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Varia

APPRAISE project

Building a security system for public spaces

Jarosław Przyjemczak

The Faculty of Law and Administration
of University of Business and Administration in Gdynia
https://orcid.org/0000-0003-3923-8078

Nina Czyżewska

The Polish Platform for Homeland Security
https://orcid.org/0009-0004-0483-7577

Open access public space, encompassing various areas and facilities, remains, especially in the case of large urban areas, a relatively free operating area for criminals, including those planning terrorist attacks. Their activity is encouraged by a number of factors, including the high accessibility of this type of space, the multiplicity and diversity of people in it, the variability of circumstances and the randomness of events and situations that may occur.

Work to develop an appropriate surveillance system for areas and facilities in public spaces has been ongoing for many years. It is assumed that such a system should not be easily noticeable and should not cause inconvenience to people in the area. Despite many efforts, it has not been possible to create a perfect instrument that, on the one hand, can effectively prevent the actions of criminals and, on the other hand, is indifferent to other participants. Past incidents such as attacks on shopping centres

(e.g. Munich, 2016), airports (e.g. Brussels, 2016), the public transport system (e.g. Madrid, 2004; London, 2005; Brussels, 2016), city squares and streets (e.g. Paris, 2015; Berlin, 2016; Nice, 2016; Stockholm, 2017) and performance halls (e.g. Paris, 2015; Manchester, 2017), highlighted the vulnerability of soft targets to attacks, and made entities responsible for security aware of the efforts that need to be made to protect such facilities[1].

One of the activities aimed at the rapid identification and implementation of appropriate countermeasures to prevent an attack from taking place or to stop it from spreading is the European Commission's APPRAISE[2] project. Its basic idea is to ensure security in public spaces without necessarily restricting the freedom of citizens by reducing or completely eliminating the threat of attacks.

Through the APPRAISE project, entirely new solutions are to be implemented to more effectively anticipate and identify criminal and terrorist acts and to strengthen operational cooperation between security entities - before, during and after an attack[3]. Based on the achievements of modern technologies, which allow the increasing use of tools such as artificial intelligence, advanced visualisation or the speed of information transmission, it is possible to significantly increase the level of security, also in public areas. The rapid detection of threats and the real-time transmission of information about abnormal or dangerous situations is of the utmost importance for uniformed or intervention services, as time is the main determinant of properly dealing with threats. The APPRAISE project, which is coming to an end as part of the development of a common anti-threat system for European Union countries, including related

[1] N. Czyżewska, J. Przyjemczak, *Wsparcie technologiczne nowoczesnych systemów bezpieczeństwa – projekt Komisji Europejskiej APPRAISE* (Eng. Technological support for modern security systems – European Commission's project APPRAISE), in: W. Zubrzycki, J. Przyjemczak, *Bezpieczeństwo w praktyce. Zagrożenia, podmioty bezpieczeństwa, działania pomocowe i ratownicze* (Eng. Safety in practice. Threats, security actors, relief and rescue operations), Kraków 2023 (in print).

[2] The project is about perspective of H2020 SU-FCT03-2018-2019-2020: *Zarządzanie przepływem informacji i danych w celu zwalczania cyberprzestępczości i terroryzmu* (Eng. Managing the flow of information and data to combat cybercrime and terrorism).

[3] *APPRAISE – facilitating private and public security operators to combat terrorism scenarios against soft targets*, https://ppbw.pl/pl/projekt-appraise/ [accessed: 10 XI 2023].

projects such as: Safe-Cities[4], Lago[5], S4AllCities[6], Starlight[7], Aida[8], provides new solutions in the security sphere. The aim of all the above-mentioned projects is to achieve the ability to anticipate and deal with threats in the event of their occurrence, as well as the systemic implementation of unified procedures and standards in the operation of public and non-public entities at the time of terrorist events.

