

# **Evolving Fire Safety towards holistic Safety A Proposal**

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## **1 The Track Record of the Fire Safety Industry**

During the past 60+ years, there has been a multiple of technical evolutions in the protection of lives and assets from the dangers of fire. We have come a long way in the development and implementation of products, systems, standards, codes and legislation that are designated to keep us safe from the dreadful harm that a fire inflicts. Today's manufacturers, installers, engineers and service companies are high-tech operations. Public and private research institutions have gained important and significant insights into fire and its many facets. Industry associations have put enormous efforts into collecting, documenting and disseminating knowledge. Subject matter experts coming from various stakeholders have invested a phenomenal amount of time in the writing of standards and codes of practice. Legislators and regulators have come to rely on the industry as a whole including its associations in defining laws, regulations and codes for all parties involved, specifically building owners and operators.

During the past 60+ years, it is conceivable that on a global basis over 500 thousand lives have been saved together with a higher number of avoided physical injuries and psychological trauma. Add to this consideration the sorrow and pain that was not inflicted on the families and friends of those saved and unharmed. On top of this is the avoided monetary impact that would have amounted to billions of EUR/USD for society. From this perspective there have been strides in success also in light of the remaining many lives still lost each year with the previously outlined causative effects.

During the past 60+ years, technology has in a very broad sense been the key driver in the development and evolution of our society. This fact is not new. However looking specifically at construction, communication, electronics and software, the fire safety industry has played a major role during this evolution. For example, new construction technology led to challenging structures that in turn required new means to protect occupants from fire events. The extensive accessibility to cost-effective electronics and software enabled the development and broad use of smoke detectors that allowed building owners to economically monitor their buildings round the clock for fire conditions. One advance led to another and another and continues to do so.

During the past 60+ years, the industry as whole has built up the resources, skills, competencies and knowledge to meet the objective of both avoiding uncontrollable fires as well as continually reducing the impact of fires on lives and assets. Less and less people experience a fire in their lives and of those who have, only a small number ever came into contact with the fire or its by-products. This means they left the building unharmed. Our most important objective was met. Within our respective roles as scientists, engineers, consultants, product developers, installers, field technicians, standards writers, etc., we not only maintain the acquired expertise to protect, but we continue to expand it. The world is measurably safer because of what we do. An inseparable part of our efforts within the fire safety industry is to continue our search for improved and new ways to reliably detect fires, provide occupants guidance to safe areas and inform intervention forces on the type, location and magnitude of a fire.

The point I wish to make here is that in the past 60+ years a revolution has been going on. During this time the fire safety industry grew and evolved into new areas, taking on new challenges and providing answers for all the aspects I listed in the beginning; technical, knowledge, regulatory, etc.. I conclude, we are experts in safeguarding people and we have decades of experience to substantiate this claim. I propose that this evolution is not over. Built on the foundation of our success and expertise, we have the potential to expand our scope in safeguarding lives and property.

## 2 Major Risk Dynamics for the 21<sup>st</sup> Century Society

In the 21<sup>st</sup> century, our most basic needs as individuals and a society for protection against endangerment of life, limb and property have not changed. Those familiar with Prof. Maslow's pyramid will support the statement that any society (modern or otherwise) requires safety in order to secure its existence. We empower organisations and people with expertise to put measures in place to keep individuals and society safe.

Yet there are three fundamental aspects to consider in understanding what this means for us today:

1. Both new and evolved technologies pose new threats. Within the last few years, large scale chemical explosions or train derailments with dangerous goods have been known to take out the better part of towns. Society perceives sufficient protective measures to be in place to avoid such hazards, or at least keep them under control. Experience has shown that these measures are not always sufficient. Even the experts are challenged with situations that they did not expect or foresee, because technology was implemented before we knew what could happen. This is part of our continuous learning curve.
2. Society is also going through an evolution. We are confronted with levels of urbanization and a population that is growing and aging, the likes of which we have never seen before. In cities and agglomerations, there are simply more people per square kilometre than what existed in the past. Intervention and rescue forces experience surmounting complications in getting to a hazard scene in time to deploy the necessary measures, before lives are lost or significant damage is caused. An event in or near a city can easily endanger hundreds or even thousands of lives.
3. Due to technological advances and changes in our society, there is a causal shift in the combination of the types, complexity and damage potential of hazards. This is best explained by what I call the "Event Metamorphous Model". This model describes how individual events interact thereby creating a "Meta Event". The management of such Meta Events can be extremely difficult and challenging during planning and moreover during response, because each singular event can have a multitude of variables that interact with other event variables in a catalytic manner.

What all of this means is, that there is a dynamic in the risk potential that we cannot always control. The key outcome of any risk assessment is the Probability and Impact analysis that informs us on the Magnitude. We can infer from the above that both "Probability" and "Impact" have increased and will continue to do so. Consequently "Magnitude" has undergone a significant increase relative to the past and will also continue to do so. Such risk assessments will evidently exhibit that the kinds, types and sources of dangers are clearly not limited to fire events. Therefore, as technology advances, society evolves and complexity grows, comprehensive efforts are needed to analyse, identify, understand and quantify these dangers to enable us to develop and implement protective measures.

