Politechnika Poznańska
Wydział Informatyki
Katedra Sterowania i Inżynierii Systemów

Robotics in Poland: Trends and Challenges

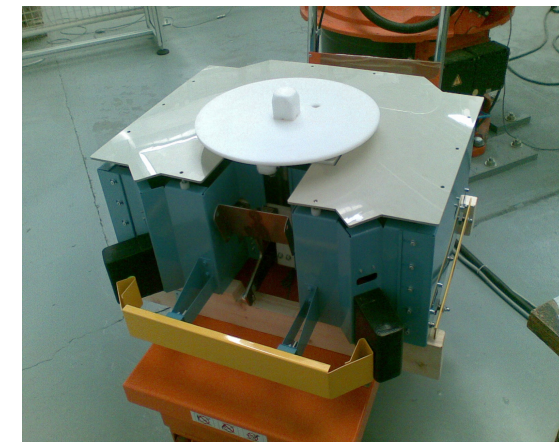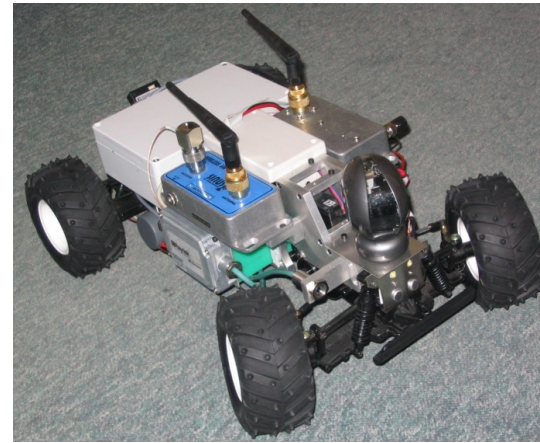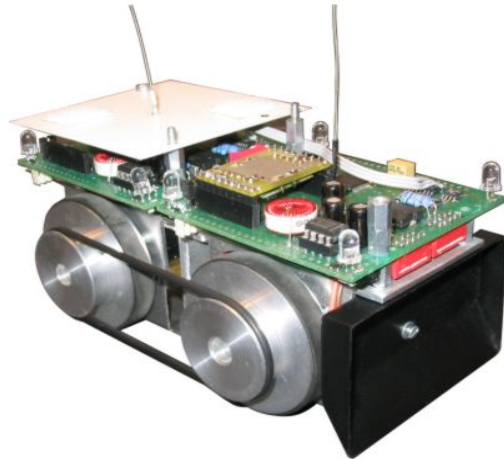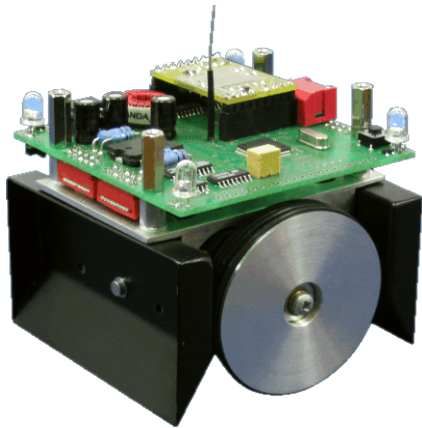## Krzysztof Kozłowski

Poznań University of Technology
Chair of Control and Systems Engineering

## Hardware: different constructions (wheeled and walking)

MiniTracker   MiniTracker 3/4WD   Inspection robot   Leonardi
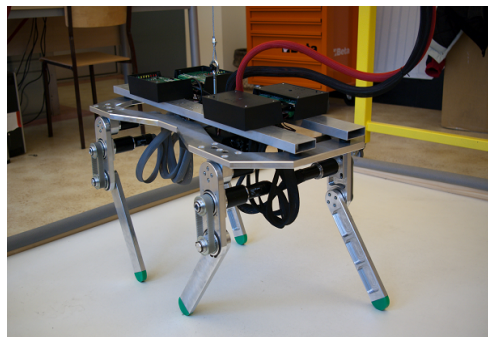
- research equipment: small size robots10x10x10 cm and big robots available to carry up to 150 kg.
- different constractions: skid steering, car like robots, mobile robots.
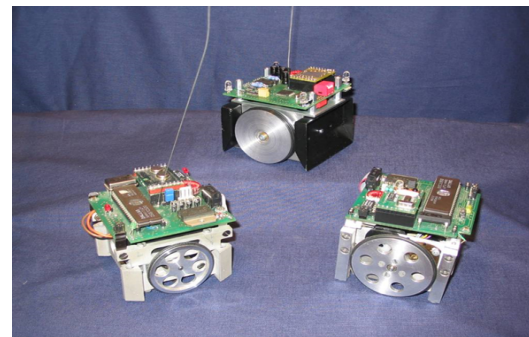- open engineering software and communication systems

