BodgeBot Risk Assessment – Robot Fighting Construction & Showcase

Date: 02/03/2023	**Assessed by:** Robotic Society	**Approved by:** Keir Groves	**Location:** Engineering building A: Ground Floor	**Assessment ref no:**	**Review date:** NA

- **This document is a continuation of the general event risk assessment and covers specific activities pertaining to the construction, testing and showcase of the robots involved in the BodgeBot challenge.**
- **Location: construction – Makerspace and workstations for basic tools, 3D printing for chassis designs, Engineering A ground floor foyer for showcase.**

For general risks associated with the use of Engineering A please see RA: RA_2023_Hackabot General Risk Assessment

Activity	**Hazard**	**Who might be harmed and how**	**Existing measures to control risk**	**Risk rating**	**Result**
Use of LiPo Batteries	Toxic fumes from damaged LiPo batteries	Attendees and organisers handling the batteries while charging or disposing of damaged batteries	• All LiPos are charged in LiPo bags using the correct charger and will not be left unattended whilst doing so. It will be the responsibility of the committee member stationed on inventory to safely charge and monitor the batteries. • All batteries will be checked for damage before they are allowed to be used. • If a LiPo is damaged it whilst mounted in a robot or contained in a LiPo bag. The robot or bag containing the battery will be placed immediately in a sand bin and the room to be evacuated. • A LiPo fire extinguisher will always be present when batteries are being used.	M	A
Use of makerspace	Burns, cuts	Attendees soldering their robots	• All attendees using the makerspace to construct their robot will be overseen by a member of staff and qualified GTA who has had appropriate lab supervision training. – ACTION • All Attendees will be inducted on the makerspace prior to using any of the facilities. • Attendees will be instructed on the safe and appropriate practices for use of any tools of which they are unfamiliar.	L	A
Designing and production of system	Burns, cuts, punctures	People constructing the	• People designing and constructing their robot which require tools not suitable for general tabletop use will only do so within the makerspace. • Robots will be permitted to be at workstations.	L	A

Activity	Hazard	Who might be harmed and how	Existing measures to control risk	Risk rating	Result
			• Attendees will be permitted to use any material which they can source for the construction of the robot including 3D printers. All 3D printers will be overseen by a designated organiser and no attendee will directly interact with the printers. See **RA_2023_HackABot General Risk Assessment.** • Dynamic assessment of risk will be conducted by those supervising to ensure that any material or method used is safe and within reason, any deemed to be outside of this will be dealt with by the supervisor		
Operation of the robots - testing	Uncontrolled Robot could cause damage	Anyone in the area	• No robot will be permitted fight outside of the arena, anyone found in breach of this will be asked to leave the event and potentially face barring from future events. • All robots are fitted with safety links, breaking the circuit until placed in the arena. All robots have fail-safes added in the event of a loss of signal. • Robots will be permitted to be powered up and driven outside the arena as long as it is safe to do so in accordance to the precautions documented in **RA_2023_HackABot General Risk Assessment**. • Use of any powered weapons will not be permitted outside the arena and anyone found in breach of this will be asked to leave the event and potentially face barring from future events.	L	A
Sharp Metal Edges	Cuts, punctures	Attendees handling their robots, technicians placing robots in the arena may be cut by sharp metal edges	• All sharp edges must be covered when the robot is not in the arena. • An organiser with first-aid training will be available during the whole duration of the event as well as GTA's and staff to supervise any practical work conducted. • The Arena Marshall will wear safety gloves when handling robots with the arena	L	A
Robot Weapons	Robot weapons could cause damage to individuals	Anyone handling the robots or in close vicinity to the robots	• Robots weapons can only be powered up inside the arena which will be locked from the outside. A committee member will be assigned the role of arena marshal and they are the only people who can open and enter the arena during the event. • Before the arena marshal enters the arena, all robots need to be turned off via their radio control transmitter and then the controller placed down. • Outside of the arena, a weapon locking bar must be present to prevent weapons from moving. This can only be removed by the arena supervisor when entering the arena.	M	A

