| **Cover Sheet for Proposals**<br>(All sections must be completed) | ***JISC Capital Programme*** |
|---|---|

**Name of Capital Programme:** e-Infrastructure

**Programme Strand:**

(Please tick ONE BOX ONLY, as appropriate)

**e-Research Community Engagement & Support**

| | | | | | |
|---|---|---|---|---|---|
| ✠ | **Call I** – Barriers to Take-Up of e-Infrastructure Services | ☐ | **Call II** – Support for Research: Tools & Standards | ☐ | **Call III** – Use Cases and Service Usage Models |

| **e-Infrastructure Security** | | | | **Knowledge Organisation and Semantic Services** | |
|---|---|---|---|---|---|
| | **Call IV** – Federated Tools and Services<br><br>☐ **a)** Integration of Grid and Shibboleth<br>☐ **b)** Developing and Applying n-tier Web Service Architectures<br>☐ **c)** Applying existing virtual home for identity solutions | | **Call V –** Virtual Organisation Management Tools and Services<br><br>☐ **a)** Tools for the establishment of VOs<br>☐ **b)** Services and UIs for management of VOs<br>☐ **c)** Federation membership models for VOs<br>☐ **d)** Delegated authorisation | | **Call VI –** Semantically Coordinating Resources and Services Across Registries<br><br>☐ **a)** Area A – integration of Resources and Services from Existing JISC Services<br>☐ **b)** Area B – Metadata for Services, Data, and Published Literature |

| | |
|---|---|
| **Name of Lead Institution:** | National Centre for e-Social Science |
| **Name of Proposed Project:** | BARRIERS TO TAKE UP OF E-INFRASTRUCTURE SERVICES |

**Name(s) of Project Partner(s):** National e-Science Centre, Arts and Humanities Data Service

**Full Contact Details for Primary Contact:**
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**Length of Project:** **24 months**

**Project Start Date:** 1 March 2007 **Project End Date:** 28 February 2009

**Total Funding Requested from JISC:** £564,211

| Funding Broken Down over Financial Years (April - March): | | |
|---|---|---|
| **Apr06 – Mar07** | **Apr07 – Mar08** | **Apr08 – Mar09** |
| | | |

| | | |
|---|---|---|
| **Total Institutional Contributions:** | £141,053 | |
| **Percentage Contributions over the Life of the Project:** | **JISC**<br>**80%** | **PARTNERS**<br>**20%** |

**Outline Project Description**

The aim of this project is to address barriers to the wider adoption of e-infrastructure. It brings the expertise of a multi-disciplinary partnership that comprises leading members of the UK e-Science programme together with a wide variety of research communities in order to significantly improve our understanding of the barriers, and to devise and implement coordinated strategies to overcome them.

The project builds on the partners' current work that is already addressing barriers to take up and which covers a subset of the research issues identified in this JISC call. As a result, the partnership is uniquely placed to pursue further work to understand the nature of barriers and use this as the basis for the development, through active engagement with user communities, of a coordinated set of responses to these barriers – such as outreach, training and exemplars.

The project will develop strategies aimed at increasing and widening adoption of e-infrastructure and significantly increasing the user-base of JISC-funded services. Involvement of actual or potential users of e-infrastructure services is a key element of this proposal: what we aim to achieve is a change in culture, in the way that researchers see their practice and the role that advanced information technologies play in their work. At the same time, we wish to provide service providers and technology developers with a sound grasp of problems as perceived by users. In addition to the tangible outcomes of the work, we envisage that this culture change will help to achieve wider impact and sustainability. Both of these elements will feed into other (JISC-funded) activities such as the e-Framework and VRE programmes, and Call III of the e-infrastructure programme (Use Cases and Service Usage Models). NCeSS and Oxford are putting in a bid under Call III which, if funded, would ensure excellent coordination between projects in calls I and III through the involvement of NCeSS in both.

The project will provide a consolidated understanding of user needs alongside the identification of gaps in the support needed for effective adoption of e-infrastructure. It will also create a repository of both information and selected support services that will build on existing world leading services but whose form will take account of the project's findings about user communities' requirements. In addition, the project outcomes will provide the basis for making a series of recommendations on how responses to barriers might be sustained and funded in future.

The project is a collaboration between three internationally leading centres in e-Science: the National Centre for e-Social Science (NCeSS), the National e-Science Centre (NeSC) and the Arts and Humanities e-Science Support Centre (AHeSSC). It will build on related activities already being undertaken by the partners in conjunction with members of their respective communities, thereby offering the opportunity for a quick start on this project and an increase in its scope and impact. The project will be led by NCeSS.

| | | |
|---|---|---|
| **I have looked at the example FOI form at Appendix A and included an FOI form in the attached bid (Tick Box)** | **YES**<br>√ | **NO** |
| **I have read the Circular and associated Terms and Conditions of Grant at Appendix B (Tick Box)** | **YES**<br>√ | **NO** |

**FOI Withheld Information Form**

We would like JISC to consider withholding the following sections or paragraphs from disclosure should the contents of this proposal be requested under the Freedom of Information Act.

We acknowledge that the FOI Withheld Information Form is of indicative value only and that JISC may nevertheless be obliged to disclose this information in accordance with the requirements of the Act. We acknowledge that the final decision on disclosure rests with JISC.

| **Section / Paragraph No.** | **Relevant exemption from disclosure under FOI** | **Justification** |
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Please see http://www.ico.gov.uk for further information on the Freedom of Information Act and the exemptions to disclosure it contains.

