SqueakBot

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Main Objectives

- SqueakBot is an educational plateform developped in Squeak. Our aims is to develop a pedagogical platform usable for 8 to 18 years old youngs (and beyond !) allowing them to control and simulate various kinds of robots.
- Motivate several students projects since 2 years
- Have fun but also may be used in research projects in the future

SqueakBot Subprojects

- remote robot control with Etoys
- simple simulation of real wheeled robots (Koala)
- live Squeak CD to distribute pedagogical support
- experiments with embedded Smalltalk in robots

Planète Sciences

- French association
- Since 1962, they propose to the young people scientific and technical activities with the support of scientific and industrial organizations.
- Vacation camp for kids with various activities : robots, rockets, astronomy and environment experiments, ...
- http://www.planete-sciences.org/robot/

Planète sciences - robotic division

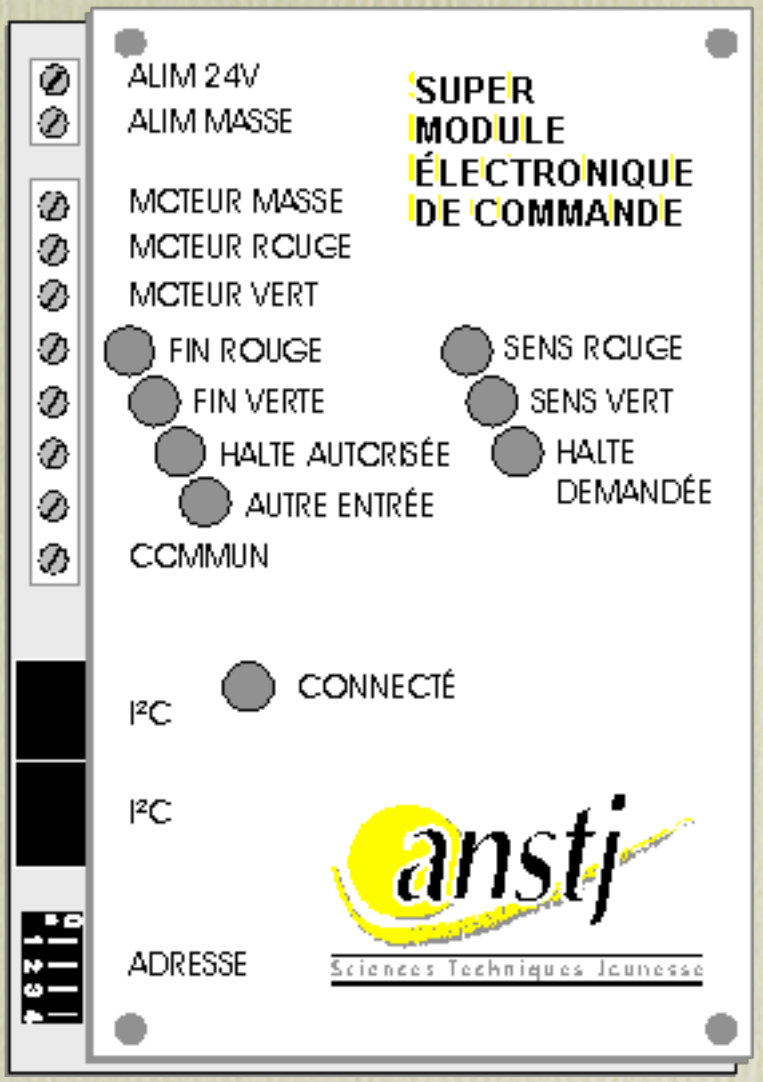
- Planète Sciences developed a whole set of electronic components for using robot in pedagogical context
- Each year, they organize a robot contest
- Hardware modules: MEC, SMEC, MOEBIUS, I2C protocol
- Software: remote control with Logo

MEC

- MEC = Module Électronique de Commande
- MEC appeared as a small case provided with entries, switches and LEDs.

