Adam Radomyski*

[iD] 0000-0001-7522-308X

Daniel Michalski**

[iD] 0000-0001-8202-6738

Paweł Bernat***

[iD] 0000-0002-8150-9794

REVIEW OF COUNTER-TERRORISM SYSTEMS DURING SUMMER OLYMPIC GAMES IN THE 21ST CENTURY

ABSTRACT

The research results presented in the article pertain to the organization of security systems by the host countries during the Summer Olympic Games in Athens (2004), Beijing (2008), London (2012), and Rio de Janeiro (2016). The central part of the considerations focuses on the complex issue of searching for methods and tools to effectively protect participants of such large mass sports events, not only against terrorists. Taking into account the identified problem situation, it was agreed that the aim of the article will be to characterize the security methods and tools employed by the organizers of the Summer Olympic Games. The research was conducted with the use of selected theoretical scientific methods, including analysis, synthesis, comparison, analogy, generalization, and inference. These methods were applied in a structured way to a research process that focused on case studies of selected Summer Olympic Games that were considered representative samples. The results of the carried out research clearly indicate a high complexity of the security systems created for the needs of the Olympic Games. In every analyzed case, the need occurred to integrate state institu-

*   Military University of Aviation, Dywizjonu 303 nr 35 (Poland), e-mail: a.radomyski@law.mil.pl
**   Military University of Aviation, Dywizjonu 303 nr 35 (Poland), e-mail: d.michalski@law.mil.pl
*** Military University of Aviation, Dywizjonu 303 nr 35 (Poland), e-mail: p.bernat@law.mil.pl

tions and international organizations, including various agencies dealing with security issues, including terrorism.

Additionally, based on the obtained results, it was also determined that properly forecasting threats is crucial in ensuring the safety of participants in the Olympic Games. It should be further emphasized that in each analyzed case study, the organizers of these large sports events fulfilled their role as hosts very well. They should, therefore, be recognized as a good example for other countries that will apply for organizing this type of mass sports events in the future. They must also be aware that each sporting event of this type requires a significant organizational and financial effort and that the threats are not limited to terrorism but can be posed by various external and internal factors.

This article is one of the first attempts to assess the justification of implementing various methods and tools to the security systems of mass international sporting events through the prism of their effectiveness. In addition, the proposed solutions, including the threat forecasting methodology, may be useful to both practitioners and theoreticians in creating more effective solutions in the field of national and international security.

Keywords: armed forces, Olympic games, security, strategy, terrorism

1. INTRODUCTION

Major international sports events, due to their nature and global media coverage, have always posed enormous organizational challenges for the host nations. It was expressed on many different levels, but the key one was to ensure the safety of all participants.

At this point, it should be emphasized that the Olympic Games are the oldest and the largest international sports event organized every 2 years (alternately summer and winter) in various countries, the motto of which is noble competition and brotherhood of all nations of the International Olympic Committee (Mallon & Heijmans, 2011).

One of the main threats that started to occur during such sports events in the second half of the 20th century was the activity of various non-state actors, including anarchist, extremist, criminal, revolutionary and terrorist organizations. The terrorist threat showed its true colors at the Olympic Games in Munich in 1972 and in Atlanta in 1996. The Games in Munich, which took place from August 26 to September 11, 1972, will be remembered mainly due to the tragic events of September 5, when a group of terrorists from the Palestinian organization "Black September" attacked the Olympic Village. As a result of the attack, two Israeli sportsmen were killed and nine others became hostages. After the unsuccessful attempt to recover them at the Munich airport, all the hostages died, as well as five terrorists and one German police officer.

An interesting fact is that the organizers, in order to ensure safety of the participants, ordered a forensic psychologist Georg Sieber to prepare a list of 26 potential scenarios of terrorist attacks that may occur during the event. One of the scenarios included an attack by Palestinian extremists on Israeli sportsmen followed by kidnapping hostages. It was intended to release Palestinian prisoners. However, this and other threat scenarios were ignored by the organizers. The main reason for this was the desire of the organizers to maintain a carefree and open image of this sports event. Another significant flaw were the mistakes made during the hostage rescue. They generally resulted from the poor preparation and inadequate equipment of the se-

curity forces as well as regulations in the post-war constitution of the Federal Republic of Germany prohibiting the use of military forces in the country in crisis situations. Considering the mistakes made in the process of preparing the security system by the West German authorities, many other European countries decided to create elite anti-terrorist forces, such as the French GIGN and German GSG9, and to reorganize units such as the British SAS.

There is no doubt that the terrorist attack in Munich made the subsequent Olympic Games different, and the security issues became even more important. Despite significant investments in security, it was not possible to prevent further terrorist attacks. A tangible example of this is the 1996 Olympic Park bombing in Atlanta. Two people were killed and 111 injured as a result of the explosion of a 20-kilogram bomb. This subsequent attack was a kind of warning for the host countries of the future Olympic Games and prompted them to treat security as a priority. Undoubtedly, the security systems developed by the host countries of the Olympic Games are consuming more and more financial resources. For example, the security expenditure for the Athens Olympics in 2004 was $ 1.5 billion, more than double that of Sydney in 2000. In the next Olympics, the costs of security were even higher (Šiljak et al., 2016). The increase in spending dedicated to security is fully justified and the experience gained in this area was used in the organization of the next Olympic Games (summer and winter).

