

Virtual Formula SAE Handbook

2020 Competition Season

*This is a living document and will updated as
information becomes available*

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VIRTUAL EVENT OPERATIONS

PART 1 - Static Judging Schedule and Operations

All teams will be assigned a time slot to present to judges via WebEx. Teams will be emailed the WebEx details. Static Schedule is provided in this handbook.

Static Judging will consist of multiple days for each static event (these dates are subject to change):

- Presentation Judging will take place on Thursday, June 4th through Friday, June 5th between the hours of 12:00 PM EDT and 4:00 PM EDT.
- Cost Judging will take place on Monday, June 8th through Tuesday, June 9th between the hours of 12:00 PM EDT and 5:00 PM EDT.
- Design Judging will take starting on Wednesday, June 10th through Saturday, June 13th between the hours of 11:00 AM EDT and 5:00 PM EDT.

PART 2 - Virtual Event Offerings and Operations

All team student members will be invited to attend the Virtual Event Part 2 via personal invitation. Teams will be emailed the access directions.

We will be updating this handbook with more details as they develop but for now please note the Part 2 Virtual event will offer the following:

1. Industry engagement with companies sponsoring Formula SAE
2. Sponsored skillshops covering a variety of technical presentations
3. Keynote speakers such as Ron Matthews, dubbed the Grandfather of Formula SAE
4. Presentations and Panel discussions in our Expert Room; topics include overall feedback on static judging events, 2021/2022 rule developments, required documents like SES and ESF, and perhaps a presentation on project management.
5. Networking/Student Lounge where students, volunteers and sponsors can meet formally/informally to have a chat.

SAE would like to make the following clarifications regarding the 2020 Virtual Events:

- Team eligibility for the 2021 “Early Registration” opportunity: teams must participate in both the virtual static events judging and the much larger virtual conference event.
- Participation in the virtual static judging events: teams must be submitting all required documents per rules and action deadlines.
- Participation in the much larger virtual conference event: all team members are encouraged to participate even if your team is not participating in static judging. Our sponsors are excited to network with you in their sponsor booths; as well as see you attending in their sponsored skillshop presentations. In addition, SAE will also be hosting several technical sessions and more in the expert room.

REGISTERED TEAMS and SCHEDULED STATIC TIMES

Team List and static times coming soon... Look for static schedules to start being populated by next weekly communication on May 5th

COST

Event Captain: Susan Zukowski, Rachel Rodgers, Steve Taylor
Date: Monday, June 8th and Tuesday, June 9th
Location: via WebEx appointments

Scope of Cost Experience (Judging):

Student teams must submit a report of their car's cost to be evaluated by the cost judges. The concept of the cost event is to obtain an accurate estimate of cost of the car in a limited production. The report is in effect your cost proposal to the senior management of a company in electronic form to get them to invest in your product line. This is the goal of the cost report itself.

Additionally, the teams will also prepare an electronic Bill of Materials and submit these materials using a shared database with standard materials and processes and a detailed process description. This evaluates not only the cost of the car, but also the team's ability to prepare an accurate engineering cost estimate and know exactly how the vehicle would be built.

Whereas the normal cost event can be divided in to three separate sections – the Virtual event can be divided into the submitted cost report and several written discussions based on various topics.

The Cost Report:

The actual cost report files are due into the judges approximately six to seven weeks prior to the event at the venue. The cost report is judged on the basis of the cost of the car and completeness of the included parts on the cost report. The cost of the car is determined by the cost of the parts and fabrication using established manufacturing practices and the application of “Lean Manufacturing” principles. The report will follow the guidelines set forth in the published rules. From this analysis, the judges (in 8 distinct areas of expertise) will determine if all parts and processes were included and if unreasonably low (determined by the experience of the judges) - the judges will add penalties if there are errors, items omitted, or have costs below reasonable estimates – at either standard point(s) deduction or at a rate equal to twice the cost error, whichever is greater. We have eight teams that review each prior to the event and every report’s evaluation will be based on their expertise. The costs and penalties will then determine the cost score.

