

# APPLICATION OF MODERN TECHNOLOGIES IN ENSURING COMMON SAFETY

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## ABSTRACT

The study presents the issues of using modern technologies to ensure public safety. It consists of two parts. The first one presents the importance of governmental and non-governmental organizations for common security, pointing to the significant importance of, above all, special forces, the Police, Border Guard, the State Fire Service and the Armed Forces of the Republic of Poland. The second part describes generally available technologies that increase public safety.

## KEY WORDS

Security, modern technologies, uniformed formations.

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## Introduction

Today's world is based on the dynamics of development of modern technologies and it is recently troublesome to find a field of human activity that does not use the latest technical solutions. It applies to Poland as well. Two decades of the twenty-first century is a time when numerous institutions and citizens began to use the amenities introduced to our lives. They are supposed to make our lives easier and it is possible to point out the innovative solutions and services, the lack of which would be made acutely aware of. It is also worth noting that many of them go beyond their original purpose and are also used to ensure public safety today.

According to the author, an objective technical determinant that can and will reassure the feeling of safety or its lack does not exist. Some hints in this regard are given by the professor Andrzej Glen

who shows the material boundaries of subject's safety. He focuses his attention to a human being and distinguishes two categories of his activity space. Having such a foundation for considerations, it can be assumed that modern technical solutions should meet their challenges and threats that have already been recognized and defined today. However, it is worth bearing in mind that the imminent future is unpredictable and there may always be an event that has not been mentioned in various emergency response plans yet. On the other hand, the reference to the essence of security, Professor Bernard Wiśniewski points to the cause and effect relationship of the introduced changes and the acceptable level of life and health protection as well as measures necessary for survival. As a result of the above, this review is an attempt to identify the most important technical

aspects which have both indirect and direct impact on the public safety. Every day, nobody except specialists wonders which technologies and technical means are used for this purpose. Those technologies are an important components apart from which it would be difficult to care for safety without dividing it into specific types.

Taken into account the above considerations, the author recognizes to be appropriate to divide the possibilities of using various technical solutions supporting general safety into those dedicated only to services, guards and inspections and on the other hand those generally available to every citizen. It is due to the fact that solutions dedicated for uniformed formations and institutions they represent should not be easily obtainable (purchased) by unauthorized men.

## 1. Governmental and non-governmental organizations acting in the interest of the public safety

The primary method of ensuring public safety is achieved by the possession and access to technology, devices and tools an handling them to specialized organizations whose purpose is to take care for the security of the state and citizens. Uniformed formations are the first in line i.e. organizations established for this purpose by the state or state's organs. Due to the open nature of this publication, the author will indicate only its most important technological and technical capabilities for determining the public safety. All uniformed formations have a hierarchical organizational structure, although they differ in terms of implementation tasks assigned to them. The basic uniformed formations include:

**1. Special forces** – special purpose formations, such as the Internal Security Agency or the Foreign Intelligence Agency. The detailed characteristics of the technologies at their disposal is not open to public, however, their basic tasks include such aspects as protection against intelligence activities of foreign countries and large-scale crimes that may threaten the stability of the state (national security), common security (e.g. identification and neutralization of terrorist cells and organizations). They have a wide range of tools and technical means to carry out even the most complex activities.

**2. Police** – its primary mission is to protect the internal public order and the safety of citizens. Each part of its structure is important, but the one most visible for citizens are the Prevention Departments and the Road Traffic Departments. The police has access to the global Internet network, they fight crime (including those related to virtual space) and ensure the safety of mass (sports/ cultural) events by accessing and using by monitoring network in cities and places (facilities) that can be a source of potential threats. It has been equipped with individual sets for transmitting information and transmitting images in real time from the ongoing interventions. They use of specialized tools to search for dangerous criminals, but also during search and rescue operation for missing persons in various environments. In terms of caring for road safety, police has a number of devices, resources and software at its disposal that allows identifying the perpetrators of road crimes and offenses and to effectively enforce road traffic regulations. These include, among others, specialized cars, motorbikes, motor boats and helicopters, but also devices for speed measurement and testing the

state of sobriety or the use of intoxicants by people driving vehicles.

