NUISANCE AND COMFORT MONITORING

RUBIX
Senses & Instrumentation

Real-time environmental monitoring with sources identification, odours monitoring and recognition Applications in the Oil and Gas industry

SAFE
40 år

June 12th, 2019

Presented by:
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VP Sales EMEA, RUBIX SI

Air Quality

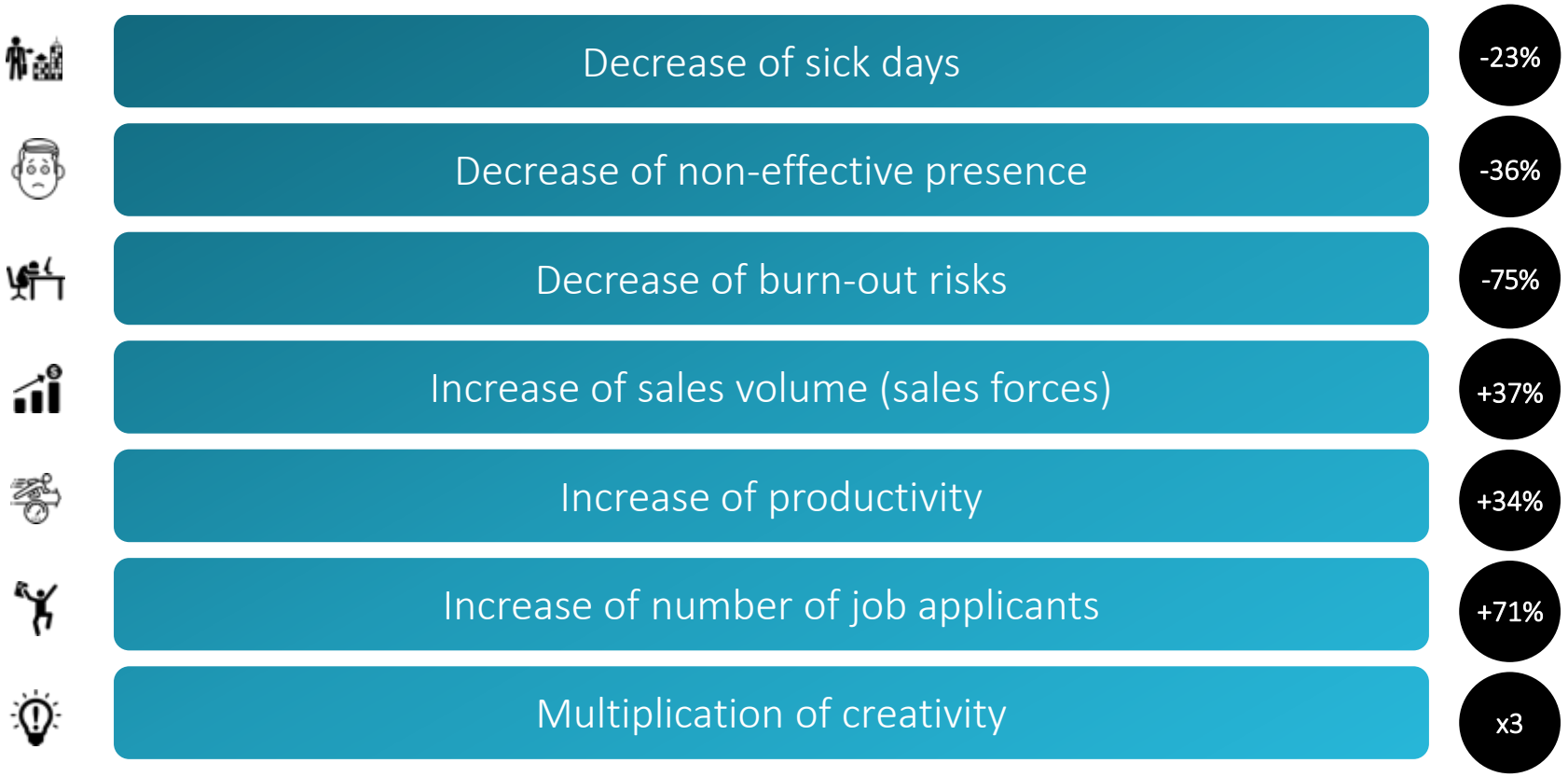
7 million people die due to indoor and outdoor air pollution (11.6% of all global deaths).

92% of the world's population lives in places where air quality levels exceed World Health Organization (WHO) healthy limits.

Indoor air is **2 to 5 times** more polluted than outdoor air according to the U.S. Environmental Protection Agency (EPA).

Improve Well-being, Increase Productivity

According to Harvard Business review, well-being improvement provides the following benefits:



What RubiX Does About It

OUR VISION is to make the world a safer and healthier place by delivering real-time environmental and wellness monitoring solutions.

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Monitoring » Identification of sources » Remediation

Unique features - A missing and essential link

Who is RubiX

- **Jean-Christophe MIFSUD** founded Alpha MOS in 1993 to develop the first World Electronic Nose, Tongue, and Eye. Granted 24 patents approved by USDA, FDA and EPA.
- Over the years, recognized advantage of Sensor Fusion and Modulation in identifying and solving health and environmental issues.
- Founded **RubiX in 2016** to develop a range of unique hardware and software solutions **to allow identification and quantification of pollutants**.
- Today through a diversified workforce skillset of chemists, electronic engineers, software engineers, deep learning and data mining scientists, **RubiX provides first class solutions to companies and individuals looking for better health and environment**.

