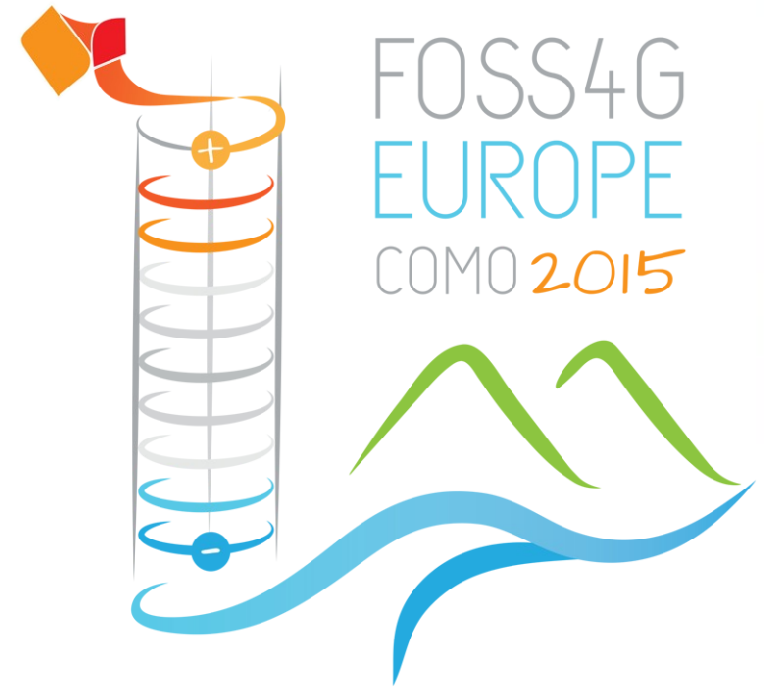


Collecting and Processing Land Surveyors' Sensor Data

Zoltán Siki

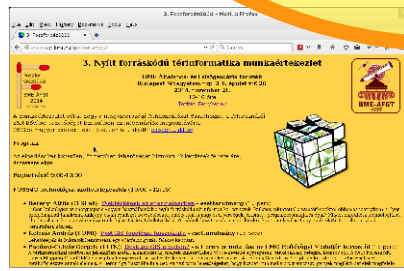
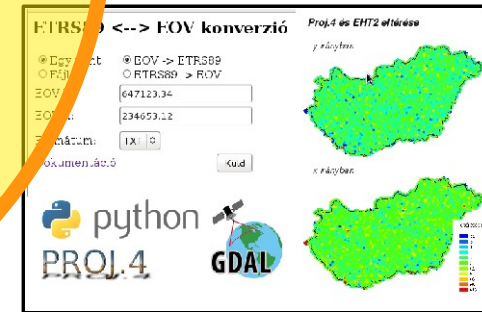
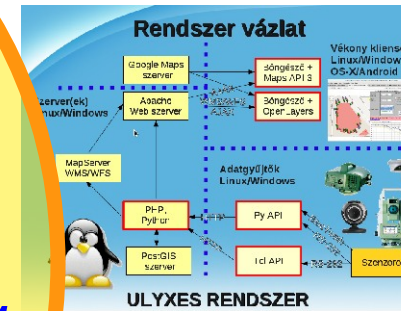
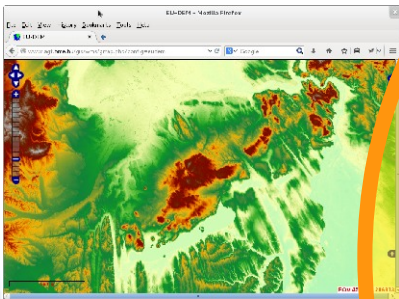
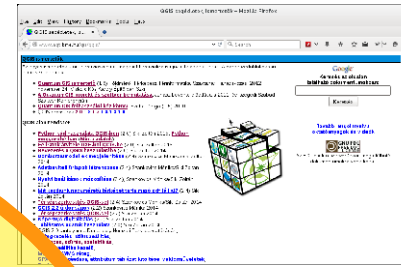
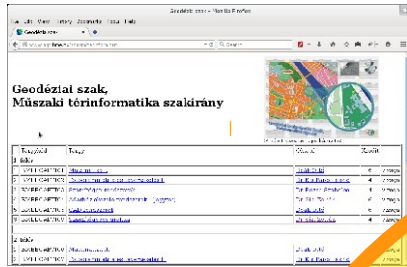
Budapest University of Technology and Economics
Department of Geodesy and Surveying



ICA-OSGeo-ISPRS
Geo for All Lab Budapest

ICA-OSGeo-ISPRS Lab Budapest

Activities
Training and support
Research and development
Conferences
FOSS4G.HU



Ulyxes project

An Open Source project (GPL2):

- Driving location aware sensors
- Started in 2008, driving robotic total stations
- First version written in Tcl (finished in 2013)
- Second version written in Python (started in 2014)



New aims:

- Indoor navigation and mapping
- Raspberry Pi



Used sensors:

- Robotic total stations (Leica 1800, 1103, 1201)
- NMEA GNSS receivers
- USB web cameras (e.g. Dino Lite)
- MEMS (barometer, 6/9/10 DOF)
- WiFi
- ...

