AQUATEC

GROUP

Measurement, Communication, Insight.

Aquatec Group Ltd

- Founded in 1990
- HQ in Basingstoke UK
- Products sold worldwide
- Design & manufacture:
  - Oceanographic Instruments
  - Hydrotest Monitoring Systems
  - Cathodic Protection & Monitoring
  - Through-Water Communication

- Key technologies:
  - Acoustics
  - Optics
  - Precision Temperature & Pressure
  - Cathodic Protection

Customers in the Offshore Market

Canadian Natural — bp — Shell — REPSOL SINOPEC Resources UK — ExxonMobil — 海油工程 COOEC — I·K·M — DUNLOP OIL & MARINE Part of Continental AG

BAKER HUGHES — fugro — centrica — corrpro an AEGION company — ALTUS Intervention — DNV

OCEANEERING — TAQA — wood. — subsea 7 — enQuest — PGS — SAIPEM

HALLIBURTON — FairfieldEnergy — OXY — Sinopec ADDAX PETROLEUM — Strainstall — EnerMech Safer · Smarter · Solutions — GARDLINE GROUP

ISO 9001:2015 — UKAS MANAGEMENT SYSTEMS 8327 — ISO 14001:2015 — UKAS MANAGEMENT SYSTEMS 8327 — BS OHSAS 18001:2007 — UKAS MANAGEMENT SYSTEMS 8327 — FPAL empowered by Achilles Registered

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You need to measure pressure subsea

- For example on a Subsea Hose…
  - Dual carcass construction
  - Outer carcass unstressed
  - Able to retain a leak from inner carcass

- How to detect inner carcass leak?
  - Diver opens valve on flange to inter-carcass void
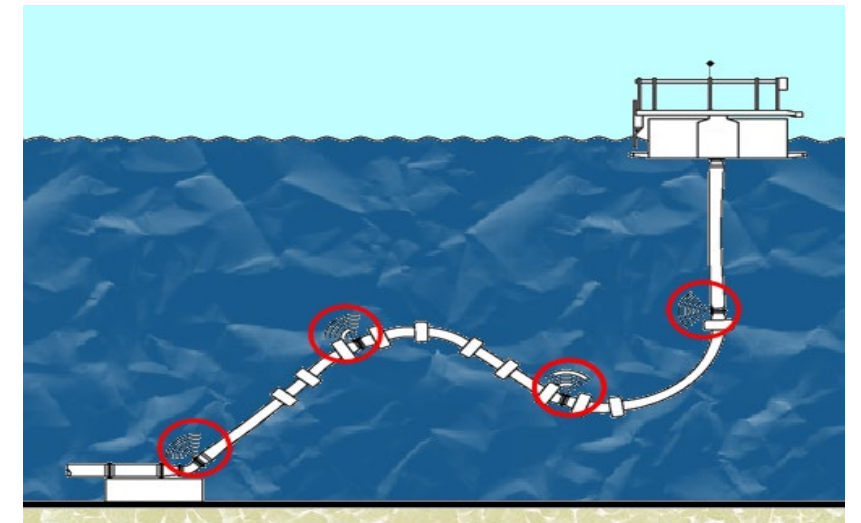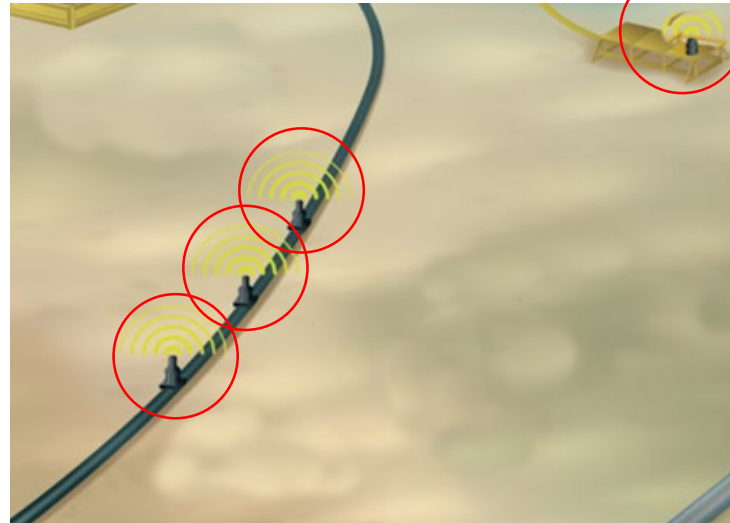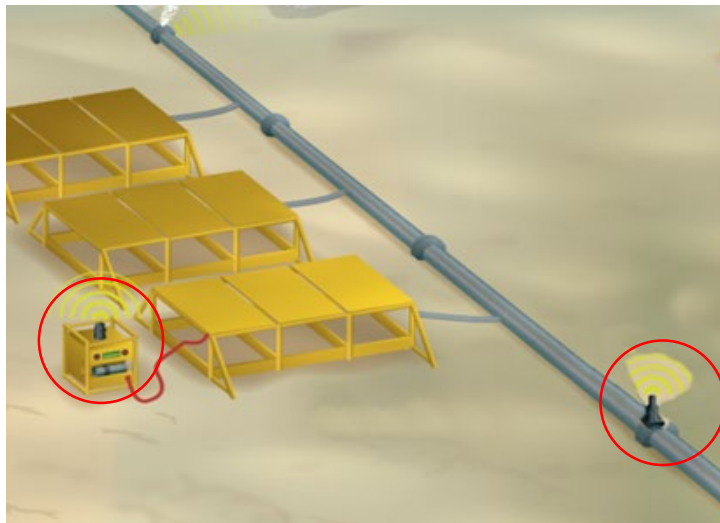 - Oil comes out = leak !

