Sarco AHV - 2000
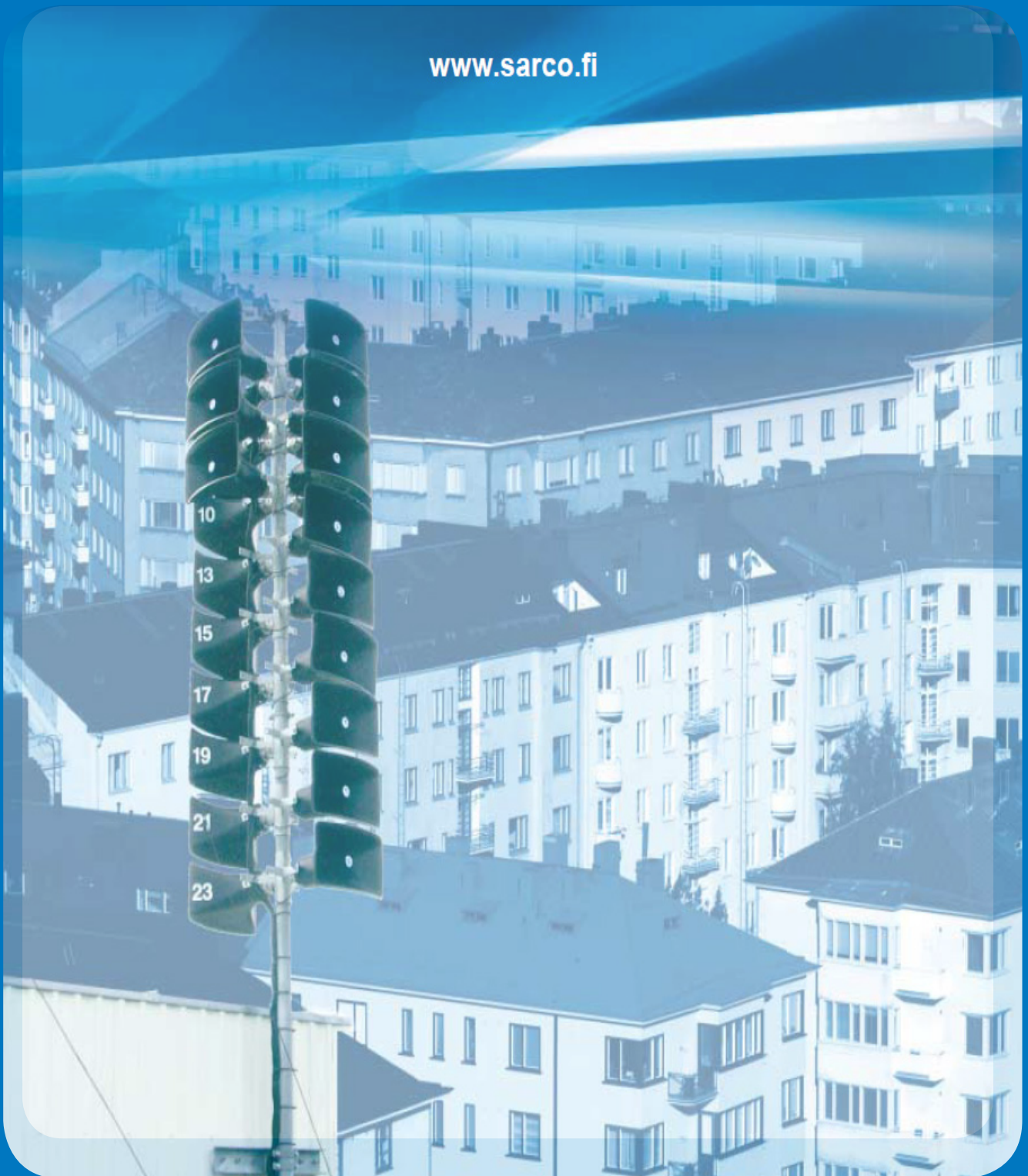
High Power Alarm System

www.sarco.fi

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Civil Defence product and service description

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1. Introduction

Sarco Oy is pleased to present our offer based on our experience in designing mission critical alarming solutions.

With the proposed alarming system an easy-to-use, state-of-the-art, stable and efficient system to meet the needs of Civil Defense controlling system will be introduced. To guarantee success in reasonable short time, Sarco Oy can contribute its profound experience as a warning Technology Supplier and System Integrator.

