Theme Proposal: Adoption of e-Research Technologies: from prototype to commodity

Rob Procter, Tom Rodden and Alex Voss

1. Theme topic and brief description

The aim of the theme is to study factors that may inhibit the wider diffusion and adoption of e-Research technologies and tools, and devise strategies for tackling them. The success of the UK e-Science Core programme has encouraged other disciplines – notably within social sciences, and the arts and humanities – to explore the benefits of e-Research approaches and technologies. Evidence is beginning to accumulate, however, of significant barriers which need to be investigated, understood and tackled in a concerted way. This theme will conduct a series of case studies to define the problem space and, by bringing together a multi-disciplinary network of leading members of research communities and experts in fields such as e-Infrastructure, usability and innovation studies, it will develop a road map for encouraging the take-up of e-Research.

The theme will be collaboration between eSI and the National Centre for e-Social Science (NCeSS). NCeSS will provide co-funding for the theme leader's salary, contribute findings from its own programme of research in this area, provide case studies and help oversee the work of the theme leader. The theme leader will work on the theme 100% for twelve months, dividing his time between eSI and NCeSS. In this way, the theme will have the multi-disciplinary context and resources that are essential for the achievement of its aims.

2. Proposed leader(s) with brief description of their areas of specialisation.

Alex Voss will lead the theme. ***Alex Voss*** is a computer scientist by training (Diplom Informatiker, University of Erlangen-Nuremburg). His research interests lie in the field of socio-technical issues in IT systems design and development, and he has recently submitted a PhD thesis on the topic of software engineering methodologies and the social organisation of IT systems development. This research was conducted in the context of the EPSRC Dependability Interdisciplinary Research Collaboration (DIRC) and supervised by Rob Procter. Alex has been working at the intersection of computer science and sociology for the last five years which has enabled him to acquire the hybrid skills – spanning computer science and sociological research methods – that are essential to the conduct of this theme. He played an important role in the Dependability Inter-disciplinary Research Collaboration, helping to understand and elaborate dependability issues in complex socio-technical systems. More recently, he has been applying this expertise in the building of e-Infrastructures for the National Translational Cancer Research Network, and the Clinical Research Information System Project in Lothian, Scotland. In September, he will be taking up the position of e-Scientist at the National Centre for e-Social Science.

Rob Procter and Tom Rodden will oversee the theme. ***Rob Procter*** is Professor and Research Director of the National Centre for e-Social Science.[1] His research interests lie within the field of socio-technical issues in the design, implementation, evaluation and use of interactive computer systems, with a particular emphasis on ethnographic studies of work practices, computer-supported cooperative work and participatory design. Rob is a PI on several Grid-related research projects, a member of the e-Science Strategic Advisory Team, JISC e-Infrastructure Advisory Board, JISC Virtual Research Environments Programme Steering Committee, the e-Science Usability Task Force, the e-Science User Group, the Arts and Humanities Research Council ICT Programme Steering Committee and the e-Science Institute Advisory Board, and has served on NSF cyberinfrastructure programme panels. Prof. Procter is on the editorial boards of Interacting with Computers, the Enterprise Information Management Journal, the International Journal of IT Standards and Standardisation Research, and a co-editor of the forthcoming special issue of the Journal of Computer-Supported Cooperative Work on Collaboration and e-Research. ***Tom Rodden*** is a Professor of Computer Science at Nottingham University and leader of the Nottingham NCeSS node. His research focuses on the development of new forms of interactive technologies to support users within the real world. This is a multi-disciplinary endeavour bringing together researchers in behavioural and social sciences and those involved in systems engineering, network infrastructures and interactive systems design. These range from those with a background in anthropology to those with a training in art and embrace technologists from software development to the construction of novel hardware. The research projects led by Prof. Rodden tend to combined different disciplines, technologies and techniques – he currently coordinates an interdisciplinary research collaboration linking eight leading research institutions in the UK with a budget of £10M over 6

[1] www.ncess.ac.uk

years.[2] He is interested in the overlap between users, the social and e-Science. He currently serves as ESRC representative on the UK e-Science Steering committee. Tom chairs the UK e-Science Usability Task Force, has recently established the East Midlands Centre of Excellence in e-Science and coordinates the e-Social Science Agenda Setting Workshop series.

