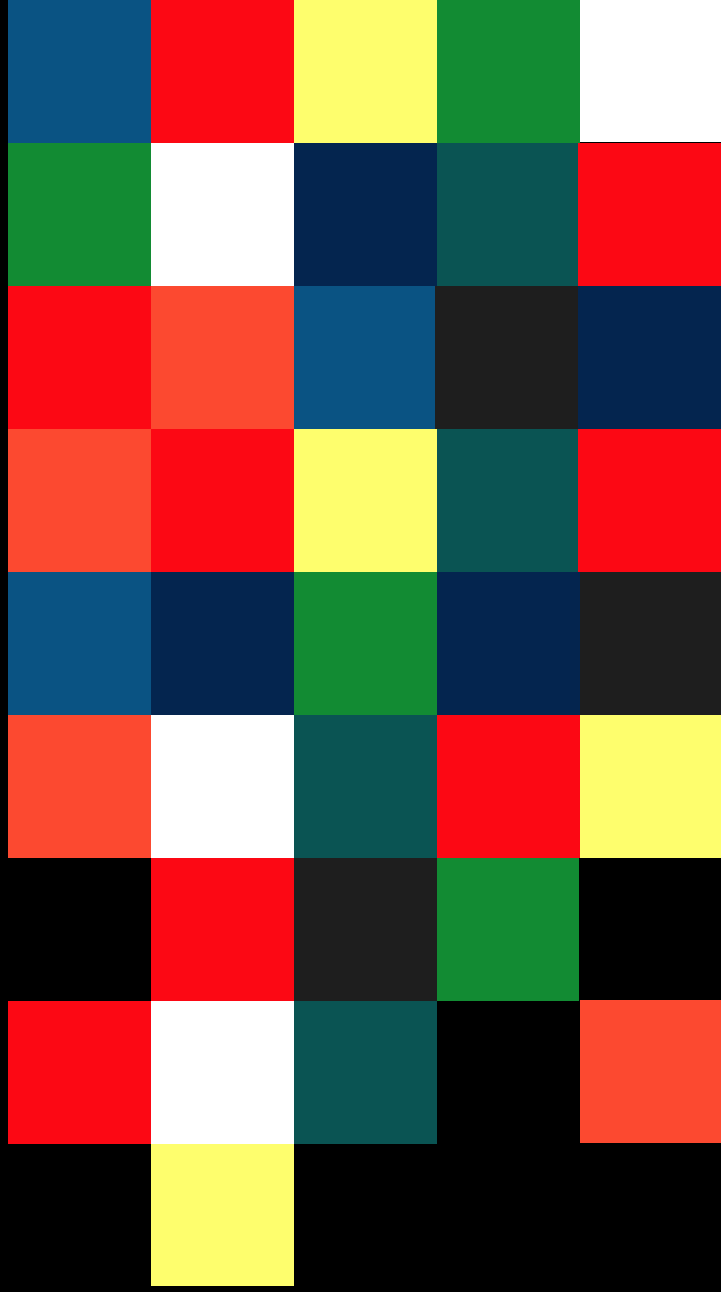
INTERNATIONAL SPACE APPS CHALLENGE



NXT Space Apps

Space App Challenge Paris

@LaCantine

April 2013

The Challenge

Using a **Lego Mindstorm robot,** how can we demonstrate the problems cause by **time latency** during remote operations of planetary rovers?

How increased **robot autonomy** can help address such challenges?

Lego Rover

NXTSpaceApps

Material :
- **Lego Mindstorms** Robot kit (http://mindstorms.lego.com)
- **NXT2WIFI** (http://robotics.benedettelli.com/NXT2WIFI.htm)

Our system has to be:
- **Easy to install** for teachers
- **Easy to use** for children

