FSG MathWorks Modeling and Simulation Award 2026

Event Name:	FSG MathWorks Modeling and Simulation Award 2026
MathWorks Point of Contact	Veer Alakshendra (valakshe@mathworks.com)
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A. Award Overview

The FSG MathWorks Modeling and Simulation Award 2026 is designed to recognize and reward teams that effectively use MathWorks tools in the design and development of their electric and autonomous vehicles in the Formula Student Germany 2026 competition. The goal is to encourage teams to adopt industry-grade Model-Based Design practices and demonstrate how simulation supports engineering decisions.

The award determination process consists of two stages: evaluation of a detailed report and assessment of a formal presentation. Teams will be evaluated based on a simulation-driven case study that highlights how MATLAB and Simulink were used to support a key design decision, focusing on the modeling approach, insights obtained, resulting design changes, and validation with real-world data.

The top three teams that demonstrate the most effective use of MathWorks software will be honored at the Formula Student Germany 2026 award ceremony with cash prizes: **3,000 USD** for the first place, **2,500 USD** for the second place, and **1,500 USD** for the third place.

B. Procedure

- Participation in this competition is free.

- **Stage 1**:
  - The teams will need to submit a document in a PDF format to the organizers by **July 26, 2026, 23:59 CEST.** Only one entry may be submitted by each team. The submission details are provided in Section **D**.
  - The report must be submitted in a ***two-column format and is limited to a maximum of four pages***.
  - All entries will be judged by MathWorks engineers on a 100-point scale. The scoring criteria is provided in Section **C.**
  - Up to **6 teams** will be selected to participate in Stage 2 of the Competition.
  - The result for Stage 1 will be announced on **August 4, 2026**.

- **Stage 2**: The teams that qualify **Stage 1** will be invited for a formal presentation and they will need to present their work to the MathWorks judges at the Formula Student Germany event. The chosen teams will receive communication on **August 7**, **2026,** to coordinate the scheduling of presentation slots.

- The 1st, 2nd, and 3rd winners will be announced at the Formula Student Germany 2026 award ceremony.

- **Judges' decisions are final.**

C. Content and Scoring

- Points (**out of 100**) will be assigned based on a single simulation-driven case study that demonstrates the largest impact on your Formula Student car design. This could include influencing a key design decision; helping choose between competing concepts; solving a critical performance or reliability issue; or reducing development time or physical testing.

- Teams must present **one (1) case study** that had the highest impact on the design, performance, or development of their vehicle. Typical examples (**not limited to**):
    - Overall vehicle performance optimization influencing vehicle setup or design choices
    - Suspension or tire modeling impacting handling performance
    - Powertrain configuration (motor, gear ratio, battery sizing)
    - Control system design (traction control, torque vectoring, etc.)
    - Thermal management decisions for endurance
    - Driverless perception, planning, or control validation

The 100 points will be evaluated based on the following criteria:

a. Engineering Context (10 pts)

- What Formula Student problem or decision were you addressing? Clearly define:
    - The event or scenario (e.g., skidpad, autocross, endurance)
    - The challenge (e.g., understeer, overheating, instability, energy limits)
    - The design question or trade-off

b. Simulation Approach (20 pts)

- How was simulation used to support this decision?
    - What model was developed? (e.g., lap time sim, vehicle model, controller, battery model)
    - What level of fidelity was chosen, and why was it sufficient?
    - What assumptions were made?
    - How was MATLAB and Simulink used in your workflow?

c. Insight Enabled by Simulation (20 pts)

- What did the simulation reveal?
    - What did you learn that was not obvious before?
    - Did the results challenge your initial assumptions?
    - What key trends or sensitivities were identified?

d. Design Decision and Impact (35 pts)

- What changed because of the simulation?
    - What specific decision did you make?
    - How did this affect the car?

  Examples: change in suspension setup or geometry; selection of powertrain components; controller tuning strategy; reduction in lap time or energy consumption; improved reliability or reduced iterations

e. Validation and Real-World Correlation (15 pts)

- How did you validate your results?
    - Comparison with track data (skidpad, acceleration, endurance, etc.)
    - Driver feedback vs simulation results
    - Agreement between predicted and actual performance

D. Submission

- The report must be submitted in a ***two-column format and is limited to a maximum of four pages***.

