Odors **Gases** **Particles** **Liquids** **Noises**

CUSTOMER CASE

Port authority of Ventspils freeport (Latvia)

Real-time quantification and identification of odors in the port and city of Ventspils

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Customer Needs

The Ventspils Freeport hosts three different oil storage terminals, managed by three different operators (figure 1). The loading and unloading operations generated a high number of odor-related complaints from citizens of the port's local communities, which are oftentimes due to the lack of streamlined operations. Given that the dominant wind comes from the north of the Baltic sea, it carries these odors south, towards the city.

Ventspills Municipality decided to introduce new regulations requesting oil terminals to install online odor monitoring systems, to ensure that odor levels are below 5 OU/m3 at the fence line of the port's terminals. Should such odor levels be reached, immediate actions will be taken by the offending terminal.

Additionally, the Municipality requires to access to all data, from these monitoring systems to in order to discriminate between, and identify, the different oil odor types for more efficient identification of odor sources and for better remediation protocols.

Figure 1: Ventspils port structure

Customer solution

The implementation of an Ellona WT1 AQMS network, consisting of nine WT1 units each with H2S, Mercaptans and 4 four different MOX sensors, plus nine weather station units. This solution was selected by customer, as contrary to most competitors in the market, Ellona has developed a unique expertise in MOS sensors. These sensors are key in accurately measureing odor intensity and quality, as H2S, RSH, and NH3 sensors alone are not. capable of accurately representing odor complexity.

WT1

Integration of the data from Ellona Intelligent Platform is made available through the built-in API, in the Municipality's dashboard and control panel.

Customer setup

In order to optimize the monitoring network, a preliminary study was conducted with the help of our local partner ELLE, to determine the optimal locations for the WT1's based on various terminals characteristics (of the three different terminals) and prevailing winds directions. Each terminal was monitored with three WT1 units (figure 2).
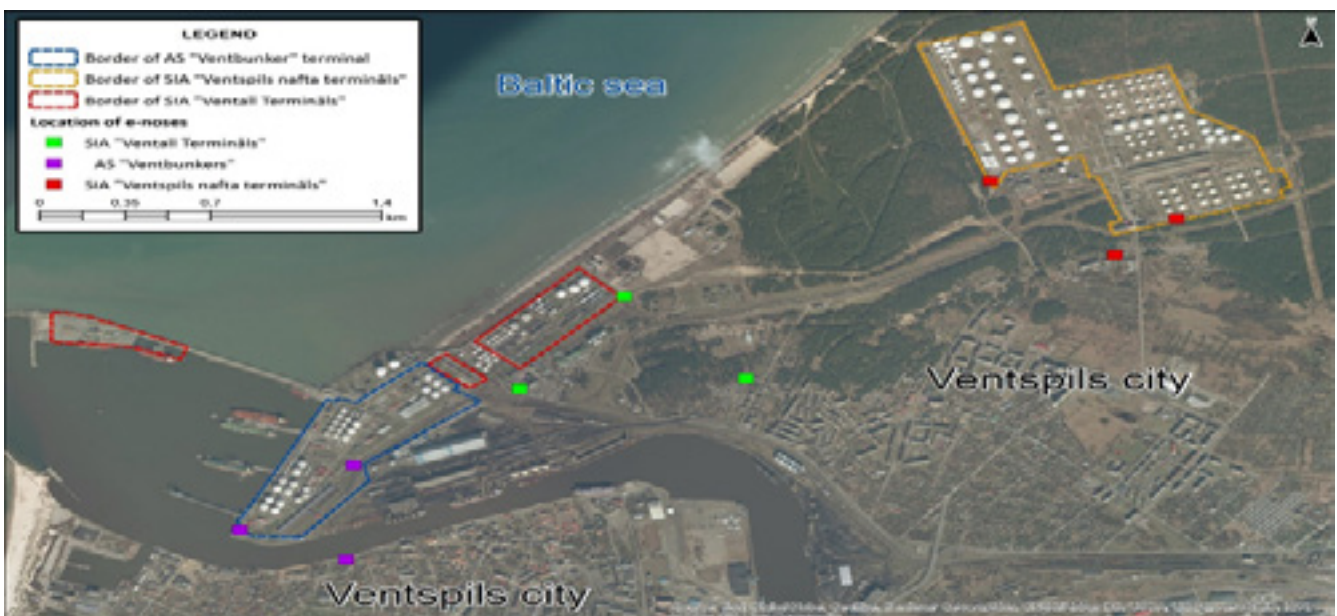

Figure 2: Implantation of WT1 units

Our partner, Elle, also carried out comprehensive training of our WT1 AQMS units (figure 3), according to EN13725 standards (dynamic olfactometry), using a trained and certified sensory panel for Odor Intensity (figure 4), and also for the identification of main odor sources such as solvent naphta, benzin or kerozen).

