INNOVATORS EDUCATIONAL FOUNDATION

The Innovators Educational Foundation (IEF) is a non-profit 501c3 organization that was formed in the fall of 2009 to carry on the American Solar Challenge mission. IEF currently hosts two events: Formula Sun Grand Prix, a solar car track event, and the American Solar Challenge, the solar car road event.

A core group of dedicated volunteers, mostly former competitors, provide the engine for IEF. They know first-hand the value of a hands-on, multidisciplinary, innovative project to the education experience.

In addition to experiential learning, these solar car events promote energy efficiency and raise public awareness of the capabilities of solar power.

We appreciate your interest in the sport of solar car "raycing" and look forward to seeing you on the road!

Become a Sponsor Now
for the 2011-2012 season

* **Multiple corporate donation levels and opportunities**

* **Host the start / finish line dinner to speak to all the teams**

* **Showcase your company on in-kind product donations**

* **Individual donations accepted securely through the website www.americansolarchallenge.org**

Contact Us

Innovators Educational Foundation
PO Box 2368
Rolla, MO 65402
ief@americansolarchallenge.org

Support all of the teams with your donation to IEF!

www.americansolarchallenge.org

education

energy

20TH ANNIVERSARY
TOUR OF THE MIDWEST
JUNE 20-26
2010

American Solar Challenge

challenge

The American Solar Challenge Finish Line Committee would like to thank our Sponsors:

City of Naperville

NAPERVILLE SUSTAINABILITY CHALLENGE
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My Chef Catering

Dan Wolf Automotive Group

North Central College

Fair Oaks Ford

Illinois Solar Energy Association

Naperville School District 203

Rickard K. Elder & Company

Whole Foods of Naperville

Naperville Park District

Best of luck to all the Solar Raycers!

On behalf of the teams, staff, and sponsors,

welcome to the 2010 American Solar Challenge!

Beginning with Sunrayce 1990, this year marks the 20th anniversary of solar car raycing events in North America. Designs and technologies have evolved over the years and these teams continue to show just how far a solar car can go.

ASC is a unique competition which promotes educational excellence and celebrates engineering creativity all while fueled by the spirit of friendly competition, teamwork, and, of course, the sun. Each team designs and builds a solar-powered vehicle within a set of rules, which then must pass a series of inspections and successfully complete a track qualifier to prove the roadworthiness of the vehicle. Qualifying for ASC is an accomplishment in itself.

Once the green flag drops at the start line in Broken Arrow, OK on June 20, teams follow a pre-defined 1200-mile route, finishing in Naperville, IL on June 26. The route is broken into a series of stages with mandatory stops along the way to interact with the public and media as well as check-in with event staff for timing purposes and updates.

To finish the Tour of the Midwest route, teams will face hilly terrain , normal traffic conditions, and unpredictable weather all while carefully managing their power. Winning this brain sport is a combination of a reliable car, efficient driving, and a good strategy to get you the checkered flag.

Tour of the Midwest

Sunday, June 20 – Saturday, June 26
Broken Arrow, OK to Naperville, IL

Stage Stops
Teams overnight and start the next stage together the following morning.

Checkpoints
Teams are required to stop for a mandatory check-in with officials and swap observers

More than just ENGINEERING

The challenge of ASC begins long before the solar cars hit the road. A solar car team really acts as a small business – attracting sponsors, managing public relations, developing and executing a two-year plan, and producing a solar car. While most teams have many engineers, you will also find majors in business, marketing, art, and other fields. The solar car team multidisciplinary experience serves these students well as they graduate and prepare for their careers.

ENERGY AND INNOVATION FAIR

June 22 - 1 to 6 p.m. - Missouri State Capitol - Official Checkpoint Location

To show case the efforts of the American Solar Challenge 2010 race and celebrate science, engineering and technology, the Missouri Department of Natural Resources is hosting an Energy and Innovation Fair on the Capitol's south lawn. The free event is open to the public and will provide displays and exhibits for viewing while awaiting the arrival of solar cars and teams.

MISSOURI DEPARTMENT OF NATURAL RESOURCES

Scrutineering

June 12-15, Motorsport Ranch, Cresson, TX

After months of designing, building, and testing, solar car teams arrive for scrutineering. For four days, the solar cars will undergo a series of inspections covering all aspects of the car: mechanical systems, electrical systems, body and sizing, and dynamic testing. Inspectors in each area make sure the solar cars are built in alignment within the regulations and have all safety features in place. Teams must pass all stations in order to compete in Formula Sun Grand Prix and the American Solar Challenge.

