

## Competition Overview



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### Document Version

The current version of this document is 1.3. Please ensure that you are reading the most up to date copy of this document, as only the latest version of the rules is valid! For more information, please contact Nick (nrh16@ic.ac.uk), or any committee member on the ICRS slack channel (ic-robotics.slack.com).

Major version changes are outlined below:

- Sumobot 2020!!!
- Date confirmed to be 1<sup>st</sup> February 2020
- Updated contact details

Sumobot is a competition that aims to bring some competitive spirit between UK university robotics societies. It has drawn inspiration from the Japanese sumo wrestling robots (see Fig. 1), although we are running a lower power version. We hope to run a remote control and autonomous version, see the competition types for more details.

This is the second year of the competition, and the rules are likely to be updated and improved as we receive feedback from participants. Please email Nick (nrh16@ic.ac.uk) if you have any feedback regarding the competition.

Note that the organisers have the final say in any disputes that may happen in the competition, as well as the final say regarding health and safety.

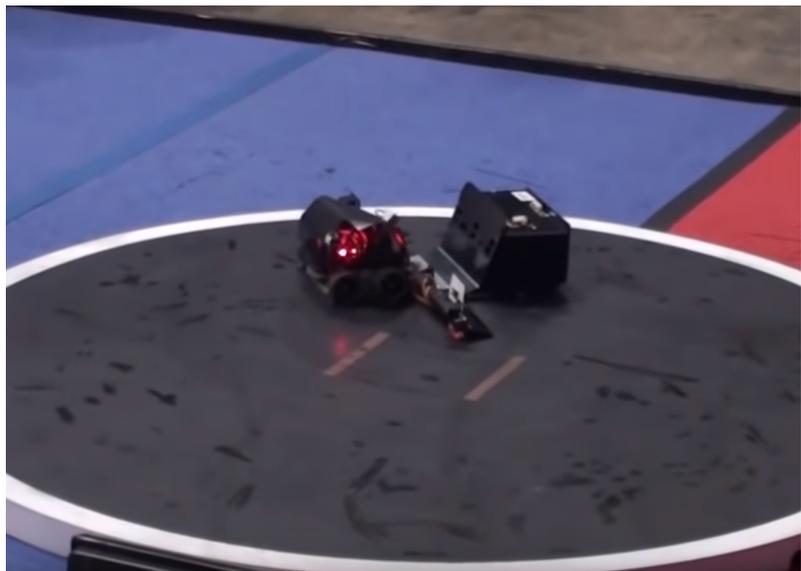


Figure 1. One of the many fights in the compilation video found here: <https://www.youtube.com/watch?v=QCqxOzKNFks>

Check out our highlight video of last year's competition! <https://www.youtube.com/watch?v=LbgDxmtnWTA>

## Key Dates

The Sumobot competition will be held on the 1<sup>st</sup> February 2020, in Imperial College London. To get there, please arrive at the main entrance of Imperial College, on Exhibition Road in South Kensington, London.

Exact times will be announced closer to the date.

## Competition Rounds

A competition round starts with two robots in the arena, at opposite starting points. After the judge gives a countdown, the robots are allowed to move. Movement before an explicit "go" command will require the round to be restarted. Causing multiple restarts may result in a robot being disqualified.

Once the command to begin has been given, the robots have 2 minutes to attempt to push the other robot out of the arena, by moving the robot fully off the raised platform. The entire robot's drive system must have fallen off of the platform for the robot to be out.

If a robot becomes immobile and is unable to move, the robot will forfeit the match.

If after 2 minutes both robots are still in the arena and are able to move, the winner will be decided by the judges.

## Arena Layout

The arena is a 1.5m diameter circle, painted white. A 50mm thick ring of black will be painted around the edge, signalling the edge of the arena. There will be a small drop, no more than 50mm off of the edge of the arena. A light gray starting area will be painted on the arena, signalling the starting area for the robots. A diagram is shown in Fig. 2.

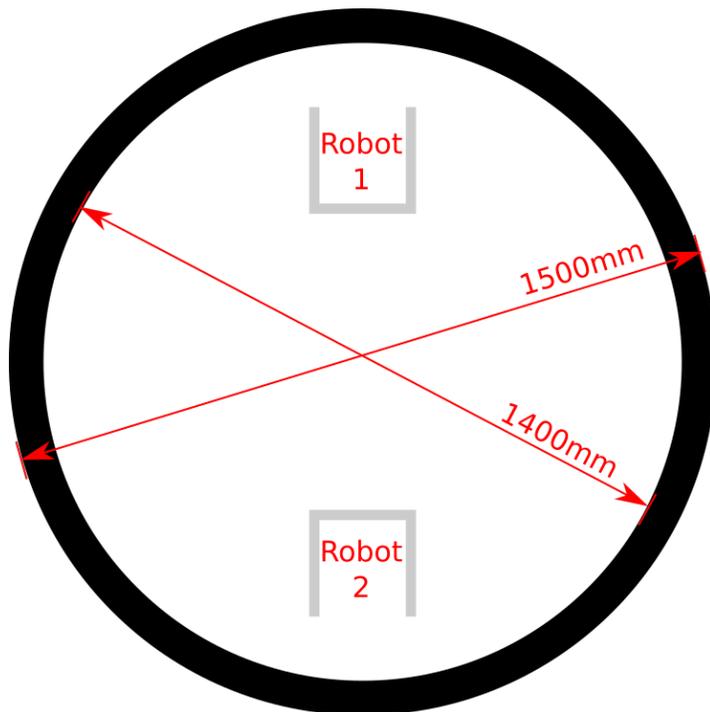


Figure 2. The layout of the arena (not to scale)

“Omae Wa Mou... Shindeiru!”  
— Nani?

