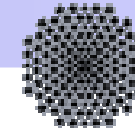


22.05.06, Karlsruhe



IPVS

University of Stuttgart

“Collective & Swarm Robotics”-III

Results & Perspectives

Sergey Kornienko

Overview of Jasmine' development

Start of development

First prototypes

10 robots & experiments

Second development

Third development

October 2004

December 2004

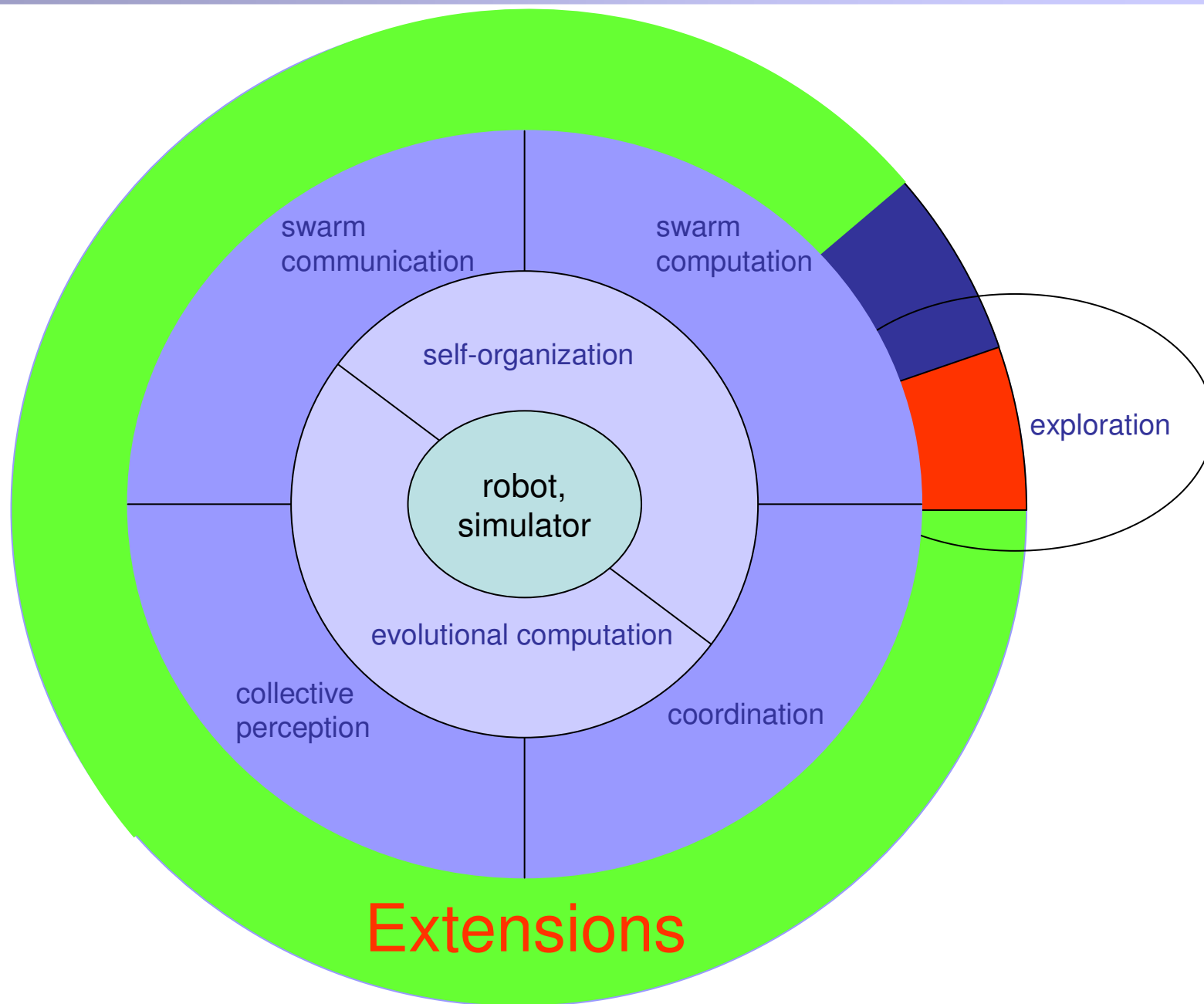
February 2005

April 2005

December 2005



Structure



Jasmine III now (hardware)