The theme leader will report on a monthly basis to Profs Procter and Rodden, via either face-to-face meetings or Access Grid.

3. Relation to e-Science

This theme will address the challenges to achieving the wider diffusion and adoption of e-Research technologies and tools, and devise strategies for responding to them. It will conduct case studies to investigate these factors in detail and host workshops to bring communities together to share experiences of e-Research. It will facilitate the building of demonstrators to increase engagement with e-Research and prototype ways of making e-Research technologies more usable and deployable through, e.g., improved dependency management, increased commodification and reusability of components.

a. Please describe the application areas that would benefit from the outcomes of this theme.
The outcomes of the theme will be of benefit across the spectrum of e-Research.

b. Please list the technical areas that would be engaged and developed as a result of the theme.
Usability of e-Research technologies and tools, methodologies for software requirements gathering, design and development, project management, policies for technology standards, strategies for deployment, sustainability and diffusion of innovation, community engagement.

4. Are there other similar projects to the proposed theme? What would be their relationship to/involvement in this programme?

The National Centre for e-Social Science (NCeSS) was established in 2004 by the ESRC as part of their e-Social Science strategy to stimulate the take-up of e-Research technologies and tools within the social sciences. NCeSS has two main aims. The first is to develop Grid-based research tools and environments for the social sciences. The second is to investigate the 'social shaping' of e-Research, i.e., how it is being developed, how it is being used, and what its impacts and implications are. NCeSS programme members are involved in numerous projects and activities in support of these aims, with the following being of particular relevance to this proposal:

- NCeSS has recently been awarded £550K by the ESRC to begin building an e-Infrastructure for the social science research community;
- NCeSS is a partner in an EU funded comparative study of the adoption of e-Infrastructure within the social sciences, arts and humanities.
- NCeSS has been working closely with the Usability Task Force to promote usability research within the UK and US e-Science communities. A series of workshops on this topic have been organised over the past fifteen months, most recently at the ACM Computer-Human Interaction Conference in April, 2006.

NCeSS has have established links over the past two years with leaders of the UK, European and US e-Infrastructure research communities (e.g., JISC, NGS, OMII-UK, EGEE, TeraGrid, Collaboratory for Research on Electronic Work).

The understanding of factors that inhibit the wider diffusion and adoption of e-Research is a key challenge for eSI and NCeSS. It calls for a multidisciplinary approach and we see a co-funded theme on this topic as providing eSI and NCeSS with the opportunity to work together and pool the expertise of their respective communities. In particular, the theme leader will be able to build upon the activities of NCeSS and the UTF in investigating barriers to the diffusion and adoption of e-Research.

5. Identify a focus that will ensure the effort is most likely to be productive, i.e., a specific test application domain/current unsolved research challenge.

The theme will adopt a case study approach conducted through surveys of research communities, interviews with key stakeholders: researchers and working e-Scientists, e-Infrastructure builders, members of e-Research support initiatives, resource providers and funding agencies. Where appropriate, interviews will be conducted using AGN facilities.

