

'Unconventional' positioning

Global fit using all available data

Input:

- Tower Base position (nominal from FUGRO report)
- Beacons positions (nominal from FUGRO report)
- TOAs from ACSA (no floor 8 – ECAP piezos)
- TSSC (Time Spectral Spread Codes) for beacons recognition
- Distances between hydrophones in the same floor (measured during integration)
- Sound velocity (CTDs data)
- Depth Floor 1 (CTD1)
- Depth Floor 7 (CTD7)

Initial Guess:

All hydrophones placed at TowerBase center (in x-y plane) and expected depths (z from CTDs data)

The code finds iteratively a root (zero) of a system of nonlinear equations

NO UNIQUE SOLUTION !!!

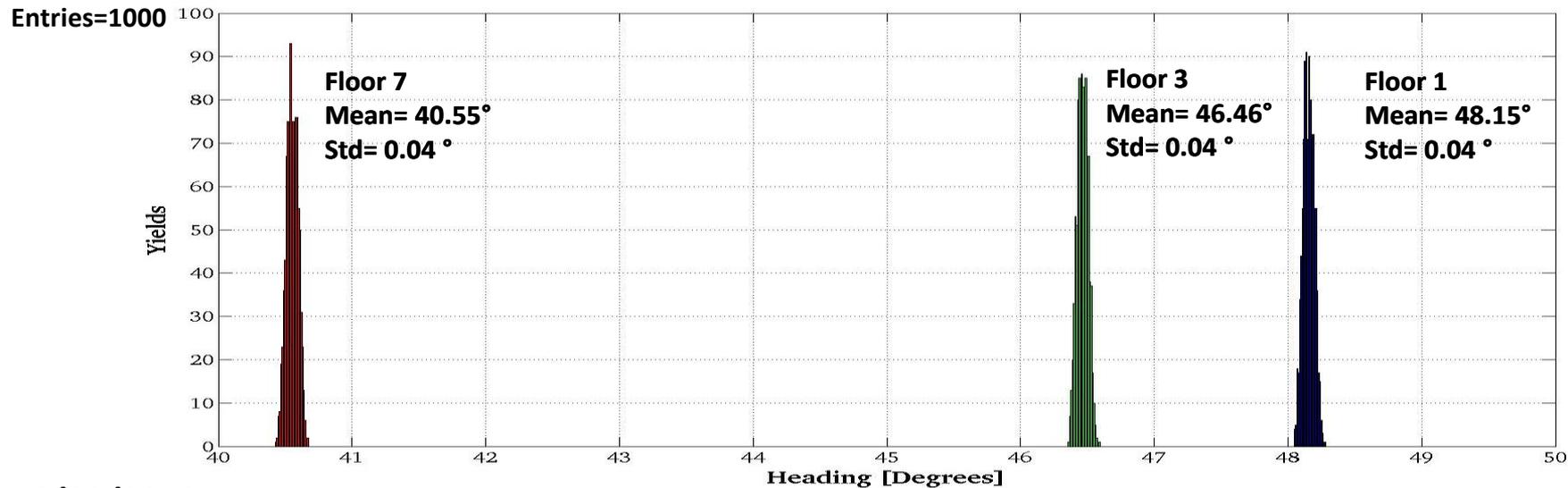
Method #1: MonteCarlo on positioning accuracy

Adding uncertainties... (optimistic)

