

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 between the hours of 10:00 AM 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

The virtual event will take place on June 19th. 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

Registered Teams is based on team submission of all required documents per rules for eligibility in participation in 2020 Virtual. And confirmation of participation per surveys.

Electric Teams

AGH Univ of Science and Technology
Auburn Univ
Carnegie Mellon Univ
Columbia Univ
Concordia University
Ecole De Technologie Superieure
Faculdade de Engenharia de Sorocaba
Georgia Institute of Technology
Massachusetts Inst of Tech
McGill Univ
McMaster Univ
Missouri University of Science and Tech
North Carolina State Univ - Raleigh

Olin College of Engineering
Oregon State Univ
Purdue Univ - W Lafayette
Rochester Institute of Technology
San Diego State Univ
Simon Fraser Univ
Univ of Akron
Univ of Calif - Davis
Univ of Calif - Irvine
Univ of Colorado - Colorado Springs
Univ of Illinois - Urbana Champaign
Univ of Iowa
Univ of Michigan - Ann Arbor

Univ of Michigan - Dearborn
Univ of Ontario Institute of Tech
Univ of Pennsylvania
Univ of South Carolina
Univ of Texas - Austin
Univ of Utah
Univ of Washington
Univ of Wisconsin - Madison
Universidad Nacional Autónoma de México
Université Laval
University of Vermont
Western University

Combustion Teams

Alabama A & M Univ
Arizona State Univ - Tempe
Auburn Univ
Binghamton Univ
California Baptist University
California Polytechnic State Univ-SLO
California State Poly Univ - Pomona
California State Univ - Fullerton
California State Univ - Los Angeles
California State Univ - Sacramento
Carleton Univ
Central Michigan Univ
Clemson Univ
Colorado Mesa University
Columbia Univ
Concordia University
Duke Univ
Ecole Polytechnique Montreal
Georgia Institute of Technology
Georgia Southern Univ
Grand Canyon University
Grand Valley State Univ
Hope College
Instituto Maua de Tecnologia
Instituto Tecnológico de Chihuahua
Iowa State Univ
IPN Esime Zacatenco
Kansas State Univ
Kennesaw State University
Lehigh Univ
Louisiana State Univ
Michigan State University
Michigan Tech Univ
Minnesota State University - Mankato
Mississippi State Univ
Missouri University of Science and Tech
National Univ of Singapore
North Carolina State Univ - Raleigh
North Dakota State Univ

Northwestern Univ
Oakland University
Oregon Inst of Tech
Polytechnic Univ of Puerto Rico
Purdue Univ - Northwest
Purdue Univ - W Lafayette
Queen's Univ
Rensselaer Polytechnic Inst
Rose Hulman Inst of Tech
Rutgers Univ
Ryerson Univ
Rzeszow University of Technology
Saginaw Valley State Univ
San Jose State University
South Dakota School of Mines & Tech
South Dakota State Univ
Southern Methodist Univ
Temple Univ
Tennessee Tech Univ
The Ohio State University
Univ of Akron
Univ of Alabama - Tuscaloosa
Univ of Alberta
Univ of British Columbia
Univ of British Columbia - Okanagan
Univ of Calgary
Univ of Calif - Berkeley
Univ of Calif - Irvine
Univ of Calif - Los Angeles
Univ of Calif - San Diego
Univ of Central Florida
Univ of Colorado - Boulder
Univ of Connecticut
Univ of Florida
Univ of Guelph
Univ of Hartford
Univ of Illinois - Chicago
Univ of Illinois - Urbana Champaign
Univ of Kansas - Lawrence

Univ of Manitoba
Univ of Maryland - College Park
Univ of Michigan - Ann Arbor
Univ of Minnesota-Duluth
Univ of Missouri
Univ of Nebraska - Lincoln
Univ of New Mexico
Univ of North Carolina - Charlotte
Univ of North Dakota
Univ of North Florida
Univ of North Texas
Univ of Pittsburgh - Pittsburgh
Univ of Saskatchewan
Univ of Southern California
Univ of Texas - Arlington
Univ of Texas - Dallas
Univ of Toledo
Univ of Toronto
Univ of Victoria
Univ of Virginia
Univ of Waterloo
Univ of Wisconsin - Madison
Univ of Wisconsin - Platteville
Universidad Nacional Autónoma de México
Universidad Panamericana Sede Guadalajara
Universidade Estadual de Campinas
Vanderbilt Univ
Villanova Univ
Washington State Univ
Western Michigan Univ
Western Washington Univ
Wichita State Univ
Wroclaw University of Technology

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 based on 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:

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

+ 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 20 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; specific topics noted below
EV vehicles – motor controllers
IC vehicles – fuel system
 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.

COST

Team Static Schedule

MONDAY, JUNE 8, 2020

12:00 PM EDT

VR #1 CE217 - Univ of Michigan - Dearborn
 VR #2 NE211 - Ecole De Technologie Superieure
 VR #3 C055 - Southern Methodist Univ
 VR #4 M042 - Minnesota State University - Mankato
 VR #5 C042 - Washington State Univ
 VR #6 M053 - Univ of Connecticut
 VR #7 M031 - Missouri University of Science and Tech
 VR #8 M046 - Univ of Guelph
 VR #9 M091 - Temple Univ
 VR #10 M111 - Univ of Manitoba

12:30 PM EDT

VR #1 CE232 - Auburn Univ
 VR #2 CE206 - Massachusetts Inst of Tech
 VR #3 C018 - California Polytechnic State Univ-SLO
 VR #4 M034 - Auburn Univ
 VR #5 C036 - California State Univ - Los Angeles
 VR #6 M123 - California State Univ - Fullerton
 VR #7 M018 - North Carolina State Univ - Raleigh
 VR #8 M058 - The Ohio State University
 VR #9 M062 - Univ of Hartford
 VR #10 C032 - Univ of North Texas

