ARIADNE

D13.5: Final testing report

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Table of Contents

Document History

Version	Date	Contributors	Activity
0.1	November 15th 2016	Federico Nurra Bernard Pinglier	Draft structure of document
0.2	December 6th 2016	Federico Nurra	Added test results Added images
0.3	December 13th 2016	Bernard Pinglier	Draft text reviewed Modified layout
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Executive Summary

This report is a deliverable (D13.5 *Final testing report*) of the ARIADNE project ("Advanced Research Infrastructure for Archaeological Dataset Networking in Europe") funded under the European Community's Seventh Framework Programme. It presents the results of work carried out in Task 13.4 *Acceptance testing* within work package 13 *Developing Integrated Services*.

This deliverable reports Task 13.4, which is is centred on testing the services produced in Task 13.2 and verifying their correspondence to design (Task 13.1), use requirements (Task 12.1) and user specifications (Task 2.1 and Task 2.2). New or improved additions were approved and passed to the next Task or returned to T13.2 for amendments. Testing was carried out within a specific testing environment prepared by the partners in charge of the task. A number of simulated contexts were set up, relevant to archaeological research, and the behaviour of the system compared with user expectations. Overall compliance was also verified with requirements, and the performance of the system in real test conditions. These tests were performed regularly and their outcomes reported to the lead partner of Task 13.2, providing necessary feedback. The testing specifications and the routine testing mechanism will be detailed in Task 13.1.

Methodology

The evaluation has been implemented in two complementary directions:

- Using predefined testing scenarios during specific training workshop with selected testers
- Using open evaluation questionnaires with power testers

The evaluation cycle followed several steps.

Preliminary tasks:

- Creation of the group of evaluators
- Preparation of the evaluation scheme and reports
- Evaluation
- Analysis of results
- Production of a structured and commented feedback to the implementation team and (if necessary), implementation of the requested changes and production of a revised version of the service/tool

The task leader had periodic contacts with services developers, concerning the bugs and issues pointed out by the testers.

The aim of the questionnaire was related to a specific service, to determine whether the service meets the expectations of the users.

This included:

- The answers to precise questions about usability of the service
- Open comments about the service (usability, request for improvements)
- A review about the service (similar to what can be found in the AppStore)
- Quantitative data about usage (e.g. number of downloads of an application, number of clicks, number of files uploaded, etc.)

The panel of testers

At INRAP a power tester panel was formed, consisting of 26 people. The power testers used all the services, answering the online questionnaire several times, following bug fixes and the development of new versions. The only service that received less feedback than expected was the Landscape Service. This is due to higher technical requirements needed by the testers.

Eight external testers, who work in the field of 3D modelling, were contacted to evaluate Visual Media Services.

The portal was tested by several partners. Some responded using the online questionnaire, others sent their informal feedback via email, or raised the critical issues during the «Portal User Group» Skype meetings.

Results

The questionnaire answers clearly show that the service rating is very high from the evaluators and, overall, that the performances have met the needs of users. It shows some deficiencies in services (such as the lack of measuring optimized instruments, the lack of links between the different services and the impossibility to download the majority of the elements present in services).

Feedback is extremely positive on the general services (average 4.01/5.00) and the developers' punctual interventions to fix the bugs found by testers have certainly helped to evaluate the services as best as possible. Several testers have used the optional answers to suggest improvements to the facilities.

1 Introduction

This report is a deliverable (D13.5 *Final testing report*) of the ARIADNE project ("Advanced Research Infrastructure for Archaeological Dataset Networking in Europe") funded under the European Community's Seventh Framework Programme. It presents the results of work carried out in Task 13.4 *Acceptance testing* within work package 13 *Developing Integrated Services*.

As stated in the Description of Work (DoW) of the ARIADNE Project, the main objectives of WP13 are:

- *To analyse, select, design and deploy the service components of the integrated infrastructure in order to improve the provision of the online services to the researchers*
- *To take into account in the design and the deployment further enhancements of the service architecture as required by the additional implementation of results from WP14-WP17*

The tasks of the WP13 are:

Task 13.1 – Service Design and Specifications

Task 13.2 – Service Implementation

Task 13.3 – Long-term Preservation Services

Task 13.4 – Acceptance Testing

This deliverable reports Task 13.4, which is centred on: *testing the services produced in Task 13.2 and verifies their correspondence to design (Task 13.1), use requirements (Task 12.1) and users' specifications (Task 2.1 and Task 2.2). New or improved services may be approved and passed to the next Task or returned to 13.2 for amendments. Testing will be carried out on a specific testing environment prepared by the partners in charge of the task. They will set up a number of simulated research contexts, relevant for archaeological research, and will compare the behaviour of the system with the expected one. They will furthermore verify overall compliance with requirements and the performance of the system in simulated real conditions. Such tests will be performed regularly. Their outcomes will be reported to the lead partner of Task 13.2 for the necessary feedback. The testing specifications and the routine testing mechanism will be detailed in Task 13.1.*

As shown in the following figure, taken from D13.1, Task 13.4 is related to the majority of work packages and tasks within the ARIADNE project:

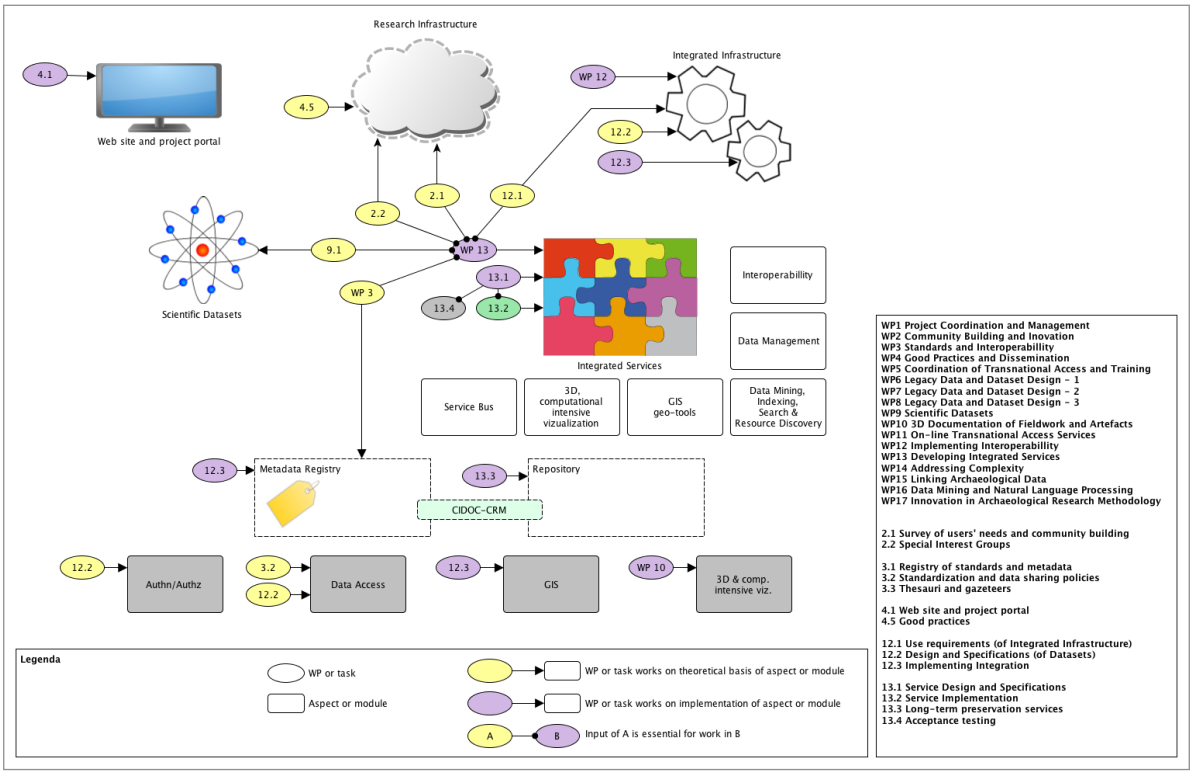


Figure 1: ARIADNE Tasks and Service Design.

2 Related Work

2.1 First report on users' needs (D2.1)

The main objectives of this report were to provide evidence on user requirements of key target groups ("users") of the ARIADNE project with regard to archaeological research data, and to contribute to building a prospective user community. This information supported the ARIADNE project in taking informed decisions regarding the specification of the e-infrastructure and services so that the integrated infrastructure is developed in a way that corresponds to perceived and actual research needs. The mandate was to provide evidence on these issues, notably through collecting feed-back from the user communities by way of user surveys.

2.2 Second report on users' needs (D2.2)

The main objective of this report was to provide additional, more detailed evidence about user requirements of key target groups ("users") of the project with regard to the ARIADNE data portal. A panel of about 25 researchers were asked to describe in detail their use of digital data archives, to evaluate existing archives and other portals and to highlight useful features of these portals which could serve as "good practice" when creating a new research data portal. This information supports the ARIADNE project in taking informed decisions regarding the specification of the e-infrastructure and services so they are developed in a way that corresponds to perceived and actual research needs. The mandate was to provide evidence on these issues, notably through collecting feed-back from the ARIADNE community by way of a user survey.

2.3 User Requirements (D12.1)

The main objective of this report was to understand the current landscape from which the ARIADNE infrastructure should be created, in order to inform the development of the ARIADNE portal and services. This landscape included the data, metadata, ontologies and vocabularies available for use, along with any associated issues of licensing and access, informed by users' needs.

2.4 Infrastructure Design (D12.2)

The main goal of this report was to specify a resource integration and discovery mechanism for use in ARIADNE. The resources to be integrated were datasets and collections, GIS data, metadata schemas, ontologies and vocabularies available from the project partners, as well as institutions outside the ARIADNE consortium. The deliverable provided an overview of the ARIADNE architecture, including a summary of the conformance of the architecture to the data and standards requirements set out in D12.1, as well as the specifications of the Services of the

ARIADNE Infrastructure, presented in D13.1. This was followed by a content analysis of the main content types defined in D12.1, and the integration strategy for the two levels of content: the metadata integration, and the data integration. This will attempt to integrate selected resources (datasets and/or metadata) from particular partners/data providers and provide cross-search and access mechanisms to integrated resources, using a facetted search on "what", "where", "when" and "resource type".

2.5 Initial Infrastructure Implementation Report (D12.3)

The main goal of this report was to present the initial infrastructure implementation of ARIADNE. The infrastructure is specified on D12.2 and included services such as the registry, vocabulary services, metadata enrichment services, preservation services, etc. with the following components: a) an RDF store b) the first version of the portal c) the MORe aggregation infrastructure d) an Elasticsearch component e) a metadata quality measurement service f) a set of enrichment services Task 12.3 and this report focused on the description of core services. The core services were described and implemented as individual service components in the overall architecture, and their complementary role was presented. Task 12.3 was followed by Task 12.4 *Testing* (which is reported in D12.4 *Initial infrastructure testing report*). This was followed by another round of implementation and testing in Tasks 12.5 and 12.6. The API specifications presented in the Annexes were especially important, as they allow developers to build on the infrastructure and deploy services. The APIs presented are REST-based and require data formats such as JSON, XML and RDF.

2.6 Initial Infrastructure Testing Report (D12.4)

The tasks of WP12 *Implementing Interoperability* aimed to specify use requirements and design for the ARIADNE infrastructure and to implement and test that design. Task 12.4 was comprised of testing the integrated infrastructure built in Task 12.3 *Implementing Integration*, based on the requirements and design specified in Task 12.1 *Use Requirements* and 12.2 *Infrastructure Design*. This document augmented the synthesis of requirements and design given in D12.2 with the infrastructure implemented in D12.3, and tested the implementation against the requirements specified. Each requirement was outlined with the infrastructural tools and/or services designed to meet it and a brief overview of the implementation documented in 12.3. Recommendations were made based on this analysis. The general use requirements were addressed in the first instance, followed by more specific requirements addressing integration activities.

The initial infrastructure implementation met many of the requirements specified. Some aspects not yet visible required further testing in Task 12.6 *Final Testing Report*. Some clarification of use requirements for the Preview Service may be necessary: D12.2 designs a service that previews search results, as described above and illustrated in the prototype portal, as a list, on a map and timeline (D12.2, 24) but which can also preview individual records. D12.3 discussed the implementation of a Preview Service through which researchers can preview their own datasets in a number of formats, which seems to be more closely aligned with the

Registry (17). The Support Portal, which includes documentation and user guidance, was approached holistically in order to provide clear and coherent guidance to a variety of users at different points of interaction with the infrastructure. Documentation was required for each major component of the infrastructure. The Registry input tool provides the necessary functionality to enable depositing of metadata. The user experience of the Registry could be improved and more closely guided with changes in design. A table of recommendations for the infrastructure is included at the end of this document.

2.7 Service Design (D13.1)

This document specified the service design of the ARIADNE Portal, and provided a common vision, a user perspective on the functionality, and a framework to identify, discuss and validate the requirements for the underlying technical services. As such, the audience of this document was both technical and non-technical.

This service design was created using the following input: Task 2.1 *Survey of users' needs and community building,* Task 12.1 *Assessment of use requirements*, an examination of existing portal services and Task 13.4 *Acceptance testing*. The service design provided a common vision formulated in terms of principles, derived from the mission statement in the Description of Work.

2.8 Initial Services Implementation Report (D13.2)

This document gives an overview of the initial implementation of the services of the ARIADNE infrastructure, which are the objective of Work Package 13 (WP13). WP13 was informed by the output of WP2 (mainly Task 2.1 *User needs and community building* and Task 2.2 *Special Interest Groups*, and parallels the data integration effort in WP12. Moreover, the services made available within WP13 also incorporate those developed within WP14 through WP16. These services will include functionality that is already available, and will be offered to communities who may not currently have access to it, but will also include new functionality created *ad hoc* by the partners on the basis of the requirements that were collected at the beginning of the project. The main modality of the implementation of this new functionality as a web-based service, although other types of services (local tools, guidelines) were integrated as well.

2.9 Initial Services Testing Report (D13.3)

D13.3 presented the initial results of Task 13.4 (T13.4), within Work Package 13 (WP13)

The report focused on the following aspects:

- Overview of design, use requirements and user's specifications, the compliance with which the services have to be tested (see D13.1, D12.1 and D2.2 for a more detailed presentation).

- Services to be evaluated: functional description and progress report for implementation of these (see D13.2 for a more detailed presentation).
- Methodology used for the tests.
- First testing results. Informal tests were conducted by Inrap among a community of internal power users, showing a great interest in the service provided for visualisation of 3D images, but also the need for enhanced visualisation and analysis tools, especially measurement tools.

2.10 Final services implementation report (D13.4)

This Deliverable presented the final state of integration and implementation of services developed in the context of the ARIADNE infrastructure. It presented in detail the organisation, the features and the design of all the services which form the ARIADNE infrastructure

This document presented the final list of services designed and implemented for the ARIADNE infrastructure, which was the objective of Work Package 13 (WP13).

WP13 was informed by the output of WP2 (mainly Task 2.1 *User needs and community building* and Task 2.2 *Special Interest Groups*), and parallels the data integration effort in WP12. Moreover, the services made available within WP13 also incorporated those developed within WP14 through WP16.

These services include functionalities that were already available, and are offered to communities who may not had access to them, but do also include new functionalities created *ad hoc* by the partners on the basis of the requirements that were collected at the beginning of the project. The main modality of the implementation of these new functionalities is to provide web-based services, although other types of services (local tools, guidelines) were integrated as well.

