Solar Racing - Race Elements Catalogue

Version 22-April-2022

The elements of a race

A solar race is an event in which solar boats compete with each other during a series of elements. A race is time bound and is typically organised over the course of a limited amount of days in a limited geographical area. A racing season will consist of a series of races.

A solar race can be built out of the following elements.

A. Sprint Competition
B. Endurance Competition
C. Time Trial
D. Top Speed Competition
E. Stage(s)
F. Slalom Competition
G. Match Race
H. Charles' Special Race
I. Speed Record Competition
J. Ton's Race

The amount and type of the elements of the race per event will be chosen by the organization and announced on the website of the organization. In case of unforeseen circumstances or in case the weather conditions make it necessary, the organization may add, remove or change the order of the elements of the race.

The organisation may decide to add a new race element to the catalogue under the condition that new race element will be published at least 2 months in advance of the event where the race element will be introduced for the first time.

The course of a race element will be published in the Race Advance Program on the website and/or in the General team briefing.
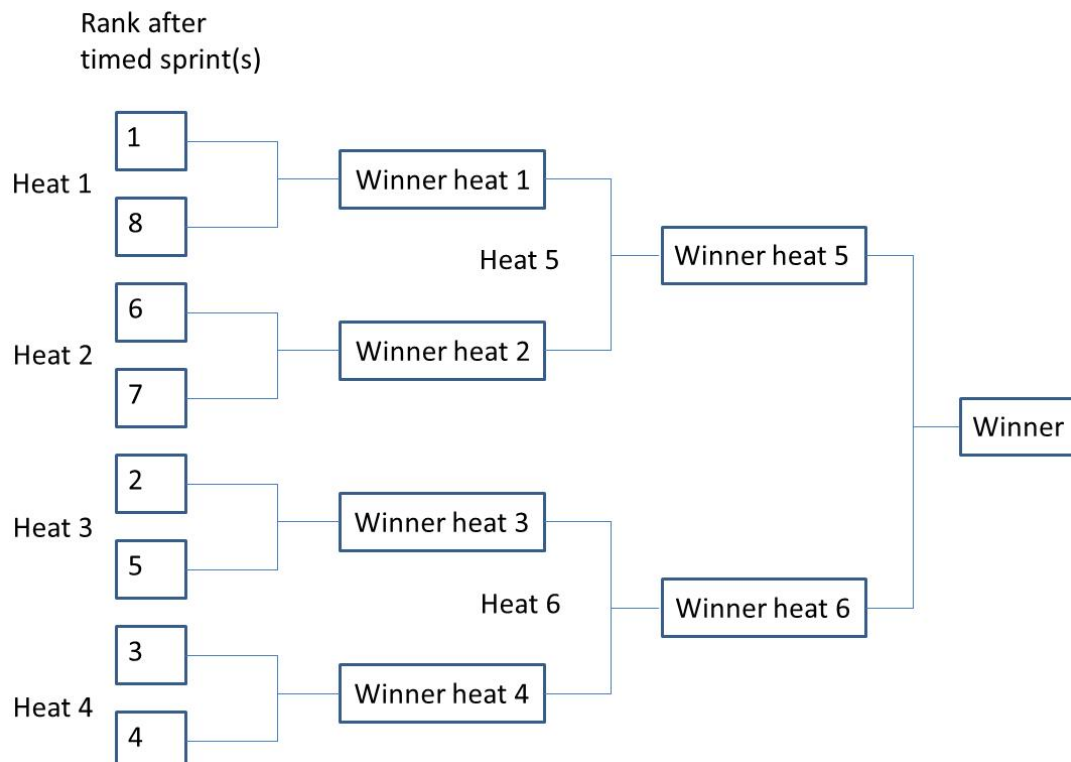
The Organiser is advised to use video recording to support race control in decision making if needed.

The position of the designated radio person of each team will be defined by the race organizer and will be close to race control. The radio person

has to wear his/her boat racing number in a well visible position. The radio person must speak English.

A   Sprint Competition

a) The course of the sprint will be published in the race Advance Program on the website and/or in the General team briefing.

b) Boats must cross the starting line in the direction of the finish line.

c) Boats must cross the finish line from the direction of the starting line.

d) 3 seconds will be added to the time for every mistake, (e.g. failing to race the correct course, missing a buoy, hitting a buoy).

e) The sprint competition can consist of the following variants

I) A timed sprint where every competitor races one or more sprints, best time to count.

