FLAIR – THE "FLYING DOG"
SNIFFING FOR AIR POLLUTION

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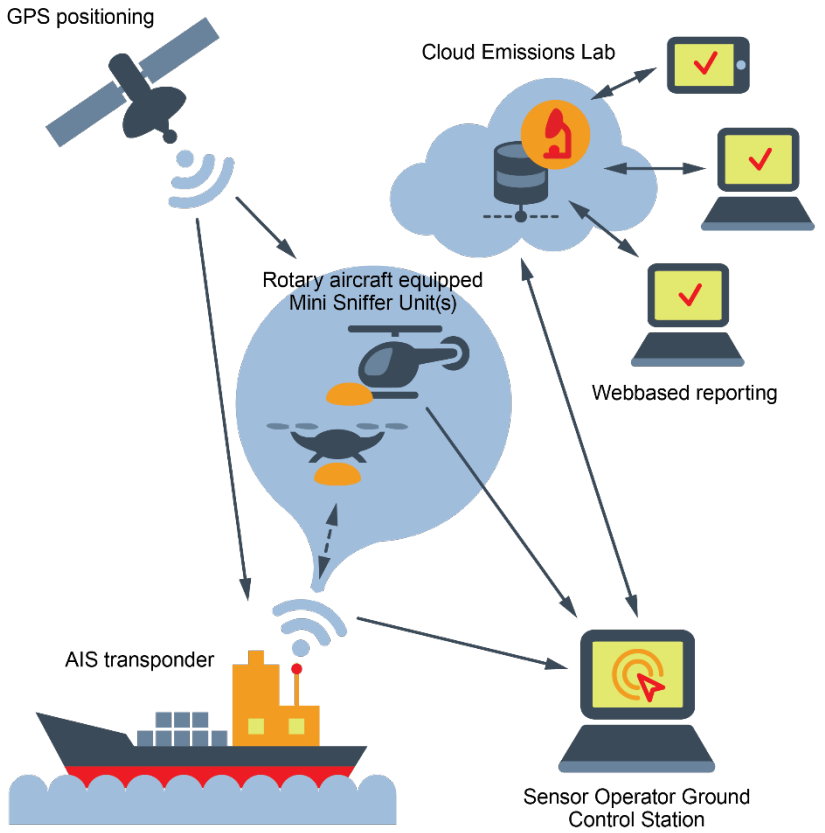
www.h2020flair.eu/

Radboud University
DTU Technical University of Denmark
NIT New Infrared Technologies
Empa Materials Science and Technology
csem
Senseair
NKT Photonics

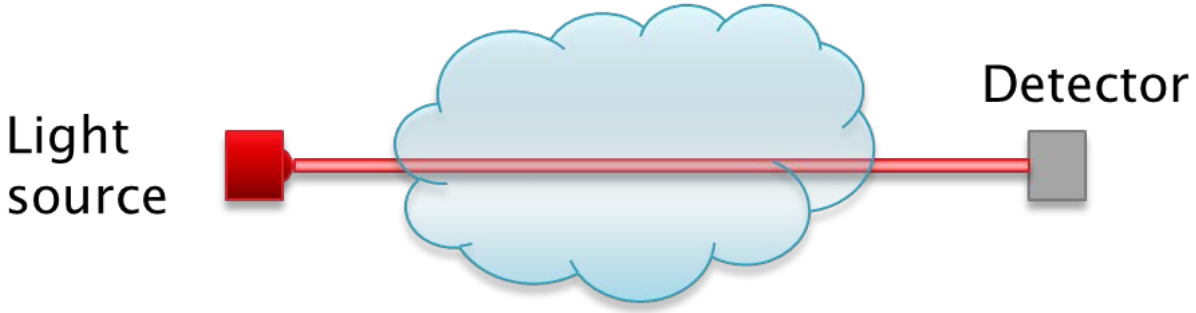
LARGE SCALE MOBILE MONITORING?

