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Research article

Use of New Technologies in the Field of Protection and Rescue During Disasters

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Abstract: Nowadays, dealing with natural disasters is becoming more and more challenging due to climate changes that lead to more frequent and intense natural disasters. Traditional protection and rescue methods are often not sufficient to meet all the challenges posed by these disasters. Therefore, the integration of new technologies becomes crucial for more effective risk management. Research of various aspects use of modern technologies in prevention, detection, response and restoration, in the context of natural disasters, it is necessary to focus on innovative approaches. By using artificial intelligence (AI), drones, sensor technologies, advanced communication systems, and the NICS system (Next-Generation Incident Command System), the goals of protecting civilian populations, reducing damage and improving the efficiency of rescue operations are achieved. Since 2016, the ARCECP Project (Advanced Regional Civil Emergency Coordination Pilot Project) has enabled the partner countries of the Western Balkans to acquire, implement and adapt the NICS system, in strengthening the capacity of emergency response and management in the region. The NICS system has partially taken root in Bosnia and Herzegovina (BiH), and this paper will mostly refer to the implementation of the application in BiH and recommendations for its development at all levels of the BiH government. Through the analysis of existing case studies and the application of new technologies, the work identifies key success factors, challenges and potential directions for future development in this area.

Keywords: Modern technologies, Natural disasters, Artificial intelligence, Sensors, NICS.

1. Introduction

After the disintegration of the former state, the Socialist Federal Republic of Yugoslavia (SFRY), a large number of independent states that were linked to each other economically, politically, infrastructurally, security-wise, etc., emerged (Cvetković et al., 2018). The disintegration of the former state happened as a result of the war, so there were negative consequences, especially in the area of protection and rescue. Most of the legislation that dealt with this area, especially in the planning part, was taken over by the former state, which no longer corresponded to the theory or practice that is applied in the world. Practice around the world tells us that when it comes to post-authoritarian and post-conflict countries, the processes of making emergency action plans and the processes of applying modern methods are largely influenced by transition processes (Cvetković et al., 2018). The very fact that as a result of inattention, negligence, intent, natural disasters and various other reasons can cause fires and arson, breakdowns, sabotage and other forms of danger to persons and property, indicates how much attention must be paid to prevention, i.e. protection and rescue of people as the greatest value of a society, as well as saving the material goods that man created (Aktar, Shohani, Hasan, & Hasan, 2021; Cvetković, Nikolić, & Lukić, 2024; Cvetković & Šišović, 2023; Cvetković, 2023; Dukiya & Benjamine, 2021; Grozdanić, Cvetković, Lukić, & Ivanov, 2024; Hussaini, 2020; Kaur, 2020; Olawuni, Olowoporoku, & Daramola, 2020; Thennavan, Ganapathy, Chandrasekaran, & Rajawat, 2020).

Bosnia and Herzegovina is a federal state union consisting of two entities and the Brčko District, which by international arbitration belonged both to the Federation of BiH and the Republic of Srpska, but all with their territorial organization, autonomy and power. It was created after a four-year civil war, from 1992 to 1995, and it got its current form by the provisions of the General Framework Agreement for Peace in Bosnia and Herzegovina, better known as the Dayton Peace Agreement, signed on 21 November 1995. Bosnia and Herzegovina is a state union in which different forms of state organization known by legal practice are interwoven. Namely, Bosnia and Herzegovina as a state union has a decentralized form of organization, because it consists of two almost independent entities that have the attributes of a state, and which also differ in the form of organization. More precisely, the Federation of Bosnia and Herzegovina has a decentralized system of state organization with ten cantons, each of which has its way of organization and functioning and its autonomy, while the Republic of Srpska has a centralized system of organization and its autonomy. (Sudar, Ivanov & Cvetković, 2016).

