

**EU
INNOVATION
HUB**

**ANNUAL REPORT
2022**

EU INNOVATION HUB FOR INTERNAL SECURITY ANNUAL REPORT

For more information on the Hub, please visit this [link](#)

The EU Innovation Hub for Internal Security Annual Report

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1. Introduction

This report provides a review of the progress achieved by the EU Innovation Hub for Internal Security (hereafter: the Innovation Hub) in 2022. The report was prepared by the Innovation Hub Team and is addressed to the COSI via the Innovation Hub's Steering Group, both of which are invited to discuss and endorse it. This document is a retrospective report on the achievements of 2022; a description of the activities foreseen for the timeframe 2023-2026 can be found in a separate document called: EU Innovation Hub for Internal Security draft - Multi-annual planning of activities 2023-2026.

2. The Innovation Hub's mandate

In line with the JHA Council outcome of October 2019, the EU Innovation Hub for Internal Security was established by the Council's Standing Committee on Operational Cooperation on Internal Security (COSI) on 18 February 2020. The Innovation Hub is a collaborative network of innovation labs. It is a cross-sectorial EU platform aimed at ensuring coordination and collaboration between all actors of the wider field of internal security. It is supposed to support the delivery of innovative cutting-edge products for citizens' security in the area of freedom, security and justice.

The Innovation Hub should contribute to establishing a common innovation picture for internal security and promote the alignment of innovation and security research efforts across Europe.

The work of the Innovation Hub is delivered by the Hub Team, which serves as the operational arm of the Hub. It is composed of representatives from the Innovation Labs (or contact points) of the JHA Agencies European Union Agency for Law Enforcement Training (CEPOL), European Agency for Asylum (EUAA), European Monitoring Centre for Drugs and Drug Addiction (EMCDDA), European Union Agency for the Operational Management of Large-Scale IT Systems (eu-LISA), European Union Agency for Criminal Justice Cooperation (Eurojust), European Union Agency for Law Enforcement Cooperation (Europol), European Union Agency for Fundamental Rights (FRA) and European Border and Coast Guard Agency (Frontex), together with the Commission (DG HOME and DG Joint Research Centre (JRC)), and the General Secretariat of the Council, including the Office of the EU Counter Terrorism Coordinator (EU CTC).

3. Innovation Hub Resources

The resources available for the work on the Innovation Hub in 2022 were very limited. The Innovation Hub Secretariat was composed of three (3) Europol staff members that were assigned to the

Hub between 50 to 80% of their time. Additionally, to the above mentioned resources, there were two external representatives seconded to the Hub Secretariat in The Hague: liaison officer deployed by eu-LISA (80%) and SNE by the French Police (50%). As of May 2022, eu-LISA remained the only Agency that seconded a staff member to strengthen the Hub Secretariat, as requested by COSI in 2020.

The activities and work described in this annual report could not have been accomplished without the contribution from the Hub Members who dedicated time to participate in the bi-weekly meetings, reviewing and providing comments to documents and reports produced by the Hub Secretariat.

4. Summary of 2022 work - Base Tasks

Despite the limitations the Innovation Hub had to face, in particular the lack of a dedicated budget and very limited human resources, the Hub has managed to accomplish various tasks identified by COSI and beyond. In 2022, the Hub Team focused its work on carrying out the work on the base tasks identified by COSI in May 2020 and continued working on its five pilot projects. The latter are described in the chapter 4.

4.1 Annual Event

One of the tasks indicated by COSI was the organisation of an annual Hub event. The Innovation Hub Annual Event, was funded by and organised in collaboration with the CERIS community and took place in Brussels 13-14 September. Attendance was by invitation only, with a focus on the Member States representatives in Brussels, academic experts and specialised practitioners. Both the participants and the discussion topics were carefully selected following consultations within the Hub Team. During the first day, four panels with twenty panellists and four key-notes speakers were organised. The main themes of the panels were fundamental rights and internal security research, innovation uptake, Justice and accountability. Approximately 100 participants were present that day.

