Puces Sur le Terrain

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Project Presentation

Project name
"Puces sur le terrain "

Activities
Electronic cards programming and creation +
testing in realistic conditions

Project creators and persons in charge
Stéphane Rode, Guillaume Ducombs, Yudish Shaan
Caussy

Origin
Created by OSI after the request from CNRS Mexico

Objectives

Our objective is to create an electronic card that will go study the evolution of fish and their environment in Mexican Caves. This card needs to collect the data for one year and has to be waterproof.
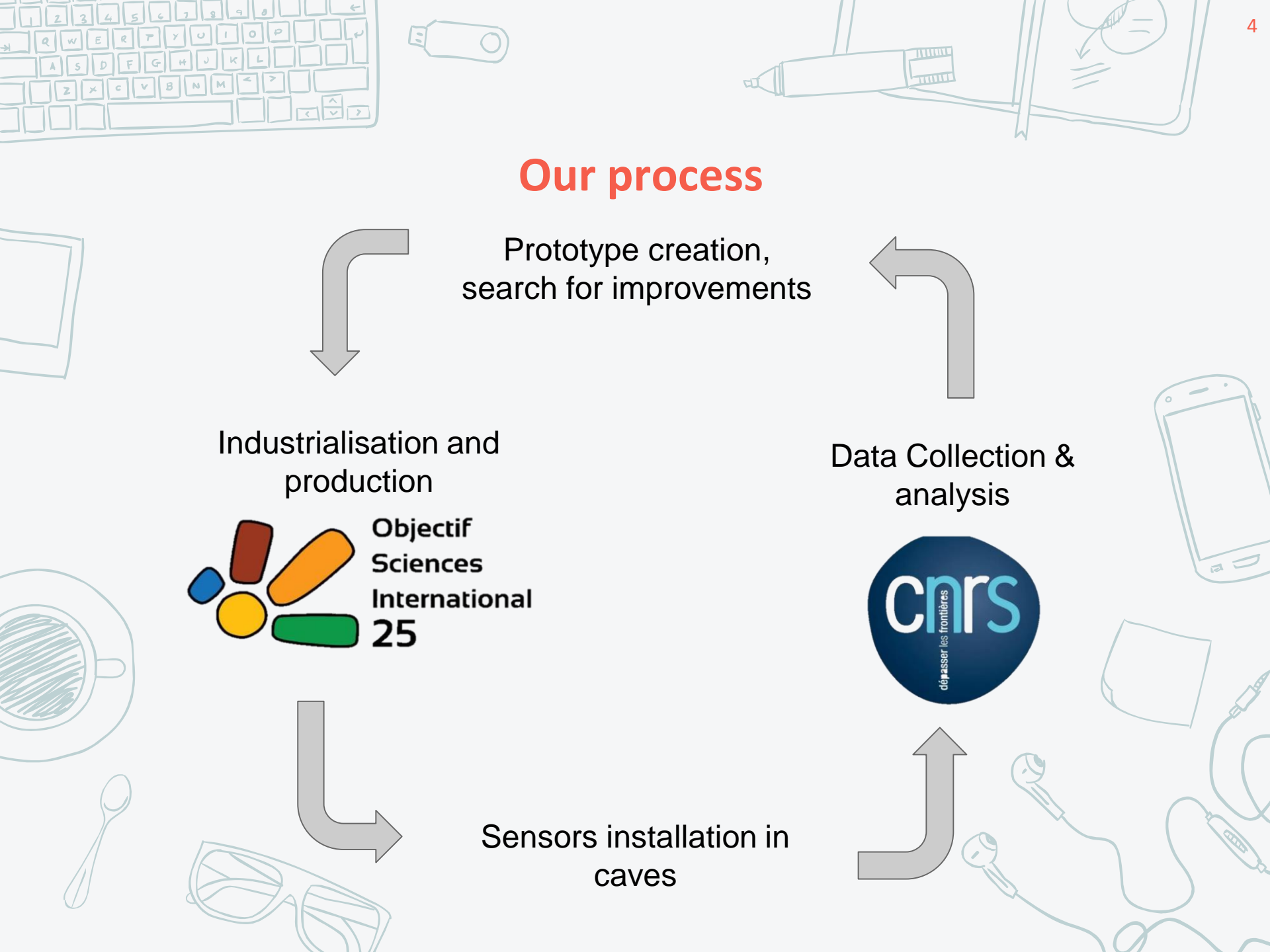
Our process

