

ELPAM

ELECTRONICS Ltd.



EL 3000

Communication & Control Methods

- ❖ **EL3000 type electronic sirens are primarily designed for complex warning systems requiring sophisticated control and efficient siren status monitoring.**
- ❖ **For this purpose these sirens can be equipped with both Control and Interface modules manufactured by ELPAM and connected directly to electronic sirens via I/O and RS232/RS485 ports and general interfaces mainly designed for use by partner companies for systems integration.**
- ❖ **ELPAM developed has developed the ElapmCMC/IP software for complex siren control and monitoring. This software provides complex functionality required by the most extensive warning systems. Moreover, its add-on modules provide functionalities for supporting other activities typically carried out at dispatching centers.**

Control methods

- Local control
- Two-way Radio control
- RDS based control
- GPRS/EDGE based control
- TCP/IP net based control
- POCSAG based control
- PSTN based control
- Satellite-based control
- Other control methods

Interface/Control Module



Local control

ELPAM developed a local control module (Command Unit) for EL3000 siren local control. It enables activation of all programmable alarms, carrying out complete siren tests and the display of test results; for radio control applications.

It is manufactured in three different designs:

Internal Command Unit

External Command Unit – Wall design

External Command Unit – Table design

Control via a designated radio network

The control via a designated radio network is the **preferred control method** in terms of simple and extensive warning systems. Experience from all over the world shows that it is almost certain that power failures and fixed phone line communication failures occur in emergency situations.

For that reason modern electronic sirens are designed **as separate units capable of announcing warnings during a power or public infrastructure failure.**

From the control perspective this requirement is perfectly met via a designated radio network established on separate infrastructure.

ELPAM has developed a complete infrastructure for remote radio control and siren monitoring. This infrastructure enables establishing both simple radio networks consisting of several sirens and extensive warning networks consisting of **thousands of sirens**. Even in the case of the most extensive systems it is capable of **activating sirens within a few seconds and is capable of subsequent status identification within dozens of seconds.**

RDS based control

RDS (Radio Data System) broadcasting is currently a standard part of any radio broadcasting in the VHF band. It is commonly used for displaying station names and for transport signalling. A part of this band is also dedicated to warning signal broadcasting as a part of RDS signal coding. Since the broadcasting area coverage for this band is very extensive it can be effectively used for very prompt siren activation practically all over the territory of a country. At the same time this method enables carrying out direct radio broadcasting via sirens. Current information transmission using radio broadcasting and sirens represents a highly effective method of informing the citizens about threatened areas. Yet, this method of siren control only enables single-directional communication, i.e. to the sirens alone. It is very fast and does not require any investment related to infrastructure establishment but on the other hand it is not capable of acquiring siren status information.

For the purposes of this communication channel, ELPAM has developed infrastructure consisting of:

- An RDS module with ElapmCMC/IP software;
- Encryption device and 9A group data modulator for RDS signal coding devices;
- RDS siren receiver module

GPRS/EDGE based control

It is also possible to use mobile operators' networks to control electronic sirens.

These use GPS-GPRS/EDGE/UMTS/HSDPA/HSUPA type data transfers, as well as text messages in rare cases.

The advantage of this control method is that it is not required **to establish a separate infrastructure**; existing ones can be used instead.

Nevertheless, this control method **is usually introduced for purposes other than main control**, since message transmission times can vary depending on the network's load. In emergency situations these networks are loaded to a maximum and siren control is not necessarily reliable. Moreover, electric backup of these networks does not usually meet warning system requirements.

TCP/IP net based control

Control using TCP/IP networks represents another option for EL3000 electronic siren control.

Once an TCP/IP module is added the siren becomes a network IP device and can be controlled via such network.

The advantage of this solution is the ability of using commonly-available and established computer network equipment for establishing warning system infrastructure or the ability of using an existing network.

