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SECOND SIGHT

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Gas cloud detector

www.bertin.fr

RÉF. WORKSHOP

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BTD46.0a

GAS CLOUD DETECTOR

▷ http://www.secondsight-gasdetection.com/

EXAMPLES OF GAS DETECTION OF HYDROCARBONS

Chevron, USA

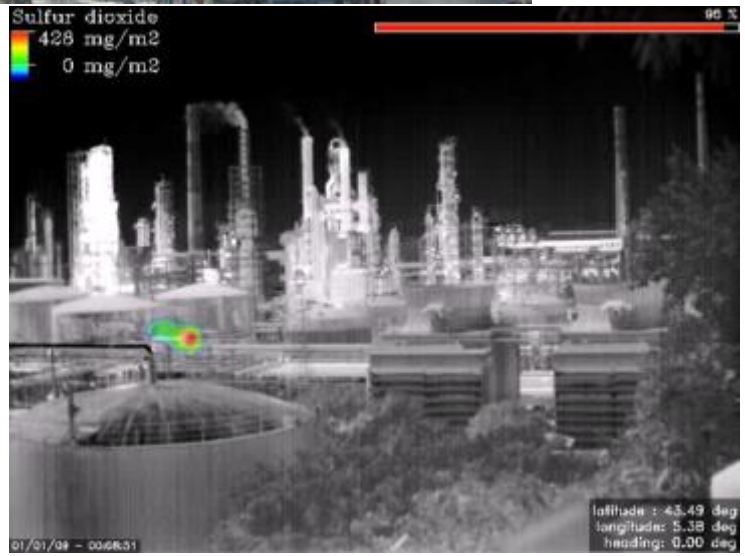
Gas : propane
Distance : 200m
Leakage Flow rate : 780 lbs/hr
Nozzle size : 2.5'' (6 cm)

Rafineries

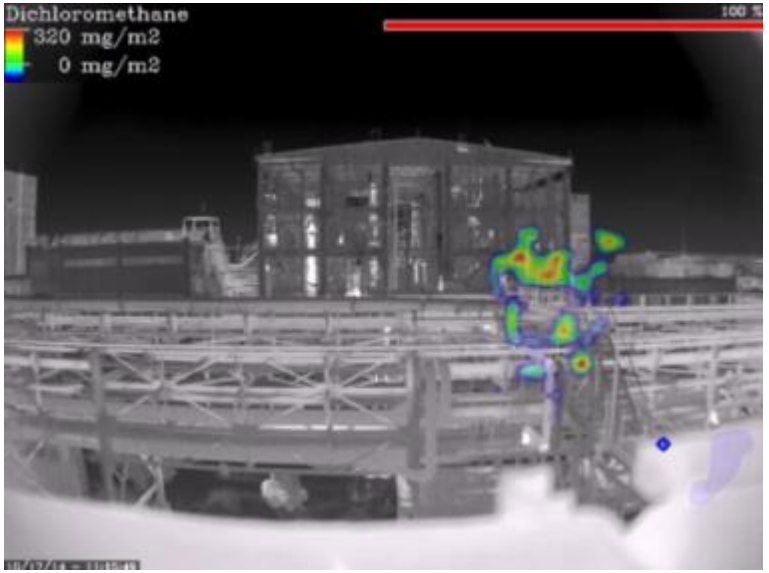
Gas : 5kg canister of LPG
Distance : 200m

EXAMPLES OF GAS DETECTION OF TOXIC GAS

Gas : SO_2
Distance : 100m
Leakage ?



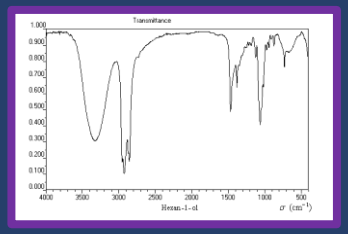
Gas : dichloromethan
Distance : 100m



Detection with Gas X and identification

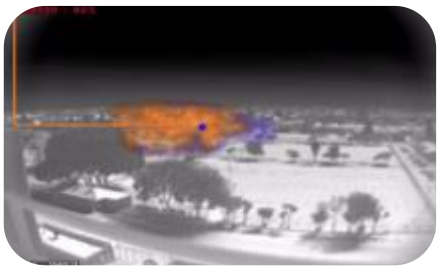
1. Measure

- IR absorbance in band III



2. Analyse

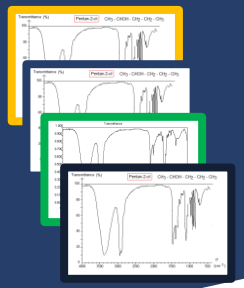
- With gas X algorithm
- Check Signal in band III modification
- Check cloud motion
- Check stable signature



