FLOODEX 2016

Benefits of water level radars are out in the open

Looking Forward VEGA

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Looking Forward VEGA

Introduction

VEGA

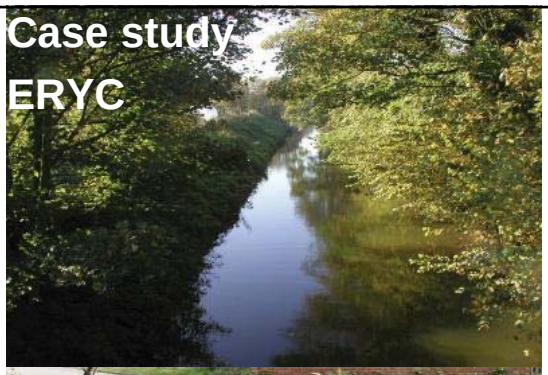
Founded in the Black Forest in 1959. UK since 1982. Worldwide process instrumentation company.

Specialists in Level & Pressure measurement technology. Leaders in RADAR level measurement

The challenge . . .

. . . reliable flood level monitoring in diverse environments.

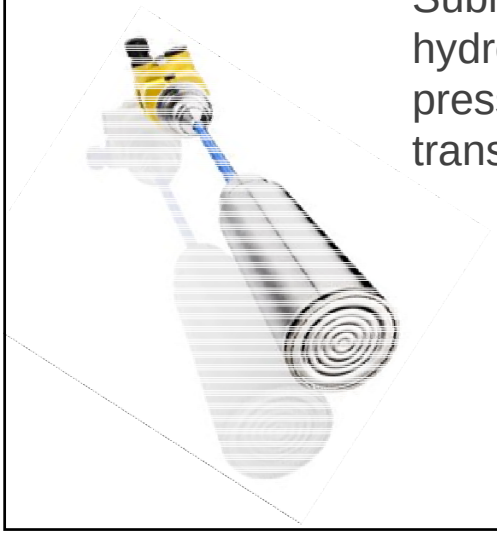
Case study
ERYC



ERYC monitoring

- Data gathering system
- Outstations
- Information distribution
- Information uses

Traditional level sensors



Submersible hydrostatic pressure transmitters

Ultrasonic level transmitters

ERYC experience

- Submersible hydrostatics were most common technology
- Typical installation
  - In conduit
- High maintenance
  - Silting
  - Damage when in spate
  - Freezing issues
  - Mechanical drift of cell

ERYC Experience

- Ultrasonics were used where hydrostatics were unsuitable
- Benefits of being non-contact
- However, transducers needed cleaning
- “Loss of echo” spikes caused by condensation, dirt & high winds
- False alarms & call outs