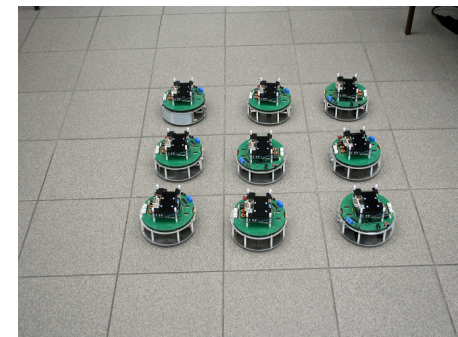## Hardware: different robot constructions (wheeled and walking)
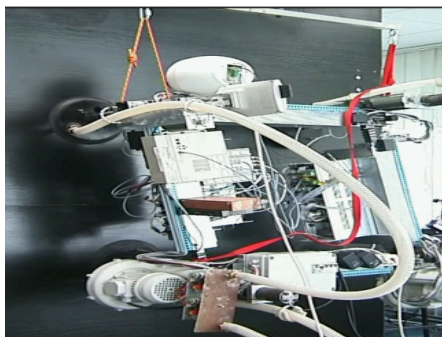
Safari   Walking robot

Multi agent systems

- Walking and wheeled robots
- Multi agent systems consisting of mobile robots, control coordination
- and collision avaidance
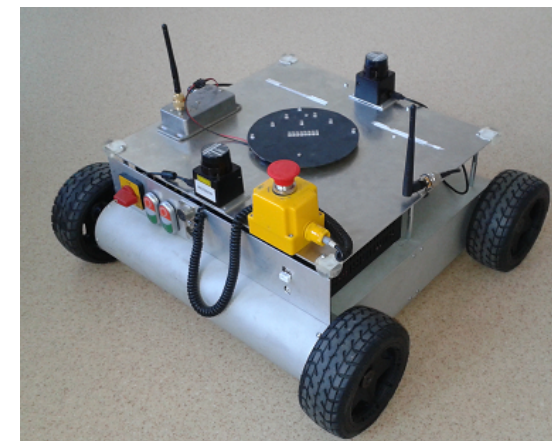
Research aims: control and navigation of different mobile robots and set of mobile robots.

