

# White Paper

## PEARS: Public Emergency Alarm and Response System



**Enabling Building Fire Safety and Security Systems & Public Alert**



**Table of contents**

Executive Summary ..... 3

The Challenge of alerting the public in crisis situations..... 5

    Technology from the last century ..... 5

    The demographic challenge..... 5

    The growing Urbanization ..... 5

    Mobil Population ..... 5

Public Alert using new communication technology and social media..... 6

Life Safety and Security Systems – A perfect complementary channel ..... 7

PEARS – Public Emergency Alarm and Response System..... 7

Next steps ..... 8

Conclusions ..... 9

## Executive Summary

Governments across Europe since years are facing an additional challenge when it comes to master crisis situation caused by natural catastrophes, manmade disasters or criminal and terroristic attacks - The question on how to alert the population in the affected area quickly, reliably and effectively!

In today's environment, characterized by growing urbanization, a mobile and multicultural population and the dismantling of the old WW2-sirens, in combination with the growing use of social networks, new methods of alarming the potentially endangered population are necessary.

The European Union, but also many Member States, have started with tests and trials to explore new methods on how to reach the highest percentage of people the shortest possible time. SMS or cell broadcast messages to mobile phones are the more obvious methods which comes to our minds. This is tested in several countries. What seem to be an easy to implement and secure method to reach a large portion of the population, has big issues if we consider that only 30% of the people reached seem to read the message immediately.

Unfortunately, in Europe, these tests are pursued in a not very coordinated way country by country. The public alert systems of the various countries are not compatible and in case a message has to be sent cross border ad-hoc coordination is necessary!

Euralarm, as the leading European trade association for electronic fire safety and security systems with its long experience in alarm management, proposes the following actions to increase the effectiveness of public alert scenarios:

- Integrate as many channels as possible in public alert concepts. Mobile phones are only one possibility. Use also e.g. GPS based navigation systems, TV channels, Internet, etc..
- Integrate existing fire safety and security systems as an additional channel. Since already ten thousands of systems are installed the cost to build-up a channel is minimal.
- Domestic smoke detectors and security systems connected to Monitoring Stations are existing, 24h active channels to millions of private homes.
- Use standardization to create public alert systems which are compatible cross border and can alert the population on both sides of the border in case of an event.

Therefore Euralarm urges the European Union and all national stakeholders involved in developing public alert systems, to cooperate and share experiences, in order to save costs in developing, deploying and maintaining the systems.

Since unfortunately catastrophes do not stop at the border between two member states, standardization is the key to create a truly European Public Alert System and Euralarm is calling upon CEN / CENELC and the European Union to support the industry in developing appropriate standards.

Changes revision table			
Date	Rev #	Paragraph / Page	Change
€1/€1	F0		First publication

## DISCLAIMER

This document is intended solely for guidance of Euralarm members, and, where applicable, their members, on the state of affairs concerning its subject. Whilst every effort has been made to ensure its accuracy, readers should not rely upon its completeness or correctness, nor rely on it as legal interpretation. Euralarm will not be liable for the provision of any incorrect or incomplete information.

*Note: The English version of this document, 14-08-01-P0-23-EN, is the approved Euralarm reference document.*

## Copyright Euralarm

© 2014, Zug, Switzerland

Euralarm • Gubelstrasse 22 • CH-6301 Zug • Switzerland

T: +49 (0)89 8137 939655

E: [secretariat@euralarm.org](mailto:secretariat@euralarm.org)

W: [www.euralarm.org](http://www.euralarm.org)

## The Challenge of alerting the public in crisis situations

### Technology from the last century

Alerting the population in case of danger, being it a natural disaster, a manmade catastrophe or a criminal act like a terroristic attack or one of the regrettably well-known shootings in public schools or other places, today is a special challenge for the authorities.

In the past, alarming was performed by sirens mounted on top of public buildings. However, these are costly to install and even more expensive to maintain. With the limited range on “information content”, a siren is able to transmit in maximum 3 to 4 different tones or patterns and the “return on investment” is not one of the best.

The maintenance costs were one of the main reasons why in many regions in Europe the sirens have been dismantled. With the effect being that even this limited method of alarming the population has been lost.

