PICARRO

FaMeGQ RESEARCH PROJECT

10 out of 10.

Picarro was the best performer at DVGW's FaMeGQ. It was the only system to detect all 10 methane events in the field test including 2 pre-existing unknown leaks.

FaMeGQ RESEARCH PROJECT

The DVGW-funded FaMeGQ research project is a technically rigorous evaluation of vehicle-based methane detection technologies conducted in the German gas distribution sector. It was designed to determine whether mobile methane monitoring systems can maintain the high safety standards established within the DVGW framework while simultaneously enabling network operators to meet the obligations introduced by the European Methane Regulation (EU Regulation 2024/1787).

Six vehicle-based systems were evaluated against DVGW G 465-4-4 requirements in a two-stage qualification process: controlled test-field validation in Düsseldorf, followed by real-world operational validation in an active distribution network in Regensburg. These tests demonstrated that Advanced Mobile Leak Detection is an effective alternative to traditional foot surveys.

Picarro not only passed but also achieved the highest overall performance recorded during the project.

> **"The project consisted of two complementary test campaigns. Picarro excelled in *both.*"**

Summary of Picarro Results

FIELD VALIDATION, LIVE NETWORK (REGENSBURG)

1 2 3 4 5 6 7 8 9 10

10 of 10

methane events detected — 100%, the highest result in the project

COMPOSITE PERFORMANCE SCORE

84.8%

highest of all six evaluated systems

CONTROLLED AND FIELD TEST

Picarro passed easily both controlled and field test with the highest combined score among tested technologies

PREVIOUSLY UNKNOWN LEAKS

Found two unknown leaks in the field that were later independently confirmed

QUALIFICATION

Obtained without limitations.

Controlled Test Field Evaluation in Düsseldorf

The first phase was conducted on a dedicated test field where multiple controlled methane release scenarios were created. Simulated leaks ranging from 5 to 15 l/h were positioned at varying distances from the vehicle routes and exposed to different wind and environmental conditions.

The objective was to evaluate leak detection performance under controlled and repeatable conditions. Participating systems were required to achieve a minimum detection rate of 90%.

Picarro achieved a 96% detection rate, successfully passing the test field qualification requirements. The project also demonstrated the value of repeated surveys, wind modeling, and advanced data analytics for improving detection reliability and repeatability.

Real-World Utility Network Validation in Regensburg

The second phase was performed in a live gas distribution network covering approximately 50 km of mains and service lines. Eight controlled methane releases were installed throughout the network. The Picarro system identified two additional unknown gas leaks that were confirmed independently. This resulted in a total of ten detectable events available for evaluation.

Picarro was the only system in the study that successfully identified all eight simulated leaks as well as both additional confirmed leaks, achieving a 100% detection rate during the field validation phase.

Composite Performance Analysis

To provide an additional analytical perspective on the published FaMeGQ results, a composite performance metric was calculated by combining precision, controlled-test recall and field-test recall:

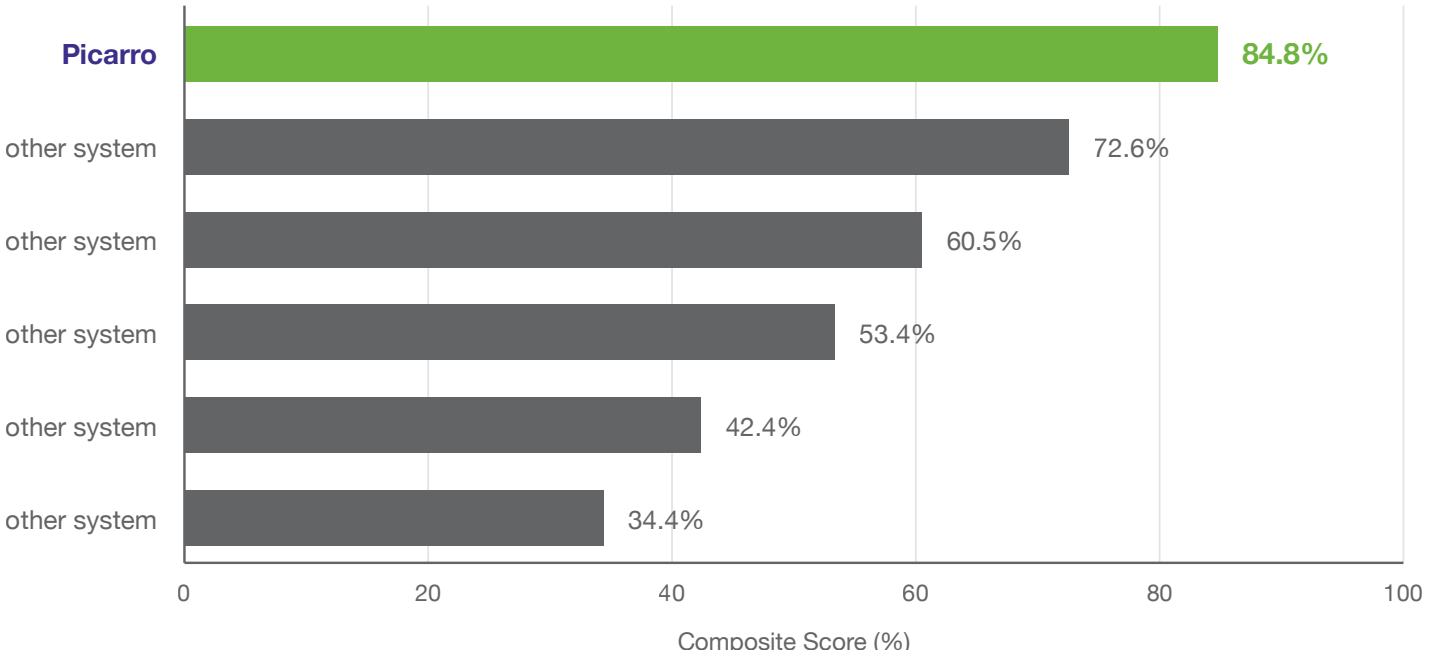
Precision = TP / (TP + FP)

