



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*)



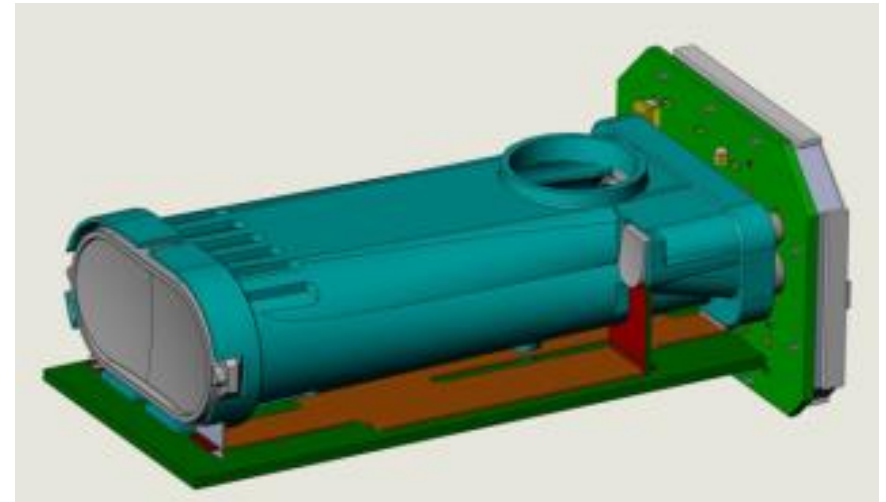
Henrik Rödjegård

WG Member

SenseAir AB / Sweden

A Robust Low-Cost NDIR Platform for sub-ppm Gas Detection

- A spin off from our alco-lock development in cooperation with Autoliv.
- Robust and suitable for mass production.
- Sub-ppm resolution.
- Adaptable for other gases.
- The platform itself is a resource for the gas sensing community.



A Robust Low-Cost NDIR Platform for sub-ppm Gas Detection

- No mouthpiece.
- No annual calibration.
- Operation temperature -40°C to 85°C .
- < 20 s start-up time.
- ppm accuracy during a test.
- 5 Hz measurement rate.
- Varying humidity.
- High production yield.
- Simple and low-cost production.

