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# Introduction and Welcome

The Ilanga Cup is Southern Africa's first closed track endurance circuit event, which is focused on driving the innovation of renewable and alternative energy. The event takes place annually and has been created for local solar car teams to put their solar vehicles to the test in a controlled environment, designed and focused on measuring the vehicles' performance, efficiency, and durability.

The Ilanga Cup serves as a platform for solar car teams - professionals and amateurs alike - to not only test their solar cars but also learn and improve both team and the vehicle dynamics – doing this in the most efficient way possible. With these opportunities, the aim is to nurture young and upcoming solar car teams and grow existing solar car teams in order to be able to compete in larger-scale events that are internationally recognised such as our very own South African Sasol Solar Challenge.

The event offers three entry classes that allow enthusiasts, pioneers, and professionals to design and build a vehicle solely powered by the sun for competition. These classes are as follows:

- **Challenger Class** is for single-seat solar cars designed to be fast
- **Cruiser Class** is for efficient, practical solar cars with two or more seats
- **Adventure Class** is non-competitive, and is designed purely for hobbyist's or project cars

The information contained in this document is for the purposes of conducting the 2022 Ilanga Cup and must not be regarded as constituting definitive instructions as to how a solar car should be constructed or operated.

## Special Credits

Technical Regulations ©Bridgestone World Solar Challenge, used with permission.

## 1. Administration

### 1.1. Scope

- 1.1.1. These regulations apply to the 2022 Ilanga Cup (The Event), which comprises of participants' eligibility, pre-event preparation, scrutineering, testing, on-track components, and associated activities.
- 1.1.2. The event will be conducted under the regulations described in this document and any amendments, further regulations or Team Notices may be issued.

### 1.2. Correspondence

- 1.2.1. All correspondence shall be conducted in English, the official language of the event.  
*If you are unsure of the meaning of a regulation, ask for clarification by emailing the Team Liaison Officer at [teams@ilangacup.co.za](mailto:teams@ilangacup.co.za)*
- 1.2.2. All official correspondence will be conducted between the event organiser and the entrants' nominated representative (normally the Team Manager) as detailed by the entrant on the

entry form. Specific written instruction to include others in team correspondence will be accepted.

### 1.3. Time Zones

- 1.3.1. At the time of the event, South Africa as a whole observe Standard South African time (SAST = GMT/UCT +02:00) and is the same as Central African Time (CAT). The event will observe SAST for the duration of the event.

### 1.4. Conduct of the Event

- 1.4.1. The track component of the event is conducted at Red Star Raceway in Delmas. In addition to these event regulations, all activity is conducted under applicable track laws, civil laws, and regulations.
- 1.4.2. Specific instructions contained in track notes will be considered part of the event regulations.
- 1.4.3. All activities undertaken by a registered entrant, including activities conducted prior to the commencement of the official event period, are governed by statutory regulations, breaches of which may incur event penalties or further action by law enforcement for which the event organisers will take no responsibility.

### 1.5. Eligibility

- 1.5.1. Eligible vehicles will be those that meet the design criteria described by the Sporting and Technical Regulations. Participating solar cars must not be used on any public roads during the event as relevant traffic and safety permissions have not been applied for by the event organisers.
- 1.5.2. Solar cars must be powered by solar irradiance collected by the solar car. The only other external energy inputs that may be used are:
- The energy in the energy storage system at the start of the event.
  - External energy used to recharge Cruiser Class solar cars at designated locations and times.

*It is accepted that energy from regenerative braking, road gradients and wind incidents on the car while driving may also be used.*

### 1.6. Entrant Obligation

- 1.6.1. By applying, entrants declare that they know and understand the regulations of the event and agree that participation will constitute their full acceptance.
- 1.6.2. Each entrant will appoint an individual to act as the “Team Manager”. The Team Manager will be responsible for regulatory compliance, the actions of the team members, and any other individuals associated with the team. Once appointed, the Team Manager may only be replaced with the approval of the event organiser.
- 1.6.3. Entrants are expected to act fairly and in good faith in accordance with the regulations.
- 1.6.4. Penalties (which may include exclusion) will be applied to any team deemed to have departed from the spirit of the event by deliberately acting to gain an unfair advantage over others, or by conduct that could bring the event into dispute.

## 1.7. Event Organiser

- 1.7.1. The event is owned and managed by Jukwaa Events (Pty) Ltd, as defined by No. 2 of 2010: Safety at Sports and Recreational Events act, 2010: “‘event organiser’ means any person who plans, is in charge of, managers, supervises or holds an event or sponsorship rights to an event or in any manner controls or has a material interest in the hosting of an event as contemplated in this Act;”.

Office Address	877 Freight Road, Louwlandia, Centurion, 0046, South Africa
Office Telephone	+27 (12) 661 0285
Event Telephone	+27 73 624 7137
Event Email	<a href="mailto:admin@ilangacup.co.za">admin@ilangacup.co.za</a>
Website	<a href="https://www.ilangacup.co.za/">https://www.ilangacup.co.za/</a>

## 1.8. Event Management Team

- 1.8.1. Core Operations Team

Robert Walker	Event Director, Ilanga Cup Director, Jukwaa Events (Pty) Ltd
Lizé-Mari Nel	Event & Project Manager, Ilanga Cup Event & Project Specialist, Jukwaa Events (Pty) Ltd
Rycardo Simoes Alves	Team Liaison Officer, Ilanga Cup Operations & Participant Officer, Jukwaa Events (Pty) Ltd
Chantè van den Berg	Volunteer & Schools Programme Coordinator, Ilanga Cup Volunteer & Project Officer, Jukwaa Events (Pty) Ltd
Yethu Dlamini	Media & PR Manager, Ilanga Cup Media & PR Manager, Jukwaa Events (Pty) Ltd
Thakgatso Maboja	Business & Finance Officer, Ilanga Cup Business & Finance Officer, Jukwaa Events (Pty) Ltd

- 1.8.2. Officials

<b>Alistair Murray</b>	Clerk of the Course (COC), Ilanga Cup
<b>Alistair Murray</b>	Chief Timekeeper & Secretary, Ilanga Cup
<b>Venue Medic</b>	Chief Medical Officer, Ilanga Cup Specialized Medical Services Coordinator, ER24
<b>Alistair Murray</b>	Chief Safety Officer, Ilanga Cup
<b>Louis Smuts</b>	Chief Scrutineer, Ilanga Cup

Louis Smuts

Control/Pit Stop Manager, Ilanga Cup

## 1.9. Officials of the Event

- 1.9.1. The event will appoint officials who will be responsible for the conduct of the event.
- 1.9.2. During the event, these officials will wear clearly identifiable clothing marked with “Official” on the back.
- 1.9.3. A full list of all appointed officials can be found in this document and in the case of any amendments teams will be notified via a Team Notice.

## 1.10. Jury

- 1.10.1. The event organisers will appoint a team of independent jurors to resolve disputes. Jurors will be published via a Team Notice once they have been appointed.
- 1.10.2. The team of appointed jurors is the only authority empowered to determine the interpretation of these regulations.

## 1.11. Judges of Fact

- 1.11.1. Each official appointed by the event organisers is a Judge of Fact in any event-related activity.
- 1.11.2. Observers appointed by the event organisers are Judges of Fact on all event-related activities.

## 1.12. Schedule

- 1.12.1. A detailed event schedule including all official functions, promotional activities and public engagement activations will be published on both the event website and distributed to teams via a Team Notice.
- 1.12.2. All registered teams must adhere to the event schedule, attend official functions, media calls, promotional activities and/or public engagement activations with the solar car and/or any other team vehicles or equipment as listed or requested.

