

# ROADMAP FOR AI INITIATIVES AT EU-LISA

OCTOBER 2021

### Document Control Information

Settings	Value
Document Title:	Roadmap for AI Initiatives at eu-LISA
Project Name:	NA
Document Author:	
Revision Status:	[Status]
Sensitivity:	Internal day-to-day
Issue Date:	__/__/2021

### Document Approver(s):

Approver Name	Role
Management Committee	Agency's Management

### Document Reviewers:

Reviewer Name	Role
	Head of GCU
	Head of PSU

NOTE: All Reviewers in the list are considered required unless explicitly listed as Optional.

### Summary of Changes:

Revision	Date	Created by	Short Description of Changes
[1]	27/07/2021		Initial outline
[2]	05/08/2021		Adding content, actions, defining scope
[3]	06/08/2021		Adding AI for Justice, AI for sBMS, Training, revise & adding content on scope & actions, introductions
[4]	11/10/2021		Re-structured; added visuals; provided resource estimates.
[5]	15/10/2021		Revisions following internal review
[6]			

### Configuration Management: Document Location

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# Introduction

During the past two years, eu-LISA has been looking into opportunities to deploy Artificial Intelligence (AI). The initial set of ideas regarding the implementation of AI in the context of eu-LISA core business was presented at a meeting of the Standing Committee on Operational Cooperation on Internal Security (COSI) in November 2019. This was followed up by a research and technology monitoring report titled “Artificial Intelligence in the Operational Management of Large-scale IT Systems”<sup>1</sup>, published in July 2020. The report provides insights on the way the Agency is exploring the potential of the AI in its internal operations and for the benefit of its stakeholders.

Furthermore, eu-LISA contributed to several EU-wide studies that explored different aspects of the potential use of AI in the JHA domain, in particular:

- A study on the opportunities and challenges for the use of AI in border control, migration and security, coordinated by DG HOME<sup>2</sup>;
- Study on technical requirements for data spaces in law enforcement, coordinated by DG HOME<sup>3</sup>.
- In the context of the new information architecture for internal security and border management, eu-LISA has identified several use-cases for the implementation of AI-based solutions in the coming years:
- AI for CRRS and ETIAS to increase the analytical tool set provided to the Agency's stakeholders, also with the aim to support risk assessment in ETIAS<sup>4</sup>;
- AI for sBMS, to improve and enhance the accuracy of biometric matching algorithms<sup>5</sup>;
- Chat bot within the scope of the visa procedure (VisaChat project), which will be piloted in collaboration with DG HOME and MS authorities<sup>6</sup>.
- eu-LISA is considering launching two additional Proofs of Concepts (PoCs) to explore the potential of AI in its internal operations<sup>7</sup>:
  - For the use of a virtual assistant/chat bot and an automated triage system in its Service Desk;
  - For the implementation of an AI-based solution for predictive analytics of IT infrastructure and/or network with the aim to improve availability of infrastructure and reduce failures and downtime.

In 2021, the Agency also established a Working Group on AI, to further explore the practical implementation of the findings of DG HOME's study 'Opportunities and challenges for the use of AI in border control, migration and security' and enhance the work on AI use cases within the systems entrusted to eu-LISA.

eu-LISA is also actively contributing to multiple forums and discussions on this subject.

The aim of this roadmap is to provide an overview of all existing and future (planned & potential, near to medium/long term) activities of the Agency in the area of AI in the JHA domain. Besides the usual estimated timeline for completion, the roadmap also provides a rough estimation of resources necessary to implement the listed activities, indicating also the priority considered for the described activities.

The overall intention is to have the roadmap as a “living” document that will be complemented with additional initiatives and further information on potential timelines and additional resources (human and budgetary).