Another classical channel to transmit alert messages was and still is the radio. Via radio the authorities have the possibility to transmit clear voice messages with a specific content adapted to the situation. The message can be repeated and adapted as the situation evolves. However, classical FM and also today’s digital radio has the disadvantage that in many cases it addresses a not specific enough, broad part of the population. Even if the message contains specific indications for the affected locations, it may still be misunderstood.

It is also a fact that many people nowadays are listening to “internet radio” where the station can be anywhere in the world, without a connection to the region of the alert. They will not be reached by the alert message. The same counts for people at work or in public building which have no access to radio stations.

### The demographic challenge

In addition to the challenges resulting from the “technology of the last century”, the authorities responsible for the safety of the population are confronted with new demographic challenges, such as the growing number of inhabitants and a constant increase in urbanization.

### The growing urbanization

It is a fact that urban areas are growing at a faster pace than the increase of the global population. Studies claim that the population living in urban areas will increase from 20% in 2010 to 70% of the total population by 2050. We will assist to the development of numerous Megacities in particular in developing countries. Classical warning with sirens will become virtually impossible or only at a prohibitive cost.

However, even if we imagine a sufficient number of sirens installed, despite the extremely high level of noise present in such Megacities, what will the population do if they hear the sirens? In which direction should they go? Will they understand whether to look for shelter or leave the city as quickly as possible? What about traffic jams, which exist even under normal circumstances? How shall the evacuation of the population be achieved in a case of emergency?

Such a scenario shows that traditional public alert systems based on sirens are insufficient in today’s urban areas with a dramatically increased mobile population.

### Mobil Population

Today people seldom live in the same neighbourhood or city where they grew up. Persons living for more than 5 or 10 years in the same place are already considered a minority. People are travelling multiple times per year to other cities or countries in which an unfamiliar or even a totally unknown language is spoken; maybe even with a different alphabet. How can alert messages be understood by non-residents?





- As a consequence of the higher mobility of the population, people more often find themselves in buildings in which they are not familiar with the emergency procedures.

Besides the changes driven by change in habits of the population, technical aspects also have to be considered:

- Resilience of GSM based systems where the primary power is cut for a longer period of time will present a problem due to their relative short autonomy on back-up power.
- A somewhat longer autonomy can be expected from the personal devices, i.e. mobile phones or tablets. However, pictures of crowds gathering around the few power outlets still in operation to charge their phones are well known.
- Improvement of the resilience of these components of the public alert chain is possible, but at a high cost for the investment of back-up power supply equipment.
- More and more private homes even in Europe are not anymore connected via “land telephone lines”. The occupants rely upon GSM or other connections.



## Life Safety and Security Systems – A perfect complementary channel

Electronic Life Safety and Security Systems have been installed in buildings since more than 50 years. Their purpose is to detect an oncoming danger in a building or a building complex and to warn people in time. These systems have a proven undisputed track record in saving lives by alarming and guiding people to safety in various danger situations.

Tens of millions of systems nowadays are installed in commercial and private buildings. Many of them are permanently connected to public and/or private alarm receiving stations. All of them are equipped with alarm devices such as sirens, horns, strobes and speakers. These could be used not only for events detected by the system itself, but also to alert in case of a public danger affecting the premises.

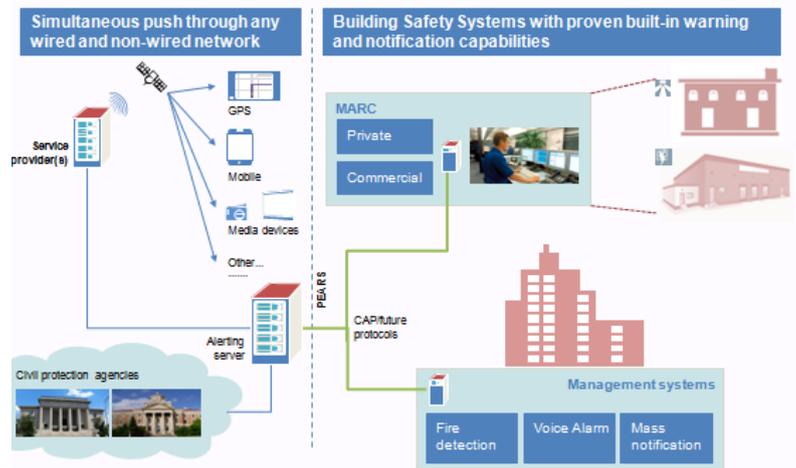
## PEARS – Public Emergency Alarm and Response System

Based on this perception the European electronic Safety and Security Industry represented by Euralarm launched a project called PEARs in 2011.

