
# RoboCupRescue

## Robot League Competition

**Padua, Italy**

**July 4-11, 2003**

### PARTICIPANT INFORMATION SHEET

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| TEAM NAME: ALCOR Group | ORGANIZATION: "La Sapienza" University – DIS |
| CONTACT NAME: Ivo Mentuccia | COUNTRY: Italy |
| TOTAL NUMBER OF TEAM PERSONNEL: ~ 8 | EMAIL: ivomen@dis.uniroma1.it |
| ROBOT NAMES: ArmHandX | TELEPHONE: +39 06 4991 8338 |
| WIRELESS FREQUENCIES (PER ROBOT): 2.4 GHz / 433 MHz | FAX NUMBER: +39 06 58300849 |

**X** PRE-REGISTERED ☐ REGISTERED ☐ ARRIVED ON SITE ☐ COMPETITION READY

TEAM DESCRIIPTION (WITH EMBEDDED PICTURES):

ArmHandX is a wheeled/tracked robot, there is the possibility to swap the four traction devices between wheels and tracks. In the latter configuration each traction body consist in an individual little tank with rubber tracks. The four traction bodies are independent each other both in velocity and in steering. We will make a decision about the "robot shoes" on the base of the arena arrangement.

The ALCOR Group is working on an advanced navigation system, we intend to merge information from many data sources. The robot is endowed with a sonar range finder system composed by a ring of sonars all around the robot shell and some additional sonars in key places, measurements coming from sonar system have an heavy influence on the performance of the reactive navigation. A laser scan device with a pan-tilt is also mounted on the machine and it is used to integrate sonar data and to improve the reliability of a 2D (or simple 3D) metric map. A roughly robot position is deduced by the four encoders assembled with traction motors, a more precise robot localization is performed working with a cognitive map obtained via visual data elaborations: a camera mounted on a pan-tilt coupled with a telemeter device will look around to grab information about interesting objects and shapes, thus natural landmark will be searched and recorded along their position. We are trying to provide ArmHandX with an inertial platform, it will be extremely useful for robot localization and robot stability in uneven floors.

Many of the sensors used for navigation are engaged for victim identification as well. Vision system will have a major part in mannequins' detection, the data processing of camera images will endeavor to intercept human body focusing on shapes and colors, victims movements will be observed working on video sequences, too; what's more camera images should reveal the presence of locator strobe. A microphone stands on the robot to reveal vocal help calls, moaning and tapping, the robot is also provided with speakers to communicate with victims in a real situation. Attempts to endow ArmHandX with an infrared camera or a thermo camera are on the road. Victims' position is determined on the base of robot location and telemeter data, existence of victims in the environment is noted down on the robot main map.

ArmHandX control scheme employs a remote monitor computer where all the robot actions are displayed, we have the possibility to interact with the machine during its autonomous exploration and switch the control of the robot between a full teleoperation mode and a full autonomous mode.

We communicate with our robot via a remote computer wirelessly; even if the robot is fully embodied (i.e. it has all the necessary hardware and software aboard) we use the remote computer to monitor ArmHandX actions and to check if the robot is in trouble. On the remote computer we can see what ArmHandX sees, hear what ArmHandX hears and we can transmit our voice through the wireless connection to the robot speakers. We operate mainly on three wireless connections:

- a video connection obtained using two pair of receivers/transmitters devices working on **2.4 GHz** frequency;
- a wireless LAN for all the other data that are exchanged between the robot and the remote computer except video stream, it works on the standard frequency of **2.4 GHz**;
- a radiomodem link for emergency and experimental situations that use the **433MHz** frequency.

Best regards,

ALCOR Group

# ArmHandX

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