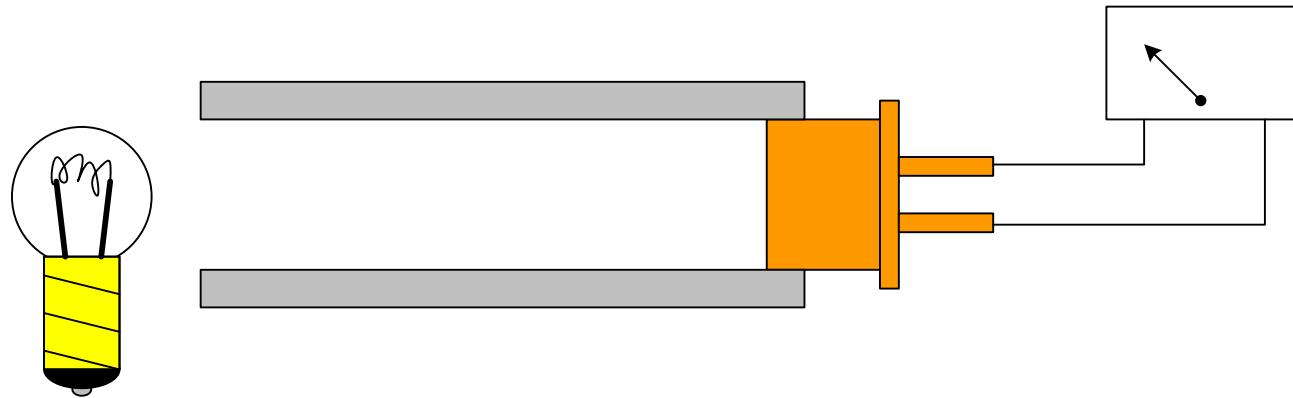


VOLVO



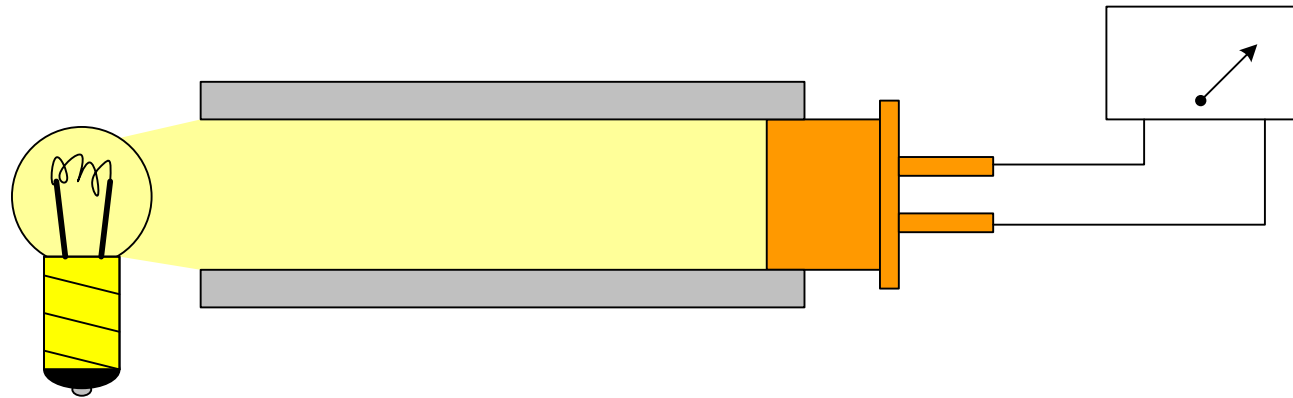
A Robust Low-Cost NDIR Platform for sub-ppm Gas Detection

A reminder on NDIR technology...



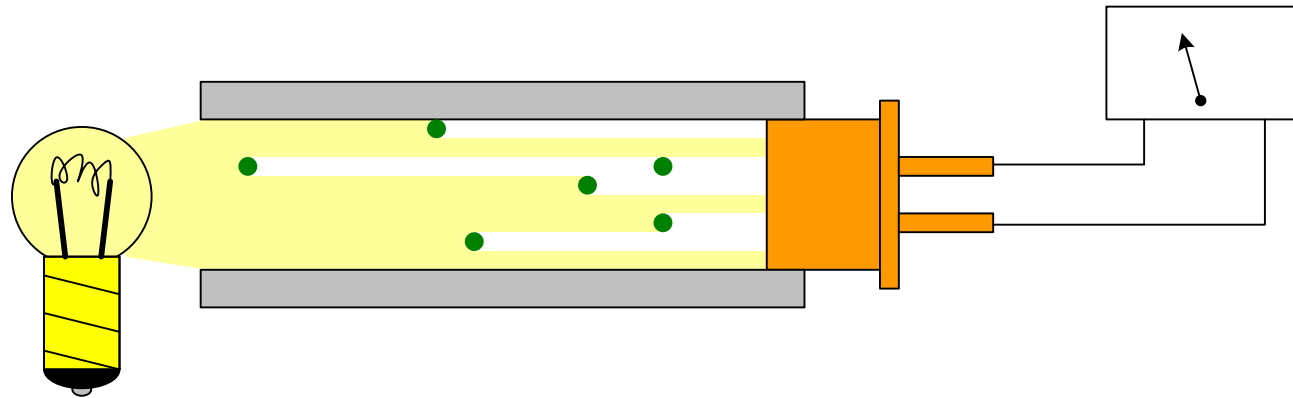
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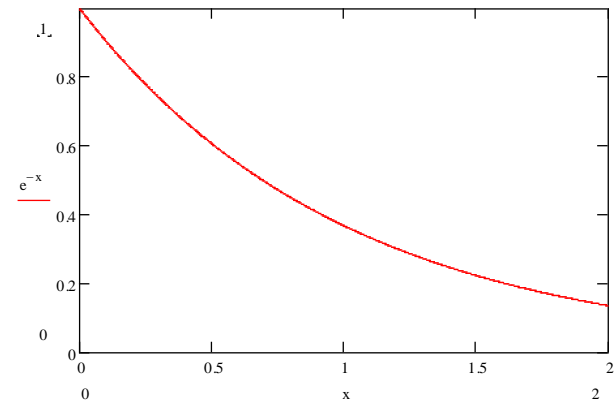


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A reminder on NDIR technology...