1:00 PM EDT

VR #1 NE222 - Columbia Univ
 VR #2 NE212 - Concordia University
 VR #3 M008 - Univ of Akron
 VR #4 M021 - Concordia University
 VR #5 M026 - Columbia Univ
 VR #6 M010 - Univ of Alabama - Tuscaloosa
 VR #7 M059 - Duke Univ
 VR #8 M051 - Tennessee Tech Univ
 VR #9 C056 - Univ of Texas - Dallas
 VR #10 M106 - Universidad Panamericana Sede Guadalajara

1:30 PM EDT

VR #1 CE211 - Faculdade de Engenharia de Sorocaba
 VR #2 CE225 - North Carolina State Univ - Raleigh
 VR #3 M076 - San Jose State University
 VR #4 M048 - Louisiana State Univ
 VR #5 M011 - Universidade Estadual de Campinas
 VR #6 M049 - Univ of Missouri
 VR #7 M036 - Rose Hulman Inst of Tech
 VR #8 C024 - Univ of Wisconsin - Platteville
 VR #9 M047 - Rutgers Univ
 VR #10 N017 - Hope College

2:00 PM EDT

VR #1 CE213 - Missouri University of Science and Tech
 VR #2 CE236 - Univ of Wisconsin - Madison
 VR #3 C025 - Univ of Wisconsin - Madison
 VR #4 C041 - Western Washington Univ
 VR #5 C009 - Univ of Calgary
 VR #6 M081 - Colorado Mesa University
 VR #7 M119 - Univ of Nebraska - Lincoln
 VR #8 M120 - California State Poly Univ - Pomona
 VR #9 M114 - Alabama A & M Univ
 VR #10 M092 - Univ of Illinois – Chicago

2:30 PM EDT

VR #1 CE208 - Carnegie Mellon Univ
 VR #2 CE234 - Oregon State Univ
 VR #3 M061 - Wichita State Univ
 VR #4 C020 - Oregon Inst of Tech
 VR #5 C003 - Univ of Texas - Arlington
 VR #6 M105 - Univ of Saskatchewan
 VR #7 C011 - Instituto Mauá de Tecnologia
 VR #8 M113 - Saginaw Valley State Univ
 VR #9 M013 - Purdue Univ - Northwest
 VR #10 C030 - Univ of British Columbia – Okanagan

3:00 PM EDT

VR #1 CE205 - Univ of Akron
 VR #2 NE220 - Univ of Ontario Institute of Tech
 VR #3 N016 - Univ of Minnesota-Duluth
 VR #4 C037 - Univ of Southern California
 VR #5 C047 - IPN Esime Zacatenco
 VR #6 M104 - Mississippi State Univ
 VR #7 C044 - Univ of Calif - Berkeley
 VR #8 C034 - Univ of Alberta
 VR #9 M095 - Universidad Nacional Autónoma de México
 VR #10 C022 - Univ of New Mexico

3:30 PM EDT

VR #8 M027 – Univ of Florida

COST

Team Static Schedule

TUESDAY, JUNE 9, 2020

12:00 PM EDT

VR #1 CE214 - Univ of Iowa
 VR #2 CE203 - Univ of Pennsylvania
 VR #3 CE209 - Univ of Michigan - Ann Arbor
 VR #4 M004 - Univ of Michigan - Ann Arbor
 VR #5 M116 - Rzeszow University of Technology
 VR #6 M052 - Univ of Toledo
 VR #7 M050 - Univ of North Carolina - Charlotte
 VR #8 M090 - Western Michigan Univ
 VR #9 M043 - Univ of Toronto
 VR #10 M012 - Wroclaw University of Technology

12:30 PM EDT

VR #1 NE219 - McMaster Univ
 VR #2 CE219 - Western University
 VR #3 CE215 - Univ of Utah
 VR #4 M066 - Georgia Southern Univ
 VR #5 M103 - North Dakota State Univ
 VR #6 M007 - Ecole Polytechnique Montreal
 VR #7 C028 - California State Univ - Sacramento
 VR #8 M060 - Rensselaer Polytechnic Inst
 VR #9 C076 - Central Michigan Univ
 VR #10 M094 - Villanova Univ

1:00 PM EDT

VR #1 CE228 - Georgia Institute of Technology
 VR #2 CE204 - Univ of Calif - Davis
 VR #3 NE226 - Univ of Colorado - Colorado Springs
 VR #4 C052 - Instituto Tecnológico de Chihuahua
 VR #5 M077 - Univ of Virginia
 VR #6 M118 - Kansas State Univ
 VR #7 M088 - Kennesaw State University
 VR #8 M063 - Binghamton Univ
 VR #9 M064 - Georgia Institute of Technology
 VR #10 M056 - Univ of Maryland - College Park

1:30 PM EDT

VR #1 CE201 - McGill Univ
 VR #2 NE218 - University of Vermont
 VR #3 CE216 - Simon Fraser Univ
 VR #4 M025 - Univ of Kansas - Lawrence
 VR #5 M022 - Univ of Central Florida
 VR #6 M079 - Michigan Tech Univ
 VR #7 M069 - Univ of Waterloo
 VR #8 M083 - Ryerson Univ
 VR #9 M006 - Carleton Univ
 VR #10 M024 - Northwestern Univ

2:00 PM EDT

VR #1 CE224 - Purdue Univ - W Lafayette
 VR #2 CE210 - Univ of Illinois - Urbana Champaign
 VR #3 CE202 - Univ of Washington
 VR #4 M015 - Univ of Illinois - Urbana Champaign
 VR #5 M112 - Grand Valley State Univ
 VR #6 M032 - National Univ of Singapore
 VR #7 C043 - Univ of Colorado - Boulder
 VR #8 M098 - Polytechnic Univ of Puerto Rico
 VR #9 M087 - Univ of North Florida
 VR #10 M030 - Purdue Univ - W Lafayette

