

Nearly 10 years of nearly space flight from nearly Valence

**Sébastien Jean**

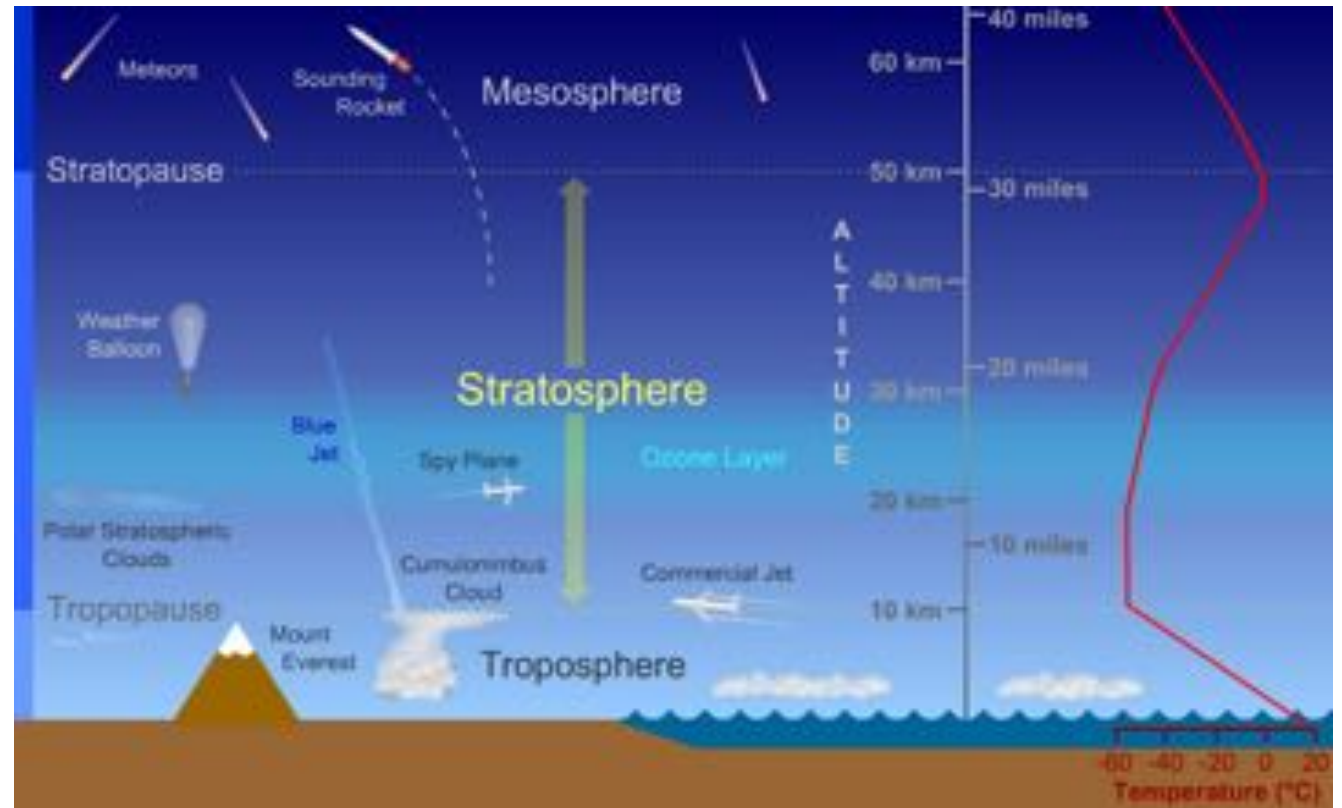
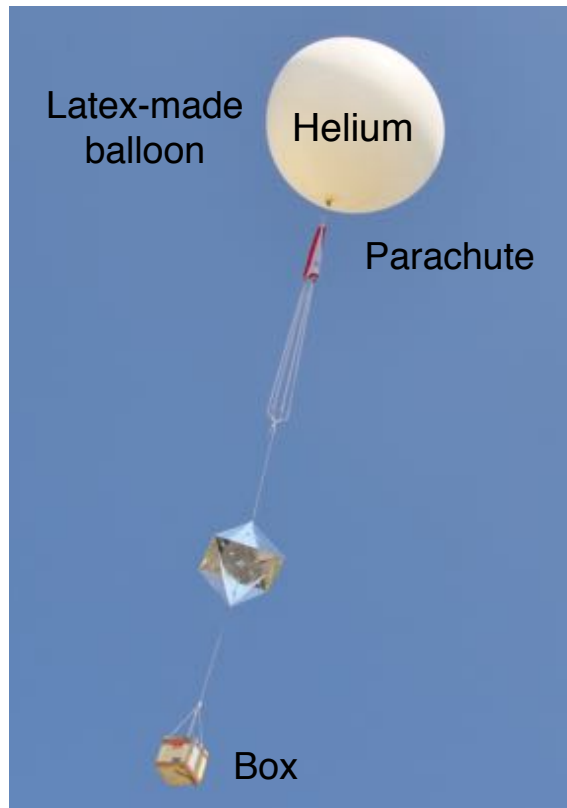
IUT Valence / LCIS / L0AD

