



# MAIMS – MEDIN Automated Image Management System

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The funding supported the development of three key Work Package components:

- i) A MEDIN compliant metadata profile for the popular open-source Digital Asset Management (DAM) software Resource Space;
- ii) A user-friendly image data ingestion pipeline to enable quick upload and metadata mark up of images;
- iii) A user-friendly portal for viewing, searching and accessing archived images.

The goal was to provide an easy way to submit dataset images to DASSH and for these imagery assets to be associated with the primary species or habitat occurrence dataset (and vice versa). We also wanted to add MEDIN Guideline information to these images, with relevant values associated with their specific image. Finally, we intend to allow browsing of all submitted images, with images to be searchable by key fields or date/place, both as a facility for end users and to allow easier administration of our image holdings.

The MAIMS tool is built on top of an existing DAM software - Resource Space (RS). RS is already used extensively in the wider MBA so our previous experience lowered the effort needed to undertake the initial deployment. The cloud-hosted version provides very limited storage opportunities and so it was installed and hosted on DASSH servers within the MBA. These benefit from daily offsite backups and a dedicated IT support team.

The submission tool can be accessed via [https://dassh.ac.uk/submit\\_images](https://dassh.ac.uk/submit_images) . The tool requires the submission of a completed MEDIN Guideline along with a directory of images. A new 'Collection'<sup>1</sup> on RS will then be created for that dataset. Images referenced by the MEDIN Guideline will have appropriate values attached to their metadata with RS and optional miscellaneous files, such as PDF reports or GIS files can also be included with the Collection. The uploaded image Collection is then be accessible and searchable by all using the RS web interface.

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<sup>1</sup> A Collection is a group of associated images in the Resource Space context - <https://www.resourcespace.com/knowledge-base/collections-public-and-themes>

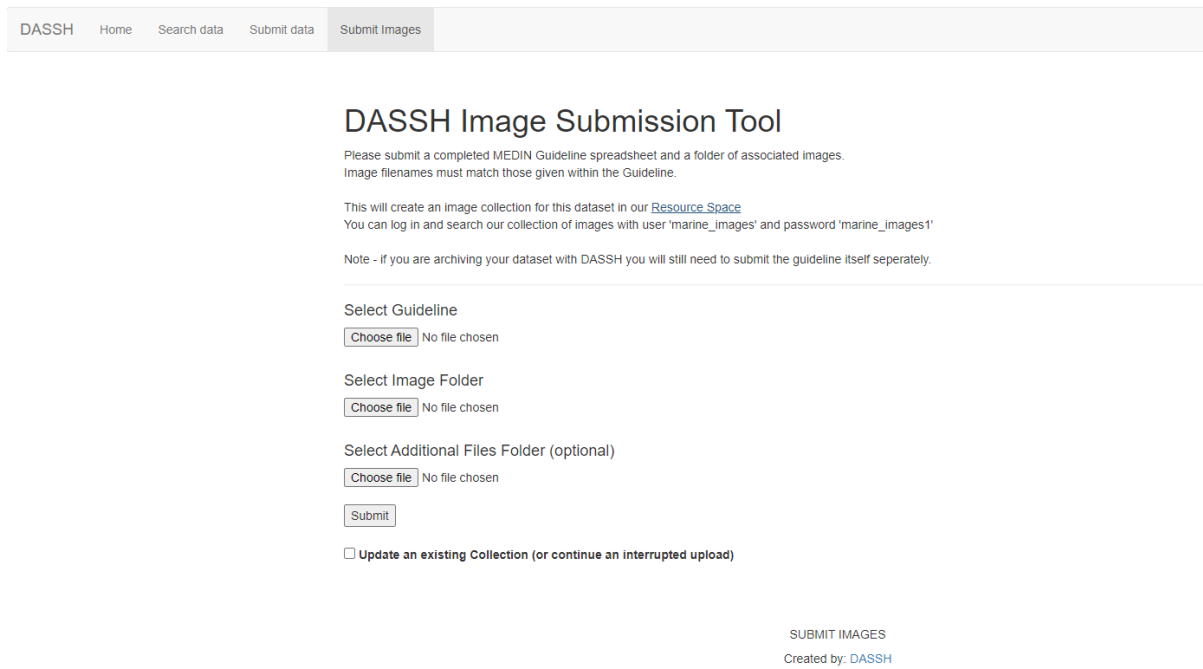


Figure 1. Screen grab from landing page at [https://dassh.ac.uk/submit\\_images](https://dassh.ac.uk/submit_images)