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<sup>1</sup> <https://op.europa.eu/s/s5Rg>

<sup>2</sup> <https://op.europa.eu/s/pYee>

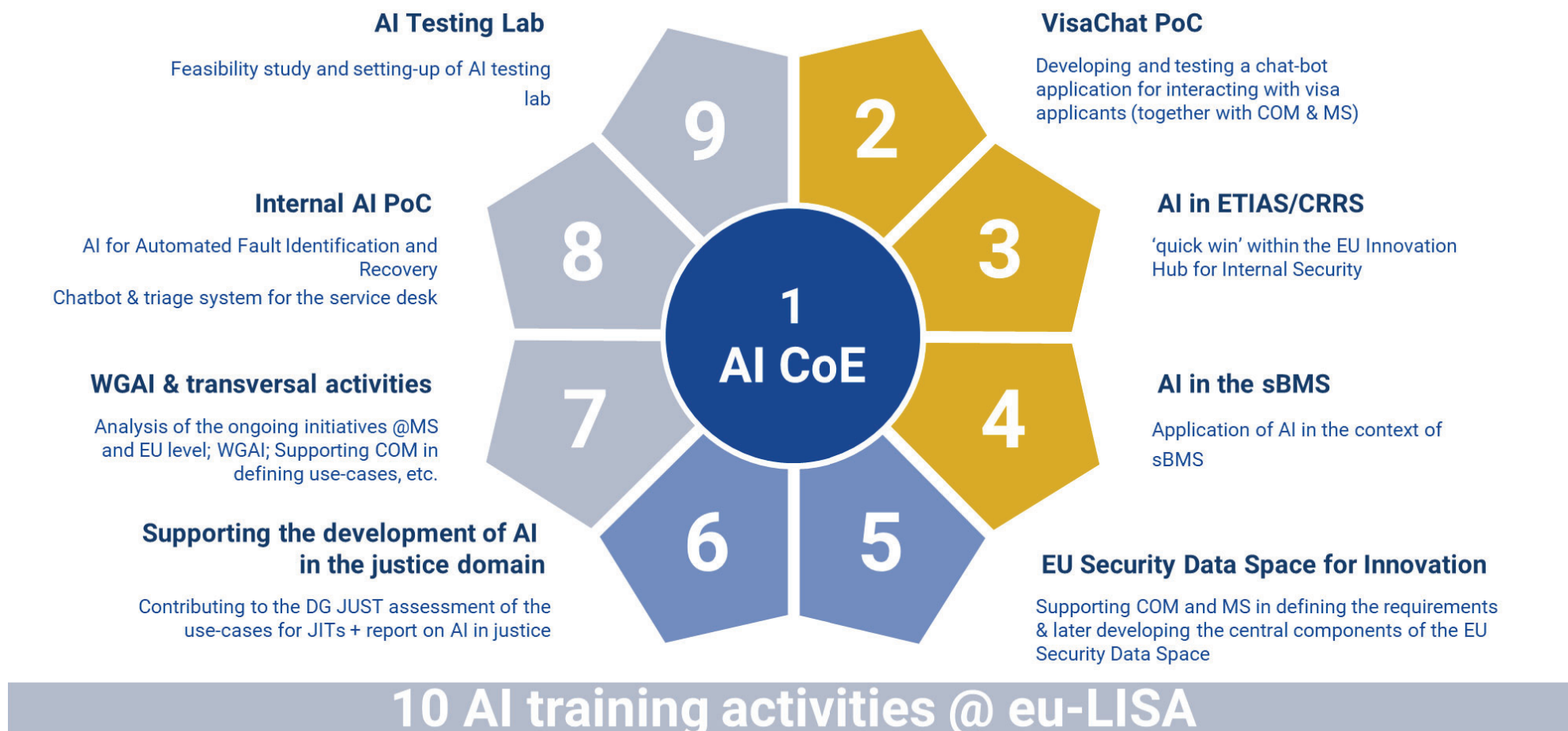
<sup>3</sup> Finalised in the summer of 2020.

<sup>4</sup> Preliminary internal assessment is currently ongoing.

<sup>5</sup> Project in progress.

<sup>6</sup> Project kicked-off in July 2021; end of project – Q1 2022.

<sup>7</sup> Has not started.



