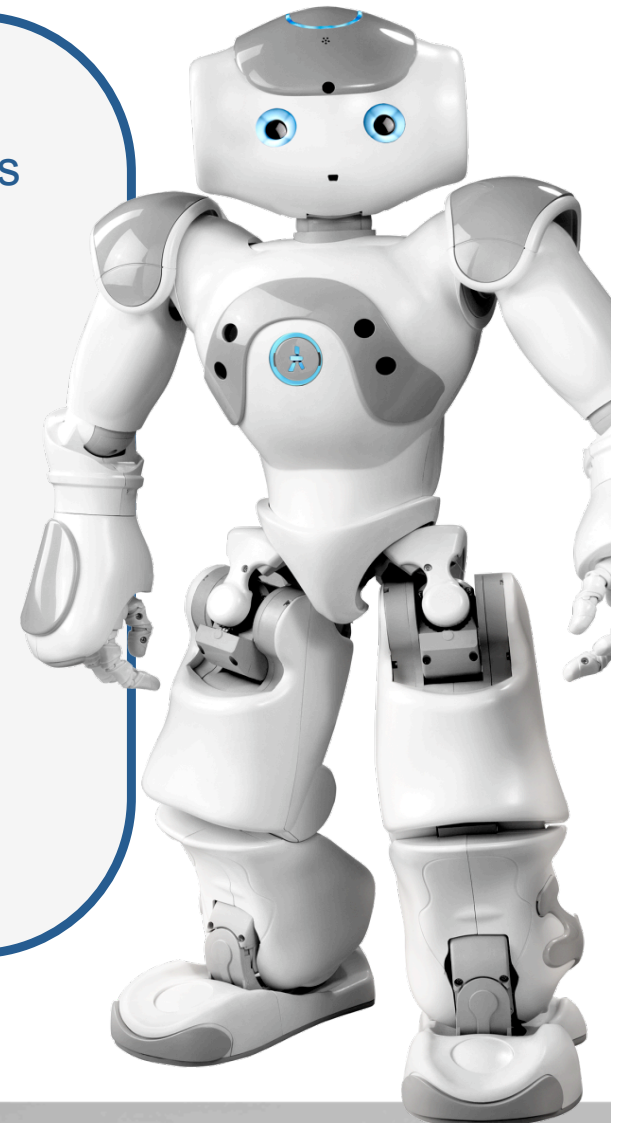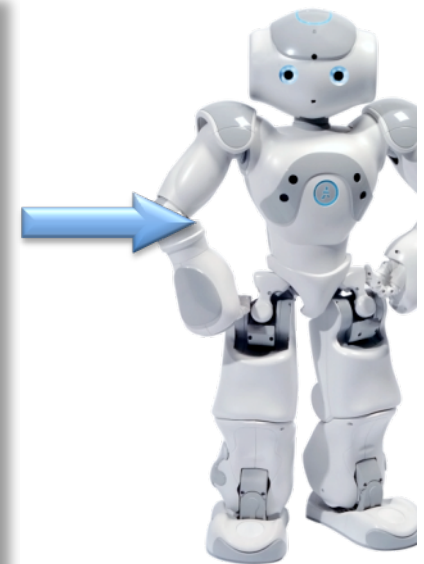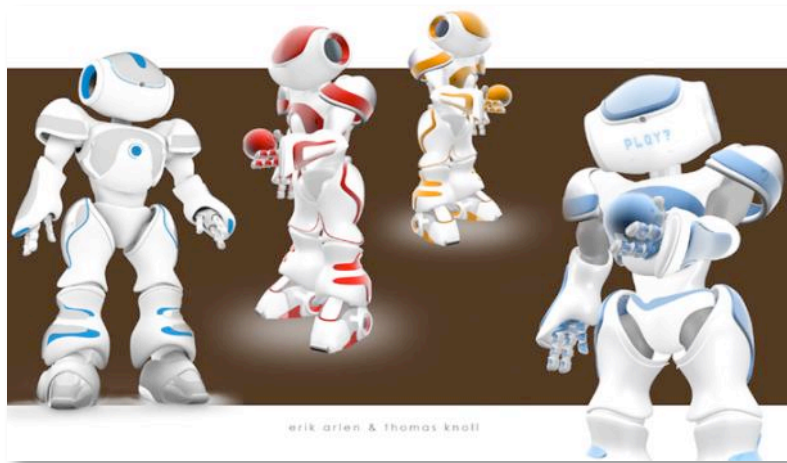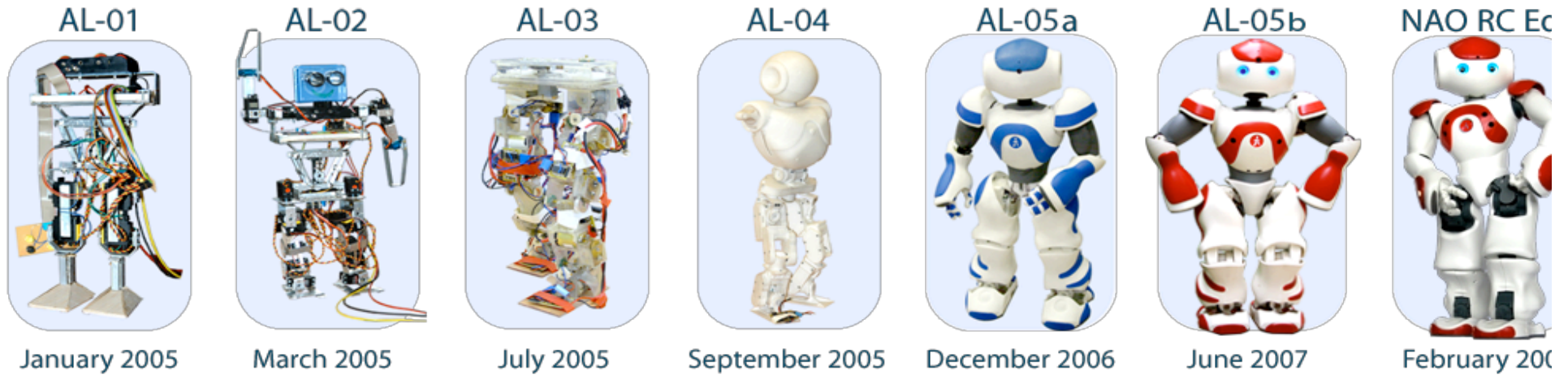Aldebaran Robotics' NAO

