Press release

AIRPARIF
Paris regional air observatory

5th edition of the AIRLAB Microsensors Challenge: technologies advancing across the globe

[Paris, 7 September 2026] Airparif has announced the results and winners of the 5th edition of the AIRLAB Microsensors Challenge, organised for the second time on an international scale. Conducted in France, Ghana and India, this edition tested 47 microsensor models from Africa, North America, Asia and Europe in environments characterised by varying climatic conditions, pollution levels and emission sources. The results highlight the progress made by these technologies, particularly in measuring particulate matter, but also reveal their limitations: their performance depends on the pollutant being measured, the environment and the intended use. For the first time, the Challenge also assessed their use in an underground railway tunnel.

This edition was carried out as part of a partnership between Airparif (France), Afri-SET (Ghana) and Indi-SET (India) – represented by the Centre for the Study of Science, Technology and Policy (CSTEP) – three initiatives specialising in the evaluation of microsensors, as well as SNCF Gares&Connexions.

Accessible devices, but which do not replace reference instruments

Small in size, compact and generally less expensive than the reference instruments used for regulatory air quality monitoring, microsensors are relatively simple to deploy. They enable the measurement of one or more parameters or pollutants, such as particulate matter, nitrogen dioxide (NO_2), carbon dioxide (CO_2) or certain volatile organic compounds (VOCs).

These characteristics open up a wide range of potential uses: increasing the number of monitoring points across a given area, documenting specific environments, or monitoring indoor air quality. They can be used by individuals, local authorities or organisations to raise public awareness of air pollution issues. However, the performance of microsensors can vary significantly depending on the device, the pollutants being measured and the conditions in which they are used. Their ease of deployment therefore does not, in itself, guarantee the quality of the data produced.

The AIRLAB Microsensors Challenge is specifically designed to independently assess this performance in order to help users identify solutions tailored to their needs.

A challenge with an international dimension

With this latest edition of the AIRLAB Microsensors Challenge, Airparif has reaffirmed its ability to bring together – well beyond the Île-de-France region – a broad network of stakeholders committed to monitoring and improving air quality. Rolled out in France, India and Ghana, the Challenge has brought together leading scientific and technical partners and enabled the micro-sensors to be tested in a variety of environments and conditions.

The international scale of this edition has also enabled Airparif to strengthen its collaborations with leading organisations and to bring together a wide range of expertise around the Challenge. Beyond the trial campaigns carried out in the three countries, this initiative helps to bring together the scientific and technical communities working on microsensors and to promote the sharing of knowledge and best practice. Airparif wishes to remain fully committed to this beyond this edition.

The 2025 edition of the AIRLAB Microsensors Challenge was organised with financial support from the Clean Air Fund, Coefficient Giving, the French Development Agency (AFD), Île-de-France Mobilités and the French Agency for Ecological Transition (ADEME).

It benefited from technical collaboration with the Asian Institute of Technology, Atmo France, the Swiss Federal Laboratories for Materials Testing and Research, the Environmental Protection Authority of Ghana, the Energy Policy Institute at the University of Chicago, Imperial College London, the Norwegian Institute for Air Research, the Observatory for Indoor Environmental Quality, the World Meteorological Organisation and the South Coast Air Quality Management District.

Performance assessed in a wide variety of environments

One of the key findings of this fifth edition concerns the influence of the environment in which the devices are used. The assessments carried out in Paris, Accra and Bengaluru show that some systems maintain their performance in very different environments, whilst others are more sensitive to deployment conditions.

The differences observed between the urban background sites in Accra and Bengaluru and the BP-Est site in Paris, which is characterised by more variable concentrations, illustrate in particular the importance of taking the measurement environment into account when interpreting the performance of microsensors. Testing a device in a single environment is therefore not necessarily sufficient to determine its performance in all situations.

Overall, the results confirm the progress made in microsensor technologies, particularly for the measurement of particulate matter. The assessments carried out in indoor air also show good performance for several parameters (notably PM2.5 and CO_2), although certain pollutants remain more difficult to measure.

For the first time, microsensors have also been tested in an underground railway tunnel, an environment with specific air quality conditions. The initial results are encouraging for the measurement of particulate matter and CO_2, and pave the way for new potential applications to better monitor air quality in such spaces.

These results thus confirm that there is no universal ‘best microsensor’. The choice of a solution depends on the pollutant to be measured, the environment in which it will be deployed, the intended use and the desired balance between performance, ease of use and cost.

For this fifth edition, the environmental footprint of the solutions is also an integral part of the evaluation protocol. This development aims to take into account not only a device’s measurement performance, but more broadly the characteristics of the proposed solution and its environmental impact.

The winners of the 2025 AIRLAB Microsensors Challenge



The detailed results of the Challenge and the performance of the various devices assessed are fully public and accessible via an interactive visualisation platform.

For more information on feedback from real-world case studies and recommendations for use, see the Airparif Dossier : microsensors.