You need to measure pressure subsea

- On a Subsea Precom Manifold…

So What's the Problem?

When you need to measure <u>LOTS</u> of pressures subsea

- Solution: <u>LOTS</u> of gauges!

But…

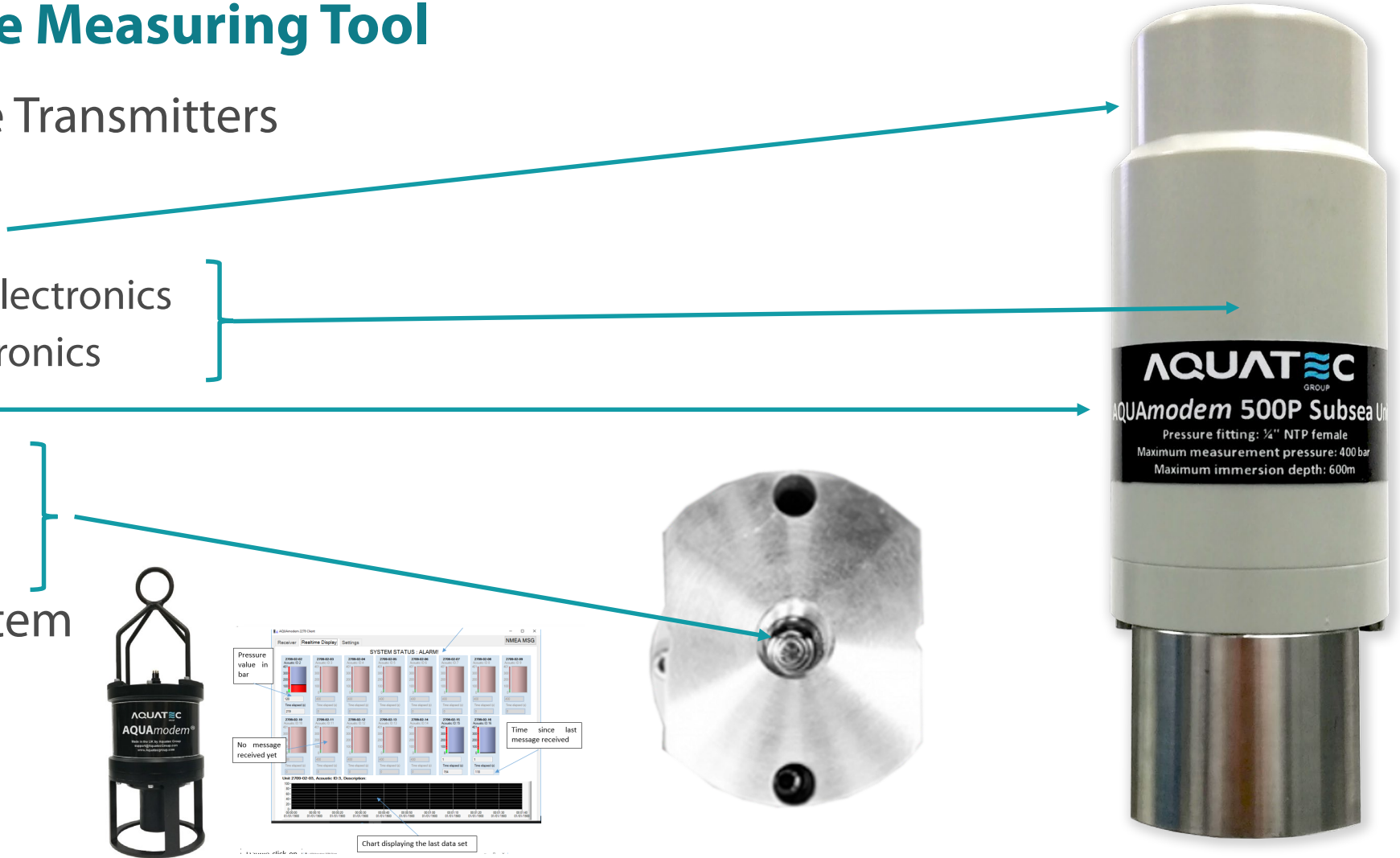- What if pressures are distributed over a large area?