Date	Activity	Venue
<b>Wednesday, 25<sup>th</sup> November 2020</b>	<ul style="list-style-type: none"> <li>• Event dates announced</li> <li>• Regulations published</li> </ul>	Online
<b>Monday, 22<sup>nd</sup> February 2021</b>	<ul style="list-style-type: none"> <li>• Team registrations open</li> <li>• Volunteer registrations open</li> </ul>	Online
<b>Wednesday, 1<sup>st</sup> June 2022</b>	<ul style="list-style-type: none"> <li>• Team registration close</li> <li>• Volunteer registration close</li> </ul>	Online
<b>Monday, 5<sup>th</sup> July 2021</b>	<ul style="list-style-type: none"> <li>• Group A Documentation submission deadline</li> </ul>	Online
<b>Monday, 12<sup>th</sup> July 2021</b>	<ul style="list-style-type: none"> <li>• Group B Documentation submission deadline</li> </ul>	Online

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<b>Monday, 19<sup>th</sup> July 2021</b>	<ul style="list-style-type: none"> <li>Group C Documentation submission deadline</li> </ul>	Online
<b>Monday, 20<sup>th</sup> June 2022</b>	<ul style="list-style-type: none"> <li>Official Entry List published</li> </ul>	Online
<b>Tuesday, 19<sup>th</sup> July 2022</b> [AM]	<ul style="list-style-type: none"> <li>Team onsite registration</li> </ul>	Red Star Raceway
<b>Tuesday, 19<sup>th</sup> July 2022</b> [PM]	<ul style="list-style-type: none"> <li>Scrutineering briefing</li> <li>Presentation of Group D Documents</li> <li>Static Scrutineering commences</li> <li>Team Manager's and team Safety Officer's briefing</li> </ul>	Red Star Raceway
<b>Wednesday, 20<sup>th</sup> July 2022</b>	<ul style="list-style-type: none"> <li>Static Scrutineering continues</li> <li>Dynamic Scrutineering commences</li> <li>Free practice open</li> <li>Hot lap for starting positions</li> <li>Team briefing</li> <li>Media briefing</li> </ul>	Red Star Raceway
<b>Thursday, 21<sup>st</sup> July 2022</b>	<ul style="list-style-type: none"> <li>Official start</li> <li>On-track segment commences</li> </ul>	Red Star Raceway
<b>Thursday, 21<sup>st</sup> July 2022</b>	<ul style="list-style-type: none"> <li>Official Finish</li> <li>On-track segment concludes</li> </ul>	Red Star Raceway
<b>Thursday, 21<sup>st</sup> July 2022</b> [PM]	<ul style="list-style-type: none"> <li>Formal Awards Ceremony</li> </ul>	Red Star Raceway
<b>Friday, 22<sup>nd</sup> July 2022</b> [AM]	<ul style="list-style-type: none"> <li>Final pack up and clean out</li> </ul>	Red Star Raceway

### 1.13. Entering the Event

*Applications for entry are invited from any entrant prepared to meet the standards and obligations of the competition.*

- 1.13.1. Applications may be made from the 22<sup>nd</sup> of February 2021, until 12H00 on the 1<sup>st</sup> of June 2022 (SAST), or such other time as the event organisers may determine.
- 1.13.2. Applications for entry must be made via the official online entry form, available on the Ilanga Cup website (<https://www.ilangacup.co.za/>).
- 1.13.3. Accepted applications for entry will only be considered confirmed upon payment of the application fee.
- 1.13.4. The number of places is limited. Applications received after the limit is reached may be placed on a reserve list.
- 1.13.5. The granting of a place in the event will become void if the entry fees have not been received by the due date.



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- 1.13.6. Entrants who do not satisfy the Chief Scrutineer that they will achieve compliance with the regulations (through documentary submission) may fail to qualify for the event and their place may be offered to a team on the reserve list.
- 1.13.7. The event organiser reserves the right to accept or reject any application without explanation.

### 1.14. Entry Fees

- 1.14.1. Entry fees include South Africa tax (VAT) and are based on the class requested on the entry form.

*Entrants will be provided with an invoice or the remaining entry fee within one month of receipt of their completed official entry form and application fee. Acceptable methods for payment of entry fees will be detailed in the invoice document.*

- 1.14.2. The Standard Entry fee will apply to all applications, irrespective of the entered class.
- 1.14.3. All entry fees are payable in full by the date stated on the invoice that has been issued or otherwise stipulated by the event organisers.
- 1.14.4. The entry fees are:

Class	Entry Fee
<b>Challenger</b>	ZAR 12,500.00 including VAT
<b>Cruiser</b>	ZAR 12,500.00 including VAT
<b>Adventure</b>	ZAR 12,500.00 including VAT

- 1.14.5. This entry fee includes:
- Team Entry fee
  - Team Member Registration fee of up to twenty (20) team members
  - Twenty (20) Awards Ceremony tickets
  - Camping accommodation for up to twenty (20) team members at Red Star Raceway during the event for four (3) nights
  - One (1) catered dinner for up to twenty (20) team members on a specified night

*Teams must be packed and cleared by 12H00 on Friday the 22<sup>nd</sup> of July 2022. The Team catered dinner will be arranged for a specified night that will be communicated to the teams via a Team Notice. The organisers commit to a minimum of one (1) catered dinner during the event, additional catering might be arranged and will be communicated by the event organisers in reasonable time.*

- 1.14.6. The event organisers reserve the right to accept late entries. Entry requests granted after the close of entries will attract a 10% late fee.

*All enquiries regarding fees or payments should be directed to the Team Liaison Officer via email at [teams@ilangacup.co.za](mailto:teams@ilangacup.co.za) or phone +27 12 661 0285 during business hours, 09H00 – 16H00 (SAST), Monday to Friday.*

### 1.15. Accommodation Arrangements

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- 1.15.1 Teams will be allocated a camping area for the duration of the event (either allocated at the discretion of the organisers or alternatively on a first-come first-serve basis). This area will serve as the official campground for each designated team for the duration of the event. Campground allocations will take place on Tuesday, 19 July 2022 upon the completion of on-site registration at the Event Office.
- 1.15.2 A compulsory refundable deposit of R1,000.00 per campground will be charged per team. Funds are payable on site at the Event Office upon on-site registration by the Team Manager. The deposit will be refunded on the condition that the allocated team campground and surrounding areas are returned in the state that they were provided. The organisers reserve the right to withhold any deposit should the campground inspection not be passed. Funds will be used to hire cleaning staff and maintenance staff should there be the need.
- 1.15.3 All campgrounds should be cleared by Friday, 22 July 2022 at 12H00. Failure to abide by these rules could result in additional penalties.
- 1.15.4 The campgrounds include:
- Designated camping area reserved per team
  - Ample electricity
  - Ambient lighting
  - Communal braai (BBQ) facilities
  - Waste disposal facilities
  - Communal Showers and toilet facilities
  - Designated parking and pack down area
  - Communal tap water

### 1.16. Refunds

- 1.16.1. Refund entitlement is based on date of withdrawal.

Withdrawal Date	Refund
Before 15 March 2022	Full Refund*
Before 5 April 2022	50% Refund
Before 3 May 2022	25% Refund
After 1 June 2022	No Refund

*\*The application fee and bank charges are not refundable, and a 10% admin fee will be levied in the case of a full refund.*

### 1.17. Cancellation of the Event

- 1.17.1. The event organisers reserve the right to cancel or abandon the event for reasons beyond its reasonable control, including but not limited to acts of God, natural disasters, acts of war, weather, riots and strikes outside its organisation, communicable diseases crisis and quarantine restrictions.

## 1.18. Insurance

- 1.18.1. The event organisers hold a ZAR 2 million Public Liability policy (aggregate cap with a sub limit of R500,000.00 per incident) which covers registered team members for property damage caused by a participating solar car during the event. The cost of this coverage is included as part of the entry fee.
- 1.18.2. The Third-Party Bodily injury insurance component is not compulsory in South Africa but is strongly advised by the event organisers as this will not be covered by the Event.
- 1.18.3. Cover has been arranged to cover any claims on *the event organisers* (not solar car teams) for damage caused by a participating solar car during the event. This cost is part of the entry fee.
- 1.18.4. Comprehensive insurance for personal effects, tools, equipment, solar cars, and other vehicles is the responsibility of the entrant.

