

# WMR

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Warwick Mobile Robotics

Sponsorship Package | 2011/12

rescue robot

 **WMMG**  
Innovative Solutions

THE UNIVERSITY OF  
**WARWICK**

# Introduction

Warwick Mobile Robotics (WMR) is an on-going undergraduate research project at Warwick's School of Engineering. This project is unique and has specific influence from the Warwick Manufacturing Group (WMG). WMG is an institution within the University of Warwick, dedicated to improving organisational competitiveness through the application of technological innovation.

## *Project Background*

The RoboCup Rescue is an international competition that tests robots' search and rescue abilities in a simulated disaster environment. The WMR team has chosen to enter this competition, as it provides not only an exciting engineering challenge, but also a socially significant real world application for mobile robotics. The competition requires both a tele-operated and an autonomous machine to navigate simulated disaster zones. The objectives are to overcome challenging terrains, identify victims and produce a map of the environment.

This will be the fifth year of WMR's involvement in RoboCup Rescue. We aim to continue this legacy of success by developing the accumulated technology and expertise of past teams. We aim to win the European title and compete in the World RoboCup Rescue 2012 championship in Mexico.

## *Achievements*

- 2009:** Achieved Best in Mobility Award  
Placed third in the competition
- 2010:** Entire platform re-designed  
Retained Best in Mobility Award  
Placed first in the competition
- 2011:** Retained Best in Mobility Award  
Showcased our robot on BBC One



2010/2011 team with the tele-operated robot

## *Aims for 2012*

- To aid the continuing development of the existing robot's systems, with particular focus on delivering reliability and functionality
- To enter and once again achieve first position in the German RoboCup Rescue Competition for 2012, showcasing the robot's capabilities to an international community
- To qualify for and enter the RoboCup Rescue World Championships
- To develop the most advanced robotic arm WMR has ever produced
- To upgrade the existing software coding, to enable overall integration of the system
- To assess the possibility of WMR becoming its own entity and make the platform viable for commercial release in the future

# Publicity

WMR is proud of its associations with both the University of Warwick and external partners. We aim to advance research and development within the field of robotics, as well as forging collaborative relationships within industry.

## *University Publicity*

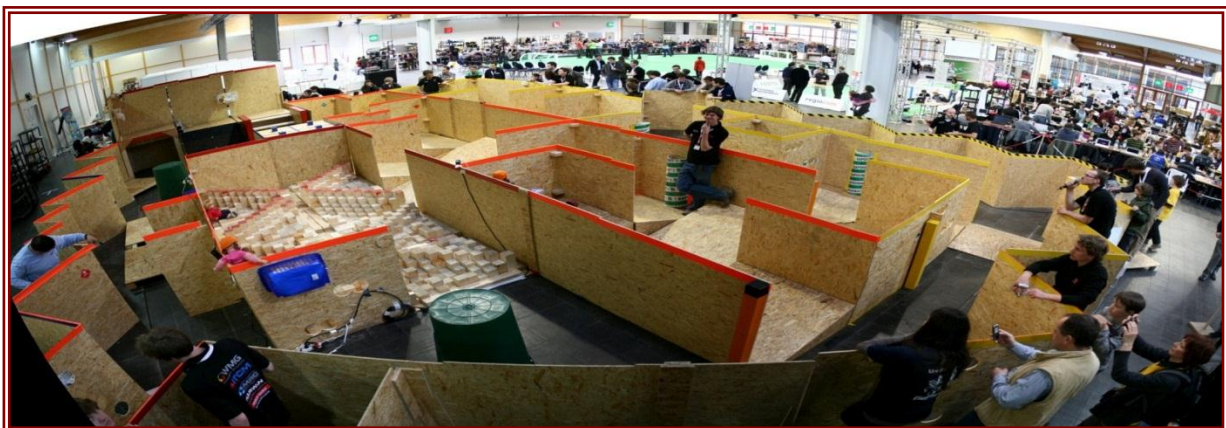
WMR is based in a modern, attractive office/laboratory within the International Manufacturing Centre (IMC) on the University of Warwick central campus. We are regular host to guests of the WMG and enjoy the chance to share our enthusiasm for our research. Previous visitors include past Prime Ministers Gordon Brown and Tony Blair, the former President of India Dr. Abdul Kalam, and recently the Tata Group Chairman Ratan Tata. Our location also makes us popular with industrial visitors, and our work is regularly exposed to prospective students and parents at University open days.

## *Visits and Media*

It is important to promote robotics in all fields and raise awareness on the subject. WMR has been actively demonstrating this by visiting interested parties and demonstrating our work. Our exposure through the media has enabled us to increase awareness and touch a much wider audience, generating a great deal of interest in our work. Television features on Channel 5's 'The Gadget Show', and Channel 4's 'Richard and Judy' are two of our most prestigious publicity achievements. We also enjoy reaching out to the younger generation by taking our robot to school activity days, and in particular fairs aimed at encouraging a future career in Science and Technology.

## *Responsibilities to Stakeholders*

An important element of WMR is the responsibility to our stakeholders. It is our prerogative to keep stakeholders continually informed of our progress throughout the year and to make them aware of our growing presence and technological advances. Apart from updating our appealing website ([www.mobilerobotics.warwick.ac.uk](http://www.mobilerobotics.warwick.ac.uk)) and Twitter account (@WMRobotics), WMR also distributes a monthly newsletter to our interested parties. We use these communication methods along with our team attire, office base, industrial journals, University notice boards and competition robot to publicise our valued partners which make this project viable. These channels reach a diverse range of students, graduates, and industry figures.