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Application Fields

Environmental Impact	Transportation	Household Appliances	Sports and Health
Outdoor and Indoor	Cars, trains, planes, boats	Hoods, Fridges, Ovens	Non invasive wearables
• Detection of health hazards • Odors and source of odors identification • Industrial applications (e.g., predictive maintenance, early fire detection)	• Health hazards analysis inside and outside the mode of transport • Driver behavior • Passengers well-being	• Food freshness • Cooking fumes	• Fat burning • Diabetes and Asthma monitoring • Dehydration

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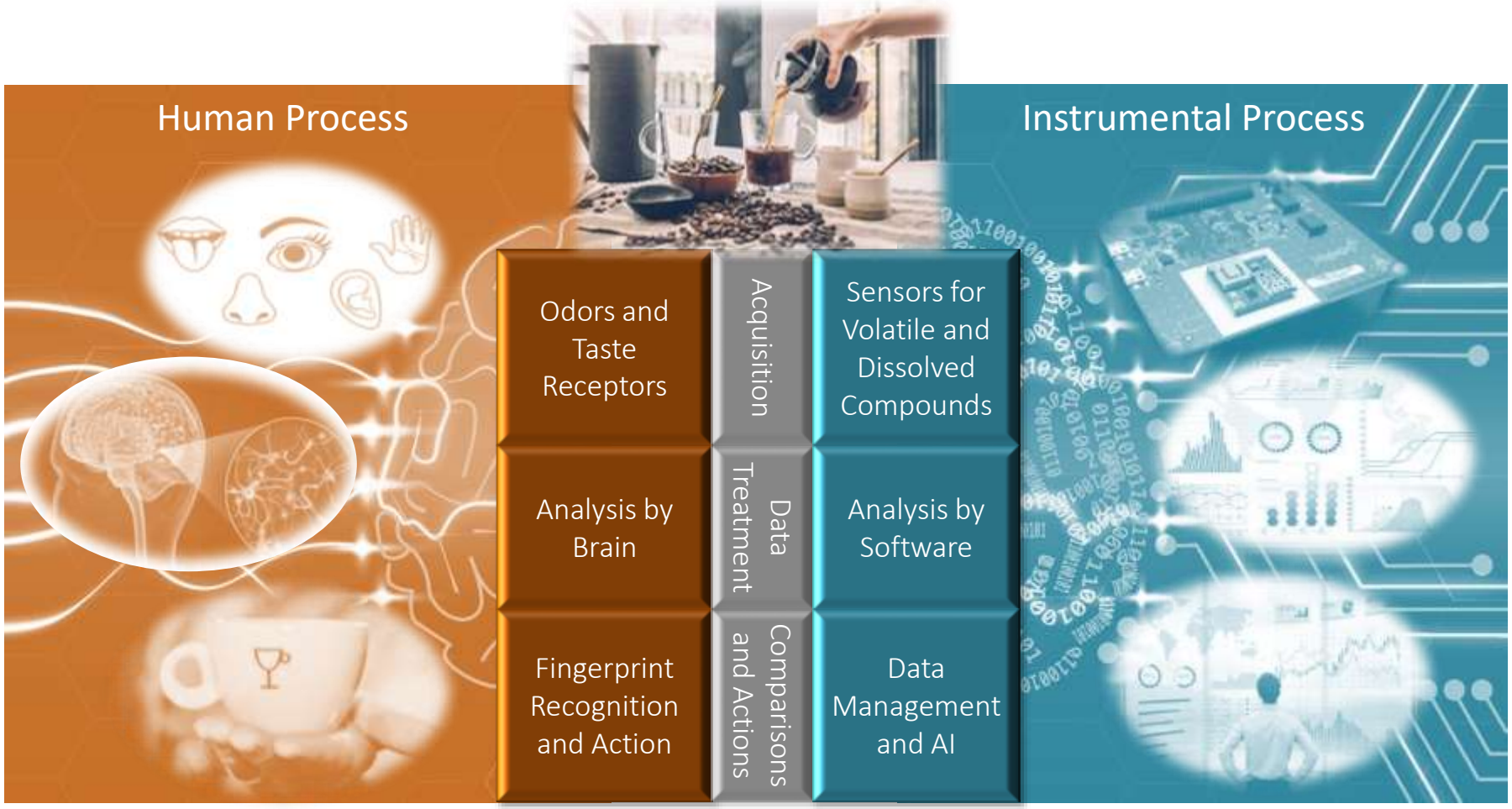
Human Being as a Model



RubiX AI Powered Technology

CONNECTED SENSORS	EXTENSIVE CLOUD-BASED DATA BANK		ALGORITHMS	USER-FRIENDLY SOFTWARE*
				
Monitoring through real time readings of all sensors in the grid using sensors array and **modulation** technology	Matching process through **RubiX** data bank of environmental and health nuisances	Hosted on a secure cloud based server allowing remote access via any internet based computer	Cutting edge data processing enabling nuisances identification	Nuisances assessment and efficient actions for remediation

