Challenge Regulations

for the

2016 Albi Challenge

24.10.2016. Release version 2.0

This document should be read in conjunction with the Technical Regulations

Date	Release	Author
24/10/2016	Create	JLF
29/10/2016	Add Challenge and scrutineering chapters	JLF

1) Introduction

The “Albi Solar Challenge” will take place in Albi from 5th May to 8th.

The aim of that French Challenge is to improve efficiency of electrical cars (EV). The challenge for the Teams during this event is focused on strategy, efficiency, sharing experience.

This document provides the details of the challenge regulations in order to ensure a smooth and fair procedure of the different challenges. If you have any questions or concerns about these regulations, please do not hesitate to contact Jean-Luc FLEUREAU (information.ecosolar@gmail.com).

We are looking forward to welcoming you at the event and we are hoping for an exciting, fair and entertaining event.

The Event Organizers

2 General Information

Race Circuit of Albi

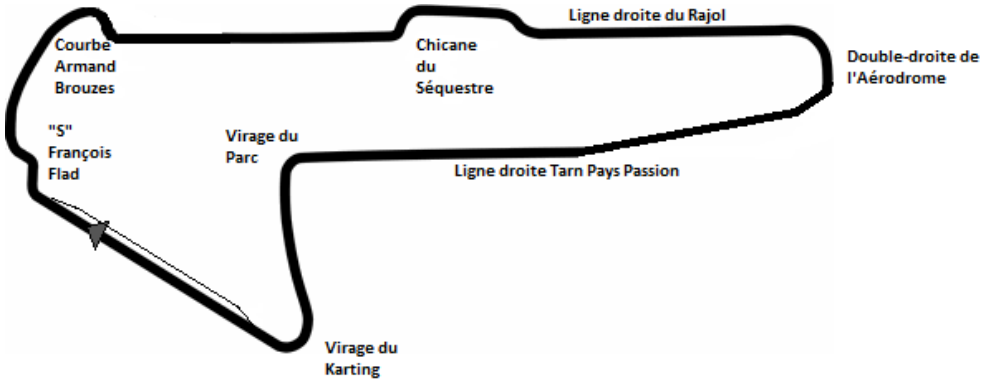
Lieu	Le Séquestre France
GPS	43° 54′ 53″ Nord 2° 06′ 48″ Est

Géolocalisation sur la carte : France

Track:

Length 3,565 km (2,215 mi)

Turns: 15



Circuit d'Albi - Le Séquestre

2.3. Flag Signals

Flag	FIA-sanctioned championships	Location	Use
	Start of race / Restart / End of hazard / Safe racing conditions / Pit lane open	Whole course	Waving flag
	Local caution / Full-course caution (if displayed with "SC" sign Safety Car on course)	Whole course	Waving flag / if necessary shown with „SC“ sign
	Debris, Fluid, or Oil on track	Whole course	Hold still
	Session stopped	Whole course	Waving flag
	Slow vehicle on track	Whole course	Waving flag
	Faster car approaching — during races / Lapped cars should give way to faster cars	Whole course	Waving flag
	Session finished / Winner	Race organizers only	Waving flag

Only for the Challenge relevant flag signals are listed
Non-compliance of the flag signals will lead to time-penalties which will be assigned by the race control.

3 Race Organization

3.1 The race

The race is composed of four parts:

- ✓ **"Qualification"**: After the scrutineering the raffle will follow. The start-numbers of the teams that have passed the scrutineering will be placed in the draw pot and will be drawn by the Fairy of Fortune. The order of the start-numbers corresponds with those of the line-up for each Challenge. This start will be given such as Le Mans. The team will have to run 20 laps of the circuit at the maximum speed. The winner is the team who run the 20 laps in the best time.

- ✓ **"Long Run"**: 8 hours of run between 9am and 5pm. The winner is the team who does the best number of laps.

- ✓ **"Best lap without battery pack"** during the Long Run. It means that the battery pack will be cut off, teams have to use only the solar panel to move the car. This race will be organized one hour before and one hour after noon. We will switch off the battery pack with a wireless electronic command (this system must be created).

