Polish Prison Service, Security Systems in Prisons and Remand Centres

ICT application

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Introduction

The study provides an overview of existing solutions in the field of physical security and protection measures, alarm and communication resources and the latest trends and concepts in the protection of prisons and remand centres. Due to the nature and features implemented, security of penitentiary units differs from security of other objects on the market. The ignorance of these differences leads to communication problems between the designer and the investor as well as the contractor and the investor. The study is intended to introduce the reader to the functional requirements of the above systems what according to the author's assumption is to minimize conceptual and installation errors in the investments made by the Prison Service.

The Polish Prison Service

The Prison Service is an uniformed and armed formation of apolitical nature subordinated to the Ministry of Justice with its own organisational structure.

The main objectives of the Prison Service include [1]:

– conducting penitentiary and social rehabilitation for persons sentenced to imprisonment, mainly by organising work leading to qualifications that are recognised outside prison, cultural and educational activities, sports activities and specialised therapy;

– execution of pre-trial detention in order to protect the proper conduct of criminal proceedings for an offence or a fiscal offence;

– providing establishments in which persons serving a sentence involving deprivation of liberty or a person in detention as well as those who are deprived of liberty or are subject to coercive measures resulting in deprivation of liberty have their rights respected, especially the right to humane living conditions, to dignity, healthcare and freedom of religious beliefs;

– humane treatment of persons deprived of their liberty;

– protection of the public from the offenders and the accused of fiscal offences who are in prisons or remand centres;

– providing order and security in prisons and remand centres;

– performing on the Polish territory provisional detention, custodial sentences and coercive measures resulting in the deprivation of liberty, if they are to be carried out in prisons and remand centres and if they are following the decision issued by the competent authority;

– cooperation with relevant formations of other countries and international organisations operating under international agreements and treaties.

Figure 1. The Polish Prison Service organisational chart
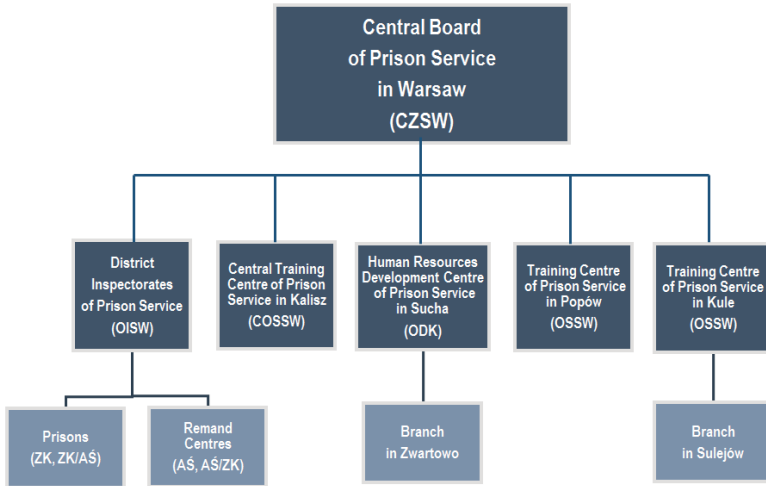
Source: own study based on www.sw.gov.pl

Sentence of imprisonment is carried out in the following types of penal institutions:
– for juvenile (M);
– for the sentenced for the first time (P);
– for penitentiary recidivists (R);
– for the sentenced to military detention (W);
– in homes for the Mother and Child when incarcerated mothers want to exercise custody over their children before they turn three years old.

Prisons can be categorised into tree types:
– closed (category I) high-security;
– semi-open (category II) medium security;
– open (category III) low security or open prison.

A remand centre is a penitentiary institution where detainees are directed to serve the pre-trial detention. A remand centre provides for the proper conduct of criminal proceedings.

Penitentiary institutions differ as to the degree of security, type of isolation of the inmates and consequently their daily routine and their rights in regard to personal freedom indoor and outdoor prison facilities.

Prisons and remand centres may have local or out-of-town branches. These are external branches and branches that provide temporary accommodation for the inmates.

Unfortunately, such crystalline typology of prisons is very rare. Most often, the closed prisons include a branch of semi-open type or even the residential dorms of semi-open or open character. In that case the unit as a whole respects the primacy of the facility with the higher level of security. The remand centres with branches for inmates serving a sentence in a closed prison are equally common. This situation significantly hampers the protective aspect of the institution as each of the units or remand centres has its own profile and objectives.

Table 1. Number of penalty units as at 2015

District Inspectorates (OISW)	15
Prisons (ZK, ZK/AŚ)	88
Remand Centres (AŚ, AŚ/ZK)	67
External Units (OZ)	37
Units for temporary accommodation of the sentenced	4
Total number of Penal Units	**196**
Homes for the Mother and Child within prisons	2
Hospitals within prisons	14

Source: statistics [12].

Figure 2. Deployment of penitentiary institutions – Penitentiary map of Poland

Legend:

- – Remand Centre (AŚ)
- – Remand centre with a prison section (AŚ/ZK)
- – Prison with a remand section (ZK/AŚ)
- – Prison (ZK)
- – External Units (OZ)
- – Homes for the Mother and Child within prison (2)
- – Hospitals within prison (14)
- – Scope of jurisdiction 15th District Inspectorates of Polish Prison Service (OISW)
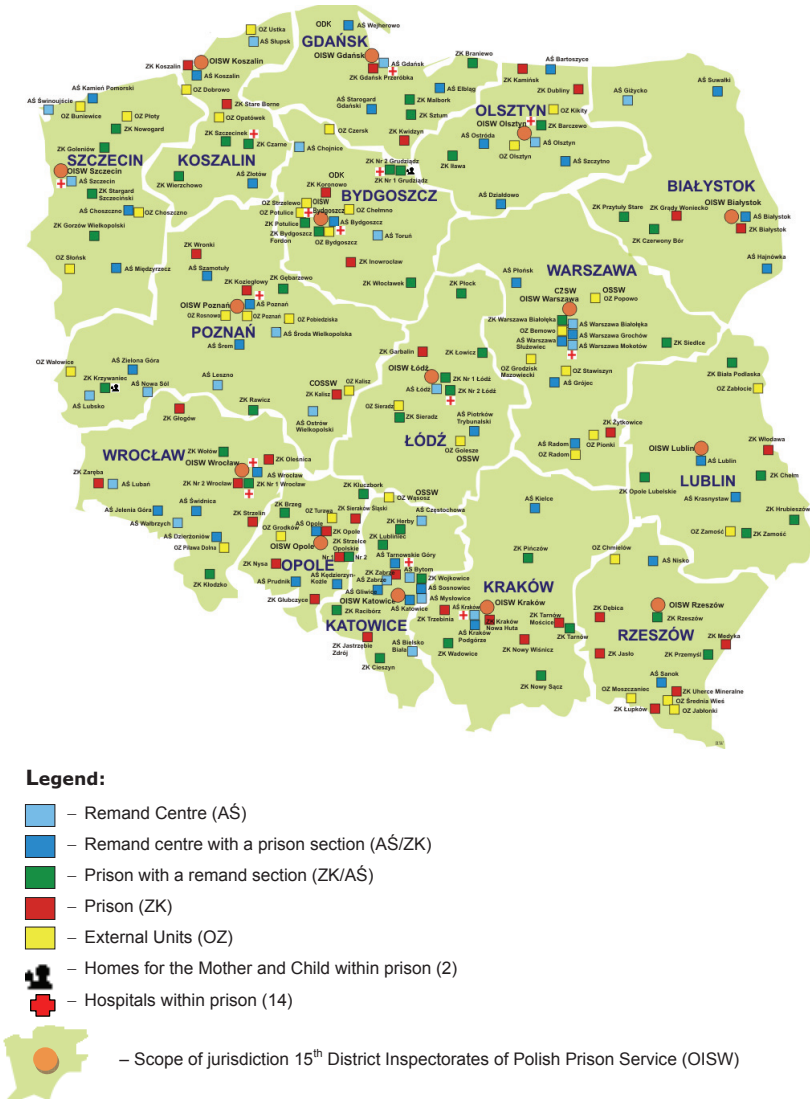
Source: http://www.sw.gov.pl Office of Information and Statistics Of Central Board of Polish Prison Service.