The submission tool interface is a simple HTML (HyperText Markup Language<sup>2</sup>) web page which uses a form to send submitted files via CGI (Common Gateway Interface<sup>3</sup>) to the Python scripts in the backend. These scripts build on existing DASSH code to read in and parse MEDIN Guidelines and then makes calls to the RS API (Application Programming Interface<sup>4</sup>) using the Python Requests library. The code is currently available to view on request on GitLab at <https://gitserver.mba.ac.uk/kevpax/maims> and will be made fully open on finalisation of the project.

The Resource Space API is relatively new addition and still in development by the Resource Space community<sup>5</sup>. The API allows the creation of Collections, the upload of images and the attaching image information, and makes the building of our own tools on top of Resource Space possible. The following Resource Space API functions are used: 'create\_collection', 'create\_resource' and 'add\_resource\_to\_collection' (to create a Collection (group of files which is equivalent to one dataset aka a submitted Guideline), a Resource (a single image/file) and add the latter to the former. Most of the information from the Guideline is appended with create\_resource - a Javascript Object Notation (JSON<sup>6</sup>) of metadata is allowed to be submitted as part of this command. 'put\_resource\_data' adds associated data to the Resources – this is used in our case to assign geographic position. Finally, 'get\_user\_collections' and 'do\_search' are used to query existing Collections (which allows Collections to be updated with additional images).

Currently, the following values are extracted from the MEDIN Guidelines and attached to the images: Date and Position (taken from Sample Event Form), Observed Species (from Species/Taxon form), Visibility (from SampleNotes in Sample Event Form), Image Resolution (from

<sup>2</sup> <https://en.wikipedia.org/wiki/HTML>

<sup>3</sup> [https://en.wikipedia.org/wiki/Common\\_Gateway\\_Interface](https://en.wikipedia.org/wiki/Common_Gateway_Interface)

<sup>4</sup> <https://en.wikipedia.org/wiki/API>

<sup>5</sup> <https://www.resourcespace.com/svn>

<sup>6</sup> <https://en.wikipedia.org/wiki/JSON>

VideoFormatAndCompression in Detailed Metadata Form), Camera make/model (from CameraMakeAndModel/ImageDeviceModel in Detailed Metadata Form), Methodology (from TransectDescription, CalibrationNotes, ProtocolsUsed, MethodImages and MethodQCNotes in Detailed Metadata Form) and Sample Notes (from SampleNotes in Sample Event Form).

To match the Guideline entries with the images the code utilizes existing fields in the Sample Event Form (SampleImages/SampleReferenceImageID) and Species/Taxon Form (SpeciesReflImageID/SpeciesReflImageIDs). It does not yet incorporate Guidelines with an Image Event Form nor images specified in Attribute Forms.

We have utilized the built-in search features of Resource Space rather than building our own as it is of high quality and highly customizable. Browsing is accessed by going to our Resource Space installation at <https://www.dassh.ac.uk/dasshresourcespace>. Full integration into the DASSH website is pending due to an imminent website relaunch. Users can search by specific field values, by geographic area, or simply browse entire Collections.

