



The Cannonball Project

An Auto-Directive Camera Set On A Smart Miniature Race Car

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Context

Cannonball is the result of an innovative and creative 3 years project. First based on a simple remote-controlled car, it has gradually become an absolutely autonomous smart vehicle which can follow another car, a predefined path while video posting transmitting on a website. Currently, the point is to make the car able to follow and film a dynamic action.

This multi-collaboration project is supported by the GIPSA-Lab of Grenoble (INP university) and carried out at Polytech'Grenoble.

Methods

To achieve our goal, we had to conceive and implement specific solutions.

- 1 The emitter sends signals in different directions.
- 2 The sensor receives signals, and transmit it to the STM32.
- 3 Data are treated by the STM32 card.
- 4 STM32 controls the servo-motor which is linked to a camera.

Objectives

- Adapt the new functionalities to the current project
- Elaborate sensors (emitter and receiver)
- Data treatment & Control (Via STM32)
- Design the physical structure

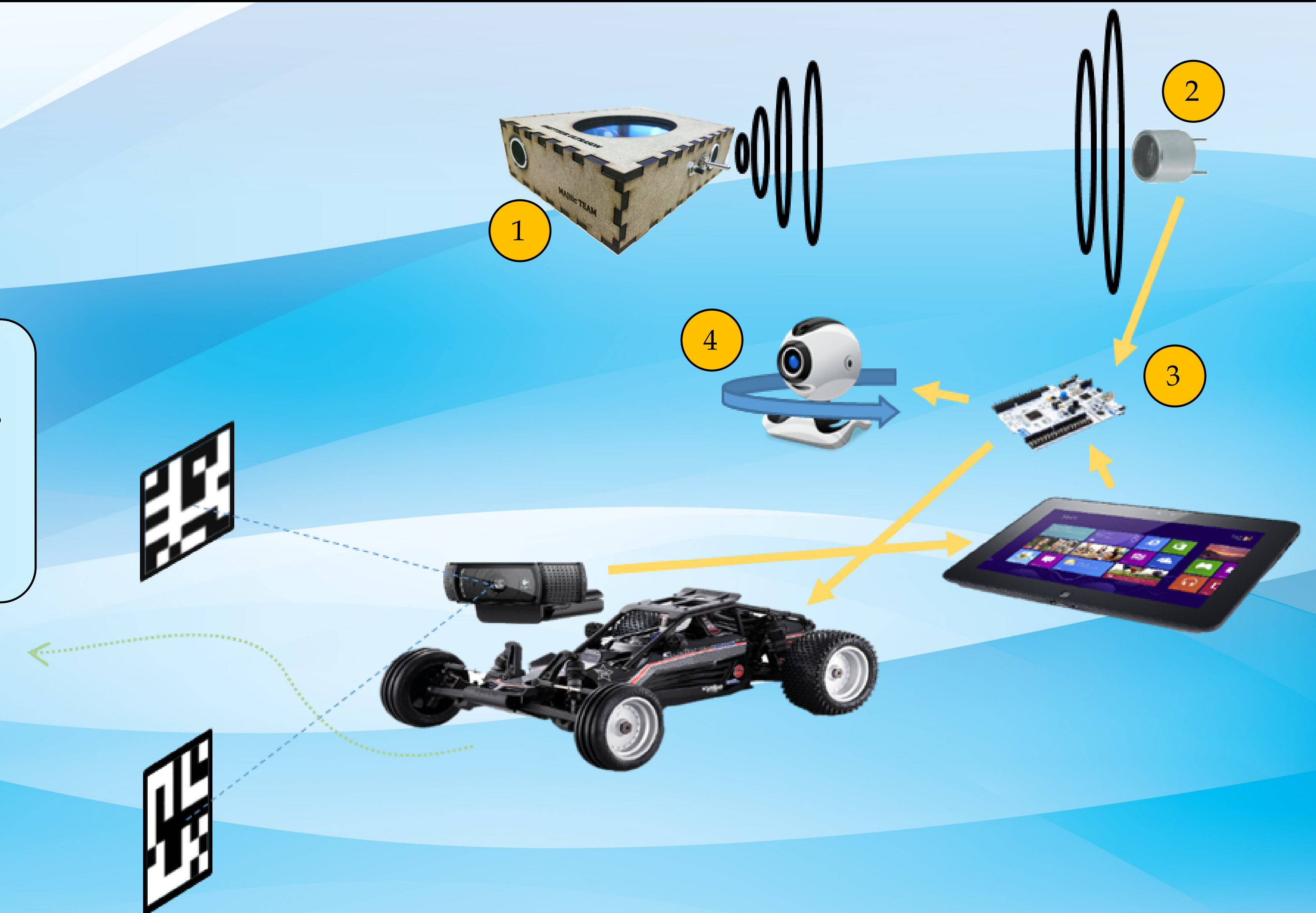
- Ultrasonic Emitter**
- Transmit ultrasonic pulses
 - Up to 50 times/second
 - 4 ultrasonic emitters

- Ultrasonic Receiver**
- 3 ultrasonic detectors
 - 3 meters range

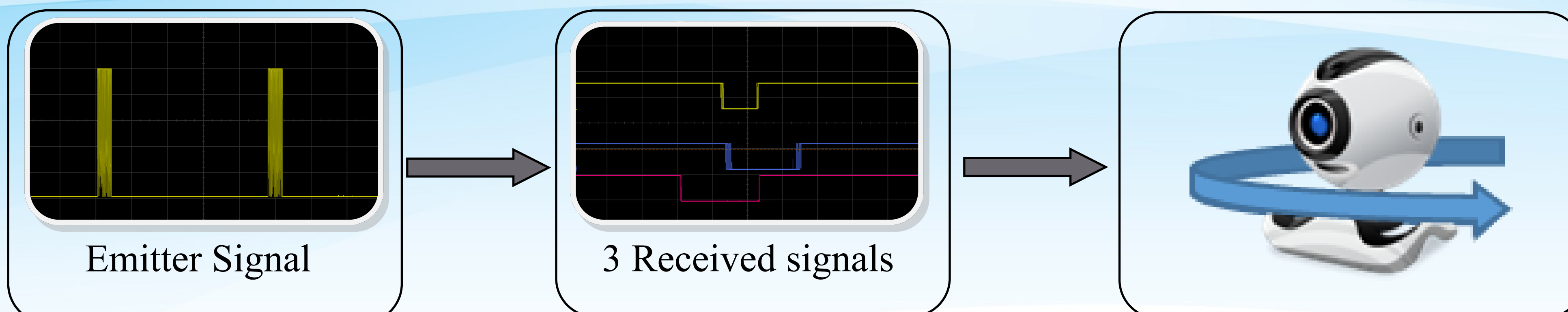
STM32F401 Nucleo

- Receive signal from sensors
- Data treatment
- Control the camera

Receiver's structure



Results



Conclusion

⇒ **Designed and built**

- Emitter circuit, receiver circuit
- Smart camera control system
- Autofocus target detection system

⇒ **Possible future applications**

- Transmit video via Wi-Fi
- Control the car through an android application
- Include GPS localization