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GDA 2

Accidents in Chemical Plants or due to transportation, fires and terrorism attacks
(Toxic Industrial Compounds & Chemical Warfare Agents)

- Which chemicals were released ?
- What is the spatial distribution of toxic compounds ?
- What is their possible toxic impact on emergency personnel, population and environment ?
- What has to be done to reduce the chemical threat ?



For correct risk management an analytical instrument is needed – On Site !

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VIEW OF THE GDA 2

AIRSENSE

A N A L Y T I C S



REQUIREMENTS ON THE GDA 2

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Clear Warning Concept

- Detection, Identification, Quantification
- No false negative alarms
- Instant response within seconds

Target Compounds

- Broad range detection:
- ETW List, Chemical Warfare Agents and another
- Database is expandable

Alarms

- at exceeding the ETW concentration
- at exceeding defined values

Concentration Range

- ppm to upper ppb level

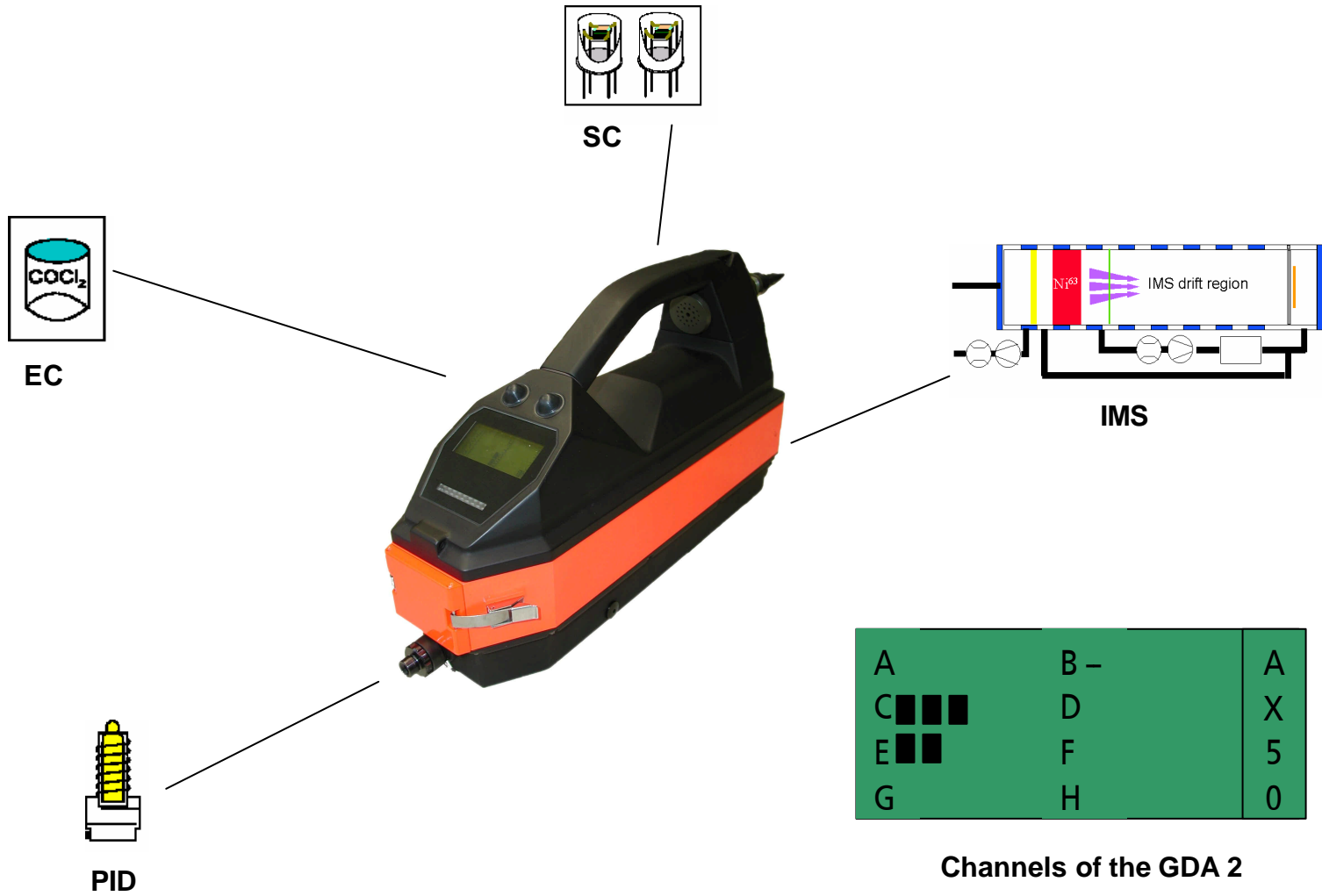
Mobility

- mobile use – only 4,5 kgs, battery operated

Surveillance Vehicle

- Monitoring the air while driving

COMBINED SENSOR TECHNOLOGY



WARNING - CONCEPT



1. WARNING

The user is informed when compounds are present. One or more of the channels are responding differently.