▲ Figure 1: High-level overview of all activities integrated in the Roadmap

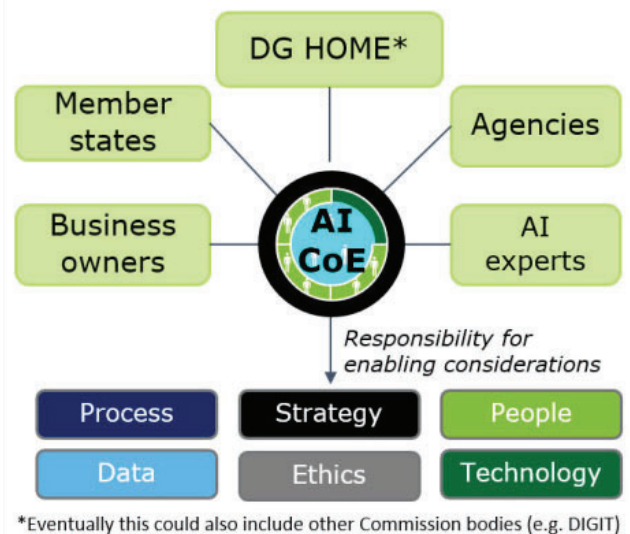
# 1. Centre of Excellence for Artificial Intelligence in the JHA domain

Artificial intelligence is widely regarded as an essential component of the internal security architecture. Stakeholders across the JHA community have embraced the technology as a potential solution to a number of challenges faced by security practitioners on a daily basis. Therefore, development of AI tools has become an important part of the work performed by the relevant Member State authorities as well as JHA agencies. Development of AI tools is a complex and resource-intensive process.

- First, it requires alignment with the existing legal frameworks at both national and EU levels.
- It often requires large-scale data sets for model training, which are expensive to produce and often also legally challenging.
- It often requires high-performance computational infrastructure, which is not always available to the parties interested in developing such solutions.
- It requires extensive testing and evaluation, to ensure that the systems work as intended without producing adverse outcomes.
- Development of AI solutions requires specific skills and capabilities.

To address these challenges and support the EU JHA community in the development of capabilities, as well as AI tools, while optimising the use of resources, the Commission proposed to create a Centre of Excellence for AI (AI CoE) in the JHA domain<sup>8</sup>.

As a follow-up to the initial proposal made in the study referred to above, DG HOME proposed to undertake an initial assessment of the creation of the AI CoE, including the operational model, scope and responsibilities, within the scope of the ongoing VisaChat PoC project. DG HOME proposed to host this CoE at eu-LISA. Therefore, CoE will provide an overall framework and integrate the initiatives focusing on AI at eu-LISA and beyond. The currently ongoing initiatives focusing on AI, as well as those planned in the near future, will feed into the CoE and help kick-start its operation.



▲ Figure 2: Schematic representation of the potential structure of the AI CoE and its responsibilities (DG HOME/Deloitte, 2020)

<sup>8</sup> <https://op.europa.eu/s/suJW>

#	Action	Timeline	Owner	Contributor Unit/Sector	Contributor Persons <sup>9</sup> (internal resources)	Resource (man- days)/year	Resource (€)	External support (Studies)	Status	SPD
1.1	Define AI Centre of Excellence strategy, purpose, requirements and operating model	Q4 2021 – Q1 2022	COM	BRMS/ARCS CABS/PDMS	4-5	20	As per COM's budget (within the study)	N	Ongoing	NA
1.2	Establishment of the AI CoE at eu-LISA in line with the model proposed in the study.	Q4 2022-Q1 2023	eu-LISA	OD/CABS	7-10	100 (TBC following the completion of the study)	TBD following the completion of the study	Y	Not started	2022 2023
1.3	Feasibility study to support the implementation of AI roadmap	Q1-Q4 2022	Eu-LISA	OD/CABS	7-10	60	500k	Y	Not started	2022 (TBI <sup>10</sup> )

<sup>9</sup> This is an indication of the overall number of persons who may potentially contribute to each of the activities and should not be interpreted as full-time engagement.

<sup>10</sup> To be included

# AI to support eu-LISA systems and the interoperability architecture

## 2. VisaChat proof of concept (PoC) project

The visa procedure is one of main processes for controlling access to the Schengen area for short stays (not exceeding 90 days in any 180-day period). The issuance of Schengen visas is organised by means of the Visa Code that applies to all Schengen Member States. In compliance with the common practices included in the Visa Code, each Member State organises the visa issuance process according to its own rules and preferences. Evaluations show that the visa process is time and cost intensive for the Member States' consular posts and the corresponding central administration. One of the reasons is that visa authorities have to answer many requests from visa applicants (e.g. the procedure to follow, the requirements for the supporting documents, the meaning of specific requirements to their situation) and have to be sure to apply the Visa Code consistently.