Sarco Oy is a Finnish company, specialized in designing and manufacturing alarm and electronic devices and systems. Our main customers are different public authorities and industrial companies.

Sarco produce electronic alarm sirens, speech amplifiers, vehicle warning lights, which are used comprehensively in emergency vehicles and for civil defence purposes. In addition Sarco provides tailor made Military equipments and systems.

The Sarco solutions have been designed to fulfil the highest communicational demands possible. Our solutions guarantee the capacity to respond immediately both under normal circumstances and in states of emergency.

80 years of cultivation

Sarco Oy has supplied and imported electronic devices since 1926.

Over the years our product range has been modified by means of the newest technology, all the better to fulfil the changing needs of our customers.

During our 80 years in the business there have been many moments worthy of remembrance and we are proud to say we have kept up the pace with the technological developments and have learned from our experience.

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Guaranteed quality

Sarco Oy's most important aim is customer satisfaction. Sarco Oy produces and delivers products and services of on-demand quality according to customer's schedule.

To ensure high-quality products throughout their life cycle, we reserve resources for product development and quality assessment. The availability of technical support, service and spare parts is guaranteed at all times. We appreciate the expertise, co-operation and persistence of our staff and partners.

Continuous development is one of our basic principles. We observe the developments in our line of business constantly and respond rapidly to change.

Our operations follow the demands and guidelines of the ISO 9001 quality management system. We regularly assess the quality of our products and operations, which are in perfect conformity with authority guidelines and legislation.

2. Sarco Oy alarm systems for civil defence in a nutshell

Civil defence is one of Sarco Oy crucial areas of operation. With the help of high-capacity alarm devices even the most difficult and versatile situations are under control.

The Sarco Oy alarm system consists of a main control system and fixed outdoor alarm devices

Alarm system loudspeakers can be used to issue instructions to the population in case of an accident or an imminent threat.

Our alarm devices can be used to control many different types of areas by directing the sound towards the desired regions.

The sound capacity can also be directed towards the area which is in need of protection from a more distant location, e.g. from the marginal areas.

Sarco Oy delivers systems on a"ready-to-go" basis, taking regional population growth into consideration. The capacity and size of the system is identified by measuring the terrain, the infrastructure and its estimated development.

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Our research and development plan as well as our efficient engineering guarantees complete and functional solutions for our customers. The seamlessness of our delivery is ensured by professional installation services. We arrange maintenance training and annual inspections and follow-up.

The customers of Sarco Oy include civil and urban rescue departments, the Finnish Defence Forces, the chemical industry and other industries that require secure protection.

3. Alarm centre protected against vandalism

The High capacity-alarm unit consists of a lockable steel casing which is protected against vandalism and fulfils the criteria of a waterproof electric box, located in a damp space (IP55).

The system includes all the necessary remote and local control electronics, charger, gas-proof and maintenance-free batteries.

Units can be connected to the control system via VHF/UHF radio, Tetra, Internet, GSM, GPRS and 3G networks.

The protected, compact-size amplifier unit easily fits in the maintenance space of the buildings.

The detachable module can be replaced with a new one during maintenance. This allows the system to function without interruption.

VSS high-capacity alarm unit

With a single electronic high-capacity alarm device you are not only able to sound an alarm signal, but also to issue clear precautionary directions to the population.

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3.1 High-capacity speakers

The speakers are high-capacity, exponential horn loudspeakers.

Their performance is unique in comparison with other speaker designs. The outer horn is made of unbending and strong fibreglass and the inner horns are anti-corrosive metal.

Due to its sturdy design, the speakers also convey spoken information very strongly and clearly, emphasizing the high performance.

Thanks to high-quality materials the speakers can handle difficult environmental conditions, such as sulphurous air.

The materials are also protected against ultra-violet light, which otherwise weakens plastics.

3.2 Mast design and audibility

The speaker's masts are constructed to be weather resistant. Special attention has been paid to demands such as wind load and suspension.

The alarm signal can also be directed to predefined areas, for example from a distant industrial facility towards a densely populated area.

Apart from sounding the alarm signal the unit can also be used to communicate speech.

The mast structures of the speaker battery are made of hot-galvanized steel. The structures have been designed to manage even the strong winds blowing along the coast. The strength calculations for the mast are based on norms used in EU.

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4. Planning

4.1 Models and audibility

Sarco manufactures and designs four different solutions according to the customers' needs. Modelling of audibility can be done different ways.