- Trajectory tracking and path following.
- Control techniques making use of potential functions.
- Sensor fusion of different data measurements collected from a set of mobile robots.
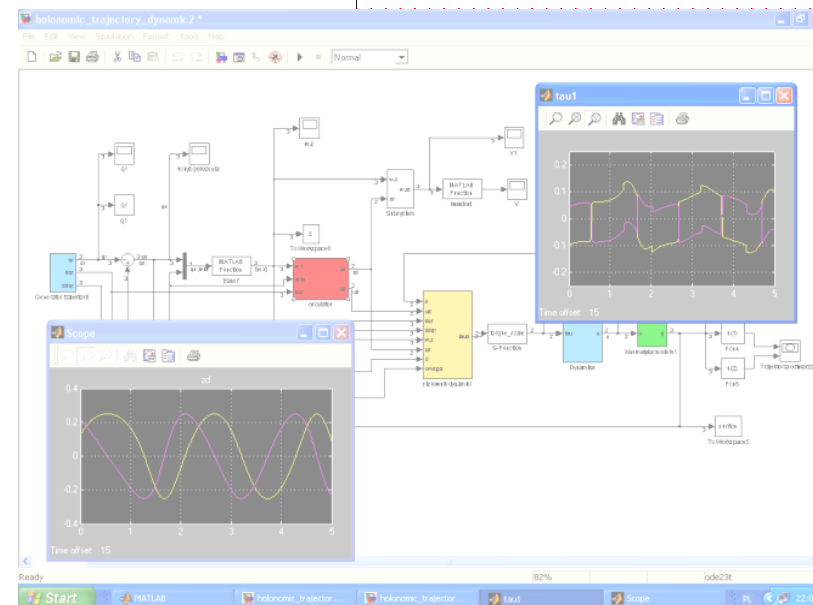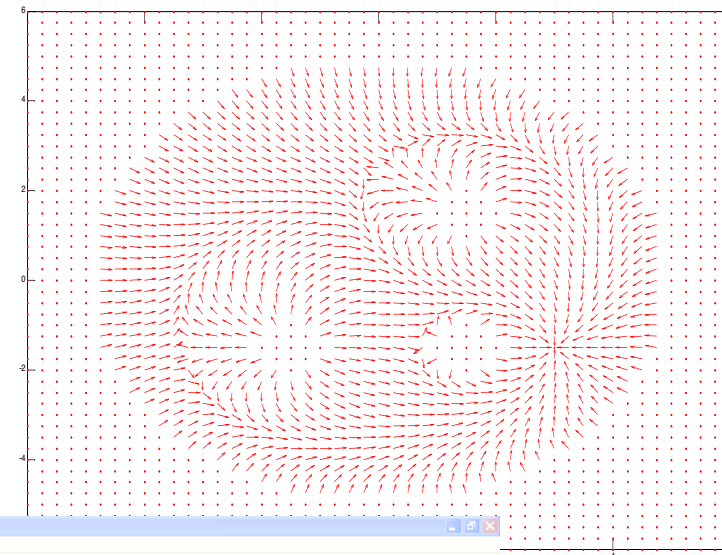
Multi agent robot systems
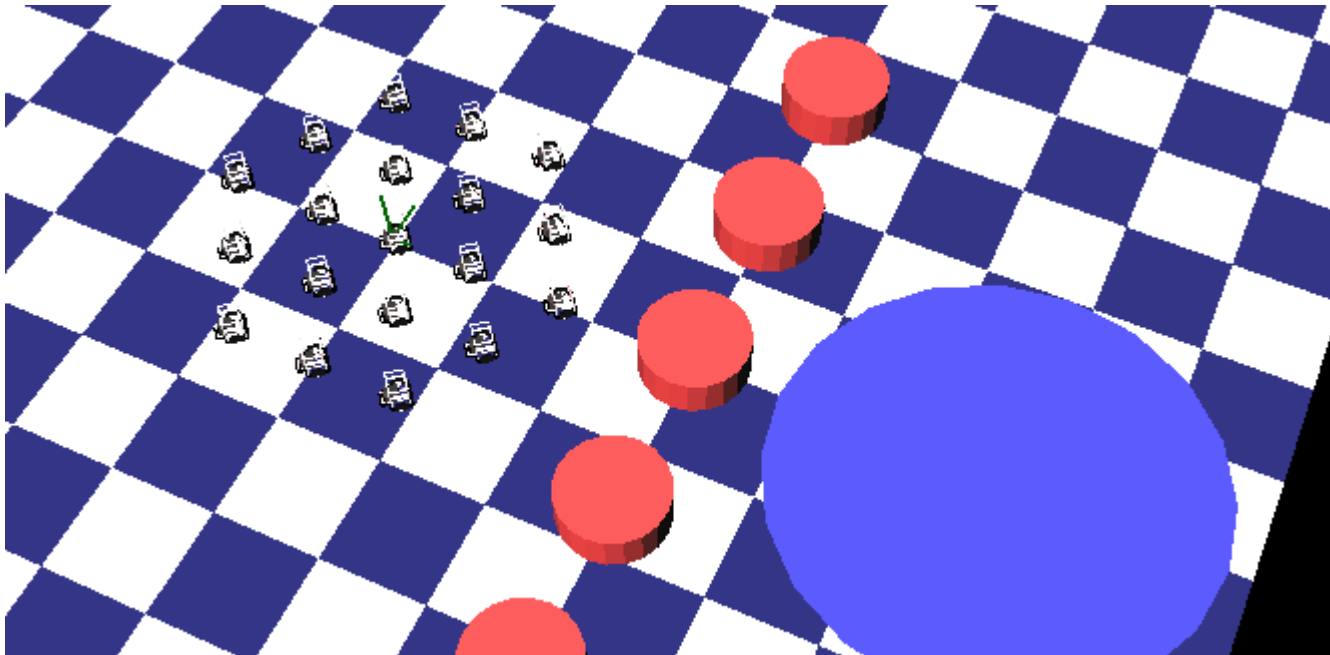
Simulation and experimental results .
Collision avoidance.
Different control algorithms: linearization methods, leader-follower,
behavioral approach.

