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FALCON 4G Report
The Belgian Defense Forces

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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 CO2 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	June 29, 2022
Place	AMAY, Belgium
Weather	sunny
Wind speed	5 – 7 m/s
Humidity	59 % (morning), 40 % (midday)
Pressure	1021 – 102 mbar
Simulants[1]	Sulphur Hexafluoride (SF_6) Ammonia (NH_3) liquid concentrate Methanol (CH_3OH)
Minimum distance	360 m
Maximum distance	999 m
Venue	Camp BRASSEUR[2]
Results	Scenarios/Success: 3/3

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

[2] Detection in a camp area with busy drive roads with construction works during the measurements.

3. METHODOLOGY

Vehicle version of Falcon 4G B was mounted on the tripod with a car pan-and-tilt platform/gimbal. Falcon 4G System was installed on the roof of the container to demonstrate that the system can be operated without need of direct contact with the Operator. The operation of the detector was conducted from a PC and joystick. Measurements were performed in three (3) scenarios using both manual and in scanning mode.

Simulants used in trials:

- SF6
- Methanol
- Ammonia (25% liquid concentrate). Simulants were released separately and jointly.

Simulants used in scenario No. 1

- 0.2 liter of liquid Ammonia concentrate together with 0.5 liters of Methanol

Simulants used in scenario No. 2

- Cca 0.5 kg of SF6

Simulants used in scenario No. 3

- None, automatic surveillance scanning mode from panorama picture

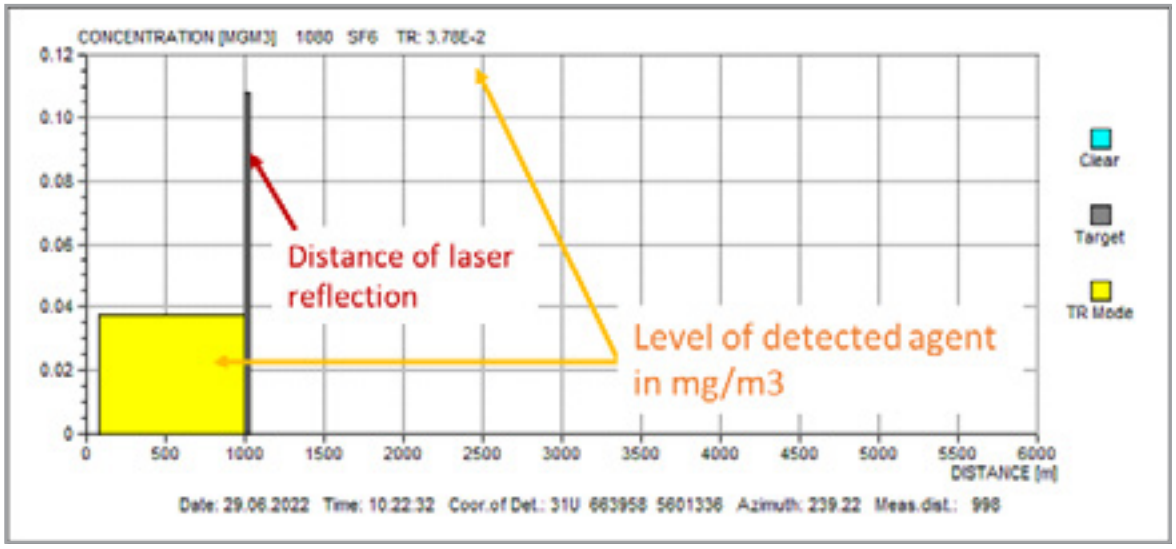