3 Overview of design, use requirements and users' specifications

The users' needs are summarised as follows, derived from D2.2:

1. **Overall focus** of the ARIADNE project is on data discovery and access services.

2. The primary focus of the design and interfaces of the data portal should be an **overview of what data is accessible**, including statistical information on quantity, types, and distribution (e.g. country/area, period).

3. The portal should focus on the **European/international dimension**. Lack of underlying resources (per country, type of data, etc.) should not be seen as a deficit, but used to promote data mobilisation (e.g. implementation of national data archives).

4. Added value should also be created through **linking** data and publication **resources not held within the ARIADNE Registry** (e.g. metadata of document archives and open access publishers).

5. Linked Open Data (LOD) can play a core role for value generation, but **further uptake of LOD principles** by archaeological institutions and projects must be encouraged.

6. In the development of the data search, access and other services, **members of the user community must be thoroughly involved** and regular feedback on implemented solutions sought by the wider community.

7. **User-focused development of the portal services** and applications (relevance, usability, user-friendliness) should be at the top of the project's priorities.

8. **Services for websites for research communities** in particular subjects or geographic regions (e.g. alerts on relevant datasets) could greatly expand the reach of the data portal and, in turn, promote further data mobilisation.

9. Full exploitation of the data resources (incl. metadata, conceptual knowledge) should be enabled by **interfaces for external applications** (e.g. a well-documented API, OAI-PMH target, SPARQL endpoint).

10. Support of e-research/science should, in the first instance, be provided through **integrating access to data resources** and by pointing users to existing tools for data extraction, processing and analysis.

The use requirements (D12.1) refer to the requirements for the design and specification of the subsequent tools and services necessary for integration. D12.1 produced recommendations for Datasets; Metadata Standards, Schemas and Vocabularies; and Access and Sharing Policies.

Datasets

- **Site and monument databases:** Most European countries and/or regions have them, and combining them may be useful for cross-border searching and geo-location
- **Intervention activity:** May have multiple activities associated with a geo-locatable site, which may allow linking of various activities to a single site or monument
- **Fieldwork databases:** Usually too diverse, so individual databases may not be useful for integration, but may be worth linking to intervention activities for bibliographic discovery
- Other **categories** are quite specific, but may be useful for integration:
    - **Scientific Databases**
    - **Artefact Databases**
    - **Burial Databases**

Balance data quality and quantity: specify requirements that datasets have to meet in order to be integrated, preferably using formal criteria.

The relationships between the types of data available from the content providing partners and the recommended integration activity to be designed within D12.2 are set out in the table below.

DATA **Balance data quality and quantity**	**ARIADNE datasets**					
Integration activity	**Sites and monuments databases**	**Intervention databases**	**Fieldwork databases**	**Artefacts**	**Burials**	**Scientific datasets**
Cross-border subject search	X	X	X			?
Cross-border period search	X	X	X			?
Map driven searching or visualisation	X	X	X		?	?
Bibliographic metadata from grey literature	X	X	X	X	X	X
Integration and interoperability from scientific databases						X
Integration of particular kinds of artefact data				X	X	
Dataset assessment required	+	+	+	+	+	+

Metadata Standards, Schemas and Vocabularies

- The **use of international standards for the documentation of excavations and monuments** so as to render it transparent and comparable and, above all, make them more interoperable.
- **Free access to tools,** particularly for data mapping, to make it easier to incorporate these standards, and offering the means and guidance for archaeologists to deposit their digital records **in an appropriate archive.**
- **The sustainability of digital datasets** must also be high on the agenda

The relationships between the wishes and concerns with regard to metadata and the recommended tools to be designated or designed within D12.2 are set out in the table below:

	Metadata schemas	Vocabularies		Metadata mapping tools	Metadata input tool	Metadata description tool	SKOSifier tool
Wishes							
Data transparency	+						
Data accessibility	++	+					
Metadata quality	+++	+++					
Data quality							
International dimension	++	+++					
Concerns							
Metadata quality (managers)						X	X
Effort for metadata creation (researchers)					X		
Anxiety about unfamiliar schemas (researchers)				X			

Table showing the wishes and concerns with regard to data standards, categorised by the type of schema or vocabulary which may address the wishes, and the tools which may address the concerns. The + signifies the level of importance.

Access and Sharing Policies

- **A common method of data citation should be established** for adoption by partners, and promoted by ARIADNE to the archaeological research community. Academic recognition is an important motivation for encouraging researchers to share access to their datasets
- **Allocation of DOIs or the equivalent to datasets ingested to the ARIADNE infrastructure** should be investigated. The system used should be capable of identifying sub-sets within collections. Persistent identification of datasets is important in underpinning data sharing and data citation
- **Content itself (databases, document archives, images, 3D models, etc.) should be provided to ARIADNE by content partners using the Creative Commons license suite** (version 4.0 is preferred) under license permissions agreed with the content owner. CC BY is recommended for open access. CC BY SA or CC BY SA NC licenses may also be applicable
- **A Collection description** (of the whole collection and subsets within the collection) should be published under a CC BY license for each dataset ingested to the ARIADNE infrastructure
- **Metadata records should be published under a CC0 license** – to enable integration of multiple datasets within the metadata repository, support resource discovery and enable linked open data

The Services Design (D13.1) introduces the functionality of the services, derived from a user perspective, and thus gives an important input for acceptance testing.

It presents a set of use cases representing various real situations encountered by members of the archaeological community:

- **Search and explore the Registry** to look for archaeological datasets to be previewed and/or downloaded

  The use case is divided in several steps (navigation, entering search parameters, displaying the results) and relates to several services e.g. portal access, timeline search, geographical search, display of the results, etc.
- **Preview data** to determine the relevance of this data for a specific research work

  The preview service and functionality depends on the nature of the data.
- **Access data** by downloading it for further processing
- **Deposit data** in the Ariadne infrastructure to allow it to be browsed and re-used by fellow researchers

  The service requires a set of guidelines for depositing data and an archive compatible with the data to be deposited.
- **Search and access the service registry** to discover tools and knowledge to support research / data management activities
- **Prepare and register a new collection** to the Registry
- **Enrich Visual Media Documents** from one of the visual documents (3D models, RTI images, high resolution images, terrain models) stored in one of the catalogues associated to Ariadne Portal

  Provide a visualization window showing the visual services that could be applied to a visual media
- **Manage accounts** to allow a security manager to handle and control authentication and access

The security manager may have an overview of the users and eventually change their attributes.

4 Services evaluated

This section gives an overview of the services evaluated.

4.1 Ariadne Catalogue / Portal

ARIADNE provides services for archaeologists to enable access to the research infrastructure. The ARIADNE Portal provides the main point of access for searching and browsing datasets and new services for processing and publishing archaeological datasets online.

A beta version of the ARIADNE portal is available at http://portal.ariadne-infrastructure.eu/. The portal brings together existing archaeological research datasets from ARIADNE partners so that researchers can browse and access the various distributed datasets for use in their projects.

The portal also provides a point of access for the new services developed by the project for visual media and landscape datasets.

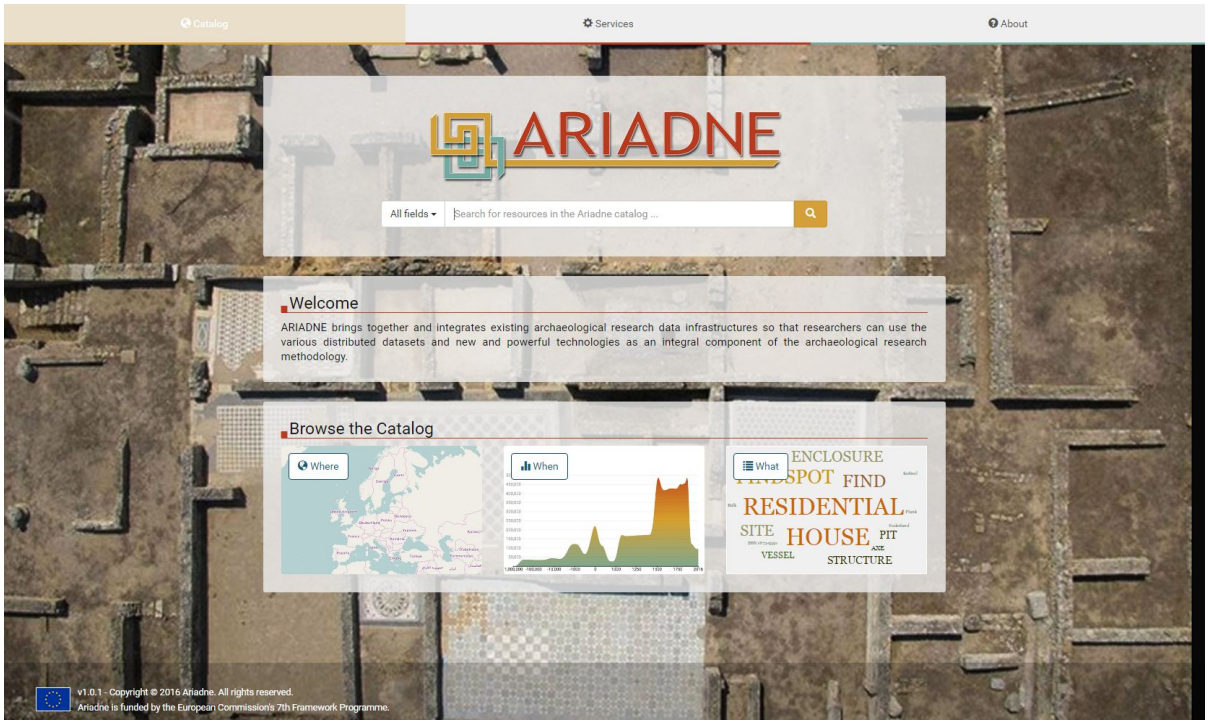


Figure 2: ARIADNE Portal - Home Page

4.2 Services provided on the Ariadne Catalogue

The ARIADNE Catalogue is based on the ACDM (Ariadne Catalogue Data Model), which describes the archaeological resources made available by the ARIADNE infrastructure to the researchers wishing to access and use them. The current version is ACDM 2.6, delivered on Sept. 26th, 2015.

4.2.1 Catalogue textual search

The User can begin a new search by using the search bar. Alternatively, users can browse the Catalogue using the Where/When/What facets.

Figure 3: ARIADNE Portal – Search window

4.2.2 Spatial search and display

The first browse facet is a direct link to the ARIADNE Geographic Search Map. Users can find resources based on geographic criteria by clicking on the specific area of interest.

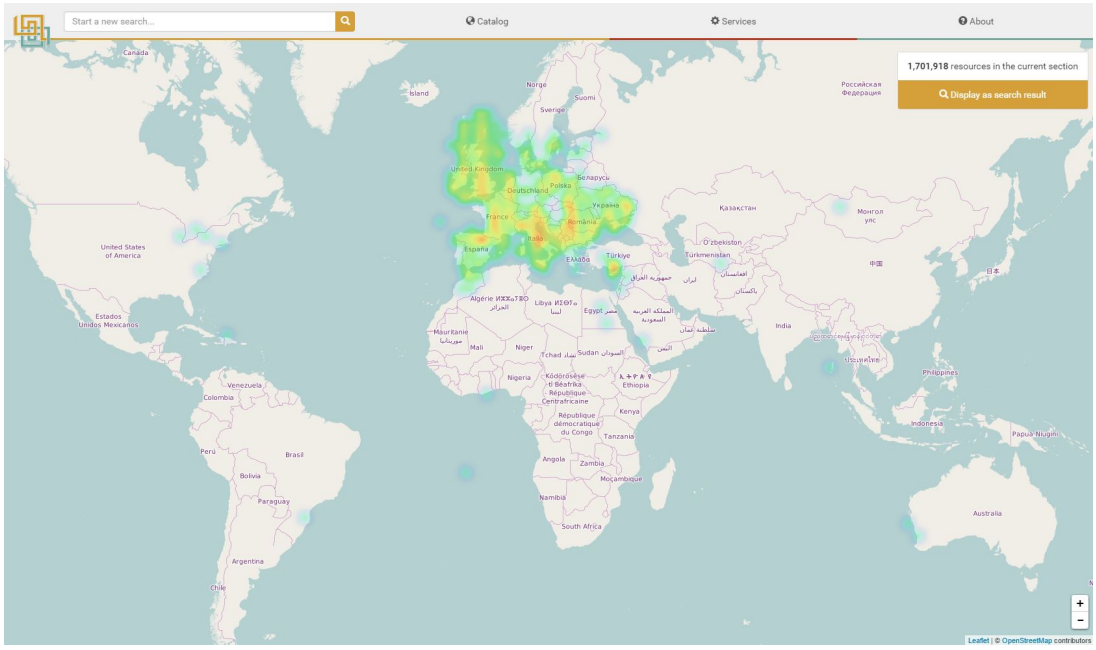


Figure 4: ARIADNE Portal – Geo search window

4.2.3 Timeline search and display

The second browse facet is the ARIADNE Timeline. Users can use temporal criteria to retrieve resources concerning a specific period.

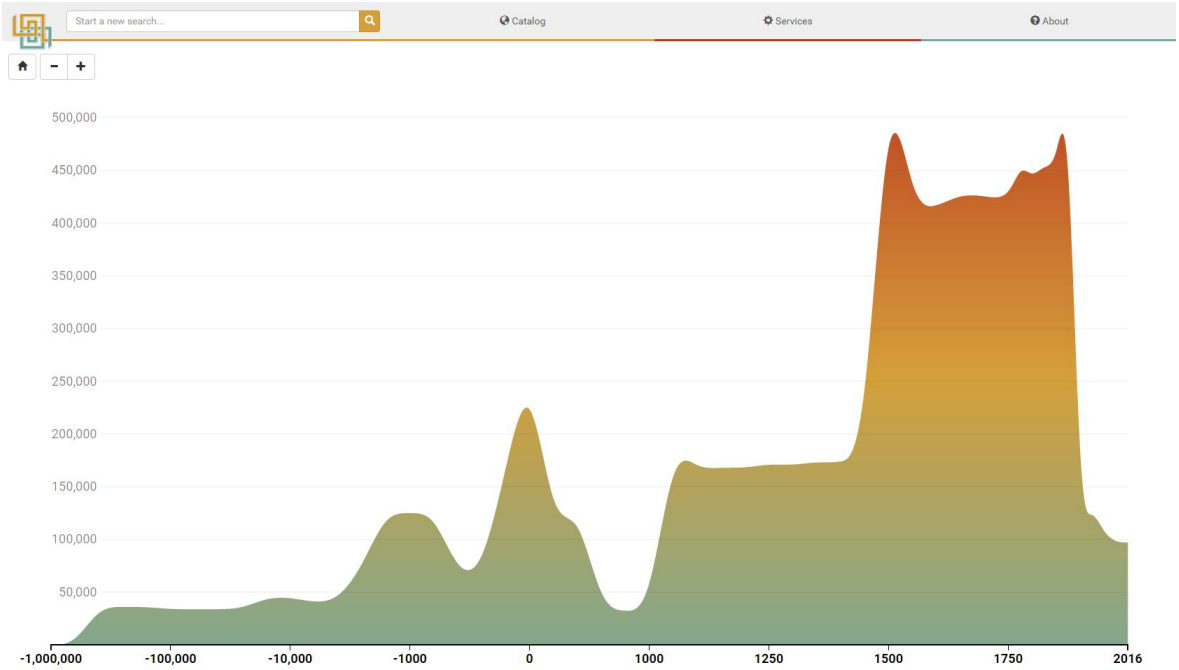


Figure 5: ARIADNE Portal – Timeline search window

4.3 Other Services created within the ARIADNE Project

4.3.1 Visual Media Services

The ARIADNE Visual Media Service provides easy publication and presentation on the web of complex visual media assets. It is an automatic service that allows the upload of visual media files to an ARIADNE server and to transform them into an efficient web format, making them ready for web-based visualisation.

