# NERC EARTH OBSERVATION DATA CENTRE (NEODC)

# ANNUAL REPORT 2003/04

## Contents




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# 1 OVERVIEW

## *1.1 NEODC Rationale*

As part of its role to support and sustain the UK's world-class environmental sciences community, NERC has, over the past three decades, acquired and generated a wealth of high-quality Earth observation (EO) data. This increasingly rich, diverse and sophisticated time series of environmental observations is of ever-growing value as we seek to understand our dynamic and changing environment.

The role of the NEODC is, in line with NERC Data Policy, to ensure the responsible stewardship and distribution of this valuable resource, to give guidance on the availability and use of EO data and to coordinate the acquisition of new data resources. Such services are to be carried out in an efficient and cost-effective manner in response to requests from its customers in the environmental science community.

The NEODC is becoming increasingly proactive in its collaborations with relevant EO-related initiatives, both in the UK and worldwide, and strives to improve the service it can offer in connecting environmental scientists with the resources they need to carry out NERC's scientific objectives.

The NEODC Mission is:

**"To deliver effective services to the NERC community in locating, accessing, interpreting and exploiting Earth Observation data and information, and to ensure the long-term integrity of EO datasets produced and acquired by NERC projects and programmes."**

In order to achieve its mission, the NERC Earth Observation Data Centre:

- maintains a central archive and catalogue of NERC commercial satellite data and NERC airborne remotely-sensed data, accessible through the NEODC website at www.neodc.rl.ac.uk
- provides access to this data for NERC Centres and Surveys, the UK HEI community, NERC Thematic Programmes, NERC EO Centres of Excellence, and NERC-funded academics in accordance with the terms of the NERC Data Policy
- co-ordinates and supervises the archiving of all digital data and ancillary information relating to the annual flying campaigns of the NERC Airborne Remote Sensing Facility
- maintains an informative web site containing a wide range of EO-related information resources
- works to ensure the professional curation, and ease of access for registered customers, of all EO data acquired by NERC by the addition of such data held at the Centres & Surveys, and EO Centres of Excellence onto the NEODC archive
- continues to develop its infrastructure to improve the quality and scope of its data services to the scientific community
- acts as a contact and liaison point for communications on other national and international archiving/cataloguing initiatives relating to EO data
- provides policy and strategy input to NERC corporate data policy through the NERC Data Management Advisory Group.

## *1.2 Highlights of the Year*

### 1.2.1 NEXTMap Britain

The NEODC provided valuable input to the case for purchase of the NEXTMap Britain digital terrain model by the British Geological Survey. It carried out a survey of its customers, which provided supporting evidence that the dataset would be of immense value as a scientific tool, and lobbied those involved in negotiating the end-user license agreement to ensure that the data would be accessible for use in NERC-funded research projects within universities, thereby enabling a wider group of NERC scientists to reap the benefit of NERC's investment. The case was successful and the dataset has now been purchased by NERC.

### 1.2.2 EO Spring School

The NEODC provided, for the 3rd year in succession, an informative set of web pages, an efficient online application form system, and a post-event online resource for the NERC-sponsored Oxford University/RAL Spring School in Quantitative Earth Observation. This two-week course provides new environmental science researchers with a solid foundation in the techniques of quantitative EO, and is highly successful in encouraging both learning and interaction among the new generation of EO scientists.

### 1.2.3 Summer Student

The NEODC benefited from the help of a summer student, Alex Copley, from Oxford University, during August and September 2003. Alex helped out with metadata creation and reorganisation of physical storage, and worked on providing new content for the NEODC website.

### 1.2.4 Data Management Funding Round / New Staff Member

NEODC responded to the first announcement of opportunity for data management funding, and was successful in securing £225k of investment for a three-year project to improve its delivery of EO data and services to the NERC community. A new staff member, Steve Donegan, was appointed in October 2003 and joined the NEODC from the Open University, where he has recently completed his PhD in space borne and ground based investigations of active volcanoes.

### 1.2.5 Support of NERC Science Customers

The following list of research project titles gives an example of the wide range of high-quality science that has been supported by the services and data provided by the NEODC over the past year. Note that, in many cases, particularly when information or advice has been provided to customers without the provision of data, no information was forthcoming from the customer regarding their source of funding. This is however indicative that the NEODC is reaching a wide section of the science community and is supporting environmental science both in the UK and internationally, which is of credit to NERC as an organisation.