Alarm device models and omnidirectional audibility 68 dB (A):

Audibility radius	Urban conditions	free terrain
Model	average	average
VSS-2400	1500 m	2100 m
VSS-1200	1000 m	1500 m
VSS-600+	800 m	1100 m
VSS-600	700 m	950 m
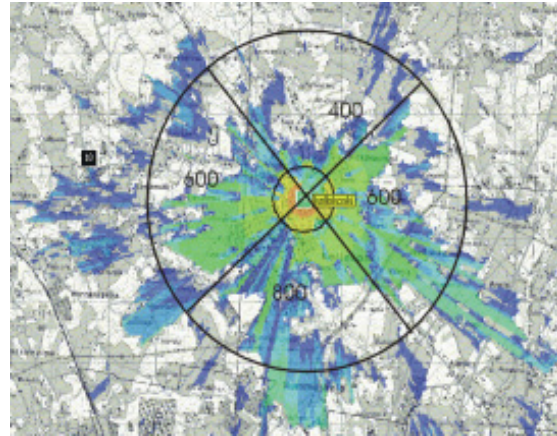
Picture. Audibility map.

Black round line represent free terrain audibilty and colors real audibility in urban conditions.

Number in each sector represent power of the loudspeakers yellow color over 100 dB (A) audibility, green over 75 dB (A) and blue over 68 dB (A).

Audibility can be estimated by using geographical information of the terrain (if available). By using knowledge that output power of the loudspeaker in one meter is 120 dB (A) and by using geographical *map audiobility program* audiobility can be calculated accurately.

If the geographical information of the terrain is not availble the audibility can be measured in actual urban conditions by using several remote measuring points. The free-field audibility radiuses are more than double of those achieved during optimal conditions. During special conditions even more remarkable audibility radius values can be achieved.

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4.2 Regional planning

Predictive planning guarantees a reliable, high-quality civil defence.

Using modern software, Sarco Oy plans specific solutions for every region on a "ready-to-go" basis in association with the local civil defence authorities.

By means of careful predictive planning the project schedule and required resources for both supplier and customer are guaranteed.
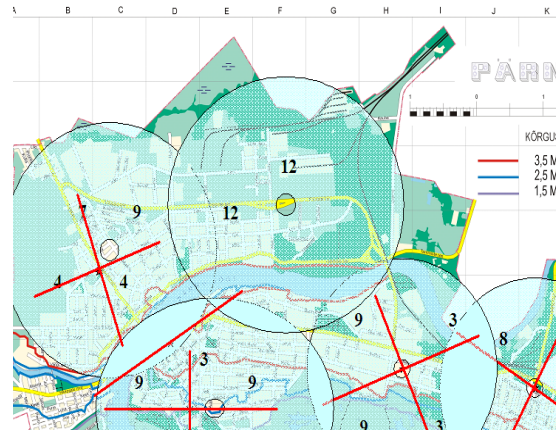
5. Controlling the devices

5.1 Local use

The device can be controlled manually, regardless of whether it is connected to the complete system or not.

The alarm signal and speech can be connected locally directly from the device. The alarm signal is activated locally by pressing the LC-4 key on the timer. The alarm is activated on a two-switch basis, thus preventing accidental false alarms.

A noise-proof command microphone is attached to the timer unit for the purpose of making local announcements and giving instructions. The noise-proofing effectively prevents the microphone from howling and makes the announcement clearer.
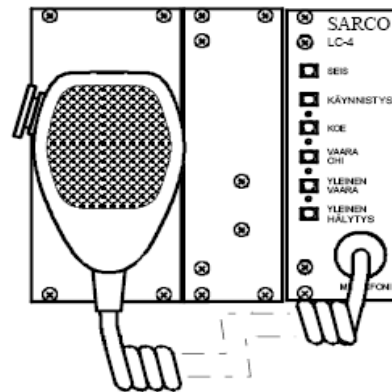
In accordance with current requirements, the control functions of the unit are activated remotely. System includes telephone line and radio adapter as standard features. The codes and spoken information can optionally be forwarded to other alarm devices

