

GETTING STARTED FOR NEW SOLAR CAR TEAMS

Solar Car Conference, February 1-3, 2019
Southern Illinois University, Edwardsville, IL
Presented by Evan Stumpges, February 2nd
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ASC/FSGP Team Coordinator

www.AmericanSolarChallenge.org

AGENDA



- Prepare for Competition
- Solar Car Outreach
- Registration Process
- Stay Connected

ABOUT THE PRESENTER



- **Education:** Iowa State University
 - Mechanical Engineering B.S.
- **Solar Car:** Team PrISUm
 - 2009-2011: Media Director
 - 2011-2012: Project Director
 - Solar Car Driver for ASC 2010, FSGP 2011, and ASC 2012
- **Event Volunteer:** IEF
 - 2012-2017: Webmaster
 - 2014-Present: Team Coordinator
 - Event Staff since 2013 including ADSC 2015
- **Employment:** Caterpillar
 - 2012-Present: Electric Drive Systems Engineer in Peoria, IL
- **Current Vehicle:** 2018 Tesla Model 3

IT'S PROVEN.

**NO GAS GETS
BETTER
MILEAGE!**



PREPARE FOR COMPETITION

MAKE A PLAN

- **Build your leadership team/organization structure**
 - Recruit people with a variety of backgrounds/skills to lead a diverse team
 - Think about how to hold leaders accountable
 - Elected vs. appointed positions
 - Team leadership is highly valuable on a resume
- **Continually work on team member onboarding and retention strategy**
 - Provide training opportunities to members
 - Host team building events
 - Do a mock races to train people on competition roles
 - Always be on the lookout for talented new members and start giving them responsibilities
- **Find a viable workspace to build your vehicle**
 - Shop air, access to tools, machine shop access, etc.
- **Start networking with teams and staff**
 - You don't know what you don't know
 - Make the most of this conference!
 - Make friends, ask lots of questions
 - Consider asking well established teams if they'd be willing to donate an old vehicle to help you get started

PREPARE A REALISTIC SCHEDULE

- Be smart about balancing design, manufacturing, and validation
- Schedule strategic key milestones in advance
 - Design reviews
 - Manufacturing trips
 - Vehicle unveiling
 - Vehicle test drives
- Schedule regular working meetings and leadership meetings to keep the project on track
- Regularly review progress against schedule - adjust as needed to stay on track for milestones

RAISE FUNDING

- **Prepare a project budget**
- **Leverage your alumni network**
- **Ask for in kind donations of products and services before buying**
- **Partner with local business**
- **Find funding opportunities at your campus**
 - Government of the Student Body
 - Engineering student organization funding
 - Demonstrate that solar car is valuable to your college/university
- **Seek out relevant grants to apply for**
- **Start a GoFundMe campaign**

SAFETY PROTOCOL

- **Holding a safe Event is of utmost importance to us**
 - All teams are required to appoint at least one Safety Officer
 - All teams are required to have a Team Safety Kit as specified in the Regulations
 - Teams must have the necessary PPE for working safely and use it whenever appropriate
 - Teams should practice various safety scenarios and coordinated responses
 - Safety starts well before the event in your school's labs and workshops
 - Please make safety part of your team's culture and look out for each other



SOLAR CAR OUTREACH

Embracing Education as Fundamental Team Mission

OUTREACH LEADERSHIP

- The team outreach function is important enough to have at least one team member dedicated to serving these needs
 - This can be an elected or appointed leadership position with a title like outreach director, event manager, etc.
- Encourage outreach event attendance by all team members as this will help with team cohesion and give them a greater sense of the importance of the team and vehicle as a whole

OUTREACH EVENT IDEAS

- Solar car facility tours
- Visit community colleges, high schools, and middle schools
- Freshman orientation at your institution
- FIRST Robotics/LEGO League events
- Sports events
- Conferences
- Parades
- State or local fairs

OUTREACH SIGNIFICANCE

- **Educating the public**
 - At the core, outreach is about educating the public about your organization, your solar car, and the competition
 - Audience demographics can vary greatly between events
 - Try to get an idea of the base knowledge/interests of the audience so you can tune the presentation to match
- **Improving communication skills**
 - Many engineers aren't the strongest with communication skills
 - Outreach events encourage team members to interact with people and explain technical aspects of the car so anyone can understand

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- **Increasing team member knowledge & interaction**
 - One of the best ways for new team members to learn about the solar car is for them to hear more experienced members explain the vehicle to people at outreach events and then learn how to explain it themselves
 - Outreach events allow team members in different fields and areas of expertise to meet each other and learn about aspects of the vehicle they normally don't work on
 - **Recruiting**
 - What better way to recruit new team members than to display the solar car on campus and talk directly to students passing by about the team?

