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IMAGE MONITORING AS A FACTOR SHAPING THE SECURITY OF THE MUNICIPALITY OF THE CITY OF SZCZECIN

This paper presents the process of developing a concept of modernization of visual monitoring in the Municipality of the City of Szczecin taking into account the module of digital image analysis. The concept took into account a number of determinants, such as: mainstreaming technological assumptions for monitoring, opinions on technical documentation concerning modernization of municipal infrastructure, integration of functionally dispersed “monitoring solutions” and developing the end model of management. It included conclusions from a 2018 survey on the sense of security. The paper includes references to regulations shaping competences and tasks of local government entities. The developed model also takes into account the integration of sensors operating in the municipality. The functional aspect is crucial here which boils down to minimizing human element involvement at the stage of signal analysis and shifting the emphasis on the speed of response from agencies and guards responsible for public security and order.

Keywords: monitoring, local government unit, security, system, integration.

1. INTRODUCTION

One of the key public tasks implemented by self-government bodies for residents of each local government unit is broadly understood security. Examples of it feature in provisions of a number of normative acts, i.a. as one of the basic needs of a self-governing community (Act of 1990, section 1 subsection 1). The aspect of the size of the community and the area it occupies is irrelevant here. It seems that residents perceive them not only through the presentation of “achievements” of bodies responsible for public security and order and for the persecution of offenders. The statistics with which these entities justify the high level of security, illustrating trends in the dynamics of various categories of events, are not very interesting for an average resident of the municipality. It is obvious that he expresses his interest in each case of a drastic violation of the provisions of the law, especially in a situation where it concerns an event on the territory of the commune. The category of events of such a character needs to include crimes marked with the perpetrator’s particular cruelty or tragic road accidents. Interest in such events is stimulated to a large extent by the media, in particular those of a local nature. A cumulated result of these behaviours in local commu-

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nities involves increasingly frequent attitudes that do not only postulate to neutralize specific threats but demand that a high level of public security and order be ensured. It is worth emphasizing here a worrying interrelation involving on the one hand a progressing indifference towards and tolerance of behaviours contrary to applicable law, and on the other hand staff problems amongst entities that are by statute responsible for public security and order, clearly evidencing the weakening of the state's structures. A consequence of this involves a growing role and activity of local self-governments in the sphere of public security and order. A direct election of authorities of commune heads, mayors and presidents as well as councilors of each level is crucial here. The development of municipal potential postulated by them that serves the implementation if this objective covers an extensive scope of tasks. They are defined by statute or determined by many various variables, i.a. such as: demographical potential, geographical location, level of residents' awareness and education, communication availability, diversification of energy sources, cultural determinants, and stability of public authority or the community's financial capabilities.

The purpose of this paper is to present the process of modernization of the visual monitoring system on the territory of the Municipality of the City of Szczecin (hereinafter referred to as MCS) in a personal, material and functional approach. As the method the author will use an analysis of the following: normative acts, literature and source documents including results of research concerning the sense of security of residents of the MCS conducted in 2018. The described process – due to the presented ontological approach – is a breakthrough in the current model of security management on the territory of Szczecin.

2. MULTIFACETED FUNCTIONING OF THE COMMUNE

The new administrative division introduced in the Republic of Poland in 1999 established 16 voivodships, 308 poviats and 5 cities with poviat rights. During the next 15 years these numbers increased slightly, since as of 1 January 2015 there were 314 poviats and 66 cities with poviat rights with the number of voivodships unchanged (Żółciak, 2015). A similar trend can be observed in reference to a commune as a basic unit of the country's administrative division (Constitution of the Republic of Poland, 1997, Article 164 section 1). In the period between 1990 and the beginning of 2018 their number was 2,383 and 2,478, respectively (Żółciak, 2015). A commune operates on a precisely defined (specified) territory which determines relatively uniform settlement and spatial set-up, taking into account specific bonds of a cultural, social and economic nature and others facilitating "the capability to execute public tasks" (Act of 1990, Article 4 section 3). One needs to note here a significant diversification of the demographic potential of individual communes in Poland – from those with just over a thousand inhabitants to those that have a few thousand residents.