<http://www.agt.bme.hu/ulyxes>

GitHub

zsiki / ulyxes

Unwatch 3

★ Star 1

Fork 0

Surveyor's sensor data processing system — Edit

236 commits

1 branch

0 releases

2 contributors

branch: master ulyxes / +

fixing doc strings rst directives

zsiki authored 8 days ago

latest commit 914a2a264a

pyapi	fixing doc strings rst directives	8 days ago
pyapps	fixing doc strings rst directives	8 days ago
robot	initial upload of robot project	7 months ago
tclapi	change output format for the first record	4 months ago
LICENSE	Initial commit	10 months ago
README.md	updated	3 months ago

README.md

Code

Issues 0

Pull requests 0

Wiki

Pulse

Graphs

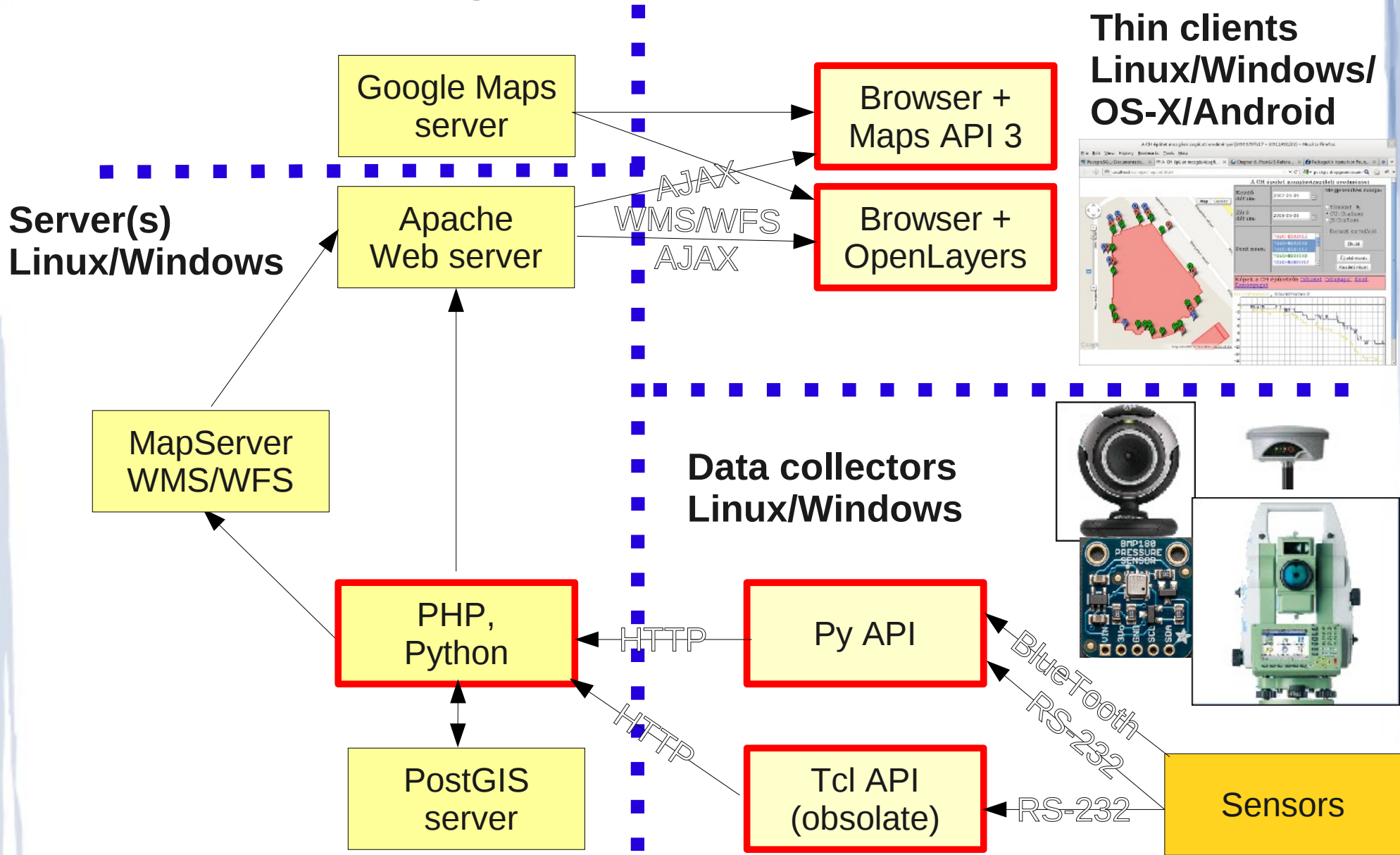
Settings

HTTPS clone URL

https://github.com/zs:

clone with HTTPS or Subversion

System sketch



Demo application



Demo dataset

English

500 x 500

Start date:

10/31/2011

End date:

11/25/2011

Query type:

- Tabular
- Chart

Submit

Point names:

- 1230
- 1743
- 620
- 861

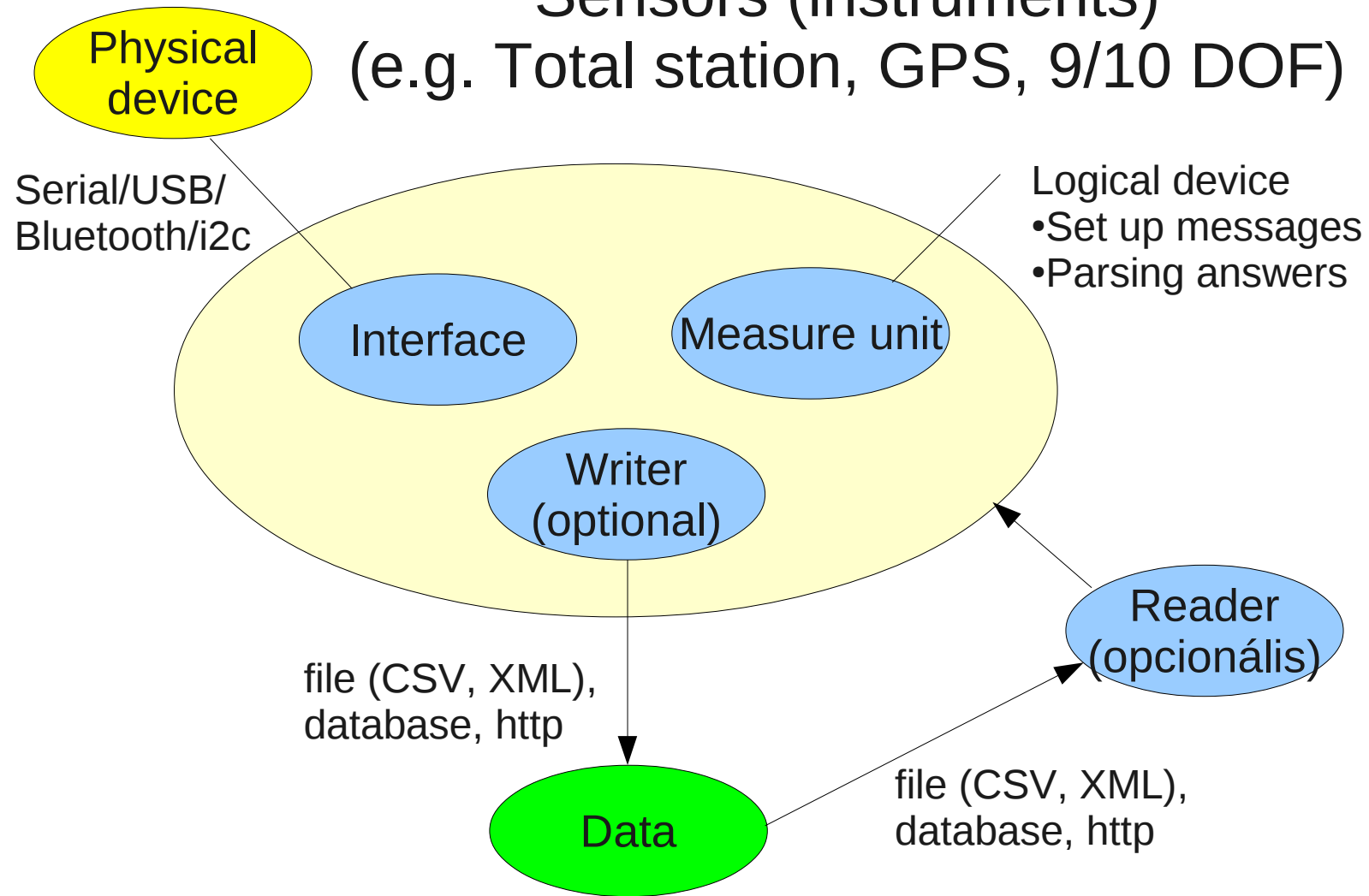
Reset query

Initial zoom