[2] www.equator.ac.uk

The study design will pay attention to a number of research dimensions: field (physical sciences, systems biology, medicine, social sciences, arts and humanities), sector (academic, public services, commercial), country (UK, Europe, US), technologies (e.g., middleware, Grid and Web services, workflow, visualisation, portals) and 'readiness' to take-up e-Research. Initial investigations by NCeSS have led us to categorise readiness to take-up e-Research into three communities: the 'early adopters' who are keen to push to the limit of what is possible; the 'interested' who will adopt new research tools and services if they believe these will provide simple ways of advancing their research; and the 'uncommitted' who have yet to appreciate its relevance. Organising the case studies around these categories of user readiness and carrying them out in the order below, will able us to exploit 'snowball' sampling techniques to inform the design of the next and, in particular, to populate its associated user readiness community:

1. 'Early adopters': we will identify members of this category from UK and other national programme documentation, websites, etc. 'Early adopters' have the most in-depth experience of e-Research, can tell us about what worked and what didn't, how potential barriers were negotiated, and will provide a range of projects from different fields and research programmes upon which we can draw. The aim of the case study will be to define an initial taxonomy of factors (both incentives and barriers) influencing take-up which we will then refine and expand upon in the subsequent case studies. We will also investigate the extent of interaction with – and technology transfer to – the 'interested' community, the subject of the second case study. Case study participants will be invited to a workshop to discuss findings.
2. 'Interested': we will use participants from the first case study, our core team and collaborator groups, and sources such as attendance at e-Science events and mailing lists (e.g., NeSC, NCeSS, UK e-Science centres, etc), to define membership of the this community. Using the study dimensions (field, sector, technologies, country), we will then identify a group of informants for survey and interview. The aim of the case study will be to expand on the initial taxonomy of factors influencing take-up and, in particular, to examine the barriers – both real and perceived – to e-Research. This will enable us to assess the impact of and identify gaps in existing initiatives in, for example, training, technology transfer and sustainability. Case study participants will be invited to a workshop to discuss findings.
3. 'Uncommitted': we will use nominations from participants in the first two case studies to profile the 'uncommitted' community. Using similar selection criteria as before, we will select a group of informants for survey and interview. The aim of the case study will be to identify the key research challenges for this community and perceptions (if any) of e-Research. This will enable us to identify how e-Research could contribute to addressing these challenges and what measures would be effective in presenting e-Research so as to encourage wider understanding of its benefits.

Through these case studies, the theme will map the take-up of e-Research across the different research fields, sectors and national programmes, and investigate the similarities and differences between them. It will then use these findings to address the following practical questions:

- What are the main incentives and barriers to the wider take-up of e-Research, and how do they manifest themselves within different fields, sectors and national programmes?
- How can we maximise the impact of incentives?
- What are the appropriate technical and non-technical responses to the barriers?

6. Please list any people who have agreed to actively collaborate.

The following people have agreed to be a member of the core team and attend theme events. Core team membership has been chosen to ensure that the theme proposal delivers its multi-disciplinary objectives:

- Dr Rob Allan, CCLRC and NCeSS (Lancaster node).
- Dr Maia Dimitrova, manager, JISC VRE programme.
- Dr Julia Lane, ex-coordinator NSF Social, Behavioural and Economic Sciences Directorate cyberinfrastructure strategy and ESRC e-Social Science programme reviewer.
- Prof Ian Miles, Policy Research in Engineering, Science and Technology, University of Manchester
- Dr Jennifer Schopf, e-Infrastructure Policy Advisor, NeSC.
- Prof Robin Williams, Director, Institute for the Study of Science, Technology and Innovation, University of Edinburgh.

In addition, the following people have indicated their willingness to participate in specific events and help secure the involvement of members of the organisations they represent. The membership includes representatives from the key stakeholders in UK e-Science:

