A. Cover Sheet

Cover Sheet for Proposals *(All sections must be completed)*		**JISC**
Name of Strand:	Geospatial	
Name of Lead Institution:	EDINA, University of Edinburgh	
Name of Proposed Project:	Interoperable Geographic Information for Biosphere Study (IGIBS)	
Name(s) of Project Partners(s) (except commercial sector – see below)	Aberystwyth University Welsh Assembly Government	
This project involves one or more commercial sector partners NO	**Name(s) of any commercial partner company (ies)**	
Full Contact Details for Primary Contact: **Name:** Chris Higgins **Position:** Workgroup Leader **Email:** chris.higgins@ed.ac.uk **Tel:** 01654 761 368 **Address:** 18 Maes Y Llan, Corris, Machynlleth. SY20 9SJ		
Length of Project: 7 months		
Project Start Date: 1st April, 2011	**Project End Date:** 31st Oct, 2011	
Total Funding Requested from JISC:		
Funding requested from JISC broken down across Financial Years (Aug-July)		
Aug10 – July11:	**Aug11 – July12:**	
Total Institutional Contributions:		

Outline Project Description

We propose to create a tool that enables users to upload and instantiate an Open Geospatial Consortium Web Service (OWS) allowing users to view and analyse their data in combination with a range of other interoperable distributed data sources. To enable a broader range of use cases, we will use Shibboleth to secure the OWS where appropriate. End user requirements will be met by localising the project and focussing on real geographic information needs emerging from the UNESCO Dyfi Biosphere reserve. This is collaboration between EDINA, Aberystwyth University and the Welsh Assembly Government. To achieve mutual benefits, we aim to strengthen and develop the level of integration between the UK academic Spatial Data Infrastructure (SDI) and the national SDI as expressed through the UK Location Programme. This project aims to bring long term benefits and contribute to more data being available in an interoperable form to a wider range of disciplines so they can engage in addressing research and education based upon real world needs.

I have looked at the example FOI form at Appendix K and included an FOI form in this bid	**YES**
I have read the Funding Call and associated Terms and Conditions of Grant at Appendix L	**YES**

B. Appropriateness and Fit to Programme Objectives and Overall Value to the JISC Community

Introduction

1. This funding proposal is in response to the geospatial strand of the JISC Grant 15/10 call for proposals to improve the infrastructure for education and research
2. The proposal builds extensively upon prior work aligning international developments in the area of geospatial interoperability with the development of the UK Academic Spatial Data Infrastructure (SDI) in conjunction with the UK National SDI.
3. Real world, localised, inter-disciplinary, end user problems are brought into focus by concentrating on research and education requirements which have emerged from the UNESCO Dyfi Biosphere reserve[1].

Brief outline of work

4. Biosphere reserves are areas of high conservation value where effort can be concentrated on finding ways of enabling sustainable development. They are designated only with the cooperation of the wide range of stakeholders who live and work within the area. A major function of the designation is to provide a focus and support for research and education related to the wide range of disciplines; environmental, cultural, and socioeconomic, concerned with sustainable development. The Institute of Geography and Earth Science (IGES) at Aberystwyth University provides coordination and support for the Dyfi Biosphere Scientific Advisory Group.
5. EDINA is active both nationally and internationally in representing academic sector interests in SDI related developments. Nationally, EDINA is a member of the UK Location Programme's (UKLP) Location Information Interoperability Board. In the context of the Data Publishing Working Group (DPWG), one of our contributions has involved running a series of tests on top of INSPIRE compliant OGC Web Map Services (WMS) in order to improve understanding of how operational services may be established within both the academic and public sector.
6. Internationally, EDINA has been working to establish Shibboleth access management federations as the preferred means of protecting OGC Web Services (OWS) in operational SDI. This most recent manifestation of this is by initiating and managing the OWS Shibboleth Interoperability Experiment[2]; note that this is being done in cooperation with the staff at the EUs Joint Research Centre responsible for rolling out INSPIRE.
7. Amongst the numerous roles and responsibilities of the Welsh Assembly Government (WAG) and associated public authorities, is responsibility for rolling out INSPIRE in Wales and WAG provides the chair of the UKLP's DPWG. A major related current initiative is the Natural Environment Framework (NEF) of the Living Wales strategy and specifically the GI sub-stream. A mapping prototype[3] has been created using open source software and open interoperability standards, specifically, WMS.
8. The idea behind this project is to reuse much of this existing work and working relationships in conjunction with existing infrastructure to provide an innovative prototype tool for use by a range of end users from different disciplines involved in Dyfi Biosphere related research and education. The application will allow users to upload data and automatically generate an instance of a WMS. Images from the resulting WMS will then be available for viewing in conjunction with other related datasets and INSPIRE compliant reference data from Welsh public authorities in a simple mapping application.

