



Safe Cities

SummerSoC 2024
27th June 2024 | Hersonissos, Greece

SAFE-CITIES

**Risk-based Approach for the Protection
of Public Spaces in European CITIES**

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Terrorism in the EU: Threat Picture



Reading, UK – 20 June 2020
- stabbing



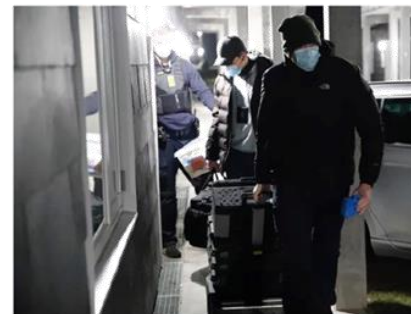
Nice, FR – 29 October 2020
- stabbing



Vienna, AT – 2 Nov 2020 - shooting



Hagen, DE – 16 Sept 2021 –
Foiled synagogue terrorist attack



February 2021 - DK/DE -
CT police operation to
arrest 14 people of a
terrorist group who had
procured bomb-making
material



Increasing challenges are faced by cities in mitigating security risks.

State of the Art



Safety plans



Tabletop



Apps

Novel approaches are needed for enhancing urban security.



SAFE-CITIES

Risk-based Approach for the Protection of Public Spaces in European CITIES

Security Vulnerability Assessment framework enabled by **Modelling & Simulation platform** supporting:

- **Scenario** building
- **Threat** and **crowd simulation**
- Urban space **design** and **retrofitting**
- **Planning** and **training**
- Advanced **analytics**



Important Facts

Call: HORIZON-CL3-2021-FCT-01:
Fighting Crime and Terrorism

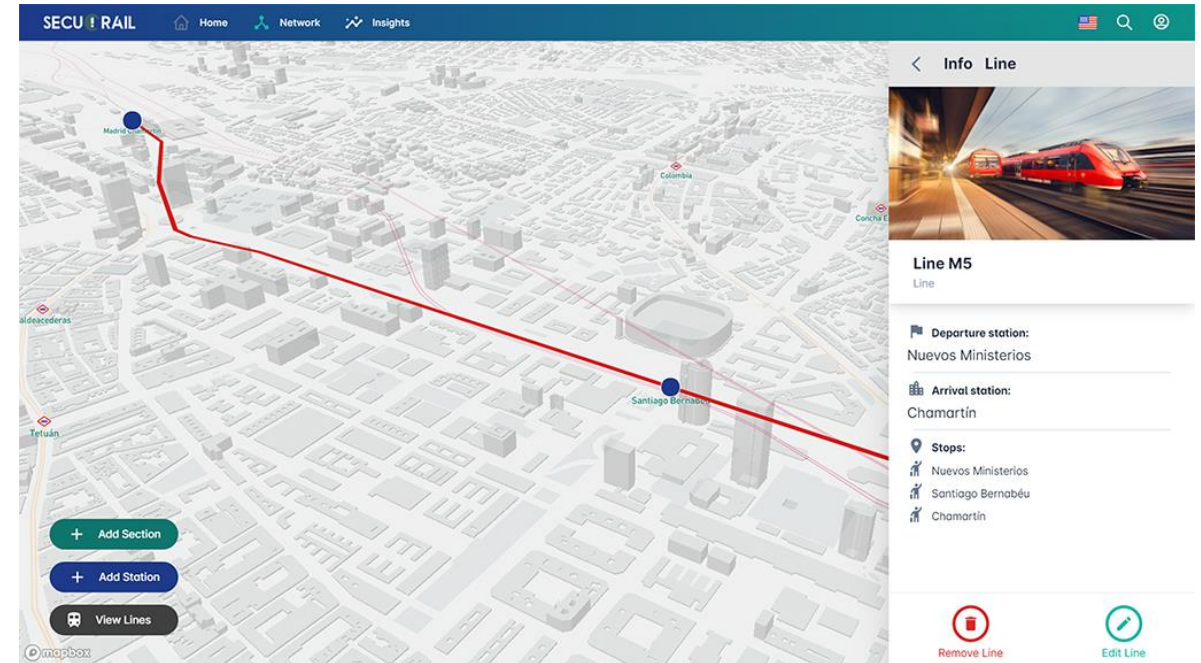
Topic: HORIZON-CL3-2021-FCT-01-07: Improved preparedness on attacks to public spaces

Project total cost: 3,342,123.75 €

Funding: 2,752,617.50 €

Start date: 1 November 2022

Duration: 32 months

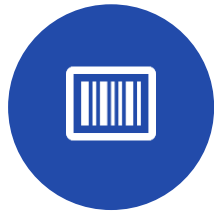


General Objectives



DEFINE

a systematic
Security and Vulnerability Assessment (SVA) for public spaces.



DESIGN

the architecture
for the
integration of modern tools to enhance public spaces security.



SUPPORT

security planners, first responders and policy makers by providing
decision-making support in security planning.



TEST

the **SVA and tools** in a series of workshops, trainings, exercises and demonstrations.



EXPLOIT

research results to foster the
uptake of technologies by end-users with the foundation of a **new legal entity**.



Consortium

16 Partners

1 Affiliated Entity

9 Countries

Confederation of European Security Services

Thridium

D-Visor B.V.

STAM S.r.l.

University of Bologna

Institute of International Sociology of Gorizia

Municipality of Gorizia

Università Verde di Bologna APS

Red Cross Gorizia

Poliisihallitus

Polish Platform for Homeland Security

Provincial Police Headquarters in Gdansk

Municipality of Nova Gorica

Ministry of the Interior

IANUS Consulting Ltd

Ministry of the Interior

National Centre For Scientific Research Demokritos



4 Use-Cases



Football stadium
(Gdańsk, Poland)



Shopping mall
(Larnaca, Cyprus)



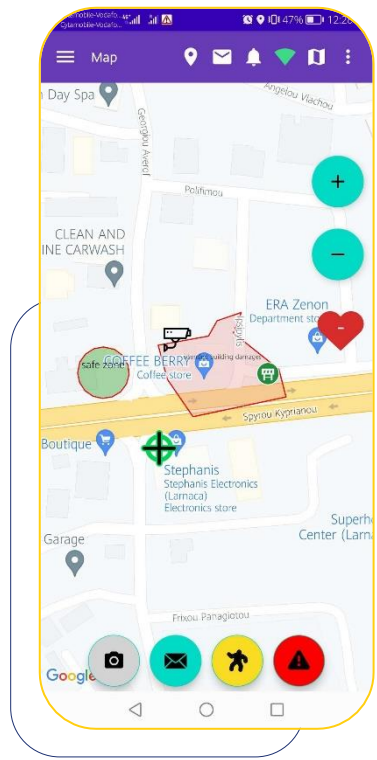
Music festival
(Meerijstad, the Netherlands)