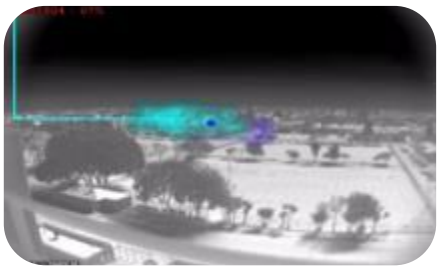
Gas X alarm

3. Compare

- With database signature



Hydrocarbons
NH3
SO2
Etc.

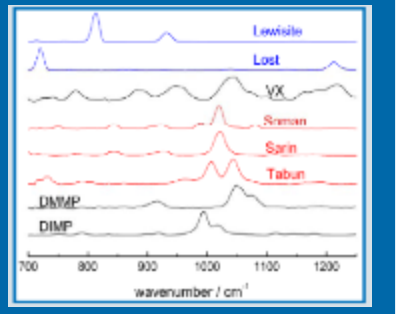


Identified alarm if match is found

4 STEPS TO VALIDATE A GAS DETECTION

1. Theoritical

- IR absorbance in band III



2. Laboratory

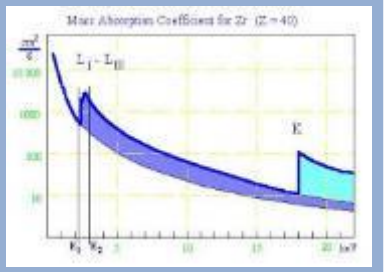
- Chamber test
- Evaluation of sensitivity in mg/m²

3. Field Tests

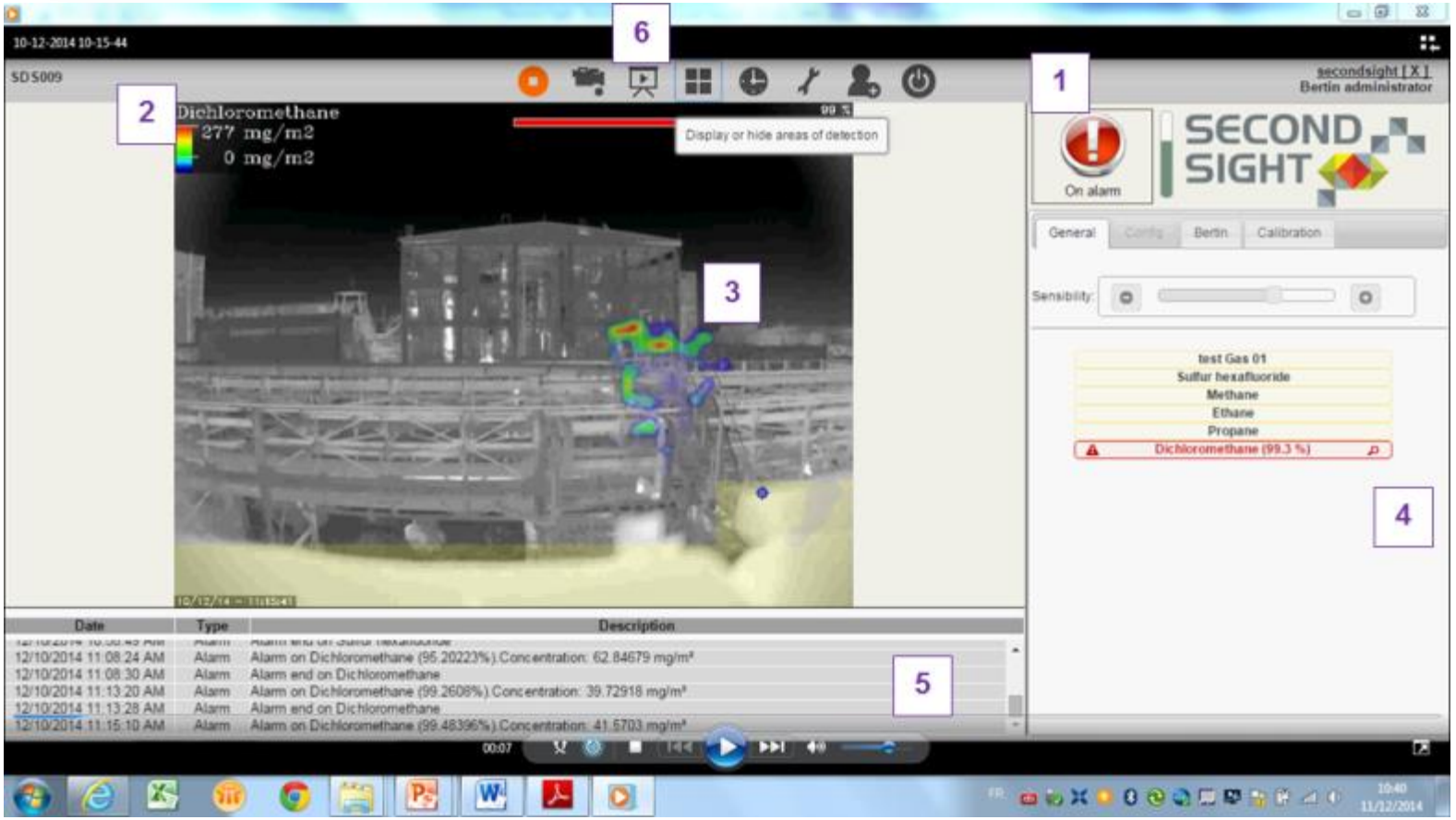
- Atmosphere releases
- Distance vs quantity

