FIRE MAGAZINE

Edition 2024 – no. 1

CASE STUDY

Inim technology protecting the
ZIN TOWER in Bruxelles

inim®
Evolving Protection

Edition 2024 – no. 1

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FIRE MAGAZINE

A tool for all professionals in the buildign protection sector.

National and international case studies, trade fairs and events from around the world, new products and technologies, regulatory updates, strategic insights and focus to excel in the sector.

The objective of this tool is to share with all professionals the most recent innovations in the field of fire safety, and to go beyond the simple dissemination of advanced technologies by entering into detail with solid examples, analyzing acclaimed case studies and industry news as well as in-depth studies into the national and international market.

This publication is intended to be a point of reference for all those who see in the sector of **Building Protection** an opportunity for growth and exchange of knowledge. A valuable tool for cultivating a common passion, improving professional skills through the sharing of experiences, technical information and much more.


CASE STUDY
A futuristic project
The ZIN Tower in Brussels with Inim technology at the service of fire protection
The CPR regulation

CASE STUDY

A futuristic project

The ZIN Tower in Brussels with Inim technology at the service of fire protection

In the heart of Brussels stands an imposing building that embodies the union between modern design and advanced security. This architectural project, known as "ZIN Tower" was created with the intention of offering a modern, elegant and functional environment, incorporating the best technology for fire protection.

The **ZIN Tower** stands in one of the most prestigious locations in the city and its bold and contemporary architecture required an equally cutting-edge fire protection solution. This is where Inim came into play, a leader in the security and fire protection sector at the service of this international project.

Working in synergy with architects and engineers, Inim has provided a series of customized products and systems that ensure maximum safety. From the installation of smart smoke detectors to the control panels, every detail has been carefully planned to protect and preserve the integrity of the structure.

The ZIN Tower is now a tangible example of how technology can combine with security, offering reliable, intelligent and integrated protection.

The new ZIN Tower in Brussels – Source: https://zin.brussels

The construction was born from the dismantling of a pre-existing work consisting of two adjacent buildings. The existing towers were connected by a new 14-storey double-height volume. This innovative project combines different functions: living, working and living spaces, all in one building. The ZIN Tower will always be alive, seven days a week, thanks to the coexistence of various ways of living in the building.

The new ZIN Tower in Brussels – Source: https://zin.brussels

The need for the project and the proposed solution

The transformation of the pre-existing towers represented a unique challenge destined to change profoundlythe architectural and urban planning realm of the neighbourhood. The need to integrate living spaces, offices and accommodation facilities into a single multifunctional complex required not only innovative architectural design, but also advanced fire safety solutions.

- The complexity of the structure and the variety of its functions led to a series of critical issues that had to be faced. The enormity of the complex required a distributed intelligence fire detection and alarm system, a system where the devices of the various levels were managed by different control panels providing promptly shared information.
- A further need was to guarantee differentiated access to information and functions of the system, considering the different types of management of the various portions of the structure. The client had also defined a series of complex and differentiated evacuation procedures, requiring specific activations based on the type and origin of the signalling.

These assumptions determined the need for a complete and reliable solution for fire safety, capable of guaranteeing the protection of all the people and property inside the ZIN complex.

Inim provided a solution tailored to the specific needs of the structure, designing a highly sophisticated and integrated fire detection and alarm system.

The proposed solution involved the installation of 29 control panels and 7 repeater panels connected in a network, to form a "cluster" distributed throughout the various buildings, an architecture in which each of the nodes manages a portion of the devices thus providing a considerable benefit for cabling and where all information is shared in detail allowing prompt control from any of the consoles.

Inim faced the challenge of guaranteeing differentiated access to the information and functions of the system through a targeted and personalized design. Thanks to the advanced features of the Previdia system, it was possible to implement complex and differentiated evacuation procedures with specific activations based on the signals detected.

Technical partners of this project

SmartSD, the Inim distributor for BENELUX, provided the logistical, technical and commercial support for the success of the project.

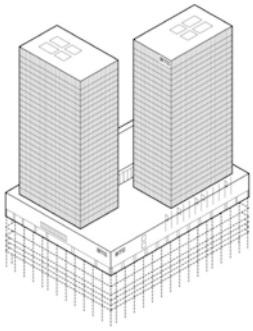
"The Belgian", a company that oversaw the design, construction and commissioning of the system, leader in the Fire & Security sector, has been operating for over 60 years in the Belgian market and beyond, it has collaborated with Inim Electronics for several years and boasts extensive list of prestigious installations.

Walter Tonoli – President of The Belgian

Son of the founder, Jose Tonoli, over the years he has been able to transform a family-run business into one of the most successful companies in the sector

The system was configured as a single cluster of Previdia control panels, managing approximately 130 loops and over 9000 detectors, 1000 call points, 2500 sounders, 1000 control modules, 40 SHEV modules and 8 protected rooms with 20 gas extinguishing systems.

The system guarantees complete coverage and timely response in the event of an emergency. Thanks to the partnership with Inim, the ZIN Tower in Brussels can now enjoy a cutting-edge fire safety system, guaranteeing the protection and security of all those who live inside or frequent it.



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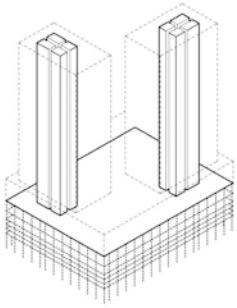

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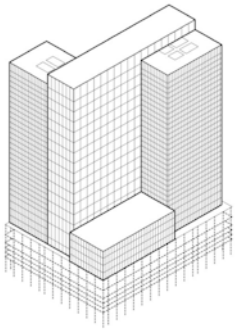

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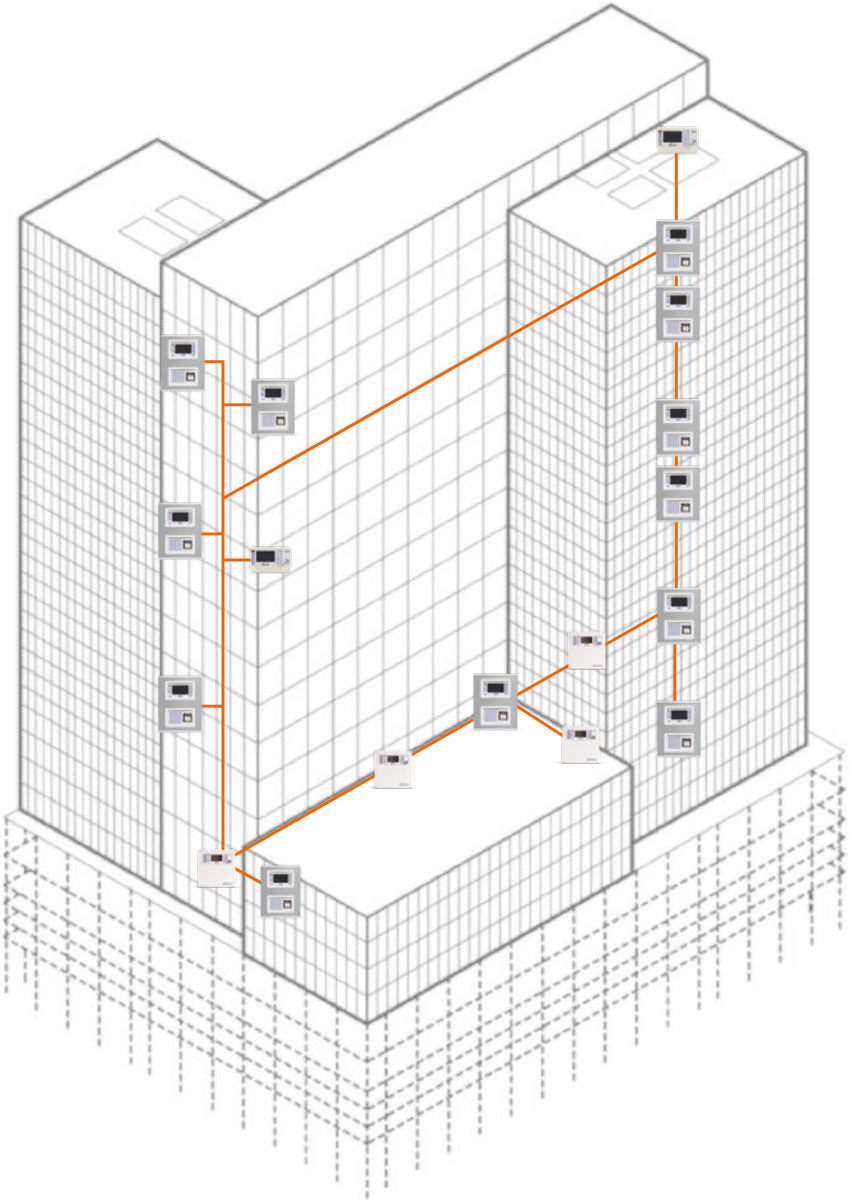
Over 13500 Inim devices to protect the structure



Previdia Max
Modular control panel for fire detection and extinction systems. It can be made up of one or more cabinets interconnected in a network. The additional modules allow you to expand the control panel and customize it based on the specific needs of the system.

