

# ResearchSpace Image Annotation – Additional Detail for Functional Requirement

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Draft 0.6 for Discussion

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## **Note:**

0.3 includes developer checklist and references to client business requirements.

0.4 controlled terms, auto complete and hyperlinks between annotations. Draft use case.

0.5 – Annotation category requirement and priority for stage 3

## 1 Introduction

Image Annotation is described in Annex 1 of the ResearchSpace Business Requirements & Specification v2 document. This describes the tool at a high level but includes the following components;

- A main area in which images are displayed and can be annotated
- The annotation text itself
- The ability to sort annotations
- The ability to filter annotations
- The ability to Zoom in and out of the images (particularly high resolution images)
- Tools for selecting regions and points for annotation.
- Information (metadata) about the image.

Related functionality is image overlay which is described at 12.9 of the same document. Image overlay allows images to be scaled so that they can be placed on top of each other for precise overlay of different types of image of the same subject or other related images. For example, an x-ray of an object placed on top of a standard image of the same object. This would allow users to relate surface details to underlying detail which may be the subject of scholarly annotation.

## 2 User Interface

Functionality will be complemented with a user interface designed by the project designers which should be implemented and should be consistent with other designed interfaces.

What deep zoom system? – example matrix

	IIP Image Server	MS Seadragon	Notes
Ability to layer annotations			
Performance			
Portability / Lack of Dependencies*			
Technical Support			
Ease of development			
Open Source*			
Image Preparation			
Other benefits			

\*Relates to business rules



web browser interface, however specialised research tools which are not web-based may additionally be adapted to access data from and contribute to ResearchSpace as required.

- All data, components and services must be capable of being invoked over HTTP.
- The primary mode of access is by URI resolution to a simple data URL (document) or Linked Data URI (semantic data).
- Services are invoked wherever possible in a REST-compliant manner; if full REST compliance is not possible, then REST-like URIs must be used.
- Complex queries in this REST-like style using standard SPARQL will be supported.
- All metadata shall be represented in an accepted format of RDF, such as RDF/XML, Turtle or N3, in order of preference.
- For data objects, such as documents and images, open formats such as html, jpeg and mp3 are preferred, although it is accepted that proprietary formats such as PDF and Microsoft Word may sometimes be necessary.
- It may be permissible to invoke a service on the same directly, for example by using direct invocation via functions, but only if there exists an equivalent means via HTTP; the direct route being used solely for performance or similar reason.

See para 13.2

#### Standard Annotation Functionality

	Function	Stage 3 status	Comment
1.	There should be synergy between the features available in data annotation. The look, feel and features should be consistent.	High	
2.	Creating a point or region on an image as an overlay that can be used as the subject of an annotation.	High	
3.	A point should be indicated using a dot or a choice of marker which might be appropriate.	High	
4.	A region should be a line, square, rectangle, circle or drawn using a freehand tool. Different colors should be available for regions and points to ensure they can be seen on different images.	Medium-low	
5.	The freehand tool should be able to trace from point to point and connect the first and last points. (polygon)	Medium low	
6.			

	Annotations should record the person who made the annotation and the date and time. This should conform to attribution requirements. (Linked to the registry).	High	
7.	The tool should provide a box with the annotation point or region that allows the entry of text in context. Text should also be editable in the main “discussion/annotation” panel.	Medium	
8.	There should be a separate panel providing the following functionality;	High	
9.	The annotations should be available as a panel (discussion forum type functionality) in the same way as data annotation.	High	
10.	The annotations displayed in the panel should be linked to the annotation point or region in the image and vice versa. Clicking on a annotation text will direct focus to the annotation region on the image. Clicking on a annotation point or region should give focus to the annotation text in the discussion panel.	High	
11.	It should be possible create an annotation that is linked to a piece of text within another annotation text. i.e. create a point or region on an image, annotate and link to a substring in another annotation. See <a href="http://ada.drew.edu/dmproject/">http://ada.drew.edu/dmproject/</a>	Medium	
12.	Create links between the different text annotations against an image. i.e. highlight a substring in an annotation and link this to a substring in another text annotation.	Medium	
13.	It should be possible to annotate an annotation as part of a thread of annotations about a particular point or region.	High	
14.	Should be able to perform text searches through the annotation.	High	
15.	Should be able to search on author, date, project etc (see same options for data annotation)	High	
16.			

