The Rules of the Rampaging Chariots Robotic Games 2015.

General Competition Rules

Competition

1. Each Rampaging Chariot may compete in up to three events. All robots compete in the Assault Course and Football. Teams also choose between the Sumo OR the Tug-of-War events. Teams entering two robots may enter one in each of these events.

Note: The Sumo and Tug-of-War events require similar skills and technical requirements and we have found that choosing between these two events allows a more even distribution of trophies/medals and prevents batteries becoming completely exhausted. The Tug-of-War event is not available at the Luton and Basildon Games

2. The age limit for competitors is before their 18th birthday on the day of the event. Older students may enter an autonomous Rampaging Chariot in a separate competition.

3. Only authorised staff and referees may touch the Rampaging Chariots during a match or bout.

5. Where appropriate, limited time will be allowed between events, bouts, and rounds for repairs, adjustments, changing or charging batteries etc.

6. Modifications and configuration changes must normally remain in place throughout the different Games events with the exception of a fixed wedge or scoop for the Sumo Event.

7. To prevent frequency clashes, radio transmitters and receivers not using 2.4GHz, will normally be substituted by technical staff for similar units working in the 2.4 GHz band. Radio control receivers should be easily accessible to allow this change to be undertaken before an event.
The organisers reserve the right to allow some robots to retain their existing radio system provided it does not interfere with another robot.

8. If a team experiences a technical problem that cannot be resolved quickly, the organisers may at their discretion allow the use of a borrowed house robot. Substitute robots are intended to allow teams to experience the fun of the games and cannot be used in the semi-final or final of any event

9. Intentional collisions are prohibited.

.

Assault Course

Contest:

Rampaging Chariots race side by side through a 20m assault course consisting of a series of obstacles designed to test both robot and driver.
The fastest eight robots go forward to quarterfinal and the knockout competition. There is a 5 second penalty for each pole knocked over and a 15 second penalty for each obstacle not completed.
If the course is not completed within 2 minutes the distance travelled is recorded.

Sumo

Contest:

A Random Order of participants compete two at a time in a Knockout Competition. (x have 1st round bye). to expel their opponent from the 1.85m (6ft) diameter ring (Dohoy) within 1 minute.
Winner is first to push their opponent off the platform. If both robots fall off, the winner is the last to touch the floor. At 1 minute time-out the robot furthest from the edge wins.
Best of three successive bouts are played.

Specific rules:

No devices are allowed to anchor the machine to the floor or prevent it from being pushed back. A wedge shaped or curved front projecting no more than 100mm from the front of the main chassis is allowed.
The Sumo Official can stop a contest and restart it at his or her discretion.

Tug of War

Contest:

A Random Order of participants compete two at a time in a Knockout Competition. (x have 1st round bye).
A line attaches the robots to each other. Each machine stands equidistant on either side of a chasm. The winner is the machine that pulls its opponent over the edge into the chasm. In the event of neither machine being pulled over the edge within 30 seconds, the machine farthest from the chasm after 30 seconds will be declared the winner.
Best of three successive pulls are played.

Specific rules:

An 8mm eyebolt or similar must be fitted to the rear of each machine at a height of 8cm from the ground. No devices are allowed to anchor the machine to the floor or prevent it from being pulled back.

Football

Contest:

Teams of 2 a side play football on a pitch 5m wide and 5m long with a 1m wide net at opposite corners. Random Order of teams compete in a Knockout Competition. (x have 1st round Bye)

Winner is the team that scores the most goals within 3 minutes. If after 3 minutes the result is a draw, extra time of 1 minute will be played and the 'golden goal' rule applies. If after a total of 4 minutes the result is a draw simultaneous penalties will be taken with an inert goalkeeper facing towards the centre. The team to score the first goal wins. Individual contestants may form teams before the day of the event, otherwise officials will assign teams on the day.