Example:

| **Section / Paragraph No.** | **Relevant exemption from disclosure under FOI** | **Justification** |
|---|---|---|
| 2.4 | s.43 Commercial Interests | Contains detailed description of our proposed system design which would damage our commercial interests if disclosed by making this information available to competitors |

# BARRIERS TO TAKE UP OF E-INFRASTRUCTURE SERVICES

## C Introduction

The aim of this project is to address barriers to the wider adoption of e-infrastructure. It brings the expertise of a multi-disciplinary partnership that comprises leading members of the UK e-Science programme together with a wide variety of research communities in order to significantly improve our understanding of the barriers, and to devise and implement coordinated strategies to overcome them.

The project builds on the partners' current work that is already addressing barriers to take up and which covers a subset of the research issues identified in this JISC call. As a result, the partnership is uniquely placed to pursue further work to understand the nature of barriers and use this as the basis for the development, through active engagement with user communities, of a coordinated set of responses to these barriers – such as outreach, training and exemplars.

The project will provide a consolidated understanding of user needs alongside the identification of gaps in the support needed for effective adoption of e-infrastructure. It will also create a repository of both information and selected support services that will build on existing world leading services but whose form will take account of the project's findings about user communities' requirements. In addition, the project outcomes will provide the basis for making a series of recommendations on how responses to barriers might be sustained and funded in future.

## C.1 UK e-Science Status

The UK is entering a period in which significant distributed computing and data resources are being made available to all researchers and higher education staff in the UK. Different disciplines have engaged with these facilities to differing extents. For example, for some communities within high-energy physics and biomedicine these services are becoming essential to everyday work while other disciplines are currently investigating how they might match their needs. The expanding resources will lead to new forms of research and will promote wide-scale collaborations which, over time, will become accepted, essential components of normal research practice across all disciplines covered by the Research Councils.

In order to capitalise on the leading position which UK e-Science has established internationally and the opportunities this brings for the UK research and higher education community, the process by which members of this community can adopt e-infrastructure must be first understood and then made as smooth and well supported as possible.

## C.2 Barriers to Adoption

As with any innovation, potential users of e-infrastructure face numerous barriers that can delay or even prevent adoption (Rogers, 1995; Molina, 1997). For e-infrastructure to be widely adopted, costs for users must be outweighed by the benefits they reap. Potential users must be aware of e-infrastructure, must understand the advantages it can bring to their own research, must be willing to invest in new skills, and must have access to the facilities and support they need for successful adoption. At the same time, e-infrastructure services must be reliable, robust and usable so that users are able to trust their mission critical work to them. Finally, users must be confident that services will continue and improve in response to their needs so that they can derive increased benefit over time.

One way of distinguishing between users which is of particular interest is whether they are 'early adopters' or 'late adopters'. An aim of this project is to understand what factors determine this timing. For example, are the former more technically skilled and quicker to grasp the advantages, and more prepared to invest their own resources into shaping tools and services to ensure that they suit their requirements? Are they also more willing to take risks even though benefits may be difficult to identify precisely at the outset? In contrast, are 'late adopters' slower to perceive benefits; do they require evidence or exemplars to convince them of advantages? For some users, e-infrastructure may exhibit strong 'network effects', i.e., adoption makes sense only if there are sufficient other users. Late adopters may also be less technically skilled or more risk adverse, preferring to wait for technologies to stabilise, for entry costs to fall and to capitalise on the experiences of early adopters (Williams et al., 2005).

It is critical to understand barriers to adoption and how potential users respond to them. Strategies then need to be devised to address them, for example, by providing clear development roadmaps and migration routes. Late adopters, for example, may require direct and personalised support in the form of staff development courses (both face-to-face as well as supporting self-paced and remote learning); specific consultancy to develop new applications to utilise services in novel ways; and a single well-curated source of exemplars and information about technical components and services.

Different user communities will be at different phases of the adoption cycle at any one time and so support has to be provided for all phases simultaneously. As communities' requirements mature, their support needs may also change. e-infrastructure users will go through cycles of evaluating requirements and assessing the

appropriateness of services while providers will similarly go through cycles of improving services and developing new ones to meet developing needs. Accordingly, potential user communities – and their experiences of barriers – are likely to be highly diverse.

The aim of this proposal is to investigate the nature of these barriers in detail, how they are perceived by different e-infrastructure user communities and, as the barriers are progressively understood, to devise and implement ways in which they be may systematically addressed and overcome.

## C.3 Contribution to the Programme

Building on the three partners' ongoing work, this project will develop strategies aimed at increasing and widening adoption of e-infrastructure and significantly increasing the user-base of JISC-funded services. Involvement of actual or potential users of e-infrastructure services is a key element of this proposal: what we aim to achieve is a change in culture, in the way that researchers see their practice and the role that advanced information technologies play in their work. At the same time, we wish to provide service providers and technology developers with a sound grasp of problems as perceived by users. In addition to the tangible outcomes of the work, we envisage that this culture change will help to achieve wider impact and sustainability. Both of these elements will feed into and benefit from other (JISC-funded) activities such as the e-Framework and VRE programmes, and Call III of the e-infrastructure programme (Use Cases and Service Usage Models). NCeSS and Oxford are putting in a bid under Call III. NCeSS and Oxford are putting in a bid under Call III. If funded, the involvement of NCeSS in both will ensure excellent coordination between the two projects.

# D Project Description

The project will be structured around three main activities: 1) desk-based research and systematic synthesis of current work being undertaken by the three partners on barriers to adoption within their respective communities; 2) a series of case studies to understand these barriers in detail; 3) development of a coordinated set of responses to these barriers – such as outreach, training and exemplars – with active participation of the user communities to develop them.

The project is a collaboration between three internationally leading centres in e-Science: the National Centre for e-Social Science (NCeSS), the National e-Science Centre (NeSC) and the Arts and Humanities e-Science Support Centre (AHeSSC). It will build on related activities already being undertaken by the partners in conjunction with members of their respective communities, thereby offering the opportunity for a quick start on this project and an increase in its scope and impact.