■ **Sponsorship**

- Market your team as a vital recruiting tool for your university that helps attract/retain good talent
 - Doing lots of outreach to prospective students, including high school and middle school students is a key part of this
 - The more you can get your team to have a strong presence at college events, the more valuable you become and the more you can ask for in return
- Outreach can also be effective in securing new or recurring sponsorship from companies and organizations
 - Make it a point to visit as many of your sponsors with your solar car throughout the year as possible
 - At every outreach event, be on the lookout for people from companies or organizations that might have an interest in partnering with or supporting your team

REGISTRATION PROCESS

Stay on top of event deadlines

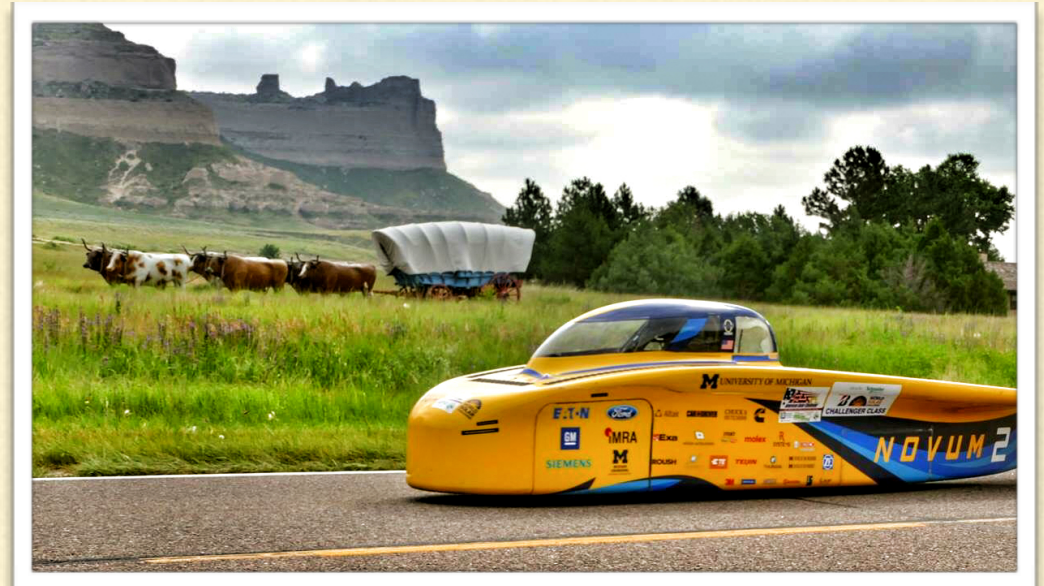


READ THE EVENT REGULATIONS

- **Regulations are the rules that all teams must follow**
 - Teams are expected to be intimately familiar with the event Regulations
 - Print them out and go through them line by line to ensure full compliance
 - Our official Inspectors exist to fairly and uniformly enforce these rules
 - Scrutineering is the process where Inspectors carefully assess each aspect of the solar car for compliance with the regulations
- **Regulation Interpretations - ascregs@americansolarchallenge.org**
 - Official
 - Have the same force and effect as the Regulations
 - All teams will have visibility to the question and response in the Event Regulations section of the ASC website
 - Unofficial
 - Have no force and effect on the Regulations and may be superseded
 - Kept private between the team and the Inspectors

CHOOSE YOUR VEHICLE CLASS

- **Single-Occupant Vehicle (SOV)**
 - Solar cars designed to carry a single occupant
 - Referred to as Challenger Class in WSC
- **Multi-Occupant Vehicle (MOV)**
 - Solar cars designed to carry more than one occupant that get to grid charge during the event
 - Referred to a Cruiser Class in WSC
- **Grandfathered**
 - Solar cars that do not meet the current regulations due to being designed for a previous recognized solar car event within the last 4 years
 - These vehicles are Scrutineered to the set of regulations they were designed for
 - They compete as a separate class in FSGP events and are demonstration only for ASC events



