



COST

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

COST Action TD1105

WG3-WG4 JOINT SCIENTIFIC MEETING

Duisburg, Germany, 4 - 6 March 2013

Action Start date: 01/07/2012 - Action End date: 30/06/2016

Year: 2012-2013 (*Starting Action*)



Dr Philippe KARPE

WG Member

ETHERA / France

ETHERA : overview

10 years of basic research

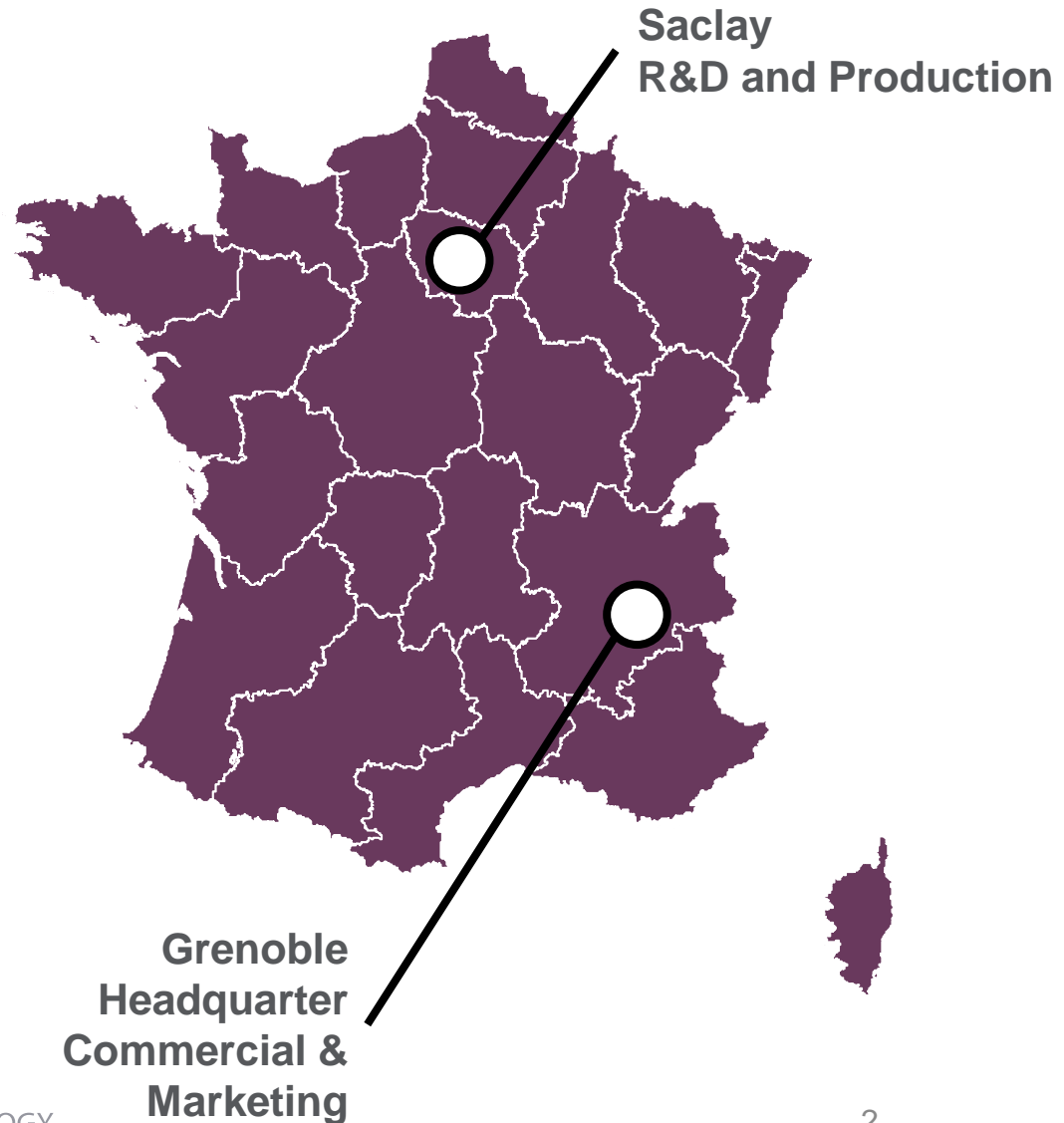


énergie atomique • énergies alternatives