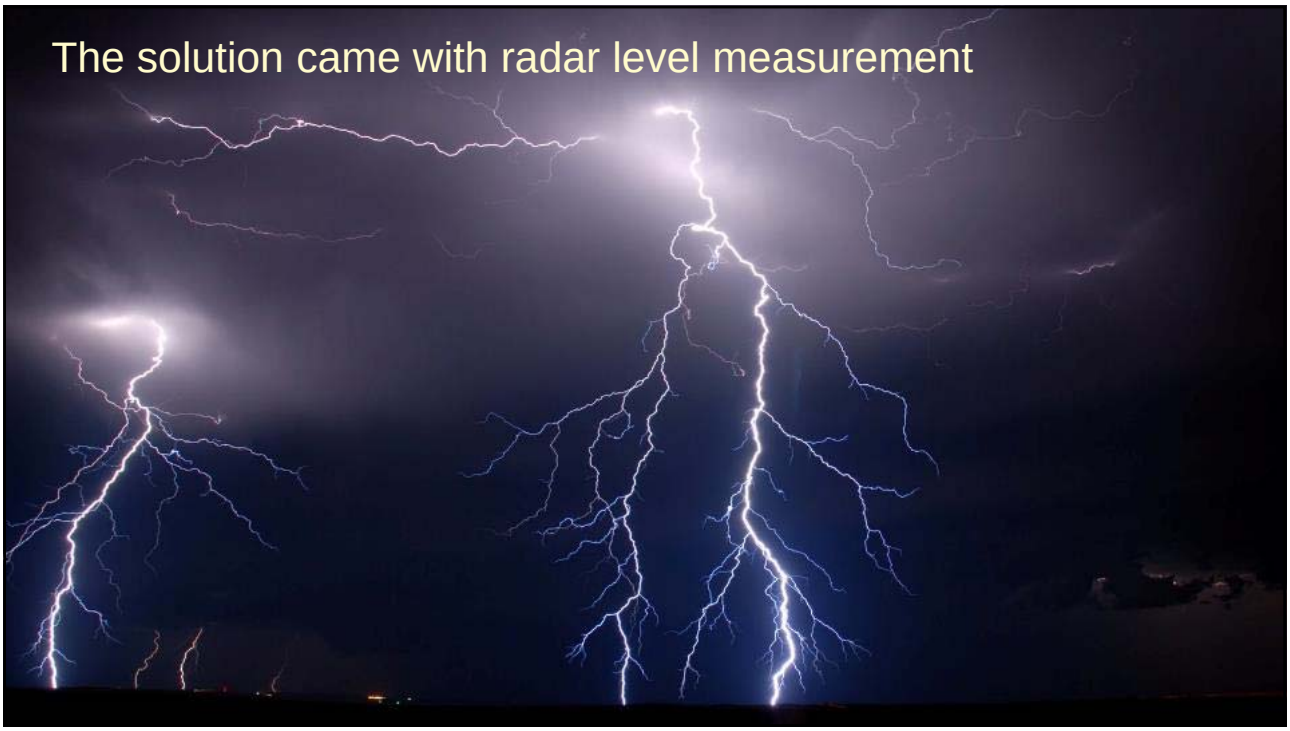
Tidal inlet - Humber

- Hydrostatic Level
  - Unsuitable due to tidal flow and silting
  - Sensor materials need to be suitable for salt water environment
- Ultrasonic Level
  - Sound signal affected by wind and direct sunlight.
  - Stilling tubes have been used on similar applications – significant installation and maintenance costs

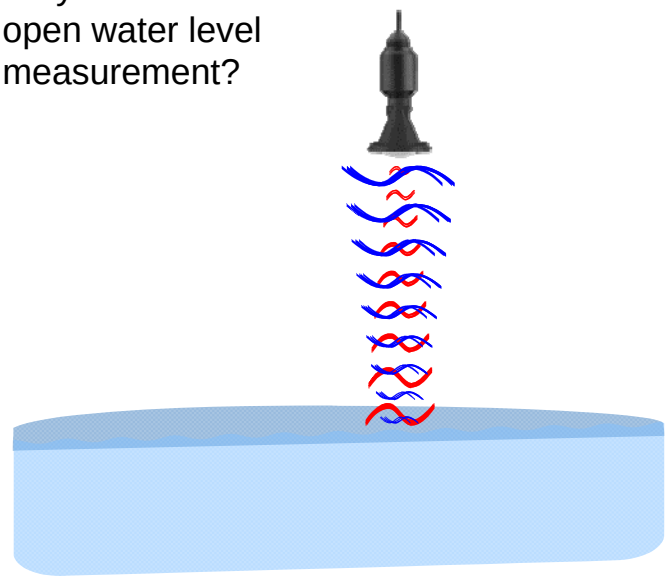
River Aire

- Hydrostatic Level
  - Unsuitable due to nature of the river bank
  - Difficult and potentially dangerous to install and maintain from bridge structure
- Ultrasonic Level
  - Measurement range 10-12 metres off bridge structure
  - Long range for ultrasound
  - Sound signal badly affected by wind over longer range

A more reliable measurement technology?



