Geoscientific Instrumentation Methods and Data Systems
Discussions

Geosci. Instrum. Method. Data Syst. Discuss., referee comment RC1
https://doi.org/10.5194/gi-2022-3-RC1, 2022

Comment on gi-2022-3

Anonymous Referee #1

Referee comment on "MOLISENS: MObile LIdar SENsor System to exploit the potential of small industrial lidar devices for geoscientific applications" by Thomas Goelles et al., Geosci. Instrum. Method. Data Syst. Discuss., https://doi.org/10.5194/gi-2022-3-RC1, 2022

General Comments:

This is an interesting manuscript that aims to illustrate how inexpensive lidar units developed for the automotive industry can be used for geoscience applications. The authors do a nice job at outlining the technical aspects of the lidar units they compare.

My general suggestions for improvements to the paper are to do a better job of setting up the problem in the introduction. In particular, can you better describe why users would want to use these systems versus techniques like photogrammetry. Your underground examples make it obvious as to why you need lidar, but I think you need to clearly explain that to readers. In addition, you should expand the intro to show the breadth of how people have been using lidar in the geosciences ranging from controlled outdoor studies (e.g., Rapstine et al. 2020; Rengers et al., 2021) to natural observations (e.g., Rosser et al. 2005) to damage assessments (Olsen and Kayen, 2013).

Another rather large suggestion is to try to gear the paper to seem relevant far into the future. Right now, there are references in euros and references to years when technology is expected to be developed, but those references will seem irrelevant 10 years from now. If you could re-frame the tone to have a long-view (at least a decade) I think it will seem more relevant.

In addition to these general suggestions, I have provided several line comments below.

Olsen, M. J., & Kayen, R. (2013). Post-earthquake and tsunami 3D laser scanning forensic investigations. In *Forensic Engineering 2012: Gateway to a Safer Tomorrow* (pp. 477-486).

Rapstine, T. D., Rengers, F. K., Allstadt, K. E., Iverson, R. M., Smith, J. B., Obryk, M. K., ... & Olsen, M. J. (2020). Reconstructing the velocity and deformation of a rapid landslide using multiview video. Journal of Geophysical Research: Earth Surface, 125(8), e2019JF005348.

Rengers, F. K., Rapstine, T. D., Olsen, M., Allstadt, K. E., Iverson, R. M., Leshchinsky, B., ... & Smith, J. B. (2021). Using High Sample Rate Lidar to Measure Debris-Flow Velocity and Surface Geometry. Environmental & Engineering Geoscience, 27(1), 113-126.

Rosser, N. J., Petley, D. N., Lim, M., Dunning, S. A., & Allison, R. J. (2005). Terrestrial laser scanning for monitoring the process of hard rock coastal cliff erosion. *Quarterly Journal of Engineering Geology and Hydrogeology*, *38*(4), 363-375.

Specific Comments:

Line 19: Explain why you used such a long-range lidar for such confined areas?

24: This is a minor comment, but I don’t see how you get the “LI” in MOLISENS. Don’t you need to put “Lidar” in there, for example, Mobile Lidar Sensor system.

28: Here and elsewhere, when you say automotive lidar, it is a little unclear. What you mean is that you are using small lidar sensors that were originally designed for the

automotive industry. But it is a little confusing because people might think you mean lidar mounted on an automobile. So try using a more descriptive term like lidar developed for the automotive industry.

43-44: I think you should avoid things like prices and saying when an instrument is expected to be out. Here you write “late 2022”, but what if your paper isn’t out in 2022? What if the instrument isn’t ever released.

145: Can you explain how the GPS works in a cave?

206: The sentences here: “We found that…” should be in the results.

218: Where you have written (etc) what are the other things that you are measuring? I’m more interested in that, than the information in Table 1. Consider putting those measurements in a table.

226: where you say “How many clusters of points in a 0.5m radius exist between 5 and 10 in THE x direction …” What are the units you are refering to when you say between 5 and 10?

345-361 Add this information to the intro.

Figure 1. Add labels (a, b, and c) for the sub-figures here. Also in (b) consider adding something for scale, such as a pen.

Figure 5. Add a colorbar in 5d.

Figure 6. Use a more complete sentence and be more descriptive in the caption for (a). (b) Add a colorbar, label the hand-rail, and try using something like the EDL filter to make the point cloud more visible in the figure.

Figure 7: Show location map of where the glacier is located (similar to inset in 5a). Add a colorbar to all figures.

Table 1: Is this table necessary? The specs feel somewhat out-of-step with a journal article.