The second day of the event was dedicated to encryption, with a focus on quantum cryptography and vulnerability management systems. During the morning session two projects were presented and one roundtable session with six panellists was organised. Approximately 70 participants took part. After the conclusion of the morning session and the departure of the other participants, the afternoon was dedicated to an informal meeting of the Hub Steering Group and Hub Team. The feedback received after the event was largely positive.

4.2 Mapping report

Among other tasks assigned to it by COSI, the Hub is responsible for assessing gaps and needs and knowledge management for innovation in the field of EU Internal Security. COSI asked the Hub to collect information about key innovation actors and projects in both the EU and its Member States (MS). Therefore, in spring 2022, the Hub Team jointly developed:

- a stakeholder map for each Hub member, listing its key stakeholders (MS key contact points, networks, projects, Agency contacts, academia, Research and Technology Organisations, private partners); and
- a questionnaire to be distributed to those communities.

Once the content was agreed, the questionnaire was uploaded to the EU survey tool for easy distribution to the respective stakeholder communities and shared by the Hub members to their communities. The questions included, inter alia: nature of responder, project description or importance of the projects, gaps & challenges, fundamental rights implications, and funding opportunities. After having collected the replies, the Hub members made a first analysis of the input, based on their extensive knowledge of their respective stakeholder communities. Subsequently, the Hub members provided aggregated data to the Hub Team who analysed it, compiled it and enriched it with further analysis and recommendations. The results and findings of that work were discussed by

the Hub Steering Group on 9 November 2022 and, following the Steering Group's endorsement, tabled at the 25 November 2022 COSI meeting.

4.3 Hub and Steering Group meetings

Throughout 2022, the Hub Team met fortnightly in the virtual format. In line with its operational and financial model, the Hub Team coordinated all Hub activities, in particular priority setting, knowledge management, and project implementation, in cooperation with the respective EU Agencies and EU Member States. It also prepared the meetings of, and documentation for, the Hub's Steering Group. Preparation of such topics was led by the staff members dedicated to the Hub, as assigned by Europol and eu-LISA and hosted by Europol. Certain activities were assigned to other Hub members, for example the design and preparation of expert panels at the annual event. The full Hub team was systematically consulted on all activities. Following the COSI's confirmation of the composition of the Innovation Hub Steering Group (on 23 November 2021) and the adopted rules of procedure, four meetings of the Steering Group took place in 2022. Two meetings (online meetings on 19 May and 09 November) were formal and two (online call on 17 January and physical meeting during the Innovation Hub meeting in Brussels on 14 September) were informal.

4.4 Other activities

In 2022 the Hub Members presented to the Hub various studies and shared the outcome of their work: e.g. eu-LISA and Eurojust presented a high level summary of the “AI in Justice” report, FRA conducted a presentation on “Discrimination and artificial intelligence: feedback loops and biased speech detection models”. The Commission also presented plans for its study regarding the possible scope of an EU Security Data Space for Innovation, and invited the Hub to assist with gathering the necessary input for the study.

In 2022, the Hub Team finalised the work on its corporate identity, sharing with all Hub Members the manual concerning the colour scheme and the logo. For the purpose of the Annual Event, the Hub Team launched a dedicated Event website, which might become a Hub website where various Hub’s publication could be published and shared with broader audience in the future. Currently, the report from the Annual Event, programme of the last event together with short bios of the panellists and key note speakers and a short movie promoting the Event could be found on the website. Additionally, Europol maintains a dedicated Hub generic website on its Extranet where information about the Hub are published.

5. Pilot projects

In 2022, the Hub Members worked on five pilot projects, which were identified

in 2021 as joint projects to be conducted together by various Hub Members under the umbrella of the Innovation Hub. Further information concerning the scope and status of each project can be found in the following sub-chapters.