13 employees

2 locations



ETHERA : overview



Our markets

Indoor Air Quality



Public buildings

IAQ monitoring



Private buildings

LEED building assessment



Industry

Personal Exposure Limits
assessment to chemical risk

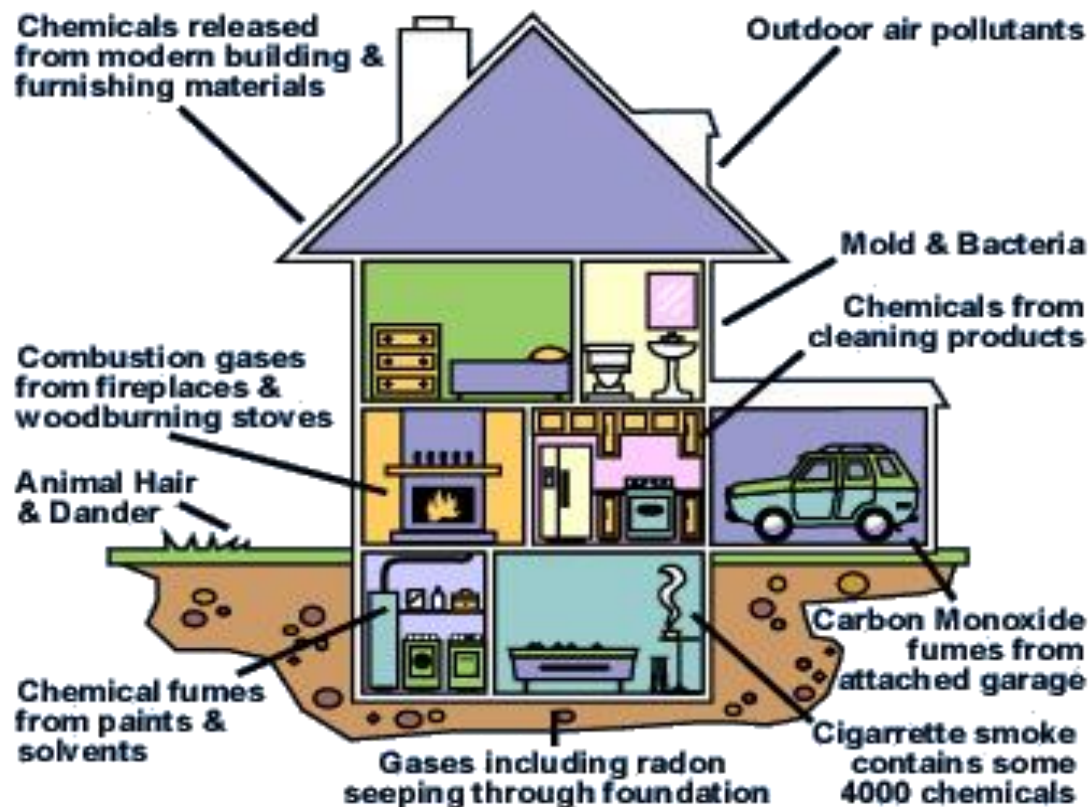
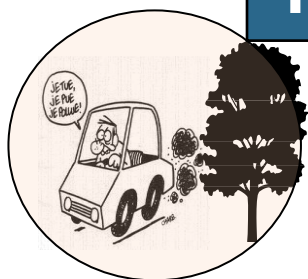
Indoor air pollution

80 up to 90% of our time is spent indoors: homes, workplaces, transport...