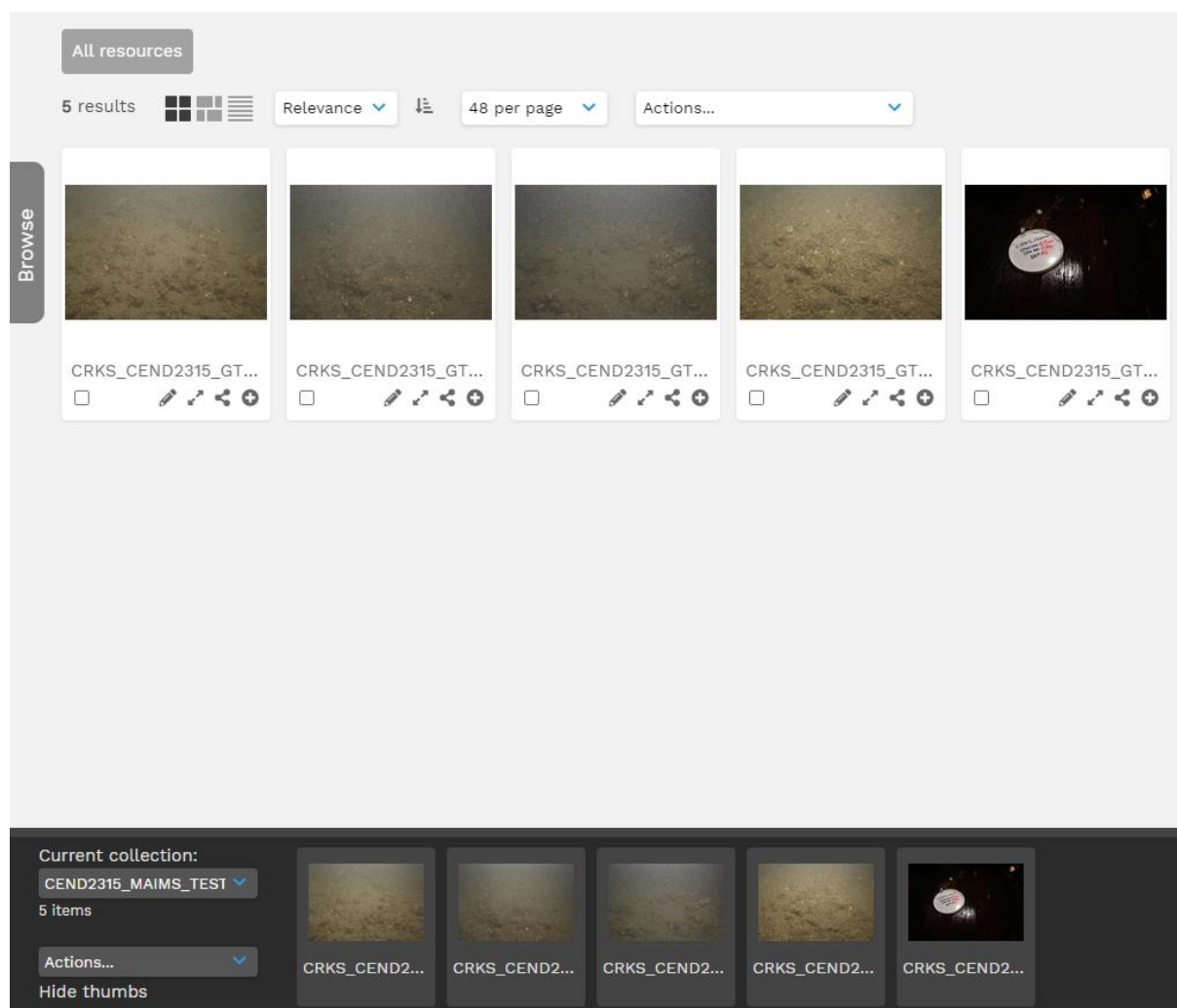


Figure 2. Example Collection view from Resource Space

To integrate with the published MEDIN datasets, we will update and republish relevant metadata with a URL to RS connecting to the relevant collection.

In order provide a reciprocal link, we enforce that the Collections on Resource Space have the same name as the dataset/resource as held by DASSH. The Resource Locator element of the MEDIN

Discovery Metadata Standard allows for multiple Resource Locator elements, and will be utilised to capture both the dataset and the associated imagery. This is of particular importance when relating imagery and annotation data deriving from the imagery, as it is critical that the link between the two is retained.

