



# Amsterdam Oxford Joint Rescue Forces



University of Amsterdam

Realistic Simulations  
to aid research and education  
in advanced Robot Control algorithms

University of Oxford

## Research Context

Both in Amsterdam and Oxford we are interested in issues such as world modeling based on incomplete and inaccurate measurements and the coordination of the actions of multiple agents (such as robots) to achieve common goals. It is important that these research issues are scaled up towards real-world applications with direct relevance to society. An application with significant potential is the use of mobile robots for search and rescue missions after a disaster (for instance in a contaminated area).

## Research Challenges

There are many scientific challenges still open in this research area. Rescue robots operate in highly unstructured environments, which means that world modeling has to be able to dynamically learn the circumstances. This can only be done by combining the strengths and weaknesses of multiple sensor systems, allowing the training of one sensor system when another sensor system has high confidence.

Another open challenge is navigating through such an unstructured environment. Ideally, the robots should be able to autonomously find their way through the environment, avoiding all hazards present. The robots should perform their exploration efficiently, which means that the robots have to coordinate their actions, even when the communication range is limited.

## Realistic Simulation

Realistic simulation allows for the development and testing of robot control algorithms in large scale urban disaster scenarios. The simulation provides a rapid prototyping environment in which new perception, control and coordination algorithms may be developed without use of robots. Consequently the simulation environment is also highly suitable for educational purposes, providing large groups of students direct access to a wide variety of sensors and robots. Another benefit is that the results can be easily reproduced and compared. The variety of worlds available in simulation also encourage testing of the algorithms beyond the world where the algorithm was developed.

## Benchmarking

The progress in the research is benchmarked in a yearly competition, where teams from all over the world compete.



Arnaud Visser  
a.visser@uva.nl

Further information:  
[www.jointrescueforces.eu](http://www.jointrescueforces.eu)

Julian de Hoog  
julian.dehoog@comlab.ox.ac.uk

