

# “Blowin’ in the Wind”

by Marta Wenta, *Data Scientist & Product Manager, SeaData*

**Air quality has been the main concern of ports in Europe since several years now, as stated by the European Sea Ports Organisation (ESPO) in its environmental reports. While certain areas are regulated by law, e.g. ship-related emissions of sulphur and nitrogen oxides, other, like coal dusting (sometimes just a nuisance, at other times a threat to public health), are left to port authorities and terminal operators to work out. That is, if they’re willing to take care of their relations with the local community and, what’s also crucially important, find the right partners to help them address the issue.**

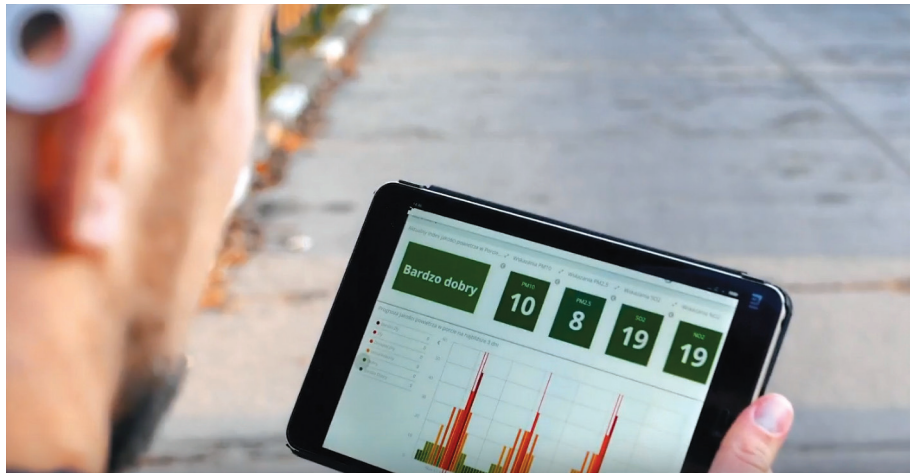
It all started with Space3ac, a EU- and Poland-backed programme aimed at accelerating promising tech-ideas, also those having the potential to change the transport & logistics world. Within the programme, which we successfully passed all the way to the Demo Day 2018, we were tasked by the Port of Gdańsk to design and implement an air pollution monitoring system.

## Have you ever seen a yeti?

We provided an end-to-end solution comprised of sensing devices and an online analytical system. The air quality sensors – capable of measuring the levels of particulate matter (2.5, 10, and 100 micrometres) or other pollutants – are fitted into the so-called YetiBox. The collected data is then continuously sent to the YetiSense system where it’s analysed and visualised.

The YetiBoxes are easy to use ‘plug & play’ devices, and can be fitted with a range of sensors, depending on the client’s request as well as the legally-binding obligations. The sensors routinely correct their indications following the changes in weather conditions as well as check their “health” (our offer includes remote control and regular servicing of the devices, along with their replacement, if necessary).

The YetiSense online system, thanks to various diagrams and high-resolution maps, provides an uncomplicated analysis of the air quality for a chosen period of time, including, what’s of the essence when it comes to risk assessment, forecasts. YetiSense also features a configurable notification system (transgression of allowable limits, unlimited storage of the measurement history, reports, and weather data), where periodical reports can be automatically sent over an e-mail. Every chart and



file in the system can be exported either as an image or in the XLSX or PDF formats. Furthermore, integrating other already installed sensors or external data sources into the YetiSense is also possible.

The system is continuously developed and tested to meet the customers’ expectations. As such, in the near future we plan to add noise analytics, enabling generation of acoustic maps, as well as a feature that will help to locate the source of air pollution.

