

Emergency Service Regulatory Framework

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1. Baseline information

Civil protection system that is established in Croatia and Italy at national, regional and local level, is primarily based on risks such as earthquakes, forest fires, floods, landslides and, particularly in the Adriatic Sea, maritime accidents. In the Republic of Croatia and in Italy, civil protection authorities such as the national government, counties, cities and municipalities are responsible for establishing a civil protection system within their jurisdiction and for establishing and operating a civil protection headquarters in case of emergency.

Each headquarter must make strategic decisions about the mobilization of response forces (firefighters, medical teams, police, mountain rescue, civil protection units) in the first hours of the emergency response and therefore needs information from the emergency area to determine priorities and the number of resources needed to save lives, protect property, and the environment.

At the regional level, this information is usually collected by operations centres such as the 112 centre or the fire brigade centre and forwarded to the respective civil protection headquarter.

Considering the new technology available in the EDSS platform, the civil protection legislation needs to be updated to ensure the implementation of EDSS in the civil protection system.

1.1. Project Info

In last year's much had been done to increase safety and resilience of Croatian and Italian Adriatic Basin, in other words, to decrease exposure of coastal and internal ecosystems and population to the impact of hazards and increase their ability to resist, absorb, accommodate to and recover from their effects in a timely and efficient manner. But evidence show that both countries' safety and resilience level remain below expectation and only a more effective crossborder cooperation between both regional and national administrations in enhancing monitoring and emergency management measures shall increase them.

E-CITIJENS approaches the above challenges and opportunities by making available to Civil Protection and Coast Guards an efficient system to predict geophysical factors influencing people and their properties, coordinate the emergency interventions, activate communication channels between institutions and citizens then integrate emergency data with those voluntaries supplied by citizens via Social Media.

This approach is built on three pillars:

1. Participatory process of citizens – It relates to its activation to change citizens' role from traditional "vulnerable element" to "active sensor" of emergencies to obtain their contribution to the Civil Protection emergency activities.
2. Innovation – It relates to the development of an innovative Emergency Decision Support Systems (EDSS), a semantically enriched web enabled platform, able to integrate heterogeneous data from institutional (research centres, sensor networks, etc) and social media sources and make available to emergency services' chain of command the same risk scenarios.
3. Governance – it relates to the improvements of existing Civil Protection Regulatory System and legislation in the two countries, enhancing their level of uniformity and similarity to make available to National and Regional Authorities a crossborder uniform emergency legislative basis.

E-CITIJENS objective is to increase the safety of the Croatian and Italian Adriatic basin natural and man-made disaster by the improvement of monitoring and emergency management measures, harnessing the characteristics of the social media network to significantly enhance Civil Protection's capacity in reducing disaster risk. The main goal of the E-CITIJENS project is to develop an innovative transnational decision support system able to integrate, in case of emergency, the data already available from traditional alert systems with data provided by citizens through social media.

1.2. EDSS platform info

The EDSS platform will add new value to civil protection decision makers by collecting primary information from people near the emergency site with general information about the scale and impact of the emergency.

EDSS will process input data from social media together with data from institutional sources to obtain as output an assessment/alert that can support civil protection authorities in coping with emergencies. Specifically, the model needs to define the main steps to allow the EDSS platform to select relevant information primarily from social media, validate it and effectively use it in the emergency management process. Main output will be to effectively use relevant information retrieved from social media for emergency management.

Data from institutional sources will be collected and processed continuously by civil protection and competent authorities according to the protocols and risk grading scaled defined in Italy and Croatia. Both countries have well-structured criteria to define risk scenarios for emergency planning and management systems, and they have adopted indicators and parameters to define emergency severity scales to activate civil protection prevention, warning and rescue measures where EDSS will support decision making process in case of emergency.

The EDSS platform primarily aims to identify and analyse relevant social media posts that can provide Civil Protection authorities additional real-time data regarding potential or ongoing emergencies in a selected geographical area.

1.3. Purpose and objectives of ESR Framework

Emergency Services Regulatory Framework consists in a set of recommendations and guidelines, addressed to local, regional, national and EU policy makers and notable stakeholders (mainly Civil Protection National Department and Regional Agencies in Italy and Civil Protection Directorate of Ministry of Interior and County/City Protection and Rescue Departments in Croatia), how to enhance CP legislations and emergency operational rules coherently with enhanced operational effectiveness of the Crossborder Functional Centre (CFC), and CP chain of command supported by EDSS platform which takes in account the experiences, learnt lessons and faced issues reached during the test of emergency decision support platform (pilot deployment).

The main outputs of the ESR framework will be further used since it will be incorporated into regional and national legislations and will provide permanent guidelines to address the implementation of any future relevant measure and action.

The contents of the Emergency Services Regulatory (ESR) Framework will ensure a wide transferability, since other regions facing the same challenge could easily use it due to the fact it is based on an effective collaboration result among crossborder regions and counties of Italy and Croatia.

1.4. Document methodology

The ESR framework, as a primary outcome of WP 5, needs to identify the existing situation with regard to civil protection legislation and identify recommendations and guidelines for adapting and updating civil protection legislation, in particular civil protection plans at all levels to include EDSS in their standard operating procedures.

In the event of a cross-border emergency between Croatia and Italy, an ESR framework needs to identify procedures for the establishment of a Crossborder Functional Center (CFC), whose main objective is the exchange of information between neighbouring countries. The CFC could act as a physical or virtual location to ensure an adequate exchange of information.

The ESR framework needs to be drafted using methods such as a case study, but also using a combination of different research methods, some empirical, some qualitative and some quantitative. Note that the document itself is not too extensive. As a guideline for the total content (main document and annexes), a length of up to 50 pages is recommended.

PP1, supported by PP2, PP6, PP8 and PP10 drafted an Emergency Services Regulatory Framework, benchmarking actual CP legislations and operational rules with Crossborder Functional Centres and EDSS platform tested modalities.

2. Strategic overview

The complexity of threats and risks and necessary capabilities highlights the cross-sectoral character of civil protection and emergency services. The key to efficient operation of the emergency services lies in an effective normative framework, a strong institutional position of central and county authorities, a systemic approach to risk management, development of existing/basic operational forces, cross-sectoral cooperation and implementation of new technologies and best practices of EU Member States.

2.1. Union Civil Protection Mechanism

The Union Civil Protection Mechanism aims to strengthen cooperation between the Union and the Member States and facilitate coordination in the field of civil protection in order to improve the efficiency of the emergency prevention, preparedness and response system. The protection provided by the Union Civil Protection Mechanism primarily includes protection of the population, but also of the environment and property, including cultural heritage, against all types of emergencies caused by natural or man-made risks, including the consequences of acts of terrorism, technological, radiation or environmental accidents, marine pollution and health emergencies occurring inside or outside the European Union. In the event of consequences of acts of terrorism or radiation disasters, the Union Civil Protection Mechanism may only cover preparedness and response activities.

The Union Civil Protection Mechanism promotes solidarity among the Member States through practical cooperation and coordination, without prejudice to the primary responsibility of the Member States to protect the population, the environment and property, including cultural heritage, on their territory against the consequences of emergencies, as well as to ensure sufficient capacities within their disaster management systems to provide an adequate and consistent response to emergencies of the nature and scale that may reasonably be expected and prepared for.

While the Union Civil Protection Mechanism includes a number of elements for cooperation and coordination in the event of disasters, one of the most important is the Emergency Response Coordination Centre – ERCC. The ERCC is the operations centre of the Union Civil Protection Mechanism, which operates within the Directorate-General for Humanitarian Aid and Civil Protection — DG ECHO and is active on a 24-hour, seven-days-a-week basis. The ERCC is the operations centre at which state participating in the Union Civil Protection Mechanism may obtain, in one place, information on available civil protection resources and equipment for responding to emergencies.

Operational capacities called civil protection modules are a self-sufficient and autonomous, pre-defined tasks and needs-driven organisation form of the Member States' capacities, i.e., a mobile operational group of the Member States, which constitutes a combination of human and material resources that may be described in terms of emergency response capacities or according to the tasks it can perform. The modules involved in the provision of assistance are intended for search and rescue from collapsed buildings, aerial firefighting, ground forces firefighting, high-capacity pumps, flood protection, rescue from water with boats, etc. To this end, emergency services may develop operational capacities to provide urgent international emergency assistance. Both, Italy and Croatia actively participates in the activities of

Union Civil Protection Mechanism in order to raise level of preparedness for both, national and international level emergencies.

2.2. Civil Protection System – Italy

The scope of civil protection in the Italian state is defined in accordance with Art. 117 of the Italian Constitution. The Italian civil protection system was established in 1992 pursuant to the act establishing the National Civil Protection Service. From 2 January 2018, the national service is defined in the Civil Protection Act, which reformed the legal regulation. The Act was drawn up in order to simplify and streamline the provisions on civil protection.