SMEC

- SuperMEC = Super Module Électronique de Commande
- More elaborate version of previous MEC.
- IConnected to the computer via the parallel port printer, thanks to the MOEBus card.
- Several SMEC could be linked with the I2C protocol



MOEBIUS

- MoEBus I2C (module externe pour bus I2C) is a module intented to control robots with a computer via the parallel port

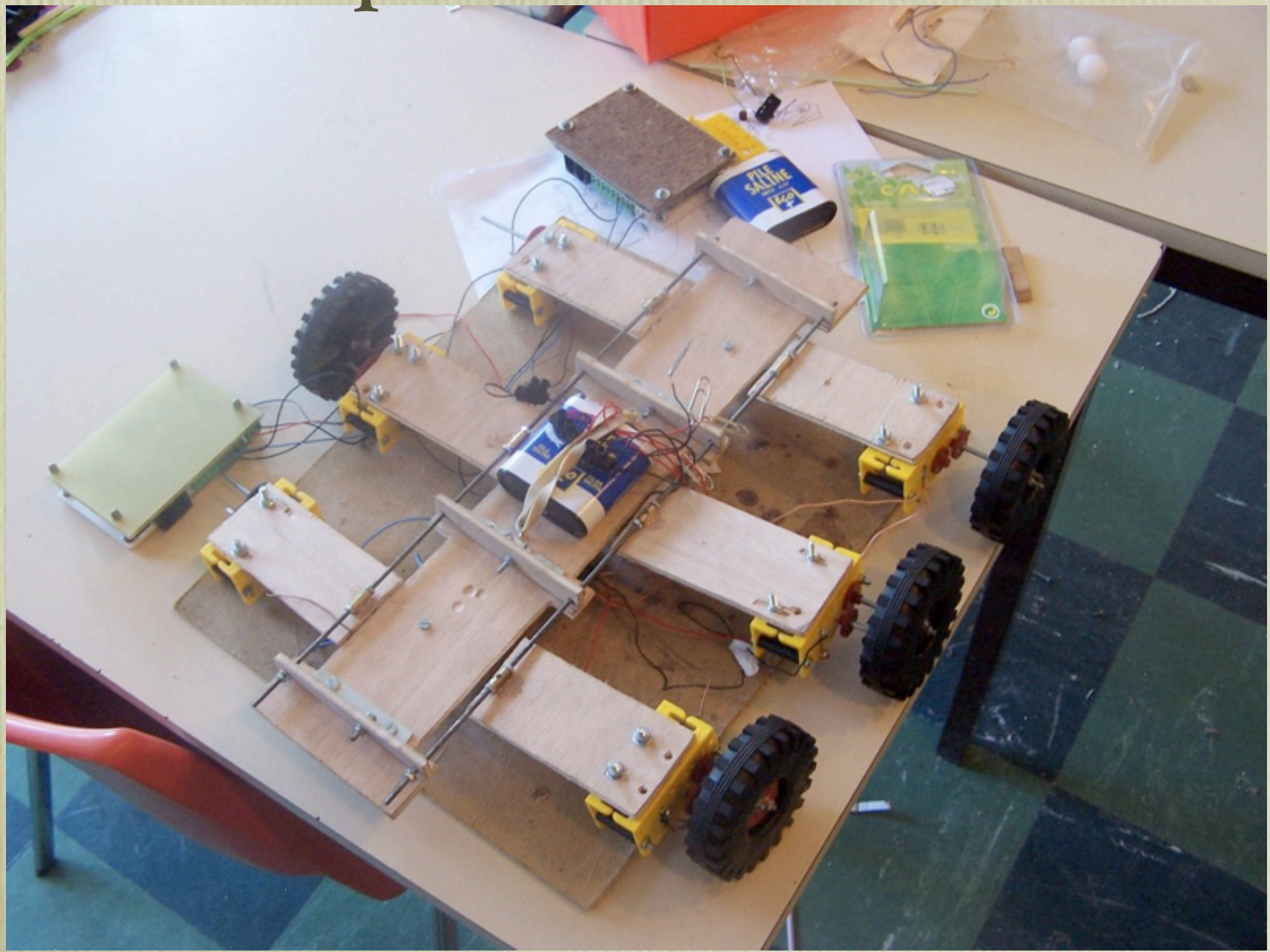
SMEC Network

- The communication with the computer is done according to the I^2C communication protocol.
- SMEC modules are using I^2C adresses
- Each SMEC could control some part of a robot