*with personalized dashboard

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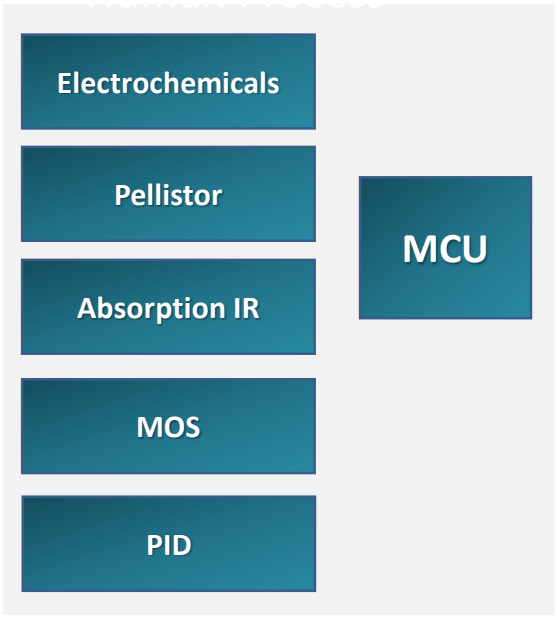
Sensor Fusion Enables Context Awareness



What can RubiX Products Sense

Our connected products can detect, identify the source, qualify and quantify separately or simultaneously

- Gas – All major toxic gases
- Odors – up to over 200 types with capability to qualify more
- Particles and allergens – PM 1, PM 2.5 to PM 10
- Noise levels
- Sounds – over several thousands different sounds
- Light – colors, intensity, flickering
- Humidity
- Vibration
- Pressure

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Data Processing, Data Mining

We develop knowledge based pattern recognition algorithms for gases, odors and particles identification using:

- AI (Artificial Intelligence)
- Multivariate statistics (PCA, DFA, PLS, SIMCA, ANOVA, SQC, MLR…)
- Neural network with “deep learning”
- Self learning algorithms
- Fuzzy logic
- Base line drift compensation
- Humidity drift compensation

RubiX Fingerprint Databanks

Facts and Figures

- 200+ Odors
- 50+ Gas
- Noise (several thousands)
- Particles (PM 0.3 um to 40 um)
- Capability to enrich databank on demand via training
- Transferable fingerprint databanks
- Ability to correlate analytical facts with perception (via QR Code)

RubiX Standard Products

WT1

Odors · Air Quality · Gas · Particles · Noise for Fence Line monitoring

POD

Humidity · Temperature · Light · Noise · Air quality & Odors · Particles · Vibration pressure

Outdoor

Application Fields

Industrial parks
Port Authorities
Waste water treatment plants
Landfill
Sewage treatment plants
Smart Cities

Indoor

Application Fields

Offices
Shopping malls
Industrial buildings
Public Buildings/Structures

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RubiX Standard Products Features

RubiX offers intelligent sensors for indoor and outdoor air quality monitoring, as well as access through the cloud to an extensive signature recognition database with detailed customer analytics and personalized dashboards.

- The WT1 (outdoor) measures air quality, odors, gas, particles and noise continuously (24/7).
- Up to 6 gas electrochemical sensors, in addition to the volatile organic compounds and particles measuring blocks
- Cutting edge data acquisition and processing
- Off-line dispersion plume
- Standalone instrument ideally suited to automated pollution control processes

- The RubiX POD (indoor) measures air quality, odors, humidity, temperature, light, particles, noise and vibrations continuously (24/7).
- Up to 6 gas sensors (CO2, NH3, CO, H2S, etc.) and 4 odor sensors
- Collect of real-time, analytics data on nuisances and building performances along with people's well-being perception (with QR code feedback)
- Automated alarms and reports
- Secure and user friendly data handling

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RubiX POD takes on these challenges

RubiX POD enables companies to collect **objective** (measured by sensors) and **subjective** (according to people own perception) data.

- Temperature
- Moisture
- Light (intensity, color, flicker)
- Noise (40 to 20,000 Hz, measurement of perception by octave)

- Odors (Data banks of odors in the clouds, 4 sensors allowing sources identification)
- Indoor air quality (4 gas sensors sensitive to VOC,CO, H2S, CO2, CO, FA and BTX)
- Particles (allergens, chemicals and biologicals)
- Vibrations , pressure

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RubiX Software Platform

An extensive AI-powered identification database

- RubiX's software platform allows to **collect real-time** data analytics on nuisances of any sort along with people's well-being perception.

- Once data is collected, it is **analyzed** and **compared** in the cloud to RubiX's data banks, and **delivered** to users through an easy to use software.

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Strategic Partnerships – SAP

Strategic partnerships allow RubiX to focus on R&D, improving scalability of its products and solutions.