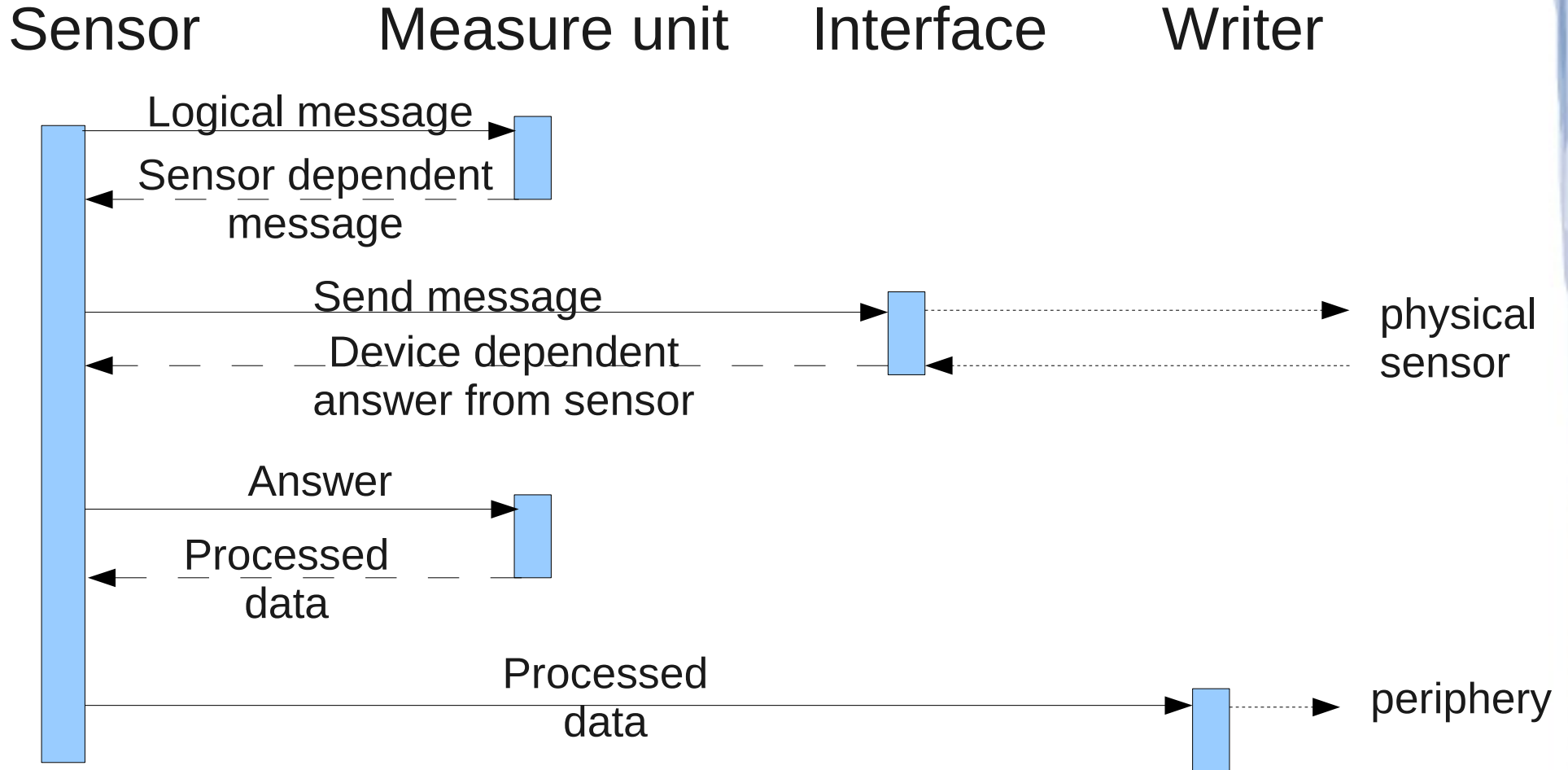


Abstraction

Sensors (instruments)
(e.g. Total station, GPS, 9/10 DOF)



