Introduction
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Mobile robotics is a very attractive research field. There are two main reasons for this. The first is the high number of applications and sectors where these machines could be introduced in the future: transport, agriculture, military, aerospace, etc. The second reason is that mobile robots are excellent test-beds to develop and integrate the results of many other research areas: control, computer vision, electronics, mechanics, artificial intelligence, etc. The third IFAC Symposium on Intelligent Autonomous Vehicles was an opportunity to present some of the latest developments in the area. Authors presented not only new methods and technologies to solve the classical problems related to intelligent autonomous vehicles, which include path planning, localization, environment modeling, path following, etc., but also new approaches to their design, such as new architectures, new navigation procedures, self-learning systems, etc. In addition, many different applications and vehicles were considered: from autonomous ocean vehicles to planetary rovers. This special issue of *Robotica* comprises some revised and updated selected papers of the Symposium. The variety of selected papers includes surveys, applications and design and development aspects of intelligent autonomous vehicles.

The introductory paper, by M.A. Salichs and L. Moreno, addresses a basic problem in mobile robotics, *i.e.* navigation. A mobile robot should be able to go to any selected place in a large, *a priori* unknown, complex and dynamic environment. The paper presents the state of the art of mobile robot navigation, focussing on the unresolved problems and new research areas.

Multirobot systems are a very promising research field. Robot societies can be an extremely robust and effective alternative for performing certain tasks. The paper by M. Vainio, P. Appelqvist and A. Halme introduces a multirobot system consisting of small size ball-shaped mobile underwater robots. The task of the robots is the cleaning of biologically contaminated spots in a closed aquatic environment.

The success of the July 1997 mission to Mars increased the interest in planetary rovers. A research rover called Rocky-7 under development at JPL implements a number of new technologies for long-range Mars traverses. The paper by J. Balaran focuses on state estimation techniques used on-board Rocky-7.

The paper by D. Kang, J.M. Anderson and P.A. DeBietto shows the aerial, ground and undersea unmanned vehicles developed in Draper Laboratory. It is an excellent survey of very different types and applications of intelligent autonomous vehicles.

The paper by D. Prasad and A. Burns discusses the problem of how to schedule real-time systems controlling an intelligent autonomous vehicle. The proposed method ranks the services pre-run-time, based on their utility. The paper focuses on the problem of calculating the utility of each service alternative.

The paper by Y. Kagami, T. Emura and M. Hiyama proposes a path following system, where incremental errors of the odometric system are compensated using visual information of the environment Pre-recorded images of the environment are compared with images obtained, while the vehicle is in motion, to estimated localization errors.

The paper by C. Balaguer, A. Gimenez, J.M. Pastor, V.M. Padron and M. Abderrahim presents a climbing robot for inspection of complex 3D metallic-based structures. The robot is autonomous and is equipped with a video camera and a laser range finder. A significant characteristic of the robot is that all the control and power supply systems are placed onboard.

A helicopter needs to hover above a ground target to perform different military and civilians missions. In the final paper of this issue, C-H Oertel describes a system, based on computer vision, able to stabilize automatically a helicopter above a fixed or mobile target. The spatial orientation and movements of the helicopter, relative to the ground, are estimated from inertial sensor data and a visual tracking system.

In conclusion, this special issue intends to present a selected collection of works in different research areas and applications of mobile robots. Unfortunately, the collection cannot be complete due to the high number of items involved in this field.

Finally, as the guest editor of this special issue, we would like to express our sincere appreciation to everyone who contributed to this effort.