Activity	Hazard	Who might be harmed and how	Existing measures to control risk	Risk rating	Result
			• An organiser with first-aid training will be available during the whole duration of the event.		
Use of electrical components in the robots	Electrical Shock, Burns, Fire	Anyone handling a robot	• All robots are electrically tested, equipped with fuses and have limited working voltage. All electrical joints must be covered with a suitable insulator. If electrocution occurs the procedure will be to ensure that they aren't touched until they are no longer connected to the source. • If first aid is required, it will follow the procedure detailed later on in the RA. • A LiPo fire extinguisher and normal fire extinguishers will be on hand and easily accessible. The procedure will be to turn off the robot, extinguish the fire if possible and evacuate the area if needed.	M	A
Robots competing	Uncontrolled Robot could cause damage	Anyone in the area	• All robots are fitted with safety links, breaking the circuit until placed in the arena. All robots have fail-safes added in the event of a loss of signal. • Robots weapons will only be powered up within the arena.	L	A
Action in the event of an emergency	Not being aware of the evacuation procedure in the event of an emergency. Fire Smoke	Staff, students, visitors Lack of awareness If present within the building during fire Burns, Smoke inhalation.	• Induction arrangements cover security and fire awareness and include how to locate and use a fire door to exit the building and the location of the fire assembly point(s) – organisers and assisting GTA's have completed building and Makerspace induction. – ACTION • Fire alarm systems are in place and tested weekly on day at time to enable users to identify the sound of the alarm, see fire action notices in prominent corridors and at entrances to buildings. Fire alarm is tested on a Wednesday at 9.45am • 4 fire assembly points are located around the building. Green running man signs direct building users to the nearest route out of the building • Emergency call point located in main cores. • Fire evacuation practices are conducted annually. • Induction covers the importance of maintaining clear fire exit routes and keeping the doors closed unless essential. Induction also covers the need for high general housekeeping standards. • Ready access to fire extinguishers is available for use by trained users or anyone to aid in escape. • Organisers and GTA's will be responsible for safety and, if required, evacuation of visitors. • Evacuation marshals attend suitable training and assist where possible during evacuations during normal working hours.	L	A

Activity	Hazard	Who might be harmed and how	Existing measures to control risk	Risk rating	Result
			• Users are instructed and empowered to act if they suspect an emergency situation to activate the fire alarm to trigger evacuation of the building.		
Assembling and disassembling arena	Heavy Lifting	The members who help with the arena could suffer from a back injury	• The arena is made to be flat packed, and free-standing and each wall will be carried by two members minimum and a spotter. • Supervision will be undertaken to ensure a safe lifting technique. The appropriate footwear will always be worn when heavy lifting is being undertaken.	L	T
Robots fighting in arena	Arena Damage	If the arena is sufficiently damaged shrapnel of the robots could escape and injure anyone in the immediate area	• The arena will be made from 6 mm thick polycarbonate and the only robots being fought in the arena will be of less than 500g robots so the arena will be able to withstand any damage from these robots. In the event that the integrity of the arena is damaged, all fighting will immediately cease.	M	A

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Action plan				
Ref No	**Further action required**	**Action by whom**	**Action by when**	**Done**
1.	Dynamic assessment of risk shall be conducted throughout the event. Upon any significant change organisers to assess if the event should be stopped or seek advice from approver	Organisers		
2.	Organisers to be given basic training on the operation and running of the makerspace. Ensure that all GTA's supervising are qualified to do so.	Organisers		
3.	All attendees to be inducted on the makerspace at the start of the event to ensure awareness of hazards and use of equipment	Organisers		

