Dear Recommender and Reviewers,

Thank you for your work on the manuscript and for considering it for recommendation. We have analyzed the comments provided by the reviewers and have made the necessary revisions accordingly.

We have uploaded to Zenodo (as version 4) a revised version of the manuscript based on the review comments provided by Reviewer 1, 2 ,3, and 4. Here you can find a summary of the changes, while the pdf attached shows all the modifications made, marked in TrackChange mode.

We have tried our best to address all the comments raised by the reviewers, and we hope that these revisions meet the expectations of the reviewers and improve the quality of our manuscript.

Once again, we thank you for your work.

Best regards,

The Authors

Recommender

[…] I agree with the comments by Trognitz and Hageneuer that suggest reviewing other 3D visualisation platforms as part of the preprint, so as to place the Visual Media Service in context for a reader not familiar with this field.

> *To better contextualize the content, we added a brief review of publication software/platforms at the beginning of the "Visual Media Service" section.*

 I also agree with Panagiotidis that further information about the potential for a configurator for high resolution 2D or RT images exisits (or is planned).

> *We have expanded the discussion about the possibility to develop a similar configurator for RTI and high-resolution 2D images.*

Finally, Trognitz, Champion and Hageneuer have made several excellent editorial suggestions that I encourage the authors to adopt.

> *We have carefully reviewed the whole text to meet the editorial suggestions made by the Reviewers.*

Reviewer #1

The only minor critique would be, that throughout the whole article, no mention of other 3D visualisation attempts or projects were made.

> *To better contextualize the content, we added a brief review of publication software/platforms at the beginning of the "Visual Media Service" section.*

Figures are well chosen and provide good description. However, in line 290, there is a reference to figure 6a, but it should be 7a. Same goes for lines 293 and 300, most probably overseen during editing.

Resolved.

Reviewer #2

[…] needs native English proofing (verb agreement, which vs that). Below are some suggestions (and suggested corrections of paper are attached for meta-reviewer, but has this reviewer's name) […]

To meet the editorial suggestions made by the Reviewer, we carefully reviewed the whole text also by cross-using different grammar checkers and writing assistants.

Reviewer #3

Abstract

The first paragraph states 'the presence of digital datasets in CH archives and repositories is becoming more and more relevant' and 'the correct management of these assets' comes with issues. But, as the authors state in line 92, the scope of the VMS is only publication and is not intended to double as an archive or a repository. The paragraph concludes with 'systems enabling assisted data publishing may be a solution'. While this might hold true for the publication part of a data life cycle (e.g. https://ukdataservice.ac.uk/learning-hub/research-data-management/ (video)) many other stations of the data life cycle are not addressed by the VMS. I strongly suggest rephrasing this paragraph and focusing more on the problems related to the publication of visual assets.

Resolved. Although we meant data management as the management of data throughout their life cycle (so data publishing can be considered part of data management), we modified the first paragraph to avoid misunderstandings.

Second paragraph: I would suggest to remove the final half sentence 'providing innovative services for archaeological data management'

Resolved. Also in this case, we have changed the final sentence to avoid misunderstandings.

Language edit suggestions by line

19: 'it's not' --> 'is not'

25: '3D models, transforming them' --> '3D models, and transform them'

26: 'VMS is an end-to-end' --> 'The VMS is an end-to-end'

33-34: 'options for 3D models presentations' --> 'options for the presentation of 3D models' or 'options for 3D model presentation'

40: 'the value of VMS' --> 'the value of the VMS'

All resolved, except for the second suggestion, which we preferred not to follow (because of the sentence composition).

Introduction

The introduction and the contribution could be improved by mentioning and maybe even discussing similar services. This would provide some context and help the readers to understand which are the special features of VMS.

To better contextualize the content, we added a brief review of publication software/platforms at the beginning of the "Visual Media Service" section.

In line 49 the FAIR guiding principles are mentioned but only by resolving the acronym. The acronym should either be included or the capitalisation of 'Findable, Accessible...' should be removed to 'findable, accessible...'.

Resolved.

The paragraph starting on line 56 is a single long and hard-to-understand sentence. Consider breaking it up into shorter sentences. Also, this paragraph ends by stating that newly implemented services address archaeological data management. But data management comprises much more and the VMS is aimed at the publication of the final content which should already have undergone a solid data management in the course of its creation. So this part should be rephrased to focus on the publication part of the data life cycle.

Resolved.

Lines 63-64 says 'configuration options already provided for'. Either 'already' should be removed or replaced with e.g. 'now' or is something different meant? Were there already some options present before the work started? If so, this should be specified.

Resolved. The already provided configuration options are now better specified in the last paragraph of the "Visual Media Service" section.

Lines 67-68: I think the part ', appropriately divided ... they provide': can be completely removed.

We preferred not to follow this suggestion. Even though it may seem a little redundant, in our opinion in this specific section ("Introduction") it helps in understanding how the development work has been organized.