***Modelling human/elephant conflict in northern Botswana***
Ref. PTA-036-2002-00030 (Joint NERC/EPSRC project)

***Individual dispersal decisions and emergent population dynamics of an endemic afrotropical mammal***
Ref. NER/S/A/2000/04039

***Source mechanisms of shallow earthquakes in the Alpine-Himalayan Belt from INSAR and waveform modelling***
Ref. GT4/00/202

***Creation & restoration of mudflats: comparison of two areas of accidentally created saltmarsh in North Norfolk***
Ref. NER/S/A/11226

***Distribution of archaeological sites in relation to natural landscape factors***

***Scrub invasion on Braunton Burrows***

***Integration of satellite imagery with GIS for modelling flood behaviours***

***VR modelling of Scatness archaeological site. Creation of land-use data for input to GIS/VR based model.***

### 1.2.6 BADC / NEODC Relationship

Further efforts were made in preparation for the merger of management and infrastructure functions of the British Atmospheric Data Centre (BADC) and the NEODC. The merger is due to take place with effect from 1st April 2004. Work is underway to identify generic functions of both data centres where effort can be combined, for example in areas such as project management, data storage and management of user databases. Effort will be directed over the coming year towards making these changes happen "behind the scenes", so that the same group at RAL provides both Data Centres as services to NERC, but that they retain their individual identities and accountability to their respective communities and funding lines within NERC.

### 1.2.7 Farewell to Stuart White

Dr Stuart White retired in March 2004 after 7 years as Head of NEODC at RAL, and a career spanning 21 years within NERC. Between 1983 and 1989 he was NERC Marine Planning Officer, and was instrumental in the first circumnavigation of the globe by the RRS Charles Darwin. He took over management of the NERC Airborne Remote Sensing Facility in 1987 and continued in that role until 1997 when he joined RAL, having successfully campaigned for NERC investment in the acquisition of the ATM and CASI instruments, photographic camera and Integrated Data System for geometric registration. Stuart also carried out the NERC management of EPFS and DRSR, and the NERC Radiocarbon Dating Facility at East Kilbride.
Stuart's efforts over the years, and enthusiasm for data management within NERC were acknowledged by friends and colleagues at RAL at his send-off in March, and by members of the NERC Data Management Advisory Group, who wished him well in his retirement.

## *1.3 Progress on Deliverables / Key Milestones*

### 1.3.1 Deliverables

The following comments relate to the deliverables defined in the NEODC Technical Annex for 2003/04 which forms part of the NERC/CCLRC SLA for that year. Note that for the period March 2003 - October 2003, the NEODC was operating with funding only for 1.5 staff, i.e. with a 40% reduction in staff resource relative to that required to carry out the Implementation Plan which had been previously agreed by EOEG.

#### 1.3.1.1 Delivery of EO Data Services

This was achieved successfully, since successful delivery of data and information to customers was seen as a key part of the NEODC's service on which it was important to maintain good service.

However, it is likely that the reduced amount of publicity interaction with the community this year resulted in a much quieter year in terms of delivery of data to customers, than might have been expected.

### 1.3.1.2 Information Content of NEODC Website

- A new and extensive set of categorised EO-related links was compiled and added to the website, giving information under a variety of categories including: upcoming conferences and meetings, degree-level courses, EO sites for schools, NERC centres and surveys, NERC EO centres of excellence, NERC-supported EO facilities, sensors and data resources, and space / EO agencies.
- Tutorials about the use of remote sensing data were provided by Sandy Winterbottom of University of Stirling, and by Andrew Wilson of CEH Monks Wood. These were formatted into an informative online learning resource.
- Categorised items of news were also added to the site and updated throughout the year although this activity, and the updating of other items on the website, such as pages about datasets, FAQ and documentation pages did not progress to the desired level due to the limited staff resource.
- The website for the Oxford / RAL Spring School in Quantitative Earth Observation was updated with information as required both pre-and post-event, and was a successful supporting resource for this year's course.

### 1.3.1.3 Metadata Creation

A catalogue of aerial photograph locations was created by work commissioned to the Cartographic Unit, British Geological Survey. This involved digitising around 200 paper maps marked with photo locations and transferring these to an Excel database. This was further enhanced by work in house, and a map produced (and published on the NEODC web site) showing the location of these data, and the extensive coverage of the collection, for the first time in a single view. The intention is to create a full web-enabled searchable catalogue in due course when staff resources permit.
Further work to tackle the backlog of satellite data inherited on CCT tape from BGS Keyworth and Durham University is still on hold until available funding for staff resource increases.

### 1.3.1.4 Physical Storage

New data ATM and CASI data was received from the NERC ARSF from the 2003 flying campaign, and stored securely at the NEODC along with data from the experimental deployments of the CASI-SWIR and LiDAR sensors. For the reasons given above, full metadata for these data have yet to be created. A small amount of new Landsat data (2 scenes) was also added to the archive.

### 1.3.1.5 Secure DSRS Secondary Archive

Secure storage of the secondary archive DSRS AVHRR and SeaWiFs data has continued. This project, which makes small demands on the NEODC staff resources, continues to schedule. The matter of provision of additional firesafe space for future deliveries of DSRS backup data was discussed both at the DSRS steering committee and with DMAG. A preliminary conclusion was that the ongoing need for the firesafe backup (in addition to backups already made elsewhere) was not clear, and that this may not be continued once the existing safes become full. A final decision is still pending.