Eclipse IoT days, Grenoble, 28 avril 2016

# Nearly ... nearly ... nearly ...

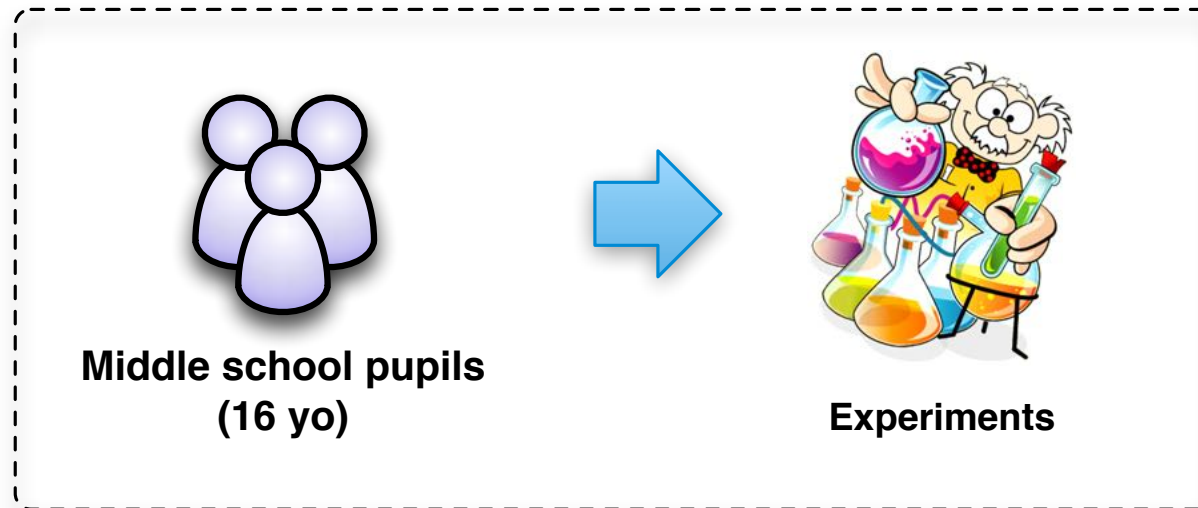


# Project in few words



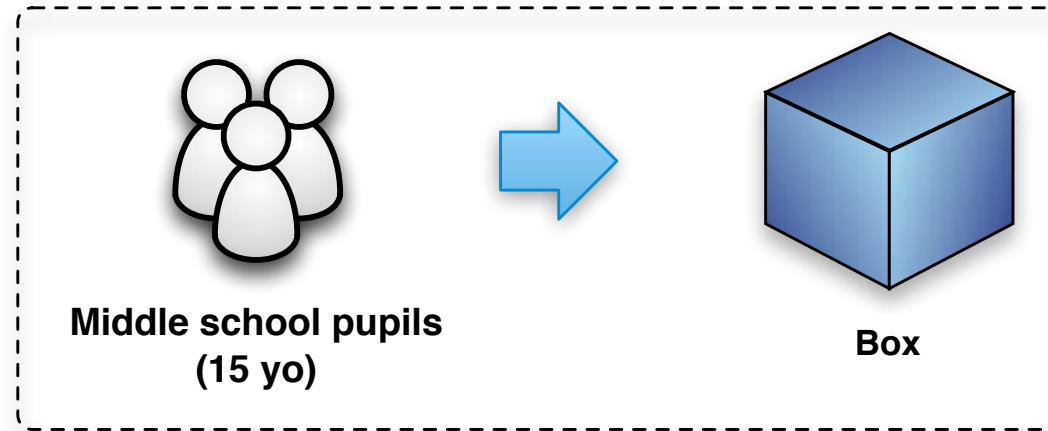
- 3 hours flight, 30 000m burst altitude, up to 200 km range
- $[-60^{\circ}C, +30^{\circ}C]$ ,  $[0.01bar, 1bar]$ ,  $[20km/h, 300km/h]$

