CAR ROBOTICS PLATFORM

– Integrated robot and car technologies –
An educative platform dedicated to the new field of car robotics.

Scale model car powered by robot technology

ZMP RoboCar™

RoboCar™ (without exterior)

ZMP RoboCar™ Z (with exterior)

Sophisticated environment recognition platform

Stereo camera image processing module

With the built-in stereo camera and image processing module, realize real time image processing and experiments on autonomous motion algorithms inside a laboratory.

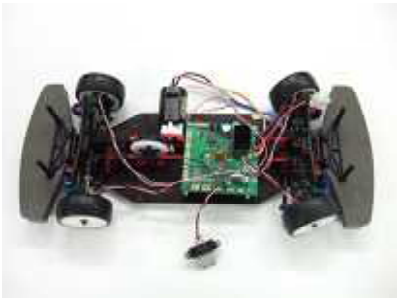
Infrared distance sensors

The platform is equipped with infrared sensors that can be used for obstacle detection, parking assistance, etc. Sensors are placed on the front, rear and flanks of the car, users can freely decide of their location.

Small size laser range finder

In option, a small laser range finder can be mounted on the platform. It is very useful to achieve a real autonomous motion system.

Electric car scale model



Electric car system

As the ECU (Electronic control unit) , main controller that controls the motor driver, the main motor and the servo motor for the steering gear. We propose a real electric car system.

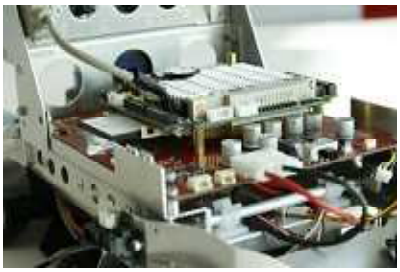
MATLAB®/Simulink® interface

You can use MATLAB®/Simulink® for the control of the electric car system. This is a very good study material to learn about the design of complex control algorithms and to practice on MATLAB®/Simulink®.

Wireless remote control

Using the Wi-Fi module, you can control the model car remotely from a PC or remote controller. It is useful for research that need direct human control of the vehicle.

Possibility to create custom applications



Built-in OS

As the platform is equipped with a general purpose Linux OS, you can load your custom applications. Moreover, you can easily access all the functions of the platform through the library provided by ZMP.

Communication with PC applications

Using the Wi-Fi module of the platform, the scale model car can communicate with custom PC applications. Thus, you can run non-real time applications on a PC, and for example gather logs about the status of the model car.

Wireless communication with other devices

Using the Wi-Fi module, the model car can communicate with various devices or to conduct experiments on communication between multiple vehicles.

*1 MATLAB, Simulink is a regisered trademark of The MathWorks, Inc. in the USA.

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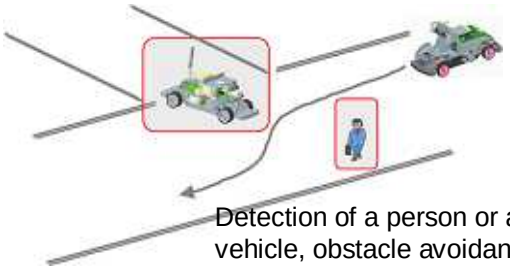
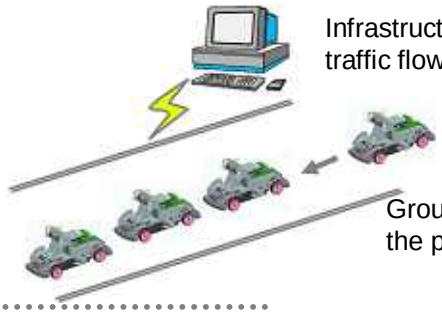
■ Use case examples

Test of obstacle avoidance algorithm



Detection of a person or another vehicle, obstacle avoidance

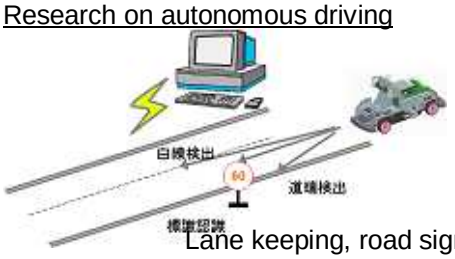
Group control and infrastructure communication research