Prototype creation,
search for improvements

Industrialisation and
production

Objectif
Sciences
International
25

Data Collection &
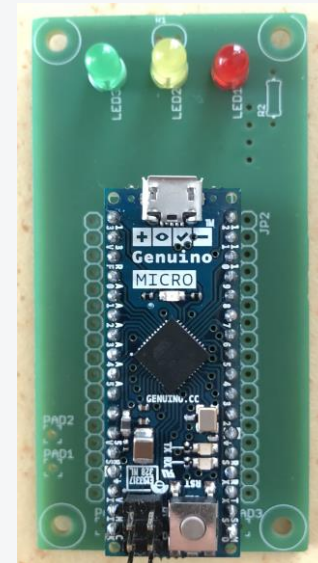analysis

cnrs
dépasser les frontières

Sensors installation in
caves

Strategies

We had two different approaches to the mission:

1. The modification of an already existing project (Coolboard)

2. The complete creation of a card (Stickboard)
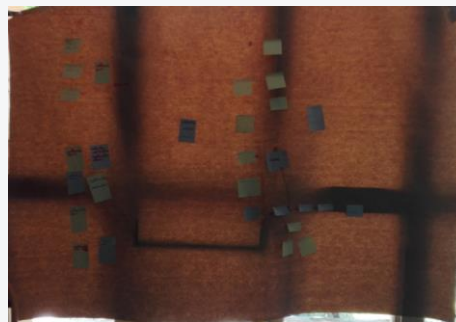
Strategy 1 – The CoolBoard

CoolBoard Problem and Solution:

No internet in caves ⟶ Develop no Internet Mode

Caves can be flooded ⟶ Waterproof Temperature sensor
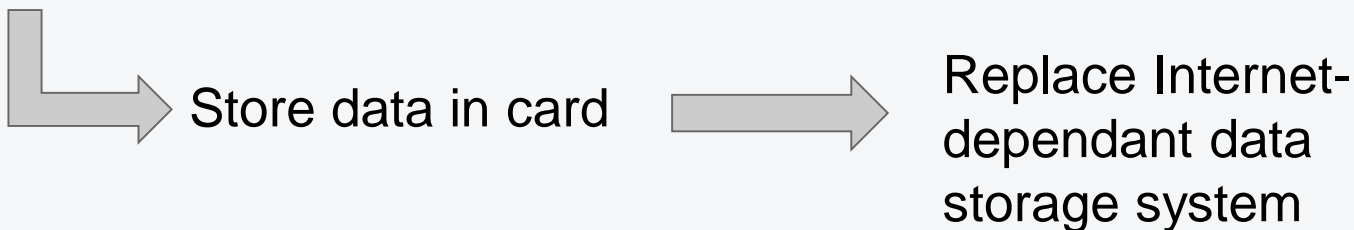
Research Method:

1. Understanding the code

2. Brainstorming

3. Ideas for no internet mode and temperature sensor

CoolBoard: No Internet Mode

Objective:
Make card work without internet.

Store data in card
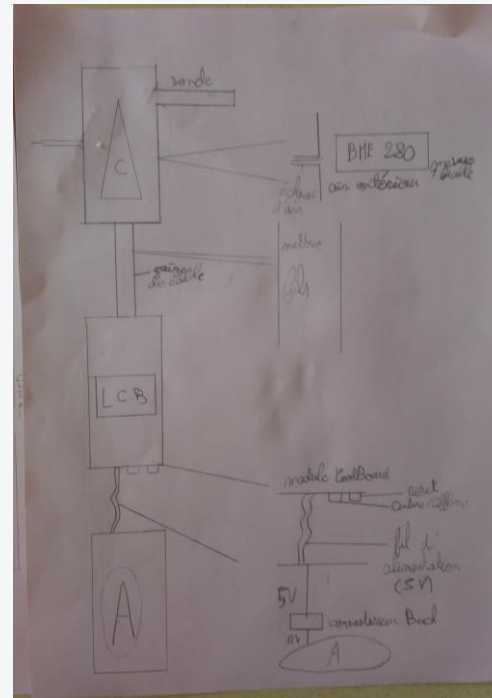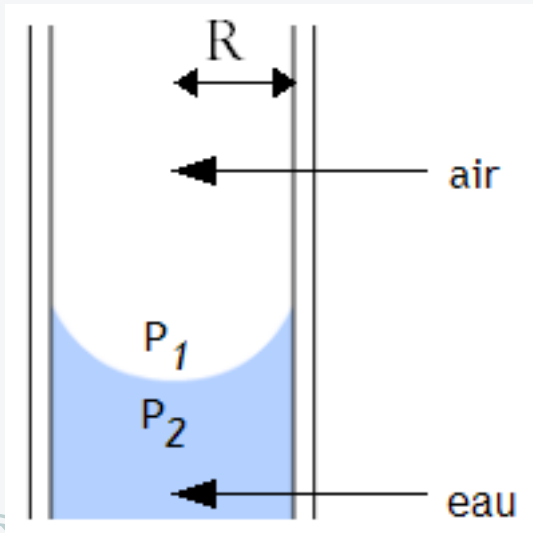
Replace Internet-dependant data storage system