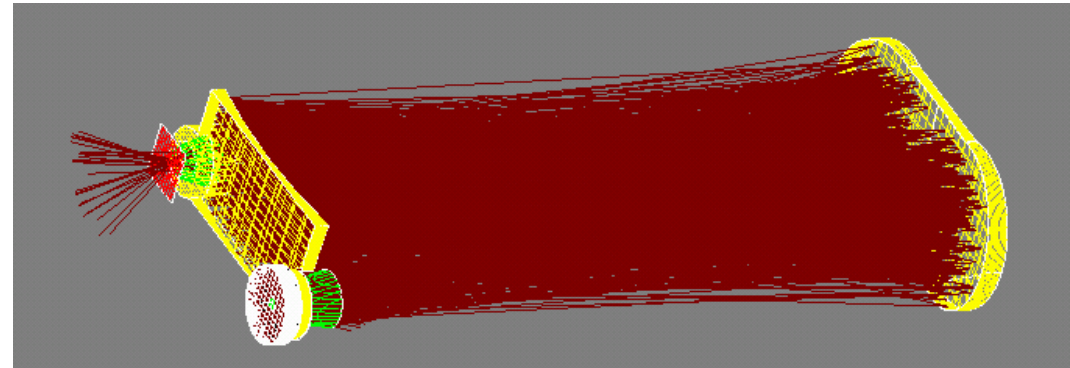
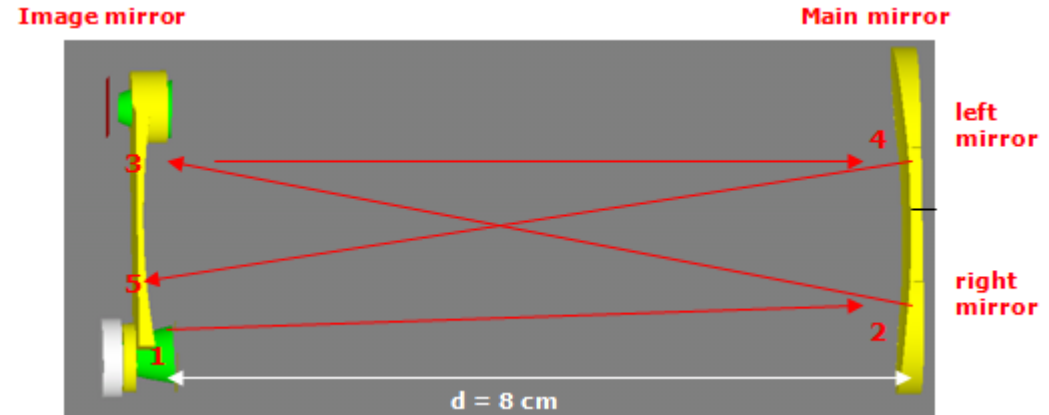


$$T = \frac{I_1}{I_0} = e^{-\alpha' l} = e^{-\sigma l N}$$



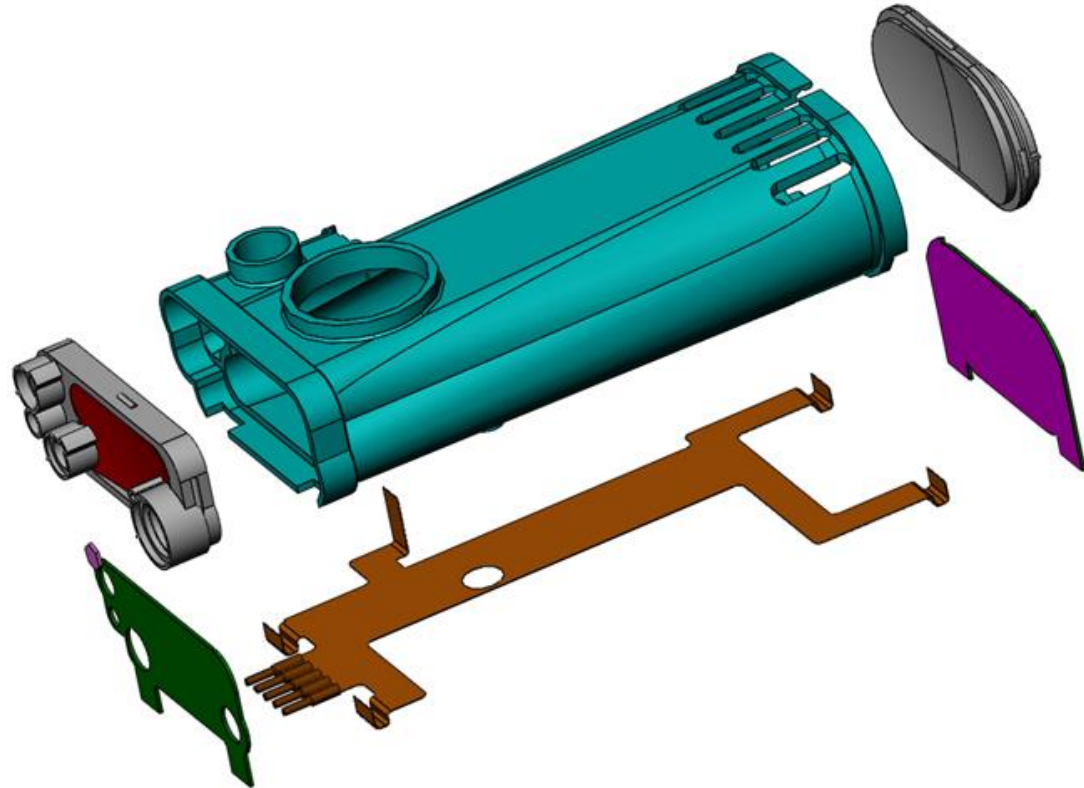
A Robust Low-Cost NDIR Platform for sub-ppm Gas Detection