	The ability to filter on author, project, date, and type (and the same categories as those used on data annotation)	Medium-High	
17.	Filters should also be reflected in the markers and regions on the image so that filtering on text annotation against the image should be reflected in what is shown on the image itself.	Medium-High	
18.	Should be able to toggle the text annotation on the image itself so that the text can be seen against the marker or region itself. This should be on an individual basis for each annotation or be applied across all annotations.	Medium-High	
19.	The ability to link the annotation to field in a record stored on ResearchSpace. (This would require the ability to find the record through a search interface)	Medium-High	
20.	The ability to link the annotation to a record or document (including other image) stored on ResearchSpace. (This would require the ability to find the record through a search interface). A link should be available for others to follow. Thumb nails should be available in the annotation which is a clickable link.	Medium-High	
21.	The ability to link the annotation to an internal or external resource, including another image or a document.	Medium-High	
22.	Ability to put embedded thumbnail images into the annotation text itself (which is a clickable link).	Medium	
23.	It should be possible to take annotations from the data annotation tool. (Specific function or data basket?)	Low (since no basket yet)	
24.	Ability to support the annotation functionality with different layers that can be turned on and off. E.g. a project specific layer or other categories.	Medium	
25.	The screen should provide the metadata information about the image.	High	
26.	Annotation should form part of the RDF and use Open	High	

	Annotation standards.		
27.	It should be possible to embed other formats like images and sound in the annotation.	Medium	
28.	It should be possible to incorporate structured terminology from ResearchSpace terminology resources into the annotation which are then searchable as structured data. Example: <a href="http://dme.ait.ac.at/annotation/">http://dme.ait.ac.at/annotation/</a>	Medium	
29.	There should be a full screen mode	Medium-High	
30.	It should be possible to create your own markers or symbol images to be used for marking an annotation.	Medium	
31.	It should be possible to include clickable links into the annotation. For example for linking existing annotations not in a thread.	Medium-High	
32.	It should be possible to place an external clickable link on a marker or region as a different option.	Medium-High	
33.	It should be possible to promote an annotation into a discussion or other collaboration post ( e.g.wiki)	High	
34.	Linking annotations to fields or records in the system should mean that annotations can take part in the why, what, who and where search scenario. A linked annotation should have the correct terminology or predicates to provide this semantic link.	Medium	
35.	Should be able to differentiate annotations using different region colours and markers.	Medium	
36.	It should be possible to superimpose a grid on the image to aid placement or annotation markers.	Low	
37.	It should be possible to assign a category to an annotation to allow the user to switch on and off certain categories of annotation which may not be of interest. e.g. Art History category	High	

	<p>Conservation science category  Inscriptions category  Technique category  General category</p> <p>(it should be possible to increase the categories in the future)</p>		
38.	<p>Ability to Annotate two deep zoom images on the same screen and make links between the two.</p>	High	

In this respect the annotation tool works in a similar way to the data annotation tool.

### Zooming Annotation

39.	The functionality above should be available at different zoom levels.		
40.	<p>An image will have different degrees of zoom depending upon the resolution of the file. However, in order to support annotation at different levels these levels should use a consistent mechanism. i.e. Level 1, level 2 etc</p> <p>The number of levels may differ depending upon the resolution of the file.</p>		
41.	<p>The user should be able to specify a view option between showing all annotations (subject to filter and the viewable area) or only the annotations that have been made at the current zoom level.</p> <p style="text-align: center;">Annotations at all levels Annotations at zoom level</p>		
42.	The user should be able to create annotations (described above) at specific levels of zoom.		
43.	Clicking on an annotation in the panel will cause the screen to focus on that annotation on the image at the same zoom level at which the annotation is made.		
44.	The user should be able to use the filtering system so that only the annotations specified by the filter are viewable. (Note that this is subject to the annotation view option – see 26 above).		
45.	It should be possible to include arrow head on lines drawn by the line tool.		
46.	An annotation could be an image or sound file or even a video		
47.	It should be possible to tag an annotation with multiple controlled terms using an auto complete terminology search box. Annotations should be searchable using these terms.		