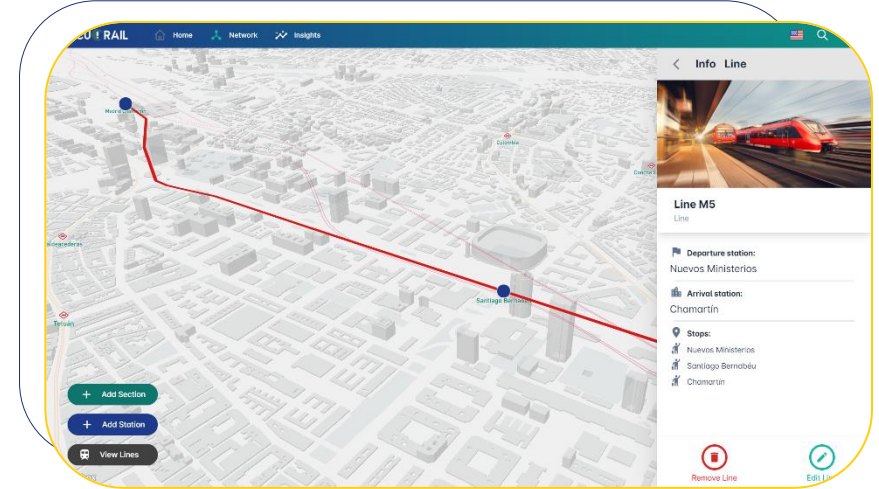
Cross-border international events site
(Nova Gorica, Slovenia; Gorizia, Italy)



Tools



- ✓ Digital Twin
- ✓ Crowd Simulation
- ✓ Risk Assessment Engine
- ✓ Detection of Efficient Pathway



- ✓ Dispersion of CBRN
- ✓ Fire in Buildings
- ✓ Incident Management Platform
- ✓ Evacuation Management Platform

Approach



SAFE-CITIES philosophy in a nutshell

Single solution to address **all phases** of security and emergency management

Consistency across normal conditions within **urban environments** and also **mass gatherings / events**

Multi-stakeholder partnerships, across the public and private sectors

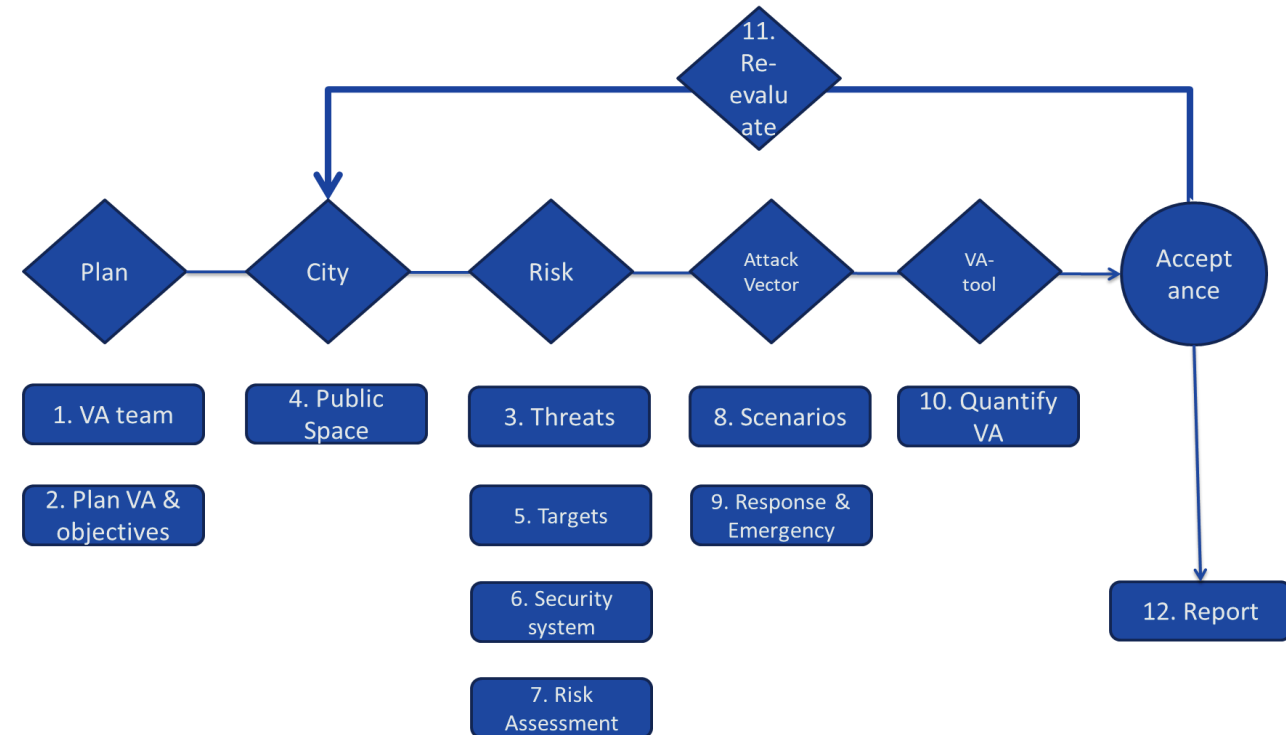
Citizens' engagement through Local Community Networks

Support "**Security-by-design**", through Crime Prevention Through Environmental Design (CPTED)