The levels of the national civil protection service are:

- the Civil Protection Department (within the Government of the Italian Republic)
- state administration authorities
- regions
- autonomous regions
- local authorities.

The main stakeholders on state level are:

- National Firefighter's Association
- armed forces
- police forces
- Italian Red Cross
- national health service
- National Alpine Cliff and Cave Rescue Corps.

Civil Protection Act provides for innovation in the dynamic study of possible risk scenarios. Assessment is a preparatory activity for alert and civil protection planning activities. Regarding prevention, the development of capacities over time is taken into consideration, which clearly shows that the field of prevention can, as a whole, encompass structural and non-structural measures.

Non-structural prevention measures include a number of activities, most prominently alerting and informing performed by civil protection services with regard to risk scenarios, rules of conduct, and civil protection planning. Structural measures are introduced as 'structural civil protection prevention', at the same time pointing out specific civil protection matters connected to structural prevention. Interventions aimed at mitigating structural risks on the emergency site are also regulated.

The Civil Protection Act defines operational criteria which allow only for the implementation of measures and activities which are deemed to be of high quality according to rules of the scientific community. The scientific community participates in the National Civil Protection Service through integrated activities and through preparatory research activities. The scientific community contributes to the National Civil Protection Service through technical and scientific support, monitoring, predicting and preventing various risk hypotheses on the national territory, development projects and technical innovation of the monitoring networks, as well as studies and surveys.

2.3. Civil Protection System – Croatia

In the Republic of Croatia, civil protection is a system of organising stakeholders, operational forces and citizens in order to protect and rescue people, animals, material and cultural goods and the environment in the event of major accidents and disasters and to remedy the consequences of terrorism and war destruction. The civil protection system is developed in accordance with the identified risks which affect human life and health, the economy and social stability and policies.

Civil protection measures include alerting and notifying, evacuation, providing care, removing, rescuing, providing first aid, CBRN defence, sanitisation (human, animal and ground), protection of animals and foodstuffs of animal origin, protection of plants and foodstuffs of plant origin. Activities of the civil protection system include preparation (in the form of prevention and planning activities as part of the regular activity of civil protection system stakeholders) and operational activities (ranging from early warning and preparedness to response). Civil protection system measures and activities are carried out by stakeholders and operational forces.

Civil protection system stakeholders are:

- the Government of the Republic of Croatia
- the central state administration authority responsible for civil protection affairs – Ministry of the Interior
- state administration and other authorities
- Croatian Armed Forces and police
- local and regional self-government units.

Civil protection system operational forces are:

- civil protection headquarters
- firefighting association/units
- Croatian Red Cross
- Croatian Mountain Rescue Service

- non-governmental organizations
- civil protection units and commissioners
- on-site coordinators
- legal persons within the civil protection system.

A large number of members (professionals and volunteers), who are an important resource of the fundamental operational forces and on-site civil protection coordinators, units and commissioners, as well as citizen's and legal person's associations, participate in the civil protection system operational forces. The operational forces have significant material resources allocated pursuant to recognised risks and provided with the support of the Armed Forces of the Republic of Croatia, the police and emergency medical assistance.

The local (towns, cities and municipalities) and regional (counties and the City of Zagreb) civil protection system level is responsible for coordinating the work of stakeholders and operational forces within its competence, but lacks the necessary administration, professional and financial capacities, so additional investments are required in order to efficiently fulfil all duties.

The Civil Protection Directorate within the Ministry of the Interior carries out numerous activities for capacity development of the civil protection system's operational forces. MoI also operates 112 centre that that organized on the county level (total of 20 112 centre operates in Croatia and on the national level Operational Civil Protection Centre for national and international level communication/coordination).

Through the civil protection system, cooperation with the private sector and scientific and educational institutions is being increasingly developed, so solutions based on modern technologies can be used for the purpose of operations and communications centres, information technology and connection systems, as well as capacity building for operational activities.

Civil protection headquarters are especially important in the coordination of emergency services in the event of emergencies. The civil protection headquarters is a professional, operational and coordination authority which aligns the activities of the civil protection system's operational forces in the preparatory phase, before consequences of the emergency arise and during the implementation of civil protection measures and activities.

The civil protection system is one of the fundamental elements of the homeland security system, tasked with responding to the threats and risks that lead to emergencies. The civil protection system needs to develop all necessary capacities for the swift mitigation and remediation of the consequences of emergencies. It shall also enable efficient integration of EU and NATO systems into the national civil protection system, as well as efficient international cooperation in this area.

2.4. Bilateral cooperation Italy – Croatia

The Republic of Croatia and the Italian Republic have for many years cooperated in the field of civil protection and emergency services, considering that these two neighbouring states share common risks (earthquakes, floods, fires and accidents at sea) and it is necessary to further strengthen bilateral cooperation regarding good practices in order to develop the capacities for emergency management. Memorandum of Understanding was signed in 2011 between Croatian National Protection and Rescue Directorate and Italian Department for Civil Protection for strengthening bilateral cooperation in field of civil protection.

2.5. Crossborder functional centre (CFC)

The participation in envisaged cross-border cooperation activities should further strengthen existing relations with neighbouring Croatian and Italian regions and improve the cooperation in emergency situations. Strengthening cooperation between the two countries through crossborder functional centre operations will enhance existing relations between them and improve joint coordination in emergency situations. Crossborder Functional Centres (CFC) equipped with an advanced and efficient decision support system will more efficiently monitor risks, manage emergencies and co-ordinate the involved forces during emergency interventions. Setting up a virtual CFC linked with national operations centre in Italy and Croatia will support mutual communication and coordination on bilateral level.

3. Current state analysis intervention – partner level

In order to describe the civil protection organization at the level of project partners as well as the role of universities and their contribution to the area of research and development, current state analysis is part of ESR Framework. Analysis will identify similarities and differences on the organization level as well as scope of activities and stakeholders involved in the civil protection system.

3.1. Civil protection system at regional and local level

3.1.1. Molise Region

Molise is a Southern Italian region of 306,000 inhabitants, its capital is the City of Campobasso. Even though geographically located in the centre of the Italian peninsula, Molise is historically, culturally, economically and linguistically strongly linked to southern Italy. Created in 1963 by the detachment of the Province of Campobasso from the former Region “Abruzzi and Molise” shares borders with Abruzzo and the Adriatic Sea to the North, Lazio to the West, Campania to the South and Puglia to the East- Its provinces are Campobasso and Isernia, the latter established in 1970, again by the detachment of 52 municipalities from the province of Campobasso. The term 'Molise' comes from the first feudal lords of the Contado, who had the surname 'De Molisio', while others claim it derives from the town of Molise.



Photo: Molise Region

HIGHLIGHTS

Population: 306,000

Area: 4,460.65 km²

Number of local self-government units: 136 municipalities

Coastline: 35 km

National parks: *Abruzzo Lazio e Molise National Park*

Natural parks: *Collemeluccio-*

At regional level, the Regional Operations Room (generally defined as S.O.R.), maintains a connection with the Operations Centres activated at provincial, inter-municipal and municipal level and ensures the use of all resources in terms of men and means available on the regional territory, based on the actual needs and requests received from the local authorities. The S.O.R. maintains close contact with the Italian Situation Room, with the regional operational rooms of the operational structures in charge of rescue and/or public utility, with the control or operational rooms of the Agencies and Administrations that manage the service networks and infrastructures, as well as with the operational and coordination centers at provincial level.

The first response to an emergency, whatever the nature of the event that generates it and the extent of its effects, must be guaranteed by the local structures, starting with the municipal structure, preferably via the activation of a Municipal Centre (generally called the Municipal Operations Centre - C.O.C.), where are represented all the different actors operating in the context.

At municipal level, the Mayor is in charge of managing the emergency services in the territory of his/her Municipality, as well as coordinating the rescue and assistance services for the affected population and takes the first steps necessary to deal with the emergency, implementing the emergency planning.

At the provincial level, the Provincial Centre (generally called Relief Coordination Centre - C.C.S.) is activated, in which are represented the Prefecture - Territorial Government Office, the regional and provincial Administration, as well as the Bodies, Administrations and other operational structures involved in the management of the emergency.

The C.C.S. ensures the centralized and unitary management of the interventions to be coordinated with those carried out by the Mayors of the municipalities concerned. The organisational model at a provincial level envisages a Single Operations Room, which, on the one hand, implements what has been established in the C.C.S. and, on the other hand, collects, verifies and disseminates information relating to the event and the Civil Protection response, through constant connection with the various Operations Centres activated in the territory and with the Regional Operations Room.

Overview of the operational capabilities of the Civil Protection System

The management of the Warning System is ensured by the Civil Protection Department and the Regions through the network of Functional Centers, which are responsible for carrying out forecasting, monitoring and surveillance activities of events in real time and the assessment of the consequent effects on the territory.

The network of Functional Centers consists of a Central Functional Centre (CFC) at the Civil Protection Department and Decentralized Functional Centers at the Regions.