http://visual.ariadne-infrastructure.eu

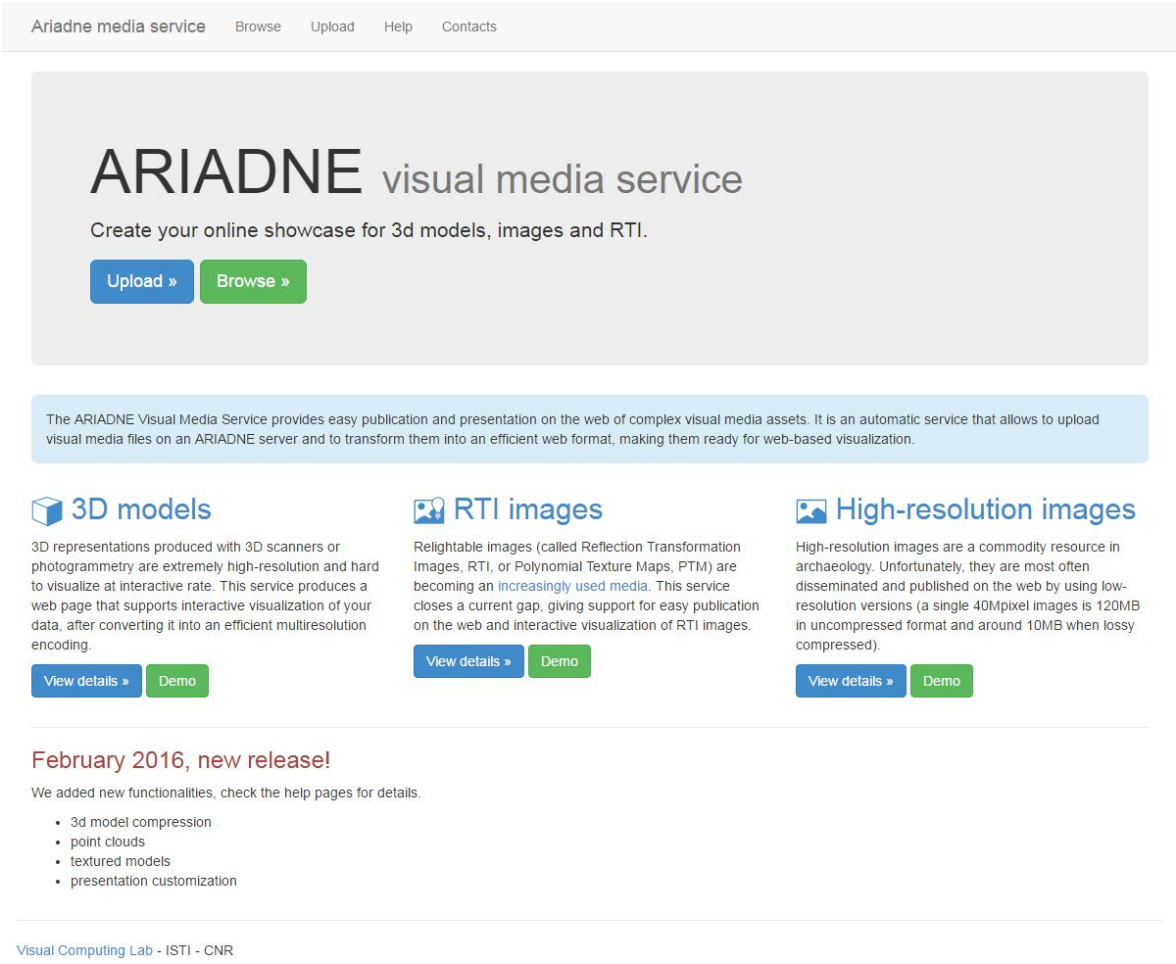


Figure 6: Visual Media Services – Home Page

4.3.2 Landscape Services

Landscape Services for ARIADNE are a set of responsive web services that include large terrain dataset generation, 3D landscape composing and 3D model processing, leveraging powerful open-source frameworks and toolkits such as GDAL, OSGjs, OpenSceneGraph and ownCloud. The main components include: the cloud service, the terrain generation service, the terrain gallery and the front-end web component for interactive visualisation.

http://landscape.ariadne-infrastructure.eu

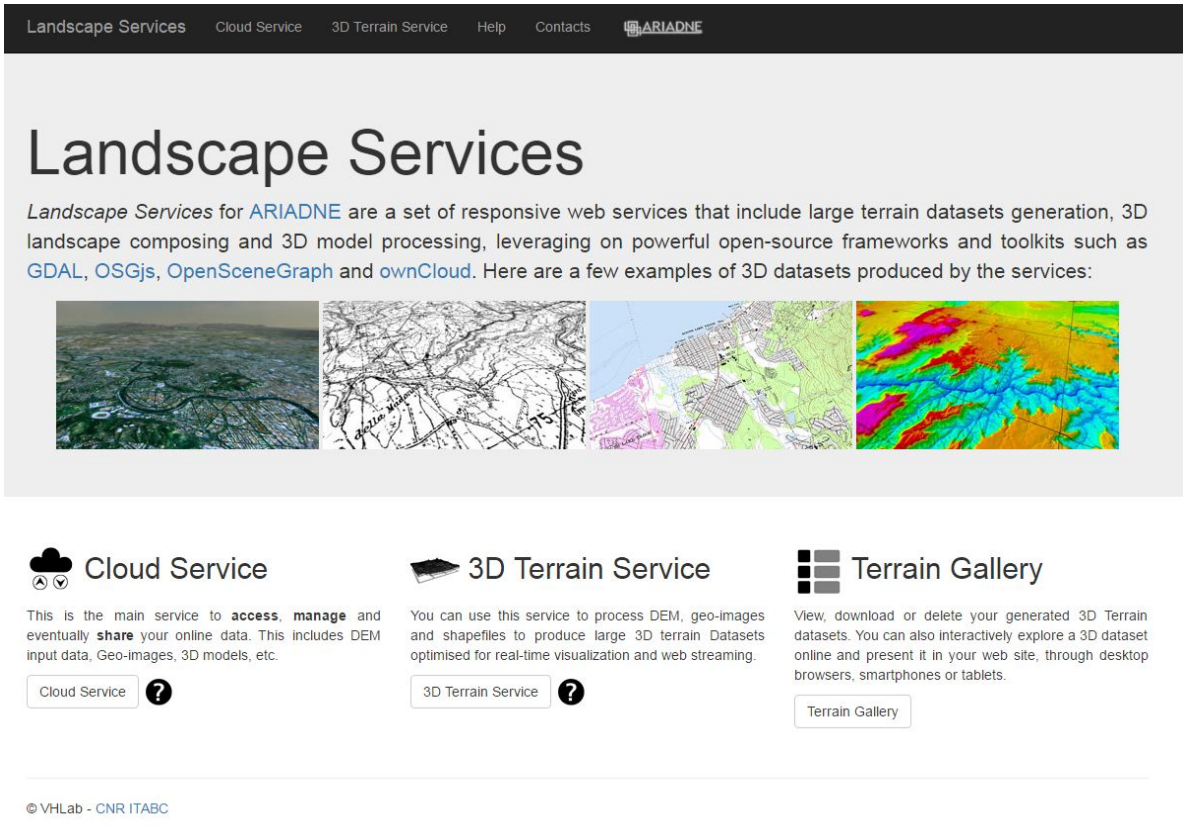


Figure 7: Landscape Services – Home Page

5 Methodology used for evaluation

5.1 Scope of the testing

Testing was carried out on the services described in the previous section.

No evaluation was conducted for previously existing services operated by partners and made available through ARIADNE, only the newly provided access to these services through the ARIADNE Portal have been evaluated as a part of the ARIADNE portal service.

5.2 General aspects on methodology

The evaluation has been implemented in two complementary directions:

- Using predefined testing scenarios according to the following matrix, during specific training workshops with selected testers
- Using open evaluation questionnaires, both with power testers (selected by Inrap, leader of Task 13.4 and by CNR, leader of WP13)

The evaluation cycle followed several steps:

- Preliminary tasks:
    - Creation of the group of evaluators, ~30 power testers within Inrap and ~10 power testers outside (e.g. University of Cambridge, University of Lund, University of Turin, etc.)
    - Preparation of the evaluation scheme and reports
- Conducting the evaluation
- Analysing the results
- Producing a structured and commented feedback to the implementation team and (if necessary), and implementation of the requested changes and production of a revised version of the service/tool. The task leader has had periodic contacts with services developers, concerning the bugs and issues pointed out by the testers.

5.3 Testing scenarios

Each testing scenario was applied to one or several services for which it was relevant, according to the following matrix (see Annex II for the results):

		SERVICES								
		CATALOGUE			VISUAL MEDIA SERVICES			LANDSCAPE SERVICES		
		1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3
		Catalogue Search	Spatial Search	Timeline Search	3D Models	RTI	High Res Images	Own Cloud	3D Terrain	Terrain Gallery
ACTIONS	Navigate	■	■	■	■	■	■	■	■	■
	Search	■	■	■						
	View	■	■	■	■	■	■	■	■	■
	Edit				■	■	■		■	
	Geo Search		■							
	Timeline Search			■						
	Upload				■	■	■	■	■	
	Conversion				■	■	■		■	
	Manage							■		■
	Download				■	■	■			■
	Embed				■	■	■			■

5.3.1 Evaluation questionnaires

Content of the questionnaires

The aim of the questionnaire related to a specific service was to determine whether the service met the expectations of the users.

This included:

– The answers to precise questions about usability of the service

- Open comments about the service (usability, request for improvements)
- A review about the service (similar to what can be found in the AppStore)
- Quantitative data about usage (e.g. number of downloads of an application, number of clicks, number of files uploaded, etc.)

The multilingual test forms were been created using the "Google Forms" platform, following the schema attached in Annex II.

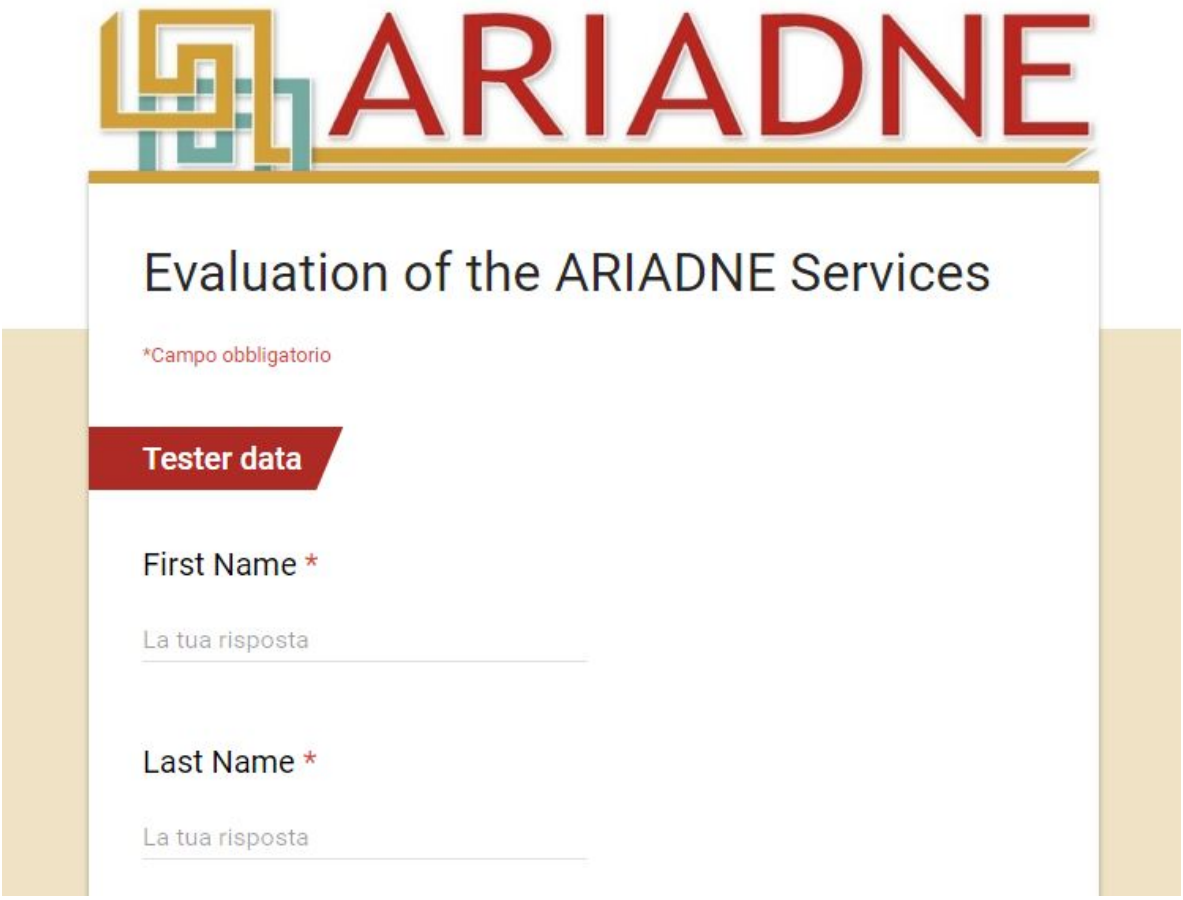


Figure 8: Testing questionnaire (Google Form)

Translation

The original questionnaires were created in English and translated into French and Italian to provide them to wider communities. The feedback received has been fully translated into English, including the comments that were useful for evaluation purposes, which and periodically transferred to service developers.

Operation

The questionnaire was sent to a selected set of users, previously identified as:

- Persons who showed an interest for ARIADNE (respondents to the survey conducted in WP2)
- Users of the specific service willing to answer questions online (tester panel within Inrap)

The questionnaire, according to the scheme presented in Annex II, was produced on a Google Form and will be sent to the list of testers.

Analysis of the data

The analysis was made by the task leader.

The results of the periodic analysis were communicated by mail to the WP leader, who helped to fix various bugs on the system (e.g. October 2016: tiff bug fix on Visual Media Services. «Tiff - especially Lidar - image processing was plagued by tifflib support, and has been fixed»)

Particular attention was given to the global acceptance and implementation of the proposed services.

Attention was also focused on the proper functioning of services and the speed of the operations carried out by testers.

5.3.2 Group sessions [workshop]

A testing workshop was organised in Paris on May 30th 2016. It was a group session with almost 30 users using the different services. It was useful to collect information about the usage of the service. The first phase concerned a free usage of the services and a first set of answers. The second phase followed a web tutorial, which explained the detailed service functions. Afterward, a second set of answers was collected. The workshop participants have also been periodically involved in remote testing sessions.

Figure 9: Testing Workshop – Paris, May 30th 2016

5.4 Feedback to the implementation teams

During the final year of project (after the services beta version release), there have been periodic contacts between the task leader and service developers. The task leader (Inrap) did not adhere to the quarterly frequency planned on D13.3 *Initial Services Testing Report*, as the flow of answers from the testers was not steady. Nevertheless, the contacts were made when appropriate relating to the issues and problems encountered by testers.