**3. Border Guard** – uniformed formation that has emerged from the change of subordination and purpose of the Border Protection Forces. Its main mission is to protect Polish land and sea borders. During assignments, the Border Guard uses, inter alia, various types of border monitoring systems (including those located on unmanned aerial vehicles), it has access to information systems of the European Union, uses its own planes and helicopters, as well as vehicles and boats adjusted to its needs. It also has access to IT systems of the Schengen area.

**4. State Fire Service** – a uniformed formation dealing mainly with fighting fires and threats other than fighting and preventing crime. Its activities cover a very wide range of tasks related to saving human health and life. For this reason, it has been regarded with the highest degree of social trust. Fire brigade equipment includes not only vehicles designed to combat the effects of fires, but also cars with equipment allowing for assistance in collisions and road accidents when it is necessary to recover the injured. It has a specialized equipment for working at high altitudes, but also in the aquatic environment, as well as rescue and search operations after construction disasters or the effects of earthquakes. It is the uniformed formation that usually reaches crisis situations and those affected by natural or industrial disasters first. It has, among other things, specialized vehicles for removal of chemical hazards from the roads.

**5. The Armed Forces of the Republic of Poland** – the most important uniformed formation assigned to defend the territory of our country and deter potential external aggressors of the state.

When presenting the issues of common security, one should also mention an increasing role of the use of troops in the period of peace and in the event of crisis situations or natural disasters. There is, among other, care for the improvement of road safety while supporting Police activities. Moreover, it is the army that cares for the security of the Polish airspace and cooperates with the aforementioned Border Guard in this aspect. It should be emphasized that the equipment used at this time is the same as the one to support military operations during an armed conflict. However, a situation and social expectations influence the soldiers to use it primarily during flood control actions, large-scale fires, search and rescue operations, removal of the chemical hazards effects and many others, for example, removal and neutralization of unexploded ordnance and ammunition stores left over from the World War II. It is the application of combat assignments in the period of peace, and at the same time a practical test of their training. It should be emphasized that applied technical solutions and means are often unique and inaccessible to other formations, a meaningful example of what are the possibilities of ensuring the exchange of information with the use of automated command support systems. The Polish army also includes Military Police, which is the equivalent of the police forces in the army itself. Due to their frequent cooperation, it has the powers and equipment that are equivalent to the police, for example in terms of road safety. Its task is to protect the internal order and security of soldiers in places where they perform their commands.

**6. The Prison Service** – a uniformed and armed formation that carries out tasks related to ensuring public safety in

the field of imprisonment and temporary arrest of convicts with final judgments or suspected with committing crimes. Technological changes that have a positive effect on the comfort of prison service include, among others, the introduction of a monitoring system and closed-circuit television in prisons. Electronic supervision technologies have also been introduced, allowing inmates with a sentence of up to one year to go free and stay at their places of residence, and at the same time remain subject to the control of the Prison Service. Detention centers and prisons are becoming more and more computerized. The Prison Service has introduced, among others, X-ray scanners (X-ray) on its equipment list. It is a device that generates ionizing radiation, which allows to x-ray objects placed in the scanner. Handheld metal detectors are becoming commonplace. Changes were also made to the individual equipment of officers, new weapons and protective kits, including helmets, bulletproof vests and modern handcuffs for arms and legs were purchased. Vehicles and infrastructure are being modernized. Devices are used to neutralize drones that can deliver telephones or illegal substances to detainees.

**7. City Guard** – a local uniformed formation appointed by the Commune Council for protecting public order in its area. The field of its operation is similar to the assignments of the police, duties of which it often supports, with the significant difference that it cannot conduct investigations. Its tasks concern minor offenses and crimes, primarily disciplining drivers who park in prohibited places or do not comply with traffic regulations. They are also meant to take care of order and public safety. The catalog of their responsibilities has been significantly

expanded when municipalities and cities decided to purchase and launch city monitoring systems based on a CCTV system. This allows for documenting cases of breaking the law and transferring the collected material to the police.