Development:
Modification of the code to avoid use if Internet if necessary. Addition of a button to switch between internet and no internet mode.

Coolboard's case

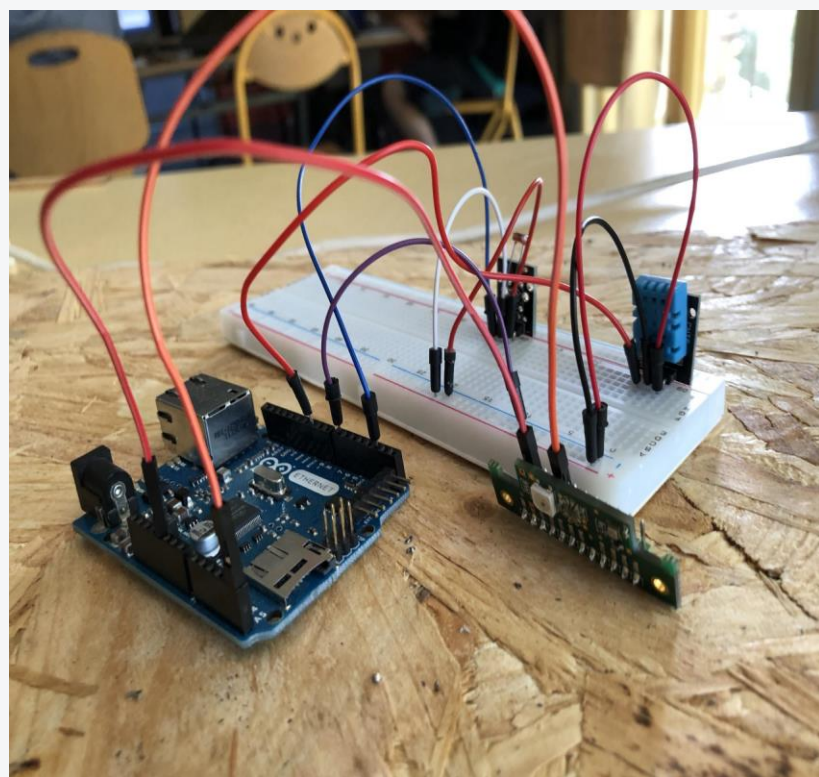Collect data from outside air   Separate battery/sensors/card

Strategy 2 – StickBoard

The stick board is:

- electronic card

- that we have created
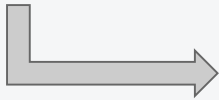
- Sensors programmed in C++

The chip contains:

- Brightness Sensors

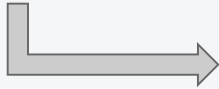- Temperature sensors

- Pressure sensors

- Humidity sensors

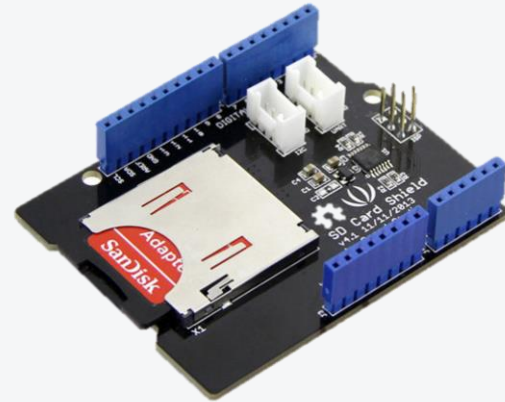# StickBoard – Constraint Analysis

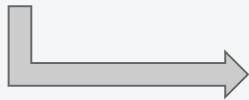No integrated memory system

Insert exterior SD Card to collect the data

Converting collected data into a single file per day

Chip must be energy independent for an entire year
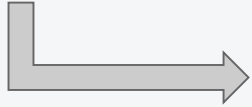
Conduct energy calculations

