KM3NeT Positioning System Product Readiness Review

Catania November 11-13

Compasses Data Analysis

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General Summary

- Description of the Code
- Calibration type
- Results

Code steps

- Initial settings
  → import libraries utilized
  → Selection of Detector (ARCA/ORCA) and set of runs
  → Download of raw data
- Data cleaning
  → Delete data which are zero
  → Delete data which miss one, or more, component of A or H
  → Offsets

Code steps

- Data manage
  - → Calculate YPR or Quaternions components
  - → Calculation of mean data value
- Plotting time
  - → Plot of YPR or Quaterions
  - → plot of A and H components

Calibration Type

There are 3 different Calibration type:

- V1 → NO calibration
- V2 → Plane calibration (old)
- V3 → Wobbling calibration

NOTA! For the analysis it is also important mind about the Firmware version:

- FW >= 4.1 → GOOD!
- FW < 4.1 → BAD!

Situation for ORCA

- DU2

  FW=4.1

  calib = 2 → DOM: 4,5

  calib = 3 → DOM: 1,2,3,6,7,8,10,11,12,15,16

  FW = 0

  calib = 3 → DOM: 13,14,17,18

  ! No calib found → DOM: 9

- DU 3

  FW=4.1

  calib = 2 → DOM: 1,2,3,4,5,6,7,8,10,11,12,13,14,15,16,18

  calib = 3 → DOM: 9

  FW = 0

  calib = 3 → DOM: 17

- DU4

  FW=4.1

  calib = 2 → DOM: 16

  calib = 3 → DOM: 1,2,3,4,5,6,7,8,9,10,11,12,13,14,17,18

  ! No calib found → DOM: 15

- DU5

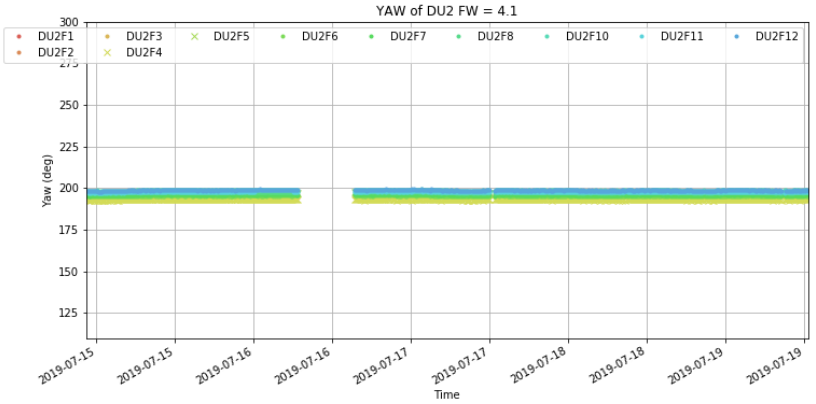
  FW = 4.1

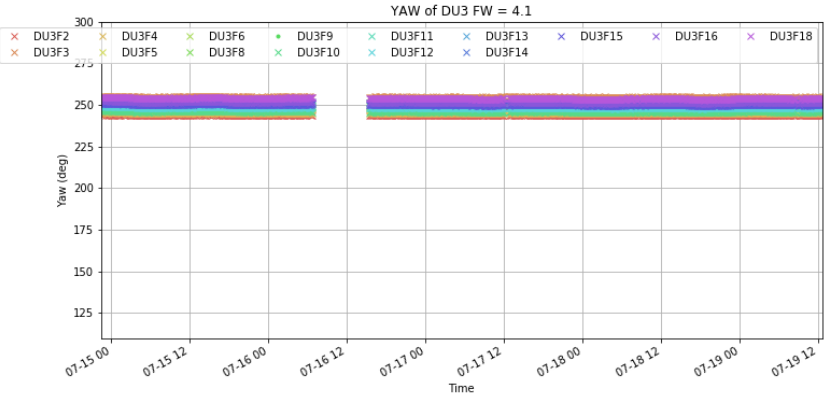
  calib = 3 → DOM: ALL! (→ a perfect DU?!?)