Due to its complexity and ambiguity security is of a multifaceted nature. It seems that it is aptly portrayed by a state of "certainty, peace, protection... lack of threat... guaranteeing the development" of man (Fehler, Piątek, Podgórzńska, 2017). For the needs of this study it should be analysed both in personal categories (individual or group security) as well as material ones: social, health-related or economical (Sulowski, Brzeziński, 2009). It is also possible to examine the security of commune residents as societal security (International Organization for Standardization, 2012). Such an approach to the issues of security dedicated to protection against events of a sudden nature (technical catastrophes and failures, natural disasters) is universal in Scandinavian countries, especially Norway. The legislator,

introducing a unified catalogue of commune's own tasks (Act, 1990, Article 7), did not include the wide spectrum of variables (differences) that occur within them, i.a., the area, population, dominant objects of activity, cultural or religious determinants, intensity of needs, interests, relations or ties occurring there. Unifying them, he concluded that they should include tasks "not reserved by statutes to other entities" (Act, 1990, Article 6), whose material scope covers, i.a.:

1. Land use planning and real estate management as well as council housing,
2. Municipal infrastructure (provision of the following utilities: water, electricity and heating, gas) as well as construction and maintenance of roads, streets and bridges,
3. Protection of the environment and nature (including municipal green areas and forest cover), removal and disposal of municipal waste, water management and sewage treatment,
4. Road traffic organization and local collective transport,
5. Protection of health, organization of social assistance, supporting the family and the foster care system,
6. Organization and maintenance of public education institutions, cultural institutions as well as protection of historic sites and care over them,
7. Physical activity and tourism, including taking care of recreational areas and sports equipment,
8. Public order and security of citizens and protection against fire and flood, including equipping and maintenance of a municipal flood protection warehouse,
9. Keeping up and disseminating the self-government idea, including boosting citizens' activity, cooperation and activity for NGOs and public benefit organizations, cooperation with local and regional communities of other countries and promotion of the municipality.

There is no doubt here that all listed tasks are crucial for the broadly perceived security of residents of the municipality. Their impact is obviously diverse, however, it cannot be omitted even in reference to such a strategic area as planning the directions of the municipality's land use development. However, it is key to undertake offensive actions in terms of public order and security. They need to be of a be-ahead and comprehensive nature, but first and foremost, their character must maximally use the potential of all entities operating in the municipality. In this regards it is essential to take an approach that integrates social, functional and technological solutions (Czarnecki, Siemiński, 2004). However, they should be preceded by a careful analysis of threats or of the state of security, adequate to the characterized area, performed both by the police, state fire brigade or city guard.

The author believes here that this requires an adoption of a different formula of evaluation of potential threats – especially in the city. At the same time one needs to depart from the traditional "departmental" approach and replace it with a multidimensional perception of security of a self-government community. It is worth noting here that the implementation of tasks defined by statute is performed by the commune "in its own name and on its own responsibility" (Act, 1990, Article 2 section 1).

With reference to the MCS, an important argument confirming the need for modernization or to be more specific for the development of a brand new concept of the operation and structure of the monitoring system involved results of the research "*Sense of security of residents of the Municipality of the City of Szczecin in 2018*" (Municipality Office in Szczecin, 2018) conducted in July 2018 on the sample of 600 residents by the Laboratory for Research on the Security of Self-governing Communities in the Institute of Political Science