The 2011 RoboRescue Competition in Magdeburg, Germany

## Public Appearances

WMR has a long and successful history with its publicity efforts. Featuring on 'The Gadget Show' in 2011 is one of our best attainments yet and a trend we are certainly looking to continue. We want to explore new avenues of publicity as well as building on the different forms of exposure which have already been achieved. Our success in the media through television, radio, newspapers, magazines, online and at exhibitions is broadly summarised below, with some of our standout achievements in each category.

### Television:

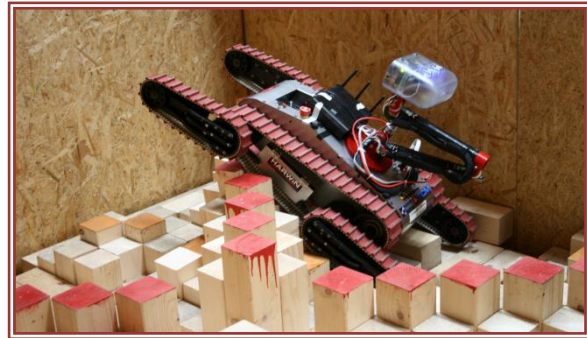
- The Gadget Show on Channel 5 BBC Midlands Today
- BBC Click, which has an estimated international viewership of 75 million
- BBC Regional News show, Midlands Today

### Radio:

- BBC World Service: Digital World

### Newspaper:

- Coventry Observer
- Coventry Telegraph
- Warwick Boar



### Magazines:

- Electronic Engineering Times, which has an estimated readership of 70,000
- E&T Magazine, which has an estimated readership of 150,000

### Online:

- IET's E&T Magazine website
- WMR Twitter, @WMRobotics
- Official Xbox Magazine online
- AZO Robotics
- BBC News Technology
- WMR YouTube Channel



### Exhibition Centre:

- WMR Stand at 'The Gadget Show Live 2011', Birmingham NEC



Meeting R2-D2 at 'The Gadget Show Live 2011', Birmingham NEC

# Sponsorship Proposal

In order to achieve our aims in 2012 we need to develop our robot and equip it with excellent devices. Hence, we need to invest in high quality solutions to fulfil our aim of building a fully functional and reliable robot. To accomplish our other main aim, we need to raise enough capital to enter and attend the RoboRescue Competition in Germany. As such, we are looking to raise capital, supplies from sponsors or advice from experts. In exchange, we will provide a range of publicity services for our sponsors, both building on WMR's impressive stature shown in our public appearances and exposing ourselves to a worldwide audience.

## *Display of Company Logo on:*

- The laboratory wall and window displays
- Monthly newsletter distributed to all stakeholders including sponsors and associates
- Inclusion in all our posters and presentation material
- Information about your company and links to your website under the website sponsorship section

## *Promotion of company logo in prestigious places as:*

- The main page of the WMR website
- On our robots, including our competition entries
- On our team uniform (sponsorship must be received before 31/12/2011)
- The sponsor banner around our demonstration arena
- Sponsors logo displayed on posters taken to school and exhibition visits

## *Exposure to world class engineering students, graduates and future industry contacts/buyers through:*

- Careers information display area located next to student pigeon holes
- Displays within our highly popular office/laboratory
- Your company information will be displayed on the WMR notice board within the engineering department
- Organize industry related talk to students and academics from Company Representative
- Poster presentation for open days to students
- Engineering events for current Undergraduate students

# Investment Strategy

For maximum improvements we are looking to invest in the following:

## *Competition Entry and Attendance: £10000*

Our main goal is to compete in Germany. We have budgeted for:

- Funding for European competition entrance
- Travel, accommodation, and insurance to and from Germany for the 5 day event
- Success at the German Open could lead to an invitation to Mexico for the worldwide competition

## *Sensors: £2500*

It is crucial that the robot platforms give accurate feedback. In order to achieve this we need sensors which can perform reliably. We expect to purchase new:

- Potentiometers for robot arm improvements
- Digital compass or gyroscope for navigation control on the autonomous robot
- Encoders to correctly identify the position of the flipper mechanism in relation to the previous point

## *Mechanics: £5000*

Mobility is the greatest strength of our robot and we aim to further develop the robotic mechanics quality. We see opportunities for improvement through selective upgrades and reengineering in all of the robots mechanical parts, for example:

- We aim to redesign and manufacture a new robot arm and head
- We aim to reduce weight and lower the centre of gravity
- Remove backlash with correct gearing to allow smooth motion using anti-backlash gears
- Maintaining the robot heads position relative to the chassis, regardless of incline or terrain
- The design of a bespoke gripping manipulator for pick and place applications
- Remove slack in flippers by changing the chain system to a gear system
- Replace the motor housing and account for the current bending moment exerted by the motors

## *Computer System: £2500*

Our computer system was first installed 5 years ago. To improve the robot's overall functionality and reliability we have highlighted parts of the electrical stack and software coding which could be improved. Our initial concerns are:

- Fixing the driver motor PCB to cater for the high powered Lithium Polymer batteries
- Slimming down the stack to maximise efficiency
- Upgrading our Tele-operated control using a 6-axis PlayStation controller

# Contact List

Thank you for taking time to read our sponsorship pack. We see this project as one of the most exciting and talked about ventures at the University of Warwick. For sponsors it provides and forms crucial links from academia to industry. After all, it is our sponsors who have made this project possible and it is their support which has heavily contributed to the past success of WMR. If you are interested in sponsoring and becoming a vital part in the future of Warwick Mobile Robotics please contact us using the following information.

Warwick Mobile Robotics  
International Manufacturing Centre  
University of Warwick  
Coventry  
CV4 7AL

Email: [mobilerobotics@eng.warwick.ac.uk](mailto:mobilerobotics@eng.warwick.ac.uk)

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