A	B -	A
C ■■■■	D ■■■	X
E	F ■■■	2
G	H	0

2. WARNING

Compounds are identified. Also an estimation about the concentration is given. The dilution may be adjusted at any time manually or automatically.

ACETONE	A
10 ppm	X
	2
	0

3. WARNING

Exceeding the concentration defined values, the instruments turns into the CLEANING MODE. Therefore the system is protected against high concentration – the name of the compounds is shown eventually. If the concentration is decreasing the instrument turns back to the MEASUREMENT MODE automatically.

CLEANING MODE	A
	X
	C
	M

TARGET COMPOUNDS – ETW LIST

Substance	Concentration – limit [ppm]	Type of Sensor	Substance	Concentration - limit [ppm]	Type of Sensor
Acetic Acid	20	IMS, SC	Hydrogen cyanide	5	IMS, EC
Acetone	500	IMS, PID, SC	Hydrogen fluoride	5	(IMS), EC
Acroleine	0.2	SC	Hydrogen sulfide	10	IMS, EC
Acrylonitrile	20	IMS, SC	Methanol	500	IMS, SC
Ammonia	50	IMS, SC, EC	Nitrogen dioxide	1	IMS
Benzene	20	PID, SC	Phosgene	0.1	EC
Carbon dioxide	10000	-	Phosphine	0.5	EC
Carbon disulfide	10	IMS	Styrene	40	IMS, PID, SC
Carbon monoxide	100	SC	Sulfur dioxide	1	IMS, EC
Chlorine	1	IMS, EC	Tetrachloroethylene	100	IMS, SC
Chlorobenzene	100	PID, SC	Toluene	100	PID, SC
Chlorcyan	0.3	IMS	Toluenediisocyanate	0.02	IMS
Hydrazine	1	IMS	Trichloroethane 1,1,1-	300	IMS
Ethanol	3000	IMS, PID, SC	Trichloroethane 1,1,2-	25	IMS
Formaldehyde	1	SC	Trichloroethylene	100	IMS, PID
Hexane, n-	200	PID, SC	Vinyl chloride	100	PID, SC, EC
Hydrogen chloride	5	IMS, EC			

Concentration range 10⁵

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TARGET COMPOUNDS – CHEMICAL WARFARE AGENTS

AIRSENSE
ANALYTICS

NERVES

Tabun, GA

Sarin, GB

Soman, GD

GF

VX

SKIN

S – Lost, HD

N – Lost, HN

Lewisit, L

BLOOD

Cyclon B, AC



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TARGET COMPOUNDS – CHEMICAL PLANTS

Modified databases
according the requirements
of the user

Library A

HF
ClF₃
H₂SO₄
MMA
...

Libraries independently of
places

Library B

Al P
AsH₃
POCl
HNO₃
...



INVESTIGATING ON SURFACES

By the aid of the IR – Heater that is installed in front of the GDA – the instrument may be used in order to investigate surfaces. As a result the success of the decontamination procedure may be ascertained.

Also difficult compounds may be detected while heating up those.

The IR – Heater may be hold closed to the surface that shall be investigated. In most cases the eight channels of the GDA stay closed at zero. In case of contamination the system shows signals on one or more channels.



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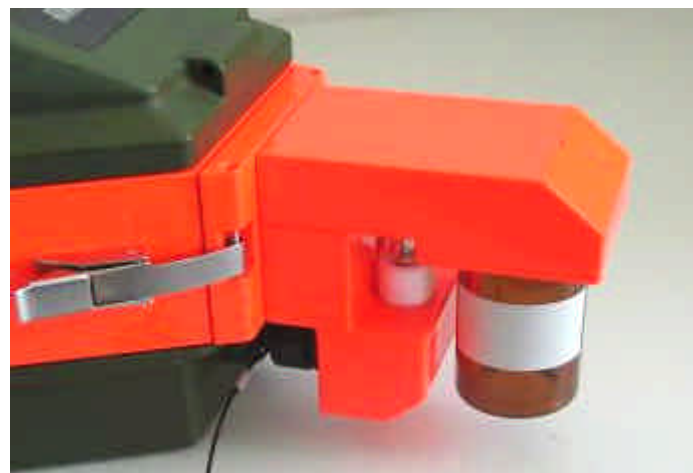
SYSTEMCHECK / CALIBRATION

By the aid of the Sensor Check Tool the user may check if all sensors work without malfunction.

- all sensors and the flow rates are checked
- short time is needed only
- easy to use
- one test substance is needed only

The Sensor Check Tool is installed in front of the GDA 2. The user is informed about the progress permanently. Also different calibration routines may be prepared.

