



IMPETUS Newsletter

Issue 3, December 2022

Welcome to IMPETUS – improving security in public spaces

IMPETUS is a Horizon 2020 Research and Innovation project aiming to help city authorities improve security in public spaces. Our newsletters aim to keep you up-to-date about project goals and achievements, and perhaps encourage you to get involved in our work or (later) use our results.

If you are involved in public safety – directly or indirectly, as a potential user or as a potential supplier – IMPETUS surely has something for you!

In this issue

Our third newsletter features accounts of our “Live Exercises” (implementation tests) of the IMPETUS platform and tools in Oslo and Padova.

We take a look at the “IMPETUS Solution” – how might it improve the safety and security in public spaces around you?

What’s been happening in COSSEC – our open community for people interested in IMPETUS topics. Perhaps you would like to join?

We’ve also included a short tribute to Snjezana Knezic, whom we remember fondly.

Also in this Newsletter: News in Brief and Forthcoming Events.



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IMPETUS will help smart city authorities to protect their citizens and improve security in public places. The project will use state-of-the-art technologies, adapt them to smart city requirements and extend them with new functionalities. The thing that makes IMPETUS special is its *integrated* approach that addresses three complementary but overlapping areas to deliver a single, coherent solution: Technology, Ethics and Working Processes.

Technology

Leverage the power of the Internet of Things (IoT), Artificial Intelligence (AI) and Big Data analysis to provide powerful tools to help operational personnel manage physical and cyber security in smart cities.

Ethics

Balance potentially conflicting needs to collect, transform and share large amounts of data with the imperative of ensuring protection of data privacy and respect for other ethical concerns – all in the context of ensuring benefits to society

Processes

Define the steps that operational personnel must take, and the assessments they need to make, for effective decision making and coordination – fully aligned with their individual context and the powerful support offered by the technology.

What kinds of threats are addressed by the IMPETUS solution?

IMPETUS will provide technologies that address different types of threats:

- **Specific threats** where the nature of the threat is known e.g., a chemical or biological attack, a cybersecurity attack, a physical attack (gun vehicle, bomb, ...).
- **Evolving threats** where the nature of the threat is not yet known – but where indications of “unusual” activities or measurements lead us to suspect that some kind of threat may be developing.

The IMPETUS solution is more than just technology: it also provides *practitioner’s guides* offering “how-to” advice for all actors involved in dealing with urban security: decision-makers, managers and operational personnel.

IMPETUS has demonstrated its solution in two pilot cities: Padova and Oslo.

The IMPETUS consortium consists of 16 partners from 11 different EU Member States and Associated Countries, including 2 local government authorities (City of Padova and City of Oslo) that will lead the field trial implementations. The project is also supported by a Community of Safe and Secure Cities (COSSEC) – see below. The project has a duration of 30 months (September 2020–February 2023), a budget of 9.3 M€ and a requested EC contribution of 7.9 M€.

Live Exercises



Following the success of both Live Exercises in Oslo and Padova, we feature these events in this third IMPETUS Newsletter to give our readers some insight into the events. The success of these events was reliant on the feedback that we received from guests and members who attended the Acceptance Pilots, as well as the lessons learned from these events (featured in IMPETUS Newsletter 2).

The first Live Exercise was in the [City of Oslo](#) on 18th August 2022.



A comprehensive IMPETUS scenario was prepared and implemented at Oslo City Hall on the 18th of August for the first live exercise of the IMPETUS platform and tools. After careful planning and preparation, all the IMPETUS tools supporting the processes of the city's Security Operations Centre (SOC) were brought into one place. There were about 30 project participants, five COSSEC members and about 60 external guests (from various actors in Oslo responsible for emergency response, representatives from other cities in Norway and representatives from other related projects in Norway and internationally). The scenario included testing of the individual roles and functions of the IMPETUS platform and integrated tools.