4.Extrapolation

- Evaluate detection limits out of field tests



GRAPHIC USER INTERFACE – HTTP WEBSERVICE



1 : alarm status
2 : identification of the gas
3 : gas cloud
4 : Gas active data base with in red the gas in alarm
5 : history of events with detection #1.1, #1.2.
6 : access to alarm movies (.avi)

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For Tank farm surveillance

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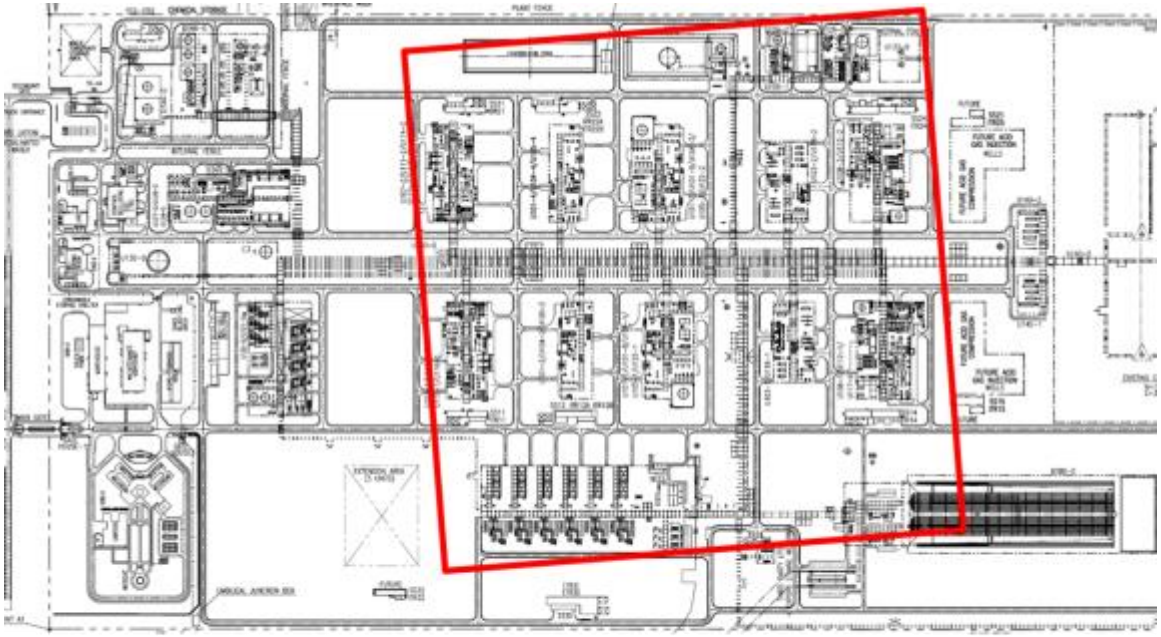
CONTEXT

Hazardous leaks run the risk of resulting in explosion, fire, energy loss and other environmental hazards if they are not quickly detected, controlled and repaired.