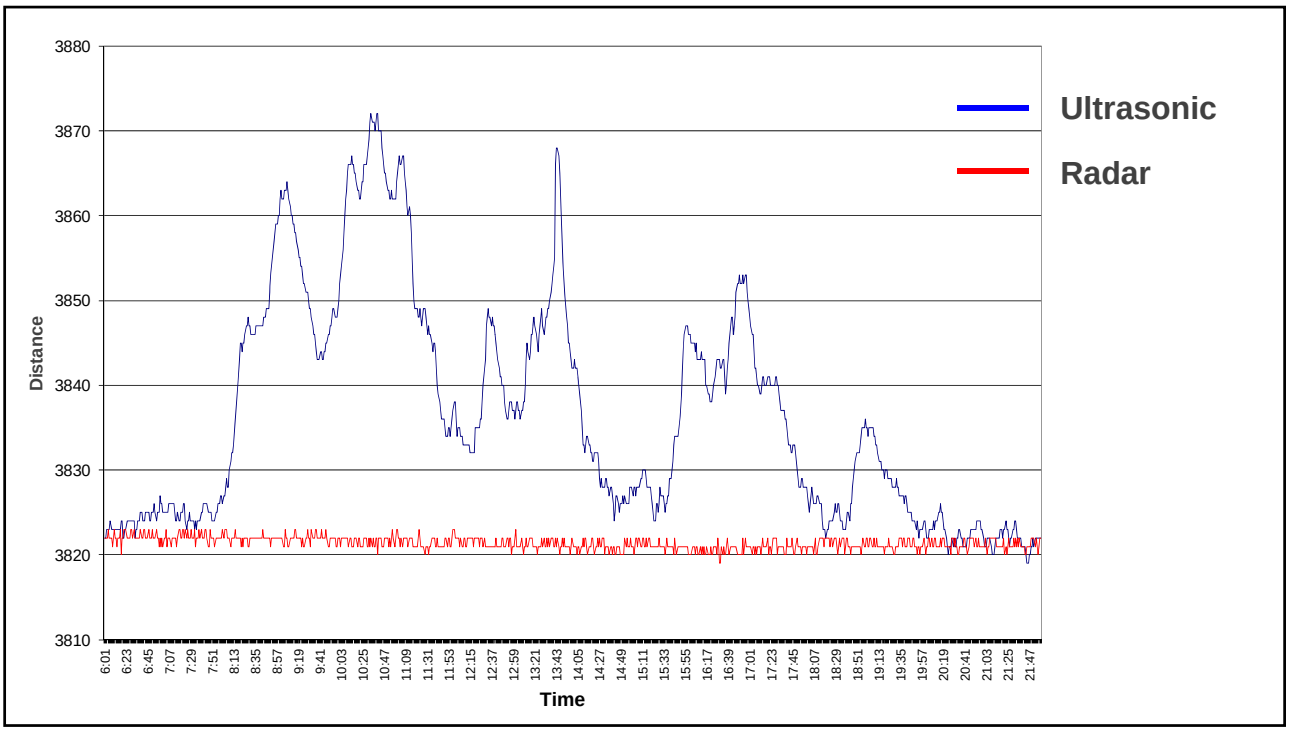
Why use radar for open water level measurement?



- ✓ Non-contact
- ✓ Simple installation

RADAR is virtually unaffected by the following conditioning :

- ✓ **temperature**
- ✓ **direct sunlight**
- ✓ **wind**
- ✓ **rain**
- ✓ **frost**
- ✓ **silting**
- ✓ **foam influence**
- ✓ **waves**