Observers on the balcony



Narration being given on the balcony by Matthieu Branlat (SINTEF)

Live exercises are essential to the development and evaluation of the IMPETUS technologies and approach. The hands-on experience of safety practitioners in live exercises in the pilot cities of Oslo and Padova helps us to assess what works well and what needs to be improved, and to learn how technologies can be effectively integrated in working processes.



Demonstrators outside the Oslo City Hall

In the Oslo live exercise, the SOC staff needed to prepare for a cyber-attack discovered on the dark web, interpret signals of possible unrest detected on social media, analyse unexpected anomalies in public transport movements, respond to a person with a weapon in the middle of a demonstration outside the City Hall, and finally contain a biological attack on the City Hall and manage the subsequent evacuation.

The exercise was followed by a de-brief session where all participants were invited to provide feedback on the IMPETUS solution and make suggestions for how it could be improved. They also provided feedback on the live exercise itself and proposed ideas for how to plan the next live exercise in Padova.



The 'gunman' being arrested



Magnus Devik Borge (City of Oslo) in one of the de-briefing sessions

The day ended with an informal poster/demo session that provided detailed demonstrations of the tools and Practitioners Guides. External guests could move freely between the “stations”, and there were many fruitful one-on-one dialogues between external guests and project members.



The poster/demo session

Some words of thanks from the City of Oslo

Thanks to the good preparation and involvement of both the IMPETUS team and the City of Oslo staff, and to the valuable contributions of our very helpful external guests, we consider that the event was highly successful in promoting the IMPETUS approach while also helping the project team learn of things that need to be improved.



The second Live Exercise was in the **City of Padova** on 6th October 2022.



The second and final live exercise in the IMPETUS project took place in Padova on 6th October 2022. Project partners and around 30 external guests gathered in the offices of a local police station and followed the exercise via live video links to the location of the exercise itself (Piazza del Signori in central Padova) and to the SOC (Security Operations Centre) where staff were using IMPETUS tools to monitor and respond to events as they unfolded.

The IMPETUS platform allows the same dashboard view of all the tools and alerts to be shown at multiple locations, so the guests and partners could see exactly what the SOC operators were seeing at all times.

Overall, the Padova IMPETUS Live Exercise was a successful event, and (as for the Oslo LiveEx) many important lessons were learned which will be of lasting value for project participants and future users of project results.

Welcome

The guests arrived in eager anticipation of what they were about to see, learn and experience from the live exercise. Among the guests were councillors and representatives of Padova and other municipalities, officers of all the police forces and other first responders (firefighters, civil protection, etc.), as well as our COSSEC members. Moreover, since the Live Exercise has been planned as part of the evaluation process, there were operatives from different first responders (Local Police, National Police, Carabinieri, Firefighters).



Councillors and Representatives of Padova and other Municipalities, Officers of all the police forces and other first responders.

Bruno Bonomini, representing the Municipality of Padova as their project manager, introduced the councillor responsible for security, Diego Bonavina, representing the City Council and the Mayor, then the Local Police Commander, Lorenzo Fontolan. On behalf of the Municipality and its citizens, the representatives welcomed the participants involved and their enthusiasm and anticipation. They applauded initiatives such as these aimed to improve safety and security.



The City of Oslo IMPETUS team was present in Padova to observe and advise based on the experience gained during the Oslo Live Exercise. From the left: Magnus Borge, Willy Olsen, Juan Cabrera, Osman Ibrahim and Simon Gjetrang.

A few COSSEC members were also present at the Live Exercise to observe and provide feedback on the events of the day.



The following COSSEC Members attended the Padova Live Exercise (from left): Massimo Bosi – Faenza City Councillor for Security, Privacy and Transparency, Caitlin Bishop – Privacy International UK, Tinus Kanters – DISSS (Dutch Institute for Safe and Secure Spaces), Sandro Bologna – COSSEC Chair, Alex Townsend-Drake – CTPN London, and Emanuela Da Ruos, Maya Battisti and Lorenzo Signori from Cittadinanzattiva Italy.