NCeSS, working with ReDReSS, has coordinated a series of Agenda Setting Workshops (ASWs) to identify drivers for e-infrastructure adoption in the social sciences and is developing training materials. ReDReSS is a repository of quality, specially selected, resources in a variety of formats and of interest to researchers from a wide range of disciplines. NCeSS is involved in the eSI Theme on 'Adoption of e-Research Technologies' (joint with eSI); and in the EU funded project on 'Accelerating Transition to Virtual Research Organisation in Social Science' (AVROSS), which is studying requirements and options for accelerating the transition to virtual research organisations through e-infrastructures.

NeSC has an established Training, Outreach and Education team that has developed and led training in European projects: EGEE, EGEE II, NextGRID and OMII-Europe. It leads outreach to promote Grid Education in the EU ICEAGE project[1]. This project also oversees a number of high profile international summer schools in this field and is involved in developing an international support structure. NeSC has received funds from e-Science and PPARC to establish UK training; it has a skilled training team and established material available as input into this project. The training team has established arrangements for working with NGS and OMII-UK, and has a programme of outreach and requirements gathering activities. An EPSRC and JISC funded project is being undertaken by NeSC, OMII-UK and NGS to discover issues that can be addressed within current and new funding streams to provide an order of magnitude increase in UK e-infrastructure use.

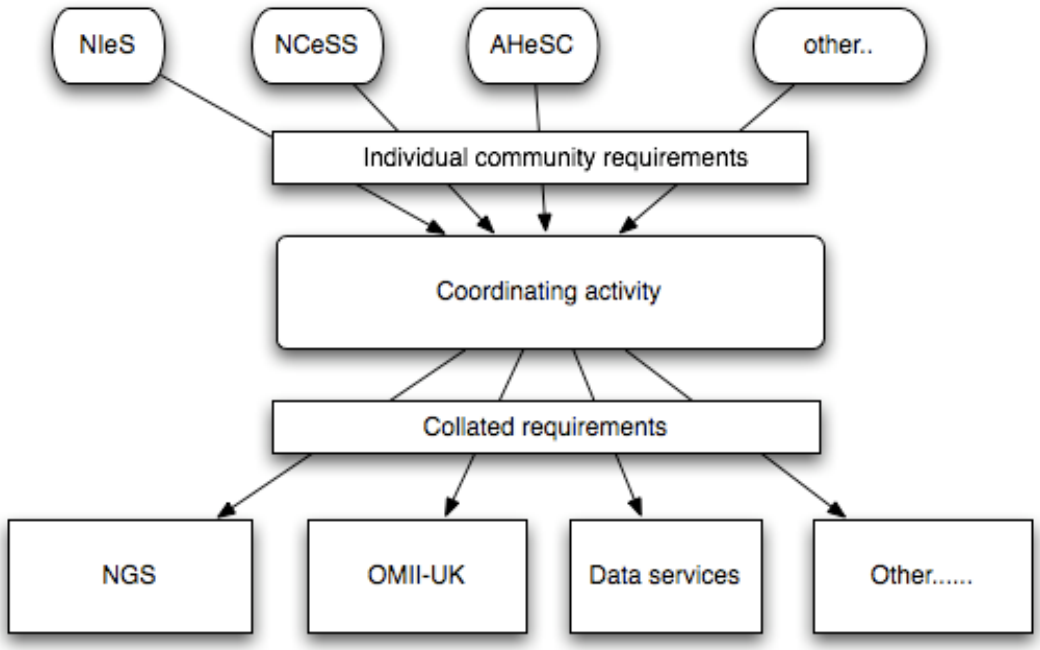
The Arts and Humanities Data Service (AHDS) has completed an e-Science Scoping Survey which identified opportunities that e-Science offers A+H, as well as strategic reasons that A+H researchers are not yet engaged with e-infrastructure. AHDS, in partnership with AHRC ICT Methods Network, manages AHeSSC which has undertaken a comprehensive review of available e-infrastructure training in A+H and developed detailed plans for a training programme. This work has also been informed by three AHRC ICT strategy projects on knowledge gathering, as well as by international initiatives such as the ACLS Cyberinfrastructure in the Arts and Humanities report. AHDS is the institutional home of the next phase of the ARIA project which will develop training and awareness materials in collaboration with AHeSSC and the Methods Network.

The project will start in March 2007 and run for two years. It will be led by NCeSS.

[1] http://www.iceage-eu.org

## D.1 Coordinated Engagement with Communities

The capacity to engage with current and potential e-infrastructure user communities is crucial to achieving the aims of this call. The partners' existing networks of engagement provide an ideal platform for this and, given funding constraints, building on this is the only realistic strategy. This project will add a coordinating function to complement the partners' existing initiatives and so maximise the ability to gather community requirements. These, in turn, will be fed back into planning and development of services, production infrastructure, training, outreach and education.




Some steps have already been taken to develop cooperation and collaboration between groups engaged in facilitating the uptake of e-infrastructures, for example, workshops and BoFs on Training and Education organised by NeSC at the All Hands Meetings. These have led to further meetings and actions such as the commitment to produce a monthly eNewsletter for UK e-Science trainers to help develop the sharing of information and experiences. AHeSSC has developed a matchmaking event, linking A+H and CS researchers, to be held in association with NERC and EPSRC.

### D.1.1 Arts & Humanities

The AHRC Methods Network and AHeSSC are already engaged in preliminary desk research on work undertaken in this area by the AHDS, the AHRC ICT Methods Network, and the AHRC ICT Programme. They are also working with early adopter groups in the A+H, and will work with NCeSS, ReDReSS and NESC on developing and expanding this work. This part of the project would also look at the results and data gathered by the AHRC Knowledge Gathering ICT strategy projects – the e-Science Scoping Survey, LAIRAH (UCL), REPAH (Sheffield), and the Bristol ILRT group.