- Upload the document in PDF format to the FSG website (→ My Team → Competitions → Deadlines).

-Please name your file in the following manner: Car#_TeamName_FSG_MW_2026_V#. For example: E01_TeamFSRacers_FSG_MW_2026_V1

- To avoid download errors, please submit the document in PDF format.

- The deadline for submission is **July 26, 2026, 23:59 CEST.**

* **You also have the choice to include link to short videos in the PDF document to demonstrate the functioning of your model or code.**

E. Reference Materials

Request complimentary software: https://www.mathworks.com/academia/student-competitions/formula-student-germany.html

Recommended Tutorials/Code/Models:

- Formula Student Vehicle with Simscape: https://www.mathworks.com/matlabcentral/fileexchange/172279-formula-student-vehicle-with-simscape
- MATLAB and Simulink Racing Lounge – Improving Your Racecar Development: mathworks.com/videos/series/improving-your-racecar-development-101027.html
- Code Generation: https://www.mathworks.com/academia/students/tutorials-videos.html#codegeneration
- Get Started with the Extended Tire Features for Vehicle Dynamics Blockset: mathworks.com/help/vdynblks/ug/get-started-with-the-extended-tire-features-for-vehicle-dynamics-blockset.html

Published Videos/Blogs by Teams:

- How AMZ Racing Designed the Motor Controller to Achieve 0 to 100 km/h in 0.956 Seconds: https://blogs.mathworks.com/student-lounge/2024/06/03/how-amz-racing-designed-the-motor-controller-to-achieve-0-to-100-km-h-in-0-956-seconds/
- Formula Student Vehicle Modeling Using Simscape Multibody: youtu.be/YzCEyr2F3Rw?si=KJYe55RFN4uXUy3f
- Virtual suspension design processes with McGill Formula Electric: blogs.mathworks.com/student-lounge/2021/08/27/virtual-suspension-design-processes-with-mcgill-formula-electric/?doing_wp_cron=1660639858.1010980606079101562500
- Lap Time Simulation; Essential Part of Concept Development: mathworks.com/videos/matlab-and-simulink-racing-lounge-lap-time-simulation-essential-part-of-concept-development-98733.html
- Formula Student Driver-in-the-Loop Simulator Using Simulink and Unreal Engine: https://youtu.be/2ewBax-etuw?si=6P0-Iy8IJRYG20o6

F. Frequently Asked Questions (FAQ)

1. Can we include more than one case study?
Teams are required to submit one (1) case study that demonstrates the largest impact on their vehicle design, performance, or development.
Teams may briefly mention other simulation activities; however, only the selected case study will be evaluated.

2. Our work spans multiple areas (e.g., powertrain and lap time simulation). Is this one case study or multiple?
This would be considered a single case study, as long as the work supports a common engineering decision or outcome. In Formula Student, systems are often interconnected. Teams are encouraged to present an integrated case study showing how different models worked together to influence a key design decision.

However, combining multiple models or systems does not provide an advantage by itself. Submissions are evaluated based on the clarity of the engineering problem, the insight generated, and the impact on the final design, not the number of models included. A focused case study (e.g., detailed tire modeling) that clearly demonstrates how simulation influenced a design decision can score equally well as a broader, system-level study.

3. What if our simulation did not directly change the design?
Simulation can still be valuable even if it does not result in a major design change.
Submissions may include cases where simulation:

- Improved system performance
- Supported validation and verification
- Increased confidence in design decisions
- Helped refine or tune existing systems

The key is to clearly demonstrate the impact of simulation on engineering decisions or understanding.

4. How much model detail or fidelity is expected?
There is no requirement for highly complex or high-fidelity models.
Teams are encouraged to use a level of model fidelity that is appropriate for the decision being made. Well-targeted models that provide clear insights are valued.

5. How should we demonstrate validation?
Validation can be demonstrated in different ways depending on available resources, including:

- Comparison with track test data (e.g., skidpad, acceleration, endurance)
- Driver feedback compared with simulation results
- Agreement between predicted and observed trends

Both quantitative and qualitative validation approaches are acceptable.