# Team in few words



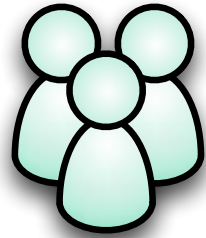
- Choice of **physical parameter measurements**
  - **Temperature** (inner/outer), **pressure**, **humidity**, **luminosity**, ...
- Analog **sensors calibration** ( $U = f(T^\circ)$ , ...)
- **Post-flight measurement analysis**

# Team in few words



- **Design and building**
  - Choice of materials, assembling, ...
- *Wrt* a set of **constraints**
  - **Weight, physical and thermal resistance, ...**

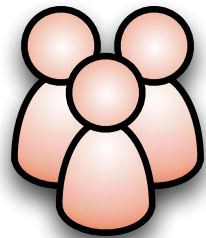
# Team in few words



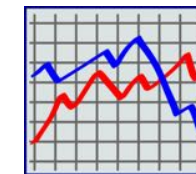
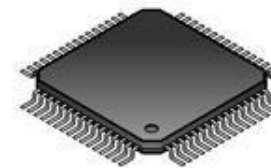
**High school students**



**Sensors, power supply**

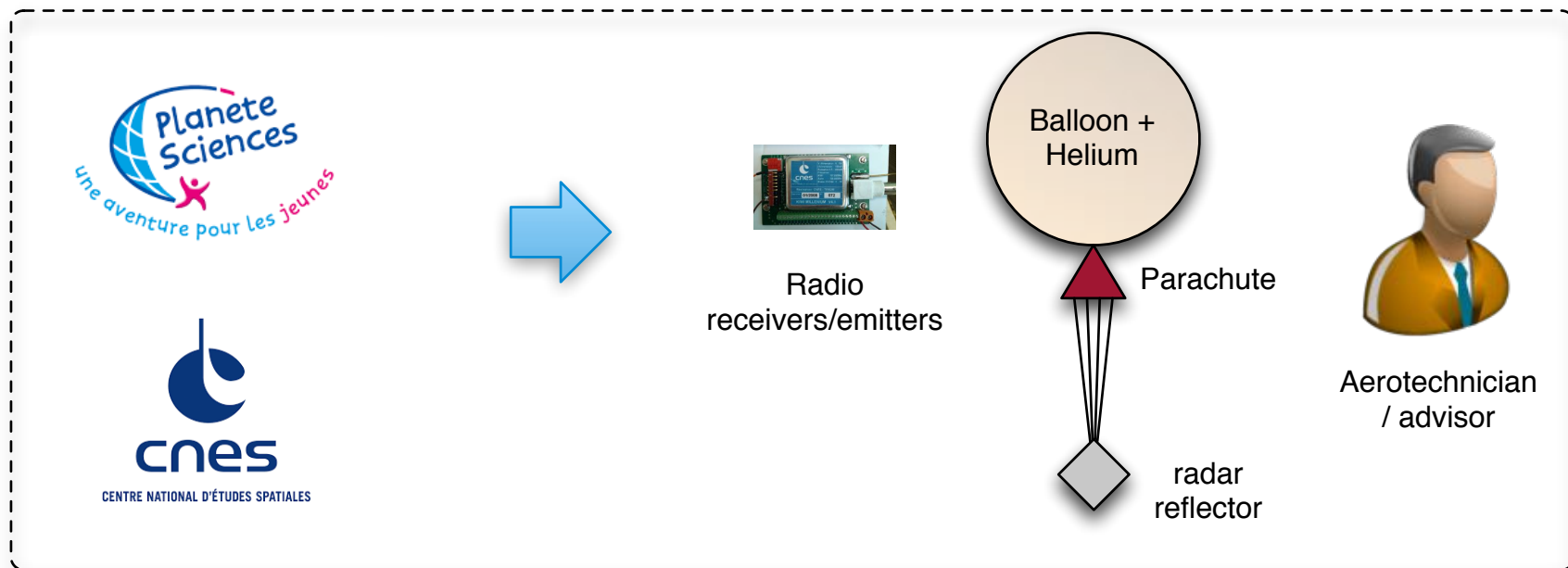


