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St Radboud

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Video Imaging and Data Interfacing for Training and Analysis

V I D I T A

History

1987	PIMEX was introduced by the Swedish Institute of Working Life (prof. dr. Gunnar Rosén)
1989	PIMEX was introduced by VTT in Finland and by HSL in the UK
1995	PIMEX was introduced in The Netherlands by Wageningen University (dr. Mieke Lumens)
2004	Reintroduction of PIMEX in The Netherlands by Arbo Unie and Radboud University
2006	International PIMEX course launched
2010	PIMEX hands-on training in Paramaribo

Experience with PIMEX hardware

It works (quite well) but …

- Based on 20-years old technology
- Many cables with banana connectors
- RS-232 interface with computer
- Radio-signal (continuous broadcasting)
- Two NiCd battery packs and a 9 V battery
- A/D converter contains a dedicated chip (uncertainty concerning future supply from VS)

At some point compatibility with current consumer electronics will require substantial technical support

Experience with PIMEX software

It works (quite well) but …

- Based on 20-y old platform (operating systems)
- Poor software compatibility with current computers
- User-interface needs some refreshment
- Signal in arbitrary units (mV)
- Bugs (bar does not function in pause mode)
- Video avi format consumes much disk space

Specs for a new system - hardware

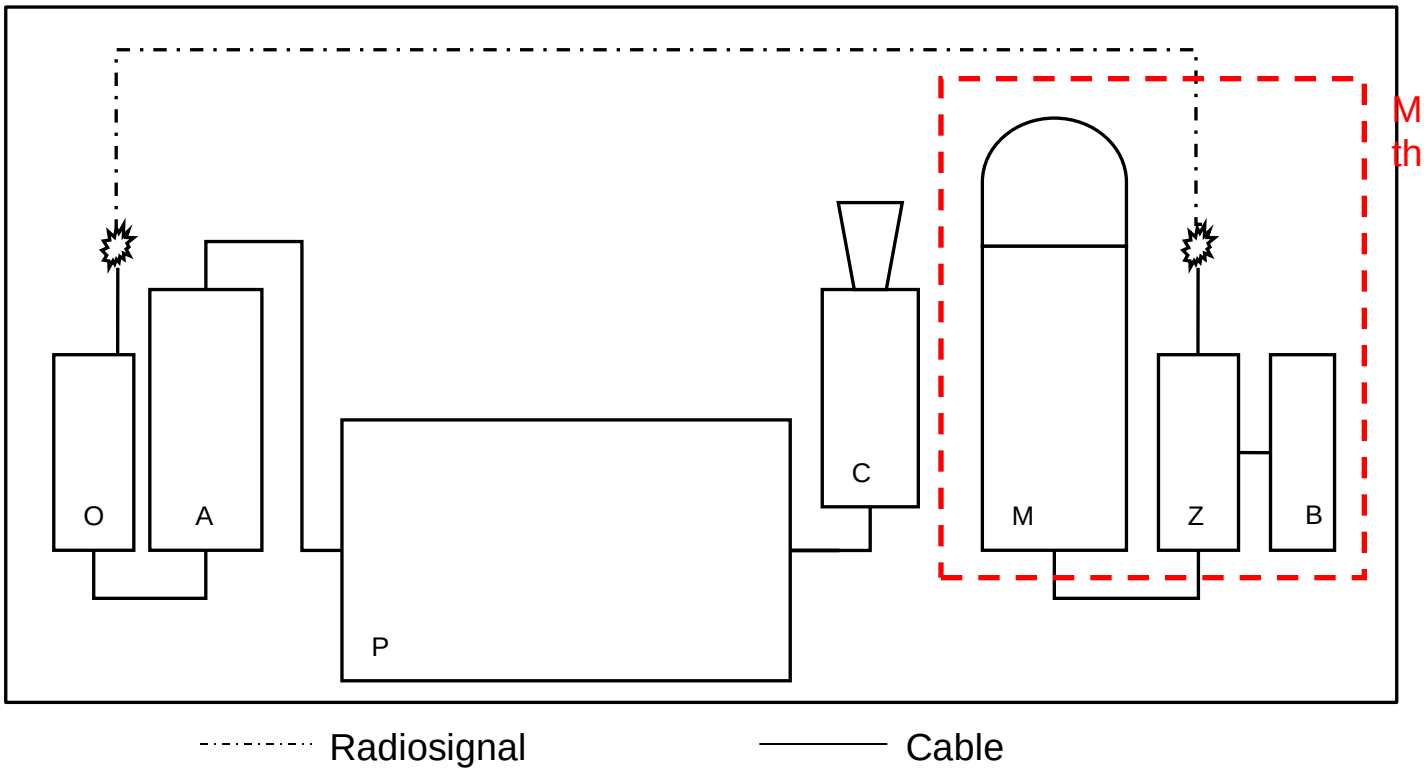
- Replace some cables by wireless functionality
- Battery supply (lowest possible energy use and use of chargers and power from computer)
- Introduce better quality cables/connectors
- No more radio signals (too energy consuming and sensitive to EM-fields)
- Heavy duty casing that can be attached on a belt
- More reliable connectors and better quality cables