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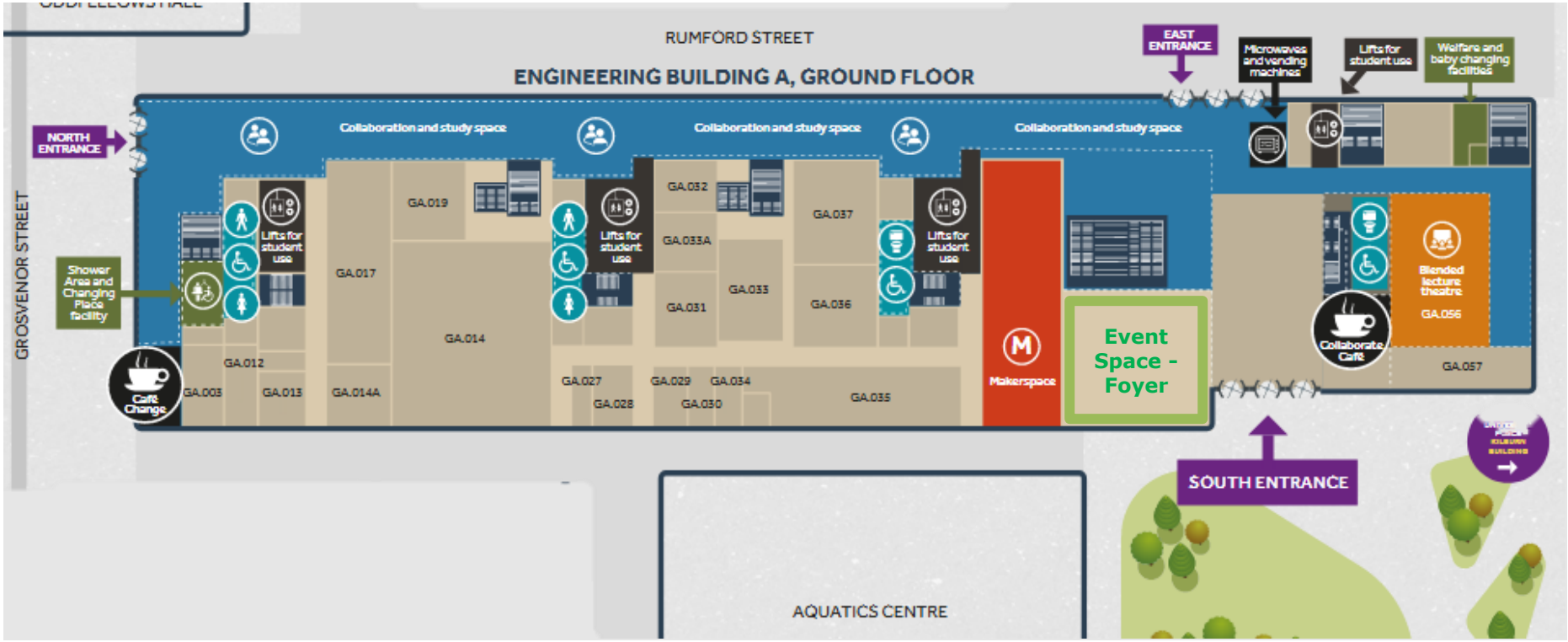
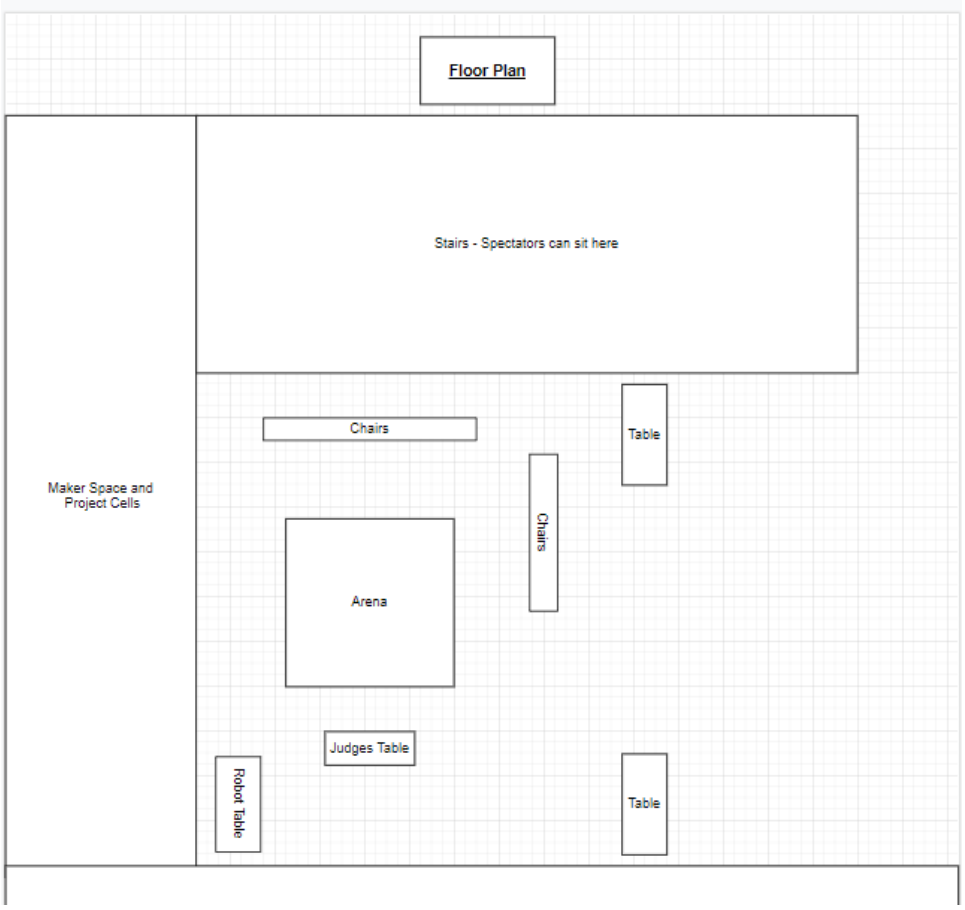
Floor Plan




Floor Plan
Stairs - Spectators can sit here
Maker Space and Project Cells
Chairs
Table
Chairs
Arena
Judges Table
Robot Table
Table