One of the main problems to be solved by the organizers of the Olympic Games is determining what form subsequent terrorist attacks might take. There is no doubt that regardless of the form of terrorism, it can be stated that it is a particularly dangerous form of violence due to the fact that the counteraction system requires the use of a wide range of political, legal, economic and order regulations, as well as the involvement of specialized military potential. Among the buildings and facilities particularly threatened by a terrorist attack, experts mention the locations of the Olympic Games. A possible target of terrorist attacks carried out during this type of sporting event may be both nationals of the host country and representatives of other countries participating in them. The group of the most vulnerable facilities to be attacked from air undoubtedly includes stadiums, which are the venue for the competition and the opening and closing ceremonies of these events. These are special moments due to the fact that the guests of honor who participate in the opening and closing ceremonies are heads of states and high-level representatives of international organizations and governments with special VIP status. They can also be potential targets for terrorists.

Bearing in mind the above issues, the organizers of the Olympic Games, the so-called host countries, must ensure that all participants feel safe. This applies not only to safety and security on the ground and water, but also in the airspace, which may be used by various types of civilian and military aircraft as well as aerial tools belonging to other services, e.g., police, border guards, television or emergency services. Undoubtedly, the scale of the air threat was increased by the terrorist attacks committed on September 11, 2001 in the United States. This case showed clearly that, despite extensive ground protection systems, airspace can be the environment which is the most difficult to protect. In particular, it concerns the possibility of suicide terrorists infiltrating the area of the main sports arenas and accompanying venues by air.

The results of the research presented by the authors in this paper focus on the characteristics and evaluation of the security systems prepared for the Summer Olympics in Athens (2004), Beijing (2008), London (2012) and Rio de Janeiro (2016).

Taking into account the outlined problem, it was assumed that the aim of the article will be to present specific solutions in the field of security that were adopted during the Summer Olympic Games in Athens, Beijing and London.

It was assumed that with such a goal, the main research problem was formulated as a question: What security solutions introduced by the host states of the Summer Olympics in Athens, Beijing and London allowed to ensure the safety and security of the participants of these sports events?

It has been found that the solution to the general research problem will occur as a result of finding answers to the following problems – specific questions:
  – What threats may occur during the Olympic Games?
  – What facilities were given special protection during the Olympic Games in Athens, Beijing, London and Rio de Janeiro?
  – What forces and security measures were used during the Olympic Games in Athens, Beijing, London and Rio de Janeiro?

2. RESULTS AND DISCUSSION

2.1. THE ATHENS SUMMER OLYMPICS (2004)

The first major event after the terrorist attacks of September 11, 2001 in the US was the 2004 Athens Summer Olympics. As part of preparations in 2000, the Greek authorities contacted seven countries seeking assistance in ensuring safety at the 2004 Olympics. The first meeting of the countries was held the same year and the Olympic Security Advisory Group (OSAG) was established (CRS, 2004). The founding members of this group were Australia, France, Germany, Israel, Spain, Great Britain and the United States (GAO, 2005). In December 2003, Russia also joined the group (CRS, 2004). OSAG members provided extensive security assistance to Greece. It concerned, inter alia, the development of a safety plan for the Olympics in Athens. In addition, France, Spain and the United Kingdom trained Greek police officers in the fight against terrorism and in the neutralization of explosives. Israel, in turn, conducted a training on counteracting suicide bombers (Clarke, 2004, D6). The assistance from the United States consisted in collecting intelligence for the Olympic Intelligence Center. It included American representatives from over a dozen federal security agencies (Schmidt, 2004).

The US government personnel, along with representatives from other countries, attended the exercises conducted in Greece called the "Shield of Heracles 2004." In this exercise, which began on March 10, 2004, various simulations were carried out. They related to system failure, bomb blasts, chemical weapons attacks, plane hijacking and an epidemic. The participants of the exercise were 1500 Greek soldiers, 400 American security forces and 100 soldiers from other countries (CRS, 2004). Among the 77 practiced scenarios were: a ground-based rocket attack on a civilian plane, suicide bombings, hostage-taking on the Queen Mary II ship (Chapman, 2004). In terms of security, assistance to the organizers of the Olympics in Athens was also provided by the Central Intelligence Agency (CIA), the State Department, the FBI and the US Department of Defense (CRS, 2004).

Additionally, in November 2003, the US military helped organize a planning exercise at the European Command Center. The US Navy force based on Crete was also involved

in Athens to secure the Olympics. The FBI's Counter-Terrorism Division assisted in the exchange of intelligence information between various law enforcement agencies. Additionally, the FBI also helped secure the facilities and create a high-speed communication system that would be used in the event of a terrorist attack (Anderson, 2003).

In August 2004, the US Sixth Fleet, the Italian and Turkish fleets were patrolling the areas east and west of Greece. The following units reported to the Sixth Fleet operating in the Mediterranean and adjacent areas: ships' strike group, expeditionary strike group, sea expeditionary force, logistics force, sea task force for special operations, ground naval patrol and submarines. The fleet was commanded by Vice Admiral Henry G. Ulrich III (NHHC, 2017). In addition, the Department of Energy provided handheld radiology detectors to Greek officials in May 2004. The value of these detectors exceeded $ 26 million. In addition, permanent detectors were also used, which were installed at 32 airports, seaports and Olympic venues. American experts in defense against weapons of mass destruction trained Greek doctors in treatment of victims of chemical and biological attacks (Clarke, 2004).

