

Referee 1

General Comment

In general, I think the authors have done a good job revising this manuscript and I do not have any further major recommendations. I do have a few small suggestions.

Dear Referee 1,

We are very grateful for your constructive reviews and appreciate the valuable time put into this. We believe by incorporating the reviews we managed to achieve a much more mature manuscript which we hereby submit for your consideration.

In the following we mark black the comments given by the reviewers and the editor, give our answers and comments in blue and indicate how we addressed the amendments in the manuscript in green.

For details please also see the attached latex diff which shows all the changes.

Once again, many thanks for the valuable input and all the best – on behalf of the author team,

Stefan Muckenhuber

Specific Comments

-first response uses the term 'Non-automotive' again, I think you should consider taking the term automotive fully out of the document. I like your 'small industrial' description better than automotive. Consider this example. If I took a camera, that was originally designed for a phone, and mounted it on a circuit board it would be strange to call it a phone camera. It is no longer related to the phone at all, the only relationship is that the part was originally designed for use in the phone industry. I think it's a similar situation with your lidar. Its not on/in a car and so it really isn't related to automobiles at all.

We agree and have replaced the term 'automotive' at several places with the term 'small industrial'. We have left the term 'automotive' only at places where it is relevant to refer to the automotive industry, e.g., as driver for new lidar technology.

-If you want to show price comparisons, then I think you need to show both the price of the new proposed unit and the price of the Riegl units. Price is something that tends to make little sense after about a decade. Consider the drop in the British pound before/after Brexit, or price inflation from 2019-2022.

We agree and added a price estimate for the TLS. NB: the Riegl VZ-6000 costs currently around 160,000 EUR.

It should be cheaper than TLS (currently around 100,000 EUR to 200,000 EUR), with a high sampling frequency and be independent of natural or artificial light, while being small and light enough to carry into tight spaces like caves.

-As the other reviewer pointed out, the authors only really compare the Riegl and the MOLISENS in a lab environment, they don't compare it in the field. I think that's fine, but I think they need to talk about it in that way. For example, take line 18:

"To evaluate the performance of MOLISENS, we present a comparison between the integrated automotive lidar Ouster OS1-64 and the state of the art, high accuracy and high precision TLS RIEGL VZ-6000. "

And change to:

"To evaluate the performance of MOLISENS, we present a comparison between the integrated automotive lidar Ouster OS1-64 and the state of the art, high accuracy and high precision TLS RIEGL VZ-6000 in a set of controlled experimental setups. We then use the Ouster OS1-64 in several real world settings "

We agree and changed the corresponding sentences in the abstract to the following:

To evaluate the performance of MOLISENS, we present a comparison between the integrated small industrial lidar Ouster OS1-64 and the state of the art, high accuracy and high precision TLS RIEGL VZ-6000 in a set of controlled experimental setups. We then apply the small industrial lidar Ouster OS1-64 in several real world settings.

Editor

Comments:

Dear Dr. Goelles and co-authors,

Thank you for your handling of the paper and response to referee comments. Reviewer #1 has responded positively to this and suggested that the paper be published as-is, but has also added some of their own comments. Referee #2 has contacted me to note that they cannot commit to a full re-review, but leave the comment that they are not sure that your edit about return intensity answered their question. In particular, Referee #2 wrote to me that,

"I was more interested in the suggestion that a lower intensity return would be better for change detection. I find that counterintuitive. That being said it may be an interpretation issue because of how the sentence was written."

If you can address these minor comments, I would be happy to take a look at your handling of them myself, sparing us another round of review.

Best wishes,
Andy Wickert

Dear Editor,

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Once again, many thanks for the valuable input and all the best – on behalf of the author team,

Stefan Muckenhuber

Specific Comments

Referee #2 wrote to me that, "I was more interested in the suggestion that a lower intensity return would be better for change detection. I find that counterintuitive. That being said it may be an interpretation issue because of how the sentence was written."

We agree that there can be an interpretation issue because of how the sentence was written. Lower intensity values itself are not better for change detection. Our intention was to point out, that the intensity difference between ice (low intensity values) and glacier surfaces covered with, e.g., moraine material or sediments (higher intensity values) allows to distinguish between bare ice and surface covers such as moraine material or sediments. We changed the corresponding sentences in the manuscript to the following:

In addition, different surface types can be distinguished if they show a significant difference in intensity. E.g., the recorded intensity values for ice surfaces are significantly lower than for surfaces covered with, e.g., moraine material or sediments. This allows to distinguish bare ice from gravel based surface covers.