During the judge’s assessment of the cost report judges may determine where the team may benefit from viewing a virtual coaching module. Virtual coaching module will be select judges walking through the cost report process with your team with a focus on problem areas identified during your review of your report. This opportunity will be offered to the team by the judge.

The price score will be awarded based on the following formula:

$$\frac{70 * (P_{max}) / (P_{your}) - 1}{(P_{max}) / (P_{min}) - 1}$$

+ up to 30 pts for completing additional written discussions

(NOTE: P_{your} is the adjusted cost of your team’s car with penalties, P_{min} is the adjusted cost of the lowest cost car in the competition by type, P_{Max} is the adjusted cost of the highest cost car in the competition by type)

COST Cont'd

On the day of the event, the cost event judges or SMEs will maintain half-hour appointments in order to have scoring discussions with those teams where penalties were assessed on their submitted reports at more than \$1k in any of the 8 commodity areas. Areas where the assessed penalties are less than this threshold are not contestable. Any adjustments to scores will be handed off to the coordinator to include in the scoring.

The judges will use the adjusted costs to determine the lowest 25 vehicles in each vehicle type to be audited by the virtual auditors (25 lowest IC's and 25 lowest EV's). These too will be accomplished by virtual appointments throughout the day. The adjustments that the auditors make will be included in the final score for the team.

The focus of the cost event centers on the cost of the vehicle and the process of building the vehicle and the components contained therein.

The remaining maximum of 30 points can be obtained by completing one of the following 6 Real Case Scenario topics. Teams will be required to submit a 1-2 page business summary on one of the topics. Documents may be uploaded in Cost document submission area. A new document submission title Real Case Scenario has been added to teams registered. Submissions will be evaluated by the cost judges and points will be added to the total cost score.

1. Discussion on how to reduce cost of 1 section of the car (I will give you choices once I have a chance to see what systems are weak in their reports)
2. Discussion on how to reduce the weight of the vehicle by 10%.
3. Discussion on how to complete production run of vehicle with smaller staffing
4. Discuss Lean Manufacturing and its principles
5. Discuss how to shorten the time between concept idea and finished functional competition vehicle.
6. For ICs – Convert the IC vehicle to EV vehicle on a limited budget

For EVs – Design protective systems for electric vehicle to perform under adverse weather conditions

Teams should plan to submit this summary by May 15, 2020 with an absolute deadline of June 5, 2020.

Since there is no physical car there would be no need to have addenda submitted with this virtual event.

In addition to the above, the cars with the lowest costs will be subject to a virtual physical audit to make sure that they included all processes and materials on their vehicle in the cost report. The audit appointments will be held on the same event day but by a separate team of auditors sometime after their initial appointment with the cost area. The adjustments that this team of auditor makes will be included in the final scores as well.

The final scores are tabulated and presented at the end of the judging day to the statisticians and will be used in combination with the other events to determine the winners of the virtual event. There will be no protest window.

Teams will be sent WebEx appointments once cost report reviews are completed. The assigned times will also be updated in this handbook.

DESIGN

Design Event Captains: Steven Fox, Dr. Edward Kasprzak, Anthony Lyscio, Dr. David Redszus, William Riley
Date: Wednesday, June 10th – Saturday, June 13th
Location: via WebEx appointments

Overall Design Review Adventure Presentation @ TBD

Scope of Design Experience (Judging):

Student teams must submit a Design Report (DR) and Design Spec Sheet (DSS) prior to the competition to be eligible for participation. All teams registered for FSAE Michigan, FSAE California and FSAE North will be design reviewed as one group.

The DR and DSS are still required submissions. The Design Judges will use the DRs and DSSs to preview your engineering efforts, prior to your actual Design Experience session. The deadline for all team submissions (including those registered for FSAE Michigan) has been extended to April 30th.