CHOOSE A TEAM NUMBER

- Teams and Solar cars are often identified during the Event by their unique number
 - New teams must choose a 1-3 digit positive integer number
- Under the Team menu on our website you'll find a page for Previous Event Participants - choose a Team Number that is not already on this list
- Disputes over team number will be resolved by Event officials based on order of request and registration status

EVENT REGISTRATION PACKAGES

- **Initial Registration Package**
 - Team Entry Form
 - Team Participation Agreement
 - Proof of Insurance
 - Preliminary Vehicle Design Report (for ASC events only)
 - Initial Entry Fee
- **Track Registration Package**
 - Vehicle Design Report
 - Track Fee
- **Road Registration Package**
 - Road Fee (for ASC events only)
- **Team Data**
 - Team Photo
 - Team Data Sheet

PRE-EVENT STATUS BOARD

- **Under the Teams tab on our website you'll find the Pre-Event Status Board for upcoming events**
 - This is where you'll find the information and documents needed for registration
 - This board should be updated every week or two - check it often to see how your team is progressing towards becoming fully registered for an event
 - Contact ascteams@americansolarchallenge.org if anything appears incorrect
- **Colors**
 - Red - item is not submitted or not complete enough to be evaluated
 - Blue - item has been received and is under review
 - Yellow - item has been reviewed and isn't sufficient to satisfy all requirements - additional information or corrections are required from the team
 - Green - item has been reviewed and satisfies all requirements
- **Event registration is not complete until a team is all green on the Pre-Event Status board**
- **First 5 teams to achieve all green status get priority slots at Scrutineering**

COMMUNICATION PROTOCOL

■ **How to reach us**

- General Team/Event Registration Inquiries: ascteams@americansolarchallenge.org
- General Event/Logistics Inquiries: ascinfo@americansolarchallenge.org
- Technical/Regulations Inquiries: ascregs@americansolarchallenge.org

■ **Generic Team Email**

- It is critical that teams set up and maintain a team email address that can be used for all event correspondence
- This email must forward to the team's current Project Manager, Department Manager(s), and Team Advisor.
- This email is to be included on all correspondence between a team and any Event representative

LEGAL AGREEMENTS

- **Team Participation Agreement and Proof of Insurance**
 - Submission deadline is early during the registration process (start working on this right away!)
 - These are important legal documents that must be reviewed and agreed upon between our or board/legal council and someone at your university with the authority to enter the school into a binding legal contract (typically someone from your legal/risk management department).
 - If you have never entered one of our events before, start working with your school as soon as possible on filling out and submitting the Team Participation Agreement and Proof of Insurance.
 - Negotiations may be required to agree upon any proposed amendments to the Participation Agreement
 - If your school is able to provide self insurance for the event that is typically the cheapest solution for teams but we also accept 3rd party insurance coverage for the event.
 - If your insurance hasn't renewed yet to cover the event dates, submit the current policy to get yellow status until the policy gets renewed - once renewed just submit for a green status
- **Our events are open to higher education institutions only**
 - This means that the College/University is the official Participant in the event (individuals, teams, companies, high schools, etc. are not allowed to be Participants)
 - The College/University name needs to be listed as the "Participant" in the Team Participation Agreement and the person signing must have the appropriate level of authority to legally bind the Participant
 - Furthermore the College/University needs to be listed as the insured entity on the Proof of Insurance

REGISTRATION PAYMENTS

- **Acceptable Payment Methods**

- Mail a Check
- Wire Transfer (must add \$50 transaction fee) - contact us for bank details
- PayPal (must calculate and add transaction fee) - reference regs for calculations

- **Payment must be submitted in US currency**

- **Late Fees**

- Late fees as specified in the regulations will be assessed for payments or reports which are submitted more than 10 days after the posted deadline
- To avoid late fees, ensure that your design reports are submitted in time and your payments are submitted early enough such that we receive them before the deadlines

- **Check the regulations for information about opportunities for partial refunds and grants**

TEAM PHOTO SETUP



- Choose the backdrop carefully
 - Try for a day with nice sunny skies!
 - Find an interesting backdrop that brings out the best in the team and institution
 - Don't make the backdrop so large that the team members and car appear small in the picture
- Must clearly feature the car (in as complete a state as possible...)
- Include as many people as possible who helped build the car
- The photo will be used in event programs and other publications