2:30 PM EDT

VR #1 CE226 - Rochester Institute of Technology
 VR #2 CE223 - San Diego State Univ
 VR #3 CE218 - Univ of Calif - Irvine
 VR #4 M097 - Univ of North Dakota
 VR #5 M073 - Univ of Victoria
 VR #6 C040 - South Dakota State Univ
 VR #7 C023 - Univ of Calif - Los Angeles
 VR #8 N024 - Vanderbilt Univ
 VR #9 M099 - Univ of British Columbia
 VR #10 M016 - Univ of Pittsburgh - Pittsburgh

3:00 PM EDT

VR #1 CE235 - Université Laval
 VR #2 NE208 - Olin College of Engineering
 VR #3 CE233 - AGH Univ of Science and Technology
 VR #4 M033 - Clemson Univ
 VR #5 C058 - Arizona State Univ - Tempe
 VR #6 N008 - Iowa State Univ
 VR #7 M038 - Michigan State University
 VR #8 M086 - Lehigh Univ
 VR #9 C035 - Grand Canyon University
 VR #10 M122 - Queen's Univ

3:30 PM EDT

VR #1 NE221 - Univ of South Carolina
 VR #2 CE207 - Univ of Texas-Austin
 VR #3 CE221 - Universidad Nacional Autónoma de México
 VR #4 C031 - Univ of Calif - Irvine
 VR #5 C021 - California Baptist University
 VR #6 N015 - South Dakota School of Mines & Tech
 VR #7 M100 - Oakland University
 VR #8 C029 - Univ of Calif - San Diego
 VR #9 C063 - Univ of Texas - Austin

COST TEAM AUDIT SELECTION

FSAE Virtual Cost Audit

No Appointments are sent so make sure to mark your calendars!

Car #	School Name	Cost Bay	Cost Time	Appt DAY
CE208	Carnegie Mellon Univ	VR #1	3:00:00 PM	June 8
CE205	Univ of Akron	VR #1	3:30:00 PM	June 8
C034	Univ of Alberta	VR #8	3:30:00 PM	June 8
CE216	Simon Fraser Univ	VR #3	2:00:00 PM	June 9
CE218	Univ of Calif - Irvine	VR #3	3:30:00 PM	June 9
M097	Univ of North Dakota	VR #4	3:00:00 PM	June 9
C058	Arizona State Univ - Tempe	VR #5	4:00:00 PM	June 9
M007	Ecole Polytechnique Montreal	VR #6	1:00:00 PM	June 9
M083	Ryerson Univ	VR #8	2:00:00 PM	June 9
M086	Lehigh Univ	VR #8	3:30:00 PM	June 9
C029	Univ of Calif - San Diego	VR #8	4:00:00 PM	June 9
M043	Univ of Toronto	VR #9	12:30:00 PM	June 9

Virtual cost audits will take following the cost judging assigned times. Teams have already been provided their cost appointments via CISCO WebEx Teams emails.

Most teams will be audited immediately following their cost judging.

Teams highlighted are scheduled for 1 hour after their initial cost judging assigned time.

*Again, teams who are being audited, the auditors will meet you in the same meeting space cost judging took place. For teams who are an hour later, you can re-enter the space at that designated time.

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 - June 19th @ 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.

Wednesday, June 10, 2020

11:00 AM EDT

VR#1 - CE233 - AGH Univ of Science and Technology
VR#2 - CE210 - Univ of Illinois - Urbana Champaign
VR#3 - CE209 - Univ of Michigan - Ann Arbor
VR#4 - NE221 - Univ of South Carolina
VR#5 - C036 - California State Univ - Los Angeles
VR#6 - M032 - National Univ of Singapore
VR#7 - C028 - California State Univ - Sacramento
VR#8 - M018 - North Carolina State Univ - Raleigh
VR#9 - M064 - Georgia Institute of Technology
VR#10 - M012 - Wroclaw University of Technology
VR#11 - C041 - Western Washington Univ
VR#12 - C037 - Univ of Southern California
VR#13 - C052 - Instituto Tecnológico de Chihuahua
VR#14 - M116 - Rzeszow University of Technology
VR#15 - C032 - Univ of North Texas

12:30 PM EDT

VR#1 - CE214 - Univ of Iowa
VR#2 - CE202 - Univ of Washington
VR#3 - CE204 - Univ of Calif - Davis
VR#4 - NE219 - McMaster Univ
VR#5 - M042 - Minnesota State University - Mankato
VR#6 - M011 - Universidade Estadual de Campinas
VR#7 - M031 - Missouri University of Science and Tech
VR#8 - M098 - Polytechnic Univ of Puerto Rico
VR#9 - C076 - Central Michigan Univ
VR#10 - M016 - Univ of Pittsburgh - Pittsburgh
VR#11 - M046 - Univ of Guelph
VR#12 - C009 - Univ of Calgary
VR#13 - M008 - Univ of Akron
VR#14 - M010 - Univ of Alabama - Tuscaloosa
VR#15 - M033 - Clemson Univ