Specs for a new system - software

- Compatibility with current (future) platforms
- Input of signals from multiple monitoring instruments
- Video file (de)compression option to safe disk space
- More intuitive user interface
- Options for use of signal calibration
- Proper units of measured signals
- More options for analysis of images and data
- Marker which can be initiated by the worker

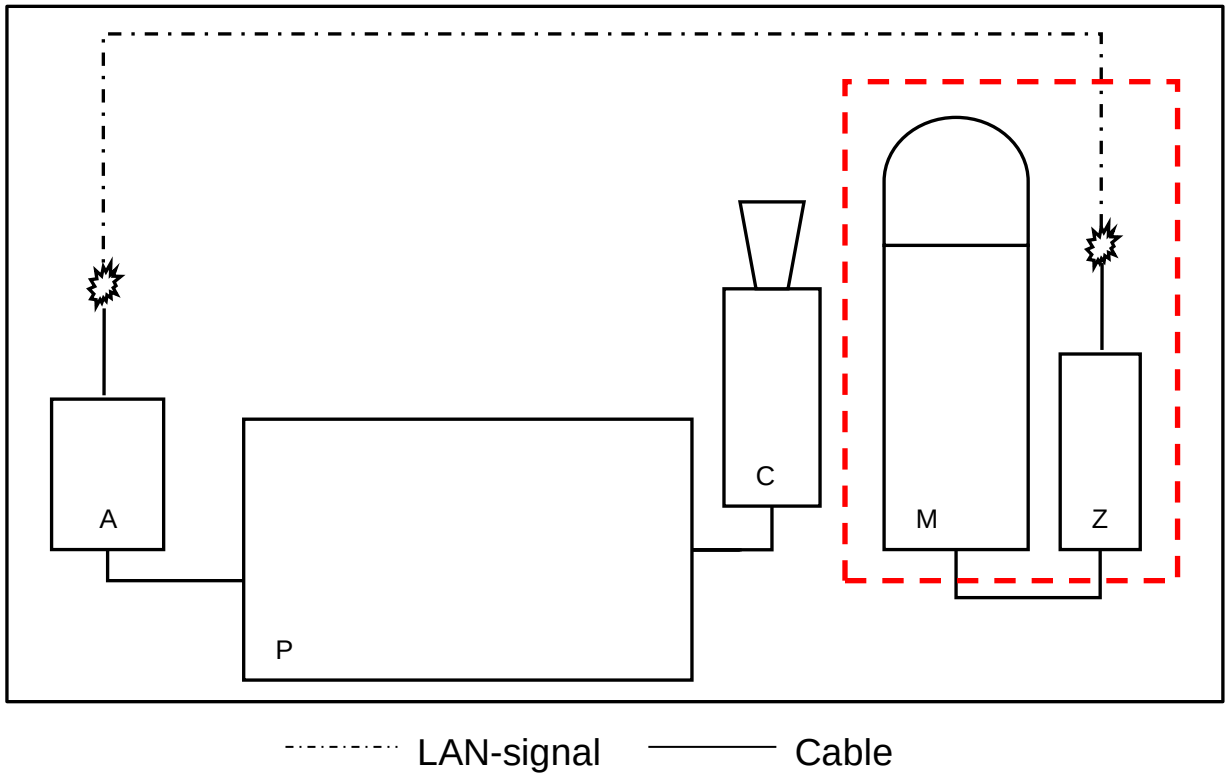
Hardware	PIMEX	VIDITA
Computer interface	RS-232 on COM-1	USB 2.0
Wireless transfer	Radio-signal	Zigbee LAN 2.4 GHz
Number of recorded	1	8
Cables	5	3
Connector	Banana	Redel
Marker	n/a	Worker-operated
Power supply	9 V battery	LiO battery