- White cell implementation.
- 1.28 m optical path.
- Stable and accurate plastic material (CRE).
- Temp. controlled optics.
- Electronics with high resolution, high stability and high electro magnetic immunity.
- Advanced measurement scheme and algorithms.



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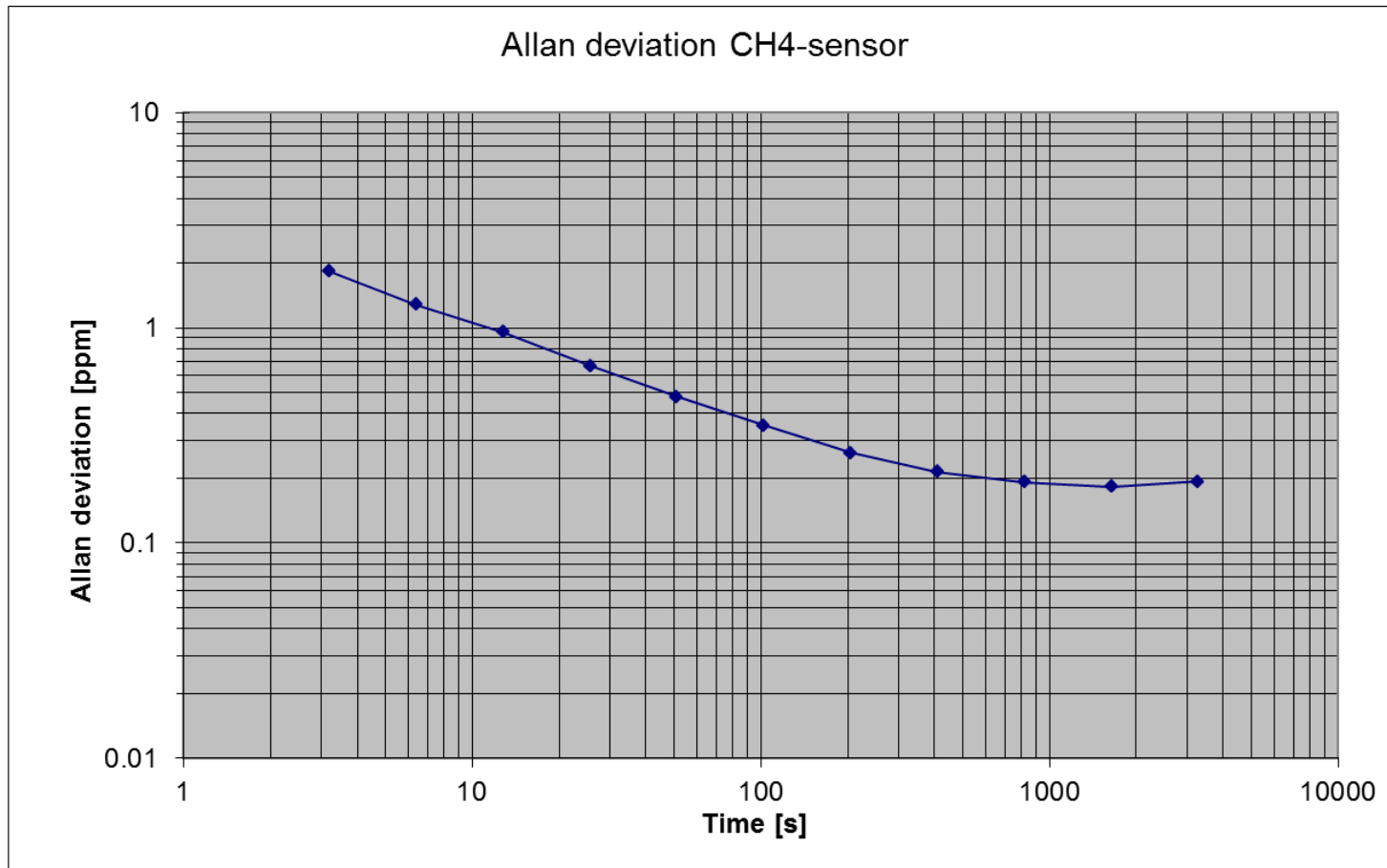
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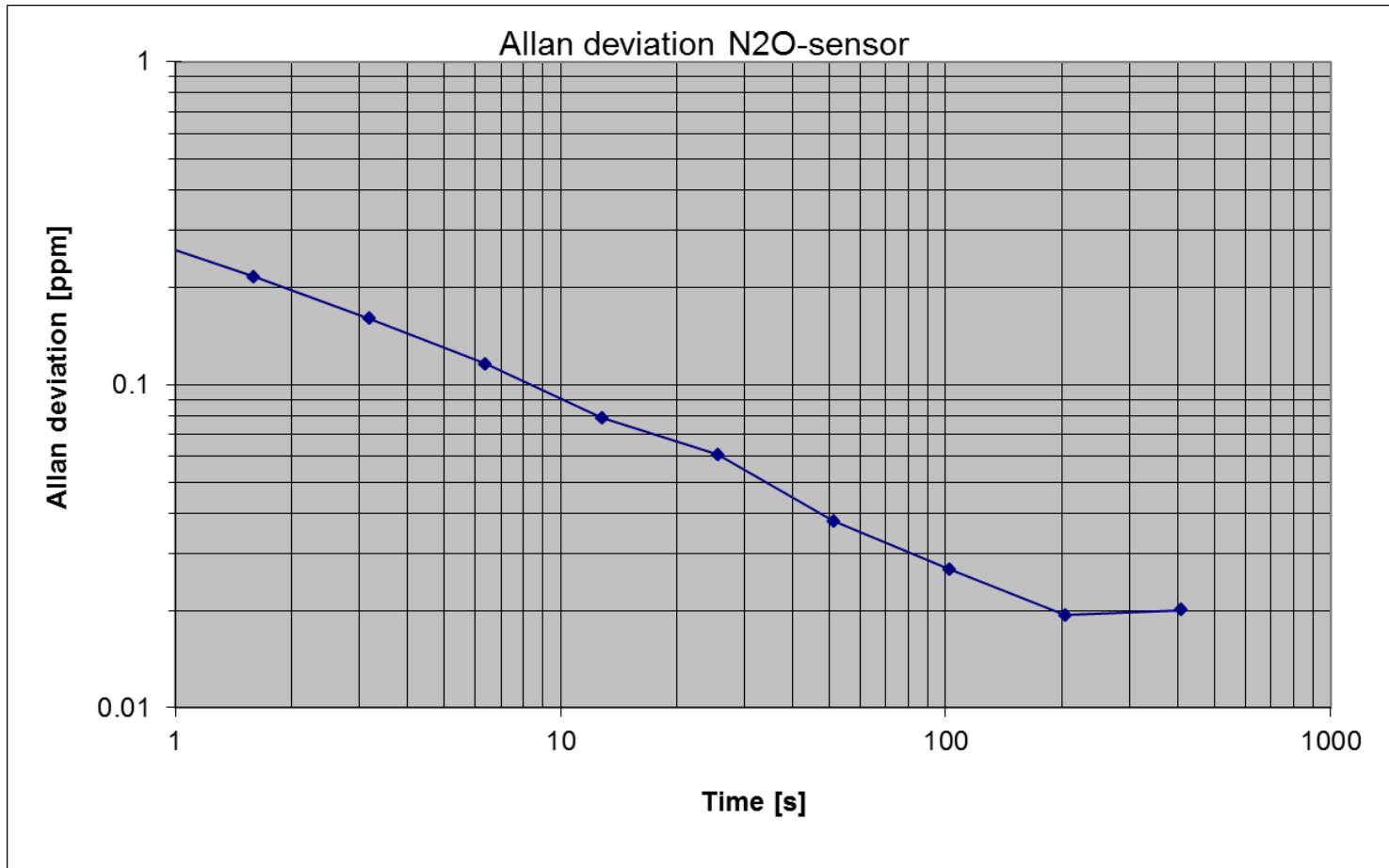
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Allan variance – Methane