Today's challenges:

- Local detector unable to cover precisely the total area.
- Need to detect point source release and to follow sliding hazardous cloud moving in the plant for control and repair operations
- Surveillance of tank farm within large industrial area. How to minimize infrastructure impact if major leaks?
- Surveillance of tank farm within urban area.
- Surveillance of plant in a seismic zone

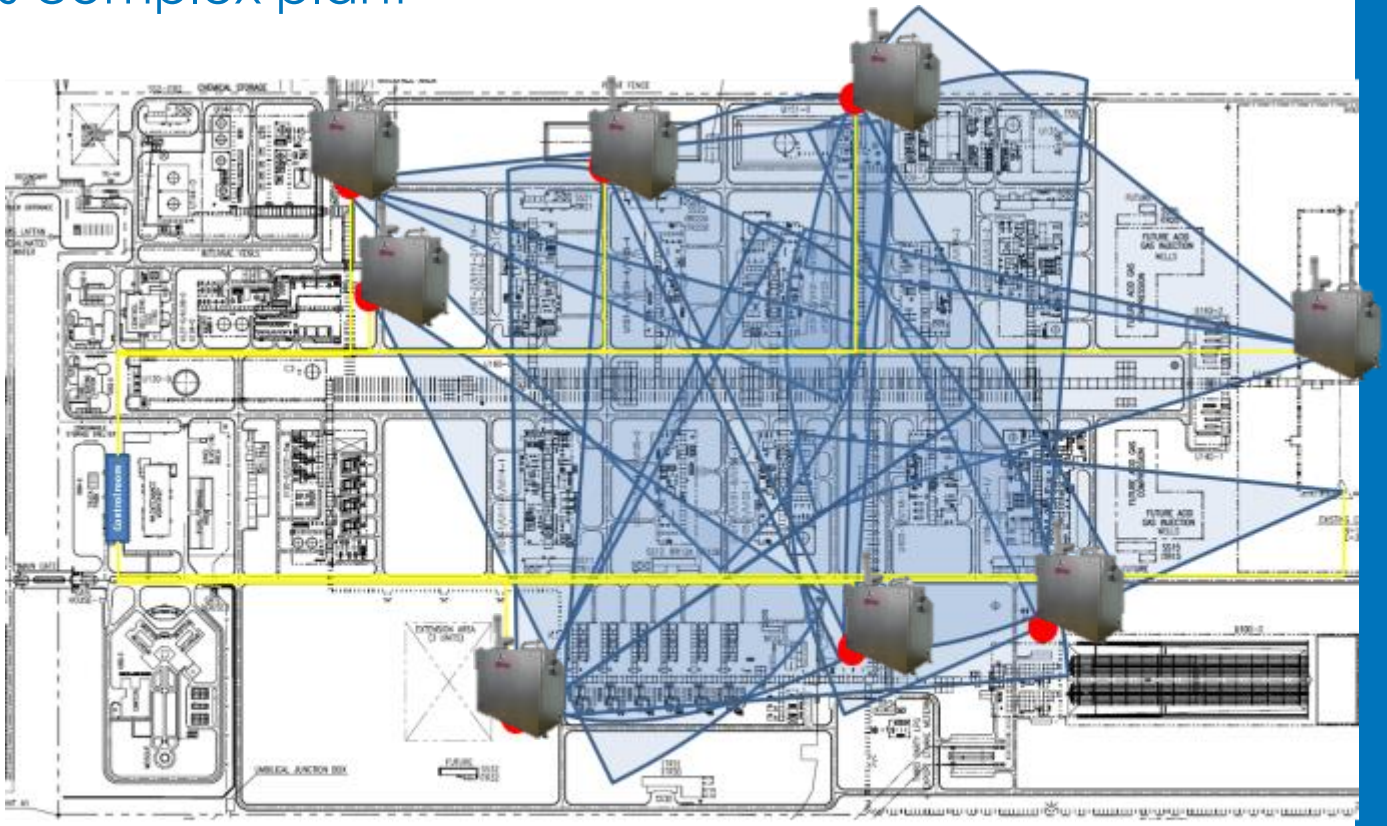


Area to cover
25 ha =500m X 500m Area

SOLUTION PROPOSED BY BERTIN TECHNOLOGIES

Second Sight Network with a complete Hardware & Software Solution to cover large Oil&Gas complex plant