Language edit suggestions by line

53: 'three different visual media' --> 'three different types of visual media'

56: 'To boost the penetration of the service in the CH community' --> 'To boost the adoption of the service by the CH community'

68: 'and finally Annotation' --> 'and Annotation'

All resolved.

Visual Media Service

In line 76 the 'large digital datasets' have to be specified a bit. Maybe as visual datasets or something similar?

We preferred not to follow this suggestion. The type of digital data is specified in the following sentence.

Line 79 states that 'reality-based 3D models' are supported. But I guess the VMS does not care what data is coming in and just looks for a supported format. Consider removing 'reality-based' from the beginning and instead specify afterwards that the VMS is optimised for high-resolution unstructured geometries originating from the digitisation of physical objects by means of 3D scanning or photogrammetry.

We preferred not to follow this suggestion. The bullet list in the text starting at this line, does not want to be just a list of supported data types and formats. Rather, it wants to give an indication about the type of data publishing service provided by the VMS ("[...] easy publication on the web of three different types of COMPLEX visual media assets [...]"). This is important because, of course, the system just looks at the supported formats, but trying to work with types of data different from those for which the platform was designed, would devalue the platform itself, would weak one of the most important motivations that led to its creation (handling the publication of complex dataset on the web), and would lead to unoptimized (or incorrect) visualization outputs. Finally, the same bullet list would like to cover a very heterogeneous audience of readers, such as that of digital humanities (hence the use of the term "reality-based", which is not very technical but able to reach a wider audience). For these reasons we keep the "reality-based" term, but we modified the descriptions in the bullet list to better convey this message.

It would be nice to include supported input formats in the list presented in lines 78-83.

Resolved. We specified the supported input formats.

Lines 85 and 131 mention an 'efficient web format'/'web-friendly multiresolution version'. What format is it? Can a reference be included?

Resolved. We specified the multiresolution formats used, adding the needed references.

Initially, I thought 'viewer download' just meant downloading the VMS software and deploying it locally or on its own server. But then later I found a comment on lines 240-241, which gives me another picture: After configuring with the 3D configurator you can download the created viewer with all its settings to then further customise it and deploy it on your own system. This is very valuable and should be explained a bit better!

Resolved. We better specified this possibility in the "Visual Media Service" section.

A suggestion for a future feature for lines 122-124: Federated login (e.g via eduGAIN https://edugain.org/)

Thanks to the reviewer for this suggestion. We added federated login to our to-do list.

Does the process described in lines 122-141 apply to all three supported visual media types? Or is the last step (lines 139-141) only available to 3D content?

Resolved. We specified that the process described applies to each of the three supported visual media assets.

Language edit suggestions by line

75, 78, 84, 123, 126: 'VMS' --> 'The/the VMS' (please also check the remainder of the paper)

78: 'three different complex visual' --> 'three different types of complex visual'

79: ', the ones created' --> ', e.g. created'

132-133: 'it happens in background (so, in the meanwhile, the user...' --> 'it happens in the background (i.e., the user...)

136-138: 'Note that by default ... he/she has to manually change the default'. --> 'By default, media is uploaded as a private resource. But this can manually be changed by the owner.'

All resolved.

3D Configurator

The first paragraph is very general and it could better be moved to the introduction or the previous section about the Visual Media Service.

Resolved. We moved this paragraph (modifying its content) at the beginning of the "Visual Media Service" section.

The descriptions following the introduction are sometimes a bit too detailed and I get the impression that I am reading a user manual and not a scientific contribution. E.g.:

Lines 154-155: I think the part ', appropriately divided ... they provide': can be completely removed.

Resolved.

Lines 163-165: The description is a bit too detailed, the part after 'one for each axis' can be omitted.

We preferred not to follow this suggestion. Although the explanation may seem obvious, it provides useful information for readers less used to interacting with 3D models.

Line 166: Avoid using adjectives like 'very annoying', just 'another issue' is sufficient.

Resolved.

Line 166-171: Please give a short explanation of 'the UP'. From what I gather the 'up vector' that indicates the upwards side of a model is meant?

Resolved.

Line 171: consider removing 'with a simple button'

Resolved.

Line 172: I am not sure if 'straightening' is the appropriate term to describe what can be done. Maybe 'orientation' or 'alignment'?

We preferred not to follow this suggestion. Even though the term is not technical, it gives a good idea of what the tool does.

Lines 181, 183: omit to list all options in the brackets

We preferred not to follow this suggestion. Even though the description is very detailed, it provides useful information to the reader.

Lines 194-200: are one long sentence that can be split up

We preferred not to follow this suggestion. Even if very long, the sentence in question aims to expose a set of points in a schematic and descriptive way. Dividing it would break the general scheme.

Lines 207-211: omit to list all options in the brackets

We preferred not to follow this suggestion. Even though the description is very detailed, it provides useful information to the reader.

Language edit suggestions by line

155: 'and finally Annotation' --> 'and Annotation'

219: 'annotations' --> 'annotation'

All resolved.