- Prof Malcolm Atkinson, UK e-Science Envoy.
- Dr Ann Borda, Programme Manager, Core Middleware, e-Research and Open Source Developments, JISC.
- Dr John Brooke, co-Director, e-Science North West.
- Prof Nosh Contractor, NSCA.
- Prof Peter Coveney, e-Science User Group.
- Prof Martin Dove, National Institute for Environmental e-Science.
- Matthew Dovey, Programme Director, e-Research, JISC and member, e-Science Strategic Advisory Team.
- Dr Jeremy Frey, e-Science User Group.
- Dr Neil Geddes, Director, National Grid Service and member, e-Science Strategic Advisory Team.
- Prof Carole Goble, Chair, OMII-UK.
- Prof Peter Halfpenny, Executive Director, NCeSS.
- Dr Steve Newhouse, Director, OMII-UK.
- Prof Gary Olson, ex-Director, Collaboratory for Research on Electronic Work, University of Michigan.
- Dr Mark Parsons, Commercial Director, NeSC.
- Dr Stephen Pickles, Technical Director, Grid Operations Support Centre.
- Prof Alan Rector, e-Science User Group.
- Prof David Robey, Director, AHRC ICT in Arts and Humanities Research Programme.
- Chris Rusbridge, Director, Digital Curation Centre.
- Prof Richard Sinnott, e-Science Technical Director, NeSC.
- Prof Anne Trefethen, Executive Director of the Interdisciplinary e-Research Centre, University of Oxford and member, e-Science Strategic Advisory Team.
- Prof Peter van den Besselaar, Head of the Science System Assessment Department, Rathenau Instituut, Netherlands.
- NCeSS node PIs.

We expect to add a number of participants drawn from relevant European and US programmes such as the e-Infrastructure Reflection Group, EGEE, NSF OCI and TeraGrid. To assist in securing the input of members of the international e-Research community, the theme leader will undertake fieldwork trips to Europe and the US. We also expect to have one theme visitor associated with each case study.

7. Sketch of who is probably working in the area, and/or might be interested.
UK: Research Councils, e-Science centres and core programme projects, NGS, GOSC, OMII-UK, Usability Task Force, JISC e-Infrastructure, JISC VRE and EPSRC/ESRC usability in e-Science programmes; Europe: EGEE consortium, Royal Netherlands Academy of Arts and Sciences, European e-Infrastructure Reflection Group (e-IRG); US: NSF OCI Cyberinfrastructure and SBE Cybertools programmes; International: Globus Alliance; Vendors: IBM, Microsoft, Sun, Oracle; Commercial users: pharmaceuticals (e.g., AstraZeneca, GlaxoSmithKline), engineering (e.g., Rolls Royce). This list will be expanded as case study designs are finalised.

8. Identify the current key research challenges(s) in the area.
The theme addresses a question that cuts across a number of areas involving technical as well as social aspects. It will require a multi-disciplinary approach that ties together an understanding of the technologies, the application domains, the organisational and larger social contexts, as well as socio-economic research on innovation, and the shaping of technologies and research practices.

Supporting Innovation and Diffusion: e-Science pilot projects have often found that direct, high-level involvement of an application scientist to drive the domain requirements has been a crucial success factor. How can different user constituencies can be effectively supported, from the occasional user with no interest in the technology per se to the programming end-user? In domains such as e-Research, where requirements are unpredictable and the technologies employed are themselves evolving at a rapid pace, design outcomes and supplier offerings are inevitably unfinished. Further innovation takes place as technologies are deployed and used, as they become embedded in broader systems of culture and practices. In this process, technologies are often reinvented, modified, configured and further elaborated. Candidate solutions are often traded within and between user organisations and between user and supplier organisations, leading to

innovation through ‘social learning’. A focus on these processes allows analysis of how technologies get traded, how arrangements are made to support their use in particular working contexts and how people deal with the problem of keeping aligned with rapidly changing technological and scientific fields. How people and organisations locate themselves in a wider nexus of innovation plays an important role in how they manage uncertainty in the face of evolving technical infrastructure, volatile requirements and the problem of limited funding time spans. What can we learn from these processes that will enable us to encourage technology transfer and the diffusion of e-Research within and between communities? What kinds of support mechanisms are needed to encourage potential new users and communities, and how should they be resourced and managed?