- Second Sight compatible with zone 2 explosive area.
- Area is covered with multiple Second Sight TC
- Installation on Masts for overlooking situation
- Each Second Sight TC is connected to the control room of the plant



Type of gas

- **Hydrocarbons**
- **NH3**
- **SO2**

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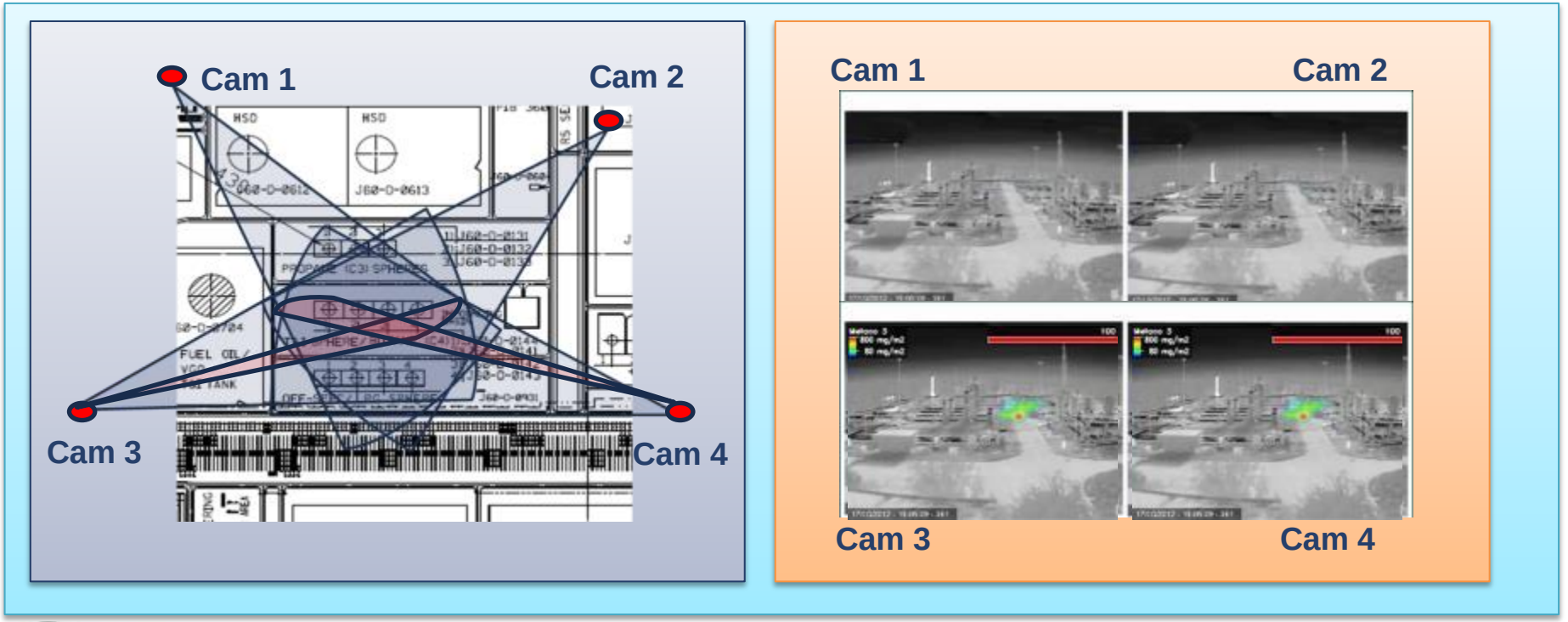
GAS CLOUD TRACKING SYSTEM WITH SECOND SIGHT

▷ Indication given by Software

- Plant map with zoning of the gas cloud (expansion, direction)
- Live view from the gas camera
- Replay available



SECOND SIGHT IN IECEX CABINET : TECHNICAL SPECIFICATIONS

▷Hazardous Area certification

- IECEx / ATEX according to IEC 60079 & 60079-2
- Zone 2; protection method by **pressurization (pz)**

▷Environnemental

- Operationnal Temperature : -20 °C to+55°C
- Sand storm resistance
- IP66 Enclosure