II) A timed sprint where every competitor races two timed sprints followed by a knock-out competition. The rank after the timed sprints will be determined on the basis of the average time of the two sprints. The eight fastest competitors will move on to the knock-out competition. The timed sprints may be raced in pairs. In the knock-out competition the teams will be paired according to the following scheme:

Rank after
timed sprint(s)

Heat 1	1				
	8	Winner heat 1			
			Heat 5	Winner heat 5	
Heat 2	6				
	7	Winner heat 2			
					Winner
Heat 3	2				
	5	Winner heat 3			
			Heat 6	Winner heat 6	
Heat 4	3				
	4	Winner heat 4			

If there is a tie in the average time of the timed sprints such that more than eight competitors qualify for the knock-out

competition then one or more of the heats 1-4 will be raced with three competitors.

III) A round-robin series of sprints. The round-robin competition may be subdivided into several pools. The composition of the pools will be determined by ballot.

B   Endurance Competition

a) The endurance may start with a mass start ("Le Mans start"). All boats are positioned with the stern towards the quay and the bow facing the course. The boat is held to the quay by a team member. All participants will appoint a runner who will carry a baton. All runners will leave at the same time from the starting point and run towards to their boat. There they hand over their baton to the person holding the boat. Only when this person has received the baton the boat may start racing.

b) The aim is to complete as many laps as possible as quickly as possible. Depending on the local circumstances the race management may choose one of the two following options for the given amount of time:

Option A: Fixed amount of time – any lap that is completed within the fixed amount of time will be counted.

Option B: Fixed amount of time plus the time needed to complete the lap that has been started within the fixed amount of time – any lap that is completed within given amount of time will be counted. The option chosen will be published in the Race Advance Program and/or on the website and/or announced in the General team briefing.

c) When using option A the finish of the race will indicated by flying a chequered flag flown from race control at the moment the allocated time has passed. When using option B the finish of the race will be indicated by waving a chequered flag flown from race control at the moment the boat completes the last lap.

d) If there is a tie in the total amount of laps raced, the tie will be broken by the total time raced when the last lap counted, is completed. The team with the smallest total time wins the tie.

C   Time Trial

a) A Time Trial is a race element in which a prescribed course with a given length has to be raced

b) The start of the Time Trial can be executed in the following variants:

I)   Boats will start with 1-minute intervals or shorter as deemed appropriate by the local organiser.

II)   The Time Trial will start with a mass start ("Le Mans start"). All boats are positioned with the stern towards the quay and

the bow facing the course. The boat is held to the quay by a team member. All participants will appoint a runner who will carry a baton. All runners will leave at the same time from the starting point and run towards to their boat. There they hand over their baton to the person holding the boat, or touch their boat. Only when this person has received the baton or the boat has been touched by the runner, the boat may start racing.

c) The aim of the time trial is to complete the course within the least amount of time.

d) The local organizer may set a time limit at the finish for the Time Trial. A team that does not make the time limit will receive a DNF score. The time limit may be set per class. The limit may be defined as
   - the time of the fastest boat plus a percentage.
   - the time of the second or third fastest boat plus a percentage.
   - A prescribed time

   The percentage used, must be set by the local organiser. This has to be announced in the General Team Briefing. The time limit may be announced in the app used by the local organiser.

e) The time limit can be extended or the elimination can be waived if more than 50% of the boats exceed the limit or for other reasons such as collisions or foul weather. Waiving the time limit is the sole privilege of the local organiser.

f) Parts of a stage may be subject to speed limits. Failure to comply with these speed limits may lead to disqualification or time added to the race time.

g) The local organiser may decide to impose one or more en-route time limits along the route of the Time Trial. A team that does not make the time limit will be taken out of the race and will receive a DNF score. The en-route time limit may be a given time or the time of the fastest boat plus a percentage. The time limit may be set per class. The setting of a time limit has to be announced in the General Team Briefing. The time limit may be announced in the app used by the local organiser.

h) If there is a tie in the times between teams, then each tied competitor will receive the same amount of points. This will be the amount of points the highest ranked team amongst the tied teams would have received in case there would have been no tie. E.g. when there is a tie between the teams on 3rd, 4th and 5th place, they will all receive 3 points. The team on the 6th place will then receive 6 points. These scores will be multiplied by the race element multiplier of the race element.

