



3D DATA PROCEDURES (VERSION 1.50)

DIGITAL ARHIVISTS
ARCHAEOLOGY DATA SERVICE
<https://archaeologydataservice.ac.uk/>

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1. Purpose of this document

1.0.1 This documents current ADS procedures for production of dissemination and preservation copies of 3D datasets. It contains a list of current dissemination and preservation formats and how to migrate files to required formats. More information on this data type, can be found in the G2GP Photogrammetry Guide http://guides.archaeologydataservice.ac.uk/g2gp/Photogram_Toc, Laser Scanning Guide http://guides.archaeologydataservice.ac.uk/g2gp/LaserScan_Toc and 3D Model Guide http://guides.archaeologydataservice.ac.uk/g2gp/3d_Toc.

2. Formats

Offered format	Accepted	Preservation	Presentation	Notes
Photogrammetry Images				
Raster images Joint Photographic Experts Group .jpg or Tagged Image File Format .tif or Digital Negative .dng	YES	Uncompressed Baseline TIFF v.6 .tif or Digital Negative .dng	Raster images Joint Photographic Experts Group .jpg	Ensure that the captured format is deposited (there's no benefit in e.g. the depositor converting from JPG to TIFF or DNG for deposition).
Agisoft PhotoScan project file (new format) .psx	NO			
Agisoft PhotoScan	NO			

project file (old format) .psz				
Point Clouds				
E57 point cloud format .e57	YES	E57 point cloud format .e57	E57 point cloud format .e57	<ul style="list-style-type: none"> • Ensure files conform to ASTM E2807 standard,¹ • Ensure 2D images are not stored within the files. • Ensure any relevant metadata is documented separately.²
ASCII TXT point clouds .txt	YES	ASCII TXT point clouds .txt	ASCII TXT point clouds .txt	Files should be documented re. content and format/order of ASCII values: separator used between values (e.g. space, comma, semicolon); Value order (e.g. "point, colour, normal" "XYZRGB")
Leica Cyclone files .imp (+ .ptd + .rcy)	NO			
Cyclone ASCII export .pts	YES	Cyclone ASCII export .pts	Cyclone ASCII export .pts	Raw text point cloud export in X Y Z I R G B format.
Models				
Blender format .blend	NO			

¹ see tool here <http://www.libe57.org/data.html>.

² Or can be extracted using the Libe57 tool.

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COLLADA XML-based exchange format .dae	NO			
Autodesk 3D asset exchange format .fbx	NO			
3D Studio Max .max , .3ds	NO			
Nexus format .nxs	NO			
Wavefront OBJ File .obj (+ .mtl + .jpg textures)	YES	Wavefront OBJ File .obj	Wavefront OBJ File .obj For groups of files, .zip archives of the formats listed above should be used for dissemination.	The open OBJ format was developed by Wavefront Technologies and is supported by a large user community with open specifications. The format can store polygonal and/or free-form geometry and textures and consists of an obj file (ascii or binary format) together with an mtl (material/texture) file and image (actual texture). OBJ can be rendered through a browser using 3DMLW. Textures will break if files are renamed in OS but can be manually fixed in a text editor (OBJ and MTL both need editing) to point to correct MTL and JPG files (Manually_editing_OBJs). Suitable for preservation of wire frame or textured

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				models. ASCII format only for preservation. ³
Adobe Portable Document Format (3D) .pdf	YES (but, see notes)		Adobe Portable Document Format (3D) .pdf	3D content in PDF files is based on the U3D and/or PRC formats (see above). The PDF format is self-contained and allows basic operations such as measuring, cross sections, light sources, wireframe views. While convenient for viewing data without specialist software the format is largely a 'dead end' in that data cannot easily be extracted. Not suitable for preservation but may be used for dissemination.
Stanford polygon file format .ply	NO			
Product Representation Compact format .prc	NO			
QuickTime VR .qvr	NO			
Google Sketchup format .skp	NO			
Stereolithography or Standard Tessellation Language .stl	NO			

³ More info: http://en.wikipedia.org/wiki/Wavefront_.obj_file.

Makerbot 3D printing file .thing	NO			
Universal 3D format .u3d	NO			
Virtual Reality Modelling Language .vrmf	YES	Virtual Reality Modelling Language .vrmf	Virtual Reality Modelling Language .vrmf	A text-based standard (ISO/IEC 14772) for representing 3D interactive vector graphics and the predecessor of X3D. VRML has undergone various updates VRML 97, VRML 2.0 etc. and has led to some confusion about plug-in requirements etc. See X3D. Suitable for preservation although now replaced by X3D.
.x3d	NO			
Makerbot 3D printing file .x3g	NO			
Java3D	NO			

2.0.1 See the Guides section on format capabilities when considering migration options for formats http://guides.archaeologydataservice.ac.uk/g2gp/3d_3-1.

3. Documentation / Metadata

3.0.1 Alongside the standard metadata for files, the following additional documentation is required for any text files. The current metadata template is available from the Guidelines for Depositors.⁴

3.0.2 3D files can come from a range of sources and processes. As a result, metadata can be complex. All elements of a project should be accompanied with metadata at project level and at the various file-levels.

⁴ <https://archaeologydataservice.ac.uk/advice/guidelinesForDepositors.xhtml>.