The warning system is therefore a distributed State-Regions system, which, in force of Title V of the Italian Constitution, makes Regions a fundamental actor. The Functional Centers are State or Regional agencies directed and coordinated as one only Agency, which are responsible for assessing the level of criticality of hydro-geological and hydraulic risk scenarios that are expected or manifest.

The duties of each Functional Centre are:

- to collect and share with the other Functional Centers, on a dedicated network, both the parametric data relating to the various risks coming from the monitoring networks present and distributed on the territory (managed by the Department and the Regions themselves), as well as from public and private satellite platforms and constellations, and the information coming from the surveillance and counter- events activities carried out on the territory
- to elaborate a real-time analysis of the events taking place on the basis of forecasting and assessment models, and summarize the results together with the Central Functional Centre and the operational Decentralized Functional Centers concerned
- to assume responsibility for such information and assessments by adopting, issuing and disseminating regulated Notices and Bulletins on the evolution of events and on the state of criticality expected and/or underway on the territory with respect to the individual risk.

The warning system is organized so that the activity of the Functional Centres is developed through a forecasting phase and a phase of real-time monitoring and surveillance of phenomena and assessment of the consequent effects on the territory.

The law enforcement agencies i.e. Carabinieri and the Police, monitor and analyze the security situation and the phenomena that favors the emergence and development of crime. They participate directly in the execution of more complex tasks within the work of the police forces and carry out specific actions in

the control of public order. In Molise there are two Police Stations in the capitals of Isernia and Campobasso, as well as a Police Station in the municipality of Termoli. As to the Carabinieri Corps, every municipality in Molise has a station. Both the State Police and the Carabinieri Corps have an emergency number: 113 for the Police and 112 for the Carabinieri.

Emergency medicine in Molise is managed via the 118 number. There are various voluntary associations throughout the region that guarantee the emergency service in agreement with the Regional Health Authority. The Regional Hospital organizational model in Molise is based on the Single Regional Hospital, which is divided into hospital compounds throughout the territory.

The health system is regulated by the Hub and Spoke model, borrowed from the American experience, which assumes that certain conditions and complex diseases require specialized and costly skills that cannot be spread throughout the territory. For this reason, this organization concentrates the most complex cases in a limited number of Hub Centers (Centers of Excellence) and peripheral Spoke centres, where are transferred people who have exceeded a certain threshold of complexity. The Molise Hub is located in the capital city of Campobasso and the Spokes in the towns of Isernia, Agnone, Venafro, Termoli and Larino.

The Port Authority of Molise has not yet been set up, even nonetheless following the forthcoming establishment of the Special Economic Zones (ZES), the Port Authority of the Southern Adriatic Sea is about to increase the number of ports it controls. In addition to Bari, Brindisi, Monopoli, Barletta and Manfredonia, which are all in Puglia, Termoli in Molise is about to be added. The Port Authority and the Puglia-Molise Inter-regional Special Economic Zone are merging. Termoli, in fact, is part of the Adriatic ZES and insists on the core Port of Bari. The procedure for Termoli's entry is at a very advanced stage. After the Puglia-Molise agreement, the green-light should soon be given by the Molise Regional Council and the Ministry of Infrastructure and Sustainable Mobility. In addition, this step is also essential to access the resources of the PNRR.

The National Alpine and Speleological Rescue Corps (CNSAS) is a public service of the Italian Alpine Club. The aims of the CNSAS, clearly defined by law, are the rescue and the recovery of the injured within the mountain territory, in the underground environment and in the inaccessible areas of the national territory plus contributing to the prevention and supervision of accidents occurred contributing to disaster relief, in cooperation with the Civil Protection structures.

The CNSAS is organized on the territory through 21 distributed Services, each one established within each region or autonomous province of the Italian State. To these converge 31 Alpine Delegations and 16 Speleological Delegations, which are sub-divided in Operational Units, called Stations, whose task it is to provide rescue and emergency relief. There are 242 Alpine stations and 27 speleological stations. In the Molise region, the CNSAS operates with the Molise Regional Service (www.cnsasmolise.it).

3.1.2. Veneto region

In 1984 Veneto Region approved the regional law n. 58 concerning all the activities related to Civil Protection. Next, with the Regional Law 11/2001 Veneto Region has transposed the national law which has redefined the overall framework of the functions and administrative tasks of the State, assigning them to Regions and Local Institutions. This law includes the institution of the Regional Coordination Centre in Emergency (Co.R.Em) to which the regional Civil Protection System refers. Co.R.Em. regulates and recognizes the Voluntary Organizations of Civil Protection with the institution of a specific Register of voluntary civil protection groups.

The Regional Law 11/2001 defines the Veneto Regional System of Civil Protection through the identification of municipalities, mountain communities, provinces and voluntary protection organizations as Key operational components of the Veneto regional system, articulated on a provincial scale.

This law has an innovative vision. The indications and prescriptions about land use and land use planning, which are part of the Civil Protection regional planning tools, are binding analysis elements for the drafting and updating of the Regional Territorial coordination Plan (PTRC), the urban plans and the ones concerning regional competences.

Similar concept concerns the provincial and municipal plans of Civil protection according to their territorial plan.

The subdivision of the regional territory into civil protection and forest fire protection districts is another peculiarity of this regional Law which reminds to the Civil protections Areas indicated by the Civil Protection Code.

The Veneto Regional Civil Protection System is fundamentally centered on a close relationship with the administrative bodies such as Provinces, Municipalities and Mountain Communities. This System is also characterized by a strong connection with the voluntary Sector, especially with some Organizations with which it has a convention. Veneto Region has a specific cooperation agreement with the National Firefighters for ordinary activities too, like training and education of the operators.

3.1.3. Pescara Municipality

The territorial organization of civil protection - brief regulatory framework

“Civil protection” is a concurrent legislation matter between the central State and the Regions (cf. Article 117, par. 3 of the Italian Constitution), so that the State legislation (cf. Legislative Decree 1/2018, the so-called “Civil Protection Code”) establishes the general principles, while the Regions have the task of defining the discipline in detail. Specifically, civil protection activities are those aimed at predicting, preventing and mitigating risks, managing and overcoming emergencies (cf. Article 2, par. 1, Legislative Decree 1/2018).

As shown above (see para. 2.2.), the National civil protection service is a polycentric network organization, which is divided into the so-called “components” (State, Regions and Autonomous Provinces of Trento and Bolzano, local authorities), “national and regional operational structures” (cf. Article 13, par. 1, Legislative Decree 1/2018) and “concurrent subjects” (Article 13, par. 2, cf. Legislative Decree 1/2018).

In addition to the national authority (the President of the Council of Ministers), the civil protection authorities are divided into regional authorities (the Presidents of the Regions and Autonomous Provinces of Trento and Bolzano) and local authorities (the Mayors). The Regions regulate the organization of civil protection systems within their respective territories and identify the optimal territorial and organizational areas on the basis of regional planning. Municipalities, also in associated form, ensure the implementation of civil protection activities in their respective territories through the municipal civil protection plans, drawn up according to criteria and procedures defined by directives of the President of the Council of Ministers and according to regional guidelines.

The organization of civil protection in the Abruzzo Region

The Abruzzo Region has regulated its civil protection activities with Regional Law no. 72/1993, which will remain in force until an organic and updated regional code on civil protection has been issued.

In accordance with national guidelines and directives, the regional government approved the new territorial multi-risk alert system, the Memorandum of Understanding between the Region and the four Prefectures on the operating procedures of this system and the Guidelines for municipal and inter-municipal emergency planning (cf. Resolution no. 521 of 23 July 2018).

With Regional Law no. 46 of 20 December 2019, the Abruzzo Region Civil Protection Agency was established. The Agency is responsible for carrying out the technical, coordination, control and surveillance activities in the field of civil protection within the functions of regional competence (cf. Resolution no. 886/P of 29 December 2021).

At the Agency the regional “Functional Center” (already established with Regional Law no. 34 of 1 October 2007) operates as a technical-scientific structure to support regional civil protection activities. In particular, this structure fulfills the functions of centralizing and integrating all instrumental and monitoring data on a regional scale, forecasting meteo-hydrogeological, environmental and seismic risk scenarios, alerting and giving support to the national and regional civil protection system for all types of risk.

Within the Agency it was also established the Regional Operations Room (“S.O.R.”) with headquarters in L’Aquila and an operational support unit in Pescara. The S.O.R. works as a technical center for news gathering, command, coordination, communication and control for the purposes of civil protection activities under the responsibility of the Region. In addition, in order to ensure an adequate response to emergencies, the Regional Mobile Civil Protection Column was set up, composed by personnel and vehicles belonging to the civil protection operational structures operating on the regional territory.

The organization of civil protection in the municipality of Pescara

In compliance with the regional guidelines for municipal emergency planning, with Resolution no. 110 of 23 November 2020 the City of Pescara approved its municipal emergency plan. Specifically, this plan defines, in a coordinated and integrated manner, the institutional subjects, the activities and the operating procedures to be activated in the event of an emergency situation in the municipal area.