Who we are, in a nutshell

- Founded in 2005, **European** company based in Paris

- Goal : spread **humanoid robots** for :
  - Personal Assistants, home companion
  - Research and Education

- **900** NAOs sold in **30** countries

- **World leader** in BtoB humanoid robotics

- Working closely with **R&D labs** and **Educational** Institutions
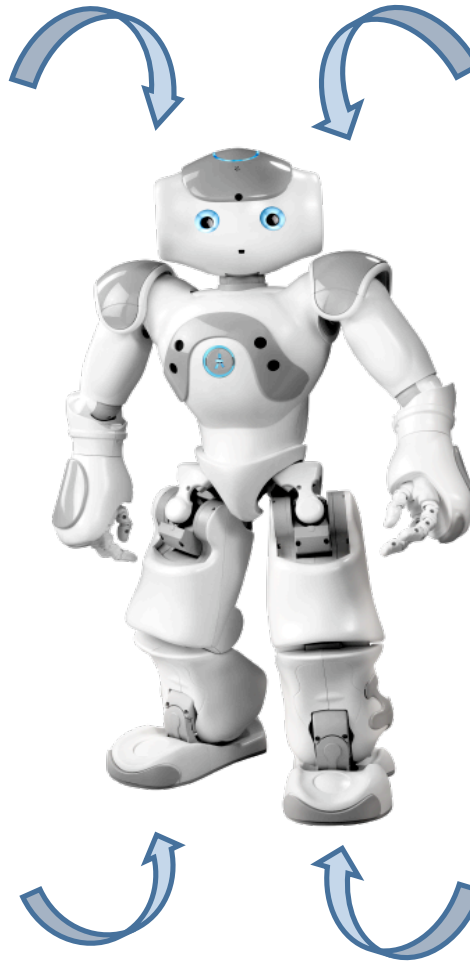
NAO project: design stages

What can NAO do?