The overall purpose is to deliver to Member States an application (chatbot) using AI that answers questions from visa applicants in compliance with the Visa Code. The expected benefits of the envisaged visa chatbot are to reduce the number of information requests by phone or emails from applicants handled by consular staff. This objective will be achieved if the applicant receives a better or quicker answer via the chatbot than by making a call, sending an email or consulting on-line information ("FAQ's" and web pages). A major differentiating element for the applicant would be to receive the answer in their native language.

The study coordinated by DG HOME and contracted under the ABCIV framework contract (FwC) with Deloitte, aims to look at the feasibility of building such a chatbot for VISA process purposes.

On the basis of the results of the first phase of the project, the current project's purpose and scope will be confirmed.

The project is organised in three phases:

**Phase 1:** Project set-up supported by a Proof of Concept (PoC). An initial version of the Centre of Excellence to be defined during this phase. (Q3 2021 – Q1 2022)

**Phase 2:** Project execution in successive releases of the chatbot as an operational system. An AI Centre of Excellence would be expected to support the chatbot development. (Q3 2022-Q2 2023)

**Phase 3:** Service continuity and making an AI Centre of Excellence operational (Q3 2022-Q2 2023 onwards)

#	Action	Timeline	Owner	Contributor Unit/Sector	Contributor Persons (internal resources)	Resource (man- days)/year	Resource (€)	External support (studies)	Status	SPD
2.1	Support DG HOME throughout the study and PoC phases	Q3-4 2021 – Q1 2022	COM	ARCS/CABS/ PDMS/BRMS	7	15	N/A - DG HOME study	No	Work in progress	NA
2.2	Development of the actual chatbot (PoC) as a combined effort with selected MS	Q1 2022	COM/eu-LISA	ARCS/CABS/ PDMS/BRMS	7-10	10	DG HOME study and hosting by Deloitte	No	Work in progress	2022 (TBI)
2.3	Hosting and maintaining the VisaChat application (result of the PoC)	As of mid Q1 2022	COM/eu-LISA	ARCS/CABS/ PDMS/BRMS	4	20	To be taken over by eu-LISA after PoC	No	Not started	2022 2023
2.4	Future development of the Actual Chatbot	As of Q4 2022 – Q1 2023 ??	eu-LISA	OD/CABS	As per legal package 8-10		As per legal package (estimation to come with DG HOME's study)	Yes	Not started	Not included

### 3. AI in ETIAS/CRRS

Article 84 of the ETIAS regulation lists the data that eu-LISA shall store in the central repository for reporting and statistics (CRRS)<sup>11</sup>. In accordance with Article 39 of the Interoperability Regulation, cross-system statistical data and analytical reporting shall allow<sup>12</sup> the listed authorities to obtain customisable reports and statistics, to support the implementation of the ETIAS screening rules<sup>13</sup> to improve the assessment of the security, illegal immigration and high epidemic risks, to enhance the efficiency of border checks and help the ETIAS Central Unit and the ETIAS National Units to process the travel authorisation applications.

In addition, following Article 54 of the IO Regulation, the Tender Technical Specifications of CRRS have been endorsed by the Agency's Management Board and received the conditional favourable opinion from European Commission.

Referring to the specific architecture building block on 'data Lake' that includes AI capabilities (Machine learning, natural language interface), COM stated that: "This component is necessary despite not being explicitly addressed in the applicable legal texts but is a consequence of requirements for performing the risk analysis included in ETIAS". eu-LISA intends to implement AI for the support of the Member States to support to the screening rules and risk profiling management of ETIAS. The Central Repository for Reporting and Statistics (CRRS) will be the mechanism which will be used for this purpose. In the longer term, this AI platform should not only provide capabilities for ETIAS but also for VIS revision related use cases.