Previdia Compact
The analogue addressable control panels of the Previdia Compact series combine the innovative features of the Previdia system with unique ease of use inside a compact cabinet. Programming through a clear and intuitive user interface allows you to minimize the system activation and maintenance times. Previdia Compact control panels can be networked with each other or with the more advanced Previdia Max and Previdia Ultra models.

Previdia C-REP
Remote keypad with customizable 4.3" touchscreen LCD, buttons for basic functions and status LEDs. Connects to the HORNET+ network (dual RS485 connection) or via ETHERNET TCP-IP network It provides detailed information about the entire network.

EC0020 Buttons
Resettable call point, can be connected to the loop and managed by analogue-addressable fire control panels.
The device trigger element and red status LED are located in the front of the device casing.

ED100 Detectors
The ID100 optical smoke detector is based on the Tyndall effect (diffusion of light) and provides first-rate early warning in the event of fire. It offers wide-spectrum detection of smoke particles generated by combustion. The newly designed optical chamber with sealed upper-part and 500 µm holes diameter mesh insect screen ensures high immunity to false alarms. Sensitivity can be modified to adapt the detector to different conditions of use (sensitivity that can be set: 0.08 dB/m - 0.10 dB/m - 0.12 dB/m - 0.15dB/m).

ES2000 Signallers
Volume, flash intensity and audio sequences selectable via the control panel – and diversified according to circumstances – selectable from the 14 tones, 16 messages in 8 different languages for the versions with voice functions – available on board the device. For models with the voice alarm function, it is also possible to customize tones/voice messages by means of the EDRV2000. The device is powered via the loop but is equipped with terminals for an optional separate power input.

Modules for Loop
The interaction of the fire detection and alarm system with all the other building systems is essential for it to be effective in fighting a fire. Inim offers a wide range of input/output modules for connection to the Loops of analogue addressable control panels which allow control and activation of external devices, monitoring of the status of appliances and the driving of signaling devices, etc.

The legislation regarding EVAC

Architecture, design and reference legislation

What is an EVAC system? This acronym EVAC (Emergency Voice Alarm and Communications) generally indicates an audible system created using loudspeakers with characteristics suitable for warning people present in the building of dangerous conditions in the event of fire.

Other acronyms often used are:
- VAS: Voice Alarm System
- S.S.E.P: Sound System for Emergency Purposes
- PAVA: Public Address and Voice Alarm

In particular, the last one (PAVA) highlights the dual function often performed by these systems, namely that of alerting people in the event of emergencies as well as audible diffusion (messages or audio entertainment) in normal operating conditions.

Approaching this category of systems can arouse a sense of insecurity when you do not have specific acoustic technical skills.

The regulatory references for EVAC

We want to delve into the reference legislation for the design, installation, commissioning, maintenance and operation of voice alarm systems for emergency purposes and try to dispel doubts and perplexities inherent to EVAC systems.

UNI ISO 7240-19:2010

FIXED FIRE ALARM DETECTION AND SIGNALLING SYSTEMS

Part 19: Design, installation, commissioning, maintenance and operation of systems for voice alarm in emergency conditions.

UNI CEN/TS 54-32:2015

FIRE DETECTION AND ALARM SIGNALLING SYSTEMS

Part 32: Planning, design, installation, commissioning, operation and maintenance of voice alarm systems.

Note that, while the first is a "Technical Standard" (UNI ISO), the second is a "Technical Specification" (UNI CEN/TS), i.e. a document that "flanks" the standards, a category defined as "agreed documents between all interested parties, whose definition is not yet consolidated, issued in order to allow a period of application and verification of knowledge".

Therefore it is consolidated practice to refer to the first document (UNI ISO 7240-19) and resort to the second (UNI CEN/TS 54-32:2015) in the case of gaps or for further clarifications.

The design of EVAC systems according to the regulations

The first activity that is indicated as necessary to approach the design of an EVAC system is that of **planning**, in other words, the designer is recommended to draw up an emergency management plan in which a series of aspects are taken into consideration, some of the most important of which are:

- Intended use and structure of the building.
- Number and characteristics of occupants: are people familiar with the building? Could there be people sleeping? Could there be people who need assistance?
- Evaluate the opportunity to alternate evacuation messages with signals of a different nature (sounders with tones, visual signalling devices, etc.).
- Assess the need for a phased evacuation (often in buildings the escape routes are not suitable for a mass evacuation, in such cases it is necessary to resort to a tiered or staggered evacuation).
- Define the characteristics of the voice messages: choice to be made based on the geometry of the rooms. It is necessary to personalize the messages by giving specific indications for the building, messages in the appropriate languages depending on the nationality of the occupants.
- Define the category of the user interface that the control panel must make available. Consider the difference between a small school complex where school workers will be called to interact with the system compared to a theatre where a team of firefighters is always present or even a stadium in which there is a control room with trained professionals.

The second activity taken into consideration by the standard in the design process is that of the **collection of documentation** necessary before proceeding, an activity whose importance is not always understood. Following are some points that summarize the aspects to consider:

1. Obtain the building plans
2. Provide yourself with an acoustic report, in which the following are reported:

   – The definition of the different a.d.a. (acoustically distinguishable areas), information necessary to identify a correct subdivision of the acoustic zones (areas on which the same audio is replayed), avoids overlaps that would prevent the intelligibility of the messages.

   – The reverberation time* of each a.d.a. at least in the octave bands 500Hz, 100Hz, 2000Hz, information necessary to evaluate the possibility of using a prescriptive approach instead of an analytical one as described below.

   – Ambient noise level (SPL in dBA*) in each a.d.a., information essential in order to proceed with the sizing of the power of the loudspeakers.

At this point, once the emergency plan has been defined, the necessary information and documents have been obtained, it is possible to proceed with the real **planning** of the system, taking into account some fundamental recommendations:

1. In the event of emergency activation, make sure that any acoustic reproductions of the non-emergency type are stopped (audio entertainment, announcements by unauthorized personnel, etc.).
2. The system must always be available. Ensure that the system is partitioned in such a way that during normal operation there is the possibility of taking only appropriate parts of the system out of service, leaving the others operational so that the system supervises everything and provides detailed fault indications.
3. Make sure that the system is capable of broadcasting the appropriate messages to one, or more or all audio zones simultaneously (that there is at least one alarm signal, sounder tone, alternating with alarm messages with the function of attracting attention).
4. Use short, clear, unambiguous pre-recorded messages in the appropriate languages (messages must have the right priority: evacuation messages take priority over warning messages).
5. In the case of evacuation in phases,provide warning messages and evacuation messages which can be activated in automatic or manual mode.
6. The evacuation system must be divided into *emergency loudspeaker zones* that do not coincide with *detection zones* and *non-emergency loudspeaker zones*. A *detection zone* should not contain more than one *emergency loudspeaker zone*.
7. Provide appropriate activations of the EVAC system:
   - automatic activation from the FDAS system (Fire Detection and Actuation System)
   - manual activation from the FDAS system (Fire Detection and Actuation System)
   - manual activation from the EVAC system (with appropriate levels of freedom)
8. Make sure that all system components are certified according to EN54 standards:
   - control panels compliant with EN54-16 standard
   - speaker compliant with EN54-24 standard
   - power supply equipment compliant with EN54-4
9. The transmission lines between FDAS and EVAC must be supervised
10. Transmission lines to the loudspeakers must be supervised

* see page 17

1. The wiring must be fire resistant for 30 minutes (or more if necessary) and with suitable mechanical protection in cases where:

- the line crosses a fire compartment to serve another compartment
- the line that crosses an emergency loudspeaker zone to serve another loudspeaker zone between different components of the emergency system
- the wiring joints completed in a closed box with terminals of the same category as the cable

2. Size the system so that a short circuit or open circuit of a cable in one speaker zone does not compromise the operation of any other zone.

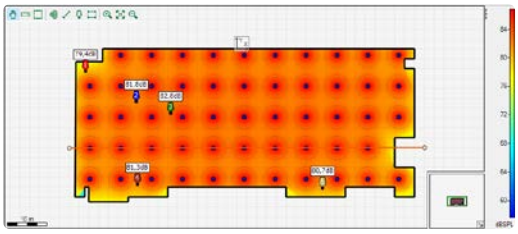
Sizing the system

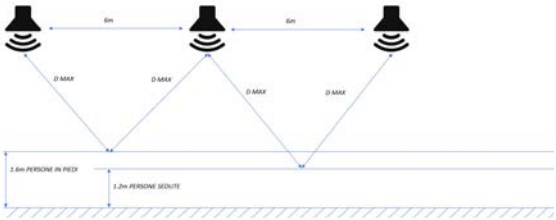
Having established that the acoustic pressure of emergency messages must be 10 dBA above the environmental noise level and that the speech intelligibility requirements are considered reasonable minimum requirements, the standard offers us two methods: an analytical **approach** and a prescriptive **approach.**

The analytical **approach** involves a real audio simulation of the environment, to follow this path you need to have:

1. A simulation software
2. Acoustic modelling of the speakers you intend to use
3. Accurate modeling of the environments that includes all the soundproofing details of the materials used

As can be understood, this way of operating is generally restricted to particularly complex applications or where acoustic performance is essential (theatres, sports halls, etc.)