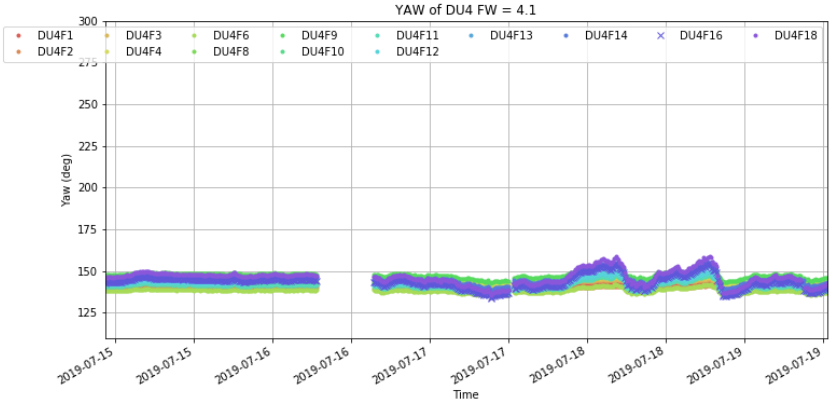
Results Summary

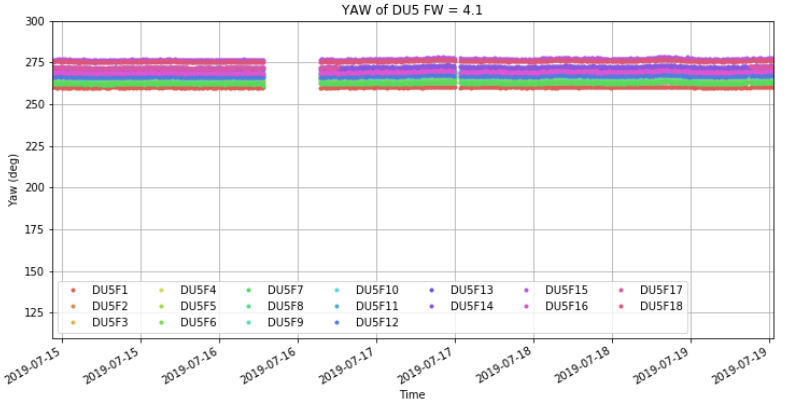
- Quiet period (Yaw, Pitch and Roll)
- Study of sistematic errors in a quiet period in “good” DOMs
- Strong sea current period