Improving Usability: Many of the prototype tools and services generated within e-Research programmes have benefited from the close involvement of committed groups of users. This has contributed enormously to understanding requirements and usability issues, and to the evaluation of the prototypes. However, the involvement of these committed users is not, in itself, sufficient to ensure that all the requirements and usability issues have been addressed and that these prototypes are ready for deployment more widely. Requirements identified by these users may not be representative of the requirements of the wider user community. Ways of doing carrying out research may vary, not only between disciplines but even between groups of researchers working within the same discipline. Hence, prototype tools and services are likely to privilege the requirements of those users who were involved in their development. Expecting other researchers to accept these requirements as their own is unrealistic and likely to be an obstacle to wider adoption. Second, early adopters may be more tolerant of limitations in these tools and services, being prepared, for example, to work around ‘bugs’, or to cope with poor usability. How should we go about ‘re-factoring’ prototype tools and services for improved usability? Where tools and services offer significant innovations over existing work practices, requirements are liable to evolve rapidly as users undergo a process of learning how best to exploit these opportunities. In some cases, new requirements may emerge as novel applications are found for the tools and services. How should we approach the social organisation of e-Research infrastructure and tool development so as to ensure the continued, close interaction between users and developers essential for effectively tracking and responding to these changes? How do we create and manage design and development processes that are sufficiently agile so as to be able to support emergent research practices?

Fostering New Forms of Research and Community: Strategies need to be developed to promote the effective integration of new technologies within existing work practices of researchers and organisational settings, while allowing space for reinvention as the possibilities afforded are explored. Understanding the dynamics of this process and providing guidance on appropriate models of innovation and adoption raises a number of questions. How can e-Research facilities be presented to promote a close fit to existing scientific practices? How should e-Research facilities be designed to promote innovations in scientific practice? The widespread use of e-Research infrastructures provides the potential for new forms of community to emerge, but this will only happen if we can respond to a range of organisational, cultural and/or technical barriers. The opportunities offered by their formation need to be identified and the development of appropriate community responses encouraged. We need to understand the role played by contexts and boundaries of collaboration (within disciplines and organisations), how people weigh the risks and benefits of collaboration, the mechanisms and techniques needed to support the formation of dynamic e-Research communities. How do we interleave technological mechanisms with broader human and social mechanisms for the management of access to shared resources?

Deployability, Configurability and Sustainability: A clear adoption path for e-Research is essential. At the heart of this lie questions of deployability and configurability as well as organisational and technical alignment (in terms of, e.g., policies, technology supply strategies and skill sets). While issues of skill, for example, are already being addressed through education programmes, there is scope for technological innovation in this area. As one example, we might consider to what extent can virtualisation help overcome deployment problems. Is there scope for developing Grid Virtual Appliances that can be centrally provided and deployed into widely available virtual machine implementations such as VMWare? Can such appliances help increasing awareness and the scope for early experimentation? Can they lead to improved uptake, easier deployment and more sustainable applications? (see www.gridappliance.org for more information). On the end-user side, what role do portals play in making the Grid accessible to domain scientists and how can their uptake be furthered? For example, is there a potential to go beyond the two classical approaches, the ‘stovepipe’ vertical problem solving environment and the generic portal framework? Can we establish a market of tradeable components that can be turned into problem solving environments through a ‘pick and mix’ approach? (One might think, for example, of a generic MAGE-ML explorer portlet for bioinformaticians.)

National and International Comparisons: Both nationally and internationally, e-Research programmes have been facing similar challenges for widening the user base. The NCeSS strategy, for example, informed by the three user community model outlined above, is to build an e-Infrastructure and support services for the social sciences. In Europe, EGEE is providing a production quality grid infrastructure to a steadily increasing range of scientific communities (including Earth Sciences, High Energy Physics, Bioinformatics and Astrophysics) underpinned through a set of coordinated support activities. In the US, TeraGrid has developed a two-part strategy to user engagement, TeraGrid Deep and TeraGrid Wide. The former addresses the early adopter community, users with a track record in computational sciences and HPC use whose requirements are (largely) understood. TeraGrid Wide seeks to engage with user communities whose profiles and requirements are more uncertain, and will require significantly more effort to get them onboard. A key part of TeraGrid Wide's strategy is the creation of 'science gateways' which seek to provide user communities with familiar and simple-to-use interfaces to resources and services. What can we learn about and re-use from these different approaches to providing access through portals or science gateways? What can we learn from these different user support models?