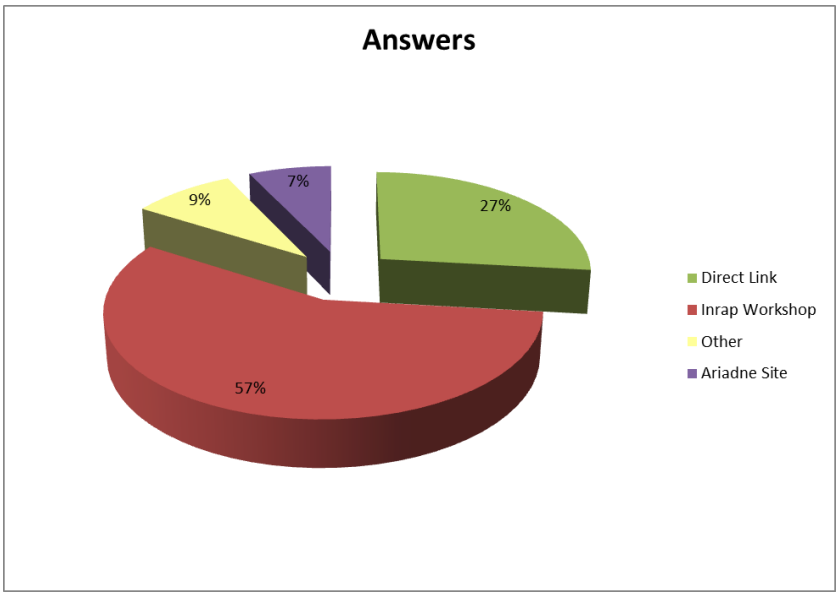
6 Evaluation results

This chapter presents the results of the online questionnaires, with the support of explanatory graphics based on 123 feedback reports from about 50 participants, structured as follows:

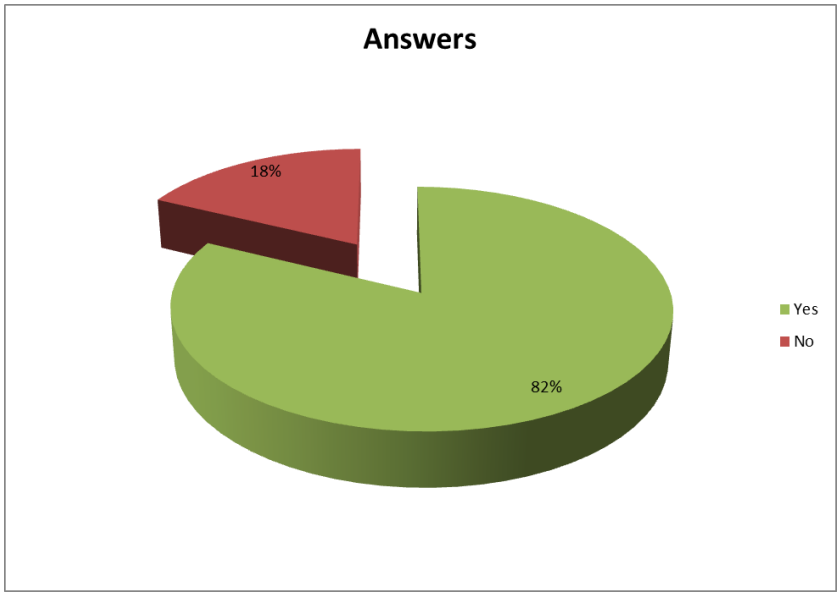
- At INRAP a power tester's panel was formed, consisting of 26 people. The power testers used all the services, answering the online questionnaire several times, following bug fixes and the development of new versions. The only service that has received less feedback than expected was the Landscape Service. This is due to higher technical requirements needed by the testers.
- Eight external testers, who work in the field of 3D modelling, were contacted to evaluate Visual Media Services.
- The portal was tested by several partners. Some responded using the online questionnaire, others sent their informal feedback via email, or raised the critical issues during the «Portal User Group» Skype meetings.

6.1 General feedback

How was the web site reached?



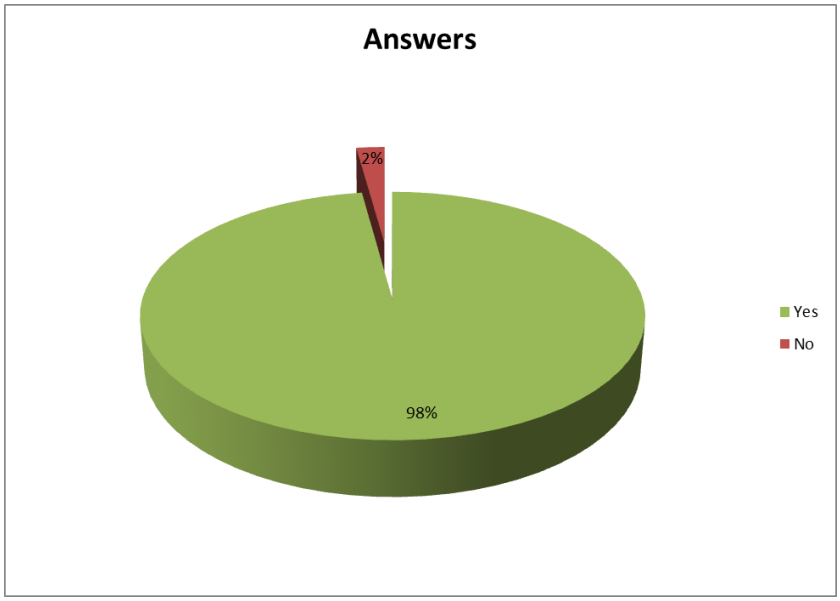
Was the service description provided on the web clear?



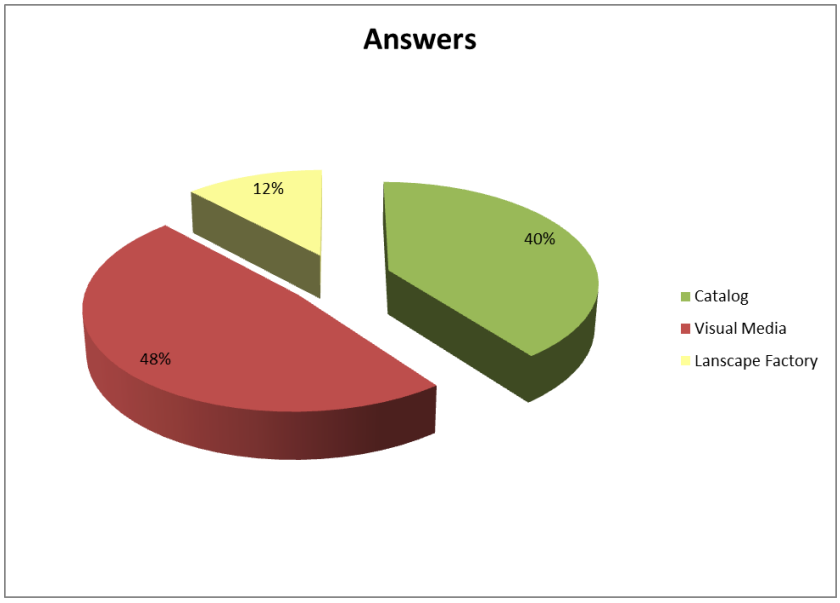
If not, why not? (most relevant answers)

- Not able to find an accurate description of the features
- Lack of Multilingual approach
- It would be helpful to have more info

Was the provided service speed satisfactory?

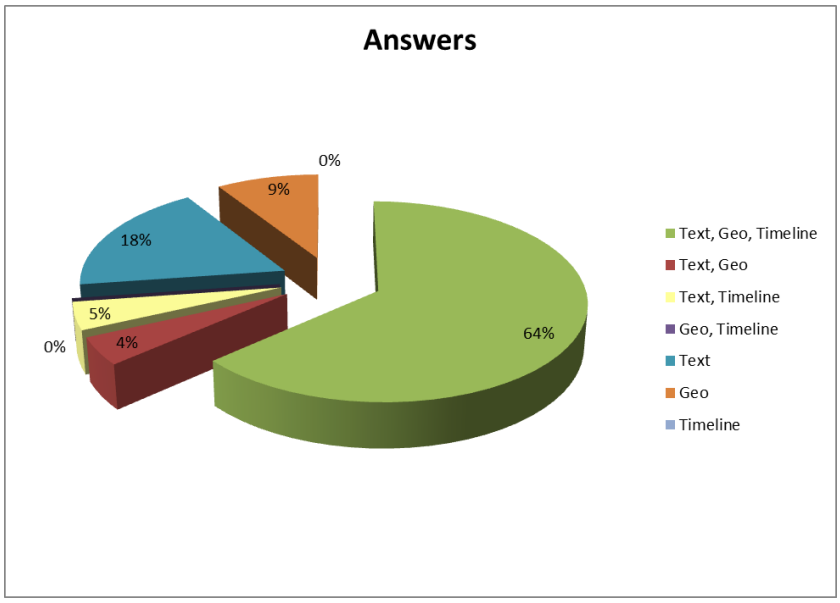


Services Used:

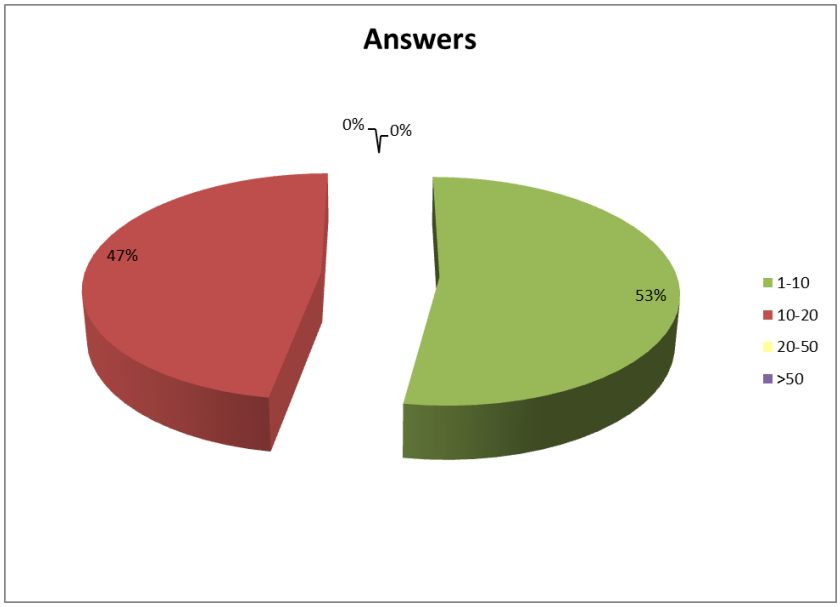


6.2 Catalogue Services (46 answers)

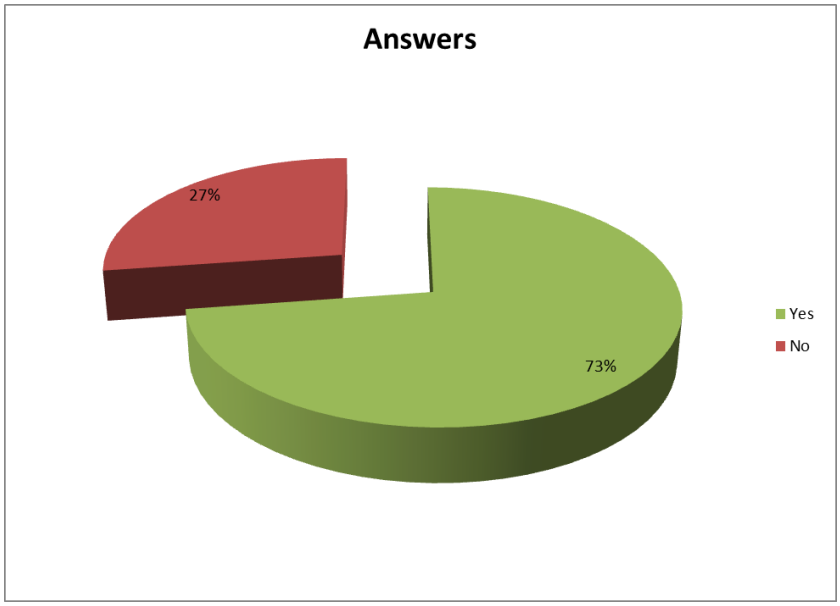
Kind of Search (multiple choices):



How many searches were carried out?



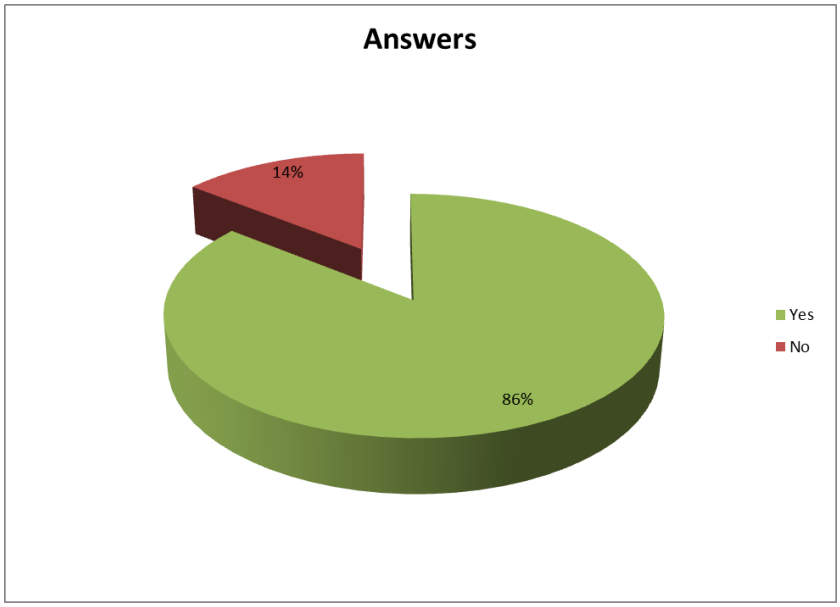
Was the results visualisation satisfactory?



If not, why not? (most relevant answers)

- Lack of data
- Difficult to understand which term to use for textual search
- Search by “Subject” is unclear
- Lack of thesauri explanation

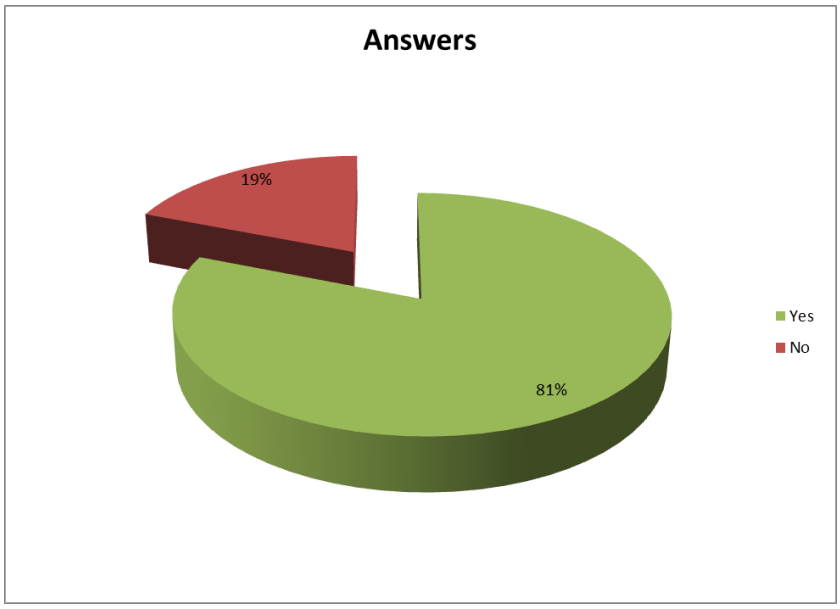
Were the page navigation commands clear?



