staff as requested. (Regulatory monitoring data on  
emissions from IPC processes will be provided by National Centre  
for Compliance Assessment; all Regions will still have their own  
Public Registers).
8. Provide publication standard plots, data and other tables for National  
'State of Environment' reports, and other information for deriving  
'opinions'.
9. Develop a common GIS framework for all environmental data and  
use GIS and statistical techniques to analyse data relationships for  
National assessments.
10. Identify, set up system to hold, retrieve and liaise over external  
databases. (Liaison will require using expertise from other centres).
11. Update and maintain Harmonised Monitoring data system.

Post 1997/98



- |    |   |              |
|----|---|--------------|
| 12 | Consider ways of integrating emissions data, RAS and waste data into Centre's systems. This will require consultation with other National Centres and Services to determine how to integrate effectively and efficiently. |              |
| 13 | Provide data to EIONET.   | Post 1997/98 |

**B. Co-ordination of Supra-Regional Monitoring Programmes**

- |    |  |            |
|----|--|------------|
| 14 | Implement National Marine Surveillance Programme, including provision and maintenance of survey and methods manuals.   |            |
| 15 | Undertake trials of Proteus moored marine monitor.   | 1997/98    |
| 16 | Plan, in liaison with HO and Regions, environmental sampling programmes for 97/98, 98/99 specifying requirements, timescales for data returns for Section A (above), quality control, etc. |            |
| 17 | Review potential of satellite and airborne remote sensing techniques (other than CASI) for supra-regional monitoring.  | 1997/98    |
| 18 | Survey coastal UWWTD eutrophic sensitive areas.  | 1997       |
|    | Assist with review of coastal UWWTD sensitive areas.   | 1997/98    |
| 19 | Investigate opportunities for integration of water quality monitoring techniques with techniques for other media, collaborating with NCRM on this.   | 1997/98    |
| 20 | Undertake studies of use of CASI for:<br>UWWTD inter-tidal vegetation studies<br>Land classification projects<br>Coastal zone project<br>Catchment management planning, application review | 1997/98/99 |

**C. R&D Monitoring and Surveillance (funded by National R&D Programme)**

**(a) Submitted Projects**

- |    |   |            |
|----|---|------------|
| 21 | Manage the Environmental Monitoring Technologies R&D topic.   | 1997/98/99 |
| 22 | Evaluate the potential of synthetic aperture radar (SAR) and LIDAR to provide digital elevation and bathymetric measurement for flood defence, conservation and water pollution control. (R&D project approved External Contractor, managed by Centre). | 1997       |
| 23 | Cost effective targeting of aircraft remote surveillance using satellite imagery - potential collaborative project with CEO, Ispra. (Submitted to R&D PAB for approval in Q2 97).   | 1997/98    |
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- 24 Application of remote sensing to the study of protected area biodiversity and degree of urbanisation topographical changes. (To be submitted to R&D PAB for approval Q3 97).
- 25 Application of remote sensing for assessing the status and condition of land, water and ecological resources, in particular the identification of contaminated land and compliance with land use restrictions in NVZs. (To be submitted to R&D PAB Q3 97).
- 26 Use of remote sensing to provide accurate information for climate change modelling of sea levels and to overview the changes in the coastal environment, including oil/gas release from off shore installations in controlled waters. (To be submitted to R&D PAB Q397).

Develop a soil erosion vulnerability map with emphasis on protected areas and special interests such as upland peat and wetland peat. Investigate land use interactions in particular winter crops and grazing. Study the effects of long term climate changes - rainfall and temperature. ;

#### **(b) Areas for Future R&D Projects**

- 27 **Health of Environment**  
Correlate the national soil quality database with vegetation health and tree health, with acid rain distributions and species habitats. Produce a national contaminated land and brownfield site map, to enable remediation of contaminated land to be remotely monitored.
- 28 **Environmental Quality**  
Develop in-situ instrument tests for broad spectrum contaminants and toxicity (with respect to the whole environment rather than effluent discharge ecotoxicology).
- 29 **Long term Climate Change**  
Provide information to detect actual long term changes in the environment, specifically:- sea level change, land level change, ground level ozone'- crop health, water vapour in air - meterological rainfall - hydrometric data sources.
- 30 **Aesthetics**  
Generate a three-dimensional terrain map of aesthetic quality of the landscape from any viewpoint, to assist planning applications, remediation, land use changes, model climate changes, etc.

#### **D. Provision of Service to Regions**

- 31 Provision of airborne surveys and interpreted satellite images for operational tasks as requested.
-

- 32 Provision of 'Help' desk on remote sensing.

**E. European and National Involvements**

**33 STREAM Network**

Standards, measurement, Testing and Research in Environmental Instrumentation and Monitoring. One EU funded post at the centre to manage the European thematic network. The objectives of stream are "to bring together environmental regulators, researchers, manufacturers and users of water quality and water quality instrumentation to increase industrial competitiveness, improve standardisation and to promote better exploitation of new science and technology".

**34 EuroGOOS**

EuroGOOS is the European component of GOOS, and consists of an Association of National Agencies working together to foster European participation in GOOS. The National Centre has developed a marine instrumentation and user data requirements data base covering all major European Agencies with an involvement in the marine environment.

- 35 Centre for Earth Observation, Ispra, Italy. EC Space Applications Institute case studies in earth observation data techniques accepted and made widely available through the Internet.

Develop projects with the CEO and other European Agencies in the combined use of EO data from satellites and airborne remote sensing for:

- i) Coastal Zone Management
- ii) Land Use classification studies
- iii) Use of SAR and LIDAR techniques linked to CASI data for topographical modelling.

**36 CENSAR**

Chemical ENvironmental Sensor ARays is a research project operating through the LINK molecular sensors programme. The programme is funded by the Department of Trade and Industry (DTI) and Science, Education and Research Council (SERC).

This proposed work programme was used to assemble a 1-year programme for 1997/98, and is shown in the Appendix (at the back of this report) in Gantt Chart format.

## **8. Strategy for IT Development and Data Handling**

### **8.1 Introduction**

The EDS Centre is of necessity very computer based and the I.T. infrastructure and systems inherited from the site's previous IMS Centre is proving unreliable and inadequate for the tasks outlined in this business plan. This document describes the establishment of an I.T. strategy that is robust and complies with the Agency's current thinking whilst maintaining flexibility to meet the Centre's business objectives.

The computer systems in use can be split into two broad groups, business systems and scientific systems. There are themes that encompass both systems, such as networking and working practice issues such as backup and data security, but they can be treated separately with respect to applications and support. This document addresses the following main issues:

- (i) networks and general infrastructure;
- (ii) working practice recommendations;
- (iii) business system recommendations;
- (iv) science system recommendations; and
- (v) data management system work program.

### **8.2 Networks and General Infrastructure**

The current LAN and WAN systems at Twerton are laid out in figs 1 and 2, respectively.

Currently, the Centre runs LANTASTIC as it's main PC network. This has become unreliable in the following areas:

1. connection to the Suns is unreliable
2. uses up far too much memory
3. connection to national systems (E-mail) slow and cranky
4. does not really allow automatic backup of data resources
5. system is unsupported by I.S.

Figure 3 shows the proposed LAN for Twerton. It is based around one large data server for PCs where all PC based data will be shared, it is based upon the industry standard and Agency standard network, NOVELL. The storage is based on RAID technology which allows for 'hot swapping' of disks that fail. A full backup system will operate nightly to Digital Linear Tape. The size of storage will be in the region of 14Gb. The Suns and systems inherited from TAPS will fit onto this infrastructure with (hopefully) little modification. The Sun systems will be able to use the data on the main server, therefore allowing storage of key data to be centralised and backed up regularly. Storage of images and large objects will continue to be done in close proximity to the Suns as working on images over the network is inefficient and slow.