Photo: the municipality of Pescara

The plan is divided into a general report which indicates: the characteristics of the territory in relation to the environment, population, and infrastructures; the natural and anthropogenic risks of the territory with the related expected scenarios; the definition of the action model; the code of conduct and the methods for disseminating information in the event of an emergency. The single emergency operational plans are attached to the general report, and they define the operational procedures to be activated for each risk scenario.

With reference to the action model and to the main stakeholders of the municipal civil protection system, it is expected that the Mayor will make use of the technical support of the Municipal Operational Center (the so-called "C.O.C.") for the coordinated management of an emergency situation on the municipal area. The extent and type of support functions of the C.O.C. are calibrated according to the factual and operational context of action. Other coordination centers can be also activated according to the different levels of local government and to the extent of the emergency (e.g., at supra-municipal level, the Rescue Operations Center-"C.C.S." can be activated by the Prefect).

The Mayor is usually supported by the C.O.C. in coordinating the following operations:

- territorial monitoring with mixed teams (volunteers, employees, etc.), under the coordination of the competent authorities
- communication of warnings and alarm messages to the population
- delimitation of risk areas

- control and regulation of the road network
- satisfaction of health and social needs through the involvement of public and private facilities
- distribution of food, drinking water, clothing, blankets, etc. to disaster victims and provision of primary care.

Before the activation of the emergency phase, however, through local territorial controls the plan provides for a reconnaissance, surveillance and monitoring activity of the areas of the territory potentially exposed to the meteorological-hydrogeological-hydraulic risk or affected by the event in progress.

Within the plan cartography, the emergency areas identified according to the criteria defined at the regional level were then reported: waiting areas, reception areas for the population and storage areas for rescuers and resources/vehicles.

3.1.4. Zadar County

Zadar County is one of seven Croatian littoral counties situated in the very center of the Adriatic coast. Geographically, it is situated in such a way that it comprises the northern Dalmatian coast and the hinterland Ravni Kotari and Bukovica. From Lika and Croatian continental part it is sharply separated by the high massive of mountain Velebit, which has determined its development for centuries. Today, this separation is felt significantly less because of Sveti Rok tunnel passing through the mountain. The Zadar County therefore has, according to its geo-traffic position, a key position in linking the northern and southern part of Croatia. The administrative seat of the county is the city of Zadar. Zadar County borders Republic of Bosnia and Herzegovina to the east, Primorsko-Goranska County and Lika-Senj County to the north, Sibenik-Knin County to the south and border of the territorial water of the Republic of Croatia to the west.



Photo: Zadar County (Risk assessment Zadar County)

Basic information

- Population: 160.340
- Area: 7.486,91 km²
- Number of local self-government units: 34 (6 towns and 28 municipalities)
- Number of islands: 25
- Coast length: 1.300 km (islands included)
- National parks: two (Kornati, Paklenica)
- Nature parks: three (Telašćica, Vransko jezero, Velebit)

At the county level, the Civil Protection Headquarters was established as a professional, operational, and coordinating body that coordinates activities of the operational forces of the civil protection system prior to the occurrence of an emergency and during the implementation of civil protection measures and activities. Representatives of the county and operational forces of the civil protection, including legal entities, participate in the work of the headquarters.

The risk assessment of major accidents for Zadar County was adopted in July 2019 in accordance with the Civil Protection System Act and the regulations issued for its application in the framework of planned civil protection activities. Based on this assessment, a risk assessment was carried out:

No.	Risk	Assessment
1	Earthquake	Tolerant risk
2	Epidemics and pandemics	Tolerant risk
3	Extreme temperatures	Tolerant risk
4	Forrest fires	Unacceptable risk
5	Stormy wind	Tolerant risk
6	Industrial accident	Tolerant risk
7	Flood	Tolerant risk

The risk assessment determined the preparedness of the civil protection system (prevention –high; response – high; collective preparedness - high).

Overview of the operational capabilities of the civil protection system

The Zadar County Fire Association - Fire service and organization of fire brigades in Republic of Croatia is regulated by Fire Service Act. The Zadar County Fire Association is voluntary, professional, humanitarian, and non-governmental association that promotes the interests of fire brigades in Zadar County. Representative bodies of local self-government units establish public fire brigades and support establishment of voluntary fire departments. Public fire brigades, voluntary fire departments, voluntary fire brigades in industry and professional fire brigades in industry unite in fire association of municipality or town. Exceptionally, two or more municipality can establish joint fire association, as branch fire association. All previously mentioned fire brigades unite in county fire association.

The Zadar County Fire Association has 5 public fire brigades (Zadar, Benkovac, Biograd na Moru, Gračac and Pag) and 40 voluntary fire departments. In addition to the above, Zadar County Fire Association includes 2 professional fire brigades in industry and 2 voluntary fire brigades in industry and 1 special intervention unit.

Zadar county adopted Fire Protection Plan as fundamental normative act which contains data and graphic necessary for effective implementation of firefighting actions on subject area, and also rights and responsibilities in field of fire protection and firefighting.

The activities of the Zadar County Fire Brigade in the field of emergencies include firefighting (urban areas, open areas, ships), search and rescue (floods, ruins, sea), securing the scene, technical operations in

industry, facilities, open areas, and traffic (road, rail, air, sea, and hazardous materials), clean-up of sea/coastal pollution. Firefighting operation center of public fire brigade of city of Zadar receives calls for all county emergency number - 193.

The Zadar Police Administration monitors and analyzes the security situation and phenomena that favor the occurrence and development of crime. It participates directly in the execution of more complex tasks within the work of the Police Station and carries out specified actions in border control and securing the state border. An important role of the Police during emergencies is to secure the place according to a special plan of its own, to carry out internal and external closures of the place of the emergency to physically protect the area and prevent traffic until the consequences are resolved.

The area of responsibility of the Zadar Police Administration includes 9 police stations (I. Policies station Zadar, II. Policies station Zadar, Policies station Biograd, Policies station Benkovac, Policies station Gračac, Policies station Obrovac, Policies station Pag, Station traffic policies Zadar and Station maritime and airport police Zadar.) Within the Police Administration there is a Center 192, which receives calls. The center performs operational activities during emergencies based on standard operating procedures, plans and instructions.

The Institute of Emergency Medicine of Zadar County is an operational health facility in the field of outpatient emergency medicine, which provides emergency medical care in Zadar County. This includes providing emergency medical care to a suddenly ill or injured person at the scene of an accident, providing appropriate emergency transport of such a person to an appropriate medical facility, and providing medical care to such a person during transport.

The seat of the Institute is in Zadar, while there are 9 branches (Zadar, Biograd n/M, Gračac, Pag, Nin, Preko, Posedarje, Benkovac, Starigrad) of the Emergency Medical Service in Zadar County. The Medical Operations Center of the Institute of Emergency Medicine of Zadar County- 194 is in Zadar.

The Zadar Port Authority is responsible, among other things, for the supervision of navigation in the internal waters and territorial sea of the Republic of Croatia, as well as for the search and rescue of human life and property at sea. In Zadar County, in addition to the headquarters in Zadar, there are 9 other field offices (Biograd n/M, Novigrad, Starigrad Paklenica, Pag, Preko, Sali, Božava, Ist, Silba).

Croatian Mountain Rescue Service - in Zadar County there is one stations of the Croatian Mountain Rescue Service – Zadar. The station carries out search and rescue operations in inaccessible areas to protect human life, health, and property. Emergency operations (search and rescue in floods, search and rescue from debris, search and rescue in the mountains and other inaccessible areas, medical care and first aid for injured people) are carried out according to the standard operation procedure (SOP) for search and rescue on land and on islands. All notifications for operations come through the 112-county center.

The Red Cross Society of Zadar County is a humanitarian and voluntary community of Red Cross municipal societies operating in Zadar County in order to promote humanitarian goals within the framework of civil protection and based on the mission and principles of the International Red Cross Movement. The Red Cross Society of Zadar County, as one of the organizational forms of the Croatian Red Cross, is a

community of 6 city Red Cross societies from the county (Zadar, Benkovac, Obrovac, Pag, Gračac, Biograd n/M. Operational activities in emergencies (care of people, first aid to injured and humanitarian and psychosocial assistance to the affected population).

The Regional Office for Civil Protection Split as an organizational unit of the Civil Protection Directorate of the Ministry of Interior, performs professional tasks of civil protection, activities of the 112 Center, early warning and alerting of citizens and local and regional self-government bodies, professional and planning and operational tasks. Actions in the implementation of activities and measures of civil protection of participants and emergency response forces of the civil protection system in an emergency in the Split-Dalmatia County (also includes the counties of Zadar, Šibenik-Knin and Dubrovnik-Neretva County).

Within the Civil Protection Service in Zadar (SCZ Zadar) there is a county center 112. County center 112 Zadar receives calls through the program CoordCom and uses the radio communication system TETRA. County Center 112 Zadar carries out operational activities in emergencies based on standard procedures for the operation of 112 centers in case of accidents on roads and highways, search and rescue operations on land or islands, accidents at sea, domestic violence, and floods.