Fig. 1 · Result window description

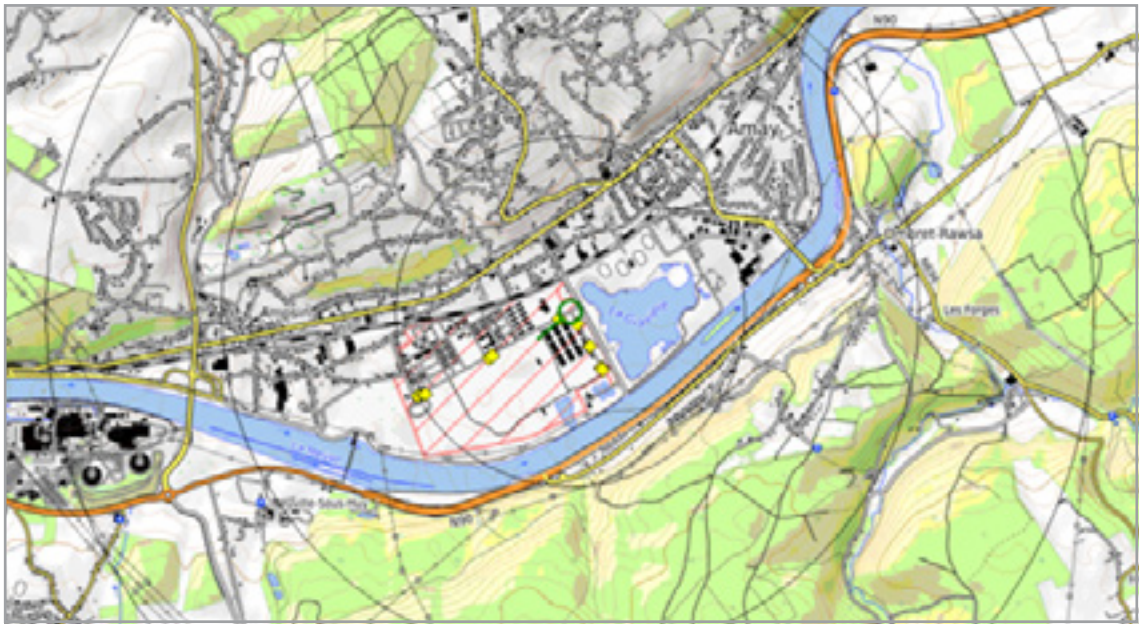


Fig. 2 · Results displayed in Falcon 4G mapping software, based on CBRN 4 messages format

Fig. 3 · Picture of camera is saved automatically after every measurement

3.1 SCENARIO 1. AMMONIA AND METHANOL AT 366 M

Detection path was 366 meters long at side unpaved road in Camp BRASSEUR.

Fig. 4 · Description of Scenario 1

Fig. 5 · Position of releasing point for Scenario 1 with chemicals

First scenario started with control measurements to confirm clean air on detected path. Measurement was realized at 10:12:35.

```
10:12:35 --- RESULTS:[CHEM,Scan Mode 3 Agent(s),022/2022] --------------------
10:12:35 Sensitivity: Normal Mode
10:12:40 3318 AMMONIA ..................... 364[m]  0.00E+0[MGM3]  TR  --------
10:12:41 1230 METHANOL .................... 364[m]  0.00E+0[MGM3]  TR  --------
10:12:42 1080 SF6 ......................... 364[m]  0.00E+0[MGM3]  TR  --------
```

After clean air confirmation, liquid substances were spilled on the ground terrain to create cloud by evaporation of Ammonia and Methanol. After few seconds first detection was recorded at 10:13.07 with concentration 0.375 mg/m3 of Ammonia and 0.178 mg/m3 of Methanol.

```
10:13:03 --- RESULTS:[CHEM,Scan Mode 3 Agent(s),022/2022] --------------------
10:13:03 100  Sensitivity: Normal Mode
10:13:07 3318 AMMONIA ..................... 366[m]  3.75E-1[MGM3]  TR  Detected
10:13:09 1230 METHANOL .................... 366[m]  1.78E-1[MGM3]  TR  Detected
10:13:10 1080 SF6 ......................... 366[m]  0.00E+0[MGM3]  TR  --------
```