Scrutineering is also about testing the abilities of the drivers. All drivers must pass the egress test, which requires drivers to get out of the car unassisted in 10 seconds or less. Drivers are randomly selected to complete the dynamics tests, which are as much about testing the car's braking, turning, and stability as it is about testing the experience of the drivers.

Qualifying

June 16-18, Motorsport Ranch, Cresson, TX

To qualify for the American Solar Challenge, teams must successfully participate in Formula Sun Grand Prix (FSGP). FSGP is a 3-day track race, where the most laps completed wins. For qualifying purposes, teams are required to complete a minimum number of laps on the 1.7 mile track.

The tight turns test the car's stability and driver's skill. Only cars (and drivers) that prove reliable and safe on the track are permitted to participate in the on-road event, the American Solar Challenge. FSGP also provides practice for the team's pit crew in changing flat tires and troubleshooting issues with the car. Teams can use this time to learn from one another and borrow supplies – sportsmanship and teamwork are strongly encouraged!

Raycing

June 20-26, Broken Arrow, OK to Naperville, IL

The teams that make it into the American Solar Challenge (ASC) have already completed quite a challenge. What lies ahead of them is 1200 miles of road across the Midwest. The team that completes the route in the lowest overall elapsed time wins.

Teams rayce during the day, between the hours of 9am – 6pm. Each solar car is escorted by a lead and chase vehicle that carry the other team members and equipment for roadside repairs. Teams are provided a detailed route book with step-by-step instructions and maps. The route is broken into stages, and teams are required to stop at all checkpoints and stage stops along the way.

For two hours in the morning and evening, teams are able to charge their batteries using the solar car's array. Many teams have an array stand to angle the solar array toward the sun for maximum exposure. Teams also use these non-raycing hours to perform maintenance on the car, check the weather, determine their strategy for the next day, and hopefully get some sleep!

www.americansolarchallenge.org

American Solar Challenge

June 20
Start Line | Broken Arrow, OK
Bass Pro Shops

Checkpoint | Neosho, MO
Crowder College

June 21
Stage Finish | Topeka, KS
Downtown Ramada Inn

June 22
Stage Start | Topeka, KS
Downtown Ramada Inn

Checkpoint | Jefferson City, MO
Missouri State Capitol

June 23
Stage Finish | Rolla, MO
Missouri S&T

June 24
Stage Start | Rolla, MO
Missouri S&T

Checkpoint | Alton, IL
Lock and Dam

June 25
Stage Finish | Normal, IL
Illinois State University

June 26
Stage Start | Normal, IL
Children's Discovery Museum

Finish Line | Naperville, IL
Naperville North High School

Awards Ceremony | Naperville, IL
North Central College, Wentz Hall

American Solar Challenge

MEET THE TEAMS

17 teams are registered for the 2010 season, with all but one planning to compete in both Formula Sun Grand Prix and the American Solar Challenge. We welcome our international teams from Canada, Germany, and Taiwan as well as the strong presence of our local United States teams. Safe travels, sunny days, and all the best to all the teams!

University of Michigan
Infinium #2

Weight: 700 lbs
Solar Cells: Emcore ATJ/BTJ
Batteries: A123 Lithium Ion Phosphate
Chassis: Carbon Fiber
Motor: CSIRO

University of Kentucky
Gato del Sol IV #3

Weight: 450 lbs
Solar Cells: Emcore ATJ
Batteries: AA Portable Power High Power Li-Po
Chassis: Spaceframe 6061 Al Tubing
Motor: NGM SCM

Illinois State University
Mercury III #5

Weight: 624 lbs
Solar Cells: China Sunergy
Batteries: 1080 sub-c Ni-MH
Chassis: Chromoly steel tube frame
Motor: Power Tec