During the APPRAISE project, a number of initiatives were taken to adapt existing or develop new technologies, and the results were tested under near-real conditions. As part of the tests, study visits and so-called pilots were carried out (in Ljubljana, Bilbao, Gdańsk and Turin) to check the correct functioning of individual systems and technologies and to continuously improve them. The end of this project does not mean the end of the development.

On the contrary, it is only the beginning of building a unified, compact warning and analysis system, the task of which is to supervise public spaces and alert the competent intervention services in the event of the emergence of a threat or the detection of anomalies in people's behaviour. The overarching goal is to achieve the highest possible degree of situational awareness building in the crisis management process.

Attack on the Atlantis water park – pilot 3

For the first time, the teams working on developing the appropriate tools and technologies for the APPRAISE project met on 11 May 2023 in Slovenia. Pilot 3 took place at the Atlantis Water City located at the BTC City shopping complex in Ljubljana and was combined with the annual exercise of the Slovenian police in which local partners participated, together with the national police, the Slovenian SWAT team, stakeholders

[4] *Project in a Nutshell*, https://safe-cities.eu/ [accessed: 10 XI 2023].

[5] *LAGO: Lessen Data Access and Governance Obstacles*, https://lago-europe.eu/ [accessed: 10 XI 2023].

[6] *Smart Spaces Safety and Security for All Cities*, https://www.s4allcities.eu/ [accessed: 10 XI 2023].

[7] *STARLIGHT. Enhancing the EU's strategic autonomy in the field of artificial intelligence (AI) for law enforcement agencies (LEAs)*, https://www.starlight-h2020.eu/ [accessed: 10 XI 2023].

[8] *AIDA project. Research project to develop a Big Data Analysis and Analytics framework*, https://www.project-aida.eu/ [accessed: 10 XI 2023].

and APPRAISE partners. The leadership role was played by the Institut za korporativne varnostne študije (Institute for Corporate Security Studies), which prepared the exercise in cooperation with the Slovenian Ministry of the Interior, the BTC City shopping complex and its security agency[9]. The initial stage of the pilot scenario involved the analysis of content posted on social media and the Darknet. On this basis, threatening posts directed at the managers of the Atlantis complex were detected. APPRAISE computer programmes also helped detect an attempted cyber-attack on the water park's security systems to increase the amount of chlorine in the water, as well as an attack on the facility's monitoring system to disrupt the transmission of its recordings. The scenario also included a firearms attack on people in the water park. In the first phase of the attack, the perpetrator fired several shots in the outdoor pool area. This triggered the APPRAISE technology, which identified suspicious sounds and located the place of the attack. Monitoring analysis detected panic among those in the pool area and injured people lying on the ground. In the next phase of the scenario, the shooter moved inside the pool complex, where he fired further shots. Re-applied technologies used to recognise sound, identify objects from audiovisual recordings (in this case the handgun) and analyse crowd behaviour worked correctly and alerted to the threat. The adopted scenario also included the taking of a hostage with whom the perpetrator had locked himself in the basement, as well as police negotiations and the neutralisation of the terrorist[10]. A report from the exercise is available on YouTube[11].

A number of public and private security stakeholders and volunteers were involved in the implementation of this pilot. The tools developed for APPRAISE were presented to 20 Slovenian and foreign stakeholders, including representatives from the police, the post office and Plus Orbita, a company dealing with security systems and services. The exercise confirmed the usefulness of the system and technological solutions used in the tools developed for the APPRAISE project and provided a good basis for their further development and testing during subsequent pilots. The involvement of the Slovenian police enabled them to test their

[9] *Pilot 3: Ljubljana*, https://appraise-h2020.eu/node/103 [accessed: 29 XI 2023].