The protection of the airspace was a very important element of the security system of the Athens Olympics. To protect it, Patriot anti-aircraft systems in the Pac-2 and Pac-3 versions, Russian S-300 missile systems and a whole range of short-range systems, including the French Crotale NG missile systems and the Russian SA-15 Tor anti-aircraft systems were used.

Figure 1

Dislocation of the main air defense forces and resources during the 2004 Athens Olympics

The Patriot batteries, which are the main element of air defense, were deployed at the Tatoi military airport, directly near the Olympic Town and the main stadium in Athens. The

remaining Patriot anti-aircraft missile batteries have been deployed on the Isle of Skyros, as well as within Thessaloniki's sports facilities (NTI, 2004). The S-300 system created an anti-aircraft umbrella over the main administrative center of Crete – the town of Heraklion (Radomyski, 2012). This particular protection of Crete was dictated, among others, by the location of the American team, which at the same time was preparing for the Olympics using sports facilities located within the island. The anti-aircraft systems were supported with information by AWACS planes stationed at the Aktio-Preveza base in the west of Greece and reconnaissance aviation of the US air force, represented by RC-135 and EP-3s aircraft. The Greek fighter jets were also on duty in the air, patrolling the airspace near the main sports facilities. These elements were a part of the Olympic security system, the total cost of which was estimated at over one billion euros (Sellias, 2005). It should be noted that the involved forces remained on 24-hour duty throughout the entire duration of the Games, i.e., from August 12 to 29, 2004. The next month they secured the Paralympic Games held from 17 to 28 September, 2004. The functioning of the security system at the highest degree of combat readiness for such a long period of time required the use of significant military potential, for the above reasons as many as eight NATO countries supported these undertakings.

2.2. THE BEIJING SUMMER OLYMPICS (2008)

The Beijing Olympic Games in 2008 were a very important undertaking for the Chinese government. Their organization was accompanied by specific threats that were brought about by the unrest in Tibet. A terrorist group attacked a border police station in Xinjiang Province four days before the Olympics, which raised concerns of even more radical threats. In addition, there were rumors of plans to hijack an Air China plane that was to be crashed at the Beijing National Stadium, which was prepared to hold the opening ceremony. In addition, alleged attempts to kill American tourists have been reported. This was to be a response to the shutdown of sites such as Facebook and YouTube due to the conflict in Tibet. It should also be noted that the Olympic torch relay was systematically disrupted by groups fighting for human rights and supporting Tibet. In the circumstances of a diagnosed threat, the Chinese government had to ensure the safety and security of about 100 world leaders and over 11,000 athletes. Thus, it is not surprising that creating an efficiently functioning security system has become a priority for the entire state. The main effort was placed on the security apparatus, which operated under very great social and political pressure (Yu et al., 2009).

From the security point of view, the Beijing Olympics was the third major Olympic event after Athens and Turin, which took place after the terrorist attacks in the United States in 2001.

The personnel involved in protecting the Beijing Olympics came mainly from the public security sector, intelligence, police, and professional security service providers. In addition, students from military academies and police schools acted as volunteers. International cooperation was also important. In order to gain more experience, the staff were sent to the Athens Olympic Games (2004), the Turin Winter Olympics (2006) and the 2006 FIFA World Cup hosted by Germany. Many other international sporting events around the world were also analyzed. In addition, foreign experts in the field of security were invited. Cooperation was established with Interpol, the Shanghai Cooperation Organization and security services from the USA and Great Britain. Another important event was the three-day international conference on the Safety of the Beijing Olympic Games, which took place in April 2008. About

400 guests, representatives from more than 120 countries, participated in it. On the part of Interpol, a declaration was made to create a hotline during the Olympic Games in Beijing to exchange information with the Games Security Command Center. In July 2008, the International Police Liaison Center was launched, consisting of approximately 200 police and intelligence officers from over 80 countries.

In order to increase security, as early as April 2008, non-Chinese citizens in Beijing were subject to regular checks of identity documents and work permits (Cody, 2008). In addition, in order to increase security at the Olympics, the security personnel had been adequately trained to counter various scenarios of terrorist attacks. Anti-aircraft artillery missile systems were deployed near the sports facilities where individual sports were played (Zhou, 2008). In Beijing alone, 110,000 police officers and other security forces were to provide protection. Additionally, there were 1.4 million volunteers. In total, ensuring security in Beijing alone cost over £ 3 billion. Outside the capital, 34,000 soldiers were to maintain order in the cities hosting the Olympic events, and key sports arenas were protected by surface-to-air missile systems (Wenbin, 2008). In addition to these measures, 74 military aircraft, 48 helicopters and 33 warships were involved, which were in the state of highest operational readiness (Righter, 2008).

The command and control structure was of key importance for the functioning of the security system. To this end, Games Security Command Center was organized, which was ready for the opening of the Olympic and Paralympic Games. It was formally established in Beijing on June 30, 2005. Its activities were coordinated with the International Olympic Committee. In addition, from 2005 to 2007, local security teams were organized and staffed by professionals. The Security Coordination Group also played an important role, helping the Beijing authorities and other host cities to properly coordinate activities within the security system. This also applied to the Hong Kong Special Administrative Region, which was responsible for the safety of equestrian competitions. In terms of efficient management of the security system, the implemented security command support system was of significant importance. It connected the Security Command Center and all sites in Beijing and other host cities.