Much more widespread is the prescriptive **approach** which is used in the majority of cases. The standard recommends using this type of sizing only if the following points are verified:

1. The average reverberation time is less than or equal to 1.3 seconds
2. Ambient noise is less than 65 dBA
3. Having verified the two points above, it is assumed that intelligibility is acceptable if the following parameters are respected:

   - the sound pressure level is at least 75dBA for appropriate hearing
   - the distance between the speaker spacing is not greater than 6 m (12 m for bidirectional speakers)

4. Evaluate the power of each speaker based on how the acoustic attenuation in air is calculated*
5. The obstacle-free distance between speakers and listeners (presumed height of 1.6m / 1.2m in the case of seated people)

* see page 17

The dBA

In acoustics, dBSPLs are used to indicate the sound pressure level. The acronym SPL, in fact, indicates Sound Pressure Level. It is calculated as follows:

$$SPL = 10\ \log_{10}\left(\frac{p^2}{{p_0}^2}\right) = 20\ \log_{10}\left(\frac{p}{p_0}\right)$$

where p0 indicates the sound pressure corresponding to the hearing threshold, equal to 20 μPa = 2 × 10−5[1] Pa.

The reverberation time

The reverberation time (T) of an ambient (room), in approximate terms, is the time necessary for a sound impulse generated in the room to be attenuated by 60 dB. Practically, when an acoustic signal that ends abruptly is generated (e.g. clapping of hands), our ear continues for a period of time to hear the sound due to the reflection of the original signal caused by the walls and obstacles present in the ambient. The reverberation time indicates how accentuated this phenomenon is in a particular ambient

How to evaluate acoustic attenuation in air

From the data sheet of a speaker, among the technical characteristics, we usually find the indication of the acoustic power in SPL with 1W @ 1m, i.e. the acoustic power that is measured 1 meter away from the speaker when we supply the speaker with 1W of power. Speakers for EVAC systems usually have a selector that allows you to vary the maximum power supplied by the speaker (when powered with a maximum power signal of 100VRMS = amplifier at full volume). The sound pressure changes as follows:

SPL= +3 dB for each doubling of power

Example:

if on a speaker with a characteristic of 90 dB 1W@1m, we move the selector to the 2W position at 1m we will have an acoustic power of 93 dB, if we move the selector to the 4W position at 1m we will have an acoustic power of 96 dB, and so forth.

Thanks to the mathematical relationship above we are able to determine the acoustic power of a speaker in the various settings. So how do you determine the acoustic power you will have at a distance greater than 1 meter? It should be considered that, in free air, for every doubling of distance we will have an attenuation of -6dB.

Example:

if a speaker generates an acoustic power of 90 dB @ 1 meter, at a distance of 2 meters we will have an acoustic power of 84 dB, at a distance of 4 meters we will have an acoustic power of 78 dB, etc..

Commissioning

During commissioning, the standard prescribes a series of measurements to be carried out on the system to verify the actual achievement of the minimum intelligibility requirements. These measurements, to be done at 90% of the a.d.a. and in any area exceeding 10m², according to the sampling table illustrated below:

Area exclusively distinguishable in m²	Minimum number of measurement points
Less than 25	1
from 25 to less than 100	3
from 100 to less than 500	6
from 500 to less than 1500	10
from 1500 to less than 2500	15
More than 2500	15 each 2500 m²

They must include:

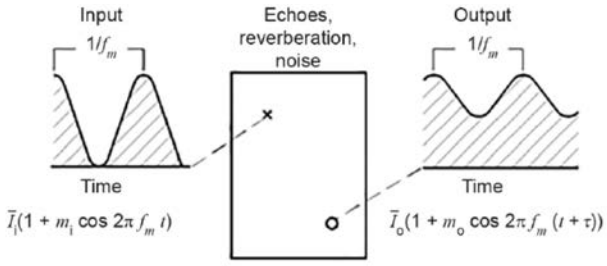
- Measurement of environmental noise
- Measurement of the sound pressure of the STIPA emergency message

The last of the points indicated (**STIPA**) is obscure to most, but what is it?

In practice, starting from the assumption that the information carried by the acoustic signal is in its modulation, the **STIPA** measurement is based on the reproduction on the system speakers of a frequency signal *f* modulated in amplitude (with a modulation frequency *f*m) between 0 and 100%.

This signal is listened to again at the point where the measurement is performed with a microphone; the measured signal, due to the effect of reverberations, environmental noise etc., will have a modulation amplitude that is certainly lower than that of the original signal.

Indicating with m_i the value of the modulation amplitude of the original signal and with m_0 the value of the modulation amplitude of the listened signal, we proceed to calculate the index m obtained as follows:



$$m = \frac{m_0}{m_i}$$

As can be understood, this index will have a maximum value equal to 1 in ideal conditions, i.e. received modulation exactly equal to the transmitted modulation (a condition difficult to reach in a real case), and a minimum value equal to 0 in the case in which the modulation in the received signal has completely disappeared (a situation of absolute incomprehensibility).

For an accurate measurement the reference standard requires that the measurement is carried out at different f frequencies and using different f_m modulation frequencies, the peculiarity of the **STPA** index compared to the **STI** index used in Hi-End applications consists in carrying out the measurement not with a single signal as described above, but with a signal that is the sum of the different signals at different frequencies and with different modulations, the result is a sort of white noise.

In the **STIPA** measurement, the device that receives the signal is therefore capable, typically through digital filters, to separate the various signals by measuring the modulation value of each component, thus managing to obtain the various m_k indexes with a single measurement. The device performs a weighted average of the various indices collected, arriving at a final value between 0 and 1 which represents the **STIPA** index.

$$MTI_k = \frac{1}{n} \sum_{m=1}^{n} TI_{kf_m}$$

The normative requires the achievement of a minimum value of the **STIPA** index according to the table below:

	Required values	
	Average intelligibility value measured across all applicable areas in the a.d.a.	Minimum intelligibility value measured across all applicable areas in the a.d.a.
STI or STIPA	0.50	0.45

Integration of Firefighting and EVAC equipment

The Inim solution that manages fire protection, EVAC and building control.

In a context in which fire safety is of primary importance, the technological evolution in voice detection and evacuation systems is fundamental. In this panorama, the Inim Previdia UltraVox stands out as a point of reference in the integration of these two systems.

Certified according to EN54-2, EN54-4 and EN54-16 regulations, Previdia UltraVox offers a complete and reliable solution for the protection and intelligent management of buildings.

The first fully integrated fire detection and EVAC control panel: a revolution in building protection

Previdia UltraVox is a revolutionary system in integrated building protection. The use of EVAC voice evacuation systems in combination with fire detection systems has seen strong growth in recent years. With Previdia UltraVox, the first EN54-2, EN54-4 and EN54-16 certified control panel, the two systems are perfectly and completely integrated. Inim is a forerunner of a massive innovation in the field of Fire & Safety. What are the advantages of this integration?

Efficiency and economy
By using a single system instead of two, clear economic advantages are obtained, while also simplifying maintenance, installation and commissioning.

Deep integration
Previdia UltraVox offers deep integration between fire detection and EVAC, with the use of evacuation matrices based on specific scenarios activated in accordance with the type of alarm detected.

Coordination of devices
The system allows coordination between audible alarm devices and emergency messages pre-recorded or transmitted via microphones, ensuring an effective and coordinated response.

Easily programmable
Programming the system is intuitive and simple, treating the audio evacuation zone like a normal alarm signaller.

In addition to these advantages, it is also important to consider the positive impact that this control panel has during commissioning. Maintenance and diagnostics of EVAC systems require specialized skills and a series of complex technical measures.

However, with the Previdia UltraVox system, all this becomes more accessible. Using the connection to Inim Fire Cloud and the Inim Fire App, both cost free and provided by Inim, the smartphone can become an autonomous tool for carrying out all test operations:

1. **Ambient measurements**
   It is possible to measure the reverberation time of the environment, the ambient noise and the sound pressure of emergency messages.

2. **Adjustments during Tests**
   During tests, it is possible to adjust the volumes and equalizations of the various zones directly from the App.

3. **Automatic Archiving**
   All measurements are automatically archived on the Cloud, thus creating the maintenance and commissioning register, accessible to both the professional and the customer.

