

# ASME Extended Reality Challenge Rules

2022



## **ATTENTION E-FESTERS!**

### **Please read this important announcement about ASME E-Fests in 2021 & 2022**

ASME E-Fest Digital (March 25-26, 2022) and affiliated competitions will NOT be held in-person. They will continue to be virtual for the academic year '21-'22.

ASME will be hosting a series of year-long digital events including competition “how to” webinars and much more. Please visit <http://efests.asme.org> for more details.

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## 1. Objective

The ASME Extended Reality Challenge (XRC) provides an opportunity for students to apply course learnings in a virtual reality competition with a focus on CAD and programming skills.

## 2. General Info

### 2.1. *Superiority of the rules*

These rules have been established by the ASME Extended Reality Challenge Committee. Should any conflict arise between these rules and those of the ASME, the ASME rules shall take precedence. Should any conflict arise between these rules and other information regarding the ASME XRC, whether generated by the ASME or any other organization, these rules shall take precedence.

### 2.2. *Questions*

Post questions about the competition, rules, and software platform to the XRC forum:  
<https://forums.siminsights.com>

General questions about ASME E-Fest Digital may be sent to [efests@asme.org](mailto:efests@asme.org)

### 2.3. *Location and competition information*

All XRC competitions will be held virtually. The competition dates, deadlines, and rules will be posted on the official ASME XRC website. Teams wishing to participate should consult the website and forum.

Official website: <https://efests.asme.org/competitions/asme-extended-reality-challenge>

### 2.4. *Definitions*

**Behavior graph:** algorithm that is called in the simulation to control the virtual object

**Competition:** XRC events where the entries are tested

**Competitor:** an individual who is competing in the competition

**Individual:** a single participant of a competition and likely a team member

**HyperSkill:** the XRC software platform

**Registration:** the process to record individual and team information by ASME

**Simulation:** the environment in which submissions are tested

**SimInsights:** XRC sponsor and creator of HyperSkill

**Virtual object:** 3D models uploaded to HyperSkill are treated as a Virtual Object (VO)

### 3. Problem statement

Design your own autonomous vehicle! Create a vehicle design in CAD, build a robust algorithm to navigate around a race course, and compete head-to-head against other teams in a virtual race track.

### 4. Deliverables

Student teams will work together to design a vehicle and build a navigation algorithm.

#### 4.1. *Registration and HyperSkill access*

Teams must choose one team captain that will register for themselves AND register the vehicle through the E-Fest Digital registration form before the XRC deadline.

Each team member must also register for E-Fest Digital before the XRC deadline.

Once registration is complete, team members will be emailed the HyperSkill User Guide which will include instructions to create a HyperSkill account and operate HyperSkill for the competition.

Each team member can create a HyperSkill account if they wish to aid in behaviour graph and vehicle development. One team member account per team will serve as the official team account and will contain the final vehicle and behaviour graph for that team.

#### 4.2. *Vehicle design and constraints*

Each team will design a vehicle using the 3D CAD software of their choice. Once complete, the vehicle design will be exported in the file format specified in the HyperSkill User Guide and uploaded to HyperSkill.

Vehicles must look like a 4-wheel vehicle and fit within the min and max rectangular prism dimensions. The size will be checked by the judges.

Max: 7m tall x 7m wide x 10m long  
Min::1m tall x 2m wide x 3m long

#### 4.3. *Vehicle testing and course*

Once the vehicle and behavior graph are complete, teams can test their designs in HyperSkill on the test course provided in the HyperSkill User Guide and adjust their designs to improve performance until the submission deadline. The course during the competition won't be available to teams beforehand so the control algorithm must be robust enough to handle changes.

#### 4.4. *Deliverable submission*

Teams will be required to submit the HyperSkill account information of the official team account by the posted deadline. This account must contain the final vehicle and behavior graph that the team will use in the competition.

Late submissions won't be accepted.

### **5. Competition rounds and ranking**

The competition will take place in two rounds:

#### 5.1. *Elimination round*

Each team will submit one vehicle and behavior graph. The vehicle will be entered into a virtual race against one other team on a course that was not previously available to teams. This race will be available to publicly view live online. Ranking will be based on the time it takes to complete the course. In case of a tie, the vehicle with the best visual detail will be ranked higher.

Visual detail will be scored based on how realistic the design is and the level of detail compared to other designs.

#### 5.2. *Final competition*

The top 10 teams from the elimination round will advance to the final competition to be held at the E-Fest Digital. Each vehicle will be entered into a virtual race against one other team on a course that was not previously available to teams. This race will be available to publicly view live online. Ranking will be based on the time it takes to complete the course. In case of a tie, the vehicle with the best visual detail will be ranked higher.

## **6. Eligibility**

### *6.1. Team eligibility*

The Extended Reality Challenge is a team based competition and entry is open to teams from any college, community college, or university in the world.

### *6.2. Team member eligibility*

Students participating in the competition must be enrolled as an undergraduate engineering student in any engineering discipline.

Full-time undergraduate engineering students, enrolled for the next upcoming semester/quarter, or have been enrolled for the previous semester/quarter, but graduated no earlier than six months prior to the competition date, are eligible to fully participate in the competition.

### *6.3. Team limits*

Teams are limited to 10 members each and the number of teams will be limited to 100.

Each student may only participate on one team and there is no limit on the number of teams from each school.

## **7. Clarification and modification of rules**

These rules may be modified by the competition judges as necessary to maintain the competition as a challenging and rewarding experience for engineering students. No changes by any party shall be made without the written consent of the XRC committee chair.

Questions or recommended changes to the rules should be submitted to the XRC Question Forum.

## **8. Prizes & winners**

1st Place	\$250.00
2nd Place	\$150.00
3rd Place	\$75.00

Competition winners will be announced during E-Fest Digital on Saturday, March 26, 2022 during the awards ceremony.