RoboCupRescue

Robot League Competition

Padua, Italy

July 4-11, 2003

PARTICIPANT INFORMATION SHEET

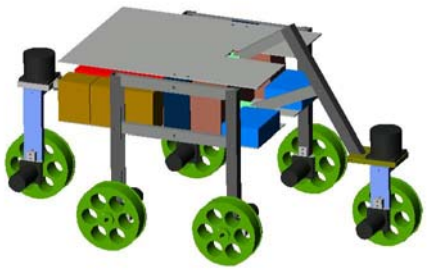
TEAM NAME: CEDRA RESCUE ROBOTS TEAM (CEDRA-RRT)	ORGANIZATION: SHARIF UNIVERSITY OF TECHNOLOGY, CENTER OF EXCELLENCE IN DESIGN, ROBOTICS AND AUTOMATION (CEDRA)
CONTACT NAME: PROF. ALI MEGHDARI	COUNTRY: IRAN
TOTAL NUMBER OF TEAM PERSONNEL: 12	EMAIL: meghdari@sharif.edu
ROBOT NAMES: CEDRA1 CEDRA2 CEDRA3	TELEPHONE: +9821 616 5541 +98911 248 3358
WIRELESS FREQUENCIES (PER ROBOT): 2.4GHz wireless LAN	FAX NUMBER: +9821 600 0021

☑ PRE-REGISTERED ☐ REGISTERED ☐ ARRIVED ON SITE ☐ COMPETITION READY

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

Locomotion:

CEDRA1 is a wheeled car, CEDRA2, a wheeled shrimp rover and CEDRA3, a tracked crawler. Our mechanical team have already designed and fabricated CEDRA2. The high degree of mobility of this robot enables it to climb stairs. The team have also selected and prepared the most appropriate toy-car for modification as the CEDRA1. The third robot's design hasn't been fixed yet. It is possibly a tracked crawler.



CEDRA2: Mechanical Design

CEDRA2: Fabricated Prototype

Sensors for navigation:

We use two reasonable accelerometers for 2D global navigation. For the angle we are considering available sensors.

Sensors for victim identification:

Visual sensors (cameras) are used to identify the victims and stereo vision for measuring the distance from the robot to the victim. Our computer science team are implementing different algorithms to this end.

Sensors for localization:

Our electrical team have chosen sonar sensors as the basis for local navigation. The sensors are arranged around the periphery of the robot and are used to measure its distance from the nearby obstacles.

CEDRA1: The Toy-car Mounted with DC-Motor Drivers

Control scheme:

CEDRA1: Expected full autonomy (This robot will navigate the yellow arena).

CEDRA2: Partial autonomy (This robot will navigate the orange arena).

CEDRA3: Teleoperation (This robot will navigate the red arena).

Our intention is to use one operator to monitor and identify victims from the video images sent by both CEDRA2&3. The operator will also move the CEDRA3 around the arena, while CEDRA2 navigates mostly by itself. Our computer science team have already implemented a GVG algorithm based path-planning software in Linux environment for the autonomous navigation of CEDRA1.

Communications:

We have prepared IEEE 802.11B wireless LAN equipment for communication. The base frequency is 2.4GHz. We have not decided our required bandwidth yet, but it may well include three video channels. We are planning to prepare analog communication as well, and switch to it in the case of interference.

Map generation/printing:

The locations of the victims are marked on the undestroyed map of the arena, which is fed to the system, before the competition. This is done combining the global navigation scheme, the local obstacle detection scheme and the stereo vision.

Note: Some design characteristics might be subject to change and modifications shall be announced later.