But, which is the difference between security and safety? In accordance to Skavland Idsø and Mejdell Jakobsen, (2000), *Safety* is protection against random incidents. Random incidents are unwanted incidents that happen as a result of one or more coincidences. *Security* is protection against intended incidents. Wanted incidents happen due to a result of deliberate and planned act. Or, a condition of being protected against planned, malicious and criminal incidents from a wide range of threats, where what is protected is all kinds of values to an organisation/individual and incidents happen due to the wish for a wanted output/consequence for the attacker.

The 2001 terrorist attacks at New York City's World Trade Center and the Pentagon, the 1995 bombing of Oklahoma City's Alfred P. Murrah Federal Office Building, and the 1996 bombing at Atlanta's Centennial Park, and more recently the bombing at the Boston Marathon, shook the nation, and made Americans aware of the need for better ways to protect occupants, assets, and buildings from human aggressors (e.g. disgruntled employees, criminals, vandals, lone active shooter, and terrorists). The 2001 terrorist attacks demonstrated the country's vulnerability to a wider range of threats and heightened public concern for the safety of workers and occupants in all Building Types. In an ideal world, every critical public or private building infrastructure would be built like a fortress to withstand any emergency. But in the real world, FRQVWUXFWLRQ FRVWV PDWWHU DQG HQJLQHHUV ³EXLOG WR FRG their critical infrastructure meets minimum codes for safety, when terror ² or nature ² hits especially hard, minimum codes provide minimal comfort. Now, thanks to researchers -all over the world and in particular at European Union (EU), European Commission (EC) and at Member States (MS)- and their communities FDQ IRUWLI\ WRGD\¶V FULWLFDO LQIUDVWUXFWXUHV DQG GHVLJ assaulted by various threats and vulnerabilities like extreme weather conditions, accidents or technical failures, pandemics, acts of terrorism, cyber-attacks etc. Member States are dependent on efficient, UHOLDEOH DQG PRGHUQ EXLOGLQJ LQIUDVWUXFWXUH V\VWHPV reliability of many critical systems. Among them are systems for power generation and consistent access to energy and clean water, for transportation and aiding the flow of goods and assets into and out of the country, and for the design and construct of residential and public buildings. Critical systems also include those that safeguard food supplies, aid public health, and provide emergency services as well as those that secure communications and data services. Specific security measures like intelligence collection and analysis, surveillance, monitoring and detection of threats are always required to protect critical infrastructures. However, should a breach of security occur and all precautionary measures fail, the physical structure itself will bear the first consequences of an attack. By choosing the right materials and designing the structures so that they can resist abnormal loads, such as explosion and impact, it is possible to avoid or mitigate major disasters involving injuries due to flying debris, fatalities due to progressive collapse etc.

The basic components of the physical security measures to address an *explosive threat* considers the establishment of a *protected perimeter*, the prevention of *progressive collapse*, the design of a *debris mitigating façade*, the isolation of internal explosive threats that may evade detection through the screening stations or may enter the public spaces prior to screening and the protection of the emergency evacuation, rescue and recovery systems. Other than establishing a protected perimeter, these *protective measures* are generally achieved through principles of structural dynamics, nonlinear material response, and ductile detailing. Operational security and life safety measures should be considered together with the physical security measures to develop a comprehensive building security design.

In this research, is presented the current framework of European Policies for the Security in Building Constructions.

In the following sections, the concepts of the main European Policies and programs for the security in building constructions presented oriented to the resistance of structures in explosive effects. At the end, discussion is made on the lack of standards, the ethics and the priorities of the EU until the 2020.

2. General European framework for Security

Both safety and security are built on a legal and regulatory framework. That framework should define the responsibilities of several organizations: the Member State, the regulatory authority or authorities, and the operating organizations. The process of improving safety and security in building constructions involved standards which have also an important role in harmonising safety & security levels within the European Union and in providing a common technical language based on the most recent scientific and technological developments. The availability of Eurocodes and European standards in buildings infrastructures are a starting condition for risk reduction and harmonisation. Although the building infrastructures are not by themselves ECI therefore constitute a key element of all the sectors and subsectors of the two main categories of ECI of the European Council Directive 2008/114/EC.