Talking to politicians, civil protection authorities and people involved in research projects to design modern, pan-European public alert systems, the industry realized that it could make a valuable contribution.

The discussion resulted in a cooperation with Alert4All, which allowed both sides to explore the possibilities in which Life Safety and Security Systems could be useful as an additional channel to alert the broad population in case of a catastrophe.

Due to the intensive discussions and preparation, the feasibility of the concept was demonstrated in the Alert4All project demonstration of October 15, 2013 at the German Aerospace Center DLR in Oberpfaffenhofen, Bavaria.



The demonstration proved that the following scenarios, although they have to be refined and reviewed more detailed, are realistic:

- Fire detection & alarm systems as well as security systems are in many cases already connected to alarm receiving and dispatch centres of first responders. This connection could be used to transmit public alert messages to the system

- Other fire detection and security systems which are not connected to a monitoring station can be equipped with a “GSM-” or other Wi-Fi communication module. The module would receive the public alert messages and convert them to a protocol which can be processed by the system. In this way these systems can also be included in the distribution of public alert messages.
- Today many private homes are equipped with security systems and many of those are connected to Alarm Receiving and Monitoring Centres (MARC’s). In UK alone more than 1.3 Million systems are connected. The connections between the private alarm system and MARC are bi-directional and could easily be used to transmit public alert messages. Many bi-directional communications can transmit voice messages from the monitoring centre to the private home and back. A public alert message could be transmitted in clear voice to the recipients and the receivers can acknowledge receipt.
- Domestic Smoke Detectors, which in several European jurisdictions are mandatory for private homes are another possible channel for public alert messages. (See studies carried out in Germany <http://www.zvei.org/Verband/Fachverbaende/Sicherheit/Seiten/default.aspx>)

All these channels have the advantage that they are:

- Already available in tens of thousands of commercial buildings and millions of private homes.
- Resilient against power failures, since all systems are designed according to European standards which require back-up battery operation for 24 hours or more.
- Private and public monitoring and alarm receiving centers (MARC) employ trained personnel which are used to act and react in crisis situations.
- Studies have been carried out in Germany to create a specific tone to be emitted by the traditional alarm devices of fire alarm systems in case of a public alert.
- With the growing distribution of Voice Alarm Systems, which in particular in buildings with numerous public accesses are used to transmit “clear voice messages” in case of an emergency, the effectiveness of the transmission of public alert messages inside buildings increases dramatically. I.e. the text message send by the public alert systems to a smart phone can be transferred to a voice message immediately.
- New generations of emergency communication systems also known as Mass Notification Systems (see NFPA 72) allow not only the vocal notification of people in a building or a campus but also the real-time display of the message on PC screens or on any other display (i.e. video monitor in the entrance, menu display in the cafeteria) connected to the alert system.
- Many of the commercial, public or industrial building sites have an onsite emergency organization trained on the specific situation on site which can assist the public first responders on the site specific actions.



## Next steps

The electronic fire safety and security industry is ready to engage in discussions with public authorities on how Safety & Security Systems can be integrated as an additional channel in public alert scenarios.

The electronic safety and security industry is confident that in a close cooperation with the national authorities responsible and the support of the European Commission a solution can be found. Technology is available at reasonable costs; however without a legislative support the roll-out would be very slow if not impossible.

Euralarm, as the representative of the European electronic Life safety and Security industry, will continue to work in close cooperation with all relevant stakeholders to drive the cause and support public authorities in the development of a European Public Alert System.

On European level, Mandate 487 has made proposals for standardization in crisis management and civil protection, which are now taken up by CEN TC 391. In this context, its WG3 has the potential to drive public alert and in cooperation with CEN TC 72, mass notification standards.