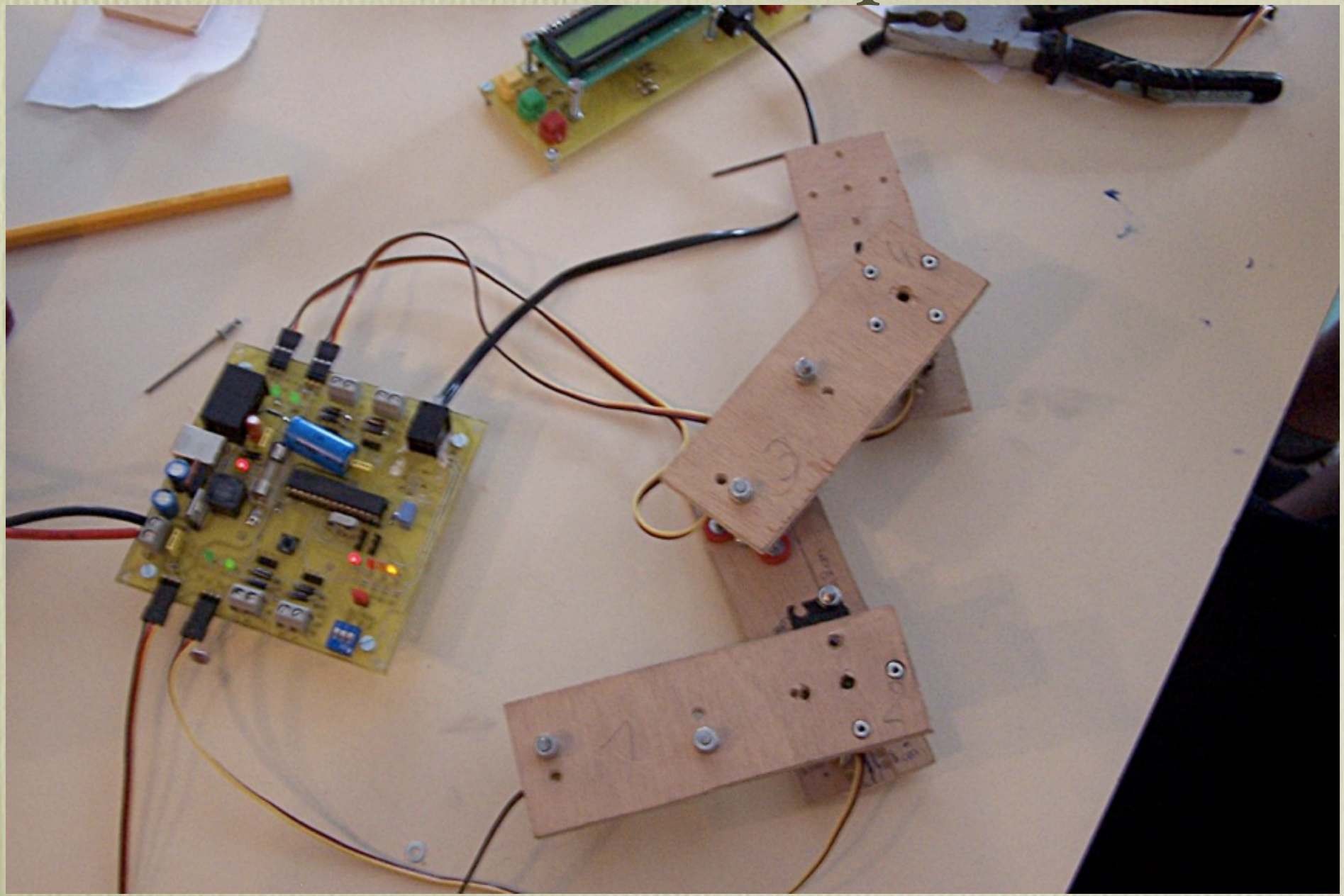
Squeak development

- Multiple platform support for parallel port in Squeak
- I2C protocol support
- Implemented by Squeak plugins
- Etoys for remote control of SMEC