Even WiFi wireless technology can be used, yet the disadvantage in the case of new WiFi based infrastructure is the small coverage of these devices and the number of access points that are required if an extensive area of coverage is required. Another disadvantage is that free frequencies dedicated to this purpose are used and congestion can occur, especially in cities.

When wiring it used, disadvantages generally applicable to the line control apply. This is due to the reliability issue related to emergency situations, caused by both very probable electric failure (Required long-term backup of an extensive infrastructure is very demanding and expensive) and mechanical damage or line flooding

POCSAG based control

The POCSAG standard was developed for the radio transmission of data to paging receivers. Radio broadcasters and repeaters are used for broadcasting. The advantage of this method of siren activation is its capability to use standard infrastructure generated by several producers.

Signal broadcasting is also relatively fast. Yet, just like in the case of RDS, data transfer is single-directional and thus it is not possible to get siren status feedback.

That is the reason why this channel is mostly used in combination with another control channel.

PSTN based control

Here are many different systems working in the speech band or supersonic band to control equipment via fixed phone lines. Their application depends on local conditions and preferences.

The foremost advantage of this control method is its ability to use existing infrastructure.

These systems are basically always bi-directional and thus they enable siren status to be identified.

The disadvantage of this control method application is, as arising from experience from all over the world, the high probability that in an emergency situation a standard connection via fixed phone lines will be interrupted, no matter whether it is the result of a power failure, mechanical damage or flooding.

This is why this control method is usually combined with some other type of radio control.

Satellite based control

For controlling sirens over large areas such as on groups of islands or sparsely populated areas without any built-in technical infrastructure it is possible to use services of the companies providing satellite connections.

This connection can be single-directional, although bi-directional data transfer is commonly used nowadays.

For the siren connection the standard modems offered by these service providers are applied.

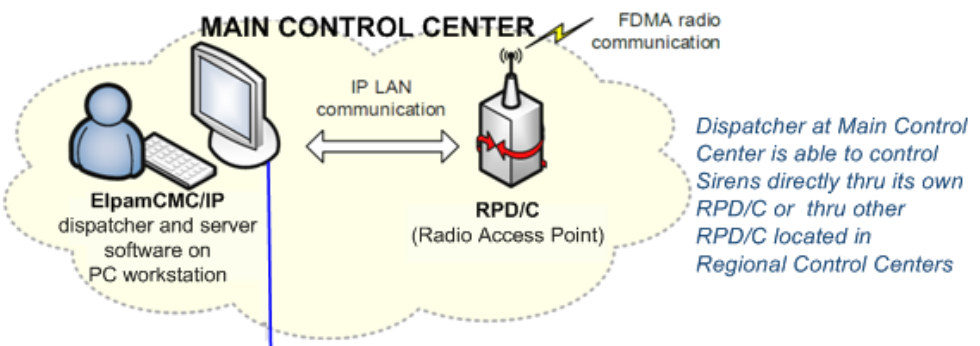
Depending on the equipment used the connection is carried out either via digital inputs/outputs, the function of which are programmed as required, or via an RS232 interface.

Public Warning System for industrial plants, military bases, earthquake and tsunami warning system

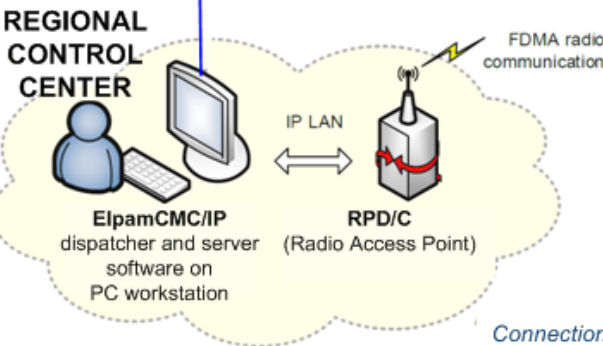
Design diagram based on ElpamCMC/IP system with IP network and FDMA digital radio transmission with EL3000 electronic sirens.