48.	Ability to create hyperlinks between annotations		
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**Scaling and Overlays of Images** (. (less developed at this point).

49.	The system should be able to take two images and scale one of them or both in order to provide a useful overlay of both images		
50.	Controls should be provided to adjust opacity and other relevant image properties and colour balances.		
51.	The process should be done through a layering system		
52.	The system should provide tools to enable the images to be scaled and matched precisely.		
53.	Annotation functionality (including zooming annotation) should be applicable to these images.		

## **Annex 1 – Draft Use Case**

### **Image Annotation Use Case**

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A researcher finds a digital image of an object that is the subject of a project they are involved in. When accessing the image and perhaps adding additional metadata (or correcting metadata) they decide to make some annotations against the image itself. They launch the image annotation tool and can see the image clear of all annotations. However, they notice that the annotation panel next to the image already contains many annotations. By turning the view annotations switch to visible, all the areas in which annotations have been made are visible.

By clicking an annotation title in the annotation side panel focus is given to the region on the image at the zoom level at which the annotation was originally made. The range of annotations from this project and previous ones is extensive. The annotations range from ones regarding interpretation, the iconography, scientific and conservation observations and historical comment. These are categories chosen by researchers when they enter an annotation. The project is able to determine additional categories if required.

The researcher's session concerns historical comment and although other annotations may have some relevance, the researcher makes all other categories of annotation invisible. The researcher also now only wants to view annotations for the zoom level that they are on and choose that option from a control panel. This means that as they zoom more annotations (subject to their visibility filter) appear. This means that the researcher can gradually build up a picture of the annotations previously made using the same view as the person who made them.

As the researcher zooms in they decide that they mostly want to concentrate on the annotations made by a particular person who worked on the image on another project. The previous project has since finished but the annotations were made public to be used to other projects. After following the annotations through all the zoom levels the researcher decides to click on another annotation in the side panel made by another researcher which, with the same settings in place, make this researchers annotations the only ones visible. Again they work through the image viewing annotations as they appear. Other filters can be applied as they work.

The researcher then decides to search through all the previous annotations in the side panel using a text search and finds a few annotations that meet the criteria. Again clicking on these puts the region of the annotation in focus and a mouse over confirms the match with the title of the annotation in the side panel. By opting for a controlled term search the search allows the annotations to be found through an auto complete search mechanism. Because annotations have been made with tags from the systems controlled terminology, the researcher is able to find very specific annotations regarding subjects like technique or iconography and so on. Filtering is also available on project, person and dates so that these results can be narrowed down further.

The researcher decides to make their own new annotation. They indicate a new annotation and select a region. The annotation is made on the region itself and an html wysiwyg allows formatting,

inserts, and links. The form also allows the annotation to be linked to another resource with an appropriate link annotation term. In this case the researcher has taken a cutting made from another image from the data basket and inserted this into the annotation making and commenting on the similarities between the region on the image and their cutting. The cutting from the data basket automatically brings with it a link to the original resource. The annotation can also be tagged with controlled terms and the researcher uses the auto complete controlled term search box to add a number of relevant tags. When the annotation is submitted it is inserted into the side panel.

The researcher then wishes to annotate an existing annotation made by a colleague. They find the annotation and highlight a particular phrase which becomes a hyperlink which can be used instead of following the annotation thread. They use the annotate button to insert their new comment or reply. Again the same features available to a new annotation are available. When submitted the annotation creates a thread from the original annotation allowing the dialogue to be followed by others.

