Press Release

February 2025

About FLEXI-cross

FLEXI-cross, a collaborative European initiative, aims to enhance border security through advanced digital solutions. This includes developed algorithms and components that streamline the process of border crossing checks for authorities.

WINGS, a key player in the project, focuses on providing cutting-edge platforms, algorithms, and components. These innovations are intended for use across public and private sectors, aiming to improve everyday procedures throughout society.

FLEXI-cross demonstrates intelligent and dynamic procedures for improved border-crossing experience at Ormenio Border Crossing Point between Greece and Bulgaria

The recent demonstration of the FLEXI-cross project marked a significant milestone in the field of border control technology, showcasing notable advancements within Use Case #2, which focuses on optimizing the road border-check process at the Ormenio Border Crossing Point (BCP) between Greece and Bulgaria. The demo emphasized the integration of cutting-edge solutions aimed at enhancing efficiency, security, and the overall flow of cross-border traffic. The objective of this trial was to demonstrate the capabilities of an integrated system that merges legacy border control systems with state-of-the-art deployable and mobile checking technologies. Key features of the demonstration included real-time data processing from OBU sensors, ML-based automated vehicle inspection & behavior analytics systems from cameras and enhanced mobile applications utilized to perform checks at the waiting queues of vehicles and passengers through a pre-registration process. These technological innovations are expected to significantly reduce wait times for vehicles, improve border security through better detection capabilities, and streamline the overall border management process.

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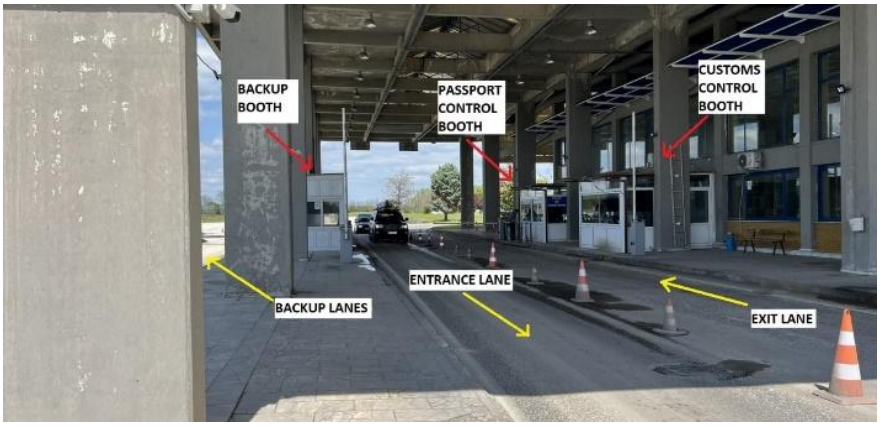
The Ormenio BCP, situated at the northernmost tip of the Evros regional unit, serves as a critical customs and passport control point on the road border between Greece and Bulgaria.. The checkpoint facilitates the movement of both passengers and vehicles using conventional border control technologies such as passport scanning machines, X-ray vehicle scanners, and plastids for monitoring incoming traffic. The massive numbers of vehicles passing through the BCP daily as well as the time-consuming process followed at the BCP, result in long queues of vehicles and passengers (could reach 5km) waiting to cross the border and thus long delays (up to 24h) may occur. By leveraging advancements in AI, OBU sensors, 5G/IoT, predictive risk assessment and automation, the Ormenio BCP can ensure faster processing times, enhanced border security and efficient remote monitoring. These innovations are essential for keeping up with the increasing volume of cross-border movement and the growing complexity of international trade and travel in the area. The following picture show the cross-border area at Ormenio.



Showcasing FLEXI-cross Technologies at Ormenio Border Crossing

During the demonstration, FLEXI-cross partners introduced several core technologies designed to enhance the capabilities of border agents:

- **Detection of False Documents**: The demonstration showcased the seamless integration of legacy equipment such as a fingerprint scanning module and a passport scanner module with the FLEXI-cross toolkit to enhance the biometric verification capabilities required for secure border management. This ensures that even the most subtle ridges and patterns are recognized, significantly boosting both the speed and accuracy of the identification process. Its robust design supports high-throughput environments like border-crossing points, where quick, dependable biometric verification is critical.