An Information Package was sent to the attendees before the event, containing an overview of the IMPETUS project, a description of the exercise scenario, the agenda for the day and brief one-page descriptions of project results. The one-pagers are available on the project website at:

<https://impetus-project.eu/index.php/impetus-outputs/the-impetus-solution>

IMPETUS Project Presentations

The day started with the Project Coordinator, Joe Gorman (SINTEF) presenting an overview of IMPETUS, the project goals and its key results. Bruno Bonomini (City of Padova Commune) explained Padova's role in the project, introduced the context of the scenario forming the core of the live exercise and the expected outcomes; he emphasised the important role that the IMPETUS solution could have for improving a city's resilience and safety. The project's Technical Manager, Matthieu Branlat, presented thereafter an overview of the exercise and what the audience could expect to observe. While noting that some of the IMPETUS tools are not designed for real-time use during an event (tools related to cyber-security and social media scanning), Matthieu explained how these had been successfully deployed the day before to detect and deal with some IT security issues, and to provide pre-warnings of the public demonstration in the square that was the focus of the live part of the exercise.



Speaking about the IMPETUS Project (Joe Gorman and Bruno Bonomini) and the forthcoming event (Matthieu Branlat)

Introducing the IMPETUS Results: The Exhibition

After the general presentations, participants were invited to move to another room to tour the IMPETUS exhibition. This consisted of separate "stations" for each IMPETUS result where project members and guests could have interactive dialogues to learn more about the results and discuss their potential application. For some results, it was also possible to view demos. External guests mingled with project members and the exhibition added a more sociable feel to the event. For the results that were later to be used in the live exercise (i.e., the integrating platform and some of the tools), this helped guests to understand the role of each in the exercise.



Just before moving to the exhibition, developers of each IMPETUS result presented themselves and briefly summarised their result. Top row, left to right: Manuela Soccol from Studio Legale Soccol, Ron Ofer from SIXGILL, Maria Mirada from INSIKT INTELLIGENCE, and Michelangelo Ceci from CINI. Bottom row, left to right: Thomas de Groot from THALES Netherland, Paolo Mocellin from University of Padova, Simon Hudd from CINEDIT, and Radu Popescu from Software Imagination & Vision.

The exhibition was followed by lunch on a beautiful balcony overlooking the magnificent Prato della Valle - Padova's main square. Then it was time for the live exercise!

The Live Exercise

The live exercise depicted a scenario in which criminals try to incite a terror attack in the city centre (Piazza del Signori Square) by taking advantage of an unauthorised demonstration against further COVID19 restrictions that the City Council was planning to adopt.

By means of a live video link, guests and IMPETUS members could watch events unfold in the square while safely seated at the meeting location. A second live video link allowed them to observe how the SOC (Security Operations Centre) personnel took charge of the situation in the square, and "chat" messages from an IMPETUS "reporter" at the SOC explained what was happening. During all of this, guests could view the dashboard of the IMPETUS platform, seeing exactly the same view as the SOC staff, live, as they interacted with the platform.

Early indications of a demonstration in the square, prepared by some citizens, were detected the day before the live exercise using our sophisticated Social Media Detection tool. In addition, indications of vulnerabilities and possible attack on the city's IT systems had been discovered by our advanced Cyber Threat Detection and Response tool. Our Cyber Threat Intelligence tool had also uncovered - and solved - some potential threats from the dark web. These alerts to signs of unrest were closely monitored by IT specialists, and relayed to SOC personnel as alerts on the IMPETUS Platform. The SOC personnel could

then notify local law enforcement so that the local police and other first responders could prepare for potential trouble the next day.

As the local police were alerted to the impending threat in the square by the SOC personnel, they raised the alert level on the day of the demonstration and prepared to manage an evacuation of a large group of people in the square using our Evacuation Optimiser tool to provide advice on optimal strategies for evacuation, based on simulations carried out before. Since multiple SOC operators see the same view of the IMPETUS Platform, and can use a messaging system to communicate with each other and forces on the ground, the potential risk can be quickly shared with all personnel involved.