▷Fluids utilities inputs

- Power : 110/230V
- Security &temperature conditioning : Compressed dry air @ 6bar
- Communication : Optical fiber

▷Dimensions :

- Size : 600 x 500 x 300 mm3
- Weight : 35 Kg

SECOND SIGHT

For leaks surveillance

www.bertin.fr

BTD46.Dg

CONTEXT

- Leaking equipment, such as valves, pumps, and connectors, are a large source of emissions of volatile organic compounds (VOCs) and volatile hazardous air pollutants (VHAPs)
- Second Sight sees gas releases in real-time so **that problems can be fixed before safety issues or environmental incidents occur**.
- Second Sight can provide temporary continuous monitoring during **turnarounds**, where cameras can be moved throughout the day to focus on specific sites.

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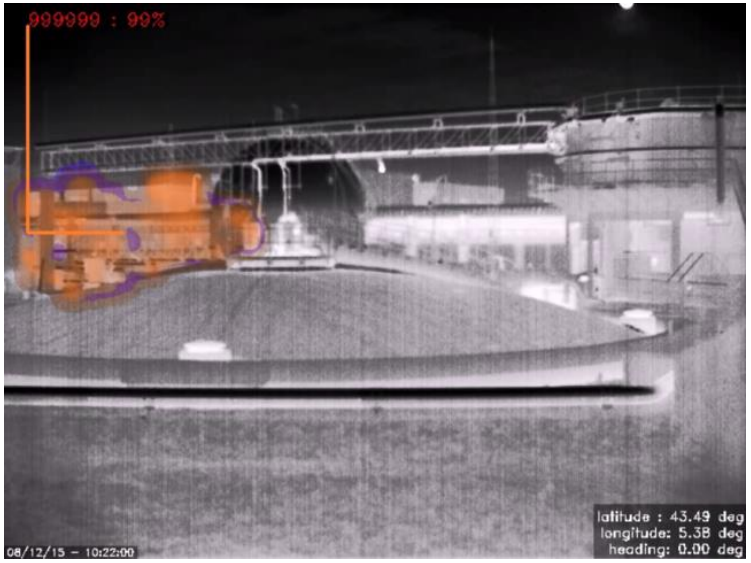
CASE STUDY : WASTEWATER TREATMENT PLANT – GAS X DETECTION

- A wastewater treatment plant is dealing with wastewater of the city of Paris. It is producing biogas by fermentation in digester
- The digester has a safety system to monitor the pressurisation. In case of overpressure, the digester degas a mixture (65% of methane, plus CO2, H2S and other compounds) with a debit of 400 m3/h.
- The Second Sight detects the gas leak with gas X for each degas.



CASE STUDY : DICHLOROMETHAN LEAKS

- Nomade second sight (operated with battery and laptop) can be used by technical team to check and troubleshoot potential gas leakage

CASE STUDY : DICHLOMETHAN LEAKS

▷ In the evaluations on the site, the Second Sight has been evaluated and has successfully detected unexpected dichloromethan leaks

1: The Second Sight® has detected 3 leakages at 100m.

2: The Second Sight has detected 1 leakage at 250m.

3: The Second Sight has detected a leakage at 5 meters while the operator is identifying the source point with thermal imaging (black point).

Case Study : SO_3 detection

- Sulfur trioxide will cause serious burns on both inhalation and ingestion since it is highly corrosive and hygroscopic in nature.
- Second Sight is installed on the ground in front of the tank containing SO_3. Gas is released for about 1 min
- Detection of Acetic Acid happened in live because of decomposition of $S0_3$ in acetic acid

CASE STUDY : NH_3 TRIAL AT INERIS

- INERIS - National competence center for Industrial Safety and Environmental Protection, France
- The Second Sight detects and identifies the gas releases of Ammonia from 25m to 110m and with a quantity from 5g to 5kg. The detection sensitivity is higher for the gaseous form compared to the biphasic form.

- 70m - 12.5g of NH3 in gas

- 70m - 663g of NH3 in biphasic form

- 140m - 149g of NH3 in biphasic form

CONCLUSION ON LEAK DETECTION

▷ Second Sight provides:

- Nomade equipment for turnaround
- Automatic detection
- Gas X provides better detection capability
- Source point detection

▷ The customer save time/cost for inspection purposes

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