NeSC has been working closely with AHeSSC to create joint events using existing European and JISC funding. For example, in running training workshops under the ICEAGE FP6 project, which seeks to encourage adoption of grid teaching in academia, and as part of the training effort for the NGS.

### D.1.2 Social Sciences

NCeSS has been leading the engagement of social sciences with UK e-infrastructure. NCeSS programme members are investigating a wide range of issues relating to the adoption of e-infrastructure services, both within the social sciences and within UK e-Science as a whole. The OeSS NCeSS Node is investigating legal, ethical and social issues relating to e-Science. NCeSS, ReDReSS and NeSC are collaborating in the provision of training and awareness raising materials and activities. NCeSS has secured funding from the ESRC to build e-infrastructure services for social sciences research. User engagement, adoption and sustainability issues are a key part of this activity.

### D.1.3 Biotechnology and Biological Sciences & Medical Sciences

There is already a strong relationship between NeSC and the UK (and International) Biomedical community. NeSC has taken part in a large number of biomedical research projects, particularly in conjunction with the

MRC HGU, DGEMap. NCeSS is working with myGrid on workflow adoption and with CO-ODE on ontology development and use issues. Under the iCEAGE project, NeSC will be running a Biomed specific summer school on grid computing in collaboration with Bioinforgrid, EMBRACE and the EBI in May 2007 in Italy (PC co-chaired by David Fergusson).

### D.1.4 Engineering and Physical Sciences

NeSC and eSI are funded by EPSRC and deliver leadership, coordination and research to all disciplines on behalf of the EPSRC. Malcolm Atkinson, as the e-Science Envoy, works closely with the e-Science Core Programme leadership both in EPSRC and in all other Research Councils. He chairs the e-Science Directors' Forum, takes a leading role in the All Hands Meetings and represents the UK at e-IRG and on the OGF Board. He leads the OGSA-DAI node of OMII-UK which has wide take up in the UK and internationally. He chairs the PC of the annual International Summer School on Grid Computing. NeSC is closely connected with many EPSRC projects, the most recent award is NanoCMOSgrid, for which NeSC delivers data management. Edinburgh is the lead site of DCC and has an EPSRC supported research activity in this area. eSI has just agreed to start a theme to identify and address barriers in the use of Grids for computational modelling. The theme will address model building in engineering, physical sciences, earth sciences and integrative biology.

### D.1.6 Natural Environment

Close collaboration with the National Institute for Environmental e-Science and NeSC training activities has already led to running events aimed at this community and on-going contacts. As a consequence of the Education and Training BoF held at the 2006 UK All Hands Meeting and organised by NeSC, NIEeS will be hosting the next workshop on Training.

### D.1.7 Particle Physics and Astronomy

NeSC has been closely involved in the major international projects aimed at providing e-infrastructure for Particle Physics (EGEE, EGEE II) as the leader of the their training activities. This has led to a close working relationship with various UK initiatives for this community, e.g., GridPP, AstroGrid and UK involvement in the Planck satellite.

## D.2 Project Plan and Methodology

We will broadly follow the project lifecycle outlined in the Call. However, by synthesising the results of our existing work relating to steps (1)-(5), we will be able to move quickly onto steps (6)-(12). We have, for example, already identified 'early adopters' across the major research disciplines and this provides us with an ideal platform for a deeper investigation. Our current engagement with users across a broad range of research disciplines also enables us to pursue requirements case studies in parallel, thereby permitting us adopt a more longitudinal approach in which we will regularly cross-reference our findings and iteratively address barriers, assess of responses put in place to overcome them and apply the lessons learnt to the next cycle of activity.

The user requirements case studies will be conducted through surveys of research communities, interviews with key stakeholders, including: researchers and working e-Scientists, e-infrastructure builders, members of e-infrastructure support initiatives, resource providers and funding agencies. Where appropriate, interviews will be conducted using Access Grid or by telephone. The study design will incorporate several key dimensions: discipline (physical sciences, systems biology, medicine, social sciences, arts and humanities), e-infrastructure components (e.g., middleware, security, service registries) and services (e.g., NGS, OMII, DCC, Access Grid Support Centre, NaCTeM, EDINA, MIMAS, UKERNA, Viznet).

We will complement surveys and interviews by taking advantage of our existing activities that supporting adoption through training. These activities can occur at multiple points in the adoption cycle. For instance, there are frequent requests from communities at the stage of assessing whether or how they should engage with e-infrastructure. Making use of these activities has the advantages of:

1. providing an existing group from communities, in all domains, who are willing to engage,
2. bringing together representatives from multiple groups to interact with a focussed manner,
3. providing access to users who interacting with the e-infrastructure to do real tasks
4. enabling production of training materials that are collations of tasks common to different user groups

Through the case studies, the project will map the adoption of e-infrastructure across different research fields, and investigate similarities and differences between them. It will then use these findings to address the following practical questions:

- What are the main barriers to the wider adoption of e-infrastructure, and how do they manifest themselves within different user communities?
- What are the appropriate technical and non-technical responses to these barriers?

The project will also develop a series of key deliverables. These will have a direct value in helping to inform service providers in their future development of services for these communities. They will also cultivate and influence the provision of training to address the identified barriers and influence the development of specific support services and self paced support materials to provide long term help for these communities. Further to this, funders will be able to tune their future calls in response to project findings.

## D.3 Work Packages and Deliverables

### WP1: Barriers to Adoption (leader AHeSSC; NCeSS, NeSC)

**WP1.1 (M1-4): Establishing a typology of barriers** A desk based analysis of the uptake of e-Science in the UK will be conducted to build a general typology of barriers. We will structure this typology by attributes such as discipline, drivers, infrastructure services and training. We use findings from our existing work (eSI themes, SUPER), and from documentation and training materials for JISC services (NGS, OMII-UK, EDINA, MIMAS, etc) to seed the typology.