Seamlessly integrate traditional and **emerging threats** such as UAS

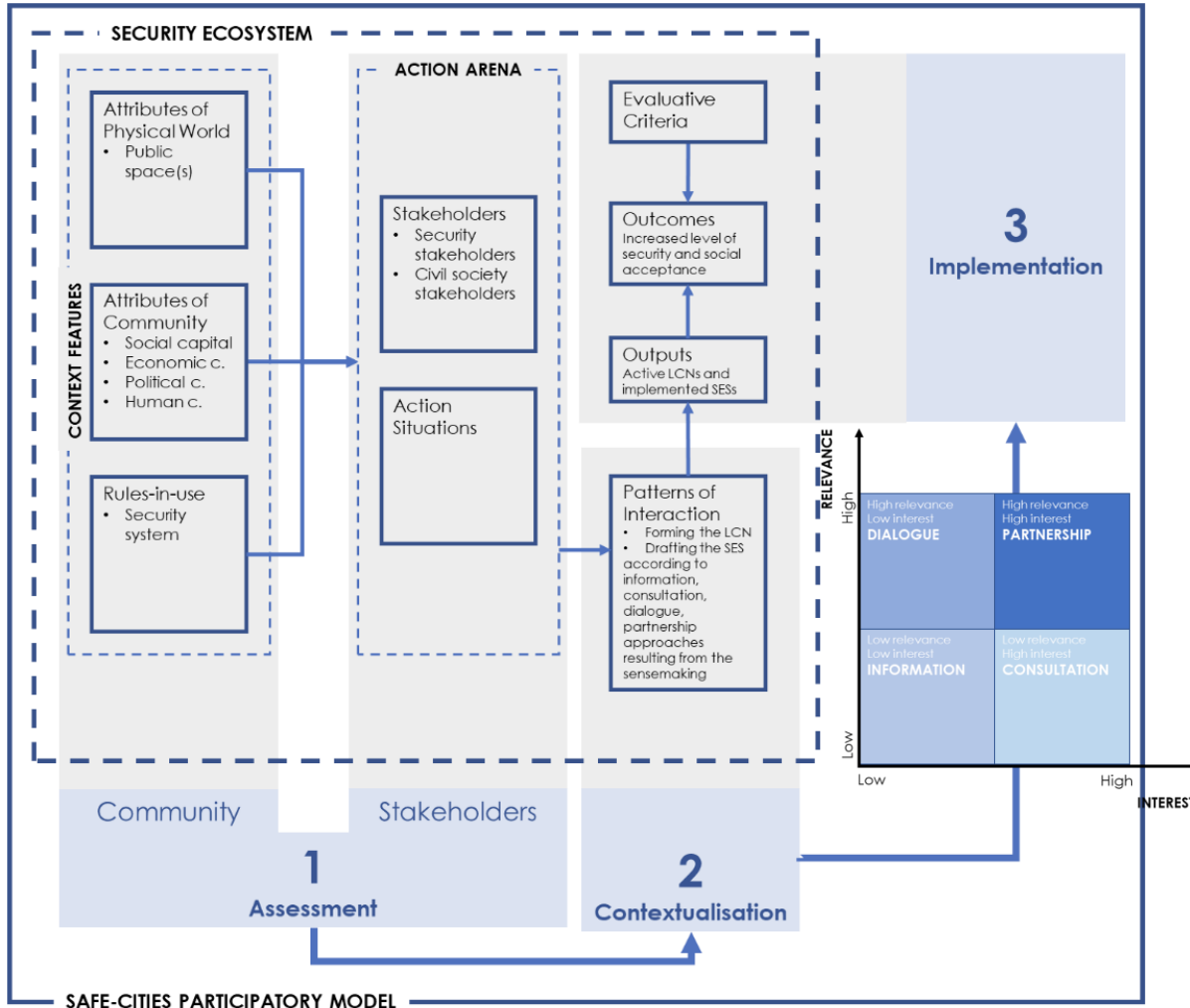
SVA has a **static** and a **dynamic** component, considering the space and time of the scenarios

Vulnerability considers **operational, technological** and **human** aspects



Security Vulnerability Assessment (SVA) framework

Participatory Model



*Security for whom?
Security from which threats?*

- Analysis of **Security Ecosystem** components
 - Overall **context** features
 - Relevant **stakeholders**
- Set-up **Local Citizens Networks (LCN)**
 - **Participatory mechanisms/platforms** composed by identified stakeholders.
- Develop context-based **Stakeholders' Engagement Strategy (SES) and Action Plans**
 - Tailored to specific needs of **pilot** site
 - Supporting or preparing **application** of SAFE-CITIES solutions at local level

Security-by-design



Methodological Approach

- Avoid **oversensitivity** to risk
- Consider security measures from **early stage of design**

User's Engagement

- **Sharing** processes of safety design
- Incorporate vulnerabilities and **differences**

Physical Interventions

- **Different solutions** for different threats
- Consider **climate** and **environmental** mitigation aspects

design-for-all

design for human diversity, social inclusion and equality. (The European Institute for Design and Disability, 2004)

The practice of design for all makes conscious use of the **analysis of human needs and aspirations** and requires the **involvement of end users at every stage in the design process** (Perrison et al. 2014)

adaptive urban design

High level of **transdisciplinary collaboration**; a design concept through which **pilot projects can test innovative, but unproven solutions** in a responsible and informed manner, with a low risk of failure.

a transdisciplinary working method, and includes **experimental design guidelines, monitoring and assessment protocols, and strategies** for including urban ecosystem services into urban development.

(Aherm et al., 2014)

security-by-design

Urban design integrating security measures into public spaces and streets without compromising the functions or aesthetics of the space.

(European Commission, 2022)

4 main interconnected principles: **proportionality multi-functionality stakeholder cooperation design aesthetics**