*Participants are advised that a personal travel insurance policy in respect of theft, loss, sickness, and accidents is highly recommended. The South African government has reciprocal health care agreements with some countries, covering limited subsidised health services for medical treatment. The South African Health Care System is more reliable when seeking private medical attention, with public health care facilities found more often than not to be unreliable in the attempt to seek medical treatment.*

## 1.19. Team Members

- 1.19.1. Each team must include (but not be limited to):

Role	Responsibilities
<b>A Team Director</b>	Responsible for communication between the event organisers and the team only in the case of a serious infringement
<b>A Team Manager</b>	Responsible for the overall management of the project and the team, serves as communication post between the event organisers and the team and reports only to the Team Director
<b>A Safety Officer</b>	Responsible for the safety of the team
<b>A Battery Officer</b>	Responsible for the solar car battery
<b>An Interpreter</b>	*If the Team Manager isn't proficient in English
<b>At least two (2) and at most four (4) solar car drivers</b>	Responsible for driving the solar car
<b>At least one (1) person with a recognised first aid certificate that is current for the duration of the event (preferably the Safety Officer)</b>	Responsible for ad hoc/emergency medical support

**At most four (4) occupants for Cruiser Class teams including the driver**

Responsible for serving as an occupant in Cruiser Class solar cars

**A Community Engagement Manager**

Responsible for interacting with different communities along the route and engaging in official event activations and education programmes

*For the team to be granted permission to commence Scrutineering all team members must be registered at Red Star Raceway in Delmas.*

- 1.19.2. Each team member will be required to register online and be physically present at the team registration at Red Star Raceway in Delmas. All team members must be at Red Star Raceway and registered by 11H30 on Tuesday, 19 July 2022.
- 1.19.3. A person holding the position of Team Director, Team Manager, Safety Officer or Battery Officer may not hold any other of these roles.
- 1.19.4. A person holding the position of Team Manager, Safety Officer or Battery Officer must be present at all times during the on-track component of the event while the solar car is in motion on the track.
- 1.19.5. The person holding the position of Safety Officer may not be a solar car driver.
- 1.19.6. Each solar car driver must hold an appropriate motor vehicle driver's license recognised by South African authorities and valid for the total period of the event.

*Driving licenses will be inspected and verified by the event organisers as part of the scrutineering process. Acceptable driving licenses must include a photograph of the holder, the class of vehicle for which the license applies and the expiry date. If these details are not in English, either the license must be accompanied by a certified translation, or a valid International Driving License is required.*

- 1.19.7. The event organisers are unable to take responsibility for any person under the age of 18.

*An entrant may make a request for a minor to be included in their team provided such request is accompanied by a document giving permission and acknowledgement that supervision of the person concerned is the responsibility of the Team Manager, not the event organisers. The document must be signed by both the parent or legal guardian of the proposed participant, and the Team Manager.*

## **1.20. Team Identification**

- 1.20.1. Team, Team Manager, and solar car details will be taken from the online entry form.
- 1.20.2. Requests to change entry details will only be considered when submitted, by the Team Manager, by email or through other applications arranged by the event organisers.
- 1.20.3. Once an entry has been accepted, any request to change entry details will be subject to the approval of the event organiser.
- 1.20.4. Each team will be allocated a team number on acceptance of entry.
- 1.20.5. Early entry applications may make a special request for the use of a team number. Requested numbers should contain two digits.
- 1.20.6. Allocation of any number is at the sole discretion of the event organiser.

## 1.21. Vehicle Preparation

- 1.21.1. Preparation facilities will not be available at Red Star Raceway prior to the event.

*The event organisers are responsible for all operations at Red Star Raceway. Red Star Raceway management is unable to assist with early arrivals, pit allocations or freight issues. Detailed arrangements will be published in the Team Manager's Guide and via Team Notices.*

## 1.22. Style Guide

- 1.22.1. The correct title of the event is the **Ilanga Cup**. Entrants and their sponsors must use the correct title in all references to the event.
- 1.22.2. The **Official Logo** will be supported by a style guide that details its conditions of use.
- 1.22.3. Registered entrants and their sponsors wishing to use the **Official Logo** in non-commercial publicity may do so in accordance with the requirements of the style guide.
- 1.22.4. Registered entrants and their sponsors wishing to use the **Official Logo** in a commercial context (i.e., merchandise offered for sale) must seek the written permission of the event organisers.

## 1.23. Sponsorship Obligations

- 1.23.1. It is a condition of participation that the entrant acknowledges event and category sponsors in their own publicity. Failure to do so may result in the team being delisted from event publicity.

## 1.24. Media and Promotional Obligations

*A promotional schedule will form part of the schedule of activities. The promotional schedule will contain details of official media calls and other promotional activities created for the benefit of the event, the entrants, and their sponsors.*

*Per Sporting Regulation 1.12.2, requests to attend media calls, promotional activities, public appearances etc. are obligatory for all registered teams.*

- 1.24.1. The event organisers will respect the Intellectual Property of the respective owners. Technical details of solar cars will be kept confidential until the start of static scrutineering and commercial in confidence requests and media embargos will be honoured.
- 1.24.2. Registered entrants must notify the event organisers of public, or media promotional activities held for or on behalf of their attendance in the event, not less than seven days prior to the activity taking place.
- 1.24.3. Media travelling with or in support of any team must comply with the event media accreditation requirements.
- 1.24.4. Entrants will be held accountable, through the application of event penalties, for the unacceptable actions of media representative travelling with or in support of their team, whether registered as such or not.
- 1.24.5. Registered entrants who maintain an internet presence are required to provide a link to the official Ilanga Cup website: [www.ilangacup.co.za](http://www.ilangacup.co.za).

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- 1.24.6. The creation and use of any sound recordings or still or moving images of the event used for commercial gain or public performance by the entrant or their sponsors are subject to the prior written approval of the event organisers.
- 1.24.7. Non-commercial media content generated by the entrant must reference the event in accordance with the provisions of Sporting Regulation 1.23.
- 1.24.8. Teams and or their sponsors shall not engage in any marketing or promotional activity that will materially detract from the value and standing of the event or its sponsors.
- 1.24.9. Activity by sponsors of teams shall not imply ownership or sponsorship of the event.
- 1.24.10. Entrants are responsible for the activities of their sponsors.

### 1.25. Remotely Piloted Aircraft (Drones)

- 1.25.1. Remotely piloted aircraft (RPA) may only be operated with the approval of the event organisers.
- 1.25.2. RPA registration and pilot accreditation must be in accordance with South African Civil Aviation Authority (SACAA) regulations.

*Further information will be provided in the Team Manager's Guide and/or any subsequent Team Notices.*

### 1.26. Compulsory Documentation

- 1.26.1. Except for Group D documents, each team must submit documentation using online forms. All submissions must be made by the dates stated in the event schedule.

*The purpose of the documentations is to help teams identify potential compliance issues before the car is shipped to the event.*

#### Group A

- General Specification
- Electrical System Specification
- Solar Collector Specification
- Energy Storage System Specification

#### Group B

- Battery Incident Plan
- Team Safety Plan
- Team promotional information
- Publication-quality information and photographs of the team and solar car

#### Group C

- Logistics schedule
- Travel, arrival, and accommodation information

## Group D

Group D documentation must be submitted prior to static scrutineering, as defined in the schedule.

- Final technical documentation that describes the car as built and highlights any changes since earlier submission.
- Two printed A4 copies of a diagram of the solar car in plain view, with the front of the solar car depicted at the top of the diagram, and clearly showing how emergency isolation is to be activated.
- The original signed Roadworthiness Certificate
- A simplified wiring diagram, printed on A4 paper, showing how the main functional blocks (PV array, energy storage packs, electronics modules, etc.) are connected, together with circuit breakers, and fuses.

- 1.26.2. If the Team Manager wants to vary the documentation after the submission deadline, the Team Manager must make the request to the event organisers in writing setting out the proposed variations. If the event organisers accept the Team Manager's request, the varied document will supersede all previous versions. The event organisers will not be responsible for failure to broadcast or publish any document for publicity because of variations proposed by the Team Manager.

## 2. The Event

### 2.1. General Definitions

- 2.1.1. **Parc Fermé**, (meaning Closed Park) this is the time between the vehicle finishing the daily segment, and the release of the final results, or the point after which no further protests will be accepted. At the end of the day, all vehicles will enter parc fermé, at which time no changes may be made to the cars, and the scrutineers may perform technical checks. On the Ilanga Cup, only 1 team member is allowed inside the parc fermé area to perform technical checks, but no vehicle maintenance or changes of components.
- 2.1.2. **Competing**: This is used to refer to the period that the solar car is engaged in the competition, by definition this is the time between the start of the stage for the day, and the finish time for the day (when the solar car has reached the finish line and the timing clock has been stopped).
- 2.1.3. **Collective Entry** is recognized when 2 or more participating teams are registered under the same collective banner (irrespective of Class and category). Collectives must be registered on the official Participation Agreement and should have a logical entity that they are all associated with (examples are 3 teams from the same university).
- 2.1.4. **High School Entry** is recognized when a participating vehicle has more than 75% of the participants that are either students or teachers in high school, they do not need to be from the same school.