and European Studies of the Faculty of Humanities of the University of Szczecin. As a result of the research very extensive analytical material was obtained that featured a high level of confidence and included a number of valuable, objective opinions from residents of this local government unit concerning various aspects of public security. It needs to be stressed that it included opinions taking into account views of persons residing throughout all neighbourhoods making up the municipality. One of the key issues was obtaining an answer to the question: *What do you expect from Szczecin Police?*. More than half of adult residents of Szczecin considered *efficiency* (52.67%) and *prompt arrival at the site* (51.17%) as the most important requirements from the police, the meeting of which to a large extent depends on issues equally important to the respondents, namely: *presence of patrols in the respondents' neighbourhood* (35.67%) and *openness to problems, providing help*. A quarter of Szczecin's residents expect the following from the police: *honesty and incorruptibility*, *elimination of unnecessary formalism* and *professionalism*. Promptness of action is in the author's opinion one of the key determinants deciding about the positive image of a secure city. More than one fifth of respondents postulates *immediate receipt of notifications*. This answer corresponds to *the possibility of easy communication with the police* (19.67%). The respondents also expected *easy contact with the district police officer* from the police. Whereas few, i.e. approximately 2%, respondents brought forward other postulates, including: *professional service*, *kindness*, *good manners*, *empathy for the elderly and physical fitness*. Only about 5% of the residents of Szczecin did not indicate or formulate any expectations towards the police.

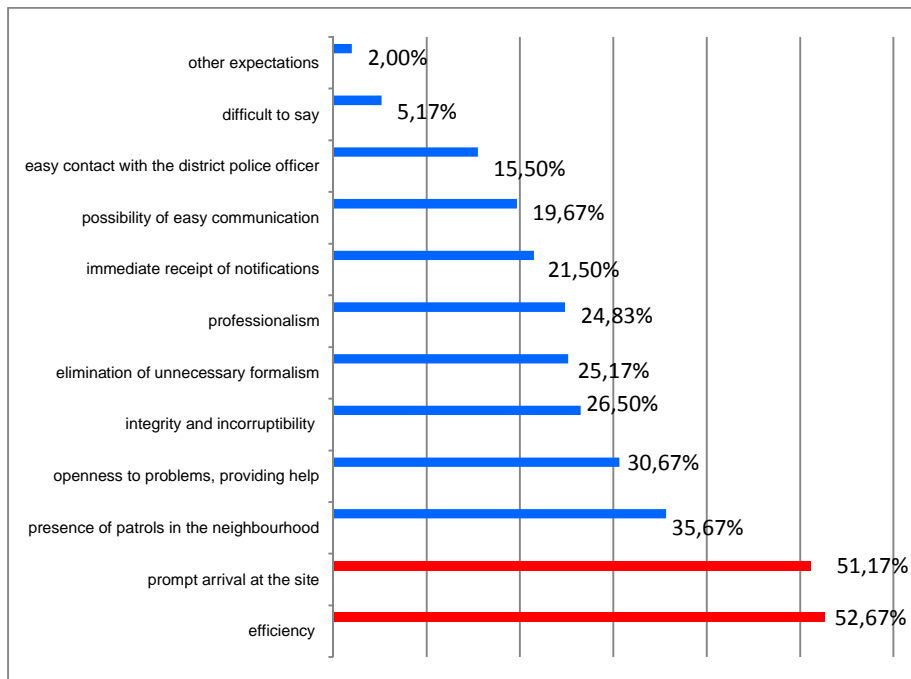


Figure 1. Response to the question: what do you expect from the Szczecin Police? Data in %

Source: Municipality Office in Szczecin.

One of the crucial issues determining the sense of security of residents of the MCS was the response to the question: *What threats are you most concerned about in your neighbourhood in Szczecin?* It is illustrated by the next figure. The obtained responses clearly show that most respondents were afraid of *daring drivers* and *aggression of drunks or drug addicts*. Slightly over one third were concerned about *destruction of property and vandalism*, while close to one third of respondents felt *fear of theft and harassment from aggressively behaving youth*. A fear of *a fight or battery* accompanies over a quarter of respondents. More or less every fourth resident of Szczecin was concerned about *burglaries*, *noisy and rudely behaving neighbours*, whereas every fifth – *assault and robbery*. Relatively few respondents are afraid of *drug dealing* (only 11%). The following caused least concern among the residents of Szczecin: *extortion and ransoms* and *other threats* to which the respondents classified: *stray dogs, dogs without supervision (without a muzzle), wild animals, mentally ill (those blocking trams), elderly mentally ill (flooding flats), arson, persecution or pseudo patriotic law enforcement officers from the National Radical Camp*.