D   Top Speed Competition

a) In a Top Speed Competition teams have to race in a straight line a try to reach a speed as high as possible

b) At one point near the end of the course the speed of the boat will be measured.

c) All teams will be given one or multiple tries to set the maximum speed. The number of tries will be announced in the General Team Briefing

d) The highest value measured will count.

e) If there is a tie in the top speeds between teams, then each tied competitor will receive the same amount of points. This will be the amount of points the highest ranked team amongst the tied teams would have received in case there would have been no tie. E.g. when there is a tie between the teams on 3rd, 4th and 5th place, they will all receive 3 points. The team on the 6th place will then receive 6 points. These scores will be multiplied by the race element multiplier of the race element.

E   Stage(s)

a) A Stage is a race element in which a prescribed course between two or more locations has to be raced

b) The winner of a stage will be the team that completes the stage in the fastest time.

c) Stages may have parts where the race is neutralised. There the timing will be stopped. The timing will continue when the neutralised part has been completed.

d) In case timing will be stopped and restarted the time to complete a stage will be a calculated time. The calculated time will be the time between start and finish minus the duration of the neutralization(s).

e) Parts of a stage may be subject to speed limits. Failure to comply with these speed limits may lead to disqualification or time added to the race time.

i) The local organizer may set a time limit at the finish for the Stage. The time limit may be set per class. The limit may be defined as
   -    the time of the fastest boat plus a percentage.
   -    the time of the second or third fastest boat plus a percentage.
   -    a prescribed finishing time
   When a percentage is used it must be set by the local organiser. This has to be announced in the General Team Briefing. Alternatively, the time limit may be announced in the app used by the local organiser.

f) The time limit can be extended or the elimination can be waived if more than 50% of the boats exceed the limit or for other reasons such as collisions or foul weather. Waiving the time limit is the sole privilege of the local organiser.

g) The local organiser may decide to impose one or more en-route time limits along the route of the Stage. A team that does not make the time limit will be taken out of the race and will receive a DNF score. The en-route time limit may be a given time or the time of the fastest boat plus a percentage. Alternatively a time limit may be a prescribed time. The time limit may be set per class. The setting a time limit has to be announced in the General Team Briefing.

h) A team that does not make the time limit will receive a DNF score. A DNF score may be applicable to the race element or to the full race. It is the privilege of the local organizer to decide on this. This decision has to be announced in the General Team Briefing.


F   Slalom Competition

a) A Slalom Competition is a race element in which all teams have to complete a slalom around a series of buoys.
b) One by one, the boats will have to complete a timed slalom.
c) The start will be a running start.
d) All teams will be given one or multiple tries to set a time. The number of tries will be announced in the General Team Briefing.
e) The lowest value measured will count.
f) The start and the finish will be between two marked points.
g) Skippers are free to choose to either leave the first buoy of the run to port or to starboard side but must start to alternate (see figure). The number of buoys used will be announced in the General Team Briefing
h) 3 seconds will be added to the time for every mistake, (e.g. a missed buoy, hitting a buoy).
i) After 3 mistakes the run is classed as incomplete and no time will be recorded (DNF).
j) In case of a tie the boat with the least number of mistakes will be the winner. If a tie remains each tied competitor will receive the same number of points.

or

Number of buoys used and color of buoys may vary.