The obligation to provide such all-encompassing security resides at the core of EU policy and grids many of the objectives outlined by Jean-Claude Juncker, the Commission's new President. His top priorities include job creation and growth, energy security, stronger borders for Europe and a strengthening of the EU's international position and influence, among others. These societal obligations are enshrined in the EU's Horizon 2020 (H2020) research budget for 2014-2020 and its "Secure Societies" pillar. The Commission's Security Research Programme is structured around these objectives and works closely with Europe's civil security stakeholder communities of researchers, societal groups, national enduser authorities and industry to ensure the right capabilities are delivered to support the Secure Societies goals of the EU and its 28 Member States. At its most basic level the programme helps reinforce EU policies across the whole of European civil security. For example, more than a dozen of the Commission's 33 policy departments (Directorates-General or DGs) have a direct or indirect link to security, whether the focus is internal or external to the EU. The European policy nexus of Security Research are illustrated in the following figure 1:

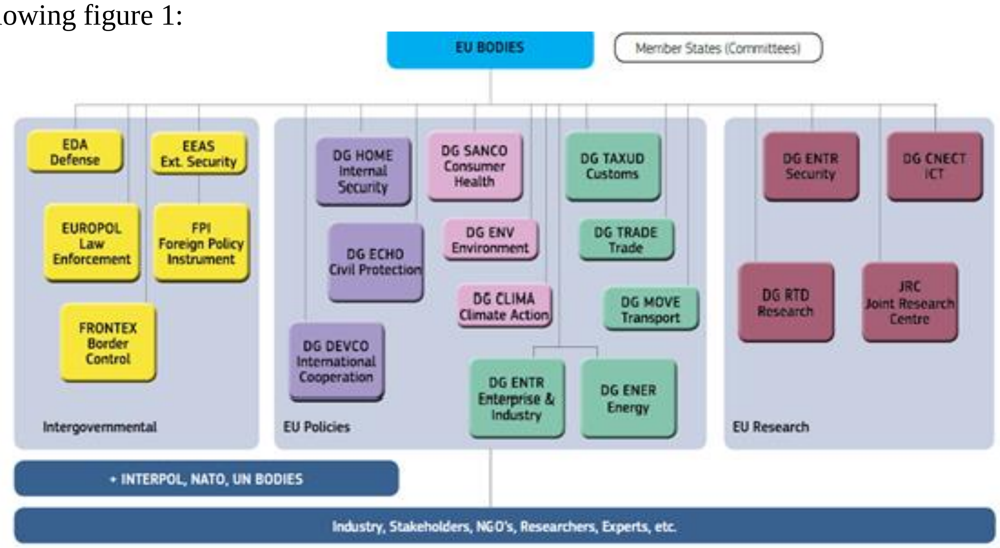

Figure 1: The policy nexus of Security Research.

The management of crises, whether natural disasters or manmade ones such as industrial accidents and terrorists incidents, has become a far more complex challenge for civil security stakeholders compared to just a few decades ago. The EU's humanitarian aid and civil protection policies cover a daunting array of tasks linked to crisis management and disaster response, both within and beyond the EU's borders, be it the delivery of food and emergency shelters to third countries or fighting fires in southern Europe. The twinned projects of DRIVER ("Driving Innovation in Crisis Management for European Resilience) and EDEN ("End-user driven DEmoforcbrNe" showing the way. This offers a nice policy symmetry since it loops back to the Security Research programme's own goal of creating a similar kind of 'user community' across the Commission to strengthen the ties between home affairs policy and security research. The type of disasters (natural or manmade) and their connection with the relative European Projects/Programmes/policies and their interrelationship are illustrated in the Figure 2.

