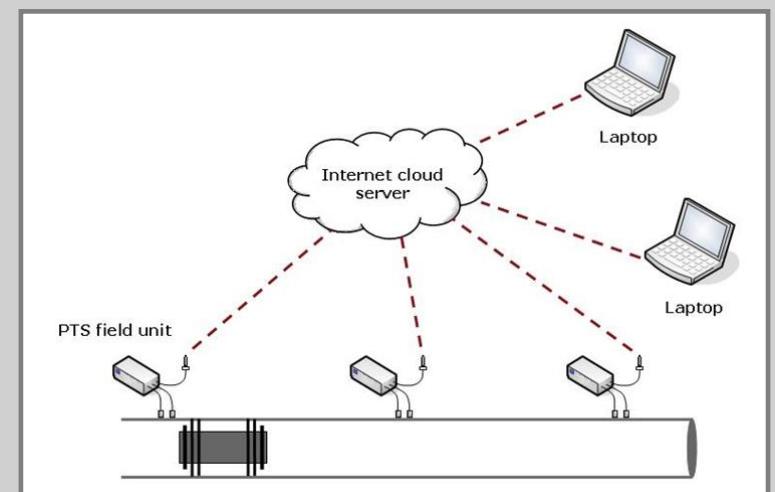


Development and implementation of a real time pig tracking system.

Jelle Krouwel, N.V. Nederlandse Gasunie

IGRC Copenhagen, september 2014



Goal and agenda of presentation

- Goal
 - Inform about development of new tool
 - Share some lessons we learnt
- Agenda
 - What pigging is
 - Why tracking pigs is important
 - How we did it in the past
 - What we learnt along the road
 - Final product

Pigging



16" Inspection pig, photo courtesy of Baker Hughes PMG

Keeping track of pigs is important

- Tracking information: pigs current speed and position.
- Position information is used for:
 - Keep track during run
 - Estimate arrival time
 - Operate valves, etc.
 - Locate stopped/ stuck pig and determine appropriate actions
 - Direct search effort for lost pig
- Speed information: intelligent pigs work best within a certain speed range. Utility pigs ?
- More important in complex grids, smaller diameters, first run.