**8. Railway Security Guard** (pl. Straż Ochrony Kolei, in short SOK) – its task is to protect people's lives and property in the railway area and to ensure safety on the railroad. SOK officers often travel on those train routes particularly exposed to the danger of theft or violation of the passengers' personal integrity. They also take care of the condition of the railway infrastructure and supervise the transport of goods through companies subordinated to the Polish State Railways. The modern solutions used by this formation include monitoring and closed-circuit television systems, cameras located on officers' uniforms.

**9. Forest Service** – its main mission is to protect the the State Forests and with other activities for the benefit of this institution. It ensures that there is order in the forest areas and that there are no cases of theft, destruction and deliberate devastation of forests, and It also supervises large forest complexes in terms of fire protection. For this purpose, it uses video surveillance systems, as well as the so-called photo traps that are triggered in a specific situation and record a situation that is an offense or a crime.

**10. Road Transport Inspection** – a formation established to supervise road safety and support police activities in this area. It has, among others, a network of electronic devices measuring the speed of moving vehicles (speed cameras) and issuing fines or referring cases to the appropriate courts. It is authorized to inspect all drivers and vehicles, with lorries as its main focus.

The formations, guards and inspections presented above are, according to the author, the most important services that apply the latest technological solutions and measures contributing to security every day. It is no less important to emphasize that the area of public security also includes civil protection and rescue, public administration in the area of internal security and civil defense. Such an approach influenced the author to narrow the general spatial framework and technologies that may be of interest to both governmental and non-governmental organizations. It was considered appropriate to present selected solutions directly related to the subject of the study.

The functioning of civil defense is based on the State Fire Service and its human and material resources (all available technologies and means), but it is also supplemented by the active participation of the population and private economic entities to provide protection to the weaker and injured, protection of crucial infrastructure, as well as rescue and assistance to the injured in times of peace, crisis and war, as well as cooperation in combating natural disasters and environmental threats. It is all part of the state's defense system.

**Sanitary and Epidemiological Stations** supervise the compliance with hygiene, sanitary and health requirements in various fields of activity that may affect human health. They carry out disease prevention activities, provide preventive vaccination services, conduct tests of people, food and utensils in terms of safety and hygiene, organize activities in the field of health education and health promotion. They have specialized laboratories for testing.

**Gas emergency service** is designed to remove damages and breakdowns in the gas network, using specialized devices, among others, measuring the concentration of gases in rooms, or detecting cracks in the installation.

**Energy emergency service** is established to repair damages and failures of power lines and devices. They repair, inter alia, power grids in forest and mountain terrain. Among other things, it is equipped with, among other, all-terrain vehicles.

**The Volunteer Fire Department (pl.: Ochotnicza Straż Pożarna, in short: OSP)** is an association that conducts activities for fire protection by putting together fire-fighting equipment, active participation in trainings, exercises and fire-fighting actions. The OSP operates mainly in small towns. It cooperates with the State Fire Service and uses similar equipment.

**State Medical Rescue** is a health care institution established to provide assistance to every person in a condition of sudden health emergency. They have vehicles equipped with life and health-saving equipment.

**Water Volunteer Rescue Association** is an association that brings together life-guards who keep the safety of separate bathing areas and open waters. It consists of regional and local unions, which then form voivodship unions. Ambulance services are financed by local governments. In practice, trained rescuers often work for free, and the equipment is purchased by the courtesy of sponsors. The main equipment includes: boats and motorboats, equipment for the individual rescue of drowning people, first aid kits and means of communication.

**The Mountain Volunteer Rescue Service** is a voluntary organization operating in the Polish mountains. Its mission is to provide the first aid in broad sense: mountain accidents, activities in the field of nature protection and widely conducted preventive activities. The Tatra Volunteer Rescue Service operates in the highest Polish mountains. They are equipped with modern vehicles, helicopters, mountaineering equipment and radio communication means.