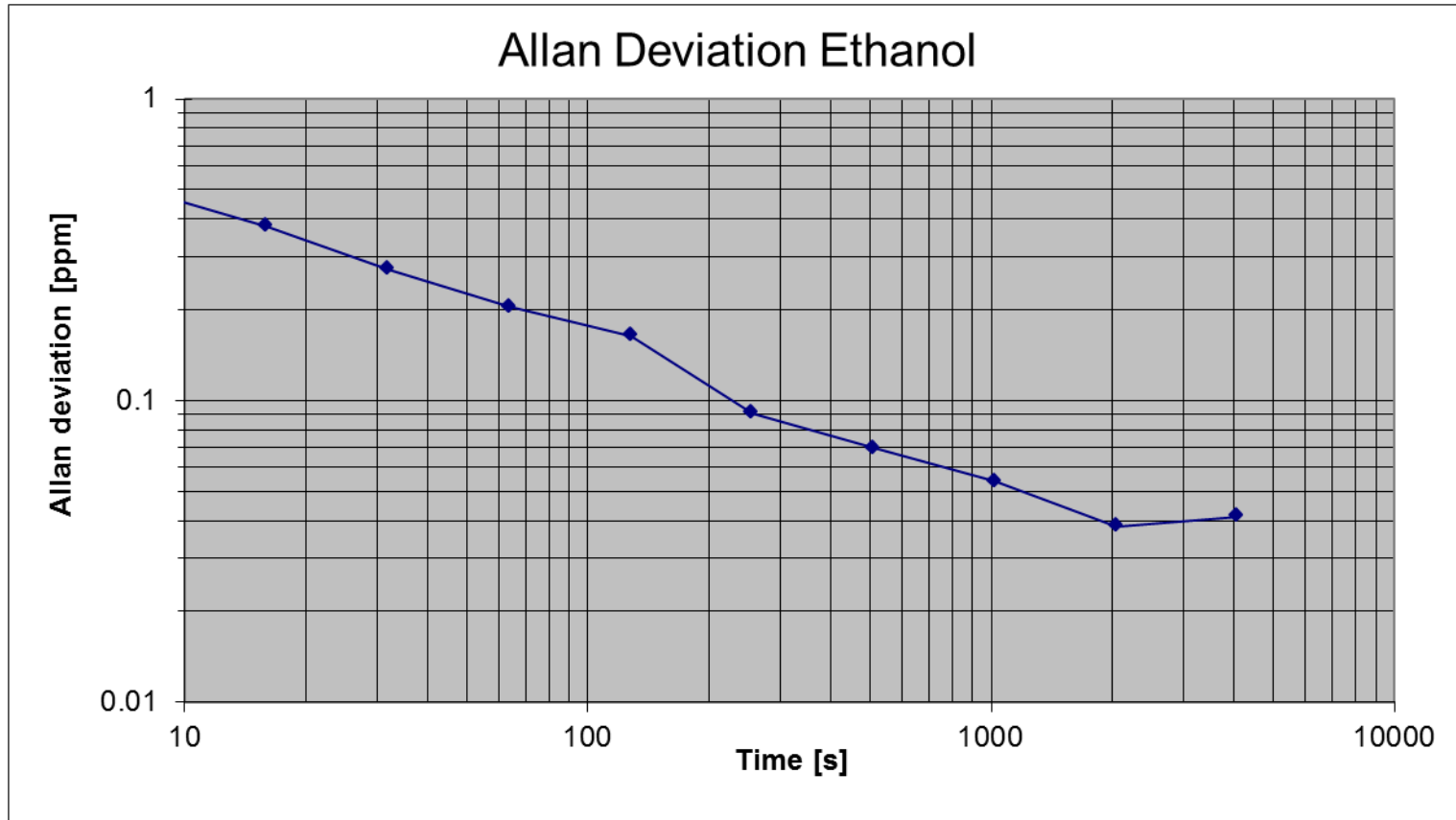
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Allan variance – Nitrous oxide



