Press Release

April 2025

About FLEXI-cross

FLEXI-cross project aims to deploy and validate a toolkit of innovative border checking solutions, with main objective to increase the security and reliability of border checks for both people and goods.

The project will be using emerging technologies, including 5G, Internet of things (IoT), Artificial intelligence (AI), Machine learning (ML), big data and predictive analytics, and cloud and edge computing.

About Visual Analytics Dashboard

Visual Analytics Dashboard is a cloud-based web application part of the HMI interface of the FLEXI-cross toolkit aiming to empower border authorities with advanced situational awareness and real-time decision-making tool. This dashboard receives raw data from all other modules making up the whole toolkit, and provides the end user with dynamic, interactive visualizations.

Designed with flexibility and usability in mind, the dashboard enables users to monitor events, filter and drill down the data as needed, it analyzes trends and show object involvement. It is considered an intelligent Human-Machine Interface (HMI) transforming received raw event data into actionable insights, facilitating the decision making for BCP personnel.

Key Features and Capabilities:

1. Support for (near) real-time data, securing the latest information to BCP personnel and authorities.
2. Support for customizable widgets, drill-down function, in addition to advanced filtering tools and controls for better look up within the database.
3. Guarantee accessibility and responsiveness, and use across different devices, from desktop monitors to mobile phones.

Funded by the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency. Neither the European Union nor the granting authority can be held responsible for them.

4. Guarantee of integration with external systems, allowing the consolidation of data streams from multiple sources into one unified interface. This capability ensures that end users will gain a complete understanding of the activities within the border area, and this is complemented by interactive visualizations such as event timelines, anomaly trend charts, distribution maps, and object-based filtering.

Advancing Border Security with Real-time Visualization- Live Rehearsal in Romania: Showcasing UC1 and UC3

FLEXI-cross project reached a significant milestone, when a live on-site rehearsal was performed in Romania to showcase the technological progress of Use Cases 1 and 3. Technical partners worked together along with on site personnel form border management, to test all the functionalities under the UC1 scope, including the Visual Analytics Dashboard as part of the user interfaces for all recorded events within the environment.

During the rehearsal we have showed how the dashboard manages all the data generated by all the modules of the FLEXI-cross toolkit—and transforming raw detection and anomaly data into actionable information.

The dashboard offers border officers a single, interactive view of events at the border, providing real-time insights into incidents, object detections, risk indicators, and other critical analytics.

Participants observed the following key functionalities in action:

- **Trend Analysis**: Visual line graph showing the trajectory of different event types over time, helping authorities determine whether anomalies are escalating or declining, and evaluate the effectiveness of their countermeasures. Figure 1 below shows a sample of such graph.

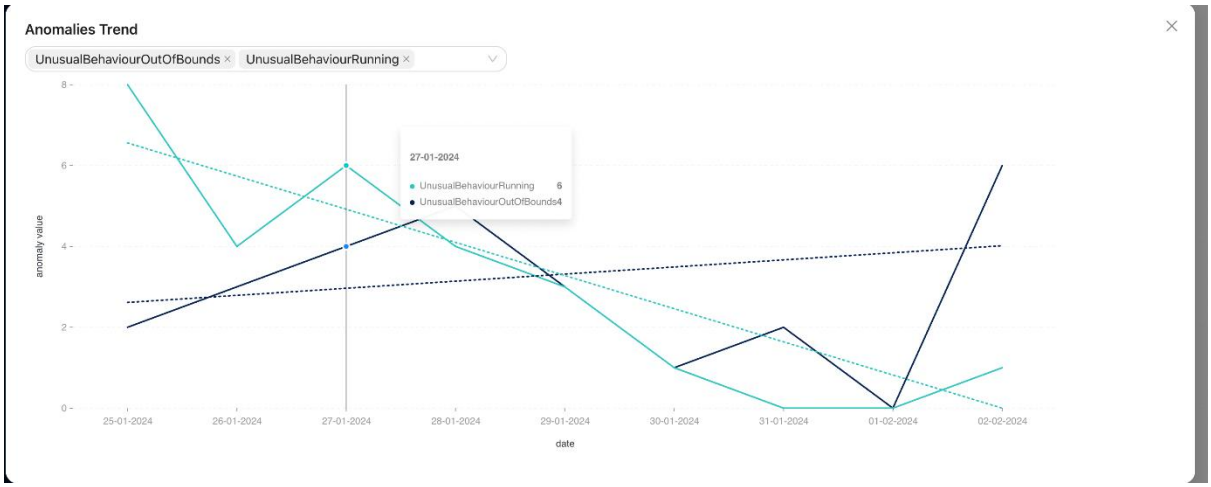

Figure 1: Trend graph.

Funded by the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency. Neither the European Union nor the granting authority can be held responsible for them.

- **Distribution Mapping**: Visual Pie chart representations displaying and showing the proportional distribution of different anomaly types, highlighting areas or event categories that demand greater attention. Figure 2 below shows a sample of such graph.