[10] N. Czyżewska, J. Przyjemczak, *Wsparcie technologiczne nowoczesnych systemów bezpieczeństwa…*

[11] *APPRAISE First Pilot: BTC City – Ljubljana*, YouTube, 12 IX 2023, https://www.youtube.com/watch?v=zWAJj2qHVbs.

equipment, organisation, tactics and effectiveness in dealing with such or similar security incidents. In addition, through the APPRAISE tools, cooperation between public and private security entities was tested and new possibilities for information exchange between them were assessed.

International cycling race Itzulia Basque Country – pilot 1

Another study visit took place on 20 July 2023 in Iurreta, Spain, at a training centre of the Basque police. The scenario for this event included a cycling race, which was staged on the premises of the aforementioned centre (organisational considerations did not allow APPRAISE technology to participate in the real event). The objectives included holding of the Itzulia Basque Country cycling race starting in San Sebastian, Spain, and finishing in Bayonne, France.

The pilot was organised by Ertzaintza, the autonomous police force of the Basque Country, the Oceta company, the race organiser, the security company Alse and RAID, the elite tactical unit of the French National Police. The scenario involved a coordinated attack carried out on both sides of the border and cooperation between the Spanish and French services. In the first phase of the planned action, even before the start of the race, APPRAISE's web content analysis tools detected threatening posts targeting one of the race sponsors. During the next phase of the exercise, on the day of the event, a post containing direct threats to attack the race organiser was detected. By this time, the public had gathered at the start and finish areas. As planned, much of the area was a restricted-access zone, including a ban on vehicle traffic and allowing entry only for pedestrians and authorised personnel. The scenario provided the occurrence of a violent protest at the start of the race undertaken to block the start of the event. During the course of these incidents, a person with a suspicious package (backpack) entered the restricted area. When this offense was detected by APPRAISE tools, combined with facility surveillance cameras conducted with a drone, the person was detained by a security officer. After analysing the video footage, it became clear that a few minutes after the start of the race, the detained person was seen in the car park in the company of two people. Security failed to detain the other suspects, so the French police were alerted to the potential threat of an attack. On the French side, at the finish line of the race, there was surveillance using drones that

worked with APPRAISE tools. These systems detected a fight near the finish line and sent reports to the organisers using a *crowdsensing*[12] application. Additionally, the scenario involved a violation of the air zone above the race finish line by an unidentified drone and its neutralisation by the police using the APPRAISE anti-drone system. During the implementation of this pilot, both the intervention of the French police and their other actions were simulated, as at the time the RAID unit was carrying out important tasks in France (related to the Paris riots and the high terrorist threat). The actions carried out by the French police would be as follows: after indicating the address of the drone pilot, the police is dispatched, but the suspect does not open the door and threatens to attack the crowd. A special RAID unit is called to the scene. While arriving, RAID carefully analyses the web content in order to obtain as much information as possible about the alleged terrorist. RAID police officers storm, enter the terrorist's apartment and neutralise him[13].

Also this time, all APPRAISE tools used during the pilot were demonstrated to representatives of public and private security services. During the open demonstration session, they had the opportunity to contact the project's technology partners directly and ask questions about the technologies used. Pilot 1 tested APPRAISE's tools for the rapid exchange of information between police forces from two different European countries and race organisers.

Knife attack at Międzynarodowe Targi Gdańskie SA (MTG SA Gdańsk International Fair Co.) – pilot 4

On 21 September 2023, the APPRAISE consortium conducted its fourth pilot to test once again the technologies developed by the project partners. The exercises took place at the Gdańsk International Fair (MTG) – AMBEREXPO during the 15. International Railway Fair TRAKO 2023. The Polish Platform for Homeland Security (leader of the pilot), the Gdańsk International Fair and the Provincial Police Headquarters in Gdańsk were

[12] *Crowdsensing* - an application-based programme designed for communication between the crowd and the system administrator, whose task is to collect information from people in danger and send it to the relevant services.