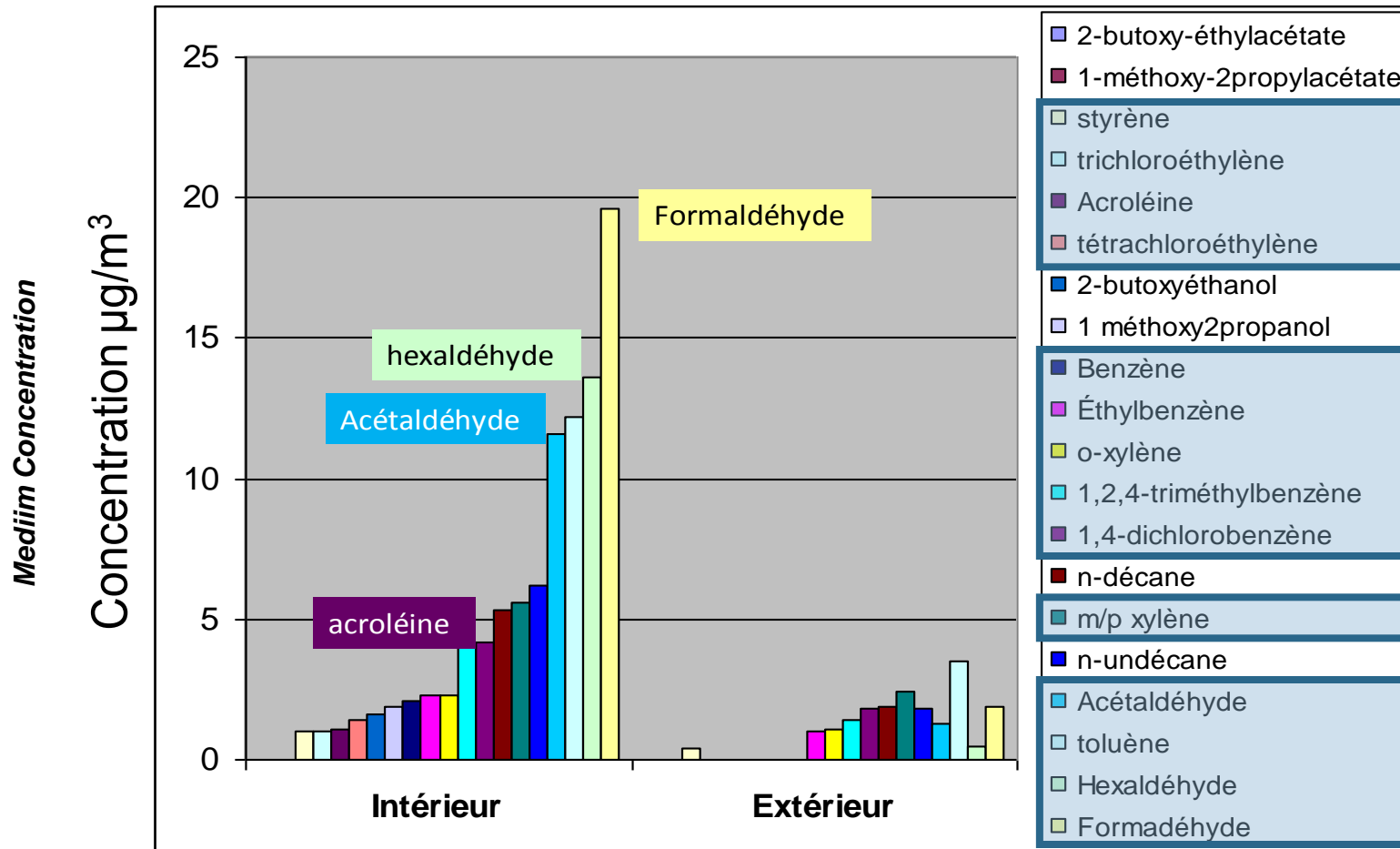
10%

90%

*Volatile
Organic
Compounds*



Which pollutants in indoor air ?



**Aldehydes +
BTEX
=
> 80% of total
chemical pollution**

Source: French Indoor Air Quality Observatory 2006 – Campaign based on 600 French representative dwellings

A stringent regulation in France

2 new decrees:



Decree n° 2011-1728 (december 2011)

**Monitoring of Indoor Air Quality (IAQ)
in public buildings**

**Periodic controls of
*Formaldehyde, Benzene and CO₂***



Decree n° 2011-321 (march 2011)

**Labeling of building products based
on their volatile compounds emission**



The needs

- Low cost solutions to measure on line pollutants at ppb to ppm levels in public area or in industries
- Efficient portable instruments to identify the sources of indoor pollution
- New equipments for the treatment of polluted air especially formaldehyde



ETHERA R&D

- Development, validation and industrialization of new chemical sensors for the measurement of indoor air pollutants
- Development of new devices for indoor air quality control
- Development of new devices for the purification of indoor air

Ethera research based on an innovative technology for IAQ measurement and treatment