Find the optimal battery

StickBoard – Constraint Analysis

Caves can be flooded
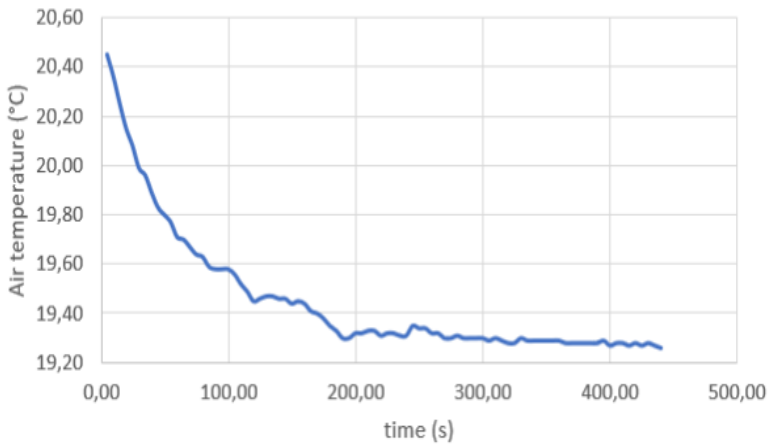
Sensors are not waterproof
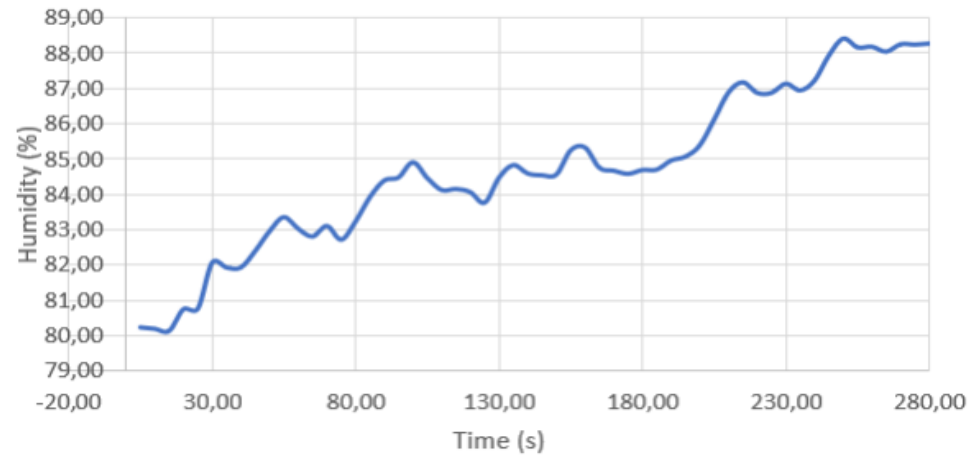
Create a Waterproof container
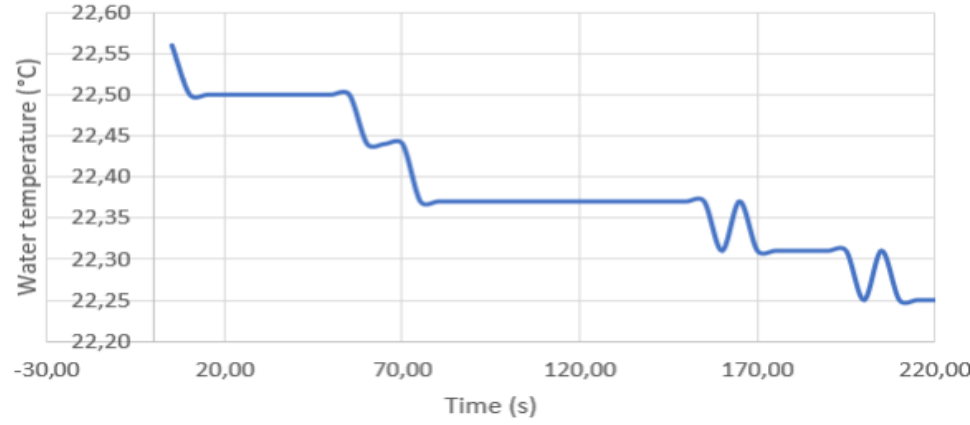
CoolBoard + StickBoard – Test

Air temperature evolution

Humidity evolution

Water temperature evolution

What's next

StickBoard

CoolBoard

- Find exterior memory system

- Separate battery from the card

- Conduct more test on the card

- Reduce total price of the chip

- Find optimal battery

- Find cheap energy solution

- Offline data protocol

- Add connective wires

- Optimize data storage

Final Goal

✖ 2 StickBoard   ✖ 1 CoolBoard

Both Going Mexico 2019