Discussion

This section is very long and the topics covered might be grouped into smaller sections like 'Adoption and use of the VMS' and 'Road-Map and future developments for the VMS'. I would also suggest first discussing any future plans and then presenting the numbers around the users and institutions.

We preferred not to follow this suggestion. Even though this section is a bit long, we think dividing it would break the logical/consequential sense of the discussion.

In the discussion, I missed a discussion on the relation of the VMS as a publication platform and any archives and repositories. Maybe this is something that can be thought about in future developments where e.g. an archive could integrate with the VMS. So a media asset stored in the archive would then be

also sent to the VMS where the presentation layer is configured, maybe with some default settings set by the archive.

Resolved. We added a sentence in the "Discussion" section to explicitly mention this possibility.

Are there any plans on integrating the service with the ARIADNEportal?

The VMS is already part of the ARIADNE portal. We edited the first sentence of the Discussion to specify this.

The lines 244-249 should be presented together with the lines 232-234.

We preferred not to follow this suggestion, since we would like to keep separate the general usage numbers from information about the use of the platform in the target community (CH / cultural institutions / research).

Line 235: Only restricted and open access is mentioned. Can licenses applicable to the content be included?

Before to start uploading the own content, the copyright owner (and eventual licenses applicable) can be specified in a dedicated text field provided by the VMS platform. Content creators can exploit this possibility, particularly useful if they decide to make their visual media accessible to anyone through the web platform (open access), rather than to keep them private (restricted access, the default option). Please note that, although there's no direct way to download data from the visualization page (except from the content creator), in order to make the media available, the platform has to send data to the final user device, and this stream can be intercepted and decoded. However, this is true for every online visualization system.

Line 237: I am not sure if saying that 30% of the content is publicly available deduces the 'usefulness' of the access option. Maybe just state that 30% of the content is open access.

This is true. So, without the possibility of publishing data with restricted access the great majority of users would not have been able to use the platform.

240-241: After reading these lines I fully understood what is meant by 'viewer download' in line 100! (see above) Also: 'just to create the viewer' --> 'just to create and configure the viewer'

Resolved.

Line 242 mentions 'other online services' but as I already mentioned for the introduction none are mentioned.

To better contextualize the content, we added a brief review of publication software/platforms at the beginning of the "Visual Media Service" section.

Line 251 is unclear: What is meant by 'so far we have received any news about a more systematic or structured use of the platform'? Does it mean you don't know if there are any systematic use cases of the platform? Or did you receive requests by users to allow for more options to enable a structured use?

> *Resolved. There was a typo in the sentence. We corrected the error to specify that, so far, we have received no news about a more systematic or structural use of the platform.*

Line 261: You mention that the configurator is tailored to 3D models but in line 79 you even have a much narrower view with 'reality-based 3D models'. So the configurator might not even be suitable for all 3D models.

> *This is true. The fact that the VMS does not aim to cope with all the types of 3D data has been already specified in the text. However, we don't think this paragraph is misleading in this regard since it aims to discuss the eventual adaptability of the 3D configurator to the other visual media supported by the VMS, not to discuss the adaptability to all the types of 3D data (for which the platform was not designed).*

265-267: The part with 'Future developments ... to content creators' can be omitted.

268: 'The first step of this process': What process is meant here? I think mentioning the road-map here might make more sense.

> *We preferred not to follow these suggestions. The sentence in 265-267 is an introduction to the future developments described in the following paragraphs. Also, it specifies the process mentioned in 268 (increasing and diversifying the publication possibilities provided to content creators).*

Language edit suggestions by line

243: 'penetration of the VMS in its target' --> 'adoption of the VMS by its target'

256: 'applying the same configurator to' --> 'applying the same configurator settings to'

263, 264: '2D Images' -> '2D images'

290, 293, 300: 'Figure 6 A/B/C' --> 'Figure 7 A/B/C'; Maybe even consider splitting up the image into one with A and B and another one with C?

> *All resolved.*

Reviewer #4

My only suggestions would be a very brief mention if there are similar steps in a configurator for the other two types of data, high resolution 2D images and Reflection Transformation Images (RTI) within the platform

> *We have expanded the discussion about the possibility to develop a similar configurator for RTI and high-resolution 2D images.*

as well as some additional information on the presentation tools provided for the 3D objects uploaded using the configurator in order to provide some insight for that tool making the platform even more appealing for potential users.

We're sorry, but we're unsure we understood what the Reviewer refers to. If "presentation tools" are meant as the interactive tools provided by the 3D viewer (lighting, light direction, measurement, point picking, sections, solid color, projection, full screen), an accurate description of these tools is provided by the reference:

Potenziani M, Callieri M, Dellepiane M, Corsini M, Scopigno R (2015). 3DHOP: 3D Heritage Online Presenter. *Computer & Graphics*, **52**, 129-141. https://doi.org/10.1016/j.cag.2015.07.001