Digital audio for emergencies and not only

The Previdia UltraVox system, thanks to the use of class D amplifiers and the latest generation Digital Signal Processor (DSP), is capable of acquiring, processing and transferring audio signals in a completely digital way.

This technology, however, is not limited to use solely in emergency evacuation, the main function of the system, but can also be used for Public Address and Audio Entertainment. In fact, the system, in addition to managing the countless audio sources and pre-recorded messages via activation timers, input terminals, customizable function keys on the display, etc. provides our **IAS** server (**Inim Audio System Server**) on which to save playlists, download web sources (web radios, etc.), and send them to the Previdia UltraVox control panel.

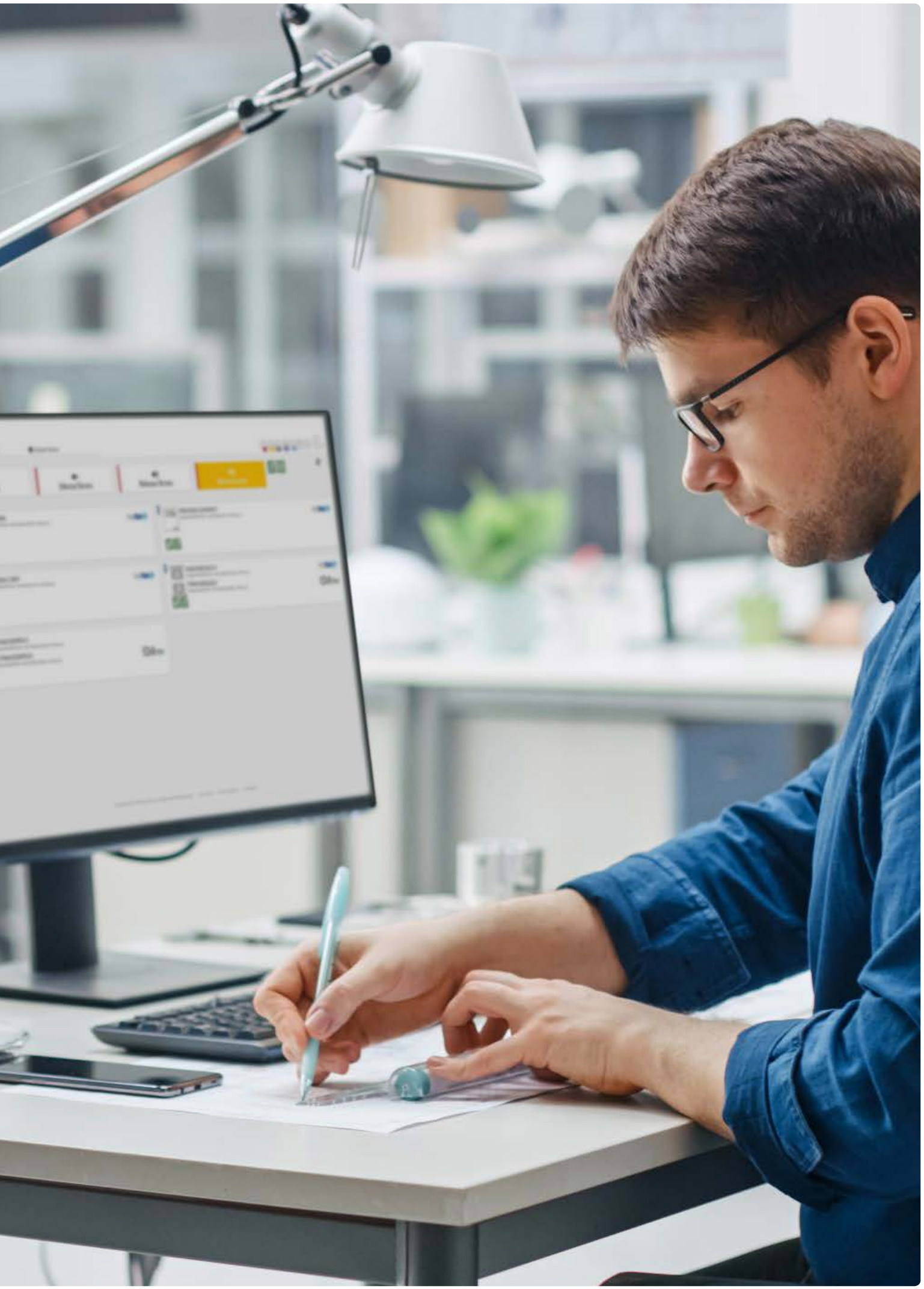
All these features can be controlled by each user via our **IAC** (**Inim Audio Control**) App for Smartphones, with which each user in audio zones where authorized, will be able to select audio sources, adjust volumes and equalizations, send voice messages from the smartphone and much more.

Services for fire prevention professionals

Connected solutions for effective management of fire prevention systems and compliance with regulations

Although the Fire Detection and Alarm Systems (FDAS) sector, due to its strictly regulated nature, can often be a field in which progress is slow, it was inevitable that in today's highly interconnected context the two spheres, FDAS and the world of the web, would converge.

Inim has been a pioneer and at the forefront in this sense, by anticipating the future direction of the industry. In fact, in addition to a vast range of fire control panels and detectors, Inim has for several years boasted a sophisticated and advanced network infrastructure that connects its devices all over the world to their respective users: the Inim Cloud Fire service.



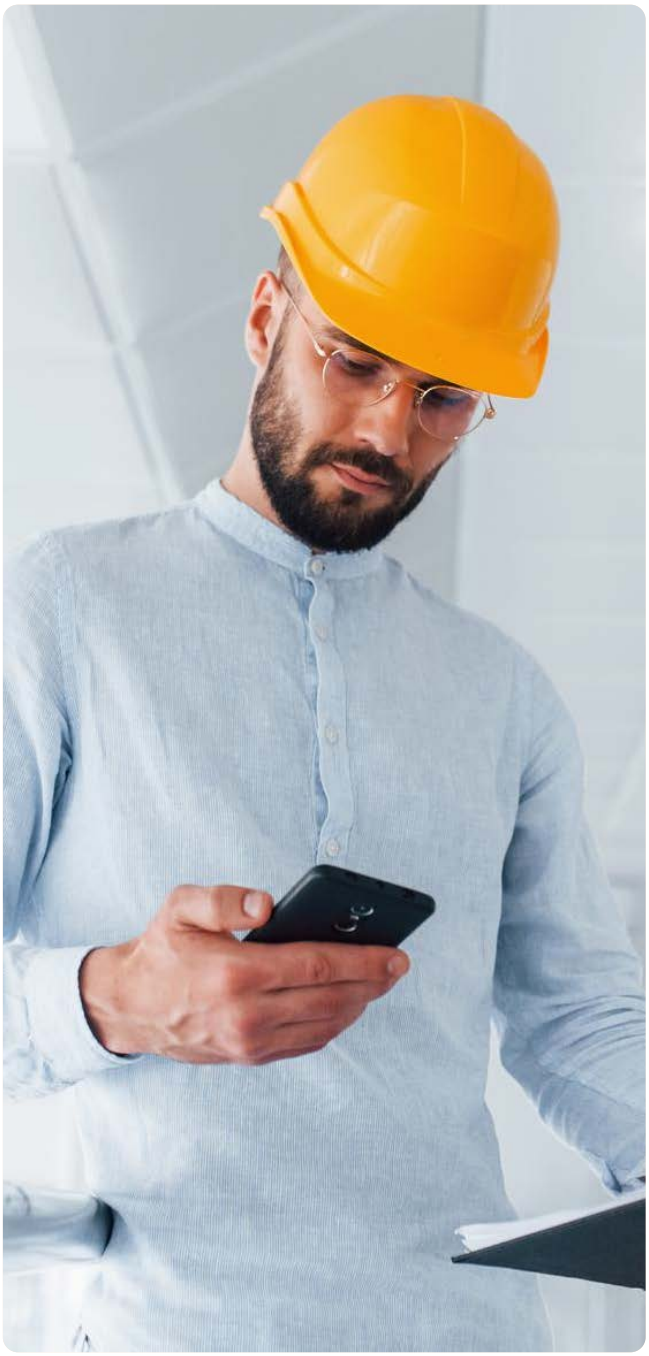
What is Inim Cloud Fire

Inim Cloud Fire is the network infrastructure that allows Inim control panels of the Previdia series to be accessed, controlled, consulted and managed remotely by users and installers alike, as well as providing useful tools even for project designers. All in a completely safe and reliable way.

While on the one hand Inim Cloud Fire is the key infrastructure through which Inim allows remote and secure accessibility to its systems, what allows users to interact are the Inim Cloud Fire web interfaces and the Inim Fire App. Both allow users, wherever they are providing they have network connectivity, to interact with the Cloud and therefore with their fire prevention systems.