Hardware PIMEX



O = receiver; A = A/D converter; P = PC; C = camera; M = monitor; Z = sender; B = battery

Hardware VIDITA



Mounted on the worker

A = A/D converter; P = PC; C = camera; M = monitor; Z = sender;


VOLTCRAFT
Battery charger
s/n: 091602 / BC3


VOLTCRAFT
Battery charger
s/n: 091602 / BC3
ant.
usb
power
Datalogger
s/n: 091602 / DL3
S1
S2
S3
S4
Remote module
s/n: 091602 / RM3


4 Channel I/O module
TNO2946


power
usb
ant.


SKC
Operating Instructions
863 Valley View Road, Eighty Four PA 15330 USA
Tel: 724-941-9701 Fax: 724-941-1369 e-mail: skctech@skcinc.com
GS-3 Multiple-inlet Cyclone
225-100 & 225-103
Description
Assembly
Figure 1
GS-3 Cyclone with Filter Cassette — Exploded View
10M
SAMPLER
770-140
CALIBRATION STANDARD FOR HAZ-DUST IV
HAZ-DUST IV
Personal Dust Monitor
HD-1004
Environmental Devices Corporation
USA


offspring of men occupationally exposed to organic solvents
Population and Methods

Software

Software	PIMEX-PC	VIDITA
Programming	Labview	Delphi
User interface	Limited adjustments possible	User-adjustable
Calibration	Not included (possible by changing data file)	Pre-measurement two-point calibration saved in protocol files
Video images	n/a	Automatic compression and decompression
Language	English	Dutch

(91) Datalogger - Analyse

PID [ppm] 150.00

Start Opname | Help | Afsluiten | Instellingen

Detail Grafiek | Memo

PID [ppm]

DETAIL OPNAME OP 1.0 MINUTEN

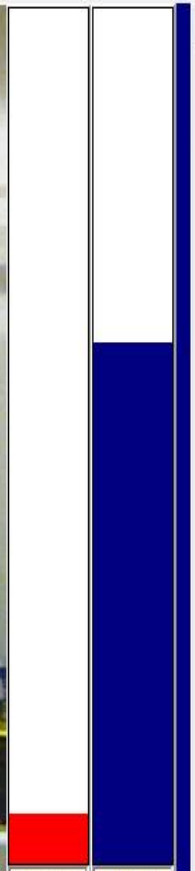
TIJD (in Seconden)

PID [ppm]

Frame : 880 uit 2029
Sample: 905 uit 2090

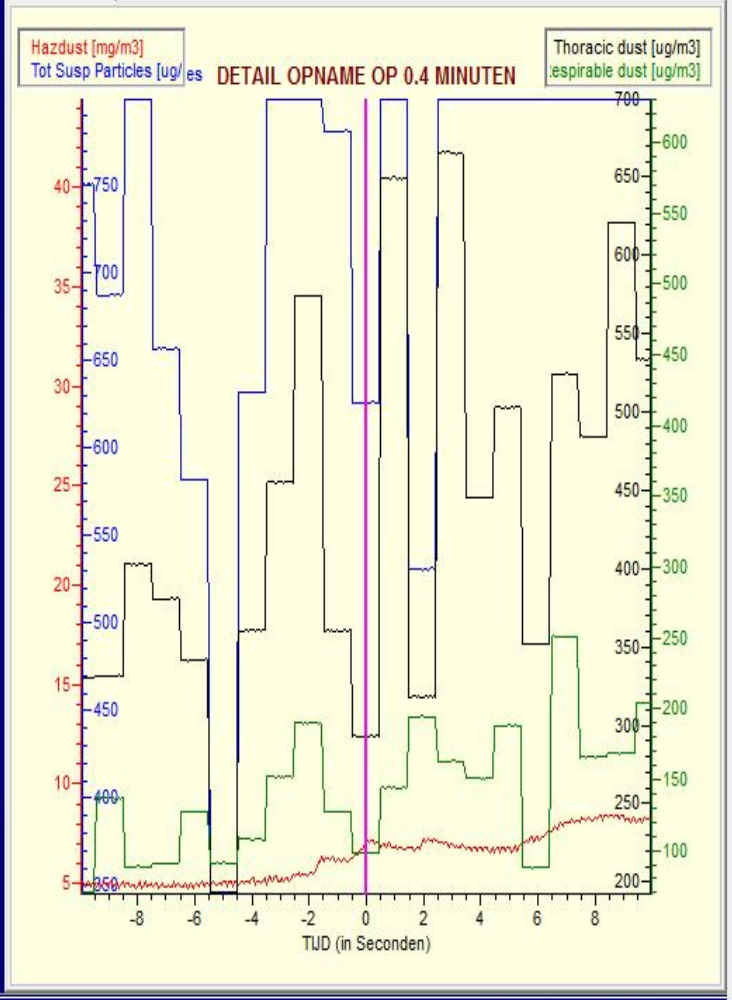
TOTALE OPNAME (Tijdas in minuten)