Figure 4 shows an idealised situation for a WAN. The national network system is under review at the moment, and we have had no input onto its shaping (as yet). The Internet connector is also speculative, it is against many I.S. edicts, but may be necessary for fast transfer of data to external bodies and provision of data systems over the World Wide Web.

### 8.3 Working Practice Recommendations

The following practices are recommended:

#### Backup

- all key data (WP, documents, spreadsheets, databases) will be stored on the main server in common and personal areas and will be backed up on a rolling backup system on a nightly basis.
- any large DTP files will be stored locally and backed up to opti/CD-rom at the users responsibility (current system).
- all Unix projects are the responsibility of the user to back up (current system).

#### Packages

As far as possible, agency standard packages will be used. Migration to these systems will be considered on a case by case basis. Current standards are:

WordPerfect 6.0/6.1 ..... Word processing  
Lotus 1-2-3 ..... Spreadsheets  
Microsoft Access ..... Databases (PC)  
Microsoft Project ..... Project Management  
GroupWise ..... E-mail  
Freelance (Powerpoint?) ..... Presentations

These packages will be loaded and available on the server to all PCs in the building. Other packages will be locally loaded and used.

#### Data Security

All backups and master disks will be kept in fire safes. Only authorised staff will be able to request access to avoid duplication and unauthorised tampering.

#### Programming

Programming will form an increasing part of the Centre's work. A set of guidelines for program construction and continuity in the case of people leaving is set out in appendix 'A'.

#### Key Data

Key data sets shall exist in one place only as a master copy. In certain circumstances, mirror copies may be kept in other locations (eg. Head Office) in these cases, the master copy must be clearly defined, with ownership and maintenance identified.

#### Internet

E-mail to external organisations will be handled by Group Wise.

Web browsing and file down loading will be done on 2 stand alone machines that have full virus checking. Once files are down loaded and checked, then the network can be activated and files moved onto the server/PCs.

CompuServe will be replaced by a faster 'Web only' service provider such as Pipex, until the Agency gets national Web access.

#### Consumables

A central store of consumables will be held within the Centre, with one budget code. The store will be organised with a base stock holding and an administration that includes costing against projects and general administrative usage. Consumables will be purchased over the national

contract, except where otherwise directed by national contract administrators.

#### Health and Safety

Care must be taken to comply with VDU assessments and good VDU practice including seating and lighting.

#### Procurement

To be handled on a project and fund basis via standard procurement procedures.

### 8.4 Business Computing

Business computing includes all routine PC based packages and administrative functions. It is important to standardise these to allow portability of information and ease of support. Many of the working practice sectors apply to this section, so reference must be made thereto.

#### Hardware

All business computing will be undertaken using IBM PC compatible computers. Networking will be achieved using 10 base T networking installed at Twerton, running IPX/TCPIP from Novell.

#### Operating Systems

The current operating system standard within the Agency is Dos 6.22/Windows 3.1 (3.11). Windows '95 is only used in exceptional circumstances. It is very likely that any corporate move will be towards windows NT. With this in mind, the Centre shall use windows 3.1 for business applications for the foreseeable future.

#### Printing

Printing will be achieved via networked printers or by locally attached printers where they are available. There has been an unnecessary proliferation of printers in the Centre for the last 2 years. Printers will be placed in easy accessible locations (except where confidentiality is needed) and run off small network printer server boxes.

#### Virus Checking

Virus checking of all floppy disks will be set up on each PC, with further checking on startup by scanning memory and hard disk contents.

The latest virus checking software will be available on the server and will be periodically down loaded onto stand alone PCs (laptops and Internet machines).

#### Filing System Interconnectivity

The file magic filing system will be rolled out to all managers and their staff. The format of the filing system will be decided by the Management team in liaison with the Administrative Staff. The input of faxes, E-mail and other business data formats will be also achieved as seamlessly as possible and will be stored in the filing system.

#### Support

All business system support will be provided by Head Office on a call out basis. If deemed necessary, a I.S. staff member will be present on site on a regular basis.

Some exceptions apply: file magic is not a standard Agency package, so support will be provided to I.S. by EDS personnel and the vendors.

The possibility of an SLA defining CIS responsibilities will be considered.



## 8.5 Scientific Computing

The scientific computing element of EDS will develop rapidly over the next 2 years as new needs and roles are catered for. Interconnectivity between the business and scientific systems is key: databases and information must flow between the two systems to allow easy reporting and analysis. Once again there is overlap between this section and working practices.

### Operating Systems/Hardware

The major elements of the scientific computing at Twerton will remain on UNIX, based on SUN platforms. This may be compromised by the importation of systems from TAPS which are based on windows NT, but should connect to UNIX easily as they use the same network protocol (TCP/IP). Specific systems may exist on PCs, such as Mapinfo.

### Distribution

At the earliest opportunity, it is imperative to make a system available that runs on the UNIX interface on PCs, thereby allowing many more seats on the SUNS via the PC network. This will allow easier administration and will facilitate more work.

### Image Processing

Image processing will continue using PC based on the SUNS. It is recommended that some future modules will be purchased to allow for new data sources and visualisation (eg. Lidar - 3D fly through) and output (mapping packages). Though care must be taken not to overlap with GIS systems.

### GIS and Data Management

PC GIS and visualisation will continue to be undertaken via Mapinfo, with extension by new licences as necessary. Including the plane system we have (or are in the process of buying) 6 licences for Mapinfo.

Grass will continue to be a UNIX toolkit workhorse, but may be phased out by new systems as they come on line.

An 'over arching' system is in the proposal stage. The whole area of GIS and Data Management must be continually assessed in the light of Agency thinking (SATIS, DSSG, GIS user etc.)

A decision on the direction of the EDS with regard to GIS and Data Management is crucial; it cannot be undertaken lightly or hastily. The development program for a "Environmental Data Management System" (EDMS) is detailed in section 5. This is now the priority task for the Centre as it is essential to fulfil the Centre's aims efficiently. The strategy for putting an EDMS in place is set out in section 8.6.

### Support

UNIX support will continue to be provided by I.S., though Head Office have no UNIX support team (S. West do). Regular backups will be instigated locally, with a member of staff responsible for them. UNIX development should also be handled in house. Software support on specialist packages should be purchased from the vendors (where available). This assumes updating and patching of current versions. The IMS did not procure such support, buying new versions sporadically and relying on in-house expertise.

### Survey Computing

Survey computing is a curious halfway house between business and scientific computing. As far as possible the working practice edicts should be applied. Support may have to be specially

purchased. Aircraft systems may need development on a case by case basis. Boat systems will become increasingly reliant on portable PC systems. Investment may be necessary in providing ruggedised systems to safeguard data security.

It is recommended that survey contractors have access to external E-mail systems so that flight/survey planning data can be sent and received as appropriate.

## **8.6 Data Management and System Work Programme**

### **8.6.1 Rationale**

The National Centre has among its stated aims:

- "the collation of the Agency's internal environmental monitoring data..."
- "creation of an integrated picture of the state of the environment and the pressures placed upon it, by relation of these data to other internal and external data sets"
- "Application of a consistent level of quality control across all the Agency's environmental data"
- "Conversion of data into meaningful information for the Agency, the DoE and the EEA..."

In order to address these aims in an effective manner, the National Centre requires easy access to all the Agency's data bases and strong links with external agencies. In order to output information, these links need to be two way. In addition, the Centre needs to be able to combine data from different sources to produce information and to present it in a clear and consistent manner.