Although, generically speaking, Cloud infrastructures and mobile technologies may raise security concerns, in an FDAS context their advantages are undeniable. It is worth remembering that in situations of real emergency and alarm, it is not Cloud technologies or Apps that have to manage the situation, but rather the control panels and detectors whose reliability remains unchanged regardless of the presence of these new players, to much the same degree as the reliable operation of the systems, their meticulous monitoring capabilities as well as proper operator training and information.

Nevertheless, Inim Cloud Fire and the Inim Fire App can help achieve regulatory requirements: they offer a valid auxiliary tool to improve the efficiency and effectiveness of Fire detection and alarm systems.

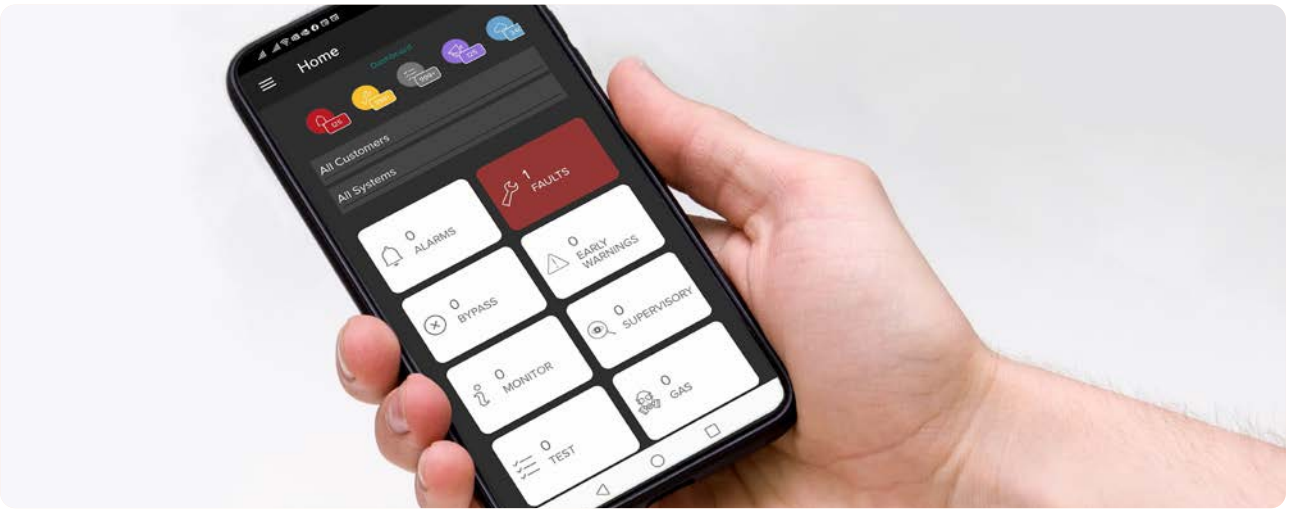


Inim technologies make it possible to acquire detailed information in the event of an emergency, speeding up the response of security personnel and facilitating commissioning, maintenance and periodic checks; they also make the personnel in charge responsible by compiling and keeping updated system registers, in addition to the control panel logs.

As a **Building Management System**, the Inim Fire App is capable of receiving all the events generated by its systems, reported in real time to the open App or via push notification, allowing the user to investigate the details of the points instantly, view the graphic map of the system and carry out instant video verification of the connected cameras.

For installers and users alike, the registration and association procedures for a new system are highly secure and easy to follow. The service, the web interface and the App, for Android and iOS smartphones, are available free of charge in more than 15 languages.

Enrollment of an Inim system in the Cloud is an optional operation and depends on the choice of the installer, as is the decision regarding which operations can be carried out remotely and which cannot, in full respect of the needs of each individual case and in order to reach the right balance.



"The Inim Fire App is a Swiss army knife in the hands of the installer and end user, this versatile tool permits, amongst other things, compliance with regulatory requirements in a fast and efficient way".

Operational Safety Management

M.D. of 18 October 2019 of the Fire Prevention Code

In compliance with the Fire Prevention Code *chapter S.5.7.1* regarding operational safety management, the Inim Fire App facilitates consultation of the system event log. Furthermore, at *point 1 paragraph A* of the aforementioned Ministerial Decree, it is possible to view the lists of previously tested devices through two flagship features of the Inim Fire App, the **Walktest** and the **STIPA** measurements, which are automatically recorded during the respective procedures. Checklists are generated from the measurements collected. At *point 1 paragraph B and C* of the aforementioned Ministerial Decree, in reference to the registration of training, practice and evacuation drill activities, the system offers the possibility of inserting customized events in the Cloud register. Moreover, also available is the generation of **maintenance reports** each of which details the status of the last test (or lack thereof) of all the system points, the autonomy tests for emergency lighting and the status of open reports (not yet signed as managed) in the event register. This **maintenance report** is conveniently made available in PDF and Excel formats, so that it can be printed out on numbered, sheets to be signed and kept in binder folders for the purpose of controls carried out by the authorities.

UNI 9795 (Italian national unification body regulation): fixed automatic fire alarm detection and signaling systems_design, installation and operation

In compliance with UNI 9795 (Italian national unification body regulation), regarding management and maintenance (*chapter 9, Operation of Systems*) it is specified that maintaining the efficiency of the system is the responsibility of the person in charge of such activity, who must guarantee continuous surveillance and maintenance, requesting, if necessary, adequate instructions from the supplier. Inim Cloud Fire and the Inim Fire App offer a direct historicized communication channel between installer and supervisor. In fact, it is possible to generate customized Cloud events of non-conformity, which are recorded and notified in real time to all those persons involved in a specific installation. Once the intervention has been completed, the installer can then notify the supervisor of the operations carried out and close the report as managed. The legislation also requires the annotation and therefore the reporting of the tests carried out on a system. The Inim Cloud Fire and the Inim Fire App greatly facilitate both field work done to obtain necessary data and desk work done to generate the required reports.

WalkTest function

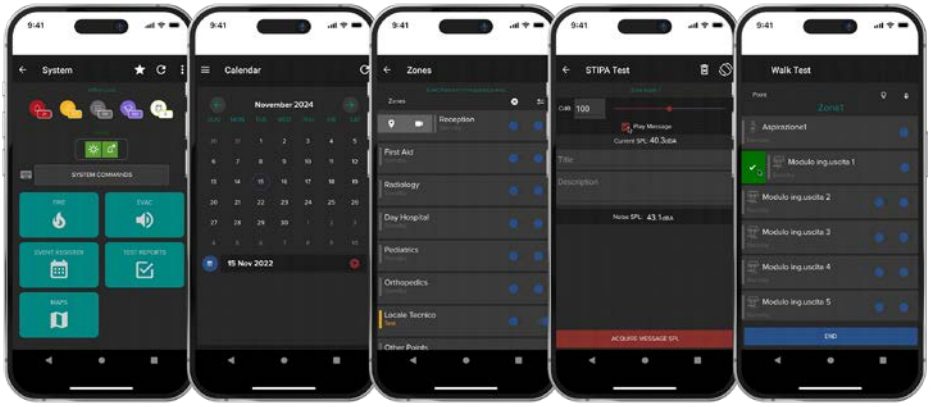
With the **Walktest** function, the App allows the installation technician to easily carry out periodic maintenance on their systems without the need to go to the installation sites to carry out for the various tasks involved. It is capable of testing zones, providing a list of all points to be tested and those already tested, turning on status LEDs for easier point identification, and more. One by one, the tested points are automatically added to the list until the list is complete. Sounders can also be tested to obtain the difference between ambient noise and noise occurring during their activation.

STIPA Measurements

With the **STIPA** test it is possible to carry out an operation similar to that of the **Walktest** but in relation to the intelligibility of speech and emergency messages in the audio zones, allowing the fine adjustment of the volumes and equalization of the relevant amplifiers. The **STIPA** test, repeated as many times as required for each audio zone, will return a series of values, including the ambient sound pressure, measured during playback of the emergency message and the **STIPA** value.

Regardless of the fact that the **Walktest**, the **STIPA** test or both have been carried out on a specific date or within a longer time window, the system provides a tool for generating checklists. The necessary documents are attached to the checklist so generated (templates to be filled in are made available), and there is also the possibility to attach photos or other necessary documents. At the end of the procedure, end users and installers will receive a notification of the generated report and will be able to consult the archived documents.

Finally, as previously discussed, it is possible to note down any action taken in the event of registration of an alarm (whether it really occurred or otherwise). Special event counters keep track of the number and type of alarm events, as well as of faults, bypass actions and so forth, that have not yet received an explanation that might lead to their closure, whether by the user or the installer.