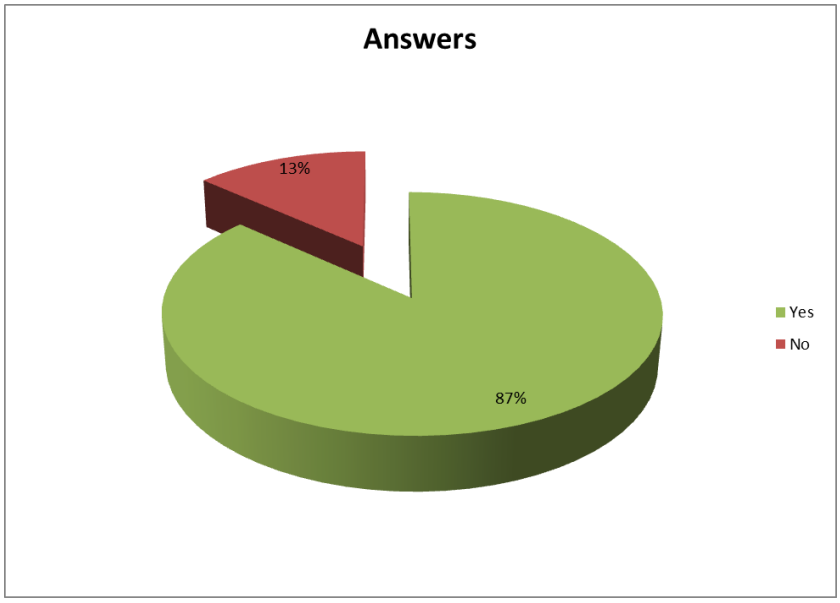
If Not, why not? (most relevant answers)

- How to move on the map with the mouse is not clear at all
- Difficult to understand the difference between the two areas of textual research, “start a new search” on top and “new search” in the results page
- Lack of Multilingual approach

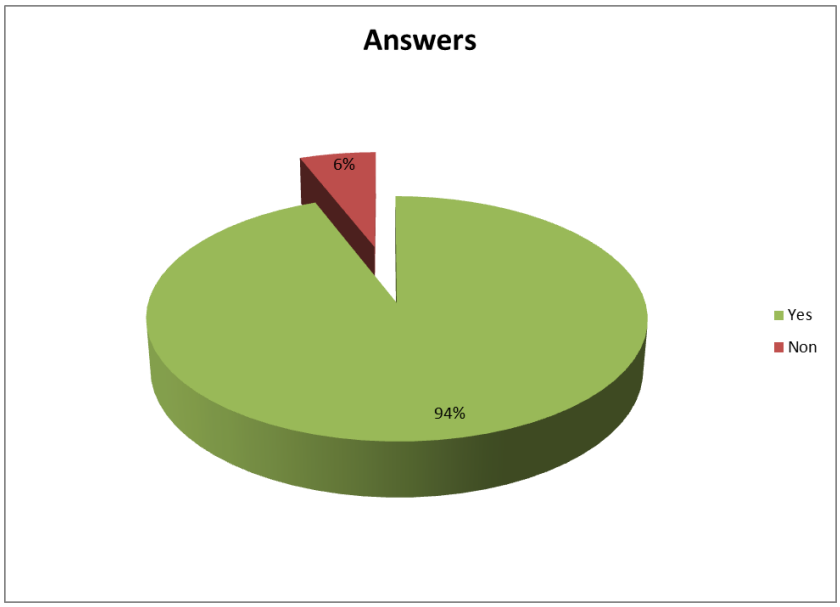
Were Links used to reach the original data?



If YES, did they work properly?



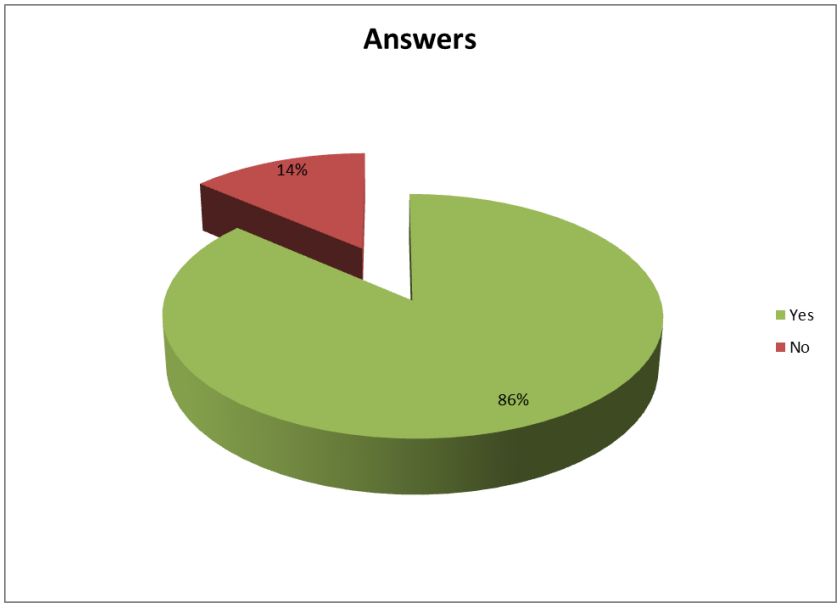
Were the results satisfactory?



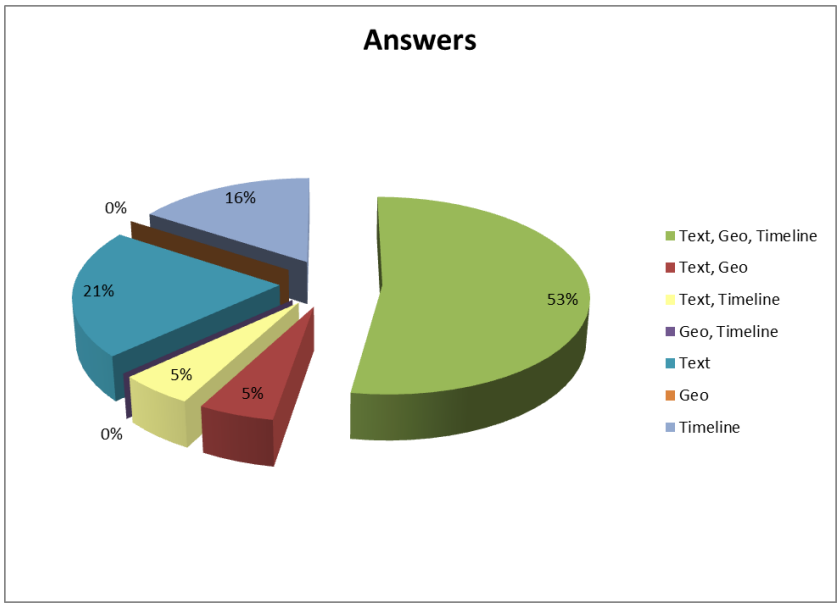
If Not, why not? (most relevant answers)

- Broken Links
- Missing Links

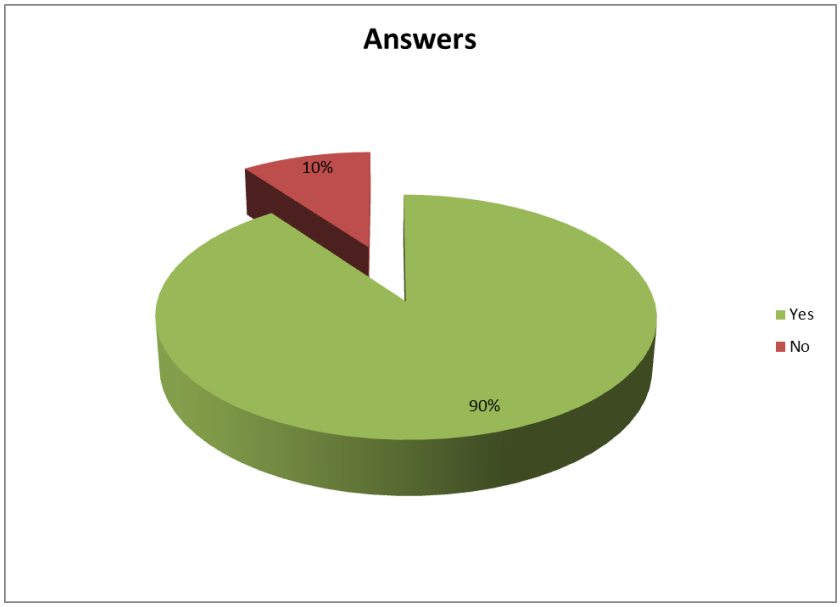
Were filters used for the search?



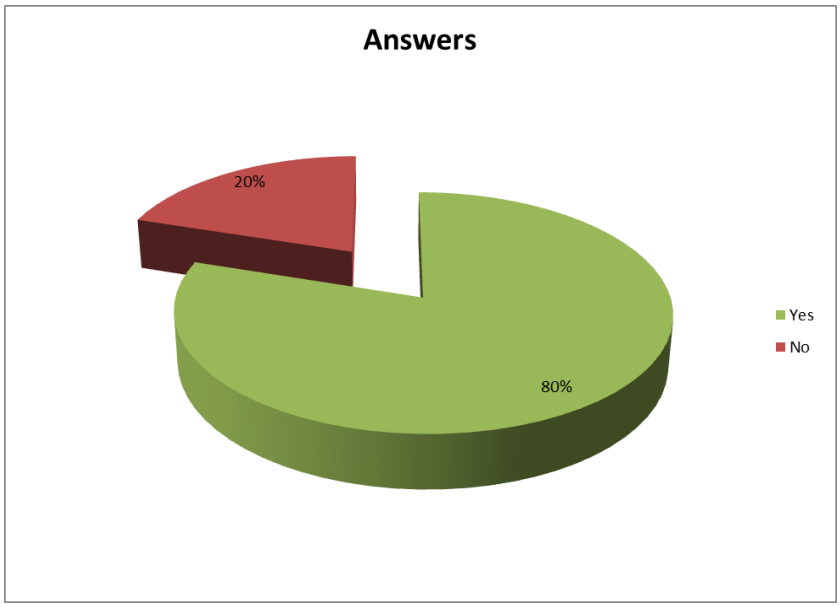
Which filters have been used?



Did the filter work properly?



Was it easy to filter the results?

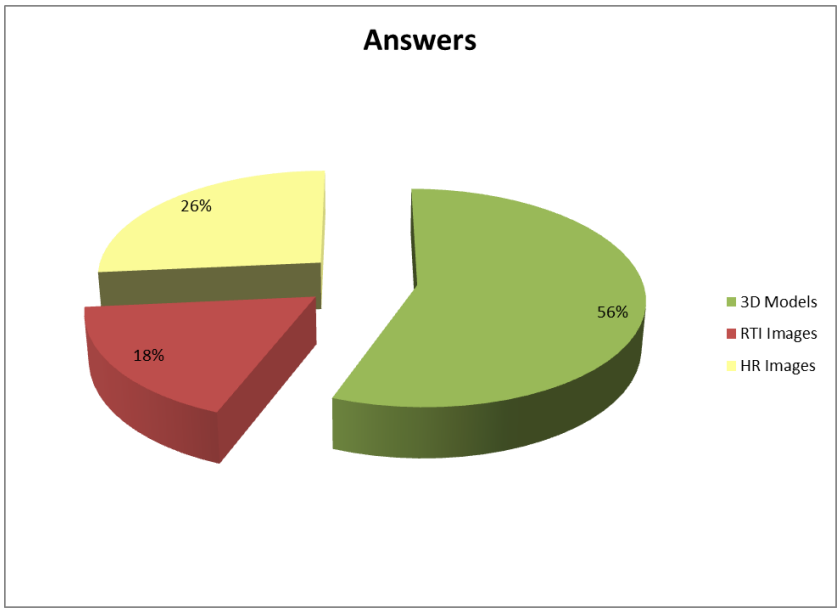


If Not, why not? (most relevant answers)

- Selection not satisfactory
- Textual search doesn't work properly
- Timeline search isn't intuitive

6.3 Visual Media Services (56 answers)

Which data were uploaded?

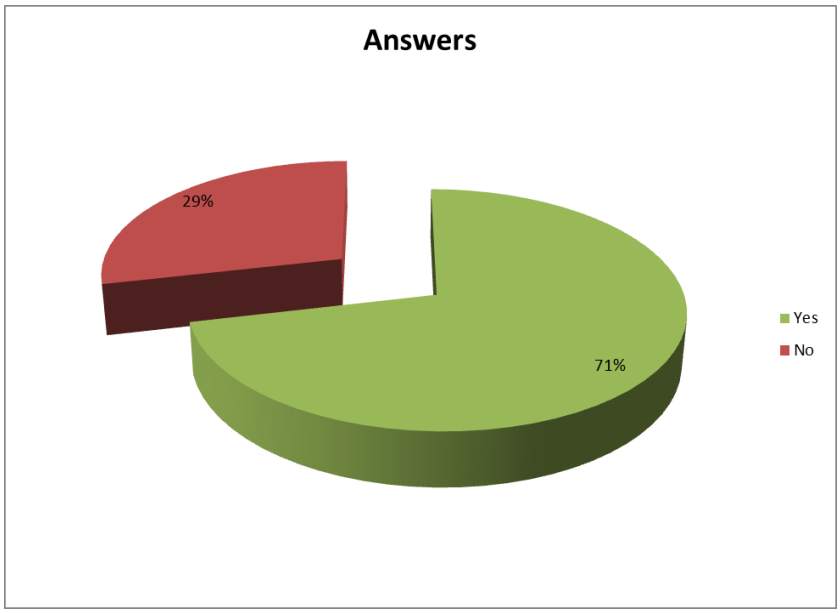


What was the total size (in Mb) of the uploaded data?

Results between 1.6 Mb and 122 Mb (average: 29.5 Mb)

3D Models:

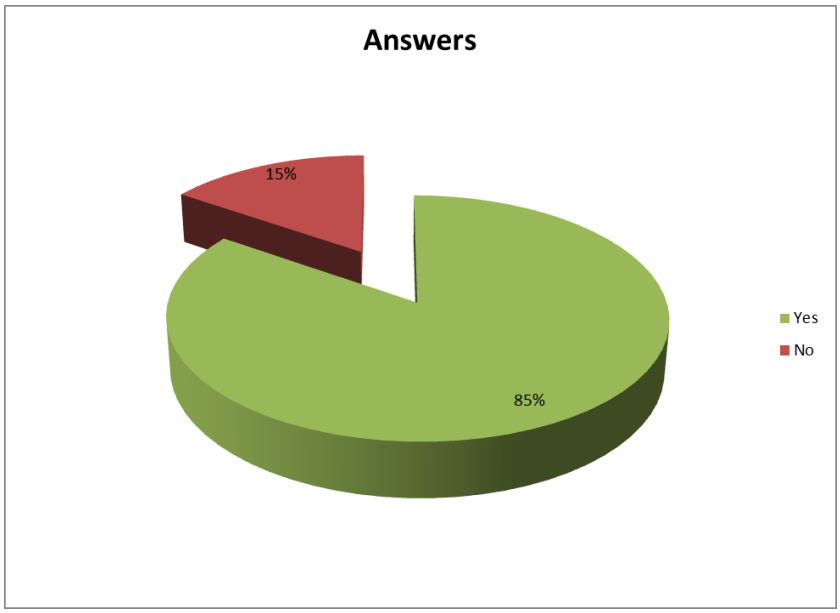
Was the 3D model visualisation satisfactory?