Access to such data must be made with the best principles of data management in mind, specifically the guidelines laid down by the Scientific and Technical Information Service (SATIS) for data management. The most important principle from these guidelines that affects any system designed to discharge such aims is that of data ownership. In essence, where a database is dynamic (that is, it changes from day to day) the data should be maintained as a master copy by those responsible for collecting the data. Access to such data sets should be made (as near as possible) at the time the data is needed as then the most up to date version can be used.

### **8.6.2. Data types and concepts**

In order to address the various aspects of state of the environment reporting the National Centre needs to collate many different types of data. Some are classed as "static" - that is they change on an infrequent basis, examples would be Ordnance Survey data, or geology data. Others are data sets that are controlled by the National Centre, so the master data set would be held at the Centre, for example the bathing beach database. Other "non static" databases that are not controlled by the Centre would be described by "metadata". Example metadata would be the coordinates, determinands sampled, sampling purpose and frequency of sampling for a site included in a regional water quality archive, but not the actual chemical quality. Metadata is relatively "static" in comparison to the entire database, and is a useful tool to condense down the size of data handling requests. When the full data is needed, the data is retrieved by querying the metadata and retrieving the most up to date information.

Traditionally, environmental monitoring has been based on detailed point based samples. This provides limited coverage when addressing large scale environmental reporting. Remote Sensing and more intense sampling methods can provide more synoptic overviews. The Centre is already using such data sets which are often large and complex. These data sets will vary between "static" and being pointed to by metadata, depending on their use and size.

A list of example data sets is shown in figure 5. All data are assumed to be "core", that is the full data set is held at the National Centre or is metadata, unless shown.

### 8.6.3. Data Model / Systems

Once the principles of data manipulation have been worked out the interaction of the main data pathways need to be defined. This is set out in figure 6 which shows the National Centre's core data and the major inputs and outputs from the system. The system relies on the data collected by the Agency's regions, with the reverse flow being information generated by the Centre being used by the Centre, especially for LEAPS.

Typical outputs are shown on figure 6, but notably include linking up with other systems such as the EIONET or other Internet initiatives. In looking ahead, the model should take into account modern methods of disseminating information. Most modern dissemination systems use the Internet protocols (such as WWW) if not the Internet itself to transfer information. It is therefore sensible to look towards the Internet as the main way to access the core data remotely.

The EDS Centre is not alone in its need to produce environmental information. Other functions and National Centres will have a similar need. It is logical to take account of these needs in the planning stage to make the system as widely useable as possible.

### 8.6.4. Aspects of a Data Management System

Given the aims, the types of data and the overall data model, a series of themes for a data management system can be drawn out:

- *Allow new data types to be handled across all mediums*  
The system must be flexible enough to allow new types of data to be handled with minimal effort.
- *Take advantage of improvements in technology*  
New methods of storing and accessing data will provide greater speed and flexibility and should be utilised as much as possible.
- *Data Mining & Warehousing*  
Methods of accessing remote data sets and retrieving data efficiently whilst not compromising good data management principles should be used.
- *Handle all data types held by Centre ON LINE*  
Core data sets are always on line so that they can be used in day to day working, more complex data sets must be able to be integrated seamlessly.
- *Produce new and "rolling" data outputs and products*  
Once a query has been run to produce a particular output or information layer, then this query should be able to be run again using more up to date information from the "warehouse" to provide updates.
- *Support new requirements for outputs placed on the Agency*  
Be flexible enough to allow for new types of reporting as yet unconsidered, that is have a high degree of user controlled customisation.
- *Data Dictionaries & Translators*  
Allow the intelligent translation of information from different archives into a common data structure: for example using a table of determinand codes to allow for different nomenclature systems over different regions.
- *Interoperability*

- Be able to connect (on line) to different platforms and operating systems seamlessly (once set up!)
- *Distribution of data sets and access (external?) (intranet?)*
- *Convergence / GIS Procurement*  
Take into account, as far as possible, at the planning stage, the initiatives by CIS and the Agency GIS community to standardise the systems in use.

#### 8.6.4. Implementation Strategy

The National Centre is already in the process of putting in the necessary hardware infrastructure to base a large data management system on (figure 7). This will be completed with a few small IT projects to configure hardware and allow for additional small hardware purchases.

The implementation of the EDMS is proposed as a 5 stage process, as shown in figure 8. It involves the commissioning of scoping studies and bespoke software to act as an over-arching framework on which commercial GIS and database products are connected.

The Centre is seeking to implement the scoping study, GIS and Database procurement and the design of the catalogue system as soon as possible. The final, and most important stage where all the systems are linked up, will follow on and will rely on the cooperation of the regions to allow full and easy access to regional data systems.

**The success of the system relies on free access to internal data sets by the regions.**

Figure 1 LAN at Twerton

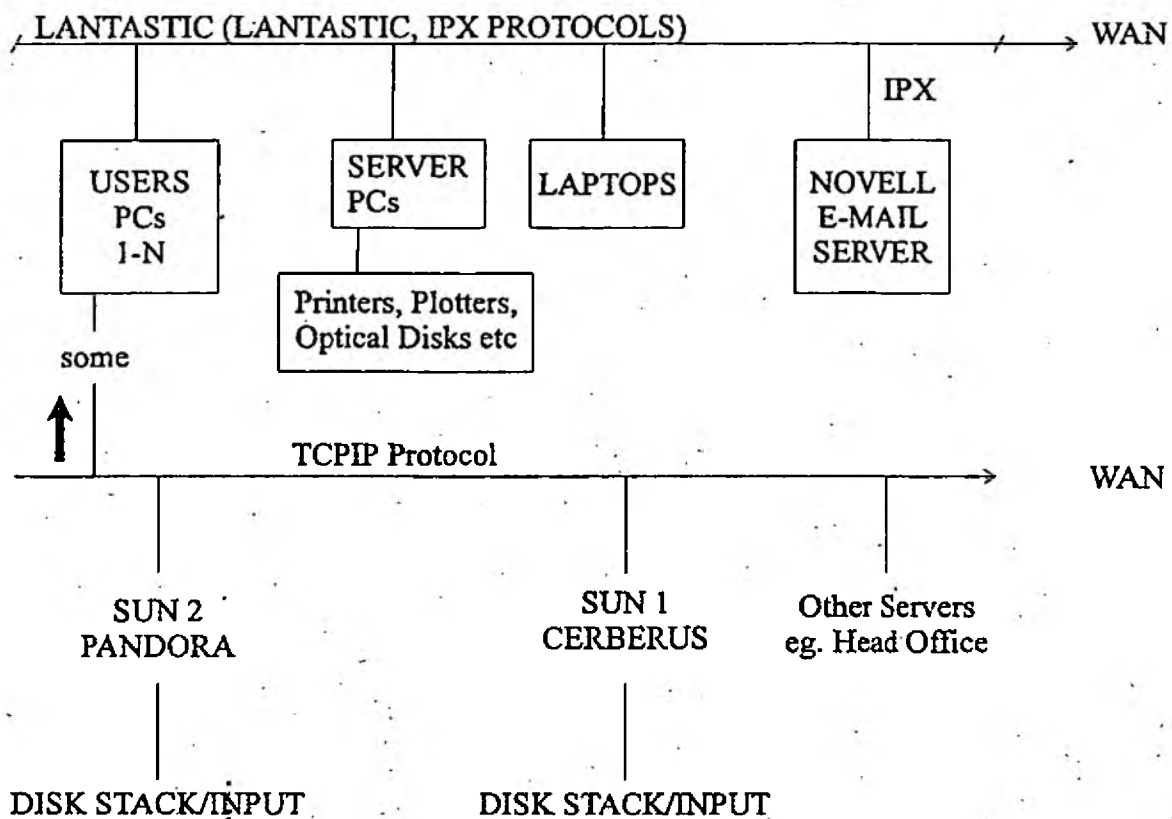
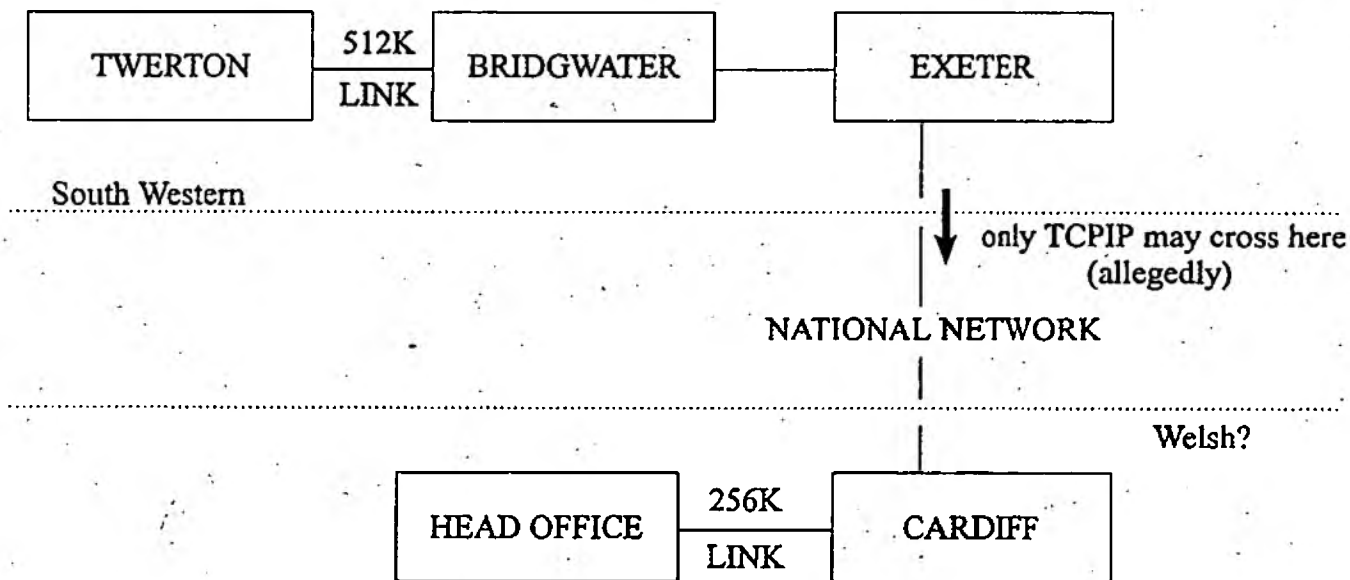