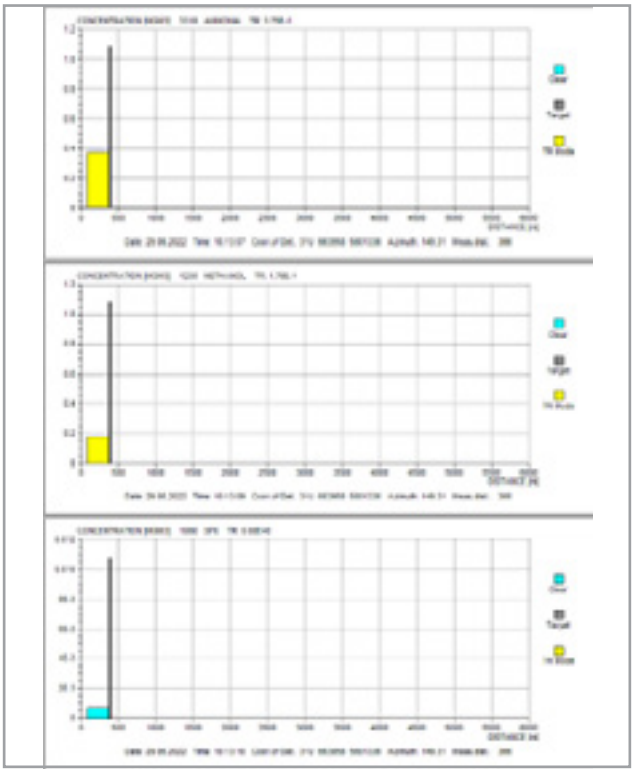


Fig. 6 · Window results of Ammonia and Methanol detection

Presence of each substance was confirmed even two minutes later where the decreasing concentrations were recorded. At 10:15:16 with concentration 0.066 mg/m3 of Ammonia and 0.098 mg/m3 of Methanol.

```
10:15:12 --- RESULTS:[CHEM,Scan Mode 3 Agent(s),022/2022] --------------------
10:15:12 Settings: Sensitivity: Normal Mode
10:15:16 3318 AMMONIA ..................  374[m]  6.64E-2[MGM3]  TR  Detected
10:15:18 1230 METHANOL .................  374[m]  9.80E-2[MGM3]  TR  Detected
10:15:19 1080 SF6 ......................  374[m]  0.00E+0[MGM3]  TR  --------
```

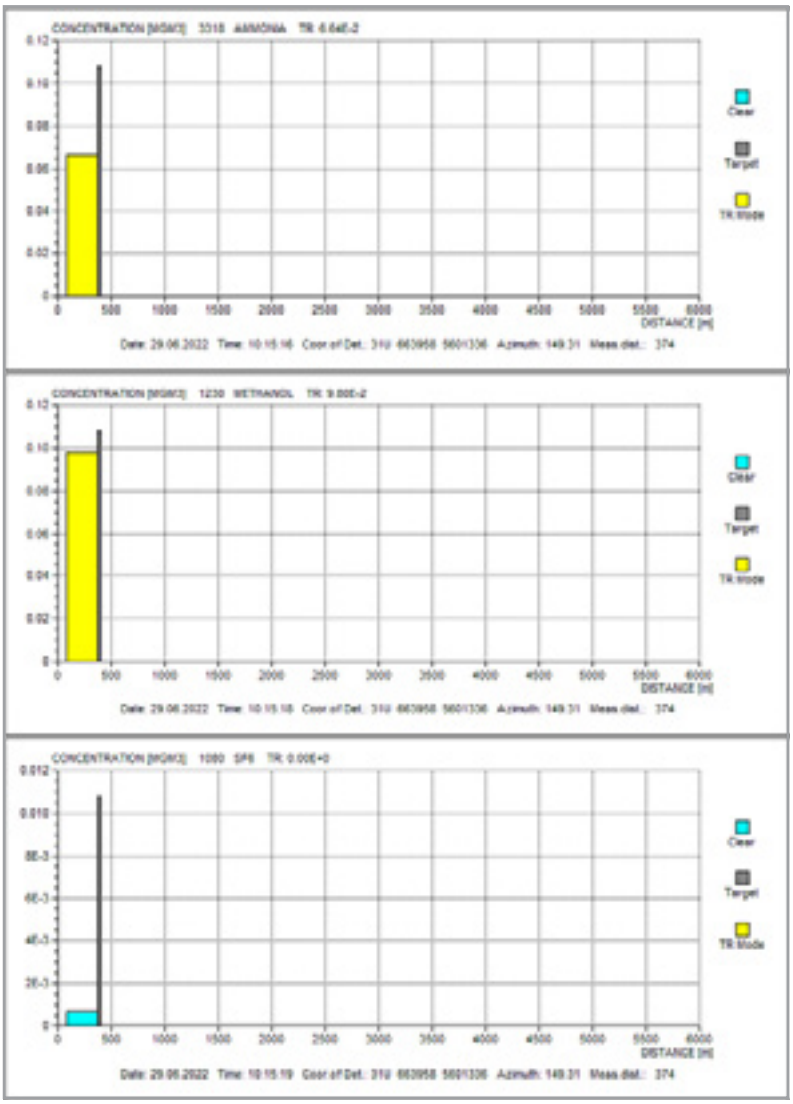


Fig. 7 · Window results that confirms detection of Ammonia and Methanol

Scenario 2. Sulphur hexafluoride at 999 m

Second scenario started directly with released SF6 in gas form into the tent.