ElpamCMC/IP- Elpam Crisis Management Centers

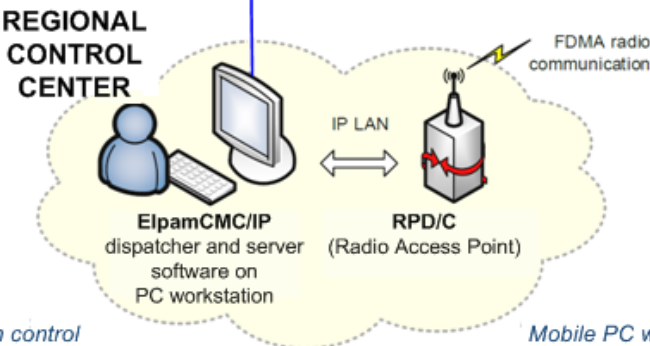
IP network provides communication and information exchange between control centers



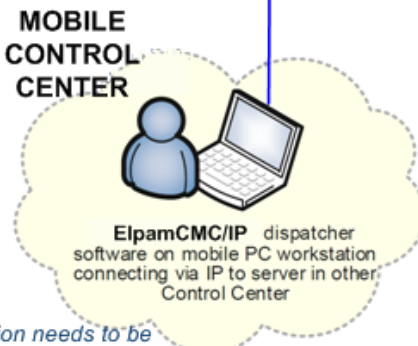
IP LAN network / Internet



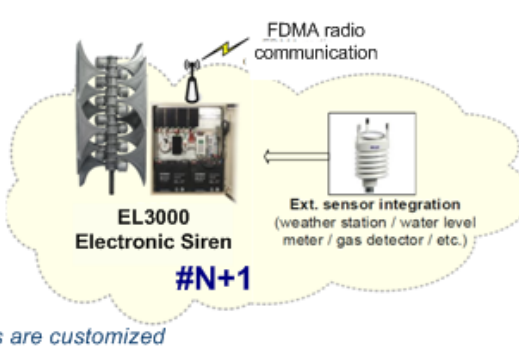
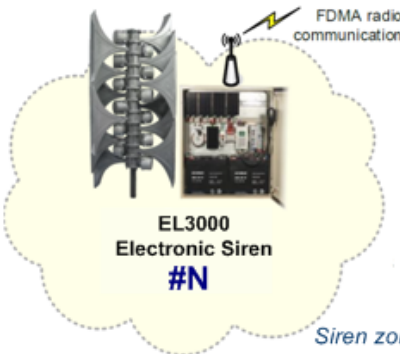
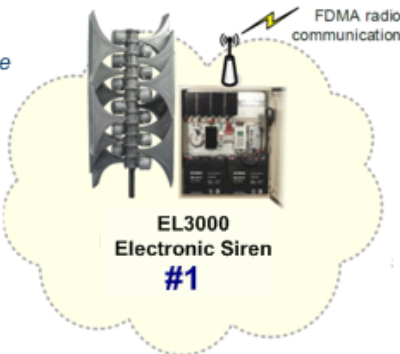
Connection between control centers and sirens is provided via fast digital radio communication.



Mobile PC workstation needs to be connected to other Control Center by IP / Internet / 3G



- Dispatchers are able to:
- select one / group / all sirens on a map
 - launch alarm sound
 - launch pre-recorded voice announcements
 - broadcast live voice messages thru microphone
 - receive current state of sirens automatically
 - test sirens state manually
 - receive alerts from burglar alarm in sirens
 - receive data from external sensors
 - print reports from system
- Access to dispatcher software is password protected. Every user permissions are customizable. IP communication in the system is encrypted and each event is logged for further analysis