A large number of tasks as well as social expectations towards the Prison Service determine the complex structure of a contemporary prison within the Polish penitentiary system [Fig. 2]. Supposedly, not everyone realises that all the base units within the Prison Service system are on duty 24 hours a day, seven days a week [Tab. 1, 2].

In these units 27,571 officers (including 4,883 women) and 1,995 employees (including 1,199 women) take care to carry out the tasks assigned by the law [1] with 78,994 inmates (including 72,405 convicted/punished, 6,589 temporary arrested and 521 foreigners) [12].

Table 2. Penal units according to capacity as at December 31, 2014

Capacity	Number of units	Remand Centres (AŚ, AŚ/ZK)	Prisons (ZK, ZK/AŚ)	External Units (OZ)	Units for temporary accommodation of the sentenced
Total:	196	67	88	37	4
to 49	4	–	–	–	4
50–99	17	6	–	11	
100–199	37	18	5	14	
200–299	30	12	13	5	
300–399	23	9	9	5	
400–499	19	6	12	1	
500–599	6	1	4	1	
600–699	16	2	14		
700–799	12	4	8		
800–899	6	2	4		
900–999	3	–	3		
1000–1099	14	5	9		
1100–1199	2	1	1		
1200–1299	2	–	2		
1300–1499	5	1	4		

Source: own study based on statistics [12].

Table 3. Penitentiary staff – officers and employees

Date	Staff	Total	Including women
31 December 2012	officers	27,567	4,793
	employees	1,962	1,164
31 December 2013	officers	27,571	4,883
	employees	1,994	1,199

Source: statistics [12].

Table 4. Penitentiary staff – departments

Departments	Total penal staff
Security Department	50%
Penitentiary Department	10%
Administration - Management - Logistic - Finance - Human Resources - Registration - Health Service - ICT - Legal	40%

Source: own study based on statistics [12].

The capacity of penal institutions according to evaluation data of December 31, 2014 was a total of 87,742 seats. At that time there were 77,371 inmates there. There were 32,290 inmates in high-security prisons, 35,530 inmates in medium-security prisons and 2,507 inmates in open type institutions [12].

People aged 22–30 years made up the largest part of the prison population. The number applied to the sentenced and the temporarily arrested, men as well as women.

Table 5. Prison population in 2012–2014

Date	Population	Total	Convicted	Remand prisoners
31 December 2012	**Total**	**84,156**	**77,147**	**7,009**
	women	2,695	2,380	315
	foreigners	566	301	264
31 December 2013	**Total**	**78,994**	**72,405**	**6,589**
	women	2,636	2,305	331
	foreigners	521	301	220
31 December 2014	**Total**	**77,371**	**71,133**	**6,238**
	women	**2,527**	**2,243**	**284**
	foreigners	**537**	**308**	**229**

Source: statistics [12].

Table 6. Detention rate per 100,000 inhabitants in 2012–2014

Date	Total prison population	Remand prisoners	Total Polish population	Detention rate per 100,000 inhabitants	Inmates per 100,000 inhabitants
31 December 2012	84,156	7,009	38,407,729	18	219
31 December 2013	78,994	6,589	38,277,058	17	206
31 December 2014	77,371	6,238	38,146,389	16	203

Source: statistics [12].

Due to the subject of this publication, tasks related to the public protection are particularly noteworthy. The Prison Service facilities belong to category II, they are listed as objects of particular importance for state security and defence [4].

Efficient implementation of the objectives listed in the introduction depends on the competence of the personnel as well as their ability to use the devices and technology they have at their disposal.

Types of prisons reflect the security systems applied there [5].

Although security systems differ from each other by definition, it happens that different security solutions are applied within one unit. There are for example parameters of a high and a medium security system present together. In such case, it is the general principle that the system assumes a higher level of security or as in the example shown above – a high security system.

Table 7. Security systems and types of prisons

	CLOSED PRISONS and REMAND CENTRES
HIGH SECURITY SYSTEM	– inmate cells may be open in the daytime for a certain period of time unless it does not interfere with security measures, – inmates can be employed outside the prison facilities under full escort, – general education, sports activities and vocational training take place in the prison setting, – the inmates mobility on the prison premises is carried out in an organised manner and under supervision, – inmates can have their own underwear and footwear and with the permission of the director of the prison, their own clothing, – inmates are allowed two visits a month, and with the approval of the director of the prison, they can use them at one time, – the visits are subject to the supervision by the prison staff. The conversations during the visits are subject to control by the prison staff, – inmate mail is censored by the prison staff, unless the law provides otherwise, – inmate phone calls are subject to control by the prison staff.

MEDIUM SECURITY SYSTEM	**SEMI-OPEN PRISONS**
	– inmate cells are open in the daytime, they may be locked up at night, – inmates can be employed outside the prison facilities under limited escort or without escort, they can be assigned individual jobs, – the inmate may be allowed to participate in academic or vocational training as well as therapeutic activities outside the prison facilities, – the inmates can participate in cultural, educational or sports activities organised by the administration of the prison outside the prison premises, – the inmate mobility on the prison premises is governed by internal regulations, – the inmates can use their own underwear, clothing and footwear, – the inmate can be granted passes from prison but not more often than once every two months. A total period does not exceed 14 days a year, – the inmates are allowed three visits a month, the visits can be combined with the agreement of the director of the prison, – the visits are subject to the supervision of the prison staff. The conversations during the visits may be subject to control by the prison staff, – inmate mail may be checked by the prison staff, – inmate phone calls may be subject to control by the prison staff.
LOW SECURITY SYSTEM	**OPEN PRISONS**
	– inmate cells are open 24 hours a day, – inmates are employed mainly outside the prison premises, without any escort, they are assigned individual jobs, – the inmate can be allowed to participate in academic or vocational training as well as therapeutic activities outside the prison facilities, – the inmates can participate in cultural, educational or sports activities organised by the administration of the prison outside the prison premises,

	OPEN PRISONS
LOW SECURITY SYSTEM	– the inmates can be allowed to participate in cultural, educational or sports activities organised outside the prison premises, – the inmate mobility on the prison premises is governed by internal regulations, – the inmates can use their own underwear, clothing and footwear, – the inmates are allowed to have at their disposal money from the prison deposit, – the inmates can be granted passes from prison but not more often than once a month. A total period does not exceed 28 days a year, – the inmates are allowed an unlimited number of visits, – the visits are subject to the supervision by the prison staff. The conversations during the visits are not subject to the control by the prison staff, – the inmates, as far as possible, are provided with facilities to cook their own meals.

