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FALCON 4G Report

The Environmental Protection Agency

Aplinkos apsaugos agentūra

SEC TECHNOLOGIES

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CHEM

www.sec-technologies.com

1. INTRODUCTION

The Falcon 4G is a powerful long range reconnaissance detector that can detect, identify and measure chemical warfare agents and toxic industrial chemicals using two independent eye-safe pulsed tunable CO_2 lasers. Its patented laser technology is undetectable by laser warning devices, making it an effective tool for military and industrial applications.

2. TRIAL CONDITIONS

Date	July 19, 2022
Place	Roof of the EPA building, Vilnius, Lithuania
Wind speed	0 – 15 m/s
Humidity	74 – 85 %
Temperature	18 – 25 °C
Simulants[1]	Sulphur Hexafluoride (SF_6) Methanol (CH_3OH) Benzene (C_6H_6) 2-Propanol (C_2H_8O)
Method	Single and Mixed clouds

[1] Please refer to the last page of the report for detailed information about the simulants.

3. METHODOLOGY

The Falcon 4G was positioned on the roof of the EPA building with one person from SEC Technologies operating the device, Mr. Jouzas Molis (Head of the Sampling and Operational Measurements Division, Department of Environmental Research) representing the EPA agency, and the Head of CBRN from the Military overseeing the trials.

The team, consisting of two SEC Technologies members and one EPA supervisor, released chemicals at all three locations chosen by the EPA. The stand-off detector operation was controlled from a standard PC.

The chemicals were released one by one at each location (SF_6, ammonia, methanol).

After measurements and detection at all three locations, EPA presented additional chemicals (benzene, 2-propanol) that were tested and measured in the long-range path chamber.

Fig. 1 · Tent with the tray used for evaporation of the given chemicals

Plumes of various gases were created and released in an open tent with dimensions of 2x3x3 m. Liquid solutions of testing chemicals were dispersed one by one on trays at different time intervals.

The trays were positioned at the bottom of the tent. An expert from SEC Technologies spilled the chemicals onto each tray under the supervision of an EPA supervisor.

SF_6 was released from a pressure bottle. Benzene and 2-propanol were released in the chamber and measured at a distance (path) of 500 meters.


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4. RESULTS

All measurement data from this trial are summarized and presented in a simplified graph. During the measurement, each detection is shown to the operator in real time. The Falcon 4G saves data in the logfile, which includes data points.

Each data point consists of the following information:

- Date and time stamp
- GPS position of the detector
- Azimuth of the measurement
- Distance and calculated position of the target used for reflection
- Measured average concentration of the agent
- Chemical identification (name, code)