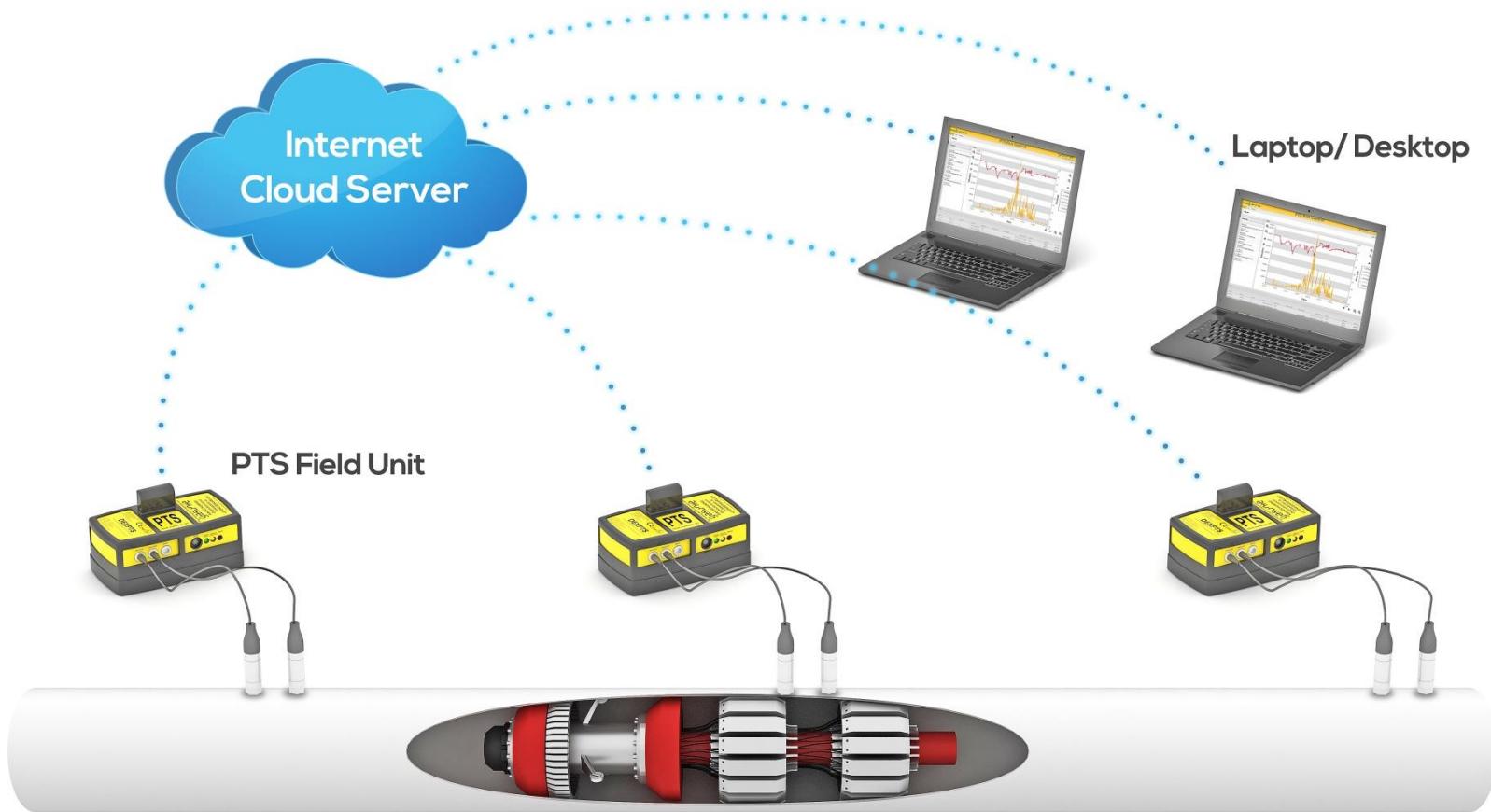
Pig tracking: previous approach Gasunie

- Run leader + mobile tracking crew
- Tracking crew: on valve stations with geophones and pressure transmitters.
- Speed is derived by interval between audible weld passage 
- Speed is derived by valve station passages (line section)
- Station passage and estimated speed is transmitted by telephone
- Run leader has to process this information for decision making
- Disadvantages:
 - Information is subjective, incomplete and delayed
 - Laborious process