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<sup>11</sup> Article 39 of Regulation (EU) 2019/817 on interoperability (IO)

<sup>12</sup> in accordance with the respective legal instruments governing the systems (article 84.2)

<sup>13</sup> Art 33 of the ETIAS regulation

#	Action	Timeline	Owner	Contributor Unit/Sector	Contributor Persons (internal resources)	Resource (man- days)/year	Resource (€)	External support (Studies)	Status	SPD
3.1	Feasibility study to identify use cases that could be derived from the applicable legislation (primary and secondary acts) and beyond, to identify the most suitable technologies and to estimate resources and costs.	Q4 2021- Q1 2022	PPMS	BRMS/ARCS/ CABS	4-5	30	Within the existing budget envelope of the programs (ETIAS and IO)	Y	Not started	2022
3.2	Mapping of the requirements stemming from the applicable legislation (primary and secondary acts) per core business systems and of the possible technology and algorithms for their implementation	Q1 2022	PPMS	BRMS/ARCS/ CABS	3	10	Within the existing budget envelope of the programs (ETIAS and IO)	N	In progress	2022
3.3	Cooperation with Frontex in order to identify their interests and potential use cases	Q2 2022	BRMS/ CABS	BRMS/ARCS/ CABS/PPMS	3	10	Within the existing budget envelope of the programs (ETIAS and IO)	N	In progress	2022
3.4	Analysis of CRRS data to support ETIAS risk management	end 2022/ 2023	PPMS	BRMS/ARCS/ PDMS/CABS	3	10	Within the existing budget envelope of the programs (ETIAS and IO)		Not started	2022 2023
3.5	Use of AI for various other analytics (e.g. for the VIS revision)	2023/202 4	PPMS	BRMS/ARCS/ PDMS/CABS	3-5	10	TBC		Not started	2023 2024

## 4. AI in the shared Biometric Matching System (sBMS)

AI in the context of biometrics within the sBMS aims to support all biometric operations required by the systems that eu-LISA runs.

Convolutional Neural Networks (CNN) is the type of AI used within the sBMS to support the current modalities (fingerprints and facial images), performing template generation, which is the base element used for both biometric verification and biometric identification. The world of biometrics is a world of statistics, where a match is always associated to a certain level of certainty, defined by a matching score. The matching score is defined by a probability that the stored biometric template matches with the template generated from a live sample match. Furthermore, AI is used to enhance the ability to extract more accurate templates, specifically in cases of low quality, thus reducing the risk of false negative and false positive matches.

Currently, the sBMS supports two types of biometric operations, both of which use AI:

- Verification, which is a comparison of two images in order to determine if they are the same. In this context, AI is used in order to analyse the image and build the templates (a mathematical representation of the image), while the comparison itself is done without using AI.
- Identification, where the AI computes the template of a specific image, associated with a specific context. The template is then stored in the database and used for later comparisons.

For fingerprints, AI is used to enhance and complement the existing good image analysis techniques in order to enhance and complement them (for instance, to complement low-quality or latent images). For facial images, the AI techniques have replaced the image analysis technologies used earlier. In the context of the sBMS, AI will support the biometric operations of all central systems run by eu-LISA that have a biometrics part on their core datasets (SIS II, VIS, Eurodac, EES, ECRIS-TCN).

In order to train the sBMS AI, there is a need for real data, as synthetic data cannot yet be used. On the contrary, to assess the throughput performances, a lot of datasets are needed, for which a synthetic database is used. eu-LISA is looking at the possibility of acquiring real data in order to assess the accuracy before the entry into operation of the new systems, in the respect of data protection. sBMS allows the end users to give feedback on the results it provides, which is then taken into account to compute the observed accuracy metric and compare them to the contractual accuracy values.

#	Action	Timeline	Owner	Contributor Unit/Sector	Contributor Persons (internal resources)	Resource (man- days)/year	Resource (€)	External support (Studies)	Status	SPD
4.1	AI implementation within the sBMS project (design, development, test, deployment)	Q2 2022	eu-LISA	OD	4	100	Within the existing budget envelope of the sBMS project	Y	ongoing	Within sBMS (but not specifically in the SPD)

# Support to eu-LISA stakeholders: Member State authorities, Commission, JHA agencies

## 5. European Security Data Space for Innovation

DG HOME is planning to launch two initiatives:

- First, within the scope of the Digital Europe Programme provide financial support to Member State authorities for the creation of national infrastructures for data spaces in the JHA area;
- Second one under the Internal Security Fund, for the analysis, standardisation and generation of training data.