- **Entity Recognition and Tracking**: During the demo, partners presented the seamless communication and data exchange between the fingerprint scan module and the passport scan module with the local FLEXI-cross toolkit, a process that verified that the legacy modules can interact with the advanced local systems developed from FLEXI-cross. The goal was to

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show the smooth integration of legacy components with the FLEXI-cross toolkit, including the backend server and relevant databases. We highlighted the communication between the modules and the toolkit. The data from the fingerprint and passport scanners are relayed to the FLEXI-cross local toolkit via a secure MQTT protocol connection. The modules are configured to communicate directly with the toolkit's backend server, where a data ingestion layer is responsible for ensuring the smooth transfer of these data. Then, a respective API processes the information and sends it to a Cross-referencing module. Here, the fingerprint and passport images are matched against records stored in external databases, such as the Schengen Information System (SIS2). The identity processing module is then responsible for analysing the results of the cross-referencing and classification processes. It evaluates whether the fingerprint and passport data match with known individuals or present any security risks.

The following images illustrate the legacy modules, the relay of the generated data to the FLEXI-cross toolkit and the cross-referencing of the captured fingerprint and passport data to the toolkit.

Fingerprint legacy modules

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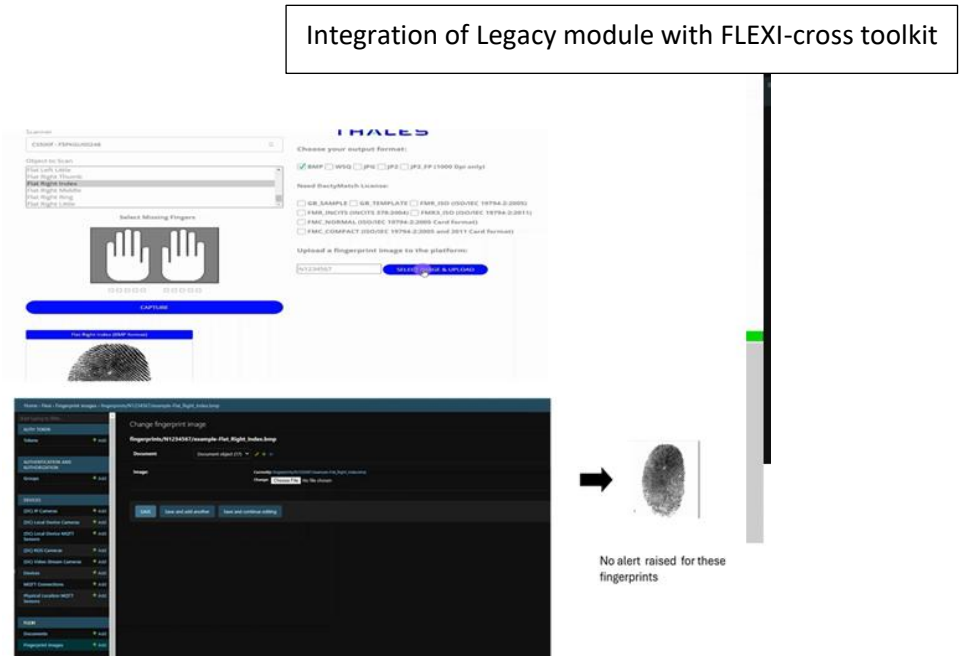

Why This Demonstration is Important

The demonstration took place early in the project and successfully showcased the smooth integration of legacy modules to a FLEXI-cross developed toolkit. The demo verified that the integration of legacy with advanced prototype platforms can ensure that the system efficiently flags discrepancies and matches data of travellers that cross a border and thus it enhances the security and accuracy of Identities processed at border points.

Additionally, the demo unfolded the collaboration between the public authorities and private companies of the project to show that different societal sectors can efficiently collaborate in a project.

Looking ahead

Building on the success of this demonstration, additional scenarios will be implemented, focusing on:

- Detecting illegal cargo in trucks
- Identifying hidden migrants in vehicles
- Monitoring rented cars attempting to cross the border
- Enhancing surge management at the Ormenio border crossing

To support these scenarios, a mobile application will be developed, allowing travellers to input personal and vehicle data into the FLEXI-cross toolkit before crossing the border. Furthermore, external equipment such as roadside units, cameras, and drones will be deployed to provide real-time data, further enhancing and expediting the cross-border process.

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

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