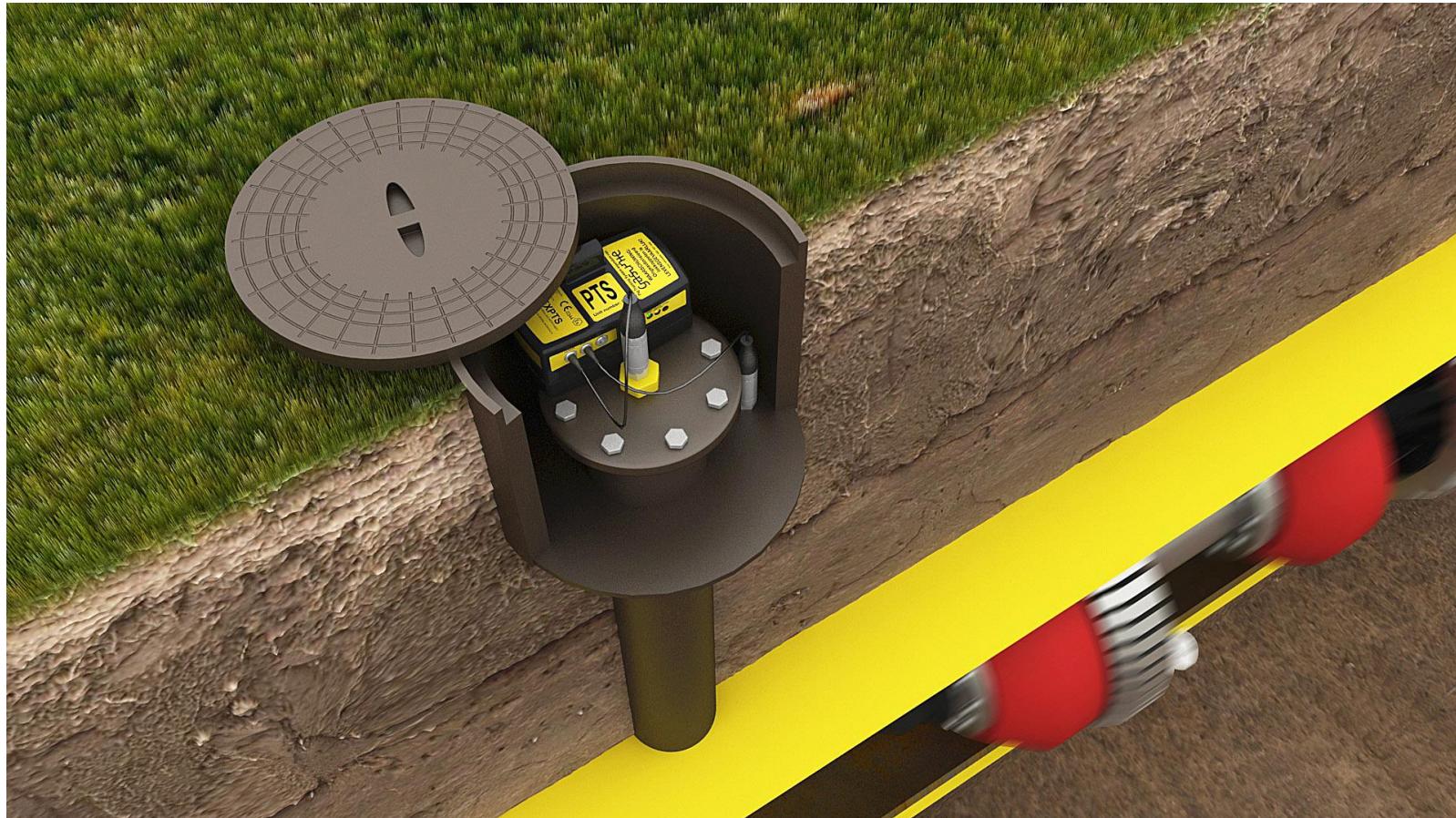
Some crucial points during the development