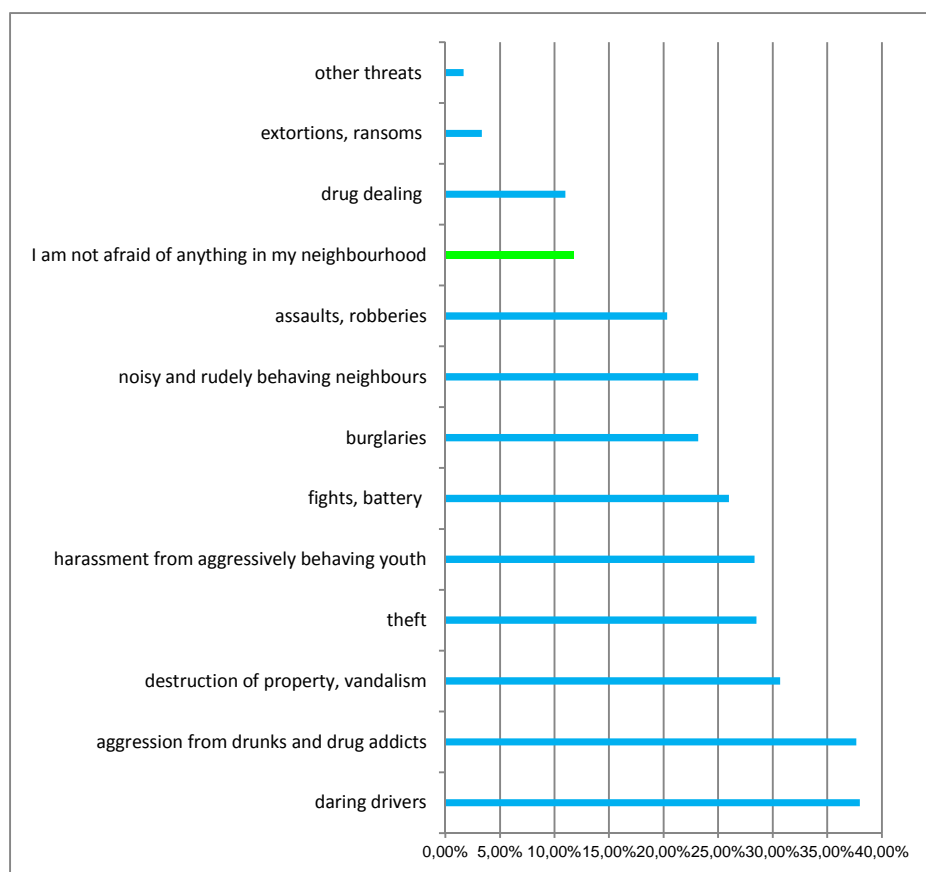


Figure 2. What threats are you most concerned about in your neighbourhood on the territory of Szczecin? Data in %

Source: Municipality Office in Szczecin.

The above opinions clearly show that threats the identification of which and counteracting which may be largely supported by image monitoring integrated with a module ensuring transferring the responsibility for the analysis of signals from the human factor onto a digitally advanced technological solution. It is not insignificant here that this technical solution may perfectly support management of police or city guard forces and resources, particularly in the event of staff shortages therein (directional priorities of the police assume successive improvement of the so-called response time to an event – material from an annual briefing of the Municipal Police Headquarters in Szczecin in 2018 held by the author).

