Letter to the Editor. – Review

Sustainability 868597

Dear Editor,

We would like to express our gratitude to the editor and reviewers for analyzing our proposal in depth and for proposing suggestions to improve the quality of our manuscript. In light of their comments and suggestions, we have revised the manuscript. We truly think that this new version of our paper addresses carefully all the reviewer's concerns. Please find below our detailed response to such comments.

Thank you very much for your time and attention.

Yours sincerely,

The authors.

Reviewer #1:

Comment 1.1.- The paper presents different methodologies for surveying cultural heritage and creating 3D models for documentation and preservation.

Response.- The reviewer presents the characteristics of the article. We fully agree with the reduced presentation made.

Comment 1.2.- The process is not new but the methodology is well explained and suitable for the aim of the work.

Response.- We fully agree and appreciate the reviewer's comments.

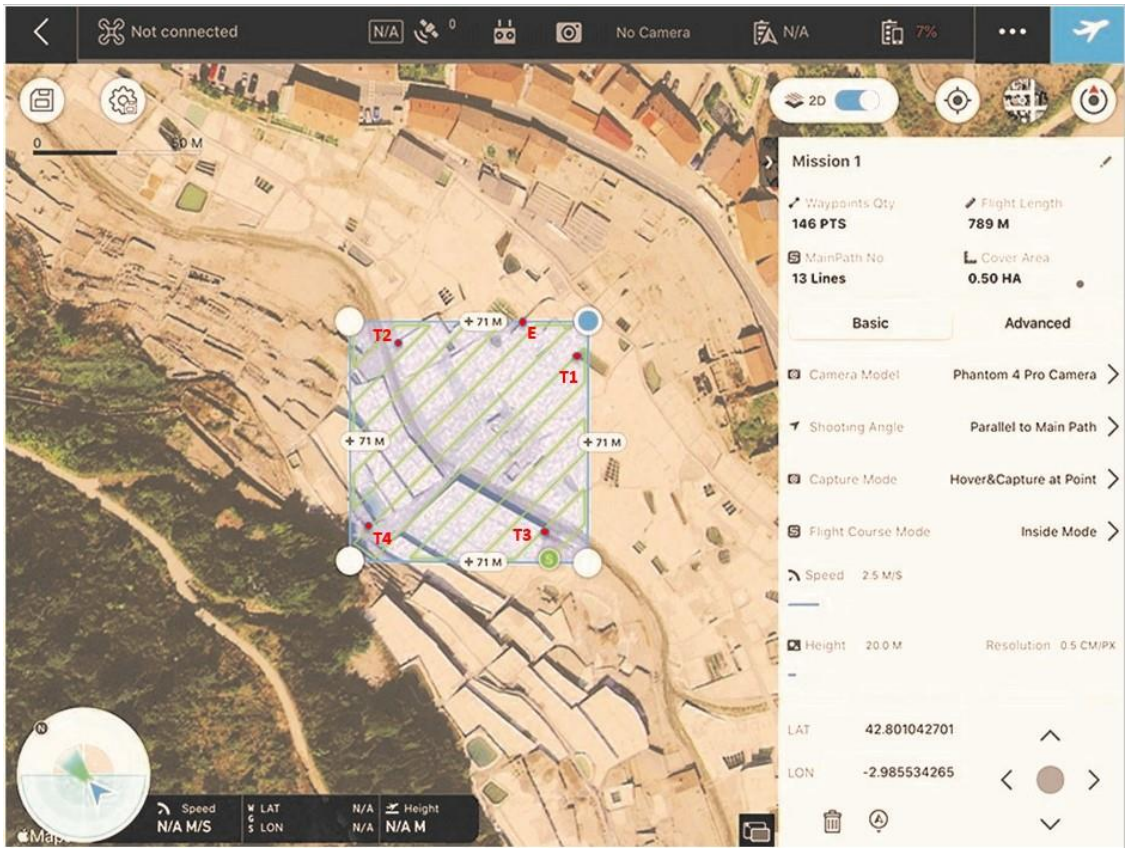
Comment 1.3.- The authors should explain better,maybe with an image, how they placed the GCP in the first survey because the position is unclear and maybe, if I understoof well, can be improved.

Response.- Taking into account the reviewer's suggestion, the explanation of the GCPs' positioning is probably too general and does not sufficiently explain the respective placement procedure, which is vital for improving the model's accuracy. The text between lines 196 and 201 has accordingly been modified and expanded. In addition, the position of the 4 targets and

the station are indicated in the sector of Figure 2b. The modified and expanded text remains as follows:

“The CPGs were positioned based on the following criteria: first, the placement of targets 1, 2, 3 and 4 on the edges of each sector, close to the vertices of the delimiting square, ensuring the greatest possible distance between them in the XY plane; second, their staggered arrangement with respect to the Z axis, trying to ensure the maximum possible elevation difference between targets 1 and 4 and locating the other targets 2 and 3 equidistantly. This was done to guarantee the highest horizontal and vertical precision of the model “.

The modified figure 2b remains like this:



Comment 1.4.- The authors shoul also explain better how they combined the different techniques in the final models.

Response.- We appreciate the contribution of the reviewer, which allows us to clarify this aspect. A paragraph has been included in the discussion, between lines 785 and 792 to explain it better:

“The different techniques for creating the digital model start with capturing and defining the points of the real model. Traditional techniques capture discrete points while modern techniques massively capture millions of points. Point-processing software like *Autodesk Recap* nowadays allow collection of data from different techniques such as laser scanning or

automated photogrammetry. All the models generated in the research were edited with *Recap*, combining data from the different capture techniques. The file generated in Recap can be exported to many types of 3D modelling software, such as the one for our models built using the BIM software *Revit* from *Autodesk*".

Comment 1.5.- It can be interesting to know if the authors think about using these models also for comunication and for other porpuses as VR.

Response.- We consider that communication and raising awareness of heritage are fundamental for its management and basic tools for the respective protection and conservation. We know that the application of new techniques of virtual representation and immersive experience have opened a wide horizon regarding the possibilities and experiences these new tools can offer. That is why several of the models presented in this paper were configured on the *Sketchfab* platform so they can be accessed through VR experiences. A brief reference to this question has been included al the end of the discussion section (lines 798-806):

"The possibility of integrating these digital models in Virtual Reality media improves access to the heritage asset, so it can overcome the spatial complexity of certain environments and the respective access restrictions or effect on the public. At the same time, there are new possibilities for interaction with the site and knowledge about it, promoting dissemination and understanding of its values. Some of these models were configured on the *Sketchfab* platform for viewing in VR, as a prior step toward broader investigation into how these new Immersive Reality techniques are applied; this could, for example, help ease the restrictions on access to wooden churches in the Basque Country, leading to greater recognition of their heritage value".