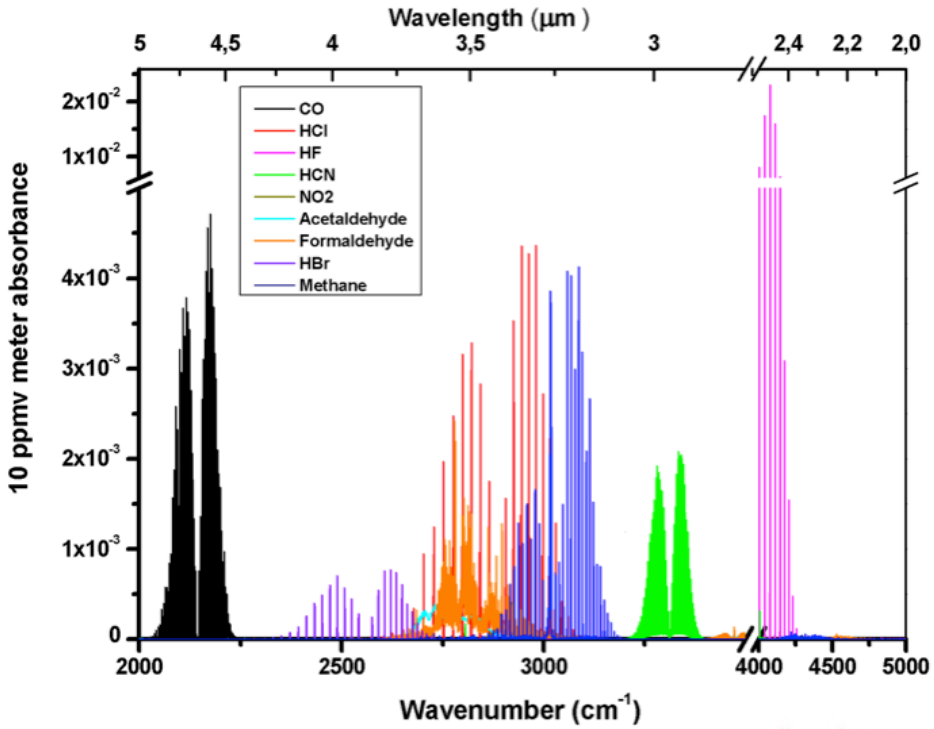
- A more detailed picture of air quality
- Access areas that are difficult or dangerous to reach:
  - Chemical fires or leaks
  - Wildfires or volcanic eruptions
  - Explosives related molecules
  - Ship emissions
- More cost-effectively than missions on manned research aircraft



GAS SENSING VIA INFRARED SPECTROSCOPY

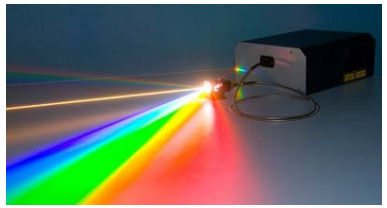
- Laser beam – one wavelength
- Different laser beams – different frequencies
- Ensuring highly sensitive detection
- Real-time molecular detection in complex gas mixtures, wide wavelength coverage needed