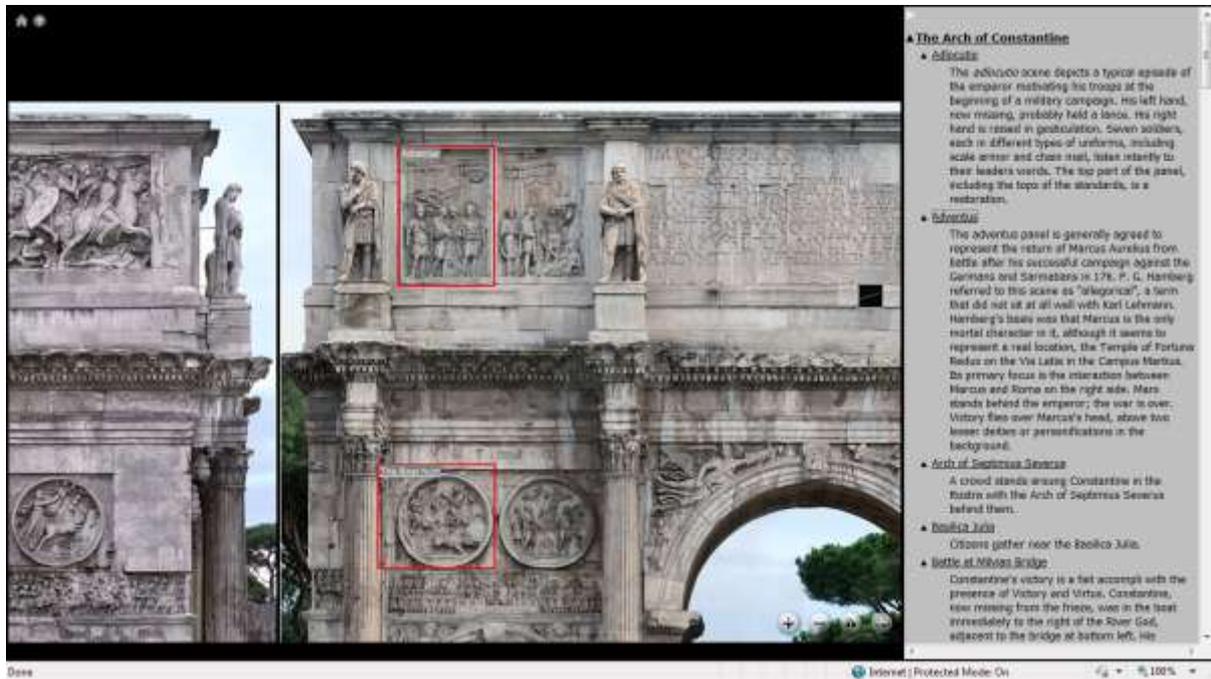
The researcher also decides that there are some interesting annotations that have relationships not reflected in the threads. They highlight words and phrases in the existing annotations and create hyperlinks. These might provide a particular route through the annotations that can be followed by other researchers. A final annotation might create the start of the path.

When the researcher has finished they may add a couple of annotations to their data basket for future reference. They exit back to their dashboard for the next piece of work.

## Annex 2

### Example 1 – Zooming Annotation - The Arch of Constantine

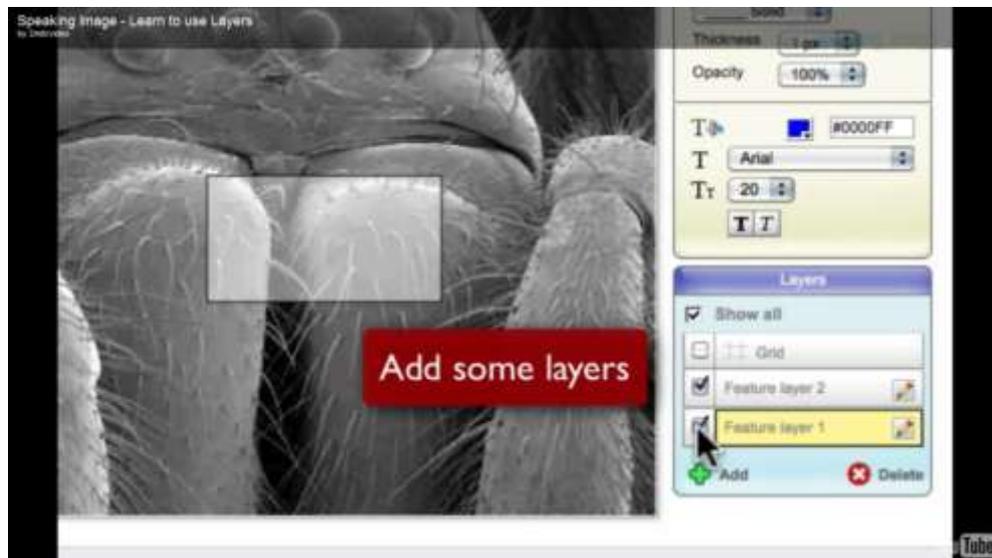
<http://theyeygame.com/DeepZoom/ArchOfConstantine#link22>