Quiet period → Yaw

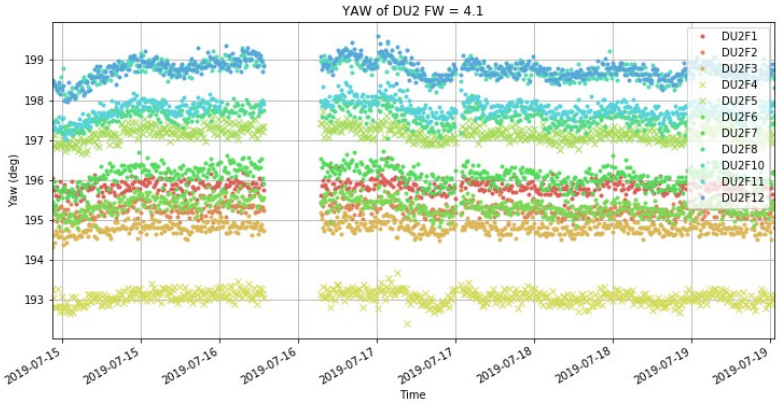


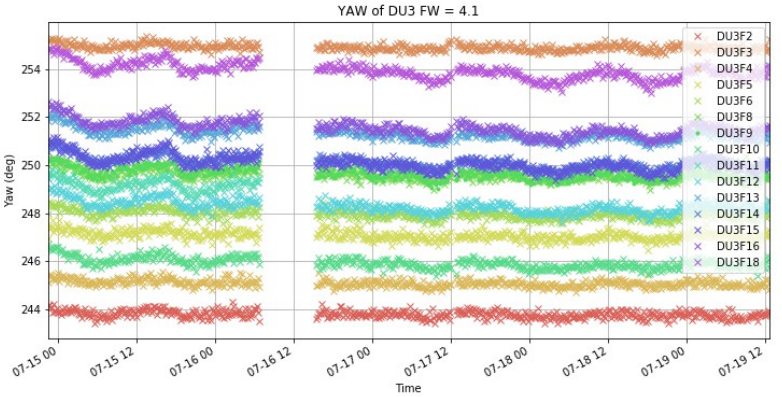


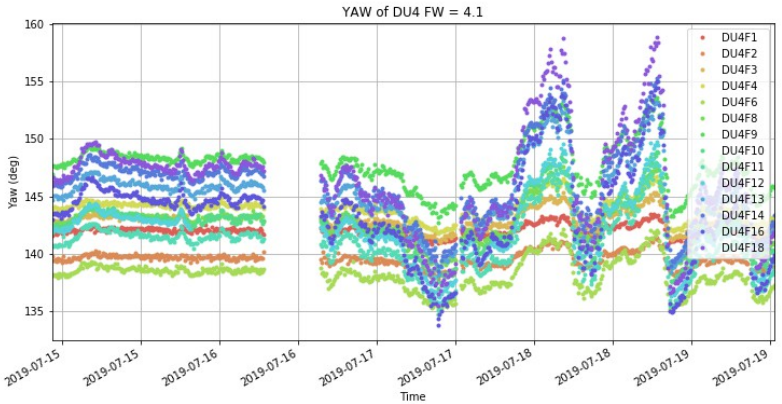


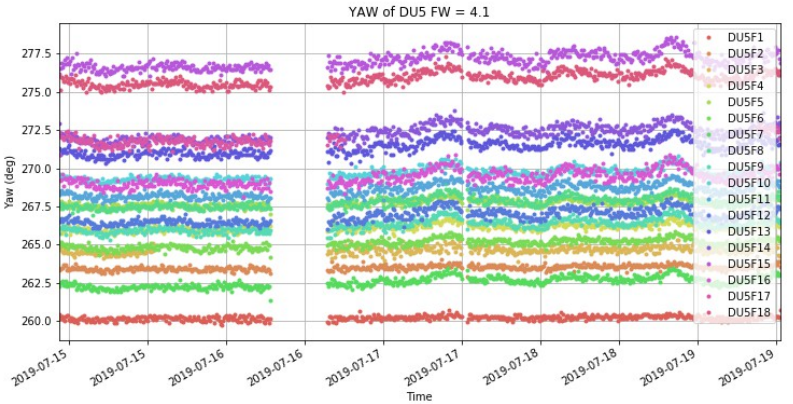


Quiet period → Yaw

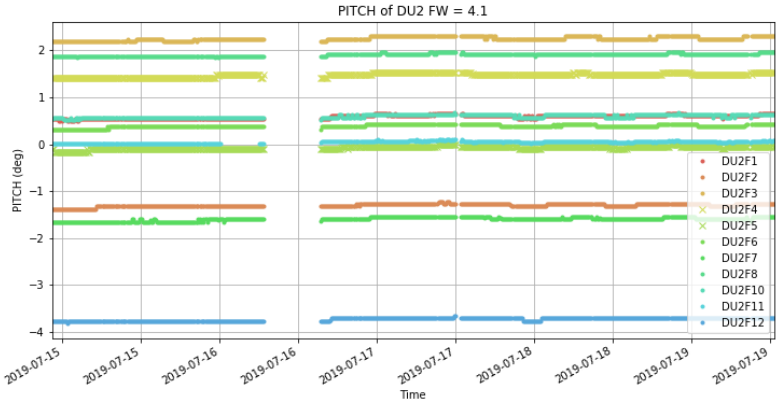