Distributed Pressure Measuring Tool

- Autonomous Pressure Transmitters containing:
  - Acoustic transducer
  - Acoustic transmitter electronics
  - Data acquisition electronics
  - Battery
  - Pressure sensor
  - Mechanical pressure coupling
- Acoustic Receiver System
- PC Display Software

The AQUA*modem*® 500 Receiver

How does the transmitter work?

- 'Send and forget' principle

- Read pressure regularly e.g. approximately every 5 minutes and transmit message

- Message collision avoidance:
  - Message interval is randomised
  - If messages from two units arrive at the same time, they will arrive at different times on the next update

- Message includes error checking, correction, and validation to minimise false alarms

- Range typically many hundred metres

- Typical 1-2 years life
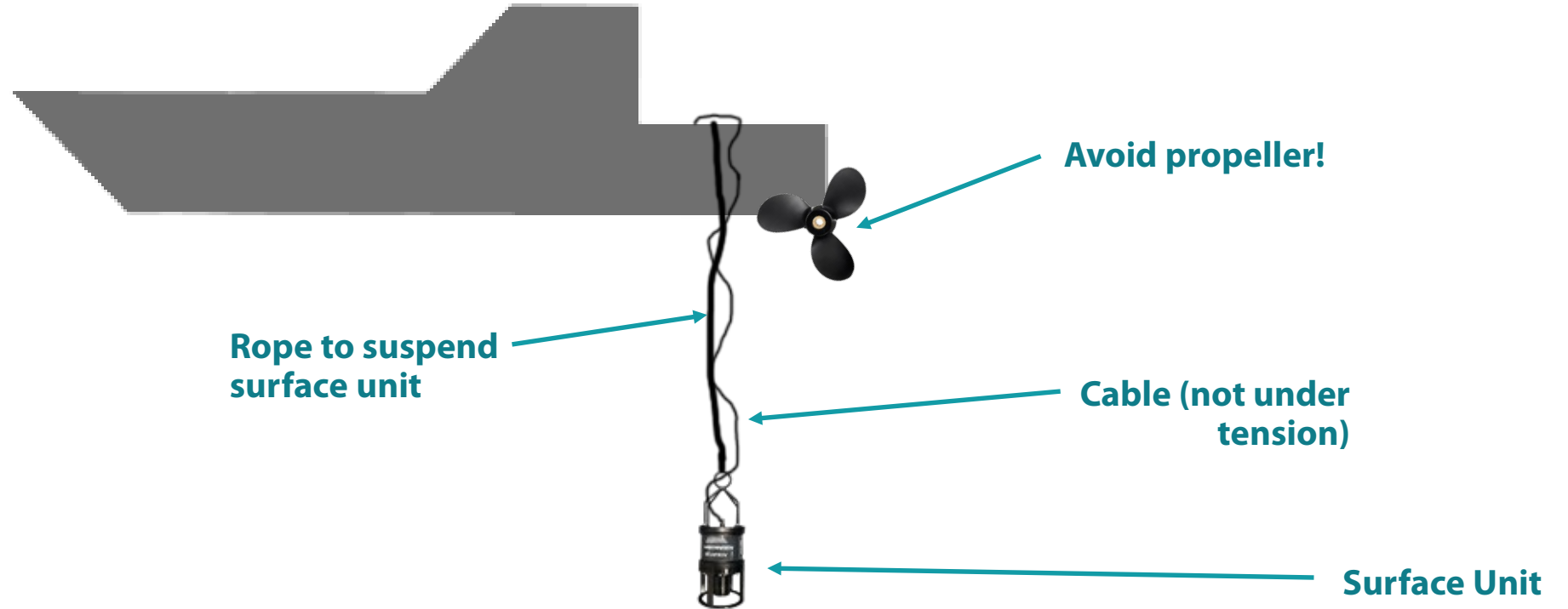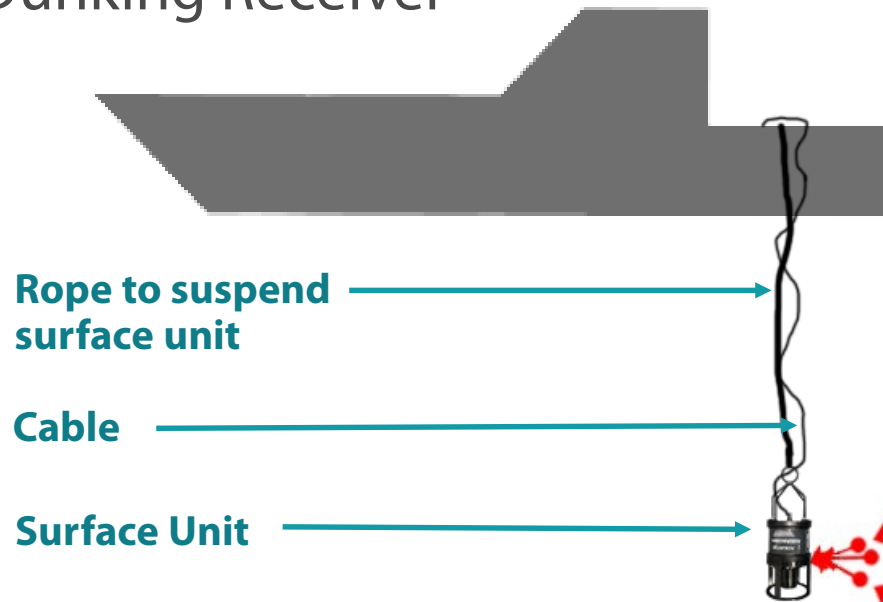
Underwater (Internet) of Things

Transmitters

Getting the data back to the user

Option 1 – Dunking Receiver

Avoid propeller!
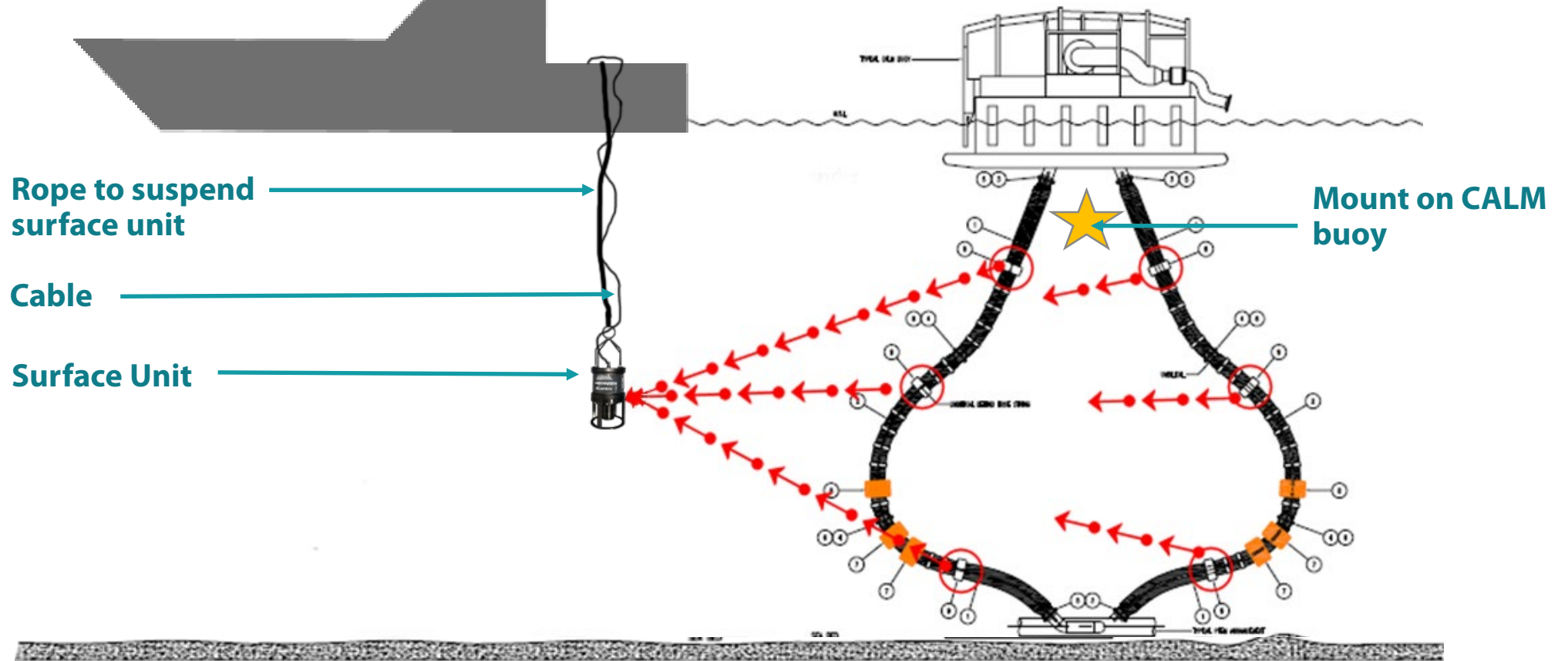
Rope to suspend surface unit