ATLAS - 4 SAFE PUBLIC SPACE DESIGN - guiding framework

Methodological Approach	Ambitions	Recommendations	Guiding questions	Insights from design examples
Methodological Approach How to lead a security-by-design project	→ Avoid oversensitivity to risk	Ensure proportionality between measures and potential risks Ensure balance between safety/protection and open nature of public environments	Does the design promote natural surveillance, allowing people to observe and have a clear perception of the space?	<p>Insights from design examples</p> <p>Be Secure - Real Secure (2019) - Enhancing community trust & well-being in Phoenix, Arizona (2019-2020)</p> <p>The project focuses on a central square of the city and an adjacent street. The project aims to create a sense of community and safety by creating a public space that is open and accessible to all. The project includes a variety of interventions, including a new public square, a new street, and a new park. The project is designed to be a model for other cities and to be a source of inspiration for other projects.</p> <p>Horizon 2020 SECURE Project (2017-2020)</p> <p>The SECURE project is a multi-city project that aims to create a sense of community and safety by creating a public space that is open and accessible to all. The project includes a variety of interventions, including a new public square, a new street, and a new park. The project is designed to be a model for other cities and to be a source of inspiration for other projects.</p> <p>Be Secure - Real Secure (2019) - Enhancing community trust & well-being in Phoenix, Arizona (2019-2020)</p> <p>The project focuses on a central square of the city and an adjacent street. The project aims to create a sense of community and safety by creating a public space that is open and accessible to all. The project includes a variety of interventions, including a new public square, a new street, and a new park. The project is designed to be a model for other cities and to be a source of inspiration for other projects.</p>
	→ Consider security measures from the early stage of design process	Design with an integrated order of buildability, sustainability and inclusive public spaces, in line with the New European Bauhaus principles	How the security needs and expectations of the public space have been considered and incorporated into the design process from the very beginning?	
	→ Integrate existing policies	Facilitate the application of existing policies, especially concerning safety and security, to the design of public spaces	Are safety and security measures designed in compliance with existing policies?	
	→ Sharing processes of safety design	Create shared information and decision-making processes, including risk assessment and inclusive processes, ensuring a wider stakeholder engagement	How do you engage with stakeholders to understand their expectations and concerns?	
User's Engagement Details concerning the involvement of stakeholders	→ Intersectional approach: Incorporate vulnerabilities and differences	Consider different mobility requirements and needs, including those of people with disabilities, older people, and people with different needs and expectations	Are you considering effectively about risk to stakeholders, ensuring they have a realistic view of potential outcomes?	<p>Be Secure - Real Secure (2019) - Enhancing community trust & well-being in Phoenix, Arizona (2019-2020)</p> <p>The project focuses on a central square of the city and an adjacent street. The project aims to create a sense of community and safety by creating a public space that is open and accessible to all. The project includes a variety of interventions, including a new public square, a new street, and a new park. The project is designed to be a model for other cities and to be a source of inspiration for other projects.</p> <p>Horizon 2020 SECURE Project (2017-2020)</p> <p>The SECURE project is a multi-city project that aims to create a sense of community and safety by creating a public space that is open and accessible to all. The project includes a variety of interventions, including a new public square, a new street, and a new park. The project is designed to be a model for other cities and to be a source of inspiration for other projects.</p> <p>Be Secure - Real Secure (2019) - Enhancing community trust & well-being in Phoenix, Arizona (2019-2020)</p> <p>The project focuses on a central square of the city and an adjacent street. The project aims to create a sense of community and safety by creating a public space that is open and accessible to all. The project includes a variety of interventions, including a new public square, a new street, and a new park. The project is designed to be a model for other cities and to be a source of inspiration for other projects.</p>
	→ Combine and integrate protection systems with a physical design of the space	Design the creation of barriers and boundaries, including the use of physical design elements, to create a sense of security and safety	Do the protection systems take into consideration the urban and architectural context of the space?	
	→ Ensure the integration/balance between standardized and ad hoc protective measures	Combine standard protective measures with ad hoc measures, ensuring a balance between standardized and ad hoc measures	Are you considering effectively about risk to stakeholders, ensuring they have a realistic view of potential outcomes?	
	→ Consider measures enabling multifunctional uses (beyond just the security functionality)	Design the creation of barriers and boundaries, including the use of physical design elements, to create a sense of security and safety	Do the protection systems take into consideration the urban and architectural context of the space?	
Physical Interventions Suggestions on urban furniture and space configuration for safe spaces	→ Consider the climate and environmental mitigation purposes/aspects in the design layout	Provide protective measures, including the use of physical design elements, to create a sense of security and safety	Are you considering effectively about risk to stakeholders, ensuring they have a realistic view of potential outcomes?	<p>Be Secure - Real Secure (2019) - Enhancing community trust & well-being in Phoenix, Arizona (2019-2020)</p> <p>The project focuses on a central square of the city and an adjacent street. The project aims to create a sense of community and safety by creating a public space that is open and accessible to all. The project includes a variety of interventions, including a new public square, a new street, and a new park. The project is designed to be a model for other cities and to be a source of inspiration for other projects.</p> <p>Horizon 2020 SECURE Project (2017-2020)</p> <p>The SECURE project is a multi-city project that aims to create a sense of community and safety by creating a public space that is open and accessible to all. The project includes a variety of interventions, including a new public square, a new street, and a new park. The project is designed to be a model for other cities and to be a source of inspiration for other projects.</p> <p>Be Secure - Real Secure (2019) - Enhancing community trust & well-being in Phoenix, Arizona (2019-2020)</p> <p>The project focuses on a central square of the city and an adjacent street. The project aims to create a sense of community and safety by creating a public space that is open and accessible to all. The project includes a variety of interventions, including a new public square, a new street, and a new park. The project is designed to be a model for other cities and to be a source of inspiration for other projects.</p>
	→ Combine different types of security systems capable of responding to different emergencies	Design the creation of barriers and boundaries, including the use of physical design elements, to create a sense of security and safety	Are you considering effectively about risk to stakeholders, ensuring they have a realistic view of potential outcomes?	
	→ Consider the climate and environmental mitigation purposes/aspects in the design layout	Provide protective measures, including the use of physical design elements, to create a sense of security and safety	Are you considering effectively about risk to stakeholders, ensuring they have a realistic view of potential outcomes?	
	→ Consider measures enabling multifunctional uses (beyond just the security functionality)	Design the creation of barriers and boundaries, including the use of physical design elements, to create a sense of security and safety	Are you considering effectively about risk to stakeholders, ensuring they have a realistic view of potential outcomes?	