Competitors must not tackle an opponent who is not in possession of the ball. Two Yellow cards = Red card which results in the offending robot being sent off the pitch for 30 Seconds or 1 minute. (Referees Decision)

Specific rules

Electric or spring actuators to 'kick' the ball are permitted. Machines must not have a scoop or bucket that can hold the ball but may have one pair of guides that project no more than 50mm from the front of the main chassis

Autonomous Competition

To enable senior pupils and students of 18 years and over to participate, we intend to have an event for Autonomous Rampaging Chariots. We challenge senior school and university students to modify a standard Rampaging Chariot (or similar size robot) to undertake any of the Sumo, Assault Course, Tug-of-War or Football events with no human intervention.

We also welcome static displays of any robots that will help to foster young people's interest in engineering.

Safety

1. Please be aware that building and operating robots can be hazardous if basic safety precautions are not taken. We will take all reasonable precautions to ensure that 'live' events are conducted in such a manner that safety of all personnel is our highest priority. We can only ask that when building and testing your robots at home, school etc., you also take the same approach of safety first. If you have any concerns regarding safety issues, you are encouraged to contact Rampaging Chariots Guild for guidance.

2. Entries will be inspected for safety and reliability before being allowed to compete. The organisers reserve the right to ban or disqualify any entry that in their opinion is, or could be, unsafe and could cause injury to people, damage to the venue, equipment or is not in the spirit of the Rampaging Chariots Robotic Games.

3. Any moving arm, lever or mechanism that could cause personal injury to competitors or others must be fitted with a visible locking pin that shows that the arm/lever/mechanism is securely locked into place when not in competition. Locking pins must be painted red and must be in place at all times except while the entry is competing or is being worked on. These locking pins are not included in the weight of the entry.

4. Sharp edges on the exterior of the robot are prohibited.

5. No spinning arms or weapons of any type are permitted

6. Maintenance within the pits area will be limited to basic hand tools. Maintenance involving the use of sharp tools is only to be undertaken by pupils or cadets under the direct supervision of an adult engineer or staff member. Technical staff will be available to assist if a maintenance operation requires the use of a power tool. No grinding or welding will be permitted. You should ensure you bring along any personal protective equipment such as goggles, gloves etc. you may need to safely maintain your robot.

7. Saturn X Radio receivers will maintain the last valid signal received in the event of a transmitter power failure. If a false signal is received outside the normal control range (This could be caused by interference or corruption of the transmitter signal.) the Rampaging Chariot will come to a halt. This feature is incorporated into the electronic motor drive boards supplied by the Rampaging Chariots Guild.

8. Any autonomous Rampaging Chariot must be fitted with a remote kill function that brings all of the robot functions to a halt.

9. All Rampaging Chariots are to be fitted with at least one visible red power-on light that illuminates when the power is connected. This light(s) should normally be on the back of the chassis.

10. You may only activate your robot in the Pits and the Arena. In the Pits, power is only to be connected when the robot is off the ground with its wheels free to rotate. In the Arena, the person connecting the power must stand to the side of the robot.

Definition of a Rampaging Chariot

A Rampaging Chariot is a radio controlled sporting vehicle designed to undertake the Assault Course, Sumo, Tug-of-War and Two-a-Side Football events of the Rampaging Chariots Robotic Games.

A Rampaging Chariot must conform to the following characteristics:

1. Four Wheels (Tracks may be fitted)
2. Tank type steering (Also called 'skid' or 'differential' steering allowing a zero radius turning circle)
3. Powered by two cordless electric drill motors fitted with epicyclic gearboxes
4. Energised by battery power
5. Two motor control boards built by students to a standard design and containing a PIC microcontroller loaded with standard software issued by the Rampaging Chariots Guild.

Construction

If circumstances demand, the organisers, at their sole discretion, reserve the right to alter or change these specifications.

Entries must be largely built by students although assistance from parents or teachers is permitted.

We encourage modifications to standard Rampaging Chariots within the rules, but the aims and spirit of the Rampaging Chariots Project is paramount. Our aims are to interest young people in engineering and provide a fair and fun competition. Modifications should ideally show engineering innovation and involve minimum cost, simplicity, ease of manufacture and maximum reliability.