5.2 Remote use
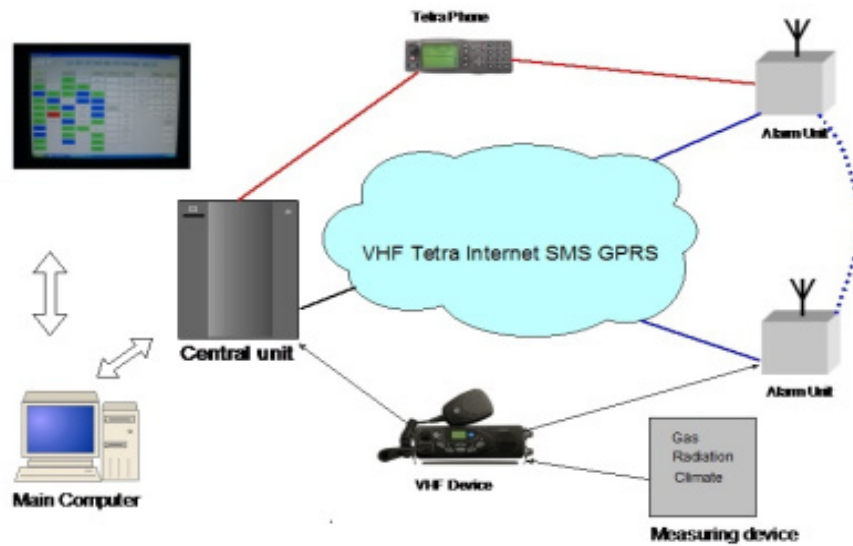
Sarco Oy high-capacity alarm devices can be controlled and used via radio. The system supports analogy (UHF, VHF), digital (TETRA) and Internet connections. The common telephone network or a separate fixed wire connection can be used as secondary connection.

5.3 Peripheral devices

The systems central processing unit can be connected to various external measurement units for gas, smoke, radiation etc.

5.4 Control via Internet

Sarco Oy high-capacity alarm devices can also be controlled and used via a common Internet connection by using protected VPN connections.

5.5 System operation and devices

The system can be controlled from one or several locations. These locations can be specified flexibly according to the customer's needs. Audio reports can be transmitted from emergency centres, regional control centres or, if necessary, from different mobile units.

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6. Complete solutions for emergency centres

The control software for the VSS alarm devices has been designed for the WinXP operating system. The user-friendly software designed for the needs of the emergency centres is available in several languages.

The software visually displays the status of the regional alarm devices on a single view. The status of the devices is indicated by colour codes. The alarms can easily be passed on to a maintenance person e.g. via TETRA SMS text messages.

# Multi Control Touch Panel

6.1 Map-based control

The control software for the VSS alarm devices developed by Sarco and its partners also includes the possibility of map-based control. In the map-based control mode the customer sees all the targets in the entire area directly on the screen. The targets can be selected either by clicking the mouse or directly from the touch panel.

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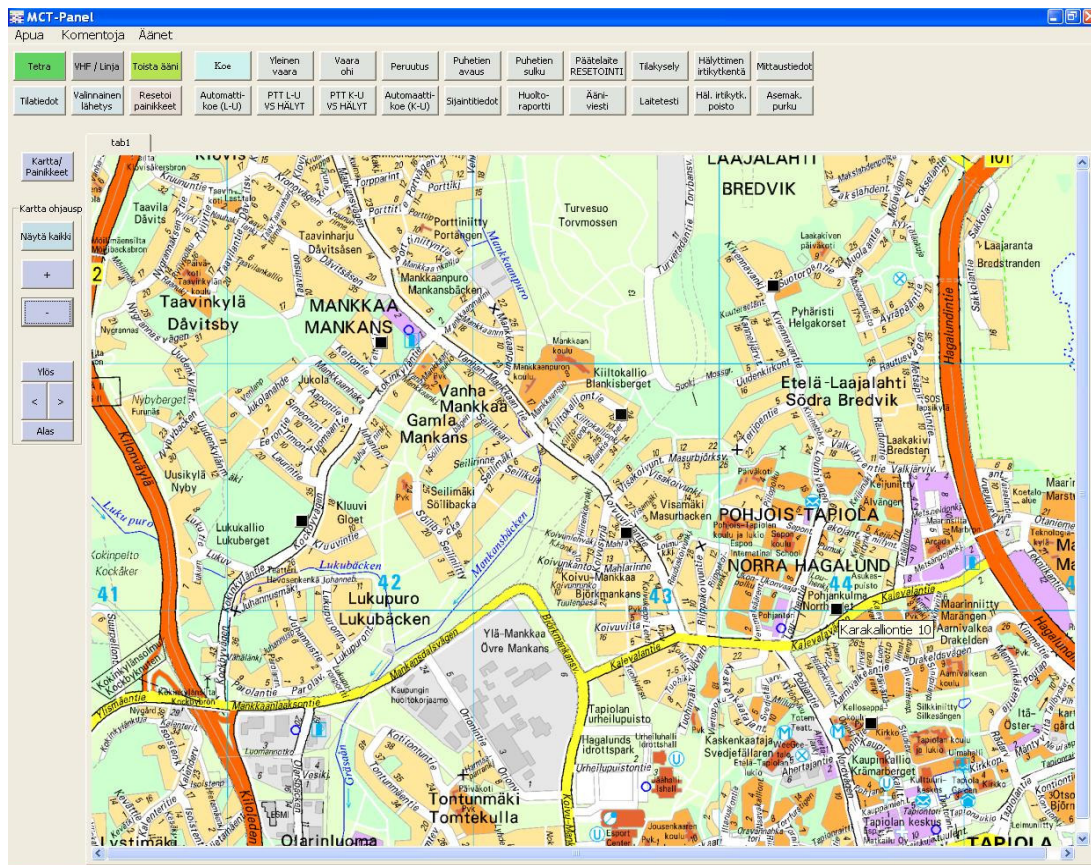
MCT (Multi Control Touch Panel)