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- 2.1.5. **Administrative Checks** refers to the administrative process that forms part of scrutineering, they are done from the 19<sup>th</sup> to the 20<sup>th</sup> of September 2022. Teams will be expected to support early submission of documents.
- 2.1.6. **Segment or Day Segment** refers to the section of the day when the solar car is on the track, and for which the laps are being recorded and counts towards the final distance travelled for this team in the event.

## 2.2. Supervision

- 2.2.1. The Clerk of the Course is responsible for supervising on-track activities.
- 2.2.2. During on-track activities, communication with the Clerk of the Course/Race Control must be made directly with the COC by the Team Manager.

## 2.3. Safety

- 2.3.1. The team Safety Officer is responsible for the general safety of the team.
- 2.3.2. The team Battery Officer is responsible for the safe operation of batteries and for supervising response to any battery emergency.
- 2.3.3. Battery incident response kits must be made readily available to the solar car and any other vehicle that is carrying or storing solar car batteries.
- 2.3.4. A team member with a recognised first-aid certificate (preferably the Safety Officer), currently for the duration of the event, must be present for the duration of the on-track segment at all times.
- 2.3.5. It is the responsibility of each team to ensure that the vehicles under its control are maintained in a safe, roadworthy condition and are operated safely and within the law always.
- 2.3.6. All solar cars and support vehicles are operated and driven at the team's own risk.
- 2.3.7. The Clerk of the Course may exclude any team from the event at any time if any team member operates a solar car or any other vehicle in an unsafe manner.
- 2.3.8. Teams must look after the health and safety of their team members and observer.  
*Fatigue and dehydration are serious hazards in this event. This is especially relevant to drivers, particularly those of solar cars.*
- 2.3.9. Drivers, team members, officials and observers are to be drug free and maintain a blood alcohol level less than 0.01% whilst engaged in any duties associated with the event.
- 2.3.1. Random testing for intoxicating substances may be conducted throughout the event at the organisers' discretion on any individual who falls under the authority of the event organisers.

## 2.4. Safety Belts

- 2.4.1. The use of safety belts is mandatory for all occupants of motor vehicles in South Africa, including solar cars.



## 2.5. Helmets and Safety Apparel

- 2.5.1. Each occupant of a solar car must wear an approved motorcycle helmet securely fitted and fastened in accordance with the manufacturer's instructions.
- 2.5.2. Motorcycle helmets must have a mark certifying compliance with either:
- DOT standard a.k.a. FMVSS 218
  - UNECE 22.05 standard a.k.a. United Nations Economic Community of Europe Regulation No 22
- Half-shell helmets are not permitted.*
- 2.5.3. Helmets must not be modified, have unauthorised attachments, or be used in any way contrary to the manufacturer's instructions.
- 2.5.4. Fire-resistant clothing (overall, gloves, shoes, socks, balaclava, and underwear) is specified as mandatory.
- 2.5.5. Such fire-resistant clothing must be in good condition and should be FIA approved or locally produced by a recognised manufacturer from flame-retardant material. The clothing item must be clearly labelled to indicate whether it is FIA approved or locally produced from flame-retardant material. In instances where the racing overall being worn is not FIA-approved, underwear that is FIA-approved should be worn underneath it.
- 2.5.6. Race suits which carry a valid FIA approval (clearly indicated on the collar) and which appear on the official "technical list" of the FIA will be deemed to be similarly approved by the Ilanga Cup
- 2.5.7. All local race suit manufacturers are required by the Ilanga Cup to include a permanent identification label on the outside of the back collar to indicate compliance with recognised fire-retardant fabrics and specifications.
- 2.5.8. Recognised fire-retardant fabrics for use in race suite manufacturing include:
- Nomex
  - Diamond
  - Pyrovatex
  - Aflammit
  - Proban
  - Kermal
  - Ter
  - Carmyth Karvin
  - Delta C
  - Hoco Tex Aramid
  - PBI
- 2.5.9. In addition to the fabric itself the Ilanga Cup highly recommends that Nomex sewing thread or similar flame-retardant thread be used in the manufacturing of the garment for all stitching and box quilting.
- 2.5.10. The Ilanga Cup recognises fire retardant race suit specifications:

- Level 1: One piece race suit with one layer of approved fire-retardant fabric
- Level 2: One piece race suit with two layers of approved fire-retardant fabric
- Level 3: One piece race suite with two layers of approved fire-retardant fabric of which at least one layer is Nomex, or a similar fabric approved by the FIA

## **2.6. Safety Equipment**

2.6.1. Suitable and appropriate safety equipment must be carried always. The minimum safety equipment that must be readily available at all times is:

- A first-aid kit
- Safety glasses and gloves for handling batteries
- At least two hazard warning cones
- Two yellow warning flags, minimum size 300mm x 300mm
- Suitable fire extinguishers
- Fire blankets
- Sand (or similar material) for extinguishing fires
- A spade
- Suitable containers for damaged electrochemical cells
- Safety vests
- Two whistles

## **2.7. Support Vehicles**

2.7.1. Each team must supply a designated support vehicle and a means of transporting the solar car, which can support the required needs and equipment (including safety equipment) during the event.

2.7.2. The minimum requirement for transporting the solar car is a suitable truck or trailer, which must be readily available throughout the on-track segment.

2.7.3. A minimum of two drivers must be available for the support vehicle associated with the team.

2.7.4. The support vehicle must not be a bus or large campervan or be towing a trailer other than that intended for the solar car.

## **2.8. Communication**

2.8.1. Every solar car must have means of two-way voice radio communication with its team. Communication must be possible whenever the driver is in the solar car, including when the main energy storage contractors are open and when the car is in safe state.

2.8.2. The Team Manager (at least) for each solar car must each have a CB radio compliant with the Independent Communications Authority of South Africa (ICASA) regulations.

## **2.9. Preparation and Testing**

2.9.1. The event organisers will provide facilities for team preparation and track testing of solar cars at Red Star Raceway in accordance with the dates listed in the schedule.

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- 2.9.2. All participating teams must base themselves, and their solar cars, at Red Star Raceway from Tuesday, 19 July 2022.
- 2.9.3. The event organisers will appoint a paddock manager to supervise the preparation test facility. The directions of the paddock manager must be followed.
- 2.9.4. The Occupational Health and Safety Act 85 of 1993 will apply to all event-related activities in South Africa.
- 2.9.5. The Clerk of the Course may impose event penalties for breaches of speed limits or other rules at Red Star Raceway.
- 2.9.6. No test driving is to be conducted in the paddock, car park or access roads.
- 2.9.7. The track must not be accessed without clearance from the Clerk of the Course/track controller.
- 2.9.8. Any team driving a solar car on a public road is liable to civil penalties and exclusion from the event.
- 2.9.9. The event organisers reserve the right to request a security deposit against damage, rubbish removal or cleaning beyond reasonable expectations.

### 2.10. Team Registration and Scrutineering

- 2.10.1. All participants are required to attend with their team to complete the registration process and present their solar car for the scrutineering process. The scrutineering process is divided into static and dynamic operations.
- 2.10.2. Team registration and static scrutineering will take place at Red Star Raceway, or such other place as determined by the event organisers at the time and date described in the schedule.
- 2.10.3. Teams must attend registration and static scrutineering with:
  - The Team Manager, and an interpreter if required
  - All solar car drivers, with their driving licenses
  - Any waiver documents required for participating under the age of 18
  - Original signed copy of the indemnity form
  - All solar car passengers
  - The team Safety Officer
  - The team Battery Officer
  - The solar car, in road-ready condition
  - The designated support vehicle, including any trailer that may be used to transport the solar car, in road-ready condition
  - The solar car trailer or solar car transport truck they intend to use in the event (if the support vehicle is a truck it needs to conform to all regulations related to the team support vehicle)
  - Tools and personnel required to facilitate inspection of the solar car

- A list of all vehicles associated with the team, including make, model, colour, and registration number
  - Group D compulsory documentation
  - A spare solar car tyre of each type
  - A sample energy storage cell (if cells inside the energy storage packs are not clearly visible)
  - The lockable box in which energy storage packs can be impounded where required
- 2.10.4. Solar cars must be transported to scrutineering on the solar car trailer or truck that will be used during the event.
- 2.10.5. The Team Manager must attend all registration and scrutineering stations. A Team Manager not proficient in English must provide an interpreter to accompany them always during this process.
- 2.10.6. All team members must complete their online registration by signing in at registration.