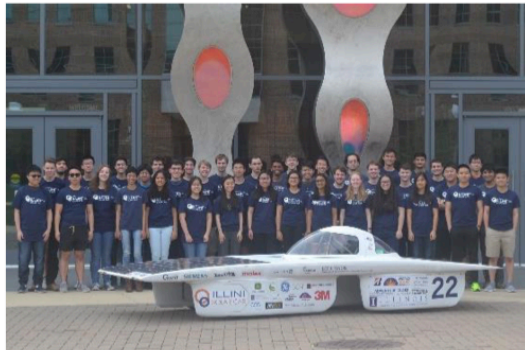
TEAM PHOTO SUBMISSION

- Aspect ratio and image quality
 - Use a good camera to take the picture (please don't submit blurry images)
 - Submit the image as a JPG or PNG file (min size of 350x234 pixels)
 - Be sure to take the photo in landscape orientation
 - We will apply a 3:2 aspect ratio crop - you can apply this crop for us
 - If it is not possible to apply this crop without removing essential parts of the image we will add black bars to two edges of the image
- Submit the Team Photo Form along with the photo by the regulation deadline
 - If you miss the deadline you may be omitted from the event program
 - Team members in the photo must be identified by name
 - Include a brief bio/project description for use in social media posts

SOLAR CAR DATA SHEET

- Submit the solar car data sheet by the deadline posted in the regulations
 - If you miss the deadline you may be omitted from the event program
 - In addition to solar car data, there is another tab in the Excel form for your race crew team member data (don't forget to fill out this tab)
 - Specify each crew member's t-shirt size
 - Teams bringing over 15 people will pay an additional fee per extra member
 - Must submit CPR/First Aid certificate with the data sheet
- The solar car data sheet requires that you provide basic technical information and specifications about your vehicle
 - This information is to be provided in metric units (SI)
 - The info will be used in event programs and other publications
- **Why not also use this info create a vehicle data sheet that can be posted on your own website and shared with team sponsors?**

ASC 2018 SOLAR CAR DATA EX.

<p>University of Michigan #2 Novum </p>  <p>L x W x H: 5.00m x 1.00m x 1.00m Weight: 185kg Array: 800W Multi-junction Gallium Arsenide Batteries: 5.0kWh Lithium Ion (30kg) Motor: MARAND Steel-back Wheels: 4 Custom 16" Chassis: Composite monocoque, metal roll cage</p>	<p>University of Kentucky #3 Gato del Sol VI </p>  <p>L x W x H: 4.50m x 1.75m x 1.12m Weight: 240kg Array: 967W Silicon Batteries: 4.5kWh Lithium Ion (19.6kg) Motor: 2 Mitsuba Radial Flux PMSM Wheels: 4 Custom 7050 Aluminum 16" Chassis: Fiberglass/Aluminum Honeycomb</p>	<p>MIT #4 Flux </p>  <p>L x W x H: 4.50m x 1.91m x 1.05m Weight: 182kg Array: 950W Silicon Batteries: 5.0kWh Lithium Ion (19.7kg) Motor: Mitsuba Hub Wheels: 4 Composite 17" Chassis: Semi-monocoque</p>
<p>Western Sydney University #15 Unlimited 2.0 </p>  <p>L x W x H: 4.60m x 1.55m x 0.90m Weight: 158kg Array: 960W Silicon Batteries: 5kWh Lithium Ion (20kg) Motor: Marand Axial Flux Surface Mount Wheels: 4 Carbon Fiber 16" Chassis: Monocoque Carbon Fiber</p>	<p>Illinois State University #17 Mercury 6 </p>  <p>L x W x H: 4.35m x 1.35m x 1.07m Weight: 270kg Array: 760W Silicon Batteries: 5.14kWh Lithium ion (20kg) Motor: Mitsuba BLDC Wheels: 4 Carbon Fiber 16" Chassis: Carbon Fiber Composite</p>	<p>University of Illinois Urbana-Champaign #22 Argo </p>  <p>L x W x H: 4.50m x 1.80m x 1.00m Weight: 230kg Array: 650W Silicon Batteries: 5.1kWh Lithium Ion (19.95kg) Motor: 2 Mitsuba Brushless DC Direct Drive Wheels: 4 GH Craft Carbon Fiber Chassis: Carbon Fiber Panel Semi-Monocoque</p>

