FS-AI Simulation Development Static Event Rules
April 2020

This year, the IMechE would like to invite teams to participate in a new optional Static event for FS-AI, called Simulation Development. The purpose of this event is to evaluate the student's understanding of simulation within the autonomous vehicle development workflow, and demonstrate their self-driving algorithms in detail, especially while teams cannot access physical hardware. This will be scored separately to the current FS-AI DDT and ADS classes.

You must continue to follow social distancing instructions from your governments and the advice of your public health institutions. Until any such restrictions are relaxed, we would like to remind you all of the following:

- Please do not conduct face to face meetings as a team to work on your cars or on your projects
- Only conduct project work which can be completed remotely but collaboratively, using the abundance of online platforms available.

Simulation Development event format
The teams are required to simulate at least 1 dynamic event out of the Acceleration, Skidpad and Track Drive events with a virtual vehicle, either the FS-AI DDT vehicle or the team's own autonomous Formula Student vehicle.

The submission to this event would include a **15** minute narrated presentation video (including graphical demonstration of your simulation), alongside a submission of suitable data or code sample to demonstrate proof of build of the team's simulation (this is an extension to S3.5.2 from the FS-AI 2020 Rules). This submission will be followed by a **30** minute live virtual Q&A session with judges for each team.

Teams are free to use whatever simulation software they choose. Development of their own sensor models, environments and vehicle models will be rewarded. Simulating more than one dynamic event will be rewarded. Vehicle performance (ie, laptime) won't be directly rewarded or compared.

Topics judges would like to see covered include, but are not limited to:

- Digital twin environments and environmental factors (ie weather)
- Perception and localisation algorithm development
- Vehicle models and dynamics analysis
- FS-AI Mission Control implementation
- Further software stack development, including path planning and vehicle controls (driver models)
- Debugging and visualisation tools

- Integration of the vehicle interface with simulated vehicle actuator controller(s)
- Correlation and validation methodologies (noise factors, etc)
- Data analysis methodologies
- How does simulation development inform real-world testing?

Teams of all levels of simulation development are encouraged to enter. To help get teams started, Edinburgh University Formula Student Team have kindly open-sourced their Gazebo simulator here:
https://gitlab.com/eufs/eufs_sim

If you have any questions about this event, please submit your questions via your Team Account and the FS Questions Database, using question type 'Other'.