5.1 EU-coordinated Darknet monitoring to counter criminal activities

Project leader: Joint Research Centre of the European Commission

Project partners: EMCDDA, Europol

On 19 November 2020, the Commission adopted an Implementing Decision on the financing of the preparatory action on the EU-coordinated Darknet monitoring to counter criminal activities for 2020. The DG JRC is working with a Steering Group composed by Europol, EMCDDA and DG HOME on this preparatory action launched in May 2021 for 24 months.

The objective of this project is to develop a flexible online multi-user software framework populated by an initial set of modules, hereafter called the platform, in order to fulfil the two following goals:

- Support and contribute to the monitoring of Darknet criminal activities;
- Support and contribute to the investigation of Darknet criminal activities through the collection of potential digital evidence.

As an initial task, Europol and EMCDDA established a series of high-level

functional requirements with the contribution of EU Member States' authorities. The platform will provide the capabilities to support all the key areas identified in this list of requirements. Those key areas will be enriched with as many functionality modules as possible, on the basis of targeted open-source building blocks, suitable third-party software components identified, key elements developed in the framework of EU research projects, the ones developed as part of the project and the resources available to integrate them.

During this first part of the project, cooperation with EUROPOL and EMCDDA has been initiated. The sources of the data to be collected for the duration of the project have been confirmed. Following the analysis of the state of the art and the market during this inception phase, a specific model of architecture based on open-source building blocks has been selected and was confirmed by the steering group in December 2021. The hardware and logical development of the platform have been initiated. Following the Steering Group meeting of June 2022, it was agreed to apply a 6 months extension to the project in order to address encountered delays in the supply by third parties of hardware equipment required by the project due to the well-known issues of global shortage of electronic components and hindrances. In the light of the developments accomplished in 2022, the project Team decided to organise in 2023 a specific workshop in the course of the project,

dedicated to the production of a common data model for the elements collected from the Darknet illegal activities. The workshop will regroup the main EU stakeholders involved in this data collection process. Developed through an iterative process of test and validation, the platform will be delivered by end of October 2023.

“
We need to define clear use cases where we should or must not use AI in the context of law enforcement and justice.



5.2 Accountability Principles for Artificial Intelligence (AI) used in the area of Freedom, Security and Justice: AP4AI

Project leader: Europol and CENTRIC (University of Sheffield)
Project contributors/ supporters: Eurojust, FRA, CEPOL, EUAA, eu-LISA

The Europol Innovation Lab, in cooperation with CENTRIC, supported by the project team, is working on a project to develop Accountability Principles for AI used specifically in the area of Freedom, Security and Justice. It could foster security-relevant AI

innovation in Europe and at the same time help facilitating social acceptability of future AI tools and capabilities in the JHA sector, in line with the proposed EU AI Act. The project is based on a broad range of expert knowledge from law enforcement agencies, border police, justice experts, legal AI experts, ethical AI experts, technical AI experts, but also includes citizens' perspectives to define the principles from different perspectives. This resulted in twelve AP4AI Accountability Principles, including materiality thresholds, applicable laws, human rights and data protection impact assessment, as well as implementation guides.

Click [here](#) to learn more about AP4AI

After having developed a comprehensive global Framework for AI Accountability for Policing, Security and Justice during 2021, in spring 2022 the project carried out a citizen survey with more than 6,600 persons participating from 30 countries. So far, a Summary Report on Expert Consultations (February 2022) and an AP4AI Framework Blueprint (March 2022) have been published at www.ap4ai.eu. A report on outcome of the citizen consultations will follow shortly. The project members actively contributed to the progress inter alia through identifying, defining and reviewing

accountability principles (FRA, Europol), as well as organising or participating in expert and validation workshops (FRA, Eurojust, EUAA, eu-LISA and Europol) and providing expert advice (Cepol). Currently, the project is busy with both validating the accountability principles (several workshops involving various Hub Team members and experts have taken place already) as well as designing a online self-assessment tool for internal security practitioners. The online tool will be freely available to all security and justice practitioners, covering several EU languages. It is operationally grounded and provides practical support to practitioners in all stages of the AI lifecycle (design, procurement, deployment, modification, etc.). Self-assessment reports can be generated whenever practitioners wish to evaluate their implementation of AI and machine-learning tools.