**D1.1 (M4): Typology of barriers report**

**WP1.2 (M5-12): User case studies** We will use data gathered by service providers and support organisations (NGS, GOSC, Access Grid Support Centre, OMII-UK, MIMAS, EDINA, etc) together with results of eSI themes and SUPER survey to profile the membership of early and potential adopter communities. For the former, we will take barriers identified in WP1.1 conduct in depth case studies through interviews to understand how these 'play out' within different disciplines, and how they were tackled. We also plan to make use of outputs from the related JISC Call III on Use Cases and Service Usage Models. NCeSS and Oxford are putting in a bid under Call III. The involvement of NCeSS in both will ensure excellent coordination between the two projects.

For potential adopters, we will investigate what would it take to get them engaged and examine mechanisms for learning between them and early adopters.

**D1.2.1 (M9-10): User workshops** Three workshops will be held, one at each of the partner institutions, aimed at bringing in groups which are at early stages (or possibly prior to any) adoption of e-infrastructure will be held where our findings will be presented for discussion.

**D1.2.2 (M12): Current state of adoption report** Updates to this report will be produced at M18 and M24.

**D1.2.3 (M12): Training recommendations** A report containing recommendations on how training can address barriers to adoption.

**D1.2.4 (M12): Other recommendations report** This will address non training responses to barriers.

**WP1.3 (M18-M22): Assessment of impact** The ultimate measure of the impact of the outputs of this proposal will be an increased engagement of the research community with e-infrastructure services. This information will be sourced from service providers. In broader terms, another important indicator of impact will be improvements in the perception of support for services supplied.

**D1.3.1 (M10, 21): General survey of user communities** This will carried out in conjunction with WP1.2 and repeated in year 2. Impact will be measured by: 1) Quality control processes for training (feedback) and materials services (online assessment systems); 2) Targeted surveys of engaged, newly engaging and non-engaged communities (through workshops); 3) Analysis in conjunction with service providers of development of engagement among research communities.

**D1.3.2 (M22): Assessment of impact report**

**D1.3.3 (M22): Lessons learnt report** A summary report will be written which will draw together the experiences and analysis generated during the period of the project and which will propose a roadmap for further developments within the support sphere for e-infrastructure in the UK.

### WP2: Training and Awareness (leader NeSC; NCeSS, AHeSSC)

**WP2.1 (M1-22): Training provision survey** Developing initiatives started through All Hands Meeting BoFs and specific training for projects, a survey of existing training and dissemination efforts in the UK – remits, schedules, contacts, materials and support frameworks (including eLearning and portals) – will be carried out. This will give a picture of current efforts in this area and allow a thorough gap analysis to be created. It is abundantly clear that the resources available for training and awareness can never match the scale of need, particularly as use of e-infrastructure becomes ubiquitous. The sharing of resources, coordination to maximise impact and the provision of services which support courses and self-paced learning will highly likely to be part of future developments in this area. The investigation will allow a better qualification of the specific properties required to allow such services to meet the expected demand and define the shape of materials required to support JISC services.

**D2.1.1 (M12, M22): Training requirements and gaps report** This will be based on the results of WP2.1 coupled with input from the experience gained in WP2.3 over the period. It will define a set of recommendations giving details on aligning service provision and the expectations of users.

**D2.1.2 (M18): Training sustainability report** Supporting access to the UK e-infrastructure is a long term task. Partly because expectation is that e-infrastructure will be supporting research for many decades to come and that it will therefore become deeply embedded in all aspects of UK research.

**D2.2.3 (M20): Training gap analysis report** Based on the outreach to communities and experience of developing and providing the services described above, the project will be in a position to have a widely based appreciation of the existing state of support for UK e-infrastructure. This is a pre-requisite for developing a soundly based gap analysis which can highlight areas of support which require development.

**WP2.2 (M1-22):** An online UK 'one stop shop' for support information will be created supporting those who wish to engage with UK e-infrastructure. Similar initiatives are being driven by partners in this proposal on the international scale (e.g., UIG group of EGEE and ICEAGE). It was apparent at recent Training and Education in Grids BoF held at UK AHM that the UK grid support community is very interested in having a specialised digital library of UK focussed support materials available to them.

The partners are in a unique position to profit from work carried out under international projects which can be re-directed to support specific UK needs. For example, agreement has been reached with a number of UK support groups that a monthly newsletter dedicated to support issues is required and should be edited by NeSC. This agreement can form the basis of development of further systems to facilitate cooperation and coordination between these groups in future.

UK t-Infrastructure, a support infrastructure for training in the use of e-infrastructure will be developed, versions at M9 and M22. This will be closely linked to international developments in this field and tie in with test-beds offered by the various JISC supported e-infrastructure projects. The materials created during the project will be made available through this service for re-use and adaptation to specific communities. The WP will investigate how this support infrastructure might further engage the relevant communities by providing the ability to edit the accompanying metadata for their content, so that the communities can create their own related information and have ownership of their own resources.

**D2.2.1 (M3, M20): UK Support event scheduling and advertising system** This will take the form of an online repository driven by digital library technology. Experience in the European context illustrates how important this type of service is for enabling users to take advantage of support services and to avoid duplication and redundancy in their provision.

**D2.2.2 (M5, M18): UK specific repository of support materials for user communities** This will be created by building on existing resources such as provided by NeSC, NCeSS, AHeSSC and ReDReSS. The NeSC system was created with the aim of being JORUM compliant and has followed the standard Dublin Core and Learning Object Models in its metadata. This system can be federated with services specific to particular communities, for instance ReDReSS for social sciences, to provide generic information and community specific resources. Repository materials will be continually updated throughout the life of the project.

