

Challenges and Experiences

MEASUREMENT SYSTEM OF THE NEW EÖTVÖS EXPERIMENT

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2019.06.12

Heterogeneous team (since 2017)

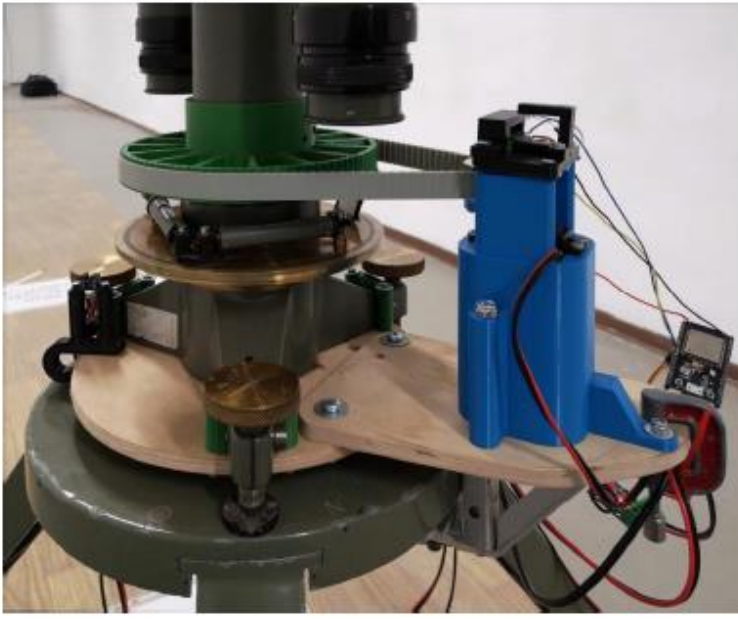
- Physicists – MTA Wigner FKK
- Geophysicists –
BME Geodesial Surveying
- Teachers and Students – BME Control
engineering and informatics
- Other volunteers and externals

Modernization of Eötvös Torsion balance



Main parts of the modernization

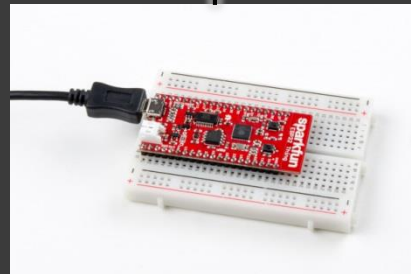
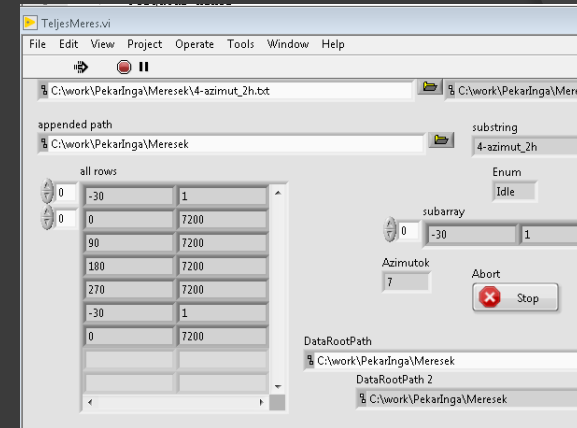
Számítógéppel távvezérelt forgatás:



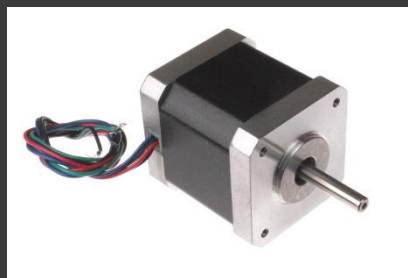
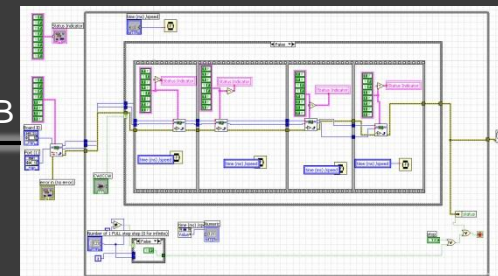
A műszer átalakítása: CCD érzékelővel történő automatikus leolvasás:



Automatic turn



Serial over USB



Arduino C++

```
PekarRev2018_12_03 | Arduino 1.8.7
Fájl Szerkesztés Vízlat Eszközök Súgó

PekarRev2018_12_03 UnBotLowLevel.h

#include "driver/pnct.h"
#include "driver/uart.h"
#include "UnBotLowLevel.h"
#include "PekarPendulum.h"
#include "driver/ledc.h"

//-----Modify below values to fine tune the pendulum rotat
// #define DEBUG //Replace serial message with debug message
// #define SIMULATION //Replace real pendulum with simulated pendul
#define SPEED_MAX 280 //Travel speed
#define SPEED_MIN 250 //Ramped speed
#define ANGLE_THRESHOLD 20 //Dead band width
#define RAMPING_WITHIN_THRESHOLD 10 //Motor shutdown steepness par
```

Measurement program

Readout

25px / osztás



1/1000 osztás felbontás

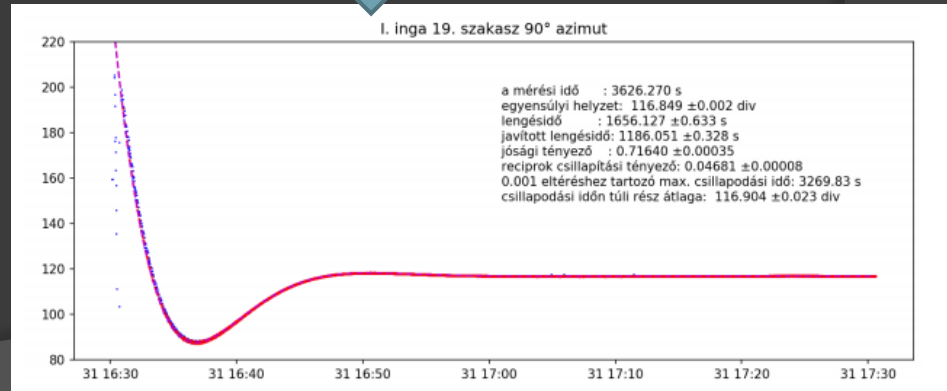
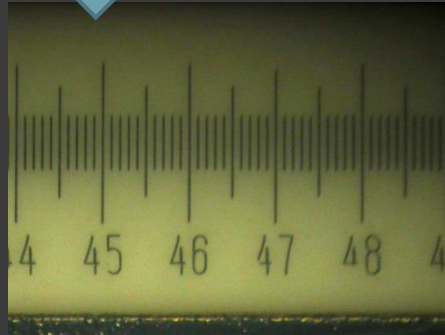
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```