Distance
3880
3870
3860
3850
3840
3830
3820
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6:01
6:23
6:45
7:07
7:29
7:51
8:13
8:35
8:57
9:19
9:41
10:03
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10:47
11:09
11:31
11:53
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12:37
12:59
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13:43
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15:55
16:17
16:39
17:01
17:23
17:45
18:07
18:29
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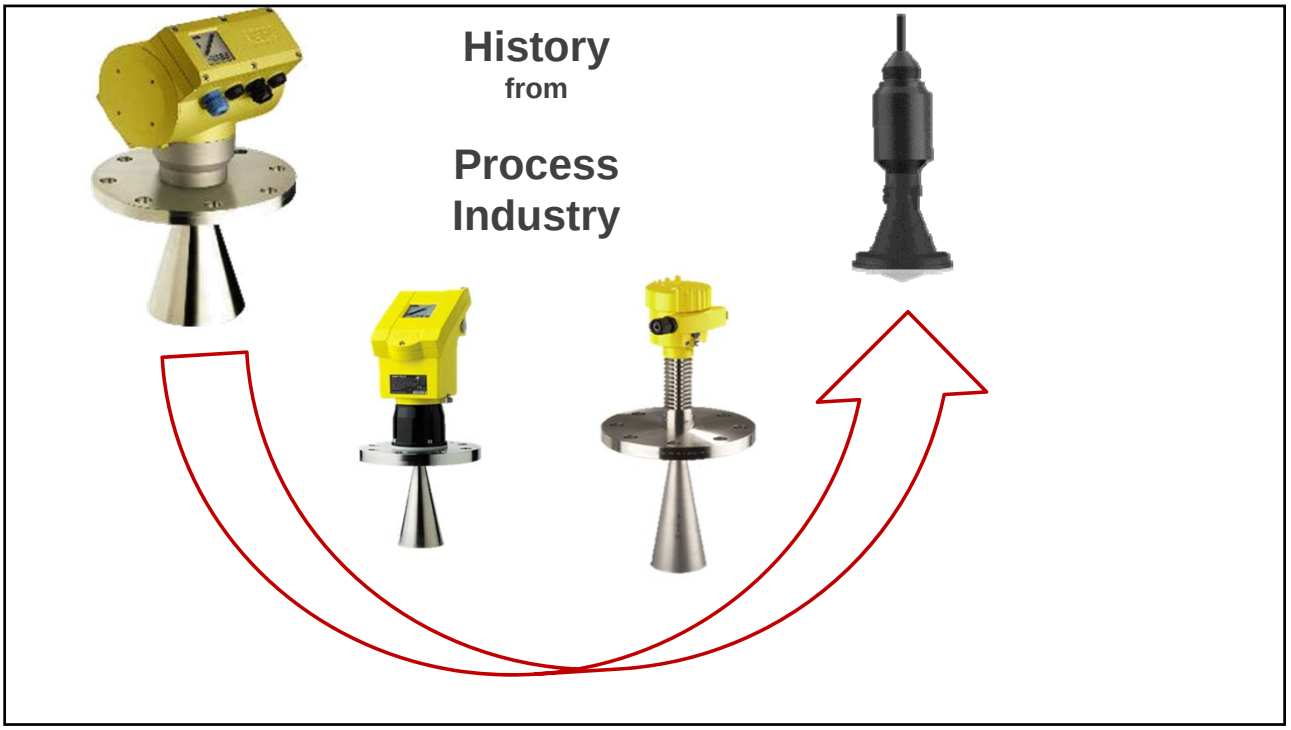
19:35
19:57
20:19
20:41
21:03
21:25
21:47
Time
Ultrasonic
Radar


History
from
Process
Industry

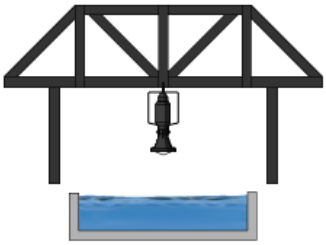
Water Radar Level

VEGAPULS WL61

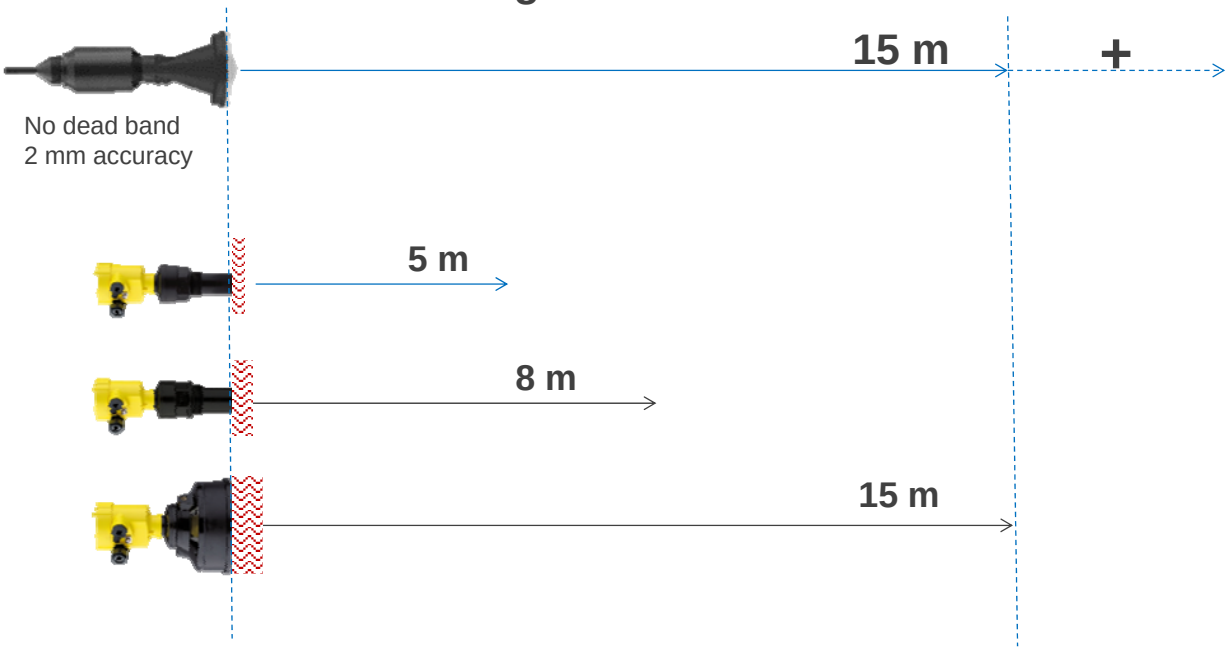
Loop powered
4 to 20 mA,
9.6 VDC,
Real time clock,
Data-logging