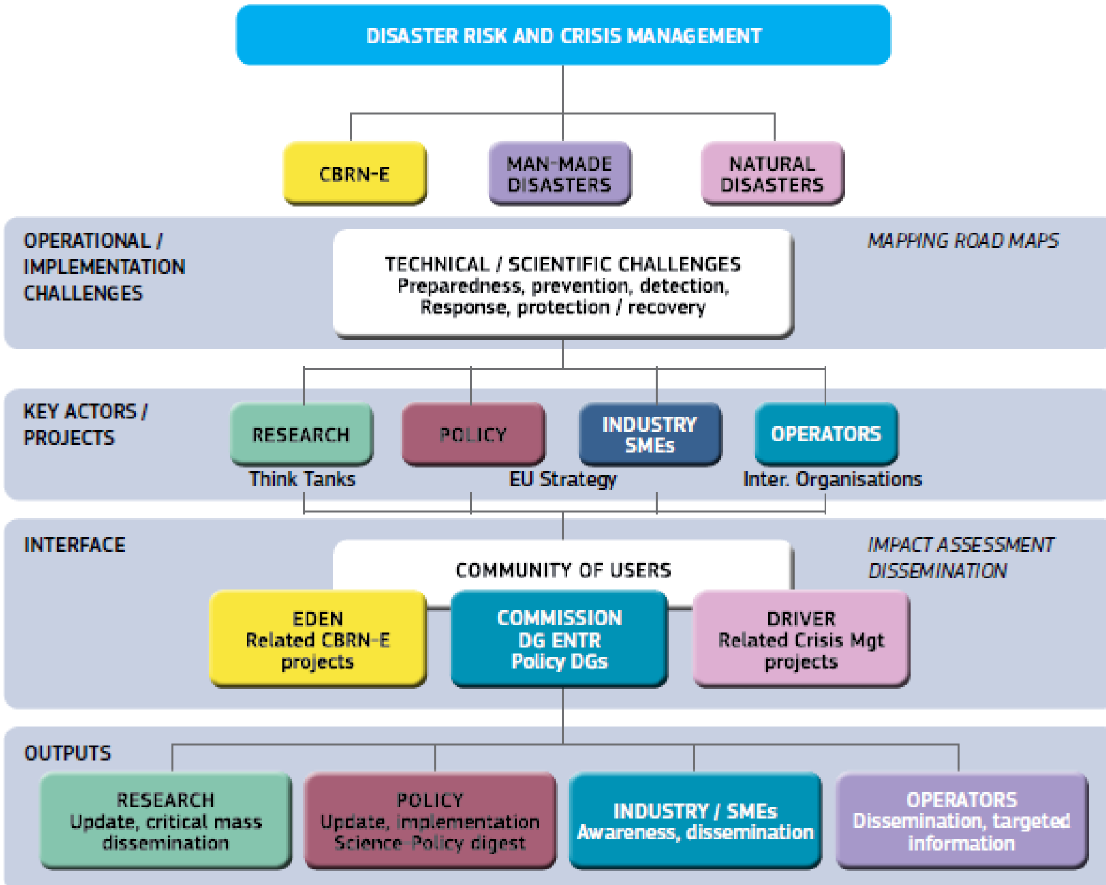

Figure 2: Using projects DRIVE and EDEN to herd Europe's disaster-response stakeholders toward a common Security vision and policy.

3. Current European Policies/Programmes for the Protection of Building Infrastructures

3.1 General

The power grid, the transport network and information and communication systems are among the so-called "critical infrastructures", which are essential to maintain vital societal functions. Damage or destruction of critical infrastructures by natural disasters, terrorism and criminal activity may have negative consequences for the security of the EU and the well-being of its citizens. Thanks to researchers at EU/EC, MS and their communities can fortify today's critical infrastructures—and design tomorrow's—to absorb blows and remain open if assaulted by various threats and vulnerabilities like extreme weather conditions, accidents or technical failures, pandemics, acts of terrorism, cyber-attacks etc. The importance of common Standards, Mandates and Norms are essential for the establishment of an harmonizing and integrated framework within EU MS. The main policies for protection against random incidents (natural causes/threats/hazards) are Eurocodes.