Main board



Motors board

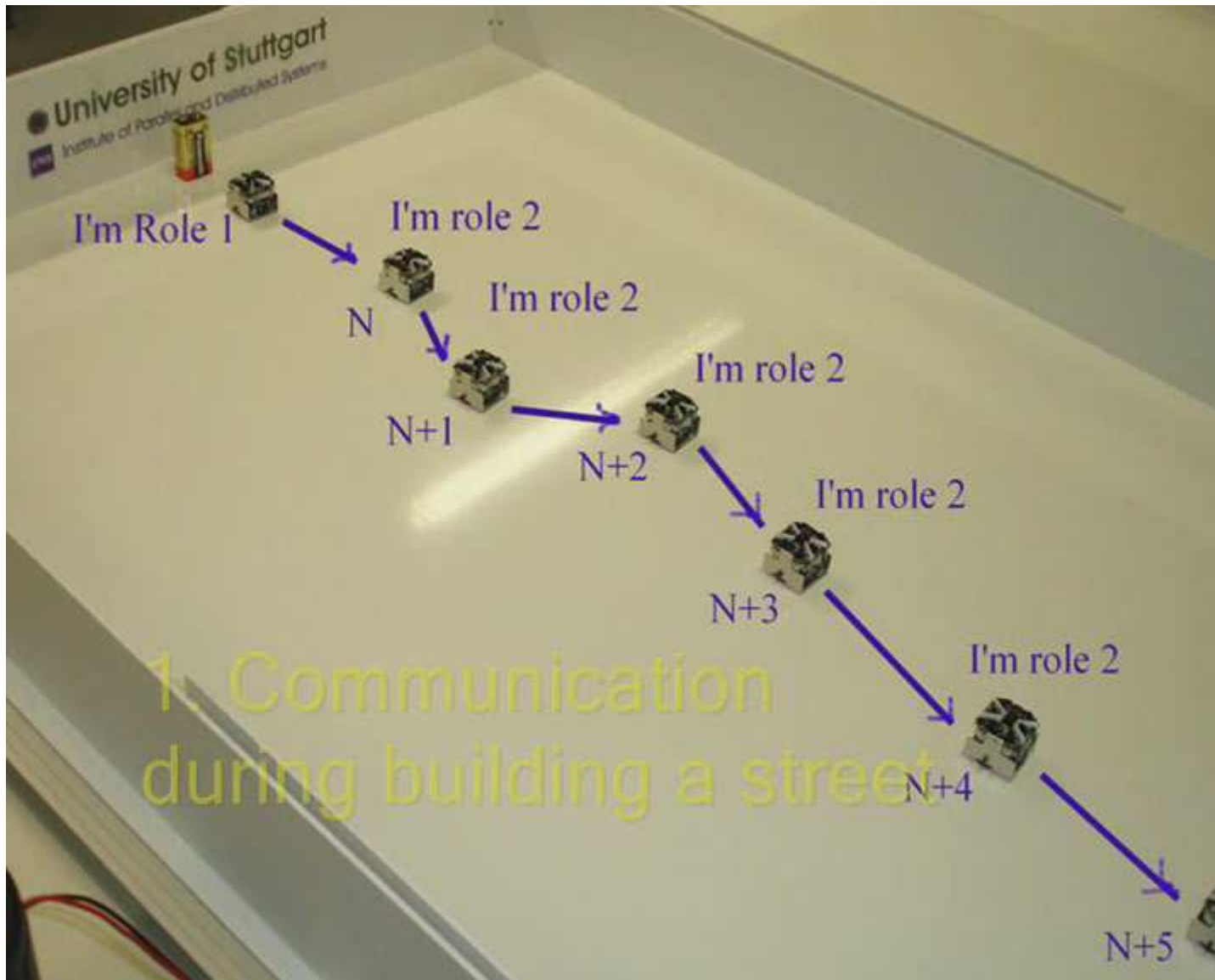


BUS



Smart powering board

jasmineSDK now (software)

