



MUNISENSE

Effective long-term noise monitoring via internet

Technical specifications of the noise monitoring station Tango_NMS

Accuracy	Class 1, IEC 61672
Calibratability	PTB type approval requested
Measure values	- Sound pressure level LAF, LAS - Maximum sound level LAFmax, LASmax - Minimum sound level LAFmin, LASmin - Continuous sound level LAeq, LCEq
Frequency weightings	A + C
Time weightings	Fast, Slow
Measurement range	25 ... 140 dB
Resolution	0.1 dB
Display *	Illuminated LCD - Measured value with 3.5 digits - Bar graph in 5 dB steps < under-range > over-range
Microphone	1/2" measurement microphone MK255, 50 mV/Pa
Weather protection	WS1 for long-term continuous operation
Calibration	With external calibrator, 94dB
Data storage	On commercial database server
Network interface	ZigBee / 3G modem
Batteries	Lithium-ion battery with integrated charger
Operating time	Without charging 100 h
Power supply	10...18 VDC (through AC adaptor or solar panel)
Dimensions	750 x 80 x 60 mm
Weight	1.5 kg
Scope of delivery	Noise monitoring station Tango_NMS, windscreen/weather protection, user manual, mounting kit, 115/230VAC adaptor
Option 1	Gateway to internet (ZigBee - LAN/WLAN)
Option 2	Audio transmission within the network for listening
Option 3	1/2" calibrator Cal200
Option 4	Customer-specific MUNISENSE website
Option 5	Software package AUDITOR_light

*) the optional LCD display is only required for calibrated devices

The MUNISENSE advantages

Using modern internet technology the SINUS MUNISENSE system offers various advantages:

Direct availability

The service only requires small installation and synchronization efforts. Immediately after the set-up of the stations and internet gateways, the measured values are available on-line. The wireless sensor network configures itself and is powered by batteries.

Large number of measuring locations

Virtually any number of stations may be integrated into the MUNISENSE network. The large number of measuring locations results in highly accurate and dense information. All measured values are stored centrally and may be retrieved without any loss of information. Due to the moderate cost a large number of measuring locations can be realized at a reasonable expense.

On-line access everywhere

Secure access to the centrally stored data via mobile internet devices is provided everywhere.

Easy and quick integration

The service supports automatic notification via e-mail and SMS. Since the measured data may be retrieved via internet, it can be integrated into existing processes quickly and easily.

Availability and reliability

MUNISENSE monitors the network 24/7. Any possible malfunction is reported and removed immediately.

Security

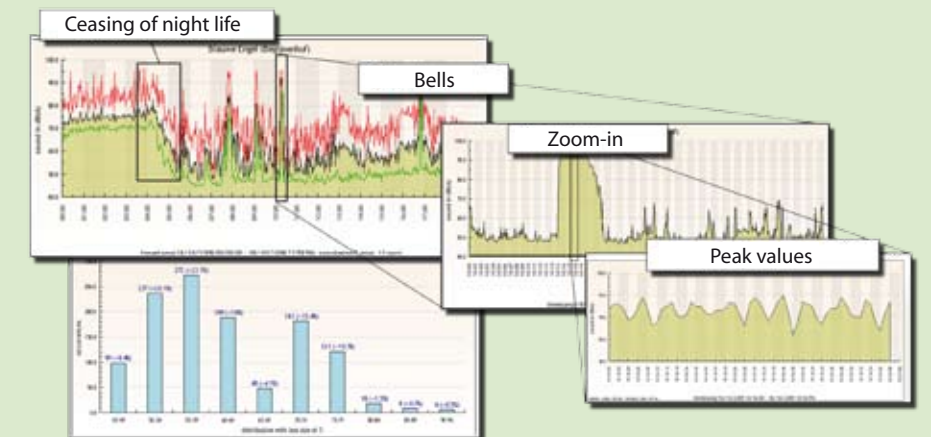
Within the network as well as during data storage every possible protective measure is taken to safeguard data integrity and protect the data from unauthorized access.