3. THE CONCEPT OF THE DEVELOPMENT OF MONITORING ON THE TERRITORY OF SZCZECIN

Citizens' safety and security is one of the key programme postulates of political parties (Stempiński, 2018) and unaffiliated candidates in parliamentary and self-government elections in Poland. The Author, by taking up the subject matter of monitoring space, with full awareness narrows the normative approach solely to the issues of monitoring image and sound. Unfortunately, contrary to many European countries, Poland has not developed legal solutions comprehensively addressing this area. There have been at least two attempts to regulate public space monitoring by statute. Unfortunately, they have not moved beyond the sphere of consultations of assumptions for a statute. Nevertheless, it is worth emphasizing that the idea included therein of vesting the right to monitor space solely in public entities or private entities acting on their behalf, of taking decisions on the application of such solutions in local communities (resolution of commune council), limitations in the form of a prohibition of using fake installations or monitoring places where human dignity could be violated, as well as indicating the catalogue of agencies and guards were, in the author's opinion, the right direction in regulating this sphere, in directional compliance with solutions of other European states (website of the The Chancellery of the Prime Minister, 2015). Currently the authority to use monitoring of image and sound is held by a number of entities responsible for public security and order, for border protection, for anti- and counter-terrorist activities or for security of mass events. In 2018 communes' rights to apply public space monitoring were specified: "In order to ensure public order and security of citizens as well as fire and flood protection, the commune may apply technical measures that allow recording images (monitoring) in the area of public space..." (Act, 2018, Article 114).

In the historical angle, the operation of visual monitoring in the area of the MCS began in 2000 as one of the integral components of the Command Support Station of the Municipal Police Headquarters in Szczecin (Decision of the Police Main Headquarters, 1999). This is when the tele-information structure was built on the basis of functional and technical requirements (developed in 1994) for the management of police forces in the area of the Szczecin agglomeration.

These assumptions included, i.a.:

1. The TETRA system of digital radio communication.
2. The system of electronic protection of a facility.
3. The system of digital registration of correspondence.
4. The system of observation of 9 key junctions involving 36 video cameras.
5. Independent sets of cameras in service vehicles.

6. Modules: of dynamic GPS patrol location, of large format visualization, of telecommunication, of usable application of GEM C 3, of a digital map, and integration of all systems and modules.

The operation of these systems over the past dozen years has proved its usefulness (especially the TETRA digital communication system and the monitoring system). The initiative of modernization, and in truth of building of an entirely new system of monitoring, is a consequence of significance that the President of the City of Szczecin assigns to broadly understood security of citizens. The team set up by him in 2015 was tasked with the following:

1. Defining directions of development of municipal monitoring.
2. Establishing principles of cooperation with other entities.
3. Coordination of works related to the development of the municipal monitoring system.
4. Approving the mode of implementation of the City's investments in terms of the municipal monitoring system (Order, 2015).

The key task in the initial phase of the team's operation was stocktaking of the city's resources in terms of: the fiber optic network operating in its area, the systems and number of cameras monitoring public space, the scope of investments carried out by the MCS, the capabilities of agencies and guards in terms of using the existing potential – including exchanging the obtained signal (at least three main monitoring centres operate on the territory of the MCS: the Municipal Police Headquarters, the Roads and Public Transport Authority, the Department of Municipal Management and Environmental Protection of the Municipality Office in Szczecin). Further, the activities were focused on specifying: the model of processing gathered data, including the distribution of signals from entities responsible for public security and order, the functionality of the system and technical conditions that the city's monitoring should meet. The team also took up activities in terms of searching for sources (including internal ones) for financing the task. An essential determinant which accompanied the functioning of the team, and in the initial period indeed hampered it, was overcoming the "sectoral" approach, one that lacked the synergy effect, of a number of entities who had already built their potential in this regard. It was essential especially in the perspective of the implementation of key infrastructural investments by the MCS in 2018 – 2023 (football stadium, aqua park, construction of transport hubs – bridges and roundabouts, building the Szczecin Metropolitan Rail or modernization of waterfronts) and strategic directions of its development. The team's authority was also expanded to include i.a. defining its prerogative to give opinions on investment projects carried out by municipal companies on the territory of the MCS.