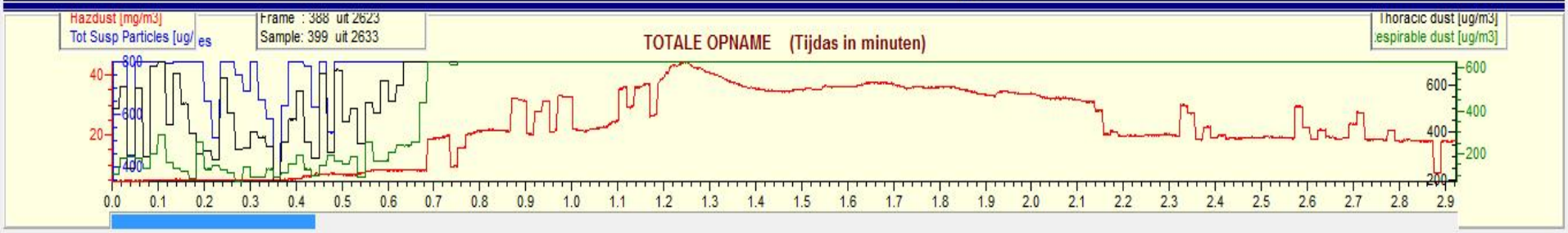
(91) Datalogger - Analyse



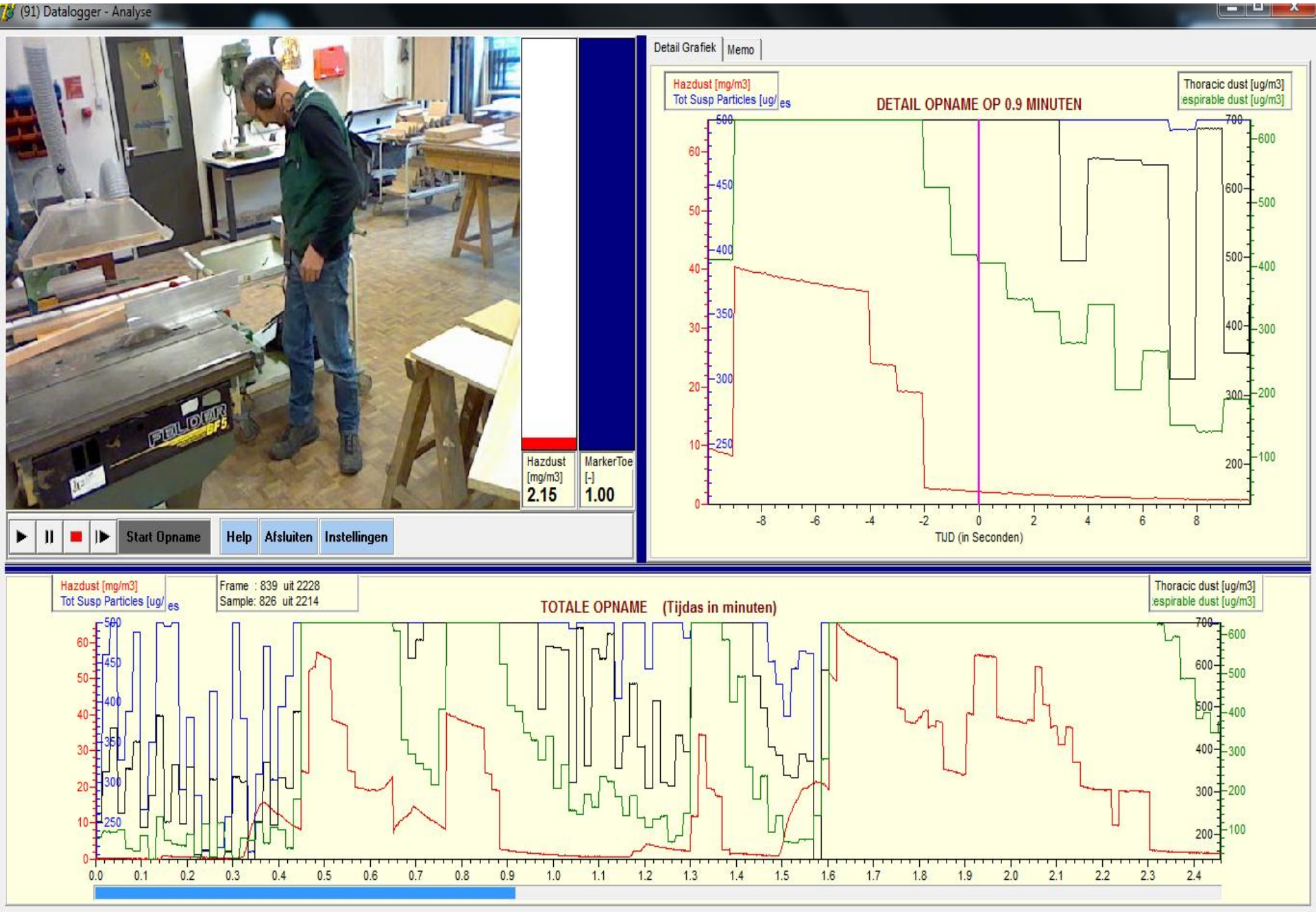
Start Opname | Help | Afsluiten | Instellingen