#### 1.3.1.6 Search Interface / System Infrastructure

The search/browse interface for the remainder of NEODC data products was maintained on a "best effort" basis for this period, but with no major developments, although the existing system is still operating well to provide access to commercial satellite and airborne data collections.
In the latter half of the year, it became apparent that the intention of EOEG was that NEODC and BADC were to merge their management and infrastructure functions, so **the majority of available effort in this area was directed towards identifying areas that would progress this in the most efficient way, rather than to continue to develop systems which could potentially diverge.**
*Update as of 12/2004: BADC and NEODC now share a common user database, and NEODC is now serving 2 datasets (NEXTMap and ATSR, more to follow) via infrastructure shared with the BADC (Data Browser and FTP server), but "branded" as NEODC systems.*

#### 1.3.1.7 ATSR-1/2 UBT Archive

A large proportion of development effort this year was directed towards the ATSR UBT archive. Technical problems with the proposed tape-based solution had limited progress, as had the difficulties in implementing a metadata database capable of dealing with the large number of records involved.
The acquisition of a large (4 Tb) network attached storage server in summer 2004 provided working space for the loading and processing of ATSR-2 UBT products to produce valuable preview imagery and location maps which will significantly enhance the quality of the online archive. Online storage space will be increased over the forthcoming months and as much as possible of the ATSR UBT archive will be loaded online, to reduce the need to resort to tape access to retrieve data.
After the appointment of the new staff member in October 2003, processing to produce preview imagery commenced in January 2004 and had completed around 20% of ATSR-2 UBTs by the end of FY2003/4. A problem had also been discovered with the header records for UBT products, which meant that product corner coordinates in the header of some products show error values, whereas values in the product body are correct. Coordinate corrections were generated as part of this processing, for application to records in the metadata catalogue, to ensure that spatial searches of the archive are effective.
*Update as of 12/2004: Preview images for nearly 90% of ATSR-2 UBTs have now been produced , and an online ordering system, using joint NEODC/BADC infrastructure, has now been put in place.*

### 1.3.2 Key Milestones

The Key Milestones were defined in the NEODC Technical Annex which forms part of the NERC/CLRC SLA and these have been met:-

#### 1.3.2.1 Quarterly Reports

Quarterly reports were delivered on schedule for the quarterly NERC SLA meetings.

#### 1.3.2.2 Annual Report 2002/3

The NEODC annual report for 2002/3 was delivered on schedule. A second version of the report was requested in a new format for EOEG. This was completed and delivered as requested.

#### 1.3.2.3 Financial Estimates

Financial Estimates for the NEODC for FY2003/04 were provided in January 2004.

# 2 SCIENTIFIC AND TECHNICAL OUTCOMES

## 2.1 Strategic Goals

The NEODC primary strategic goals for the period 2002-2005 were defined as:

1. Maintain and improve the acknowledged valuable services which the NEODC has previously delivered to the NERC scientific community
2. Provide enhanced data, metadata and information services through the NEODC website
3. Develop automated search and retrieval systems to further improve the quality and timeliness of the NEODC EO data services
4. Develop and implement the professional curation of the ATSR-1/2 archives and the future delivery of associated data product services for which there is increasing demand from the NERC community.

Until the additional funds were made available from the Data Management funding round (and the appointment of the new staff member took place in October 2003), the NEODC was continuing to operate for a second year at a 40% reduction in staff resources. Consequently, it was necessary to direct effort towards the goals 1 and 4 above, at the expense of goals 2 and 3, since the former are critical to the provision of efficient services across the full range of NEODC products and have a major impact on the public image of the NEODC as an effective NERC Designated Data Centre for the delivery of high quality Earth Observation data and information.

Furthermore, a new priority objective is for the NEODC to collaborate with the NERC EO Centres of Excellence by supporting their requirements for data acquisition, curation, access and delivery as appropriate in meeting the wider needs of the NERC scientific community.
It was agreed that additional staff resources were needed for the NEODC if it is to meet its present strategic objectives together with any further requirements as defined by the report of the EOEG Strategic Working Group on EO Data chaired by Barry Wyatt.
*Update 12/2004: Additional funding has now been agreed to resource this initiative, which will convert the post previously held by Stuart White (50%) into a full post and enable proper interaction with the EO Centres of Excellence to begin. A new staff member, Victoria Jay, joins NEODC on 1st December 2004.*

In addition, EOEG and the NERC Data Management Coordinator have directed that the management and infrastructure functions of the NEODC and BADC at RAL should be merged and that generic functionality should be shared, but with each retaining its own identity to its own community.