Institute of public health Zadar is health institution that performs public health activities in Zadar County. The institution covers organized health promotion, epidemiology, microbiology, public health, health ecology and environmental protection, school medicine, mental health care and addiction prevention. Institute of public health Zadar is operational force of civil protection in area of Zadar County in prevention of appearances and spread of epidemics and pandemics. Headquarter of institute is in city of Zadar.

3.1.5. City of Dubrovnik

City of Dubrovnik is located in the southernmost part of the Republic of Croatia and is the administrative and economic center of the Dubrovnik-Neretva County. The City of Dubrovnik has an elongated shape and can be conditionally divided into characteristic areas, as follows:

- Coastal edge (Dubrovnik, Zaton, Orašac, Trsteno, Brsečine), mostly built on steep slopes with southern and southwestern exposure
- Hinterland (Gornja sela, Šumet, Bosanka), hilly passable with limited communications and difficult access to machinery and equipment
- Islands (Elafiti and Lokrum) poorly or underdeveloped roads prevent the use of motor and other vehicles or strictly limit them to smaller urban units (the possibility of using smaller agricultural machinery, motorcycles and bicycles).

The position of the city is mostly southern and southwestern exposure, which is the reason mainly for the dry summer period and high average summer temperatures. A large slope on the slopes of the soil with southern exposure increases the risk of sudden vertical spread of possible fire due to thermodynamic

currents, even if the influence of wind is not taken into account. The area of the City of Dubrovnik covers an area of 14,335 km² (8.3% of the County).

Elafiti are a group of islands located west of Dubrovnik. The largest island in the group is Šipan, and it also includes Lopud, Koločep (Kalamota), Jakljan, Ruda, Goleč and Crkvine and some smaller islands and cliffs such as Grebeni. Its beautiful landscapes and sandy beaches attract many tourists. They are connected daily with ferry lines to Dubrovnik.



Photo: Position of the City of Dubrovnik, Source: County Spatial Planning Plan

The basic planning documents for the civil protection system of the City of Dubrovnik are, in addition to the Civil Protection System Act, the Major Accident Risk Assessment and the Civil Protection Action Plan. Risk assessment scenarios for possible major accidents in the area of the City of Dubrovnik have been developed. Thus, the last major accident risk assessment from March 2021 developed a scenario for earthquake, flood, open fire, extreme temperatures, epidemics and pandemics.

The Civil Protection of the City of Dubrovnik consists of:

- Civil Protection Headquarters of the City of Dubrovnik
- City Society of the Red Cross Dubrovnik
- Croatian Mountain Rescue Service, Dubrovnik station
- Public fire brigade "Dubrovnik firefighters"
- General purpose civil protection units
- Specialist civil protection units for search and rescue from floods

- Civil Protection Commissioners and their deputies
- On-site coordinators
- Legal entities of interest to the civil protection system of the City of Dubrovnik.

Overview of the operational capabilities of the civil protection system

The **Civil Protection Headquarters** of the City of Dubrovnik is composed of the Chief, Deputy Chiefs and other members who act according to the Staff Work Plan.

The **City Society of the Red Cross Dubrovnik** is a non-profit association for the promotion of humanitarian goals and the implementation of tasks of protection and improvement of health, social care, health and humanitarian education and advocates respect for international humanitarian law and human rights. It is filled with 35 trained and equipped employees who are joined by up to 190 volunteers in various activities. From the equipment and material and technical means there are 2 larger tents, 5 small tents, air dryers, mobile kitchen with a capacity of 100 meals, tables, benches, generator, 100 blankets, 30 mattresses, 30 canisters, 30 field beds and 20 sets of HCK uniforms.

The **Croatian Mountain Rescue Service** is the basic operational force of the civil protection system in major accidents and catastrophes and performs its obligations in the civil protection system in accordance with special regulations governing the area of operation of the Croatian Mountain Rescue Service. It was filled with 6 associates, 19 trainees and 15 licensed rescuers.

Dubrovnik Public Fire Brigade - The fire brigade in the area of the City of Dubrovnik is JVP "Dubrovnik Firefighters" with branch Orašac and DVD Orašac, Zaton, Gornja sela, Koločep, Lopud, Šipan, Suđurađ, Rijeka dubrovačka, Mravinjac, Osojnik.

The **General Purpose Civil Protection Unit** of the City of Dubrovnik and the **Specialist Flood Search and Rescue Unit** are established by the Decision on the Establishment of the Civil Protection Units of the City of Dubrovnik. The General Purpose Civil Protection Unit of the City of Dubrovnik consists of a management group and five operational groups, a total of 51 members.

The **Specialist Flood Search and Rescue Unit** consists of a steering group, a logistics group and two operational groups, a total of 15 members. Troops are mobilized, called and activated to implement measures and procedures in order to prevent the occurrence and mitigate and eliminate the consequences of a disaster or major accident.

The risk assessment of major accidents of the City of Dubrovnik defined the need for the establishment of units, the size and organization of units.

Civil Protection Commissioners and their deputies - by the Decision of the Mayor on the appointment of the Civil Protection Commissioner of the City of Dubrovnik and their deputies, 80 Civil Protection Commissioners and 80 Deputy Civil Protection Commissioners were appointed for the area of the City of Dubrovnik. Civil Protection Commissioners and their deputies participate in the preparation of citizens for personal and mutual protection and coordinate the implementation of personal and mutual protection measures. care and other civil protection measures organize protection and rescue of members of vulnerable groups, check the posting of information on warning signs in residential buildings in the area of their competence and inform the Civil Protection Inspectorate about omissions.

On-site coordinators - in accordance with the specifics of the emergency, the Chief of Civil Protection Staff appoints a site coordinator. The site coordinator assesses the situation and its consequences on the ground and in cooperation with the competent Civil Protection Headquarters coordinates the activities of the operational forces of the civil protection system, in order to take measures and activities to eliminate the consequences of the emergency, pursuant to Art. 26 para. 2 of the Ordinance on the mobilization, conditions and manner of operation of the operational forces of the civil protection system (Official Gazette 69/16). The Chief of the Civil Protection Headquarters of the City of Dubrovnik, by the Decision on the appointment of the site coordinator, will appoint the site coordinators, in accordance with the Major Accident Risk Assessment for the City area.

Dubrovnik has designated **legal entities of interest to the civil protection system**. Legal entities are participants in civil protection, and are called, mobilized and activated to implement measures and procedures in order to prevent, mitigate and eliminate the consequences of disasters and major accidents. Legal entities are obliged to plan measures and take activities in order to eliminate or reduce the possibility of catastrophe and major accidents, and to adjust the performance of regular activities in the circumstances when the disaster was declared. Legal entities are managed and coordinated by the Mayor with the expert support of the Civil Protection Headquarters.

In disasters and major accidents, the Mayor directly commands the civil protection operational forces.

3.1.6. Split – Dalmatia County

Split-Dalmatia County is the largest county in the Republic of Croatia. It is located in the central part of southern Croatia and stretches from Vrlika in the north to the islands of Vis and Palagruža in the south, from Marina in the west to Vrgorac and Gradac in the east. The administrative seat of the county is the city of Split. Split-Dalmatia County borders Bosnia and Herzegovina to the north, Dubrovnik-Neretva County to the east, Sibenik-Knin County to the west and the border of the territorial waters of the Republic of Croatia to the south.



Photo: Split-Dalmatia County

(Source: <https://proleksis.lzmk.hr/57645/>)

Basic information

Population: 425.412

Area: 14.106 km²

Number of local self-government units: 55 (16 cities and 39 municipalities)

Number of islands: 171

Coast length: 874,45 km (islands included)

National parks: none

Nature parks: 1 (Biokovo)

At the county level, the Civil Protection Headquarters was established as a professional, operational, and coordinating body that coordinates the activities of the operational forces of the civil protection system prior to the occurrence of an emergency and during the implementation of civil protection measures and activities. Representatives of the county and operational forces of the civil protection, including legal entities, participate in the work of the headquarters. The risk assessment of major accidents for Split-Dalmatia County was adopted in March 2021 in accordance with the Civil Protection System Act. Based on this assessment, a risk assessment was carried out:

No.	Risk	Assessment
1.	Earthquake	Tolerant risk
2.	Forrest fires	Tolerant risk
3.	Flood	Tolerant risk
4.	Extreme temperatures	Tolerant risk
5.	Droughts	Tolerant risk
6.	Snow and ice	Acceptable risk
7.	Hail	Acceptable risk
8.	Landslides	Acceptable risk
9.	Epidemics and pandemics	Tolerant risk
10.	Industrial accident	Tolerant risk
11.	Technical - technological and other traffic accidents (maritime accidents)	Tolerant risk

The risk assessment determined the preparedness of the civil protection system (prevention – high; response – high; collective preparedness - high).