6.2 MCT Panel functions

- Status transmission
- Sending text messages
- PTT control
- VHF/UHF and Line control
- IP network control
- Log information
- Recording and repeating audio files
- The commands can be strung together
- Other functions:
- Optional transmission
- Status reports (20 most recent events)
- Automatic transmissions, e.g. an hourly status request
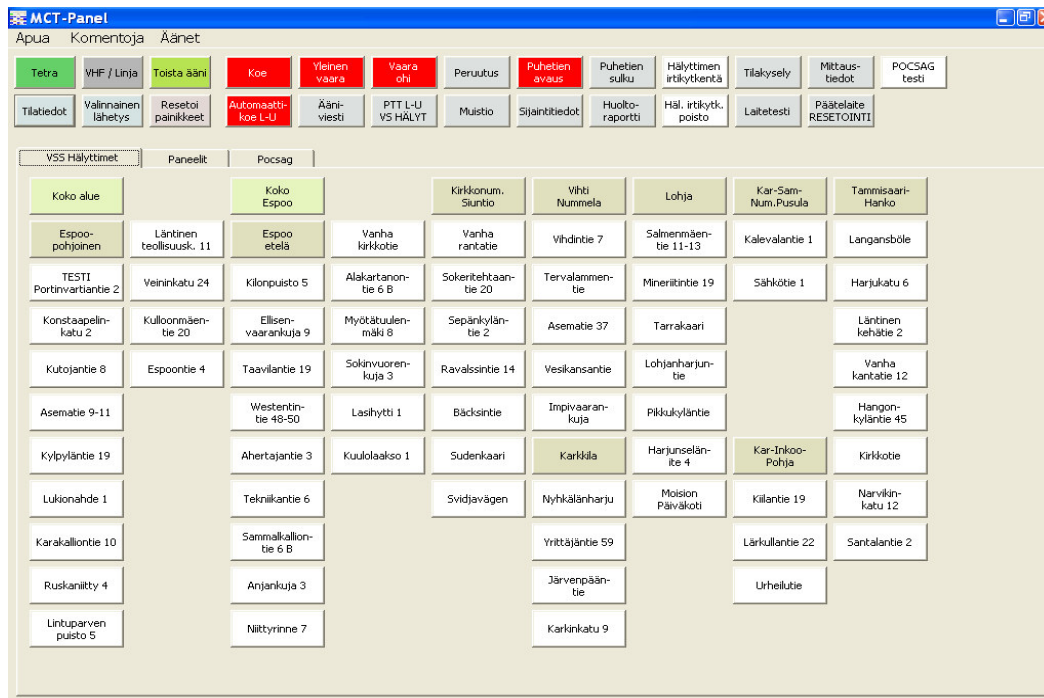
All log information is recorded in the system and can easily be retrieved later from the database by the personnel. New communication interfaces can be added later on if the customer wishes. Currently available are TETRA (status/text message) , VHF/UHF (ccir), IP, I/O.