## 2.2 User Support, Operations, Science Support and Research

### 2.2.1 Update on User Support

The NEODC provided data and information services across the range of the environmental science disciplines:

| **Science:** | **Atmos.** | **Earth** | **Marine** | **Terr.& Fresh.** | **Earth Obs.** | **Sci. Bas. Arch.** | **Polar** |
|---|---|---|---|---|---|---|---|
| **No. of Projects:** | **2** | **9** | **3** | **17** | **10** | **5** | **1** |

The majority of individual requests for data during this financial year were satisfied from the existing NEODC data archives. Two enquiries required the purchase of new data from other archive

sources and were funded by the Earth Observation directorate. All such data acquisitions were required in support of NERC-funded grants or studentships and copies of these datasets were added to the NEODC archives for potential future reuse.

It is noted that this year was a quiet year in terms of customer enquiries, due in part to the reduction in publicity, community interaction and information dissemination via the website, for reasons of staff resourcing. However, it is noted that the NEODC is beginning to field more enquiries regarding general data availability, i.e. not restricted to its own data archives, and is increasingly acting as a source of information about EO and remote sensing in general.
No enquiries for data in support of commercial applications could be satisfied by the NEODC either due to lack of the specified datasets or for reasons of copyright restrictions.

For new acquisitions, following confirmation of image specifications and data pricing, the supplier delivery time for new satellite data rarely exceeds 15 working days, except where data is sourced from non-European ground stations. Response time targets for both commercial archive data provision - two weeks - and the delivery of NEODC archive digital data - 5 days maximum - have been maintained for all data deliveries. Copy prints of archive aerial photography are usually delivered within two weeks.
No significant data quality problems were recorded during the year and no formal/informal complaints regarding the quality and delivery of the NEODC services during 2003/04 have been received. In fact, there has often been correspondence complimenting the NEODC on the quality and timeliness of its data and information services.

### 2.2.2 Update on Datasets

The present NEODC data holdings comprise commercial satellite datasets acquired in support of environmental research since 1972; the majority of these data comprise the Landsat series together with smaller holdings of SPOT, Radarsat, ERS-1/2 SAR, AVHRR and Ikonos imagery over the UK and worldwide. The NEODC holds complete sets of the satellite imagery used by NERC to create the UK Landcover Maps for 1996 and 2000. From 2004/05 there will be a significant increase in the size of the NEODC satellite archive when the Data Centre accepts responsibility for the complete ATSR-1/2 data archives (~ 40Tbytes).

The present NEODC data holdings also comprise the total archive of airborne data - digital multi-spectral imagery and photography - acquired by the NERC Airborne Remote Sensing Facility (ARSF) since 1982.
Specific datasets added to the NEODC archive during 2003/04 included:

- ARSF 2003 campaign data (ATM, CASI, CASI-SWIR and LiDAR)
- 2 new Landsat scenes purchased on behalf of NEODC customers.

The NEODC also holds a secure secondary archive of the total AVHRR and SeaWiFs imagery acquired by the NERC Dundee Satellite Receiving Station (DSRS); this secondary archive is augmented quarterly each year.

Significant projected future additions to the NEODC archive include:

- ATSR-1/2 UBT product archive
- NERC ARSF campaign data
    - Remaining data from 2003 flying campaign

- Data from 2004 flying campaign (including routine LiDAR and digital photography acquisition)

The majority of the NEODC data holdings are probably unique in the UK in the context of their UK geographical coverage and the period of data coverage.
Certainly the total archive of the NERC Airborne Remote Sensing Facility datasets – comprising Airborne Thematic Mapper (ATM), Compact Airborne Spectrographic Imager (CASI) and aerial photography is a unique collection both in the context of the data characteristics and their temporal coverage. Similarly the complete satellite imagery of the UK - predominantly Landsat and SPOT - which formed the basis of the UK Landcover Maps created by NERC for 1996 and 2000 is almost certainly unique.
It is possible to duplicate much of the commercial satellite imagery acquired over the preceding three decades by NERC, and lodged with the NEODC, by purchase from other sources. It is not possible to duplicate any of the NERC airborne datasets which are the sole property of NERC.

*Update 12/2004: ATSR-1 UBT processing at RAL has now been rescheduled to accommodate a requirement for the inclusion of ATSR-derived information in the IPCC process. The change in order of processing will result in a delay in the availability of ATSR-1 UBT products from the NEODC archive, however this is a key indicator of the importance of data from the ATSR series of instruments in a real-world application, and is an important demonstrator of the value of the dataset.*

### 2.2.3 Update on System Infrastructure

A metadata catalogue structure for the ATSR UBT archive was implemented using the open-source PostgreSQL database, after an evaluation of a selection of potentially suitable database servers. This database achieved the best balance between performance (especially with spatial searching), adaptability and ease of development.

