



RoboCup Rescue
Robot League Competition
Padua, Italy
July 4-11, 2003

PARTICIPANT INFORMATION SHEET

TEAM NAME: SPQR	ORGANIZATION: Università La Sapienza
CONTACT NAME: Luca Iocchi	COUNTRY: ITALY
TOTAL NUMBER OF TEAM PERSONNEL: 6	EMAIL: iocchi@dis.uniroma1.it
ROBOT NAMES: RR1,RR2	TELEPHONE: +39068841947
WIRELESS FREQUENCIES (PER ROBOT): 2.4 GHz	FAX NUMBER: +39-06-85300849

PRE-REGISTERED REGISTERED ARRIVED ON SITE COMPETITION READY

PLEASE DISCUSS YOUR APPROACH TOWARD KEY DESIGN CHARACTERISTICS (WITH EMBEDDED PICTURES):

Locomotion: [wheeled, tracked, legged, specify other]

Explain basic design, add pictures:

We have two different kinds of robots:

1. A non-homonymic 2 wheels robot, with unicycle like kinematics.
2. A homonymic 3 wheels robot, with Swedish wheels and 3 DOF kinematics

A third robot is still under development.

Sensors for navigation: [tactile, acoustic, sonar, infrared, visual, specify other]

Explain how you use them:

1. Color camera
2. Sonars.
3. Wheel encoders.

The camera image is processed in the following way:

- 1) Is performed a color filtering, for highlighting the image regions of the floor from the others (Assuming the floor has an uniform color).
- 2) Edge detection is performed on the image regions detected in the previous phase
- 3) The points of the edge are projected in robot local coordinates by taking into account the vision system, and then given as input to the control system.

Any object but the ground is marked as an obstacle and thus avoided in navigation.

Sensors for victim identification: [tactile, acoustic, sonar, infrared, visual, specify other]

Explain how you use them:

1. Color camera.
2. Stereo vision system
3. Sound detection (Microphone).
4. We are evaluating IR cameras.
5. We are evaluating temperature sensors.
6. We are evaluating Gas detection (Co2) sensors.

We use Visual sensors for Autonomous Human body detection and the other sensors for limiting the search space.

For human body detection via visual information we are studying current methods of Human Body Detection like shape based model matching and Classification using human body recursive remodeling.

Sensors for localization: [tactile, sonar, infrared, visual, encoder, ladar, specifies other]

Explain how you use them:

The same as for navigation.

We are currently investigating localization and mapping Algorithm operating in the Hough domain, and suitable for Rescue environments.

Control scheme: [teleportation, partial autonomy, full autonomy]

Explain expected operators, what they do, and what/when tasks are autonomous:

Fully autonomous.

Communications: [each particular frequency, spread spectrum range]

Explain exact frequencies, information content, and bandwidth for each robot:

A wireless LAN IEEE 802.11b, used for broadcast transmission of UDP packets for robot coordination.

Map generation/printing: [operator/drawn, computed/drawn, computed/printed]

Explain how you track arena features, mark victims, and provide maps to the judge:

The map is acquired during operation and shared among the operating robots.

We provide a metric map denoting both structural elements like walls and position of victims I this map.