Wednesday, June 10, 2020

2:00 PM EDT

VR#1 - CE213 - Missouri University of Science and Tech

VR#2 - CE218 - Univ of Calif - Irvine

VR#3 - CE234 - Oregon State Univ

VR#4 - CE205 - Univ of Akron

VR#5 - C029 - Univ of Calif - San Diego

VR#6 - M106 - Universidad Panamericana Sede Guadalajara

VR#7 - M119 - Univ of Nebraska - Lincoln

VR#8 - C043 - Univ of Colorado - Boulder

VR#9 - M058 - The Ohio State University

VR#10 - C056 - Univ of Texas - Dallas

VR#11 - M024 - Northwestern Univ

VR#12 - C063 - Univ of Texas - Austin

VR#13 - N008 - Iowa State Univ

VR#14 - M076 - San Jose State University

VR#15 - C055 - Southern Methodist Univ

3:30 PM EDT

VR#1 - CE225 - North Carolina State Univ - Raleigh

VR#2 - CE236 - Univ of Wisconsin - Madison

VR#3 - NE212 - Concordia University

VR#4 - CE221 - Universidad Nacional Autónoma de México

VR#5 - C058 - Arizona State Univ - Tempe

VR#6 - M104 - Mississippi State Univ

VR#7 - C047 - IPN Esime Zacatenco

VR#8 - M063 - Binghamton Univ

VR#9 - C024 - Univ of Wisconsin - Platteville

VR#10 - M092 - Univ of Illinois - Chicago

VR#11 - C023 - Univ of Calif - Los Angeles

VR#12 - M043 - Univ of Toronto

VR#13 - M111 - Univ of Manitoba

VR#14 - M034 - Auburn Univ

VR#15 - C018 - California Polytechnic State Univ-SLO

Wednesday, June 10, 2020

5:00 PM EDT

VR#1 - NE222 - Columbia Univ
VR#2 - NE211 - Ecole De Technologie Superieure
VR#3 - CE216 - Simon Fraser Univ
VR#4 - CE228 - Georgia Institute of Technology
VR#5 - M081 - Colorado Mesa University
VR#6 - M073 - Univ of Victoria
VR#7 - M088 - Kennesaw State University
VR#8 - M048 - Louisiana State Univ
VR#9 - M114 - Alabama A & M Univ
VR#10 - M027 Univ of Florida
VR#11 - M049 - Univ of Missouri
VR#12 - M122 - Queen's Univ
VR#13 - C030 - Univ of British Columbia - Okanagan
VR#14 - M015 - Univ of Illinois - Urbana Champaign
VR#15 - C020 - Oregon Inst of Tech

Thursday, June 11, 2020

11:00 AM EDT

VR#1 - CE208 - Carnegie Mellon Univ
VR#2 - CE203 - Univ of Pennsylvania
VR#3 - CE217 - Univ of Michigan - Dearborn
VR#4 - CE215 - Univ of Utah
VR#5 - C025 - Univ of Wisconsin - Madison
VR#6 - C040 - South Dakota State Univ
VR#7 - C044 - Univ of Calif - Berkeley
VR#8 - M051 - Tennessee Tech Univ
VR#9 - M087 - Univ of North Florida
VR#10 - M030 - Purdue Univ - W Lafayette
VR#11 - N015 - South Dakota School of Mines & Tech
VR#12 - M038 - Michigan State University
VR#13 - C011 - Instituto Mauá de Tecnologia
VR#14 - C021 - California Baptist University
VR#15 - M062 - Univ of Hartford

Thursday, June 11, 2020

12:30 PM EDT

VR#1 - CE201 - McGill Univ
VR#2 - CE223 - San Diego State Univ
VR#3 - NE226 - Univ of Colorado - Colorado Springs
VR#4 - CE207 - Univ of Texas-Austin
VR#5 - M103 - North Dakota State Univ
VR#6 - M026 - Columbia Univ
VR#7 - M059 - Duke Univ
VR#8 - M060 - Rensselaer Polytechnic Inst
VR#9 - M013 - Purdue Univ - Northwest
VR#10 - M086 - Lehigh Univ
VR#11 - M052 - Univ of Toledo
VR#12 - M097 - Univ of North Dakota
VR#13 - M118 - Kansas State Univ
VR#14 - M091 - Temple Univ
VR#15 - M066 - Georgia Southern Univ

2:00 PM EDT

VR#1 - CE211 - Faculdade de Engenharia de Sorocaba
VR#2 - CE206 - Massachusetts Inst of Tech
VR#3 - CE235 - Université Laval
VR#4 - CE232 - Auburn Univ
VR#5 - C003 - Univ of Texas - Arlington
VR#6 - M022 - Univ of Central Florida
VR#7 - M050 - Univ of North Carolina - Charlotte
VR#8 - C034 - Univ of Alberta M095 - Universidad Nacional
Autónoma de México
VR#9 - M047 - Rutgers Univ
VR#10 - M099 - Univ of British Columbia
VR#11 - C031 - Univ of Calif - Irvine
VR#12 - N017 - Hope College
VR#13 - M061 - Wichita State Univ
VR#14 - N016 - Univ of Minnesota-Duluth

Thursday, June 11, 2020

3:30 PM EDT

VR#1 - CE226 - Rochester Institute of Technology
VR#2 - NE220 - Univ of Ontario Institute of Tech
VR#3 - NE218 - University of Vermont
VR#4 - M021 - Concordia University
VR#5 - M021 - Concordia Univ
VR#6 - M079 - Michigan Tech Univ
VR#7 - M036 - Rose Hulman Inst of Tech
VR#8 - M006 - Carleton Univ
VR#9 - N024 - Vanderbilt Univ
VR#10 - C022 - Univ of New Mexico
VR#11 - M105 - Univ of Saskatchewan
VR#12 - M120 - California State Poly Univ - Pomona
VR#13 - M056 - Univ of Maryland - College Park
VR#14 - M123 - California State Univ - Fullerton
VR#15 - C042 - Washington State Univ

5:00 PM EDT

VR#1 - CE224 - Purdue Univ - W Lafayette
VR#2 - CE219 - Western University
VR#3 - NE208 - Olin College of Engineering
VR#4 - M112 - Grand Valley State Univ
VR#5 - M053 - Univ of Connecticut
VR#6 - C035 - Grand Canyon University
VR#7 - M083 - Ryerson Univ
VR#8 - M090 - Western Michigan Univ
VR#9 - M004 - Univ of Michigan - Ann Arbor
VR#10 - M077 - Univ of Virginia
VR#11 - M100 - Oakland University
VR#12 - M069 - Univ of Waterloo
VR#13 - M094 - Villanova Univ
VR#14 - M113 - Saginaw Valley State Univ

BUSINESS PRESENTATION

Event Captain: Dean Case, Reed Greenwood, Michael Konig, David Roberts, Adam Zemke
Date: Thursday, June 4th
Location: via WebEx appointments

Presentation Feedback Seminar: June 19th @ 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.