External work by a member of the RAL EISCAT group to modify existing tape archive software for use in the ATSR UBT archive has been intermittent (due to other commitments), has hit several unforeseen technical problems, and has resulted in the continued delay in completing this part of the archive. Once completed, this component will serve to deliver data rapidly from archive tape to disk, even from the end of a tape, in minutes rather than the usual hours, so is an important part of the delivery system. However, as the price of disk space has continued to fall over the year, and with the move to closer operational harmony with the BADC (and thus sharing of generic resources such as disk space), it is intended that as much ATSR UBT data as possible will be loaded online, reducing the need to access tape data. Over the coming months, more network-attached storage servers will be purchased and loaded with data as soon as possible.
The majority of the NEODC's previous airborne and satellite data holdings are now stored online, using the Atlas DataStore at RAL as secure backup.

The "Footprints" helpdesk software, also used by the BADC, was installed for use by the NEODC during this period and is now operational. This provides an efficient means of logging and handling enquiries by email and telephone.

### 2.2.4 Update on Services

Web access statistics for the NEODC web server www.neodc.rl.ac.uk for 2003/4 show a similar level of activity as the previous year. Around 1200 individual "visits" (see Appendix 1) took place each month, representing a total of nearly 500,000 individual HTTP requests ("hits") - see Appendix 1 for definition of "visits" and "hits".

Data delivery to registered users via the web-based download facility continued successfully, although there are now plans to replace this system with an "NEODC-branded" version of the BADC data browser. This will provide self-service access (via a system of access control linked to a shared user database) to the various NEODC data collections.
*Update 12/2004: This has now been successfully implemented on two pilot datasets: NEXTMap and ATSR UBT.*

### 2.2.5 Update on Liaison and Publicity

- Mailshots to university departments and advertisements in New Scientist and several websites resulted in a highly successful recruitment campaign for the new post funded by DMAG.
- Matt Pritchard & Stuart White attended the RSPSoc 2003 meeting in Nottingham in September 2003.
- Steve Donegan attended the annual meeting of the Geological Remote Sensing Group of the Gological Society, London, in December 2003.
- Matt Pritchard and Steve Donegan took part in the "Metadata for Remote Sensing" workshop at the National Institute for Environmental e-Science at the University of Cambridge, January 2004. Matt Pritchard gave a presentation about metadata handling and search interfaces within the NEODC.

### 2.2.6 Update on Collaboration

Stuart White (SJW) and Matt Pritchard (MJP) attended meetings of the NERC Data Management Advisory Group (DMAG).

MJP has continued involvement in the evaluation of the MapsDirect UK mapping service which is currently undergoing a 12-month trial by NERC, due to end 31/12/2004.

SJW and MJP worked with staff from the Cranfield Centre for Geographical Information Management, Silsoe, and from QinetiQ to prepare a bid to the NERC EO Enabling Fund for rescue (and acquisition for NERC) of satellite imagery from the Silsoe and Infoterra archives.
*Update 12/2004: Bid was unsuccessful.*

MJP and Steve Donegan (SJD) formed part of a consortium with Plymouth Marine Laboratory and the British Antarctic Survey, and provided input to a bid to the NERC EO Enabling Fund for expediting access to the Rothera AVHRR archive.
*Update 12/2004: Bid was successful. NEODC was allocated 30 days of staff time to carry out metadata creation and preparation of a web interface in early 2005.*

MJP provided input to a NERC consortium bid for the validation and provision of ice thickness products from Cryosat, led by CPOM/UCL.
*Update 12/2004: Bid was successful. NEODC was allocated £15k to do metadata creation and web interface development work, due to start 2007/8.*

SJW and MJP worked with a consortium of EO-related companies (NPA Group, Comsine Ltd, and RSI UK) led by QinetiQ, to prepare a bid to ESA for the development of services as part of ESA's Service Support Environment SSE.
*Update 12/2004: Bid was successful. NEODC services have now been developed and are incorporated into the ESA SSE Portal, http://services.eoportal.org for a demonstration period. Technology used is likely to be very useful in future improvements to NEODC internal infrastructure.*

MJP continued collaboration with QinetiQ and Comsine Ltd regarding the use of NEODC metadata in a BNSC ICP2 project to demonstrate desktop GIS access to z39.50 catalogues for searching for EO data, and the use of an OGC-compliant Web Coverage Server for data delivery.
*Update 12/2004: Project has now been completed and NEODC z39.50 server was used successfully. NEODC now has a working OCG WCS which can be used to demonstrate delivery of some of its Landsat-7 data.*

MJP met on several occasions with members of the Association for Geographic Information (AGI) to discuss and implement the improvement of accessibility of NEODC and BADC discovery metadata via the "GIGateway" metadata gateway (a UK equivalent to the NERC Metadata Gateway).