The developed concept is the result of several years of careful analyses and preparations both from the MCS's organizational units and bodies and administration merged at the poviat level. Key support in terms of identification of locations that are at risk and the functionality of the monitoring system was given to the team by the Municipal Police Headquarters in Szczecin. The concept's general postulates assume that:

1. The integration of the system will be based on the potential of the Technopark Pomorania (hereinafter: TP, municipal company of the MCS).
2. Its development is to be based on full integration of resources (data processing and retention by the TP), including fiber optics that are owned by the city and the police.
3. Each data owner has access to their data (where they are responsible for its handling and making it available to other entities).

4. Investment projects (also at the stage of a concept) must take into account the need of a parallel expansion of resources (MCS's monitoring) in compliance with the principle of their full integration
5. The TP will develop the monitoring support infrastructure by using the model of digital (automatic) image analysis.
6. Sensory points monitoring a number of other indicators will be included in the system (e.g. the information system of public transport or the measurement system functioning since 2016 composed of scales monitoring the axle load in vehicles. They are located on four key transport hubs covering both entry to and exit from the city).

The Functional and Utility Programme developed in July 2018 entitled: "Expansion of the monitoring system of the City of Szczecin with the delivery of the image analysis system" is a consequence of developing a comprehensive concept of development of the MCS monitoring assuming the operation of the municipal monitoring as one of the most important technological elements of support for agencies and guards by statute responsible for public order and security. It is a key element of the application for launching the procedure of public procurement. The end result of these activities should involve building an infrastructure including:

1. an expansion of the currently functioning monitoring system of the city of Szczecin, through... construction of visual monitoring points of the city of Szczecin with the execution of necessary construction and assembly works in the indicated locations, together with inclusion into the existing system;
2. equipping visual monitoring points with devices that allow obtaining visual image and image for analysis in the image analysis system,
3. construction of tele-technical connections from the monitoring points being constructed to the tele-technical infrastructure of the city of Szczecin,
4. reconstruction and configuration of the data transmission system of the city of Szczecin;
5. supplying mobile video camera points,
6. designing, supplying and launching the image analysis system;
7. designing, supplying and launching the system of analysis of data obtained from the image analysis,
8. supplying the computing power to the image analysis system and the data analysis system (Municipality Office in Szczecin, 2019).

The attached map illustrates the distribution of fiber optic networks in the strict centre of Szczecin and planned distribution of cameras monitoring public space. The author stresses that the development of the fiber optic network – apart from ensuring connections between key entities responsible for public security and order, as well as fire protection – is also determined by directions of the planned city monitoring expansion. It is essential to point out that the signal from 97 camera locations will be transmitted in 95% using fiber optic networks. The developed context assumes that in the functional terms the monitoring system will be equipped with the following analytical possibilities:

1. Vehicle type identification.
2. Number plate identification.
3. Identification of crossing on red light.
4. Traffic flow analysis module.
5. Identification of objects left behind in municipal space.
6. Monitoring assemblies of people.

