SYSTEMY BEZPIECZEŃSTWA

WYMIAR LOKALNY I PAŃSTWOWY

REDAKCJA

ARTUR GRUSZCZAK

PIOTR BAJOR

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WYDAWNICTWO
KSIĘGARNIA AKADEMICKA

Artur Gruszczak, Uniwersytet Jagielloński w Krakowie
artur.gruszczak@uj.edu.pl

Piotr Bajor, Uniwersytet Jagielloński w Krakowie
piotr.bajor@uj.edu.pl

Recenzent
dr hab. Marcin Lasoń, prof. Krakowskiej Akademii im. Andrzeja Frycza Modrzewskiego

Redakcja tekstów w języku polskim
Weronika Werewka

Redakcja tekstów w języku angielskim
Dariusz Rossowski

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Marta Jaszczuk

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ul. św. Anny 6, 31-008 Kraków
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e-mail: publishing@akademicka.pl

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Grzegorz Kasprowicz, Wojciech M. Zabołotny, Krzysztof Poźniak
Warsaw University of Technology

Agata Tyburska, Jarosław Struniawski
Police Academy in Szczytno

Commanding a police operation with a Mobile Distribution Point of ICT Infrastructure

Abstract: Currently public safety is threatened by emergencies related to broadly understood terrorism, natural disasters and technical failures or are related to mass events, public gatherings and state or religious ceremonies and other situations causing risks involving a potential loss of control over the course of events. Hence, the Police must take specific actions carried out as part of organized police activities, primarily police actions and operations. The efficiency and effectiveness of the command in the Police is dependent on developing new, alternative, innovative technical solutions. The Mobile Distribution Point of ICT Infrastructure (Pol. MPDIT) serves as an example in this respect. It will be an autonomous node that integrates technologically advanced ICT services, such as voice, data, and image transmission and GPS positioning, for the needs of mobile command posts and the provision of ICT infrastructure in a specific area. This type of device is currently unavailable to the Polish Police, which limits the effectiveness of its operation in emergencies.

Keywords: new technologies, threats, ICT, command, police operations

Introduction

Ensuring national security and providing safety to citizens is the main task of state authorities equipped with resources and capabilities to prevent threats to protected values, to counteract their occurrence, react in an emergency, and restore order.

The Police is one of the most important public administration entities serving the society. As a uniformed and armed service, it has the greatest competence and formal and legal powers to fight all types of crime and social pathologies effectively.[1] Its main task is to respond to situations that may pose a threat to the life or health of people and to their property, as well as striving to develop such mechanisms of action that would result in maintaining public safety and order. All this requires a comprehensive preparation for efficient and effective conduct of operations in the event of a crisis. The aim of the article is to present new IT solutions which enhance the abilities to properly conduct tasks entrusted to police organizational units.

Organization of police operations in the event of a crisis

Currently, public safety is threatened by emergencies related to broadly understood terrorism, natural disasters or technical failures,[2] but also related to mass events, public gatherings, state or religious celebrations and other situations that may cause a risk of losing control over the course of events.

The occurrence of a threat causes the Police to undertake specific actions carried out in four basic forms, which are intervention, preventive protection, action, and operation. The highest organizational form of police activities is the police operation, which is the most complex, multi-faceted endeavor and requires a comprehensive approach – both during planning, implementation and control, as well as at the end of operation. It is defined as a set of organizational, tactical, and material and technical undertakings aimed at the prevention or elimination of a crisis event when its scope covers an area of more than one District Police or Voivodship Police Headquarters, or it involves a prolonged action or requires the support of unit forces, Police prevention subunits, or Police anti-

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[1] K. Jałoszyński, *Przeciwdziałanie zagrożeniom terrorystycznym w Rzeczypospolitej Polskiej*, in: P. Guła, P. Płonka (ed.), *Przeciwdziałanie zagrożeniom niemilitarnym. Zasadnicze aspekty współpracy Żandarmerii Wojskowej i Policji*, Wydawnictwo Centrum Szkolenia Policji, Legionowo 2009, p. 71; A. Tyburska, *Ochrona infrastruktury krytycznej. Zarys problematyki*, Wydawnictwo Wyższej Szkoły Policji, Szczytno 2012, pp. 88-113.