[13] N. Czyżewska, J. Przyjemczak, *Wsparcie technologiczne nowoczesnych systemów bezpieczeństwa*...

involved in the organisation of these exercises. Employees of the TAURUS security office and students of the Polish Naval Academy of the Heroes of Westerplatte in Gdynia who played the role of fair participants also took part in the fair[14].

The scenario of this pilot was based on a knife attack on the participants of the fair. Phase one involved constant observation of social media and content posted in the Darknet. In this way, increased activity related to the fair and a post containing threats addressed to the organisers were detected. Using tools designed to analyse web content and detect online threats, information was collected on suspicious individuals who may have directed these threats. In addition, the police received information that the day before the start of the fair, one of the suspects purchased a knife from a nearby shopping centre. On the opening day of the event, a cyber-attack on the TRAKO website was carried out, which was detected using APPRAISE tools. On the same day, the suspect entered the MTG area, where he was recognised by one of the security guards. The monitoring system that was activated tracked the suspect with a tool using technology based on so-called non-biometric features. Initially, the observed person behaved normally, calmly walking around the exhibition area. At one point, the monitoring system spotted a suspect with a backpack he didn't have before. APPRAISE video analysis tools allow you to search for items on CCTV recordings. Thanks to this, the suspect's helper who had dropped the backpack was also identified. To make it easier to find him, one of the security guards was equipped with HoloLens goggles with the image of the helper displayed on them. During this time, the suspect made his way to the restricted access area. At the entrance to the conference room, he wounded a security guard with a knife, then entered the room and continued the attack. As a result of the incidents, several fair participants were injured. The attacker then took the victims hostage and locked himself in a conference room with them. APPRAISE tools overseeing the incident triggered alerts about the attack, which were sent to both MTG security and the police. The audio analysis tools detected screams and panic, while the video analysis tools detected a running crowd, injured people lying on the ground, and a knife.

[14] *Update and video for Pilot 4 in Gdansk*, https://appraise-h2020.eu/node/107 [accessed: 10 XI 2023].

Countering the effects of panic required effective crowd management and evacuation to avoid additional casualties. Using a *crowdsensing* application, evacuation instructions were sent to those attending the fair. Additional police forces, including the Independent Counter-terrorist Sub-division of the Police and police negotiators, were called to the event area and managed to neutralise the terrorist and free the hostages. The negotiators' conversations were recorded and were transcribed using speech-to-text conversion tools. The pilot also included drone surveillance of the area. This allowed the detection of a vehicle moving through the MTG area in a suspicious manner (zigzag driving). This scenario also introduced elements of communication via a *crowdsensing* application, allowing participants in the event to inform security staff of potential danger and send information about where the injured or people who had taken cover after the attack were located[15]. The event can also be viewed on YouTube[16].

The tools used in this pilot were demonstrated to more than 20 stakeholders, including representatives of the Police, the Armed Forces, government agencies, the Fire Brigade, operators of sports facilities, representatives of seaports and academia. As during previous meetings, there was an opportunity to contact the technology partners directly and ask questions about the tools developed for the project.

The pilot scenario 4 was the most comprehensive of all those prepared. It was the first and only one to be carried out during the actual ongoing event – a large event such as the TRAKO 2023 fair. It also used the largest number of tools developed by the APPRAISE project. This posed many - sometimes unforeseen - challenges for the preparation and organisation of the pilot, but at the same time provided the consortium with a unique opportunity to test new solutions in a real-world setting. Pilot 4 proved that they are effective. The exercise was also an opportunity to develop better cooperation between public and private entities involved in providing security in public spaces in case of attacks.

[15] N. Czyżewska, J. Przyjemczak, *Wsparcie technologiczne nowoczesnych systemów bezpieczeństwa*...

[16] *APPRAISE Pilot in Gdańsk*, YouTube, 17 XI 2023, https://www.youtube.com/watch?v=8-7inzQ1grE.