**High school students,  
hackers**



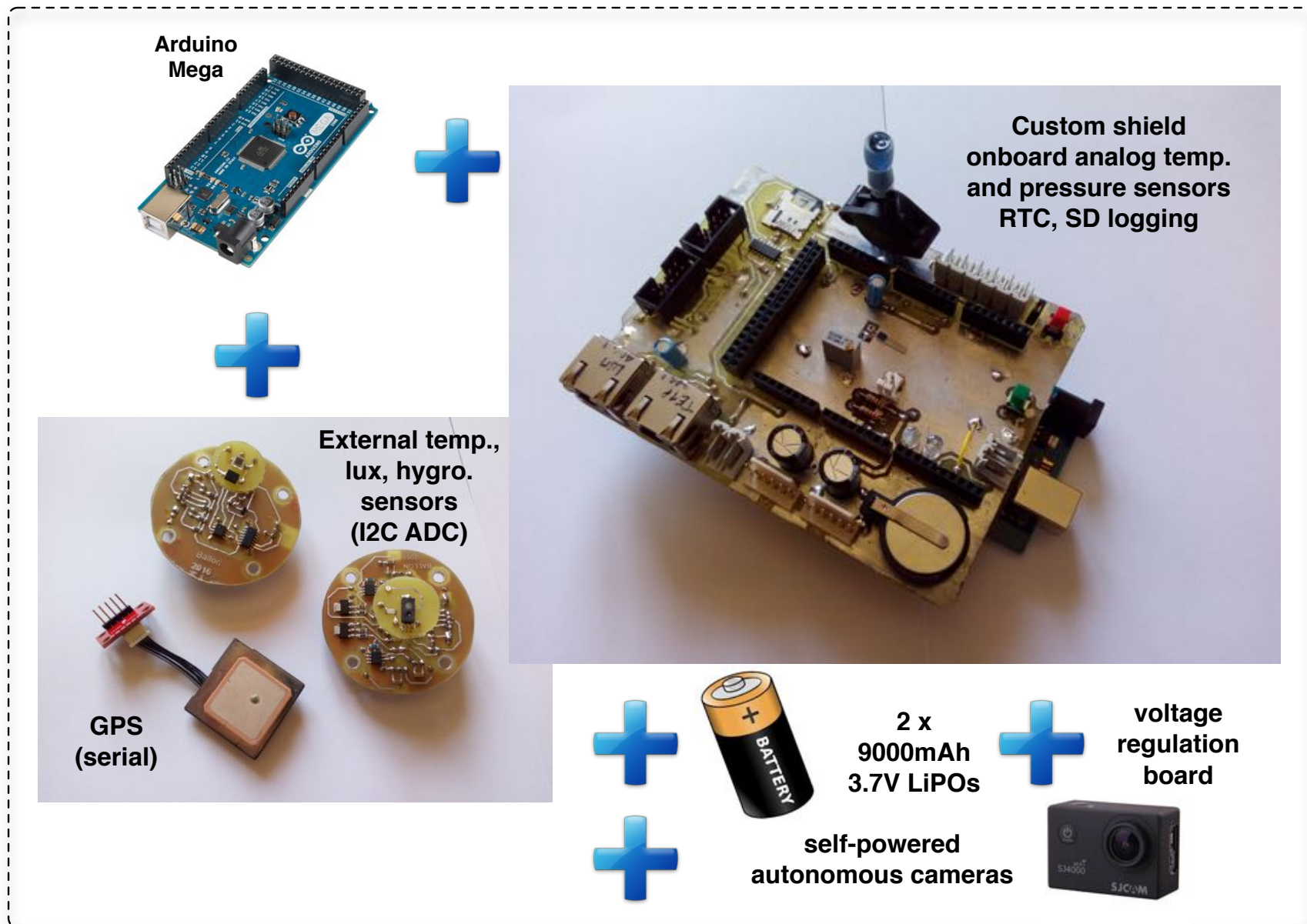
**Embedded system,  
ground software**

# Team in few words



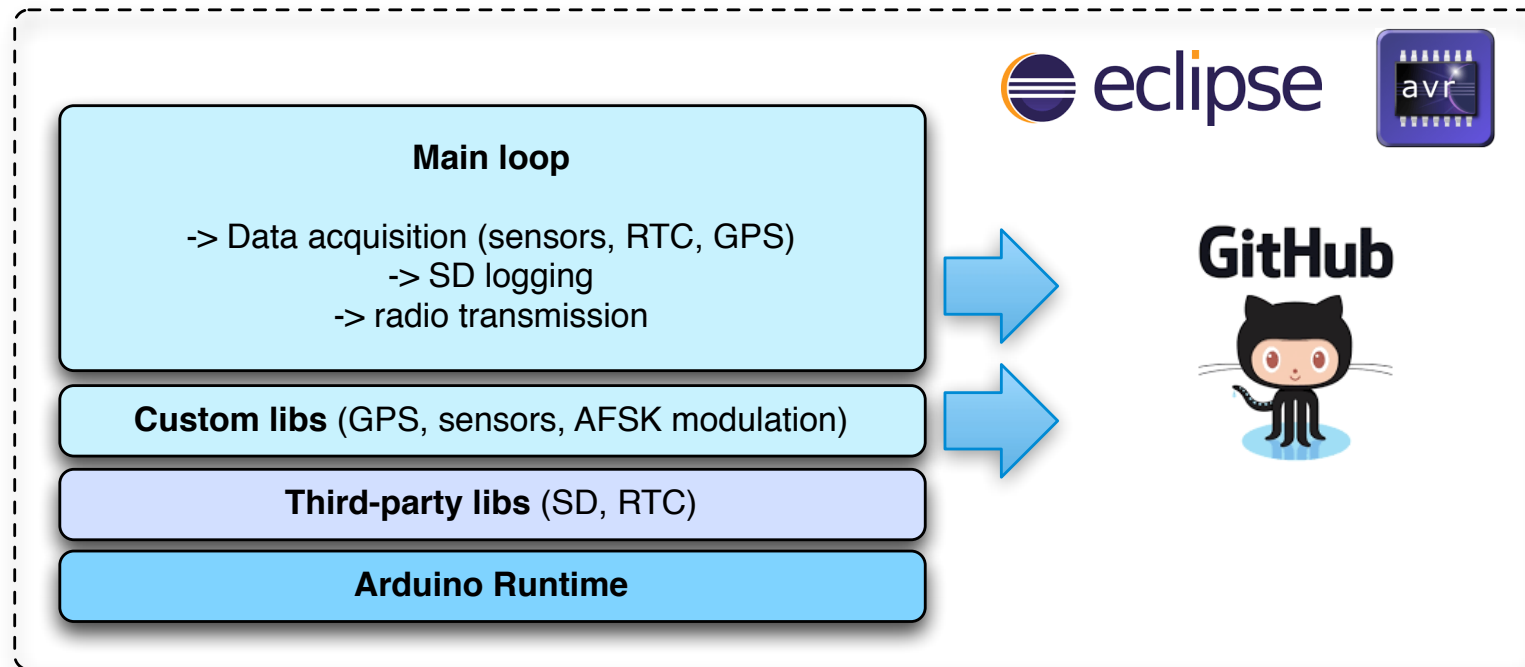


# Balloon : hardware concerns



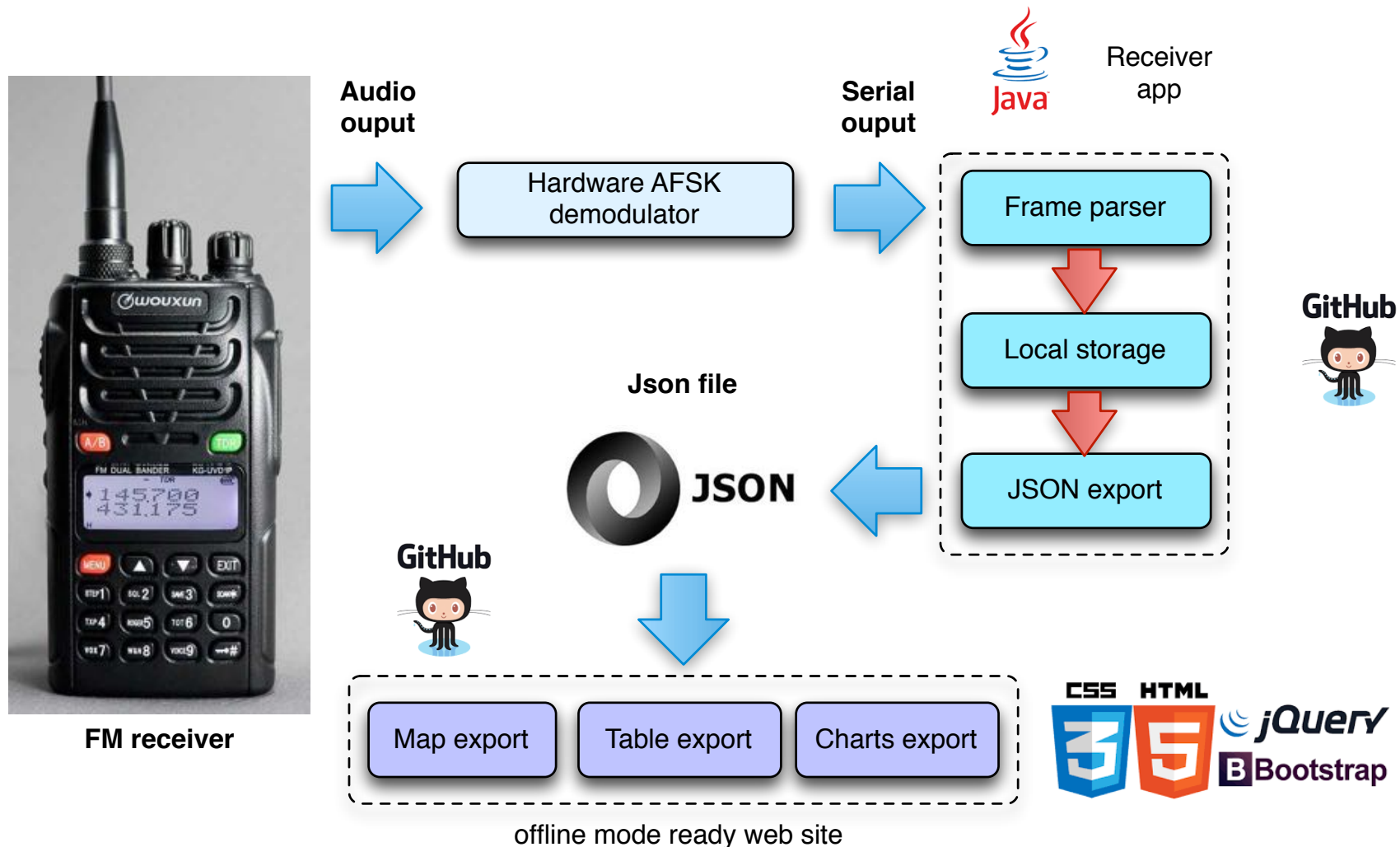


# Balloon : software concerns



- **Software 2 tones AFSK** (bitbanging) + hardware filter
- **Human-readable raw messages** as a requirement
  - ASCII-CSV
  - Raw NMEA output (acts as a virtual GPS)

# Ground station : software concerns



- **Web site as flight tracking application**
  - Offline mode as a requirement

# End !



- <http://ubpe.iut-valence.fr>