Cable (not under tension)

Surface Unit

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Getting the data back to the user

Option 1 – Dunking Receiver

Option 2 – Permanent Mount

Rope to suspend surface unit

Cable

Surface Unit

Mount on CALM buoy
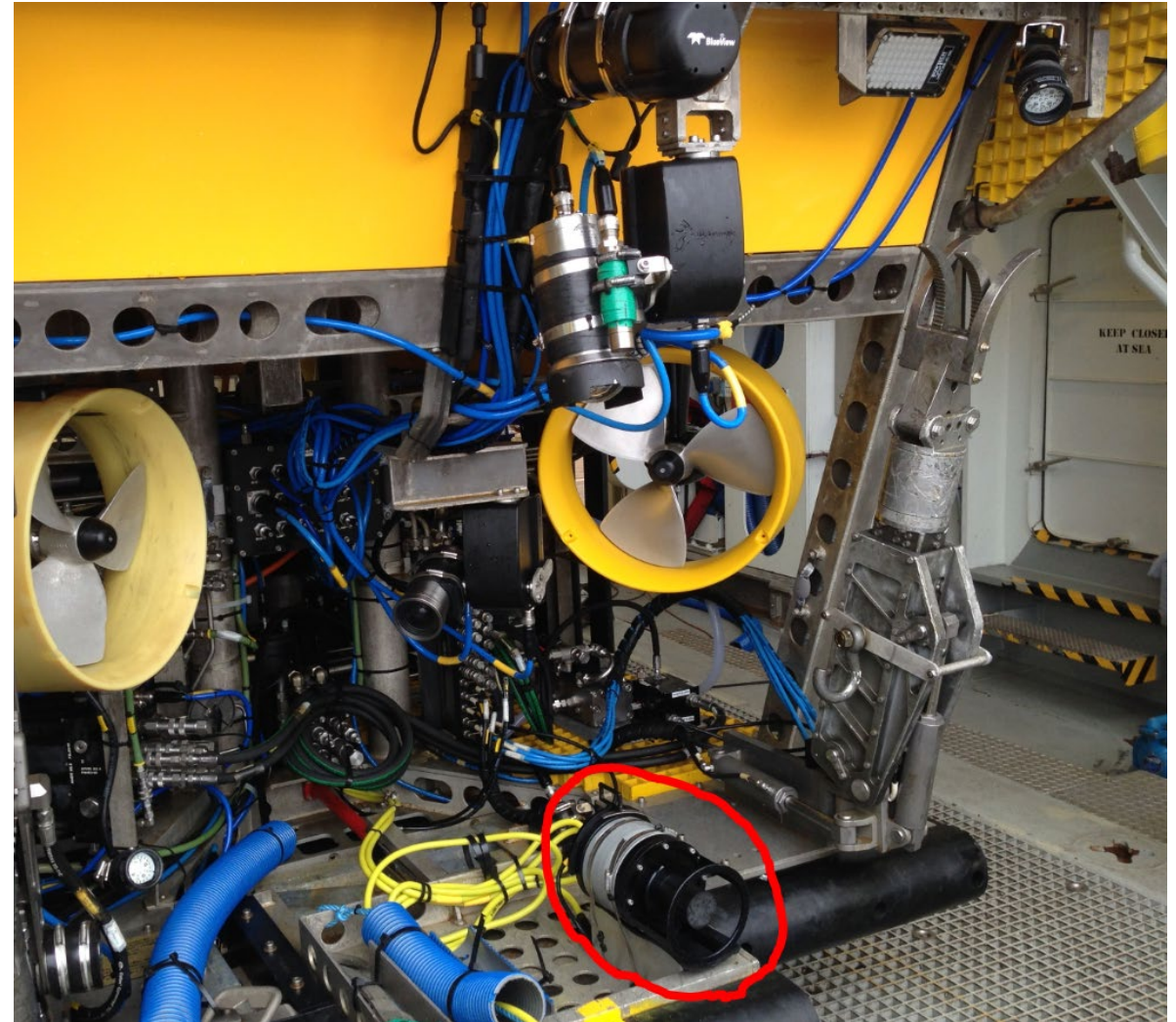
Getting the data back to the user