Overview of the operational capabilities of the civil protection system

The [Split-Dalmatia County Fire Association](#) is a voluntary, professional, humanitarian and non-governmental association that promotes the interests of fire brigades in Split-Dalmatia County. In Split-Dalmatia County there are 6 public fire brigades (Split, Makarska, Podstrana, Sinj, Trogir and Imotski), 4 brigades in private companies and 50 voluntary fire departments. The activities of the Split-Dalmatia County Fire Brigade in the field of emergencies include firefighting (urban areas, open areas, ships), search and rescue (floods, ruins, sea), securing the scene, technical operations in industry, facilities, open areas and traffic (road, rail, air, sea and hazardous materials), clean-up of sea/coastal pollution.

The [Split-Dalmatia Police Administration](#) monitors and analyzes the security situation and phenomena that favor the occurrence and development of crime. It participates directly in the execution of more complex tasks within the work of the Police Station and carries out specified actions in border control and securing the state border. An important role of the Police during emergencies is to secure the place according to a special plan of its own, to carry out internal and external closures of the place of the emergency in order to physically protect the area and prevent traffic until the consequences are resolved. The area of responsibility of the Split-Dalmatia Police Administration includes 17 police stations. Within the Police Administration there is a Center 192, which receives calls through the program CoordCom and uses the radio communication system TETRA. The center performs operational activities during emergencies based on standard operating procedures, plans and instructions.

The [Institute of Emergency Medicine](#) of Split-Dalmatia County is an operational health facility in the field of outpatient emergency medicine, which provides emergency medical care in Split-Dalmatia County. This includes providing emergency medical care to a suddenly ill or injured person at the scene of an accident, providing appropriate emergency transport of such a person to an appropriate medical facility, and providing medical care to such a person during transport. The seat of the Institute is in Split, while there are 12 branches of the Emergency Medical Service in Split-Dalmatia County. The Medical Operations Center of the Institute of Emergency Medicine of Split-Dalmatia County - 194, is located in Split.

The [Split Port Authority](#) is responsible, among other things, for the supervision of navigation in the internal waters and territorial sea of the Republic of Croatia, as well as for the search and rescue of human life and property at sea. In Split-Dalmatia County, in addition to the headquarters in Split, there are 15 other field offices (Trogir, Omis, Makarska, Rogac, Supetar, Milna, Sumartin, Hvar, Jelsa, Stari Grad, Sucuraj, Vis, Komiza, Bol and Kastela).

In Split-Dalmatia County there are two stations of the Croatian [Mountain Rescue Service](#) - Split and Makarska. The stations carry out search and rescue operations in inaccessible areas to protect human life, health and property. Emergency operations (search and rescue in floods, search and rescue from debris, search and rescue in the mountains and other inaccessible areas, medical care and first aid for injured people) are carried out according to the standard operation procedure (SOP) for search and rescue on land and on islands. All notifications for operations come through the 112 county center.

[The Red Cross Society](#) of Split-Dalmatia County is a humanitarian and voluntary community of Red Cross municipal societies operating in Split-Dalmatia County in order to promote humanitarian goals within the framework of civil protection and based on the mission and principles of the International Red Cross Movement. The Red Cross Society of Split-Dalmatia County, as one of the organizational forms of the Croatian Red Cross, is a community of 13 city Red Cross societies from the county. Operational activities in emergencies (care of people, first aid to injured and humanitarian and psychosocial assistance to the affected population).

[The Regional Office for Civil Protection Split](#), as an organizational unit of the Civil Protection Directorate of the Ministry of Interior, performs professional tasks of civil protection, activities of the 112 Center, early warning and alerting of citizens and local and regional self-government bodies, professional and planning and operational tasks. Actions in the implementation of activities and measures of civil protection of participants and emergency response forces of the civil protection system in an emergency in the Split-Dalmatia County (also includes the counties of Zadar, Sibenik-Knin and Dubrovnik-Neretva County). Within the Regional Office for Civil Protection Split (PUCZ Split) there is a county center 112. County center 112 Split receives calls through the program CoordCom and uses the radio communication system TETRA. County Center 112 Split carries out operational activities in emergencies based on standard procedures for the operation of 112 centers in case of accidents on roads and highways, search and rescue operations on land or islands, accidents at sea, domestic violence and floods.

In Split-Dalmatia County, the [National Civil Protection Intervention Unit](#) - Split Service has its base, as an organizational unit of the Directorate of Civil Protection of the Ministry of Interior and provides civil protection activities like urban search and rescue, floods rescue, CBRN protection, shelter and technical-tactical support. The National Intervention Unit for Civil Protection in Split consists of a professional core and a reserve.

3.2. Role of universities in civil protection

The scientific community participates in the national civil protection systems through integrated activities with main emphasis on providing knowledge in research activities that has main objectives to support

area such as modern technologies for early warning systems, seismology, hydrology, etc. In last decade universities are very active with participation on development projects and technical innovation, as well as studies and surveys, that provides recommendations and new tools to improve management of emergency in all phases (planning, prevention, preparedness, response and recovery).

3.2.1. University of Split

The Faculty of Civil Engineering, Architecture and Geodesy, University of Split (hereinafter Faculty) conducts research in the fields of structural and civil engineering, architecture and spatial planning, as well as geodesy and geoinformatics. Eleven state-of-the-art laboratories support research and professional work which may contribute to the disaster prevention and preparedness by increasing the resilience of the society, namely critical infrastructure, goods and saving lives. Moreover, Faculty developed the methodology, which may be used to improve semantic interoperability of first responders during the disaster response phase.

Disaster risk assessment: Faculty's research includes modelling of natural phenomena which cause disasters, as well as assessment of threats, hazards, vulnerability and exposure for river, karst groundwater and flash floods, as well as earthquake. Faculty also conducts research in the new frequent phenomenon of sea level-rising, which may be caused by three different phenomena acting together: exchanging of low and high tide, atmospheric pressure and waves. Regarding floods, activities have been conducted in the several fields of research: hydraulic modelling, risk assessment, hazard assessment, vulnerability assessment and exposure. In general, when put together, these fields of research contribute to flood risk management presenting potential adverse consequences associated with flood scenarios. Faculty extends its research in earthquake engineering towards assessment of seismic vulnerability of buildings based on the structural properties of an object as well as geometry and current state of examined building, which in total express the vulnerability (or resistance, inversely) to seismic impact. Particular hazard assessment for rockfalls on the specific coastal areas have also been a topic of the Faculty's research.

Disaster risk reduction: Faculty's research capacity may contribute to recommendations for buildings – how to be more resilient to earthquakes and all types of floods. Moreover, the research in structural and hydraulic engineering contribute to the advances in construction of flood defence structures as flood protection structural measures. Faculty has a research capacity to improve non-structural flood protection measures in the field of land use and spatial planning.

Methodology for improved semantic interoperability of first responders: Faculty developed the faceted taxonomy model for interpretation and mutual understanding of first responders' practices during the disaster response phase, to comprise situational awareness during the disaster response phase to its maximal semantic extent in an arranged and classified way and to improve navigation and retrieval of

information using common information space. Concepts and facets are systematically chosen and defined taking into account future transformation into standards and translation into different languages as well as in terms of its relationship with other terms. The main three distinctive concepts, i.e. facets are: Capacity, Disaster and Organisation. Based on the developed taxonomy the ontology model for the use case including methodology, model design and validation is developed. The methodology explains three levels of ontologies and their usage. Upper ontologies describe common concepts across a wide range of human domains and domain ontologies narrow the scope to the particular domain such as medicine or computer science. The first step is the modelling of the application knowledge, when experts define basic concepts and relations among them, and axioms together with rules for data interpretation and reasoning. During the second step the application concepts are linked with the concepts in both reference upper and domain ontologies. This research was supported by the European Community's Seventh Framework Programme (SEC-2013.5.1-1) through the Grant Agreement Number 607078 to the budget of the Collaborative Project EPISECC.

From the very beginning, scientific research has been the main driving force behind developing the Faculty's study programs and scientific infrastructure. The establishment of eleven Specialized Laboratory Units furnished with the state-of-the-art, 40 million kunas' worth of scientific equipment has sowed the seeds of the Faculty's success, scientific excellence, and international recognition, and so has the new administrative structure that reformed the scientific research process into a distinct organizational unit of the Faculty. The Faculty's scientific track record in carrying out locally-funded and EU-funded projects ranks it among the leading faculties in technical sciences in Croatia and the region. Strong ties between the professional work and scientific research performed by the Faculty employees not only strengthened the relevance of our research activities but also resulted in the design and construction of a significant number of structures and performance of construction works that positioned the Faculty among the leading institutions in civil engineering research and industry in Croatia. Nowadays, after fifty years of experience, the Faculty, apart from its elaborate research network in technical sciences, slowly but steadily engages in interdisciplinary research, combining areas of civil engineering, architecture, and geodesy in a range of cross-disciplinary research topics.