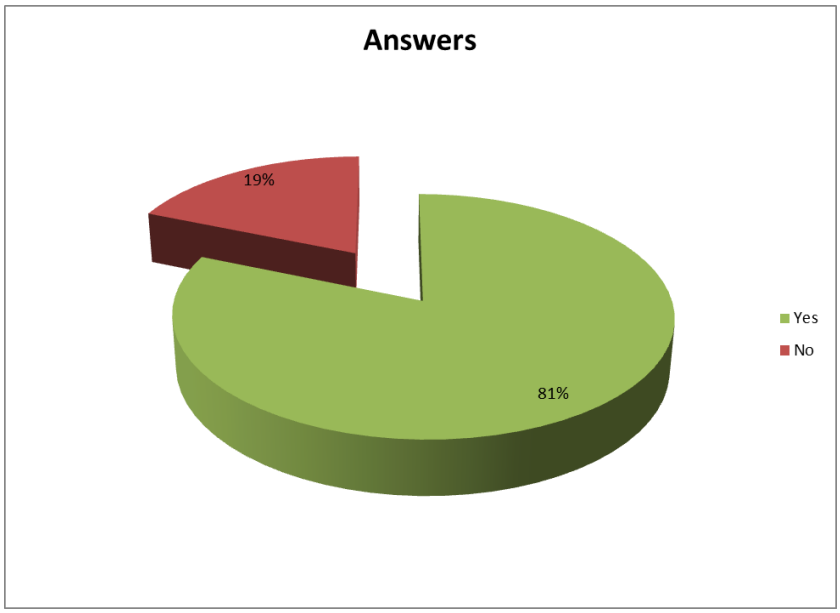
If Not, why not? (most relevant answers)

- Wrong visualisation of long titles within the catalogue
- Problem with ply files over 50 Mb
- Colour projection needs some improvement

Was the navigation speed of the model satisfactory?



Was the model quality satisfactory?



If Not, why not? (most relevant answers)

- No georeferencing
- No unit measure
- Lack of metric precision

RTI Images

Was the RTI visualisation satisfactory?

100% “Yes”

Was the response speed of the light satisfactory?

100% “Yes”

Was the reflectance model quality satisfactory?

100% “Yes”

HR Images

Was the HRI visualisation satisfactory?

100% “Yes”

Was the zoom speed satisfactory?

100% “Yes”

Was the image definition quality satisfactory?

100% “Yes”

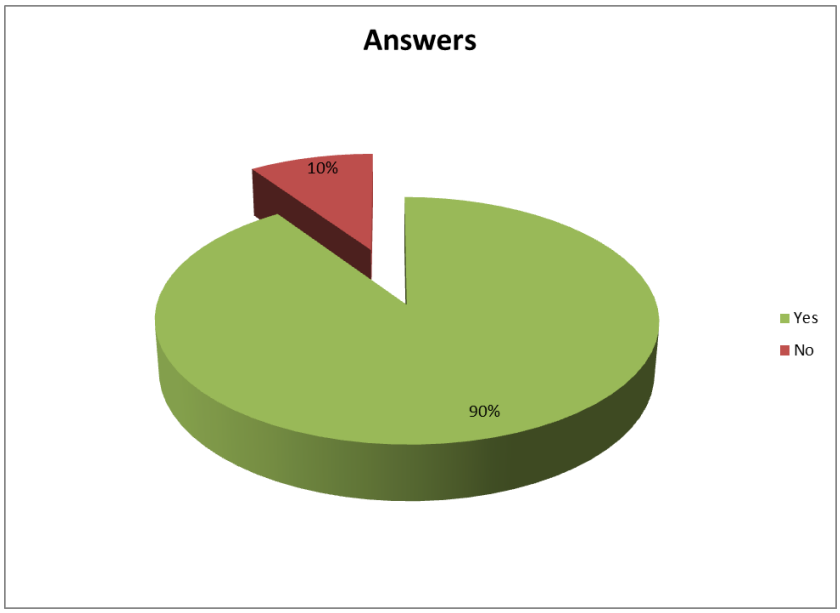
6.4 Landscape Services (21 answers)

Landscape

Was the gallery seen?

100% “Yes”

Was the model visualisation satisfactory?



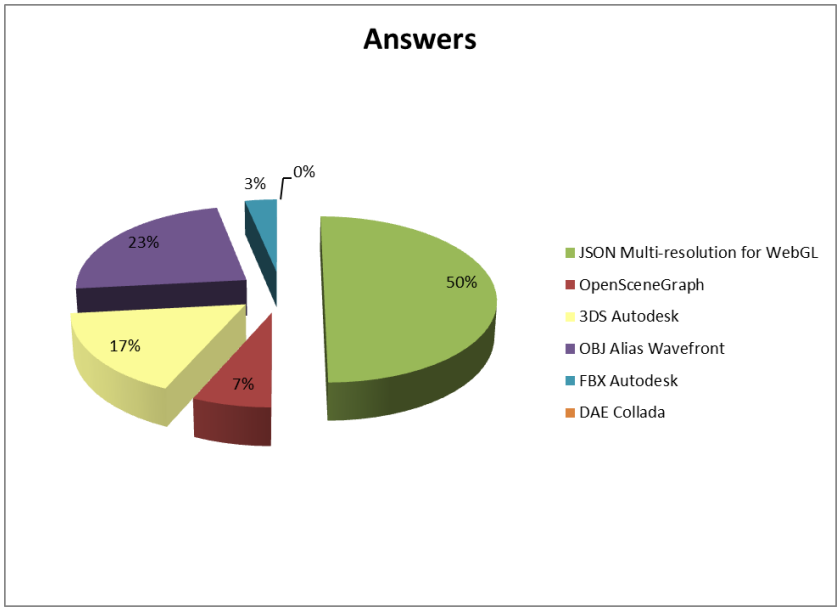
If Not, why not? (most relevant answers)

- Issues with Safari Browser on Mac OS
- The movements on the model aren’t intuitive

Have any process been run?

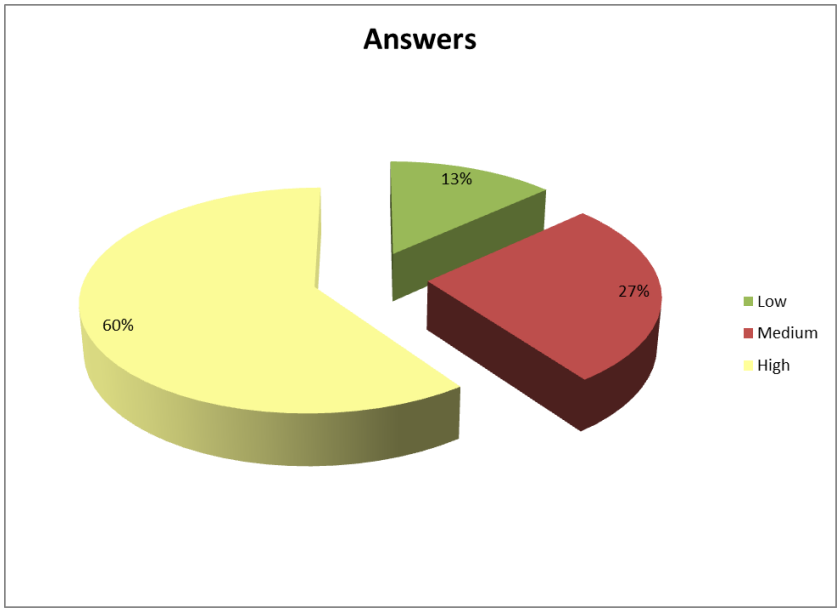
100% “Yes”

What kind of output was chosen? (Multiple choice)

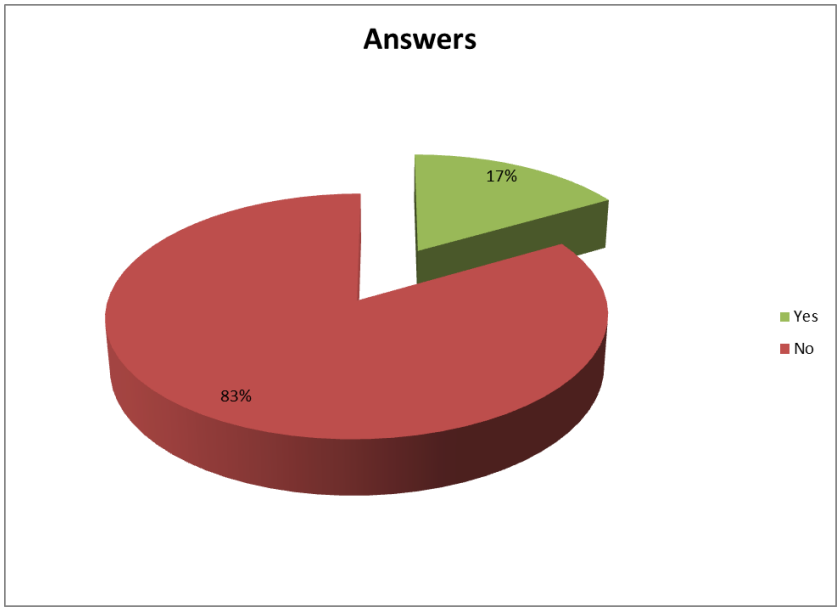


NB: the DAE Collada export support is a future development

What kind of resolution was used?



Was an area defined with an ESRI shapefiles?



If YES, are you satisfied?

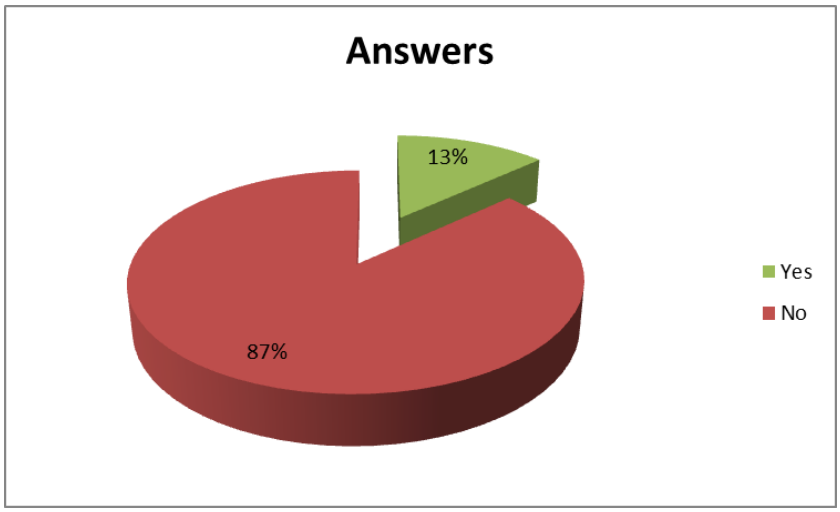
100% "No"

If Not, why not? (most relevant answers)

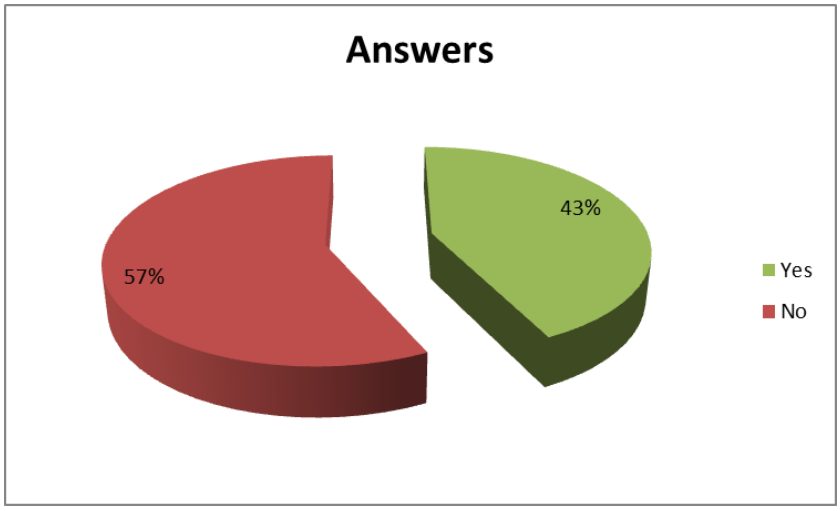
- Shape file cut doesn't work

6.5 Help Section

Was the help section used?



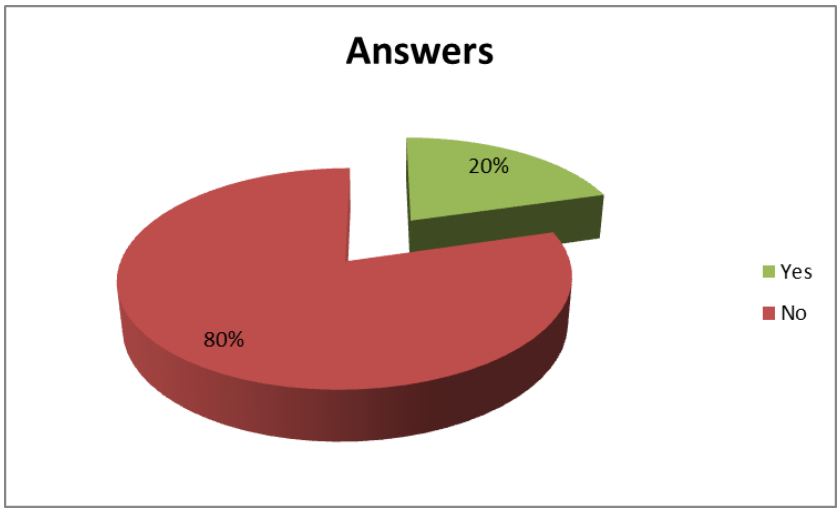
If YES, was it helpful/satisfactory?



If YES but it did not solve issues, why? (most relevant answers)

- Difficult to find the "help section"
- Not useful
- Explanations not clear

Have problems/bugs been found when using the system?



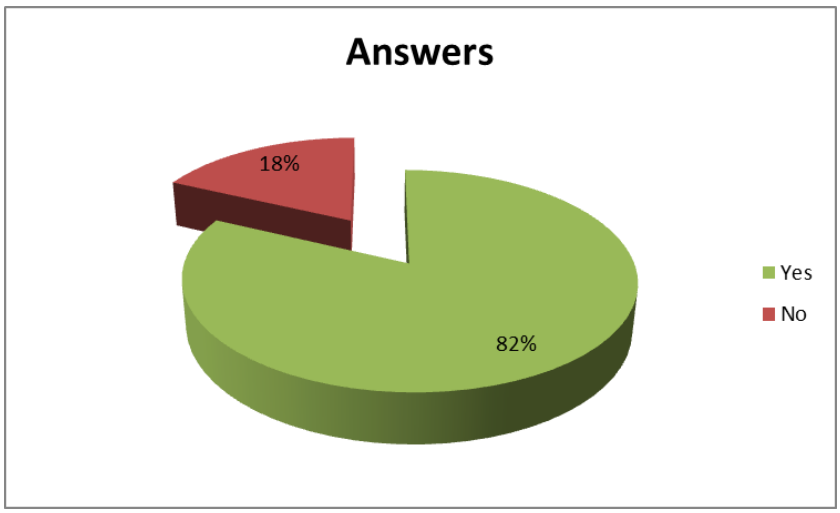
If problems/bugs were found, have they been reported to developers?