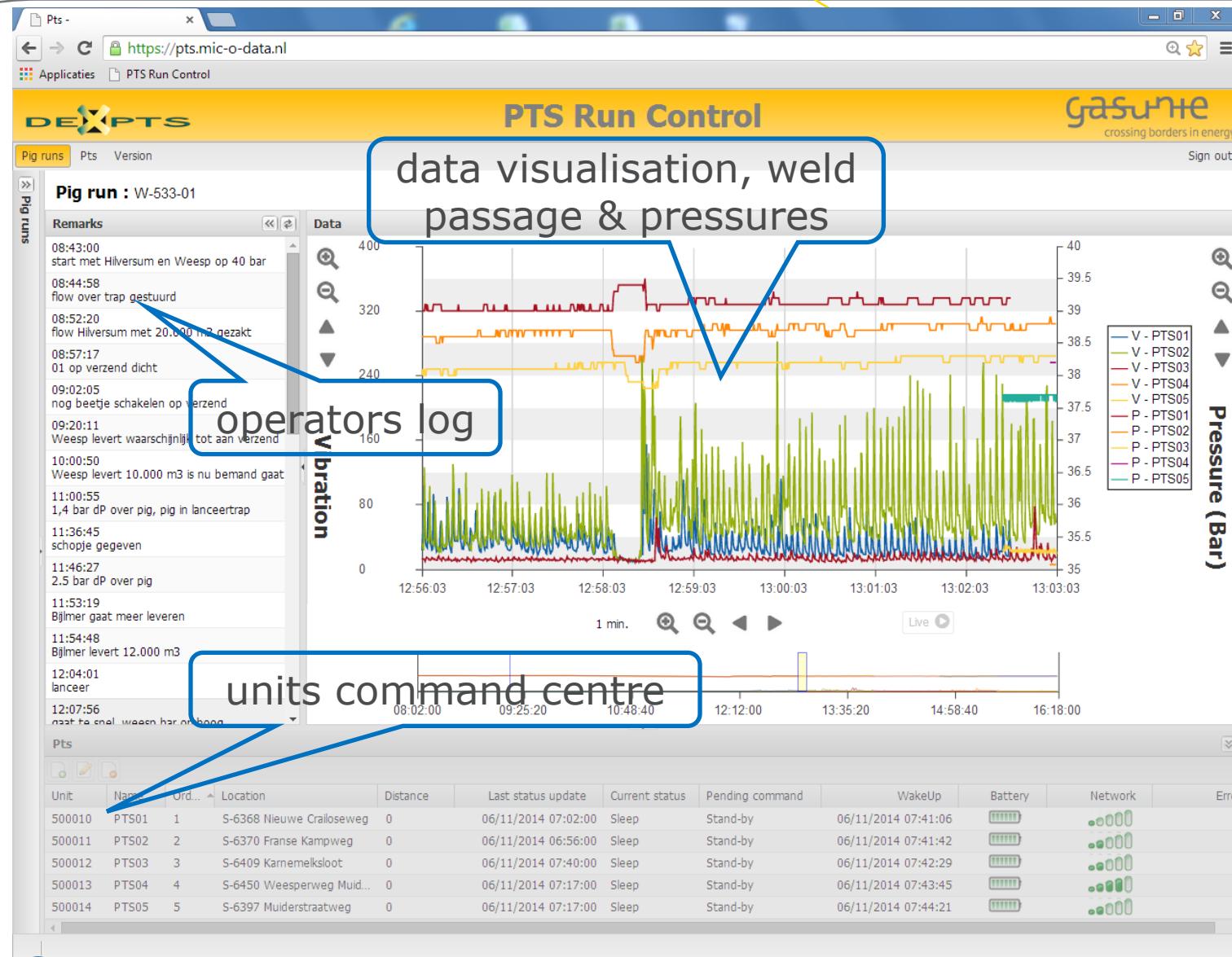
- The initial **idea** of combining a geophone with a telephone was the start of the project.
- Project **took** way **longer** than anticipated (first estimate: half a year, realisation two year).
- We needed **more money** than anticipated ;-(
- Transmitting processed data in stead of audio (**teach computer** how to distinguish welds from noise).
- Hold point: change of contractor; Brutal but Brilliant!
- ATEX certification for small batch of units...
- Different power modes to increase battery life