Figure 2 WAN at Current Time



Data transfers of 7K per second achievable reliably from Twerton to Head Office

Figure 3 Proposed Future LAN

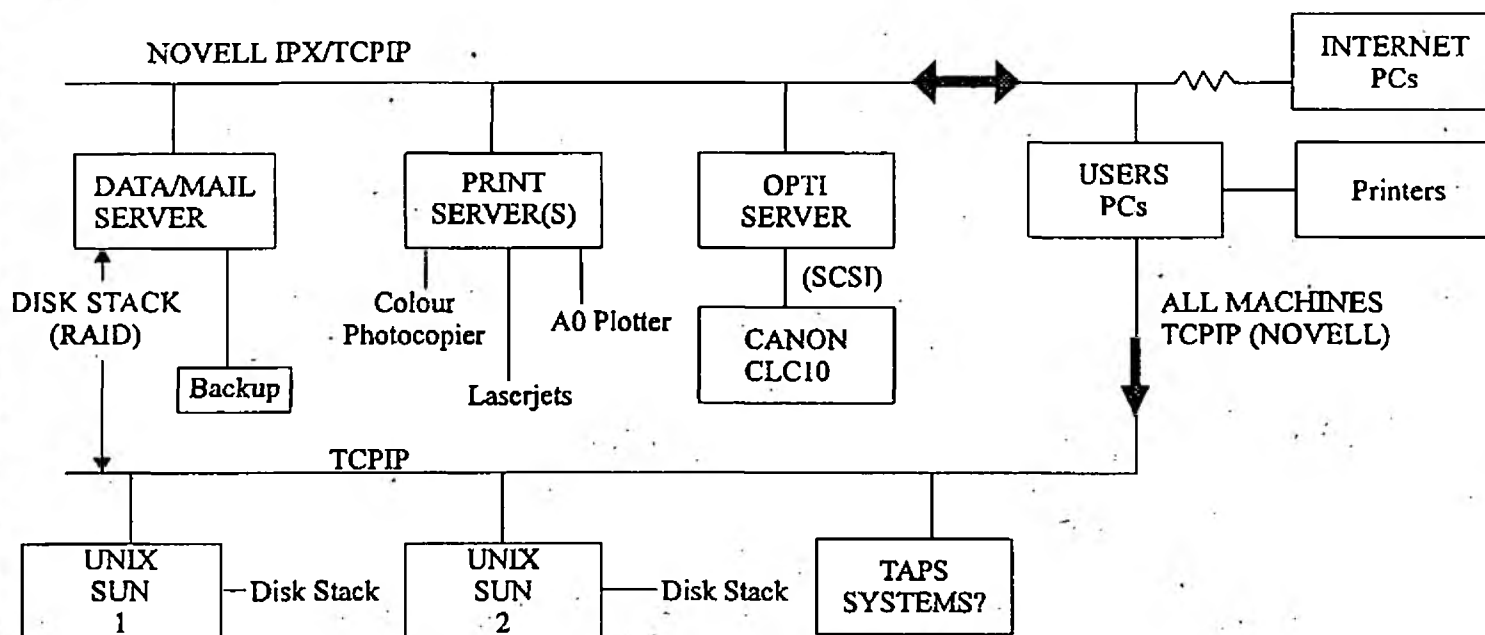
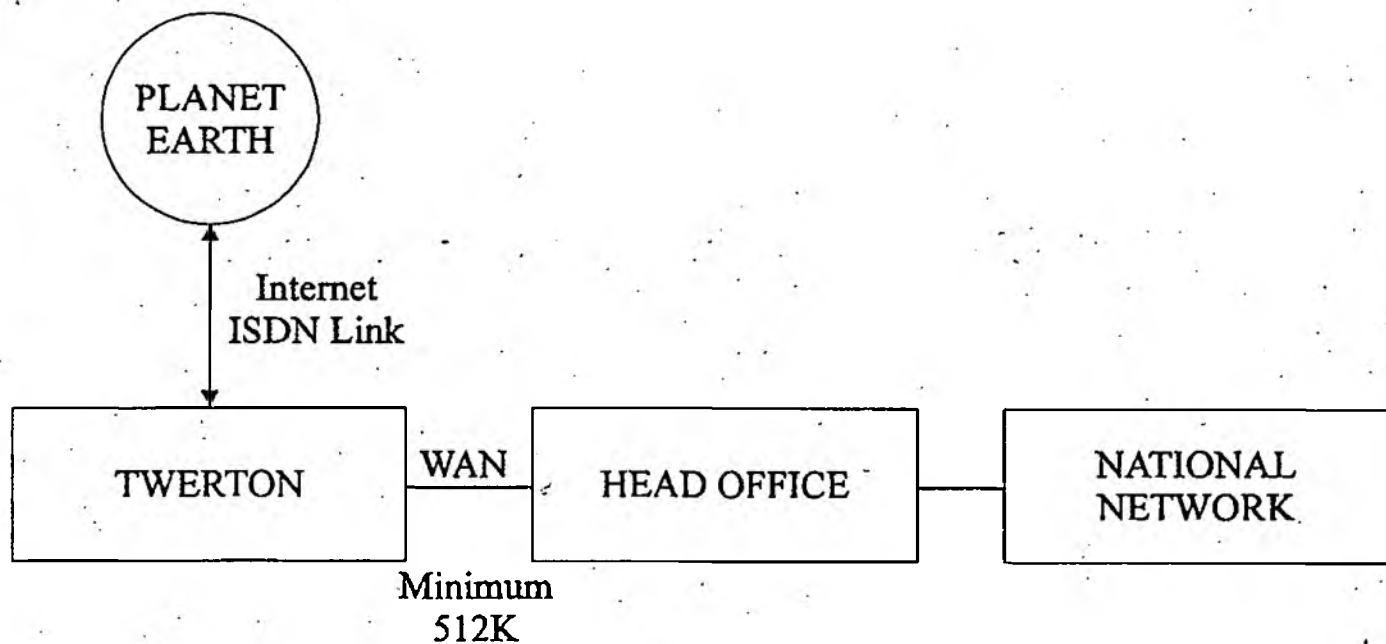


