

Competing in the RoboCup Rescue Robot League

RoboCup Rescue is an international competition in which robots compete to find disaster victims in a simulated earthquake environment. It features both a Rescue Simulation League (RSL) which is entirely computer-simulated and a Rescue Robot League (RRL) with real robots and a test arena.

This paper will describe the experience gained sending an undergraduate team to compete in the Rescue Robot League at the RoboCup German Open for the past two years. The design of the test arena, and the rules of the competition will be outlined; as will the approaches taken by different teams; and the competition results.

The test arena uses a multi-zone design, with some zones suited to autonomously-operating robots with limited mobility; some zones suited to high-mobility robots regardless of their autonomous capabilities; and some zones between the two extremes. Disaster victims are simulated by dolls, with heat, CO² and sound sources. There are new challenges in most years of the competition, although the main test design is broadly consistent from year to year.

The competition is run in two stages; each team performs 4 or 5 preliminary 20-minute 'missions' exploring the test course, scoring one point for every victim found. The highest-scoring teams then take part in the competition finals, where a more sophisticated score is calculated, based on both number of victims found and the quality of victim identification. However, several teams approach the competition with their own technical objectives, rather than aiming for the highest numerical score.

The multi-zone design of the course allows for a variety of approaches; some teams focus on traversing the mobility test areas, which include stairs and 45° ramps, while other teams focus more on the autonomous operation section of the course, which can easily be traversed by a Pioneer P3-AT robot platform.

In the 2009 German Open competition, the winning team scored an average of 1.6 victims per 20-minute mission (with the winning team operating entirely autonomously) reflecting the fact that many teams approach the German Open as a venue for testing before the world championships. At the 2009 world championships, 9 teams scored more than 1.6 victims per run, and the winning team scored an average of 5.5 victims per run.