Following the prescribed jurisdictions, the Parliamentary Assembly of BiH adopted the Framework Law on protecting and saving people and material goods from natural and other disasters in BiH (Official Gazette of BiH No. 50/08). Based on the Constitutional provision, that the entities on their territory and under their jurisdiction organize a safe environment for everyone in such a way that they will form civil institutions for law enforcement, the National Assembly of the Republic of Srpska adopted the Law on Protection and Rescue in Emergency Situations in 2012. By this Law, the term protection and rescue means a unified form of management and organization of the forces and subjects of the protection and rescue system for the implementation of preventive and operational measures and the execution of the tasks of protection and rescue of people and property from the consequences of natural disasters, technical-technological accidents, catastrophes, epidemics, the consequences of acts of war, the consequences of terrorism and other dangers and accidents that may threaten the population, material and cultural assets and the environment, including recovery measures from the resulting consequences (Official Gazette of the Republic of Srpska No. 121/2012).

Also, the Federation of BiH has prescribed the Law on the Protection and Rescue of People and Material Goods from Natural and Other Disasters (Official Gazette of the Federation of BiH, No. 39/03, 22/06 and 43/10). The Brčko District of BiH passed its own Law regulating the area of protection and rescue (Official Gazette of the Brčko District of BiH, number 2/10). The organization of the Protection and Rescue System in BiH is best seen from the following schematic representation:

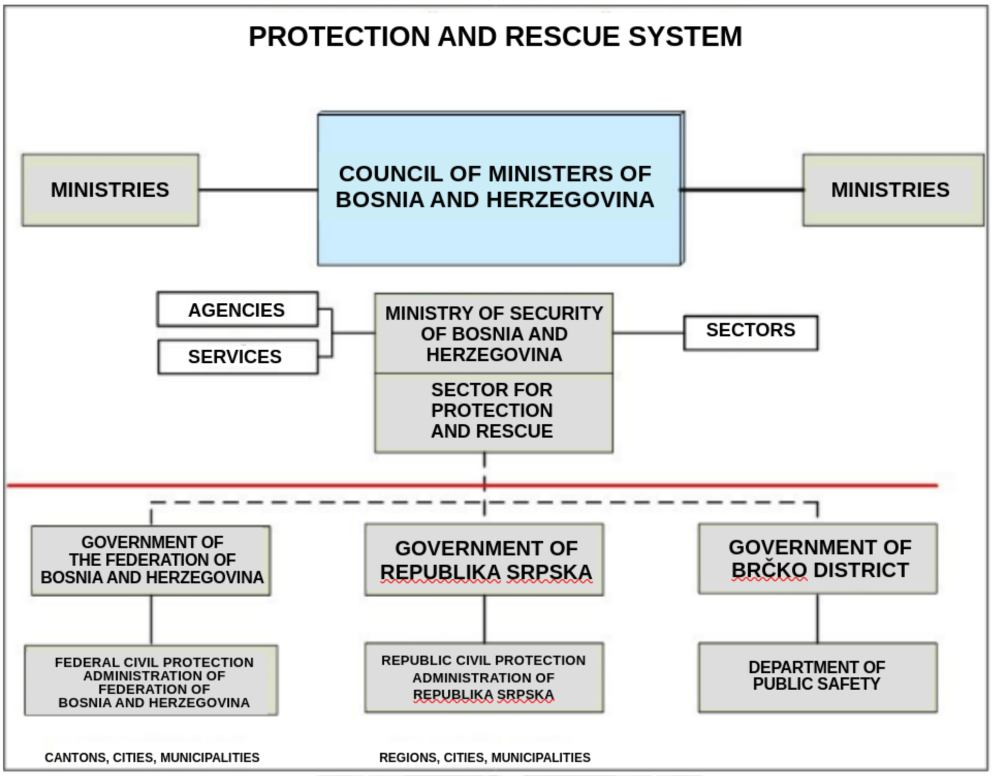

Figure 1. Schematic representation of the connection between protection and rescue institutions (Source: Ministry of Security of Bosnia and Herzegovina Sector for Protection and Rescue)