Source: [2].

Technical and protective security features, alarm devices and means of communication

The security systems are based on physical security measures taken by the Prison Service and include technical and protective security features, alarm devices and means of communication [5].

Technical and protective security measures include physical protection, electrical and electronic components and construction aspects used in the security system of an organisational unit.

Technical and protective security measures depend primarily on the security system applied. The Head of the organisational unit together with the Head of Security develop the security schedule in which, inter alia, the security measures applied are specified.

Guidelines [8, 9] impose a procedure including the functional assumptions of the system designed by the Head of the Security. The technical specification developed by the ICT technician and the logistics/supply department is determined by the functional assumptions.

Every year, in April and October the technical and protective security measures are checked by a team of experts [5, 7]. On the basis of the information gathered, repairs and maintenance schedule is developed.

Table 8. Technical and protective security features, alarm devices and means of communication applied in penitentiary institutions

The component of prison security	Description/supplement
The outer line of security fences	Made of solid material, it may be a wall of the building where the inmates stay temporarily or permanently, or openwork fence equipped with protective measures, wall, guard towers, inspection posts, concertina wire.
The inner line of security fences	Made of solid material or openwork wall or otherwise marked.
Internal fences	Separating different areas of the organisational unit, multiple barriers.
Gates, doors, prison bars	Of particularly durable structure mounted at the entrance to the organisational unit and other important buildings.
Gates, doors, prison bars	Of particularly durable structure mounted at the entrances and passageways to individual buildings, areas and inmate cells as well as between the floors of the buildings.
Window bars and internal bars (the latter called "basket bars")	Installed behind the entrance doors and in front of window openings.
Shutters and nets (the latter called „basket nets")	Of durable structure, mounted on the outer side of the window openings.
Locks for gates, doors and bars	Locks (keys) and mechanical locks, electromechanical locks, magnetic lock armature, electromagnetic lock, gate drives, door closers, latches, door viewers.
Power generator or other backup power source and lighting systems	Power generator, UPS (Uninterruptible Power Supply) units, buffer power supply units, emergency lighting, flashlights.

Protection system for manholes, ducts, ventilation units, gutters, lighting arresters, poles, aerial masts, chimneys and other objects like skylights, access to attics and roofs and entrances to the basement	Razor wire fences, concertina wire, bars, blades, railings, nets, barbed wire.
Close circuit TV equipment	Close Circuit Television Systems (CCTV)
Access control equipment	Access Control Systems (ACC)
Equipment for the control of individuals, luggage, vehicles and cargo	Walk – through metal detectors, hand held metal detectors, mobile phone detectors, drug detectors, parcel and luggage X-ray scanners, body X-ray scanners, vehicle X-ray scanners, people and electronics detectors, inspection cameras, inspection mirrors, scales.
Intercom call system	In cell and corridor intercoms, intercoms and video intercoms.
Radio and wire communication devices	Wire communication, radio communication and IT structural network.
Alarm means	Alarm systems: Intrusion and Hold-up Alarm System (I&HAS), Fire Alarm System (FA), integration and visualisation, emergency buttons, wireless Emergency buttons etc.

Source: own research based on home regulations [5].

Modern electronic security systems in organisational units of the Polish Prison Service are presented below. Table 9 lists the systems and their components in numbers.

**Table 9.** Size of technical/electronic security systems

System [number of individual units]	Device/Component	Number
Intrusion and Hold-up Alarm System (I&HAS) [412]	I&HAS control panel	412
	Barriers (Passive Infra Red, MicroWave)	873
	Motion detector (Passive Infra Red, MicroWave)	1683
	Sensor cables	65
	Reeds	1356
	Inertia sensors	158
	Flooding detectors	6
	Emergency buttons	4521
	Wireless emergency buttons	1326
	Warning devices	1069
	Batteries	1331
Access Control System (ACC) [169]	Controlled entry/exit points	2575
	Controlled cell doors	441
	Card readers	1762
	Cards for access control	3859
CCTV [474] (close circuit television)	Speed Dome security cameras	410
	Internal security cameras	8555
	Outdoor security cameras	4184
	Video recorders	962
	CCTV screens	2527
	Cameras in a secure cells	305
	Cameras in inmate cells	797
	The analogue CCTV systems	449
	IP CCTV systems	8
	Hybrid CCTV systems	17

	Walk-through metal detectors	267
Detectors	Handheld metal detectors	1874
	X-ray scanner	145
	Body X-ray scanner	1
	Portable mobile phone detector	437
	Built-in intercom mobile phone detector system	1 (343 pcs)
Radio communication	Radmor base station	177
	GP portable radios	4253
	Car stations	489
	Battery chargers	996

Source: data provided by the Central Board of Prison Service, March 2012.

Figure 3. Time of usage of alarm systems by the Prison Service units
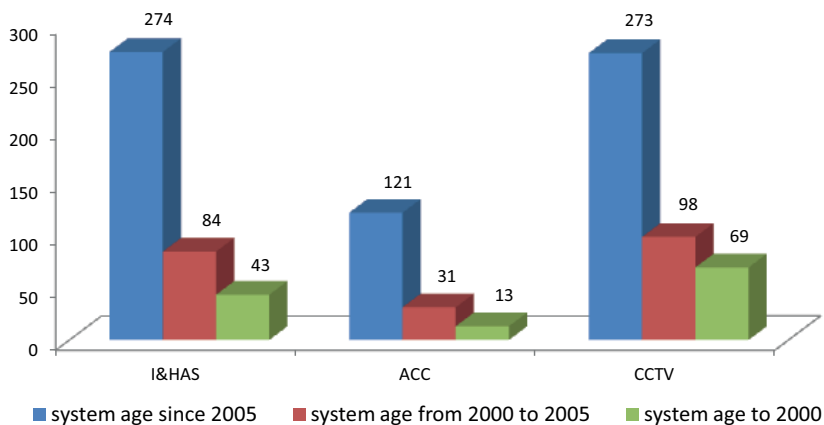
Source: data provided by the Central Board of Prison Service, March 2012.