SOC personnel then received alerts from the Urban Anomaly Detector tool: one noting an unusual flow of cars approaching the city centre, and another noting an unusual flow of citizens into the square. The tool only detects anomalies, it is not able to explain why they might be happening: judgment on that is left up to staff. The demonstration ensues.

While tension in the square is growing, another crisis arises when the Bacteria Detector tool raises an alert that high levels of bacteria have been detected in a municipal building in Piazza dei Signori, possibly due to a biological attack. As personnel evacuate the building they merge with the demonstrators in the square. Panic and chaos follow, with many citizens not knowing what to do in the square, or where to go.



In the chaos, three people armed with guns prepare to shoot in the crowd! Luckily for the crowd, the IMPETUS Weapon Detection tool alerted the SOC operator to one of these guns. Seconds later, the local police and other policing units sweep in, promptly arresting the gunmen before they fire their weapons.

The SOC operators worked long hours over these two exciting days, which can strongly impact their physical, emotional and mental workload capacity. The Workload Monitoring System was used to monitor the operators in the SOC, allowing the SOC supervisor to be made aware of any signs of stress during the live exercise.

At the end of the exercise, the innocent citizens were safe, the unrest was controlled, the SOC personnel applauded... and the “gunmen” were caught. Calm was restored in the Piazza del Signori in central Padova.

And... at the centre of this multi-system approach to improving safety and security in these public spaces is the IMPETUS Platform.

Discussion on the Live Exercises

Valuable feedback from the SOC operators was gathered about how they experienced practical use of IMPETUS, and its potential usefulness for their city. COSSEC members also gave valuable feedback. All of this will be an important input to the structured validation activities that will now be carried out by the project team. This will influence the strategies being developed in the consortium for the longer-term development and promotion of project results.



The feedback from local police and by the SOC operators was gathered by IMPETUS members.

The Social Events

A demonstration and exercise like the Padova IMPETUS Live Exercise is an excellent opportunity for networking and for one-on-one discussions and making professional connections. The lunch and evening dinner – with excellent Italian food! – was a great way to conclude the Padova Live Exercise.



Those of the IMPETUS team who had energy left after a very exciting and busy day continued social activities late into the night.

The IMPETUS Partners Preparations and Summing Up

The following day, IMPETUS members gathered to discuss the live exercise, one-on-one demonstrations, attendee feedback, and ways to improve the use of the IMPETUS solution for the future.



The Ethics team assessing the data gathered from the Ethics survey prepared for the guests in Padova (top left), while the rest of the IMPETUS team discuss the events of the Live Exercise (middle, right and bottom).

Some words of thanks from the City of Padova

Thank you to everyone involved, including the IMPETUS team, the City of Padova staff and first responders, and to our very helpful external guests, whose valuable contributions made this event a success!



The IMPETUS Solution



Want to know more about our latest development within the IMPETUS Project? The IMPETUS Solution is a collection of the IMPETUS tools, Platform and the Practitioners Guides. The complete collection is available [here](#).



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| <p><u>Practitioners Guides</u> Bringing the lessons learned from IMPETUS to a wider audience</p> |
| <p><u>Firearm Detector</u> Continuously monitors surveillance camera feeds and automatically creates an alert if a firearm is detected in a public space</p> |
| <p><u>Bacteria Detector</u> Continuously monitors air samples to detect abnormally high concentrations of airborne bacteria</p> |
| <p><u>Urban anomaly detector</u> Continuously monitors data gathered from multiple city sensors and detects cases deviating from the norm - indicating possible cause for concern</p> |
| <p><u>Social Media Detection</u> Scans large volumes of text on social media and other public online sites, looking for topics/keywords that might indicate potential trouble or threats</p> |
| <p><u>Workload Monitoring System</u> Measures mental workload and stress of emergency operators using a brain-computer interface, raises alerts if anomalies arise</p> |
| <p><u>Evacuation Optimiser</u> Provides instant advice to emergency staff on how to effectively manage an evacuation, based on simulations of different evacuation scenarios</p> |
| <p><u>Cyber Threat Intelligence</u> Detects, classifies and helps mitigate cyberspace threats to an organisation's IT assets</p> |
| <p><u>Cyber threat Detection and Response</u> Detects cyber vulnerabilities in IT Systems: raises alerts and suggests countermeasures if they arise</p> |
| <p><u>The IMPETUS Platform</u> Integrates multiple tools in a unified interface</p> |