Move

- **25 Degrees of Freedom**
- Smooth and precise **coreless motors** (Maxxon)
- Controlled with software

Sense

- **2 cameras**
- **4 microphones**
- **8 FSRs, 2 Bumpers**
- **DCM**
- **2 Sonars**

Communicate

- **2 loudspeakers**
- Multiple **LEDs**
- **Tactile** sensors, **prehensile** hands
- **Infrared** sensors
- **WIFI** connection

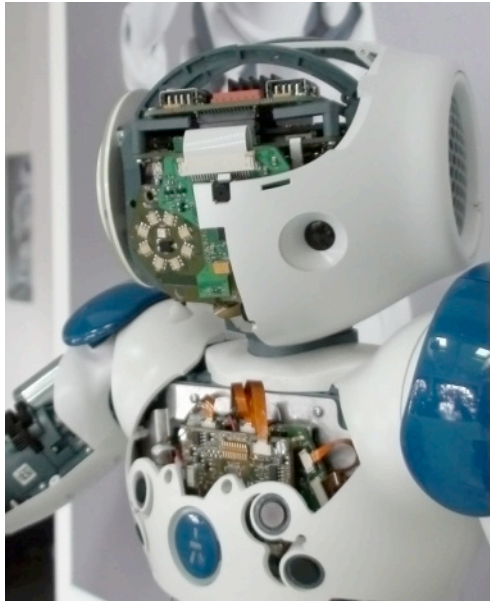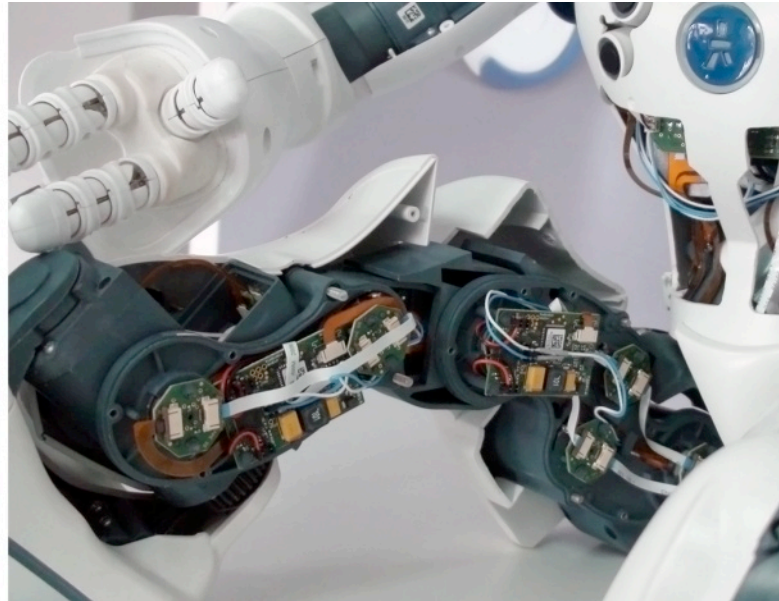## « Think »

- **Geode 500 Mhz CPU**
- 256 MB SDRAM
- 2 GB Flash Memory
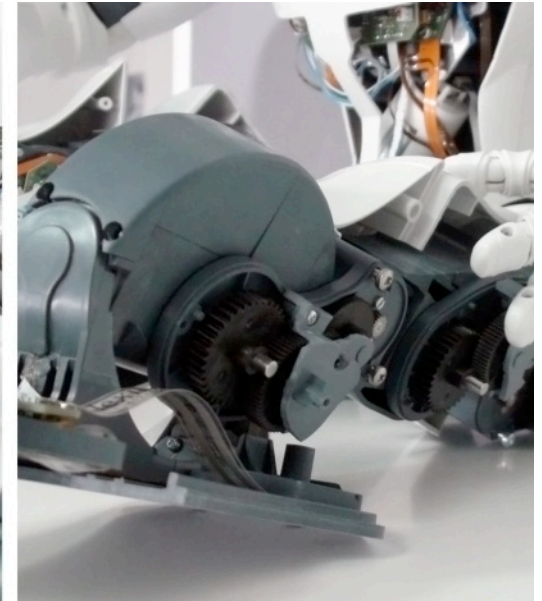- **Software suite** + **SDK** to program Nao