**D2.2.3 (M4, M12): UK Support contact system** Information service providing contact information about the various projects and services. Their training programmes and activities and also experts in the UK (and internationally) who might be approached to provide support in developing and producing training and other support activities for UK infrastructure services. This will take the form of an online information resource which can be integrated with other services in this section.

**W2.3 (M6-18): A programme of workshops and training events** aimed at communities wishing to engage with e-Science will be scheduled. Part of this programme will be based on the highly successful UK Grid Training Roadshows run by TOE at NeSC over 2005/6. These events will also be timed to provide feedback on the use of existing services for the reports produced by WP1. The events will form the basis of detailed, re-useable training materials that will be developed into an information pack for institutions on the use of e-infrastructure and will feed into the services created in WP2.2. Commonalities discovered in consolidation of these materials into services in WP2.2 will also help in the identification of common themes in the need for support in these differing communities.

**D2.3.1 (M6-18): A+H training events** AHeSSC will develop a A+H training programme based on needs already identified. A Summer Training School will take place at M6. Four specialist workshops on topics identified as of primary importance for A+H user communities will also be developed: A. Tools for interpretation (automated tagging, highlighting, annotation) B. Tools for exploration of data (knowledge mining of non-textual resources such as video and images) C. Collaboration (Grid tools) D. Visualization (spatial and temporal exploration and representation). The events will be carefully evaluated, and results will contribute directly to the final set of training and awareness recommendations made by the project (the workshops will be run and funded as part of the A+H theme at eSI).

**D2.3.2 (M6-M18): Social Science training events** NCeSS will host a series of training events based around the format of its successful 2005 Winter Training School. The choice of topics will be determined by WP2.1.

**D2.3.3 (M20): Training materials** The training events will form the basis of detailed, re-useable training materials that will be developed into an information pack for institutions on the use of e-infrastructure.

## WP3: Project Evaluation (leader NCeSS; NeSC, AHeSSC)

**WP3.1 (M3-22):** Each project WP will be carefully and continuously evaluated (by means of survey and evaluation forms, and interviews with participants, especially early adopters). These evaluations will directly inform development of subsequent activities, and refinement of training materials and documentation that will be delivered and maintained for the long term.

This continuous process will enable us to develop a consolidated understanding of user needs across different communities and disciplines.

**D3.1 (M6, 12, 24): Project evaluation report**

## WP4: Project Management (leader NCeSS; NeSC, AHeSSC)

An advisory committee will be established comprising representatives of the major UK JISC-funded infrastructure and service providers. This will meet in months 6 and 18 to provide input about the services and to open a direct conduit from experiences gained in the project back to the service providers. The project manager will report to this committee. A chair will be elected from its members. Project evaluation reports will be made available to the committee.

A project committee of WP leaders will meet regularly by face to face or Access Grid to steer the development of the project. This committee will be chaired by the project manager.

# D.4 Risks

| Risk | Probability (1-5) | Severity (1-5) | Score (P x S) | Action to Prevent/Manage Risk |
|---|---|---|---|---|
| Staffing | 2 | 4 | 8 | Expertise is spread across a number of individuals at each institution. |
| Organisational | 4 | 1 | 4 | The partners are experienced in working within consortium projects. A partnership agreement will be established early in the project. |
| Legal | 1 | 3 | 3 | IPR agreement will be negotiated at project start. |

# D.5 Value to the JISC Community

### D.5.1 Survey of required services & gap analysis

This project will survey and evaluate in detail the existing support for JISC funded e-infrastructure services. In parallel, the project will also survey the target audiences' perception of the current services and support. This will then be analysed and synthesised into a report which can be presented to the service providers.

### D5.2 Improving e-Infrastructure services and support

The excellent existing relationships between the project partners and both the target communities and service providers will facilitate this as an iterative process. Thus, the JISC community as a whole can derive maximum benefit from the project partners acting as intermediaries to facilitate collaborative development of the services. Similarly, these relationships allow strong synergy between the support content provided for services, not only to avoid redundancy in creating and managing the support, but also to ensure interoperability and composability.

### D.5.3 Cross-discipline commonalities

The composition of the project enables it to reach out across all of the domains represented by the Research Councils. This will allow the community as a whole to benefit from cross-discipline commonalities in reducing "re-invention of the wheel" as each discipline engages with e-infrastructure and from the pooling of experiences (and generalisable materials) of early adopters.

### D.5.4 Requirements for production infrastructure

The project partners have good relationships with not only UK (OMII-UK, NGS, etc) and international production infrastructure providers (EGEE, OMII-Europe, etc) but also, significantly, a leading part of the policy and standards development efforts in this domain (e-IRG, OGF working groups, EUNIS working groups, etc). This means that the partners have a clear mechanism for feeding results not only to providers but also bodies which are involved in defining the environment in which they operate.

### D.5.5 JISC liaison for future developments

The project partners have strong relationships with JISC services which are central to current e-infrastructure and will undoubtedly form the basis for future developments in the UK and internationally. Similarly, the partners have strong relationships with component regional and local grids and these relationships can form

the basis of a move towards services being supported directly by institutions as the infrastructure becomes a necessary underpinning for research.

### D.5.6 Awareness and dissemination to communities

One of the primary functions of this proposal is to create an information resource of use to communities wishing to engage with UK e-infrastructure. As such, it will be advertised to all the communities which may have an interest. The partners in this project already have extensive contacts which can be utilised in reaching not only those already committed to using e-infrastructure but also in reaching beyond these into those who are interested but as yet unconvinced.

## D.6 IPR and Sustainability issues

Under the three universities' policies on intellectual property (IP), all rights in IP created by their employees in the course of their employment will generally belong automatically to the university, except that the universities do not normally assert any claim to the ownership of copyright in scholarly materials. Results from this project will therefore be owned in the first instance by the universities as the employing institutions. The universities seek to maximise the commercial potential of its IP through their wholly-owned technology transfer companies. The project will put in place a partnership agreement which makes explicit where IP is to be held solely or jointly. In accordance with the desires of the e-Infrastructure Programme it is proposed to release project deliverables under either a Creative Commons licence or, in the case of software, under an OSI-approved open source software license to maximise the benefit for the wider community.