Figure 4: Certified sensory panel

Figure 3: Odor training phase

A correlation model was built (figure 5), using PLS (Partial Least Square Regression) between the panel results and the WT1 data, producing a very good R2, close to 0.9, and an excellent reproducibility between the different WT1 units (figure 6).
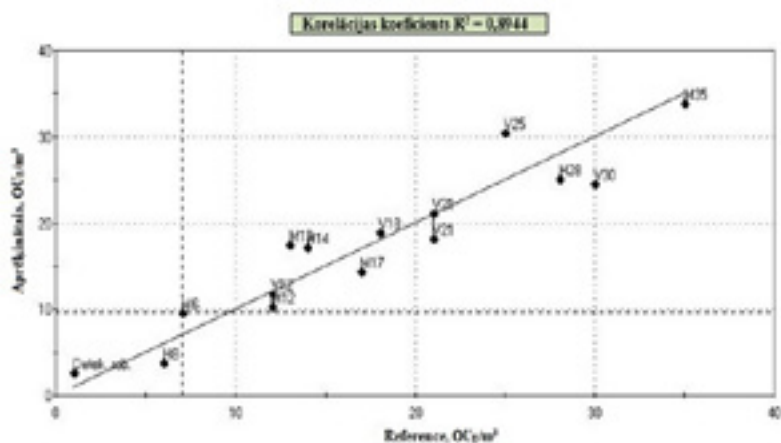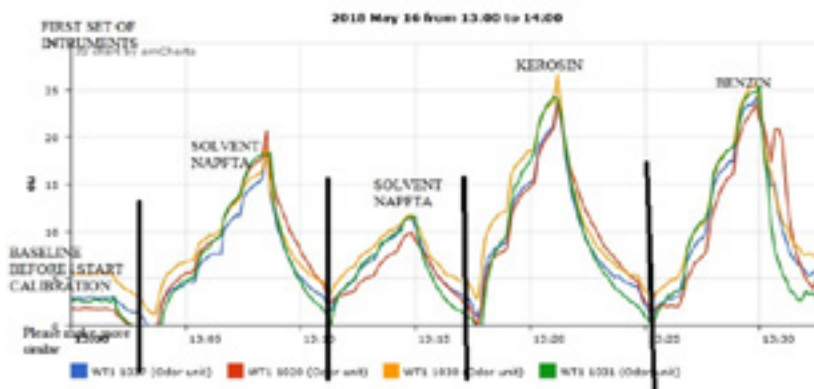

Figure 5: Correlation with certified olfactometry panel

Figure 6: reproducibility between the different WT1 units

The WT1 and the associated model were able to distinguish between the various petrochemical products, displaying unique digital fingerprints (figure 7), thus leading the path to online odor identification.
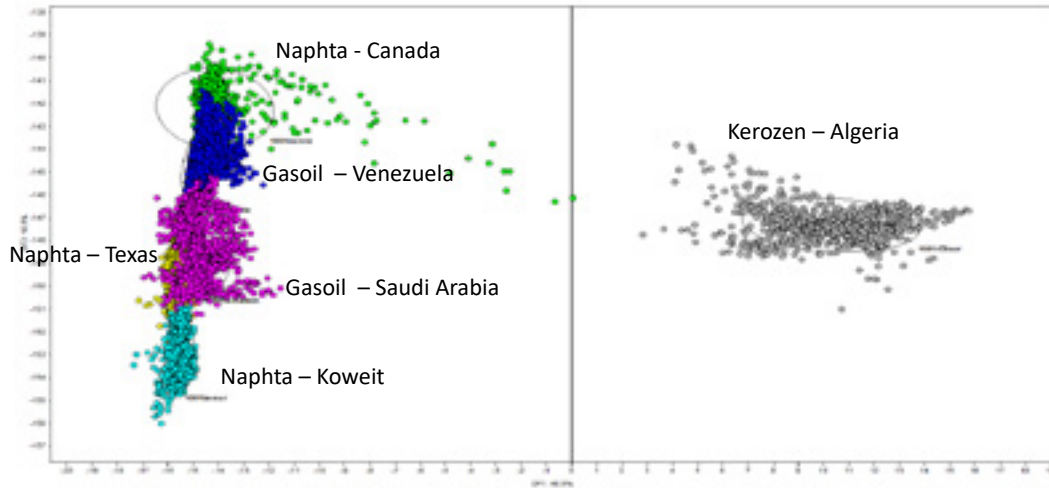