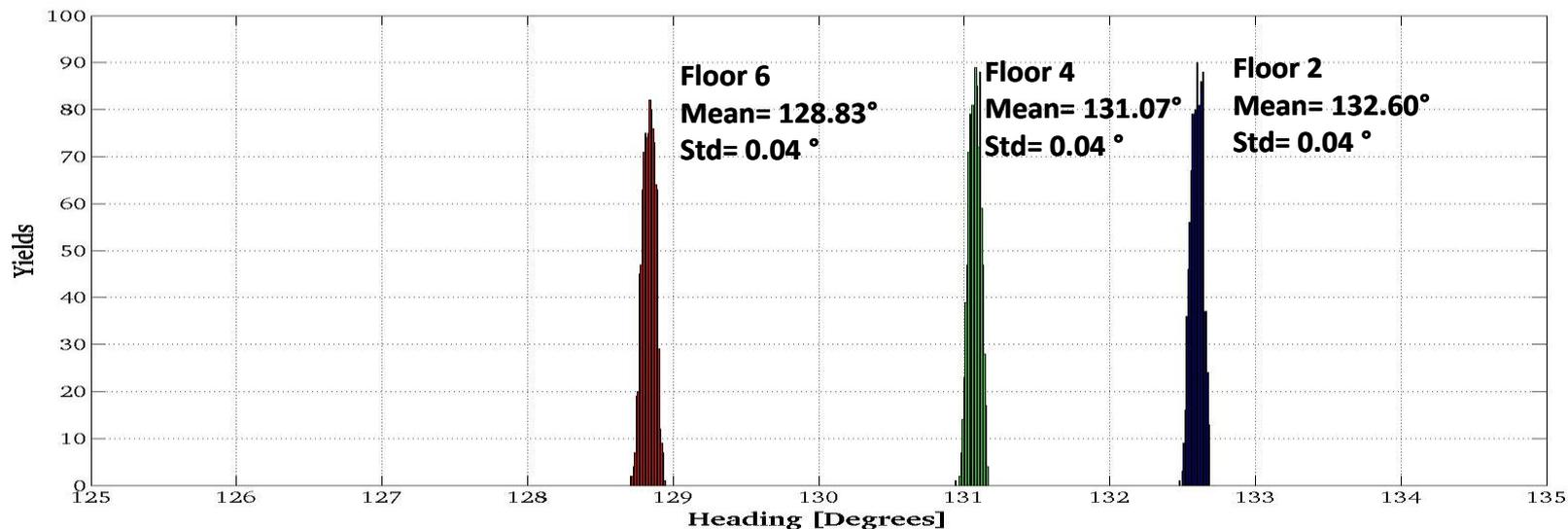
Assumptions:

- **External beacons position accuracy**
 - Easting: ± 0.5 m
 - Northing: ± 0.5 m
 - Depth: ± 0.5 m
- **Towerbase beacon position accuracy**
 - Easting: /
 - Northing: /
 - Depth: ± 0.5 m
- **Floor 1 depth error: ± 0.5 m**
- **Floor 7 depth error: ± 0.5 m**
- **Hydrophones distances on the same floor: ± 0.01 m**

Method #1: MC results for an optimistic case



16/09/2013
00:00 UTC



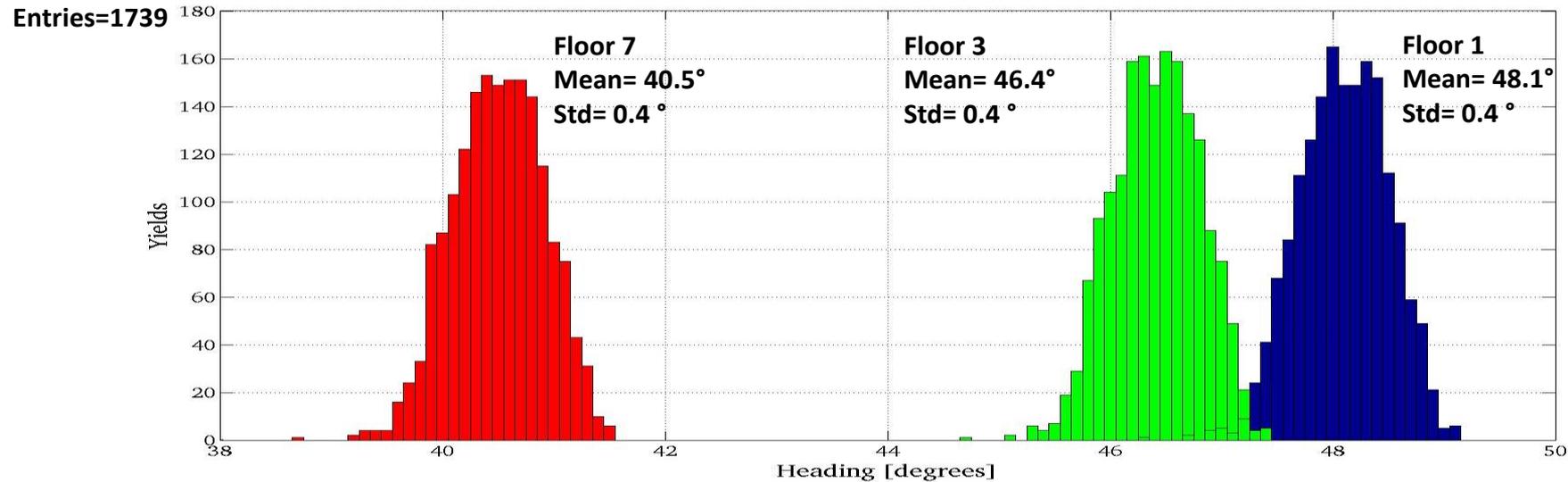
Method #1: MonteCarlo on positioning accuracy