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3.0.3 A combined metadata template for Photogrammetry (3d model and orthophoto) and Laser Scanning is attached to this page. For photogrammetry projects (and to a lesser extent LS) additional software report (e.g. Photoscan/Metashape processing reports) and metadata files (e.g. calibration images and reports, control images) can/may be required.

3.1 Associated metadata

3.1.1 Any additional or associated metadata included in the depositor should be stored alongside the requisite file in a suitable preservation format.

3.2 Embedded metadata

3.2.1 Metadata is often automatically generated on creation/editing of files, but the quality and nature of this metadata varies between file software packages. With this in mind, the ADS metadata template attempts to cover much of the required metadata. During conversion care should be taken to preserve any existing metadata found within files, in an ideal world we should ask for metadata to be supplied separately but this may not always be possible. If this metadata is embedded within the file then it should be extracted, saved in a suitable preservation format and the process documented in the CMS. Whether supplied by the depositor, or extracted by the digital archivist, this metadata should be preserved and, if appropriate, disseminated alongside the relevant files (see below for notes on storage).

4. Accessioning checks

4.1 Checks

4.1.1 These are dependent on each file type and included in notes section of the formats tables above.

4.2 Significant properties

4.2.1 These are dependent on each file type and included in notes section of the formats tables above.

4.3 File-naming

4.3.1 Where possible files should retain the same name as the original. On occasion (and normally for dissemination), it may be necessary to create different versions of the same file. In these cases a logical naming strategy should be used, and should be accompanied by explanation in the Processes section of the CMS.

4.3.2 All files and metadata should be placed in the appropriate location as outlined below.

5 How to convert files

5.0.1 Generally, we should not need to convert 3D data files as they should be deposited in a preservation/dissemination format. Documentation should be dealt with according to the relevant procedures document. However, they should be stored as documentation as per procedures below.

6 Storage

6.1 Storing data

6.1.1 Data should be stored in appropriately named folders, as described in the ADS Repository Operations manual.⁵ Any directory structure from the SIP should be retained in the AIP. In some cases editing/restructuring may be necessary, but such restructuring should be recorded in the Processes section of the CMS.

```

/preservation
  /{original_structure}
    /mymodela
      mymodela.obj
      mymodela.mtl
      mymodela_texture1.jpg
      mymodela_texture2.jpg
      mymodela_texture2.jpg
    /mymodelb
      mymodelb.obj
      mymodelb.mtl
      mymodelb_texture1.jpg
  
```

6.1.2 Given the large number of composite files dissemination versions will need to be zipped up. In this case disseminate in a sensible, logical fashion under their original file extension.

```

/dissemination
  /{original_structure}
    mymodela.zip
    mymodelb.zip
  
```

6.1.3 Where the dataset includes photogrammetry original (raster) images can be stored in 'sets' as deposited.

```

/preservation
  /{original_structure}
    /image_set1
      image1.jpg
      image2.jpg
  
```

⁵ <https://archaeologydataservice.ac.uk/advice/PolicyDocuments.xhtml#RepOp>.

image3.jpg

```
/dissemination
  /{original_structure}
    image_set1.zip
```

6.2 Storing metadata

6.2.1 File metadata should be stored in an appropriate archival format with the preservation/dissemination files in a "documentation" folder within the requisite folder.

```
/preservation
  /{original_structure}
    /mymodela
      mymodela.obj
      mymodela.mtl
      mymodela_texture1.jpg
      mymodela_texture2.jpg
      mymodela_texture2.jpg
      /documentation
        mymodela_ADS_metadata.xlsx
        mymodela_extracted_metadata.csv
    /mymodelb
      mymodelb.obj
      mymodelb.mtl
      mymodelb_texture1.jpg
      /documentation
        mymodelb_ADS_metadata.xlsx
```

6.2.2 For dissemination, any embedded metadata can be left within the file, although care should be taken to make sure this metadata remains unchanged, particularly following conversion. If this metadata is supplied by depositor separately, then this should be presented with the dissemination data.

```
/dissemination
  /{original_structure}
    mymodela.zip
    mymodelb.zip
  /documentation
    mymodela_ADS_metadata.xlsx
    mymodelb_ADS_metadata.xlsx
```

7. Creating and linking objects in the OMS tables

7.0.1 See Match Objects Overview for general overview {internal access only}

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see also CMS-OMS TableStructure for MOS data requirements {internal access only}

8. Tech watch / things to note

9. Archival notes

10. References

- AHDS Deposit Formats: <http://ahds.ac.uk/depositing/deposit-formats.htm>
- AHDS Guides to Good Practice - VR:
http://vads.ahds.ac.uk/guides/vr_guide/index.html
- Web 3D consortium: <http://www.web3d.org/>
- G2GP Photogrammetry Guide
http://guides.archaeologydataservice.ac.uk/g2gp/Photogram_Toc
- G2GP Laser Scanning Guide
http://guides.archaeologydataservice.ac.uk/g2gp/LaserScan_Toc
- G2GP 3D Model Guide http://guides.archaeologydataservice.ac.uk/g2gp/3d_Toc
- e57 https://www.ri.cmu.edu/pub_files/2011/1/2011-huber-e57-v3.pdf