As part of the EU-level effort to create European data spaces that would facilitate innovation in different sectors, the Commission, following the interest expressed by the Member State, proposed to create the EU Security Data Space for Innovation. The data space will address one of the main challenges met in the development of reliable AI systems: the availability of high quality training and testing data sets of sufficient size. The data space will serve the interests of all stakeholders in charge of public or internal security in Europe, including the national law enforcement authorities and authorities in charge of border security as well as the relevant European JHA Agencies, such as Europol, Frontex, and eu-LISA. It aims to lay the economic, organisational and technical foundations of a federated data infrastructure for innovation in the area of security, as a hybrid model including:

- a reference architecture (including a target design, at solution, application and infrastructure levels) with national and central components;
- data quality standards and data governance (taking into account the already available standards or work conducted, as well as the requirements set in the proposed AI Act<sup>14</sup>), data protection safeguards and privacy by design functionalities, and criteria for certifications and product quality;
- interoperable datasets suitable to test, train and validate specific algorithms (including sharable data models) for specific intended purposes, which should be available for innovation activities in the area of internal security performed by Member State authorities and relevant EU agencies, including for the development and deployment of tools using AI technologies.

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<sup>14</sup> Commission proposal COM/2021/206 final for laying down harmonised rules on artificial intelligence (artificial intelligence act) 21 April 2021 (<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0206>)

#	Action	Timeline	Owner	Contributor Unit/sector	Contributors Persons (internal resources)	Resource (man- days)/year	Resource (€)	External support (Studies)	Status	SPD
5.1	Feasibility study launched by DG HOME on the central AI data space components (including also interfaces with national ones)	Q4 2021- Q2 2022	DG Home	ARCS/CABS/BRMS	3	30	NA	No	Prep.work by DG HOME ongoing	2022
5.2	Contribution to drafting of the high-level architectural solutions (federated and/or central) for this data space and to the draft technical requirements for national data spaces	As of Q2 2021	DG Home	ARCS/CABS/BRMS	3	15		No	Work in progress	2022
5.3	Thorough examination about the need of a dedicated legal instrument allowing the sharing of training data and expanding eu-LISA's mandate (DG HOME's view of having the centralised components with eu-LISA)	Q4 2021	DG Home	ARCS/CABS/BRMS/	4	10		No	Not started	NA

## 6. Supporting the development of AI in the justice domain

Justice stakeholders have been voicing for some time the need for a digital tool ensuring secure cross border exchange of digital evidence between EU Member State authorities, as well as with third States involved in joint investigations within the framework of a Joint Investigation Teams (JITs). The Digital Criminal Justice (DCJ) study carried out by Deloitte on behalf of the European Commission in 2020<sup>15</sup>, picked up on this issue. The study's results confirmed the need and elaborated on further aspects that could be covered by the digital tool. Following the study, the Commission acknowledged that a dedicated IT tool could be helpful in different phases of a JIT. The study recommends creating an IT collaboration platform to support the functioning of JITs, ensuring that they communicate and exchange more efficiently and more securely. As a result, the European Commission has launched preparations for a proposal for a EU Regulation on the establishment of "a collaboration platform to support the functioning of Joint Investigation Teams". The general objective of the initiative is to facilitate the communication and collaboration within a JIT, through a dedicated digital tool and increase the efficiency and effectiveness of investigations and prosecutions conducted by the JIT members.

The specific objectives of the proposal are to: ensure that members of a JIT have easy and immediate access to the technology they need for working together; ensure that members of JITs can more easily share and possibly store information and evidence collected in the course of the JIT activities; ensure that members of a JIT can make use of a technology solution that does not depend on the IT infrastructure used by Member State law enforcement and judicial authorities, while at the same time facilitating the exchange of data with the case management systems of the Member States, as well as of the EU agencies and bodies involved in the JIT, and facilitate collaboration with third countries, taking account of the specific legal framework applicable in such cases.

Key potential functionalities of the platform being considered:

- an administrative workflow to set up the JIT (preparation of the JIT agreement, collaborative editing of the text, machine translation of the agreement, signing of the agreement via electronic signature, etc.);
- functionalities related to daily management of the JIT (contacts, calendars, dashboards, tasks, etc.);
- secure communication (a communication tool replacing emails, "Signal" or "WhatsApp" like instant messaging, chat, audio and video-conferencing, etc.);
- exchange of information and evidence (including large files), file storage (temporary and/or permanent);
- evidence traceability;
- various technical capabilities (e.g. crime analysis tool, search tool, text to speech converter, speech to text converter, Optical Character Recognition (OCR), etc.).