IMPETUS outreach: Community of Safe and Secure Cities (COSSEC)



The Community of Safe and Secure Cities (COSSEC) was established to extend involvement in the IMPETUS project to stakeholders beyond the project consortium.

COSSEC is a group of individuals representing organisations or projects that have an interest in or might be affected by the work being done in IMPETUS. Members will influence IMPETUS activities so that solutions emerging from the project will meet local needs in other cities and/or meet other concerns or requirements they might have. Recruiting members for COSSEC has been a continuing process throughout the project.

Three COSSEC webinars were held to discuss the three main areas of IMPETUS: technology, operations, and ethics:

1. Use of Advanced IT for the Protection of Public Spaces, May 4, 2021

This meeting was held to discuss challenges and approaches associated with technical solutions to the protection of public places, sharing the perspectives from IMPETUS, as well as from several COSSEC members.

2. Ethical and Legal Issues with the Use of Smart Cities Technologies for Public Protection, June 16, 2021

The purpose of this meeting was to discuss ethical and legal issues associated with the deployment of smart city technologies for public protection.

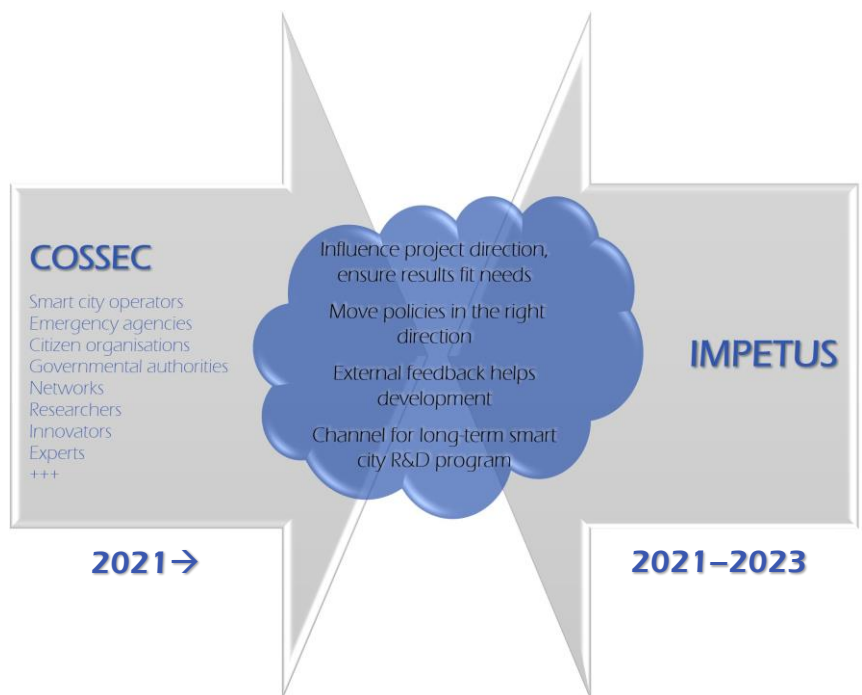
3. Influence of technology on operations and operational concepts in IMPETUS, March 30, 2022

This meeting aimed to address the third pillar supporting the IMPETUS project: *processes*: delivering a solution to support the cognitive processes of sensemaking, decision making and coordination, fully aligned with the needs of multiple city stakeholders (e.g., police, first responders, cities) and complemented by deployment guidelines.