With this, AP4AI delivers a universal mechanism that allows practitioners to assess, review, and demonstrate AI accountability systematically, reliably and pragmatically. The project proposes a framework which could help practitioners to comply with the requirements of the risk-based model proposed in the draft EU AI Act, by allowing more granularity to objectively assess and evaluate the risk of certain AI applications and tools used in the internal security domain including the justice sector.

The ambition of the project is to contribute to the practical implementation of the future European AI Act in the

internal security domain and the online self-assessment tool will be adapted to the requirements of the AI Act once the Regulation will have been adopted by the legislators.



5.3 Artificial Intelligence (AI) initiatives in CRRS and ETIAS and VIS Revised for the risk profiling/ screening rules/ risk indicators

Project leader: eu-LISA

Project partners: Frontex (member of ETIAS Screening Board and manages the ETIAS Central Unit), Fundamental Right Agency (member of the ETIAS Screening Board) and Europol (member of the ETIAS Screening Board)

Context

The European Travel Information and Authorisation System (ETIAS) is a pre-travel authorisation system for visa exempt travellers. Its key function is to verify if third country nationals meet entry requirements before they travel to the Schengen area. The information submitted via an online application ahead of their arrival at borders enables pre-travel assessment of irregular migration, security, or epidemic risks. This shall be done by automatically processing each

application submitted against EU and, in the future, the relevant Interpol databases, and a dedicated ETIAS watch-list, whilst respecting clearly defined screening rules. Similar systems are already established in the US (Electronic System for Travel Authorisation - ESTA), Canada (electronic Travel Authorisation - eTA) and Australia (Electronic Travel Authority - ETA). Article 33 of the ETIAS Regulation states that an algorithm shall be developed to allow for automated profiling of travellers on the basis of pre-defined risk indicators and screening rules. The algorithm shall be based on the specific risk indicators to be defined by the ETIAS Central Unit (hosted by Frontex). Considering the timeline of the implementation, this might one of the first use cases where AI could be deployed to support the processes indicated in the applicable legislation.

According to Article 84 of the ETIAS regulation, the Central Repository for Reporting and Statistics (CRRS) will provide anonymised information that will support the ETIAS Central Unit in defining the specific risks indicators.

Study

In order to further investigate how AI technologies could enhance the analytical capabilities related to risk profiling/ screening rules/ risk indicators, eu-LISA decided to run a study aiming at identifying all potential BUCs, elicit stakeholders and business requirements. The study is titled "Artificial Intelligence (AI) in CRRS in the context of ETIAS and Revised VIS". The purpose of the study was to examine how AI can support the

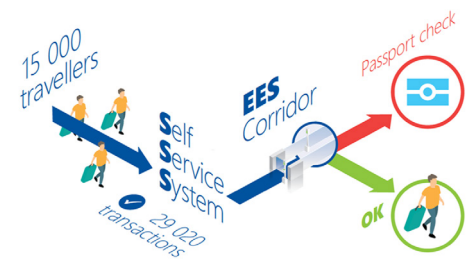
analysis of the huge amount of data that will be collected in the CRRS and establish how AI can be used to improve the efficiency and quality of processes related to the risk profiling management for ETIAS and the Revised VIS, by identifying trends, better understanding the existing risk and identifying possible new risks. The study aimed to identify the use cases that could be derived from the applicable documentation (primary and secondary legislative acts, reports, etc.) and beyond, including the needs of stakeholders, elicit stakeholder and business requirements for the use of AI in the CRRS to support the Revised VIS risk identification and screening rules for ETIAS, identify the most suitable technologies, and estimate the resources and costs necessary for the implementation of the envisaged AI component in the operational system. The study was completed in December 2022.