Support of other sensor types

As an option the system allows integration of additional or alternative sensors for measuring other physical quantities as for example temperature, humidity, vibration, barometric pressure, water level.



- Autonomous noise monitoring stations
- Wireless communication within the network
- Continuous data storage on the server
- Flexible web interface for the user
- Stationary and mobile systems available



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MUNISENSE noise monitoring uses the internet for data storage and offers measurement values in real time

In some municipalities noise pollution is becoming a severe problem. Many citizens are exposed to various different sources of noise, which affect their quality of life as well as their health.

Especially with temporary or short noise events the authorities for public order and environmental protection are not able to react sufficiently quickly to perform noise measurements on site. One typical example for such noise events are open air concerts. Often noise exposure occurs during the night and therefore not within the authority's regular working hours.

Only suitable automatic monitoring stations allow for an effective method to capture such events.

The web-based long-term monitoring system MUNISENSE provides authorities, administrations and companies with all means to automatically and continuously measure the current noise pollution level as well as further environmental parameters, if needed, at a large number of long-term measuring locations. The measured values are stored centrally and in real time using the internet technology.

In this, safety is provided by storing the data as well as by protecting the personal interests and privacy of the individual citizens.

The MUNISENSE monitoring network consists of an arbitrary number of autonomous outdoor noise monitoring stations in permanent operation, which are connected to a central server through a wireless network.

The measured values are continuously transferred to the server and are accessible to the different users through a web portal. The individual design of the web portal and the administration of users' rights allow protection of the interests and rights of each individual user.

A public presentation of current noise measurements is an efficient means to improve acceptance of noise emitting events such as open air concerts or major sports events within the municipality. Combined with background information on the event this helps to de-escalate possible conflicts with the residents.

MUNISENSE noise monitoring enables authorities to verify compliance with limits / requirements for the host in a legally certain way.

Modern technology combines secure long-term data administration with a customized website

For noise measurement the SINUS MUNISENSE system uses the modified hardware platform of the Tango sound level meter, offering accuracy class 1 according to IEC 61672.

The Tango monitoring station meets all requirements of the following fields of application:

- Monitoring traffic and industrial noise
- Monitoring neighbourhood noise / noise from recreational activities
- Monitoring noise at work.

The low power consumption of the sound level meter and the additional communication unit allow battery operation on the internal battery for up to 100 h.

The measured data are sent to the central server via ZigBee wireless network (for several stations in the immediate vicinity) or via 3G modem.

The data are available for further use through a web interface. An individually designed website offering the possibility to grant differentiated user rights allows to display and analyse the data anywhere. Apart from the instantaneous sound level values at each measuring location, the level values of the preceding days as well as the audio data – for listening in – are provided.

An SMS or e-mail alert in the event of level exceedance is an integral part of the system.



Easy set-up, commissioning and administration of the measuring stations and the entire system

Apart from the purchase cost, the installation costs are a major factor.

The Tango_NMS stations allow permanent outdoor installation. Due to their low weight and small dimensions installation on public lamp poles is possible. The low power demand combined with the integrated battery and charger unit enables direct feeding from the street lights. Alternatively the stations may be powered by a small solar panel (30 x 40 cm).

Due to wireless data transmission no wiring or earthwork costs incur!

Additional stations may be integrated into the system without problems at any time.

PTB Type approval for the device Tango_NMS has been requested (for German legal calibration).

The INSIGHTNOW™ server created by the company Munisense is used. The optional installation of the server at the customer is possible.

MUNISENSE system integration by post-processing with the AUDITOR™ software package