Public-Private Partnerships



Where they exist, PPPs are usually part of **formal frameworks**, organized at municipality-level and of permanent nature, including mostly:

- **Points of contacts** among LEA, PSCs, and other actors (75%)
- **Regular** information **exchange** at management level (65%)
- **Live** information/data **exchange** in case of incident (55%)

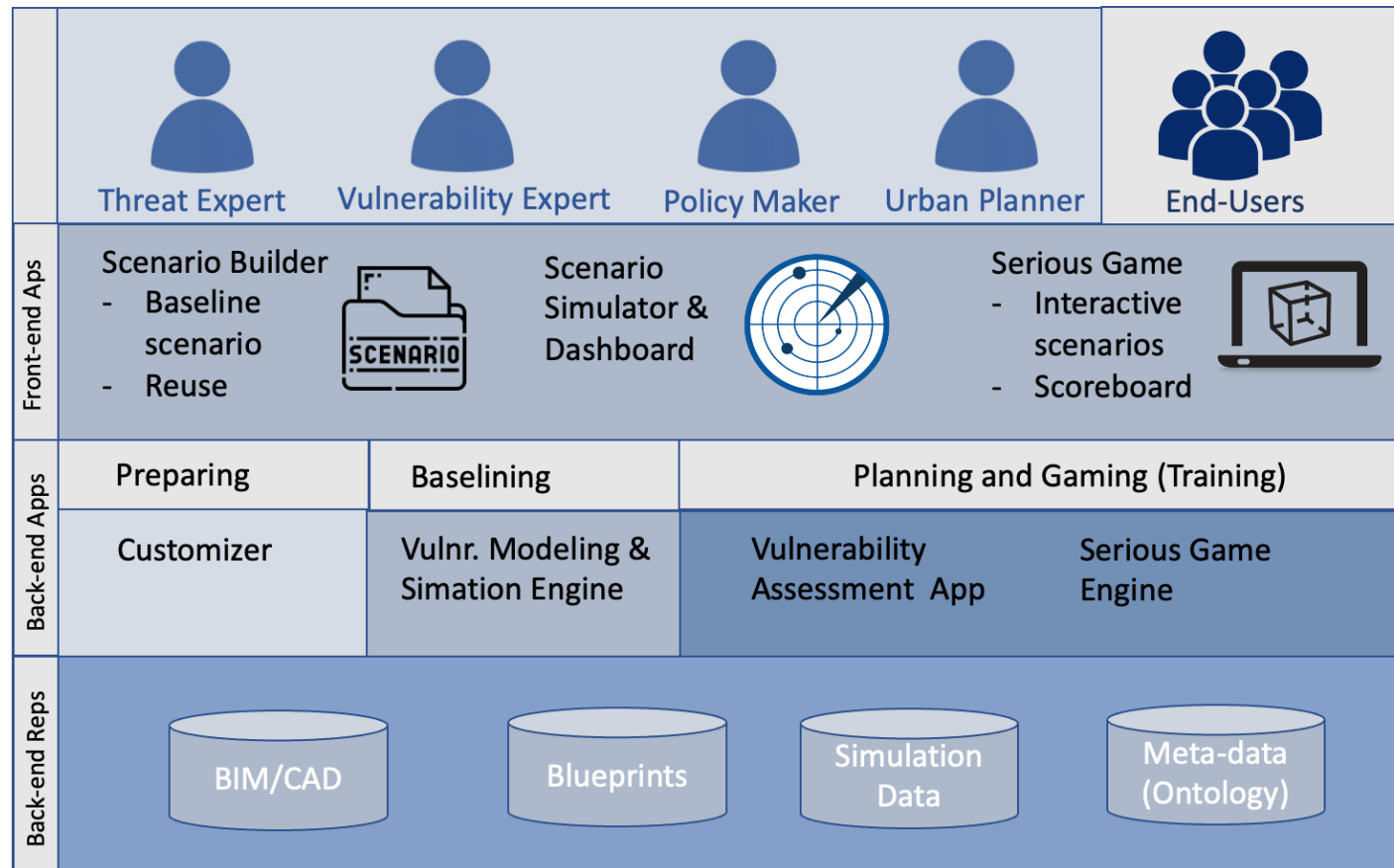
Least used means of collaboration:

- **Pooling** of resources (30%)
- Joint **SVAs** (17%)
- Joint **trainings** (10%)

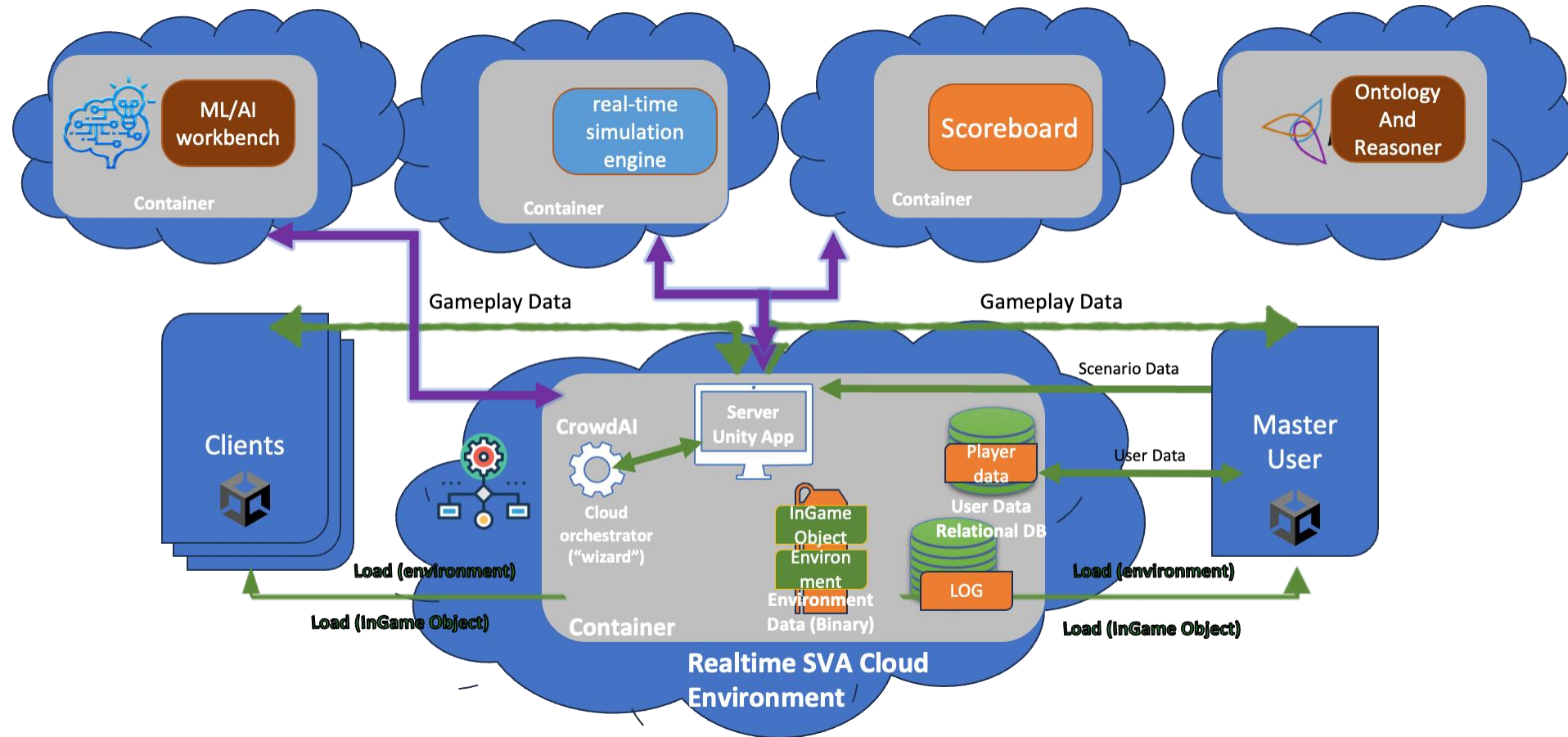
Reason: **Lack of trust** for data-sharing