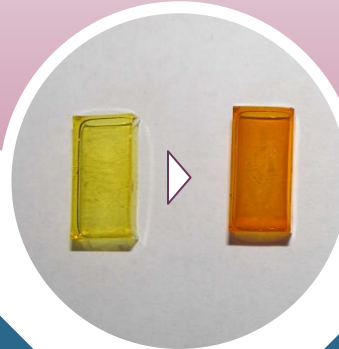
A nanoporous Sol-Gel material like a « sponge »

Pollutant filtration and concentration



Probe molecule integration

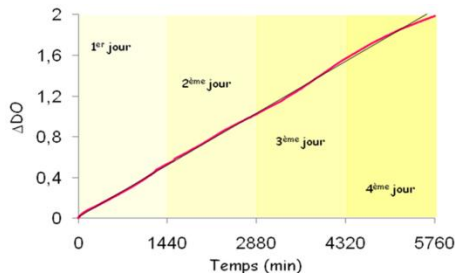
Specific colorimetric reaction with the pollutant



QUANTIFICATION

Direct optical detection

Direct and ultra-sensitive measurement of pollutant concentration without lab analysis



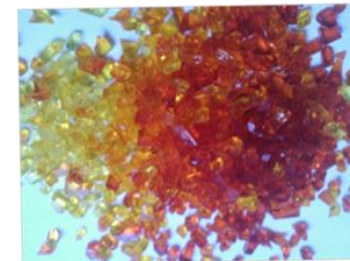
A Simple, Sensitive and Selective technology