PTS System lay out

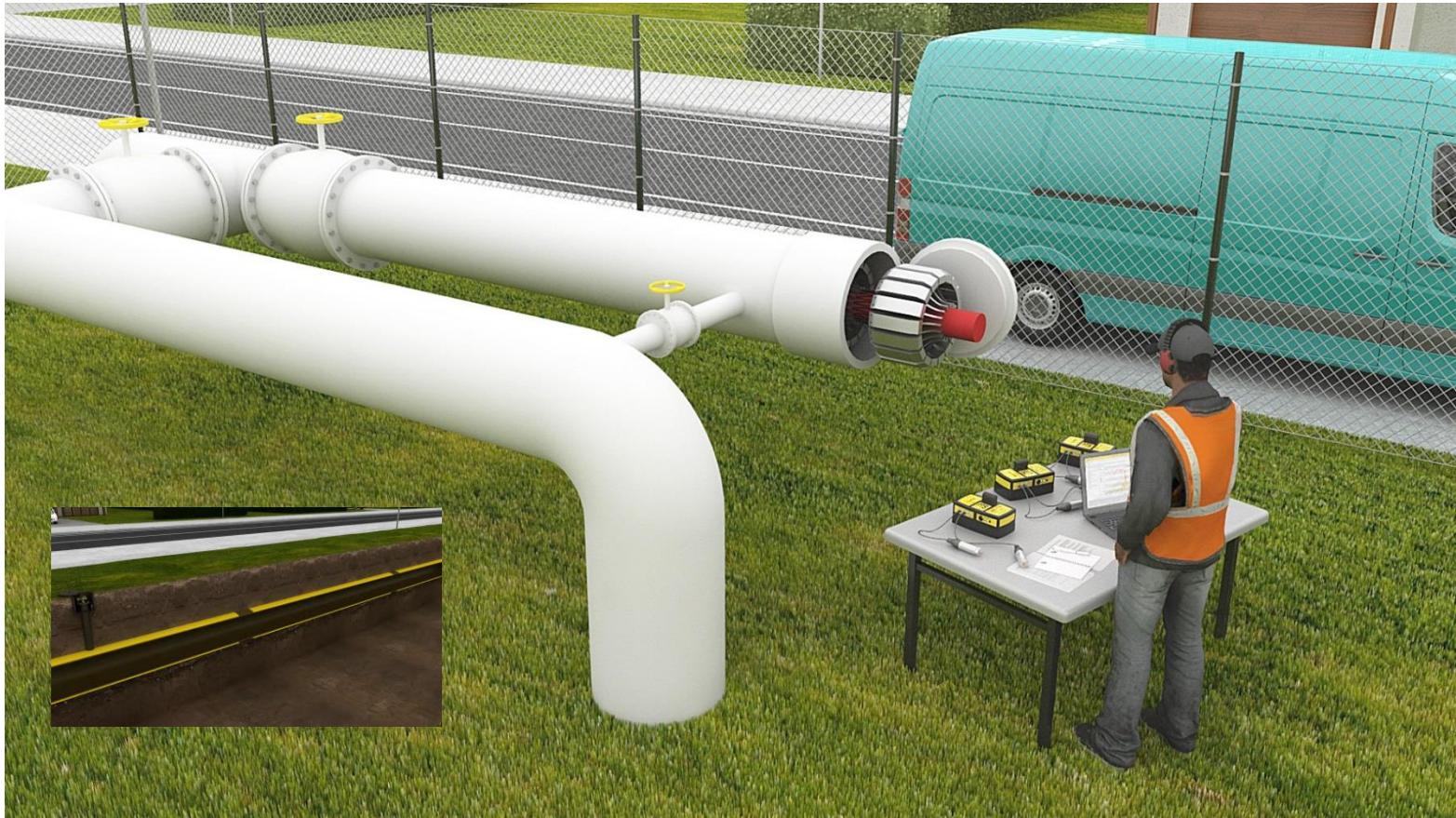


DexPTS field unit





Animation of system



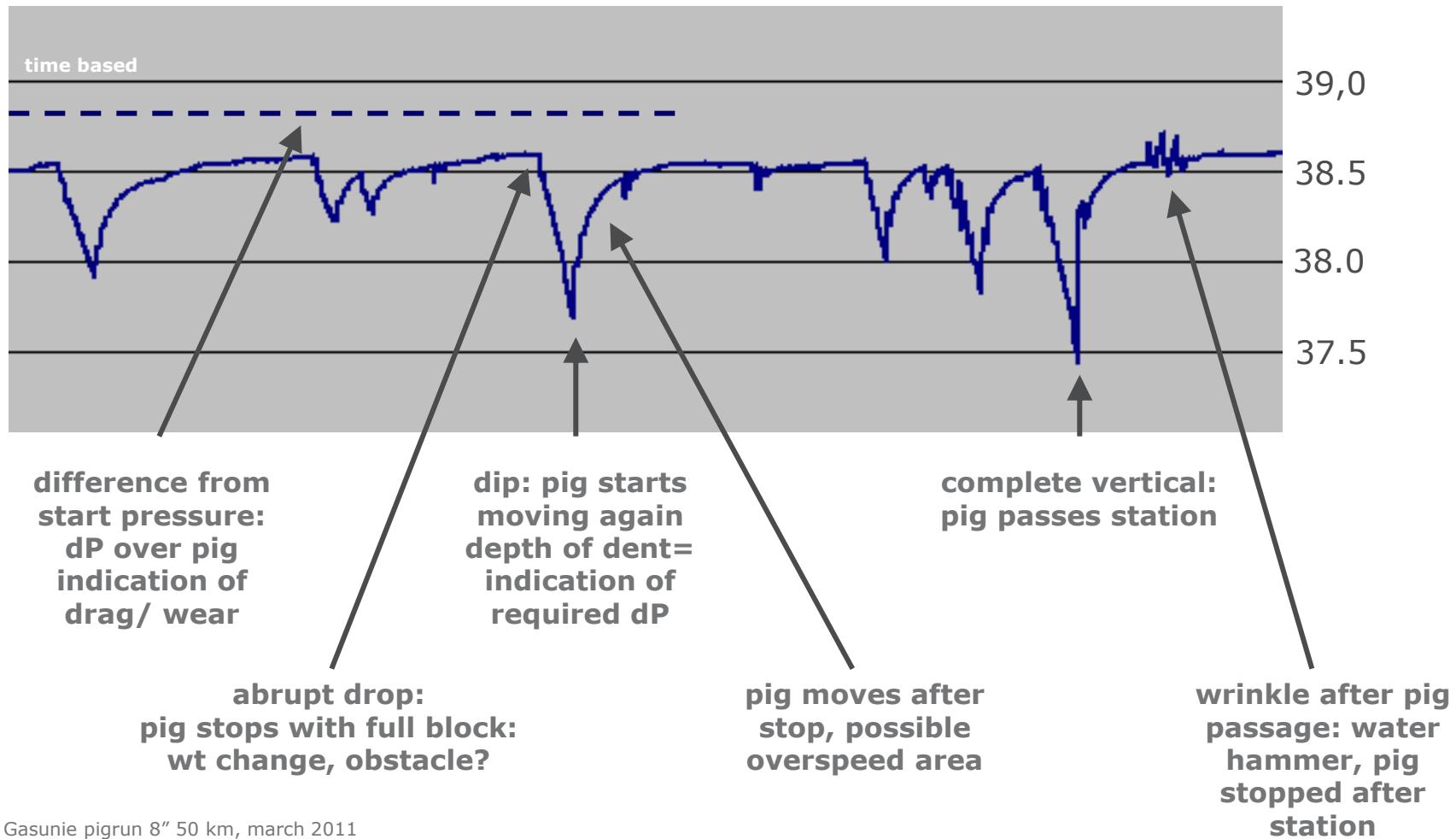
Thank you for your attention!

Additional slides

Additional points

- Range? Dependent on sensor mount!, medium, line pressure, diameter, type of pig, etc. etc.
- Range? Our rule of thumb: line diameter in kilometre (= safe)
- Very powerful tool but operator needs knowledge of pipeline, pigging and PTS system itself.
- Reduces manpower requirements significantly.
- Subject to theft?
- Increases sense of control, success rate of runs.
- As all stops are visible you might become nervous...
- Installing the units requires manpower.
- Some issues in area's with poor GSM network coverage.