## **2.11. Pit Garages**

- 2.11.1. Teams will be allocated a pit garage for the duration of the event (either allocated at the discretion of the organisers or alternatively on a first-come first-serve basis). This area will serve as the official workshop for each designated team for the duration of the event. Pit allocations will take place on Tuesday, 19 July 2022 upon the complete of on-site registration at the Event Office.
- 2.11.2. A compulsory refundable deposit of ZAR 1,000.00 per pit garage will be charged per team. Funds are payable on site at the Event Office upon on-site registration by the Team Manager. The deposit will be refunded on the condition that the allocated team pit garage and surrounding areas are returned in the state that they were provided. The organisers reserve the right to withhold any deposit should the pit inspection not be passed. Funds will be used to hire cleaning staff and maintenance staff should there be the need.
- 2.11.3. All pits should be cleared by Friday, 22 July 2022 at 12H00. Failure to abide by these rules could result in additional penalties.
- 2.11.4. Each allocated pit garage will include:
- Covered pit garage
  - Ample electricity
  - Lighting
  - Pit dividers
  - Extended pit area barricaded behind each team's allocated pit (size of 1 motor vehicle)
  - Waste disposal facilities

## **2.12. Static Scrutineering**

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- 2.12.1. Static scrutineering will check for compliance with the regulations and will include a regulatory compliance and roadworthiness inspection by the appointed officials and event organisers.
- 2.12.2. Specific scrutineering times for each team will be communicated to the teams via a Team Notice before the on-site registration date.
- 2.12.3. Qualification must be achieved in road-ready condition. **Teams that do not present at the designated time in road-ready condition may fail to qualify.**
- 2.12.4. Up to seven members of a team (including an interpreter and any team media personnel) may accompany the solar car on the scrutineering floor. Team members may be substituted between inspection stations.
- 2.12.5. Some dismantling (such as removal of the solar collector or top shell) may be required to facilitate inspection of the following components:
- Mechanical systems (including seats, tyres, brakes, and steering)
  - Electrical systems
  - Energy storage systems
- 2.12.6. Dismantling and reassembly of the solar car when required to facilitate inspection of the solar car must be conducted (in the sole opinion of the Chief Scrutineer) in a reasonable time.
- 2.12.7. Checks and inspections with the solar car in a road-ready configuration will include, but not be limited to:
- Signage
  - Dimensions
  - Solar collector type and size
  - Egress – all solar car drivers and passengers are required
  - Vision – all solar car drivers are required
  - Lights, indicators, and horn
  - Electrical compliance
- 2.12.8. All energy storage devices must be declared at static scrutineering. Failure to declare any energy storage device may lead to disqualification.
- 2.12.9. The mass of each Challenger or Cruiser Class solar car driver or passenger, with helmet, driving clothes, and shoes, will be determined at scrutineering. If the mass of a driver or passenger is less than 80kg, ballast provided by the team will be added to make up the difference. No credit will be given if a driver or passenger weighs more than 80kg. All ballasts provided by the team will be weighed and scrutinized during the scrutineering process to ensure all regulations are abided by. Ballast must consist of non-functional items e.g., batteries may not be used as ballast.

*Deliberate consumption of excessive food and drink prior to weigh-in is not in keeping with the spirit of the event and may be hazardous to the health of the individual.*

*Solar car occupants must wear similar clothes (including shoes) while driving as when they weigh in.*

- 2.12.10. Drivers and passengers may be re-weighed at any time during the event. Changes in weight considered unreasonable by the Chief Medical Officer will be referred to the Clerk of the Course.
- 2.12.11. Non-compliance penalties may be imposed at the absolute discretion of the Chief Scrutineer and may include failure to qualify. Penalties will be published.

## **2.13. Dynamic Scrutineering**

- 2.13.1. Dynamic scrutineering exercises will test the speed, stability, and barking capability of the solar car.
- 2.13.2. Dynamic scrutineering will be held at Red Star Raceway, or such other place as determined by the event organisers, on Wednesday, 20 July 2022. Attendance of Team Managers and drivers at 07H30 roll call is mandatory.
- 2.13.3. No solar car may be submitted for dynamic scrutineering without having first passed static scrutineering.
- 2.13.4. Solar cars must complete dynamic scrutineering in road-ready condition and with occupants and ballast in place.
- 2.13.5. Cruiser Class solar cars with four or fewer seats must complete dynamic scrutineering with all seats occupied. Cruiser Class solar cars with more than four seats must complete dynamic scrutineering with four seats occupied.
- 2.13.6. No solar car will be given permission to start the event until it has passed dynamic scrutineering. Any solar car failing dynamic scrutineering will only be permitted to re-scrutineer at the absolute discretion of the Chief Scrutineer. Dynamic scrutineering will close at 17H00 on Wednesday, 20 July 2022.

## **2.14. Modifications or Changes After Scrutineering**

- 2.14.1. Once a solar car and its drivers have passed static scrutineering, no changes to the design or configuration of the solar car (that is, to any items described in the compulsory documentation) or changes to drivers will be permitted.
- 2.14.2. Once a solar car has passed dynamic scrutineering, and until released from the start line, component exchange, modification or repair to the solar car is not permitted without the approval of the Chief Scrutineer.

## **2.15. Briefings**

- 2.15.1. A compulsory briefing for Team Managers and team Safety Officers will be held at Red Star Raceway on Tuesday, 19 July 2022 at a time and place to be advised. Team Managers not proficient in English must request permission to be accompanied by an interpreter.
- 2.15.2. A compulsory safety, procedural and media briefing will be held on Wednesday, 20 July 2022 at a time and place to be advised. All team members must attend.

## **2.16. Observers**

- 2.16.1. The Clerk of the Course will appoint an observer to each team. Observers may be changed between teams at any time during the event.
- 2.16.2. The observer's responsibilities are:
- To record the locations and times that teams start and stop
  - To record the locations and times of all activities and incidents that may affect the outcome of the event
  - To check that ballast is correct for each driver or passenger change
  - To be satisfied that the energy storage system cannot be charged or interfered with between sunset and sunrise, except as allowed for Cruiser Class solar cars
  - To notify an Event Official or the Clerk of the Course at the earliest opportunity if any breach of regulation is suspected, energy storage cells or modules have been changed or an energy storage system seal broken, or if they have any concerns about the actions of the team
- 2.16.3. Observers are not permitted to interpret regulations or to give advice or directions to teams. Advice or directions from observers do not supersede regulations or directions from Event Officials.
- 2.16.4. Each team's responsibilities to the observer are:
- To assist the observer in their duties always
  - If requested by the observer, to send for assistance from the event organiser or transmit information to Race Control
  - To provide a proper seat in the pit area/area of operation
  - To not make any demands of the observer to assist team operations

## **2.17. Start Line and Grid**

- 2.17.1. The official start of the event will be held at Red Star Raceway, official event venue, at 08H00 on Thursday, 21 July 2022, or such other place and time as the event organisers may direct. Detailed procedural instructions will be issued at Red Star Raceway via a Team Notice.
- 2.17.2. Starting position will be determined by class and performance during dynamic scrutineering.
- 2.17.3. Entrants not taking part in the speed trials will be placed at the back of the field, or in an order determined by the organisers.
- 2.17.4. All solar cars must be in their starting grid position by the appointed time for final inspections. Any solar car not present will have their starting position amended.
- 2.17.5. Teams must not work on their solar cars on the start grid.
- 2.17.6. Two team members must stay with the solar car on the start grid to assist Event Officials with final inspections (one of these team members must be the driver that will start and the other must be an individual who will help the driver during the Le Mans-style start).
- 2.17.7. All team members and crew must be in their designated places by 07H30.

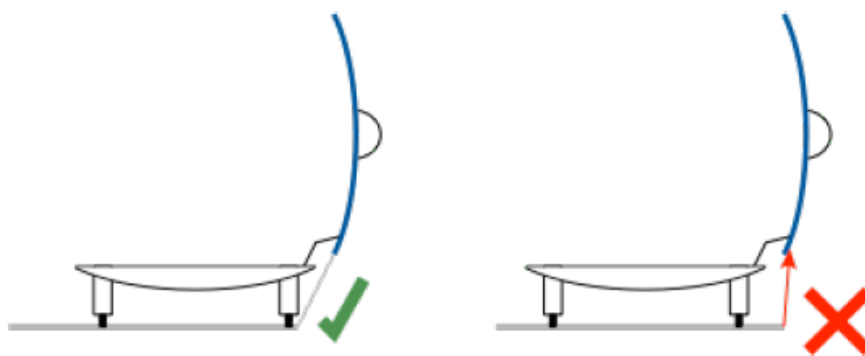
- 2.17.8. All solar cars must be in place by 07H15 in starting grid position for final scrutineering and vehicle inspections.
- 2.17.9. The starting grid will be classed as “parc fermé” between the hours of 07H15 and 07H45 or such other time as the Clerk of the Course may nominate.
- 2.17.10. Starting positions will be determined by results based on the performance during dynamic scrutineering.
- 2.17.11. Solar cars will be lined up according to their dynamic scrutineering results (top qualifying solar car positioned first on the start grid, followed by a descending order) in a Le Mans-style start grid.