We will not allow the Rampaging Chariots Robotic Games to be compromised by unfair competition using expensive or purpose built professionally made components.

3D printed components must be designed and coded by the pupils/cadets, but may be printed at another school.

All robots will be inspected by experienced engineers to confirm the construction is within the spirit of the competition and commensurate with that expected from school pupils below the age of 18 with access to normal school workshop tools and facilities.

If you consider that your design of robot may not comply with either the rules or spirit of the Rampaging Chariots Robotic Games, please contact the Rampaging Chariots Guild by email for guidance: technical@rampagingchariots.org.uk

The decision of the judges is final.

Weights and Dimensions

The Maximum Weight is 12Kg.

The Maximum Dimensions are 600mm long, 400mm wide and 350mm high. The height limit is to enable robots to pass under the pivot point of the Assault Course Paddle

For Sumo only, a wedge shaped or curved front projecting no more than 100mm from the front of the main chassis is allowed. It must be fitted and detached in less than 1 minute.

For Football, an electric or spring powered actuator to 'kick' the ball is permitted. Machines must not have a scoop or bucket that can hold the ball but may have one pair of guides that project no more than 50mm from the front of the main chassis

Motors

Motive power must be two cordless electric drill motors fitted with epicyclic gearboxes.
An adittional drill motor or spring is allowed to power a football kicker. Kinetic energy storage devices for example a flywheel are not permitted.

Batteries

1. The following battery technologies are permitted: NiCd, NiMH, Sealed Lead Acid Gel (SLA).

   Lithium-Ion batteries that are designed specifically for cordless electric drills are also permtted provided that the charger that is used for this type of battery is the one sold by the same drill manufacturer specifically for charging this model of battery.
2. Cordless drill batteries must be charged using the matching charger supplied with the cordless drill. Other types of battery (excluding Lithium-Ion) should be charged using commercially available chargers suited to the battery technology and capacity used.
3. Cordless electric drill batteries and associated chargers must not be modified in any way.
4. Maximum battery voltage is a nominal 18v DC. (i.e. A maximum of 20v when fully charged)
5. The safety precautions and charging technique published by the drill manufacturer must be followed.
6. Each individual battery pack must be protected by a 15 or 20 Amp fuse. The fuse should be connected to the battery pack final output positive terminal and be easy to replace. (Note: Future kits will be issued with appropriate fuses. Fuses will be available for retrofit at the Games for existing kits.)
7. Batteries must be firmly attached to the chassis and be easily removable for charging
8. All power connections must be of an adequate grade and adequately insulated. Cables must be routed

to minimise the chances of being cut or damaged.

9. Robots generating excessive levels of electrical interference will be excluded from events.

10. Entries must be fitted with a means of removing all power from power circuits, radio receivers and control systems. **This must be quick and easy to operate**. Battery connectors, on/off switches or removable plugs are examples. If there is more than one switch, these must be positioned adjacent to one another. Switches must be positioned in a visible part of the robot bodywork, and this position must be clearly marked and easy to access.

Radio Control

1. Entries should normally use the 2.4GHz frequency band.
The 27 or 40MHz bands, AM or FM are also allowed provided frequencies do not clash with competitors. VHF Splat transmitters which transmit over a band which covers a number of discrete frequencies are not permitted. The VHF frequency band 35 MHz is not allowed as it is exclusively reserved for flying models.

2. Any additional radio controlled operating circuit that is or could be deemed to be dangerous, *e.g. a* ball kicker, must be fitted with an approved type of radio signal fail-safe device.

3. Radio transmission devices that interfere with the operation of other Rampaging Chariots are prohibited.

Autonomous Rampaging Chariots

1. An autonomous Rampaging Chariot is defined as one which can accomplish the event without human intervention.

2. Any autonomous robot must be fitted with a remote kill function. This could typically take the form of a GO- STOP switch on the radio transmitter.

3. All navigation calculation and control functions should be undertaken on board the robot.

4. An external beacon or camera with a uni-directional radio or electro-optic link is permitted.