Design Experience sessions will be conducted virtually using WebEx conferencing software. Each WebEx session will host multiple judges in addition to the student team members participating. Each student team should have at least one representative who is prepared to discuss each major system individually. The specific details on WebEx sessions will be provided at later time when teams receive their WebEx appointments as we are still finalizing these details.

The Design Experience sessions will be one hour in length for each team. Each team will be asked to provide a 10-minute presentation on the overall design of vehicle and team overview detailing where they are at in the design process. Teams may use PPT slides for this portion. Teams will be kept to 10 minutes. Following the team initial presentation, judges and student team members will split into breakout sessions to continue discussion on specific systems of the design based on the scoresheets which can be found online under Series Resources – Design.

Teams are encouraged to have all engineering related material to their Design Experience readily available on their computer to share on-screen with Design Judges. Teams will be able to present the vehicle using relevant files, photos, videos, etc. Access to the physical vehicle is not required, and we are not encouraging you to ignore social distancing practices. During this virtual design experience, judges will focus on obtaining an overview of the team's build and providing good, constructive feedback on those efforts.

The Design Experience will have a similar look and feel to Design Judging of past years, with a few key considerations. In contrast to traditional judging onsite, Design Judges will provide instant feedback to their questions based on student team responses. To challenge all participants, questions will range from general to advanced (Design Finals level). A high level of emphasis is still placed on the student team's ability to Design, Build, Refine & Validate, and Understand the vehicle; COVID-19 pandemic does not change this expectation. In lieu of Design Finals, the Design Judges will end each Design Experience session with feedback on the team's overall performance.

Due to the conditions beyond everyone's control and an unprecedented disparity between teams, SAE agrees with the Design Judges decision to not score teams resulting in a new ranking. However, as leaders in our static events this supportive volunteer team has risen to the occasion to work with SAE staff on creating the environment and opportunity to continue the education and learning aspects of this competition for the students as we pivot our year to virtual learning. SAE will still look to award monies for the best teams identified by our judges.

SALES PRESENTATION

Event Captain: Dean Case, Reed Greenwood, Michael Konig, David Roberts, Adam Zemke
Date: Thursday, June 4th and Friday, June 5th
between hours of 12:00pm EDT and 4:00 pm EDT
Location: via WebEx appointments

Presentation Feedback Seminar: @ TBD

Scope of Presentation Experience (Judging):

Student teams are to make a presentation to upper level executives of an imaginary organization. The presentation should tie together all factors that would influence the marketability, technical details, manufacturing feasibility and profitability of their design. The team's presentation must meet all the requirements outlined in the concept document (available in the "Series Resources" section on fsaeonline.com), while maintaining a direct relationship to the team's original goals and objectives of the entered vehicle. All teams registered for FSAE Michigan, FSAE California and FSAE North will be presenting as one group and reviewed by judges as one group.

The presentations will be conducted virtually using WebEx conferencing software. Each WebEx session will host multiple judges in addition to the student team members participating. The specific details on WebEx sessions will be provided later when teams receive their WebEx appointments as we are still finalizing these details. Each competitor will be assigned a 30-minute appointment via WebEx.

A team of three to four judges will grade the competitors for feedback purposes. Presentations this year will not be scored for an overall ranking; however, award monies will still be provided for best teams identified per queue.

The judges will use the form available in the "Series Resources" section on fsaeonline.com for event scoring feedback. This form breaks the scoring down into four unequally weighted categories: Content, Organization, Delivery and Visual Aids, and Questions. A perfect score on the judges' form will be 50 points.

The rules and layout to the team presentation process will consist of the following:

Teams will be assigned a 30-minute time slot using WebEx platform.