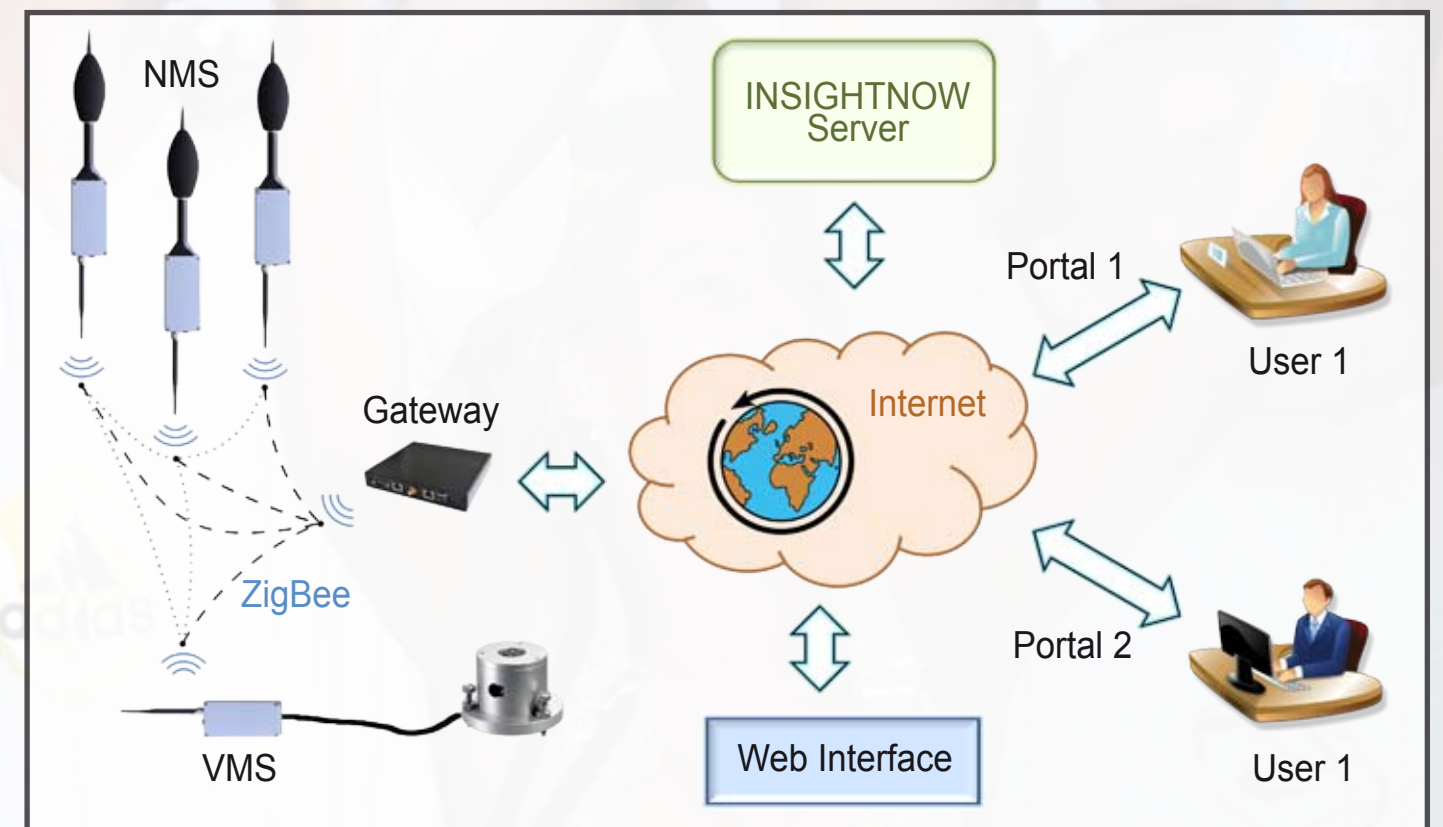
The combination of the monitoring system MUNISENSE and the post-processing software AUDITOR allows the convenient analysis of noise pollution levels according to the German Technical Instructions on Noise Abatement (TA Lärm).

The post-processing provides an effective means for calculating the rating level according to the German Technical Instructions on Noise Abatement (TA Lärm) as well as international standards and regulations.

The main components of AUDITOR are:

- Import of MUNISENSE measurement values
- Graphical overview of long-term measurement results
- Merging, highlighting and masking of data
- Rating level calculation
- Reporting

The full version of AUDITOR™ allows processing the measurement data from all sound level meters and analysers of SINUS Messtechnik GmbH including Tango and MUNISENSE.



Structure of the MUNISENSE™ system