Human to machine **software development** for existing products and new applications to leading software corporations (benefiting from their AI capabilities and accessing their network of prestigious clients)

User Interface Example

Subjective Perception – QR Code

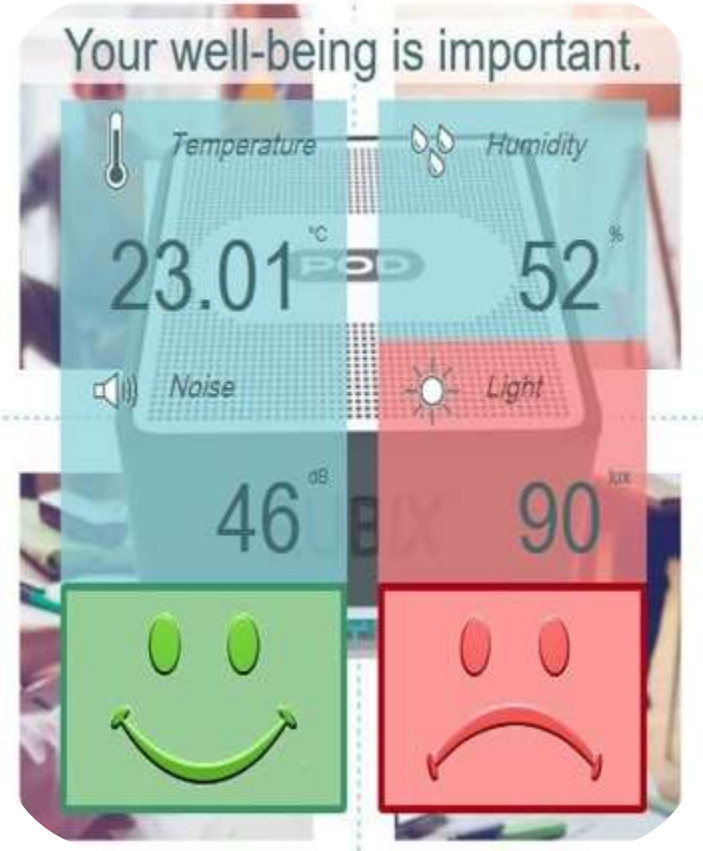
First IoT device for individual and complete well-being evaluation in offices via QR Code and App.

Temperature	Humidity	Noise Vibrations	Light color Flickering Brightnesst	Air Quality VOC, Odors particles Origin identification	Subjective Perception

Feedback tool – Subjective Data

User application dedicated to perception analysis

First IoT device for individual and complete well-being evaluation in offices via QR Code and App.



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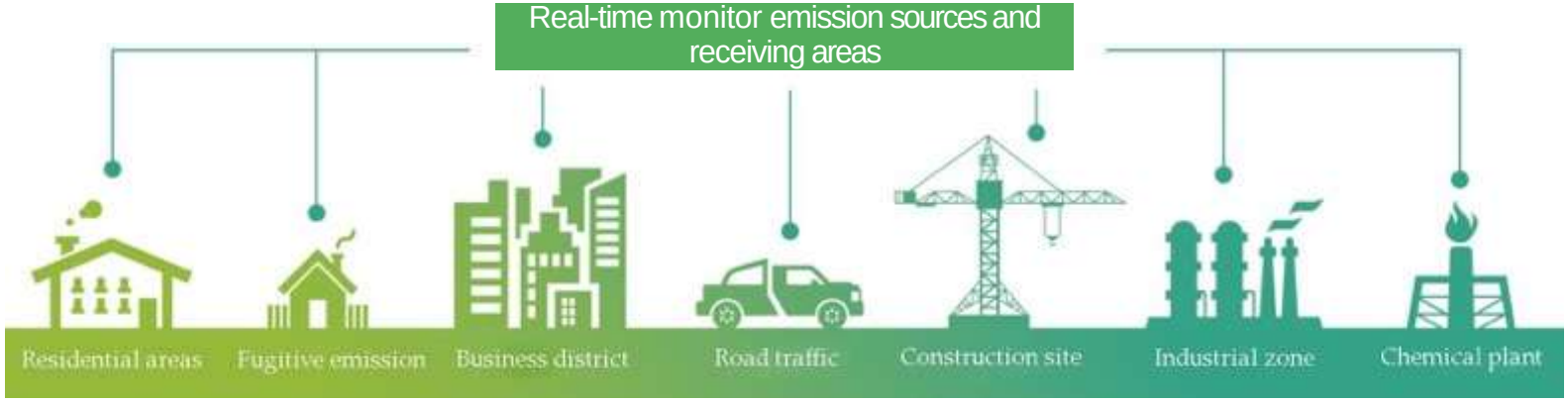
Use Cases:
Facility Management
Industrial Sites Monitoring

Intensive temporal and spatial resolution of data is urgently required

Real-time surveillance network could monitor pollution, nuisances sources, formation, development and evolution, in order to efficiently control the sources of pollution, and ultimately

realize targeted governance.