Recall = TP / (TP + FN)

Composite score = Precision × Recall (test field) × Recall (field test)

where TP (true positives) are correctly identified methane leaks, FP (false positives) are reported indications that could not be confirmed, and FN (false negatives) are methane releases that were not detected. The multiplicative approach underscores consistent performance on all controlled and field tests.

Composite Performance Score
Based on FaMeGQ controlled testing and field validation results



Composite score analysis developed by Picarro using publicly available results from the FaMeGQ final report. It is not an official DVGW performance metric.

PICARRO

Picarro achieved the **highest composite score of all evaluated technologies**, combining strong precision, high controlled-test performance and complete recall during the field validation campaign. The ranking reinforces one of the central conclusions of the project.

Validation of the Picarro Survey Methodology

One of the most important findings of FaMeGQ is that the project effectively validated not only the sensing technology, but the survey methodology. The DVGW evaluation concluded that repeated surveys, robust quality-control procedures and optimized operating conditions are critical factors for achieving high detection reliability. The report specifically notes that night-time surveys provide improved detection conditions due to reduced atmospheric turbulence, lower traffic influence and a more stable measurement environment. It further concludes that systems using near-ground sampling with several sampling nozzles achieved more robust and reproducible results than those relying on a single nozzle in an elevated position.

Photo: Frank Peterschröder

Both align directly with the established Picarro deployment model, which uses repeated network surveys performed primarily during night-time operating windows, and vehicles equipped with four sampling nozzles mounted at the front of the vehicle, alongside high-precision methane and ethane measurement, wind characterization and atmospheric analytics. The project therefore independently confirmed key elements of an operational framework that Picarro has applied internationally for many years.

> **“The project therefore independently confirmed key elements of an operational framework that Picarro has applied internationally for many years.”**

A further distinction identified during the project is the degree of automation built into the Picarro workflow. According to the project report, survey drivers require system-specific training but no advanced leak-detection qualification, because data acquisition, validation and quality-assurance processes operate automatically in the background.

The system continuously monitors hardware and sensor health, validates wind and positioning data, flags measurements taken outside approved operating conditions and excludes invalid data from final reporting. Such automated controls become increasingly important as utilities move toward regulatory methane reporting requirements.

From Leak Detection to Methane Emissions and Network Safety Management

The FaMeGQ project focused primarily on leak detection performance, but one of its most significant outcomes is the confirmation that gas utilities no longer need to treat safety compliance and methane emissions management as separate activities. Conducting separate programs for leak detection and repair, emissions reporting, regulatory compliance and asset management creates considerable operational complexity and cost. The project demonstrates that these objectives can be integrated into a single workflow.

THE SAME DATASET USED TO IDENTIFY LEAKS ALSO SUPPORTS:

- EU Methane Regulation compliance and methane inventory reporting
- Emissions quantification
- Risk-informed leak prioritization and asset integrity management
- Capital investment planning and network modernization

Combined with repeated surveys, leak history, ethane validation, GIS information and asset records, this transforms survey results into a continuously growing operational dataset rather than a one-off report, giving operators a progressively deeper understanding of network performance and infrastructure condition.

Conclusion

The unmatched performance of Picarro observed during FaMeGQ did not come as a surprise.

Picarro's technology and methodology have been tested through more than 800 independent validation studies. They have been deployed for more than a decade across gas distribution systems representing more than 30% of the global market and have led to the detection and quantification of millions of leaks accumulating an unparalleled experience.

While FaMeGQ focused exclusively on leak detection performance, the true differentiation of the Picarro platform extends far beyond leak discovery itself.

A new customer recently summarized the advantages of Picarro in an eloquent way:

> **"...Everything Picarro brought to the table after detection made the difference. Picarro delivered accurate, actionable data in a format that was easy to understand. The software package for data analysis was in a league of its own. System support was second to none. The equipment performed flawlessly, and any concerns were addressed immediately by the Picarro team."**

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