3.1.1 Supporting the development and implementation of standards

The research carried out at the JRC contributes to the development of the Eurocodes, a set of European standards for the design of buildings and other civil engineering works. Since 2010 the Eurocodes have reached the final stage of national implementation by the Member States as they are now replacing all national standards, assuring more uniform safety levels for buildings and critical infrastructures within the

EU. The JRC has contributed significantly in bringing the Eurocodes to their present stage and is now supporting their implementation, harmonization and further development. In 2010 and 2012, respectively, the Enterprise and Industry Directorate General of the European Commission issued the mandates M/466 EN and M/515 EN to CEN concerning the process of further evolution of the Structural Eurocodes aiming at the publication of the second generation of the Eurocodes.

3.1.2 Testing for increased seismic safety

It is unfortunately not possible to predict the location and intensity of future earthquakes, but most of the human casualties are due to the collapse of inadequate construction. Therefore, effective prevention has to be based mainly on adequate design, construction and maintenance of civil engineering structures. To mitigate the effects of earthquakes, the JRC studies the structural behaviour of buildings and other infrastructures under earthquake scenarios, develops methodologies to increase the safety of buildings and contributes to the creation of European standards for the construction sector.

3.1.3 Improving safety of precast structures

The JRC participates in the FP7 project SAFECLADDING which addresses the problem of the interaction of cladding elements with the precast structures. The role of the JRC is to provide the full-scale experiments, to be conducted on a realistic portion of a single-storey building, equipped with a series of different arrangements of claddings and fixture devices.

3.1.4 Stress tests of critical infrastructures

Critical infrastructures provide essential goods and services for modern society; they are highly integrated and have growing mutual dependencies. To reduce the societal and economic consequences of low probability-high consequence events, the FP7 project STREST aims at designing a stress test framework that addresses the interdependencies and vulnerability of critical infrastructures. The JRC is leading the dissemination activities and the interaction with stakeholders.

3.1.5 Other Programmes

In order to assess the performance of technological systems and quantify the economic impact of disruption of critical infrastructures on society, the JRC has set-up a framework to assess resilience of critical infrastructures both at technological as well as economical level. In 2012 the JRC is working towards a GIS-based platform in which users will be able to use their data and models and it will be possible to visualise the output on a GIS layer.

3.2 Protecting buildings from explosions, impacts and blasts

Main priority of the European Union in respect of the EU Counter-Terrorism strategy, whereby EU Member States are committed to jointly fighting terrorism, making Europe safer for its citizens. The second priority of the EU counter-terrorism strategy is the protection of citizens and infrastructure and the reduction of vulnerability to attack. This includes the protection of external borders, the improvement of transport security, the protection of strategic targets and the reduction of the vulnerability of critical infrastructure. Other relative policies are included the COM(2014) 247 final, on a new EU approach to the detection and mitigation of CBRN-E risks, as well as the EU Internal Security Strategy in Action, which pays attention to the need to enhance capabilities against CBRNE (chemical, biological, radiological, nuclear, explosives. Furthermore, the European Standardisation Organisations, under the banner of DG Enterprise and Industry’s Mandate 487 is aimed at leading towards more harmonised European CBRNE security standards. Built infrastructure, such as government buildings, dams, power plants, train stations, are potential targets for terrorist threat and can also be damaged by accidents. Their protection starts from the resistance and robustness of the physical structure itself, so that if security measures fail, catastrophic consequences can be contained.