Adding uncertainties... (pessimistic)

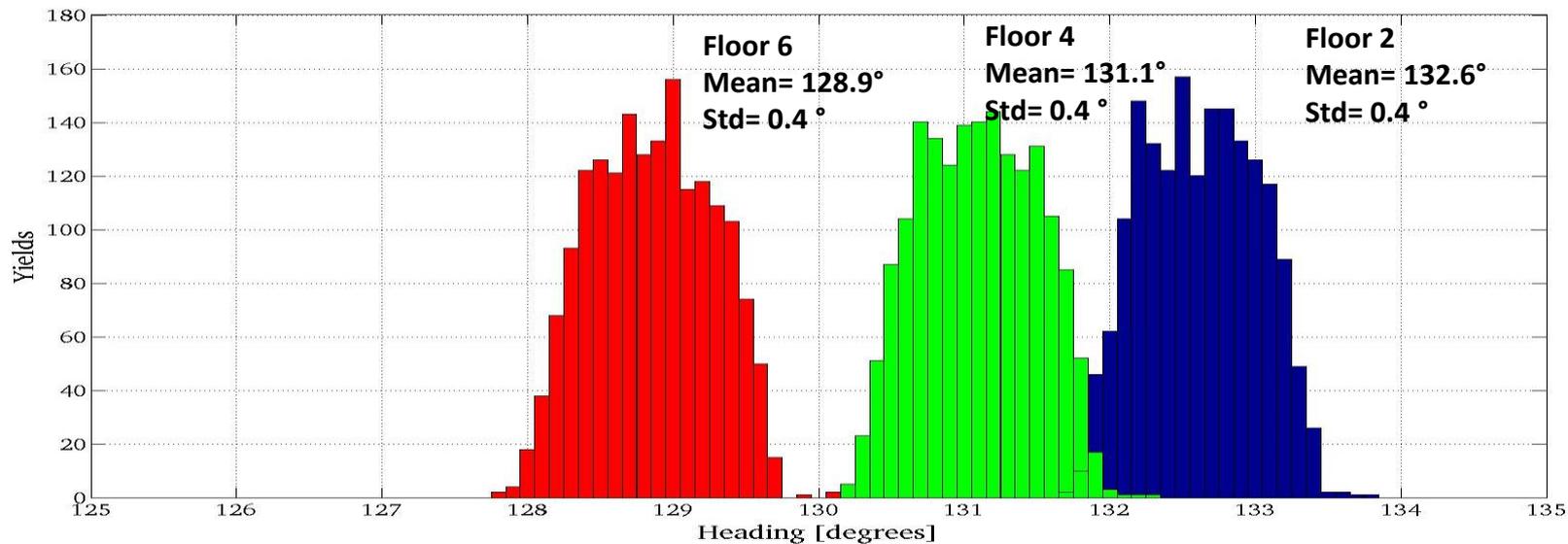
Assumptions:

- **External beacons position accuracy**
 - Easting: ± 5 m
 - Northing: ± 5 m
 - Depth: ± 5 m
- **Towerbase beacon position accuracy**
 - Easting: /
 - Northing: /
 - Depth: ± 0.5 m
- **Floor 1 depth error: ± 3 m**
- **Floor 7 depth error: ± 3 m**
- **Hydrophones distances on the same floor: ± 0.01 m**

