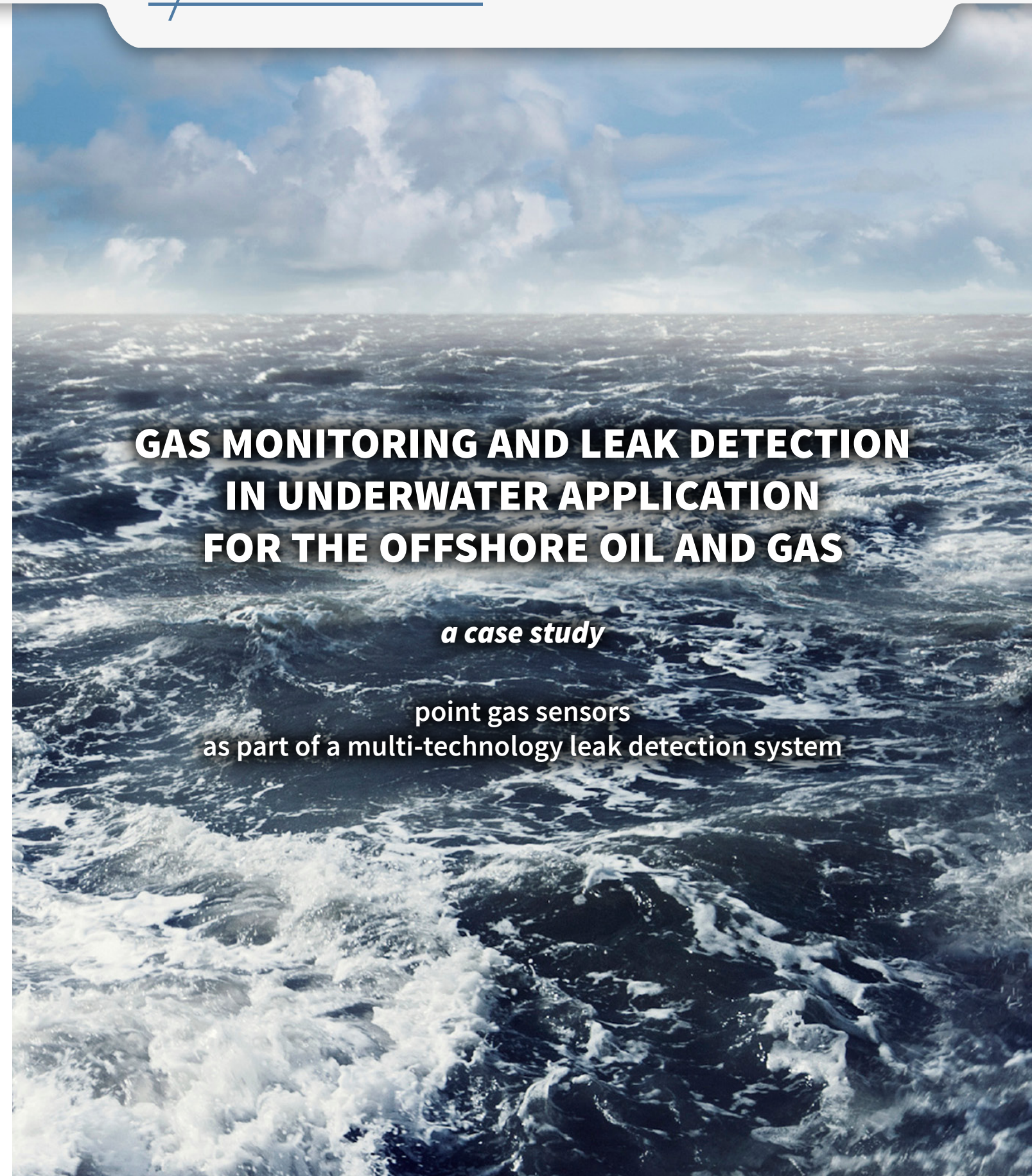


With over 300 sensors and systems sold world-wide and over 35 scientific users publications, Franatech is market leader for underwater methane detection and monitoring.

Franatech is a developer and supplier of sensors for detection of gases in water. The company has more than 15 years experience in subsea applications, working with all kinds of sensing technologies.