# 3 FINANCE OVERVIEW

**Note:** Funding for the DMAG project is, for this financial year, included in the figures below. From April 2004, funding from DMAG was reorganised internally so that monies received by both BADC and NEODC from DMAG are managed together, with the intention that future reports on progress against DMAG funding and milestones will be reported to the NERC Data Management Coordinator.

## *3.1 Expenditure for 2003/04*

The full cash cost budget for operating the NEODC in Financial Year 2002/03 was £174.2k. £29.2k of this was received "in kind" as 50% of Stuart White's post (comprising £20k + 46% Swindon overheads, since he was employed directly by NERC, not CCLRC), hence the total budget received by CCLRC/RAL in respect of NEODC was **£145.0k**).

The actual spend against the CCLRC/RAL budget of £145.0k in 2002/03 was **£140.0k** comprising expenditure as follows:-

- **£56.5k** for staff at CCLRC/RAL
- **£32.7k** recurrent (including £35.2k for new acquisitions of satellite data for NERC award holders. The NEODC was reimbursed by NERC for these costs)
- **£40.5k** overheads (CCLRC/RAL)
- **£10.2k** capital

## *3.2 Budget for 2004/05*

The budget allocation for the NEODC from the NERC Earth Observation Directorate for 2004/05 is as follows:

| | |
|---|---|
| Core activities | £103.0k |
| Centres of Excellence interaction | £30.0k |
| New post | £39.0k |
| **Total from Earth Observation** | **£172.0k** |

In addition, the following budget is available to NEODC from DMAG for 2004/5

| | |
|---|---|
| DMAG Enhancement project: | £87.0k |
| NEXTMap project | £18.5k |
| **Total from DMAG** | **£105.3k** |

*(Figures above are based on the finance table agreed after the 2nd SLA review meeting of FY2004/5 "finance table 3 Oct 2004_after 2nd review meeting.xls")*

# 4 FUTURE DEVELOPMENT & STRATEGIC FORWARD LOOK

## *4.1 Specific Changes to Strategic Goals*

### 4.1.1 Collaboration with NERC EO Centres of Excellence

NERC has established six Centres of Excellence in Earth Observation in order to exploit Earth Observation data in environmental science. The NEODC plans to collaborate more extensively with these Centres with the intention of providing support with respect to data acquisition, data curation and associated services. Initial collaboration has already been agreed with CPOM for data archiving services in support of a potential project making use of the ESA Cryosat mission to measure fluctuations the Earth's land and marine ice fluxes.

The NEODC is proposing a series of meetings with the Centres of Excellence to establish areas where it is appropriate for the NEODC to support their activities in the context of the NERC Data Policy.

Funding for this new initiative had yet to be agreed at the end of FY 2003/4.

*Update 12/2004: Funding has now been agreed for a new post at NEODC, partly to replace the 50% post held by Stuart White, and partly to take on this new role of interaction with the EO Centres of Excellence. Although an initial recruitment exercise in July 2004 was unsuccessful, a new staff member, Dr Victoria Jay has now been recruited and will join NEODC on 1st December 2004. A first priority for this new work will be the creation of Data Management plans for each of the EO Centres of Excellence.*

### 4.1.2 DMAG Project: Earth System Science: Enhanced Delivery and Visibility for Multiple Earth Observation Datasets

The NEODC was been awarded £225k funding over 3 years for this project and a new staff member, Steve Donegan, started in October 2003. The overall objectives of this project are:-

- Developing a flexible framework for providing services alongside NEODC datasets. For example, there will soon be a software tool to convert from ATSR UBT format to AATSR format. This conversion routine will need to be "wrapped" in the necessary interfaces to enable it to be available "on demand" via the NEODC website. The framework developed here will enable this and other similar services to be provided, using generic Web Service technology to wrap existing software tools. Ever closer interaction with the NERC DataGrid is a likely and necessary by-product of this work.
- Groundwork for hosting upcoming datasets, such as Airborne LIDAR, MODIS, MERIS, SeaWiFS and AATSR.
- Enhancement of the ATSR UBT archive by the creation of preview images and location maps, and additional helpdesk support to bring forward the availability of this dataset to the community.

### 4.1.3 Future Funding Opportunities

#### 4.1.3.1 (A)ATSR Seamless Archive

The major new development on the horizon for the NEODC is possible creation of a seamless archive of products from the (A)ATSR series of instruments. RAL/NEODC received an invitation to tender from DEFRA, with the following scope:

- To produce and maintain an archive of consolidated AATSR and ATSR GBTR (Level lb) global 1 km data, and the Level 2 averaged and gridded products.
- To supply a consolidated set of the (A)ATSR Level 2 meteo products to the Hadley Centre.
- Provide (A)ATSR products to DEFRA and NERC scientific users

*As of December 2004*, this proposal is at a late stage and is now under consideration by DEFRA and other stakeholders. If successful, work is likely to begin in April 2005. This would be a hugely important dataset, bringing together a unique timeseries of observations which are invaluable to current scientific challenges.

