**Robotics**

**The Skills Show 2015 – Demonstration Competition**

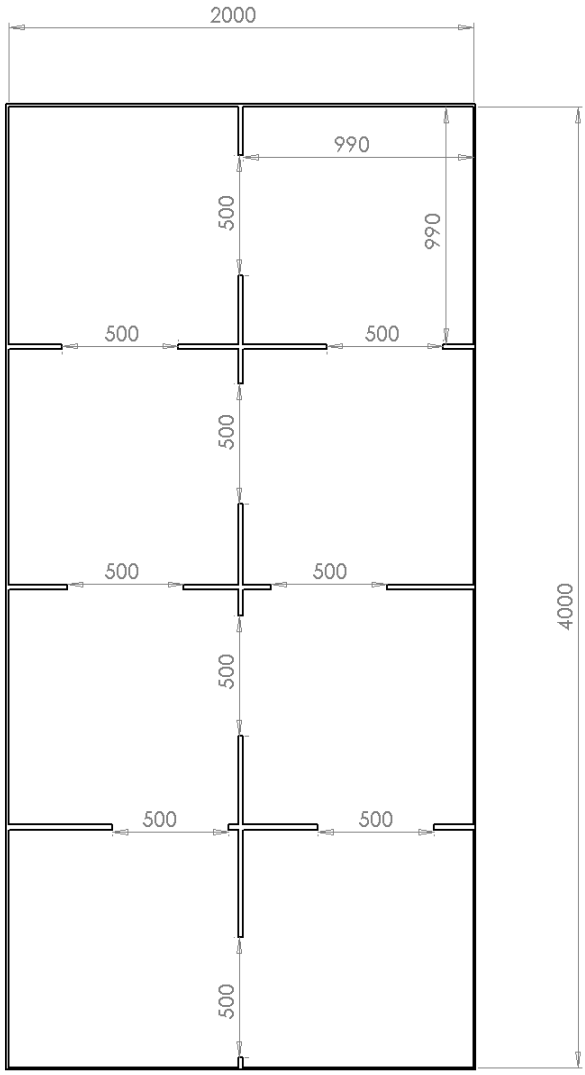
**Competitor's Booklet**

## Tasks

There will be two tasks over the two days. The first task will test the robots ability to navigate through the course. Some parts of the course could be narrower than others and objects may be placed on the competition area as obstacles. The second task the robot must do four full circuits of the course. It must start and stop in the designated zone. The route will be given to you at the beginning of the competition day.

## Table

All measurements are in millimetres.




The competition table is 4000 mm x 2000 mm with a 100 mm exterior wall. The table will be split into eight 990 mm x 990 mm rooms with an internal wall height of 100 mm. Each room will have a 500 mm wide entrance and exit. The positioning of the entrance and exit to each room will be different.

## Robot

Teams have to design and build an autonomous robot with a perimeter of ≤ 1400 mm +/- 2 mm and height of ≤ 300 mm +/- 2 mm. It must not damage the competition table or the elements. The robot is not allowed to leave or lose any parts on the competition table. Teams are allowed to use a premade robot and make modifications to it as long as the robot meets the requirements.

The robot must have the ability to detect objects and walls. Object size, material and position will vary but will have a height of ≥ 100 mm +/- 2 mm. It should be able to run on a variety of different surfaces (carpet, smooth vinyl, timber etc.). It must have an emergency stop button which must be placed on the top of the robot where it is safely accessible by the judges. A downward movement must actuate the button. After pushing the button all actuators of the robot must shut down and stay limp. The teams need to integrate a start sequence to indicate to the judges and members of the public when the robot will begin. This can be done visually or with audio.

Teams are advised to bring at least two sets of batteries for the two competition days, with the ability to charge without too much effort. If you wish to use lithium based batteries you must present a suitable charger and every battery must remain inside a certified and unaltered safety bag at all times. Those restrictions do not apply if the batteries are inside commercial products such as laptops, mobile phones or is a Lego NXT battery, as long as they have not been altered or modified in any way.

Energy sources using chemical reactions like combustion or pyrotechnic processes are prohibited for safety reasons. Any corrosive products or other liquids that can splash are not allowed for the same reason. It is also prohibited to use living beings inside the robot.

To prevent the risk of fire, special attention should be paid to the choice of conductors, depending on the intensity of current passing through them. It is also recommended to protect the wiring with a fuse that should be placed as close to the batteries as possible.

In the competition area there will be a small workstation available with basic tools. Competitors are recommended to bring their own toolkit.

## NEC

Competitors will arrive on familiarisation day, this time should be spent familiarising themselves with the competition area. Make sure their robot is still fully functional after the journey to the NEC. It is not guaranteed that the competition area will be available for you to test on. Every team needs to qualify to compete. This will be held in the afternoon; teams must demonstrate and describe their obstacle avoidance system, emergency stop button and programming including start sequence. Judges will measure the robots dimensions to check it meets the requirements. Teams will have till the end of familiarisation day to try and modify their robot should it not meet the requirements.

On the morning of the competition days teams will be briefed on the task and will be given a schedule of the day. Each team will be given a 10 minute slot for their judged run; within this 10 minute slot teams must notify the judges they are ready to be judged. If the robot is still running the course after the time has run out the team will be asked to stop their robot and the points will be added up to where they ran out of time. There are 100 points in which the teams can win, 90 points for the tasks and 10 points for originality and economic build of the robot.