Use Case

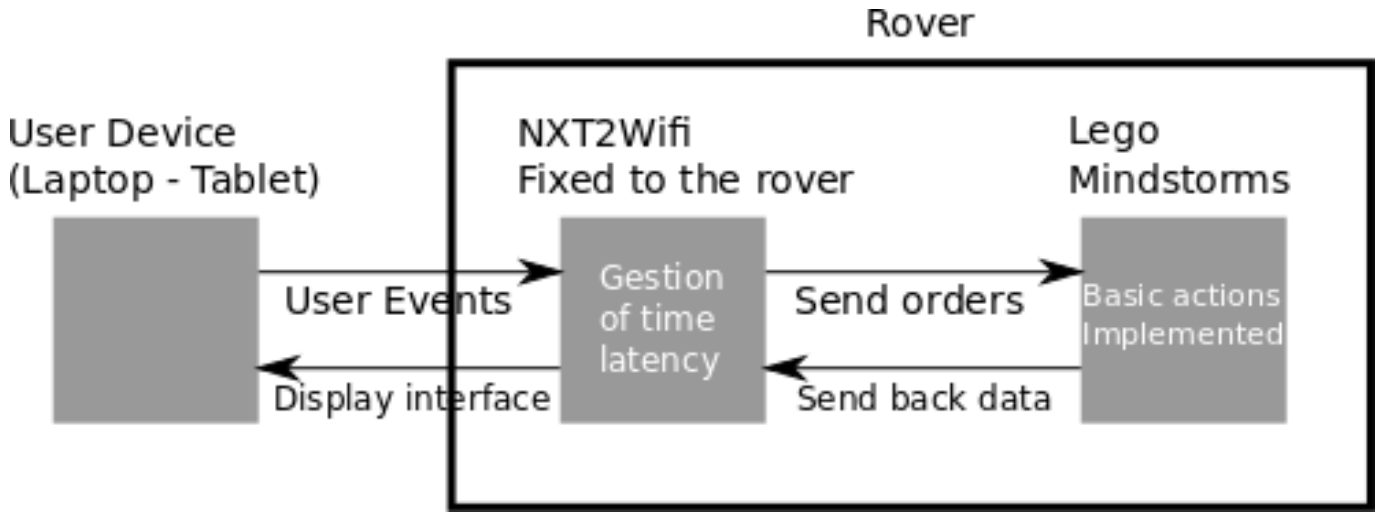
A teacher demonstrates a Mars rover teleoperation, highlighting the difficulties: lag, no emergency stop button, possibility of getting stuck...

After this demonstration, the teacher could divide the Class into **small groups**, and ask them to **imagine and resolve a problem**. They would then **write a report** describing the experiment, their own experience, and the solution proposed.

A **classroom presentation** is possible, dealing with all topics concerning Mars rovers, missions history or achievements. The group could present it's report conclusions and share it's ideas to solve the problem too!

Tools and technology

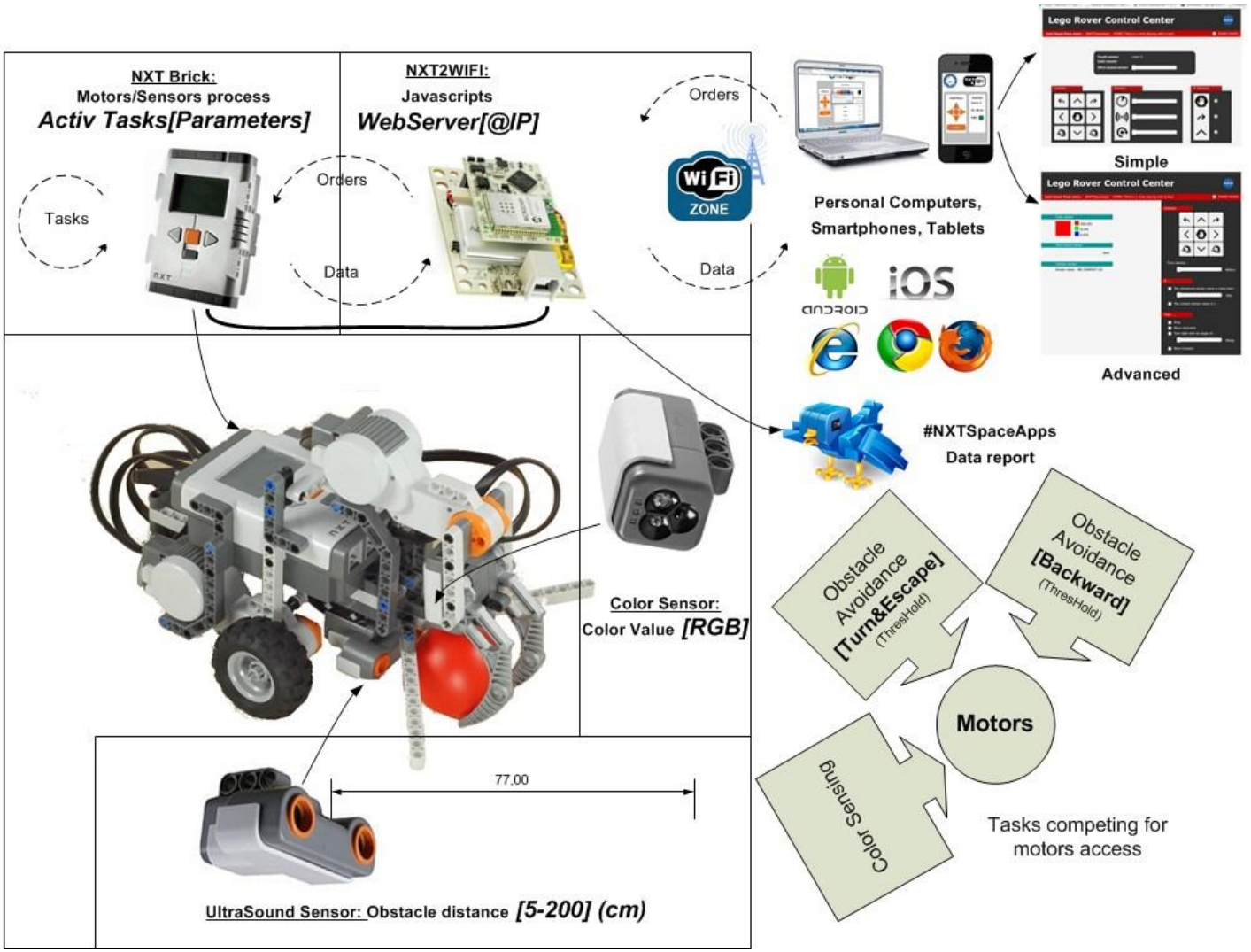
Use of LEGO Mindstorm, to simulate the rover!!!
Use of a NXT2WIFI webserver to provide user interface