## Competition Types

There are two proposed competitions:

1. Remote Control Sumo Robots
2. Autonomous Sumo Robots

### Remote Control Sumo Robots

This is the primary competition. All robots are to be controlled remotely, by a designated operator. The operator may change between matches, but may not change during a match. The Operator must have an unrestricted view of the arena and robots. The remote control method is up to the team (e.g. Wireless, Bluetooth, Radio). In the case of modes with potential interference, all robots and controllers using this method not in the active match must be switched off. If a robot loses a match due to demonstratable interference, a rematch may be attempted. If the interference continues then the match is forfeit. Any team found intentionally interfering with the control method of another team will be disqualified from the competition.

An autonomous robot may be entered into the remote control competition as an autonomous robot if the team wishes. This robot must then follow the rules outlined below.

**Autonomous Sumo Robots** All rules in the remote control version apply, except that the robot does not have manual control. The robot must be able to be activated after the go command has been given from a distance of 0.5m. This may be done via remote control, or e.g. a cord which is then quickly removed from the arena.

The autonomous competition will only be run if there are sufficient autonomous robots. Otherwise they may be entered into the remote control competition!

**Entries** Each robot may be entered into one or both of the above competitions, with or without modifications. It is recommended that teams focus on the remote control robot, and then add autonomy at a later date.

## Maximum Dimensions

### Robot Control

Depending on the competition type (see [Competition Types](#)), a different control method may be used. The following rules apply wherever applicable:

- Upon losing signal from the control source, a robot must stop moving immediately. This must be demonstrated during the safety check (e.g. by turning off the remote controller).
- After the start of a match, an autonomous robot must stop automatically after 120s. This must be demonstrated during the safety check.

The maximum dimensions for any robot at the start of the match is 250 mm cube. After the go command has been given, a robot may deploy itself to be up to 400 mm along a single axis, while keeping the original dimensions along the other two axis (e.g. sweeper in Fig. 1).

Robots **must** weigh less than 2 kg to be allowed in the competition. The dimensions and weights will be checked during a safety check before the competition begins.

### Power Limits

Power supplied to the drive motors of the robot must not exceed a total of 30 W. All robots **must** employ some form of power control (e.g. active current limiters/motor controllers) to prevent motors from exceeding this limit, **or** show the stall current for the voltage being used to prove that the total drive power will not exceed 30 W. Teams will be asked to show their power limiting circuit/datasheets before the competition as part of the safety check.

### Weapons

The only forms of weapon allowed are scoops and flipping mechanisms which aim to get underneath the other robot and overturn them. Anything which may cause intentional damage to another robot or the arena may be considered to be a weapon. These must not be capable of lifting a 2kg mass off the ground higher than 100 mm. Robots must not have any sharp edges for people to injure themselves on.

### Example Robot

Fig. 3 is a design of an example robot which meets the above requirements. It contains some brief explanations for how things work.

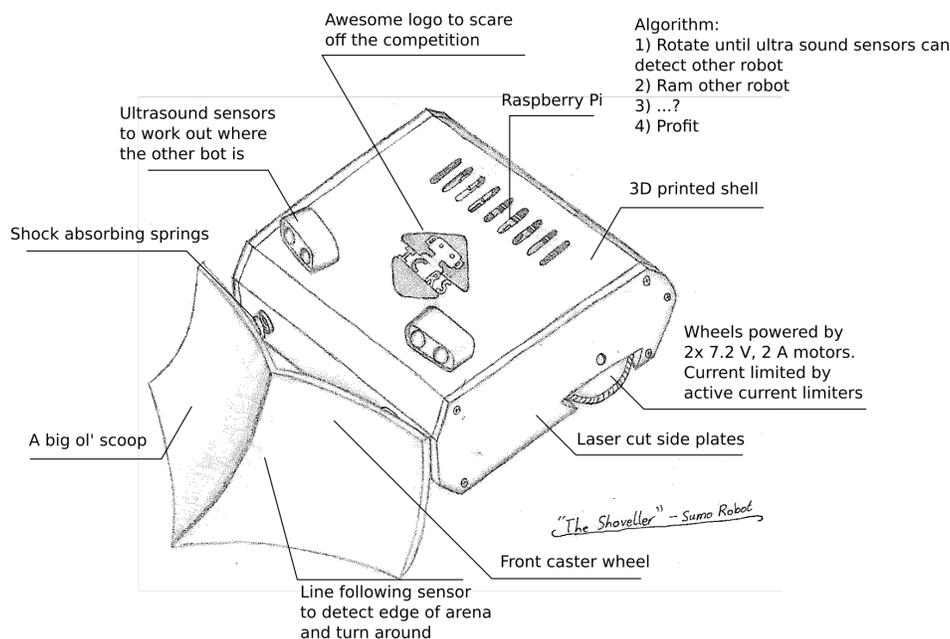


Figure 3. An example robot - The Shoveller