Protected with 5 international patents

EPURATION

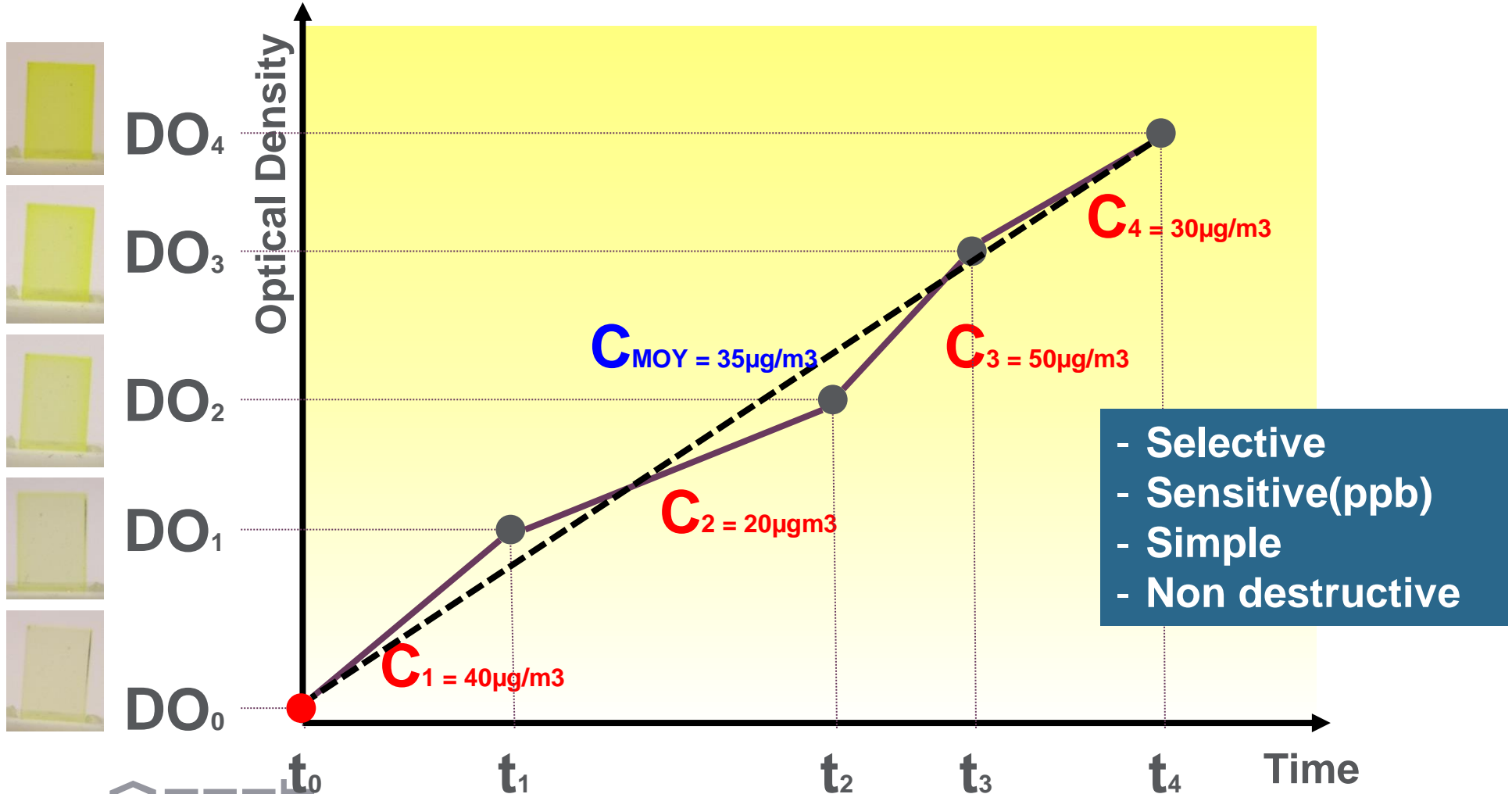
High trapping capacities

Selective and efficient treatment of the pollutant with integrated saturation indicator



ETHERA technology

During exposure, the sensor optical density (420 nm) increases linearly with the pollutant concentration



Main research equipments



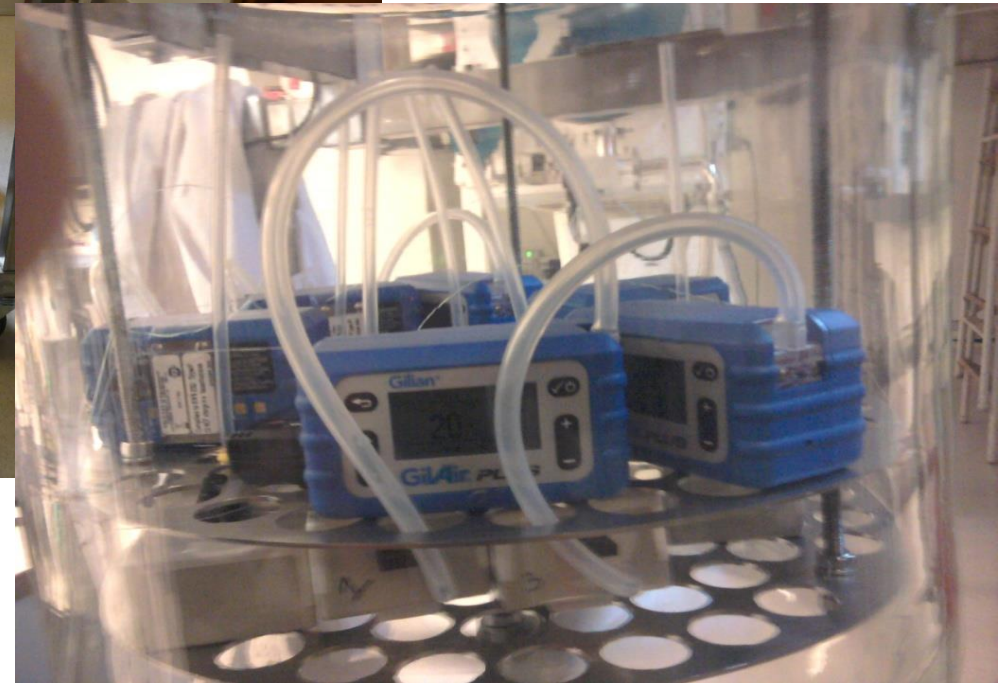
Environmental chamber

**T° (10 - 40°C), RH (20 – 80 %), air velocity
(0,1 - 2 m/s) control**



**Generation of calibrated gas
mixtures**

Main research equipments



Profil'air® product range : a modular approach



Competition Market

Specificity of Indoor Air Quality Analysis:

- Selective
- Long-term exposure (i.e. 4,5 days for public buildings)
- Very low concentration (few ppb)

Current protocol



Sampling on cartridges



Analysis in a laboratory (HPLC-UV)