100% "No"

NB: issues were reported to developers through the T13.4 leader and were always addressed

6.6 Final Evaluation

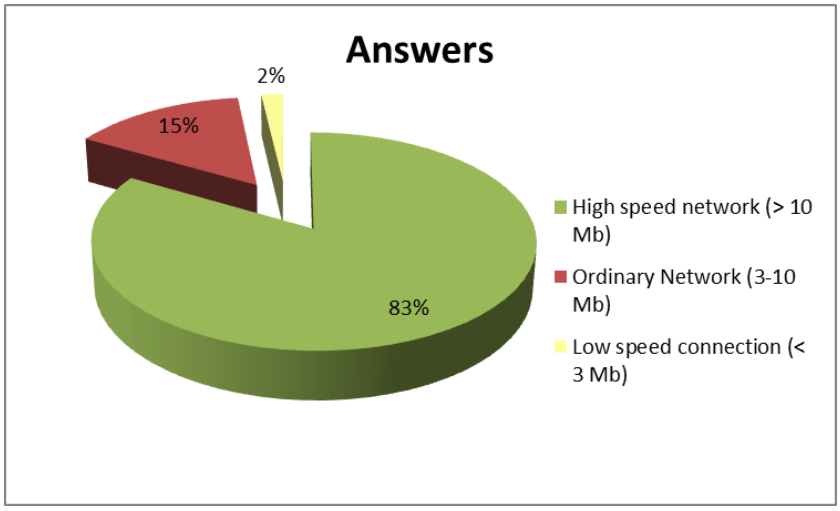
Was the service performance satisfactory?



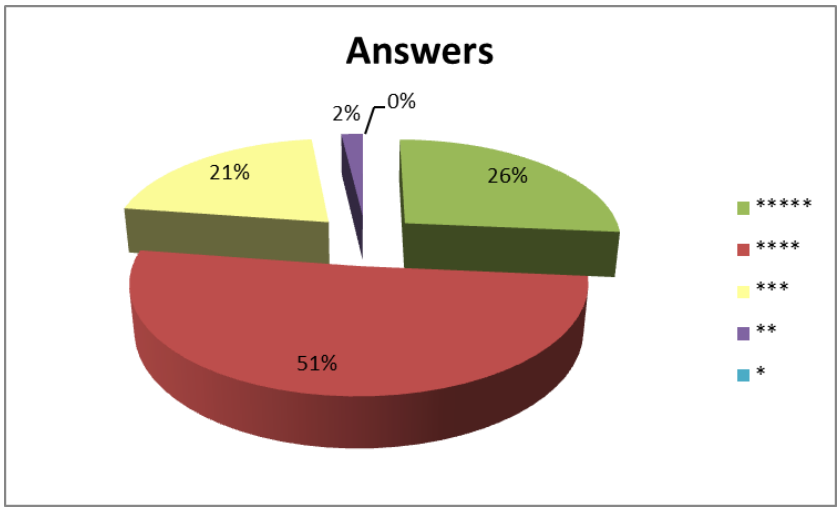
If Not, why not? (most relevant answers)

- Lack of metrics
- Visualisation problems
- Necessity of having an account to upload data on Landscape Services
- Lack of consistency between services
- Not easily usable
- Impossible to download search results
- Lack of metadata management on Visual Media Service
- Lack of export tools
- Lack of measurement tools
- Lack of analysis tools

Was the system used while connected to:



Global Judgment on the experience:



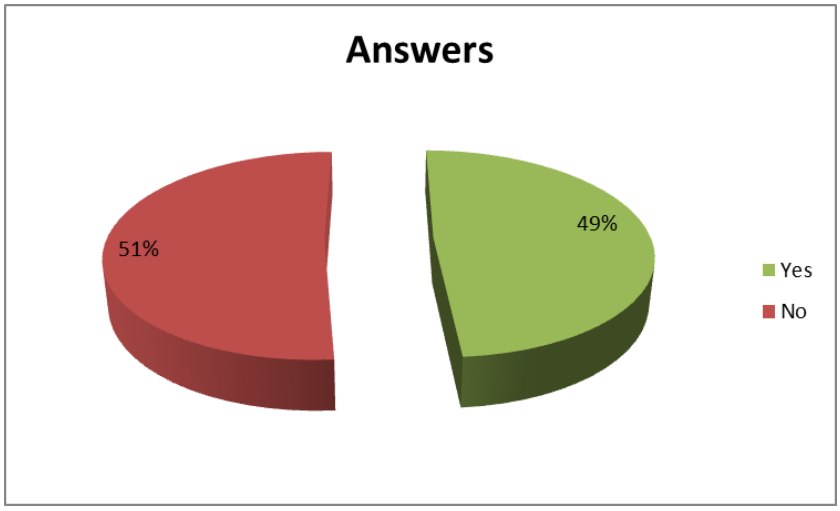
Global average: 4.01/5.00

Catalogue average: 3.90/5.00

Visual Media average: 4.16/5.00

Landscape Services average: 4.02/5.00

Are there any further suggestions for the developers?



If YES, what? (most relevant answers)

- Option to download the search results on the catalogue
- Option to create a RSS feed related to a specific query
- Option to create email alert related to the resources on the catalogue
- Implementation of statistical tools
- Add new kind of “sort by” in the catalogue
- Improve the ergonomy of the system
- Access to the metadata for the 3D models
- New widgets and tools for Visual Media (lights, sections, analysis…)
- Improve the harmonisation of the services
- Add a legend on the map search
- Increase the usable formats on Visual Media Service
- Need computation tools and spatial analysis tools for the Landscape Services
- A zoom function for DEM display after being processed would be useful
- Improve the colour projection
- Possibility of defining a starting view/coordinate system (Visual Media)

Which other data type should be managed by the services?

- Spatial data from the Catalogue
- 3D spatial data
- Items’ Metadata

- GeoDB
- Link between Visual Media Items, Landscape Models and Catalogue
- Raw data of photogrammetry Terrain model creation
- Archaeological images collection
- 3D shape files
- 360° panoramas in .mov format

7 Conclusions

The questionnaire's answers clearly show that the service rating is quite high from the evaluators (§7.6 "Global Judgment on the experience") and, overall, that the performances have met the needs of users (§7.1 "Was the speed of the service provided satisfactory?"), while showing some deficiencies in services (such as a lack of optimised measurement instruments, the lack of links between the different services and the inability to download the majority of the elements present in services).

It was taken into account in the results analysis, that most of the testers used broadband connections (> 10Mbps).

Only a small number of testers used the help section owing to the fact that 80% of users found no problems in the use of services.

In general, the origins of the testers were mostly from France, as INRAP was the Task Leader of the T13.4 and more than half of the responses came from testers who followed a specific workshop in Paris.

According to the users, the services are in general easy to use.

In detail, the largest number of answers related to the Visual Media Services; then to the Catalogue / Portal and finally to the Landscape Services.

As for the Catalogue, it is evident that most testers have used the three different kinds of search jointly (Text, Geo, Timeline - 64%) and only a small number used a single search function. The average number of searches was not very high (~14 per user) but this was due to the need to test the services in a reasonable amount of time in order to provide useful feedback. The search service in the Catalogue (Portal) was tried by most of the testers (73%) who evaluated it positively with an average of 3.90/5.00. How to use the service was clear to most of the testers, and the navigation and search tools were effective and functional.

The Visual media services were mainly used for uploading and viewing 3D models (56%) and High Resolution (HR) images (26%). This is probably due to a lack of knowledge about the processes used to create and use RTI images. The general acceptance of the Visual Media Services was the highest of the three services evaluated: 4.16/5.00. The satisfaction with 3D model users was quite high (71%) with peaks related to service speed (85%) and image rendering quality (81%). The problems encountered were related to difficulties with uploading large size 3D models (> 50 Mb) and the colour rendering of models. Regarding HR images (13 answers) and RTI images (10 answers) the global satisfaction was 100% approval, and emphasises, once again, the need for archaeologists to be able to take advantage of free tools for image management.

The Landscape services, despite having fewer evaluations than the other two, however, had a high approval rating (4.02/5.00). The display quality satisfied 90% of the testers, with a wide use of terrain service for the construction of models in JSON WebGL (navigable on common

browsers, both desktop and mobile). The second choice was the OBJ format, a free format for 3D model interchange. Most of the testers used a maximum resolution (60%) or medium resolution (27%). One of the service tools (cutting with ESRI shape files) was still in development, so it was not possible to evaluate this feature.

To conclude, feedback was extremely positive on the general services (average 4.01/5.00) and the developers punctual interventions to fix bugs found by testers helped the evaluation of the services to be the best possible. Several testers used the optional answers to suggest improvements to the facilities: the most requested feature was the ability to download the results from the Portal and to download objects from the Visual Media public galleries, followed by requests related to improved metadata management (for all services). Specifically for manipulating 3D models in visual media, which often requires the ability to use other formats than .ply. Within the Landscape Services the lack of computation tools and spatial analysis tools was highlighted. Finally, from the perspective of the testers' proposals for more services to be developed in the future, they requested tools for the treatment of 3D GIS vector data, processing of image collections and the management of photogrammetry terrain model creation raw data. Although proposed only by one tester, the suggestion for the development of applications for the management of 360° panoramas in .mov format was also interesting.

8 References

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ARIADNE, 2014, D 12.1 "User Requirements", http://www.ariadne-infrastructure.eu/Resources/D12.1-Use-Requirements

ARIADNE, 2014, D 13.1 "Service Design", http://www.ariadne-infrastructure.eu/Resources/D13.1-Service-Design

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ARIADNE 2015, D 13.2 "Initial services implementation report", http://www.ariadne-infrastructure.eu/Resources/D13.2-Initial-services-implementation-report

ARIADNE 2016, D 13.3 "Initial services testing report", http://www.ariadne-infrastructure.eu/Resources/D13.3-Infrastructure-services-testing-report

ARIADNE 2016, D 13.4 "Final services implementation report" [v. 0.4 - draft version]