Considering the data presented in Fig. 3 and the recent investments in electronic security systems, it can be concluded that most of the systems have been launched, expanded and modernised recently.

Operation related issues concerning electronic, information and communication security systems are regulated by appropriate orders [19, 20].

Requirements for electronic security systems – system outline

The issues concerning electronic security have been presented in detail in this study due to the immense progress and key changes that recently have taken place in this field.

Problems concerning the physical security and security of buildings does not change so much and are structured in guidelines [8, 9] which contain information on the material, the height of the walls and barriers, wire netting, concertina installation method, etc.

In February 2012 the analysis of electronic systems and devices operating within all Polish Prison Service units was carried out for the purposes of further work on the guidelines related to electronic security systems. The findings showed that the lack of uniform guidelines resulted in differences within the construction of electronic systems. The security system remained the responsibility of the director of the penitentiary unit and very often was determined by the budget available. The situation also caused difficulties in professional training, as after completing a unitary training the officers returned to their units that were equipped differently.

One of the first implementations of electronic security systems was CCTV (the term 'monitoring' is nowadays overused in an inaccurate way in many regulations). For many years it was a preview of the image without any recording. Then the simple control of selected transitions was possible due to the use of control panel buttons which supplied the power directly to the selected devices like electromechan-

ical or electromagnetic locks. The camera operator at the guardhouse watched the images sent from cameras, the call button was installed at the entrance, the repeater light and sound went on. After verifying the identity of the person in the camera image, the operator switched the button and supplying the power to the electromechanical lock or magnetic bar released the gate. The system had functioned for years in a number of penitentiary units (it is still working in some places) and evolved from intercoms at checkpoints that allowed two-way voice communications to access control systems with cards. Together with the authorised access, first emergency buttons arrived. These buttons were installed in designated areas of service, e.g. guard towers, prison officers' offices, the infirmary. They worked as an ordinary bell with a visual signal. The concept of 'the silent control of officers on guard (guard towers)' was an interesting solution. It was a system of visual signals, at that time just ordinary lamps, deployed in the penitentiary unit in areas controlled by guards or surveillance areas. The commanding officer or the operator in the guardhouse (control room) turned the selected visual signal (flash) on and waited for the officer on duty to turn it off or confirm the signal. The intensive development of electronic security systems started in 2000, especially since 2009 when the number of armed guard towers began to decrease. Expansion-reconstruction of the system continues, with focus on integration and visualisation of existing operating systems and optimisation of an operator-observer role. The Prison Service adapts electronics to the current needs and the functioning of the unit, as well as the changes introduced to the regulations (guidelines or even video surveillance [2]). New technologies very often trigger the changes in the Prison Service, e.g. video conferencing, the internet access for the inmates. The architectural diversity of the Prison Service facilities, distribution of the objects on the premises of the unit and various security systems applied make adopting of a single solution virtually impossible.

The general strategy for the construction of electronic [9] and physical [8] security systems has been proposed to systematise the following solutions.

Intrusion and Hold-up Alarm System (I&HAS) is one of the basic alarm systems.

In an organisational unit it is responsible for:

– intrusion (emergency buttons are placed in offices of prison officers, personal officers, psychologists, in the infirmary, at the dentist's, registry, at the corridors of cell blocks, at checkpoints, in the offices of superintendence staff responsible for the kitchen, workshops, storerooms, etc. wireless emergency remote buttons are used by supervising officers, personal officers, psychologists, operational officers responsible for escorting inmates and supervising visitors as well as female prison officers and civil workers;

– burglary (mainly perimeter protection, implemented through motion detectors, passive infrared and microwave barriers, sensor cables and laser detectors, glass break detector, vibration, reed and smoke detectors, etc. The protected areas also include prison facilities like weapons storerooms, registry, server rooms, archives, storerooms, entrances to the cell blocks, emergency exits, manholes and skylights, entrances to the basement, etc. While installing the perimeter detectors the crucial issue is the effectiveness of the system and the distribution of its elements as well as the probability of false alarms (e.g. caused by animals or weather phenomena). The use of alarm system should be minimised so that to relieve the system service (operator) of their verification. Spatial conditions like narrow and winding perimeter areas or adjacent walls of the main residential pavilion as well as areas of intense movement where changing of the guard or patrolling takes place, often cause serious problems with the selection of appropriate security measures. There are units located in the centres of big cities or outside the inhibited areas, in the woods. Currently the security measures applied in the perimeter protection of prisons include PIR (passive infrared) and MW (microwave) motion detectors, MW (microwave) barriers, sensor cables that are installed underground and hung on top of inner fences and laser detectors. According to the guidelines [9] the Intrusion Alarm

System should be constructed to comply with **Grade 3** requirements and PN-EN 50131-1 standards.

The general division of security systems applied in prisons into external and internal protection was made in accordance with regulations [5] and it was supplemented with 5 categories of zones classified in the guidelines [9] and described in the table below.

Table 10. Division of protection zones

Zone A	Main residential pavilion (cell block) for offenders
	– entrances and exits to and from the zone are equipped with the system of airlocks (exclusive lock); – the airlock is equipped with the security system providing observation of the entrance/exit area, Access Control System with full identification of people and the system to detect and signal the opening of the door. – entrance to or exit from the zone requires a double authorisation; – passages within the zone are equipped with Access Control System and CCTV. Anyone entering or leaving the zone has to undergo an identification procedure; – communication routes, places and facilities designated for inmate work and training programs, sports and cultural activities, visiting rooms and a prison chapel are all equipped with CCTV; – supervising officers' offices are equipped with devices enabling them to observe controlled rooms and areas; – all civil workers and prison staff within Zone A are equipped with wireless emergency buttons indicating the location of the alarm source. The alarm is transmitted to the central call station and to the supervising officer's office; – roof hatches and smoke exhaust flaps are equipped with opening detection system; – security of correction/safety and protection cells, cells to confine the most dangerous inmates who are a severe threat to public safety, prison staff and other inmates, cells for detained on remand who are a severe threat to public safety, remand centre staff and other detainees, are regulated by separate provisions.

Zone B	**Buildings adjacent to the main residential pavilion for inmates and the defined area adjacent to the main residential pavilion and other facilities adjacent to them**
	– Zone B is protected by the Intrusion Alarm System equipped with devices detecting the presence of individuals; – the surveillance cameras are used to verify alarms set by the Intrusion Alarm System. The distribution plan of the cameras has to provide the surveillance of the protected area. Dome security cameras are allowed. The recorded footage has to provide enough information about the incident to identify individuals involved.
Zone C	**Perimeter areas called "protection belts", entrance and exit gates and entrance to and exit from the unit premises**
	– the perimeter areas called "protection belt" is protected by the Intrusion Alarm System equipped with devices detecting the presence of individuals; – the fixed security cameras are used to verify alarms set by the Intrusion Alarm System. The distribution plan of the cameras has to provide the surveillance of the protected area without any blind spots. The recorded footage has to provide enough information about the incident to identify individuals involved; – entrance to and exit from the perimeter areas called "protection belt" are equipped with the opening detection system. Access Control Systems are allowed; – entrance and exit gates as well as pedestrian zones are equipped with the system of airlocks (exclusive lock); – gates, entrances and exits are equipped with the opening detection system. Access Control System is allowed; – airlocks for vehicles are controlled by CCTV providing: • immediate monitoring of the area in from of the entrance gate to the premises, • full identification of the vehicle in the airlock, • monitoring of the chassis and the roof of the vehicle in the airlock; – airlocks for the pedestrians are equipped with the system providing: • monitoring of the area in front of the entrance to and the area in front of the exit from the premises, • the Access Control System with personal identification; – the prison officer on guard is equipped with a device for monitoring and surveillance of areas supervised by him.