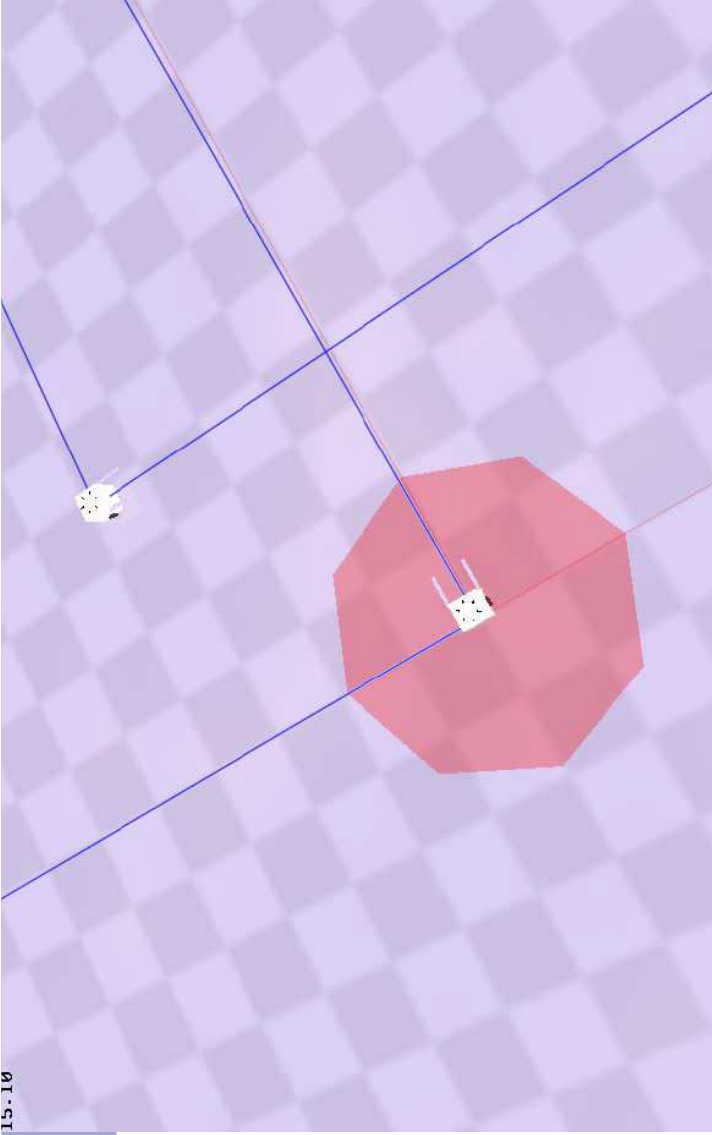


What did we learn ?

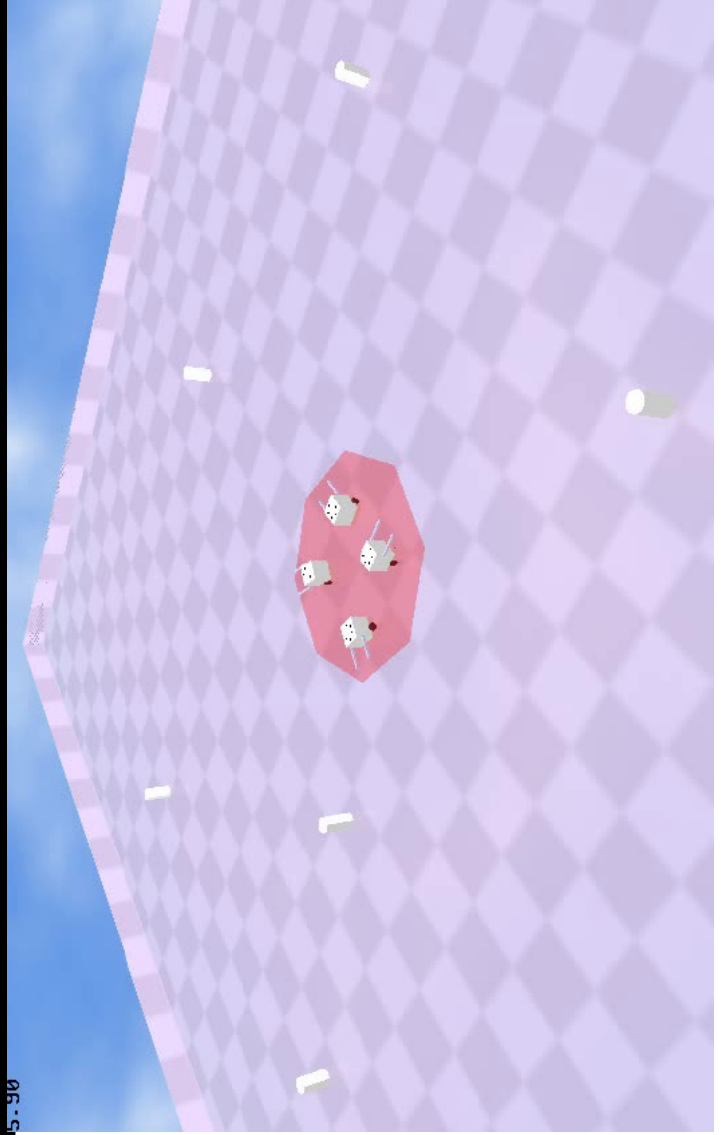
~~Swarm Intelligence = Clever Algorithms~~