It is certainly necessary to take into account the best practices and recommendations (Al-ramlawi, El-Mougher, & Al-Agha, 2020; Mano, A, & Rapaport, 2019; Perić & Cvetković, 2019; Xuesong & Kapucu, 2019; Cvetković, Öcal, & Ivanov, 2019) of the European Union contained in the Decision, which, among other things, states: "Given the significant increase in the number and severity of natural and man-made disasters in recent years, and in a situation where it is likely that future disasters will be more extreme and complex with far-reaching and long-term consequences, caused especially by climate change and the potential interaction of several natural and technological hazards, an integrated disaster management system is increasingly important The European Union should support solidarity, complement and facilitate the coordination of actions of member states in the field of civil protection with the aim of improving the efficiency of the system for prevention, preparation and response to natural disasters and man-made disasters" (Official Gazette of the European Union number: L 347/924). The protection that should be ensured under the Union Civil Protection Mechanism should firstly cover the population, but also the environment and property, including cultural heritage, from all kinds of natural and man-made disasters, including ecological disasters, marine pollution and emergency health situations, which occur inside or outside the Union. Within the framework of the Union Mechanism, it is possible to request civil protection and other types of assistance in emergency situations to supplement the response capacity of the affected country in the event of any of the listed disasters. Also, through the EU Civil Protection Mechanism, it is possible to get access to new technologies, which is very important for BiH at all its levels of administrative activity, as previously stated.

2. New technologies, application possibilities

The use of new technologies in the field of protection and rescue represents a revolutionary step in the management of natural disasters. By integrating artificial intelligence AI (*artificial intelligence*), drones, sensors, and various other tools and devices, it is possible to significantly improve the capacities for early warning, rapid evacuation, and efficient distribution of aid, thereby saving lives and reducing material damage (Aleksandrina, Budiarti, Yu, Pasha, & Shaw, 2019; Carla S, 2019; Cruz & Ormilla, 2022; Cvetković, 2019; Cvetković et al, 2020; Cvetković, Adem, & Aleksandar, 2019; Cvetković & Filipović, 2018; Cvetkovic & Martinović, 2020; El-Mougher, 2022; Faicel, 2022; Hossen, Nawaz, & Kabir, 2022; Kumiko & Shaw, 2019). Although there are a number of challenges, including the need for standardization, privacy protection, and ensuring interoperability among different technology systems, the potential benefits that these technologies offer are unquestionable. Therefore, the continuous development and integration of new technologies should be a priority in strategies to reduce disaster risk and strengthen the resilience of communities around the world (Cvetković, 2023). In addition to technologies that are directly applied in real situations, it is also possible to apply technologies for preparing for action in emergency situations, and various software for simulation exercises (JANUS, JCATS, VBS3, XVR, VSTEP). It is also necessary to highlight the inadequate capacities of local authorities and professional services to improve society's resilience to disasters (Cvetković, Filipović, & Jakovljević, 2017; Cvetkovic, 2016; Cvetković, 2016; Cvetković, Öcal, & Ivanov, 2019; Cvetković and Stanišić, 2015; Islam, 2023; Rajani, Tuhin, & Rina, 2023; Starosta, 2023; Ulal & Karmakar, 2023).

2.1. Artificial intelligence (AI) in disaster management

Artificial intelligence is increasingly used to analyze large amounts of data collected from various sources, including satellites, ground sensors, and social networks, in order to predict the occurrence of natural disasters, assess their possible damage, and optimize the allocation of resources for emergency interventions (Crawford & Finn, 2018). AI systems can quickly analyze data on earthquakes, floods, forest fires, and other disasters, enabling early warning and rapid evacuation of threatened areas. It is characterized by the ability of machines to perform tasks that would otherwise require human intelligence, including perception, language comprehension, decision making and learning. Within AI, we can say that there is a kind of subset that we can call ML (machine learning) that focuses on the development of algorithms that allow computers to learn and adapt to data without explicit programming for specific tasks.

The applications of AI and ML models are most visible in forecasting and early warning, as they use the analysis of meteorological data and the detection of patterns that may indicate the occurrence of natural disasters such as strong winds, floods, forest fires and earthquakes. These models can predict the occurrence and intensity of disasters with greater accuracy, enabling timely activation of early warning systems. Also, after a disaster, AI can be used to quickly analyze images and videos taken by drones or satellites to assess the damage. This allows for faster decision-making on the allocation of resources and prioritization of areas for rescue operations. Machine learning algorithms can analyze data from various sources, including social networks, to identify the most urgent needs and optimize the deployment of rescue teams and resources (Cvetković & Andrić, 2023; Cvetković, Čvorović, & Beriša, 2023; Cvetković, Nikolić, & Ivanov, 2023; Cvetković & Šišović, 2023).