Fig. 8 · Description of Scenario 2

Initially the concentration of Sulphur Hexafluoride was low. First detected concentration was recorded at level of 0.022 mg/m3. After few seconds it was possible to see that Falcon 4G detected increasing concentration up to 0.155 mg/m3 inside of the tent.

```
10:22:19 --- RESULTS:[CHEM,Single Mode 1080 (SF6),022/2022] ------------------
10:22:19 Settings: Sensitivity: Normal Mode
10:22:23 1080 SF6 ......................  999[m]  2.24E-2[MGM3]  TR  Detected
```

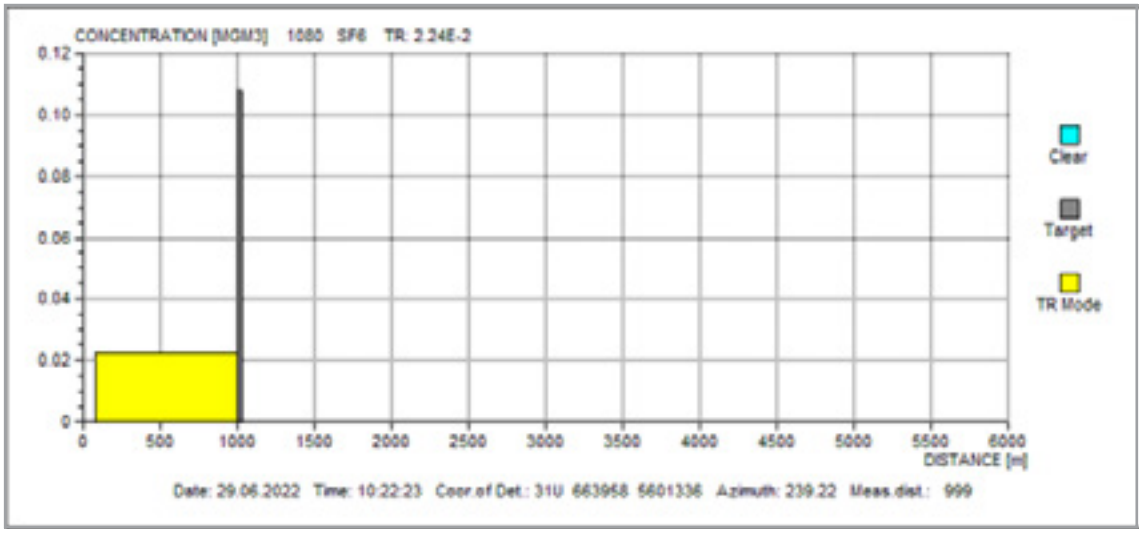


Fig. 9 · Window results of first SF6 detection

```
10:22:27 --- RESULTS:[CHEM,Single Mode 1080 (SF6),022/2022] ------------------
10:22:27 Settings: Sensitivity: Normal Mode
10:22:32 1080 SF6 ........................ 998[m]  3.78E-2[MGM3]  TR  Detected
```

