

Referee report on the manuscript

**“Review article: Emergency Response Automation (ERA) as a Safety-Critical System:
A Systematic Review of Reliability, Architecture, and Evolution (2010-2025).”**

submitted to the journal

Natural Hazards and Earth System Sciences

The authors present a comprehensive review of Emergency Response Automation (ERA) systems, examining their evolution, architectural characteristics, and reliability considerations across multiple domains. By synthesizing literature from diverse application areas, the manuscript provides a structured overview of how sensing, decision support, and automated response mechanisms have developed over time. The study also attempts to conceptualize a next-generation ERA framework and situates it within existing theoretical models in emergency management. Overall, the topic addressed is timely and relevant, as increasing automation and data-driven technologies are playing an important role in disaster response and risk management. The manuscript is generally well organized and offers useful insights into current research directions and technological trends in ERA systems.

The following are a few concerns that need clarification:

1. On page 8, a Boolean search strategy was mentioned with a few keyword combinations. However, there is no clarity in the choice of these terms, including whether synonyms and plurals were captured, and whether there were any field restrictions or exclusionary criteria. The choice of search terms may also introduce bias and omit relevant literature. This bias needs to be addressed.
2. The conceptual evolution diagrams presented in Figures 4, 5, and 6 are interesting. Since the review includes 198 studies, the authors could significantly strengthen the analysis by quantitatively categorizing the reviewed papers according to these stages. For example, presenting the number or proportion of studies corresponding to each phase and how these evolve over time would provide support for the proposed framework and illustrate the evolution of ERA research more clearly.
3. The rating methodology described in Section 5.1 and summarized in Table 3 is currently unclear. The categories “Strong,” “Medium,” and “Weak” are not explicitly defined, and the criteria used to assign these ratings are not sufficiently explained. It would strengthen the manuscript if this could be clarified in the evaluation procedure, including whether these ratings are based on defined thresholds, quantitative indicators, or a structured set of assessment conditions.
4. While the paper provides a broad synthesis of ERA research, the limitations of the review process are not explicitly discussed. As mentioned earlier, potential biases may have influenced the selection of papers, which is one of the other limitations.
5. The conclusion section currently focuses mainly on design principles for future ERA systems. While these recommendations are valuable, the section could be strengthened by providing a clearer synthesis of the main findings of the review. In

particular, summarizing the key insights emerging from the analysis of the literature, limitations identified from the literature, and other major insights would help reinforce the contribution of the study.

Other modifications:

1. Line 86, add appropriate references for the sentence 'Moreover, few studies provide a systematic synthesis...'.
2. Table 1 shows the recent literature reviews. It would be helpful to readers if the caption included the duration, which considers recent reviews, such as 2020-2025. Also, it would be good if the articles were listed in the table in chronological order of publication year. The first author's name is written and then again in-text citation in parentheses. Either all the author names can be listed and keep the in-text citation as a separate column, or just keep a 'Reference' column is fine.
3. Since many readers would not know what a PRISMA review of literature is, it would be good if an appropriate reference could be added wherever the term 'PRISMA' is used, as shown in line 128.
4. Figure 1 - the figure needs to be in high resolution (300 dpi). The caption needs to elaborate on what it represents - what each layer represents, and refer back to the section where these layers are explained in detail. Also, change 'Fig.1' to 'Figure 1'.
5. Line 129 - include the sources where articles were searched. It is mentioned that the focus of publication duration is 2010 to 2025. But the search results also included articles published before 2010, which were retained. This contradicts the statement that the review duration is from 2010 to 2025. It would be good if a clarification is added here stating whether the articles published before 2010 are included in the systematic review or not.
6. Figure 2 - More spacing can be added between the bars so that the x-axis values have space between them. Or make the x-axis values tilt.
7. All figures need to be in 300 dpi for high resolution.

Minor Typos:

1. Add a space before a parenthesis begins, such as in lines 54, 55, 57, 69, and more. Check the whole document for such spacing issues.
2. Line 64, make the first letters of the word 'artificial intelligence' in capital letters, as it shows an abbreviation using '(AI)'.
3. Line 216 - the comma appearing before the word 'forest' should be placed after the word 'management' and then a space.
4. Lines 222, 267, 328 - the space between the in-text citation and fullstop can be removed.
5. All figure captions - change 'Fig.' to 'Figure'.
6. Line 297 - spacing required before and after in-text citation parentheses
7. Line 300 - for in-text citation, 'Azid et al.', provide the year as well. Same for line 301.

8. Line 321 - remove the extra parentheses for the in-text citation provided.
9. Line 408-409 - capitalise the first letters of 'unmanned aerial vehicle' as it represents the abbreviation 'UAV' given in line 409.
10. Table 2 - better to repeat table headers in all the pages where the table is present.
11. Good to add a table showing the list of abbreviations.
12. For in-text citations of multiple papers, good to give them in the order of year of publication for better readability. For example, line 356 lists 3 papers, but not in the order of publication year.

Overall, the manuscript addresses an important and timely topic, and the above revisions would help improve the overall contribution of the paper.