Inside NAO

- Head with onboard computer, Leds and 2 cameras

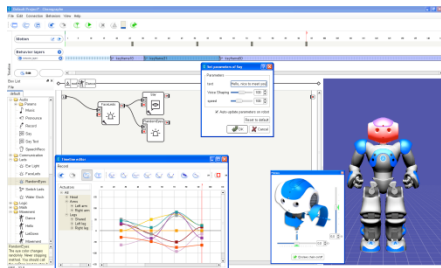- Magnetic Rotary Encoders and motor controller

- Gears and Force Sensing Resistors

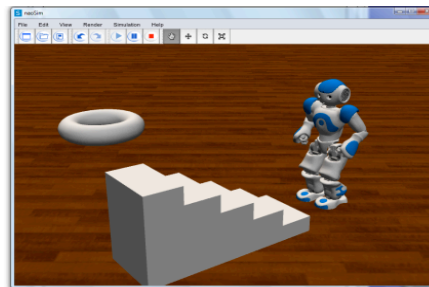- Chest electronic board with sensors and the ARM9

Our Software Suite

More than a software suite, a **comprehensive programming environment**

Monitor

- **Feedback** of what NAO is seeing and feeling
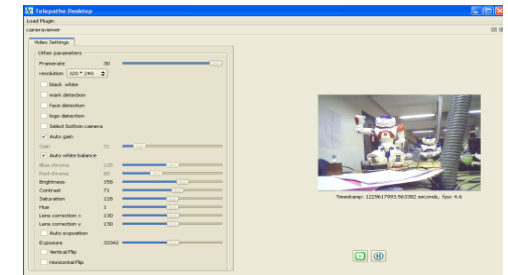- **Ergonomic** interface to access the data from the ro sensors

Choregraphe

- Ergonomic and **user-friendly** interface
- Drag and drop **behavior** boxes in the **flow diagram**

NAOsim

- Official **simulator** for NAO
- Quickly **test** new robotic behaviors & applications

SDK

- **Embed** modules you have created into your robot in or to create **elaborate** behavi for NAO
- **Compilation** and **debugg** tools.

Programming NAO

Many possible ways to access NAOqi APIs :

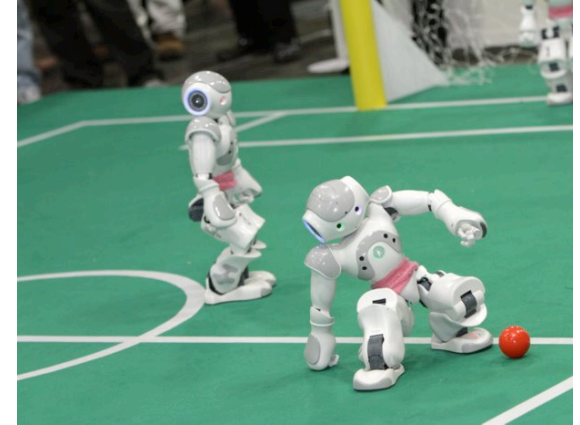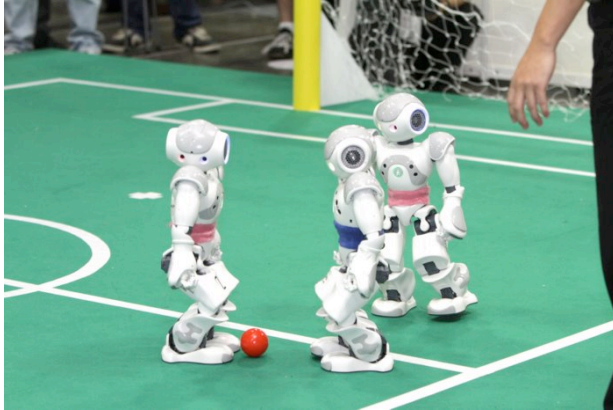| Languages	Running on…	OS	Remarks	Tools
Choregraphe			Python code running locally on the robot	Choregraphe
Python URBI			Communications with the robot may be **slow**.	Scite…
C++				Visual Studio 2005/2008, Xcode, GCC...
			Cross compilation available on Linux (or Linux virtual machine) **Real-time is possible**	Eclipse
.NET			Tools: Visual Studio	