Furthermore, the finalization of a capital project at FCEAG is underway, as is the construction and equipment of new laboratory premises. 'Implementation of Contemporary Research Infrastructure at FCEAG for Smart Specialization in Green and Energy Efficient Construction KK.01.1.1.02.0027', (abbr. INFRA FGAG) is a capital project worth 84,513,801.36 HRK.

4. Recommendations for improvements

Insight into the legislative framework that regulates the issue of civil protection at both national and regional level, it can be stated that the tasks and obligations of citizens in the civil protection system are very well developed. Thus, it is prescribed that every citizen is obliged to take care of their personal safety and protection and implement personal and mutual protection measures and participate in civil protection system activities, while it is prescribed that preventive activities in civil protection system include raising awareness of citizens, vulnerable and targeted social group on hazards and measures for protection and use of number 112.

Such a legal obligation of every citizen is a good basis for making a SWOT analysis with recognized and comprehensive elements (strengths, opportunities, threats and weaknesses) as a basis for determining recommendations for improvement in the project area, using social networks as a tool for collecting and transmitting information.

STRENGTHS	THREATS
<ol style="list-style-type: none"> 1. Citizens as "active sensors" in collecting and distributing information on threats using social networks. 2. Recognition of 112 centers in the function of direct cooperation with interested citizens. 3. Decision-making by the governing bodies of civil protection at the regional level with the use of information from citizens submitted through social networks. 4. Concretization of tasks and actions of operational forces of the civil protection system. 	<ol style="list-style-type: none"> 1. Unavailability of the Internet in the area of emergency. 2. Inability to process information due to inadequate plans and standard operating procedures. 3. Lack of understanding of citizens about their role in civil protection. 4. Poor interoperability between multiple data collection platforms / applications.
OPPORTUNITIES	WEAKNESSES
<ol style="list-style-type: none"> 1. Inclusion of all categories of the population in the threat response system. 2. Effective and faster response of emergency services as well as operational forces of the civil protection system. 3. Exchange of information at regional / national level. 4. Improving IT bases, solutions and technology. 	<ol style="list-style-type: none"> 1. Poor quality of information. 2. Malicious use of social networks. 3. Lack of knowledge and awareness of citizens about their active role in crisis situations 4. Lack of obligations of citizens to provide information on sudden events or threats. 5. Non-uniform (unbound) system of communication centers of emergency services and 112 centers and operational forces of civil protection.

Although very principled, this can be an incentive for citizens to participate in all civil protection activities, which includes collecting and distributing information on threats and emergencies and sending them to 112 centres using social networks and understanding the existence of certain restrictions but certainly a

good basis for initiating implementation of such activities by citizens in emergency situations, which refers to:

- creating conditions for effective use of social networks by citizens - Facebook, Instagram, Twitter, TikTok, WhatsApp
- encouraging citizens to more actively use social networks as a platform for forwarding information (exact location with GPS data, weather; photos; video) about emerging extraordinary events or threats
- continuous education, ie training of the younger population of citizens (school-age children) for recognizing and forwarding information on possible threats or extraordinary events
- education as an integral part of the curriculum in primary schools, eg. in the classroom or technical education class lasting 30 minutes once a month
- ensuring the visibility or recognizability of this specific use of social networks by sending appropriate promotional messages to the interested public
- strengthening promotional activity as an integral part of specific threat response plans
- establishment of a platform as part of the information system in 112 centres in order to support the reception and processing of information sent by citizens, using social networks
- activation of so far unused resources at the local level (county, city, municipality) in order to understand the given information and use it in response to the extraordinary event
- activities to create habits among citizens, primarily the younger population, to use the social network and applications and to comply with the "rules for classified messages"
- classification of messages and introduction of an unambiguous / unique concept of simulations in the use of information collected from citizens
- information platform capabilities for "generating" different messages
- elaboration of a unique concept (protocol) for receiving, processing and forwarding information from 112 centres to known users
- creation of a database on "users" of information collected through social networks (Civil Protection - Fire Brigade, Mountain Rescue Service, Red Cross, other participants, and operational forces of the civil protection system; Coast Guard; Police, Emergency Medical Service, Harbour Master's Office)
- contribution of citizens in the management of natural disasters and threats as well as disasters caused by human activities through their inclusion as "active sensors" with the use of social networks as tools

- encouraging cross-border cooperation through the exchange of important information on threats and disasters at the regional and national levels and the consequent increase in impact reduction
- harmonization of data through uniquely conceived databases and protocols of procedures in collecting information from citizens with the use of social networks, which increases the accuracy of such collected information and consequently creates conditions for more efficient operation of the response system
- enabling the use of mobile devices or installed social networks even if the user does not have funds on the account as a cover for sending a message
- improving information and communication capacities to support decision-making and action on the ground
- development of a single platform or joint information database for receiving and processing information sent by citizens with the use of social networks
- educating the public to raise awareness and the importance of their participation and contribution to disaster risk reduction as well as more effective operation of the operational forces of the civil protection system in the field
- information as a basis for connecting emergency services and other participants as well as the operational forces of the civil protection system at the regional (and local) level with the aim of their better coordination in operational action to eliminate threats or consequences.

All these activities could improve the civil protection system as a result of more active involvement of citizens with the function of "active sensors" in the process of sending information about possible threats or emergencies using social networks, which they regularly use in communication with family members or friends are a good basis for amendments, corrections or additions related to normative acts, plans and procedures, activity of operational centres (112 centres, etc.), early warning system and education and training.

4.1. Legislation

emergencies or situations of possible threat or occurrence of an emergency and the consequences of such situations. In all such emergencies citizens are active participants who are or may be affected by the consequences and as such, due to legal provisions, have the obligation to actively participate in the implementation of activities and measures of the civil protection system.

This is the basis for the correction or amendment of legal solutions in the Republic of Croatia and in the Italian Republic that regulate the issue of civil protection at both national and regional levels. Namely, more active participation of citizens in emergency situations is an extremely important segment of emergency services but also of all other participants in the civil protection system, since apart from the umbrella law, each emergency service has its own law (Lex Specialis) which prescribes all measures and activities.

Recognizing the goal of this project related to the creation of an innovative emergency support system based on social networks in the Republic of Croatia and the Italian Republic and related to increasing the safety of citizens on the one hand and increasing the ability to manage natural and other risks in the Adriatic with more active role of citizens as "sensors" for reporting such threats or sudden events.

All of the above is a prerequisite for normative regulation of civil protection through amendments to laws and sub-laws, including the national and regional level in relation to encouraging citizens to use social networks in emergencies, which would aim to enable more efficient and effective work of emergency services and other participants in civil protection. in case of threat and occurrence of an emergency and no less important strengthening of their mutual communication and coordination.

Following the above, it is necessary to adequately amend the Civil Protection System Act, which prescribes provisions at the state level and the County, Cities and Municipalities Act, in order to implement the provisions of the regional and local level act in the Republic of Croatia and in the Italian Republic.

Respecting the set goal of this project and the desire to promote more active participation of citizens in collecting important information on the threat and occurrence of emergencies, it will be necessary to implement adequate changes in regulations governing fire protection, environmental protection and consequently the Adriatic Sea and regulations. as umbrella laws governing the activities of voluntary organizations in the emergency response system.

Given the international environment of this project and the set goals, the international standard ISO 22320:2018 for emergency management can serve as a basis for the necessary amendments to normative acts.

Also, as part of the normative regulation of civil protection, it is necessary to undertake activities to further strengthen cooperation between the two EU member states and sign a bilateral agreement on cooperation in civil protection between Croatia and Italy, especially in the context of long-term active cooperation.

4.2. Plans and procedures

Civil protection headquarters are of special importance for the coordination of emergency services activities in emergencies. The Civil Protection Headquarters is a professional, operational and coordinating body that coordinates the activities of the operational forces of the civil protection system in the preparatory phase before the consequences of an emergency and during the implementation of civil protection measures and activities. Success in performing the tasks of coordination and management of participants and operational forces of the civil protection system as well as the ability to manage natural risks or emergencies (fires, earthquakes, floods, landslides, marine pollution) is conditioned by specific action plans and detailed implementation procedures. treatment protocols, both at national and regional level.

The action plans of the operational forces of the civil protection system must provide answers to the tasks, available human and material resources as well as horizontal and vertical connection of the governing body while providing conditions for informing the interested public about the threats and activities and

tasks. Also, action plans for the operational forces of the civil protection system should be prepared in accordance with changes in legislation governing civil protection, with emphasis on recognizing the role of citizens in the function of active sensors in collecting and submitting (reporting) information on possible threats or emergencies social networks.

In order to create conditions for receiving (receiving) information from citizens who want to share information about emergencies with the use of social networks, there is a need to create unambiguous procedures for receiving, processing and forwarding "important" information to known users. This presupposes the creation of such information platforms in 112 centres and on mobile devices (manufacturers, operators), all with the aim of enabling simplicity both in the application and in the use of information by interested citizens with the use of social networks.