- ✓ **"Fast and furious solar challenge"** or "High speed challenge", because as the circuit is close to the airport, the landing strip of 2575 yards (1600m) will be used to do a standing start. The speed at 1609 yards (1000m) will be checked by the police radar. The winner is the team who does the best time to run 1000m.

3.2. Safety equipment

The teams have to dispose of the following equipment:

- ✓ First-aid-box,
- ✓ ABC fire extinguisher (10 kg or more),
- ✓ reflective vests for all team members,
- ✓ battery datasheet,
- ✓ battery safety container
- ✓ a safety method to extinguish a battery fire.

The battery safety container and first-aid box have to be ready to use in the pit lane. Each team member, who is on the pit lane or the race track has to be wearing a reflective vest.

3.3. Support vehicles

- ✓ Without an allowance no supportive vehicles are allowed on the race track.

3.4. Safety vehicles

- ✓ Safety vehicles will be driven by the official event organizers of the Challenge or by employees of the race track themselves (ambulance).

- ✓ If a safety car is required it will drive on the „slow side“ of the race track. No driver may overtake another solar car on the track, including the safety car, until the safety car re-opens the track and car returns to the pit lane. As well as when the yellow flag is up, overtaking is not allowed.

3.5 Radio Communication

The teams have to have a two-way channeled radio, which allows the communication between the pit lane and the solar car.

3.6 Pushing

It is not allowed to move the solar car manually (by pushing or pulling) as soon as they have been placed on the starting position. This is only allowed in the pit lane.

Emergency: In an emergency situation, technical failure or vehicle damage, the vehicle has to be removed from the race track immediately. In this case it is allowed to push, pull or lift the vehicle from the race track. If the challenge will be continued it is allowed to push, pull or lift the vehicle to the exact position where it was removed from the race track.

3.7. Damage and vehicle failure

- ✓ Each solar car which breaks down on the track or encounters any mechanical problems or battery shortage has to be removed from the race track as soon as possible before a repair can take place (for details look into the safety concept).

- ✓ Each solar car has to carry a towrope within the vehicle at all times in order for the safety car to be able to tow off the vehicle from the track into the pit lane. It is prohibited for team members to enter the track until they get the OK from the marshals. All people have to follow the rule of wearing a reflective west when on the race track at all times! Every vehicle which is towed off the race track has to be inspected again before re-entering the race track.

- ✓ Stopping on the Race track for any reason will cause time penalties.

3.8 Energy Sources

With exception of the Challenge, “Long Run” any kind of charging the Batteries is allowed.

3.9 Static Scrutineering

- ✓ Qualification must be achieved in road ready configuration. Vehicles unable to present at the designated time, or are not ready to start, may fail to qualify.
- ✓ Each team must provide appropriate tools and personnel to facilitate the inspection of structural components.
- ✓ One group of checks will be made with the solar panel in place, and another group of checks will be made with the solar panel removed.
- ✓ Checks with the panel in place include:
    - ✓ signage
    - ✓ Solar EV size
    - ✓ solar collector type and size
    - ✓ vision (all Solar EV drivers required)
    - ✓ lights, indicators, horn.
- ✓ Checks without solar panel:
    - ✓ mechanical systems (seats, tyres, brakes, steering)
    - ✓ electrical systems
    - ✓ energy storage system
    - ✓ Roadworthiness.

3.10 Drivers

- ✓ The official mass of each solar car driver, as weighed at scrutineering with helmet and driving clothes, shall be 80 kg.
- ✓ If the mass of a driver is less than 80 kg, ballast will be added to make up the difference.
- ✓ No credit will be given if a driver or passenger weighs more than 80 kg.
- ✓ Ballast will be provided by the Organizer.

The Entrant must provide, at the time of scrutineering, two printed copies of a diagram (plan view, front of the Solar EV at the top), clearly showing how emergency isolation is to be activated. One copy will be placed in the Observer's log book; the other will held by the Organizer.

4 Penalties

Protests: The organizer has the right to exclude a team….

Any team failing to comply with these regulations during scrutineering, the qualifier, or the challenge will be penalized. Penalties range from official warnings to disqualification from the event.

Penalty Times : All penalty times listed are suggested minimums. Driving conduct may double with each subsequent infraction. Mathematical penalties will normally be the same for each infraction.
If the Inspectors believe the teams are deliberately violating traffic or driving regulations for strategic advantage, they may impose more penalties up to and including potential disqualification.