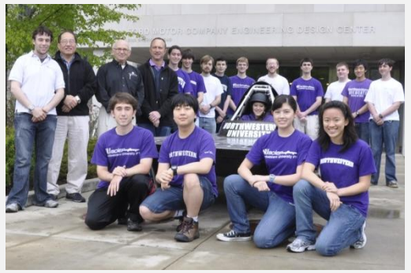
Iowa State University
Anthelion #9

Weight: 460 lbs
Solar Cells: SunPower A-300
Batteries: Samsung Li-Ion SDI 18650-26C
Chassis: Aluminum space frame
Motor: NGM – SCM150

Hochschule Bochum
SolarWorld No.1 #10

Weight: 483 lbs
Solar Cells: AZUR SPACE 3G Gallium Arsenide
Batteries: Sanyo UR10650F
Chassis: Carbon Fiber
Motor: NGM

Northwestern University
Nusolar sc5 #11



Weight: 624 lbs
Solar Cells: Mono Silicon (Sunpower A-300)
Batteries: Lithium Ion (LG Chem ICR 18650 A2)
Chassis: Carbon Fiber
Motor: NGM

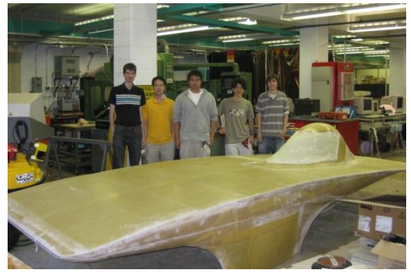
Stanford University
Apogee #16

Weight: 414 lbs
Solar Cells: Sunpower C50
Batteries: WANMA Li-Po
Chassis: Carbon Monocoque
Motor: NGM SCM-150

Western Michigan University
Sunseeker #20

Weight: 378 lbs
Solar Cells: Emcore Triple Junction Gallium Arsenide
Batteries: EEMB Lithium Polymer
Chassis: Monocoque
Motor: CSIRO hub motors (2) FW drive

University of Waterloo
Midnight Sun #24



Weight: TBA
Solar Cells: SunPower A-300
Batteries: Lithium Polymer
Chassis: TBA
Motor: NGM SCM-150

State Univ. of NY New Paltz
SUN Hawk #28

Weight: 503 lbs
Solar Cells: SunPower C-50 silicon
Batteries: LiFePO4
Chassis: Tubular aluminum
Motor: NuGen sm-150

University of Minnesota
Centaurus 2 #35

Weight: 400 lbs
Solar Cells: China Sunergy
Batteries: BAK Lithium Polymer
Chassis: Fiberglass Composite
Motor: NGM

MO Univ. of Science & Tech
Solar Miner VII #42

Weight: 375 lbs
Solar Cells: Emcore ATG Gallium Arsenide
Batteries: Kokam Lithium Polymer
Chassis: Chromoly Steel
Motor: NuGen SCM

University of Calgary
Schulich Axiom #65

Weight: 441 lbs
Solar Cells: 1980 Gallium Arsenide
Batteries: Lithium Polymer
Chassis: Composite
Motor: NGM; CSIRO

University of Texas at Austin
Samsung Solorean #88

Weight: 350 lbs
Solar Cells: SunPower A300 Silicon
Batteries: LG 18650 Lithium Ion
Chassis: Chromoly Steel
Motor: NGM

National Kaohsiung University
Apollo VI #95

Weight: 284 lbs
Solar Cells: GaAs
Batteries: Lithium Ion Polymer
Chassis: Carbon Fiber
Motor: MITSUBA-M2096D-II

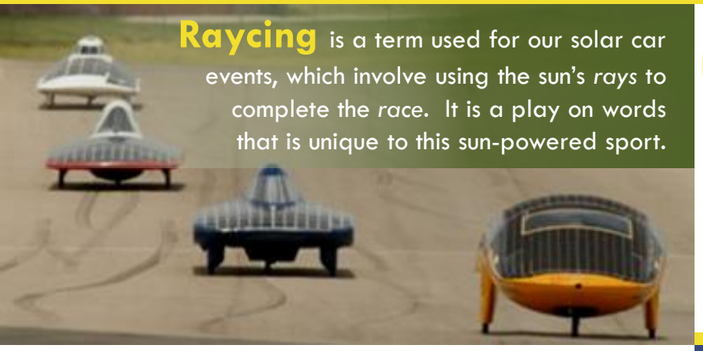
Oregon State University
Odyssey #256

Weight: 450 lbs
Solar Cells: SolarWorld A-262 Monocrystalline Si
Batteries: Trustfire Li-Ion
Chassis: Titanium
Motor: NGM SC-M100

University of New Mexico
Lobo del Sol #505

Weight: 700 lbs
Solar Cells: Advent Ventura
Batteries: Werker Lead-Acid WKA12-33C-J
Chassis: Steel
Motor: Vectrix

Understanding the Lingo: Talk like a Solar Car Raycer



Raycing is a term used for our solar car events, which involve using the sun's *rays* to complete the *race*. It is a play on words that is unique to this sun-powered sport.