In the context of the collaboration platform for JITs, AI can be applied in a number of use cases, such as automated translation, analysis of unstructured data (e.g. named entity identification), analysis of different types of audio-visual media for the identification of crime victims or perpetrators, etc. Some of these use cases will be explored in the report on AI in the justice domain jointly prepared by eu-LISA and Eurojust.

The proposal is expected to be adopted in December 2021, based on the results of the above-mentioned DCJ study, as well as the JITs evaluation reports prepared by the JITs Network, and the annual reports from Eurojust. Information is also being collected through targeted consultations with stakeholders, i.e. the JITs Network, the Member States, Eurojust, Europol, OLAF, eu-LISA and the EDPS. The topic will be also presented and discussed in the context of two Expert Groups managed by the Commission, including the Expert Group on EU Criminal Policy.

eu-LISA has held a series of technical meetings with key stakeholders in order to discuss the feasibility of implementing the functionalities and it is foreseen to contribute to the assessment in terms of resources needed for future implementation. Development and implementation of the JITs platform and the related services would require a change in the eu-LISA establishing regulation. Therefore, we do not include the related activities in the current Roadmap, beyond the initial assessment.

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<sup>15</sup> Cross-border Digital Criminal Justice. Final report (<https://op.europa.eu/s/s5ZX>)

#	Action	Timeline	Owner	Contributor Unit/Sector	Contributor Persons (internal resources)	Resource (man- days)/year	Resource (€)	External support (Studies)	Status	SPD
6.1	Contributing to the DG JUST assessment of the use cases and resources needed for the JIT legislation.	Q2-3 2021	ARCS	BRMS/ARCS/CABS/ PDMS/SMSS	5	5		N	ongoing	NA
6.2	Special report on AI in Justice	Q3-4 2021	CABS	BRMS/ARCS	3	20		N	Ongoing	NA

# Building internal AI capabilities at eu-LISA and supporting stakeholder capability building

## 7. WGAJ and transversal activities

In addition to the outward-facing activities aimed at providing support and services to eu-LISA stakeholders, eu-LISA will undertake a number of auxiliary activities. Those mainly focus on supporting the core activities, developing AI capabilities within the Agency, as well as deploying AI in internal business processes. The Working Group on AI (WGAJ) was established by an Executive Director's Decision in February 2021. The first meeting took place in May 2021 and two following meeting are scheduled in 2021. The meetings are planned to be held once per quarter with the representatives of eu-LISA, the European Commission, EU Agencies, Member States (incl. experts from industry if/when needed).

### **The mandate of the WGAJ is to:**

- a. Provide Member States, the European Commission, JHA Agencies and eu-LISA with a regular forum for the exchange of best practices and the discussion on opportunities and challenges arising from the implementation of AI-based solutions within the Agency's mandate;
- b. Identify use cases for the implementation of AI solutions in the systems entrusted to eu-LISA, and prioritise them, maximising the added value of the services provided by eu-LISA to its stakeholders;
- c. Facilitate the development of a common approach for the use of AI-based solutions in the context of the operational management of large-scale IT systems in the JHA domain, leveraging synergies and capitalising on existing investments in information and communication technologies across Member State authorities, EU Agencies and the European Commission;
- d. Facilitate alignment across stakeholders in the practical implementation of AI-based solutions, in particular with the aim to provide standardised solutions and mitigate possible risks in deployment of those.