[2] E. Nowak, *Zarządzanie kryzysowe w sytuacjach zagrożeń niemilitarnych*, Akademia Obrony Narodowej, Warszawa 2007, p. 17.

terrorist units or organizations from outside the Police unit territorially competent for the location of a crisis incident in the Voivodship Police Headquarters. The operation is managed by the Chief Commander of the Police when the scope of a crisis event covers an area of more than one Voivodship Police Headquarters or when there is a high probability of the occurrence of such a risk and during operations undertaken at the proper Voivodship Police Headquarters that are prolonged or require the support of unit forces, Police prevention subunits, or Police anti-terrorist units or organizations from outside the competent Voivodship Police Headquarters, and in the situation of a threat to national security and in wartime. In addition, the Voivodship Police Commander is entitled to order an operation when the scope of a crisis covers an area of more than one District Police Headquarters or when there is a high probability of the occurrence of such a risk and during actions that take place at the competent District Police Headquarters, but are prolonged or require the support of unit forces, police prevention subunits, or Police anti-terrorist units or organizations from outside the competent District Police Headquarters.

A command structure for the purposes of a police operation is defined based on the analysis and assessment of the threats. Its individual components (command posts and staff teams) are properly structured, interrelated, and prepared for the implementation of the assigned tasks. The development of optimal organizational structures and methods of their work should aim primarily at ensuring high quality and speed regarding the command process implementation.[3]

The basic organizational unit, being an auxiliary and executive body of the police commander, is the staff. The specificity of the police protection of a specific crisis event and the number of forces involved in the activities affect the quantity, type, and composition of the teams of staff. These can be single-person or multi-person units, supervised by a designated policeman. It is important, however, that the number of people assigned to work in a team should ensure the continuity of tasks during the performance of long-term activities.[4] The main functional staff units are:

a) a recognition and analysis unit;
b) a tactical unit;
c) a process service unit;
d) a communications and IT unit;
e) a logistics unit;
f) a service unit.

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[3] J. Orzechowski, *Dowodzenie i sztaby. II wojna światowa i współczesność*, Wyd. Min. Obrony Narod., Warszawa 1986, p. 340.

[4] J. Struniawski, *Sztaby w Policji. Organizacja i funkcjonowanie*, Wydawnictwo Wyższej Szkoły Policji, Szczytno 2017, p. 45.

The spectrum of staff responsibilities is very broad, starting with the development of current forecasts regarding potential threats to public safety and order through planning and coordination of activities. It depends on organizing and maintaining a communication system that ensures efficient command and cooperation in the implementation of the adopted tactics of operations. The aforementioned task is a responsibility of the communications and computer science unit. It is implemented in consultation with the head of the territorially competent organizational unit for communications and information technology. As part of the above mentioned scheme, the following activities are performed:

a) developing a structure diagram of the command communication organization, cooperation, alerting, and setting up a communication system for the needs of the action (operation);
b) enabling the functioning of police communication systems, including their interaction with communication systems of other bodies and services used for the purposes of actions (operations);
c) providing the staff and the forces involved in operations with technical means of communication and information technology, implemented in agreement with the manager of the territorially competent organizational unit for communication and information technology;
d) ensuring communication and operation of IT databases for the needs of command posts, ensuring the functioning of communication means and providing access to IT databases for the needs of command posts.