What does this have to do with the fire safety industry?

### 3 Evolving Fire Safety Systems to Meet the Needs

This points us in the direction of a more holistic kind of safety. The issue is not about diverting attention and resources away from fire safety. It is however about amending today's safety measures to appropriately address the new risk situation. These measures must be based on the principles of Detection, Initiation, Evaluation, Notification and Signalisation. Our expertise is needed!

A fire detection and alarm system is in line with this principle. Further, these systems are one of the most regulated and hence secure systems in any building. Because of long-standing, tried and tested standards respectively codes of practice, certified products and system components along with skilled experts, fire detection and alarm systems demonstrate the highest levels of resilience, availability and redundancy. The number of lives saved and the avoidance of damage to buildings and infrastructure is proof of the dependable substance of these systems even under harsh conditions.

Taking all of the above into consideration, I conclude that an evolution of fire detection and alarm systems (FDAS) into danger detection and management systems (DDMS) is a logical and needed development. Such a system would for example include functions for detection of chemical, biological, radioactive and other threats, provide guidance for occupants to safe areas as well deliver information to intervention forces. A DDMS would also tie in other building systems and resources by tapping into their emergency functions as needed. The "Emergency Mode" concept would be a new approach in product and system development and design that would open new possibilities for building owners, engineers and so on.

Have I been able to convince you that a pro-active step of the fire safety industry into the direction of holistic safety is the right thing to do? And that we have the skills, knowledge and competencies to be successful? Is my reasoning clear enough?

### 4 Functional Convergence through the Internet of Things

If not, then there is another imperative reason. If you follow the market development "Internet of Things" (IoT), then you will know that communication is providing the foundation for the next level of convergence. Connecting systems together has been around for over 40 years, but these connections are more or less limited to the automation level. Interactions at a sensor and actor level are even more limited if different vendors are used. IoT is an environment where all things exist in an interconnected world. The definition published in Wikipedia is:

*<sup>1</sup>The Internet of Things (IoT) is the network of physical objects or "things" embedded with electronics, software, sensors and connectivity to enable it to achieve greater value and service by exchanging data with the manufacturer, operator and/or other connected devices. Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the existing Internet infrastructure.*

For the purpose of this document, the term "Internet" is understood as a technological platform that can be public or private with regards to accessibility.

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<sup>1</sup> Source: [https://en.wikipedia.org/wiki/Internet\\_of\\_Things](https://en.wikipedia.org/wiki/Internet_of_Things)

This video gives insight into how our lives could change in the foreseeable years to come:<sup>2</sup>“Internet of Things - Imagine everything was linked”  
<http://youtu.be/qfhcPvwzJF0>

IoT is to a greater part still a vision and hence not a widely spread reality. However, the direction is clear and the steps towards this new world are not only taking place now, but they are impacting the fire safety industry just to mention one of many. Data centres are where this vision is quickly being developed and implemented. They demonstrate the potential to be representative of the wider market making them ideal “IoT Incubators”. Within the complete data centre management, fire safety systems are one function amongst others. The argument of codes and standards in light of a heightened demand for data centres cannot be an option for the fire safety industry to defend its realm. This also holds true for security, building automation, power management and so on.

Based on this example alone, the fire detection and alarm industry is faced with the decision of being a Leader or a Follower. As outlined earlier in this document, the fire safety industry has the skills, knowledge and competencies, moreover the experience to establish a leadership position in defining the future of safe buildings, which is a pre-requisite for safe cities. There can be no misunderstanding that if our industry does not respond to this call, then others will.

## 5 The Relevant Points

The summary of the relevant points is:

1. The people in the fire safety industry have the expertise and a proven track record for safeguarding lives and property.
2. The 21<sup>st</sup> century society is confronted with major risk dynamics due to technological advances, urbanisation, growing and aging population, and increasing complexity in the types and sources of dangers.
3. The evolution of fire detection and alarm systems into danger detection and management systems is a logical and needed development.
4. The convergence of systems is a reality for all building technologies including fire safety. The “Internet of Things” outlines the path into a world of connected things, which is a pre-requisite for safe cities.

What could be the next step?

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<sup>2</sup> Source: <https://joinup.ec.europa.eu/elibrary/video/internet-things-europe-movie-imagine-everything-was-linked>

## **6 A Call for Action**

Assuming that both general and wider agreement exists on what has been written, then the next step is to establish a common position within the fire safety industry on how it will address such a change. It is not sufficient to just outline the challenges and opportunities. Therefore, I propose an initial workshop with various representatives and stakeholders. Its objective would be to draft an industry document that portrays a vision and provides a roadmap with major milestones. This document would have the potential to set the scene for the next evolution. The fire safety industry including its stakeholders and interest groups could build on it.

Understandably, there is a need for courage to act and perseverance to achieve and our sights must be set to a new horizon. To find the necessary motivation, we need only to remind ourselves that the results of our work makes the world a safer place for millions of people!