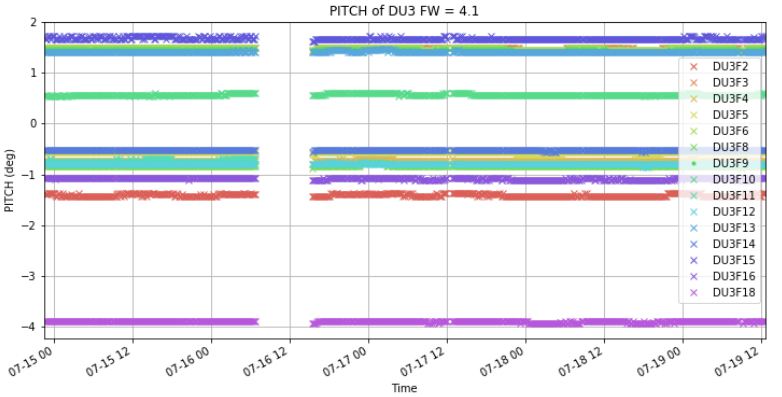


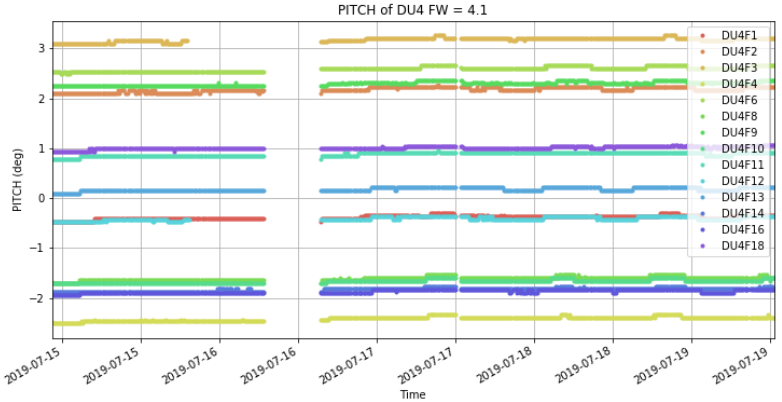


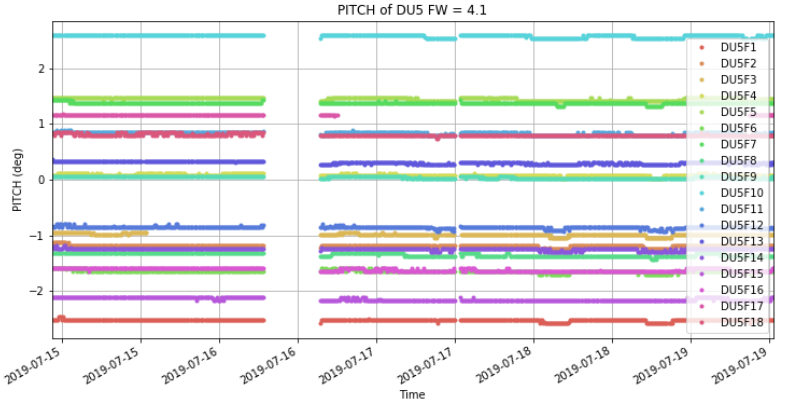


Quiet period → Pitch

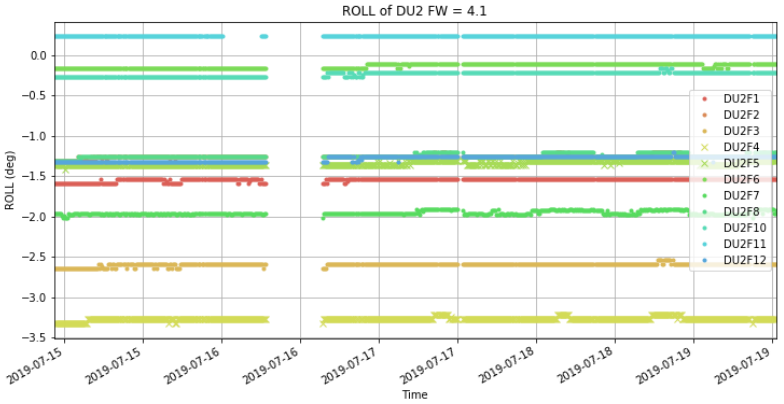


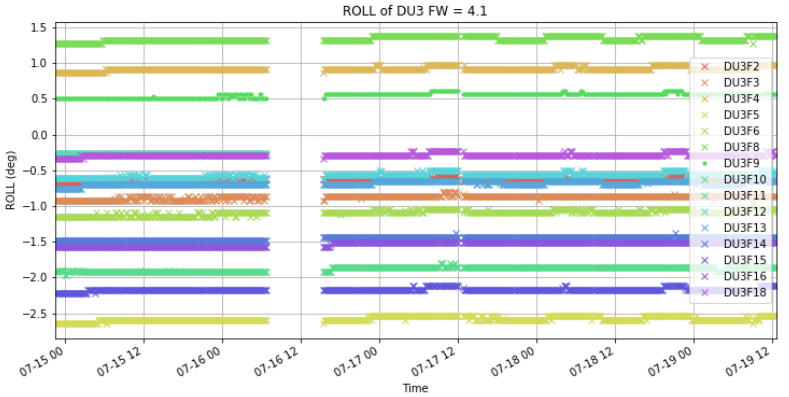


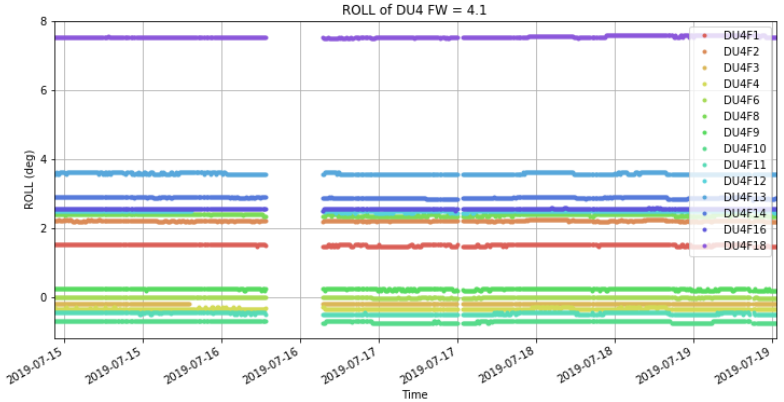




Quiet period → Roll