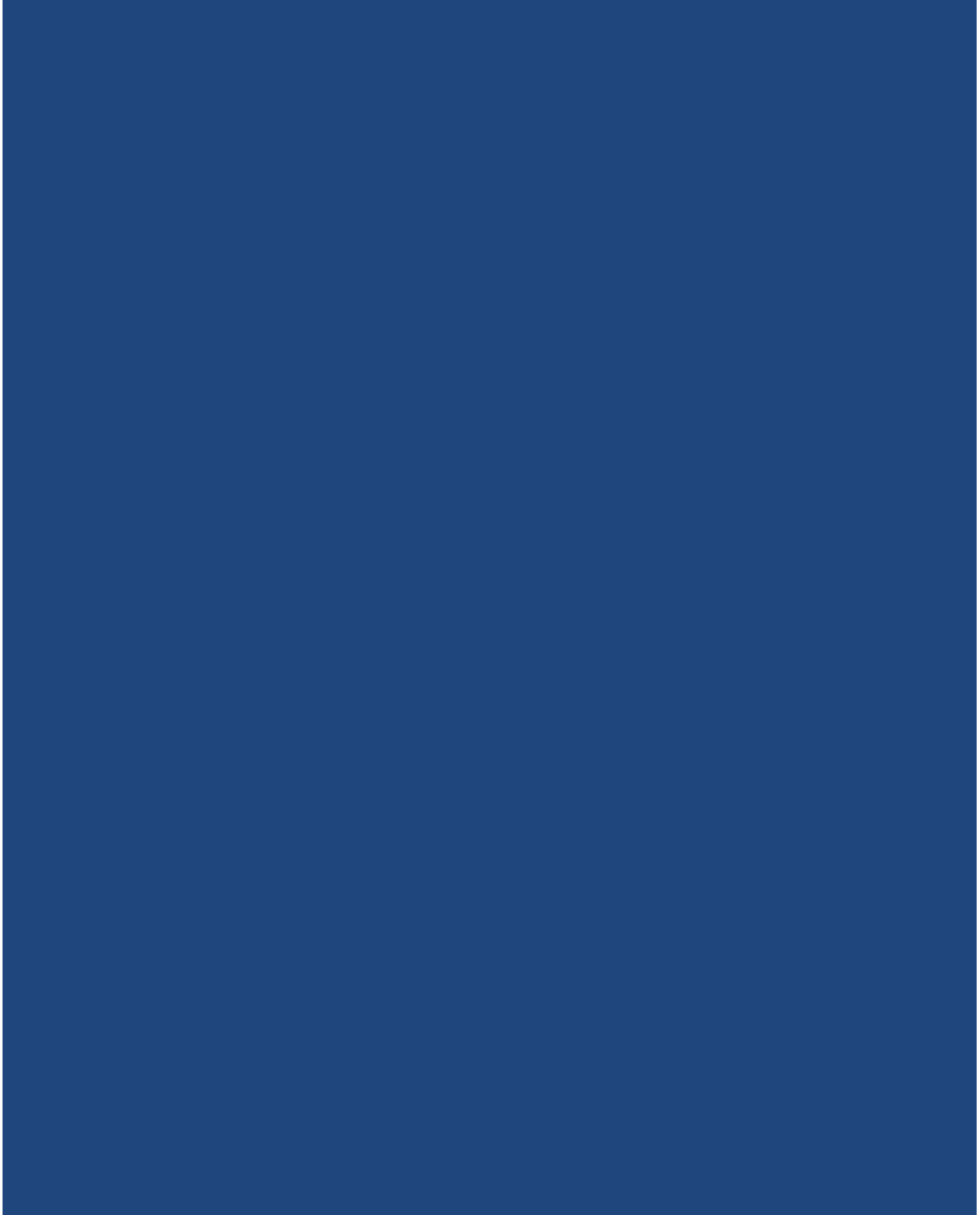
Swarm Intelligence = Clever Sensor System
+ clever algorithms