#### 4.1.3.2 Unified formats for (A)ATSR products

A key component of the above is the creation of a tool to convert ATSR UBT format data to ENVISAT AATSR format, to enable all (A)ATSR products to be archived and accessed in a common format, and handled by common processing applications. Work funded by NERC under a recent EO Enabling Fund grant is now underway at RAL, in collaboration with the NEODC.

#### 4.1.3.3 Rothera AVHRR Archive

NEODC is involved with BAS on a project led by PML, funded by a recent NERC EO Enabling Fund grant to provide access to ARIES AVHRR data from Rothera base in Antarctica.

#### 4.1.3.4 Cryosat: Archiving of Ice Thickness Products

The successful Cryosat Consortium Bid, led by CPOM/UCL includes a work package for NEODC to provide ongoing data management, and a web interface to the archive of validated ice thickness products from Cryosat.

#### 4.1.3.5 Interaction with the EO Centres of Excellence

New work beginning in December 2004 will involve the creation of formal data management plans with the NERC EO Centres of Excellence, and signals the start of a new phase of greater engagement with NEODC's scientific community, and it is likely that further projects will follow on from this work, to implement the requirements of the individual data management plans.

#### 4.1.3.6 Other Projects

The NEODC now has a range of new exciting projects to work on for the NERC community, listed above, and will be concentrating on achieving success with these over the next years. Although it will continue to increase its engagement with the EO community, it will not be actively seeking major new projects for the next year as it currently has a full and varied programme of work to be carried out.

### 4.1.4 Opportunities for Improvement

#### 4.1.4.1 Engagement with the Scientific Community

It is important that the NEODC increases its engagement with its scientific customers and is seen to be not only a valuable data archive but a coordinating body for the management and exploitation of EO data. The interaction with the EO Centres of Excellence is the first step along this road, to be coupled with greater publicity and communication with the scientific community.

#### 4.1.4.2 Handling of Enquiries

The introduction of the “Footprints” helpdesk software has improved the way enquiries are logged and handled internally, but there is still scope for improvement. Full integration with the BADC user database and address book is due shortly and will add full functionality to this system.

#### 4.1.4.3 IT infrastructure

The IT infrastructure of the NEODC will continue to be improved and will benefit from the sharing of resources with the BADC. Further online storage capacity will be acquired as necessary and, where possible, resources will be managed centrally within NEODC/BADC, to reduce duplication of effort.

#### 4.1.4.4 Physical data storage and cataloguing

There is still much work to be done in arranging easily-accessible physical storage and metadata descriptions for many datasets that are currently held by the NEODC. With the increased staff resource expected in 2004/5, it is intended that the backlog of data which is stored, but not properly catalogued and therefore “visible”, will start to be cleared. More efficient ingestion procedures will be put in place that will ensure that metadata creation keeps pace with physical storage.