Method #1: MC results for a pessimistic case

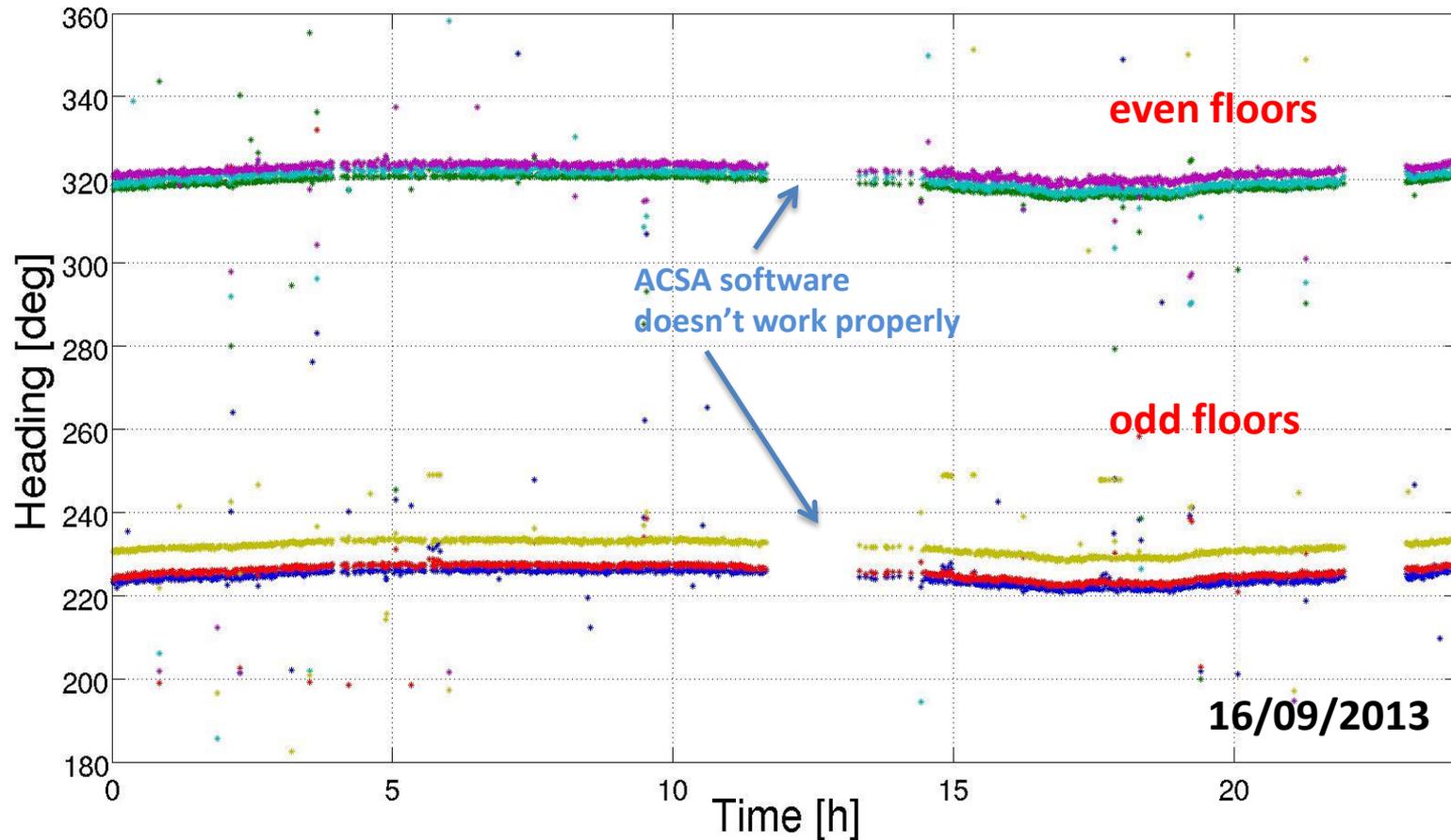


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Acoustic reconstruction: heading

Floors heading from ACSA ToAs (Time of Arrival):



Comparison with compass data

