OPTICS11

ideas on the top of a fiber

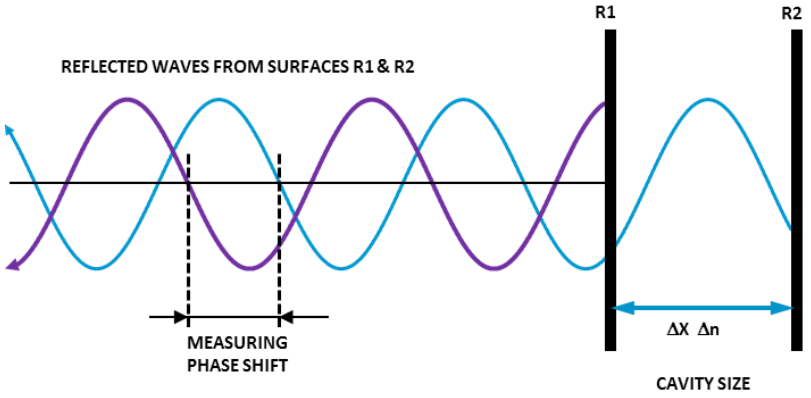
FIBER OPTIC SYSTEMS

Pipeline monitoring concept

Amsterdam - The Netherlands
www.optics11.com

Principle of detection

- All optical transducers
- **Optical interferometry** to detect minute length change



Advantages:

- Interferometry: lowest noise, highest frequencies, highest dynamic range
- Performance in most challenging environments
- High stability and high sensitivity
- Intrinsically safe
- Miniaturized sensors
- Easy to use (plug and play)

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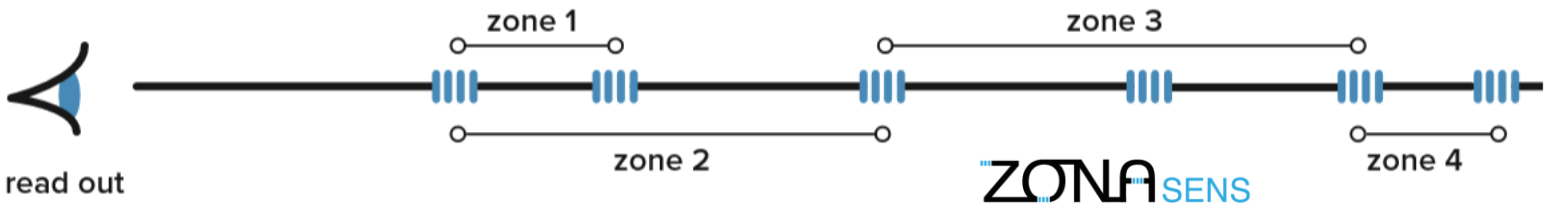
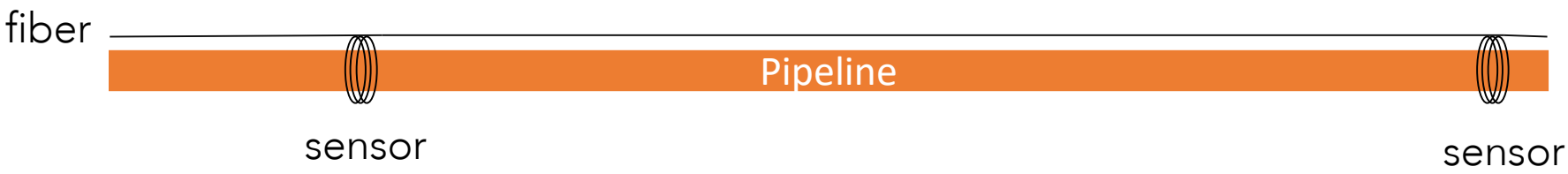
Acoustic sensor technology

- Measure strain in the fiber between 2 FBGs
  - Cavities defined by FBG located at a given position
  - Measurement zone addressed by signal processing
  - Noise free signal retrieved by calculations

- What we measure
  - Signal encoded in phase/amplitude!
    (typically – signal encoded in wavelength – e.g. temperature and strain)



Acoustic leak detection concept



- Acoustic detection of leaks/intrusion
- One optical fiber sensor every 100 – 1000 m
- High frequency acoustic detection **(1 MHz)**
- Location by cross correlation **(<1 m spatial)**
- Unique ZonaSens technology – fiber interferometry