Private security is often seen as a late-entry enforcement service. Change can only be achieved through **trust-building** and **quality control**.

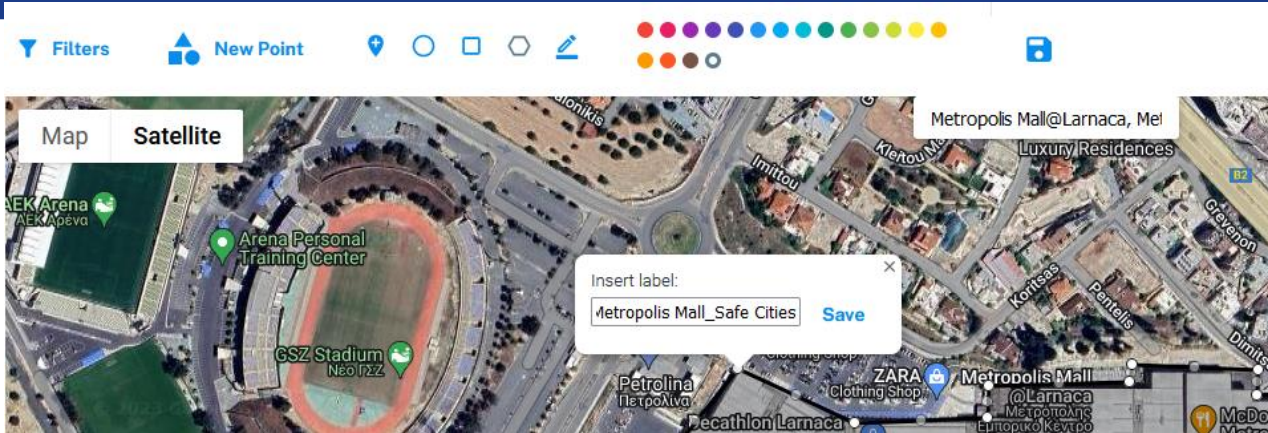
SAFE-CITIES Logical View



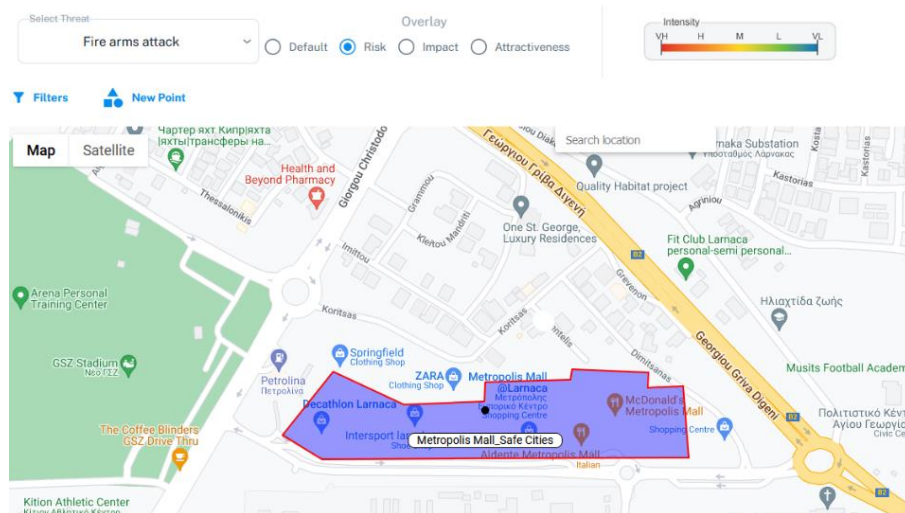
SAFE-CITIES Architecture



SVA Tool



- 1) Select **Point of Interest**
- 2) Mark its **area**



5) Results on the map

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101073945

Id	Title	Description	Intent	Capability	Likelihood	Action
1	Fire arms attack	small caliber pistol or semi/full-automatic rifles				...
2	Sharp object attack	knives, machete, other sharp and blunt objects				...
3	Vehicle Attack	use of vehicle as a weapon by ramming large crowds				...
4	IED	in objects or goods (based on either home-made or commercial explosives)				...
5	PBIED	explosives concealed on a person (suicide or carrier)				...
6	UA VIED	remote controlled device- explosives or CBR threats carried and delivered by a UAV (either aerial or ground)				...
7	VBIED	explosives concealed inside a vehicle (or its cargo)				...
8	Chemical attack	threat by toxic or harmful chemical in goods or carried items				...
9	Biological attack	threat by deliberately released biological pathogen				...
10	Radiological attack	threat by deliberately released radioactive material either as is (exposure device) or combined with dispersal material (explosive- radioactive dispersal device or dirty bomb)				...