Just like the application in any system, the application of AI and ML systems in the management of natural disasters (Ali & Sciences, 2013; Chatfield & Brajawidagda, 2013; Westen, 2013) also brings certain challenges, including issues of privacy, data security, and ethical dilemmas around decision-making based on algorithmic predictions. There is also a risk of bias in the data that can influence decisions made by AI systems, which requires careful validation and monitoring (Cvetković et al., 2015). Artificial intelligence and machine learning offer significant opportunities to improve disaster management, from forecasting and early warning to optimizing post-disaster response. However, it is crucial to direct these technologies to serve the public good, with careful consideration of ethical, security, and privacy implications (Cvetković & Šišović, 2024; Cvetković, 2024a, 2024b; Cvetković, 2023; Kabir, Tanvir, & Haque, 2022; Mohammed & Maysaa, 2022; Öcal, 2021). Further development and application of these technologies requires a multidisciplinary approach, including collaboration between technologists, researchers, government agencies, and communities to maximize benefits while minimizing potential risks and inequities (CRC Press).

2.2. The use of drones in disaster management

Drones, also known as UAVs (Unmanned Aerial Vehicles), are increasingly becoming an indispensable tool in the management of natural disasters. Thanks to their flexibility, accessibility and ability to quickly collect data from hard-to-reach or dangerous areas, drones play a key role in disaster prevention, response and recovery (Cvetković et al., 2022). Before a disaster occurs, drones can be used to map and analyze the terrain, identify potential risks, and develop detailed evacuation and response plans. This includes analyzing topography to predict flooding, identifying weak points in infrastructure, and modelling fire spread scenarios. In the phase immediately before or during a natural disaster, drones provide crucial information through real-time monitoring of weather conditions, fire activity, watercourse behaviour, and other critical factors. This enables faster and more accurate early warning of the population and mobilization of resources. Drones are extremely useful in coordinating and conducting rescue operations, allowing teams to identify survivors, access hard-to-reach locations, and deliver emergency aid, such as medicine, food, and water, to isolated regions (Cvetković et al., 2022).

After a disaster, one of the first steps in the response is to assess the damage. Drones can quickly cover large areas, providing high-quality photos and videos that help determine the extent of damage, identify affected areas, and prioritize rescue and recovery efforts. In the recovery phase, drones help in mapping the destroyed infrastructures and monitoring the reconstruction process. They can also support reconstruction efforts, allowing planners to effectively allocate resources and monitor the progress of reconstruction (Cvetković et al., 2021). Advances in drone technology, including improvements in autonomous flight, camera quality, and integration with AI and analytics tools, are continuously expanding the possibilities of their use. In addition, the development of specialized sensors, such as thermal cameras for heat detection and multispectral sensors for vegetation analysis, further increases their effectiveness in natural disaster management. Although drones have numerous advantages, their use carries certain challenges such as regulatory restrictions, privacy and data security issues, as well as technical limitations such as flight time and resistance to bad weather conditions. Addressing these challenges requires collaboration between government agencies, industry, and academia (Cvetković et al., 2020). Despite the aforementioned shortcomings, drones are a powerful tool in the hands of disaster managers, offering fast, flexible, and efficient technology for disaster assessment, monitoring, and response. As technology advances, their role is expected to become even more important, contributing to saving lives and reducing damage from disasters.

2.3. The use of sensors and IoT devices in disaster management

The Internet of Things (IoT) and sensor technologies are key elements in modern natural disaster management. By connecting various devices and sensors in a single network, it is possible to collect, analyze and exchange data in real-time, which significantly contributes to the efficiency of prediction, detection, response and recovery from disasters. Sensors placed at key locations can continuously monitor changes in the environment, such as rising water levels, seismic activity, and changes in temperature and humidity, which is crucial for early detection of potential disasters. This data is used to activate the early warning system, which enables the population to take the necessary protective measures. IoT devices provide detailed information about the state of infrastructure and the environment, enabling authorities and organizations to better assess the risks associated with natural disasters. Analysis of data collected from sensors can help identify areas that are particularly vulnerable and require additional protection measures.