Starting and finishing line
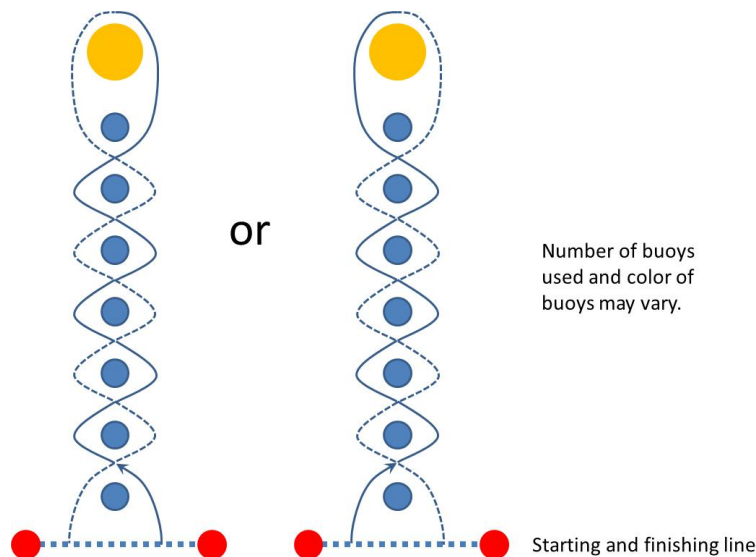
G   Match Race
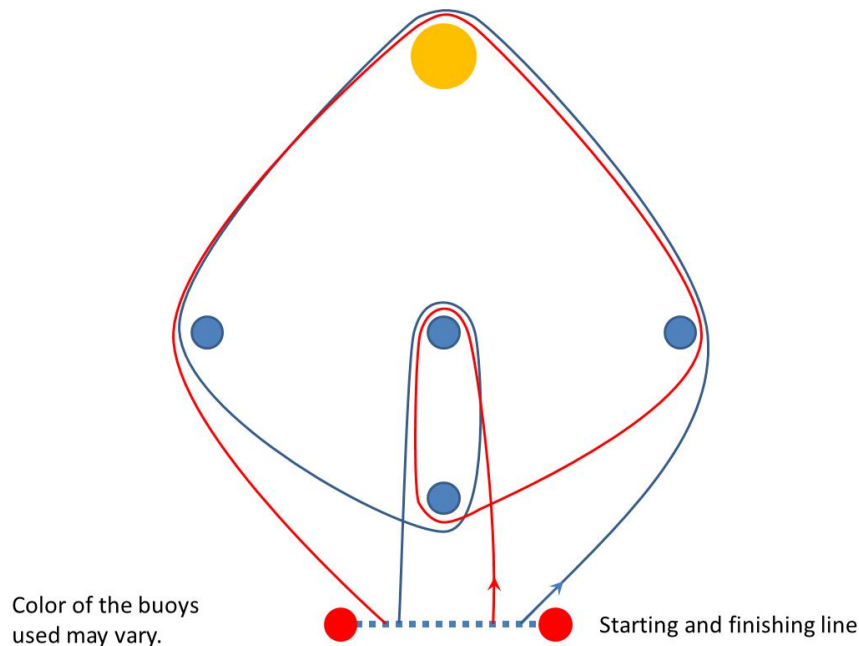
a) A Match Race is a race element in which teams have to complete a prescribed course

b) In pairs the boats will compete in racing the prescribed course (see figure). There will be an inner course and an outer course.

c) The start will be from standstill.

d) The boat that crosses the finish line first will be the winner of the heat.

e) Cutting across the bow of another boat such that it causes hindrance to the other boat, is not allowed and will lead to automatically losing the heat.

f) Failing to race the correct course, missing and/or hitting a buoy will lead to automatically losing the heat.

g) The Match Race can be executed in the following variants:

I)   The winner of the competition will be determined via a knock-out competition. The first series of heats will be a timed race. The fastest competitors will move on to the knock-out competition. The amount of competitors that will move on to the knock-out competition will be equal to the smallest, nearest power of 2 to the total number of participants (e.g. with 29 participants 16 participants move on to the knock-out competition). The timed heats will be raced in pairs as much as possible. In the knock-out competition the teams will be paired according to the following scheme:
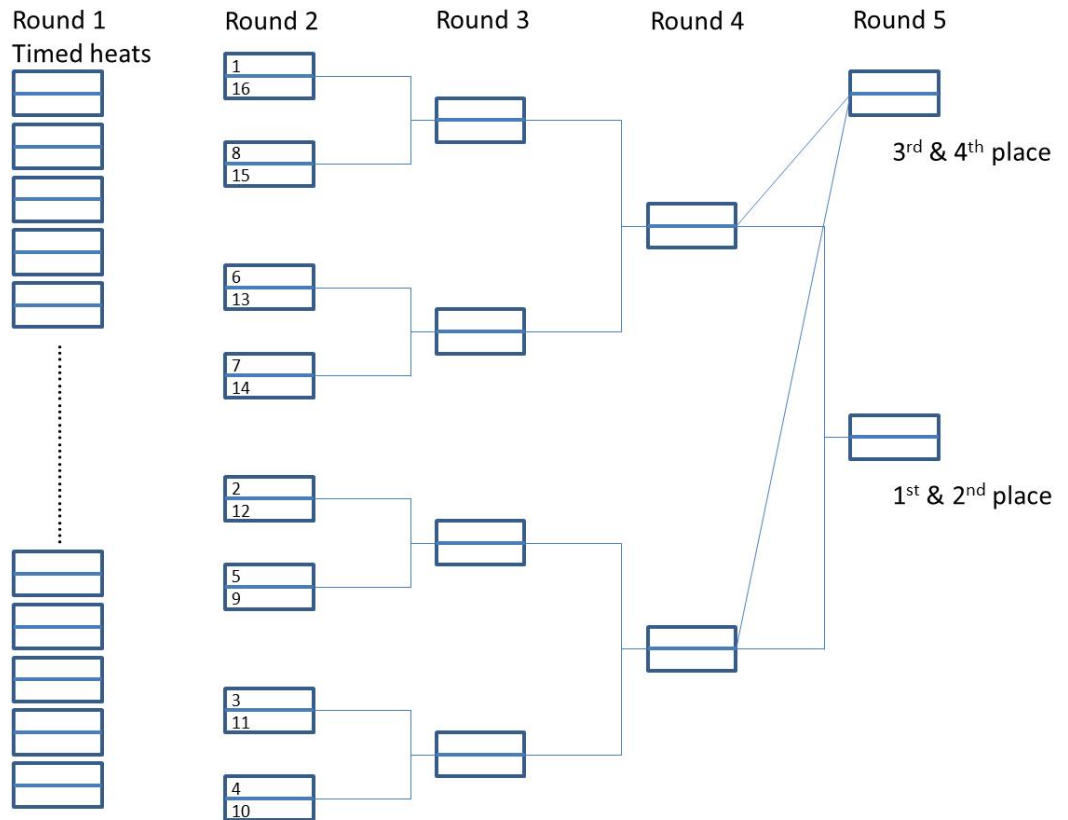
If there is a tie in the time of the timed heats such that more than the nearest power of 2 to the total number of participants competitors qualify for the knock-out competition then one or more of the heats in round 2 will be raced with three competitors.
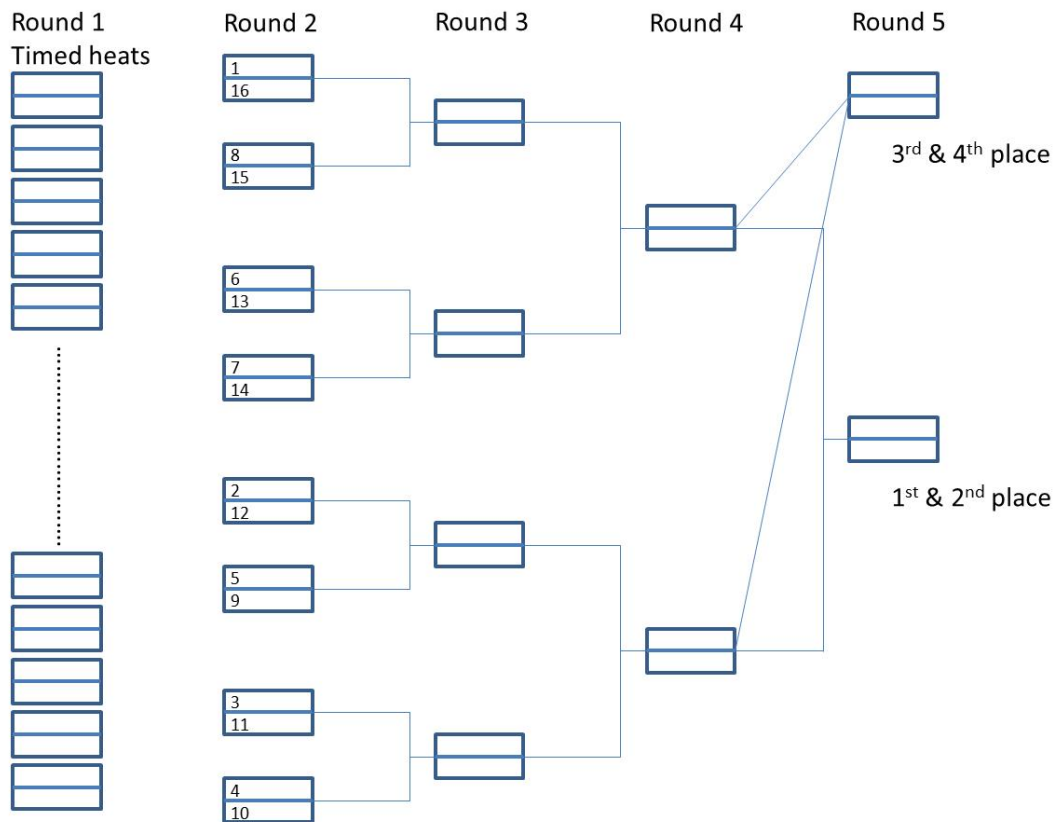
The winner of the knock-out competition will receive 1 point, number 2 will receive 2 points, number 3 will receive 3 points, number 4 will receive 4 points, numbers 5-8 will receive 5 points, numbers 9-16 will receive 9 points, etc. All teams that took part in the timed heats but do not move on to the knock-out competition will receive a number of points that is equal to the amount of teams that moved on to the knock-out competition + 1. If time permits the local organiser may decide to race extra heats to distinguish between numbers 5 and 8 and give them the respective amount of points.