Standard Platform for Robocup

350 teams, multiple leagues, +3000 students

SP League : each team uses exact same hardware

SONY's AIBO was the standard platform until 2006
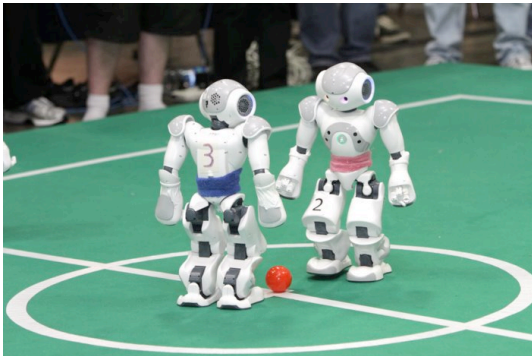
24 teams from 18 countries used NAO during **RoboCup** 2010 in **Singapore**
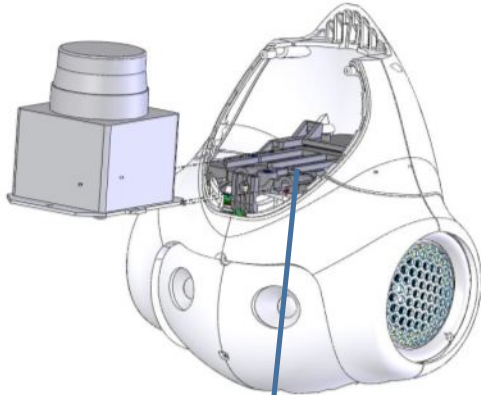
Laser Head

Removable door

- **Special head with Hokuyo Laser Scanner**

URG-04LX Laser

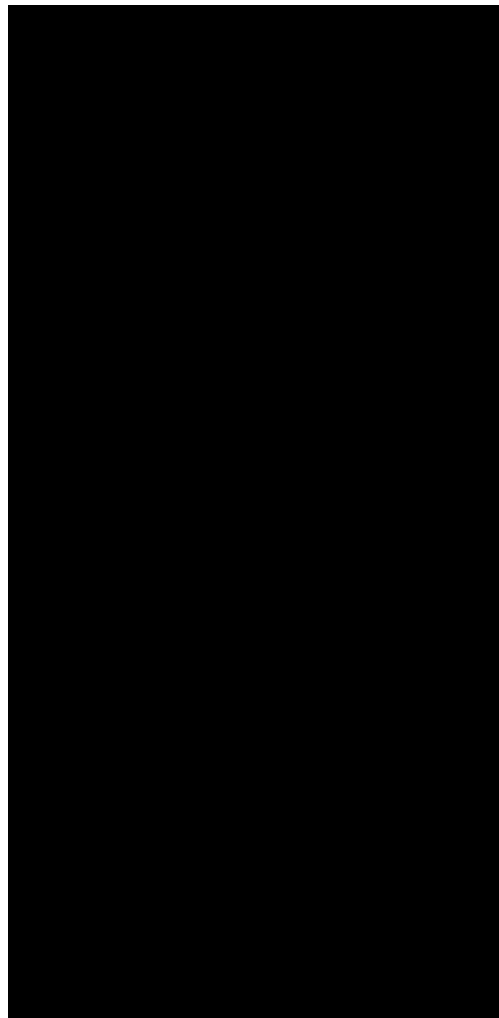|	
Detection range	0.02 to approximately 4m
Scan angle	240°
Scan time	100msec/scan (10.0Hz)
Resolution	1mm
Interface	USB 2.0, RS232