Option 3 – ROV-Mount Receiver

- Data travels via ROV umbilical to the surface

The User interface
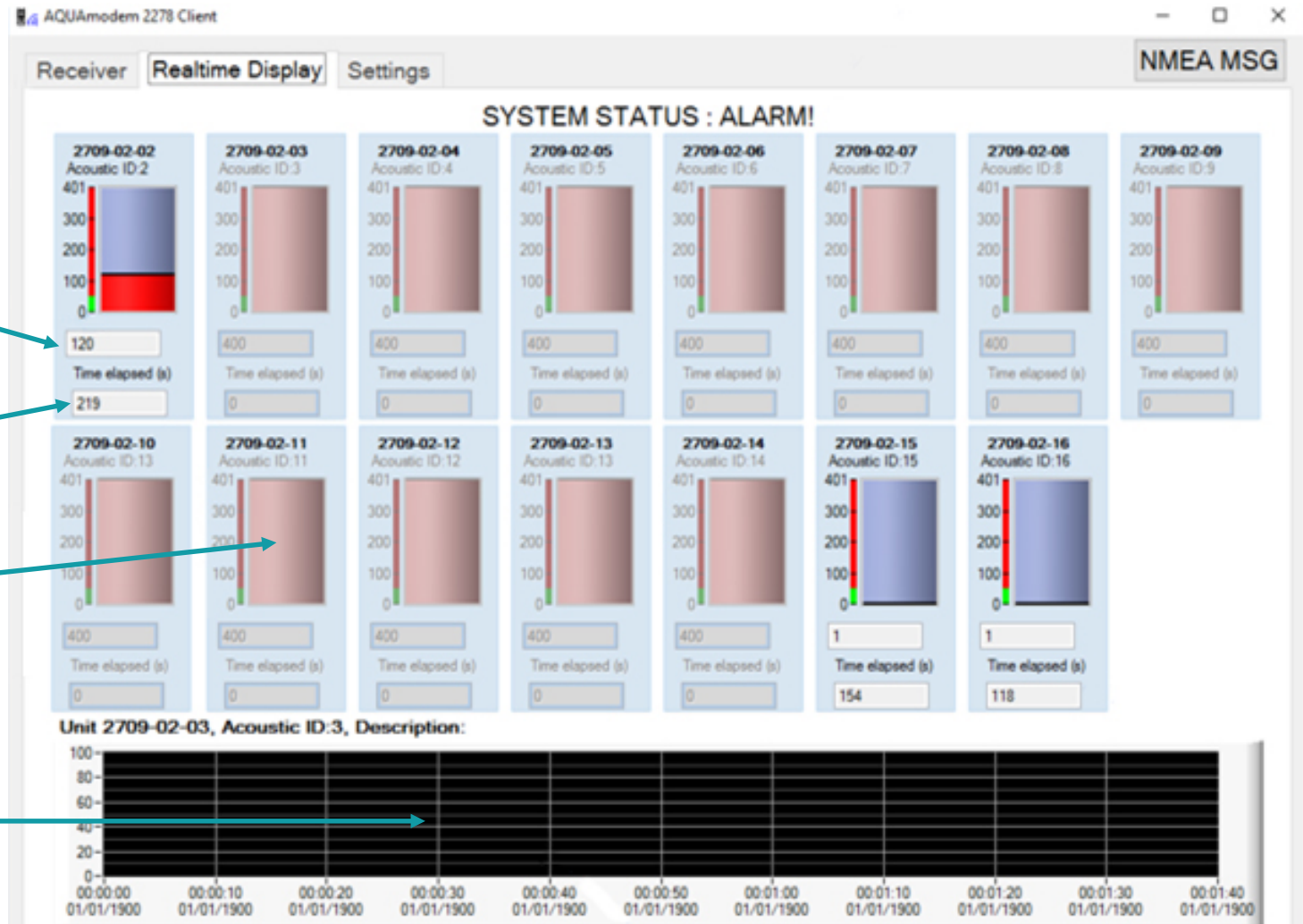
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Making sense of the data:

Manifold Pressures

Pressure value in bar

Time since last message received

No message received yet

Chart displaying the last data set

The User interface

Making sense of the data:

Hose Application

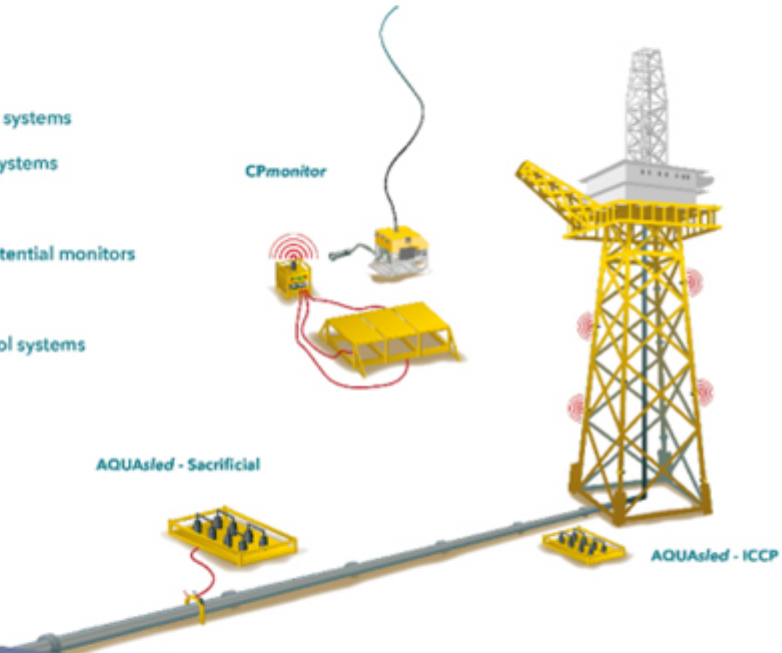# Distributed Pressure Measurements Available Topsides

- Compact, long life instruments
- Simple automated transmissions
- Listen from vessel of opportunity
- Receiver deployable on ROV
- All your readings in one place
- Also useful for other slow-changing parameters:

AQUA*modem* 500 models
Pressure / Depth
Temperature
CP Potential
CP Current

CPguardian

CATHODIC PROTECTION FOR AGING ASSETS

≈ System design assessment

≈ Retrofit CP

≈ Impressed current systems

≈ Sacrificial anode systems

≈ Dual electrode potential monitors

≈ Current monitors

≈ Closed loop control systems

≈ Data retrieval, analysis & insight

CPmonitor

AQUAsled - Sacrificial

AQUAsled - ICCP

Integrity Monitoring

≈ Real time

≈ Data logged

≈ Through-water comms

	Vessels, Floaters & TLPs	Structures	Subsea Production	Pipe/ Flowlines	Risers	Cables	Moorings	
Position	■				■		■	
Heading	■							
Displacement								
Motion	■	■	■	■	■	■		
Acceleration					■	■		
Vibration		■	■	■	■			
Tension/ Load	■	■					■	
Stress	■	■		■				
Temperature			■	■	■			
Pressure			■	■	■			
Water Quality			■	■	■			
Leaks			■	■	■			
Cathodic Protection	■	■	■	■				

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≈ Thank you!

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