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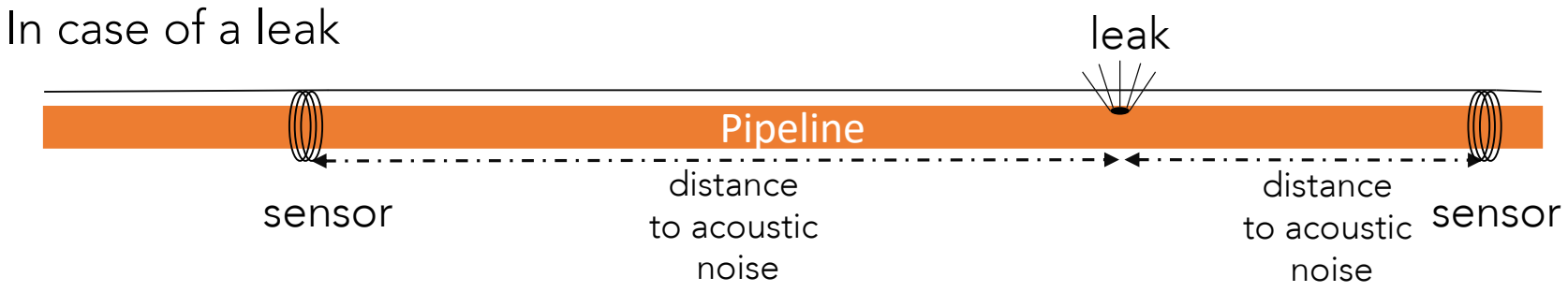
Acoustic leak detection concept



- Two sensors continuously monitoring for high frequency acoustic noise, generated by leak
- (Metal) pipeline will carry the noise to the sensors, as fiber is only sensitive at sensors
- Extreme sensitivity with ZonaSens fiber interferometry: < **600 fm / √ Hz**
- 10-40 sensors per interrogator

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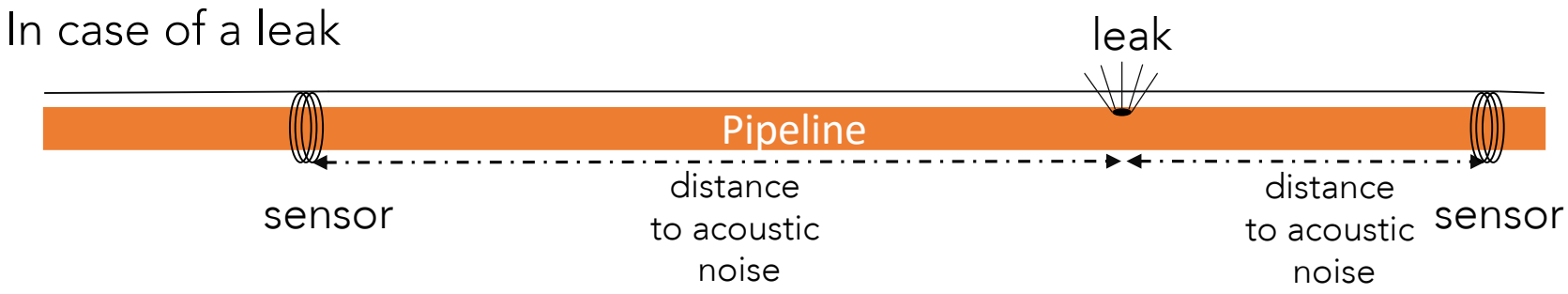
Acoustic leak detection concept



- Instant detection
- No single point failure
- Only local attachment of sensor is important
- Optic couplers no problem
- Less sensitive to spurious noise

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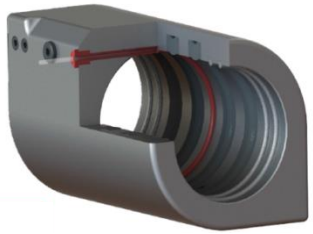
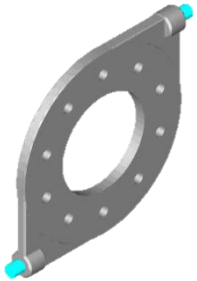
Pipeline value proposition

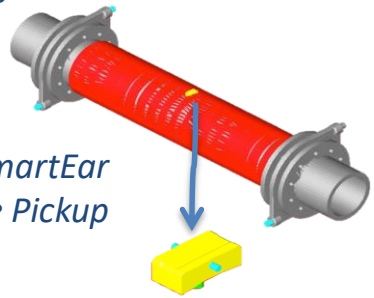
- Measurement of process parameters across networks
- Indication of flow rate, flow regime and fluid phases
- Detection of leaks at or near joints
- Operation of nearby pipeline equipment (valves, pumps, etc) assured
- Tamper detection at valves
- Operating conditions up to 15kpsi / 400°F for Sour Gas Service



SmartProbe Pipe Connector



SmartProbe Ring Flange Adaptor



SmartEar Surface Pickup

Optics11 origins

- Founded in 2011 in Amsterdam
- Fast growing university spin-off
- Unique patented optical fiber technologies
- In house engineering, production & sales
- Installed product base in US, Europe & China

We love making cutting-edge technology fit for use!

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Do you have a measurement challenge?

One readout > many sensors

- Acoustic Emission
- 3D acceleration, pressure and more

Optics11 sensing technology

- Small and light, fast, extreme sensitive sensors
- All optical sensors

Contact us!

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