Materials hosted by services are mainly expected to be materials created under the aegis of related projects (NGS, OMI-UK, DCC, etc) which have a strong interest in making them as widely available as possible. It is not expected that negotiating suitable licensing arrangements will be difficult.

The eventual aim will be to provide services of sufficient value for them to be supported nationally by subscription and for these to form the UK component of an emerging cooperative federation of EU support services (the development of which is to be proposed as an EU FP7 project).

# E Budget

**NCeSS**

| **Salaries (plus on costs)** | **year 1** | **year 2** | **year 3** | **total** |
|---|---|---|---|---|
| [redacted] | | | | |
| *sub total* | | | | *93,577* |
| ***Directly allocated*** | | | | |
| [redacted] | | | | |
| *sub total* | | | | *8,053* |
| **Indirect costs** | | | | |
| [redacted] | | | | |
| *sub total* | | | | *90,175* |
| **Estate Costs** | | | | |
| [redacted] | | | | |
| *sub total* | | | | *17,988* |
| Total | | | | |
| T&S | 250 | 3,000 | 2,750 | 6,000 |
| hardware & software | 0 | 2,000 | 500 | 2,500 |
| workshops & training events | 0 | 2,500 | 2,500 | 5,000 |
| consumables | 0 | 1,000 | 1,000 | 2,000 |
| *sub total* | 250 | *8,500* | *6,750* | *15,500* |
| Total NCeSS costs | | | | **225,292** |

**NeSC**

**Salaries (plus on costs)**

| | | | | |
|---|---|---|---|---|
| ***Directy incurred*** | | | | |
| [redacted] | | | | |
| *sub total* | | | | *139,822* |
| ***Directly allocated*** | | | | |
| [redacted] | | | | |
| *sub total* | | | | *6,588* |
| **Indirect costs** | | | | |
| [redacted] | | | | |
| *sub total* | | | | *100,413* |
| **Estate Costs** | | | | |
| [redacted] | | | | |
| *sub total* | | | | *25,299* |
| Total | | | | |
| T&S | 500 | 5,000 | 4,500 | 10,000 |
| hardware & software | 0 | 2,000 | - | 2,000 |
| workshops & training events | | | | |
| consumables | 0 | 1,000 | 1,000 | 2,000 |
| *sub total* | | | | *14,000* |
| *Total NeSC costs* | | | | **286,122** |
| **AHeSSC** | | | | |
| ***Salary including on costs*** | | | | |
| [redacted] | | | | |
| *sub total* | *3,110* | *37,483* | *35,954* | *76,547* |
| **Indirect costs** | | | | |
| [redacted] | | | | |
| *sub total* | | | | *87,430* |
| **Estate Costs** | 0 | 0 | 0 | 0 |
| [redacted] | | | | |
| *sub total* | | | | *18,372* |
| Total | | | | |
| T&S | 250 | 1,250 | 1,000 | 2,500 |
| hardware & software | 0 | 1,500 | 0 | 1,500 |
| workshops & training events | 0 | 6,000 | 0 | 6,000 |
| consumables | 0 | 1,000 | 500 | 1,500 |
| *sub total* | | | | *11,500* |
| *Total AHeSSC costs* | | | | **193,849** |
| Total project costs | | | | 705,263 |
| **Total project cost to JISC at 80%** | | | | **564,211** |

## E.1 Resources

Project management (Alex Voss, 0.2 FTE): NCeSS
Barriers study, training requirements gathering and service development (1 FTE): NCeSS
Barriers study, training requirements gathering and service development (1 FTE): AHeSSC
Training requirements gathering and delivery (Mike Mineter, 0.5 FTE, Guy Warner, 0.5 FTE): NeSC
Service integration and development (John Scotland, 0.1 FTE; Boon Low, 0.2 FTE): NeSC

User engagement workshops and training events (6 workshops @ £3k each, 30 participants)
AHeSSC Summer Training School and NCeSS Winter Training School: £12k

# F Key Personnel

## F.1 NCeSS

**Rob Procter** is Research Director of the ESRC-funded National Centre for e-Social Science (NCeSS). His role at NCeSS focuses on developing Centre research strategy, coordinating development of applications of e-infrastructure and services in social sciences, and investigating socio-technical issues which may influence wider adoption. He is a member of the EPSRC e-Science Strategic Advisory Team, the JISC VRE and e-Infrastructure Programme Advisory Boards, the eSI Scientific Advisory Board, e-Science Usability Task Force, e-Science User Group, OMII-UK User Group and the AHRC ICT Programme Steering Committee.

**Peter Halfpenny** is Professor of Sociology and Executive Director of NCeSS. His role in NCeSS is overall strategic management of the Hub, seven Research Nodes and 12 Small Grant Projects, and he is responsible to the ESRC for the success of the Centre's programme of research, outreach and capacity-building. His own research interests are in the integration of Grid tools and services into a comprehensive support environment for social science researcher practitioners, and the investigation of the adoption and adaptation of support tools across the social research community.

**Alex Voss** is a computer scientist with an interest in the organisational use of ICTs and the relationship between design and use of IT systems. His technical interests and skills revolve around enterprise computing (esp. J2EE technologies) and component architectures. His practical experience in building systems, both in research and in industry contexts resonate with a number of issues involved in the organisational use of technologies, esp. regarding various aspects of dependability such as availability, maintainability or security. In addition to his post as a research associate at NCeSS, Alex is a research theme leader at eSI, working on uptake and sustainability of e-Research.