The MAIMS application has been demonstrated at recent meetings of the Biodiversity Data and Information Group (BioDIG), and within the Big Picture initiative in order to gain feedback and solicit datasets for testing. NatureScot, Natural Resources Wales and Joint Nature Conservation Committee have all been engaged in the trail.

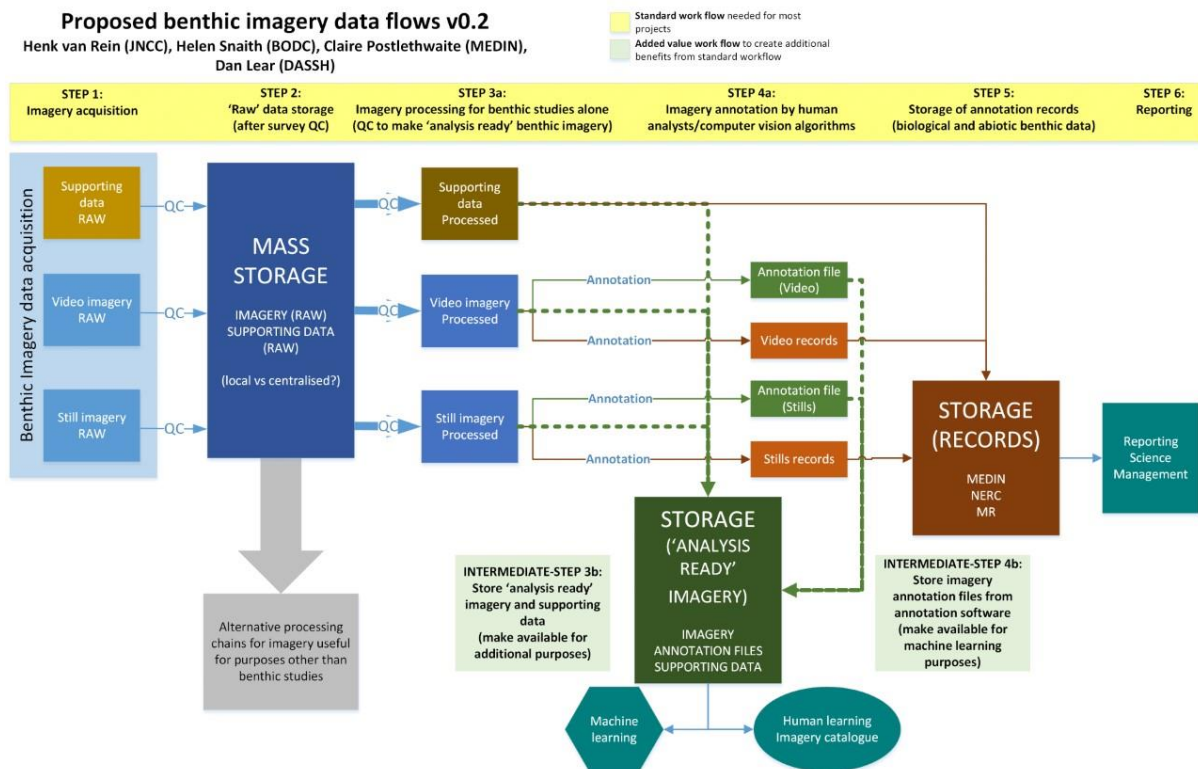


Figure 3. The proposed Big Picture Data Flow Diagram

The intended usage of the MAIMS application and processes supports the aspirations for the Big Picture Benthic Image Action Plan, and further testing and adoption of MAIMS within this community is underway.

The additional resources included in the project from matched funding via iCPR (integrated Continuous Plankton Recorder) are currently still in development, but ring-fenced resources are allocated to ensure this valuable dataset is integrated in the future.

This has been a pilot, proof of concept project and there is still much that can be done. The greatest issue so far has been upload times – especially video. Better batching of uploads would mitigate this problem. Additionally, we would like to develop the tool to accept a wider range of historical and more recent Guidelines. We also intend to expand user testing and gather additional feedback with the communities and organisations identified above.