BUSINESS PRESENTATION

Team Static Schedule

THURSDAY, JUNE 4, 2020

AM Schedule

10:00 AM EDT

VR #1 CE205 - Univ of Akron
VR #2 CE216 - Simon Fraser Univ
VR #3 CE233 - AGH Univ of Science and Technology
VR #4 M012 - Wroclaw Univ of Technology
VR #5 M116 - Rzeszow University of Technology
VR #6 M032 - National Univ of Singapore

10:30 AM EDT

VR #1 CE214 - Univ of Iowa
VR #2 CE203 - Univ of Pennsylvania
VR #3 NE219 - McMaster Univ
VR #4 CE207 - Univ of Texas - Austin
VR #5 C036 - California State Univ - Los Angeles
VR #6
VR #7 C028 - California State Univ - Sacramento
VR #8 M063 - Binghamton Univ
VR #9 M064 - Georgia Institute of Technology
VR #10 M004 - Univ of Michigan - Ann Arbor
VR #11 C041 - Western Washington Univ
VR #12 C032 - Univ of North Texas
VR #13 C011 - Instituto Mauá de Tecnologia
VR #14 C021 - California Baptist University
VR #15 C076 - Central Michigan Univ

11:00 AM EDT

VR #1 CE210 - Univ of Illinois - Urbana Champaign
VR #2 CE221 - Universidad Nacional Autónoma de México
VR #3 CE219 - Western University
VR #4 M015 - Univ of Illinois - Urbana Champaign
VR #5 C003 - Univ of Texas - Arlington
VR #6 M079 - Michigan Tech Univ
VR #7 M105 - Univ of Saskatchewan
VR #8 M076 - San Jose State University
VR #9 M083 - Ryerson Univ
VR #10 M094 - Villanova Univ
VR #11 N015 - South Dakota School of Mines & Tech
VR #12 C037 - Univ of Southern California
VR #13 N024 - Vanderbilt Univ
VR #14 M050 - Univ of North Carolina - Charlotte
VR #15 M112 - Grand Valley State Univ

11:30 AM EDT

VR #1 CE202 - Univ of Washington
VR #2 CE236 - Univ of Wisconsin - Madison
VR #3 CE224 - Purdue Univ - W Lafayette
VR #4 M008 - Univ of Akron
VR #5 M010 - Univ of Alabama - Tuscaloosa
VR #6 M104 - Mississippi State Univ
VR #7 M059 - Duke Univ
VR #8 M113 - Saginaw Valley State Univ
VR #9 M114 - Alabama A & M Univ
VR #10 M047 - Rutgers Univ
VR #11 M046 - Univ of Guelph
VR #12 M097 - Univ of North Dakota
VR #13 M069 - Univ of Waterloo
VR #14 C043 - Univ of Colorado - Boulder
VR #15 M106 - Universidad Panamericana Sede Guadalajara

12:00 PM EDT

VR #1 CE209 - Univ of Michigan - Ann Arbor
VR #2 CE217 - Univ of Michigan - Dearborn
VR #3 NE211 - Ecole De Technologie Supérieure
VR #4 M025 - Univ of Kansas - Lawrence
VR #5 C058 - Arizona State Univ - Tempe
VR #6 M026 - Columbia Univ
VR #7 M042 - Minnesota State University - Mankato
VR #8 C034 - Univ of Alberta
VR #9 C063 - Univ of Texas - Austin
VR #10 M056 - Univ of Maryland - College Park
VR #11 M052 - Univ of Toledo
VR #12 M062 - Univ of Hartford
VR #13 M091 - Temple Univ
VR #14 M006 - Carleton Univ
VR #15 C055 - Southern Methodist Univ

VOLUNTEER BREAK

12:30 PM EDT– 1:00 PM EDT

BUSINESS PRESENTATION

Team Static Schedule

THURSDAY, JUNE 4, 2020

PM Schedule

1:00 PM EDT

VR #1 CE228 - Georgia Institute of Technology
VR #2 NE226 - Univ of Colorado - Colorado Springs
VR #3 CE213 - Missouri University of Science and Tech
VR #4 C020 - Oregon Inst of Tech
VR #5 M018 - North Carolina State Univ - Raleigh
VR #6 M031 - Missouri University of Science and Tech
VR #7
VR #8 M098 - Polytechnic Univ of Puerto Rico
VR #9 C023 - Univ of Calif - Los Angeles
VR #10 M092 - Univ of Illinois - Chicago
VR #11 C047 - IPN Esime Zacatenco
VR #12 C009 - Univ of Calgary
VR #13 N017 - Hope College
VR #14 M016 - Univ of Pittsburgh - Pittsburgh
VR #15 M033 - Clemson Univ