Zone D	**The area between Zone A and Zone C**
	– Zone D is controlled by CCTV. The recorded footage has to provide enough information about the incident to identify individuals involved.
Zone E	**The premises and facilities of particular importance for the security of the penitentiary unit, e.g. server rooms, storerooms, exercise yard, registry, arsenals, archives, etc.**

	– server rooms are equipped with:
	  • Access Control System,
	  • Intrusion Alarm System allowing detection of smoke, movement, door opening, pane breakage and flooding,
	  • air temperature and humidity monitoring system,
	  • system to notify about supply failure;
	– storerooms are equipped with intrusion alarm system to detect smoke, movement and door opening;
	– exercise yards are equipped with close circuit television system. The distribution plan of the cameras has to provide the surveillance of the entire protected area without any blind spots. The recorded footage has to provide enough information about the incident to identify the individuals involved. The post of the officer in charge is equipped with the devises allowing for surveillance of the exercise yards under supervision.

Source: own study based on [9].

Access Control System (ACC) passing through is often controlled by using buttons, not the standard defined Access Control System. Such "historic" solution diverts the operator's attention from watching camera screens and obligatory surveillance. The same applies to pseudo access control systems, where, although computer-aided, each entry and leave is controlled by the operator. The guidelines [9] clearly state that the access control system must be implemented to allow access to the prison premises only to authorised persons whose entitlements are coded in RFID cards. The Prison Service has decided to adopt MiFare Plus contactless crypto cards for these purposes.

Electronic card is treated as a **special key**. It unlocks entrance doors and bars to buildings and cells as well as pass doors and bars in passageways only within the scope required by its users to perform their duties [7]. The Prison Service has introduced RFID to officers' badges, which at the same time are crypto cards containing the access key to the databases and electronic signature. The cards are issued by the Certification Centre of the Central Board of Prison Service. The guidelines mention one exception, namely entrance/exit from the main cell block, where double confirmation is recommended. The system operator confirms the entry door opening. airlocks should be used here, which means that if one nearby entry is open, then the other one, directly following it, cannot be opened by the user unless the first one is closed. Central locking system is another functionality used when safety in cell blocks is threatened. It is initiated by the operator from the guardhouse (control room) and then the user, in spite of the entitlements, is not able to open the door. The person's identity is verified by the access control system, the card is read and the user's identity confirmed by the surveillance television.

Integration of systems would be the best solution here, so when the card approaches the reader, two pictures appear at the operator's screen, one shows the information read from the card (ACC database) and its user, for example with the photograph, while the other picture is the one from the door camera. After verification, the operator either blocks the door or does nothing and the system automatically let the user pass.

Mechanical keys still open the cell doors and their definition contained in the regulation [5] is as follows:
– **special keys** are the keys to the entry gates, doors and bars leading to the buildings, to the passage doors and bars, cells, security cells, lock-up disciplinary cells and special rooms;
– **ordinary keys** are not mentioned above.

The keys are also the data medium in form of RFID cards to open gates, doors or bars [5].

Locks, electromagnetic passes, electrical openers, electromagnetic locks function as actuators in the Access Control Systems. Their quality and functionalities carefully dedicated to their functions guarantee smooth operation. The experience has shown that they are one of the most important elements affecting the people's traffic and safety in the unit. Few devices available on the market prove suitable in harsh prison environment where they are used so frequently, especially taking into account their mechanical strength, power supply and electromagnetic compatibility.

Guidelines [9] define the minimum requirements for the Access Control Systems:
– the door controllers should be used with the independent power buffer which even in the case of loosing communication with the master unit, continue the monitoring and supervising of the passage;
– card readers should respond to MiFare Plus standard, they should read the number stored in the memory unit and protected by the password;

– the Wiegand, RS485 and TCP/IP protocols are allowed to com-
  municate with the reader;
– the wiring system must be protected against unwanted access,
  damage and sabotage;
– the screws have to be protected against removal, a special tool
  is required to remove the reader;
– single passageways (protected with doors/bars) should be equ-
  ipped with the card readers, reed relays and electromechanical
  lock (and the CCTV system which should meet the requirements
  described in the guidelines);
– passageways should be equipped with two-sided full identifi-
  cation, entering the facility (e.g. a server room, storage) should
  require full identification of each side (inside door handle or exit
  button);
– it should be possible to open passageways (protected with doors/
  bars) manually with a key in case the access control system fails;
– the Access Control System should provide signals describing
  the developments at the passageway, such as: open, closed,
  damage/sabotage, unauthorised opening. These developments
  should be recorded in the system event log.

CCTV (video surveillance system, closed circuit television)
often referred to as the monitoring system in various provisions.

As one of the first systems installed in the units, over the years
it was subject to various upgrades. As a result, many units are still
equipped with old cameras (providing a low resolution, black and
white image) together with newer solutions. Statistically, there are
83 cameras for one organisational unit. It is important that the opera-
tor/observer is provided with the best ergonomic working conditions
in order to achieve the expected efficiency of observation.

When considering two aspects of video surveillance in prison,
this efficiency becomes particularly important. Optional surveillance
(Art. 73a [2], surveillance of yards, corridors, facilities, etc) and obliga-
tory surveillance (surveillance of the inmates in cells (Art. 88c, 212b

§ 2, Art. 116 § 5a, the camera is placed in a prison cell, transitional cell and solitary confinement cells according to the director's decision [2] and in correction/safety and protection cells [11]). We should distinguish between two types of circumstances: when the observer/operator carries out other tasks besides the surveillance and when surveillance is his sole task. These two situations have different legal consequences, should any emergency occur.

There are various technologies applied, from old analogue ones to IP megapixel models with IR illuminators and thermal imaging.

Cameras in cells are used for ongoing supervision of inmates. Cells very often have geometrically unified structure, sometimes they have arched ceilings or they are specially so limited that it is difficult to adjust the right camera considering its optics, the case size and mounting procedure. The precondition is that the cameras have to be vandal-proof and equipped with night vision (zero light). Here, for psychological reasons it is important that infrared illuminators work at the right range so the light-emitting diodes are not visible at night.