3) Select the **threat**

Fire arms attack - Likelihood of Attack

Intent Level

☒ Very Low (No intent)

☐ Low (There is no justification to think that the adversary has an intention)

☐ Medium (There is potential intention)

☐ High (The adversary has implemented similar threat in the past and could have intention to do so in the future)

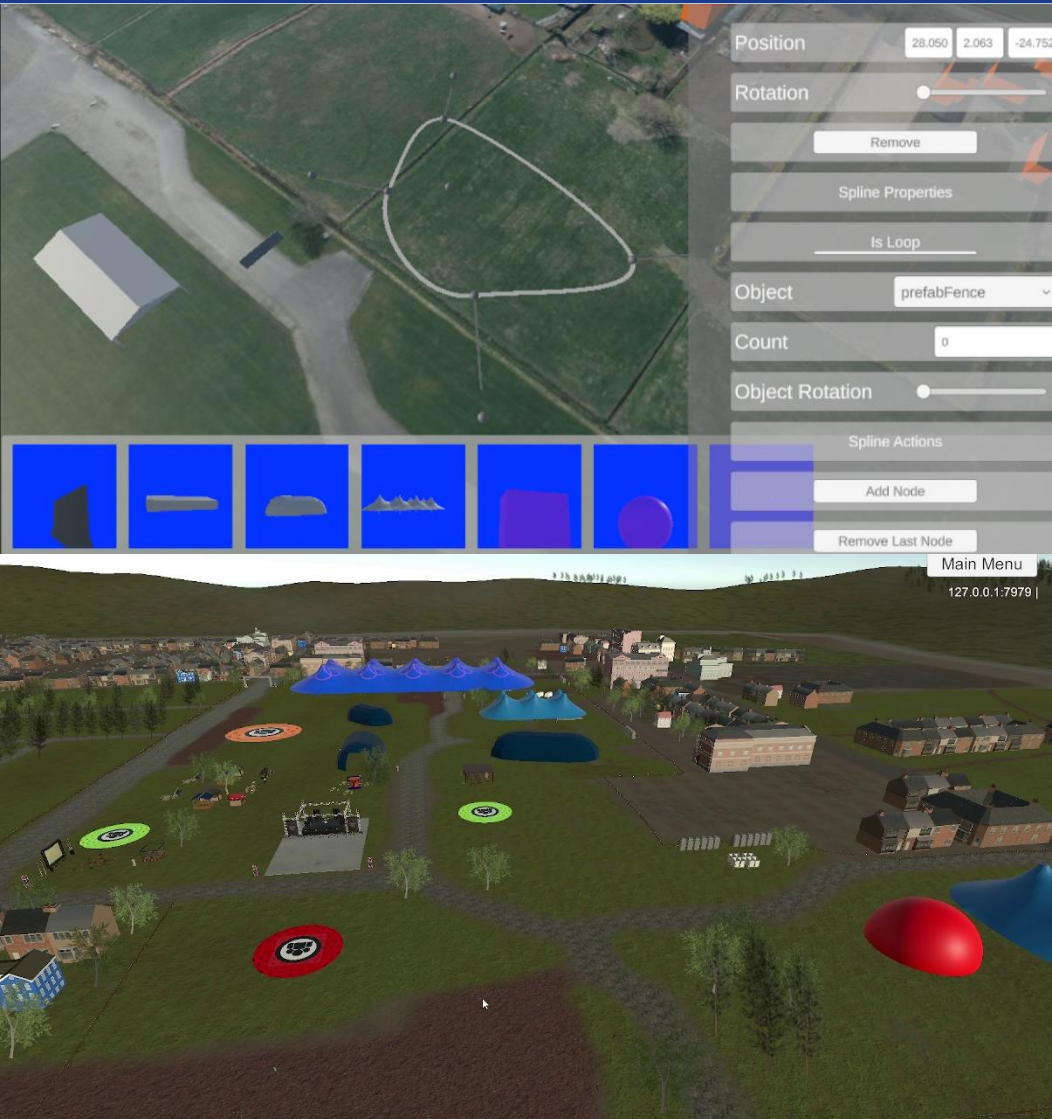
☐ Very High (The adversary has implemented similar threat in the past and has the intention to do so in the future)

Next

Save

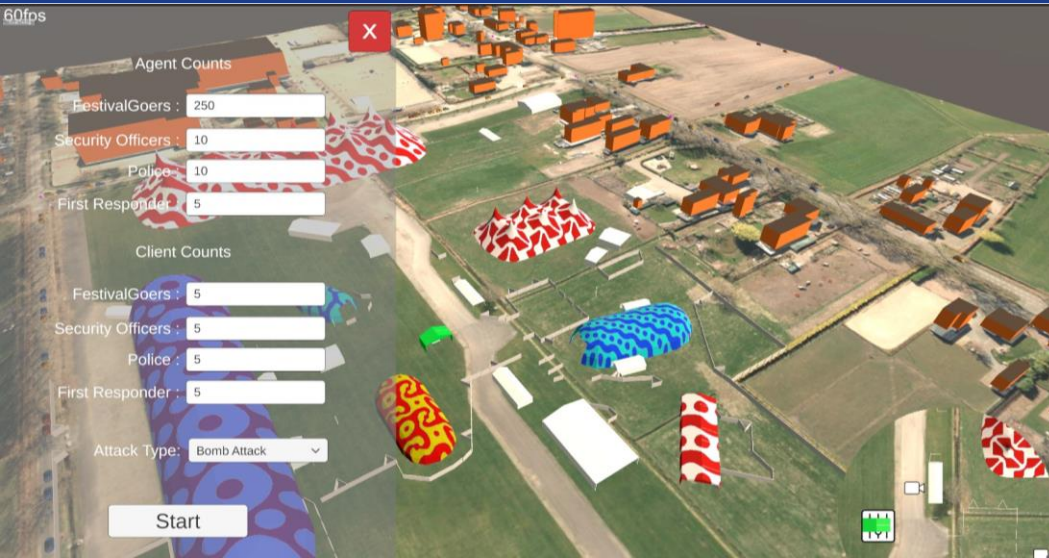
4) Answer **questions** (e.g. threat likelihood)

Scenario Builder



- Create **3D environment**
 - Import CAD/BIM files
- Configure **site** with blueprint objects
 - Static and dynamic elements
- Configure **threat scenario**
 - Blueprints and timelines
- Deploy as multi-player **serious game**

Serious Gaming Simulator

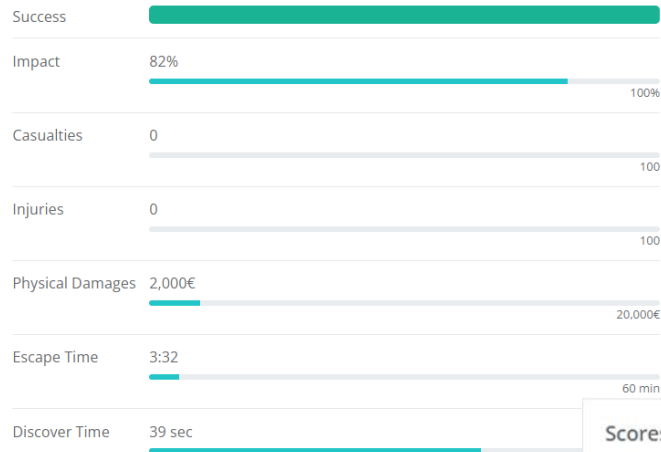


- **Multi-player** serious game
 - Multiple players and **roles** (e.g., game master, security agent, citizen, etc.)
- **Threats simulation**
 - Different and/or multiple threats
- Human and crowd **behaviours**
- **Data-driven** modelling and simulation
- **VR** immersive sessions