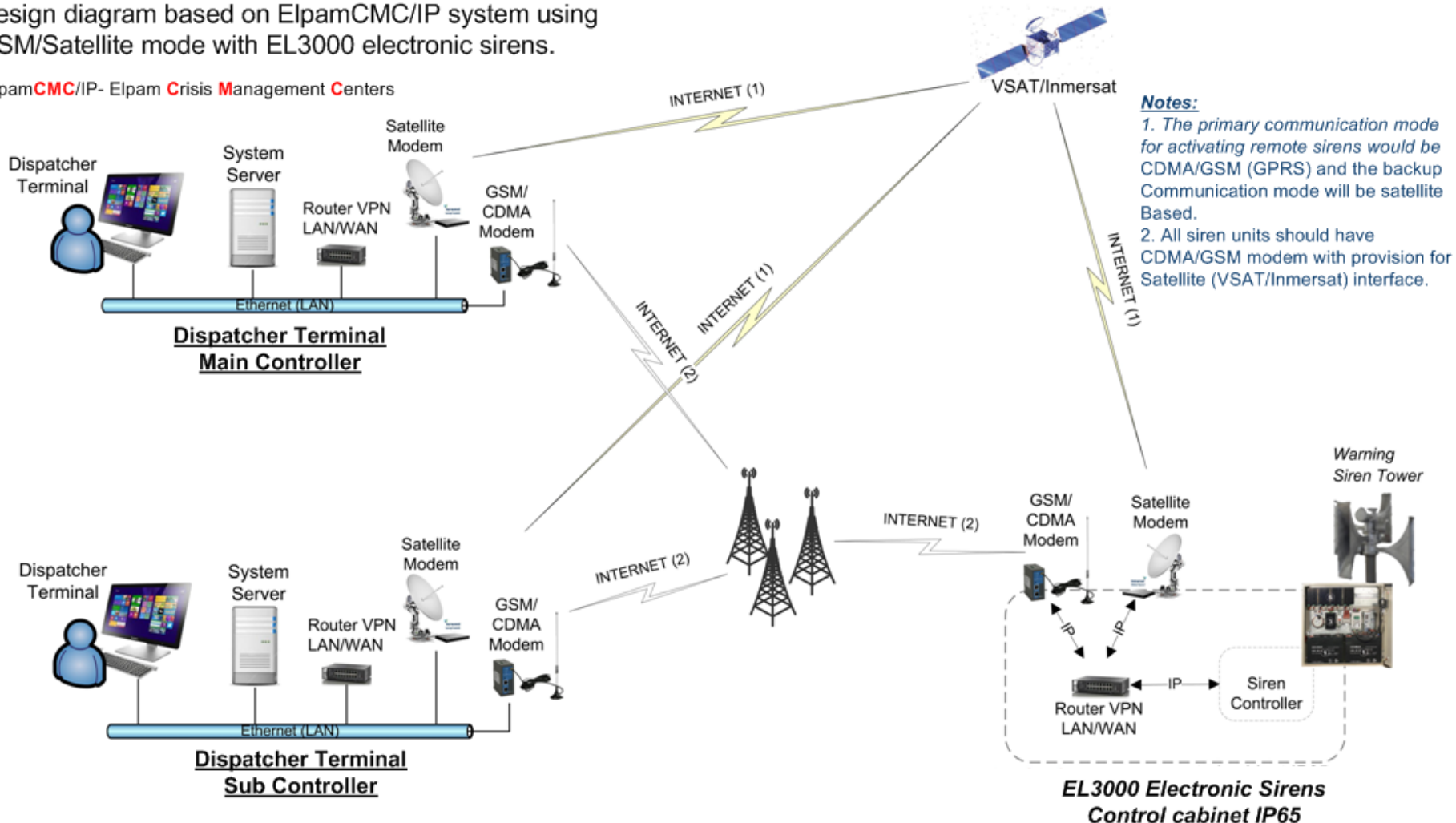


Siren zones are customized individually in each ElpamCMC/IP software