"Don't Shade the Array" is a reminder to watch your shadow when near the solar car during charging. Casting a shadow on any portion of the solar array will decrease the energy available to be stored in the batteries.

"Spray the Array" is the action of misting the array with distilled water to cool down the solar cells for more efficient charging.

"Check the Ballast" occurs when a new driver gets in the solar car. Drivers are weighed during scrutineering and given ballast to make the driver weight equivalent to a minimum of 176 lbs. Colored coded wristbands and ballast bags are used to verify the correct weight is in the solar car.

Trailering occurs when a team cannot reach the next stage/checkpoint in the allotted time. The solar car is loaded onto a trailer. Time penalties are in place to discourage trailering.

Impound means that the batteries are removed from the car and kept under the control of the observer to make sure they are not externally charged. Batteries are impounded upon arriving at a stage stop and every night from 8pm to 7am the following morning.

Charging typically refers to the time in the morning and evening that is designated time to point the solar array towards the sun and charge the batteries. Any extra power the team has as they go down the road can also be put into the batteries for charging on the road.

Body is the aerodynamic shell of the car holding the solar cells.

Chassis is the structural frame of the car forming the driver cockpit.

Official Elapsed Time represents the calculated time for each team in completing the American Solar Challenge. This time includes driving time, checkpoint credits, and trailering and other penalties. The team with the lowest Official Elapsed Time wins, therefore the first team to cross the finish line is not necessarily the winner!

Lead is the vehicle in front of the solar car, responsible for navigation.

Chase is the vehicle behind the solar car, responsible for protection

Lead, solar car, and chase make up the **solar car caravan**.

Many teams have a **scout** vehicle which travels the route several miles ahead of the caravan to check weather and road conditions.

The Wilson Cup

The Wilson Cup is the traveling trophy for the American Solar Challenge. The winning team of the road event gets to take home the Wilson Cup and display it until the next road event.

On the upper base, the five bands recognize the winners of Sunrayce in 1990, 1993, 1995, 1997, and 1999. The lower base includes American Solar Challenge 2001 and 2003 and the special edition North American Solar Challenge 2005 and 2008.

This year's winners will be added with more space for the tradition to continue!

THANK YOU to our 2010 SPONSORS!

The MathWorks™ · City of Naperville · Broken Arrow · Missouri Department of Natural Resources · All Around Alton Illinois · Missouri S&T University of Science & Technology · Center for Mathematics, Science, and Technology, Illinois State University · Crowder College · Ramada Topeka, KS · Caterpillar · Columbia Sportswear · Hutcheson Ford Sales · Nixon Peabody LLP Attorneys at Law · NuGen Mobility · Underground Printing

A Typical Day on ASC…

Day 1, 7:00 AM – Batteries are released from impound and morning charge time begins.

9:00 AM – Wait for the green flag to drop. Teams are released in 1-minute intervals.

During the day – drive, drive, drive…and only if needed, stop to charge, fix a flat, change drivers

Reach a Checkpoint – the team jumps out, points the solar array towards the sun, and takes a much needed restroom break. Drivers of support vehicles go off to find the nearest fuel station. Observers are swapped, route updates are given, and the public gathers around to see the cars. After staying the allotted time, 3…2…1..and they're off again.

6:00 PM – 9-hours after the green flag, the raycing day ends and evening charge time begins. Teams have a 45-minute window to find a safe place to stop.

8:00 PM – Battery impound, work on the car (minus batteries), find lodging, eat dinner, call HQ, and get ready for the next day.

Day 2 is much the same, except that it ends at a stage stop where all teams will meet together for stage awards and camaraderie.

Like ASC? Check out FSGP!

Formula Sun Grand Prix is a 3-day track race held on a road course track. FSGP also serves as the qualifier for ASC, requiring teams to demonstrate the reliability and stability of the car on the track. On off-ASC years, FSGP is a great way to educate new team members.