Dashboard & Scoreboard



STATIC SVA

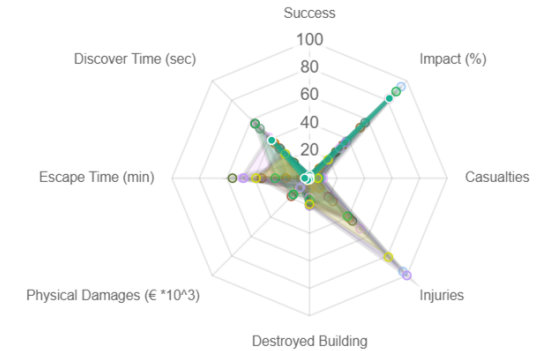
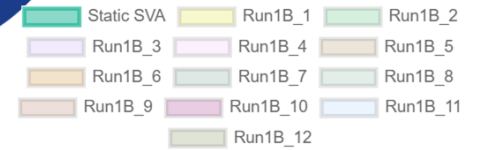


Static SVA Results

Scores

Scenario	Configuration	Run	Scores
10 buildings-100 policemen	50 cameras-50 weapons	2C_1	success : Green
	100 cameras-100 weapons	2C_2	impact : 74%
	150 cameras-200 weapons	2C_3	casualties : 9
		2C_4	injuries : 17
		2C_5	destroyedBuilding : 18
		2C_6	physicalDamages : 13,398€
		2C_7	escapeTimeSec : 08:32
		2C_8	discoverTimeSec : 3

Dynamic SVA Results (per configuration)



Scores



Benefits



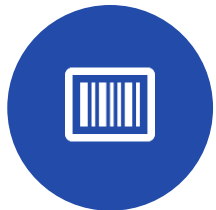
Improved Vulnerability Assessment

by law enforcement and managers of public spaces on **countering** and/or **preventing terrorist attacks**



Enhanced training

of LEAs and first responders, in collaboration with different public and private actors, through an **interactive and engaging platform**



Optimized protective measures

thanks to the possibility to **simulate** attack **scenarios** and to test **different countermeasures**

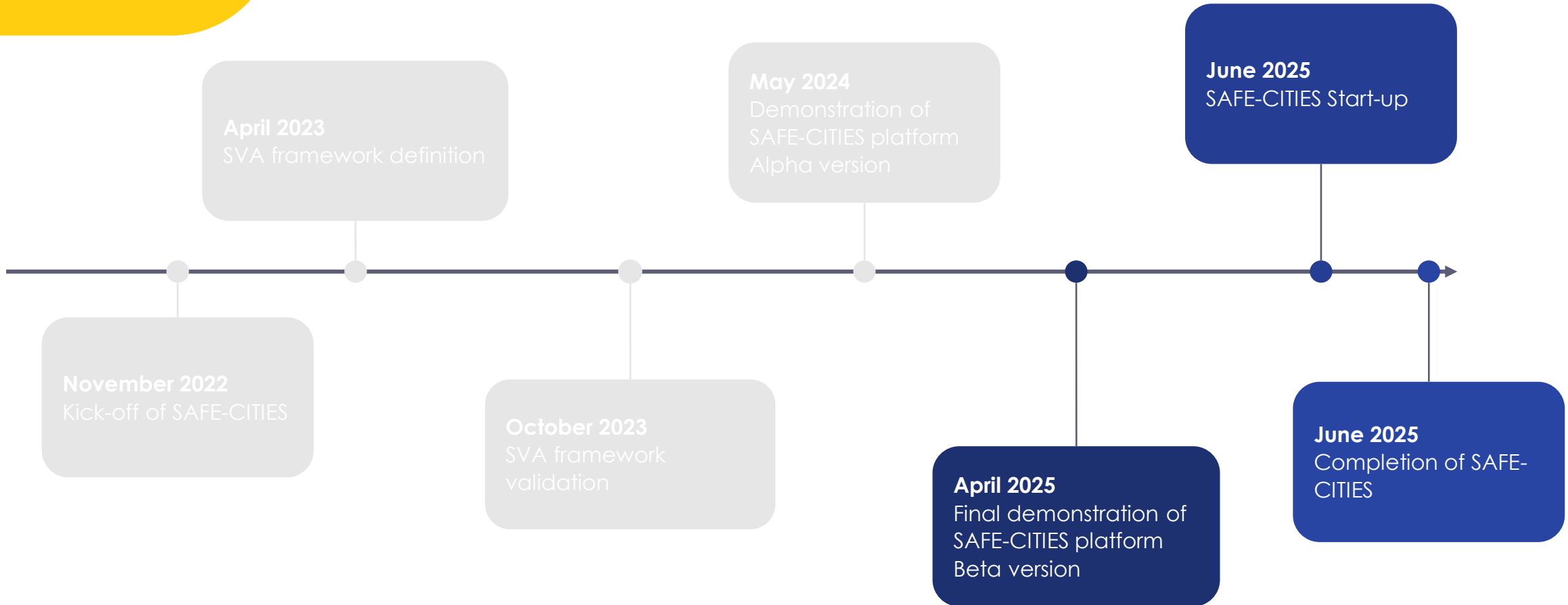


Better planning

through identification of potential vulnerabilities connected to **design, refurbishment, construction, improvement** of public spaces



Timeline & Next Steps



SAFE-CITIES Community

The SAFE-CITIES project approach bases on fostering bi-directional **communication and cooperation with all practitioners** and **clustering with relevant projects**.

Do you want to be part of this initiative?

Visit the SAFE-CITIES Website and fill the form!
www.safe-cities.eu

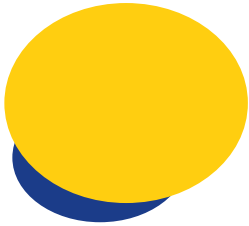


Safe Cities

COMMUNITY



Thank you for your attention!



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