Guidelines [9] in accordance with the provisions [6] define the minimum requirements that have to be met by CCTV systems and they include:
– power supply for all devices included in the video surveillance system must ensure their uninterrupted and continuous operation. In order to achieve that the buffer power supply with batteries and UPS units are used. Electrical circuits that supply power to buffer power supplies and UPS units must be connected with the engine generator. New prisons and remand centres are equipped with CCTV in IP digital technology. Cable infrastructure is built according to IT structured wiring standards;
– when modernising, extending or repairing the existing CCTV systems, the signal lines of the audio-video track must be equipped with twisted-pair cables, minimum Cat 5e or an optical fibre and a signal converter. It is assumed that one twisted-pair cable

is applied for one audio-video track. This solution will allow a smo-
oth transition into CCTV IP in future;
– PAL-D1 registration, minimum 3 fps for each audio-video stream;
– capacity of records archive for each channel, minimum 7 days;
– the cameras in corner toilets, baths must have a function to camo-
uflage intimate parts (currently, the systems blur the images, but
at the same time they allow for video surveillance).

Characteristic places to install cameras

Apart from the above mentioned alarm systems, devices and
security and protection systems indicated in table 7, there are charac-
teristic places where video surveillance operates:
– a security cell with a special, soundproof room (image and sound
obligatory, where the sound quality, because of the specific cell
structure, as well as the appropriate camera optics to allow vie-
wing of the entire cell must be taken into account) [11, 13];
– a solitary confinement (116 § 5a, of the Act [2] video surveillance
is applied upon the Director's decision);
– inmates' cells (116 § 5a, of the Act [2] video surveillance is applied
upon the Director's decision);
– temporary cell (116 § 5a, of the Act [2] video surveillance is applied
upon the Director's decision);
– hospital cells (116 § 5a, of the Act [2] video surveillance is applied
upon the Director's decision);
– cells and ward premises for inmates who require to be placed in a
specific ward or cell (high-security cell for "dangerous detainees")
(art. 88c and 212b § 2 of the Act [2], obligatory);
– common rooms, chapels, inmates' workstations, libraries;
– visitation rooms for supervised or contactless visits;
– walking, exercise yards;
– perimeter areas, entrance gate airlocks, safety zones, the prison
premises;
– the area in front of the entrance gate into the premises;

- passageways, entrances, exits on the prison premises and in the buildings;
- the area in front of the entrance into the registry.

The guidelines [18] must be taken under consideration when choosing places for cameras to be installed. The guidelines indicate the zones and lightening parameters (indicators), for example, in passageways, perimeter areas, in electronic observation zones, etc.

Fire Alarm system (FAS)

On account of the specific features of the prison facilities, the Prison Service must depart from fire safety regulations. Fire detection and alarm systems are generally installed on some premises, not in the whole objects. These specific premises are: the storehouse of weapons, weapon stores called "handy", registry or archive. Because of 24-hour physical protection surveillance, environmental conditions as well as the inmates themselves, who often destroy the equipment and smoke cigarettes, installation of such sensitive systems as fire detection and alarm systems seem rather irrational. The experience of some prisons where fire alarm systems have been installed support this approach.

Visualisation and integration of alarm systems

Due to staffing problems the Prison Service faces, the systems must be easy and intuitive to operate. It is possible thanks to visualisation and integration of the alarm systems. A great number of cameras as well as other components of the alarm systems installed enforce installation of systems supporting work of the operator-observer, such as integrating or possible switching over of the displayed images thanks to movement detection or intelligent image analysis (going beyond the virtual border or areas, movement direction, analysis of events, e.g. zooming in of more than 2 people for a defined distance). The ergonomics of the operator's workstation is very important here, appropriate arrangement of cameras, lack of destructors, both in the

image itself (i.e. too big descriptions, irrelevant elements such as, for example, the sky, ceiling, walls, etc.) as well as appropriate arrangement of the supervisor's room seem to be essential.

Intercoms (three variants) in prisons are installed to provide communication between:
– inmates in their cells and day rooms with the officer on duty;
– the inmate and a visitor during "contactless visitation" (through the glass) when no personal contact with the visitor is possible [10];
– a person at passages in prison and the operator's stand.

They are independent systems which must meet certain requirements: the intercoms must be vandal-proof, they might have additional functions, for example the PA system with a volume button. The vandal- proof panel in the cell might have a button to open the window (especially in solitary confinements for inmates to be put in special wards or cells [2]). The panel should have special screws which require unique keys as well as mechanical restrain device to protect the loudspeaker and the microphone.

Video intercoms, intercoms are placed at entrances and entrance gates to the prison premises, sometimes at selected passageways on the premises where the Access Control System is not implemented.

Inspection equipment, detectors and communication systems

The Prison Service uses various types of inspection devices to carry out its duties. The officer equipped with mechanical or electronic devices is obliged to use them at any control, such as:

– superficial and personal check of inmates and visitors;
– cells, rooms and other premises inspection;
– parcel and object checks;
– vehicle search;
– general inspection of the prison.

Dogs may be used to carry out the above mentioned controls (excluding control of persons) [5].

Appropriate provisions [2, 5] determine what things are allowed on the prison premises, what objects can be brought in and brought out.

Walk-through metal detectors – applied at entries, sometimes in parts of residential pavilion of inmates. However, due to the existing architecture, the space to install these devices is often limited. They operate in narrow passages, often in the vicinity of passageway bars, roentgen scanners, they are exposed to nearby movable metal elements. The more precise the detection place is indicated by the devise, the better. Devices with many detection zones are particularly useful.

Handheld metal detectors – used very frequently, they are given to officers entrusted with specific tasks/controls or guard posts are equipped with them to conduct body searches, parcel and mail checks, cell and premises inspections (including mattresses, inmates' belongings). There are various types of detectors, however, their efficiency and handiness seem to be the most important factors. They are extensively used because of a great number of conducted checks.

Drug and explosive detectors. Apart from special dogs, trained to detect drugs (in parcels, mail, on the premises, in cells as well as on persons entering the prison – from the distance through a protective net), the Prison Service also uses electronic drug detectors, i.e. gas chromatographs, portable or stationary devices, operating on the principle of the spectrometry of volatile ions. Chemical tests are used to identify the substance or psychoactive agents.

X-ray security scanner – used to scan parcels sent to inmates, letters addressed to them and the Prison Service as well as luggage and bags of visitors entering or leaving the prison. There are installed in all closed prisons and remand centres.

X-ray body security scanner – used to scan people entering and leaving the prison. An excellent control tool, but because of its price, it can be found only in one penitentiary institution.

X-ray vehicle security scanner – used to scan vehicles entering and leaving the prison premises. Another excellent tool to carry out checks, but its price is too high for the Prison Service to have it. Only one enterprise employing prison inmates uses a pulse detector to detect people who might be hidden in a vehicle.