- PID calibration
- Flow calibration



SURVEILLANCE VEHICLE / FILTER UNIT

The instrument may be installed in surveillance vehicles in order to investigate and monitor the ambient air while driving. For that the instrument is fixed in the mounting holder where the GDA 2 is connected to the external filter.

By the external filter unit the instrument is provided with clean air in order to avoid contamination inside the system. So the instrument keeps clean and short launch times are ensured.



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MAINTENANCE

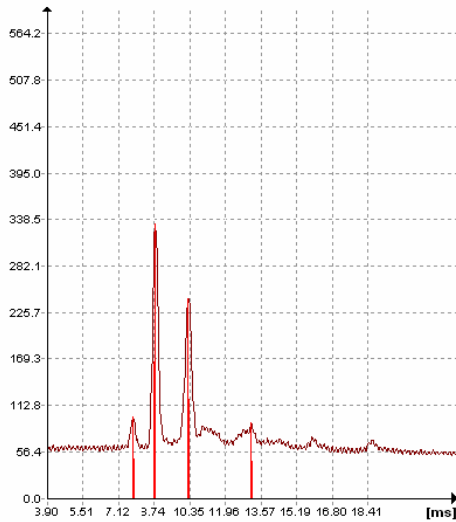
AIRSENSE
ANALYTICS

While developing the instrument it was important to consider to hold the maintenance costs at a minimum. So all maintenance work may be prepared by the user alone. The instrument need not to be shipped back to the manufacturer.

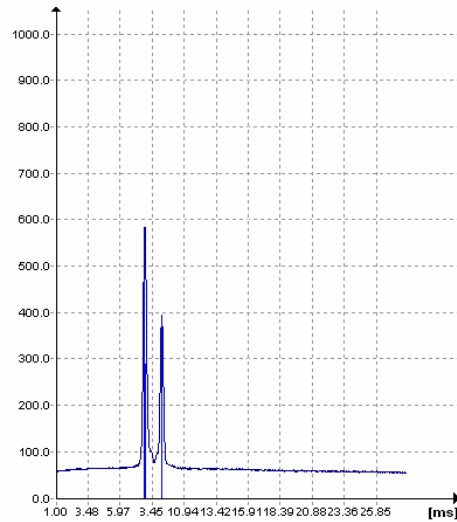
- Replacing the Electrochemical Cell
- Cleaning the PID lamp
- Replacing the drying filter
- Replacing the zero gas filter
- Replacing the O - Rings



SOFTWARE



Positive Spectra



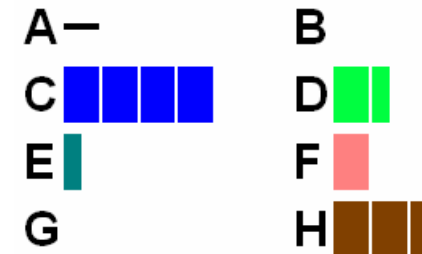
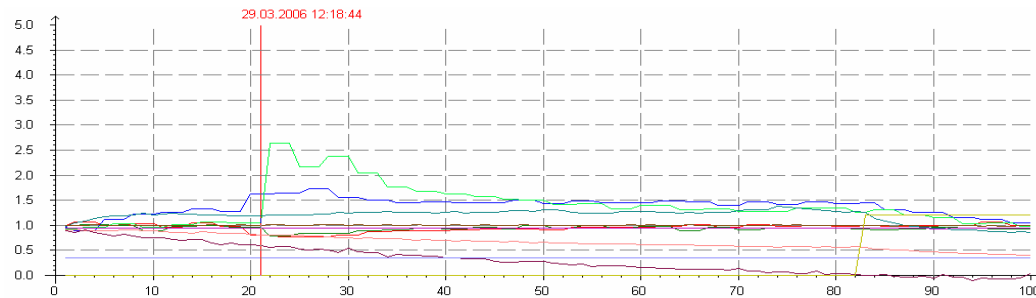
Negative Spectra

S(A) =	2271.749	0.609
S(B) =	2902.194	1.768
S(C) =	2781.361	1.117
S(D) =	3007.494	0.855
S(E) =	2022656.000	0.680
S(F) =	100150.000	-0.150
S(G) =	495.000	0.964
S(H) =	278.400	2.072
Verdünnungsfluss =		0.0
Temperatur =		41.0
Druck =		1006.8
Pos. Spannung =		1762.9
Neg. Spannung =		1793.6
K0 / H	pos.	neg.
	2.26 / 163.6	2.45 / 220.9
	2.06 / 570.4	2.24 / 470.7

Substanz	Konzentration
METHYLBROMID	2.00 ppm

Information on the compounds and the channels of the GDA 2

Progress of measurement – all channels of the GDA 2 (also date and time is shown)



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OUR CUSTOMERS

- Fire Departments
- Plant Fire Brigades
- Airports
- Chemical Plants
- Police
- Military