In the case of military forces involved in protecting the Olympic Games, they were commanded by a special body which the Chinese media referred to as the Olympic Security Command Group. It was led by Deputy Chief of Staff General Ge Zhenfeng. Similar bodies have been set up in other provinces. Altogether, the commands in Beijing, Tianjin, Shanghai, Shenyang, Qingdao and Qinghuangdao mobilized more than 40,000 volunteers and reservists (Wenqing, 2008). These military bodies coordinated their activities with the security cell within the structure of the Organizing Committee of the Beijing Olympics. This was conducted through the Department of Military Affairs, headed by Colonel Tian Yixiang (Xiangfei & Na, 2008; Qingcai & Yongjian, 2008). The body became fully operational on July 1, 2008.

In turn, in accordance with the adopted procedures, the police subordinate to the Ministry of Public Security were responsible for maintaining security in Olympic venues and in the host cities. During the Olympics, the police faced a number of security tasks. These included: protection of Olympic venues; maintaining security during the opening of the Olympics, securing the Olympic culture festival and other large-scale events; protection of accommodation facilities, VIP routes; protection of the quarters and activity areas of members of the International Olympic Committee; protection of the Olympic relay, airports and special aircraft as well as protection of water, electricity, gas, fuel, communication facilities and oth-

er important facilities. Police forces also checked order in public places and in business districts where they were supposed to counteract acts of terrorism, e.g., kidnapping (Dongbo & Haihua, 2008).

With regard to the specialized military forces designated by the Chinese People's Army as part of the preparation of the Olympic security system, anti-terrorist exercises were conducted throughout the country. An example of this is the Beijing Military Region, where the first exercise was carried out on June 29, 2007. In the case of the Autonomous Region of Tibet, anti-terrorist exercises were conducted, codenamed "Sky Road (Tian Lu) 08" and "Grand Hawk (Xiong Ying)." The exercise site was Lhasa Railway Station and Lhasa Gonggar Airport (Junwu, 2008). In this regard, it should be noted that the anti-terrorist exercises continued even during the Games.

During the Olympic Games in Beijing, forces assigned by the Chinese People's Army were responsible for the implementation of a number of tasks, i.e.:

1) protection of the air space in Beijing and over other areas (venues) where specific sports competitions were held;
2) maritime security in the vicinity of the coastal area;
3) protection against weapons of mass destruction, mainly against terrorist attacks with the use of chemical, radioactive agents and biological weapons, and assistance to the public security department in neutralizing, for example, explosives planted by terrorists;
4) intelligence support;
5) medical rescue and helicopter transport;
6) border control during the Olympic Games to maintain stability at the border and in coastal areas (Mulvenon, 2008).

One of the examples of the implementation of tasks was the security provided by the military forces during the Qingdao sailing regatta. Specialist anti-terrorist groups and units as well as experts from Engineering Corps were responsible for detecting and removing explosives, technical support, rescue, chemical reconnaissance and decontamination, as well as monitoring the radiation situation and defense against biological weapons. In total, these forces numbered almost 2,000 people.

The air force was responsible for the security of the airspace over the Olympic venues. It should be emphasized that in order to assess the degree of military preparation for the protection of this sporting event, a security conference was organized on June 29–30, 2008 (Qingchun, 2008). During the meeting, speeches were delivered by Ge Zhenfeng; Xu Qiliang – member of the Central Military Commission and Air Force Commander; Deng Changyou – Political Air Force Commissioner. Zhao Zhongxin, Deputy Air Force Commander and Commander of the Olympic Security Group, also made his speeches, in which he presented an air safety action plan. The Chief of Staff of the Air Force, Yang Guohai, presented information on the rules of aviation safety during the Olympic Games. It should be emphasized that the content of the conference focused on identifying each of the possible aviation accident scenarios and on presenting solutions related to the coordination of activities of many civil and military entities, which were to ensure full safety in the airspace (Eryan, 2008).

In the case of the Air Force, their main effort was focused on intercepting unidentified aircraft at low and very low altitudes. An important element in the security system was also

the deployment of anti-aircraft artillery and missile systems around Beijing (Min & Jun, 2008; Songbo & Jianghuai, 2008). Another important element of the system was the organization of special helicopter groups as part of a "special air force." As it turned out, one of the most spectacular tasks performed by aviation during the Olympics was trying to prevent rainfall before the opening ceremony. As part of this operation, flight crews sprayed chemicals (bentonite) for more than 30 hours to contain the rain (Songbai, 2008).

Summing up, it can be concluded that the air force units organized a tight airspace security system based on anti-aircraft missile systems located around the main Olympic venues. The sports facilities airspace protecting system consisted mainly of the domestic HQ-7 missile systems and radar devices integrated with them, which were placed around the newly built Olympic stadium, commonly known as the "Bird's Nest." The HQ-7 anti-aircraft missile system is designed to destroy targets aircraft flying at low altitudes and at distances from 500 m to 15 km.

Figure 2
HQ-7 anti-aircraft missile systems located near the national stadium in a special military zone

Note: Adopted from NBC NEWS, 2008.