## Speaking Images

<http://www.speakingimage.org>

Layers / Overlay example. Also example of point and region tools.

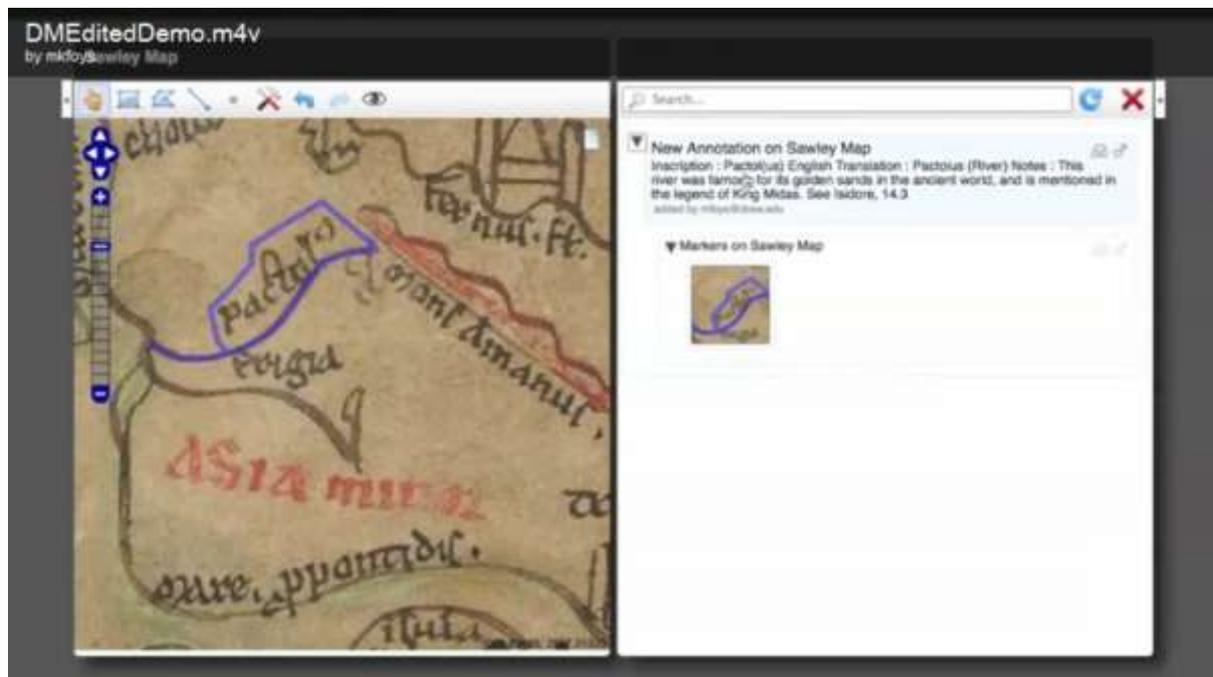


Example 3 – Marking and Linking, turning off and on, annotation of an annotation

<http://ada.drew.edu/dmproject/>

Part funded by the Andrew Mellon Foundation

See tutorial video



## Example 4 – Structure data and Zoom

<http://dme.ait.ac.at/annotation/>