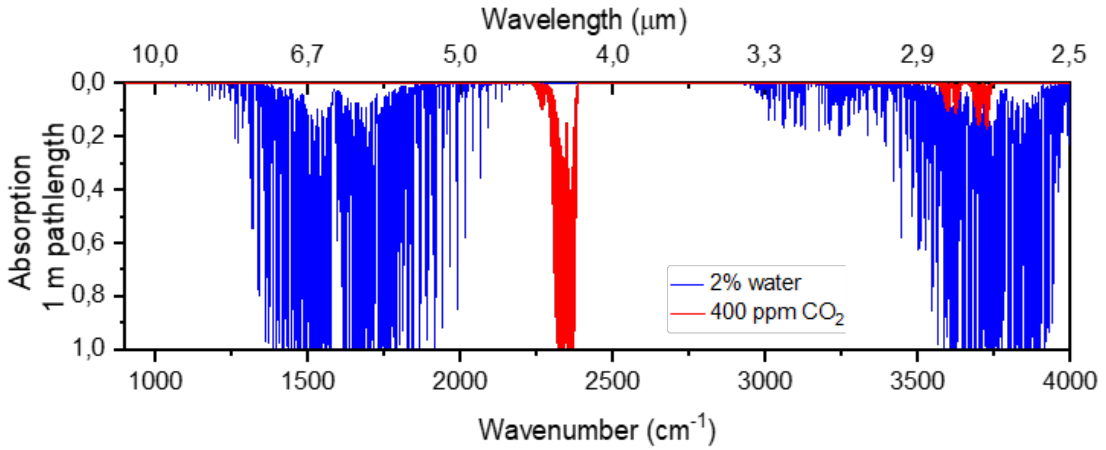




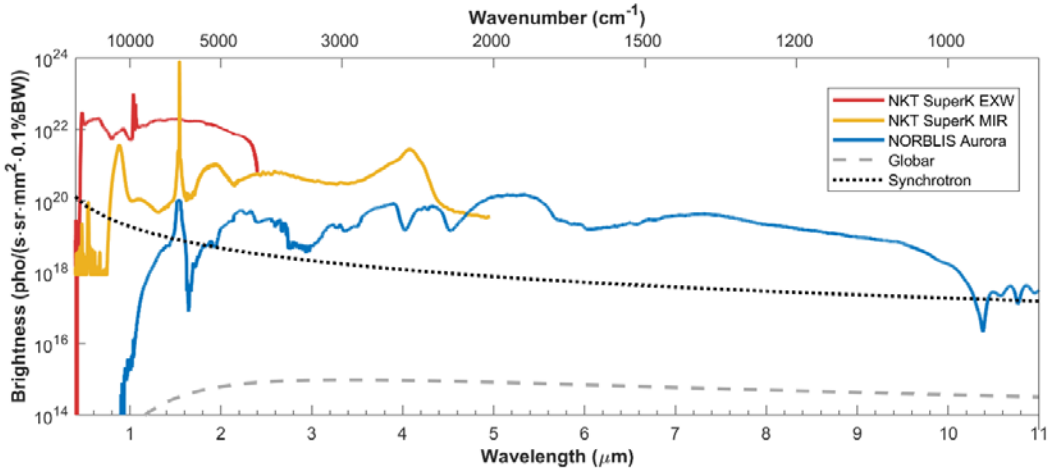
GAS SENSING VIA INFRARED SPECTROSCOPY

“white light laser”





- Innovative supercontinuum source
- Ultra-bright emission across the entire spectrum of interest
- Complete picture of the air quality
- Challenge of water vapor



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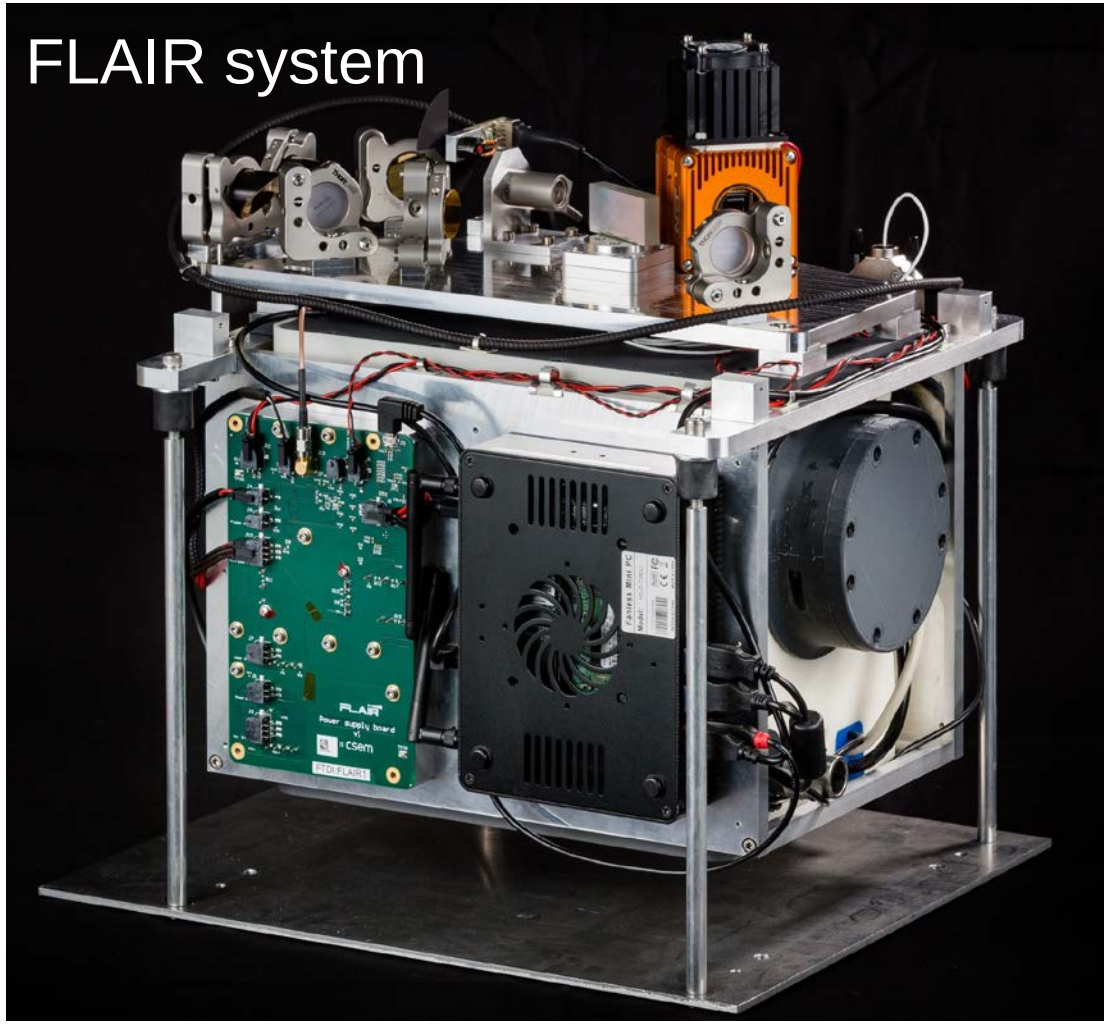
FLAIR TECHNICAL CHALLENGES