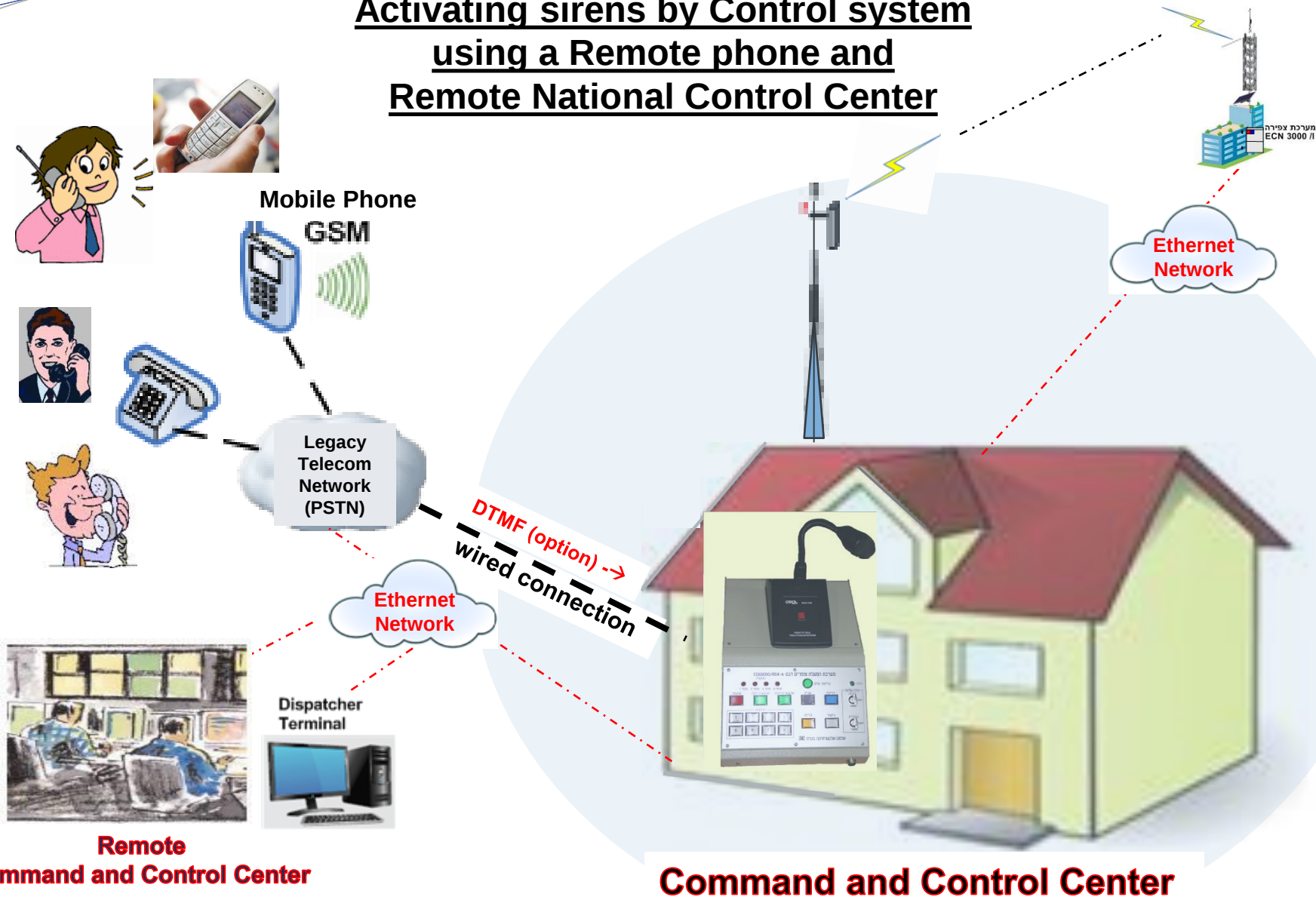
Public Warning System for industrial plants, military bases, earthquake and tsunami warning system