Localization of a mobile robot

Real time localization methods of multiagent systems with collision avoidance and coordination.
High frequency of the vision system and its subpixel accuracy.

$f_p = 64Hz$

Kamera cyfrowa
SVS 084MSCL-2

Robot mobilny MTv3

Komputer PC

Diody LED
znacznika

115200b/s

$$\omega_d = \begin{bmatrix} \omega_{Ld} \\ \omega_{Pd} \end{bmatrix}$$

Moduł radiowy
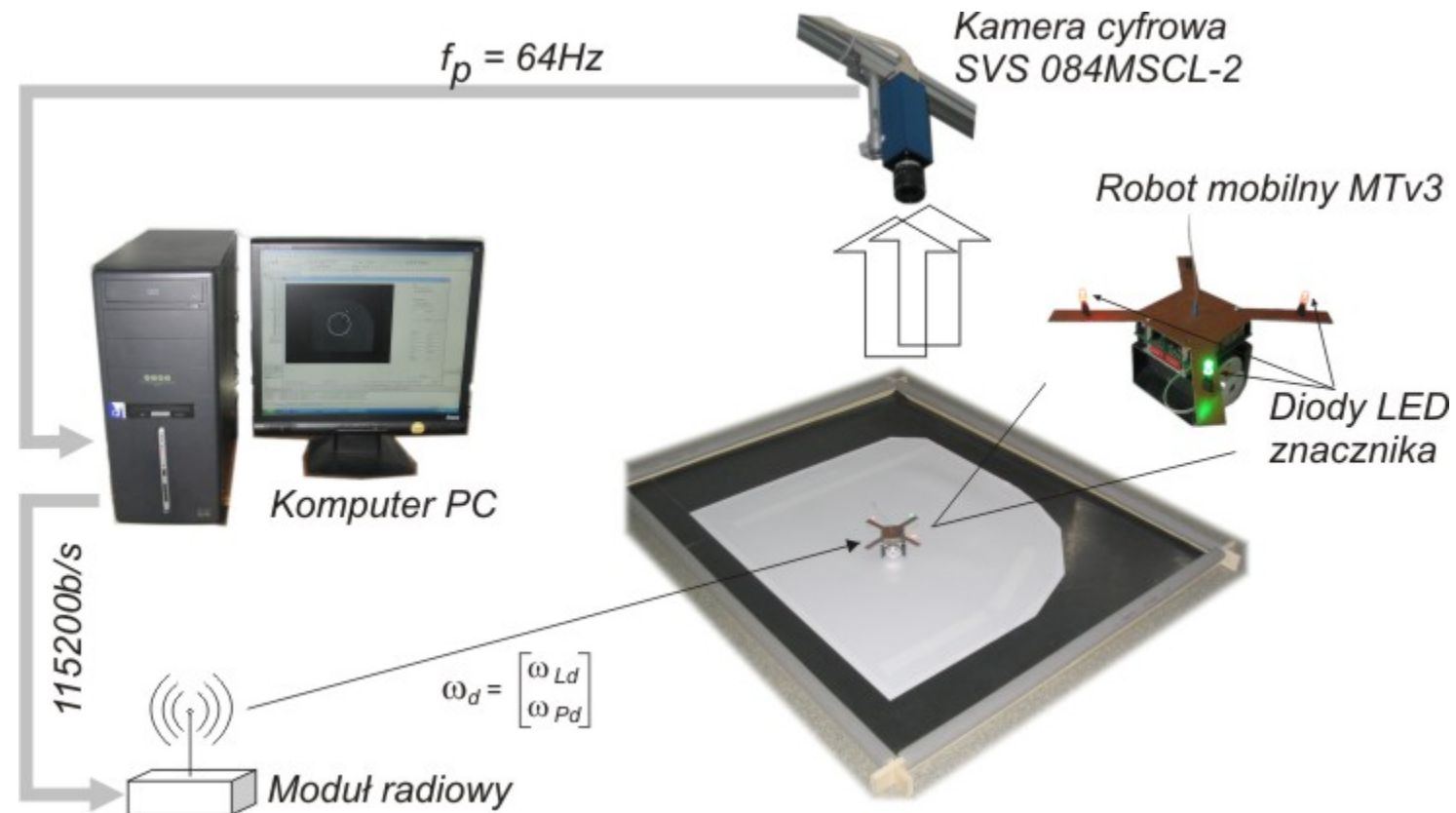
Join project at national level entitled Exploration and resque robot carried out by: PIAP – Industrial Research Institute for Automation and Measurements (coordinator), Warsaw University of Technology, Wroclaw University of Technology, Lodz University of Technology, Institute of Computer Science PAN, and Poznan University of Technology. Budget of this project is 1,5 million USD, The national Centre for Research and Development. Years of duration 2013-2015
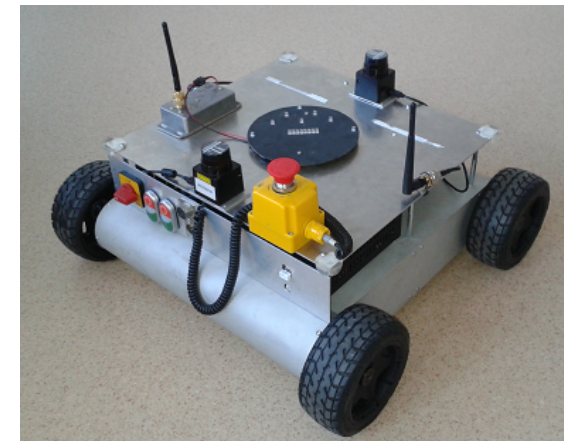
Academic institutions involved in research projects at European level