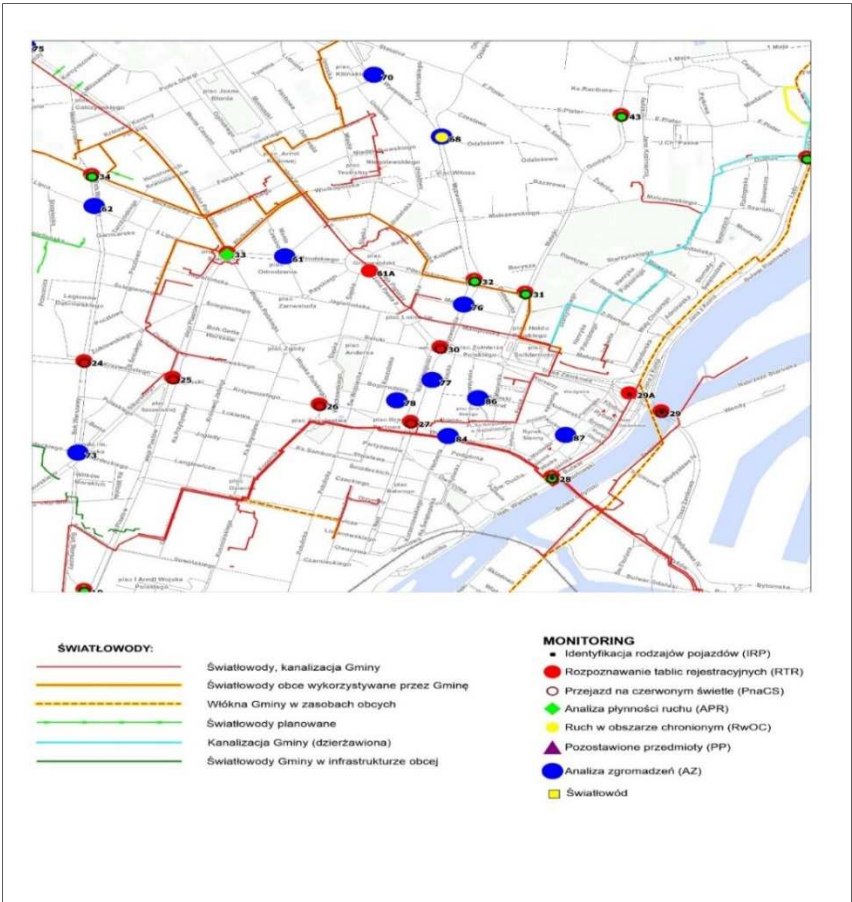


Figure 3. Distribution of fiber optic networks and planned location points for monitoring cameras in the centre of Szczecin

Source: Municipality Office in Szczecin.

[Author's note: map key in Polish. English translation provided below]

FIBER OPTICS:
Fiber optics, Municipality's sewage system
Third party's fiber optics used by the Municipality
Municipality's fibers in third party resources
Planned fiber optics
Municipality's sewage system (leased)
Municipality's fiber optics in third party infrastructure

MONITORING
Vehicle type identification (VTI)
Number plate identification (NPI)
Crossing on red light (CRL)
Traffic flow analysis (TFA)
Traffic in protected area (TPA)
Objects left behind (OLB)
Assembly analysis (AA)
Fiber optics

In the author's opinion it is essential for the team responsible for the operation of monitoring on the territory of the Municipality of the City of Szczecin to be guided by the following determinants: the need to develop a model integrating the current equipment diversity, elimination of the current institutional dispersion, the requirement to monitor space diversified in sensory terms (not only visually), the establishment of a catalogue of places key due to the city's security – also in the perspective of directions of its development – and transferring the responsibility for signal analysis from the human factor onto a digitally advanced technological solution. It is essential to point out that constructing the system requires the MCS's involvement of significant financial resources. The adopted multiannual financial prognosis for 2019-2020 allocated in total PLN 18 million for this purpose.

CONCLUSION

Monitoring, as a systemic technological solution may to a significant degree support the activity of entities such as the police, the commune (city) guard, the state fire brigade or the structures of commune crisis management. Its particular importance is seen not only in a crisis situation but also, and perhaps most of all, in optimal management of forces and resources of the abovementioned entities. A crucial premise for the task team established by the President of the City of Szczecin in the described example – apart from developing directional infrastructural changes – also involved optimal use of the municipal potential, including the Technopark Pomerania (TP). In the technological concept, apart from the identification of needs (of residents as well as agencies and guards) the concept also took into account risks identified by the proprietary team. One of them involves the lack of national normative regulations in terms of using visual monitoring as well as gathering and retention of obtained data. The discussed subject matter is a crucial element in building an integrated potential directed towards raising the level of security of residents of a local government unit. Developing the concept of the operation of monitoring is an example of task-based management of the commune's security also in the budgetary dimension.

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