II)   The winner of the competition will be determined via a round robin competition. The winner of a heat receives 1 point. The loser of the heat will receive 2 points. If there is a tie at the end of the competition an additional heat between the tied participants will be raced.

Color of the buoys used may vary.

Starting and finishing line

H Charles' Special Race

a) A Charles' Special Race is a race element in which teams have to complete a prescribed course.

b) In pairs the boats will compete in racing the prescribed course (see figure). There will be an inner course and an outer course.

c) The start will be from standstill.

d) The boat that crosses the finish line first will be the winner of the heat.

e) Cutting across the bow of another boat such that it causes hindrance to the other boat, is not allowed and will lead to automatically losing the heat.

f) Failing to race the correct course, missing and/or hitting a buoy will lead to automatically losing the heat.

g) The Charles' Special Race will be executed in two variants

    I)   Via a knock-out competition. The first series of heats will be a timed race. The fastest competitors will move on to the knock-out competition. The number of competitors that will move on to the knock-out competition will be equal to the smallest, nearest power of 2 to the total number of participants (e.g. with 29 participants 16 participants move on to the knock-out competition). The timed heats will be raced in pairs as much as possible. In the knock-out competition the teams will be paired according to the following scheme:

Round 1　Round 2　Round 3　Round 4　Round 5
Timed heats

| 1 |
| 16 |

| 8 |
| 15 |

| 6 |
| 13 |

| 7 |
| 14 |

3rd & 4th place

| 2 |
| 12 |

| 5 |
| 9 |

1st & 2nd place

| 3 |
| 11 |

| 4 |
| 10 |

If there is a tie in the time of the timed heats such that more than the nearest power of 2 to the total number of participants competitors qualify for the knock-out competition then one or more of the heats in round 2 will be raced with three competitors.

Points will be awarded for both the timed heat as well as for the knock-out competition.