In addition, the organizers developed a detailed airspace control plan. Apart from limiting the airspace over the arenas of sports competitions, the duty was performed by military planes that controlled the airspace and introduced closed zones by the organizers. This was to prevent the appearance of unauthorized aircraft in them, ranging from balloons to small-size aircraft and drones. The airspace control system organized in this way was also in force during the Paralympic Games.

2.3. THE LONDON SUMMER OLYMPICS (2012)

Safety was taken very seriously at the 2012 London Summer Olympics (Fussey et al., 2012). Planning for the security system for the 2012 Olympics began shortly after it was awarded to London, which won the right to host matches after competing against Madrid, Moscow, Paris and New York. The decision was announced on July 6, 2005, and on the next day, July 7, i.e., the day after the city was selected to host the Olympic Games, the London underground and a London bus were attacked by Al-Qaeda terrorists. As a result of the attacks conducted by suicide bombers, 52 people were killed and over 700 injured. It was without a doubt a very serious warning to the organizers of the London Olympics in 2012. Otherwise, months before the Games began, Michael Shrimpton, a former immigration judge, contacted the authorities to warn them of an impending attack that was planned during the Games. According to a report presented by Shrimpton, a German terrorist organization was to steal a nuclear warhead from a sunken Russian submarine and place it in London. As a result, according to Shrimpton's thesis, the terrorist organization planned to detonate the warhead during the opening ceremony of the Games. The Shrimpton report was taken seriously by the police, and when it turned out to be a hoax, he was arrested, tried and sentenced to 12 months in prison.

After a detailed analysis of the threat, the organizers decided to use a serious force of 13,000 police officers to secure the 2012 Summer Olympics. In addition, 31,000 Scotland Yard members and policemen from posts outside London were also ready to be work when required.

In addition, the private security company G4S was also involved and was to provide 13,700 employees, but due to various problems with recruitment and training, it managed to provide only about 10,000 people. In addition, 17,000 soldiers from the Royal Navy, Army and RAF were involved in the security system. The number included 11,000 security personnel, 5,000 soldiers from specialized units, including sappers for disarming explosives, and search teams with dogs. In turn, 1,000 soldiers were to provide logistical support. The protection system was also supported by two national intelligence services, MI5 and MI6.

The final cost of the safety measures was estimated at £ 553 million (pounds sterling). The safety budget was partly funded by the London Organizing Committee of the Olympic and Paralympic Games. An amount of £ 9.3 billion earmarked for contingencies from the infrastructure budget could also be used for this purpose.

Bearing in mind the importance of security, the British Organizing Committee of the Olympic Games, in cooperation with the International Olympic Committee, developed documents on the basis of which the preparations for this international sports event were conducted. These official documents also contained specific safety regulations during the Games. In October 2010, the Government published "A Strong Britain in an Age of Uncertainty: The National Security Strategy" (HM Government, 2010). It estimated that the greatest threats result from:
– international terrorism, including the use of chemical, biological, radiological or nuclear (CBRN) materials; and terrorism related to groups in Northern Ireland;
– cyber-attacks, including organized crime and terrorists;
– international crises of an armed nature;
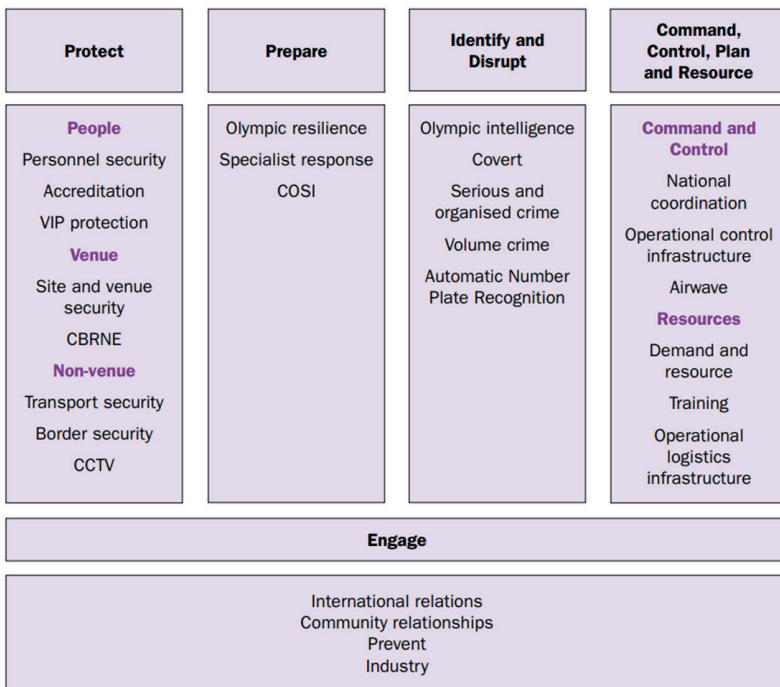– serious accidents or natural hazards (natural disasters).

On the basis of the adopted security strategy, the Olympic Strategic Threat Assessment (OSTA) was developed, which assessed occurrences that may threaten the safety of the London Olympics. In this regard, the following risks were identified:

- terrorism;
- serious crimes;
- internal extremism and social anxiety;
- natural disasters.