To achieve win-win situation of environmental protection and economic



Facility Management

To improve the building's Key Performance Indicators (KPIs) by increasing performance and well-being and decreasing toxics and nuisances

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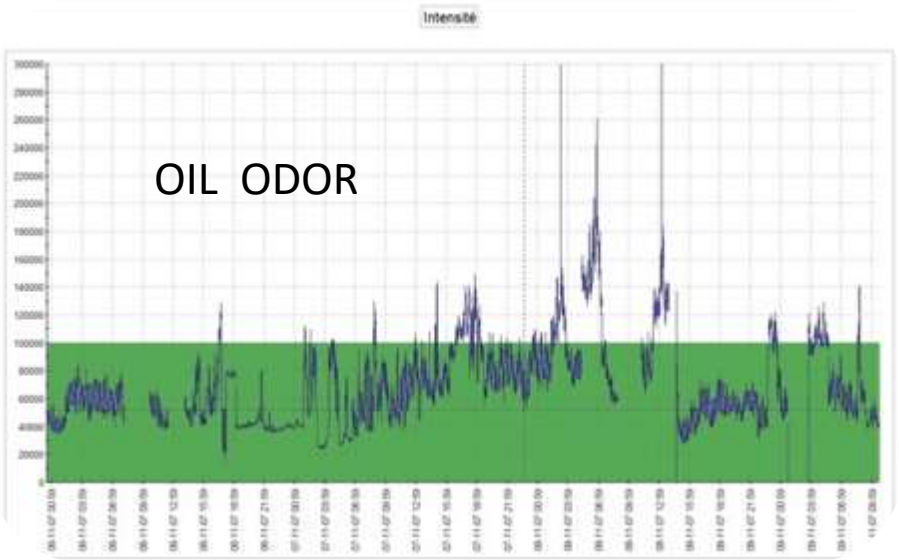
Users Dashboard – Objective Data

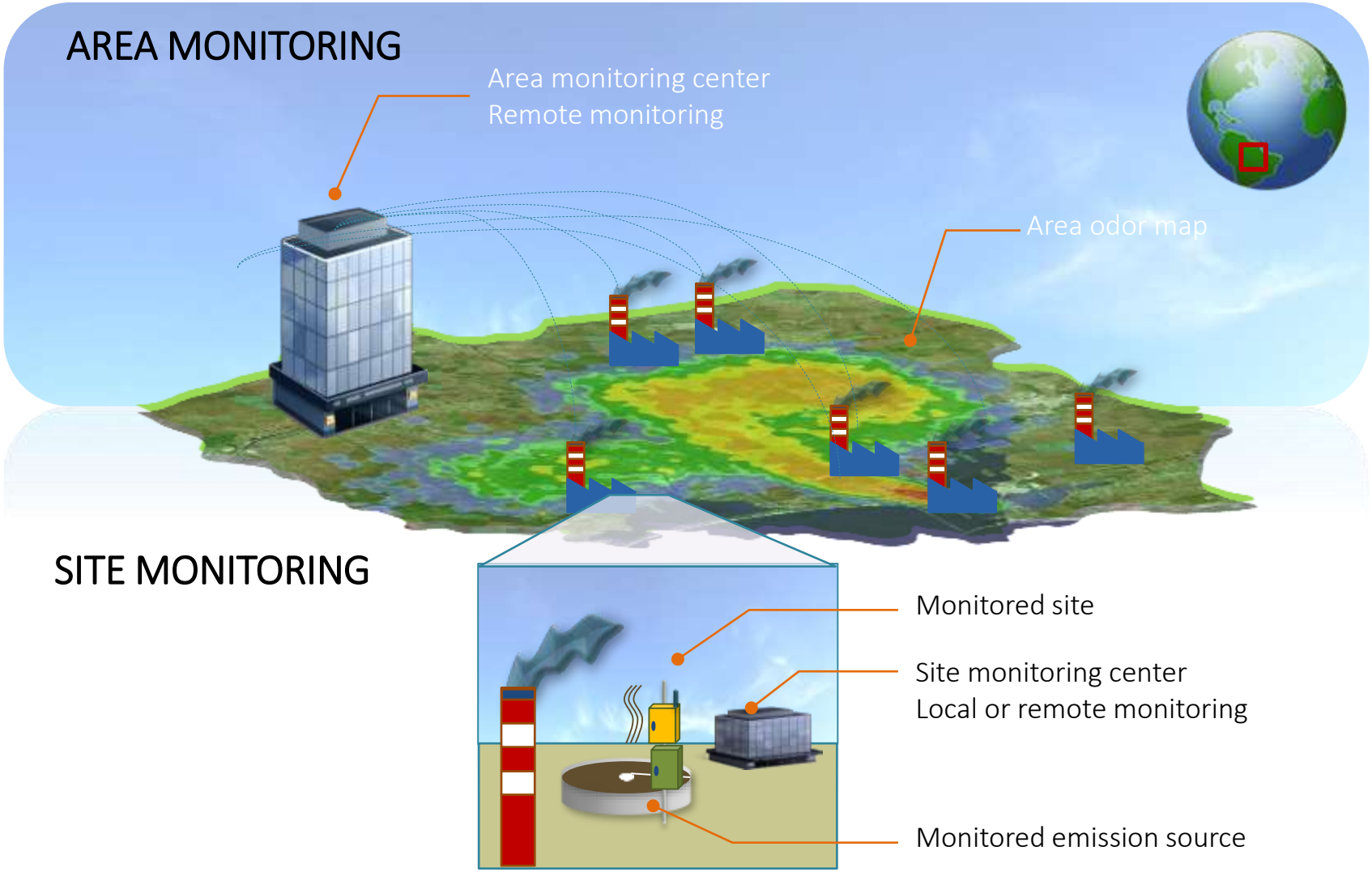
A unique management of alarms and comfort factors