STAY CONNECTED

Digital & Print Media



SOCIAL MEDIA



- **ASC has Facebook and Twitter accounts (follow us!)**
 - This is a good source for up to date news during ASC & FSGP events
 - We use this as a method to make announcements throughout the year
 - We also use this to highlight and promote things going on with solar car teams and enthusiasts around the world
- **We suggest that teams create Facebook and Twitter accounts**
 - Use to share team photos, images, videos, news, etc.
 - Have a team member dedicated to keeping your social media feeds active (the whole team can help contribute content though)

USE EVENT HASHTAGS

#SolarCarConf2019

#FSGP2019

#ASC2020

ONLINE SOLAR CAR DISCUSSION COMMUNITIES

- **Google Group**

- This is a discussion forum open to a wide range of topics relevant to solar car teams and enthusiasts around the world
- Help make the most of it!
 - Ask your team members join this group
 - Post lots of questions, responses, and let's bring it to life...
- <https://groups.google.com/forum/#!forum/solarcarteams>

- **Solar Car Subreddit**

- Started at the 2017 Solar Car Conference
- <https://www.reddit.com/r/solarracing/>

TRADITIONAL NEWS OUTLETS

- **Newsletter**

- Many teams produce a monthly, quarterly, or semesterly newsletter
- Can be in the form of a printed publication, PDF, blog post, or email format
- Send it out to sponsors and alumni to keep them up to date
 - Keep master contact lists of team sponsors and alumni for this purpose
- Paper copies can be placed at strategic locations around campus to generate interest among faculty and assist with recruiting new team members

- **Team News Coverage**

- Never turn down the chance to have your team participate in a newspaper, magazine, radio, or TV story
- This is a great way to get your team's name and mission out in your community, state, and potentially a national or even international audience

ASC WEBSITE RESOURCES

<http://AmericanSolarChallenge.org>

- **Competition Menu**
 - Find information about upcoming competitions
- **Regulations Menu**
 - Find the latest event regulations, official interpretations, and approved solar cells
 - Find Mechanical and Electrical vehicle design resources
- **Teams Menu**
 - Find team registration status and forms
 - View list of teams that have competed in our Events
- **Media Menu**
 - Download event graphics ASC & FSGP

TEAM WEBSITE MANAGEMENT

- **Domain Name**

- Many teams choose to purchase their own domain name
- Others use their university's domain name for free

- **Hosting**

- Universities often have hosting services that are freely available to teams
- If you choose to use a private provider outside the university, ensure they can handle the web traffic during races
 - ASC site had this problem until switching hosting providers in 2012

- **Platform**

- Choose something that is easy for team members to manage and update
- ASC use WordPress, which is a convenient and easy to use platform

TEAM WEBSITE CONTENT IDEAS

- News/Blog
- Links to social media accounts, school website, and ASC website
- Information about your team members
- Information about how to join the team
- Information about your current vehicle and upcoming races
- Information about past vehicles and race history
- Information on how to sponsor or support the team
- Sponsorship recognition page
- Contact information

TEAM VIDEO

- Create a YouTube channel to share videos (or similar service)
- Content Ideas
 - Time-lapse videos during vehicle manufacturing/assembly
 - Interviews with team members or sponsors
 - Live feed of your shop viewable from your office or possibly by alumni/sponsors
 - Mounting Go Pro cameras to the solar car
 - Videos of solar car or component testing
 - Race documentaries

TEAM PHOTOGRAPHY

- Create a Flickr or similar online photo sharing account to share images with the public
 - This is a great way to publicize the progress you are making on your solar cars and outreach/education events your team is involved with
 - Alumni and sponsors love to see lots of photos!
- Our staff takes pictures throughout Events for our Flickr page
 - <https://www.flickr.com/photos/americansolarchallenge/>
 - You can utilize this as inspiration for your next solar car design

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- Unfortunately written documentation can be lacking on teams
 - Taking good photos throughout the manufacturing and assembly process can help fill this gap and assist future teams
 - Need to have a central repository/database for photos taken by all team members
 - Ideally come up with a good organizational structure for the photos that makes it easy to find the right photos later on
 - Encourage all team members to take pictures and add them to this repository
 - Sorting build pictures by date can help the next team reconstruct a vehicle timeline and help ensure they don't leave out important process steps
 - Pictures are useful as a reference when servicing the solar car to ensure things get taken apart and put back together correctly
 - Pictures of a past vehicle can be valuable as a reference when designing the next solar car



OPEN DISCUSSION