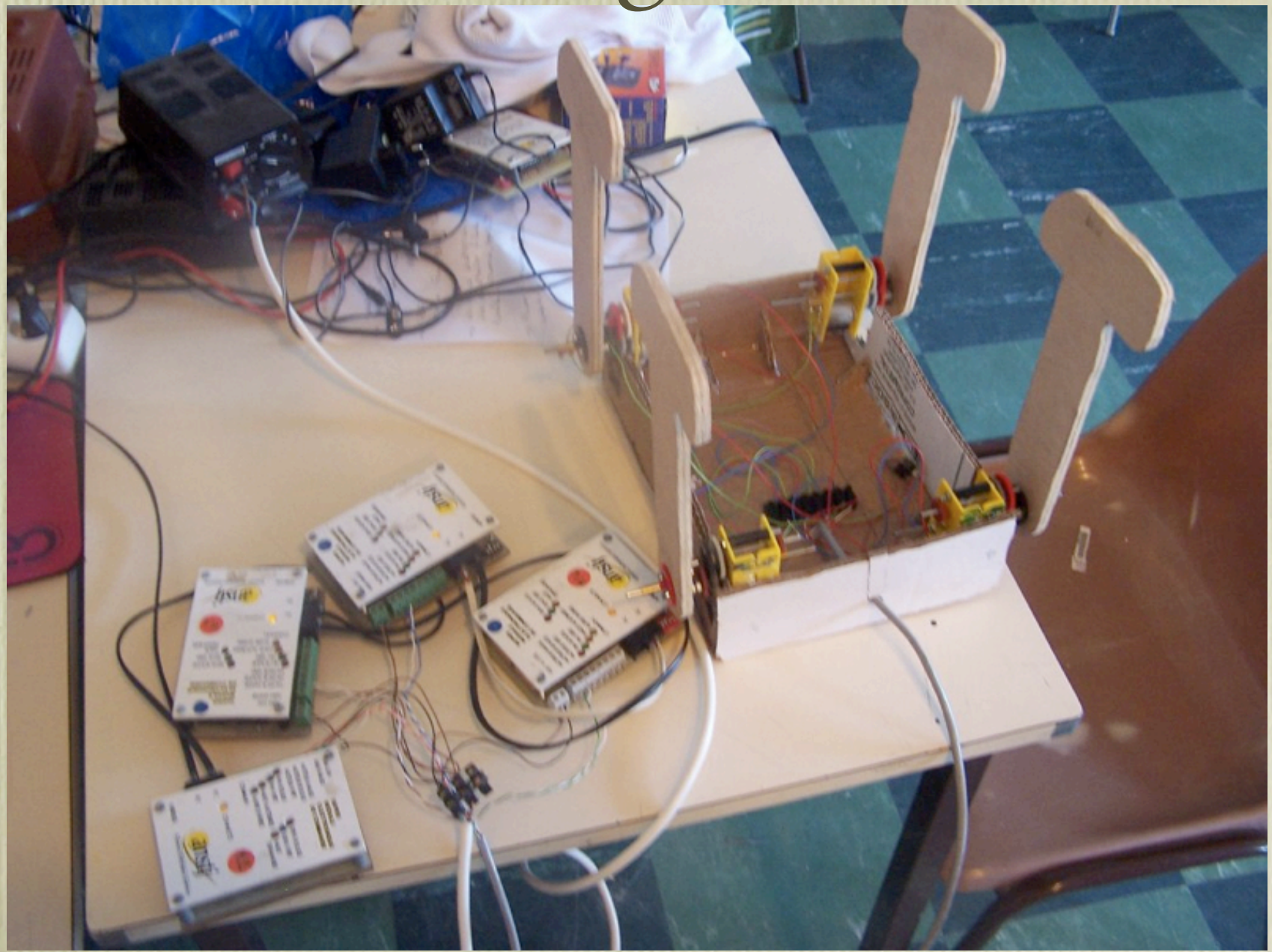
Exploration Robot



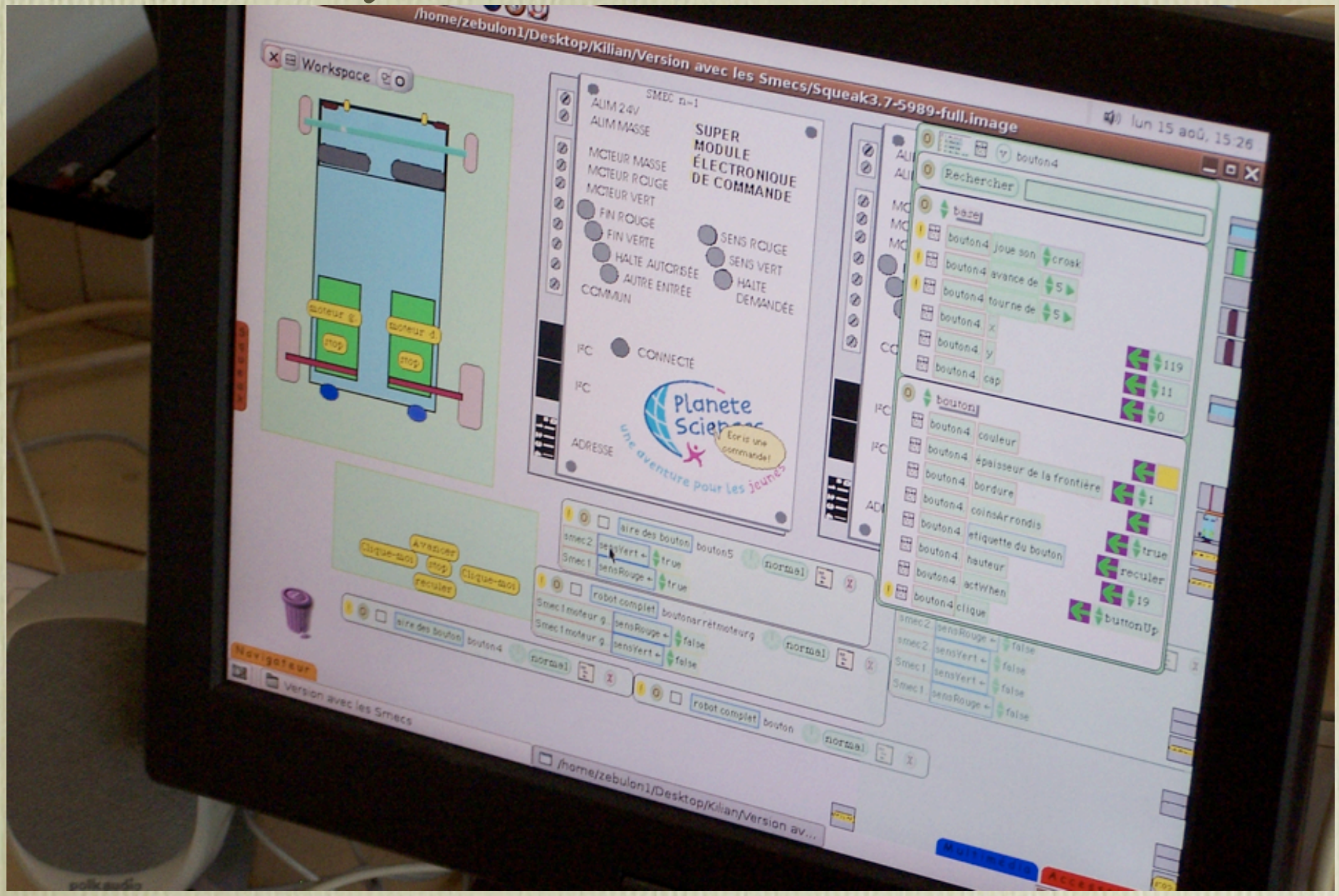
Robotic Caterpillar



Walking Robot



Etoys Remote Control



Video 1

Video 2

SqueakLive

- SqueakLive is based on Linux Gentoo LiveCD distribution
- Boot directly into Squeak
- Allow the control of electronic module without installing software on computer.
- Pedagogical activities distributed with the CD

Koala Platform

- Mid-size robot designed for real-world applications.
- Motorola 68331 @ 22MHz
  RAM 1Mbyte RAM, 1MByte ROM
- Motion : 2 DC servo motors with integrated incremental encoders
- Sensors : 16 infra-red proximity and ambient light sensors, battery and ambient temperature, motor torque and global power consumption

Embedded Smalltalk experiments

- We would like to use Koala robots for doing pedagogical stuff for students and kids
- K-team says : “Powerful computational capabilities”
- Some experiments with Spoon, a small VM, derived from Squeak.
- Unfortunately, the Koala software support is very bad (Cross-compiler based on GNU tools).

Koala simulation

- Simulation of simple koala robots
- Accurate model for robot motion and a very simple model for sensors
- Scripting with Etoys
- Physical engine thanks to the ODECO Squeak plugin
- Behavior based on Braitenberg vehicles model

Simulation Demo

Links

- Project page : http://www.iutc3.unicaen.fr/serge/SqueakBot
- Code available on SqueakSource
- Current vacation camp blog : http://www.planete-sciences.org/loisirs/florac/aout/