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CASE STUDY
Research

# Empowering Environmental Research at AUTH with Real-Time Air Quality Insights

## *INTRODUCTION: Enhancing Environmental Research with Precision Monitoring*

ENCO Ltd has been a leader in providing environmental monitoring solutions across Southeastern Europe, the Middle East, and Asia. In a recent collaboration with the Department of Civil Engineering at Aristotle University of Thessaloniki, Greece, ENCO deployed Oizom's Polludrone Custom, a multi-parameter air quality monitoring device, for advanced research applications. This installation was a part of an academic initiative to support environmental research and data-driven air quality analysis within the university campus.

ARISTOTLE UNIVERSITY OF THESSALONIKI

As one of the leading academic institutions in Greece, the university required a robust and precise monitoring solution to gather multi-parameter environmental data for its research projects and student learning.

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## *THE CHALLENGE: Capturing Urban Air Pollution for Research Precision*

The Civil Engineering department required a solution that could deliver highly accurate, continuous air quality data under dynamic urban conditions. Their specific challenges included:

1. **Need for Holistic Environmental Data:** The research demanded real-time monitoring of multiple parameters including Particulate Matter ($PM_1$, $PM_{2.5}$, $PM_{10}$), CO, $CO_2$, $SO_2$, NO, $NO_2$, $O_3$, and weather conditions (Temperature, Humidity, Pressure), along with Noise levels, UV radiation, and Light Intensity, to establish correlations between air pollutants and environmental factors.
2. **Gaps in Data Accessibility and Visualization:** Researchers required seamless and instant access to historical and real-time data to analyze pollution trends.
3. **Scalability for Future Research Projects:** The solution had to be modular and scalable, allowing the institution to expand the system or integrate it with other research-based monitoring setups.
4. **Real-time data acquisition:** Facilitating timely analysis and responsiveness in research activities.
5. **User-friendly data management:** They needed a device that is easy to use, allowing students and researchers easy access to data for analysis and interpretation.

## *THE SOLUTION: A Customized, Research-Centric Air Quality Monitoring System*

To address these challenges, ENCO deployed a Polludrone Custom device integrated with advanced monitoring capabilities and cloud-based data management. The key aspects of the solution included:

**INSTALLATION DETAILS**

**1 UNIT** of **POLLUDRONE CUSTOM**

1. **Advanced Multi-Parameter Monitoring:** The custom unit was equipped to monitor $PM_1$, $PM_{2.5}$, $PM_{10}$, CO, $CO_2$, $SO_2$, NO, $NO_2$, $O_3$, Temperature, Humidity, Pressure, Noise, UV, and Light Intensity, delivering a complete environmental profile for in-depth scientific analysis.
2. **Research-Grade Sensor Accuracy:** Oizom's factory-calibrated and field-validated sensors are perfectly suitable for high-precision academic research and real-time monitoring
3. **Easy Data Visualization:** The device was integrated with the Envizom software platform, enabling real-time data access, visualization, and advanced analytics.
4. **Advanced module for Data analysis:** The modules for Data Analytics and Historical Trends allowed researchers to track pollutant fluctuations, perform multi-variable analysis, and generate reports for academic publications.
5. **Easy Deployment:** The compact design and modular setup allowed for swift installation without extensive infrastructure, which is ideal for a university environment with space and budget constraints.
6. **Data Transparency and Accessibility:** Envizom's user-specific dashboards allowed multiple stakeholders, including professors, students, and research collaborators, to access

and customize data views, improving collaborative analysis and educational outreach.

The device was configured per the university's research requirements, enabling them to better visualize and analyze data in research workflows and scalability for additional projects.

## *THE TRANSFORMATION: Enhancing Academic Research Through Smart Monitoring*

The deployment of Oizom's Polludrone at the University created tangible shifts in the university's research infrastructure:

1. **Real-Time Air Quality Insight:** The university now receives continuous, real-time updates on environmental parameters, improving decision-making in experimental research projects.
2. **Data-Driven Curriculum Enrichment:** Professors are integrating live data streams into coursework, enabling students to work with real-world environmental datasets, enhancing experiential learning.
3. **Enhanced Research Output:** With access to accurate pollution and meteorological data, the department has accelerated its ability to publish peer-reviewed papers and participate in EU-funded climate research initiatives.
4. **Optimized Research Efficiency:** The "Alerts & Automation" module enabled setting threshold-based notifications, reducing manual monitoring and increasing research productivity.
5. **Community Engagement Potential:** With the deployment of Polludrone, the university is now better equipped to engage with policymakers and citizens, using credible data to support urban planning and public health awareness programs.

The automated data acquisition and cloud accessibility helped eliminate manual data logging and enabled seamless collaboration across research teams.

## *BROADER IMPACT: Building a Regional Air Quality Knowledge Hub*

This collaboration has far-reaching implications beyond the immediate research benefits:

1. **Catalyzing Regional Environmental Intelligence:** As one of Greece's foremost academic institutions, Aristotle University's initiative may serve as a blueprint for other universities in the Balkans and Southeast Europe to adopt smart environmental monitoring.
2. **Strengthening Industry-Academia Partnerships:** The successful collaboration between ENCO Ltd, Oizom, and the university sets a precedent for cross-sector innovation in air quality monitoring.
3. **International collaboration opportunities:** With the help of robust and exportable technology, Aristotle University is positioned to contribute to international collaborative research projects.

## *CONCLUSION: Empowering Environmental Research with Real-Time Intelligence*

By integrating Oizom's Polludrone solution, Aristotle University of Thessaloniki has demonstrated a forward-thinking approach to urban environmental research. With the support of ENCO Ltd, the university now harnesses a continuous air quality monitoring system to maintain ambient air standards and enhance research efficiency. Through the advanced functionalities of Envizom, researchers gain actionable insights, helping shape a healthier and smarter urban future. This installation not only reflects the institution's academic rigor but also Oizom's commitment to providing scalable, data-driven, and accessible air quality solutions for tomorrow's cities.

Oizom is a company specializing in environmental monitoring solutions. They offer products to monitor air quality, weather conditions, and other environmental factors. Utilizing advanced sensor technology and data analytics, Oizom aims to provide actionable insights for construction, industrial compliance, and community awareness. Their solutions can be applied in various sectors including government, industries, and community initiatives.