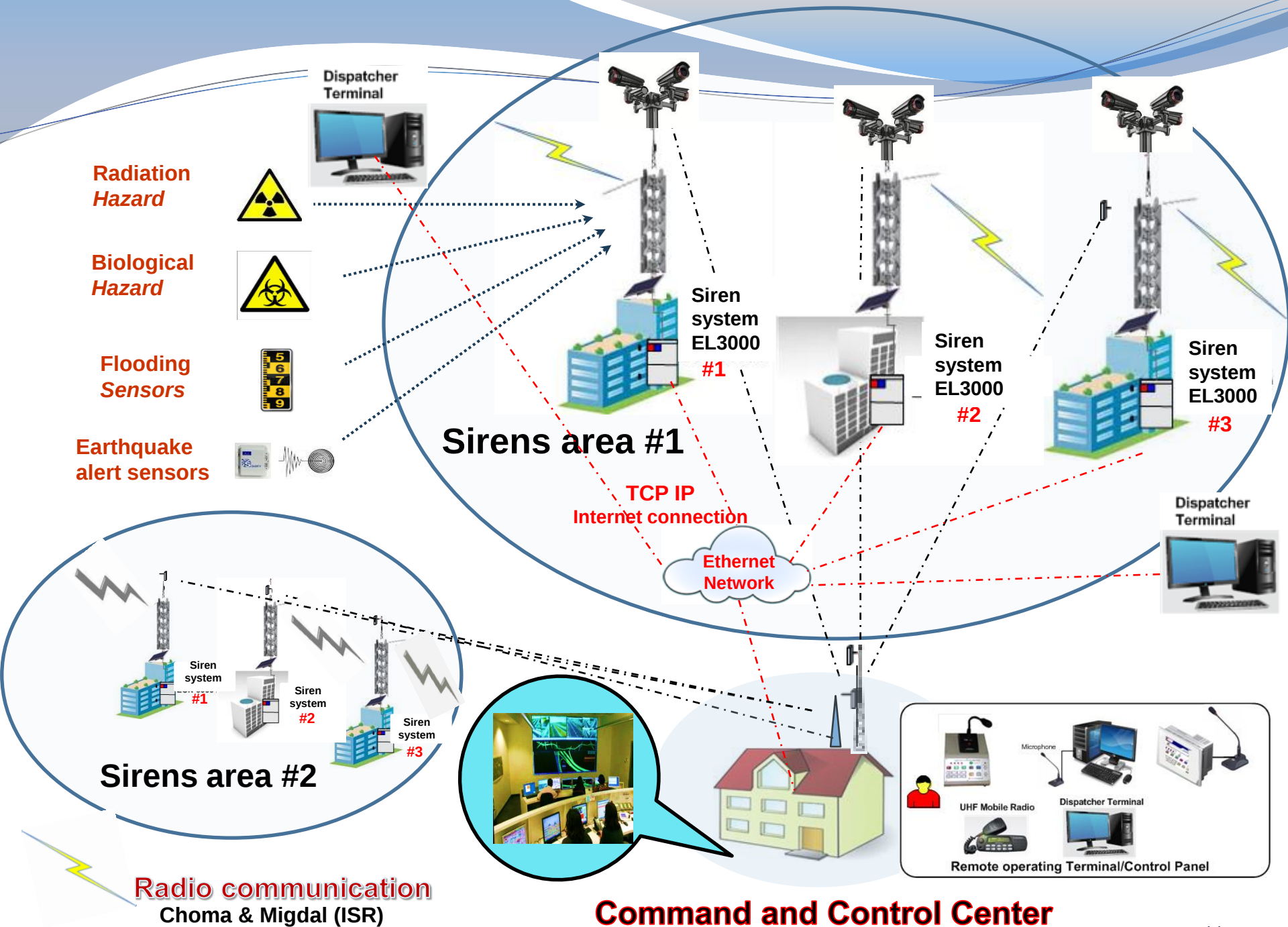
Design diagram based on ElpamCMC/IP system using GSM/Satellite mode with EL3000 electronic sirens.

Elpam**CMC**/IP- Elpam **C**risis **M**anagement **C**enters



Activating sirens by Control system using a Remote phone and Remote National Control Center





*Thank you for your
attention*

ELPAM
ELECTRONICS Ltd.