Detail Grafiek | Memo





Hazdust [mg/m3]	Tot Susp P [ug/m3]
7.17	626.00


(91) Datalogger - Analyse
Hazdust [mg/m3] 2.15
MarkerToe [-] 1.00
Start Opname
Help
Afsluiten
Instellingen
Detail Grafiek
Memo
Hazdust [mg/m3]
Tot Susp Particles [ug/es
Thoracic dust [ug/m3]
espirable dust [ug/m3]
DETAIL OPNAME OP 0.9 MINUTEN
TIJD (in Seconden)
Frame : 839 uit 2228
Sample: 826 uit 2214
TOTALE OPNAME (Tijdas in minuten)

Requirements for instruments to be linked to PIMEX

- Analog output: 0 - 1 Volt
- Response time: 1 sec or less
- Portable (can be attached to worker): < 1 kg
- Wide sensing range (3-4

Osiris nephelometer for TSP, PM-10, PM-2.5 and PM-1

OSIRIS

Turnkey Instruments

0.32 µg/m3
latest PM2.5

environmental
particle monitor

RESET

START
STOP

EDIT
ENTER

TNO2946

Channel I/O module

TNO2946

Monitoring of Volatile Organic Compounds

Photo Ionisation Detector

Monitoring of Aerosols

Personal Dust Monitor

Hazdust IV Personal Dust Monitor with
Sensors for inhalable, thoracic and respirable dust

Limitations of the VIDITA system

Hardware

- Battery of remote (worker's) unit needs to be charged
- Instrument needs to have an analogue output (V)

Software

- Software has more features/requires more training
- Still no facilities for video-editing
- Software interface in Dutch
- Compression decompression cycles take time (minutes)

Conclusions

- VIDITA is a new hardware and software system for combining video images with measuring data based on the principle of PIMEX
- Hardware compatible with current computer systems, heavy duty casing, cables and connectors and low power use.
- Software with user-adjustable interface and many features for analysis and presentation of data from up to eight different input channels.

Useful internet links in **English**:

- Dalarna University: http://www.du.se/en/Samverkan/Samverkansprojekt/Tema-Arbetsliv/Metoder/PIMEX/ab/

Useful internet links in **Dutch**:

- Arbo Unie: http://www.xpertlink.nl/PIMEX.htm
- Arboportaal Clip-o-teek http://www.arboportaal.nl/types/alle/video?/
- Think Global Paint Local (TGPL): http://www.tgpl.nl/beeld/
- Wikipedia: http://nl.wikipedia.org/wiki/PIMEX

Useful internet links in **German**:

- Kooperationsstelle Hamburg: http://www.pimexservice.de/
- KOHS (Austria): http://www.pimex.at/pimex.php

Acknowledgements

- Gunnar Rosén for technical support and discussion related to the current PIMEX hardware and software
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- All former course attendants and current users of PIMEX who provided us with their user-experiences


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