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[1] http://www.dyfibiosphere.org.uk/
[2] http://www.opengeospatial.org/projects/initiatives/shibbolethie
[3] http://maps.wales.gov.uk/NEFW/

9.   The services being consumed by the mapping application will be protected using Shibboleth. This will enable more data to be available into the network as users, eg, IGES, and content providers such as WAG, will be able to restrict access to sensitive, commercial, licenced, work-in-progress datasets, etc, to suitably authorised users.

Community Value Summary

10.   By continuing to work with the public sector to develop mutual understanding of the issues involved in operational SDI we further the objective of ensuring the developing National SDI interoperates with the academic SDI. This means more data and services, much of it related to real world end user problems, being available to the JISC community. In particular, this project affords all parties the opportunity to investigate further the potential of the advances EDINA has made in using Shibboleth to protect OWS.

11.   The intention of this work is that it will re-use various components already in place at EDINA and contribute to their further development. When users are uploading data to create their WMS they will supply the required information, including metadata, using components adapted from Geodoc. They will be encouraged to make metadata available within Go-Geo! and deposit their data in ShareGeo. The existing INSPIRE compliant services on top of EDINA's national data holdings will be reused and hardened. We will gain increased understanding of the consequences of INSPIRE for the JISC comunity.

12.   It is expected that the broad interdisciplinary range of stakeholders being engaged through the Dyfi Biosphere Scientific Advisory Group will identify a range of future requirements. To an extent, some of these requirements may be expected to align with those from UKLP, which wants to:
   - understand how INSPIRE data and non-INSPIRE data may be delivered on the same services
   - integrate multiple services
   - use the data in applications to realise business benefits

13.   In cooperating with the Dyfi Biosphere Partnership, we are doing so in the understanding that this work will eventually be of benefit to the wider downstream community, ie, the local community in the Biosphere Reserve area. There is a myriad of ways in which interactive mapping can contribute to good governance and local democracy through awareness-raising, transparency, community participation, etc. Interoperable web services should be at the heart of this and we expect many requirements in this area to emerge.

14.   In broadening stakeholder engagement to the wider community we will be exposed to input from a wider range of cultural and heritage concerns. In particular, we anticipate the bilingual nature of the area to raise significant future requirements for an operational Dyfi Biosphere mapping application.

15.   The bilingual aspect also adds to this projects international dimension as the Biosphere network of reserves frequently operates in multi-lingual environments. They are intended to act as exemplar areas for demonstrating sustainable development. EDINA is already cooperating with JRC on showing how Shibboleth access management federations enable operational SDI. The example of INSPIRE services being used in UNESCO designated biosphere reserves provides JISC with further opportunity to show strategic leadership and influence the international agenda.

C. Quality of Proposal and Robustness of Workplan

Description of intended project plan

16.   In this section we provide a description of the intended project plan as a series of Work Packages (WP). The lead organisation and indicative effort (person months) is given in

parenthesis after the WP title. Should this proposal be accepted, a detailed project plan in accordance with JISC guidelines will be produced.

WP1 - Project Management (EDINA, 1 month)

17. **Description of Work** – This work package covers the central aspects of managing and coordinating the project. This includes ensuring overall effective communication between the JISC, all project members, and the wider stakeholder community. Broader awareness and dissemination activities, eg, JISC, OSGeo, OGC, UKLP related, will also be a function of this WP.
    Outputs:
    - Project website; wiki and blog
    - Participation in JISC community activities, eg, community synthesis
    - Presentations, articles, papers, etc
    - Programme reporting and project management documentation

WP2 – Stakeholder Engagement (IGES, 4.5 months)

18. **Description of Work** – The key objective of this WP is to work with a range of end-users and potential end-users to make sure their requirements inform project development and longer term direction. All project partners will participate in this WP to ensure that the tools created, the services established and the data provided match real-world requirements. Focus will be provided primarily by the range of academic disciplines and public sector organisations represented on the Dyfi Biosphere reserve Scientific Advisory Group. Activities will include hosted meetings, site visits, interviews and extensive use of social media tools. Mechanisms will also be put in place to gather requirements from the wider group of stakeholders clustered round the reserve. In addition to this broad consultation, Aberystwyth University will 'test' user needs in two specific areas: (1) Scientific data integration for the proposed Dyfi Catchment and Forest Research Platform, that IGES is involved in developing along with the Institute of Biological, Environmental and Rural Sciences (IBERS), Forest Research and WAG; (2) Educational use, which IGES will test with their own students as part of their new digital resource centre The partnership with WAG will ensure UKLP and "Living Wales" problems are fed in and addressed.
    Outputs:
    - A motivated network of individuals and institutions with raised awareness of the potential benefits of integrating academic SDI with National SDI
    - A report articulating the real world end user problems that drove the project
    - A Best Practice model for using UK academic SDI at the departmental level
    - A report articulating future requirements