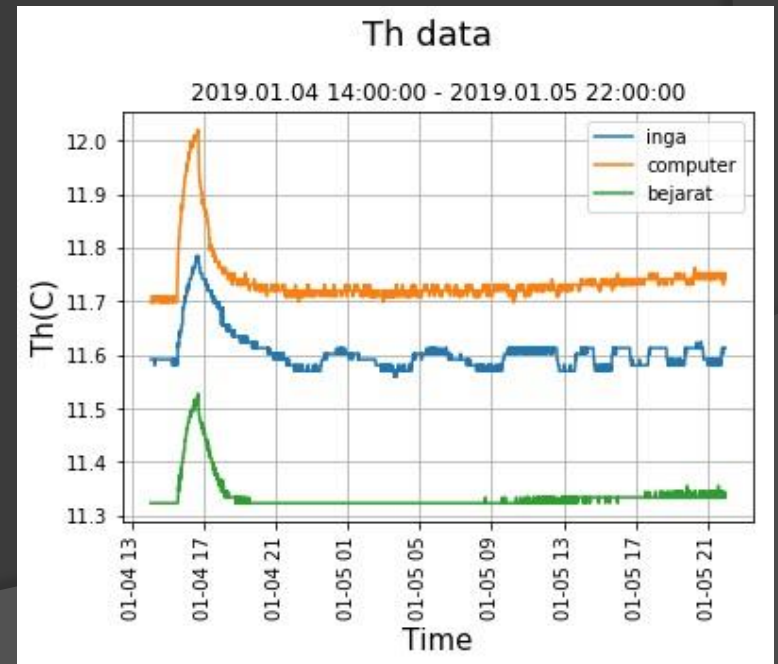
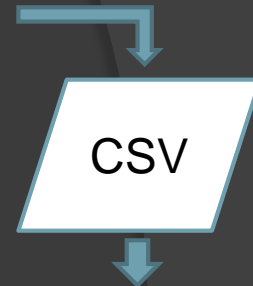
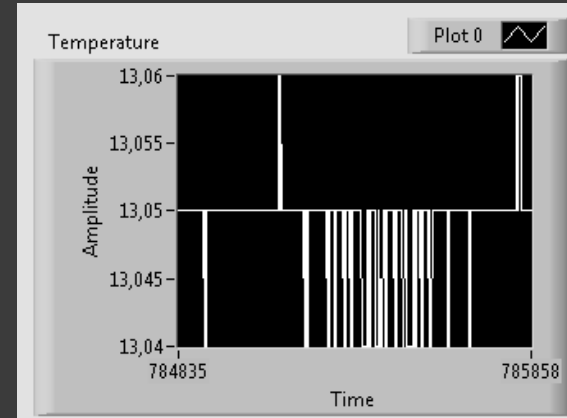
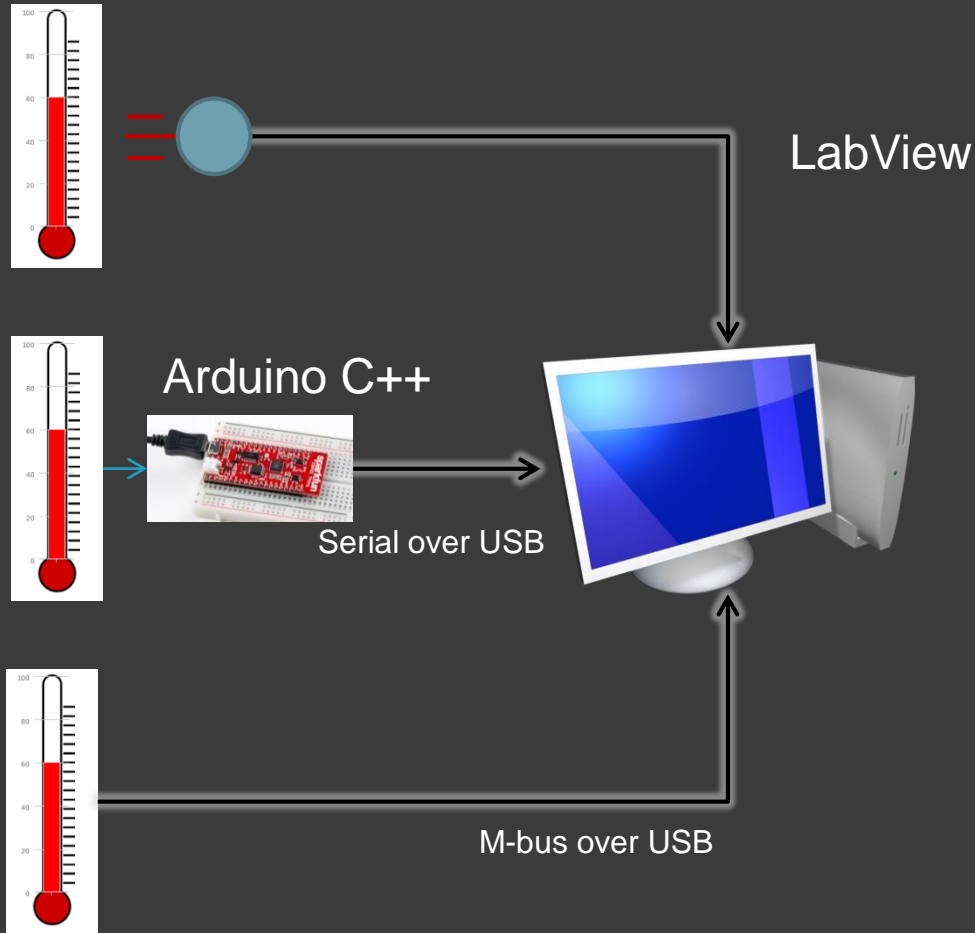
Java
sarxos
2x 1-4fps
1280x960