Coming from a scientific environment and further engaged in long term co-operation with universities and institutions, the company has been involved in several oil and gas projects, piloting the use of point sensors for continuous monitoring of gas leakages.



GAS MONITORING AND LEAK DETECTION IN UNDERWATER APPLICATION FOR THE OFFSHORE OIL AND GAS

a case study

**point gas sensors
as part of a multi-technology leak detection system**

BACKGROUND

“Selection And Use Of Subsea Leak Detection Systems”

Det Norske Veritas Recommended Practice, DNV-RP-F302 (April 2010)

- It is not anticipated that a single technology/principle would be able to detect all of the possible leaks in all possible environments...
- Combining two or more types of sensors may provide more confidence in the overall leakage detection system.
- Complementary sensor technologies should be selected to compensate for the respective weaknesses and enable indication of a leak event from one sensor type to be confirmed by positive indications from the other sensor type.
- Point sensors may be installed over critical leak points

ADVANTAGES OF POINT GAS SENSORS

- Data aggregation from different technologies is necessary to reduce uncertainty in particular rate and risk of false alarms
- Substance identification plays an important role
- Gas sensors offer such a feature
- Gas sensors can be used also for oil detection, as crude live oil has a high content in dissolved gas.
- Gas plumes spreads out much faster than oil, and can therefore be used as early indicator
- Gas sensors can be positioned according to prior leak propagation simulation based on model e.g. “DeepBlow – a Lagrangian Plume Model for Deep Water Blowouts” Spill Science & Technology Bulletin, 6(2), April 2000, pp103-111, Øistein Johansen, SINTEF, Trondheim, Norway



APPLICATION

A total of 11 Franatech METS Methane Sensors have been deployed as part of an under water leakage detection network in the North-Sea for a long-term monitoring purpose.

The concept design and development of the under water leakage system is lead by the Norwegian Geotechnical Institute and Company Stinger Technology AS.

The network is installed around a platform operated by a major international oil company. The picture shows some of the network nodes (without seabed frames) prior to offshore installation.

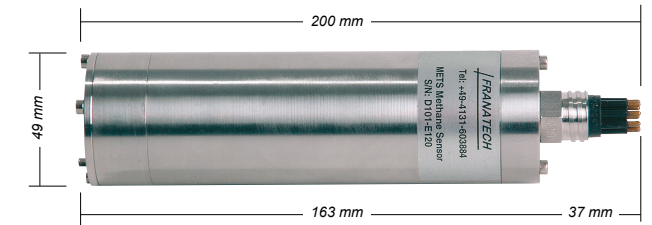
MECHANICAL SPECIFICATIONS

Standard:

- Material: Stainless steel
- Weight in air: 1,3 kg
- Weight in water: 1,0 kg

Optional:

- Material: Titanium
- Weight in air: 0,8 kg
- Weight in water: 0,5 kg



Depth rating 4000m

No internal moving parts or pumps, hence lower failure risk and lower power drain. Inherent to the technology, and also dependent on detector manufacturing and tuning, all parameters such as sensitivity, power consumption, response time and response behavior are linked together. Following specifications are indicative, we can select and tune the detectors to meet your requirements.

ELECTRICAL SPECIFICATIONS

- Input: 9 to 36 VDC, 35 to 100 mA@12VDC
- Output: standard analogue 0..5V and digital RS485
- Options: 4..20mA, RS232, analogue only, digital only, Desktop Converter RS485/RS232

CALIBRATION RANGES

- Temperature: standard 2–20°C, others on request
- Methane: standard 50nM – 10µM
sensitive 1nM – 500nM (in pumped flow-through mode)
low range 20nM – 1µM / high range 1µM – 40µM
- Calibration formula and parameters can be provided in format compatible with CTD-probe from different manufacturers (e.g. Seabird, SST)
- Response time: reaction time within few seconds
T90 between 1 and 30 min depending on version and deployment conditions
- Special features: integrated formula (plug & play)
correction formula for work under variable oxygen levels

NOTE: above concentration and temperature ranges are typical. Depending on the application requirements, we can select other calibration ranges.