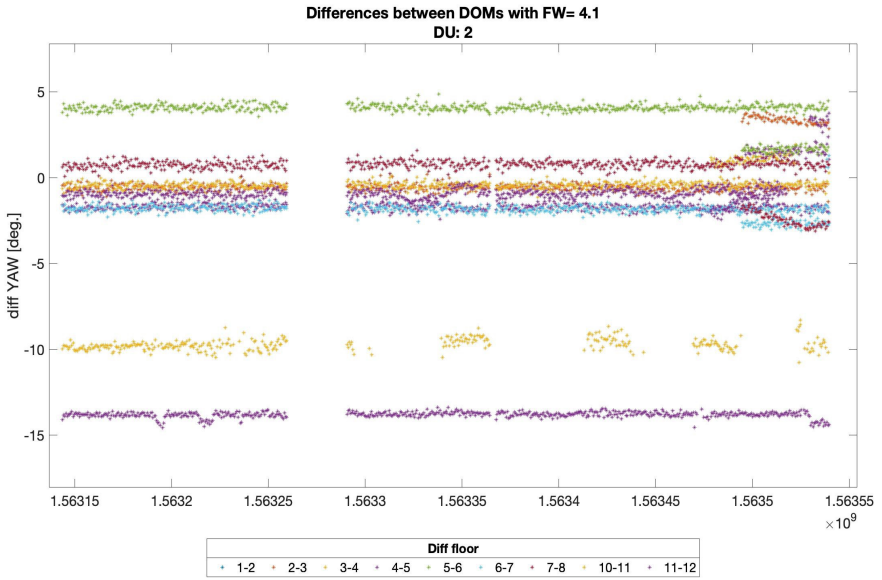


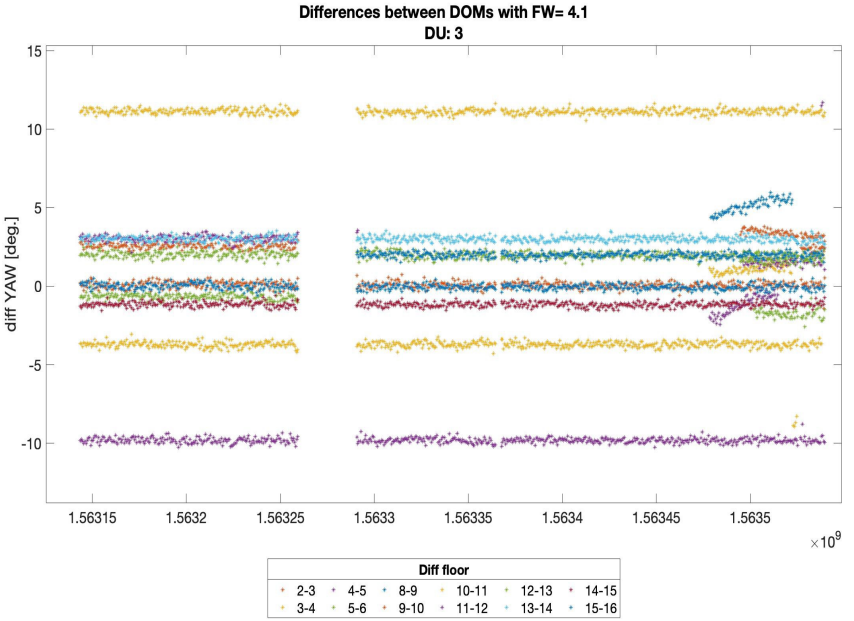


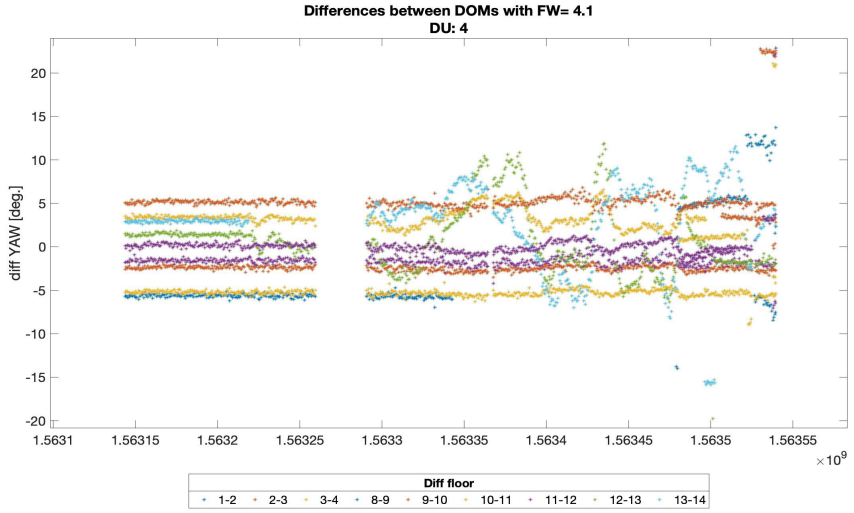
Study of sistematic errors

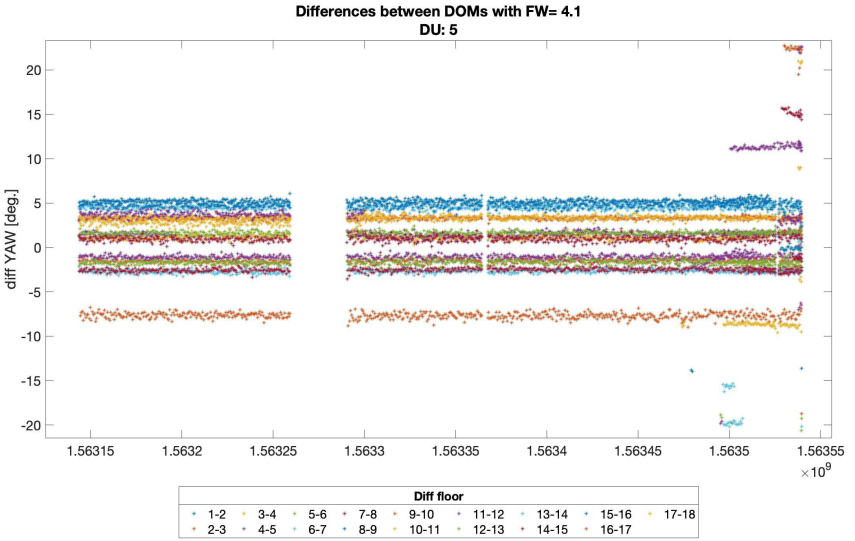
- Consider a period of data taking with no strong currents
- Consider only DOMs with last FirmWare and Calibration versions (called “good” DOMs)
- Study:
  $\longrightarrow$ calculate differences of yaw mean value between close DOMs for a quiet period
  $\longrightarrow$ calculate differences of yaw value between close DOMs for a quiet period