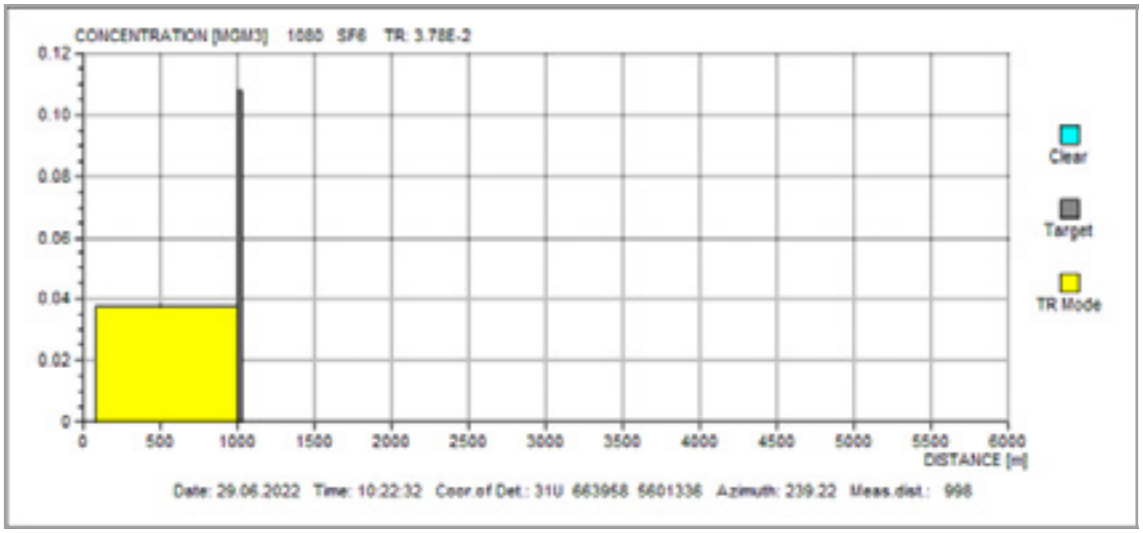


Fig. 10 · Window results of second SF6 detection

```
10:22:39 --- RESULTS:[CHEM,Single Mode 1080 (SF6),022/2022] ------------------
10:22:39 Settings: Sensitivity: Normal Mode
10:22:44 1080 SF6 ........................  996[m]  1.01E-1[MGM3]  TR Detected
```

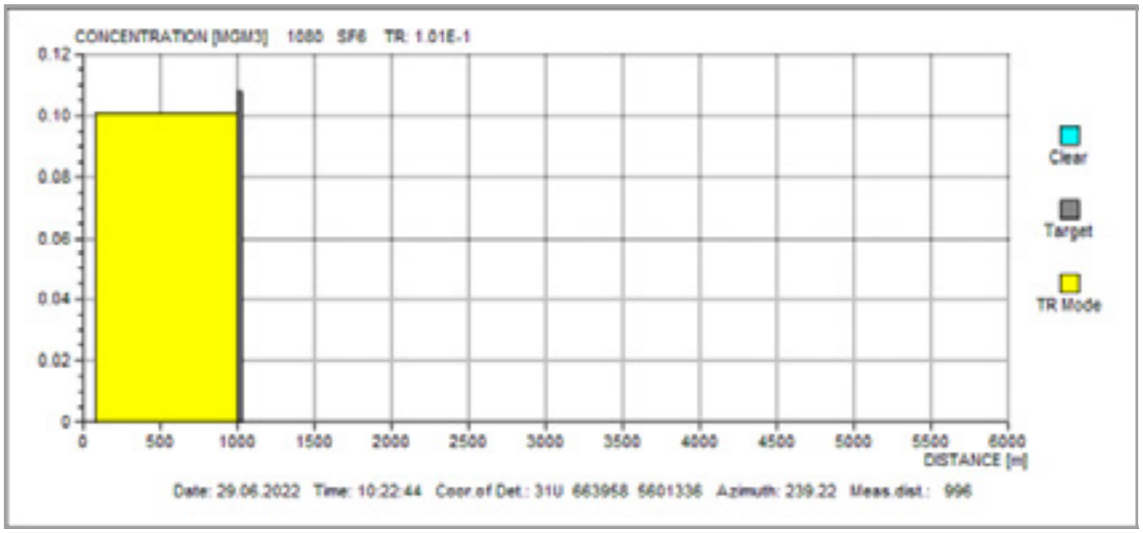


Fig. 11 · Window results of SF6 detection with increasing concentration

```
10:22:49 --- RESULTS:[CHEM,Single Mode 1080 (SF6),022/2022] ------------------
10:22:49 Settings: Sensitivity: Normal Mode
10:22:55 1080 SF6 ........................  997[m]  1.55E-1[MGM3]  TR Detected
```