Github : https://github.com/NXTSpaceApps/

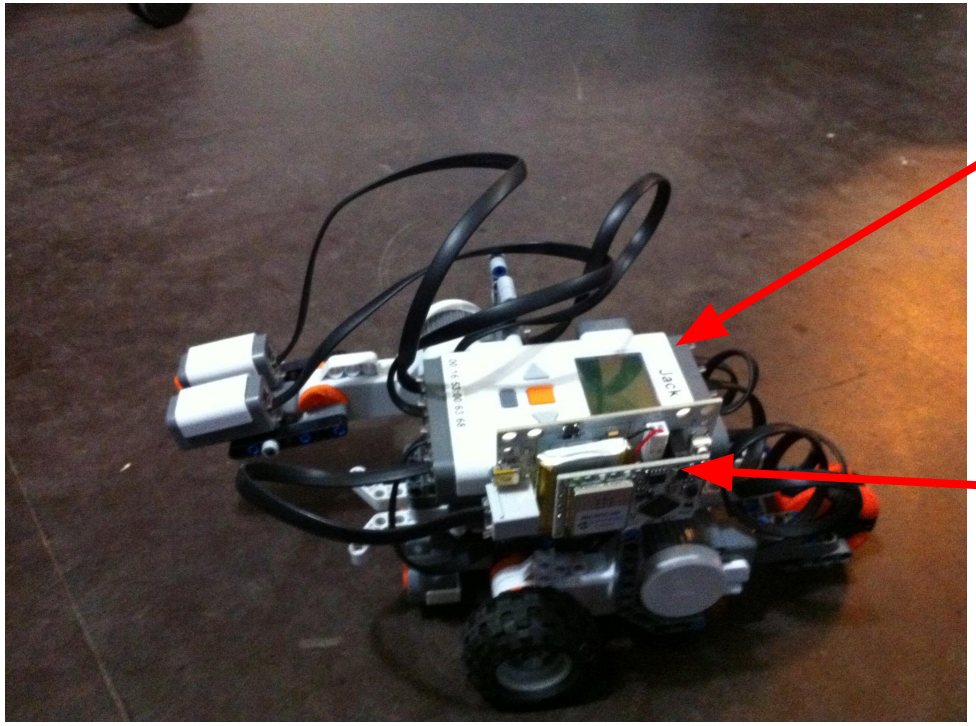
DemoTweet: program able to tweet
NXT2WIFI: lib to use the NXT2WIFI
NXTSpaceApps: internal program able to deals with NXT real time operation (motors and sensors), and use of the NXT2WIFI.