*A Le Mans-style start grid consists of vehicles being parked on one side of the start grid and drivers positioned on the opposite side. Once the start flag is dropped drivers must sprint to their solar car, get in, start the solar car, and start driving to begin the challenge. The team member selected to assist the driver during the start proceedings will only be allowed to hold up the canopy of the solar car while the driver gets in, the driver must secure the canopy and him/herself before being permitted to start driving.*

## 2.18. Energy Collection and Storage

- 2.18.1. Charging the energy storage system or powering the solar car from an unauthorised source will lead to exclusion from the event.
- 2.18.2. External devices intended to increase the irradiance on the solar collector or increase the efficiency of the solar collector must not be used at any time with the exception of spraying water from an external source.

*Ground sheets must not be placed in any position where it is possible to draw a straight line from any part of the ground sheet to any part of the solar collector.*



- 2.18.3. From the official start of the on-track component of the event until finish or withdrawal, the energy storage system must never be removed from the observer’s control.
- 2.18.4. Damaged energy storage cells may be bypassed, but must not be removed from the energy storage system unless it would be unsafe to leave them in. Cells removed must be replaced by ballast with mass greater than the mass of the removed cells.
- 2.18.5. If a solar car is unable to continue because too many energy storage cells have been damaged, the team may, with the event organisers’ permission, replace cells and continue. The final ranking of the team will be based on the distance achieved before replacing cells.



## **2.19. Route**

- 2.19.1. This is a single-stage event consisting of a single competition day.
- 2.19.2. The event course will be on a racetrack at Red Star Raceway in Delmas
- 2.19.3. The event organisers will ensure that the track at Red Star Raceway is tracked and plotted in the form of KML files. This will be distributed to all participating teams and will be available for download on the Ilanga Cup Website.
- 2.19.4. Mandatory control stops will be established at each team's designated pit garage where they will serve their compulsory stops. This will be overseen by the Control Stop Manager with assistance from the team's assigned observer.
- 2.19.5. Any detour signs erected by the track marshals must be observed and the correct track re-joined at the first opportunity.
- 2.19.6. The event organisers may change the course at any time.
- 2.19.7. Any team intending any action that involves the solar car during competition hours, should inform the Clerk of the Course, with all relevant details.
- 2.19.8. Any team leaving the course for reasons of repair or other non-competing activities, should inform the Clerk of the Course, with all relevant details.

## **2.20. Timing**

- 2.20.1. The official start time is 08H00. The official finish time is 16H00, at this time all completed laps will count towards your final score.
- 2.20.2. Event timing is managed by the official Event Timekeeper with the assistance of assigned observers.
- 2.20.3. Timing starts when the Clerk of the Course drops the start flag and initiates the Le Mans-style start and is stopped when the finish time is reached at 16H00. This is called the period in which the team is "competing".
- 2.20.4. When the event timing is stopped at 16H00 all solar cars that have not yet cross the finish line will be required to leave the track once crossing the finish line and proceed to the parc fermé area. All solar cars that have passed the finish line prior to the event timing being stopped at 16H00 will be permitted to complete the lap (for which they will be credited the distance) after which they will be required to leave the track once crossing the finish line and proceed to the parc fermé area.
- 2.20.5. If the Clerk of the Course chooses to apply time penalties in place of or in addition to the total kilometres of the solar car this will influence the final result of the solar car.

## **2.21. Tracking**

- 2.21.1. Each solar car must carry a data logging and tracking device provided by the event organisers. The specifications of the tracking device are described in Technical Regulation 1.9.

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- 2.21.2. Information concerning progress and operation of solar cars may be published during the event.
- 2.21.3. Satellite tracking data will not be accepted as basis for inter-team protests.

### 2.22. Solar Car Drivers and Passengers

- 2.22.1 Only registered solar car drivers may drive the solar car during event hours. Please refer to Sporting Regulations 2.14.1.
- 2.22.2 All solar car drivers must have a minimum experience of 12 hours driving the solar car, as demonstrated by the presentation of a signed declaration by the Team Manager.
- 2.22.3 When driving, ballast must be carried in accordance with the provisions of Sporting Regulation 2.12.9.
- 2.22.4 Each solar car driver and passenger must have at least two litres of water whenever they start their stint.
- 2.22.5 Solar car drivers must change every two hours.

### 2.23. Driving Conduct

- 2.23.1 Each team must ensure that the solar car associated with their attendance at the event is driven in a careful and courteous manner always.
- 2.23.2 Overtaking must be done in a safe manner and take into account prevailing conditions.
- 2.23.3 The organisers reserve the right to determine if any individual is acting de facto as a part of a team.
- 2.23.4 The participating vehicle may not, during competition hours, be pushed, towed, or carried forward by another vehicle unless abnormal circumstances prevail (such as safety, this must be clearly documented by the observer) or under the direction of the Clerk of the Course. Push starting the solar car is not allowed.
- 2.23.5 Solar cars must not be driven on any public road.
- 2.23.6 Teams must comply with all requirements imposed by the Clerk of the Course, Event Officials, or the event organisers.
- 2.23.7 Solar cars, support vehicles and solar car transport vehicles (including trailers) may be subject to scrutineering at any time during the event to ensure compliance with the regulations.

*It is the responsibility of the entrant to operate their solar car safely at all times. The entrant may take whatever action they consider appropriate to any given situation.*

*It is the duty of the observer to record such matters, and to record times and laps, and teams should not be asking for advice from the observer.*

- Push starting the car is not allowed.
- Regenerative power systems must not be on when hand pushing or being towed.

### 2.24. Stopping

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- 2.24.1. No solar car may stop on the course except in an emergency or when required by the Clerk of the Course or track marshals.
- 2.24.2. When stopped adjacent to the course, all wheels of the solar car must be clear of the course.
- 2.24.3. If a solar car has suffered damage to any component certified by the team's certifying engineer, other than tyres, then the team may repair their solar car but may not resume driving until:
  - The team's certifying engineer has rectified the repaired car
  - The team has submitted the new certification to the Clerk of the Course
  - The Clerk of the Course has approved the resumption of driving
- 2.24.4. If a solar car rolls onto its side or roof, the team must safely move the car back to their pit lane to be assessed. Subject to the approval of the CoC, the team may continue the challenge should the solar car be in a state where the driver and other teams would compete in a safe environment.
- 2.24.5. Teams wanting to repair their solar car may, after obtaining approval from the Clerk of the Course, trailer their solar car to their designated pit garage to make repairs, then return to the course to continue driving.

### 2.25. Obstructing Other Participating Teams

- 2.25.1 Solar cars associated with a team must not obstruct other solar car teams, including support or official vehicles. Infringement of this regulation will incur a penalty for each incident.
- 2.25.2 To avoid obstructing other solar cars, each team must leave reasonable space in front of their pit garage and their solar car, wherever it may be stationed, so that other solar car teams can overtake and occupy the space in front of them safely.

### 2.26. Control Stops and Pit Stops

- 2.26.1 Control stops will be established every 2 hours from the start of the event. Control stops are located at each team's designated pit garage.
- 2.26.2 Solar cars must stop for a 30 minute control stop during the halfway mark of the endurance challenge (12H00). The Clerk of the Course may direct any additional penalty time to be taken at a control stop. At this time, the course will be reversed under the instruction of the COC for the second half of the challenge.
- 2.26.3 Solar cars must stop for a 5 minute control stop during the rest of their compulsory stops every 2 hours during the event before and after the halfway compulsory 30 minute control stop.
- 2.26.4 All vehicles must obey control stop speed limits.
- 2.26.5 Teams must obey all directions given by the Control Stop Manager.
- 2.26.6 Teams must park in the spaces designated by Control Stop Officials at their pit garage. No team members other than arriving occupants may touch the solar car once it is in the parking space.