Control Panel and Comfort Meter

70-b3-d5-9b-a0-00-01-14	48 %	21.61 °C	47 dB	267 lux	0 ppm	0	0
70-b3-d5-9b-a0-00-01-58	51 %	21.62 °C	46 dB	312 lux	0 ppm	0	0

RubiX Software Anywhere



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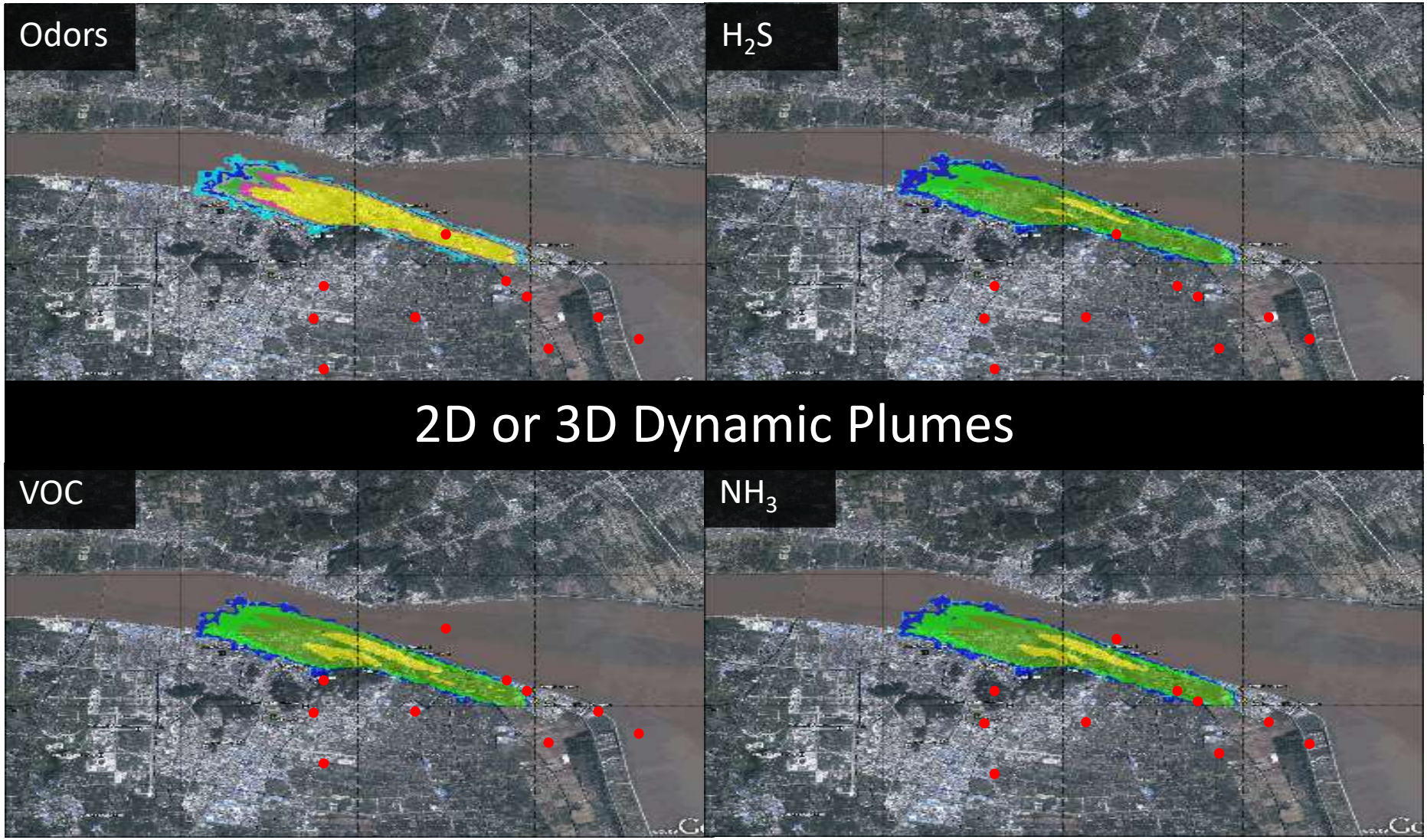
2D or 3D Dynamic Plumes



