
PICARRO
AMMONIA
SUMMIT
20-21 March 2024 - Aarhus, Denmark
PICARRO

Picarro Team

Ammonia Summit

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EMEA Sales East

Magdalena Hofmann
Senior Application Scientist,
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Jan Wozniak
Application Scientist,
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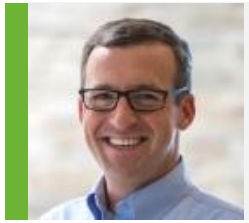
Arthur Schaeps
Manager, Customer Support



Joel Avrunin
VP, Environmental

Siqin He
Product Manager

Agenda – Day 1

Wednesday, March 20th

Time	Activity	Speaker
12:00 - 13:00	**Welcome Lunch:** Horisont Hotel Brasserie Höst Restaurant	
13:00 - 13:30	Introduction to Picarro Ammonia Analyzers	Peter Swinkels, Joel Avrunin, Siqin He, Picarro
13:30 - 14:00	The Need for Reliable Gas Emission Measurements in the Agricultural Sector	Anders Feilberg, Aarhus University
14:00 - 14:30	Emission Measurements with Micrometeorological Methods	Jesper Nørlem Kamp, Aarhus University
14:30 - 15:00	Ammonia Emissions After Field Application of Organic Fertilizer: Evaluating Mitigation Technologies with High-Time Resolution Flux Measurements	Johanna Pedersen, Aarhus University
15:00 - 15:30	**Break and Group Photo**	
15:30 - 16:00	NH_3 Emission Measurements After Urea Fertilization on Different Soil Types	Eszter Hubainé Tóth, ATK TAKI
16:00 - 16:30	Emission Measurements in Pig Barns	Anne Lindstrøm Hansen, SEGES
16:30 - 17:00	Measurement of Emissions From Slurry Storages and Environmental Research Units at Dairy Campus	Hendrik Jan van Dooren, Wageningen UR
17:00 - 17:15	quantiAgremi - Ammonia and Greenhouse Gas emissions from Livestock Farming	Johannes Fritsche, METAS
17:15 - 17:30	CRDS for VOC's	Joel Avrunin, Picarro
17:30 - 18:30	**Break**	
18:30 - 20:30	**Dinner:** Horisont Hotel Brasserie Höst Restaurant	

Agenda – Day 2

Thursday, March 21st

Time	Activity	Speaker
08:30 - 09:15	Best Practice Tips: Maintenance, Field Deployment, Troubleshooting	Jan Woźniak, Magdalena Hofmann, Picarro
09:15 - 10:00	G2509 Hands-on Training Part 1: Software	Jan Woźniak, Picarro
10:00 - 10:15	**Break**	
10:15 - 11:00	G2509 Hands-on Training Part 2: Inside the Analyzer	Jan Woźniak, Picarro
11:00 - 12:00	Q&A Session with Customer Support	Arthur Schaeps, Picarro
12:00 - 13:00	**Closing Lunch:** Horisont Hotel Brasserie Höst Restaurant	
13:00 - 17:00	**Excursion to the Aarhus University Viborg Campus in Foulum*** Join this guided tour of the new integrated campus for research and teaching in Foulum, near Viborg. See how the Picarro G2509 and G2103 analyzers are being used in research there and get practical tips from the scientists. Plus, learn about three ongoing research projects related to ammonia emissions: •Pilot-scale manure storage tanks with measurement system •Dynamic flux chambers for field measurements of emissions after manure application **Note: Transportation to and from Foulum will be provided. It is approximately a 50 minute drive from the Horisont Hotel.*	Lise B. Guldberg, Johanna Pedersen, Anders Peter Adamsen, Aarhus University