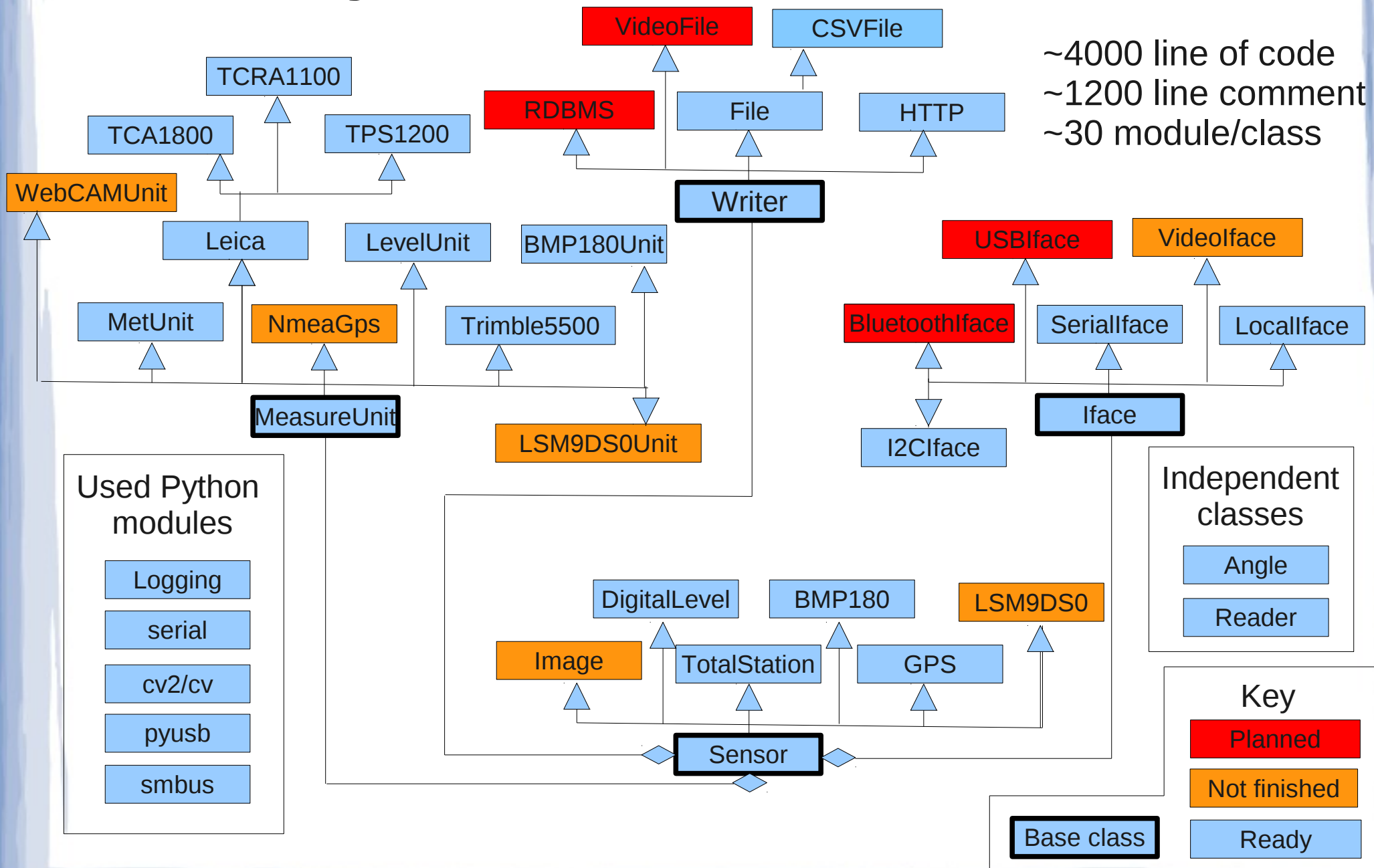
Process of operation

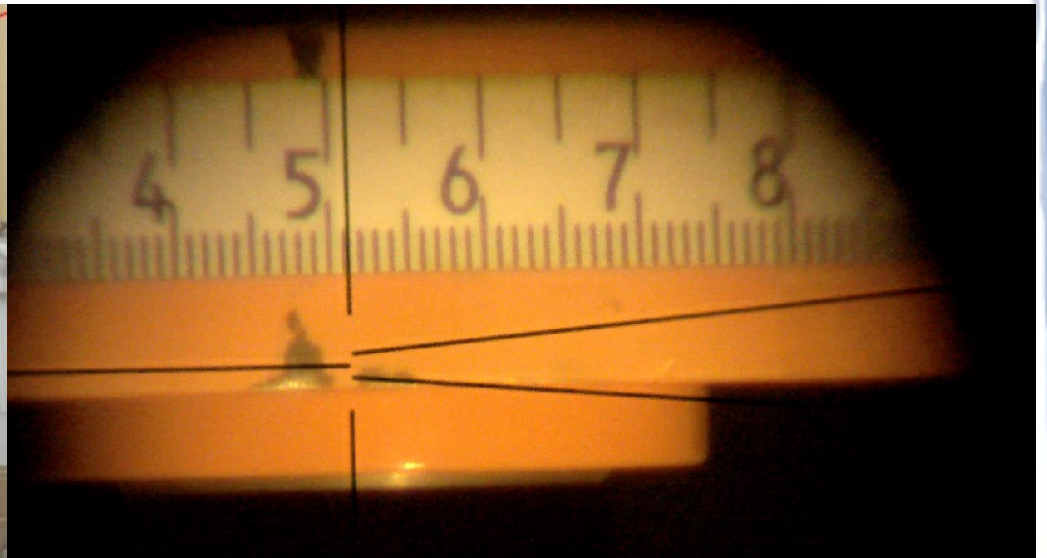
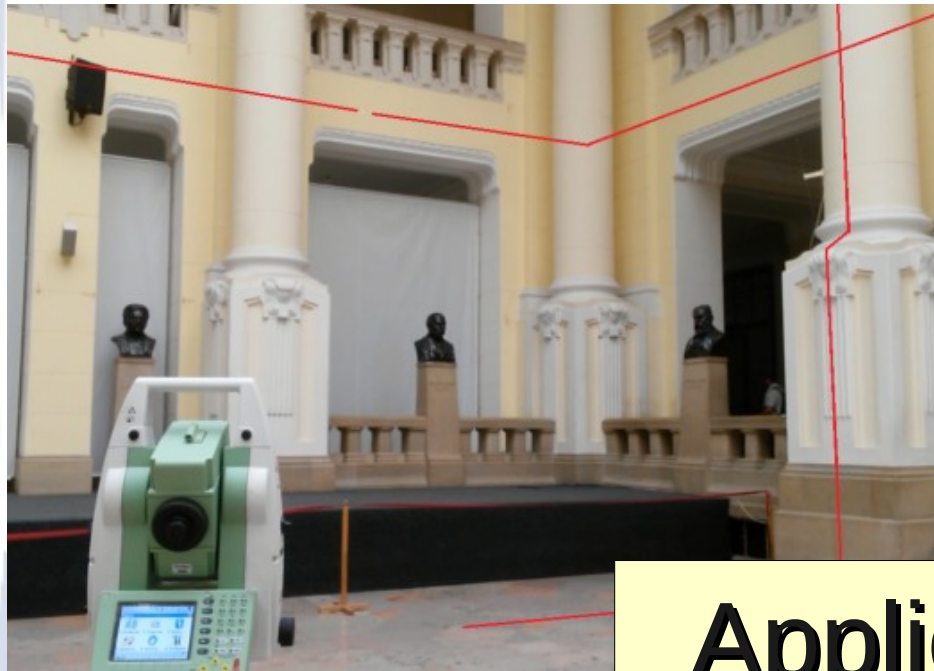


UML sequence diagram

Object model (PyAPI 2015 May)