Removable Laser

Perfect for mapping, planning, localization
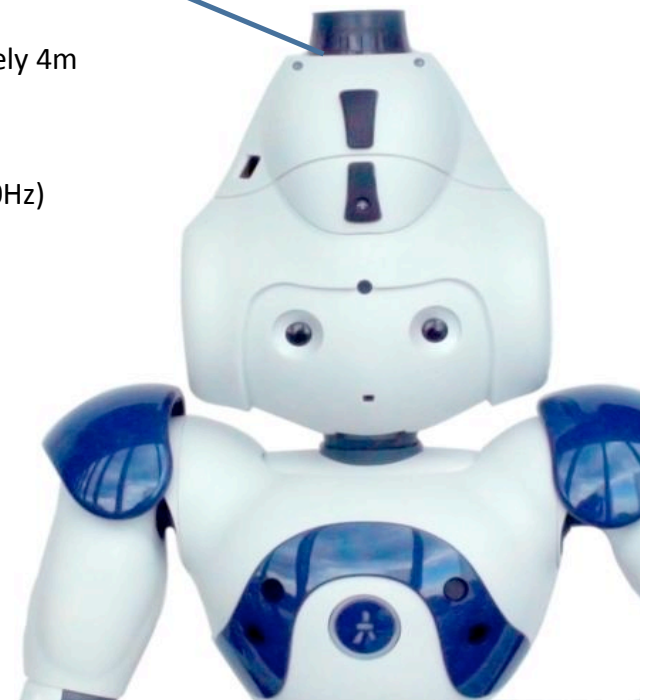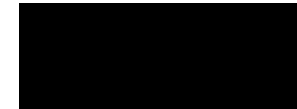
Romeo Project

- Ambitious research project

- Objective :

  Develop a **humanoid robot** which can serve as a **Personal assistant**

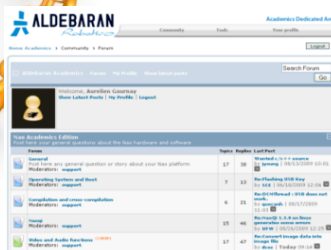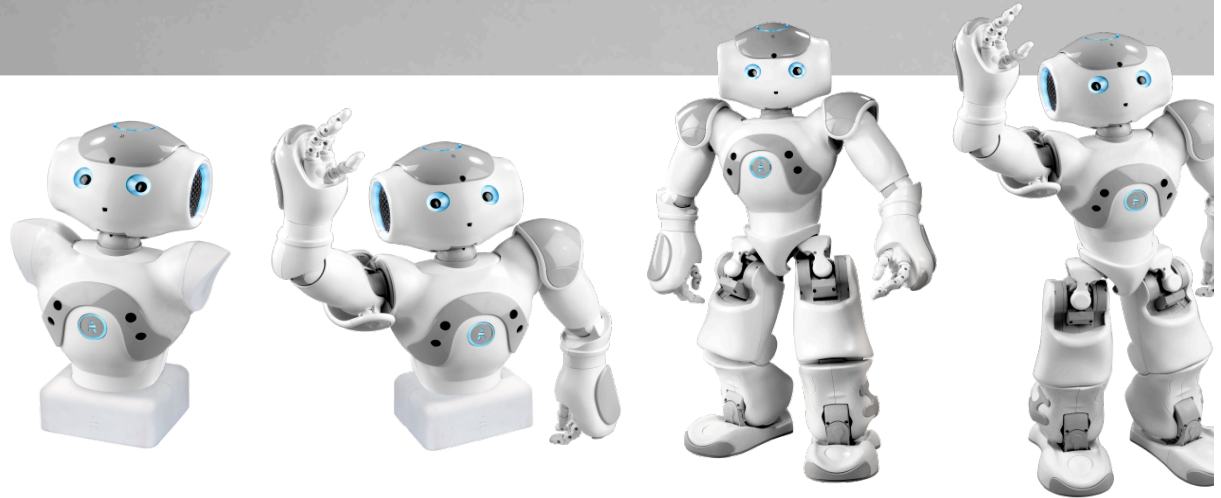- Prototype due to Spring 2011

Partners :