## F.2 NeSC

**Malcolm Atkinson** is UK e-Science Envoy and Director of eSI. He leads several e-Science projects, including OGSA-DAI building data access and integration systems. He is a member of the Grid Forum Steering Group, the UK e-Science Technical Advisory Group, the OMII Steering Committee, the Globus Alliance Board and the Scientific Advisory Boards of the Simula Research Labs, Oslo, the GEON project, San Diego Supercomputing Center and NCeSS. He leads the training for EGEE and NextGRID and has more than 120 publications.

**David Fergusson**, Deputy Director for TOE, has a background in biomedical research and commercial bioinformatics development. He has managed NeSC's EGEE training Activity (NA3) and is managing ICEAGE. He has taught at the ISSGC and GridKa Summer Schools in '04 and ISSGC '05.

## F.3 AHeSSC

**Sheila Anderson** is Director of AHDS. The AHDS acquires, curates, preserves and provides access to complex digital resources created by or supporting research and teaching in higher education. With Lorna Hughes, she is co-Director of the recently established AHeSSC. In 2005, she was the recipient of an AHRC grant to undertake a Scoping Survey investigating the potential for e-Science. She is currently engaged with partners from CNRS, Max Planck Society and the Dutch Archiving and Networked Services in developing ideas for a pan-European Research Infrastructure.

**Lorna Hughes** is Manager of the AHRC ICT Methods Network and Co-Director of AHESSC. The AHRCT ICT Methods network provides a national forum for the exchange and dissemination of expertise in the use of ICTs for A+H research. The Methods Network supports a variety of activities to promote, support and develop the use of advanced ICT methods in A+H, and to develop interdisciplinary activities and partnerships.

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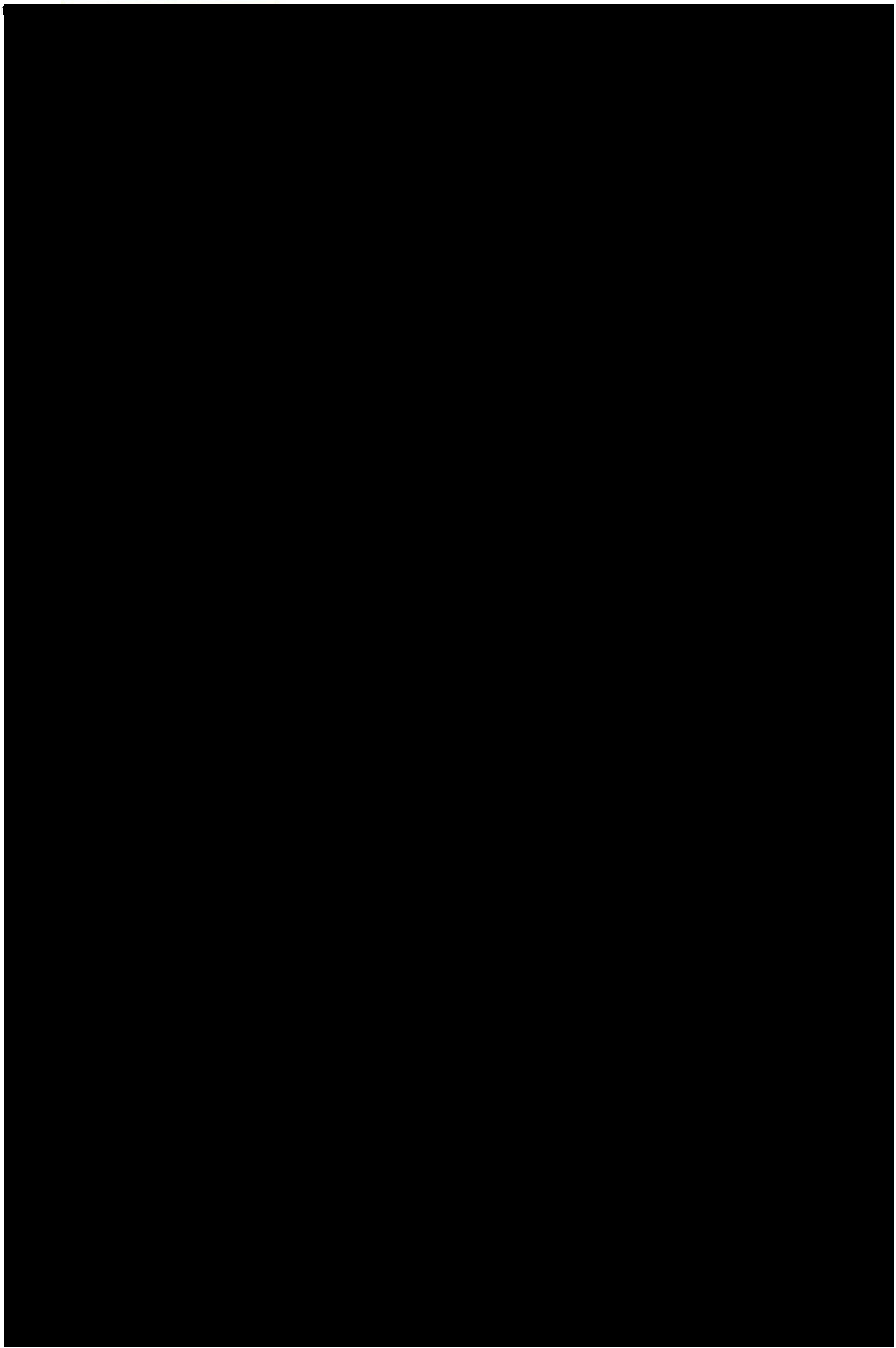
Williams, R., Stewart, J. and Slack, R. (2005). *Social Learning in Technological Innovation: Experimenting with Information and Communication Technologies*. Cheltenham: Edward Elgar.



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