5.4 Land border pilot for Entry-Exit System (EES) solutions

Project leader: Frontex
Project partners: inter alia eu-LISA, DG JRC

The EU is moving forward with implementing various “smart borders” solutions that will make it easier for bona fide travellers to cross Europe’s borders while protecting the security of hundreds of millions of Europeans. Among these is the Entry-Exit System (EES), which will register the biometric

data on entry or departure activity of non-EU nationals crossing the external borders. The system will significantly impact the work of border guards and other border management national authorities.



To prepare for these essential changes at border crossing points, Frontex’ Research and Innovation has implemented an operational EES technological trial in three selected land border crossing points (BCP) of Bulgaria and Spain in close cooperation with the Host Countries, the EU Agency for the Operational Management of Large-Scale IT Systems (eu-LISA), DG JRC, and internal business units of the Agency. The EU Agency for Fundamental Rights (FRA) provided specific input on how to inform travellers and on the general fundamental rights implications of the EES pilot. From May to October 2021, the Entry-Exit System Land Border Pilot Project operated in a production environment in the Bulgarian Land Border BCP of Kapitan Andreevo (entry), BCP Kalotina (exit) and in the Spanish land border BCP of La Linea de la Concepción (Entry/Exit). The Pilot Project simulated the future EES environment collecting and crosschecking the required data while maintaining strict

adherence to fundamental rights and personal data protection measures. The pilot consisted of installing full set EES-compliant equipment, including complete technological solutions, hardware and software, development, and integration services with national systems. An EES Mock-up database was developed following the original technical specifications of the Central System to simulate verification and registration processes. Cooperation with eu-LISA allowed an exchange of technical and operational information on the performance of the EES biometric functionalities.

The technology deployed included four Self Service Systems (SSS) for registration and two automatic e-corridors for border crossing at each location. In addition, four mobile workstations supported the core-system operation. The mobile stations were tested as:

- stand-alone mobile registration/ verification solutions and as
- stations for SSS supervision and/or
- e-corridor border crossing supervision.

Throughout the Project, Frontex was supporting and encouraging its stakeholders to generate new products, processes, methods, and services that could be more efficient, such as the use of seamless solutions that capture biometrics on the move, mobile registration workstations, touchless fingerprint scanners, biometric e-corridors, etc.

Border officials carried out border controls in production, simulating the next European border control system's most common biometric registration and verification workflows. The pilot's approach generated constant improvements of the technical means and border control processes in use.

More than 15,000 travellers used the system under a real border process. This number of travellers represents the biggest EES test in terms of the number of users and EES data quality compliance so far. The core system deployed proved to be flexible and fit for different Border Crossing Point scenarios. The system was configured and used alternatively as an entry and exit installation and handled both EU and Third Country Nationals. The main use case of focus for the trial were pedestrian travellers. The system was occasionally used as EES for travellers driving vehicles, thereby sparing these citizens the need to leave their cars and trucks to carry out the entry/exit process at the SSS.

The results of the pilot project showed that the environmental conditions (light and space) had a considerable impact on the system's performance, requiring adjustments and improvements during the trial. Though the technological system proved capable of assisting in the management of the crossing allowing the traveller to perform some of the actions independently, the pilot showed that overall the EES-required processes may significantly increase the average traveller processing time at the border.

To meet the requirements of the future EES, in the vast majority of cases, border control areas, equipment, processes, and traveller flow management will have to be adapted to process optimally all the different categories of travellers and avoid long waiting times. Travellers and border police will require extensive guidance and training.

Frontex is finalising the Pilot Project Evaluation Report, which will include all the relevant information, lessons learned, and operational results. The report will be disseminated to Member States, the Commission and Agencies in 2023.