- 2.26.7 Occupants must get out of the car without assistance from other team members. Occupants must remove their ballast from their solar car.
- 2.26.8 Occupants must get out of the solar car, the arriving driver, alone, may reconfigure the solar car for charging before control stop timing commences.
- 2.26.9 Control stop timing commences when the arriving driver has exited the solar car and the Control Stop Manager initiates the team's timing.
- 2.26.10 No team member may touch the solar car during any of the control or pit stops. The solar car may reconfigure itself.
- 2.26.11 After the control or pit stop time has elapsed, the departing driver, alone, may reconfigure the car for driving. The driver and any passengers may get into the car and prepare for departure. No other team member may touch the solar car.
- 2.26.12 The solar car may depart only once the total control or pit stop time has elapsed. The solar car must not depart until ballast and drinking water are in place, seat belts are fastened, helmets are secured, and the solar car is ready for the road.

*The Control Stop Manager may reset the remaining time to the intended stop time if team members interfere with the solar car during the control or pit stop period.*

## **2.27. Solar Array Charging**

- 2.27.1. Solar Charging is only allowed during the morning from sunrise, and while competing (when the competition time is running).
- 2.27.2. Once crossing the finish line and the competition time has stopped, the team will be allowed reasonable time (no more than 10 minutes), to demonstrate that the solar array is disconnected when secured in parc fermé.

## **2.28. Trailering**

*The term "trailering" applies to all means of transport used to carry the solar car.*

- 2.28.1. The solar car must be in safe state always while being transported.
- 2.28.2. If a solar car is being trailered all event regulations still apply, including finish line closing times and observer protocols.

## **2.29. Withdrawal**

- 2.29.1. A team may withdraw by forwarding a completed withdrawal form (available from the observer) to the Clerk of the Course. The solar car may be transported to the finish line parc fermé area to take part in the post event activities and awards ceremony.

## **2.30. Penalties**

- 2.30.1 The Clerk of the Course may impose penalties on any team that breaches a regulation and may deputise any other Event Official to serve the notice to the entrant. Penalties will be published and may be used to determine overall event standings when all other determining factors are equal.
- 2.30.2 All regulation infringements are subject the scale of seriousness of the infringement.

## 2022 Ilanga Cup Sporting Regulations



- 2.30.3 Once a team has infringed a regulation a decision on the severity of the infringement will be taken by the Event Director, the Clerk of the Course, and an independent adjudicator within 1 to 3 hours of its occurrence.
- 2.30.4 The Team Director may submit a written or verbal testimony regarding the infringement to the panel to be assessed when contemplating the severity of the penalty to be issued.
- 2.30.5 Decisions regarding the severity of the penalty to be issued must be unanimous. All infringements are subject to the following criteria:
- 2.30.6 Unintentional and non-beneficial: 2-5 Laps
- This is when team A's actions unintentionally affect team B's position/opportunity to gain points/km. If team A's infringement did not benefit them in any way, they could potentially face a penalty of up to 5 laps.
- 2.30.7 Unintentional but beneficial: 5-10 Laps
- This is when team A's actions unintentionally affect team B's position/opportunity to gain points/km. If team A's infringement benefitted them in any way, they could potentially face a penalty of up to 10 Laps.
- 2.30.8 Intentional infringement: 10+ Laps or disqualification/exclusion from the event.
- This is when team A's actions intentionally affect team B's position/opportunity to gain points/km. If team A's infringement is declared intentional, they could potentially face a penalty of 10+ Laps or disqualification/exclusion from the event.
- If a team is disqualified, they will be classified as a non-finisher.*
- 2.30.9 Under normal circumstances penalties imposed are lap oriented, however when time penalties are imposed, they shall be served, usually at the control stop and prior to crossing the finish line.
- The Clerk of the Course reserves the right to impose penalties (time or laps) after a solar car has crossed the finish line, even if such actions change the final position of the team.*
- 2.30.10 Each demerit point given to a Cruiser class team will reduce the team's final score by 1%.
- 2.30.11 A team accruing three or more infringements will be excluded from the remainder of the event.
- 2.30.12 The Clerk of the Course may impose operation restrictions (such as speed restrictions) on any team.
- 2.30.13 At any time during the event, the Clerk of the Course may issue a time penalty in response to any of the following behaviours noted by an observer or reported by an Event Official:
- Obstructing other course users
  - Stopping on the course (other than when required by the COC or track marshals)
  - Poor safety protocols (e.g., safety flags, whistles etc.)
  - Driving without effective rear vision
  - Hand pushing

- Failure to follow the track instructions
- Failure to observe a request by Event Officials
- Wilful damage or interference to property
- Failure to stop at a designated control stop
- Exceeding any posted speed limit
- Driving without adequate visibility, due to smoke, dust, or rain
- Failure to comply with any provision of any event regulations

*The Clerk of the Course may impose other arrangements appropriate to circumstances. Time penalties for cell or module replacement shall be served at the Control Stop following the replacement.*

2.30.14 The Clerk of the Course may exclude any team from the event for wilful disregard of any regulation or of the spirit of the event. These offences include but are not limited to:

- Misrepresentation
- Wilful obstruction, or aggressive or unsafe driving
- Replacement of energy storage cells
- Charging of the energy storage system from any unapproved source
- Removing the battery back from the observer's control without permissible grounds
- Unauthorised drivers operating the solar car during competition times
- Failing the stability test
- Carrying or towing a competing vehicle without the assigned observer present
- Repeated failure to adhere to instructions from Event Officials
- Accumulation of three or more infringements

*If the problem experienced can be addressed during competition hours, the team may attempt to prove that their solar car is roadworthy and functional to the Clerk of the Course as soon as reasonably possible.*

*The panel of stewards, in consultation with the event organisers, will determine whether an excluded team will be given credit for their activities up to the point of their exclusion, and if they may participate in the post event activities, irrespective of this decision, the team will be termed a non-finisher.*

2.30.15 In the rare instance that the Clerk of the Course rules that the infringement may be served as either a time or lap penalty, normal rules for penalties will apply.

## 2.31. Protests and Appeals

2.31.1 All event protest fees are R1,500.00.

2.31.2 Protesting against the preliminary results must be lodged in writing by the Team Manager to the Clerk of the Course within 30 minutes of publication on the official notice board.

- 2.31.3 Upon the expiration of the 30 minute time period the preliminary results of the corresponding daily stage become final.
- 2.31.4 Every protest is eligible to be examined by the event stewards only if it is accompanied by the above refereed protest fee, which is not refundable should the protest fail to be upheld.
- 2.31.5 The Clerk of the Course may convene a tribunal to consider any protest or appeal requiring final resolution. The tribunal may take advice from any party about the incident giving rise to the decision being appealed. The decision of the tribunal is final and binding.
- 2.31.6 If the protest requires the dismantling and the re-assembly of some parts of the solar car the claimant must pay the cost if the protest is unfounded; otherwise, the team against whom the protest was lodged must cover this cost if the protest is upheld.
- 2.31.7 Where an unfounded protest has resulted in time loss for competition against whom the protest was lodged, the panel of stewards has the right to both penalise the claimant and find an acceptable means to credit the team that was disadvantaged.

*The panel of stewards or event stewards will consider all protests at the earliest opportunity.*

## **3. Achievement and Celebration**

### **3.1. Event Results**

- 3.1.1. Results published throughout the duration of the event are final.
- 3.1.2. Overall results will be determined at the conclusion of the event by consolidating all results of each team.

### **3.2. Completing the Course**

- 3.2.1 To complete the course, the solar car must reach the finish line by the designated course, in accordance with the regulations.
- 3.2.2 For a team to be classified as a finisher a solar car must have completed at least 15 Laps within the time parameters allowed.
  - 3.2.1. The solar car must drive to the official finish line and final parc fermé area.

### **3.3. Challenger Class**

- 3.3.1 The goal for the Challenger Class is to have driven the furthest distance, in accordance with the course and the regulations.
- 3.3.2 Parc fermé will be established close to the official finish line. The location will be indicated by Event Officials. All teams must continue to parc fermé to prepare for the official finish line proceedings.
- 3.3.3 Once all teams have convened at parc fermé the organisers will coordinate the official finish line proceedings by organising solar cars according to final competition standings. Solar cars will be placed from 1<sup>st</sup> place in a descending order.
- 3.3.4 Any unserved time penalties must be served at the final control stop before the finish line.