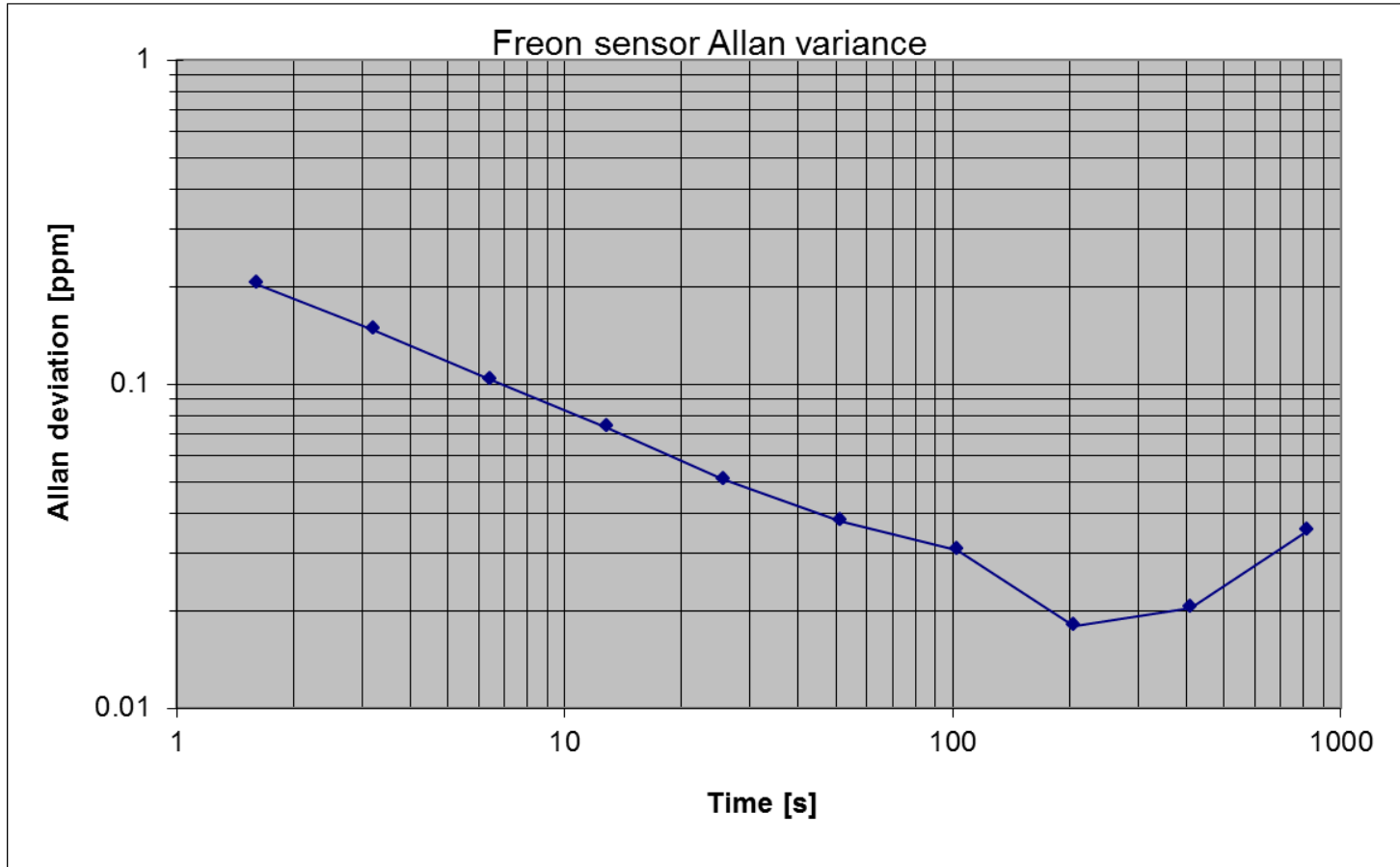
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Allan variance – Ethanol



A Robust Low-Cost NDIR Platform for sub-ppm Gas Detection

Allan variance – Freon (R134A)



A Robust Low-Cost NDIR Platform for sub-ppm Gas Detection

What is next?

- CO₂
- Ethylene
- CO
- SF₆
- NH₃
- ...