In Appreciation of our Volunteers

ASC 2010 would not be possible without our volunteers. Many have been with the event since the early years of Sunrayce and we continue to thank them for their dedication to the teams and the event!

Rayce Officials

The green shirts identify the officials, who perform a variety of roles from inspectors to stage/checkpoint crews to our route advance team and on-road EMTs. Many are also involved in the prep and planning work prior to the event and reviewing the technical design reports submitted by the teams.

Dan Bohachick
Brian Call
Steve Day
Mark Eudaly
Sue Eudaly
Geoff Heavin
Paul Hirtz
Steve Hunt
Gail Lueck
Marie McMullen
Steve McMullen
Bernie Neidert
Dick Roberto
Steve Rummel
Andrew Rutgers
Dan Saulsberry
Grant Smith
Ryan Smith
Greg Thompson
Jim Williams

Observers

Observers wear orange shirts and volunteer to spend a week on the road living and traveling with the teams. Their role is to ride in the chase vehicle, monitor the solar car's progress, and ensure batteries are impounded at the appropriate time. Observers are the eyes and ears for the staff and get to experience first-hand the hospitality of the teams.

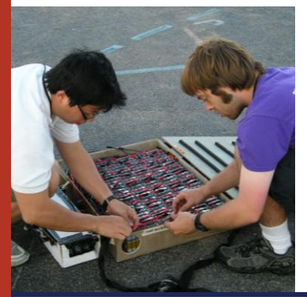
Dennis Bearden
Andre Carpiaux
Rita Crocker
Taylor Fontenot
Chloe Gibbons
Dustin Grue
Jimmy Hack
Kila Henry
Brian Kamusinga
Jordan Littlejohn
Patrick Markan
Bill Mayberry
Robert Rieffel
Jeff Sharp
Bill Stilwell
Alisa Vancel
Louis Werner

Additional thanks to the following staff who could not join us on the road but helped make ASC 2010 possible:
Dan Eberle, Jason Kramb, and Cheryl Williams
Special thanks to all of the local hosts responsible for organizing the stage/checkpoint locations and activities.

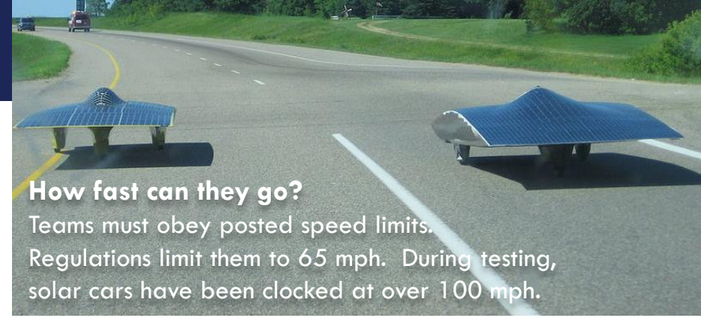
Solar Car FAQs

How do solar cars work?
Solar cars are very similar to electric vehicles, except that they utilize energy straight from the sun as opposed to a battery charger. Solar cells on the car convert sunlight into electricity, which in turn powers an electric motor to run the vehicle.

Do the cars have air conditioning?
Though teams are required to provide ventilation for the driver, these are racing vehicles. Air conditioning, radios, power windows, and other creature comforts would only consume electricity without improving the car's performance.



What about those not-so-sunny days?
Solar cars carry batteries that can be charged using the solar cells. When facing clouds or needing extra power, the car uses this stored energy



How fast can they go?
Teams must obey posted speed limits. Regulations limit them to 65 mph. During testing, solar cars have been clocked at over 100 mph.

Why do they look so different?
Conventional passenger cars spend more than 85% of their energy overcoming air resistance, known as aerodynamic drag. Solar cars are designed to minimize the energy lost to drag, resulting in some unique shapes.

Do solar cars have engines?
Instead of an internal combustion engine, most cars use a small electric motor mounted inside one of the wheels. Motor efficiency is typically over 90%.

Can I buy a solar car?
These solar cars are built specifically for events and are not suitable for the general public. However, you can buy hybrid electric vehicles or vehicles that run on ethanol, natural gas, or other cleaner fuels.