Cellular phone, portable detectors. Development of cellular phone technology has been extremely intensive in recent years. It is essential to ensure that the cellular phone detectors are able to

detect all ranges and technologies. The detector used by the Prison Service must incorporate a display of the signal maximal level indication, a sound or light notification about the detection and a date, time and signal level record. It is desirable for the detector to detect other wireless technologies than the mobile technology used for communication purposes, for example CDMA, Wi-Fi and others. The user must have an opportunity to access the register without erasing any data (self-adding register).

Built-in detectors to locate cellular phones – inserted in various places in the residential pavilion, for example in intercoms. It is essential to ensure that the cellular phone detectors detect all ranges and technologies. The maximal level of the received signal in a group of several detectors will be indicated on the computer screen and the visualisation will indicate the ZONE where the active phone is located. The date, time, signal level and its location will be registered. The user must have an opportunity to access the register without erasing any data (self-adding register).

Electronic device detectors – both switched on and off. It is a highly promising solution in the field of detectors allowing for some independence from the mobile technology and detecting such media as pendrives, glasses and pens with audio/video recorders, watches with recorders or cellular phones, etc. Solutions such as gates or handheld devices are introduced. At the moment the Prison Service does not have any of these detectors.

Electronic weighing scales – used to weigh parcels sent to inmates, to weigh their meals as well as to weigh psychoactive substances found during inspections.

Inspection cameras have been introduced in penitentiary facilities lately. They are used to carry out all sorts of inspections (except body checks). They are used by superintendence staff for mainte-

nance and repair purposes, for example to check ventilation installations, cable channels, the space above suspended ceilings, etc.

Head/Tactical cameras have been introduced in the units recently. They are used in situations when safety is threatened, interventions are necessary, direct coercive measures are imposed, as well as during training.

Telephony system, wired communication – the existing analogue and digital telephony has been gradually replaced by VoIP technology to achieve optimum use of the WAN Network and to reduce costs of telephone communication among the organisational units.

Dispatcher communication (Dispatcher Exchange) – a dedicated telephone exchange, not connected to the external network, allowing for "fast" connections (without dialling the number, immediately after taking up the handset) from selected guard posts or inmates' workplace with the guardhouse. They are often used as independent systems parallel to the traditional telephone communication. In new objects equipped with new telephone exchanges they operate as one system, with one switchboard due to appropriate line programming.

Public phones, payphones – available for prisoners in each penal unit. Depending on the type of prison, inmates' conversations must be controlled by the officer.

Video conferencing system for Prison Service Staff – the Central Board of Prison Service, the Central Training Centre of Prison Service, training centres, district inspectorates and some basic units are equipped with Cisco video conferencing system. It is used to carry out remote checks and trainings, which, in turn, considerably reduce travel and business expenses. Moreover, videoconferences may be recorded, all participants see and hear one another, the devises allow

for connecting the computer to display remote multimedia to be seen by all videoconference participants.

Video conferencing with the Prosecutor's Office. The Prison Service is equipped with video conferencing systems for procedural steps purposes – distance questioning. An inmate does not have to leave the prison or a remand centre and both costs and escort procedures are eliminated. An inmate is taken to a suitably prepared room on the penitentiary institution premises and guarded by an officer and once the questioning is completed, he/she comes back to the cell.

Video conferencing for inmates. It may complement the existing payphones used to contact family and friends. The Prison Service, following the example of other European countries, is testing and preparing to implement the video conferencing to inmates. It may be a supplement, an addition to a phone call or an inmate video (tele)visitation with his/her relatives and friends. It is realised by secure VLAN over the Polish Prison Service existing data network. Skype was the first communicator to be used for that purpose.

Radio communication was implemented homogenously throughout the entire Prison Service in 2000. The wireless system of a penal unit is conducted in FM analogue broadcasting technology with the CCIR selective calling system and the CTCSS function within the scope of VHF and, in particular, consists of:
– Radmor base station radiotelephone;
– Radmor mobile radiotelephones;
– Motorola, GP series handheld radiotelephones;
– digital conversation recorder;
– antennas, masts, power supply with a battery, overvoltage protections, etc.

Radiotelephones operate within a dedicated frequency range, on several channels: working, alarm, closed and the one reserved for

connections within the National Cooperation and Alarming Network (it is with the Police throughout the country). The working and alarm channels are recorded. The guidelines [13] regulate the principles of communication via radiotelephones. Following the principles of radio communication is particularly important as the system operates on a simplex mode (one to one, one to many) where at a given moment only one sender can transmit the information. The additional functionalities of the radiotelephones are the emergency button and the "lone worker" function, which mean that after a defined period of time of not using the radiotelephone, a signal will be heard which must be confirmed by the user. If it is not confirmed, ALARM and the radiotelephone number are displayed on the base station and the commander must react appropriately. The Prison Service uses radiotelephones to communicate on the prison premises and outside the premises when escorting inmates (during transportation).

GSM communication – the Prison Service uses mobile technology for business purposes. The management, commanders and drivers have cellular phones and use them to notify rapidly, by voice or text messages (e.g. Emergency Alarm).

Power generators are installed to ensure proper communication and correct operation of the electronic protection systems in the penal units. The systems are supplemented with a buffer power supply unit and UPS for the time of the switchover from the basic supply to the generator. Automatic start of the generator is the ideal solution, as it considerably reduces the time the devices operate on the buffer power supply and UPS equipped with batteries and, moreover, the officers are not involved in restoring the power supply.

Apart from the above mentioned systems and devices, penitentiary institutions also offer their inmates PA systems, radio and television and multimedia services.

PA system linked with the inmates' cells and day rooms is meant to serve them. They use it to prepare their programmes, news about their prison life, they listen to the radio. The officers monitor the system and have a remote switch off option in the event the inmates start transmitting forbidden information. It is often integrated with a vandal-proof intercom.

RTV system – radio and television installation linked with the inmates' cells (provided they have their own radio or television set). The day rooms, libraries and selected premises are also equipped with these devices, so inmates have access to radio and television programmes.

Television and multimedia studios are intended for cultural, educational and rehabilitation purposes. Inmates may create and record their own audio-video materials.

Electronic systems mean not only technical and protective measures or alarm signals and communication, but also intensive computerisation of the Prison Service, which is noteworthy here.

IT systems are based on the VPN MPLS technology with fibre connections (10 MB/s – the basic unit, 50 MB/s – district inspectorates, 2 x 500 MB/s – the Central Board of Prison Service – the server room) as well as with reserve satellite connections (8/2 MB/s). Only cable networks are possible, wireless Wi-Fi networks are not allowed. Microsoft technology offers server software such as Windows Server, Hyper-V, MS Exchange, SharePoint, and MS SQL as well as the customer's one. Active Directory, its security policy enables efficient management of network services. New computers have been installed and now they reach the number of 16,000 pcs, while the number of servers amount to 700 pcs and laptops to 1000 pcs. Multiple security levels protect the networks, equipment and software of all units throughout Poland. Development and implementation of the Integrated Manage-

ment System based on Microsoft Dynamics AX is in progress, while the software is financed from the Norwegian Financial Mechanism. The software will comprise, among other things, the modules such as human resources-payroll, training, health and safety, time and attendance, warehouses and others, in the ERP system.