Overall, the Inim Fire App offers a wide range of features, including:

- Management and sending of commands, such as re-arming, from remote.
- Reception of push notifications for alarms, faults, bypass actions, maintenance and much more.
- Display of the list of active events in a specific system or transversely to all.
- Display of status icons for the installation and the control panels as well as from the panel.
- Planning of maintenance events via calendar, with precautionary generation of maintenance reports for the installers.
- Navigation of the systems through graphic maps and the possibility of carrying out video checks via snapshot capture.
- Badge counter of events in the log that have not yet been managed and closed.
- Consultation of the traditional events log, with the possibility of communication between the installer and end user regarding each event until closure, following adequate explanation.
- Generate customized Cloud events, including non-compliant or training events, with notifications to interested parties and the possibility of management and closure similarly to traditional events.
- Guided procedure for the Walktest.
- STIPA measurement wizard.
- Calculation of ambient noise and reverberation time for project designers.
- Real-time monitoring of the points that allow it, as well as the contamination index.

The LPCB certification

The cutting edge of aspirating systems, now LPCB certified

For components used in fire detection and alarm systems, there is the requirement of compliance with a series of product standards: the UNI EN 54 series. Within these, are defined the essential characteristics of each of the elements that make up the systems.

The standards of the EN 54 series are harmonized according to the CPR regulation.

CPR (Construction Products Regulation) is a European regulation (EU/305/2011) which establishes the conditions for placing or making available construction products on the market, by establishing harmonized provisions for the description of the performance of such products in relation to their essential characteristics and for the use of the CE marking on the products in question.


LPCB
LOSS PREVENTION CERTIFICATION BOARD
inim
Evolving Protection
Loss Prevention Certification Board

The CPR regulation

The harmonized standards according to the CPR regulation establish the methods and criteria for assessing the performance of products. This process involves a series of activities carried out by a notified body. Notified bodies are bodies authorized by the member states to carry out assessment and verification operations for constancy of performance.

Inim collaborates with many notified bodies, with which it certifies its products and which periodically conduct in-depth inspections in Inim factories to verify and certify the adopted manufacturing processes. The same standards indicate the systems for assessing and verifying the constancy of performance, an essential requirement for affixing the CE marking on the product; in the EN54 series, mode 1 is required.

Verification of the consistency of performance according to System1

a) The manufacturer implements:

- factory production control;
- other tests on samples taken from the manufacturing plant by the manufacturer in compliance with the prescribed test plan;

b) The notified product certification body decides on release, limitation, suspension and withdrawal of the certificate of constancy of performance of the construction product based on the outcome of the following assessments and checks, carried out by the same body:

- an assessment of performance of the construction product based on tests (including sampling), calculations, values taken from tables or descriptive documentation of the product

- initial inspection of the manufacturing plant of factory production control
- continuous monitoring, assessment and verification of factory production control

BRE Science Park Laboratories, Watford - United Kingdom

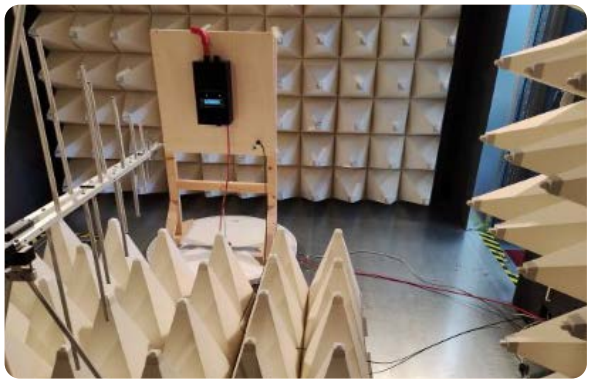
The LPCB certification

New certifications from one of the most prestigious bodies in the world have arrived for the new FA100 detector (aspirating smoke detector), these certifications were in fact issued by **BRE** (https://bregroup.com), both the **certificate for CE marking** according to the CPR directive (Certificate of Constancy of Performance) and the certificate for the use of the prestigious **LPCB** brand – Loss Prevention Certification Board (https://lpcb.com).

The path that led to the certification of the FA100 detector was long and complex, this due to the intrinsic structure of aspirating smoke detection systems that base their operation on long ducts, these can take on countless configurations requiring sizing operations involving complex fluid dynamic simulations, the tests were multiple and required exceptionally laborious operations during the preparation of the test setups.

In accordance with the reference standard (EN54-20), a selection of equipment representative of the production was subjected to a series of severe tests, some of which are listed below:

- Reproducibility and repeatability tests, conducted through simulation tunnels in which the concentration of particulate matter is accurately controlled by particle counters, both in standard environmental conditions and in extreme temperature and humidity conditions.
- Fire test response: different configurations representative of possible scenarios (minimum and maximum number of blowers , minimum and maximum sensitivity, single pipe or different branches, etc.) were tested to verify their sensitivity, demonstrating the capability of detecting all fire test outbreaks both standard (class C configuration) and reduced (high sensitivity in class A or B)
- EMC testing: the equipment was subjected to both radiated and electromagnetic stress conducted on connection cables
- Mechanical tests: vibration and impact resistance tests to verify mechanical robustness
- Environmental conditioning at high and low temperatures
- Corrosion test in saline atmospheres



The FA100 test phases

At the end of this long journey which lasted almost two years, after having successfully passed all the tests, after an in-depth assessment of the software, of the documentation, after the verification both on paper and at the Inim manufacturing plants, we are proud to exhibit the coveted logo that was so laboriously achieved.

The collaboration between Inim and BRE, now of twenty years, has seen the certification of a long list of products currently on the market, starting from point fire detectors up to the control panels of the Previdia Max series.

Special thanks go to Yasin Khan who conducted the tests demonstrating extraordinary expertise.

A special thank you to Zsuzsanna Major who supervised the project with great professionalism.

The revolutionary technology of the FA100 detector

The new FA100 aspirating smoke detector stands out for its unique characteristics and the technical innovations developed by the Inim R&D department.

The FA100 meets the highest safety standards and has obtained LPCB certification. The detector is supplied in the single-channel version and can be expanded to two channels by inserting a second detector, model FAD100, into the device.

The control board is equipped with terminals for direct connection to the Loop, both inputs and outputs in order to combine the device with any control panel.

The display and keypad on the panel front allow you to configure the system, carry out control and diagnostic operations and acquire in an immediate and intuitive way information regarding the operating status of the system.

The detectors of the FA100 system use two light sources with different wavelengths: an innovative technology that allows the size of the aspirated particulate to be assessed, thus discriminating the aerosols produced by real combustion from any contaminating agents (dust, steam, etc.).

The cutting-edge algorithm developed by Inim is therefore capable of reacting extremely quickly and early on in the event of a real fire danger thus avoiding false reports due to contaminants.

Each channel of the FA100 system can be configured independently in classes A, B and C, as required by the EN54-20 standard:

- **CLASS A**: high sensitivity, in this mode up to 8 holes can be managed for each channel.
- **CLASS B**: increased sensitivity, in this way up to 18 holes can be managed for each channel.
- **CLASS C**: normal sensitivity (each detection hole reaches the same sensitivity as a point smoke detector), in this way up to 51 holes can be managed for each channel.

The system tolerates a total pipe length of up to 160 meters. However, it is important to note that the maximum distance allowed between the detector and the farthest hole must not exceed 100 metres.

The FA/STUDIO software

FA/STUDIO is the design, configuration and diagnostic software available on the Inim website, this software allows you to design an aspirating pipe network using a practical and intuitive 3D CAD into which it is possible to import .dwg, .dxf, .pdf, etc files.