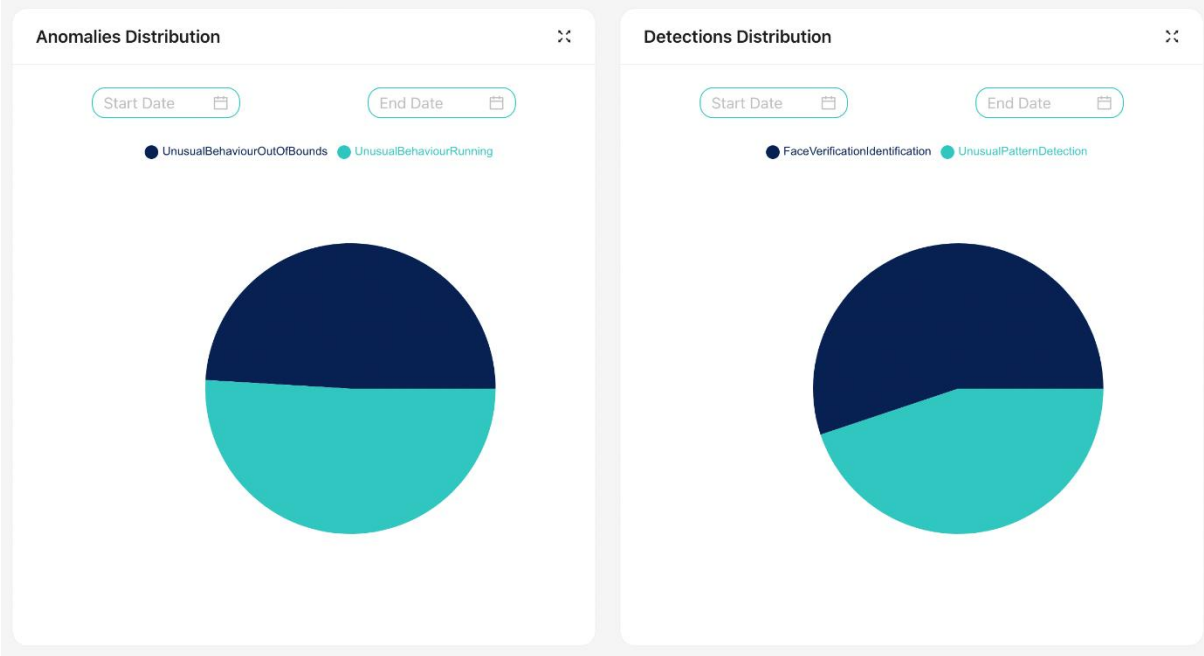

Figure 2: Distribution graph.

- **Live Geolocation Tracking**: An interactive map highlighting the locations of each detected event, offering an additional tool to give the end user and authority personnel to understand the different activities hotspots and supporting faster response coordination. Figure 3 below shows a sample of the tracking map.

Funded by the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency. Neither the European Union nor the granting authority can be held responsible for them.

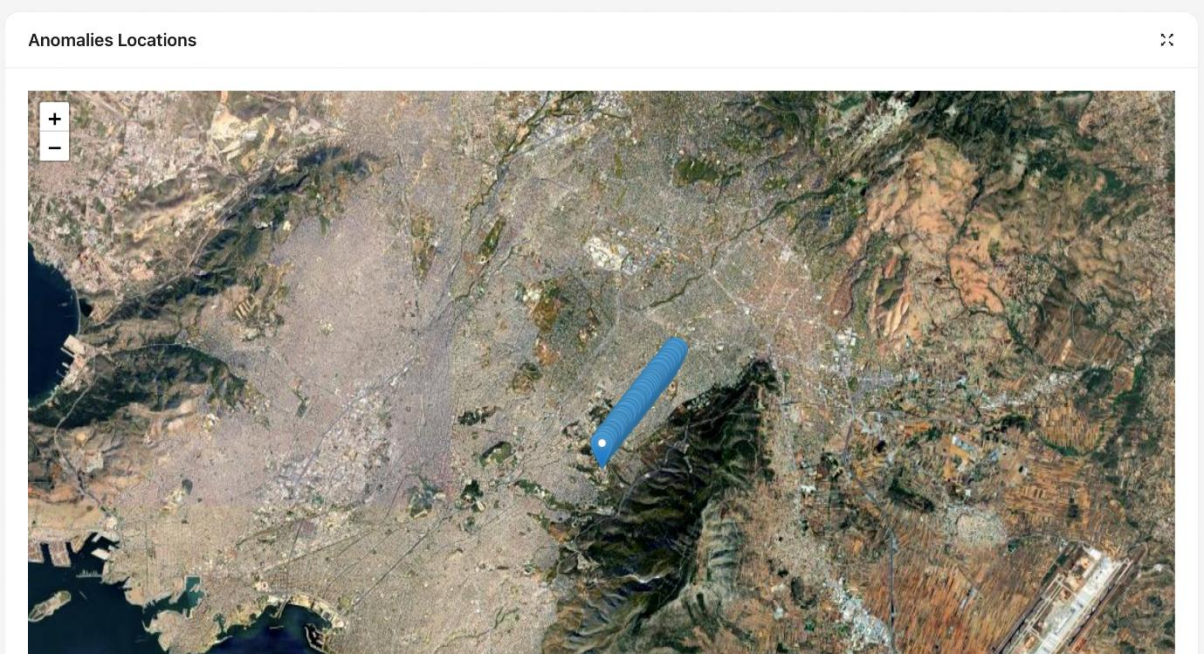

Figure 3: Live tracking map.