1:30 PM EDT

VR #1 CE235 - Université Laval
VR #2 NE208 - Olin College of Engineering
VR #3 CE226 - Rochester Institute of Technology
VR #4 C030 - Univ of British Columbia - Okanagan
VR #5 M011 - Universidade Estadual de Campinas
VR #6 M049 - Univ of Missouri
VR #7 M058 - The Ohio State University
VR #8 M060 - Rensselaer Polytechnic Inst
VR #9 M087 - Univ of North Florida
VR #10 C056 - Univ of Texas - Dallas
VR #11 M024 - Northwestern Univ
VR #12 C031 - Univ of Calif - Irvine
VR #13 N008 - Iowa State Univ
VR #14 N016 - Univ of Minnesota-Duluth
VR #15 M036 - Rose Hulman Inst of Tech

2:00 PM EDT

VR #1 CE208 - Carnegie Mellon Univ
VR #2 CE223 - San Diego State Univ
VR #3 CE218 - Univ of Calif - Irvine
VR #4 M048 - Louisiana State Univ
VR #5 M103 - North Dakota State Univ
VR #6 M081 - Colorado Mesa University
VR #7 M088 - Kennesaw State University
VR #8 M051 - Tennessee Tech Univ
VR #9 C024 - Univ of Wisconsin - Platteville
VR #10 M030 - Purdue Univ - W Lafayette
VR #11 C022 - Univ of New Mexico
VR #12 M061 - Wichita State Univ
VR #13 M095 - Universidad Nacional Autónoma de México
VR #14 M120 - California State Poly Univ - Pomona
VR #15 C035 - Grand Canyon University

2:30 PM EDT

VR #1 NE221 - Univ of South Carolina
VR #2 NE212 - Concordia University
VR #3 CE232 - Auburn Univ
VR #4 C029 - Univ of Calif - San Diego
VR #5 CE225 - North Carolina State Univ - Raleigh
VR #6 M053 - Univ of Connecticut
VR #7 M022 - Univ of Central Florida
VR #8 C025 - Univ of Wisconsin - Madison
VR #9 M043 - Univ of Toronto
VR #10 C018 - California Polytechnic State Univ-SLO
VR #11 M123 - California State Univ - Fullerton
VR #12 C040 - South Dakota State Univ
VR #13 M118 - Kansas State Univ
VR #14 M099 - Univ of British Columbia
VR #15 C052 - Instituto Tecnológico de Chihuahua

3:00 PM EDT

VR #1 CE201 - McGill Univ
VR #2 NE218 - University of Vermont
VR #3 CE211 - Faculdade de Engenharia de Sorocaba
VR #4 M034 - Auburn Univ
VR #5 C042 - Washington State Univ
VR #6 M100 - Oakland University
VR #7 C044 - Univ of Calif - Berkeley
VR #8 M086 - Lehigh Univ
VR #9 M090 - Western Michigan Univ
VR #10 M111 - Univ of Manitoba
VR #11 M077 - Univ of Virginia
VR #12 M038 - Michigan State University
VR #13 M122-Queen's Univ
VR #14 M073 - Univ of Victoria
VR #15 M066 - Georgia Southern Univ

3:30 PM EDT

VR #1 NE222 - Columbia Univ
VR #2 CE234 - Oregon State Univ
VR #3 CE206 - Massachusetts Inst of Tech
VR #7 M027 - Univ of Florida

4:00 PM EDT

VR #1 NE220 - Univ of Ontario Institute of Tech
VR #2 CE204 - Univ of Calif - Davis
VR #3 CE215 - Univ of Utah

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, Thurs, May 28th

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

**May 28th date only from 12:00 PM EDT to 3:25 PM EDT*

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

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

ELECTRIC SYSTEMS FORMS (ESF) Team Assigned Schedule

ESF REVIEWS COMPLETED

ESF 1:1 Review is not mandatory for all eligible teams.

To be eligible, teams needed to submit all their required documents for all events to be considered eligible for virtual participation.

Below is the schedule, teams have been sent appointments directly.

Thurs, May 14th	
12:00 pm – 12:30 pm EDT	Auburn Univ
12:35 pm – 1:05 pm EDT	Universidad Nacional Autónoma de México
1:10 pm – 1:40 pm EDT	Carnegie Mellon Univ
1:45 pm – 2:15 pm EDT	Univ of Michigan – Dearborn
2:20 pm – 2:50 pm EDT	Univ of Washington
3:30 pm – 4:00 pm EDT	Univ of Wisconsin – Madison
4:05 pm – 4:35 pm EDT	Massachusetts Inst of Tech
4:40 pm – 5:10 pm EDT	Purdue Univ – W Lafayette
5:15 pm – 5:45 pm EDT	Univ of Pennsylvania

Sat, May 16th	
9:35 am – 10:05 am EDT	Univ of Michigan – Ann Arbor
10:10 am – 10:40 am EDT	Georgia Institute of Technology
10:45 am – 11:15 am EDT	Rochester Institute of Technology
11:20 am – 11:50 am EDT	Univ of Akron
11:55 am – 12:25 pm EDT	Oregon State Univ

ELECTRIC SYSTEMS FORMS (ESF) Team Assigned Schedule

ESF REVIEWS COMPLETED

ESF 1:1 Review is not mandatory for all eligible teams.

To be eligible, teams needed to submit all their required documents for all events to be considered eligible for virtual participation.

Below is the schedule, teams have been sent appointments directly.

Fri, May 22nd	
12:00 pm — 12:30 pm EDT	McMaster Univ
12:35 pm — 1:05 pm EDT	Olin College of Engineering
2:55 pm — 3:25 pm EDT	Virginia Tech
3:30 pm — 4:00 pm EDT	San Diego State Univ
4:05 pm — 4:35 pm EDT	Univ of Missouri

Thurs, May 28th	
1:10 pm — 1:40 pm EDT	Université Laval
1:45 pm — 2:15 pm EDT	Univ of Iowa
2:20 pm — 2:50 pm EDT	Missouri University of Science and Tech
2:55 pm — 3:25 pm EDT	AGH Univ of Science and Technology

This test is for educational purposes and will help build a virtual prediction tool that teams may benefit from in the future when designing their systems. It is in their best interest to provide realistic input files so they can get realistic feedback.