~4000 line of code
~1200 line comment
~30 module/class

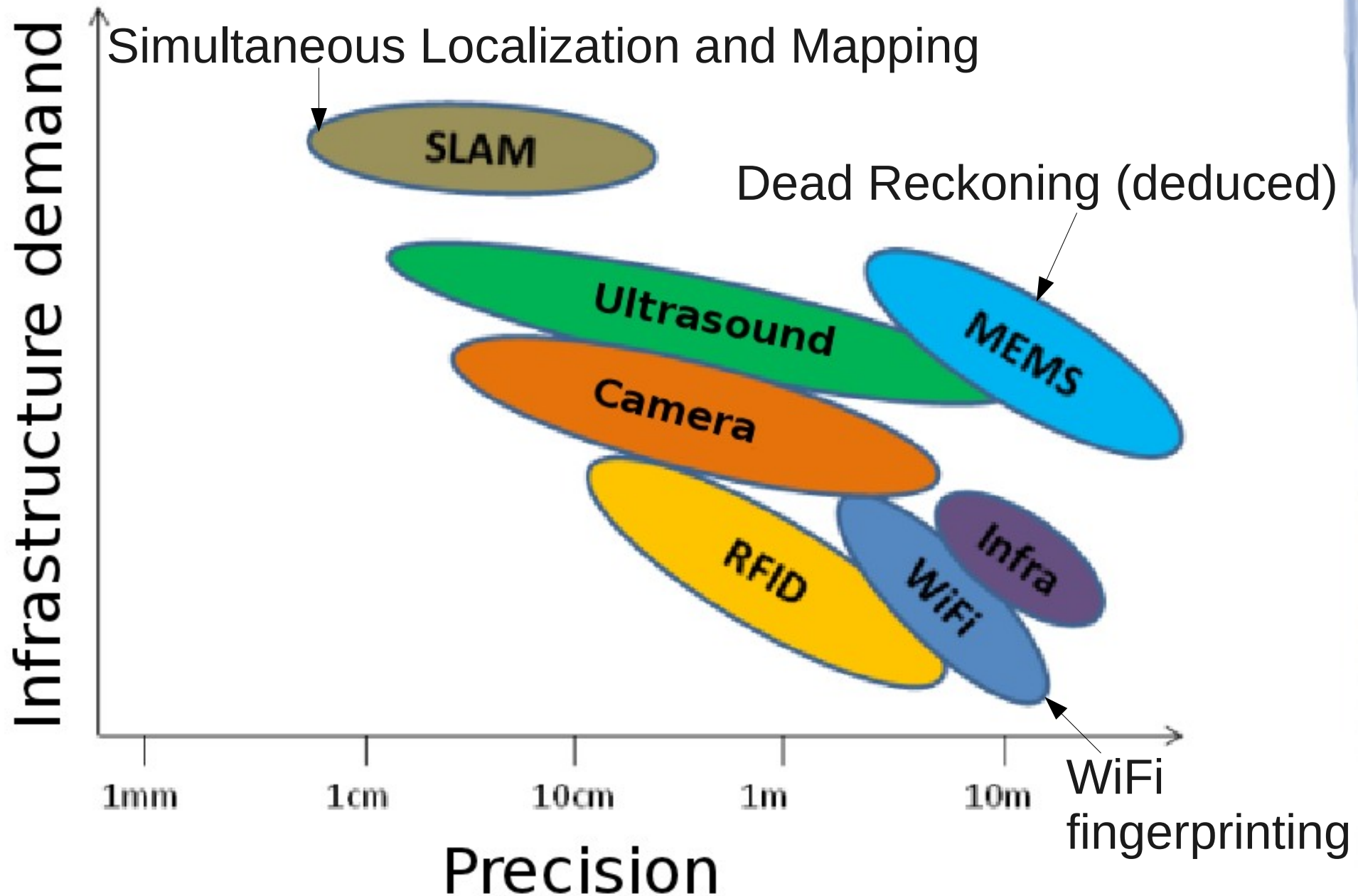




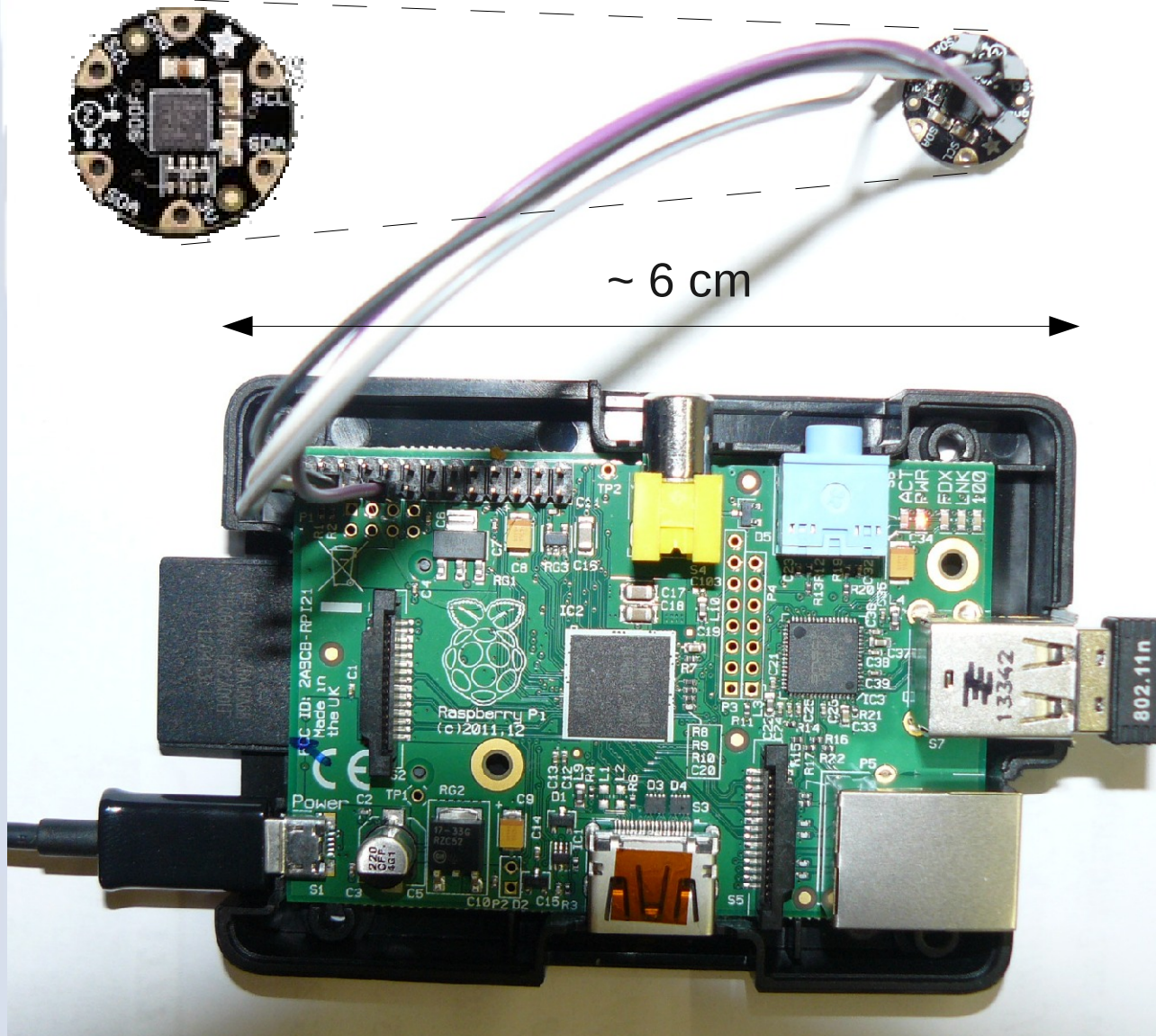
Applications



Indoor localization methods



Raspberry Pi and MEMS