Apart from the above mentioned software, the Prison Service uses such software as Software Unit, portals Procurements, BIP, Inbox Electronic Mail and E-Secretariat, Legal Information System, Electronic Post, Intranet, www pages, both the internet and intranet. Professional and special training courses have been initiated, where e-learning and b-learning, with a well developed base of multimedia training materials, are implemented.

Table 11. IT in numbers

Personal computers	16,000
Laptops	1000
Servers	700

Source: statistics.

Offender Management System (Central Database of Persons Deprived of Liberty called Noe.NET) is a WEB application with a huge data base, built on a cluster of servers (MS Windows Server, Microsoft.Net (IIS), Tomcat) with the disk arrays (MS SQL Server data base) located in Warsaw Data Centre of Prison Service. Work on Noe.NET began in 1995 and the present version has undergone numerous modifications. The system may be accessed only from the internal (secured) network by a user having a crypto card with the electronic certificate issued by the Certification Centre of the Central Board of Prison Service. There are more than 24,000 crypto card users. Noe.NET consists of such modules as penitentiary unit, record, penitentiary, transport, protection, legal, medical, statistical, data access ones. There is a separate programmes meant for statistical and reporting analyses purposes (called Crystal and Repos). Some selected database resources are accessible to other institu-

tions, for example: the police, courts. Noe.NET database is classi-fied as particularly important for national security. The database is constantly expanded with new modules and functionalities. Moreover, it is constantly modernised in terms of equipment and software.

Table 12. Noe.NET in numbers

Database size	1 TB
Database records	190,000,000
Functions of application	2200
Functions of database	170
Standard reports	140
Users	24,000
Direct online users	2000
Roles	193

Source: statistics.

Offender Management System (Noe.NET educational) – pre-pared for educational purposes in full functionality but with fictitious data and it may be accessed only from the internal network.

The Central Board of Polish Prison Service implements the Infor-mation Security System in conformity with ISO 2700-1.

Describing the Prison Service electronic systems, the system of Electronic Monitoring may not be omitted.

Electronic Monitoring (EM), Electronic Tagging system – following the example of other European countries, where penal-ties served outside penal institutions turned out to be a successful alternative to overcrowded prisons, Poland is gradually implement-ing electronic monitoring. The system is based on electronic tagging consisting of a bracelet with a transmitter attached to a person's leg or hand and a module to contact the monitoring centre, which

is installed in a person's house. The module contacts the monitoring centre via GSM. A timetable stating when a monitored person must stay at home and when he/she may go out is programmed in the monitoring centre. Moreover, principles of contact, alarm and reaction to any timetable violation are clearly defined. The system capacity now stands at 7,500, whereas at present the system comprises 4,969 convicted. Up to March 2014, more than 25,000 convicts served their penalties in this system.

The Prison Service facilities consist mainly of buildings and the area around them. Due to hazards, such as electrical discharges and voltage surges, when installing any kind of electronic system, equalising connections for metal housings, structural elements, trough tanks, etc must be taken into account along with overvoltage protections in supply and signal paths. It is absolutely required for the overvoltage protections to correspond to the resistance values of the devises installed.

Obviously, the information presented above do not cover all issues referring to technical protective measures, alarm and communication or IT systems which operate in penitentiary institutions. However, the above material clearly shows the tremendous impact of intensive development of electronic technologies on technical protective measures used by the Polish Prison Service in its penitentiary facilities.

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cell **110** cell **111** cell **112** cell **113** cell **114**

Home History Users Tags Sections Areas FLU FLM FLE PTZ cameras 3D Viewer Exit

- officers and inmates monitoring inside the building/object and during escorting
- monitoring of inmates under a special security regime
- integration with the safety systems, for ex. surveillance television
- multi-function alarm systems, the panic button system
- detection of a lying, bent, motionless and falling down person
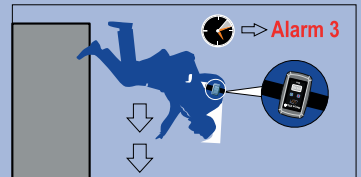- certificate Grade 4 – the highest safety level
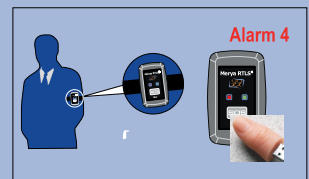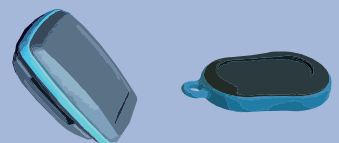
Examples of detection of:

⇨ **Alarm 1**

a lying person

⇨ **Alarm 2**
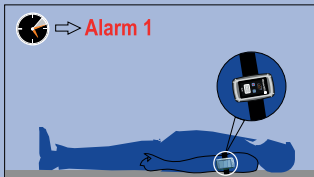
a motionless person

⇨ **Alarm 3**

a falling down person

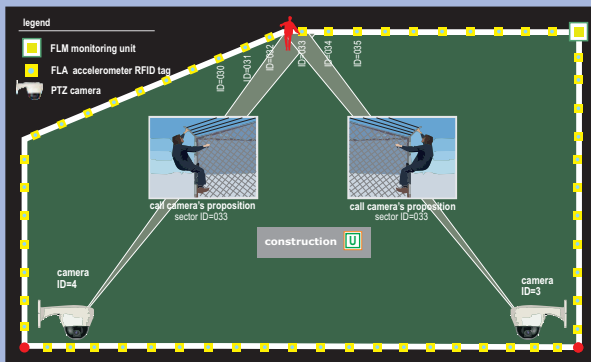

Alarm 4

Emergency button

Manufacturer

Ronyo Technologies s.r.o.
Česká 3195/47
700 30 Ostrava Zábřeh
Czech Republic
www.ronyo.cz

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The unique wireless perimeter protection system based on the RFID technology.
Complete detectors communication and integration with the surveillance television system –
the number of detectors corresponds to the number of presets of RFID monitoring of guard patrols.
No cables – cabling limited to monitoring units only.
Designed and tested in the disturbing climatic influences.

legend
- ■ FLM monitoring unit
- ■ FLA accelerometer RFID tag
- PTZ camera

ID=030 ID=031 ID=032 ID=033 ID=034 ID=035

call camera's proposition
sector ID=033

call camera's proposition
sector ID=033

construction U

camera ID=4

camera ID=3

Features:
- wireless communication of detectors (accelerometers)
- compatibility with any camera
- easy and fast installation
- IP67 security degree
- very long life of a battery (8 years at average)
- advanced visualisation
- the system checked in prisons

Ronyo Technologies s.r.o is the company with many years of experience at the
international markets, proved by references and customers' satisfaction.
It is highly developed, patented products earn growing recognition and have wider
and wider range of uses in the most difficult conditions.

Manufacturer

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