Measuring Impact of e-Research: In order to persuade research communities of the benefits of adopting e-Research, it is important that there be an evidence base for its impact on scientific discovery and practices. Work needs to be done to define a rich set of research impacts, identify metrics for them and how to collect and analyse the data.

9. What are the plausible outcomes (deliverables) from the theme? Journal papers, books, reports? Will they be entirely theoretical, or will there be some experiments and/or software produced?
   - Workshops and papers to disseminate findings.
   - A series of reports, including: main case study findings, a 'gap analysis' and a road map ('blue book') for the wider take-up of e-Research.
   - A proposal for at least one follow-up research project.
   - Technical components and patterns facilitating uptake and reuse (e.g., in the form of virtual Grid appliances).
   - A repository of demonstrators exemplifying the benefits of e-Research sourced from the e-Research community (e.g., NCeSS).
   - A community website and wiki, and populated with relevant materials.

10. Sketch of the kind of events (focus/scope) proposed and who would participate.
We will conduct surveys, interviews and host workshops. Participants will include members of research communities, e-infrastructure builders, usability and innovation studies experts.

11. What difference will be generated by running the theme for 6 or 12 months?
A 12 month period allows more than one application domain to be studied and comparisons between different areas to be made. We expect that some issues and candidate solutions will be common to a number of areas while others will be specific only to some. Identifying the similarities will allow decisions to be made to prioritise future work. This cannot be achieved within 6 months.

12. Is the topic of the theme so specific that it can really all be "tied up" in 6 or 12 months time, or should there be some follow-on? If so, how might the follow-on be funded? (e.g., some of the people that have been active in the theme might make a proposal to EPSRC).
The theme addresses ongoing concerns but we expect that the 12 month period will allow us to make significant progress and provide a solid basis for future work. In particular, we will develop proposals to one or more research councils to follow on from this work.

13. Are there opportunities for co-funding from other sources?
NCeSS will fund the other 50% of the theme leader's salary to provide 1.0FTE for the theme for twelve months. This will leverage the work conducted and ensure that the link with relevant research in e-Social Science is established. In addition, NCeSS is in a position to co-fund some theme related events.

14. Please provide a high level project plan with milestones and the resources being applied for.
An initial three working weeks will be needed to set up the theme, i.e., to produce a poster, advertise it through a number of channels, create the website and wiki and finalise the study design. Three case studies will be conducted, each to the following template: two weeks to plan and pilot the survey and interview

questions; four weeks to distribute survey and carry out interviews; four weeks to analyse and write up the results.

Two major trips will be undertaken, one to the US and one or two to Europe for case study fieldwork. We will finalise details of these visits once the theme is underway. Candidates for the US trip include the two main axes of the Teragrid project (Chicago and San Diego), plus NSF OCI. Candidates for the European trip(s) include EGEE team members and partners. Theme visitors will be identified during the case studies.

Three workshops will be held, their preparation being interleaved with fieldwork and technical work. The first two will be used to present case study findings to their participants and get feedback. The final workshop will be used to disseminate the overall theme findings. A call for participation will be written and a list of invited speakers arranged for each workshop. The time between the initial planning and running of each workshop will be about six weeks to allow for appropriate advertising of the events. This time will be used in the first two instances for further targeted interviews (of fieldwork), which will then inform the planning for the subsequent workshop. A final workshop will be held before the writing of the theme reports.