The mentioned documents also became the basis for the development of the National Counter-Terrorism (CT) Strategy for the Olympic and Paralympic Games in 2012. In addition, it was closely related to the plans of national and regional agencies, plans of the police concerning serious and mass crimes. The strategy and the related programs were essential to managing key risks. The implementation of the strategy required close cooperation with industry and the private security sector.

Figure 3

Main elements of the 2012 London Summer Olympics security system

Protect	Prepare	Identify and Disrupt	Command, Control, Plan and Resource
People	Olympic resilience	Olympic intelligence	**Command and Control**
Personnel security	Specialist response	Covert	National coordination
Accreditation	COSI	Serious and organised crime	Operational control infrastructure
VIP protection		Volume crime	Airwave
Venue		Automatic Number Plate Recognition	**Resources**
Site and venue security			Demand and resource
CBRNE			Training
Non-venue			Operational logistics infrastructure
Transport security			
Border security			
CCTV			

Engage
International relations Community relationships Prevent Industry

It was also assumed that in order to achieve the main safety objective, the activities should be focused on:

- protecting the Olympic and Paralympic venues, events, and supporting the transport infrastructure and people using it;
- preparing for counteracting events that may significantly disrupt the safety of sports competitions and developing solutions to mitigate their negative impact;

- identifying threats which the security system may face;
- commanding, controlling and good planning management of the resources at the disposal of the security system;
- working with international and national partners and communities to increase safety;

The main elements constituting the structure of the London Olympic and Paralympics security system are shown in the figure below.

The main body that was to manage the security system during the Olympics was the Security Team during the Olympics in London.

Just like in the case of the previously characterized sports events of this rank, the specialized forces and resources designated from the British armed forces played a key role in the security system. A very important undertaking was to ensure the protection of the air space above the sports facilities. This was to be ensured, among others, by the Rapier anti-aircraft missile defense systems, which were deployed in six locations in London, i.e., Leytonstone, Bow, Blackheath Common and Oxleas Wood, Enfield and Epping Forest.

The representatives of the British Ministry of Defense stated that anti-aircraft missiles are the optimal means of protection against acts of air terrorism, because they are capable of shooting down both large and small-sized aircraft that could be used by terrorists to carry out an attack during the London Olympic Games. In addition to the Rapier systems, Starstreak MANPADS have also been deployed. They have been located on the roofs of high-rise buildings located near the Olympic Stadium. One such place was the water tower of a factory converted into exclusive apartments in Bow. The other was the Council's 15-story Leytonstone block of flats. The inhabitants of the latter have brought a court complaint against such actions of the government. It concerned a protest against the location of a Starstreak missile battery on their building. However, this complaint was rejected by the court on July 10, 2012. Such sets were also placed on the roof of other buildings, i.e., in the Lexington Building and Tower Hamlets.

No-fly zones were also introduced for the duration of the London Olympics and monitored by Royal Air Force planes. To this end, a special control task force called "Atlas Control" was set up. Its task was to monitor the airspace in London in the weeks leading up to the Olympic Games and during the event. This was a very important task due to the fact that air traffic was strictly regulated during the Games and the Atlas Control Team was also responsible for coordinating the patrolling of the airspace by Typhoon fighters in the Rapier anti-aircraft missile systems.

A very important issue in countering acts of air terrorism was the introduction of No Fly Zones for aircraft and restricted traffic zones. No Fly Zones were introduced in: London City, Northolt, White Waltham, Denham, Fair oaks and London Heliport (Battersea). The areas restricted also for unmanned aerial vehicles were in force in: Duxford, Shuttleworth (Old Warden), Dunstable Downs, Lashenden (Headcorn), Earls Colne, Booker and Wethersfield. The restricted area also included several general aviation airports. This was due to the analyzes carried out, which indicated that potentially small planes taken over by terrorists could run from these airports and they would be above the sports facilities after about 10 minutes. All security and containment measures implemented were to help in the rapid identification of unauthorized flights. Therefore, the applicable restrictions on the use of airspace have been introduced around all venues for sports competitions. The main limitation was with London and the Olympic Stadium. Such restrictions were in force from July 13 to September 12,

2012. As regards airspace restrictions around other places, they were in force only during sports competitions and accompanying events.

Figure 4
Olympic Airspace Restrictions
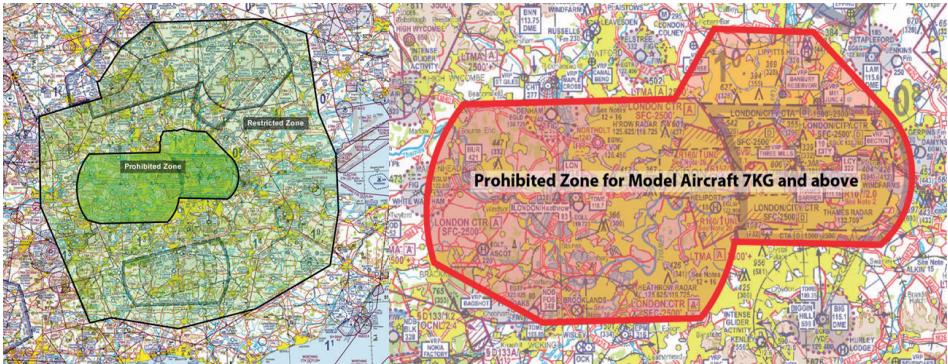
Note: Adopted from Mortimer, 2013; Sheppard, 2012.