Infrastructure: acquisition of traffic flow information

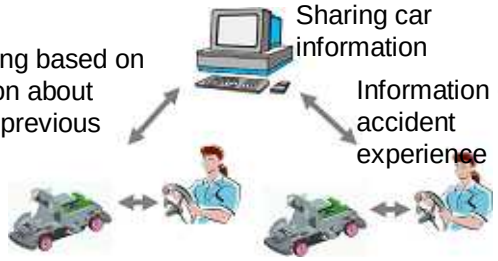
Group control: following the previous car

Research on autonomous driving



Lane keeping, road sign and traffic light recognition

Research related to human and cars interaction

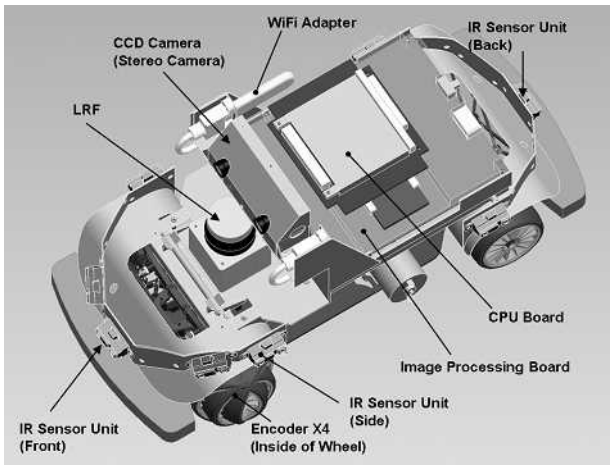


Sharing car information

Safe driving based on information about recorded previous accidents

Information on accident experience

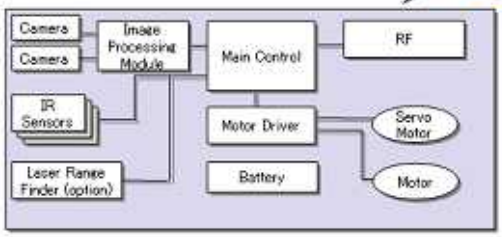
■ Structure of the platform



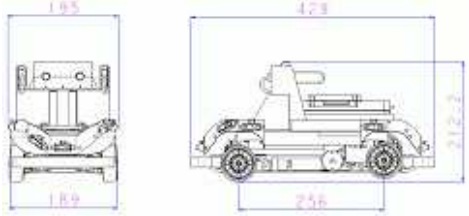
■ System architecture

Embedded in the scale model car

PC



■ External shape and dimensions



■ ZMP Robot Car™ (RC-Z) specifications

Product name / model number		RoboCar™ / ZMP RC-Z
Dimensions / weight		429.0 x 195.0 x 212.2, 3kg (maximum load capacity: 1kg)
System equipment	Stereo Camera	VGA CCD 30fps (x2)
	Image processing module	ZMP made module (based on NEC IMAPCAR® parallel processor)
	Main processor	CPU: AMD Geode® LX800 Processor 500MHz
	Communication module	WiFi communication module IEEE802.11 b/g/n
	Internal sensors	Gyroscope x1
		Acceleration sensor x3
		Rotary encoder (wheels x4, main motor axis x1)
	Infrared sensors	Infrared distance sensors (x8)
		Laser range finder *Option
	Chassis, frame	Carbon FRP chassis, double wishbone type suspension, ZMP made aluminum frame
	Motor driver	ZMP made module
	Servo motor	Servo motor for robots
	Main motor	DC motor
	Battery	Control system battery 1.2V AA NiMH batteries (x12)
		Power battery 7.2V NiMH battery pack (x1)
Scale model car embedded software	Main processor OS	Linux (Soft real time)
	Control software	Control software, ZMP library, network software
	Image processing module	Dedicated code
PC Software	OS	Windows® / Linux
	Development environment	gcc

■ Development of additional functions

Depending on customer's request, we can add additional feature such as:

- *Extending available space and reinforcing the chassis to enable users to add additional devices*
- *Electrical consumption monitoring*
- *GPS for positioning in outdoor use*

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Sales rep:

※ IMAPCAR is a registered trademark of NEC Electronics Corporation in Japan.
※ Please understand that as this is a preliminary announcement, some changes may be made to the content of this document.

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