Review of manuscript:

"**Evaluating the Effectiveness of Aluminum Coatings on Patch-Repaired Composites Using Electro-Thermal Analysis**"

The simulation and experimental result of this study is strong, well-structured, and provides valuable insights for the development of Patch-Repaired Composites field. I have only two question for the author.

1. The author mentioned that scaling this approach for broader application will pose challenges due to significant weight increases. Does author have any thought to overcome this issue?

Thank you for your insightful question.

In the initial design of aircraft structures, there is always a trade-off between weight reduction and structural performance. It is essential to optimize material selection and structural configuration to minimize weight while meeting the requirements for strength, stiffness, and durability.

However, regarding **repair design**, particularly for **composite material structural repair solution**, key considerations should include repair feasibility, structural performance restoration, and minimizing operational impact, such as reducing Aircraft on Ground（AOG） status duration.

In this study, whether using the fully aluminum coating repair scheme or the cross-shaped aluminum coating repair scheme, the primary objective is to enhance the lightning protection capability of the repaired structure upon re-exposure. **Therefore, while ensuring the effectiveness of the repair, aluminum coating strategy was further optimized, and the cross-shaped coating design is detailed in Section 3.2.** This approach aims to provide effective lightning protection while simultaneously addressing weight reduction and improving operational feasibility, thereby balancing repair efficiency and practical applicability.

2. These findings pave the way for the development of more effective repair techniques and lightning protection strategies in composite material applications. Does author has any future direction for further study?

Compared to metallic material repairs, the repair design of composite materials typically involves more complex feasibility assessments, often requiring the Repair Design Office of the OEM to issue and approve a Technical Disposition. Due to the constraints imposed by material performance and repair procedures, significant simplification of existing repair methods remains challenging. Therefore, **enhancing the durability of repaired structures and reducing the frequency of future repairs** could be key directions for achieving more efficient repair solutions.

In this context, future research could explore **the application of a Tedlar ply over the repaired composite surface before aluminization.** Tedlar, a fluoropolymer film with high weather resistance, corrosion resistance, and thermal stability, can mitigate impact-induced damage to the substrate, reduce the formation of burn marks from lightning strikes, and enhance resistance to hail and wind erosion, thereby extending the service life of the repaired region.

However, the low surface energy of Tedlar may affect the adhesion of the aluminium coating. Therefore, surface preparation techniques such as sanding or plasma treatment are typically required before applying the aluminum coating to improve adhesion. To further investigate the feasibility of this approach, **relevant discussions have been included in Section 4 of the paper, with additional details highlighted in green.**

Other than these two comments, I think this article is ready for publication.