Figure 4 Proposed WAN





9. **Financial Resources**

An outline budget approved with the Business Case is given below:

Year	97/98 £K	98/99 £K	99/00 £K
Staff costs	557	557	557
C.I.S.	80	80	80
Data costs	60	60	60
Environmental Surveillance	407	407	407
Instrumentation	42	42	42
Other	23	23	23
Total	1169	1169	1169

After discussion with Finance, it has not been possible to provide a more detailed breakdown of the financial resources necessary to operate the National Centre, until the staffing structure and work programme has been agreed.

# Figure 5: Example Data / Information Types Held / Used at EDS

## EA Routine Initiatives Master Held by EDS

Directives  
- Dang. Subs  
- Bathing Waters  
- Surface Waters  
- Standardised RD

NMP  
PARCOM  
Key Facts  
GQA  
Marine Baseline  
etc

Non Core Data

## "Static Data"

Boundaries:  
- SSSI  
- NNR  
- RAMSAR  
- etc  
Ordnance Survey  
Rivers /  
Catchments

Surfaces:  
Topography  
Land Cover  
etc

## Metadata - Data Not Maintained By EDS

Air Quality  
Consents databases  
Chemical Release Inventory  
Water Quality Archives  
etc

### Project Oriented Pointed to by metadata

As above...  
Ad hoc surveys

## Remote Sensing

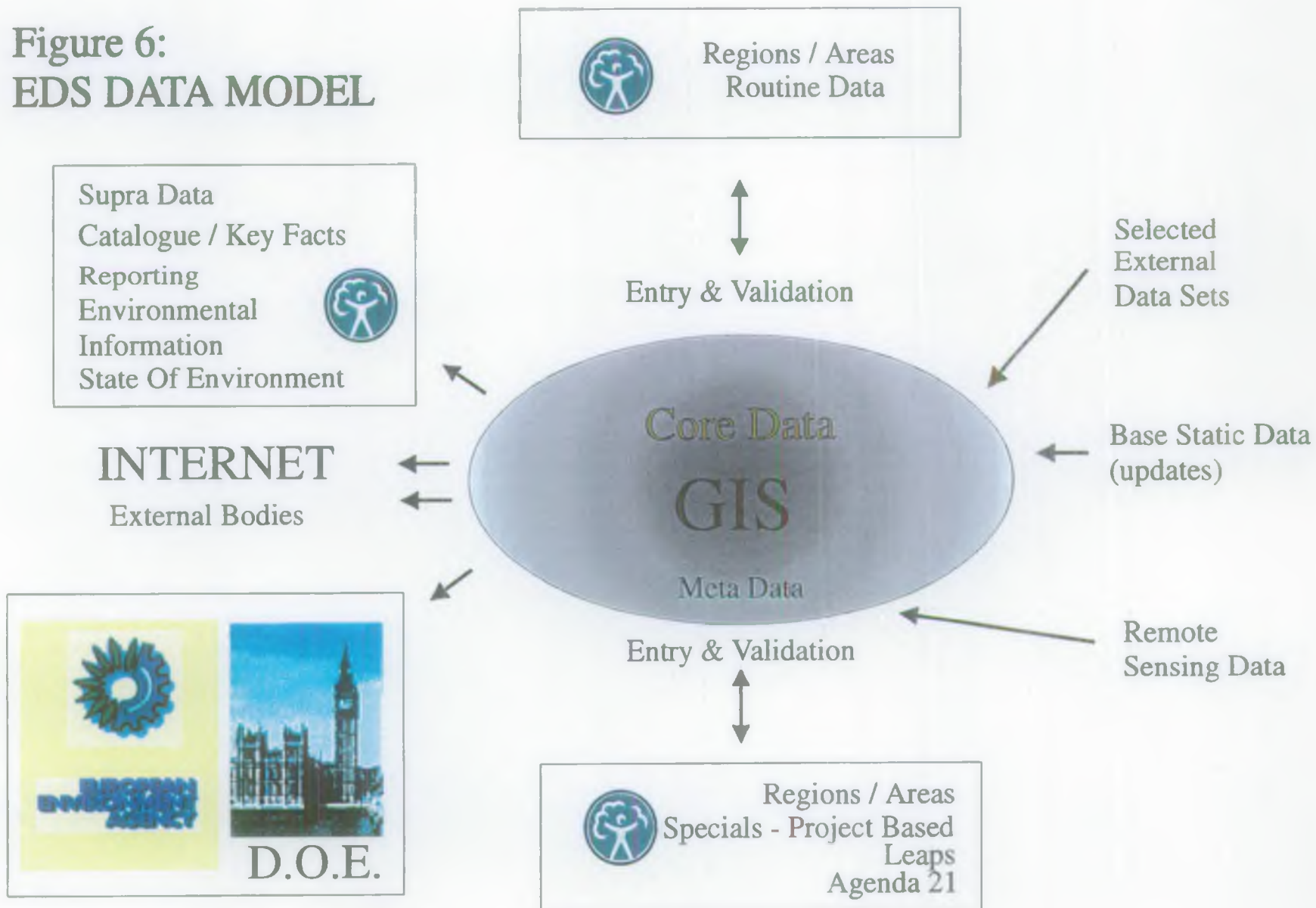
Satellite  
Airborne  
Aerial Photography  
Subsurface