WP3 – Application Development (EDINA, 5.5 months)

19. **Description of Work:** Using existing EDINA expertise and components, a tool will be implemented which allows users to upload data and instantiate a WMS. Working in partnership with WAG, a mapping client application similar to the Wales Ecosystems portal will be implemented to allow the uploaded data to be viewed using the EDINA hosted WMS and the information analysed in conjunction with other "INSPIRE compliant" services. Within the constraints of the project, this application will be designed to be of use to the stakeholders identified in WP2.
    Outputs:
    - A working prototype of the "WMS factory" tool
    - A simple mapping application
    - Technical recommendations for what is necessary to take the "WMS factory" tool into production
    - Technical suggestions for enhancements to the relevant components of the UK academic SDI
    - Technical suggestions for next steps to take the mapping application forward

WP4 – Access Management (EDINA, 1 month)

20. **Description of Work:** In partnership with WAG, Shibboleth will be used to secure a number of the OGC web services established by the Welsh public authorities and EDINA provisioning the mapping application. We will implement a simple authorisation mechanism at the server provider side to demonstrate that for the required datasets access can be restricted to only suitably authorised users. The client will be engineered to allow it to undergo the Shibboleth interactions in the cases where users require access to protected services.
    Outputs:
    - A demonstration of UK access management technology being used to secure public sector services in combination with academic sector services
    - Recommendations for further work

Project Management and Communication

21. EDINA will act as the lead partner for the purposes of project administration and finance. Overall responsibility for the project will rest with senior staff at EDINA. The project will be coordinated and managed by an experienced Project Manager, Chris Higgins. A series of full project meetings will take place including a project kick-off, mid-term and final round up meetings. Checkpoint meetings will review progress against the plan. Day-to-day communications amongst project members shall be conducted primarily face to face, by email, phone, wiki and blog.

22. The style of project management we will use in this project will be driven by the Agile approach that we intend using for software development, ie, there will be close, regular contact between individuals with different roles in the project working in short cycles to rapidly deliver working software. Over the last few months EDINA has been conducting internal trials of SCRUM based approaches to developing software with positive feedback coming from both developers and project management.

Risks

23. The following preliminary risk analysis will be updated at project commencement and reviewed regularly throughout the lifetime of the project.

Risk	Probability (1-5)	Severity (1-5)	Score (PxS)	Action to Prevent/Manage Risk
Community buy-in not forthcoming	3	4	12	Identify at outset what the most important real world problems are and address. Quickly create demonstration software with high visual impact. Visible support from WAG important.
It proves impossible or prohibitively difficult to automate WMS creation	4	3	12	Manage expectation. Initial investigation indicates it is possible for simple datasets. Consider a range of options covering simple to complex data. Consider alternative flowlines, eg, semi-automated. Make sure it is understood that this is not the only criteria upon which project success will be measured.
Lack of	3	2	6	Emphasise value to sector, absence of

public sector enthusiasm for using Shibboleth to secure services				interoperable alternatives and increasing amount of Shibb enabled software becoming available. Track progress in other projects investigating interoperability between UK Access Management Federation and the Government Gateway.
Difficulty recruiting a Research Assistant	2	4	8	Whilst this is not anticipated to be difficult, timely advertisement of the position will be ensured
Key staff leave	3	2	6	Make sure knowledge spread within partner organisations. Agile software development style assists in this.

IPR Position

24. As described in the JISC Generic Terms and Conditions of Grant, EDINA recognises that the ownership of intellectual property rights made, discovered or created during the period of project funding will be indicated to them in the letter of grant. Communicating this to those involved with the project will ensure IPR issues are minimised. For project outputs including reports, JISC will be allowed to utilise, archive and disseminate the work in accordance with current JISC policy. Software produced will, as far as practicable, be open sourced in accordance with JISC OSS Watch guidelines.

Sustainability

25. The software produced will feed into improvements of both the National SDI (through WAG/UKLP) and the academic SDI mainly through enhancements of those components hosted by EDINA, eg, Go-Geo!, ShareGeo, Geodoc. Lessons learned during the project should result in better understanding of issues relating to geospatial interoperability between the UK public and academic sectors, and of the value of sustaining this engagement.

26. The project, and particularly the best practice model for using academic SDI, will be used by IGES to inform related developments within the department, including: the development of their digital resource centre, data integration within the Dyfi component of the new NERC Virtual Observatory, and the proposed Catchment and Forest Research Platform.

27. The wider academic community (via the inter-disciplinary Scientific Advisory Group) clustered round the Dyfi Biosphere reserve, and the much larger group of stakeholders living and working within the reserve, will have access to a prototype portal (EDINA commits to keeping this running for a minimum of 6 months beyond the end of the project) demonstrating the benefits of being able to integrate data. It is expected that this will form the foundation for a future operational portal.