- × Complex
- × Delayed results
- × Costly



- ✓ Simple
- ✓ Instantaneous results
- ✓ No lab analysis

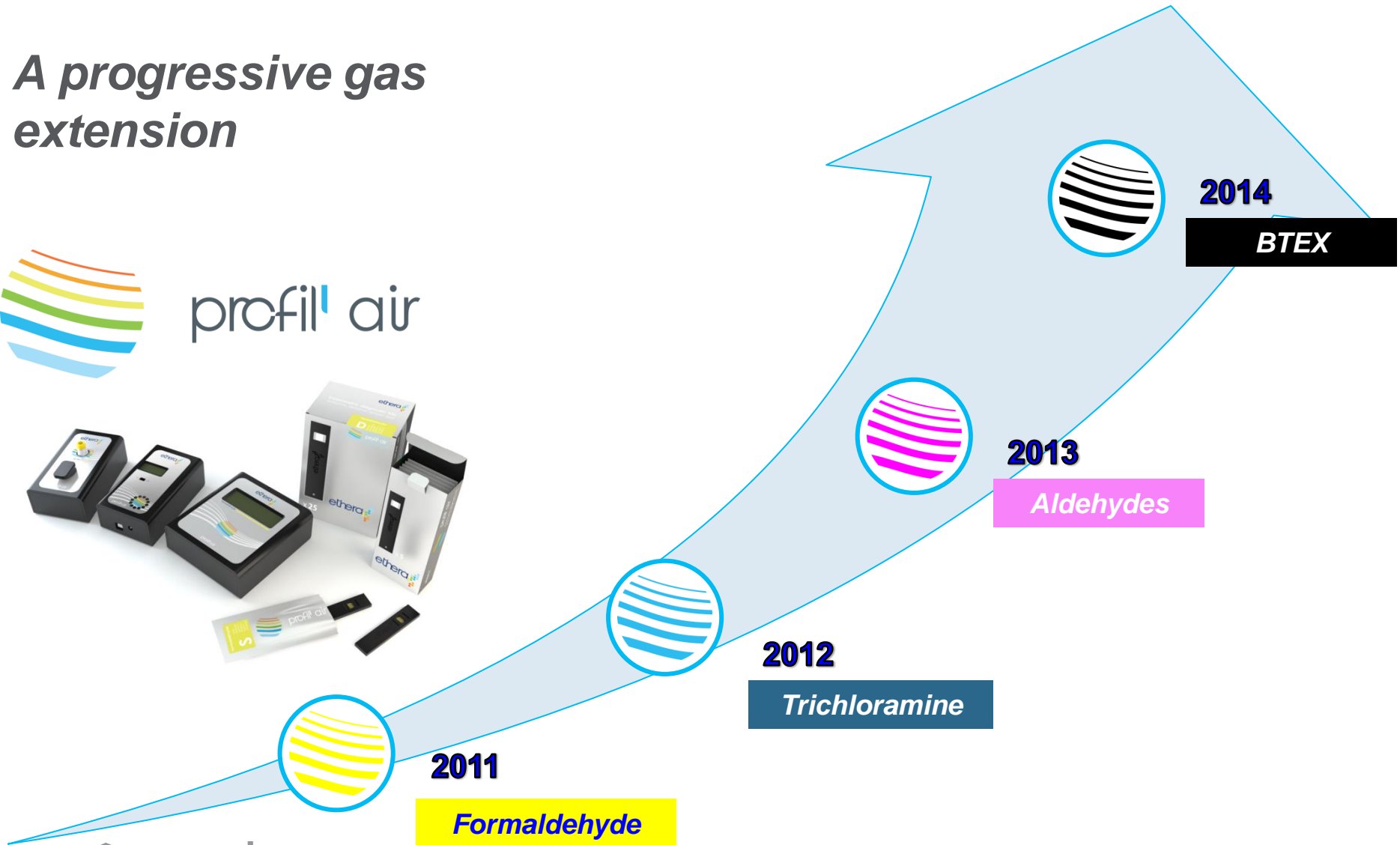
Standards and regulatory measurements are adapted to the current protocol

Profil'air® roadmap : planned activities

A progressive gas extension



profil' air



Proposed activity in the frame of the COST Action

- Test of innovative methods based on chemical sensor in comparison with the standard methods. Formaldehyde analysis should be a first step.
- Proposal of new Protocols, standards and methods for IAQC using sensors technologies
- Bringing new ideas on how to combine sensors for measuring various indoor air pollutant (BTX, others...)



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