Micro
Electro
Mechanical
Sensor

For example:
9/10 DOF sensor

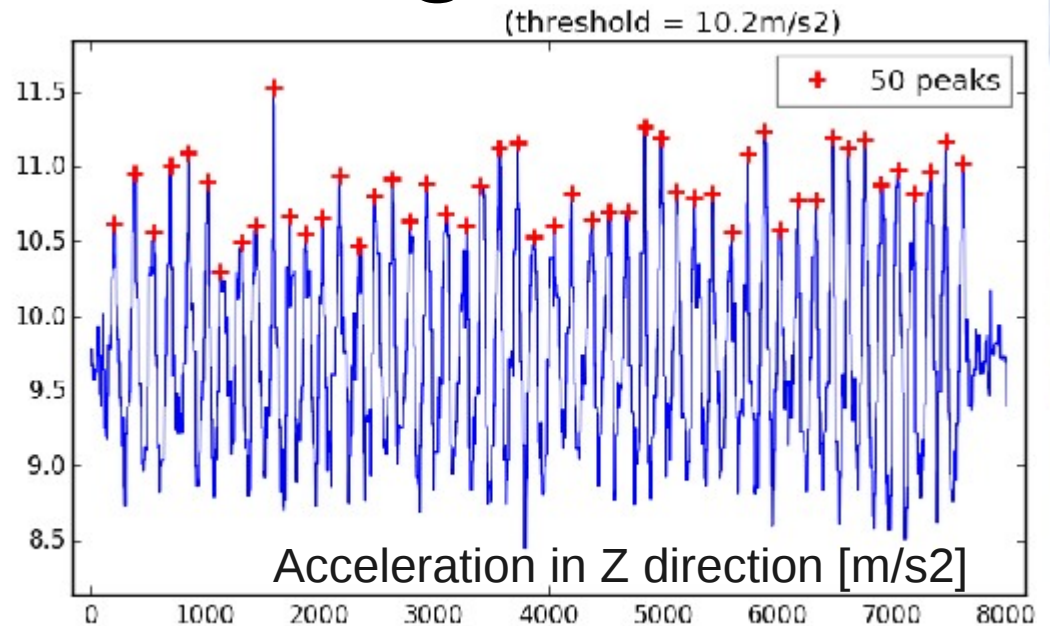
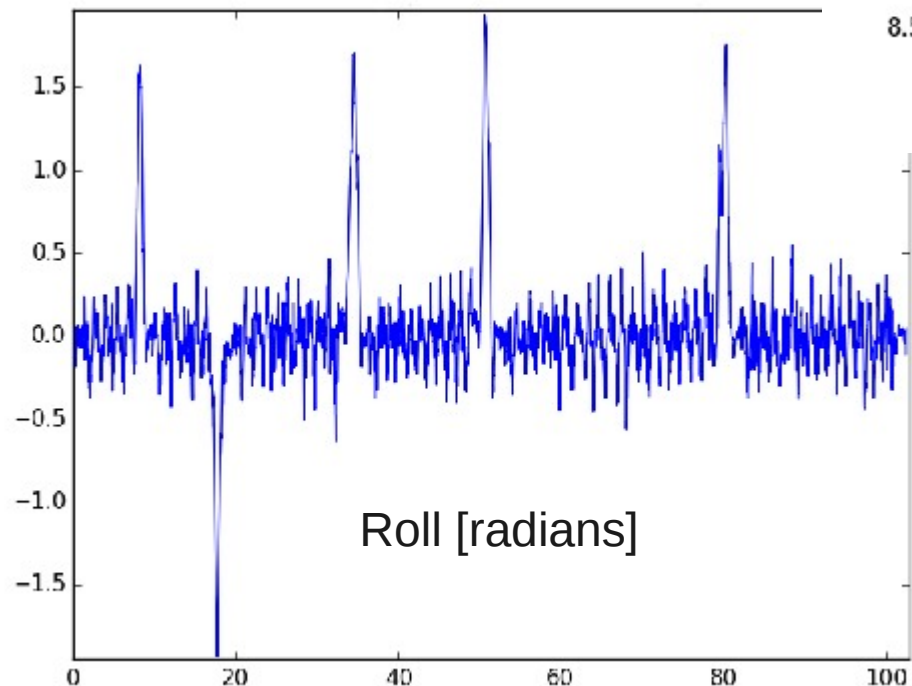
Compact system
Cheap components
I2C interface
GPS available, too