Figure 7: Online odor identification

After comprehensive training and model validation with unknown samples, the network was fully deployed and operational along the fence line.

Main results:

The monitoring network is operational 24/7, and serves as an alarm system. Thanks to Ellona's API built into our platform (figure 7), Ventspils Municipality is able to import the data into their own dashboard with complete monitoring of the port's activity.
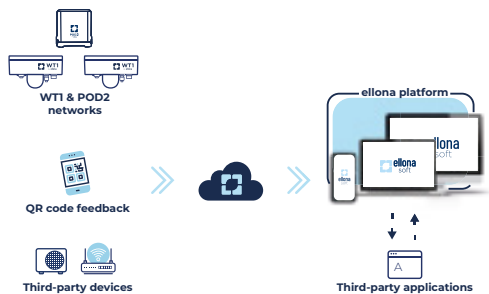

Figure 7: Ellona Environmental API

The Municipality is then able to monitor, online, odor intensity at the terminal fence lines where the measurements are

correlated to EN13725 standards. The Municipality is also able to identify, online, odor type and quality and in order to take immediate and targeted actions against the offending terminal or tanker that set off the alarm.

Notes
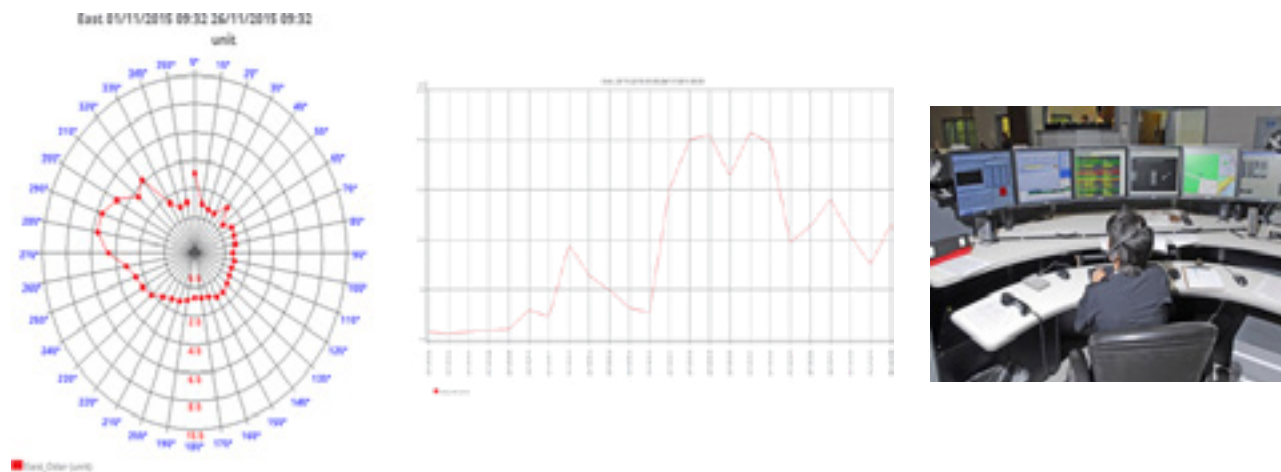
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We empower people with environmental intelligence

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About ELLONA

Our mission is to make the invisible visible, by measuring in real time gases, particles, but also noise, light or vibration, and by providing this data to citizens, employees and customers (the 3Cs). But our challenge is above all to make these data actionable in order to allow to remedy in real time these different nuisances and pollution, and to make the concerned spaces healthier and safer.

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