Kappa FuturFestival – pilot 2

The most recent verification of technologies developed under the APPRISE project took place on 30 November 2023 in Turin, Italy. Originally, the plan was for the tests to take place from 13 to 17 November, 2023, during the ATP Finals 2023 tennis tournament. Unfortunately, it was necessary to change the date and place. Finally, the pilot was carried out as part of the Kappa FuturFestival – one of Italy's most popular summer festivals of urban electronic music. During this pilot, the organisers wanted to test elements such as: online content tracking and control, real-time video analysis, surveillance of areas and facilities with drones and cameras, elements of crowd communication.

The course of this exercise was as follows. As in previous pilots, hateful tweets against Kappa FuturFestival appeared online prior to the start of the event, so additional forces in the form of public and private security and rescue teams were prepared on the day of the event. At one point, an unidentified car passed the access barrier, drove into the pedestrian area and headed at full speed towards people queuing and waiting to enter the festival. It moved in such a way as to injure as many people as possible. Some people managed to escape, others were injured. The terrorist got out of his car and tried to enter the roofed area of Parco Dora Park. Spectators staying there were alerted via the APPRAISE application that an attack was taking place nearby and they should hide. Some of them did so, but some panicked. As they fled, they fell over and suffered injuries. Information about the dead and injured was given over the radio, social networks and a crowd detection application. Police sent a drone to the premises to check the damage caused by the incidents and whether the area was safe for rescuers to provide first aid to the injured. Online content related to the incident was monitored to find out the perpetrator's motives. A special tool searched web browsers sites, social media, analysed texts, as well as assessed risks and estimated the threats that arose. Given the large flow of people after the attack, it was extremely important to monitor the situation constantly. It was also important to collect evidence that law enforcement authorities would be able to use during the detection process. The monitoring system has been enriched with a tool that analyses the collected data (e.g. panic situations, beatings, etc.). During the implementation of the scenario, individual services were kept informed about the next steps and tasks.

This exercise, once again, proved the usefulness of the tools and technologies developed by the APPRAISE project. As before, a stakeholder meeting was organised after the pilot to discuss the possibilities of these tools and exchange comments.

Summary

The European Commission's APPRAISE project within the H2020 SU-FCT03-2018-2019-2020 Perspective: Management of information and data flow to combat cybercrime and terrorism is an initiative that has indicated the appropriate direction of development in the field of security surveillance and monitoring of open access public spaces. It has tested the functioning of tools and technologies in challenging, difficult and problematic situations in order to effectively counteract threats, avoid them and act appropriately when they arise. The level of advancements of the technologies developed and produced allows us to conclude that the tools that make use of them will interact efficiently with those already existing and will contribute to a faster and more effective response by the services to arising threats. Thanks to the efforts of the people involved in the APPRAISE project, the activities made in the project to improve safety will continue and be developed through various initiatives.

Jarosław Przyjemczak, PhD

Doctor of social sciences in the discipline of security sciences, assistant professor at the Faculty of Law and Administration of the E. Kwiatkowski University of Business and Administration in Gdynia. Retired major, for many years served in the Independent Counter-terrorist Sub-division of the Police in Gdańsk. Participant in numerous national and international courses and trainings related to counter-terrorism. He completed, among other things, a strategic counter-terrorism and terrorist threats course in Bramshill, United Kingdom organised by the Police College (CEPOL) within the Europol framework. Member of the Polish Association for National Security, security expert of the Polish Platform for Homeland Security. Scientific editor of the cyclical publication

Zadanie specjalne – człowiek, technologia, instytucja (Special task - man, technology, institution).

Contact: jarek.przyjemczak@wp.pl

Nina Czyżewska

Project Manager at the Polish Platform for Homeland Security. She completed a master's degree in political science with a specialisation in international organisations at Leiden University in the Netherlands and a bachelor's degree in international relations at the Jagiellonian University in Kraków. In the PPHS, she is responsible for the implementation and execution of public space security and counter-radicalisation projects funded by European Union programmes.