Picarro’s Commitment

Joel Avrunin

VP, Environmental

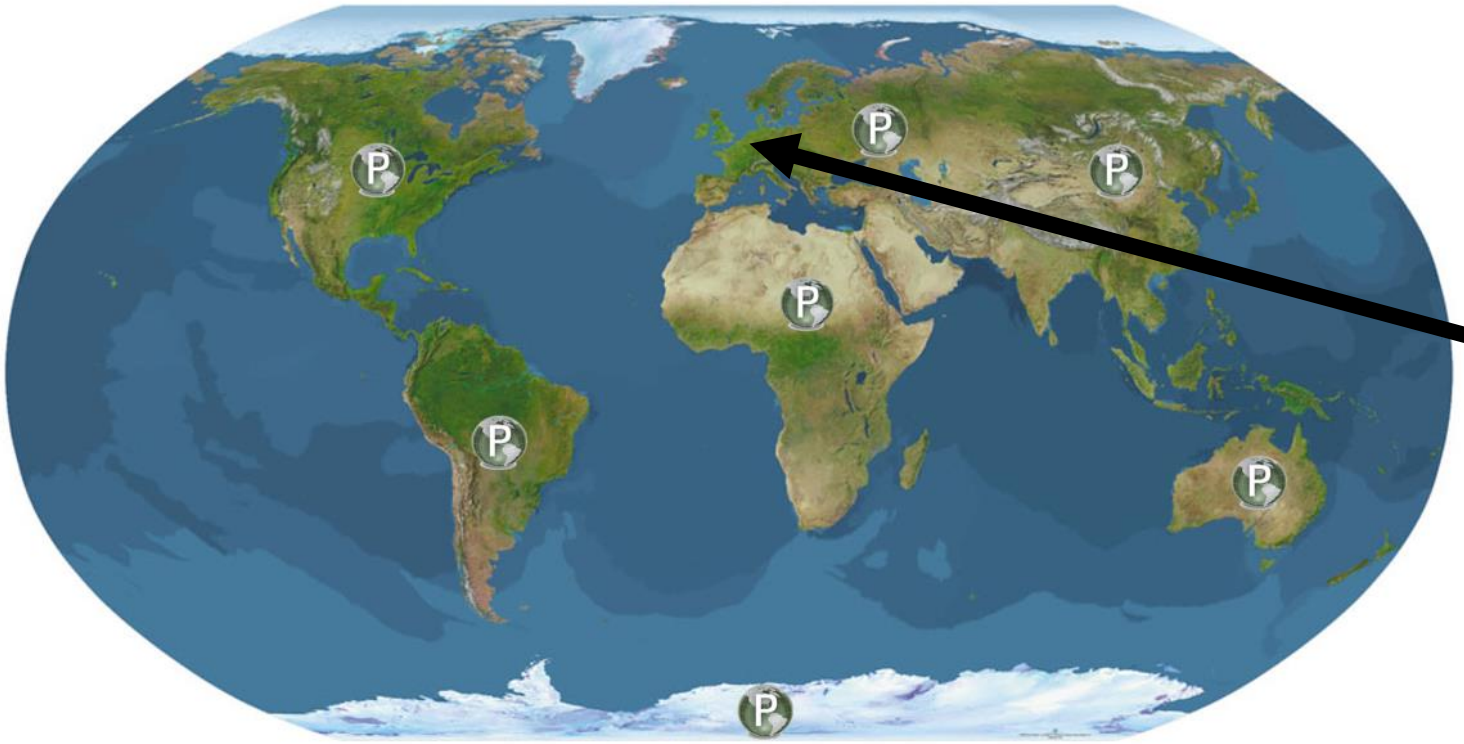
WHO
ARE WE?

- **Leading provider of solutions** to measure greenhouse gas concentrations, trace gases and stable isotopes across **many scientific applications**, along with the **energy and utilities** markets.
- Over 45 patents owned by Picarro or exclusively licensed from Stanford University
- ISO 9001:2015 Certified Corporate Headquarters, including R & D, Engineering and Manufacturing/Operations in Santa Clara, California
- 300+ employees including 35+ STEM PhDs

- **Timely, trusted, actionable data**

Global Presence

- HQ in Santa Clara, CA and regional offices in the Netherlands, Switzerland, Italy, South Korea and China
- Over 4,000 instruments installed on 6 continents and over 95 countries
- Global partnerships with 30+ channel partners
- Sales and Service office in Eindhoven, Netherlands



Our Mission, Vision, Purpose

Vision

Be the world's leading provider of real-time, high performance gas analyzers enabling superior data analytical solutions for both industrial and advanced scientific research applications.