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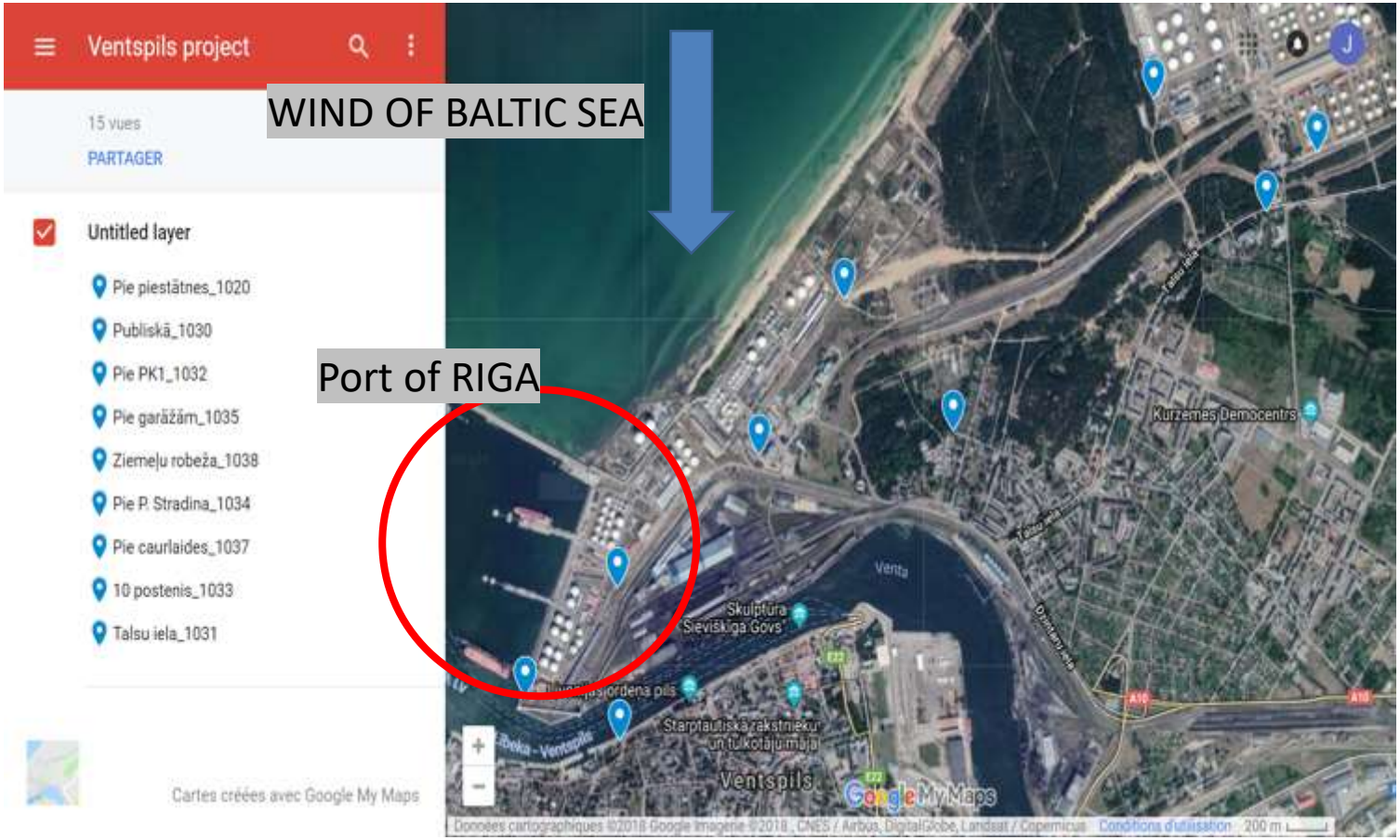
Use Cases:
Port Authority
City of RIGA
Oil & Gas Harbour

Port / City of RIGA



CITY OF RIGA

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Apprentissage en Intensité et en qualité d'odeurs et de gas

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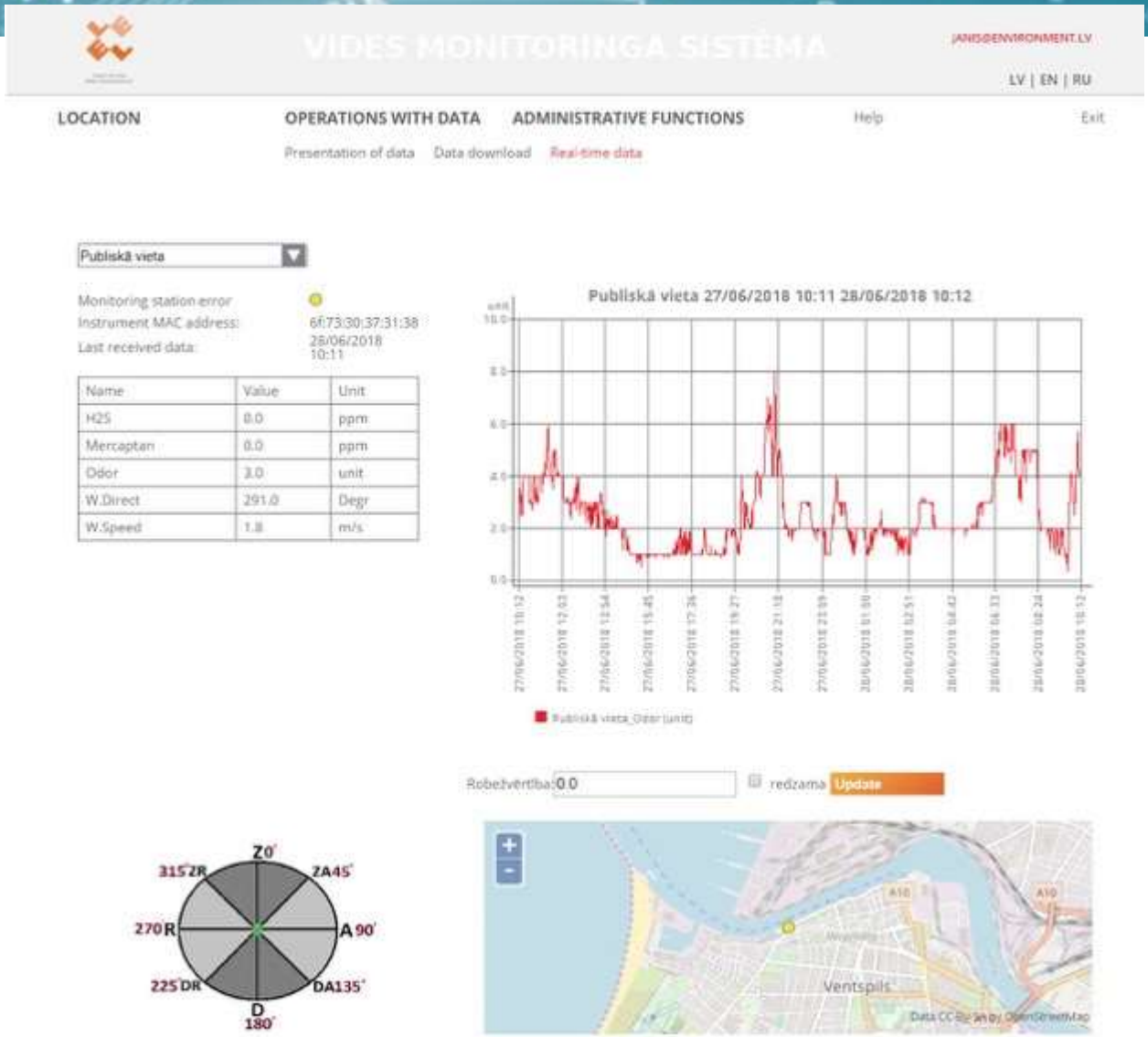