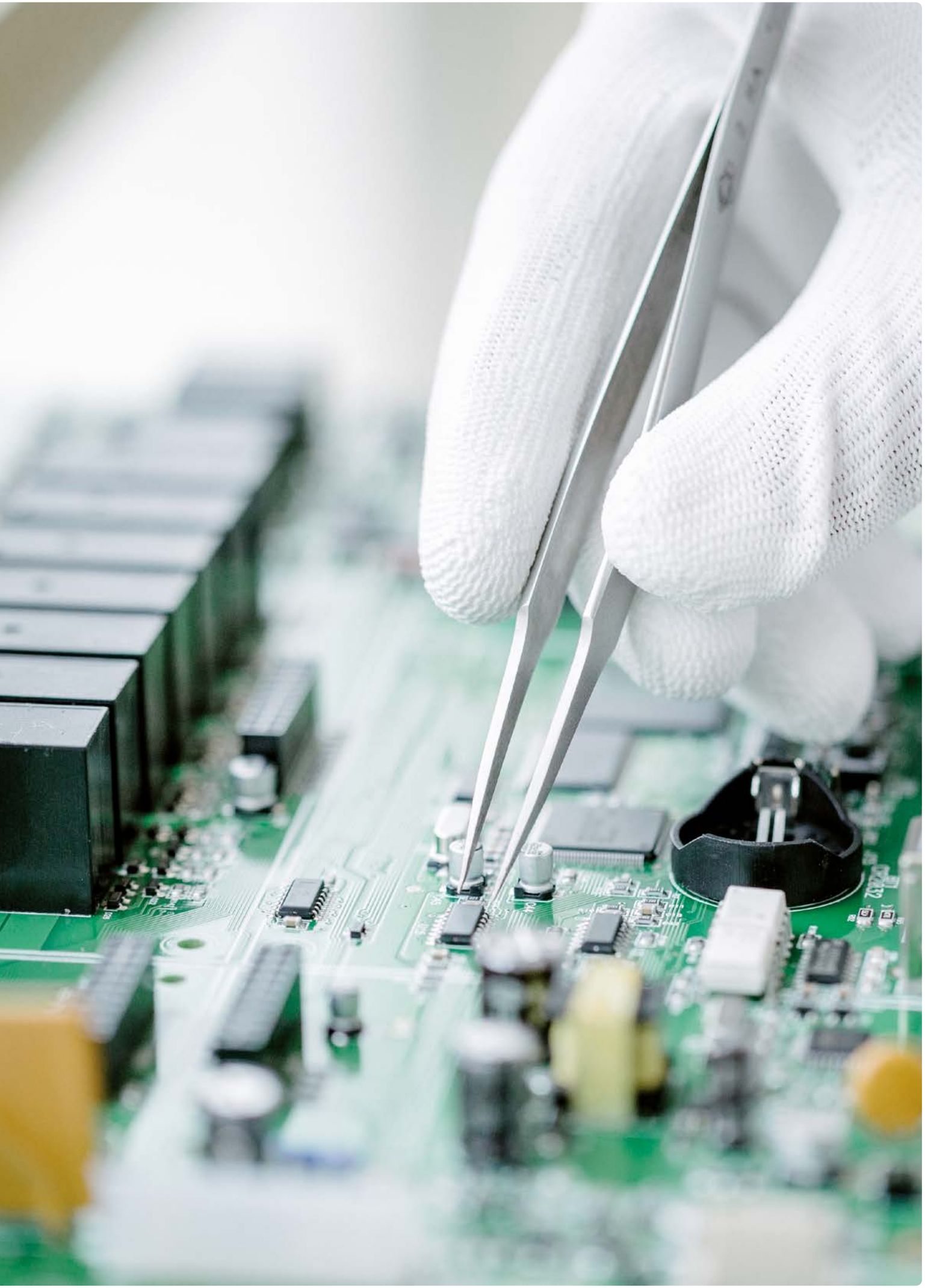
The calculation section carries out the appropriate fluid dynamic calculations on the designed network, balancing the flows and providing all the parameters for each sampling hole. The diagnostics section allows you to monitor all the device parameters in real time and download the graph recording the last 3 months of operation.

Technologies at the service of protection

Robotic line, conformal coating and X-rays revolutionize the production system

The point fire detectors are devices inside Fire Detection and Alarm Systems capable of detecting the presence of smoke or any anomalous increase in temperature and of triggering the fire danger signal.

Inim is among the few companies that designs and develops these devices completely within its own structures, a 100% made in Italy production.



Control of the FPC

Regulation (EU) No. 305/2011 of the European Parliament and of the Council of 9 March 2011

A fundamental premise, when talking about the production of equipment intended for Fire Detection and Alarm Systems, is that these devices, in order to be marketed within the European community, must be certified according to the scheme envisaged by the aforementioned standard, which establishes harmonized conditions for the marketing of construction products in accordance with the European CPR regulation.

The issuing of the certification involves, in addition to a series of tests on a significant production sample conducted in qualified and authorized laboratories, the surveillance of the manufacturing process (Factory Process Control).

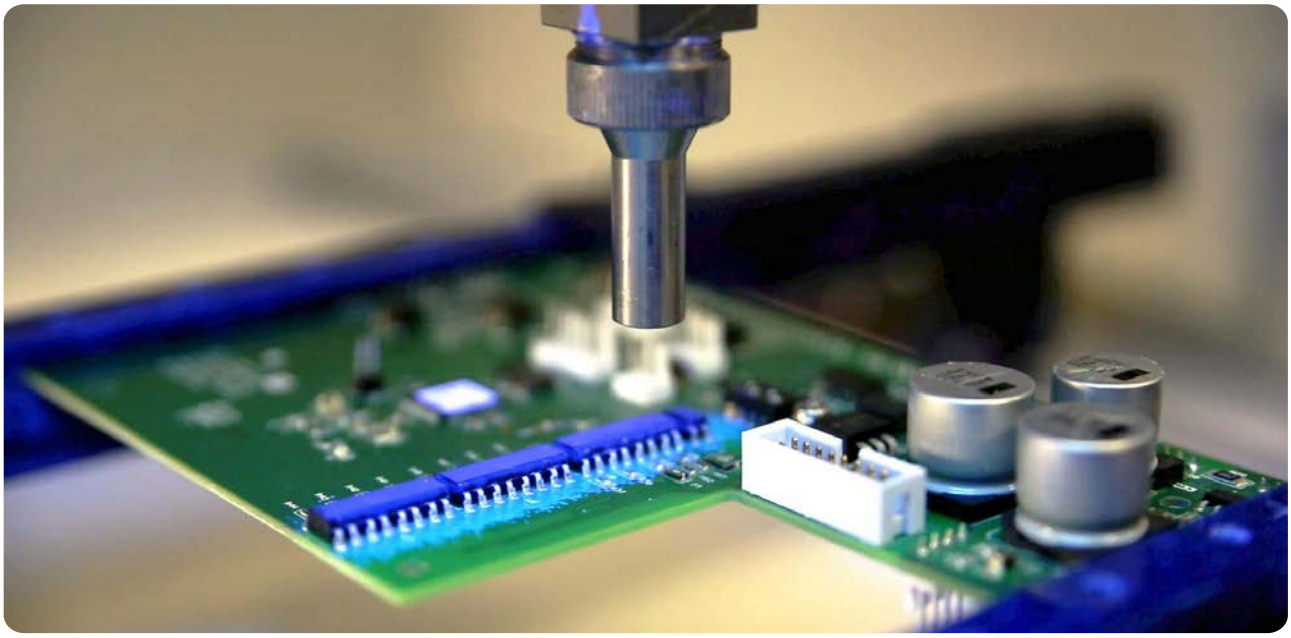
Before issuing the certificates attesting the compliance of the product with the reference legislation, the notified body (IMQ, in the case of Inim detectors) verifies that, through a series of audits and visits to the company, the production process adopted for the manufacture of the equipment is able to guarantee repeatability of these characteristics on all specimens produced (**FPC certification**). The notified body, after having verified that the production system complies with the appropriate quality standards, agrees with the company on a series of controls and tests that the quality department will have to carry out constantly to ensure that each production batch corresponds exactly to the certified characteristics. Furthermore, the notified body monitors the production process by means of periodic inspections (**FPC surveillance**).

For example, Inim point detectors boast numerous quality marks and are subjected to periodic controls by various bodies. These controls are necessary to maintain authorization to use the trademarks **LPCB**, **UL**, **and BOSEC**, thus guaranteeing the quality of the production process.

These bodies, applying even more stringent certification schemes in respect to the **CPR regulation**, carry out further checks on the product, annually subjecting specimens taken from the market to the same tests carried out in the certification process of the initial samples.

The testing and calibration phase of the assembled product

The production of point fire detectors involves a series of highly automated and complex work processes, carried out within the Inim production plant. Let's talk about the final testing and calibration process.



Fire detector production process

- PCB photoetching
- SMD assembly
- Automated optical inspection
- Automated parametric and functional testing of the boards
- Conformal coating
- Automated PCB assembly process
- Finished product testing and calibration
- Keeping the product running for 12/24 h (burn in)
- Packaging
- Random verification using laboratory tests
- Dispatch

Once assembled the detectors are conveyed via conveyor belts into the robotic testing and calibration line. The first section of the line transports the devices by means of a Cartesian robot (linear robot) on a carousel which performs the initial series of operations:

- Reading of serial number on the label
- Writing of the same serial into the detector memory
- Verification that the board has been tested, compliance of the type of board with the type of detector, etc.
- First functional test

A second 4-axis robot picks up the detectors and places them on pallets that move along the calibration line. The loaded pallet is then transported in clean air to the calibration station. At this stage, the detectors are subjected to a flow of clean air; each of the detectors is connected to a PC by contact and control software performs a second series of checks and calibrations:

- Verification of detector response in clean air
- Calibration of light source power
- Temperature reading verification and calibration
- Saving of the obtained parameters to the detector memory

Once the calibration phase in clean air has been completed, we move on to the second calibration stage, where the pallet is put inside a smoke tunnel, a circular duct inside which a laminar air flow is circulated with a controlled aerosol concentration. In this section, the detectors are connected to the control PC again and the process continues to the second testing and calibration phase:

- Verification of the response of the detector to aerosols
- Calibration of gain in internal circuits to obtain the established sensitivity
- Saving of parameters to the detector memory
- Testing of "R" output functionality

Next, the pallet is transported to the final section where an anthropomorphic robot picks up the detectors from the pallets and sorts them:

- Detectors that do not pass any of the previous stages are routed onto a conveyor belt that takes them to the rework and test station
- Detectors that successfully pass all the phases are positioned on panels, sorted by model, then put through the Burn In phase, where the detectors are connected to a PC and kept in operation for a period of 12/24 hours and where the control software continuously checks their response

The calibration parameters of each detector are collected in a database on which constant checks are carried out capable of verifying and predicting any drift phenomena (parameter drift).