In the event of a disaster, IoT can play a key role in coordinating rescue operations. Sensors can provide real-time information on the condition of roads, bridges, and other key infrastructure elements, enabling the rapid and safe mobilization of rescue teams. Also, with the help of IoT devices, it is possible to track the movement and location of people in real-time during an evacuation, which helps to effectively manage evacuation routes and reduce congestion.

After a disaster, sensors and IoT devices can monitor the progress of infrastructure recovery and the state of the environment, providing key information that helps direct efforts and resources where they are most needed. The development of advanced sensor technologies, such as sensors for detecting humidity, pressure, temperature, and air quality, together with advances in battery technology and wireless communication, enables the widespread use of IoT devices in the management of natural disasters. Integration with technologies such as AI further improves the ability to analyze and secure data. Although sensors and IoT devices offer significant benefits, there are also challenges such as the need for robust and secure communication networks, protecting data privacy and security, and managing the vast amount of data these devices generate. Also, there is a need for standardization to ensure interoperability between different systems and devices. Despite these limitations, sensors and IoT devices play a key role in modernizing natural disaster management, offering new opportunities for early warning, risk assessment, and effective coordination of disaster response. Their application promises a reduction of damage and losses and a faster recovery of the affected areas. However, to maximize their potential, it is important to address existing challenges and work on developing safe, reliable and interoperable technological solutions (Cvetković et al., 2021).

3. The next-generation incident command system

When a disaster strikes, multiple agencies can take over and respond to the call. Organizing, coordinating and managing large-scale events presents significant challenges for those involved in such a response. To overcome these challenges, effective collaboration, shared situational awareness and decision support requires timely distribution of information across different systems and platforms. NICS is a web-based command and control environment for small, large extreme scale incidents that facilitates state, county and local/municipal preparedness, planning, response and recovery collaboration for all risks/ hazards. NICS facilitates situational awareness for widely distributed crisis responders. Two key attributes give the system its strength (Öcal et al., 2020): simplified geospatial referencing, user familiarization that enables teams to be quickly formed and collaborate within an incident; sharing information using drawings and speech; and a basic modular design that allows the system to be quickly adapted to different user needs and changing mission requirements.

The NICS architecture is a cloud-based system which emphasizes open standards for software development, user interface display, and external data interfaces. Recognizing that the crisis management and disaster response communities are always spread across a wide range of organizations that have different tools, and communication systems, NICS is designed around some key principles: non-proprietary: not owned by the supplier, no proprietary IP, community development effort; based on open standards: works on any computer, any operating system, any browser; uses the "app store" model: applications can be developed by anyone, with easy plug-play functionality; designed for the tired-dirty-hungry: it doesn't try to do everything, it's carefully designed for people who are under extreme stress; focused on scalability: technologies for small and large to extreme scale incidents that enable the ability of processes, networks, software or organizations to grow and manage increased demand (Cvetković et al., 2018).

3.1. The origin and history of NICS

The Massachusetts Institute of Technology, USA, (MIT), more precisely, Lincoln Laboratory, has a long history of research and development of architectures for information exchange, situational awareness and decision support in the military. Recognizing that many aspects of these architectures were directly applicable to civilian disaster response applications, in 2007 the Office of Laboratory Technology initiated a study to explore applications for large wildfire response in California. The Lincoln Laboratory research team partnered with California Department of Forestry and Fire Protection (CALFIRE) units in San Diego and Riverside CA to jointly identify the requirements for such a system and demonstrate its utility (Gregg & Stephanie 2023).

With guidance from these operational partners, MIT Lincoln Laboratory designed and implemented a prototype system that enabled shared situational awareness and collaboration during response operations. The architecture of the next-generation incident command system (NICS) is based on network-centric paradigms, services, combined sensors, communication, and visualization and collaboration technology with all components connected in real-time. The performance of this prototype system and the impact of the new technologies on then-current concepts of operations were evaluated through a limited objective experiment (LOE) conducted over a three-day period in August 2009 in Riverside, California, and included professional responses from CALFIRE, the US Forest Service departments and local agencies. The utility of the favoured tactical system for collaboration and shared situational awareness among field operators and command centres was clearly recognized by participants and by the US Department of Homeland Security, which initiated sponsorship for further research and development in 2010.

