European Network on New Sensing Technologies for Air Pollution Control and Environmental Sustainability - *EuNetAir*

COST Action TD1105

INTERNATIONAL WG1-WG4 MEETING on

New Sensing Technologies and Modelling for Air-Pollution Monitoring

Institute for Environment and Development - IDAD

Aveiro, Portugal, 14 - 15 October 2014

Action Start date: 01/07/2012 - Action End date: 30/06/2016 - Year 3: 2014-15 (*Ongoing Action*)

NDIR sensors: Trends and applications

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Delsbo, Sweden

COST is supported by the EU Framework Programme

ESF provides the COST Office through a European Commission contract

SenseAir AB

World leading company in Research & Development and manufacturing of cost-effective IR gas sensing

Develops and produces affordable precision carbon dioxide sensors for high volume applications

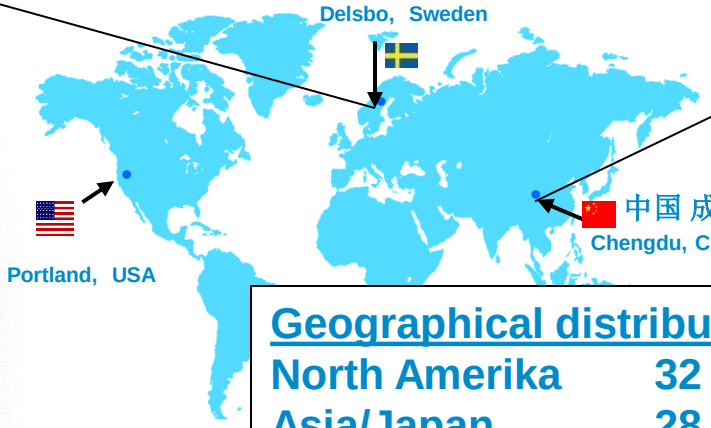
Competence centre for infrared gas measurements

SenseAir AB

Company information…

Turnover: *110 MSEK*
Growth (1993-2011): *22 % / year average*
Employees: *110 people*

Delsbo, Sweden



中国成都
Chengdu, China

Geographical distribution	
North Amerika	32 %
Asia/Japan	28 %
Nordic countries	23 %
EU	17 %

- **Background:** NDIR technology is proven and has been in use for many years in the field of gas detection and measurement.

- Two current trends can be distinguished:

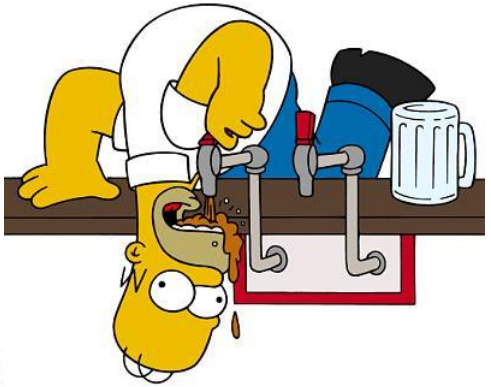
1. **Smaller, lower cost & lower power**

2. **Higher performance**

Current activities of the Partner

CO_2 measurement using NDIR technology is used in many applications:

- Building control - ventilation
- Safety alarms - beer & soda dispensers, liquid fuel heaters,…
- Agriculture - greenhouses, mushroom farming, poultry
- Medical - incubator, patient monitoring
- Food transportation & storage



Towards lower cost, smaller size

Drivers for lower cost & small size:

- Market need for small, low-cost CO_2 modules…

  …that easily can be built into any device or even ”gadgets” for home use

Personal air monitors gaining popularity in Asia

- PM, CO_2, temp, VOC et.c.
- Connects to internet / smartphone

Towards lower cost, smaller size

Portable air cleaners

- Electrostatic filter + CO_2 sensor

Towards lower cost, smaller size

Combination IAQ sensors

- Temperature, RH, CO_2, VOC, …

One box on the wall – lower installation cost

Towards lower cost, smaller size

Automotive applications

IAQ – cabin air

- Save fuel by controlled ventilation

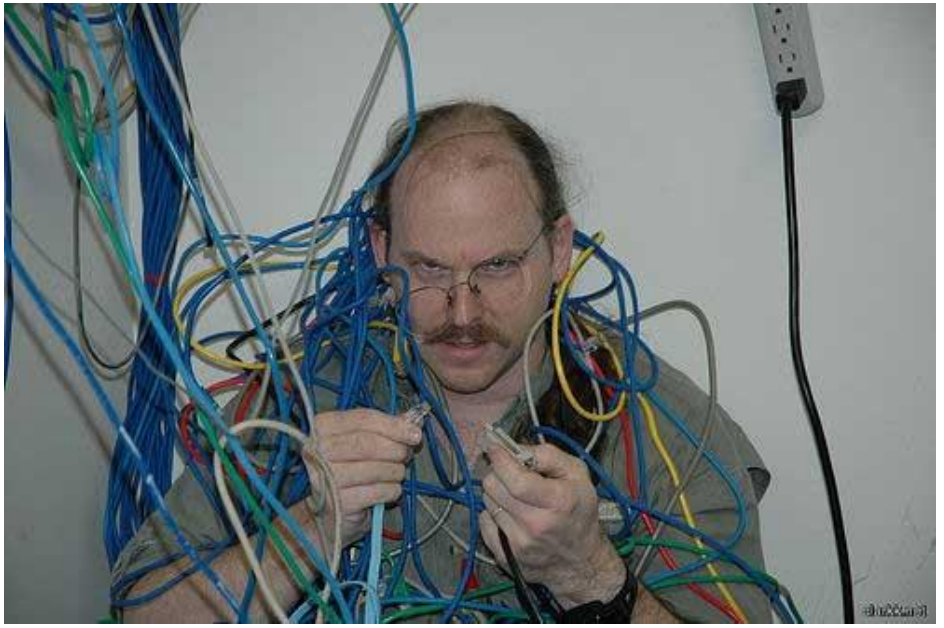
Leakage warning

- Replace R134a - R744 or R1234yf ?

Towards lower power

Networked sensors – drivers for low power:

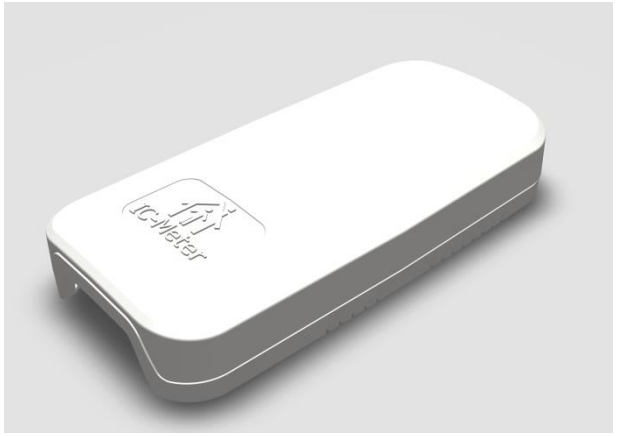
- Lower installation costs through reduced cabling
- Bus powered – same wires for power and communication
- Battery powered
- Wireless
- ”Internet of Things”



Towards lower power

Networked sensors– drivers for low power:

- Energy harvesting
- Reduced self-heating improves temperature and humidity measurement accuracy



High performance

The second trend – High performance:

High resolution CO_2: Meteorological research

Low concentration: Methane, Alcohol

High performance

- Leakage detection – Methane, freons
- Refrigerant leakage - refill with wrong type of refrigerant

High performance

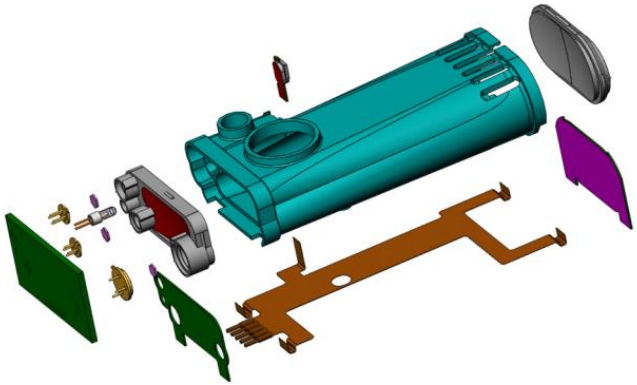
Methane sensing

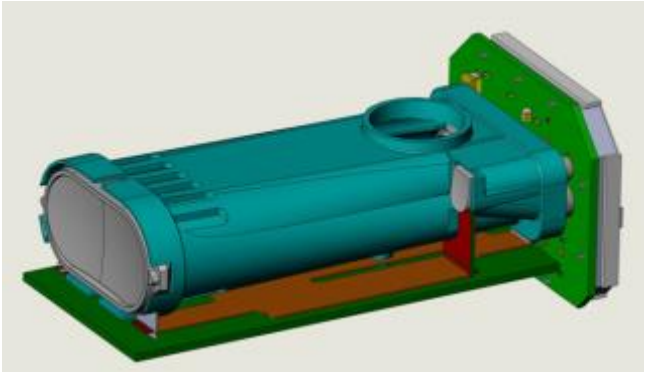
- Landfills
- Fracking
- Mining

Methane detectors challenge

High performance

- Long path length - Requires stable optics
- New materials and assembly methods
- Goal: Automotive alcolock





Facilities available for the Partner

- **Research/Measurement/Service Facilities:**
- Chemistry lab
- Climate chambers for testing and production (calibration)
- Semi-automated production line

CONCLUSIONS

We must make efforts in broad perspective to develop better sensors:

- Simpler -> smaller, lower cost, lower power
- Better -> high precision, high accuracy

Questions?