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7. Device control and system operation assurance

7.1 Control

The system is able to control many different functions simultaneously. Examples of such applications are e.g. analogy and digital alarm devices, fire station alarms and announcements, different public and industrial facility alarms and announcements and, if necessary, remote control of regional gates or emergency lights.
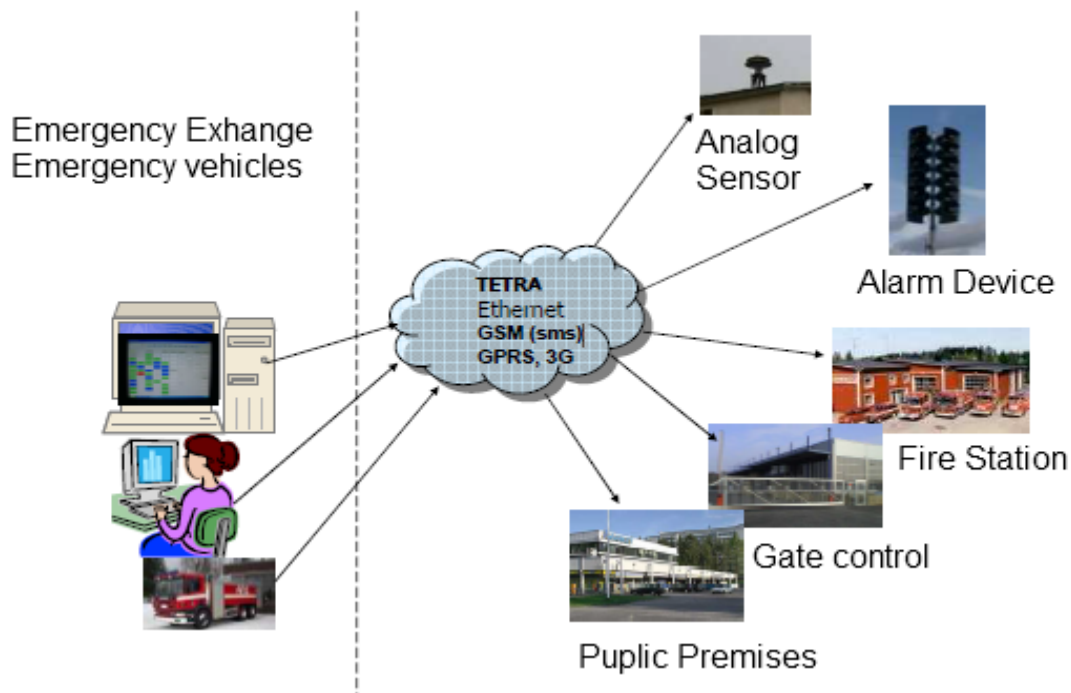

Picture:
- Emergency centres
- Regional rescue departments
- Leading vehicles
- Analogy alarm device
- Electronic alarm device
- Fire station alarms and announcements
- Gate control
- Public facility announcements

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7.2 Assuring functionality

The functionality of the system is assured by sending active status requests to the devices. Sarco Oy alarm system for civil defence is also monitored by means of status requests.
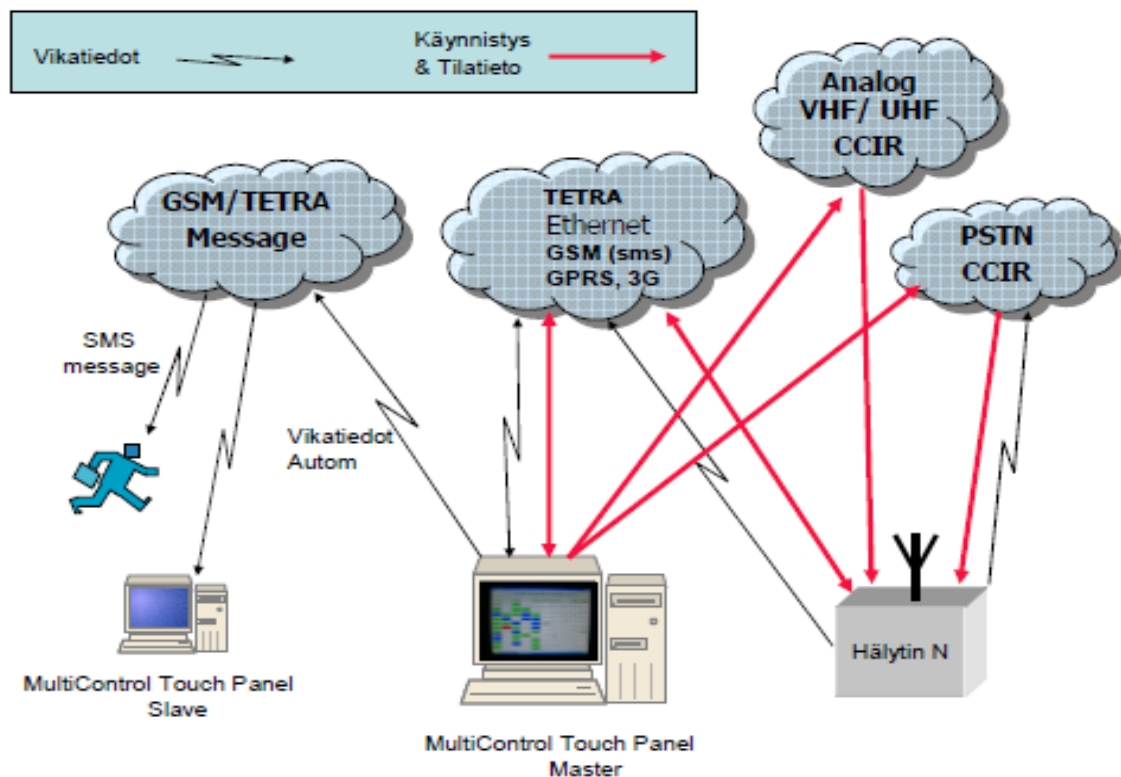
Automatic fault reports
Alarm device N