Mission

Pioneer the development and customer adoption of superior data analytics within our targeted industrial markets.

Purpose

We provide analytical tools to enable scientific research and improved industrial efficiencies while creating a safer, more climate-friendly living and working environment.

- **Timely, trusted, actionable data**

Picarro’s Commitment towards Agricultural Research

- Significant New Product Introductions for Ammonia, Nitrous Oxide, Peripherals for Agriculture

- Commitment to the community

Picarro’s Ammonia Portfolio

Siqin He

Product Manager

Overview Picarro Analyzers

GHG analysis

G2301 : CO_2, CH_4, H_2O
G2311-f: CO_2, CH_4, H_2O (flux)
G2401 : CO_2, CH_4, CO, H_2O
G2401-m: CO_2, CH_4, CO, H_2O (flight)
PI5310: N_2O, CO, H_2O
G2508 : N_2O, CO_2, CH_4, (NH_3), H_2O
G2509 : N_2O, CO_2, CH_4, NH_3, H_2O

Suitable for concentration analysis in the atmosphere. Analyzers are optimized for atmospheric concentrations.

Trace gas analyses

SI2103 : NH_3, Ammonia
PI2114 : H_2O_2, Hydrogen Peroxide
G2307 : H_2CO, Formaldehyde
SI2205 : HF, Hydrogen Fluoride
SI2108 : HCl, Hydrogen Chloride
SI2104 : H_2S, Hydrogen sulfide
PI2910/PI2920: C_2H_4O, Ethylene Oxide

Suitable for trace gas detection with a specified lower detection limit, for industrial and atmospheric use.

Isotopic analyzers

G2131-i : $\delta^{13}C$ of CO_2
G2201-i : $\delta^{13}C$ of CO_2 & $\delta^{13}C$ of CH_4
G2210-i : $\delta^{13}C$ of CH_4 & [C_2H_6]

L2130-i : $\delta^{18}O$ & $\delta^{2}H$ of H_2O
L2140-i : $\delta^{18}O$, $\delta^{17}O$, $\delta^{2}H$ & ^{17}O-excess

Suitable for field-based monitoring and laboratory application, can be used with different peripherals.

Picarro's Ammonia Analyzers

Model	CO_2	CH_4	N_2O	H_2O	NH_3
SI2103/G2103	(s)			(s)	X
G2508	X	X	X*	X	(s)
G2509	X	X	X*	X	X

X: primary measurement
s: secondary measurement
*: additional corrections for NH_3>2ppm

G2509, 5-Species Analyzer

G2509

5 species:

- CO_2 (ppb precision)
- CH_4 (ppt precision)
- N_2O (ppb precision)
- NH_3 (ppt precision)
- H_2O

- **Optimized NH_3 performance:**
  - Response time
    - Coating for sampling handling parts
    - Increased flow rate (1.3 L/min instead of 240 mL/min)
  - Accurate ammonia measurements up to 10 ppm
- **Extended CH_4 range (up to 800ppm)**
- **Surrogate gas validation**
  - Proven as ‘customized G2508’ since 2018
- ★ **Updated water vapor correction for NH_3**
- ★ **Added averaging intervals for N_2O**

G/SI2103, Single-species NH_3 analyzer

- **Superior NH_3 performance**
  - ppt precision (100 ppt, 1-σ in 100 sec*) and lower detection limit
  - Virtually no drift (less than ± 0.5 ppb/month)
  - Large concentration range (up to 50 ppm with extended range mode)
  - Short response times (<1 min for 0 – 20 ppb)
  - Surrogate gas validation of calibration
- **PI2103: Improved NH_3 analyzer**
  - **Coming soon in Q2, 2024**
  - Built with the best of the two existing NH_3 analyzers
  - Faster (1 Hz) measurements from G2103
  - More stable OS (Linux) and upgraded sample handling from SI2103