The challenge will be how to realize public alert systems which are able to send alert signal and enable communication across national borders. Emergency situations do not stop at the border!

To enable communication between different systems, standards are necessary. In this respect the fire safety and security industry is willing to engage with CEN TC 391 to support the realization of standards guidelines and KPI's for Crisis Management Systems.

Only with an agreement between first responders, civil protection, authorities or organizations in charge of public alert systems and the industry providing public alert and command and control stations as well as the telecom industry the goal will be achieved.

Another line of action for the industry is to prepare itself to be able to receive and handle alert messages from outside of the building respectively the system. For this, a new working item shall be introduced in CENELEC TC79 WG5.

The most important step however is the one to define a “communication protocol” for the interface between different public alert systems and the individual channels to alarm the public. The fire safety and security industry supports the development of such a standard protocol in ETSI- EMTEL. This European standard protocol will allow a rapid and cost effective expansion of public alert systems to reach the majority of the affected population over multiple channels.

## Conclusions

The PEARS project has demonstrated that fire and security systems not only can, but also should be integrated into public alert systems. The extensive installed base could be easily upgraded to receive alert signals which could be utilized to activate audible and/or visual warnings.

However, most of the installed base of systems in commercial and industrial buildings is limited in signalling a “public alert” with a different tone of their already installed alarming devices, like sirens and horns.

A far better way to reach people inside buildings is to convert the text message emitted by a “public alert system” in a clear voice message transmitted via the speakers of a Voice Evacuation System according CEN/TS 54-32. This allows addressing people inside a building in the same way as in the case that the danger situation develops inside the building.

Unfortunately, **Voice Alarm systems** are not very popular in Europe, except maybe for the UK. Therefore today the chance is still limited to benefit of this opportunity. However, since the technology exists, it should be relatively easy for the relevant authorities to promote such systems. A broader use of Voice Alarm system would not only be beneficial in case of a “public alert” but, in the increasing complexity of building, also in case of fire or another dangerous situation for the occupants of the building. It is proven that messages in clear voice are very important for a coordinated action in order to guide the occupants to safety.

If voice alarm systems are a first step to reach a higher level of safety, even better options are **Mass Notification Systems**, already used in other zones of the world, but far less in Europe.

Mass Notification Systems today are the state-of-the-art to alert larger number of people in complex buildings and campuses. With the ability to use not only voice but multiple channels to communicate alert messages e.g. on the PC screen at the workplace, the internal telephone system, internal information screens, etc., Mass Notification Systems are almost ideal to be integrated in public alert scenarios.

Unfortunately, since in Europe application standards and a common understanding of the content for Mass Notification Systems are missing, these types of systems are not very popular in Europe. However, this should be a special motivation for all stakeholders to create an European standard with the basic conditions to increase the safety and security of the population.

Encouraging steps however, have already been made with **domestic smoke detectors**. In Germany, studies have been carried out on how domestic smoke detectors could be integrated in the public alert chain. If such a concept could be rolled out across Europe, it would be an important step for the distribution of public alert signals in a capillary way. The industry is ready to discuss with all the stakeholders how to develop this channel.

A possibility which has not yet been fully explored is the option to integrate **Alarm Receiving and Monitoring Stations** in the public alert chain. Nowadays millions of **domestic security systems** are connected to monitoring stations. Modern connections allow a bi-directional communication between the security system and the alarm receiving centre, which in case of a public alert could be used to send the message to the private homes. Since many connections allow a **two-way voice communication** between monitoring stations and systems, this could be a valuable possibility to transmit public alert messages directly to your home.

All in all, the life safety and security technology offers several resilient options to transport public alert messages to the population. The industry is ready to engage with all the other stakeholders on how to best utilize these opportunities.

**Document: 14-08-01-P0-23-EN**

**Publication date: 01-08-2014**

**eurallarm**

Euralarm  
Gubelstrasse 22  
CH-6301 Zug

T: +49 (0)89 8137 939655  
E: [secretariat@euralarm.org](mailto:secretariat@euralarm.org)  
W: [www.euralarm.org](http://www.euralarm.org)