Tools and technology



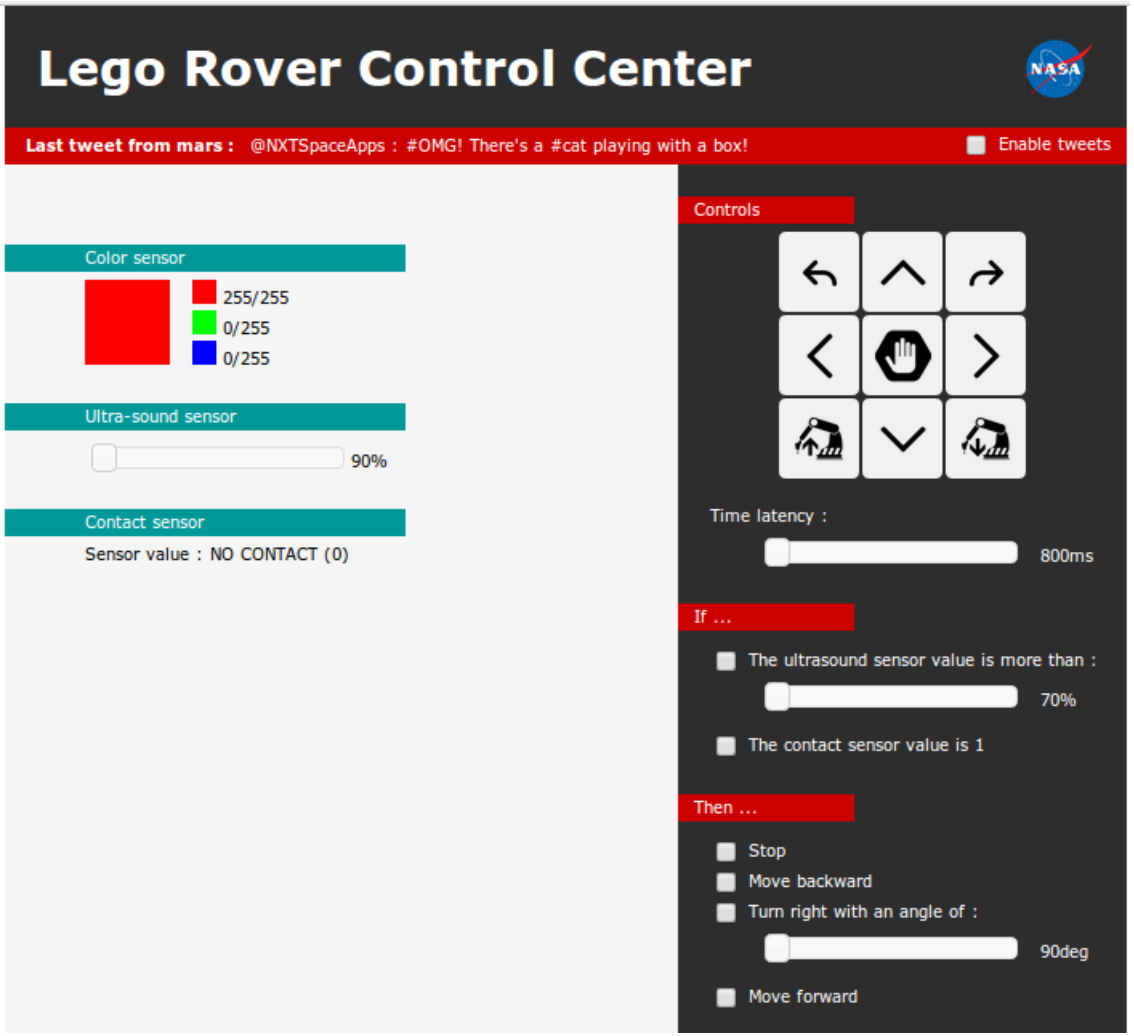
Achieving the projet

The Rover NXTSpaceApps



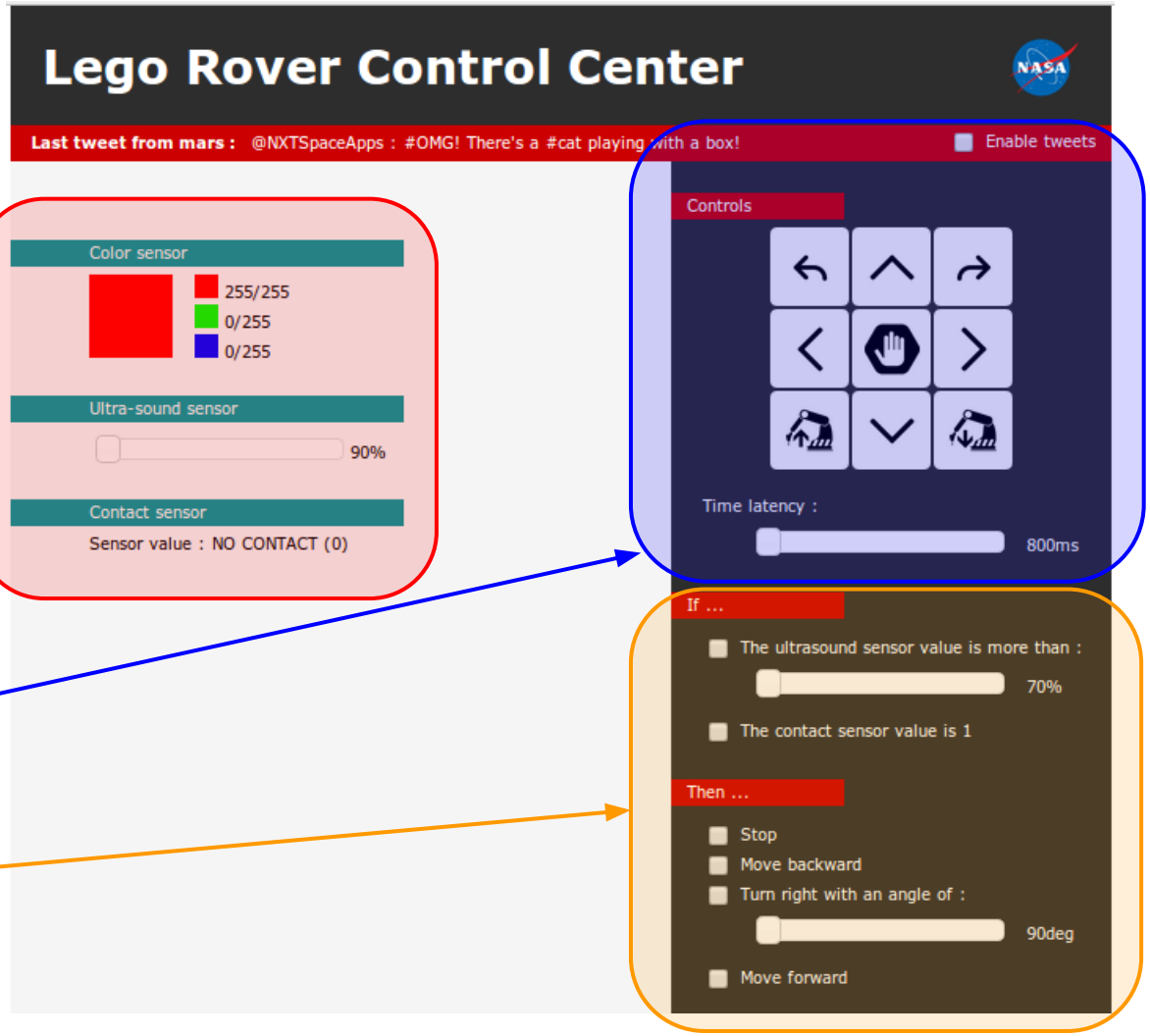
Achieving the projet

The Web interface



Achieving the projet

The Web interface



Sensor panel

Control panel

Scenario management

Achieving the projet

It works!!
- Webserver is hosted on the NXT2Wifi Card.
- The web control interface is developed.
- Most connections from the interface to the rover controls are implemented.
- The Rover can tweet.
- Display of rover outputs on the web interface

It will work soon!
- Settings of some parameters (threshold...)
- More behaviors

What would you need to consolidate the projet ?
- More time

Team

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Thanks to every persons who helped us during this intergalactic adventure!!

www.spaceappschallenge.org