Following the limited-goal experiment, the NICS team worked intensively over the next several years with a growing number of responsible agencies in California to refine the basic platform and expand the system's capabilities driven by strong user participation. Early on there was a desire for a system; by 2012, a NICS User Group was formed consisting of over 450 organizations across fire, legal, medical, emergency services, emergency management, emergency management agencies, US Border Patrol, private industry, utilities, non-governmental organizations, etc. During this period, it has been used in thousands of training exercises and live incidents to coordinate various emergency response activities, including disaster management and law enforcement. In 2009, the devastating bushfires in Australia prompted Australian officials to look around the world for a large-scale crisis management system. As a result, the state of Victoria, Australia, chose NICS as its new system. The state of Victoria, Australia, adopted the NICS in 2014 to facilitate their preparation and response to emergencies such as fires and floods. In 2014, the Emergency Management Directorate of Australia's largest state, Victoria, began to implement the NICS Open Platform into its emergency management system, and the Directorate continues to share software updates with the NICS community. NICS, which was used to call for responses to wildfires (*cal fire*), mudslides and floods, was transferred in 2015 to the California Office of Emergency Services. Renamed SCOUT, the system supports emergency and law enforcement officials across the state.

3.2. NICS in Bosnia and Herzegovina

The NATO Science for Peace and Security program through the pilot project "Advanced System of Regional Coordination for civil emergencies" in the period 2017-2021 implemented the new generation incident command system - NICS and accompanying technology in Bosnia and Herzegovina, Croatia, Montenegro and Northern Macedonia. Within the Science for Peace and Security (SPS) program, NATO has approved the SPS G6188 project "Improvement of the New Generation Incident Command System (NICS) in Bosnia and Herzegovina (BiH). Since 2017, Bosnia and Herzegovina has organized numerous workshops, trainings and exercises where hundreds of rescuers have been trained. As a result, the NICS system has proven to be an integral tool in the field of protection and rescue. It is a tool that has demonstrated numerous benefits in real-time events directly supporting civil protection teams on the ground and is used for mobile tracking and management of rescuers and resources. Respecting the constitutional structure of Bosnia and Herzegovina, as well as legal jurisdictions in the field of protection and rescue, NICS was implemented at the following levels: Ministry of Security of Bosnia and Herzegovina; Ministry of Defense of Bosnia and Herzegovina; Republic Administration of Civil Protection of the Republic of Srpska; Federal Administration of Civil Protection of the Federation of Bosnia and Herzegovina; Department of Public Security of the Brčko District of Bosnia and Herzegovina.

The implementation of NICS went primarily to the umbrella bodies with the intention that in the following period, the implementation will be brought down to the level of the local community because it is estimated that this tool will have its full effect only in this way. During the implementation at the top levels of government, and through various types of exercises as well as real situations, more than 200 incidents and more than 2,500 reports submitted (via the mobile application) and more than 1,500 rooms for cooperation in support were recorded (OKC 112 BiH).

The NICS system is an example of a pilot project of new technology produced and adapted to the specific needs and requirements of the geographical characteristics and institutional arrangement of Bosnia and Herzegovina. Partner institutions from Bosnia and Herzegovina continuously upgrade the system and implement it in real-time events, including simulation of different scenarios. As a result, the system is well supplied with data and information that serve daily in complex situations in the field of civil protection. In order to continue the implementation of NICS system activities, its continuous upgrading and use is required. The Ministry of Security of BiH in cooperation with all competent institutions in BiH, including entities, cantons and the Brčko District of BiH must continue activities related to the NICS system in terms of regular maintenance and management of the system and creating, coding, designing and organizing special system components: adaptation and harmonization of the system for the needs of Rescue Services in Bosnia and Herzegovina; training of IT experts and technical staff for system maintenance; Development of standard operating procedures (SOP); training, conferences, seminars and exchange of expertise for working on the system; training of rescuers; procurement of equipment for all levels of NICS users;

4. Conclusion

The integration of advanced technologies is increasingly becoming a key strategy in improving protection and rescue operations during natural disasters. This entails harnessing the power of innovative solutions to strengthen resilience and response mechanisms on various fronts, including natural disasters and other crises. In the field of disaster management, resilience is essential. It refers to the ability of systems, communities or societies to withstand, absorb and recover from hazards, preserving and restoring essential functions and structures. Resilience effectiveness is measured by the speed with which a system returns to its original state after a disturbance, taking into account many factors.