### External & Specific Environmental Pointed to by metadata

Biodiversity  
Avian  
Soils  
Geology  
etc

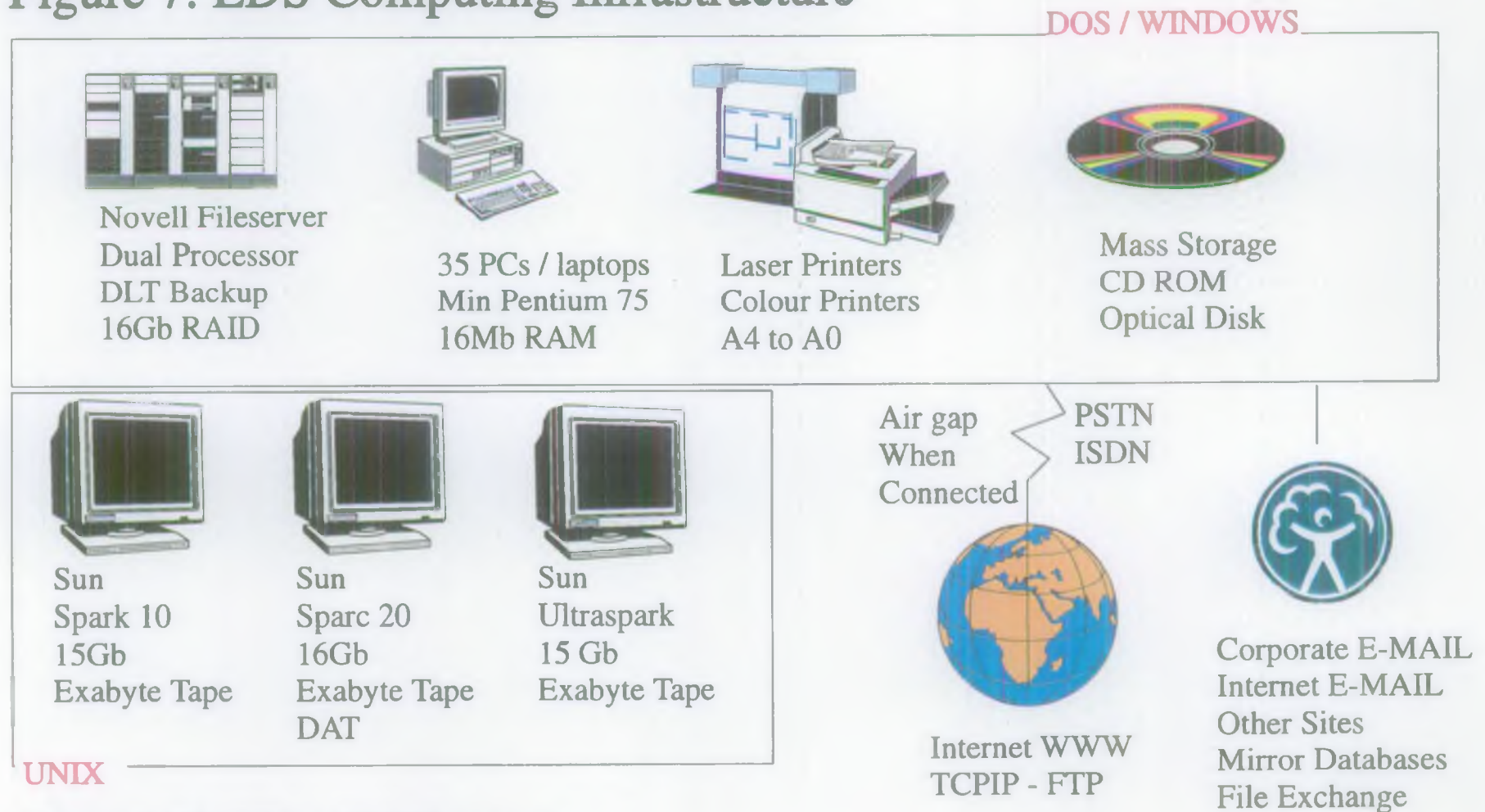
Note: Considerable overlap exists between these groups

**Figure 6:  
EDS DATA MODEL**





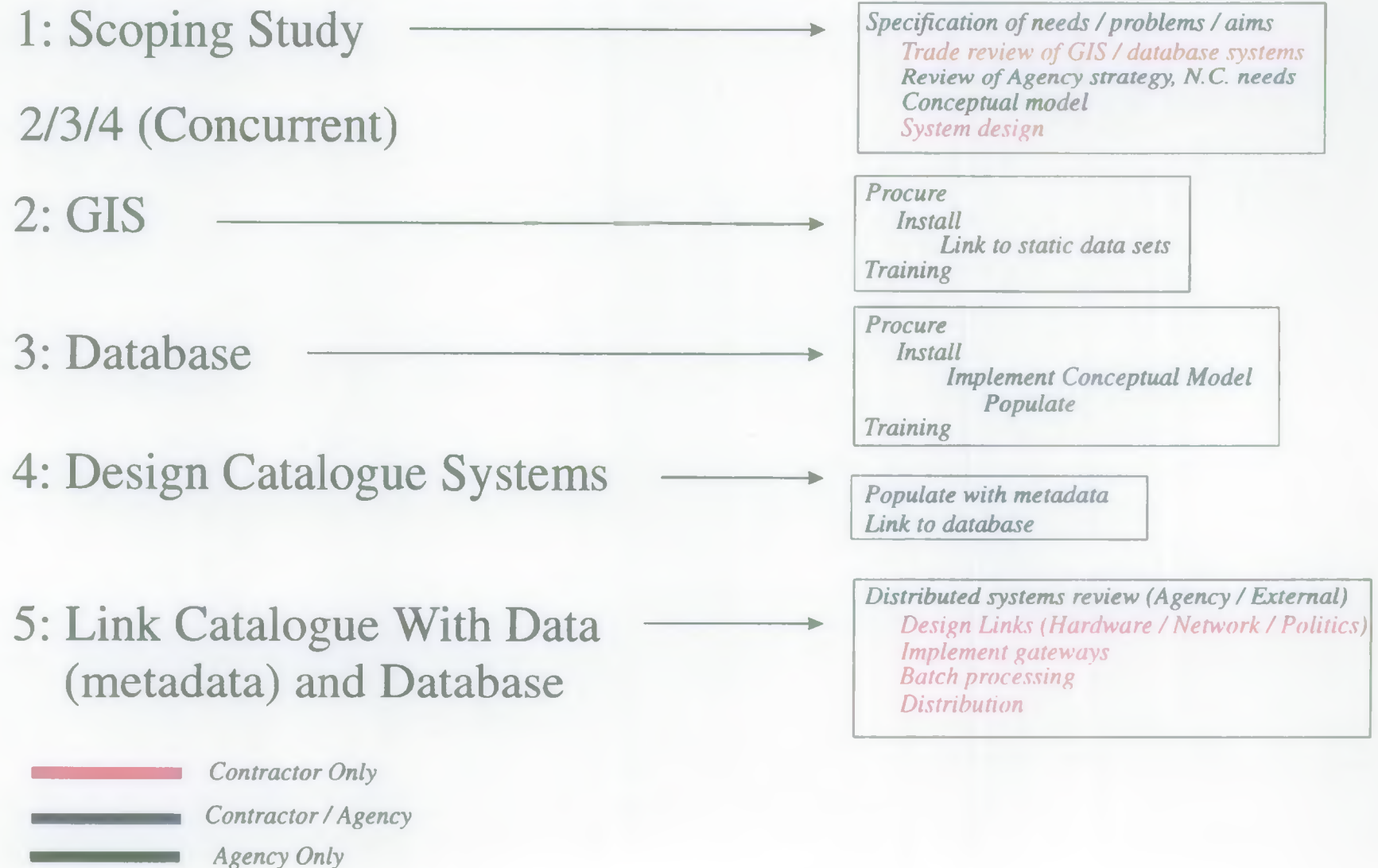
# Figure 7: EDS Computing Infrastructure



UNIX

Twerton LAN - IPX and TCP/IP protocols  
 Total connectivity within building:  
 Novell server accessible from UNIX  
 UNIX available from PCs  
 PCs can run UNIX graphics sessions (X)