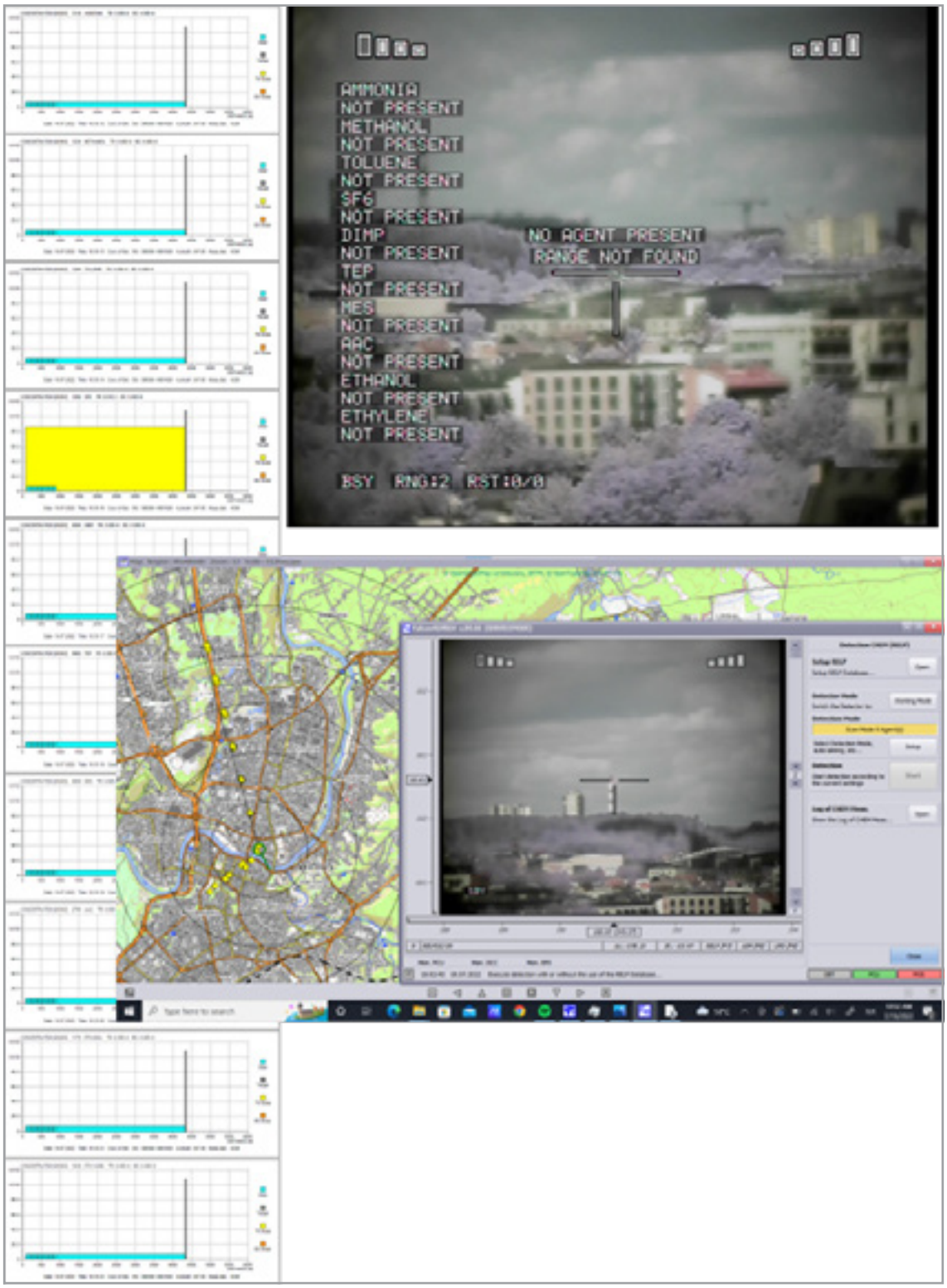

Fig. 2 · Information Available to the Operator for Further Tactical Evaluation at the Time of Detection

	Ammonia (25%)	**Methanol (99%)**	**SF_6 (99%)**	**Success**
No. 1 **Opera House 456 meters**	100 ml	100 ml	~ 50g	3/3
No. 2 **Aurochs Mtn. 1185 meters**	300 ml	300 ml	~ 100 g	3/3
No. 3 **Highway 4380 meters**	Not released due to safety reasons (people working nearby).	1000 ml	~ 350 g	2/2
	Benzene		**2-propanol**	**Success**
No. 4 **Chamber 500 meters**			Not in the database	2/3

5. CONCLUSION

The Lithuanian Environmental Protection Agency meticulously prepared measuring paths to test the detection capabilities and ability to detect small amounts of vapors from long distances. The demonstration was professionally organized with excellent support from skilled observers at the release and detection site.

> "The Falcon 4G has reliably and quickly detected vapors in tiny quantities from a very short distance of less than 500 meters as well as at a long range over 4300 meters. All measuring paths were within the city with all its potential influences and limitations. Unique and unmatched performance in a scenario that might seem impossible at first sight."

FALCON 4G

Long-Range Reconnaissance Chemical Detector

The 4th generation active stand-off detector is based on eye-safe and undetectable laser technology.

- **Detection**
- **Identification**
- **Quantification**
- **Up to 6 km**
- **Best sensitivity on the market**
- **No calibration needed**

- Distance to the cloud without triangulation
- Refractors not required
- No need to scan background

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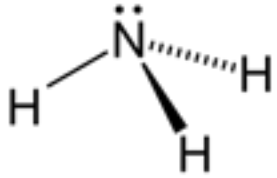
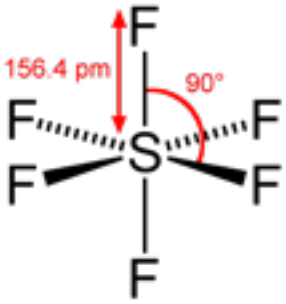


AMMONIA

(NH_3, Molecular weight: 17.031 g/mol)

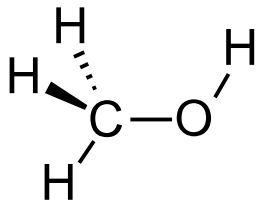
Ammonia is a colourless inorganic compound of nitrogen and hydrogen, usually in gaseous form with a characteristic pungent odour. Ammonia is irritating to the skin, eyes, nose, throat, and lungs. It is essential for many biological processes and has various industrial applications. Relative Air Density is 0.597 (lighter than air).



SULPHUR HEXAFLUORIDE

(SF_6, Molecular weight: 146.06 g/mol)

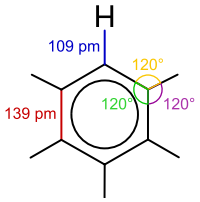
Sulphur Hexafluoride is a colourless odourless gas. Relative Air Density is 5.10 (5 times heavier than air and very similar to CWA agents).



METHANOL

(CH_3OH, Molecular weight: 32.04 g/mol)

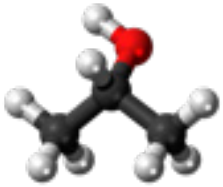
Methanol is a toxic alcohol that is used industrially as a solvent, pesticide, and alternative fuel source. It also occurs naturally in humans, animals, and plants.



BENZENE

(C_6H_6, Molecular weight: 78.114 g/mol)

The chemical compound benzene (C_6H_6) is a colorless, flammable, aromatic hydrocarbon, that is a known carcinogen. Produced by hydrogen reduction of some allotropes of carbon, or from petroleum, it is used in the creation of drugs, plastics, gasoline, synthetic rubber, napalm and dyes.



2-PROPANOL

(C_2H_8O, Molecular weight: 60.096 g/mol)

2-propanol is a colorless, flammable organic compound with a pungent alcoholic odor.

It is used in the manufacture of a wide variety of industrial and household chemicals and is a common ingredient in products such as antiseptics, disinfectants, hand sanitizer and detergents.

Source: www.worldofmolecules.com.

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