

Geosci. Instrum. Method. Data Syst. Discuss., author comment AC4  
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## Reply on RC2

Hubert T. Samboko et al.

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Author comment on "Evaluating low-cost topographic surveys for computations of conveyance" by Hubert T. Samboko et al., Geosci. Instrum. Method. Data Syst. Discuss., <https://doi.org/10.5194/gi-2021-22-AC4>, 2021

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We acknowledge and appreciate the comments made by RC2. We are greatly encouraged to hear that the reviewer finds the data collected potentially interesting and of practical use to water managers in developing countries. As advised by RC2, we acknowledge the need to reorganise the paper to focus more on the novel attributes such as the 'gridding' approach, low-cost GNSS based bathymetry, RTK line. We therefore submit the following point by point responses to the reviewer comments.

	<b>Comments from Reviewers</b>	<b>Authors Response</b>	<b>Authors Changes</b>
1	clarify in the abstract that GNSS data are used to characterize the subaqueous bathymetry, and UAVs are only used to map the dry surfaces.	The manuscript indeed misses out on the opportunity to describe much more about the low-cost GNSS. Which we believe could be revolutionary in terms of access to accurate measurements for researchers with smaller budgets.	We will adjust the abstract to clarify that the GNSS is in fact the key tool for the wet bathymetry reconstruction. We will also add a description of the system and its costs to the main text.
2	The description of the	Given that the flight	We will add a

	UAV flight path is not clear. Was the UAV flown in one direction back and forth ("lawnmower" style) or in two direction back and forth ("checkerboard" style)?	path is important as mechanism that can be manipulated to reduce the doming effect, it is noted that the specific flight method must be clarified.	description of the flight path as well as a figure to aid with visualisation.
3	The flowchart in Fig 5 needs to be described better. For instance, what is "MVS"?	The flow-chart which describes the SfM processing of the dry bathymetry was indeed not described. Including terms such as Multi view Stereo (MVS)	We will redo the image to include fully described terms rather than acronyms and we will detail a step by step description of the flowchart in section 2.2.4 'processing dry and wet bathymetry'
4	clarify how the slope was extracted – was a plane fit to the DEM? Is the slope computed from the average of dry points?	An explanation of how slope is derived is missing.  NB* The slope will be compare to the slope of the RTK line (collected using the rolling cart)	We will add a description of the method of slope calculation. This will include a brief explanation of a python module called 'rasterio' which is able to interpret raster images, and therefore extract elevation values (Z) which correspond to the RTK line (the 'true') slope coordinates (X,Y).

5	<p>I believe this is the first mention of "Fixed Camera Parameter". This needs to be described earlier and in more detail. The method is partly described later (line 345) but that is out of place.</p>	<p>The term FCP is indeed misplaced and is supposed to be described in the introduction in-line with methods which can potentially decrease the impact of lens distortion (doming)</p>	<p>We will add a description of FCP to the main text, including references and why it is potentially useful.</p>
6	<p>Figure 13 makes it appear there is a lateral slope of the water surface. Was there? Can we be sure the RTK system is working properly?</p>	<p>We had the opportunity to do simple pre-experimental tests on the accuracy of the RTK system and its accuracy was working. There was no lateral slope of the water surface. However the extreme left bank of the river was inaccessible due to overgrown vegetation. This implies that a small section which would equalise the water levels on the left and right bank is missing.</p>	<p>We will provide an explanation for the apparent lateral slope. It may also be worthwhile to suggest selection of a site which is easily accessible on both sides of the river in future studies. Unfortunately selecting a location which would satisfy this condition and many other conditions such as a straight reach, accessible flood plain, etc. was not straightforward</p>
7	<p>Figures B4 and B5 do not have legends.</p>	<p>Noted</p>	<p>We will add legends to both figure sets.</p>