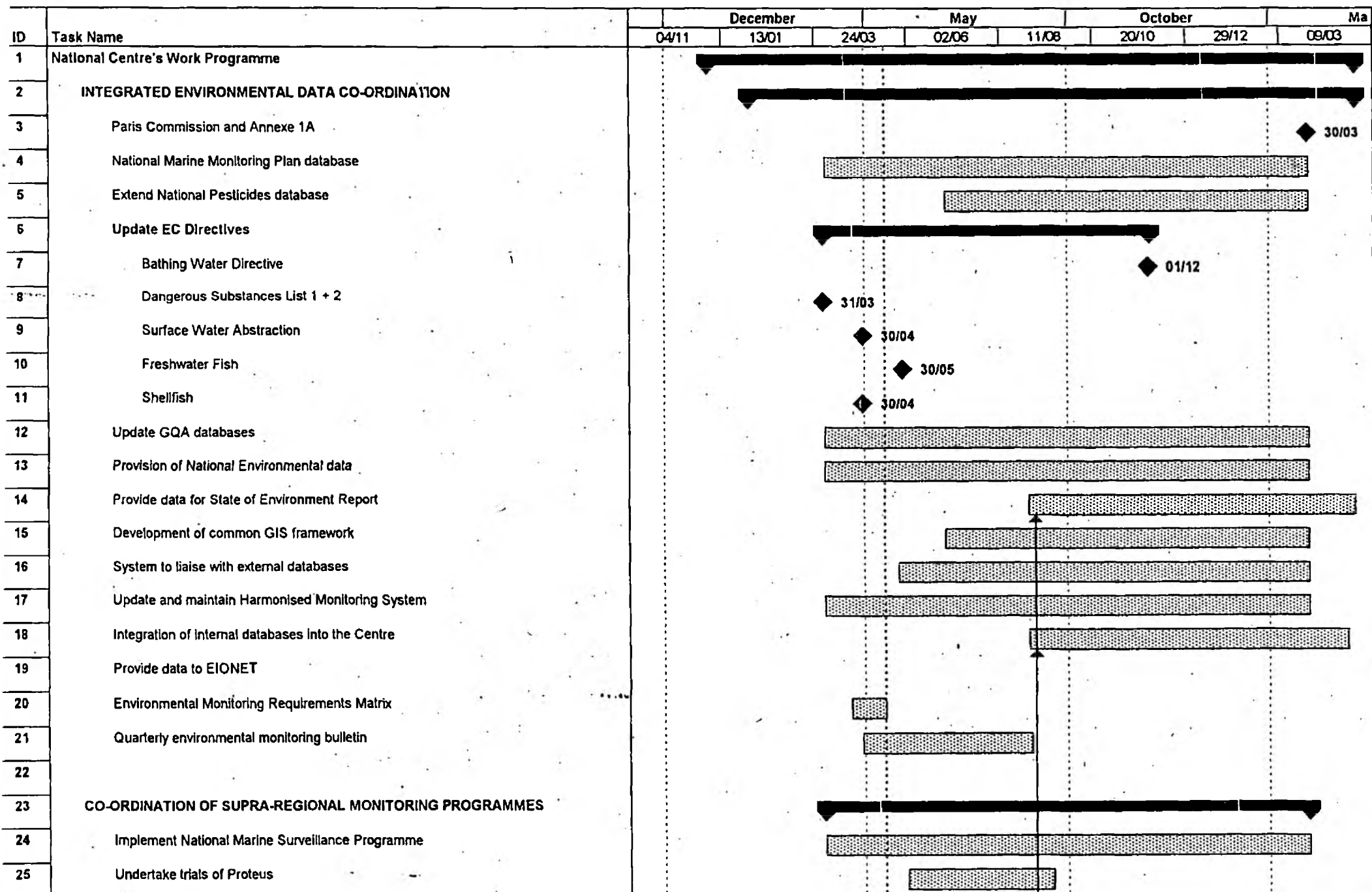
## Figure 8: EDMS System Components



**Appendix - 1997/98 Work Programme**



**NATIONAL CENTRE Centre 1 YEAR PROGRAMME**  
(April 97 - March 98)



ID	Task Name	December			May		October		Ma
		04/11	13/01	24/03	02/06	11/08	20/10	29/12	09/03
26	Plan environmental sampling programmes								
27	UWWTD eutrophic sensitive areas								
28	Investigate the integration of water quality monitoring techniques								
29	Investigate potential use of CASI								
30									
31	<b>PROVISION OF SERVICE TO REGIONS</b>								
32	Provision of airborne surveys and satellite images								
33	Provision of help desk on remote sensing								
34									
35	<b>EUROPEAN AND NATIONAL INVOLVEMENTS</b>								
36	STREAM								
37	EuroGOOS								
38	Collaborative proposal with ISPRA								
39									
40	<b>RESEARCH &amp; DEVELOPMENT (Ongoing Work)</b>								
41	Synoptic view of the environment								
42	Data transmission								
43									
44	<b>RESEARCH &amp; DEVELOPMENT (New Starts)</b>								
45	Remote sensing: Protected area and urbanisation topographical changes								
46	Remote sensing: Status and conditions of land, waters and ecological resources								
47	Remote sensing: Climate change, sea level modelling & coastal changing landscape								
48	Remote sensing: Aircraft and satellite images								
49									
50	<b>RESEARCH &amp; DEVELOPMENT (Proposed)</b>								

ID	Task Name	December			May		October		Ma
		04/11	13/01	24/03	02/06	11/08	20/10	29/12	09/03
61	Environmental Monitoring Technologies R&D Programme								
62	Investigate potential of LIDAR/SAR								
63	Investigate use of Thermal Imagery								
64	Biodiversity								
65	Soil Protection								
66	Health of Environment								
67	Environmental Quality								
68	Aesthetics								
69	Contaminated land								
61	MANAGEMENT OF THE NATIONAL CENTRE								
62	OUTPUTS								
63	Establish and agree work programme (inc. Regional work)								
64	Disseminate and market outputs								
65	Develop communications and links with external bodies								
66	Identify internal data sources								
67	Identify external data sources								
68	Project management of other topic areas								
69	Set up help desk for enquiries								
71	STRUCTURE								
72	Determine outline structure and responsibilities								
73	Appoint next tier of staff								
74	Provide detailed structure								
75	Staff appointments								

ID	Task Name	December			May		October		Ma
		04/11	13/01	24/03	02/06	11/08	20/10	29/12	09/03
76	External advertisements								
77	Recruit vacancies to structure								
78	Identify possible secondments to the National Centre								
79									
80	MANAGEMENT								
81	Inaugural meetings of Management Board								
82	Establish Infrastructure SLA's:								
83	IT								
84	Procurement								
85	Building Maintenance Support								
86	Financial Services								
87	Operations								
88	Personnel Services								
89	Identify transfer of resources from TAPS								
90	Carry out accommodation changes								
91	Plan new layout								
92	Tender work								
93	Construction and decorating								
94									
95	FINANCE								
96	Establish more detailed and phased budget								
97									
98	GENERAL								
99	National Centre Public Open Day (1)								
100	National Centre Client Board Open Day (2)								

**NATIONAL CENTRE Centre 1 YEAR PROGRAMME**  
(April 97 - March 98)5

ID	Task Name	December			May		October		Ma
		04/11	13/01	24/03	02/06	11/08	20/10	29/12	09/03
101	National Centre Public Open Day (3)								
102	Seminar on 'Soil'								