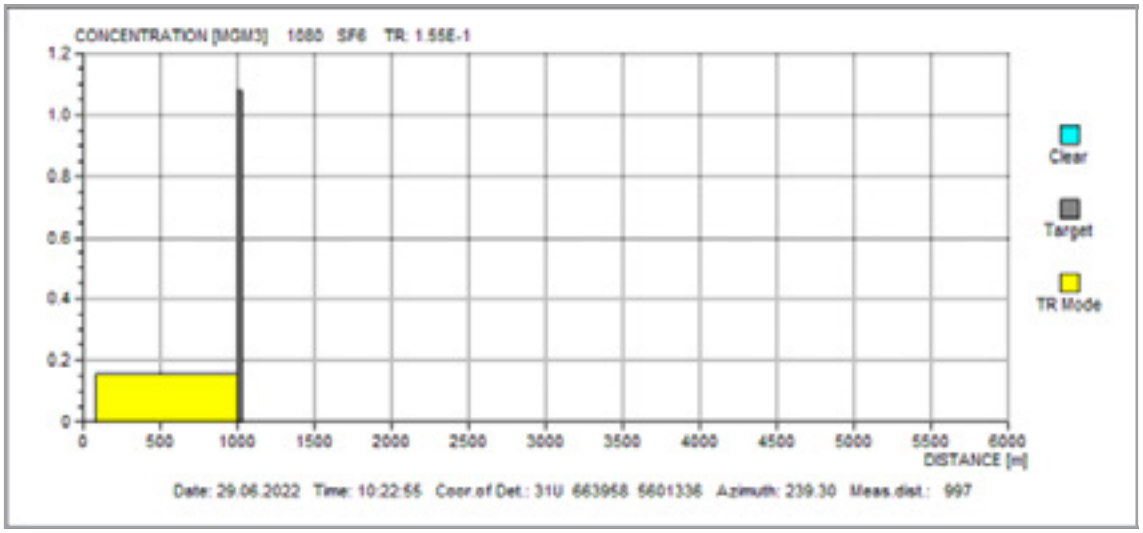


Fig. 12 · Window results of SF6 detection with increasing concentration in time

3.2 SCENARIO 3. AUTOMATIC SURVEILLANCE SCANNING MODE FROM PANORAMA PICTURE

In third scenario Falcon 4G performed automatic surveillance using the scanning mode for selected targets from the panorama picture.

Panorama picture is a tool where the operator can quickly mark points of interest of detection surveillance. Falcon Software will automatically calculate these market points and save as targets for automatic surveillance.

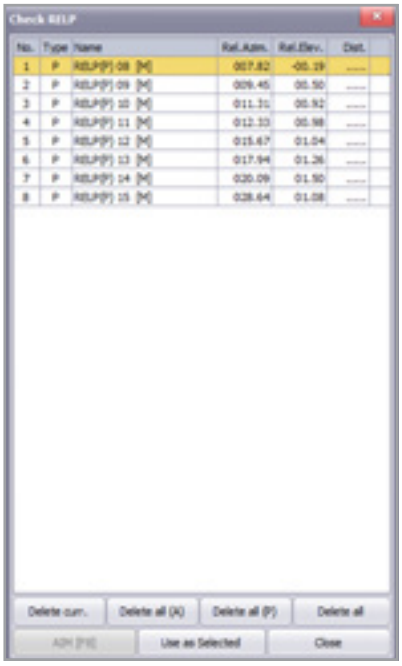


Fig. 13 · Automatically calculated relative positions selected form panorama picture

Fig. 14 · Selected points of interest in panorama picture

Fig. 15 • Selected points of interest in panorama picture

Fig. 16 • Selected points of interest in panorama picture

FALCON 4G

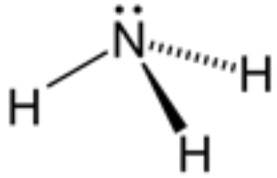
Long-Range Reconnaissance Chemical Detector

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

- **Detection**
- **Identification**
- **Quantification**

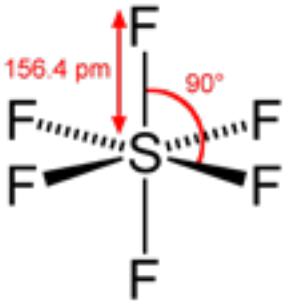
- **Up to 6 km**
- **Best sensitivity on the market**
- Distance to the cloud without triangulation
- Refractors not required
- No need to scan background

NOTES



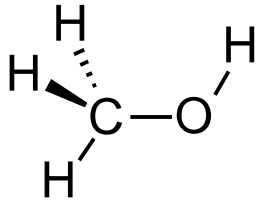
AMMONIA
(NH_3, Molecular weight: 17.031 g/mol)

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.

Source: www.worldofmolecules.com.

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