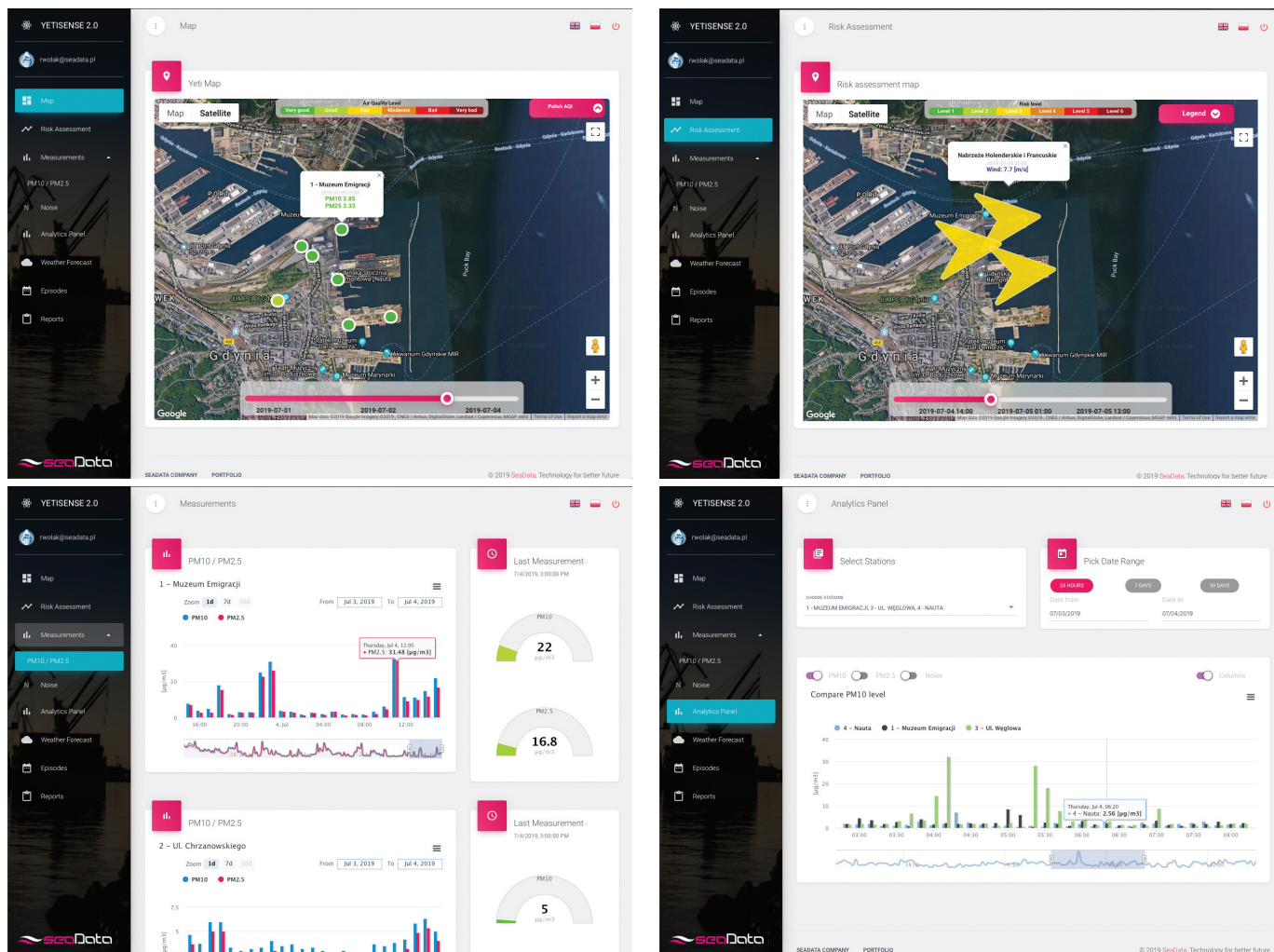
## Done and dusted

Two weeks after we’ve signed the deal with Gdańsk, the nearby Port of Gdynia has entrusted us with another task. Last year, in mid-July, a meeting took place in the Gdynia City Hall, gathering citizens, representatives of the local government,

the Chief Inspectorate of Environmental Protection, and the Port of Gdynia Authority. The topic at hand was the particularly intense and frequent dusting of coal during the hot summer days. Black, fine dust covered the windows and floors of flats and houses located in the port’s proximity, annoying, but most of all concerning the residents. Pressured to act, the Port of Gdynia promised to take action and prevent the situation from repeating.

As a result, the HES Gdynia Bulk Terminal (HES Gdynia) has set in motion a number of measures to counteract coal dusting, including spraying the slag heaps of coal with a mixture of water and cellulose, cleaning the wheels and landing gears of cars and trucks prior to them leaving the terminal to prevent spreading of dust,

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#Gdynia



as well as reducing the height from which the coal can be dropped onto the pile. At the same time, meeting the expectations of Gdynia's citizens and in cooperation with other port companies, the Gdynia Port Authority implemented a solution designed by SeaData in the eastern part of the seaport.

The "Great Dusting of 2018" was mostly caused by high temperatures, clear sky conditions, and strong insolation. This perfect storm resulted in extensive heating of the coal piles and generated strong turbulences on their surfaces, which, in result, carried the dust particles towards the city, despite the absence of strong wind. Apart from monitoring air pollution, the risk assessment tool has proved to be particularly useful when addressing the dusting issue. Specifically, it has enabled the operators to plan their cargo handling operations to be performed during favourable weather conditions. For instance, evening and night hours are often characterised by high air humidity, which decreases the risk of dusting. On the other hand, though, when operations cannot be rescheduled, supervisors

know in advance that extra measures will be needed, alike in the case of HES Gdynia.

By combining the data on the location of the operations with current and forecasted local weather conditions, the YetiSense algorithms can determine the occurrence of dusting on a 1-to-6 scale (where the higher the number, the greater the risk). The risk level is displayed on the map, along with the chosen weather conditions. Terminal operators and the Gdynia Port Authority receive each day a 24 and 72 hours report about the predicted risk. Dusting can come from other than port sources. That's why the risk assessment tool predictions are validated daily with information collected through the YetiBoxes to determine who or what is responsible for exceeding the permissible levels of dust in the air. Last but not least, the tool is flexible enough to accommodate for the fact that each and every port is different,

hence its settings can be adjusted to catch the specifics of different local conditions.

So, though fairly new in the market, SeaData has successfully introduced its product in two major seaports. Soon, we're going to expand outside Poland by implementing our solution in another Baltic port.

### What it really means to be green

According to ESPO, cultivating positive relationship with the community is another key concern of European ports. As modern societies become more and more aware of the health effects of air pollution, ports start to realise that "green" stands for something more than just cutting their carbon footprint. Tackling the air quality issue (incl. dusting), though at present not mandatory, has become one of the elements distinguishing those who actually care from those who couldn't care less. ■



The Gdynia-based SeaData is a Polish IT company founded in 2017 by a group of friends passionate about software engineering. The company specializes in Internet of Things, Industry 4.0, and Business Intelligence-applied data science software. For more info please visit <http://seadata.pl>