- 30-minute session will break down as follows:
 - 5 minutes for logging on and greetings
 - Presentation segment 20 minutes with approximate time distribution of session
 - 10 minutes team slid presentation
 - 10 minutes judges/team Q&A plus feedback
 - 5-minute final comments before ending session

The question and answer period wherein only judges may ask questions and only presenters may answer still applies; therefore, be sure to introduce all participants up front. It is allowable for a presenter to only participate in the question and answer section; however, he/she must be a member of the 'presentation group,' as defined by S.2.5.2 of the 2020 Formula SAE rules. Teams are encouraged to have all business-related material for their business presentation readily available on their computer to share on-screen with judges. Judges encourage student team members to consider using video feed to view live presenter in addition to PPT slides.

UPDATE: Teams will be asked to submit initial draft of PPT online by May 15th. Teams will be able to submit final draft up to the day of their presentation. A document submission has been created for teams on www.fsaeonline.com.

ELECTRIC SYSTEMS FORMS (ESF) 1:1 REVIEW EVENT DESCRIPTION

Event Captain: Danny Bocci
Date(s): Select dates available detailed below
Time(s): select times available detailed below
Location: via WebEx appointments

Scope of ESF Document Review 1:1 Experience (Feedback):

Student teams must have submitted an Electric Systems Form (ESF) prior to competition to be eligible for participation. All teams registered for FSAE North and FSAE California will be eligible to sign up for 1:1 document feedback with EV Tech Captain, Danny Bocci.

The ESF Document Review 1:1 Experience will be ½ half hour in length for each team. Each team will sign up for their specific date and time using the EventBrite.com link. Teams will then be emailed a WebEx invite to confirm their appointment.

The ESF Document Review 1:1 Experience sessions will be conducted virtually using WebEx conferencing software. Judges will offer review using the most recent submission of team’s ESF from www.fsaeonline.com. Teams are encouraged to have the most current version submitted online prior to their appointment. Teams are also encouraged to have all engineering related materials to their ESF document readily available on their computer to share on-screen if needed.

How to be prepared:

- Have team members knowledgeable about the electrical design of the vehicle and content of the ESF on the WebEx.
- Prepare questions about your design, the ESF and/or the rules that you would like clarification on during the assigned time.

Date(s) / Times of available for review are listed below. Teams who meet criteria of participation in the virtual event will be emailed a link to sign up for their preferred time.

Weekdays – Thurs, May 14th, Fri, May 22nd

12:00 pm – 12:30 pm EDT	5 min	12:35 pm - 1:05 pm EDT	5 min
1:10 pm – 12:40 pm EDT	5 min	1:45 pm – 2:15 pm EDT	5 min
2:20 pm – 2:50 pm EDT	5 min	2:55 pm EDT – 3:25 pm EDT	5 min
3:30 pm – 3:00 pm EDT	5 min	4:05 pm – 3:35 pm EDT	5 min
4:10 pm – 4:40 pm EDT	5 min	4:45 pm – 5:15 pm EDT	

Weekends – Sat, May 9th and Sat, May 16th

9:00 am – 9:30 am EDT	5 min	9:35 am - 10:05 pm EDT	5 min
10:10 pm – 10:40 pm EDT	5 min	10:45 pm – 11:15 pm EDT	5 min
11:20 pm – 11:50 pm EDT	5 min	11:55 pm EDT – 12:25 pm EDT	5 min

Information coming soon...

Sessions taking place during Virtual Event (separate from Static Judging) *Scheduled times will be published closer to Virtual Event*

Discussion and feedback on 2021 draft rules and beyond – Presented by Steve Sayovitz, FSAE Rules Chair

Lap Time simulation and Driver-In-Loop simulation – Presented by John Burford, Senior Application Engineer, Vi-Grade, Inc.

Overall Design Review Adventure Presentation – Presented by FSAE Design Event Captains

Presentation Feedback Seminar – Presented by FSAE Presentation Event Captains

2020 FSAE AWARDS

Awards will be presented for the following:

- Cost Event
- Design Event
- Presentation Event

2020 FSAE SPONSORS

Information coming soon...