ALDEBARAN Robotics

VOXLER

aca

SPIR.OPS

as
an
ang

TELECOM ParisTech

I IN

dgcis

direction générale de la compétitivité
de l'industrie et des services

LISV

LPPA

oks

INSTITUT DE LA VISION

CNRS LIMSI

îledeFrance

MAIRIE DE PARIS

Romeo Project

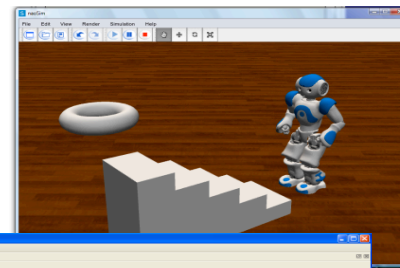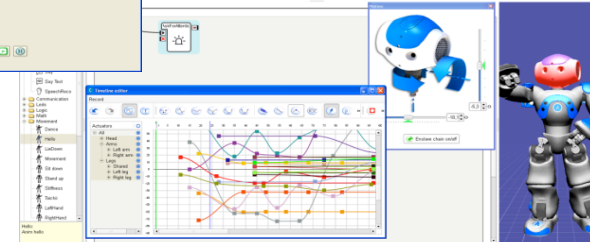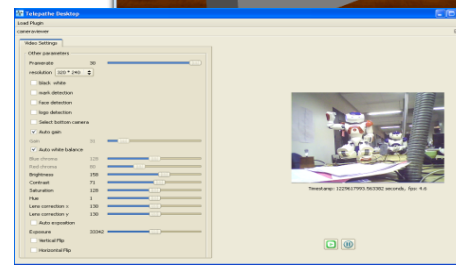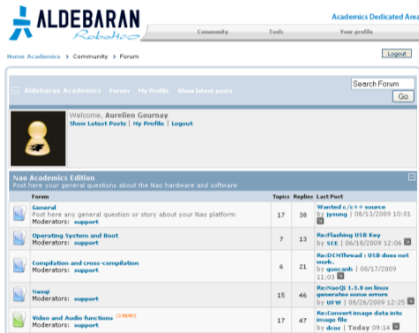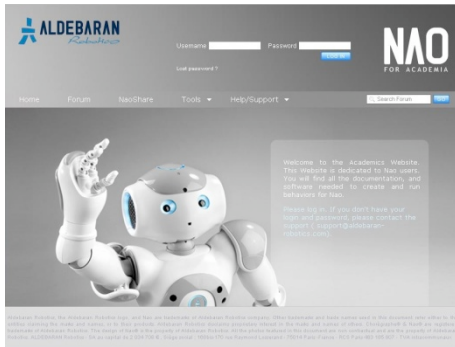# Our Offer

A full range of
products

Dynamic community of
users

A whole
Programming
Environment

A dynamic community of users
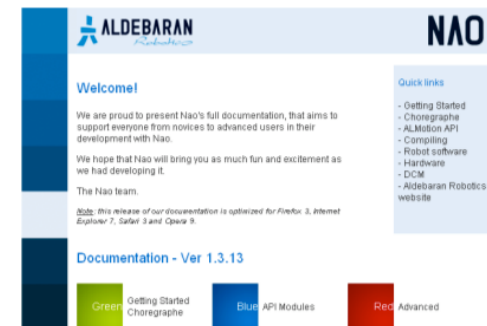
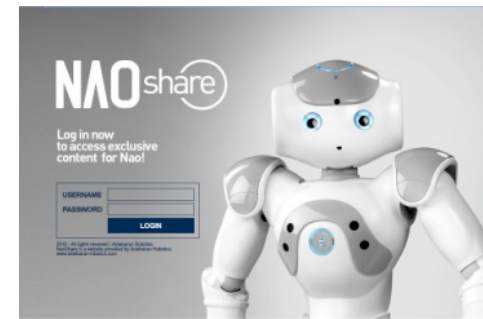## NAO Academia, dedicated to NAO users

A dedicated forum:

- **Community**: be in touch with other NAO owners
- **Support**: talk with Aldebaran Robotics Support and R&D teams

NAOshare

Web-based sharing application of content related to NAO

Online Documentation

Thank you!

…and see you soon