Access to up-to-date information during police operations is an indispensable condition of the situation and task analysis. This access depends, among others, on an efficient system of the flow of orders and reports. Systematic inflow of reports from subordinate staff illustrating the course of activities and the development of events is of great importance for forecasting the development of the situation and the preparation of forces and means, and thus has a significant impact on the successful course of operations. It also allows exercising control in order to coordinate and monitor the force activities. Based on the reports, conclusions and suggestions regarding possible changes in the dislocation of forces and the manner of operation are prepared by the staff and presented to the commander of the security. The indicated system should be characterized, in particular, by speed of information flow, faithful transmission of content, maintaining secrecy, and simplicity of execution.[5] Relaying the reports

[5] J. Struniawski, *Dowodzenie w trakcie operacji policyjnych w zakresie imprez masowych i zgromadzeń publicznych*, Wydział Wydawnictw i Poligrafii Wyższej Szkoły Policji, Szczytno 2014, p. 11.

by radio or telephone communication means available for immediate use is relevant to the speed of the flow of reports and orders. Therefore, setting up efficient wired or wireless communication that ensure a continuous flow of information necessary to command operations is an important skill in operation of the staff. In particular, technical information systems are crucial in this respect.

The quality of information is an important determiner of the quality of the information system. All activities aimed at improving the quality of information contribute to the improvement of the entire system.[6] Technical means support the process of selecting and processing of this information. The development of modern information technologies supports and increases effectiveness of police activities and contributes to a reduction of risk and shrinking the area of uncertainty. Accessible, reliable, constantly supplemented and updated in real time information about the facts will create the basis for illustrating the situation. Technical means allow for real-time transmission of information in the form of voice, text, and image. Setting up communication that ensures continuous exchange of information with subordinates, supervisors, and co-operating forces allows for proper organization of work on the command post.

Modern ICT solutions used in organized police operations

Modern threats determine the search for new, alternative technical solutions for the effectiveness of command by the Police.[7] An example of modern ICT solutions, which can be introduced to police units, is Mobile Distribution Point of ICT Infrastructure (Pol. MPDIT).

The concept of MPDIT is a key part of the priority technology area, modern technologies or innovative solutions in the field of ICT security, information security in ICT systems and networks, and national cryptography as well as modern technologies and innovative solutions in the detection, combating, and neutralization of threats, as identified by the 7th strategic direction of scientific research and development 'The State Security and Defense' and determined in the National Research Program. The implementation of project results aims at obtaining and developing the priority operational capability of the staff responsible for safety to detect and combat crime

[6] A. Tomaszewski, *System dowodzenia wojsk obrony terytorialnej*, Warszawa 2011, p. 10.

[7] See W. M. Zabołotny [et al.], *Implementation of multistandard video signals integrator, Photonics Applications in Astronomy, Communications, Industry, and High Energy Physics Experiments*, 2017, Vol. 10445, pp. 104450M, International Society for Optics and Photonics.

as well as proper functioning of the crisis management system, and the rescue and fire extinguishing system.

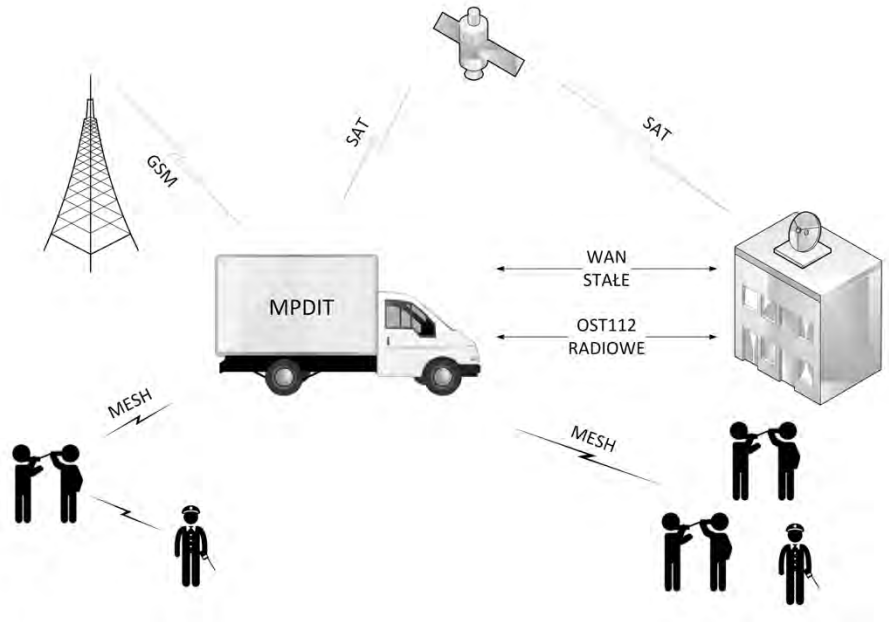
The main goal of the Mobile Distribution Point for ICT Infrastructure is to increase public safety and to counteract and reduce the threats related to terrorist attacks and natural disasters, increase the safety of mass events through the use of innovative ICT solutions supporting command along with the preparation of ICT infrastructure for the needs of operations in specific situations.

