Robots to the Rescue: KENsington (Team 20)

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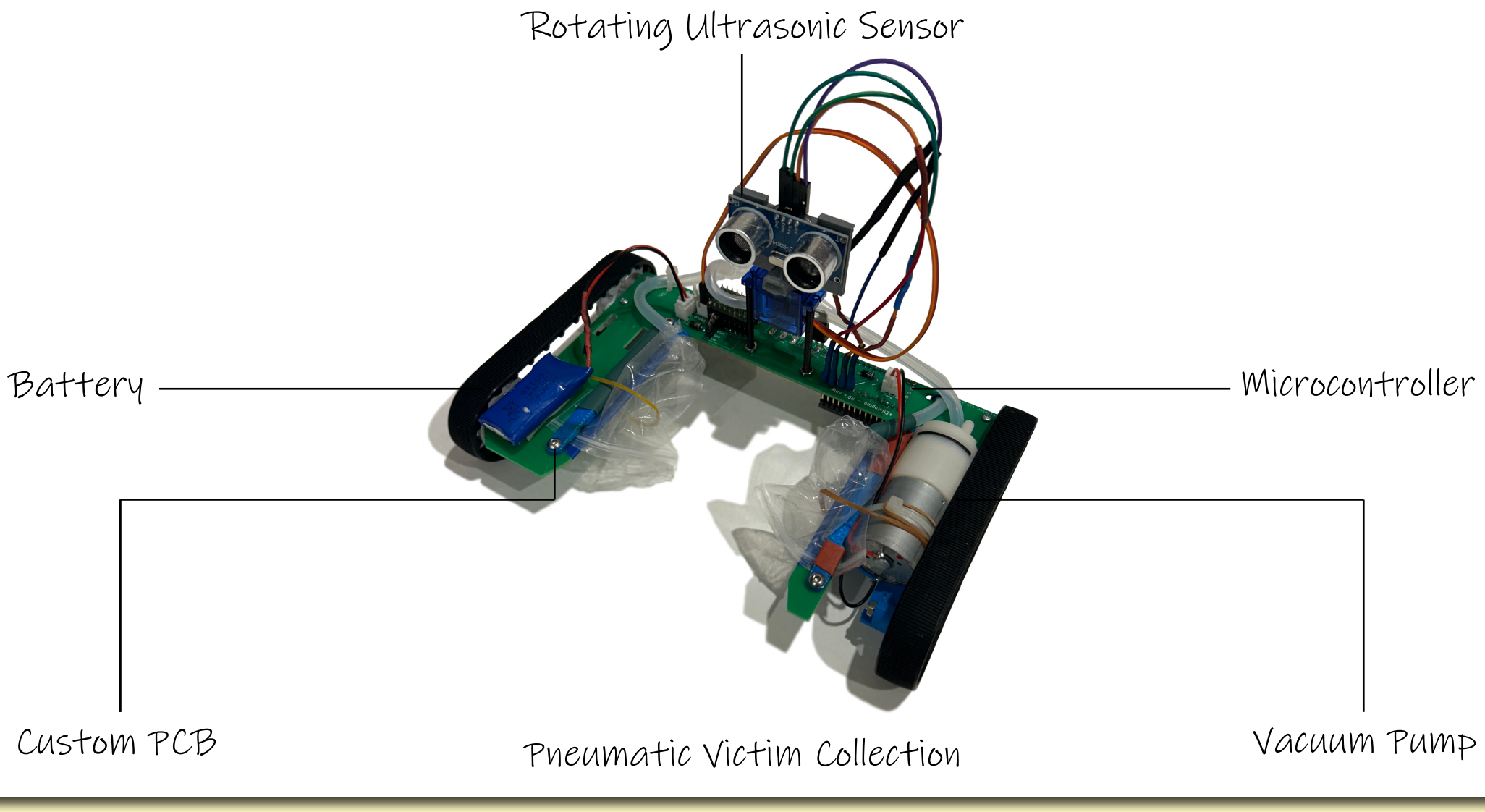

Robustness of Build

Careful selection of parts and material have enabled the construction of a robust robot, ensuring reliable performance. Materials, such as premium acrylics and a custom 'U'-shaped PCB (printed circuit board), significantly improve the quality and durability of the prototype in several ways.

- *Possibility of error during construction is reduced as there is a reduction in soldering required, substantially reducing assembly points of failure.*
- *The materials are impact resistant and can withstand extreme conditions and rough terrain. For example, the robot, due to its 'U'-shaped chassis, allows independent twisting of either side of the tracks.*
- *Additionally, this chassis design, when combined with a pneumatic victim collection system, enables collection of objects that vary in weight and size, as the airbags conform to that which they surround.*

Engineering Quality

Excellent engineering quality is demonstrated by adherence to the constraints of the design challenge. With planar dimensions of 205 mm by 120 mm and a 'U'-shaped design, the robot's footprint is minimal. Additionally, the robot weighs approximately 290 g, which is significantly lower than the 1 kg maximum, reducing the robot's power consumption. Additional evidence of engineering excellence can be seen in the robot's construction and software system.

- *Precisely engineered components, such as a manufactured custom PCB and laser cut acrylic parts, ensure the prototype is manufactured in line with its design.*
- *The unified user interface provides robot control, some degree of automation, and visual feedback from one interface. The software is also modular, allowing easy maintenance.*

Aesthetic Appeal

While the most important aspects of the robot are related to innovation, quality and robustness, it is important that the robot maintains a certain level of visual cohesiveness. The aesthetic appeal of the robot can be a minor source of relief to victims who are stressed or hurt or who otherwise may be startled by their non-humanoid rescuer. Several visual techniques have been utilised.

- *Notable green colouring provides high visibility.*
- *Visual humour, which can provide a reduction in psychological stress, is incorporated via the attachment of googly eyes to the front of the chassis, providing a comical and non-threatening sight.*
- *Soft airbags provide a gentle, non-threatening collection solution, as compared to more brutish solutions such as claws and buckets, which can appear sharp, rough or jagged.*

Innovation

This robot exceeds requirements established in the design challenge which is a testament to its innovative and creative design. All technical aspects of the robot including electronics, mechanics and software are seamlessly integrated to produce a high performing rescue robot which exhibits the following features.

- *A custom printed circuit board forms a U-shaped chassis and allows for all required functions to be performed.*
- *A pneumatic victim collection system to gently and safely rescue the victim.*
- *Mapping of 180 degrees surrounding the robot through the use of a rotating sensor to maintain alignment and avoid collision.*
- *Small, sturdy and light-weight design which is perfect for disaster zones.*