The technical work will involve the development of a framework for the provision of Grid technologies in the form of Grid Appliances. The idea of a Grid Appliance involves pre-packaged functionality that can be acquired and deployed without too much effort, giving researchers (or other users of the technology) the chance to gain experience with the technology without a major investment. One aim of the theme will be to explore the possibility of providing grid appliances for a number of exemplar applications and to make them available in the form of virtual machine images for a widely available, low cost virtualisation engine. For example, researchers at the University of Florida have built a Grid Appliance that can be used to implement "virtual clusters" running Condor on the basis of existing machines.[3]

We are aiming to provide a basic virtual appliance that contains important elements such as operating system, a database management system, etc. to form the basis for the construction of Grid Appliances. An initial prototype will be built at the start of the theme and will be made available to partners in the e-Research community who are interested in advertising and distributing their technologies in the form of a Grid Appliance. The website at www.gridappiance.org will be used to provide a community space for developers of Grid Appliances and a directory of existing products for potential users of Grid technologies. We estimate that an initial 2 weeks will be sufficient to build the prototype and set up the website and that an overall effort of approx 2 weeks will be required over the course of the theme to maintain and expand this resource.

The timeline presented is necessarily an idealisation. Adjustments will be needed to accommodate conference visits, paper writing and to remain flexible in order to exploit unforeseen opportunities and respond to problems. However, the rough distribution of effort and the reporting periods are fixed and provide the basis on which the theme’s progress will be made accountable to eSI and NCeSS.

[3] http://www.acis.ufl.edu/~ipop/grid_appliance

Final

ID	Task Name	Duration	Start	Finish	Predecessors
1	Initiation and advertising	5 days	Fri 01/09/06	Thu 07/09/06	
2	Interviews planning (1)	10 days	Fri 08/09/06	Thu 21/09/06	1
3	Website and Wiki	5 days	Fri 22/09/06	Thu 28/09/06	2
4	Technical work	10 days	Fri 29/09/06	Thu 12/10/06	3
5	Interviews (1)	20 days	Fri 13/10/06	Thu 09/11/06	4
6	Analysis (1)	20 days	Fri 10/11/06	Thu 07/12/06	5
7	Interviews planning (2)	10 days	Fri 08/12/06	Tue 02/01/07	6
8	Workshop planning (A)	5 days	Wed 03/01/07	Tue 09/01/07	7
9	Interviews (2)	20 days	Wed 10/01/07	Tue 06/02/07	8
10	Analysis (2)	20 days	Wed 07/02/07	Tue 06/03/07	9
11	Workshop (A)	1 day	Wed 07/03/07	Wed 07/03/07	10
12	Interviews planning (3)	10 days	Thu 08/03/07	Wed 21/03/07	11
13	Workshop report (A)	10 days	Thu 22/03/07	Wed 04/04/07	12
14	Workshop planning (B)	5 days	Thu 05/04/07	Wed 11/04/07	13
15	Interviews (3)	20 days	Thu 12/04/07	Wed 09/05/07	14
16	Analysis (3)	20 days	Thu 10/05/07	Wed 06/06/07	15
17	Workshop (B)	1 day	Thu 07/06/07	Thu 07/06/07	16
18	Workshop report (B)	10 days	Fri 08/06/07	Thu 21/06/07	17
19	Workshop planning (C)	5 days	Fri 22/06/07	Thu 28/06/07	18
20	Technical work	10 days	Fri 29/06/07	Thu 12/07/07	19
21	Holidays	5 days	Fri 13/07/07	Thu 19/07/07	20
22	Workshop planning (final)	5 days	Fri 20/07/07	Thu 26/07/07	21
23	Work on final report	10 days	Fri 27/07/07	Thu 09/08/07	22
24	Workshop (C)	1 day	Fri 10/08/07	Fri 10/08/07	23
25	Workshop report (C)	10 days	Mon 13/08/07	Fri 24/08/07	24
26	Work on final report	5 days	Mon 27/08/07	Fri 31/08/07	25
27	Final workshop	1 day	Mon 03/09/07	Mon 03/09/07	26