# 5 Appendices

## 5.1 Appendix 1 NEODC Website access statistics for FY 2003-4

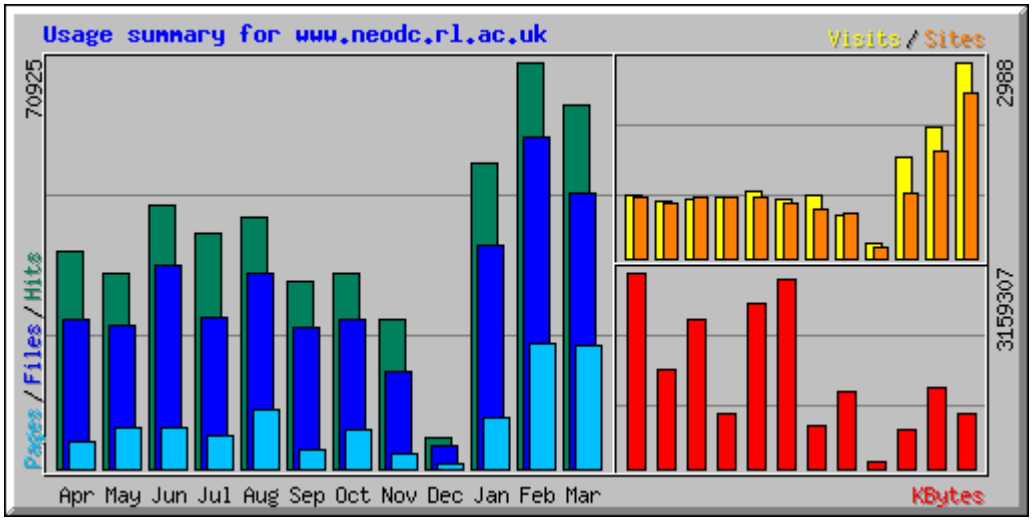


**Figure 1 Graphical summary of access statistics for [www.neodc.rl.ac.uk](http://www.neodc.rl.ac.uk)**

| Summary by Month | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Month | Daily Avg | | | | Monthly Totals | | | | | |
| | Hits | Files | Pages | Visits | Sites | KBytes | Visits | Pages | Files | Hits |
| Mar 2004 | 2049 | 1555 | 694 | 96 | 2503 | 894075 | 2988 | 21539 | 48210 | 63546 |
| Feb 2004 | 2445 | 1996 | 748 | 69 | 1619 | 1299737 | 2004 | 21715 | 57908 | 70925 |
| Jan 2004 | 1723 | 1259 | 283 | 49 | 1003 | 628721 | 1542 | 8800 | 39056 | 53425 |
| Dec 2003 | 696 | 497 | 108 | 27 | 161 | 101877 | 219 | 868 | 3978 | 5568 |
| Nov 2003 | 1086 | 704 | 116 | 27 | 682 | 1232760 | 659 | 2786 | 16912 | 26071 |
| Oct 2003 | 1095 | 843 | 217 | 31 | 749 | 703049 | 964 | 6751 | 26145 | 33958 |
| Sep 2003 | 1091 | 816 | 113 | 30 | 847 | 3039812 | 912 | 3415 | 24501 | 32742 |
| Aug 2003 | 1411 | 1099 | 336 | 33 | 928 | 2651170 | 1023 | 10442 | 34088 | 43770 |
| Jul 2003 | 1321 | 848 | 188 | 30 | 945 | 871199 | 945 | 5831 | 26291 | 40965 |
| Jun 2003 | 1533 | 1185 | 235 | 30 | 940 | 2405982 | 914 | 7060 | 35555 | 46018 |
| May 2003 | 1102 | 805 | 233 | 27 | 828 | 1595996 | 854 | 7234 | 24963 | 34191 |
| Apr 2003 | 1263 | 864 | 153 | 31 | 934 | 3159307 | 959 | 4615 | 25935 | 37904 |
| **Totals** | | | | | | **18583687** | **13983** | **101056** | **363542** | **489083** |

**Table 1 Tabular summary of access statistics for [www.neodc.rl.ac.uk](http://www.neodc.rl.ac.uk) (see following notes for explanation of terms: e.g "visits" vs "hits")**

## Explanatory notes for web access statistics

Figure 1 and Table 1 show access statistics for the NEODC website at http://www.neodc.rl.ac.uk/. These statistics are produced by the *Webalizer* analysis program (available from http://www.mrunix.net/webalizer/).

The input data to these statistics consist simply of the Apache web server access log file, once the relevant log files covering the time period of interest had been concatenated. Filtering was applied to exclude from the statistics any visits to the site from computers operated by NEODC staff (by means of specifying their IP addresses), which would have skewed the statistics.

Several measures are reported, defined as follows:

- ***Hits.*** These are individual requests to the web server for any item, be they HTML documents, images, data files, requests to run a server-side script or other items. When a remote host (i.e. a computer elsewhere on the internet) requests a web address (say, a web page) from the web server, the loading of that page in the client's browser usually results in the requesting of many more files (e.g. images, stylesheets) which are part of that page, but count as separate "hits". Note that requests to non-existent pages or web addresses also result in "hits".

- ***Files.*** These are items successfully returned from the web server to the remote host. A request does not always result in a "hit", for a variety of reasons (e.g. mis-typing an address, files that have moved location, incorrect access permissions held by the client, etc.).

- ***Pages.*** These are text documents written in HTML, or generated on-the-fly by a request to a server-side script, that result in HTML text being transferred to the client's web browser. Images and other "files" are excluded (on the basis of their filename extension).

- ***Sites.*** These are remote computers, recognised as distinct IP addresses when recorded in the log file, which have submitted requests for items on the web server. Depending on how the client's access to the internet is configured, it is possible that multiple computers connected to the same network and sharing a web proxy (or cache) can result in only 1 "site" being reported for these multiple computers (Example: a classroom full of students using the internet, all submitting requests to the web server, may all count as 1 "site", [and, according to next definition, as one "visit"]). "Site" statistics are therefore likely to be conservative.

- ***Visits.*** Requests from the same "site" that are either the first request from that "site", or separated from the last request from that "site" by a period of 30 minutes. This is probably the most useful measure reported in the statistics, and is probably conservative. For example, someone browsing through the web site will initially access the front page, at which time the clock starts ticking and all subsequent requests to the webserver from their "site" still count as one visit, so long as no more than 30 mintues inactivity is recorded. The first request after a period of 30 minutes' inactivity will result in the visit count being incremented.

- ***KBytes.*** Kilobytes of data transmitted by the web server in response to successful HTTP requests from remote computers.