No points or disqualifications will be given based on this test. This is not mandatory of all teams.

The virtual sound level test will be performed using the VI-grade NVH Simulator and HBK's BK Connect software, with the source data from each team's GT-Power model

The data required from the GT-Power model is the Volume Velocity Source (Q Source) time history as simulated at the end of the exhaust pipe. With the assumption that this Q source is a monopole source, the sound pressure is calculated at 0.5m from the source to keep in alignment with the physical noise test. The Transfer Function (P/Q) used for the calculation Sound Pressure is based on the formula for an ideal monopole point source in free field and is as follows:

where
$$H_{QR} = j\rho ck \frac{e^{-jkR}}{4\pi R}$$

ρ = density of air; c = speed of sound; $k = \omega/c = 2\pi f/c$, f = frequency; R = distance (0.5m)

This calculation does not account for effects due to ground reflections.

The Q source and the P/Q transfer functions are provided as inputs to the NVH Simulator for the Sound Pressure (P) calculation. The simulated sound pressure time history is then recorded using the BK Connect software and analyzed with an Overall Level analyzer.

There are two measurements in the noise test:

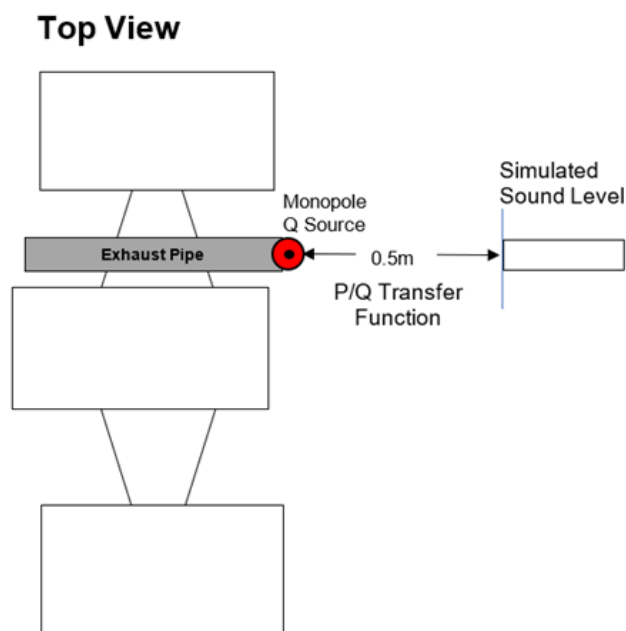
- 1) With the engine idling, the measurement must not exceed 103 dBC.
- 2) With the engine at the designated test speed, the measurement must not exceed 110 dBC.

The designated test speed is approximately $\frac{3}{4}$ of the maximum engine speed as calculated by the SAE published formula. Refer to FSAE online for engine speed data

If your engine is not listed, you can calculate your $\frac{3}{4}$ engine speed by using the following calculation:

$$\frac{914.4 \text{ m/min} \times 1000 \text{ rpm}}{2 \times \text{Stroke (mm)}} = \text{Calculated Test Speed}$$

In the case of dual exhausts, both exhausts will be tested with the loudest one being the basis for judgment.



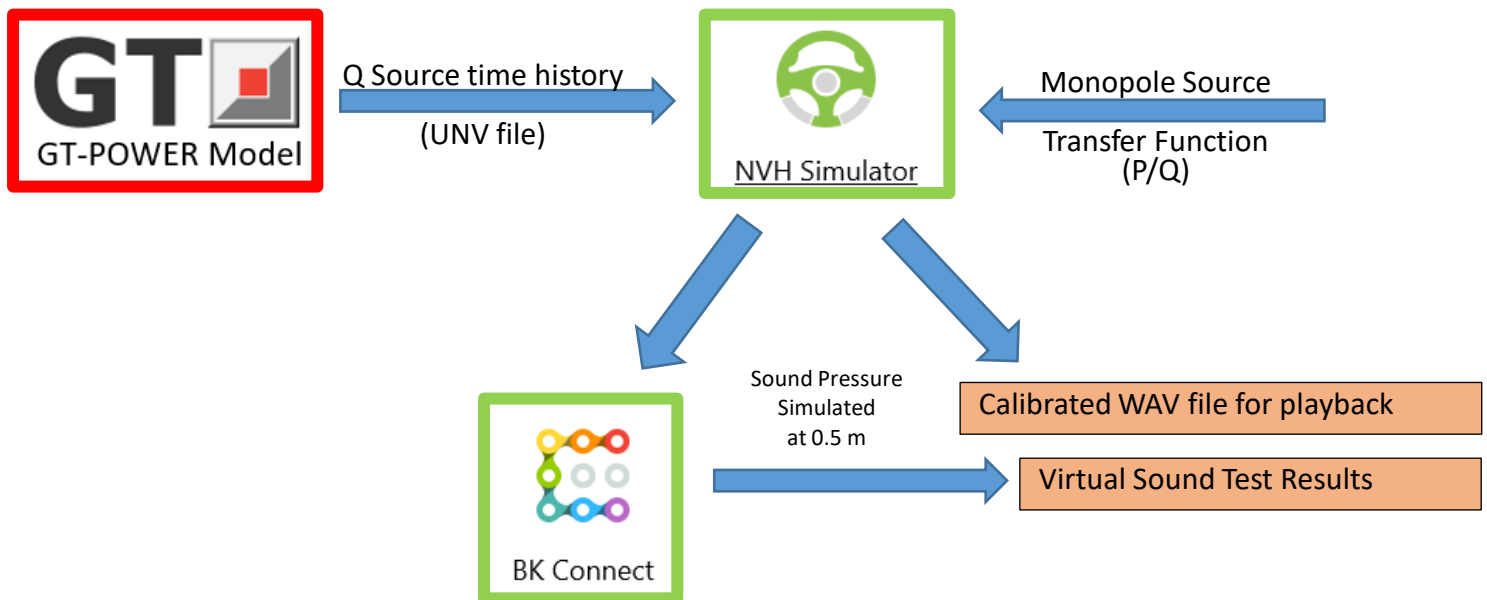
VIRTUAL NOISE TEST EVENT cont'd

Follow the below procedure to generate the data needed for the virtual noise test evaluation:

1. 10 s of Q Source time histories for each operating condition (Idle and $\frac{3}{4}$ max engine speed) as simulated at the end of the exhaust pipe should be submitted.
 - a. The file should include Q Source (m^3/s) and the Engine Speed (RPM v time) as time histories
 - b. In the case of dual exhausts, the Q Source for both exhausts should be included in the file and labelled appropriately.
2. Start with your GT-POWER engine model and create a model for the idle test named *Idle.gtm*.
 - a. Define parameters for required attributes.
 - i. Use [EngSpeed] for the Engine Speed (EngineCrankTrain object)
 - ii. Use [duration] for the Maximum Simulation Duration (Time) (Run Setup>TimeControl)
 - iii. Use [FLUIDSS] for the Automatic Shut-Off When Steady-State (Run Setup>TimeControl)
 - iv. Use [ISTATE] for the Initialization State (Run Setup>Initialization)
 - v. Use [HTSS] for the Thermal Wall Solver (Run Setup>ThermalControl)
 - b. Create 2 cases, both at the engine idle speed [EngSpeed] and with 10 s duration [duration].
 - i. Note that if your model utilizes other parameters that are changing, make sure the other parameters are set with the values that correspond to the engine idle speed.
 - c. Set the following parameters so Case 1 is steady state to allow the engine to reach steady conditions and Case 2 transient to create data for the Q Source time histories.
 - i. [FLUIDSS] = "on" for Case 1, "off" for Case 2
 - ii. [ISTATE] = "user imposed" for Case 1, "previous case" for Case 2
 - iii. [HTSS] = "steady" for Case 1, "Transient" for Case 2
 - d. Copy the microphone from the provided GT-POWER model named *template.gtm* into your engine model. Files were provided for v2018, v2019, and v2020 so make sure to use the file from the same version of GT you are using. **These file templates can be found under Series Resources – 2020 Virtual Event Docs – Virtual Noise folder at www.fsaeonline.com.**
 - i. Connect the exhaust orifice adjacent to the end environment to the microphone. This sensor should sense "Velocity".
 - ii. For dual exhausts use the microphone from *template-dual.gtm*. This microphone will need a connection from both tail pipe orifices.
 - e. The provided model named *guide.gtm* can be used as a guide to the above steps as it contains an example model with the proper setup and microphone connection.
 - i. For dual exhausts use *guide-dual.gtm*.
 - f. Run the model to create the Q Source file (.unv) for the idle speed. The model will create 2 .unv files; 1 for each case. Only the second case is used for this process (*Idle-exh-mic-Q-data-c2.unv*).
 - g. Make a copy of the model for the designated test speed test and name it *SS.gtm*.
 - i. Change the engine speed from the idle speed to the designated test speed.
 - ii. Note that if your model utilized other parameters that are changing, make sure the other parameters are set with the values that correspond to the designated engine speed.
 - iii. Run this model to create the Q Source file (.unv) for the idle speed). Again, only the second case is used (*SS-exh-mic-Q-data-c2.unv*).
 - h. For any questions/issues on the GT-Power model/procedure, please reach out to Jared Cromas at J.Cromas@gtissoft.com

VIRTUAL NOISE TEST EVENT cont'd

3. The format and naming of the file should be done as follows:
 - a. The file should be submitted as a UNV file
 - b. The naming convention for the file should be *SchoolName_Idle* and *SchoolName_SS*
4. Each team should also submit a specification sheet of their engine including
 - a. Engine Type
 - b. Stroke
 - c. For dual exhausts, include a sketch/representation indicating the relative coordinates between the two tailpipes
5. Teams can submit a .zip folder encompassing the two UNV files and specification sheet of their engine on www.fsaonline.com under their team profile. SAE has created a new National Document for this Virtual Noise submission.
Again, this is not mandatory but encouraged for interested teams.
Deadline for this submissions is June 2, 2020.
6. Participating teams will be provided with a calibrated WAV file for playback of the simulated sound pressure results, and a certificate attesting their participating in the virtual sound test.



VIRTUAL SEMINARS

Sessions taking place during Virtual Event (separate from Static Judging)

Scheduled times will be published closer to Virtual Event

Looking at 40 Years of Formula SAE – Presented by Ron Matthews, University of Texas-Austin and Founder of Formula SAE

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

Monetary awards will be presented for the following:

- Cost Event
- Design Event
- Presentation Event

In addition, several sponsors have specialty awards available which are highlighted below. To view more on the award, visit the links. *These awards have **due dates prior to June 19th**.*

MacLean-Fogg Fastening Challenge Award (\$1000, \$750, \$500)

This award is intended to reward teams with the best solution to a fastening challenge at Formula SAE. [Award Information](#)

2020 Siemens Digital Twin Engineering Excellence Award (\$3000, \$2000, \$1500)

This award recognizes 3 Formula Electric teams which have used professional, innovative and thoughtful ‘Digital Twin’ engineering practices. [Award Information](#)

2020 Siemens Software Success Video Award (\$1000, \$750, \$ 500)

This award rewards 3 FSAE teams which create a professional and thoughtful video success story about using Siemens software to solve their FSAE design or simulation challenges. [Award Information](#)