28. This project may be regarded as a scoping or design study. Doing one piece of innovative software engineering but also 1) collecting requirements for longer term data management and data use, and 2) establishing a network of organisations with common objectives built around improving the use of SDI using the Dyfi Biosphere reserve as an exemplar area. It is hoped that further projects, funded from a variety of sources, will flow.

D. Engagement with the Community

Stakeholder Engagement and Dissemination

29. The Research Assistant (RA) employed at IGES for much of the project will focus on collating information on research and educational (undergraduate/postgraduate) activities within Aberystwyth University (including Departments other than IGES) in relation to the use of GI in connection with the Dyfi Biosphere Reserve. The RA will consult with the Scientific Advisory Group, people living and working in the Dyfi Biosphere and those employed in institutions (e.g. local and national government) with interests in the reserve. Through this approach, the RA will ensure that available, relevant geospatial information is collated and that uses and needs are identified. This information will feed into the development of the mapping application and identification of future requirements. The individual will be supervised by IGES staff, who will also contribute time and resources to the project. Regular reciprocal meetings will be arranged with the relevant EDINA staff to ensure fit with existing infrastructure.

30. The principal means of engaging with the other various academic disciplines involved in Dyfi Biosphere related research and education will be through the auspices of the Scientific Advisory Group. The project will host a minimum of one meeting of this group, possibly timed to coincide with kickoff, and will meet with individual members through the lifetime of the project. Extensive use will be made of a blog and a wiki.

31. The Scientific Advisory Group operates within the context of the wider community of the Dyfi Biosphere Partnership. The project will take guidance from the Advisory Group and expose its work as appropriate to this wider community in order to get its input, support and guidance. This is likely to be through a variety of social media.

32. The active involvement of WAG staff in the project who are engaged in using GI derived evidence to support policy making as part of the Natural Environment Framework leverages a broad network. The Wales Environment Research Hub[4] forms a focus for this activity and a willing contact point for the project.

33. EDINA participates in a wide range of activities that can be categorised as engagement with the GI community. For this project, contact with the following groups is likely to be the most significant; public sector through UKLP mechanisms, standards bodies through OGC technical committee meetings, the open source geospatial software community through OSGeo, and JISC through the Geospatial Working Group and at programme level.

Evaluation Mechanisms

34. Success of the project will be evaluated primarily through the structure of the activities assembled for WP2 and in discussion with the JISC community, eg, via the community synthesis project. At this stage, we propose to have regular meetings and interviews with representatives from all key stakeholder groups and will monitor (and quantify where possible) uptake of the "WMS factory" tool, use of the mapping application, and the less tangible but very important enthusiasm with which the community views the project. EDINA will quantify the increase use of the academic SDI components we host, eg, ShareGeo, as a consequence of this project.

E. Budget

35. The following proposed budget summary identifies, in broad outline, how we intend spending funds over the lifetime of the project.

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Summary of benefits to the partner institutions

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[4] http://www.werh.org/

36. **EDINA**: With respect to those components of the academic SDI that EDINA hosts, we expect that this project will result in their enhancement and increased use. By partnering with the public sector and concentrating on access control we intend to gain better understanding of operational web services, research requirements and how we may increase access for students to public sector data. The benefit of concentrating on working with the scientific community around the Dyfi biosphere is that it will afford us with real world interdisciplinary requirements in a configuration that can be sustained.

37. **IGES**: Aberystwyth University has a long history of environmental research in Wales, including within the Dyfi Biosphere Reserve area. The project will significantly increase opportunities for using geospatial information to enhance both research and education within the University. It will also potentially benefit a wide range of institutions and landholders with interests in the Reserve area. The project will support the Natural Environment Research Council's (NERC) Virtual Observatory and Aberystwyth University's involvement - the reserve has been nominated as one of five demonstration catchments in the UK.

38. **WAG**: The outputs will be of benefit to WAG in improving the understanding of the geographic information needs of the academic sector in Wales and more widely in the UK, particularly through the integration of our information infrastructure into the EDINA services and the ongoing development of WAG's Corporate GIS programme. It will also provide a platform to test how environmental evidence can be used as a tool to assist research activities within the academic community relating to the Dyfi Biosphere as a specific case study, and how environmental information can be communicated spatially to different key stakeholder communities. The outputs will help WAG understand how these technologies can be utilised to assist in the formation, delivery and monitoring of environmental policy in Wales e.g. in the development of Wales' Natural Environment Framework. We are potentially interested in developing the research outputs into a full production toolkit. Note that the amount volunteered by WAG in the budget table above under "Directly Allocated" is based upon day rates provided by technical partners.

F. Experience of the Project Team

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