- 3.3.5 The Challenger Cup will be awarded to the Challenger Class team that completes the course with the most completed laps (including time and penalties).
- 3.3.6 Challenger Class teams that complete the course will be ranked by most laps completed.
- 3.3.7 Challenger Class teams that do not complete the course will be ranked behind Challenger Class team that complete the course. They will be ranked by the number of laps completed during the challenge.

### 3.4. Cruiser Class

- 3.4.1 The goal for Cruiser Class teams is to design and build a practical solar car and transport people on the course according to the regulations. Cruiser Class teams will be scored on energy efficiency and practicality.
- 3.4.2 Cruiser Class solar cars may be recharged from Electric Vehicle Supply Equipment (EVSE) provided by the organisers at each team's designated pit garage. No other charging from external sources is allowed. The external energy used to recharge the solar car will be measured by the organisers. The time each Cruiser Class spends charging from external sources will be published, along with the energy used, and will be considered by the practicality Judges.
- 3.4.3 Each Cruiser Class solar car completing at least 15 laps will be given a final score calculated by

$$S = D / E \times P \times 0.99^{(l + d)}$$

where

- $D$  is the person-laps travelled [(laps) × (number of people)]
- $E$  is the nominal external energy use of the solar car, in kilowatt-hours
- $P$  is the practicality score of the solar car, between 0 and 1
- $l$  is the total lateness, in minutes (in excess of 10)
- $d$  is the number of penalties received by the team

- 3.4.4 The Cruiser Cup will be awarded to the Cruiser Class team that completes all stages with the highest score.

- 3.4.5 Cruiser Class teams will be ranked in the following groups:

- Teams that complete the minimum required laps on the course, ranked by score
- Remaining teams that complete at least 15 laps of the course, ranked by score
- All remaining teams, unranked

- 3.4.6 The progressive score of a Cruiser Class team at the end of the challenge will be calculated by

$$S = D / E \times 0.99^{(l + d)}$$

where

- $D$  is the person-laps travelled between day start and the control stop



- $E$  is the nominal external energy use of the solar car, in kilowatt-hours, prior to arriving at the control stop
- $I$  is the total lateness at the day end, in minutes (excluding the 10min grace)
- $d$  is the number of penalties received by the team

3.4.7 Nominal external energy use of a Cruiser Class solar car will be calculated as  $E_0 + \sum E_n$ , where  $E_0$  is the nominal energy capacity of the energy storage system,  $E_n$  is the sum of all recharge energy measured at each of the charging points provided by the organisers. The nominal energy capacity of a rechargeable electrochemical battery is the sum of the nominal cell masses in kilograms multiplied by:

- 330 Wh kg<sup>4</sup> for Li-S cells
- 250 Wh kg<sup>4</sup> for Li-ion cells
- 250 Wh kg<sup>4</sup> for Li-polymer cells
- 125 Wh kg<sup>4</sup> for LiFePO<sub>4</sub> cells

3.4.8 The nominal energy capacity of other types of energy storage system will be determined by the Chief Energy Scientist.

3.4.9 Person-laps is the sum of the laps driven by drivers and passengers in the solar car. Person-laps will be counted for each seat that is occupied for a complete lap of the course.

3.4.10 The practicality score for a Cruiser Class team will be determined by a panel of Judges appointed by the organisers. Each Judge will allocate a single score between 0 and 100% to each team. The final practicality score for a team will be the arithmetic mean of the individual Judge's scores. Judges will be asked to consider:

- Design innovation
- Environmental impact
- Ease of access and egress
- Occupant space and comfort
- Ease of operation (driving and charging)
- Versatility
- Style and desirability
- Suitability for the declared purpose

Judges will not be told how much weight to place on each of these criteria.

*The number of seats will not contribute to the practicality score, because the benefits of more seats should be reflected in the person-laps score.*

3.4.11 Cruiser Class teams must prepare a 3-minute video and a brochure that describes their car, how it will be used, and how it addresses sustainability, mobility, and energy resilience. The video and the car will be presented to the Judges at awards ceremony. Teams must allow Judges to get into their car to test the space and comfort.

### 3.5 Adventure Class

- 3.5.1 Adventure Class is non-competitive.
- 3.5.2 The progress of Adventure Class solar cars will be controlled by the Clerk of the Course.
- 3.5.3 Teams in Adventure Class will not be ranked by performance.

### 3.6 Awards

- 3.6.1 An awards ceremony will be held at Red Star Raceway during the evening of Thursday 21 July 2022 (exact time and location will be confirmed).
- 3.6.2 Entry to the awards ceremony is by ticket only.

*Tickets for registered team members are included in the team entry fee and pro-rate team member registration fee outline in Regulation 1.14. Additional tickets (subject to the capacity of the venue, and approval from the event organisers) for friends, family, sponsors, and public may be purchased. Further detail will be provided in the Team Manager's Guide and/or via Team Notice.*

- 3.6.3 The winner of the Challenger Class will receive the Challenger Cup; the winner of the Cruiser Class will receive the Cruiser Cup.
- 3.6.4 Additional awards may be presented.
- 3.6.5 The event organisers reserve the right not to present an award in any given category.
- 3.6.6 Each team will receive a participation award.
- 3.6.7 All winning teams must make themselves available for an official media call if required.

## Glossary

<b>Battery</b>	Electrochemical cells wired in series or parallel and housed in a single container
<b>BWSC</b>	Bridgestone World Solar Challenge
<b>CB</b>	Citizen’s Band radio
<b>Certifying Engineer</b>	A professional engineer engaged by a team to report on compliance with regulations and roadworthiness requirements. The certifying engineer must be qualified to certify vehicles for operation on a closed circuit.
<b>Clerk of the Course</b>	The person responsible for coordinating Dynamic scrutineering and the on-track segment of the event
<b>DOT</b>	Department of Transport
<b>DST</b>	South African Department of Science and Technology
<b>Energy Storage Pack</b>	A self-contained box containing components of the energy storage system, such as electrochemical cells and a battery management system
<b>Entrant</b>	The legal entity that completes the Participant Agreement and requests a place in the event for one or more teams. An entrant is typically a registered institution, organisation, or commercial entity.
<b>Event Name</b>	The official name of the event is the “Ilanga Cup”
<b>EVSE</b>	Electric Vehicle Supply Equipment
<b>FIA</b>	Federation Internationale de’Automotive
<b>FMVSS</b>	United States Federal Motor Vehicle Safety Standards
<b>High Voltage</b>	More than 60V DC or more than 30V RMS AC
<b>ISF</b>	International Solar Car Federation
<b>Judge</b>	A person invited to make subjective comment on Cruise Class attributes
<b>Judge of Fact</b>	A person recognised by the organiser as able to determine whether an event occurred (e.g., whether a team obstructed traffic)
<b>Juror</b>	A person appointed by the event to resolve disputes
<b>Participant</b>	A person who has registered to participate in the event as a member of a team
<b>PV</b>	Photovoltaic
<b>Official Website</b>	<a href="https://www.ilangacup.co.za/">https://www.ilangacup.co.za/</a>
<b>Official Instagram</b>	<a href="https://www.instagram.com/ilangacup/">https://www.instagram.com/ilangacup/</a>
<b>Official Facebook</b>	<a href="https://web.facebook.com/IlangaCupZA/?_rdc=1&amp;_rdr">https://web.facebook.com/IlangaCupZA/?_rdc=1&amp;_rdr</a>
<b>Official Twitter</b>	<a href="https://twitter.com/IlangaCup">https://twitter.com/IlangaCup</a>
<b>Official Time</b>	South African Standard Time GTM + 2

## 2022 Ilanga Cup Sporting Regulations



<b>Regulations</b>	2022 Ilanga Cup Sporting Regulations, Technical Regulations and Team Manager's Guide
<b>Road-ready</b>	Ready to drive on a closed circuit
<b>Scrutineering</b>	The process of checking the solar car and other team vehicles for compliance with the regulations
<b>Solar Collector</b>	The solar car subsystem used to collect solar energy. It is typically an array of photovoltaic cells, with or without concentrators or reflectors, but other types of solar collectors are possible
<b>Steward</b>	An event official responsible for ensuring regulations are applied correctly and fairly
<b>Team</b>	A group of people registered by the entrant to participate in the event. An entrant may have more than one team participating in the event.
<b>Team Manager</b>	The person in charge of, and responsible for, the actions of a team
<b>UHF</b>	Ultra-High Frequency. Commonly refers to a South African two-way radio.
<b>UNECE</b>	United Nations Economic Commission for Europe, responsible for regulations for motor vehicles
<b>VIN</b>	Vehicle identification Number