

We sincerely thank Referee #1 for their constructive, helpful, and thorough review that has improved this paper. Below, we address each referee comment. Each referee comment is in **BOLD** and our response directly below. Page/line numbers in referee comments refer to the original submission. Page/line numbers in responses refer to lines in the revised manuscript with Track Changes mode enabled (prior to accepting the changes).

GENERAL COMMENTS

- 1. The manuscript presents an interesting study about the potential of terrain elevation data sets and façade images generated from unmanned aerial vehicles (UAVs, also known as drones) to support post-disaster rescue decision making. The study has also a strong practical relevance.**

- 2. In my opinion, a discussion on the applicability of the proposed data acquisition methods in different conditions from those in Victoria (Canada), e.g. different types of buildings or different city layouts, and also the limitations related to building destruction and weather conditions can impose on the fly-ability of UAVs, should be included in the manuscript.**
 - We thank the referee for this important consideration. We added the following paragraph to the end of **Section 4.2**: “The data acquisition methods used in this study will need to be adapted to fit the conditions of different urban areas. For example, flight altitude will need to be adjusted to give a safe vertical clearance from the tallest building. If the terrain in the area is sloped, elevation data should be input to the flight planning software to keep the flight altitude constant. A grid of flight lines is recommended, although its orientation and image overlap will vary depending on factors such as building layout and density. In a post-disaster context, a takeoff and landing location may be difficult to locate and access due to widespread destruction. Weather conditions such as high winds and rain following storm events may pose challenges to the flying ability of lightweight drones. Atmospheric conditions such as haze and smoke limit optical sensors in imaging destruction. These factors are examples of considerations that should be made when adapting the data acquisition methodology in this study”.

- 3. In general, the manuscript is well written and clear, and the figures and tables are informative and of good quality. Below I suggest a few minor points that the authors may consider to improve the quality of the manuscript**

SPECIFIC COMMENTS

- 4. Page 1, Lines 14-15. This sentence should be rephrased/improved as it is too general and not completely correct, as it ignores many factors that may minimise the impact of natural hazards in cities (increased quality of construction, alarm systems, proximity to rescue services, . . .).**
 - We thank the referee for this important point. On **page 1, lines 14-17**, we revised the sentence and the proceeding sentence as such: “Increasing global population and urbanization (particularly in vulnerable areas) are factors that can contribute to increased death and destruction by natural hazards like earthquakes and tropical cyclones. In addition to initiatives such as increased quality of construction, alarm systems, and proximity to rescue services, pre-disaster mapping can help increase a city’s resilience against disasters (Pu, 2017)”.

5. **Page 3, Line 4: according to many guidelines the % symbol should not be preceded by a space. This happens in many other parts of the manuscript. Please consider to revise**
- We followed the NHESS manuscript preparation guidelines (link below) when we decided to include spaces between numbers and units (e.g., %, m, °). The specific guideline is listed under the section “Manuscript composition”, subsection “Figure content guidelines”, item 4: “Spaces must be included between number and unit (e.g. 1 %, 1 m)”. The description for “Figure content guidelines” reads “In order to facilitate consistency with our language and typesetting guidelines applied to the text of the manuscript, please keep the following in mind when producing your figures”. Therefore, we interpreted these figure guidelines to be applicable to the text. However, if our interpretation is incorrect, we will remove the spaces between numbers and the % symbol.
 - NHESS manuscript preparation guidelines we consulted: https://www.natural-hazards-and-earth-system-sciences.net/for_authors/manuscript_preparation.html
6. **Page 3, Line 5: “. . . report. . . conducted. . .”. I believe reports do not conduct assessments. Perhaps “present”. Please consider to adjust the sentence.**
- On **page 3, line 6**, we replaced “conducted” with “presented”: “A 2016 report on the seismic vulnerability of Victoria ~~conducted~~ **presented** a risk assessment...”.
7. **Page 5, Line 2: “GNSS” all acronyms should be defined when they are used for the 1st time in the text to avoid ambiguity. Is GNSS the acronym for “Global Navigation Satellite System”? Please check other acronyms that are not defined in the manuscript.**
- **Page 5, lines 10-11**: we defined GNSS
 - We also defined SODA (**page 4, line 17**), RGB (**page 4, line 17**), NRCan (**page 4, line 26**), and CGG2013 (**page 6, line 5**).
8. **Page 6, Line 13: a reference to the software should be added.**
- **Page 7, line 18**: We added an in-text citation to CloudCompare software. We added the citation to the reference list.
 - For consistency, we also added in-text citations for senseFly eMotion (**page 4, line 28**), Pix4D Pix4Dmapper (**page 5, line 12**), and ESRI ArcMap (**page 7, line 9**), and added them to the reference list.
9. **Page 6, Line 16: “to” seems to be missing in the sentence**
- **Page 6, line 14**: We added “to” to the following: “ASPRS (2015) recommend vertical checkpoints **to** be...”.
10. **Page 8, Line 1: a “that” seems to be missing in this sentence**
- **Page 8, line 18**: We added “that” to the following: “With a 0.31 m average point spacing, it is possible **that** the LiDAR point cloud...”.
11. **Page 8, Line 24: “was assessed going forward”? what do the authors mean with this? Please consider to rephrase the sentence.**
- **Page 9, lines 8-9**: After considering this comment, we realized this sentence is unnecessary, and have removed it from the text.

12. Page 9, Line 27: “single story building” instead?

- We would like to retain “single building story” because the use of DSMs to detect building collapse can include partial collapses such as single-story collapse (Fig. 1) and roof collapse (Fig. 2) within a multi-story building. We believe “single building story” is the more general term, as it includes single-story buildings and partial collapses.



Fig. 1. Single-story collapse. Copied from So (2016).

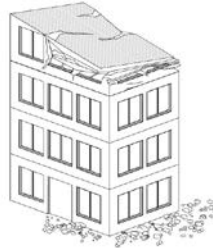


Fig. 2. Roof collapse. Copied from So (2016).

So, E. (2016). *Estimating Fatality Rates for Earthquake Loss Models*. London: Springer.

13. Page 9, Line 32: should read “. . . sub-meter LoDs. . .” instead of sub-decimeter?

- We thank the referee for identifying this error. On [page 10, line 19](#), we changed “sub-decimeter” to “sub-meter”.

14. Page 10, Line 25: “, . . . but achieve a fraction of time. . .”. This part of the sentence is not clear. Please revise.

- [Page 11, lines 15-16](#): We revised the sentence as follows: “Lightweight RTK/PPK-enabled multi-rotors may be more affordable than the senseFly eBee X with SODA 3D camera, but typically have a shorter battery life and subsequently lower areal coverage than fixed wings.”

15. Figure 2: the font of the 3D point density images legend/scale is very small and difficult to read.

- In Figure 2, we increased the size of the text in the legend and scale.