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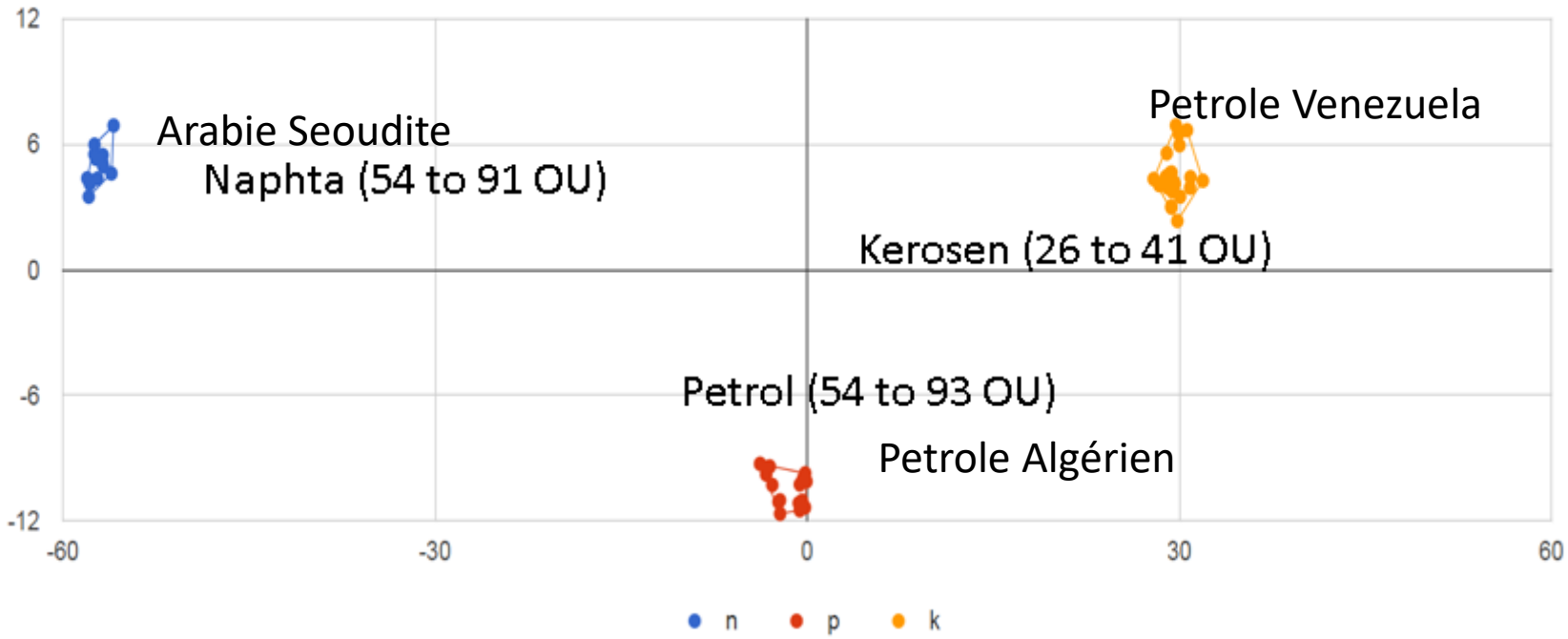
IDENTIFICATION OF SOURCES OF POLLUTIONS

LDA



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Conclusion

1. RubiX is a leading edge expert in nuisances identification and well-being optimization

2. RubiX has the technology to enable you improve your process and working conditions

3. First thing to do to improve is to measure : let's start measuring

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Thank You

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or contact us @info@rubixsi.com