Dead reckoning

distance = step length * step count

Barometric elevation

Direction from
gyroscope or magnetometer



Known start point needed
Cumulative errors

Reference points e.g. QR code
to reduce cumulative errors

ID= 5;X = 12.34;Y=43.23

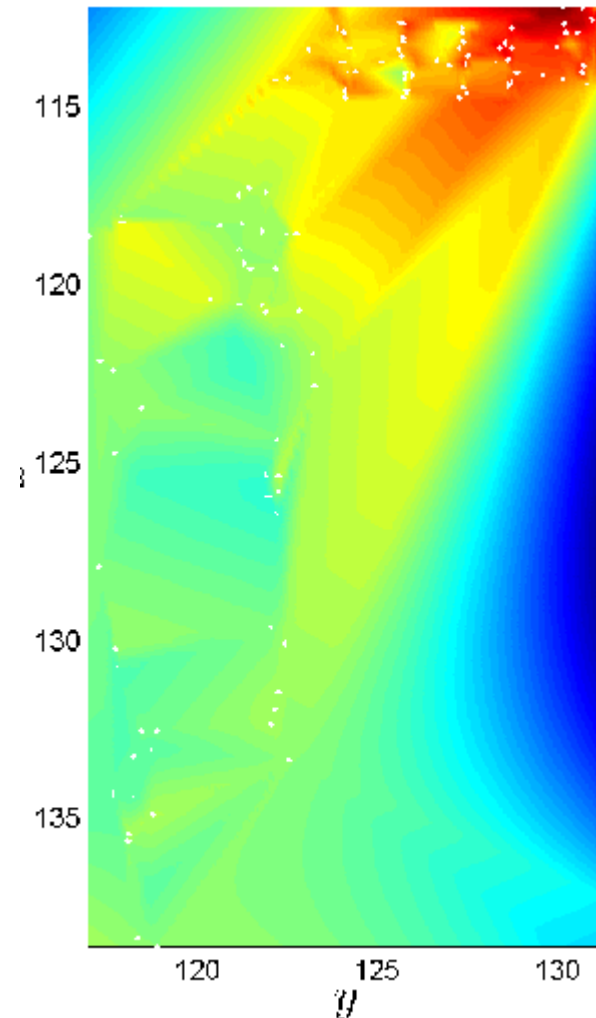


WiFi RSSI survey

RSSI:

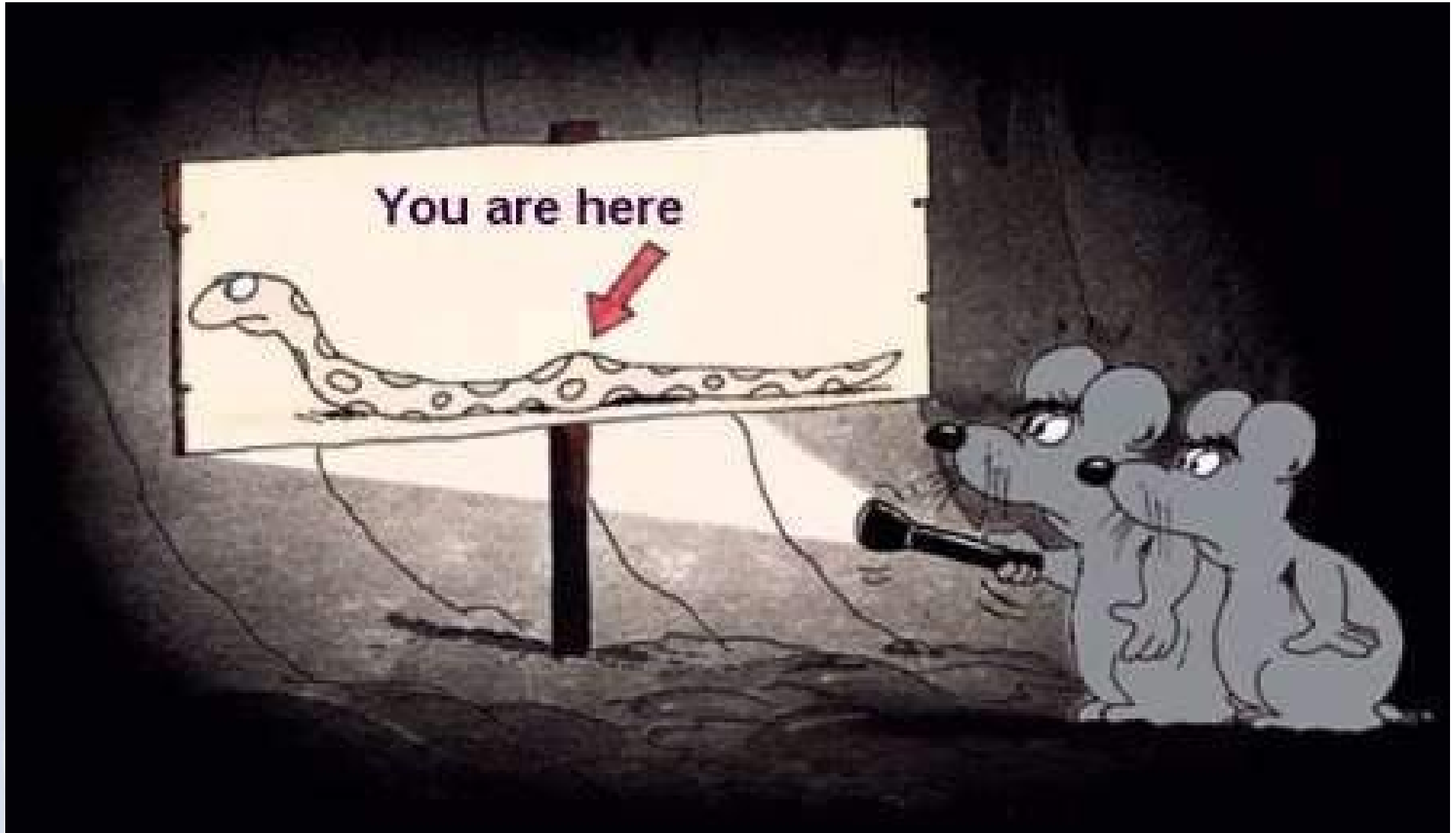
Received Signal Strength Indicator

Alternative solution:
Magnetic field
Mobil signal strength



Source: Bsc diploma work Mónika Fanczal BME 2015.

Perfect indoor (insnake) navigation



<http://www.funnyzone.org/funny-cartoons/you-are-here-perfect-navigation/>