- Low weight
- Small size
- Mechanically robust
- Low electrical power
- High optical power
- High gas sensitivity
- High spectral resolution
- High spatial resolution / speed of response
- Reasonable cost



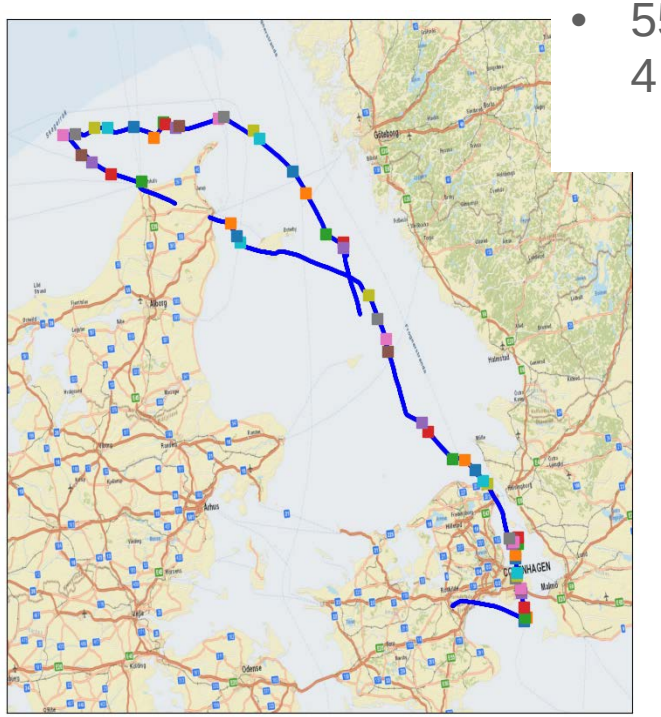
ACHIEVEMENTS

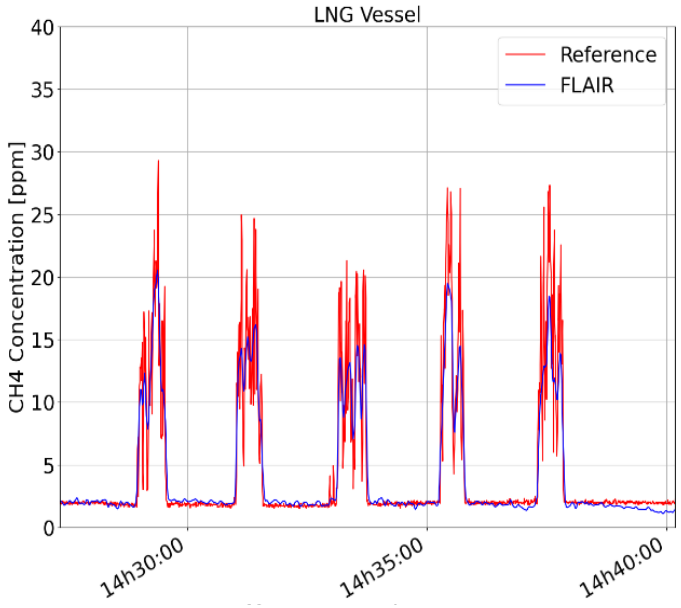
- Validation against tower reference sensors
- Detection of a controlled methane leak