Warsaw University of Technology

http://rapp-project.eu/rapp-project/
http://cordis.europa.eu/result/rcn/57017_pl.html
http://robotics.ia.pw.edu.pl/twiki/bin/view/Grants/
GSwarmItFIXFP7-214678

Wroclaw University of Technology:
Project LIREC http://lirec.eu/project
ReMiDi http://www.remedi-project.eu
Social robots http://www.flash.iiar.edu.pl
Museum of Science and Industry, Chicago
Heriot Watt University, Edynburg
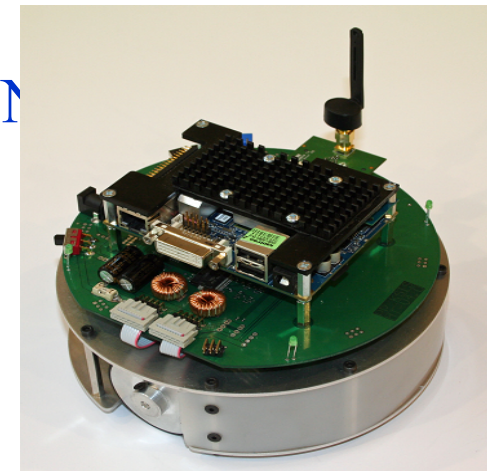People for the Ethical Treatment of Animals, Norfolk

PIAP carried out many projects
ESA, ESO

Summary

- Reseach and development in the area of Robotics and Automation and educational (field of study Automation and Robotics, Double degree diploma in English: Smart Autonomous Aerospace and Autonomous Systems carried out by Chair of Control and Systems Engineering and University of Evry),

- Team consisting of about well qualified30 people,

- Realization of projects supported by NCBiR and NCN

National Science Centre.

- Cooperation with different academic institutions

(France, Germany),

Thank you for your attention