3.2.1 European Programm for Critical Infrastructure Protection EPCIP

To reduce the vulnerabilities of critical infrastructures, the European Commission has launched the *European Programme for Critical Infrastructure Protection* (EPCIP). This is a package of measures aimed at improving the protection of critical infrastructure in Europe, across all EU States and in all relevant sectors of economic activity. The EU initiative on Critical Information Infrastructure Protection (CIIP) aims to strengthen the security and resilience of vital Information and Communication Technology (ICT) infrastructures. The European Programme for Critical Infrastructure Protection (EPCIP) is a framework under which various measures together aim to improve the protection of critical infrastructure in the EU.

3.2.2 European Reference Programm for Critical Infrastructure Protection ERNCIP

In support of EU efforts to protect critical infrastructures, the EC and in particular the JRC coordinates the *European Reference Network for Critical Infrastructure Protection* (ERNCIP), provides technical support for the review of the Directive on European Critical Infrastructures and carries out different research activities such as the development of methods and tools for international cyber security exercises, the assessment of the vulnerability of networked infrastructures in case of extreme space weather events, and the evaluation of the resistance of buildings and transport systems against explosions. ERNCIP provides a framework within which experimental facilities and laboratories can share knowledge and expertise in order to better align test protocols throughout Europe, leading to better protection of critical infrastructures against all types of threats and hazards. The European Policies/Programmes for the Protection of Building Infrastructures are illustrated in Table 1.

Table 1: European Policies for the Protection of Building Infrastructures

European Policies for Built Infrastructure Protection				
Safety				Security
Natural causes/threats/hazards (protection against random incidents)				Not natural causes/threats/hazards (protection against intended incidents)
Supporting the development and implementation of standards	**Testing for increased seismic safety**	**Improving safety of precast structures**	**Stress tests of critical infrastructures**	**Protecting buildings from explosions, impacts and blasts**
Standards in construction: the **Eurocodes**	European Laboratory for Structural Assessment (**ELSA**)	**SAFECLADDING** - Improved fastening systems of cladding panels for precast buildings in seismic zones	**STREST** - Harmonized approach to stress tests for critical infrastructures against natural hazards.	**EPCIP**- European Programme for Critical Infrastructure Protection **ERNCI**P- European Reference Network for Critical Infrastructure Protection

The JRC works on the physical protection of critical infrastructures under certain types of intentional threats or accidents, such as explosions, impacts and blast waves. Vulnerabilities of buildings are identified and classified via proper material modelling, structural mechanics and numerical simulation techniques. Specific security measures like intelligence collection and analysis, surveillance, monitoring and detection of threats are always required to protect critical infrastructures.

Among others ERNCIP thematic areas is the explosion effects and in particular the thematic group of resistance of structures in explosion effects. The resistance of civil buildings and building elements against explosive effects has only been considered in the last decade and consequently only now being understood by governments and society. For this reason the number of regulations available is very limited, and, consequently, there is no harmonised system of testing the elements. The same goes for dynamic numerical test methods where, in general, no regulations or accepted guidelines have been established. While there is a lot of testing experience in individual facilities and laboratories, each facility has its own testing methods, and there are a very limited number of published harmonised experimental procedures. The goal of the TG is to develop guidelines to help to harmonise test procedures in the testing of structural elements against explosion-induced loads. First, as the loading characteristics of an external and an internal explosion are quite different and need to be considered separately, the TG will focus on testing methods for only external detonations. Second, the TG will concentrate on far-field blast loading and the specification of the test methods to define the resistance of structural elements against this loading. Third, the plan is to start with an element for which a regulation is available that enables certification products with an explosion resistance class, which in this case is windows and glazing. In a later phase, the same process of harmonising test methodologies and protocols will be applied to other structural elements. In the next chapter we present the main parameters in the resistance of structures in explosion effects under the concept of building construction security.