It should be emphasized that a certain group of aircrafts has been exempted under the above restrictions. These included police and Medevac helicopters and planes securing the course of the event, the so-called Olympic Broadcast Service. There were special procedures for these aircraft. As part of the assistance, airspace users were provided with up-to-date information on airspace restrictions and changes introduced.

The use of three Puma helicopters, which had been allocated by the Royal Navy, was also planned (Ministry of Defense, 2010). In addition, Lynx helicopters, which operated from HMS Ocean, moored in Greenwich, were also taken from the land forces. There were snipers from the RAF regiment on board, and their task was to intercept and redirect slow-flying aircraft that would enter the restricted airspace. This method of operation was tested in February 2012 during an exercise codenamed "Taurus Mountain."

In addition to the ships assigned by the Royal Navy, protection from the water was also provided by fast patrol boats and pontoons, which were to stop suspicious vessels. The sailing competition was secured by HMS Bulwark. It was armed with improved weapon systems, radars and sensors. What is more, there were about 350 soldiers from the Royal Marines on board. In addition to these forces, the Royal Navy also deployed teams of divers who were prepared to disarm explosives placed under water.

Proper airspace management and early warning of threats was also a very important issue. It was carried out using stationary air traffic control and air defense radar, the activities of which were reinforced by the Type 101 mobile radar from the 1st Air Control Center RAF, deployed in Kent. The radar also served as Air Control Center No. 1. This center could take over the tactical command and control of the interceptors. Four Typhoon fighters from RAF Northolt were allocated to intercept unauthorized planes wishing to enter restricted airspace (Graham, 2012).

In addition, the early warning capabilities were also increased by using the E-3 Sentry Airborne Warning and Control System (AWACS) aircraft from the RAF and the Air Surveil-

lance and Control System (ASACS) from the Royal Navy, which were temporarily transferred to Northolt.

At this point, it should be emphasized that the entire security system was practically tested on May 2–10, 2012 as part of the Exercise Olympic Guardian. In the opinion of the secretary of defense, the security system confirmed its complexity and multi-level nature, and allowed for the protection of all people participating in this event. It was also an important deterrent.

When assessing the airspace security plan during the London Olympics, it should be emphasized that it had a multi-layer structure that allowed for the adoption of countermeasures against a wide range of potential air threats, from passenger aircraft, through light and microlight aircraft, to drones.

2.4. THE RIO DE JANEIRO SUMMER OLYMPICS (2016)

Analyzing the organization of the Olympic Games in Rio de Janeiro from the point of view of safety, it should be stated that Brazil was very well prepared. It was also due to the fact that, in the run-up to the Olympics, the country had built up a wide range of safety expertise during previous mass sporting events. This knowledge was gained through a detailed analysis of the organization of security systems during large sports events organized by other countries, where Brazilian observers were sent. In addition, it should be noted that the Rio 2016 Olympics and the subsequent Paralympics ended a de facto long cycle involving the organization of several other important events by Brazil. In this regard, ensuring the security of the 15th Pan-American Games organized in 2007 was a major challenge. The 1st Military World Games organized in Brazil in 2011 and the United Nations Rio + 20 Conference on Sustainable Development in 2012 also required a great effort in terms of security. In the following year, the organization of the Confederation Cup in 2013 and the World Youth Day in Rio de Janeiro posed another challenge. However, the event that was supposed to be the larger contributor to the proper organization of the Olympic Games in 2016 was the World Cup held in Brazil in 2014.

Based on the results of the analysis, it can be concluded that during nine years, Brazil was subjected to serious tests in terms of ensuring the safety of millions of participants of various mass events, including sports, political and religious. Undoubtedly, the gained experience helped to ensure protection and security at the Rio 2016 Olympic games, as it required close cooperation with civilian agencies, intelligence and other government agencies.

However, the Rio 2016 Summer Olympic and Paralympic games presented the biggest challenge for the Brazilian government, as it had to ensure the safety of 15,000 athletes from 206 countries, and approximately 7.5 million spectators, 25,000 journalists and around 100 dignitaries (PESI Rio, 2016).

The foundation for ensuring the security system during the Rio Olympics was the coordination of the activities of various state institutions, i.e., the Ministry of Justice and Defense, the Brazilian Intelligence Agency (ABIN), state and local governments, as well as various international agencies. In fact, it required the creation of a complex management, command and control architecture. This was also due to the specificity of the administrative division in Brazil, which includes twenty-six states and the Federal District. In this regard, it should be emphasized that each unit of the federation has its own public security forces, including

state police forces (civilian and military) and civil defense that is responsible for crisis management.

Following the example of previous host countries, it was decided that the basis of an effective security system would be the adoption of a Strategic Integrated Security Plan for the Rio 2016 Olympic and Paralympic Games (*Plano Estratégico de Segurança Integrada para os Jogos Olímpicos e Paralímpicos Rio 2016*), known as PESI Rio 2016. It indicated three main areas of security:

1. Public safety,
2. Defense,
3. Intelligence (PESI Rio, 2016).

Moreover, the document also laid down guiding principles for the games security, as well as the missions, governance structure and authorities that were to be responsible for managing public security, national defense and intelligence agencies based on their tactical and operational plans. The rationale behind these activities was to ensure the safety of the Games in a discreet and friendly manner, in coordination with the federal government and in integration with the state and municipal governments, and the Rio 2016 Organizing Committee.

