IDEMIA

Shaping the Future of Border Control

EINSTEIN's Role in Europe's Security Evolution

TRAVEL

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Europe's border landscape is becoming increasingly complex. Rising migratory pressures, geopolitical instability, and the evolving tactics of organized crime are putting border systems under significant strain. At the same time, the European Union must preserve the principles of free movement and facilitate growing volumes of international travel.

Modern border management now demands far more than visual inspections and travel document checks. Border authorities are expected to **identify potential risk**s early, **process biometric data rapidly**, and **uphold data privacy**, all while avoiding congestion at key checkpoints.

This operational shift is taking place alongside sweeping regulatory changes, including the rollout of the **European Entry/Exit System (EES)** and the **European Travel Information and Authorization System (ETIAS)**. These initiatives call for border infrastructures that are not only secure and automated but also interoperable across Member States.

Co-funded by the European Union

In response to these challenges, EU-funded projects, such as **EINSTEIN**, are paving the way for smarter, more adaptive border control. Leveraging the latest advances in **biometrics**, **AI**, and **data protection**, these programs are designed to transform how Europe safeguards its borders, ensuring a more secure, efficient, and transparent experience for all.

Bringing border innovation to life: The EINSTEIN project

Spearheaded by the **Centre for Research and Technology Hellas** in Greece, the EINSTEIN project unites a consortium of **21 partners** from **11 European countries**, including **public authorities**, **research centers**, and **private-sector experts** . Rather than focusing solely on experimentation, the project is geared toward building deployable tools that support **key EU initiatives**, such as **EES**, **ETIAS**, and **Digital Travel Credentials**.

Over its three-year course, the project will provide a suite of **six interconnected applications**:

- **Online document issuance:** A web application which provides the eGovernment service that enables a citizen to apply online for a first time or renewal of a document (e.g., travel, identity), with the main innovation to detect and prevent fraudulent enrollment of biometrics uploaded by the applicant.
- **Mobile document and identity checks:** An application, available on smart devices, which will be able to scan ID documents and determine if the document is likely to be fraudulent or not.
- **Document authentication:** An application supporting document experts from immigration services and border authorities to authenticate travel, identity, and breeder documents.

- **Preregistration for border crossings:**An application to permit travelers to preregister for border crossings by land to enable enhanced security checks and an overall improved border crossing experience for travelers and border guards.
- **EES kiosk with advanced fraud detection:** Development of a kiosk application to expedite entry of third country nationals' biometric and biographical data and to efficiently conduct fraud checks.
- **Fast-track biometric corridor:** An application that allows the identity verification of travelers at a border without the traveler having to stop, supporting a smoother experience for both travelers and border guards.

Each application is tailored to a different use case that will be tested in real-life border scenarios across multiple EU countries, with the aim of reaching **Technology Readiness Level 7** or higher—a milestone that marks the transition from **demonstration to deployment**. The project's ambition is clear: make advanced tools both available and usable, ensuring they meet operational standards and comply with EU law.

At the heart of EINSTEIN is a commitment to **modularity** and **interoperability**. Each application is designed to plug in to existing systems, using standardized interfaces that make it easier for national authorities to adopt, adapt, and expand. Whether at an airport in southern Europe or a land border in the north, the tools developed under EINSTEIN will be ready to scale, securely exchange data, and remain fully aligned with **regulations** such as **GDPR** and **the AI Act**.

Beyond its technical scope, EINSTEIN also empowers the people who use its tools. For **travelers**, this means **shorter queues**, **faster processing**, and **more transparent identity checks**. For **border officers**, it means **better and more information**, **real-time fraud detection**, and **tools that are easy to use under pressure**. The emphasis on user experience, both civilian and professional, is a deliberate choice. EINSTEIN is guided by a privacy-first approach, embedding ethical safeguards and legal compliance from the design phase onward.

In an age of heightened mobility, complex threats, and growing regulatory demands, EINSTEIN represents an important bridge between innovation and implementation. By focusing on systems that are secure, interoperable, and ready for the field, the project adds momentum to Europe's border modernization efforts, helping to ensure the next generation of checks is both smarter and more reliable and trusted.

Driving smarter, safer border technology in EINSTEIN

As one of the **key partners in the EINSTEIN consortium, IDEMIA Public Security** plays a central role in developing the project's **biometric and document authentication capabilities**. With decades of experience in **identity verification technologies**, including **facial**, **fingerprint**, and **iris** recognition, IDEMIA Public Security brings a proven track record to the field of border innovation. Its contributions to EINSTEIN focus on building scalable, interoperable tools that can be seamlessly integrated into real-world systems.

A cornerstone of IDEMIA Public Security's contribution to EINSTEIN is the **creation of an enhanced biometric kiosk**, featuring **AI-driven fraud detection capabilities**. Using analytics and camera-based sensors, the kiosk can detect presentation attacks in real time, such as when a fraudster attempts to pass a photo or a prosthetic hand as a legitimate biometric trait. These capabilities go beyond traditional identity checks, helping to expose deceptive tactics at the point of entry.

The company is also leading advanced research into **document authentication**, with a particular focus on verifying security features that are often overlooked in standard border control processes. One objective is to improve the recognition of special characters and increase the overall number of verified elements in travel documents, strengthening the system's ability to detect forgery and tampering.

Beyond the fixed installations, IDEMIA Public Security is also contributing to **mobile-based preregistration solutions**, giving travelers the ability to securely submit their identity information in advance. This not only improves the flow of

passengers at border checkpoints but also provides border agents with richer, pre-verified data to support decision making.

Looking ahead, EINSTEIN's applications are scheduled for pilot testing. These trials—conducted in conditions that simulate or reflect real operational environments—will validate the readiness of each tool for deployment across Europe's external borders.

Through its work on EINSTEIN, IDEMIA Public Security is **helping turn complex technological research into practical**, **privacy-conscious tools that frontline officers can rely on**, **bridging the final gap between innovation and impact**.

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