5.5 Technology Foresight on Biometrics for the future of travel

Project leader: Frontex

Project partners: inter alia DG HOME, DG JRC, eu-LISA, Europol

This Frontex-led Research Study was conducted between January and September 2021, with a budget of EUR 491,500. Three expert consultation events (two Technology Foresight Workshops and a Delphi survey) took place during

the project. A diverse set of stakeholders was involved in these events to make use of their knowledge and stimulate consensus-oriented discussions. More than 40 entities were represented during the Technology Foresight expert consultations, among others experts from the EBCG community (Frontex and Border and Coast Guard Authorities from 8 MS/SAC), EU Institutions and Agencies (DG HOME, DG JRC, eu-LISA, EUROPOL and FRA) international organisations (INTERPOL and ICAO), the U.S. Department of Homeland Security, 3 EU-funded Horizon R&I projects (including industrial producers of systems and components, academic institutions and RTOs), civil society, trade associations and consultants.

A custom technology foresight methodology was developed for the purposes of the study, opening the door to the exploration of the vast field of biometric technologies, which was analysed from various perspectives in the context of border checks.

Each of the phases of this complex Research Study produced its own set of insights which were compiled in the Research Study report and its three Annexes, planned for publication in Q2 2022 and which will include:

- A thorough explanation of the Technology Foresight Methodology and the Supporting Tools, customised to the needs of this specific study but with future implementations in mind, included in an annexed Technology Foresight Manual. The devised methodology can

be used to conduct a similar study on a different topic, to analyse newly identified technologies in a comparable manner or to conduct an in-depth analysis of the technological clusters identified as non-key within the present study.

- A Taxonomy of Biometric Technologies and Biometrics-Enabled Technological Systems, also thoroughly described in a dedicated Annex, which can be of great benefit to future research and innovation activities revolving around the aforementioned subjects.
- The results of the in-depth analyses conducted on patents, scientific literature and EU-funded projects, which provide an overview of the relevant technological landscape and show the evolution of EU interest in biometrics over time. The associated insights, collated and detailed into the third Annex, can help to focus future research initiatives.
- A customised set of scenarios, which can be used for the future-proofing of any potential new technology as well as systems or products intended for use in the areas of travel and border checks (not limited to biometric technologies).
- A prioritisation Matrix of biometric technological clusters, which can serve as a foundation for future research, planning, and decision-making. It enables the comparison and systematisation of emerging future technologies. It can also be used to track the impact of technological advancements and other factors on the placement of technologies

on the Matrix and, thus, to monitor the evolving strategic recommendations regarding further investments in research or implementation.

- A set of roadmaps developed for the identified key biometric technological clusters (KTCs: contactless friction ridge recognition, 3D face recognition, infrared face recognition, iris recognition in the NIR spectrum, iris recognition in the visible spectrum), which can be used as a starting point for further analysis of these technological clusters' development paths, monitoring associated opportunities and threats, and questioning the assumptions of underlying strategic plans.
- A set of capability readiness heat maps showing a comprehensive overview of the extent to which KTCs' cluster-specific needs are met or will be fulfilled in the future. They can be utilised by the EBCG community to identify the necessary actions in terms of strategic capability development.

Due to the substantial amount of information provided and the adopted participatory foresight approach, the Research Study will directly contribute to an enhanced understanding of the relevance and applicability of novel biometrics and technology foresight. The findings can also be utilised by public organisations and industrial entities in Europe to identify areas of strategic interest and to make informed decisions about paths of future developments in biometrics, fostering Europe's strategic autonomy in this sector.

6. Conclusion

This report presents the progress achieved by the EU Innovation Hub in 2022. In the absence of a dedicated budget line for the Innovation Hub, having limited resources at its disposal and having in mind that the Agencies are not eligible to benefit from Horizon Europe funding, the work accomplished in 2022 by the Hub Members should be considered as a significant achievement. The lessons learned through the delivery of the activities described above have been taken into consideration in the drafting of the Hub's multi-annual plan 2023-2026.





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