Plot of Yaw differences time by time

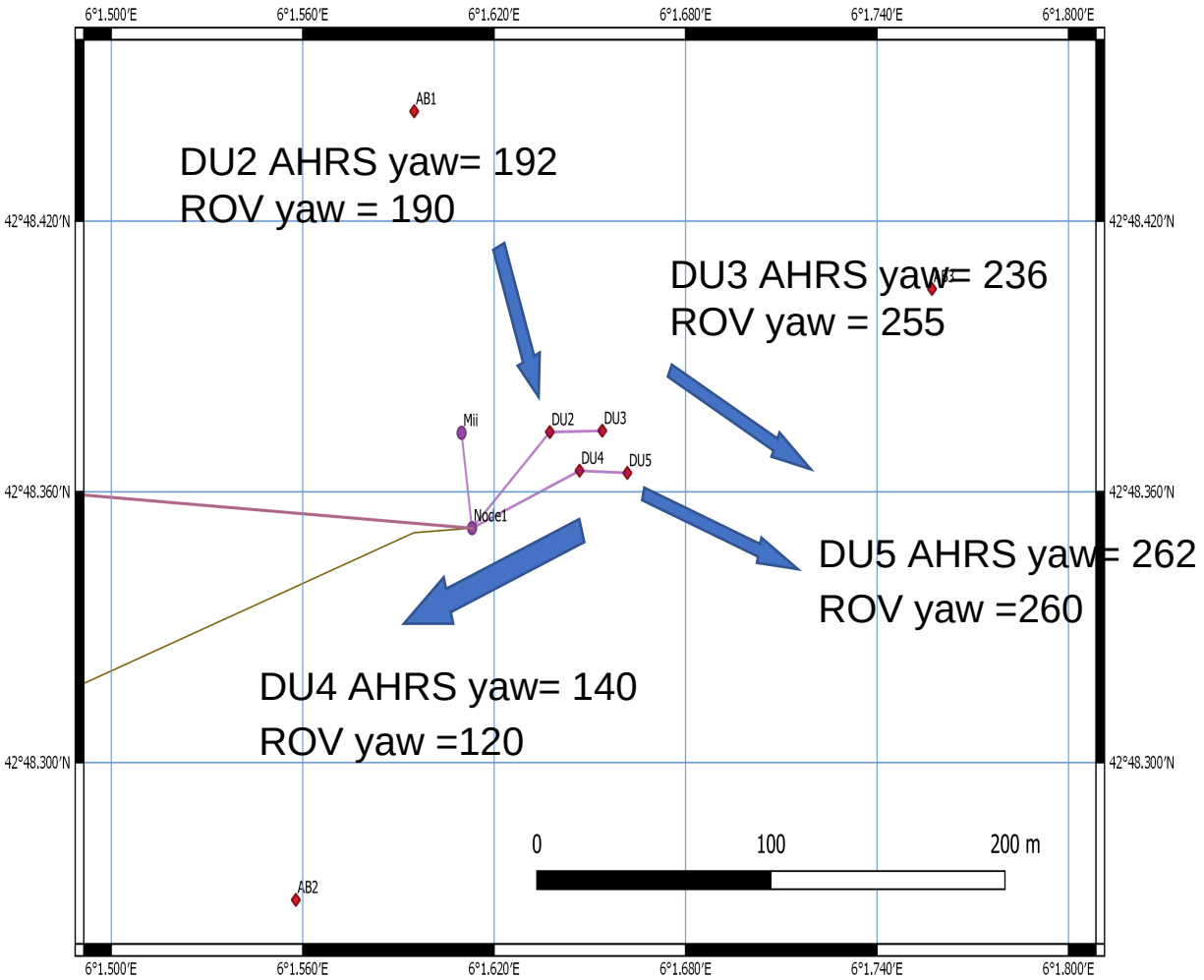




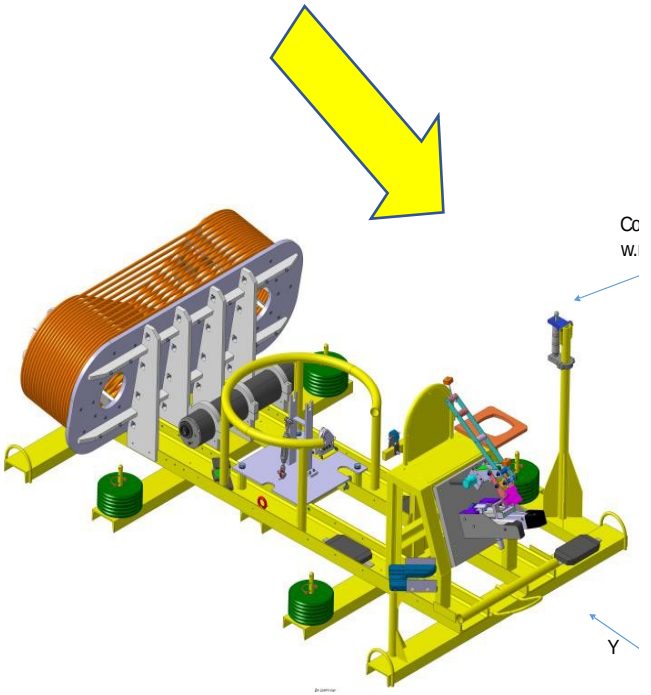




KM3NeT/ORCA Summer 2019



ROV orientation measurement



Strong sea current period