- 3 **Paris Commission and Annexe 1A**  
Update Paris Commission and Annexe 1A data.
- 4 **National Marine Monitoring Plan database**  
Populate National Marine Monitoring Plan database. Provide expertise for reporting, development of the plan.
- 5 **Extend National Pesticides database**  
Extend National Pesticides database.
- 6 **Update EC Directives**  
Update EC Directives database, when available.
- 12 **Update GQA databases**  
Update GQA database, when available.
- 13 **Provision of National Environmental data**  
Provide summary national environmental data from Centres systems to all Agency staff as requested. Regulatory monitoring data on emissions from IPC processes will be provided by National Centre for Compliance & Assessment; all Regions will still have their own Public Registers.
- 14 **Provide data for State of Environment Report**  
Provide publications standard plots, data and other tables for National State of Environment reports and other information for deriving opinions.
- 15 **Development of common GIS framework**  
Develop a common GIS framework from all environmental data and use GIS and statistical techniques to analyse data relationships for National assessments.
- 16 **System to liaise with external databases**  
Set up system to hold, retrieve and liaise other external databases. (Liaison will require using expertise from other Centres)
- 17 **Update and maintain Harmonised Monitoring System**  
Update and maintain Harmonised Monitoring System.
- 18 **Integration of internal databases into the Centre**  
Consider ways of integrating emissions data, RAS and waste data into Centre's systems. This will require consultation with other National Centres and Services to determine how to integrate effectively and efficiently.
- 19 **Provide data to EIONET**  
Provide data to EIONET (when it is started)
- 20 **Environmental Monitoring Requirements Matrix**  
A matrix that sets out all the required Agency's environmental reporting.
- 21 **Quarterly environmental monitoring bulletin**  
Proposed quarterly environmental information bulletin, proposal put to PR who are supplying appropriate forms for presentation to Agency Board. First issue likely to be September, then quarterly thereafter.
- 24 **Implement National Marine Surveillance Programme**  
Implement National Marine Surveillance programme, including provision and maintenance of survey methods and manuals.
- 25 **Undertake trials of Proteus**  
Undertake trials of the moored marine monitor, Proteus.
- 26 **Plan environmental sampling programmes**  
Plan, in liaison with HO and Regions, environmental sampling programmes for 97/98, 98/99 specifying requirements, timescales for data returns for Section 1A (above), quality control, etc.
- 27 **UWWTD eutrophic sensitive areas**  
Survey using coastal vessels to identify UWWTD eutrophic sensitive areas. Assist with review of coastal UWWTD sensitive studies.
- 28 **Investigate the integration of water quality monitoring techniques**  
Investigate opportunities for integration of water quality monitoring techniques with techniques for other media, collaborating with NCRM on this.
- 29 **Investigate potential use of CASI**  
Undertake studies of use of CASI for;  
UWWTD intertidal vegetation studies  
Land classification projects  
Coastal zone project  
Catchment management planning, application review
- 32 **Provision of airborne surveys and satellite images**  
Provision of airborne surveys and interpreted satellite images for operational tasks as requested.

**Inter Regional Programme (NW and Bangor University)**

Study of estuarine nutrient fluxes and impact on the primary productivity of	the adjacent coastal water.
Spring Survey	Waterford 19-22 April Conway 12-16 May

Summer Survey	7-11 July	21-25 July
Autumn Survey	6-10 October	20-24 October

Cumbria Coast - Background surveillance of trophic status

May 19-23

June 16-20

July 14-18

Liverpool Bay - Background surveillance of trophic status and support for

JONUS process studies and MAFF/EA continuous monitoring

moorings.

South Wessex farm catchments

River Stour intertidal vegetation

Lake Bala Catchment vegetation

Synoptic state of environment monitoring (ongoing)

Remote surveillance of mineral extraction discharges (ongoing)

33 Provision of help desk on remote sensing

Provision of help desk on remote sensing.

36 **STREAM**

Standards, measurement, Testing and Research in Environmental Instrumentation and Monitoring. One EU funded post at the Centre to manage the European Thematic Network. The objectives of STREAM are "to bring together environmental regulators, researchers, manufacturers and users of water quality instrumentation to increase industrial competitiveness, improve standardisation and to promote better exploitation of new science and technology. Start date set by the European Commission.

37 **EuroGOOS**

GOOS is an international programme preparing the permanent global framework for observation, modelling and analysis of ocean variables needed to support operational ocean services. EuroGOOS is the European component of GOOS, and consists of an Association of National Agencies working together to foster European participation in GOOS. The National Centre has developed a marine instrumentation and user data requirements database covering all major European Agencies with an involvement in the marine environment.

38 **Collaborative proposal with ISPRA**

David Palmer and John Seager held talks with ISPRA, a memo of understanding is being developed by DJP. ISPRA are likely to be partners in R&D (new starts) Use of remote sensing and satellite images project.

41 **Synoptic view of the environment**

To further develop CASI to provide a synoptic view of the environment to assist in the forming of an opinion on the state of the pollution of the environment.

42 **Data transmission**

To review existing data collection techniques in the Agency and to recommend future data transmission to be adopted by the Agency.

45 **Remote sensing: Protected area and urbanisation topographical changes**

Application of remote sensing to protected area and urbanisation topographical changes: To use current and historical satellite imagery to provide an overview of topographical changes, particularly compliance with protected area requirements, over the past decade.

46 **Remote sensing: Status and conditions of land, waters and ecological resources**

Application of remote sensing for assessing the status and conditions of land waters and ecological resources: To use airborne CASI, thermal, LIDAR and photographic imagery techniques to audit level and water condition (including contaminated land, vegetation stress etc) and ecological resources.

47 **Remote sensing: Climate change, sea level modelling & coastal changing landscape**

To develop a range of imaging techniques (satellites, airborne CASI) to monitor methane and oil released to the environment from these installations

48 **Remote sensing: Aircraft and satellite images**

Development of a strategy for cost effective targeting of aircraft remote sensing using satellite images: To use broad commercial satellite imagery to guide the optimal deployment of high resolution aircraft-based surveillance system.

51 **Environmental Monitoring Technologies R&D Programme**

Manage the Environmental Monitoring Technologies R&D Topic. Proposal to be forwarded to NC management board.

52 **Investigate potential of LIDAR/SAR**

Evaluate the potential of SAR and LIDAR to provide digital elevation and bathymetric measurement for flood defence, conservation and water pollution control. Proposal to be forwarded to NC management board.

53 **Investigate use of Thermal Imagery**

Explore use of thermal imagery in contaminated land/waste disposal studies. Other customers include NCRM. Proposal to be forwarded to NC management board.

54 **Biodiversity**

Develop national databases for communities/habitats map, building on biological monitoring information and species counting. Investigate relationships between vegetation stress, contaminated land, soil quality and land use. Proposal to be put forward to NC management board.



Develop a soil erosion vulnerability map with emphasis on protected areas and special interests such as upland peat and wetland peat. Investigate land use interactions in particular winter crops and grazing. Study the effects of long term climate changes - rainfall and temperature. Proposal to be put forward to NC management board.

56 **Health of Environment**

Correlate the national soil quality database with vegetation health and tree health, with acid rain distribution and species habitats. Proposal to be put forward to NC management board.

57 **Environmental Quality**

Develop in-situ instrument tests for broad spectrum contaminants and toxicity (with respect to the whole environment rather than effluent discharge ectotoxicology). Proposal to be put forward to NC management board.

58 **Aesthetics**

Generate a three dimensional terrain map of aesthetic quality of the landscape from any view point, to assist planning applications; remediation, land use changes, model changes, etc. Proposal to be put forward to NC management board.

59 **Contaminated land**

Within the limits of remote sensing capabilities produce a national contaminated land and brownfield site map, and establish the extent to which remediation of contaminated land can be monitored remotely. Proposal to be put forward to NC management board.

64 **Disseminate and market outputs**

Establish links to Regions, HO, SATIS, functions, PR etc

99 **National Centre Public Open Day (1)**

Open day for general public

100 **National Centre Client Board Open Day (2)**

Open day for client board

101 **National Centre Public Open Day (3)**

Open day for public

102 **Seminar on 'Soil'**

Seminar to be held in June, 50/50 co-funded by Soil Survey.