

RoboCup Competition

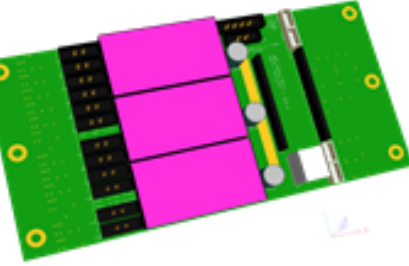
Building on previous year's knowledge and experience at the European championships, this year the team aims to compete in the **World RoboCup Rescue 2013** championship in the Netherlands.



Above: WMR at last year's RoboCup

Outreach

The team attended the Imagineering Fair in Coventry to promote WMR to encourage engineering amongst young people.



Above: New Power Board design



Urban Search and Rescue Robotics Newsletter

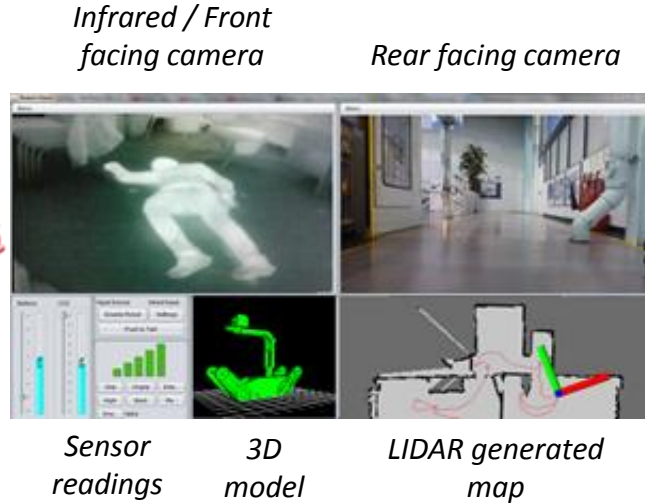
Jan 2013

Warwick Mobile Robotics

Robotics for teleoperated rescue operations in unstable or unsafe environments



Left: New space frame design



Infrared / Front facing camera

Rear facing camera

Sensor readings

3D model

LIDAR generated map

UPDATES

- The new chassis is 5 times thicker than the old design, however, using aluminium 6082-T6 (heat treated and aged) has reduced the overall weight by 35% and increased strength significantly
- The team improved the flipper clamps design by using a higher tensile strength material (Al 6082-T6) and eliminating stress raising geometry
- The head circuit board has been improved to include a new microcontroller and a CO₂ filter to remove high frequency noise
- The head itself has been redesigned to reduce weight (approx. 600g) by using a 3D printed shell and removing unnecessary devices. The new design also allows for quick and easy access to key components / electronics.
- 3D representation has been implemented which will provide feedback information to the driver such as the current position of the robot arm, flippers, Centre of Mass and the robot's current orientation in space
- Inverse kinematics have been introduced to allow the user to 'fly' the head – where the movement of the arm is based upon where the head is looking
- A warning system is now in place to provide collision detection, toppling prevention and notify of device errors
- The LIDAR sensor is now used to help create a map of the robot's surroundings, which could be used by emergency responders to locate victims marked on the map by the robot
- A more compact power board has been created, which uses high reliability Harwin connectors and clearly labels the available voltages and polarities to make connecting devices simple. The power supplies have also been upgraded to ensure reliability under heavy load
- A new battery management circuit has been designed which will protect against both over- and under-voltage, short-circuit and excessive discharge current. The circuit also includes a fuel-gauge that tells the robot how much charge remains in the battery
- A new battery pack has been designed which allows batteries to be easily inserted and removed from the robot. Batteries are now located at the front of the robot rather than the sides, allowing it to safely traverse puddles and loose dirt