4. Resistance of structures in explosive effects

As is evident in the overview of the different existing standards above, there are currently no universal codes or standards that apply to all public and private sector buildings. However, most designers agree that security issues must be addressed in using integrated design process with an understanding of the impacts and goals of other design objectives. This will ensure a quality building with effective security.

The four basic physical protection strategies for buildings to resist explosive threats are (1) Establishing a secure perimeter, (2) Mitigating debris hazards resulting from the damaged façade, (3) Preventing progressive collapse; and (4) Isolating internal threats from occupied spaces.
Other considerations, such as the tethering of non-structural components and the protection of emergency services, are also key design objectives that require special attention.

Generally, the size of the explosive threat will determine the effectiveness of each of these protective strategies and the extent of resources needed to protect the occupants. Therefore, determining the appropriate design threat is fundamental to the design process and requires careful consideration. Comprehensive threat and vulnerability assessments, and risk analysis can help the design team understand the potential threats, vulnerabilities, and risks associated with a building as well as determine the design threat for which a building should be designed to resist. Usually, the definition of the design threat is based on history and expectation. However, it is limited by the size of the means of delivery. For example, a hand-carried device, if efficiently packaged, could occupy as little as half a cubic foot of space and could be easily concealed in a large brief case or small luggage and introduced deep into the structure where it could do considerable damage.

Some types of attack and threats to consider include: (1) Unauthorized entry/trespass (forced and covert), (2) Insider threats,(3) Explosive threats: Stationary and moving vehicle-delivered, mail bombs, package bombs, (4) Ballistic threats: Small arms, high-powered rifles, drive-by shootings, etc, (5) Weapons of mass destruction (chemical, biological, and radiological), (6) Disruptive threats (hoaxes, false reports, malicious attempts to disrupt operations), (7) Cyber and information security threats, (8) Supervisory Control and Acquisition Data (SCADA) system threats (relevant as they relate to HVAC, mechanical/electrical systems control and other utility systems that are required to operate many functions within building.

Therefore, the selection of the design level explosive threat depends on the (1) features of the building, the (2) site conditions, and the (3) level of risk the client is prepared to accept. Regarding the defining of the design threat, the factors that are crucial are the (1) blast loading, the (2) dynamic analysis of building systems and the (3) performance of the standards.

Parameters like (1) perimeter protection, (2)façade protection, (3) curtain wall protection, (3) floor slab reinforcements, (4) column reinforcements, (5) preventing progressive collapse, (6) transfer girder reinforcements, (7) overall lateral resistance, (8) internal partition reinforcements and (9) alternative construction materials to resist explosive threats, they consists crucial physical protection strategies and features for the security in building constructions.

5. Concluding Remarks

It is a fact that there is a lack of enforcement of specific series of standards in the field of building construction security. All the involved stakeholders like policy makers, scientists, researchers, regulators, operators of private and public sectors, in all the MS are agreed that is a priority to work together for enforcing international and European best practices, testing methodologies for developing strategies and standards for successful application in the area of security building construction.

As the fruits of security research find their way into more products and processes across society it is vital to embed data protection requirements into their technical design specifications. This also pertains to business practices, physical infrastructures and societal interaction in general. The concept of privacy-by-design takes into account each step in the design, production and provision of security technologies and services to strengthen to privacy management and the social acceptance of EU security-related products. The EU is working on a plan to promote privacy-by-design standards to help Europe's manufacturers and service providers embed this concept in its products and services. A robust framework of collaboration with CEN/CENELEC/ETSI, the European Standards Organisations, will support all the relative efforts for the existence of specific standards.

Horizon 2020's Secure Societies pillar lays down ambitious objectives for Europe: better resilience to natural and man-made disasters, stronger maritime and supply chain security, higher levels of cyber-security and, not the least daunting, new ways to curb crime and terrorism. Due to globalisation's pervasiveness, nearly all of these veer into the international arena today. The integrity of critical infrastructures and their reliable operation are vital for the well-being of the citizens and the functioning of the European economy.

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