The structure of the mobile point constitutes an autonomous node that integrates technologically advanced ICT services, such as voice, data, and image transmission and GPS positioning, for the needs of mobile command posts and for providing ICT infrastructure in a given area. The node provides connectivity in fiber optic, electric, satellite, cellular, and local wireless technology with, among others, the ICT infrastructure of the Ministry of the Interior, such as OST112. The node mounted on a vehicle will consist of standardized communication and positioning devices, an integrated signal conversion module, devices for processing and transmission of signals, their archiving and sharing as well as user communicators ensuring simultaneous real-time access. The node's modularity enables easy expansion of hardware and software. The use of industry standards ensures successive, partial technological modernization throughout many years of operation. The need for the node results from the necessity to provide advanced tools and services (Police Command Support System, access to police and non-police databases) to forces performing rescue and search tasks, police actions/operations, outdoor events, and other activities related to broadly defined national security in an area of low level of ICT infrastructure or with no infrastructure of this kind (non-urbanized areas or ones destroyed during natural disasters, technical disasters, large-scale communication incidents).

The MDPI system will consist of three basic functional components:

a) an operating car whose body is equipped with elements of a communication system to fulfil the communication system integration tasks;
b) a stationary set allowing communication with MPDIT together with 10 videophones;
c) a Patrol Communications System based on terminals with implemented software operating in the MESH system.

Fig. 1. A functional diagram of the MPDIT technical solutions layer based on the use of the MESH type networks and other channels



Source: *Project documentation of the MPDIT consortium.*

While working on the MPDIT concept, it has been assumed that an operating car will be equipped with necessary telecommunications devices such as:

a) a satellite communications subsystem;
b) a GSM communications subsystem;
c) a radiotelephone communications subsystem;
d) a WAN/LAN network subsystem;
e) a patrol communication subsystem in the MESH system;
f) a radio subsystem;
g) an IP video subsystem;
h) a Wi-Fi subsystem;
i) a subscription registration subsystem;
j) an operator's station that enables, among others, displaying the operational situation on a digital map.

The developed node is to enable the set-up of four independent LAN/WAN networks and to provide Wi-Fi access for users (laptop, smartphone, telephone, radio, mobile terminals) to the established WAN networks via wireless access. In addition,

communication should be provided to users in the MESH topology for secure real-time, non-delayed communication that bypasses public operator systems. Taking into accounts the needs of the Polish Police, it has been assumed that communication can be implemented as short text messages, voice transmission, camera images, and device readings. All participating devices must be covered by a solution using location positioning with the ability to visualize the location and the route of movement as well as reconstructing history and laying a route for users. In turn, the node must provide integration with the radio communication systems of the Police and other services and entities (TETRA, DMR). The node's capacity has been set at the level of up to 200 users.