The fight against terrorism was in the foreground and Brazil adopted best international practices. Despite the fact that Brazil is perceived as a peaceful and friendly country with no history of terrorist activity, the Olympic Games, with over 200 participating countries and an audience of five billion viewers, significantly increased the terrorist threat. A key tool of the security forces in counteracting terrorism was cooperation, training and investment in equipment. Brazil has also created the Integrated Anti-Terrorist Center (CIANT) specifically for the Olympic Games. Coordinated by the federal police, CIANT employed foreign police officers from the intelligence area with experience in combating terrorism. In addition, there was also the International Center for Police Cooperation (CCPI), created for the 2014 World Cup, which included police officers and employees from over 50 countries and from Interpol. They took part in the Games in their national uniforms. Uniformed foreign police officers were unarmed, but in the areas where citizens from their countries were expected to concentrate, they always were accompanied by their Brazilian counterparts. This cooperation had a double effect: on the one hand, it gave foreigners a greater sense of security, because they recognized officers in their national uniforms, and on the other, it prevented them from engaging in criminal behavior because they knew they were watched by officers from their own countries (Buzanelli, 2013).

In addition, as part of international cooperation, Brazilian intelligence specialists visited the countries that hosted major sporting events in order to exchange experiences and learn best practices in the field. In this regard, nearly 100 police officers were dispatched to major international events such as the Boston Marathon, Beijing World Athletics Championships, Pan American Games in Toronto, Tour de France, the Super Bowl in the United States and the UN General Assembly. These teams watched security operations carried out for each of these events, including the preparation of the police operations and the command of the security forces. Investments were also made in technological and intelligence equipment and combat vehicles used against terrorism. A series of trainings and courses for 15 thousand employees were conducted. People working in hotels, subway staff, taxi drivers, armed forces and the federal police were also trained in the field of terrorist threats recognition. These types of courses helped the personnel of various services to identify suspicious attitudes in

the crowd. Hospital workers were also trained to recognize injuries caused by explosives and radioactive burns.

In the Rio 2016 security system, securing Brazil's airspace played an important role. The Brazilian Air Force allocated over 15,000 troops, including air traffic control management personnel, to secure the Olympic and Paralympic Games.

Apart from human resources, the Brazilian air force deployed 80 aircraft. 32 fighters (Northrop F-5M and A-29 Super Tucano) were assigned to defense missions and air patrols. The air alert tasks were carried out by 2 Embraer R-99 airplanes and observation tasks were carried out by three unmanned aircraft (Hermes 450 and Hermes 900). One P-3 Orion aircraft was assigned to maritime transport and patrol missions. Logistic support was supported by airplanes (Boeing C-767, C-130 and C-295) and 15 helicopters (Mil Mi-35, UH-60 Black Hawk and EC-725).

A considerable challenge for the military and civil air traffic control services was securing the increased traffic in the airspace. As a result of the adoption of the proper solutions, despite the enormous traffic volume during the Olympic Games, the air traffic was smooth and without disruptions.

3. CONCLUSIONS

Based on the results of the conducted research, it can be concluded that the key role in the organization of security systems is played by proper forecasting of the possibility of terrorists using various means and tools, such as aircraft, during the Olympic Games. An effective response to this type of threat seems to be the coordinated use of airborne military aircraft and anti-aircraft missile systems. Analyzing the way of organizing security during the Summer Olympics in Athens, Beijing and London, it can be noticed that it was the anti-aircraft defense forces, along with aviation and radar reconnaissance, that constituted the pillar of security in the airspace. In addition, when analyzing the threats generated in the airspace, one can risk a statement that air terrorism in the near term may constitute one of the most dangerous sources of air safety destabilization, both regionally (within a state) and internationally. This is, among others, due to the fact that today aviation is not only the fastest, but also more and more common means of transport available to every citizen. This will also make the plane increasingly the subject of terrorists' interest, who see it as an excellent combat tool (Karpowicz & Klich, 2004).

In addition, the analysis of the security solutions applied by the states organizing the Olympic Games shows that their planning should take into account not only the use of security forces, the police and the army, but also use the potential of private security entities and volunteers. The practice so far clearly indicates that ensuring security in all its spheres (land, sea, air) during the Summer Olympics should take into account the use of a wide range of civil and military technical means.

The practice also proves that the effective use of various military and civil protection systems at the same time to protect sports facilities requires huge coordination effort and the development of joint action plans. They should provide for cooperation between aviation, air defense forces, intelligence services and government bodies, and take into account international cooperation.

There is no doubt that striving to increase effectiveness in counteracting terrorism also forces the search for new procedural solutions. One such solution was the introduction of No-Fly Zones around potential attack targets. These zones may be permanent, such as the airspace over Washington, or temporary (organized on an ad hoc basis), e.g., around the sports and cultural venues during the Olympic Games. The implementation of such restrictions has already become a standard not only during sports events, but also during the G-8 economic summits, NATO Summits, or other important events such as World Youth Day.

The use of security forces and military forces to protect the future Olympic Games against terrorism will probably require further changes to improve the existing methods of operation; therefore, the procedural assumptions should be flexible enough to allow for their free modification. The above statement suggests that the content of this article does not yet provide a complete and comprehensive solution to the problem of effective counter-terrorism at the Olympic Games, as these issues require further research.

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