A) The winner of the knock-out competition will receive 1 point, number 2 will receive 2 points, number 3 will receive 3 points, number 4 will receive 4 points, numbers 5-8 will receive 5 points, numbers 9-16 will receive 9 points, etc. All teams that took part in the timed heats but do not move on to the knock-out competition will receive a number of points that is equal to the number of teams that moved on to the knock-out competition + 1. If time permits the local organiser may decide to race extra heats to distinguish between numbers 5 and 8 and give them the respective amount of points.
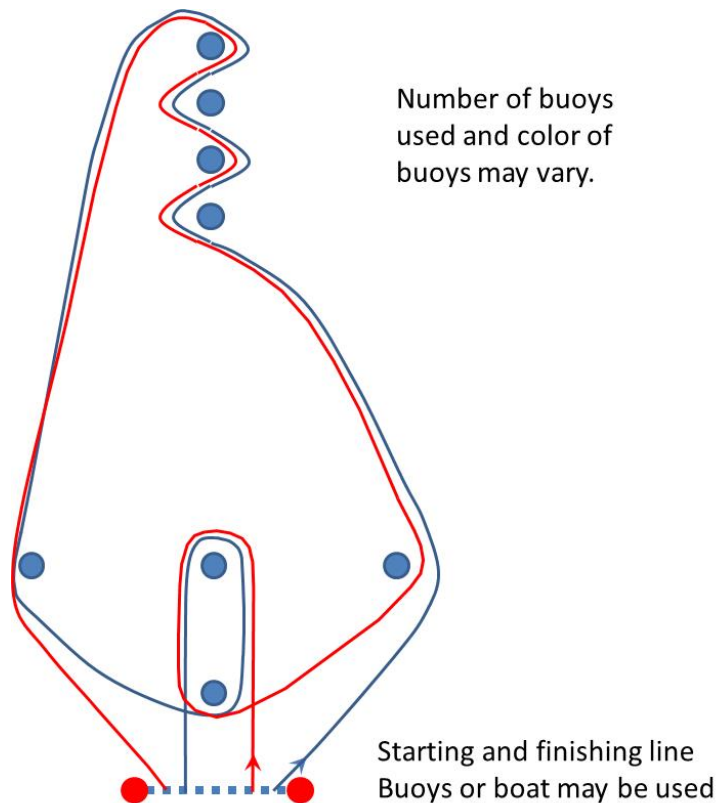
B) The results of the timed race will also lead to points being awarded. The team with the fastest time will receive 1 point. The team with the second fastest time will receive 2 points, etc.

II) Via a knock-out competition in which the boats are paired on the basis of a preceding race. Boats will be timed during the race. The winner of a heat is the boat that crosses the finish

line first. If one boat overtakes the other boat the overtaking boat wins the heat and stops racing, thus does not complete the track. In this course, if on normal course a fast boat comes within one boat length behind a slow boat, the fast boat wins the heat. The second boat continues the track and is timed. The first boat will be timed in one of the following heats. If a boat is timed more than once the fastest time will count. Points will be awarded for both the timed heat as well as for the knock-out competition.

A) The winner of the knock-out competition will receive 1 point, number 2 will receive 2 points, number 3 will receive 3 points, number 4 will receive 4 points, numbers 5-8 will receive 5 points, numbers 9-16 will receive 9 points, etc. All teams that took part in the timed heats but do not move on to the knock-out competition will receive a number of points that is equal to the number of teams that moved on to the knock-out competition + 1. If time permits the local organiser may decide to race extra heats to distinguish between numbers 5 and 8 and give them the respective amount of points.

B) The results of the timed race will also lead to points being awarded. The team with the fastest time will receive 1 point. The team with the second fastest time will receive 2 points, etc.

Number of buoys used and color of buoys may vary.

Starting and finishing line
Buoys or boat may be used

I   Speed Record Competition

a) One by one the boats will race a course with a given length. Depending on the local circumstances the race management may choose one of the following options for the length of the course:
Option A: 231.5 m (1/8 nautical mile)
Option B: 402.25 m (1/4 statute mile)
Option C: 100 m
Option D: 250 m
Option E: 300 m
Option F: 500 m
The option chosen will be published in the Race Advance Program and/or on the website and/or announced in the General team briefing.

b) The start will be a running start.

c) The start and the finish will be between two marked points.

d) All teams will be given one or multiple tries to set a time. The amount of tries will be announced in the General Team Briefing.

e) The lowest value measured will count.

f) The winner of the competition will be the team that sets the lowest time in its class.

g) Rules for UIM World Speed Records see section 600.

J   Ton's Race

a) A Ton's Race is a race element in which a participant needs to cover as much distance within a given amount of time.

b) All boats start at the same moment in time from the same buoy. (Buoy A in the sketch given)

c) A distance raced is only counted when it is sailed in between two buoys. Between every two buoys in the course a leg can be sailed. (In the sketch the following 12 legs are valid legs: A-B, B-A, A-C, C-A, A-D, D-A, B-C, C-B, B-D, D-B, C-D, D-C).

d) The legs must be sailed using the waterways as indicated by the organisation. Taking shortcuts is not allowed.

e) There will be no prescribed order in which legs have to be sailed.

f) All legs may not be sailed more times than determined by the organization.

g) The organisation will set a finishing time window in which the participants have to finish.

h) The finish will be located at one of the buoys in the course. This is not necessarily the same buoy as the starting buoy.

i) A participant who does not finish within the given finishing time window will receive a DNF-score.

j) The team that covers the largest distance will be the winner of the race element.