The robotic line is capable of processing **over ten thousand specimens per day** ensuring exact sensitivity and total quality and reliability of every single detector manufactured by Inim.

Technical/regulatory training

Continuous updating to excel in the Building Protection sector

The training of technical staff working in the FDAS sector is an often debated problem and at the centre of the technical meetings called to define the reference legislation for the sector.

Inim has always been committed to and promoted countless training and dissemination events, from events at its own headquarters or at the offices of its distributors, to initiatives such as the Focus Tour, itinerant training events which have seen the participation of a large number of professionals over the last few years.


PREVIDIA ULTRAVOX
Centrale di rivelazione incendio con funzioni EVAC integrate
PREVIDIA C-REP
Tastiera remota
IFAMFT
Modulo per la gestione dei telefoni di emergenza
IFMR
Modulo 4 rele configurabili
IFM4O
Modulo 4 ingressi/uscite di potenza
IFM16O
Modulo 16 canali di ingresso/uscita a bassa potenza
IFMNET
Modulo per la connessione in rete HorNet
IFMDIAL
Modulo comunicatore remoto PSTN & GSM
IFMEXT
FBCAE
cabinet aggiuntivo
FBMLED
Modulo LED
FBMLEDPRN
Modulo LED e stampante termica
HorNet

This training, as underlined by the reference legislation (see the recently published Decree on Inspections) cannot ignore the involvement of the manufacturers of the equipment used, for various reasons:

· The technical staff finds themselves working with increasingly structured and complex equipment, each model characterized by technical specifications that require in-depth insight provided by the company that designs and builds them

· Companies that design and build equipment intended for the FDAS sector very often have a technical background such that, if shared with the personnel who work on the installations represents an asset capable of qualifying the professional and raising the level and safety of their installations

· Training opportunities with product manufacturers very often constitute a precious moment of discussion, where the parties share problems, experiences and ideas, always leading to significant growth for both parties

In the wake of this enthusiasm, the 2024 edition of the **Inim Academy Fire** event was held, this learning curve was promoted by Inim and was aimed at the advanced training of technical personnel capable of operating FDAS installations created with Inim equipment.

The training course, partly online via Webinars organized by members of Inim's own teaching team, involves three days of full immersion at the company's manufacturing plant. During this time participants learn all the technical details, participate in the vertical understanding phase in close contact with the Inim R&D department, test the equipment hands-on, are made aware of the production details and the meticulous quality control chain that supervises the production of the equipment.

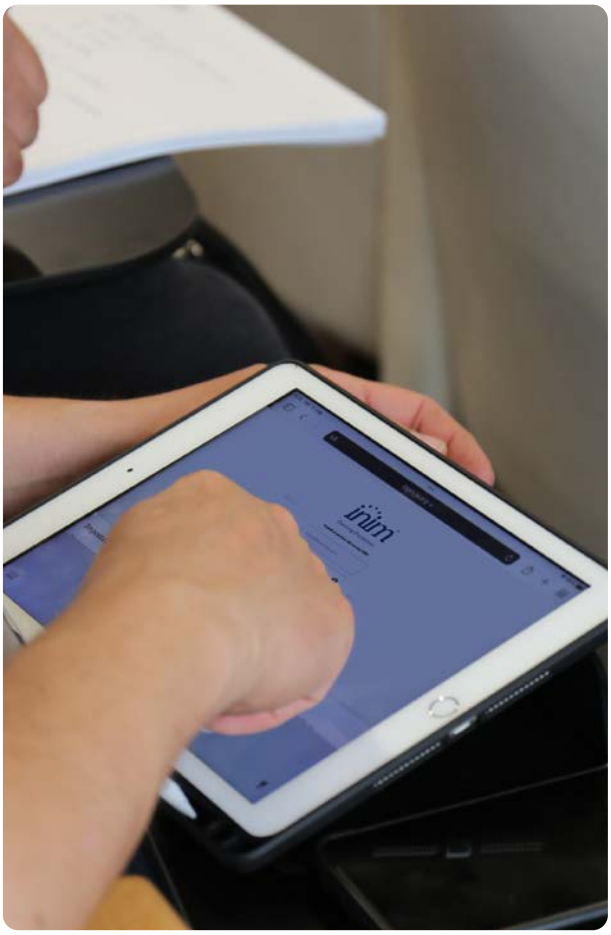
INSTALLATORE CERTIFICATO INIM *Fire*

The course ends with an evaluation exam which, if passed, allows candidates to enter the list of **Inim Fire Certified Installers**, who are indicated as a reference by the company and who enjoy a preferential communication channel.

During Inim initiatives there is no shortage of lighter moments of socialization during which guests can appreciate the culinary specialties of the area, the beautiful landscapes and the pleasant evenings on the shores of the Adriatic Sea.

The Academy program

- Previdia Max System
- Previdia UltraVox System
- Previdia Compact System
- Previdia Micro System
- Networking
- FireVibes
- FA100 & FA/STUDIO
- Using the oscilloscope
- Troubleshooting (Fire and EVAC)
- Inim Cloud Fire and Inim Fire App
- IAS Server and IAC app
- Programming via Previdia/STUDIO
- FDAS UNI 9795 Standard for project design and FDAS installation
- UNI 11224 Standard for Maintenance
- UNI ISO 7240-19 or UNI CEN/TS 54-32 Technical standard for project design, installation and maintenance



International technological innovation

The Dubai World Fair presents the future of fire safety and building protection

The 2024 edition of Intersec confirms itself as the reference event in the global Fire & Safety panorama. The annual trade fair, hosted in Dubai, has always been a crucial moment for the Middle Eastern market and even further afield.

After two years marked by a reduction in participants due to the pandemic, this year's edition saw a significant increase in attendance, even surpassing the best editions of the past and confirming itself as a crucial meeting point for manufacturers and operators in the sector at an international level.

Saudi Arabia emerges as one of the most promising markets for the next decade, with significant investments in ambitious projects such as "THE LINE", an eco-sustainable city that promises to revolutionize urban architecture by putting human well-being at its core.

This has attracted the interest of all the operators in the sector, with Inim at the forefront, that for years has positioned itself among the market leaders, experiencing outstanding growth.

Among the many Fire & Safety sector innovations presented at the stands, we noticed substantial attention was paid to two technologies of great interest: the use of the Cloud for the management of **Building Protection** systems and the integration of EVAC voice evacuation systems.

The Sheikh's visit to the Inim stand at Intersec 2024

More and more companies are moving towards the adoption of technologies like the Inim Fire Cloud for remote management and management through Apps on smartphones. These tools, often underestimated in the past for Life Safety systems, are increasingly appreciated as they prove crucial for efficient building management.

Another dominant theme of the trade fair was EVAC technology, with warning and evacuation systems based on voice messages and emergency microphones. These systems are preferred to or combined with those based exclusively on tone-based audible signals, as it has been shown that a simple sounder can generate disorientation during the stages of evacuation, delaying it and even making it chaotic. Therefore, the main brands are proposing EVAC solutions integrated with fire detection and alarm systems, such as the Previdia UltraVox, a product already on the market and which way ahead of time perfectly understood the need for integration.

Aspirating smoke detection systems stand out, a constantly growing and evolving technology that is increasingly used in a wide range of scenarios. Particular emphasis was placed on the FA100 aspiration detection system presented by Inim, which gained wide consensus thanks to its ability to discriminate between aerosols generated by fire and contaminants such as dust, fog or evaporation.

Inim played a leading role in the 2024 edition of Intersec, confirming its position as one of the leading global manufacturers in the sector. The Inim stand, among the largest at the trade fair, attracted thousands of visitors, all impressed by the many innovative solutions and technologies presented.

In this edition Inim received prestigious recognition from the organizers of Intersec, who awarded the company "The best partner of the event" award. This highly regarded prize was awarded by virtue of Inim's continuous growth and significant participation at Intersec over the years. The ability of the company to maintain constant commitment to innovation and excellence in the industry has contributed significantly to its success and recognition.

The moment of the awarding of the prize to Elisabetta Saini and Baldovino Ruggieri, Inim owners, by Michael Grossman and Wajahat Hussain of Messe Frankfurt

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FIRE MAGAZINE

Edition 2024 – no. 1

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