Conduct: Penalties, including disqualification from the event, may be imposed for improper conduct or the use of alcohol or illegal substances. Improper conduct may include, but is not limited to, improper language, unsportsmanlike conduct, unsafe behavior, or cheating. Teams are responsible for the conduct of all persons associated with the team, whether or not they are officially registered.

Speeding: Any solar car found to be speeding will be penalized. Speeding penalties may be assessed based on the following factors: (1) velocity over posted speed limits on the Pit Stop, (2) length of time of speeding infraction. The speed of either the solar car itself or the trailer vehicle may be used in determining a speeding infraction.

Pushing: A one lap penalty for every team who pushes a solar car along the Track. (Except in an emergency).

Improper Ballast: A five lap penalty may be assessed each time a team operates their solar car with ballast that does not match the solar car driver.

Unauthorized Drivers: Any solar car that drives with an unauthorized driver will be required to return to pit lane and drive with an authorized driver. Unauthorized driving will not be counted.

Non-Solar Charging of Batteries: From the start of the Long Run challenge until the official finish, teams will be disqualified from the event for charging their solar cars' storage batteries from any other source.

Disturbing Official Battery Seals: Solar car batteries will be marked with an official seal.
Disturbing these seals in a manner that prevents proper identification by an observer may be penalized as though all of the battery modules affected had been replaced as in Reg.

Replacement of Batteries: Decisions to exchange all or part of a battery must be communicated formally to the team's observer.

The penalty will be computed as follows: One Lap penalty for each single physical cell

Exceeding Size Specifications: Oversized solar arrays will be penalized one lap per excess centimeters in each dimension beyond the allowed size specification.

Restriction on Overtaking: On the track there are three dangerous curves where overtaking is not allowed. The restriction on overtaking will be marked with red tire stacks (will be published in the Team meeting), three laps penalty for overtaking in the marked zones.

Shortcut curves on the green areas beside the track will be penalized with one lap penalty.

4 Scrutineering

After the static scrutineering, all the team must do a dynamic scrutineering. Solar cars will be tested for dynamic stability and handling performance. A combination of the following tests may be conducted:

- ✓ **Figure-8:** Solar cars must be able to negotiate a figure-8 course in less than 12 seconds per side. The figure-8 course shall have a 5 m wide lane around two 8 m radius center circles, as illustrated in Figure 6-1. The vehicle shall not knock over any of the cones or exhibit signs of structural instability. No body work shall contact moving structural members.

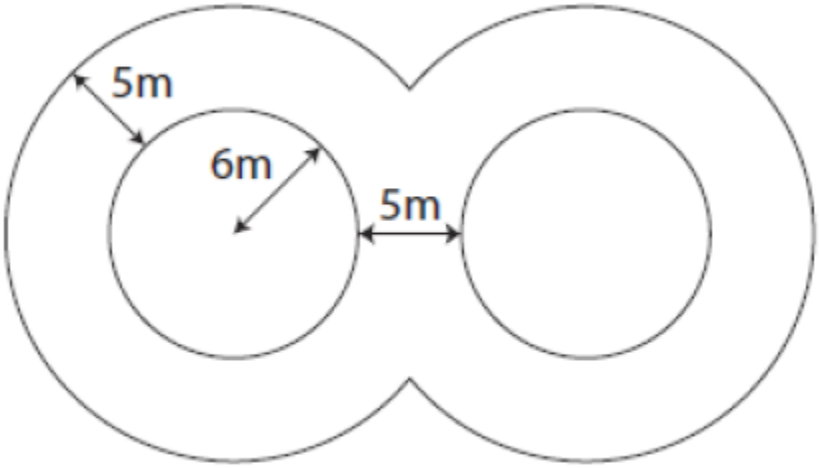


Figure 6-1 Figure-8 Course Layout

- ✓ **Stability at Speed:** Solar cars must be able to stay within a 3.5 m lane for at least 250m at its maximum speed. Cars must be able to achieve this regardless of crosswinds or gusting conditions.