What detailed pressure visualisation can tell



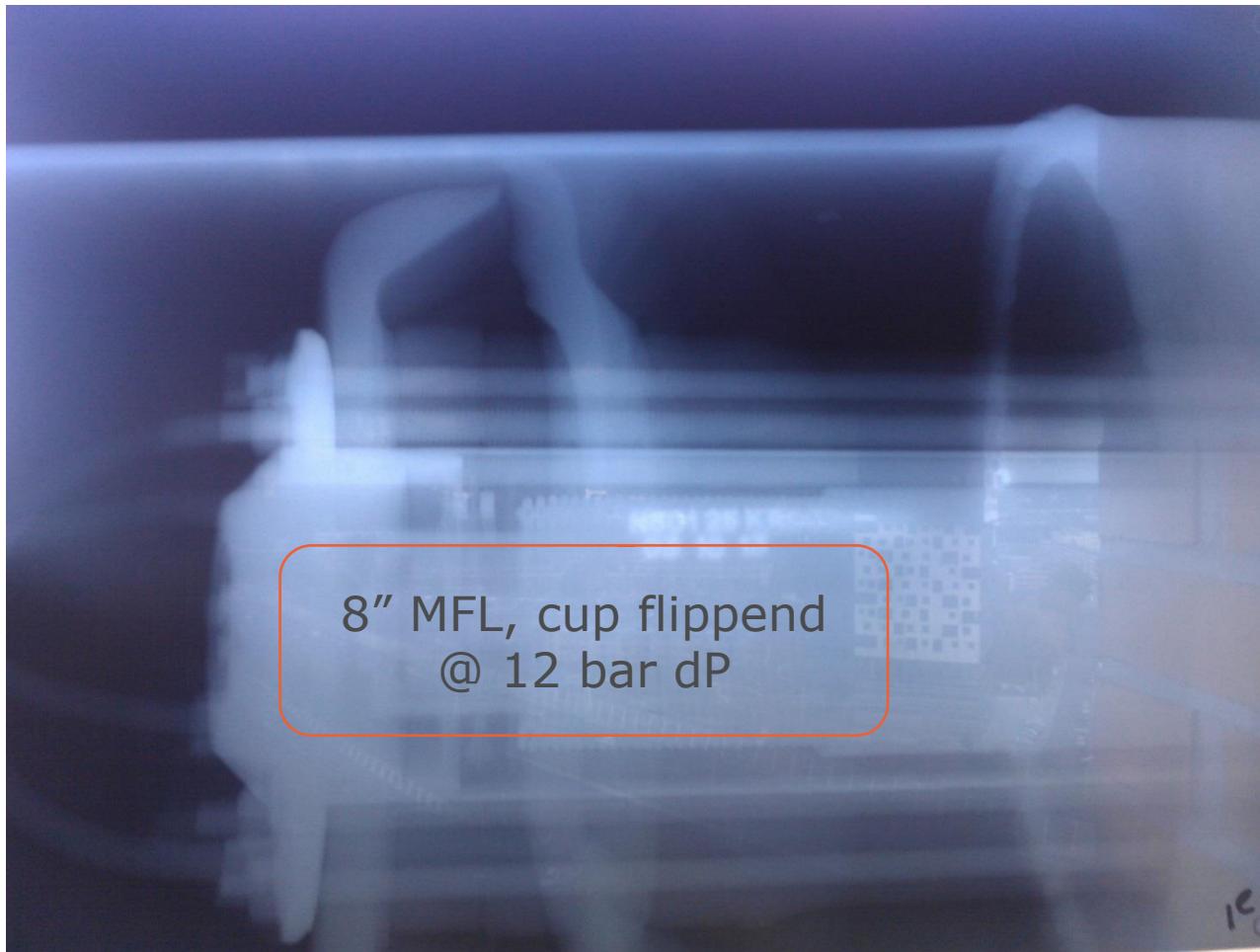
Recap: Pig Tracking System?



Typical valve pit where unit will be placed



Stuck 8" pig located spot on with PTS



(part of) Gasunie 40 bar grid (all piggable)