15.10



15.90





The first issue

How to control them really ?

How to create emergent
behaviour in real robots ?

(the main problem)

University of Stuttgart
IPVS Institute of Parallel and Distributed Systems

Energy

is the most hardest issue
in micro-systems

| Extension | Developers team |
|---|---------------------|
| Ego-position system, Light gradient detection and Programming | Karlsruhe |
| Electro-magnetic gripper | |
| Wireless communication | |
| Odometrical system | Stuttgart |
| Auto Recharge System | Stuttgart, Bittibot |



Tiny camera ?

The publicity & coordination issues

swarmrobot.org - Netscape Browser

File Edit View Go Bookmarks Tools Help

http://www.swarmrobot.org/

swarmrobot.org

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Robot

- Home
- Concept of the robot:
 - General design
 - Communication
 - Perception
 - Powering & Locomotion
- Jasmine-II
 - Sensors board
 - Assembling of SBII
 - Simple chassis
 - Chassis v.K
 - Chassis v.R
- Jasmine-III
 - Main board
 - Assembling
 - Robot' Modularity
 - TWI Interface
- Next generation of Jasmine
- Extensions boards
 - Motion Control
 - GPS, Light board
 - Gripper
 - Auto Recharger
 - Smart power module
- Software & control
 - BIOS, Comm, Percep
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 - MDL
 - Simulation
- How to purchase
 - Copyrights
 - How to get started
 - Workshops & teams

Swarm


- General Idea
- Artificial Self-organization
- Swarm Genetic Programming
- Biological Experiments
- Swarm Game

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Open-source micro-robotic project



Jasmine III

This site, as well as the [yahoo group "swarmrobot"](#), are devoted to development of the open-source hardware and software micro-robotic platform in the size of *less-than-3cm-cube*. The main goal of this project is to develop a cheap, reliable and swarm-capable micro-robot, that can be easily reproduced even at home. This robot allows building a large-scale swarm system (100 and more robots) to investigate artificial self-organization, emergent phenomena, control in large robotic groups and so on. This research is important to understand underlying principle of information and knowledge processing, adaptation and learning for the design and development of very limited autonomous systems. These systems represent the result of miniaturization processes in such fields as robotics, micro- and embedded controllers, sensor networks, non-destructing control, environmental monitoring, ubiquitous systems, medical and nano-technological research. Even today the autonomous micro-systems are of interest for entertainment/toy industry.

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Done

Can the robot fly ?

of course !

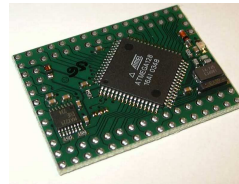
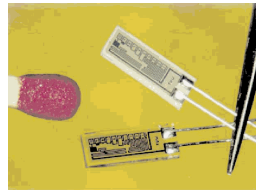


The future issues II

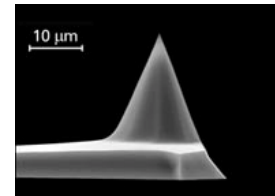
Li-Po Accu



Micro-Sensors



ASIC/FPGA/Microcontroller Electronics



Tools



Piezo-Locomotion



Thank you