Adaptable
fittings
Easy installation

Application
optimized,
Overfill
protection
IP68 (2 Bar)



One instrument fits all **Ranges**



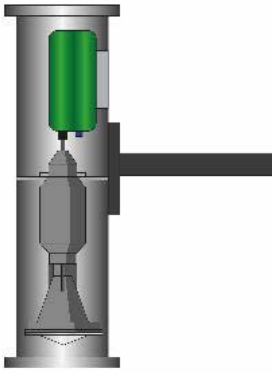
ERYC Integration of radar

Software & Hardware

Isodaq Frog was ERYC standard GSM/GRPS logger

Isodaq software modified to include start up requirement of VEGAPULS WL61

Both units housed in anonymous plastic tube housing



ERYC Installation of Radar Sensors

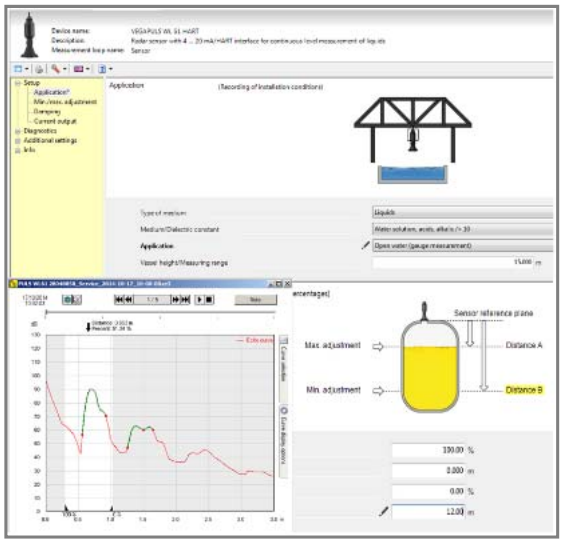
- Challenges
- Mounting Devices
- Operational Requirements
- Performance

Good co-operation

EAST RIDING OF YORKSHIRE COUNCIL

ISODAQ TECHNOLOGY ⟷ VEGA

Commissioning & Maintenance Tool



- VEGA designed and supplied a bespoke portable power supply & PACTware software connection tool.
- Simple common plug enabled connection of the portable sensor power supply & laptop interface unit.
- Allowing sensor optimization or troubleshooting.
- PACTware / VEGA DTM software
  - Saves sensor databases
  - Produces documentation

Examples of diverse ERYC radar level installations

- River Aire
- Simple non-contact radar installation.