ACHIEVEMENTS

- FLAIR sensor monitoring CH_4 and H_2O at 1 Hz measurement rate

- Helicopter flight with positions of the vessels (23 July 2020)
- 55 vessels measured in 4 hours





- Example of vessel powered by LNG (Liquid Natural Gas)
- 5 times Crossing plume

FUTURE RESEARCH

https://cordis.europa.eu/project/id/958840

MAX-FRESH

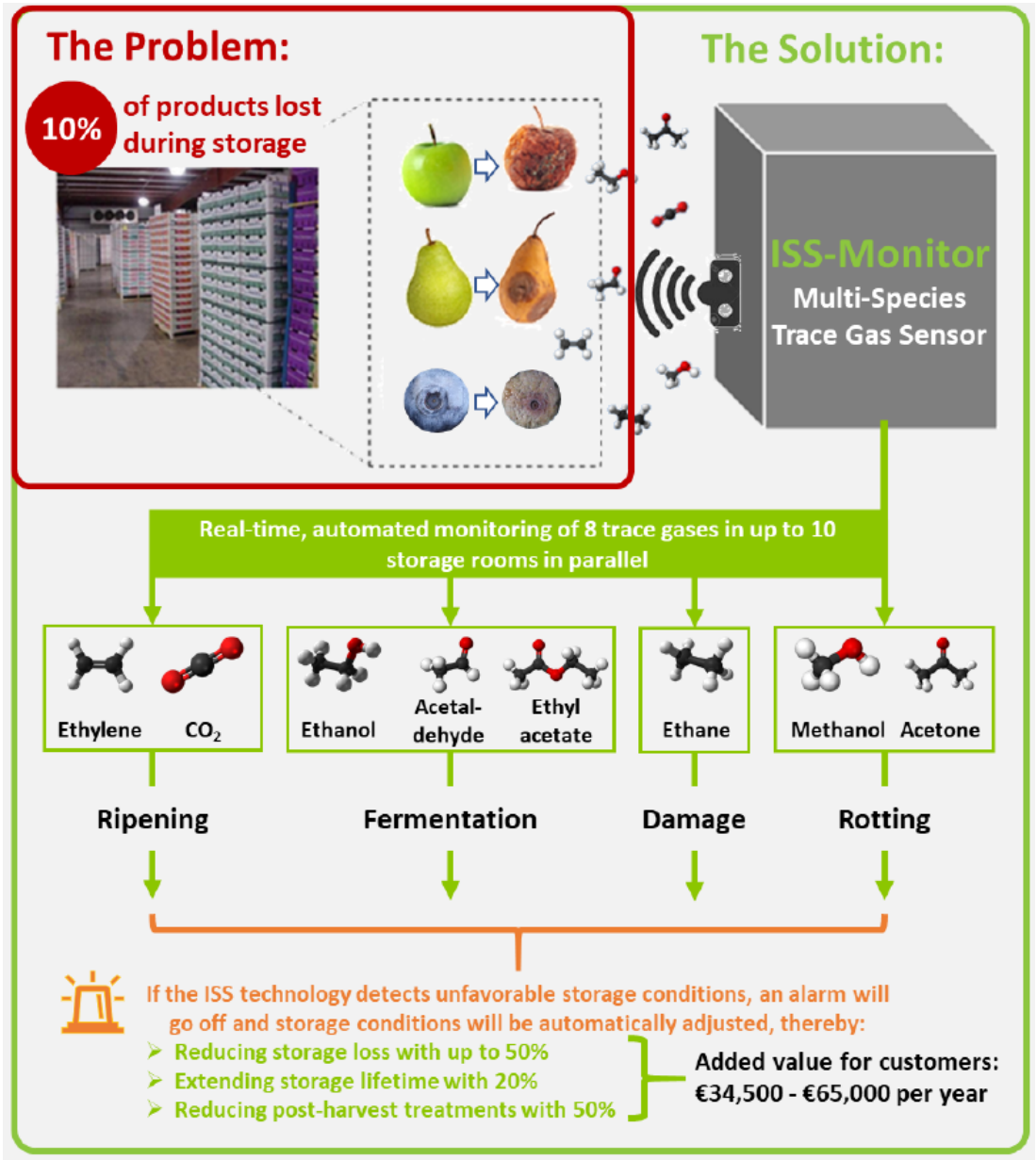
Real-time, automated monitoring of 8 trace gasses for quality control of fresh agricultural products in storage facilities