Recognizing the specific goal of this project related to increasing the security of citizens and the ability to manage risks in the Adriatic, planning solutions and procedures for receiving information need to be addressed in the Republic of Croatia and the Italian Republic at the county / regional level. of the collected information, putting into function the Cross-Border Function Centre and its connection in accordance with the bilateral cooperation of the two countries in the field of civil protection.

4.3. Operational centers

Operational-communication centres can be understood as 112 centres established at the regional level with a function of 7 days / 24 hours and with the remark that operational-communication centres of emergency services (police, fire, ambulance, maritime, etc.) are also in operation.

Considering the set goal of the project related to the use of IT platform and the introduction of a new application that can collect data on natural disasters submitted by citizens as "active sensors" with the use of social networks, it is necessary to make some improvements in Croatia and Italy:

- execution of tasks on amendments to normative acts at the national and regional level regulating the issue of civil protection and electronic communications with the aim of defining the legal framework for performing tasks on receiving, processing, and forwarding notifications to civil protection system participants by operational communication centres
- development of protocols for receiving, processing and forwarding information and information collected by citizens in real time and forwarding to end users as a basis for making operational decisions
- creation of a database for receiving, processing, transmitting, and storing information using existing IT platforms
- performing tasks on standardization of IT equipment used by 112 centres in order to create conditions for unambiguous behaviour of employees
- development of programs and implementation of training and qualification of employees of 112 centres in the part related to the receipt, processing and transmission of information submitted by citizens using social networks

- creation of databases "information users" with indication of data important for quick change of information and basis for using IT platform.

Proposed amendments to the normative framework as well as arranging tools for receiving, processing and forwarding information with additional training of employees are a prerequisite for successful involvement of operational and communication centres in Croatia and Italy in citizens' activities in collecting information on possible threats and disasters using social media.

4.4. Early warning systems

As established in the project, one of the preconditions for its implementation is to create conditions for the use of IT platforms in order to collect data on possible threats and disasters and publish them in the form of posts on social networks and thus putting citizens in the function of "active sensors". Submission of such data related to a photo or video of the event with an indication of real-time GPS data using social networks is the initial information that can initiate a decision by the competent civil protection headquarters to activate plans and implement prescribed early warning measures.

Recognizing the fact that "early warning systems" are one of the components of the action plans of the civil protection system and thus the operational forces of the civil protection system, all information related to the possible threat or initial phase of an emergency is an important factor in activating the civil protection system. responding to a threat or an extraordinary event resulting in a reduction in the consequences, shortening the response time of emergency services or operational forces of the civil protection system, which ultimately results in savings in terms of financial resources.

4.5. Training and exercises

The precondition for the successful implementation of activities related to putting citizens in the role of "active sensors" in emergency situations is related to performing tasks on training and educating citizens to use social networks in informing 112 centres and providing information on threats and emergencies.

An integral part of the project was the implementation of "pilot activities" with the participation of a number of members of emergency services and children of school and high school age in order to acquaint them with the IT platform and provide information about the simulated emergencies. The results of the implementation of the mentioned pilot activity indicate the need to plan and implement continuous activities on the education of the expected participants of the innovative support system in emergency situations through:

- informing citizens through the media or in some other appropriate way about "new opportunities" to use social networks in order to actively participate in gathering information about threats or emergencies
- continuous implementation of education of school and secondary school children as an integral part of extracurricular activities but with adequate support from teachers and professors

- training of employees of 112 centres in receiving, processing and forwarding information on threats or emergencies to end users
- planning and conducting exercises of pre-determined groups of citizens in order to check the functionality of the IT platform and installed applications and the training of employees of 112 centres in receiving, processing and forwarding information
- promoting opportunities for the participation of citizens and children of school and secondary school age in the "simulation of events and reporting" with the aim of popularizing such support of citizens in collecting data on threats or emergencies.

Continuous implementation of the above education and training of all participants in the innovative emergency support system and raising awareness of citizens about their opportunities to contribute to increasing their safety and ability to manage natural risks is a fundamental prerequisite for achieving the basic goal of this project, putting citizens in the function of "active sensors".

4.6. Crossborder Functional Center (CFC)

The Republic of Croatia and the Italian Republic have long-term cooperation in the field of civil protection, as they are neighboring countries that have common risks (earthquakes, floods, fires, pollution and accidents at sea). This is the basis for further improvement of bilateral cooperation with the aim of developing new capacity for emergency management.

One of the possibilities of such improvement recognized in this project is the establishment of Cross-Border Functional Centre with the task of exchanging information on emergencies that pose a common risk and that would operate within the National Operations Centre.

The main problem to be solved in further work is to find a solution for the rapid exchange of information via such Cross-Border Functional Centre, taking into account the obligation of National Operations Centre at the same time. The precondition for successful implementation of information exchange activities at the regional / county level is the development of appropriate "common" protocols and the use of the same IT platforms and applications and databases in receiving and transmitting information on threats and emergencies. Cross-Border Functional Centre can function in virtual mode as one of the features of EDSS platform.

5. Conclusion

The complexity of threats and risks and necessary initial and additional information on the occurrence of a sudden event or threat emphasizes the need to involve citizens in collecting and forwarding information using social networks, which emphasizes the specifics of the operational forces of the civil protection system. The key to effective response and execution of tasks and activities by emergency services and operational forces of the civil protection system is certainly in changing the normative framework but also emphasizing the more active role of citizens in recognizing important information that can be photos or

videos and GPS data and their urgent transmission to centers 112 with the use of social networks. Considering the new technology available in the EDSS platform, the civil protection legislation needs to be updated to ensure the implementation of EDSS in the civil protection system, especially for the following activities: Information management, Strategic contingency planning, Crisis communication, Search and rescue operations (land and sea), Firefighting activities, Maritime pollution, etc.

The possibility that citizens are "active sensors" can contribute to more successful management of emergencies should be recognized by citizens in order to use a single IT platform that allows better cooperation and effective coordination of all participants and components of civil protection as an organized system to collect information that citizens will continuously forward to the 112 centers with the use of social networks, in which way information on the occurrence of the extraordinary event is provided in real time. This also enables a more active role of the civil protection headquarters at all levels of the organization in coordinating the response to the sudden event by more efficient use of the operational forces of the civil protection system in size as well as in the affected area. and their more efficient elimination.

The key to more efficient operation of the operational forces of the civil protection system is to adequately change the normative framework that should create the basic preconditions or framework for involving citizens in the process of responding to possible threats or emergencies and indirectly upgrading and further developing 112 centers. by citizens, their processing, construction of appropriate databases, urgent transmission of such information to the operational forces of the civil protection system, all based on information collected by citizens using social networks.

5.1. Implementing guidelines

In order to implement effectively, the following guidelines are aimed at establishing a clear framework for the execution of tasks while defining the processes and procedures of all partners in achieving project objectives and project implementation, which relates to:

- encouraging the competent civil protection bodies of the states/regions (counties) of project partners in raising the awareness of citizens about the need to collect information on threats and emergencies and their transmission using social networks
- improving the management of natural risks in the area of competence of project partners while encouraging the improvement of regional cooperation of partner countries in the area of improving procedures for responding to threats, extraordinary events in the area of competence
- development of IT platform and upgrades with applications to support the reception of information using social networks and their transmission to end users.

Following the above, these guidelines represent a mutually agreed framework of action of the project coordinator and project partners in the realization of the project objectives. In particular, civil protection plans at all levels (government, counties, cities and municipalities) need to be updated and identify the EDSS as one of the platforms for collecting primary information in the event of an emergency. The key to the system's efficient operation lies in an effective normative framework, a strong institutional position

of central state and county authorities competent for emergency services, a systemic approach to risk management, development of existing/basic operational forces in the field of civil protection, cross-sectoral cooperation and implementation of best practices of EU Member States.

5.2. Next steps

Taking into account the set goals of this project, the implementation of further activities and tasks should be focused on making proposals for:

- amendments of normative acts in the segment in which the issues related to the role and tasks of citizens in emergency situations are determined, as follows:
- building and putting into operation an IT platform with applications that support the reception and transmission of information collected using social networks used by citizens (Facebook, Instagram, Twitter, TikTok, WhatsApp)
- continuous informing of citizens with the use of media or in other convenient (customary) ways about the possibility of their more active role in collecting data on threats and extraordinary events with the use of social networks that they already have installed on their mobile devices
- implementation of tasks on informing and educating school and high school children within the extracurricular activities and to include these topics in the curriculum of individual subjects or permanently organize forums on the topic and on the possibility to use social network
- establishment of the Cross-Border Functional Centre and establishment of procedures for receiving and exchanging information between the Republic of Croatia and the Italian Republic.

This represents only the basic steps in the realization of project objectives, after the project ends on 31 June 2022 and it depends on the organization and the achieved ability of the coordinator and each project partner in carrying out the tasks to put EDSS in fully operational function.

6. References

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