The system interface consists of a PC-based software interface and a PIC card. These make it possible to use different media connections, such as TETRA, Ethernet, GSM, GPRS, 3G, Analog PSTN and Fixed BBN. All of the above can be used by the customer according to the situation in order to retrieve an order or some information from the device or system.

7.3 Alarms

An alarm can be issued via the TETRA network, using Status/Text messages, or via analogy networks using the CCIR signal system.

If preferred, the alarms can also optionally be activated using the TCP/IP protocol (Ethernet, GPRS and 3G) and GSM text messages.

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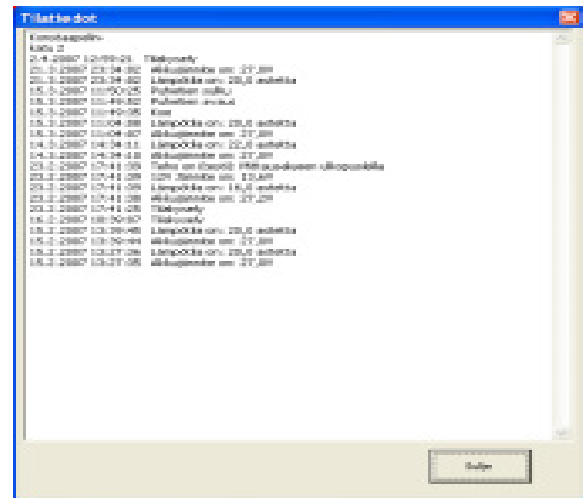
7.4 Status requests

Through the MCT Panel you are able to issue status requests directly to the devices, using any of the networks mentioned above. These requests include:

Fault registration data
- Door protection against burglary
- Checking whether the control system is active

Device testing
- Voltages
- Temperatures

7.5 Status reports
The PIC adapter transmits the control data as return data to the MCT Panel once the device has been controlled.

7.6 Fault reports
The PIC adapter monitoring the equipment immediately transmits a fault report to the MCT Panel when a status request has been sent to the device or it has encountered an error.

Appendix

1.   Technical description

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8. Technical specifications

Dimensions (whole system)	600x600x600 mm
Weight	88 kg, (without batteries 50kg)
Encapsulation class	IP 54
Max. supply power	3,5 kW
Standby power	30 W (including Tetra radio)
Standby time (on batteries)	72 hours
Continuing speech durability	Aproximately 30 minutes.

Amplifier AHV-1000

Output power rms	2000 W / 8 ohm, 4000 W (pp) / 8 ohm
Frequency response	300-4000 Hz, Siren frequency 300-600 Hz
Supply voltage	72 V (battery backup system)
Supply current	(max.) 30 A
Efficiency	90 %

Control unit AHV-2008

Line connection	0 dBm, compression -10db / -3dB
Microphone connection	5mV/600 symmetric, compr -10db / -3dB
Warning and alarm signals	According to standard

Local or remote control:

The control unit includes Tetra adapter, which is compatible with for example the following handsets:

Nokia, Sepura and Motorola

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