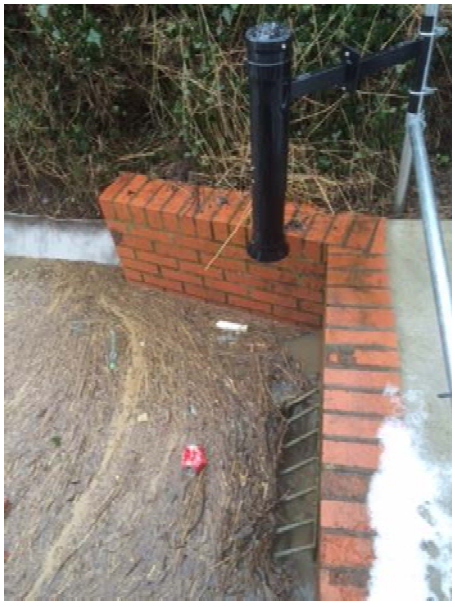
Rural locations

Rural locations

Urban locations

Urban locations

Any location

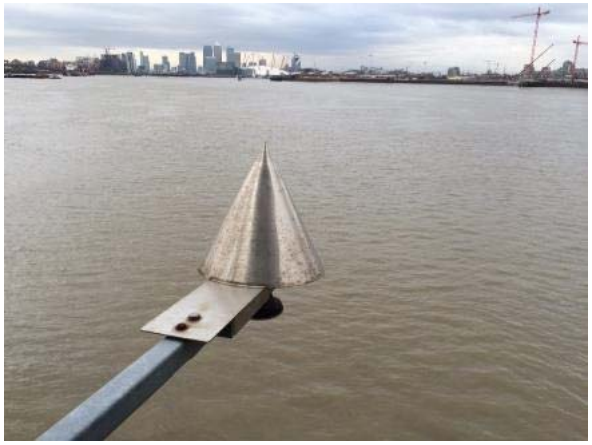


Any location

Further examples of radar level for flood level monitoring.

EA Thames Barrier
& tidal River Thames

Radar with simple bracket



Plus locally made protection from perching gulls & pigeons

Diverse EA Installations

Tidal inlet
Hampshire Coast.
Simple bracket

River Thames
45 degree
reflector
installation

Diverse EA Installations

River Wey
Surrey
Simple bracket

River Test
Hampshire
Simple bracket

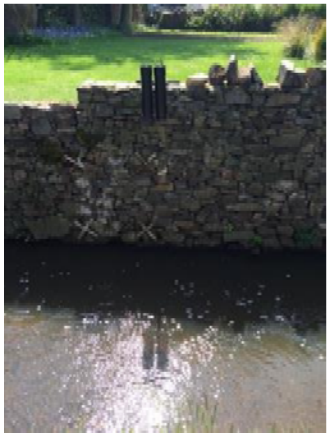
Diverse EA Installations

Urban Berkshire
Flood alleviation.
Provision for
GSM/GRPS
logger

Urban Surrey with
provision for
GSM/GRPS
logger

Diverse EA Installations

Previous high maintenance ultrasonic installation



Rural Leicestershire Water Radar in left tube & data logger in right tube

Diverse EA Installations

Rural Nottinghamshire Simple installation

Previous ultrasonic installation with sun shield

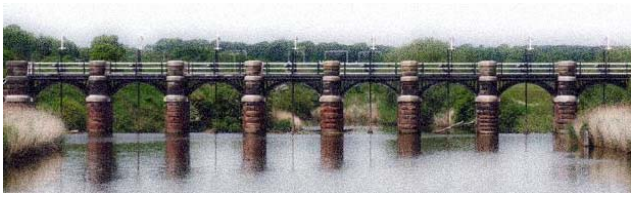
Sluice Gate Position (IDB)