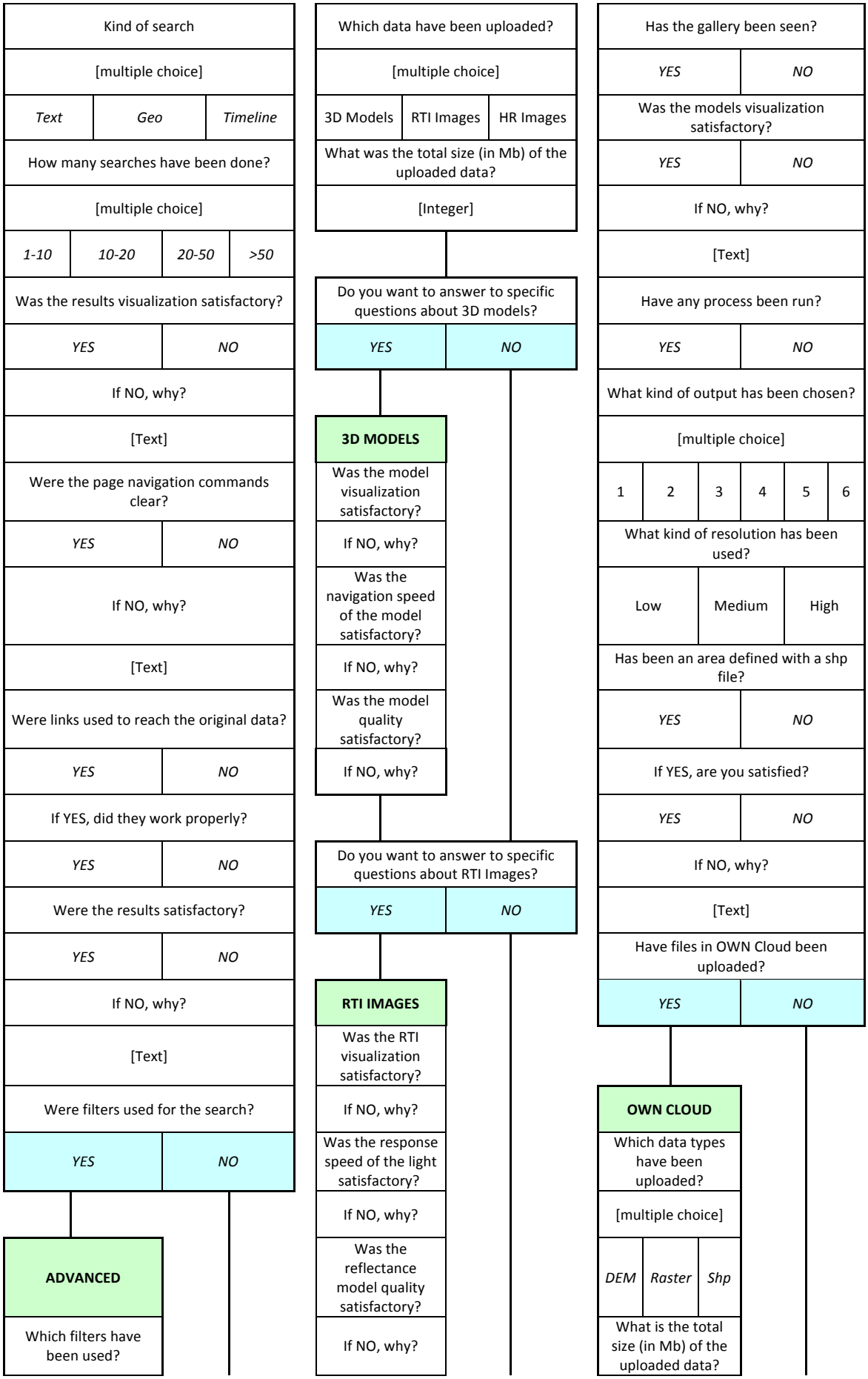
9 Table of figures

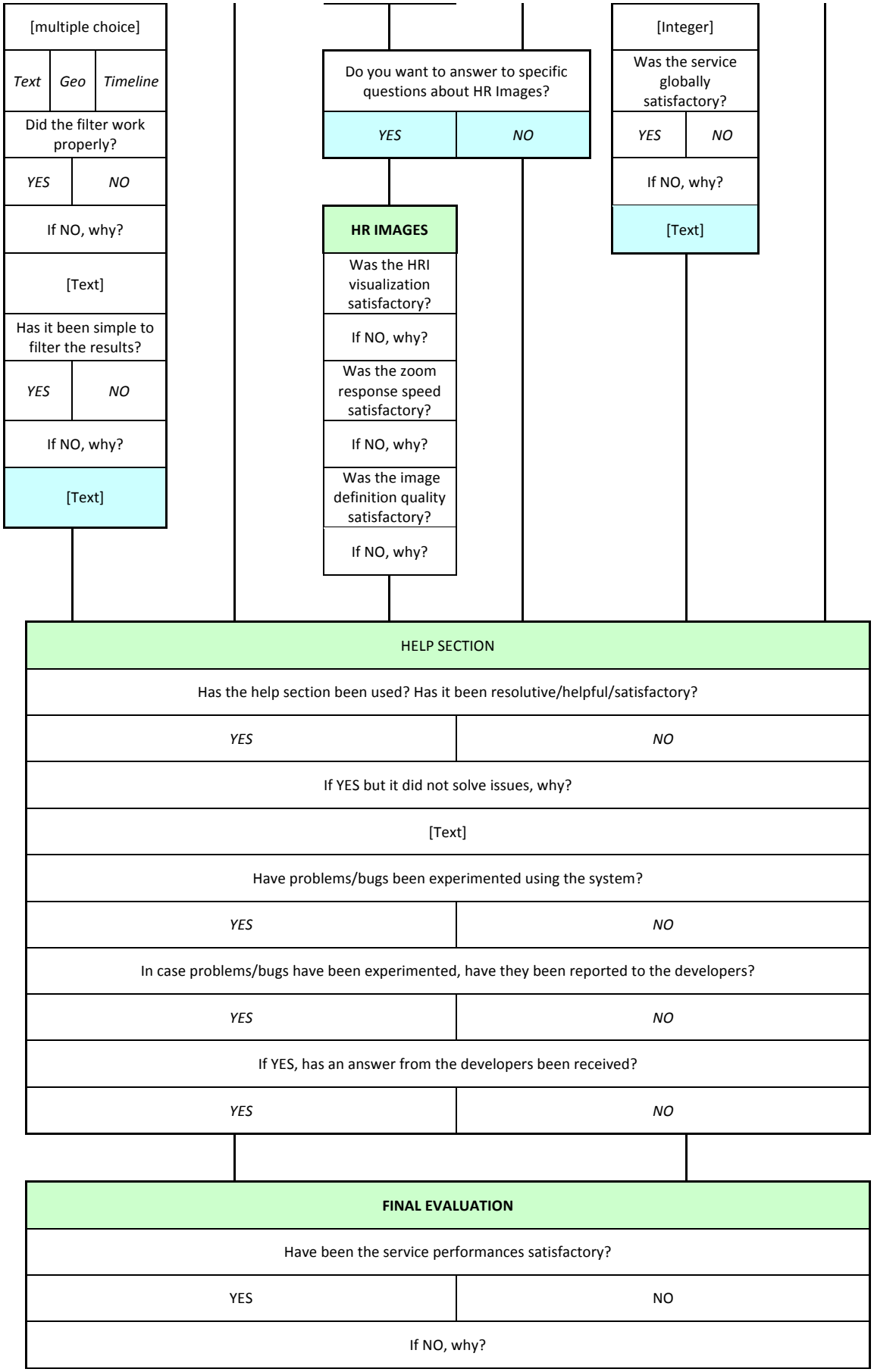
10 Annex I – Questionnaire for the evaluation of the ARIADNE Services

TESTER DATA
First Name
[Text]
Last Name
[Text]
Institution
[Text]
Country
[Text]

START			
How was the web site reached?			
[multiple choice]			
Google	*Direct Link*	*Ariadne Site*	*Other*
Was the service description provided on the web clear?			
YES		*NO*	
If NO, why?			
[Text]			
Was the provided service speed satisfactory?			
YES		*NO*	
If NO, why?			
[Text]			
Used services			
Catalogue	*Visual Media*	*Landscape*	

CATALOGUE	**VISUAL MEDIA**	**LANDSCAPE**


Kind of search
[multiple choice]
Text
Geo
Timeline
How many searches have been done?
[multiple choice]
1-10
10-20
20-50
>50
Was the results visualization satisfactory?
YES
NO
If NO, why?
[Text]
Were the page navigation commands clear?
YES
NO
If NO, why?
[Text]
Were links used to reach the original data?
YES
NO
If YES, did they work properly?
YES
NO
Were the results satisfactory?
YES
NO
If NO, why?
[Text]
Were filters used for the search?
YES
NO
ADVANCED
Which filters have been used?
Which data have been uploaded?
[multiple choice]
3D Models
RTI Images
HR Images
What was the total size (in Mb) of the uploaded data?
[Integer]
Do you want to answer to specific questions about 3D models?
YES
NO
3D MODELS
Was the model visualization satisfactory?
If NO, why?
Was the navigation speed of the model satisfactory?
If NO, why?
Was the model quality satisfactory?
If NO, why?
Do you want to answer to specific questions about RTI Images?
YES
NO
RTI IMAGES
Was the RTI visualization satisfactory?
If NO, why?
Was the response speed of the light satisfactory?
If NO, why?
Was the reflectance model quality satisfactory?
If NO, why?
Has the gallery been seen?
YES
NO
Was the models visualization satisfactory?
YES
NO
If NO, why?
[Text]
Have any process been run?
YES
NO
What kind of output has been chosen?
[multiple choice]
1
2
3
4
5
6
What kind of resolution has been used?
Low
Medium
High
Has been an area defined with a shp file?
YES
NO
If YES, are you satisfied?
YES
NO
If NO, why?
[Text]
Have files in OWN Cloud been uploaded?
YES
NO
OWN CLOUD
Which data types have been uploaded?
[multiple choice]
DEM
Raster
Shp
What is the total size (in Mb) of the uploaded data?


[multiple choice]
Text
Geo
Timeline
Did the filter work properly?
YES
NO
If NO, why?
[Text]
Has it been simple to filter the results?
YES
NO
If NO, why?
[Text]
Do you want to answer to specific questions about HR Images?
YES
NO
HR IMAGES
Was the HRI visualization satisfactory?
If NO, why?
Was the zoom response speed satisfactory?
If NO, why?
Was the image definition quality satisfactory?
If NO, why?
[Integer]
Was the service globally satisfactory?
YES
NO
If NO, why?
[Text]
HELP SECTION
Has the help section been used? Has it been resolutive/helpful/satisfactory?
YES
NO
If YES but it did not solve issues, why?
[Text]
Have problems/bugs been experimented using the system?
YES
NO
In case problems/bugs have been experimented, have they been reported to the developers?
YES
NO
If YES, has an answer from the developers been received?
YES
NO
FINAL EVALUATION
Have been the service performances satisfactory?
YES
NO
If NO, why?

[Text]		
Have been the system used while connected to:		
[multiple choice]		
High speed network (>10MB)	Ordinary network (3-10MB)	Low speed connection (< 3MB)
Global judgement on the experience:		
(* * * * *)		
Experience description (optional)		
[Text]		
Are any suggestions for the developers possible? (Possible suggestions for the developers)		
YES	NO	
If YES, what?		
[Text]		
Which other data type should be managed by the Services? (Specify data type)		
[Text]		
Which visualization or interaction features should be considered while extending the Visual Media Service? (Please specify)		
[Text]		

Links:

English version: https://goo.gl/forms/4HZE4J3vkcVvbWJi1

French version: https://goo.gl/forms/6G6DHUFRi9YpnPEq2

Italian version: https://goo.gl/forms/hjYc96O55LIAzAUJ3

11 Annex II – Testing scenarios Results

11.1 Basic Catalogue Services

Scenario Group 1		**Basic Catalogue Services**		
Pre-requisites		Basic ICT skills User browses the ARIADNE Portal		
Step	**Action**	**Expected result**	**Conclusion**	**Validation**
1.1	Catalogue Navigate	Visualisation of the entire catalogue within ARIADNE Portal	The portal allows to access to the entire catalogue by searching with an empty value	Yes
1.2	Catalogue Search	Textual research on the catalogue	In the home page of the ARIADNE Portal there is a search window that allows textual research on the catalogue	Yes
1.3	Catalogue View	Visualisation of search results	The catalogue is represented on the ARIADNE portal as a multipage dynamic table (query on elasticsearch). Each record has its own web page derived to ARIADNE Registry	Yes
1.4	Spatial Navigate	Navigate the catalogue on a webmapping page	The geolocation of the catalogue records is displayable and navigable on a leaflet webmapping page (base openstreetmap)	Yes
1.5	Spatial Search	Search for a specific element on a webmapping page	The research is available by using pan and zoom on a leaflet webmapping page and by pushing on a search button	Yes
1.6	Spatial View	As 1.4	As 1.4	Yes
1.7	Timeline Navigate	Navigate the catalogue on a timeline graph	The representation of the temporal attribute on a graph is available on a javascript page	Yes
1.8	Timeline Search	Search for a specific timespan on a timeline graph	The research is available by using the mouse drag on the javascript graph page	Yes
1.9	Timeline View	As 1.7	As 1.7	Yes

11.2 Advanced Catalogue Services

Scenario Group 2		**Advanced Catalogue Services**		
Pre-requisites		Basic ICT skills Basic geo search skills Basic time search skills User browses the ARIADNE Portal User advanced search on the ARIADNE Portal		
Step	**Action**	**Expected result**	**Conclusion**	**Validation**
2.1	Catalogue Parameterise Search	Specific textual research (e.g. «roman»)	The search window on the Portal home page allows specific textual search, suggesting similar terms from AAT thesaurus	Yes
2.2	Geo Parameterise Search	Specific geographic research (e.g. by coordinates or by place name)	It isn't possible to insert a specific couple of coordinates or to insert a place name for the research. The geographic search is only available by using pan and zoom (mouse click and mouse scroll)	No
2.3	Timeline Parameterise search	Specific timespan research (e.g. by period name or specific date)	It isn't possible to insert a specific date or to insert a period name for the research. The timeline search is only available by using mouse drag	No

11.3 Visual Media Services

Scenario Group 3		**Visual Media Services**		
Pre-requisites		Advanced image processing skills User has a visual media document (3D model, RTI, HR image)		
Step	**Action**	**Expected result**	**Conclusion**	**Validation**
3.1	3D Models Navigate	Visualisation of the public registry of 3D models uploaded on the Visual Media Service	The navigation of the items is available from the home page of the service (button «browse»). It is possible also to add a type filter	Yes
3.2	3D Models View	Visualisation of each 3D model published on the Visual Media Service	From the browse page it is possible to click on each item to visualise the model on a 3DHOP page	Yes
3.3	3D Models Upload	Upload their own 3D models on the Visual Media Service on different formats	The upload of the models is available from the home page of the service (button «upload»). So far, the only format accepted is the .ply	Yes
3.4	3D Models Parameter	Change the parameter of 3D model management	The service allows item metadata to be modified and to set up the visualisation web page of 3D model	Yes
3.5	3D Models Transform	3D model transformation format	The service allows transformation of the .ply models in a downloadable web page based on 3DHOP (.zip). No more transformation is available	Yes
3.6	3D Models Download	3D models download	The downloading of the models is available only for their own uploaded models. It isn't possible to download	No

			the models on the public gallery	
3.7	3D Models Embed (on web site)	Embedding 3D model web page on its own web site	The 3DHOP web page can be embedded on a website as an «iframe»	Yes
3.8	RTI Navigate	Visualisation of the public registry of RTI images uploaded on the Visual Media Service	The navigation of the items is available from the home page of the service (button «browse»). It is possible also to add a type filter	Yes
3.9	RTI View	Visualisation of each RTI image published on the Visual Media Service	From the browse page it is possible to click on each item to visualize the image on a web page	Yes
3.10	RTI Upload	Upload their own RTI images on the Visual Media Service on different formats	The upload of the RTI images is available from the home page of the service (button «upload»). The formats accepted are: .ptm and .hsh	Yes
3.11	RTI Parameter	Change the parameter of RTI image management	The service only allows to modify item metadata	Yes
3.12	RTI Transform	RTI image transformation format	The service allows the transformation of .ptm and .hsh images in a downloadable web page based on 3DHOP (.zip). No more transformation is available	Yes
3.13	RTI Download	RTI images download	The downloading of the RTI images is available only for their own uploaded files. It isn't possible to download the models on the public gallery	No
3.14	RTI Embed (on web site)	Embedding RTI image web page on its own web site	The 3DHOP web page can be embedded on a website as an «iframe»	Yes
3.15	High Res Images Navigate	Visualisation of the public registry of HR images uploaded on the Visual Media Service	The navigation of the items is available from the home page of the service (button «browse»). It is possible also to add a type filter	Yes
3.16	High Res Images View	Visualisation of each HR image published on the Visual Media Service	From the browse page it is possible to click on each item to visualize the image on a web page	Yes
3.17	High Res Images Upload	Upload their own HR images on the Visual Media Service on different formats	The upload of the RTI images is available from the home page of the service (button «upload»). The most common image formats are accepted	Yes
3.18	High Res Images Parameter	Change the parameter of HR image management	The service only allows to modify item metadata	Yes
3.19	High Res Images Transform	HR image transformation format	The service allows images to be transformed (in different formats) in a downloadable web page based on 3DHOP (.zip). No more transformation is available	Yes
3.20	High Res Images Download	HR images download	The downloading of the HR images is available only for their own uploaded files. It isn't possible to download the models on the public gallery	No
3.21	High Res Images Embed (on web site)	Embedding HR image web page on its own web site	The 3DHOP web page can be embedded on a website as an «iframe»	Yes

11.4 Own Cloud Services

Scenario Group 4		**Own Cloud Services**		
Pre-requisites		Advanced ICT skills User has some geographical datasets (Raster + DEM + shp file)		
Step	**Action**	**Expected result**	**Conclusion**	**Validation**
4.1	Own Cloud Navigate	Files and Folders visualisation on a web cloud storage	The service allows navigation to folders and files un a user friendly web cloud storage	Yes
4.2	Own Cloud (Access and) View	Private access to the web cloud storage	The service asks for a username and a password for the private access to its own web storage	Yes
4.3	Own Cloud Upload	Upload files on a web cloud storage	The service allows uploading of different size files in a user friendly web cloud storage (drag and drop and button “upload”)	Yes
4.4	Own Cloud Manage	Manage the folders and the files on a web cloud storage	The service allows users to manage, rename, delete, copy, cut, paste, etc. both folders and files in a user friendly web cloud storage	Yes

11.5 Landscape Services

Scenario Group 5		**Landscape Services**		
Pre-requisites		Basic GIS skills User has uploaded a geographical dataset on Own Cloud		
Step	**Action**	**Expected result**	**Conclusion**	**Validation**
5.1	3D Terrain Navigate	3D terrain models navigation on a web gallery	The 3D terrain gallery is available from the Landscape service home page	Yes
5.2	3D Terrain View	3D terrain model visualisation	From the public gallery, each model is accessible for the online visualisation (both from desktop and mobile)	Yes
5.3	3D Terrain Parameter	Change the parameter of 3D terrain model management	The 3D terrain service allows users to modify model metadata, model parameter (format, resolution, layers, etc.)	Yes
5.4	3D Terrain Upload	Upload their own 3D terrain models on the Landscape Service on different formats	The service allows to upload items on different file formats by using “Own Cloud” (see 4.1-4.4)	Yes
5.5	3D Terrain Transform	3D terrain model transformation format	The 3D terrain service allows users to transform their own 3D terrain models on different formats (e.g. JSON WebGL, 3DS, OBJ, FBX, etc.)	Yes
5.6	Terrain Gallery	As 5.1	As 5.1	Yes

	Navigate			
5.7	Terrain Gallery View	As 5.1	As 5.1	Yes
5.8	3D Terrain Download	3D terrain download	The download is available in different formats for each item published on the public gallery and from its own private gallery (private access via “Own Cloud”)	Yes
5.9	3D Terrain Embed (on web site)	Embedding 3D Terrain web page on its own web site	The web page containing the model on JSON WebGL format can be embedded on a website as an «iframe»	Yes