EU H2020 project: Fast Track to Innovation

MAX-FRESH

Minimizing food loss of fresh agriculture products through automated atmosphere management of storage facilities

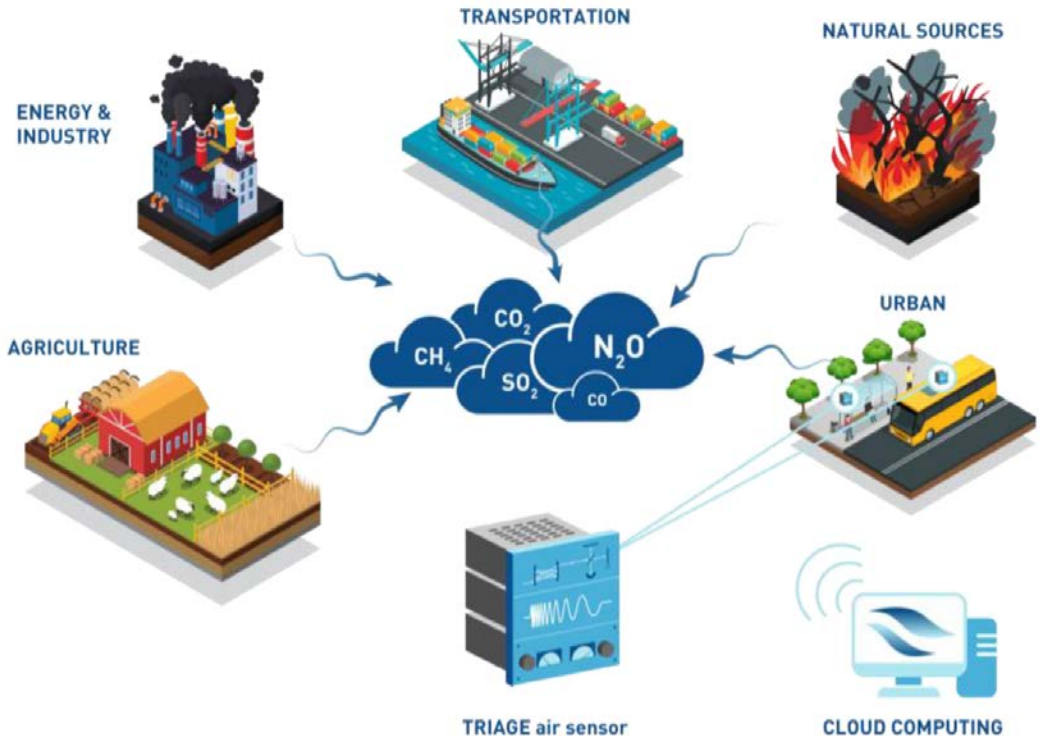
STOREX CONTROLLED ATMOSPHERE · Radboud University · NKT Photonics · Sensair



FUTURE RESEARCH

https://triage-project.info

EU H2020 project: ICT-37-2020



TRIAGE

ulTRa-broadband InfrAred Gas sensor for pollution dEtection

Participant No.	Participant organisation name	Abbreviation	Country
1 (Coordinator)	Technical University of Denmark	DTU	Denmark
2	Vivid Components	VV	UK
3	NKT Photonics A/S	NKT	Denmark
4	Radboud University Nijmegen	RU	Netherlands
5	Senseair AB	SA	Sweden
6	CSEM SA	CSEM	Switzerland
7	NORBLIS	NORBLIS	Denmark
8	VIGO System S.A.	VIGO	Poland
9	Linkoping University	LiU	Sweden

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THE FLAIR CONCEPT