Natural resources such as land, water, forests and minerals play a key role in building resilience. Financial resources, including savings, pensions and income, provide important support for recovery. Human capital, which includes health, knowledge and skills, is the backbone of resilience, while social cohesion factors such as family ties, social networks, trust and the sharing of information and resources strengthen collective resilience. In addition, physical resources such as infrastructure, roads, shelters, transportation and health systems are necessary parts of a resilient framework.

Within the framework of protection and rescue efforts, modern technologies provide unprecedented opportunities for progress. From early warning systems using artificial intelligence and predictive analytics to real-time platforms using drones and satellite imagery, technological innovations enable proactive risk management and rapid response actions. In addition, communication technologies facilitate seamless coordination between response teams, which improves the efficiency and effectiveness of rescue operations. Additionally, advances in robotics and automation are making search and rescue missions easier, reducing the risk to people in dangerous environments. Also, the use of advanced sensors and Internet of Things (IoT) devices enhances situational awareness, enabling responders to make data-driven decisions in dynamic disaster scenarios.

In essence, the use of new technologies in protection and rescue efforts during natural disasters represents a paradigm towards more proactive, adaptive and resilient approaches to disaster management. By embracing technological innovation, stakeholders can improve preparedness, response and recovery capacities, ultimately minimizing the impact of disasters on communities and protecting lives and livelihoods.

The use of technology for the process of planning and responding to natural and other disasters is inevitable. What its scope will be depends on the technology itself that is available. By joining the EU Civil Protection Mechanism, Bosnia and Herzegovina gained access to some new technologies and systems that can now be used more easily to increase the country's resistance to natural and other disasters. In addition, during the great floods in BiH and the Balkan region, the need for the use of modern satellite systems for creating maps of flooded areas was visibly expressed. There are also technologies related to prevention, communication, early warning and elimination of consequences, which develop and progress in their development on a daily basis. Given that Bosnia and Herzegovina is a small and undeveloped country, the use of modern technologies in the preparation and planning of response to natural and other disasters uses quite modest modern technologies. It is not only a question of money, but also of education for working with new technologies. All this modern and new technology gives many advantages, but it also has some requirements that must be met for its use to be successful. First of all, it is the human factor and its ability and training to use this technology. Technology itself cannot be harmful if it is used correctly and if we know how to use it. On the other hand, no technology is good without its familiarity and knowledge of its use, and in that case, the effects of its use can be negative.

The agility of response to various natural or other disasters, in the context of the use of modern technologies, enables timely and realistic planning, and early warning, i.e. the use of technologies for that segment, then modern technologies that enable the monitoring and coordination of responses (NICS) and the transfer of information in real-time, as well as technologies that enable the rescue of people from the affected area. As can be seen, these are all phases of response to natural or other disasters.

A higher degree of use of modern technologies is directly proportional to the number of people trained and familiarised with these technologies. It is in human nature to be afraid of the unknown and thus of new technologies with which he or she is not familiar. There is also a generational gap where the older generations who are now in the managerial top or in top management are not so familiarised with new technologies, which creates additional resistance among the older generations. It means that to use new technologies, it is necessary to educate, to change the way of thinking about modern technologies, as well as to understand generational differences. In addition, the use of new technologies implies clear conditions for its application, so without clear SOPs (standard operating procedures), confusion and mistrust is created. Modern technologies are tools that can be used in all phases of managing natural or other disasters, but they are not and cannot be a substitute for humans. Man must not be a servant but a ruler of modern technologies. This implies that training must not stop only at the use of modern technologies, because in the case of major disasters, the capacity to use certain technologies may be questionable. Man must remain the main driver and know alternative ways of acting in all phases without relying only on technology. To trust technology to a certain extent, but not to be blind to subsequent technological innovations, because technology still has no soul.

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