- **Object Involvement Indicators**: for detection of anomalies, which is accompanied by involved objects—such as vehicles, people, or other—this helps authorities to detect patterns or repeat risks linked to specific object categories. Figure 4 below shows a sample of the object involvement graph.

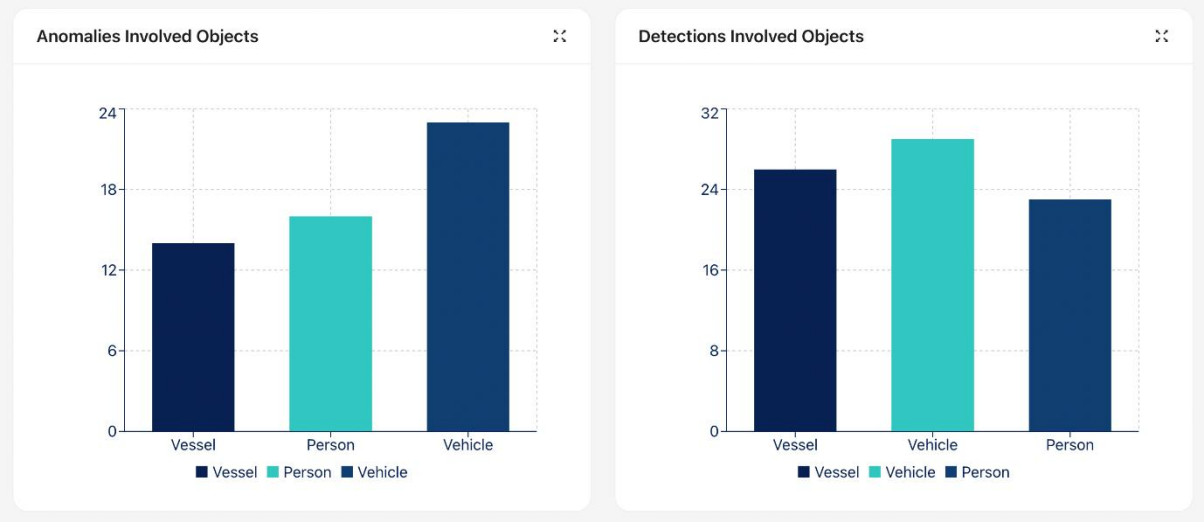

Figure 4: Object involvement graph.

Funded by the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency. Neither the European Union nor the granting authority can be held responsible for them.

This rehearsal was an opportunity for all partners to validate technical integration and UI/UX of the different events in a real-world scenario, while getting valuable feedback from on-site stakeholders. The use of real data streams within border environment proved the system's reliability signalled its readiness for broader deployment.

The Importance of This Demonstration

The importance of this demonstration rehearsal lies in the engagement of the end users within the current and final environment with all the challenges and criticalities of the situations that may and will be witnessed during the live demonstrations. All project stakeholders, from border control personnels, technology owners and system integrators, looked and interacted with the dashboard in a real situation and realistic setting, offering the real look and feel and expected experience.

Experiencing and understanding the needs and activities of BCP personnel is essential to ensure a successful dashboard. This event allowed end users to test the dashboard's responsiveness, usability, and operational value.

Moreover, the flexibility of the dashboard architecture was emphasized, showcasing how it can be extended or adapted to include additional analytics, event filters, or decision-support tools. This adaptability ensures that the platform is not just a prototype for the current project's scope but a future-ready solution that can scale, evolve, and continue adding value post-project.

Looking Ahead

Currently FLEXI-cross is moving toward the final stage, full deployment and showcasing, therefor this rehearsal set the stage for the live showcasing of the three project Use Cases where the dashboard will play an integral role. The upcoming demonstrations will not only validate the tool's performance in real operational settings but will also collect critical feedback from users to refine the tool's functionalities.

End users and authorities are invited to assess the dashboard's real-time features and help in shaping its roadmap for the final release.

Stay tuned for further updates as we move closer toward the final integrated solution for next-generation border management.

Funded by the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency. Neither the European Union nor the granting authority can be held responsible for them.

More information about the project can be obtained from the project website and social media networks.

Funded by the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency. Neither the European Union nor the granting authority can be held responsible for them.