### Publically available technologies for increasing common safety

The possibilities of ensuring public safety by citizens come down to the ability to use modern technologies to counteract the effects of threats that affect them as part of functioning in local communities. According to the author, they consist of a number of measures and services, the consolidation and interrelations of which make up the entire security system. However, it is not a homogeneous system as it may contain all or only selected components. Currently, citizens have the opportunity to purchase and use a wide range of technologies and measures that can increase the personal security of their beloved ones. Everything depends on the needs and funds, some of them should be discussed with the administration of local government or the building's community in a given estate. The basic technologies that can be used individually and in groups include:

- a) use of alarm systems in buildings (apartments), including fire protection and lightning protection systems;
- b) disseminating information about threats via social networks, radio stations or local radio stations;

- c) restrictions on the free access to weapons and ammunition;
- d) use of light and acoustic signals (intersections, pedestrian crossings, railway crossings);
- e) street lighting;
- f) supply of utilities necessary for life (electricity, water, gas, heating, air-conditioning systems);
- g) food supplies and its delivery;
- h) organization of public transport;
- i) receiving alerts from the Departmental Security Center;
- j) operations and access to the emergency numbers ...

These are only selected examples of the use of various technologies for public safety, which are usually not consciously perceived as they are operational and constantly modernized.

### Conclusion

It is without doubt that the Author has taken up a big challenge trying to outline a general picture of the area being considered in this study. The performed analysis allows to conclude that the cognitive appetite has been awakened and the area of scientific exploration could be shared with many specialists. The volume of the publication and the concern for protection of classified information did not allow to present the technical details of the indicated solutions. However, It elevates the need to deepen the author's knowledge and has become a beginning to the continuation of further research. It is also a foundation for discussions among experts and an attempt to identify the dominating technologies of the future. It is worth emphasizing that currently the so-called technological leap takes place on average every five years. A striking example are the services and technologies listed as generally available, which in-

crease public safety. The possibilities of their use were indicated, hopefully there will not be any serious break down, that could stop electricity supply for a month and shut down the Internet ...

In the author's opinion, the study is a prelude to further detailed considerations, as the progressive development of technical thought will not be stopped.

### About the Author

**Mariusz Frączek – Associated Professor** at the Cyberspace Security Department, Institute of Security and Management, Pomeranian University in Słupsk, Poland. Phd with habilitation, Eng. Since 2021 res. Colonel, gained his experience both in military units and headquarters. He was an academic teacher at the most important Polish military universities (the National Defense Academy 2005-20016, the War Studies University 2016-2017 and the Military University of Land Forces 2017-2020). Areas of scientific interest: cyberspace security, security of ICT networks (telecommunications / IT), including cryptographic information protection), information technologies, information systems management, management support systems, information security threats and communication systems, as well as the possibility of information exchange and cooperation between various emergency services. Author of over 140 publications, including: 14 articles, 67 monographs, 22 research works (8 as the manager), 8 textbooks, 138 chapters in collective works, 149 reviews of publications of various types (including competition works for the Department of Science and Military Education), 7 doctoral and 2 postdoctoral reviews, reviews of monographs, textbooks and articles. Participant of 49 scientific conferences. Teaches technical subjects, the subject of which includes: Information Technology, Security of Teleinformatic Networks, Cryptographic Information Security, Telecommunications Networks, Military Communication Systems, Communications and IT, Security threats,

Organization and design of security systems, IT systems in logistics and Systems and ICT networks, Information War, Security of local communities, Information technologies, Basics of telecommunications networks, Security in cyberspace, Cyberspace environment, Information security, Tactics of Types of Military. He cooperates with the defense industry, including: the Military Communication Institute (MCI), Military Communications Works No. 1 and the Industrial Telecommunications Institute, with Central Institutions of the Ministry of National Defense. In 2020, a representation of AWL cadets under his supervision participated in the CYBERSECURITY CHALLENGE 2020 tournament, and four of them were in teams awarded by the Ministry of Digital Affairs and The Bridge Foundation.