In addition, the operating car will be equipped with an indispensable system, reflecting the Police needs, providing power and electrical interfaces with cables enabling wire connection of individual telecommunications subsystems. Moreover, the operator's compartment will be fitted out with a ventilation/air conditioning and heating system with parameters enabling 24/7 operation. As perimeter security, the Operating Car will be armed with surveillance cameras, PTZ cameras and portable cameras connected to an internal server supporting monitoring and registration functions.

Current Police experience indicates that the central component of the Car will be a unit integrating communication standards in the MicroTCA format. Thus, the unit will include:

a) modular PCs;
b) Ethernet switch modules;
c) GPRS/3G/LTE communication modules;
d) location modules, e.g., GPS;
e) power, management, and cooling modules;
f) video capture modules with the h.264/h.265 encoders;
g) optionally, universal IO boards with FMC connectors that allow the implementation of any communication interfaces.

All modules are compatible with the AMC standard, which allows the use of unique features of the MicroTCA cartridge:

a) a gigabit Ethernet dual star topology link;
b) a fast PCI Express dual star topology interface;
c) a gigabit mesh topology interface that allows to set up fast connections between modules bypassing the Ethernet and PCI Express switches.

The adopted solution will facilitate the implementation of almost any architecture of the communication signal integrator system.

The Stationary Centre will be equipped with the necessary telecommunications interfaces warranting communication with the Operating Car via communication means, in particular, via a Satellite connection.

The third subsystem will comprise Patrol Terminals operating in the MESH network. The above solution is planned to be implemented on a smartphone basis and additional wearable devices in the form of a mini repeater allowing for voice and text communication as well as sending photos and short low-resolution films. During the stage of work on the MESH network, the smartphone will be equipped with an application compatible with the most popular operating systems.

As already mentioned, this type of device is currently unavailable to the Polish Police. Construction and implementation of the indicated technical solution (MPDIT) will facilitate:

a) increase of the conducted tasks effectiveness,
b) improvement of the safety of participants involved in operations: Police officers (constant contact, precise location),
c) support in the creation of procedural documentation (inspection of the incident site, protection of materials that constitute evidential value),
d) savings resulting from the rational use of forces and resources as needed,
e) providing a reserve for the needs of national institutions which enables temporary replacement of damaged or destroyed infrastructure.

An efficient and effective conduct of police activities in the form of operations can be successful only with the use of technical means that, along with the organization and implementation of the command, constitute the most crucial elements of the command system. The most difficult issues in this regard usually include proper organization of communication between participants engaged in the action and their provisioning. The establishment of a radio communication network, facilitating an effective command of a police operation, is a basic task of staff teams. For this task to be accurately performed, it is necessary to use all available means of communication that are most appropriate to the situation.

In the conditions of high dynamics of crisis situations, making a final decision is based on a conjecture of forthcoming events, identification of factors that will affect them, inclusive of the consequences of own decisions and actions. It is therefore necessary to use technical command support systems and experience resulting from other projects aimed at improving the effectiveness of the Police in crisis situations.[8]

[8] W. M. Zabołotny [et al.], *Diagnostic system for Video Concentration Device, SPIE 10808, Photonics Applications in Astronomy, Communications, Industry, and High-Energy Physics Experi-*

The development of telecommunications technologies and electronic media creates potential opportunities for improving communication and increasing access to information. Equipping police organizational units with the Mobile Distribution Point for ICT Infrastructure will certainly allow for raising the efficiency of conducting future police operations.

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Książka dotyczy problematyki bezpieczeństwa narodowego, analizowanego przez pryzmat systemów, z uwzględnieniem wymiaru lokalnego i państwowego. To zbiór kilkunastu artykułów naukowych, przygotowanych przez specjalistów prowadzących badania w zakresie współczesnego bezpieczeństwa państwa. W publikacji zostały przedstawione najnowsze wyniki badań, dotyczące zróżnicowanych czynników wpływających na zagadnienia bezpieczeństwa, zarówno na poziomie lokalnym, jak i ogólnym systemu bezpieczeństwa narodowego.

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