**COSSEC Status
(as of 5 December 2022)**

Members: 41 Organisations
 14 Cities
 5 Citizen groups
 14 EU countries

Activities: 3 Workshops
 3 Webinars



The three COSSEC workshops collaborated with UrbSecurity:

1. **IMPETUS-URBSECURITY Virtual Cooperation Meeting, October 6, 2021**
The goal of this meeting was to familiarize the representatives from the two projects with each other and their respective activities, explore collaboration, and identify and fix conflicts in event dates. IMPETUS had a particular goal to recruit COSSEC members.
2. **UrbSecurity Action Planning Network Transnational Meeting 7, January 20, 2022**
The aim of this cooperative meeting was to coordinate an agenda and secure the collaboration between UrbSecurity and IMPETUS. Representatives from the two projects, TIEMS and SINTEF, as well as municipal officials were involved.
3. **URBACT UrbSecurity Action Planning Network Transnational Meeting 8, May 31 to June 1, 2022**
This meeting offered further opportunities for collaboration and COSSEC recruiting, and provided COSSEC, and IMPETUS, with insight into several users' perspectives on security concerns.

Municipalities, other projects (not only EU projects) and initiatives to improve the security of public spaces and community resilience are invited to apply for joining COSSEC.

If you want to learn more about COSSEC, please contact:
Sandro Bologna, our COSSEC manager
s.bologna@infrastrutturecritiche.it



In memory of Snježana Knezić



Snježana Knezić's of TIEMS was a prominent and very active participant in IMPETUS, as Communication and Dissemination Manager. The entire consortium was very sad to hear, in Autumn 2022, that she had passed away.

Snježana's involvement with TIEMS started in 2007 at that year's TIEMS Annual Conference in Trogir, Croatia. Since then, she served in various positions on the TIEMS Board of Directors, and she was an essential contributor to all of TIEMS's research and development. In IMPETUS we knew her as the Communication and Dissemination Manager, but she was also involved in several other projects as various levels. She held the positions of Acting Vice President and Director of Research and Development for TIEMS until her declining health prevented her from continuing this work.



Wherever Snježana served in any position or activity, she did so with dedication, professionalism, and sincerity. Her work was of the highest quality, and she was a pleasure to work with. Snježana listened carefully, was understanding and supportive, and she resolved issues and led teams without excessive self-promotion and with a good sense of humour. While many of us did not have the chance to meet her in person, she will be truly missed.

Although we admire and appreciate her work for TIEMS and IMPETUS, family was her priority. K. Harald Drager (TIEMS President) conveyed our deepfelt and sincere condolences to her family, who have suffered an irreplaceable loss. We share with them her memory, which will live forever.

May her soul rest in eternal peace.

News in brief



IMPETUS plenary – Trondheim

5–7 April 2022

IMPETUS held its first in-person plenary meeting in Trondheim, Norway. Due to COVID restrictions, this was the first face-to-face plenary meeting since the project started in September 2020. The meeting was very successful in creating a good team atmosphere, and excellent progress was made in detailed planning of upcoming live exercises, as well as in technical development and exploitation planning.

IMPETUS at the 2nd ECSCI Workshop (Critical Infrastructure Protection)

27 April 2022

As one of 24 participating project members of ECSCI, IMPETUS joined the 2nd ECSCI Virtual Workshop on Critical Infrastructure Protection. Policy makers, academics, practitioners, and representatives in cyber and physical security in the energy, transport, health, sanitation, financial and telecommunications sectors were brought together from around the European Commission to present and discuss their novel techniques in security modelling, IoT security, AI, information sharing and security detection and mitigation techniques.

Read more: <https://impetus-project.eu>

Forthcoming events



IMPETUS looks forward to:

1. IMPETUS Final Dissemination Day, Rotterdam – 30 and 31 January 2023

We are co-organising our final dissemination event with Efus project Secu4All (<https://efus.eu/>, <https://efus.eu/secu4all-en/>). The event will include a city "study visit", an evening networking event and a full day of exhibition, presentations and panel discussions. COSSEC members, other projects, and representatives from various municipalities and others interested in our project will be invited.

Want to know more? Please contact:

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The IMPETUS Consortium

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