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Prof. Eskandarian
Department Head
Nicholas and Rebecca Des Champs Chair
Mechanical Engineering Department, Virginia Tech
635 Prices Fork Road, 449 Goodwin Hall (MC 0238) Blacksburg, VA 24061

Review of paper T-ITS-21-05-1111.

Dear Prof Azim Eskandarian,

Thank you for taking the time to review our manuscript. We have given each comment careful consideration between all the authors and we have made changes to the document that make the document clearer and more correct. We give a full account of the changes and rebuttals below.

Reviewer 1

Comment 1: "the whole manuscript seems written from the perspective of Game Engines testing, which lacks practical values in the transportation area.". Thank you for this comment and we believe that the title of the document should better reflect the content of the paper, which is primarily concerned with the importance of determinism for simulation based verification of autonomous vehicles.

Carla is based on a game engine and Carla is currently a popular choice for simulation-based vehicle testing, so this would suggest that the underlying game engine of Carla is of practical value to the community of intelligent transportation. The paper is not focused on game engines per se, but rather the implications of using those game engines for vehicle testing.

Furthermove, we state on pg.4 the differences between the requirements of game engines for gaming, and for that of AV testing. "Considering the objectives for gaming and comparing them to these for AV development and testing, there are fundamental differences. Providing game players with a responsive real-time experience is often achieved at the cost of simulation accuracy and precision. The gamer neither needs a faithful representation of reality (i.e. gamer accepts low accuracy) nor require repeated actions to result in the same outcome (i.e. gamer accepts low precision). In contrast, high accuracy and precision are necessary for AV development, testing and verification." Carla, and other game engine based simulators, will be an entry point for many SME's and start-up companies looking to develop products and services in this area and we believe that this paper bring pertinent information to this community may of whom may look to ITS for guidance.

Thank you and the reviewers for your time and consideration into this paper.

Sincerely,

Dr. Greg Chance, PhD, CEng,
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