- ✓ **Slalom Test:** Solar cars must be able to negotiate a slalom course in 13 seconds. The slalom course shall be 126 m long, with cones equally spaced every 18 m as in Figure 6-2

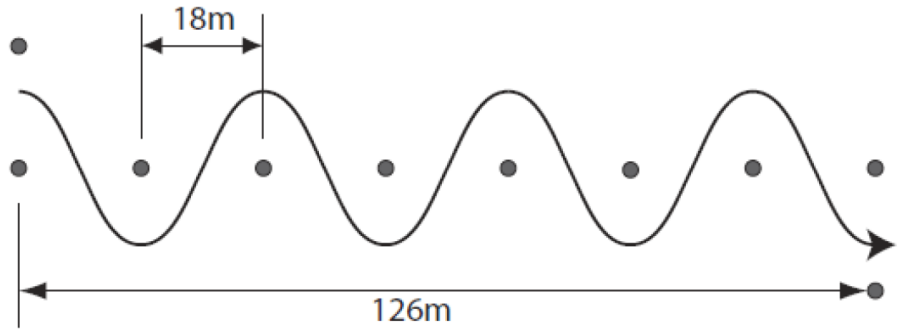


Figure 6-2 Slalom Course Layout

Brake Test: Solar cars will be tested to verify compliance with the Braking Performance. The time interval over which the deceleration is averaged shall be from the first indication that the driver should stop until the solar car comes to a complete halt. When braking, the solar car must not veer excessively to the left or right, or exhibit structural instability. The tire pressure and mechanical systems settings used in this test will be considered Event configuration. Solar cars may be required to demonstrate the brake performance a minimum of two out of three times.

- ✓ Solar cars must be able to make a U-turn in either direction, without backing up, such that any portion of the solar car that is within 200 mm of the ground remain within a 16 m wide lane. Portions of the solar car above 200 mm above ground may exceed the 16 m distance.

5 The competition

5.1 First Challenge (Qualification)

The aim of that challenge is to do 20 laps at the maximum speed. The winner is the team who run the 20 laps in the best time. The schedule of arrivals will determinate the order of the start for the next Challenge the next day.

- ✓ The start-numbers of the teams that have passed the scrutineering will be placed in the draw pot and will be drawn by the Fairy of Fortune. This start will be given such as Le Mans.
- ✓ This Challenge will be take place between 5pm and 7pm.
- ✓ The batteries pack could be full
- ✓ The solar car must be on the track 30mn before the start

5.2 Second Challenge (Long Run)

The aim of that challenge is to prove efficiency of solar cars. That why during a long day they will run at their best speed. The winner is the team who run the maximum laps during the day.

- ✓ The solar car must be on the track 30mn before the start. The order is the order of arrivals at the previous challenge.
- ✓ This start will be given such as Le Mans.
- ✓ Each team has the possibility to assign one team member to help the driver enter the solar car during the start
- ✓ This Challenge will be take place between 9am and 5pm.

- ✓ The batteries pack could be full at the start, then only the solar energy is allowed.

- ✓ The driver must be changed at least all the 20 laps

- ✓ The teams are only allowed to charge their batteries with solar energy during the challenge only on the predefined area. The orientation of the panels is only allowed on the declared charging area [the charging area will be announced during the event].

- ✓ After a driver exchange and before that the solar car leaves the pit, Observers must check horn and lights.

5.3 Third Challenge (Only the sun)

The aim of that challenge is to determine the high speed using only solar energy. This challenge will be done during the Second challenge. It means that the battery pack will be cut off, teams have to use only the solar panel to move the car. This race will be organized one hour before and one hour after noon. We will switch off the battery pack with a wireless electronic command (this system must be created).

5.4 Fourth Challenge (Fast and Furious)

The aim of that challenge is to demonstrate that solar cars are also cars that could have high velocity.

The Albi track is close to the airport, the landing strip of 2575 yards (1600m) will be used to do a standing start. The speed at 1609 yards (1000m) will be checked by the police radar. The winner is the team who does the best time to run 1000m.

- ✓ The solar car must be on the landing strip 30mn before the start. The order is not determined previously. Who is ready could do the try.

- ✓ A team is allowed to do 3 tries

- ✓ This Challenge will be take place between 8am and noon.

- ✓ The batteries pack could be full at the start,

6 Rewards

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