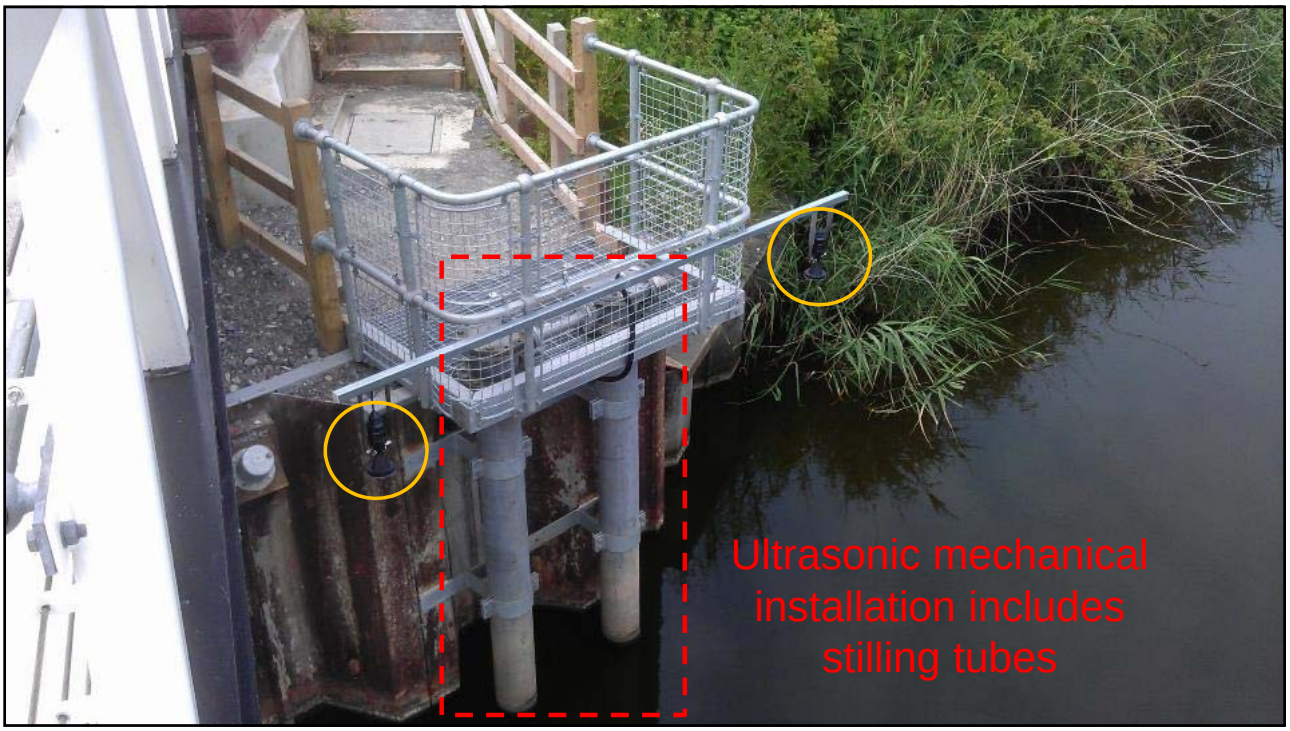
Sluice Gate Position

Reference target 350x350 mm

Sluice Gate Control

- Existing level measurement for the control included two ultrasonics in stilling tubes
- High cost of mechanical installation and maintainence call outs for Ultrasonics.
- Two Water Radars WL61s installed on simple uni-strut.
- Lower overall installed cost and more reliable





SEPA Test Site

- Extended tests of Water Radar and Ultrasonic sensor (by others)
- Data showed sunlight temperature effects on ultrasonic
- The sun shield above the two sensors was “unsuccessful” in improving ultrasonic issues.

Tide Measurement

Humber

Radar on bracket
Top of ultrasonic
Measurement tube
can be seen.

Storm damaged
ultrasonic Measurement
tube lying on the shore

Summary

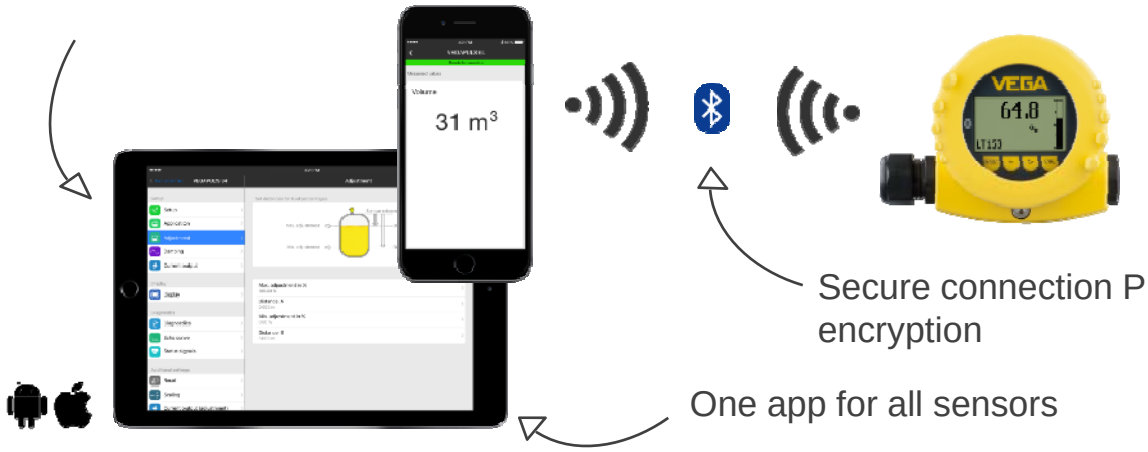
Developments?

Bluetooth
PLICSCOM

Wireless adjustment with smartphone/tablet

Quick display & diagnosis

Simple, intuitive adjustment



Secure connection PIN & encryption

One app for all sensors

Wireless adjustment with laptop

Wireless sensor set up using PC & PACTware set up software

Range ~ 25 metres

VEGA Bluetooth USB adapter

80 GHz radar technology

- Already here with process radar
- Smaller antennas
- Better focussing
- Even better with build up and condensation
- Better with foam on liquid surface

“Thank you for listening”