Python
Numpy, Matplotlib,
OpenCV

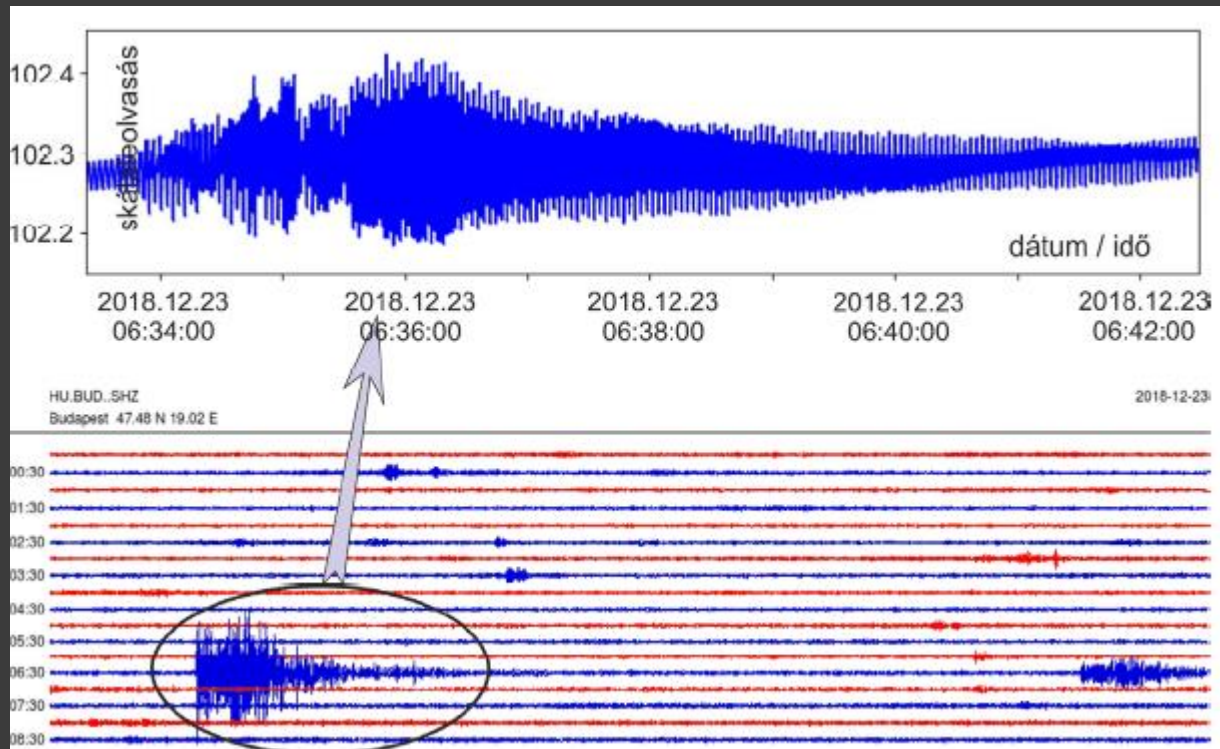
Python



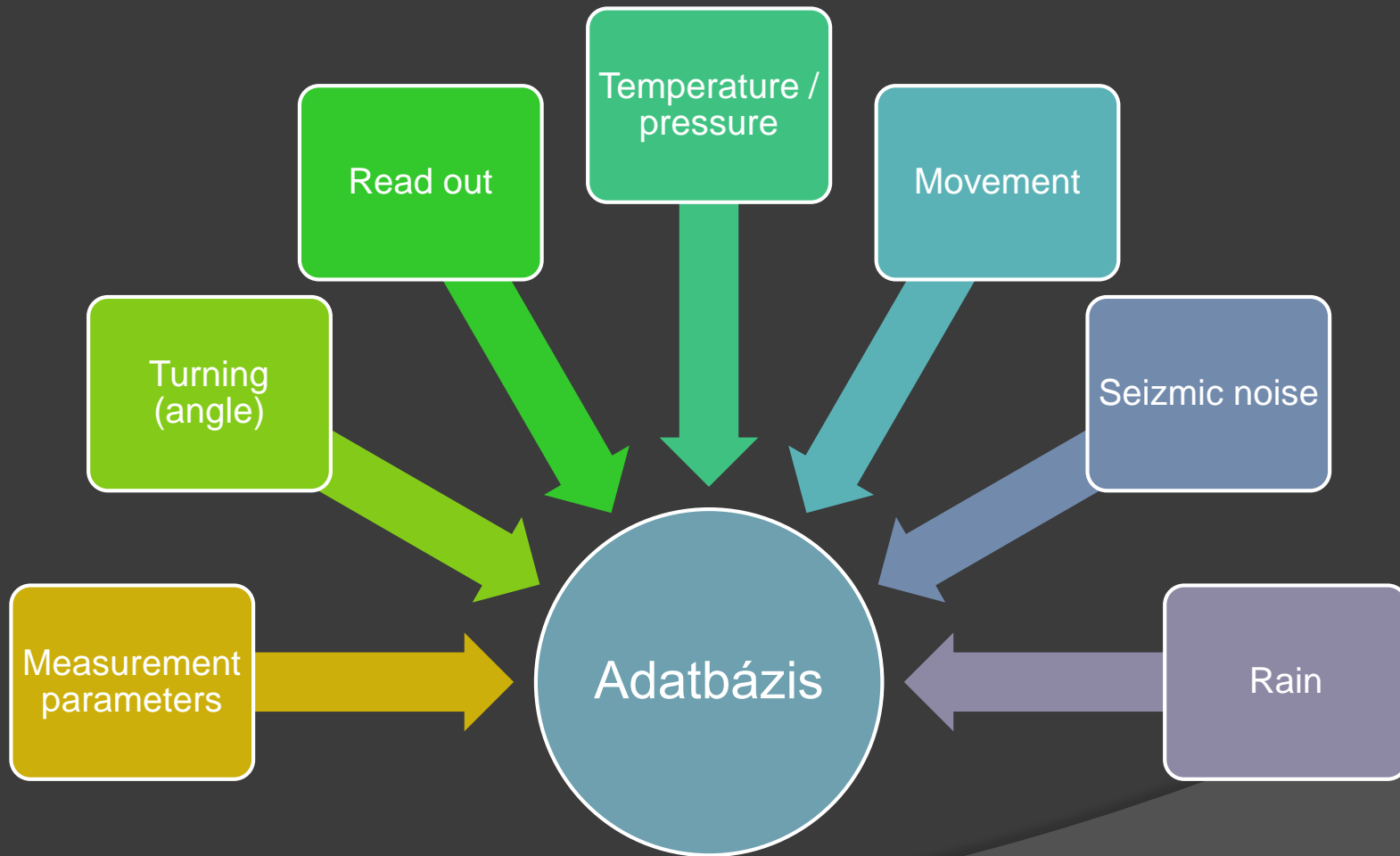
Collecting environmental data



Example: Serbian earthquake



How it all comes together?



Finally: The Janossy Underground Lab