#	Action	Timeline	Owner	Contributor Unit/Sector	Contributor Persons (internal resources)	Resource (man- days)/year	Resource (€)	External support (studies)	Status	SPD
7.1	Analyse the AI initiatives at national level in the Justice and Home Affairs (JHA) area conducted and planned by MS	Q3-Q4 2021	CABS	ARCS/BRMS/COM/MS/JHA agencies	4	5		NA	Ongoing	NA
7.2	Organise regular quarterly meetings of the WGAI	Regular	ARCS/CABS	BRMS/PDMS	2	10		NA	Ongoing	2022/23

## 8. Internal AI Proof-of-Concept (PoC) projects

In addition to the outward-focused initiatives, eu-LISA is also planning to carry out two internal PoC projects, which, if successful, will be implemented in production. The initial plan is to implement two PoC projects:

1. AI for Automated Fault Identification and Recovery at eu-LISA
2. Chatbot interface to increase efficiency of Level 1 (L1) service desk

The objective of the first PoC is to automate the process of fault identification and recovery of systems, hence to predict potential failures, and allow the systems to respond in a preventive and proactive manner rather than with a reactive approach. AI should be applied for incident prediction and will use metrics including infrastructure performance, and historical data to automate the process of fault identification and recovery.

The PoC will be structured in two Modules: **Module 1:** AI for detecting emerging faults; **Module 2:** AI for suggesting the appropriate remedial action.

The PoC will be implemented in three stages.

**Stage 1 - Analyse and plan.** The current infrastructure management process will be evaluated to identify the most appropriate mechanisms for the testing of AI techniques, and the datasets required. Stage 1 will include the following activities:

- **Identify in-scope components:** (Module 1) Systems and fault types to which the AI should be applied (e.g. failed connections with stakeholders, processing errors of records in the CBSs, inferior data quality of fingerprints within AFIS, and (Module 2) corrective actions which should be encoded as rules;
- **Identify out-of-scope components:** (Module 1) Systems, fault types and (Module 2) actions that human intervention should always handle (e.g. critical incidents).
- **Agree success measurement metrics:** Metrics that will evaluate the accuracy and business value of the AI (e.g. (Module 1) lower number of incidents, increased MTBF; (Module 2) decreased MTTR, number times system is unexpectedly interrupted for maintenance;
- **Identify and assess the available data for the AI:** (Module 1) Data that will be used to train the AI (e.g. historical data on the VIS, such as creation of records) and (Module 2) content to respond with (such as historical data logs of the CBSs).

**Stage 2 – Build.** Rapidly build both of the AI modules and to test through a series of iterative Agile sprints. Each sprint may include the following activities:

- **Data exploration:** carry out initial analysis to assess the nature of the data, highlight insights, inform modelling results.
- **Build initial AI model(s):** develop an initial version of the AI model to generate forecasts.
- **Review results and insights:** evaluate interim modelling results and findings from data, with key stakeholders.
- **Iterate AI model(s):** iterate modelling methodology to improve solution effectiveness.

**Stage 3 – Validate:** Validate the solution, assess accuracy, and assess the subsequent value expected from follow-on implementation. Stage 3 will include the following activities:

- **Assess the solution using success measurement metrics:** the solution accuracy will be evaluated against a test set of data, simulating 'real world' operation as closely as possible but without integration of the systems in operational environment.
- **Operational value assessment:** using the results of the solution evaluation, a value assessment will inform the expected benefit of the solution as in a live deployment in an operational environment. Moreover, within the finalisation of the PoC, a knowledge transfer to eu-LISA shall be performed: the hardware and software purchased to implement the PoC shall also remain available at eu-LISA AI lab, in order to be able to correct the algorithm's behaviour and to create new models.

#	Action	Timeline	Owner	Contributor Unit/sector	Contributor Persons (internal resources)	Resource (man- days)/year	Resource (€)	External support (studies)	Status	SPD
8.1	Development of the Automated Fault Identification and Recovery	2025-2027?	IMU	ARCS/CABS	5-7	70	400 000	Y	Not started	Depending on the timeline
8.1.1	Analyse and Plan: a. Identify in-scope components b. Identify out-of-scope components c. Agree success measurement metrics d. Identify and assess the available data for the AI	2025?	IMU	ARCS/CABS	5-7	40		Y	Not started	Depending on the timeline
8.1.2	Build: a. Data exploration b. Build initial AI model(s) c. Review results and insights d. Iterate AI model(s)	2026?	PSU/IMU/TTU	PPU/CABS	7-9	200		Y	Not started	Depending on the timeline
8.1.3	Validate: a. Assess the solution using success measurements metrics b. Operational value assessment	2026?	PSU/IMU/TTU	PPU/CABS	7-9	60		Y	Not started	Depending on the timeline

The second PoC is a **chatbot interface to increase efficiency of Level 1 (L1) service desk**. A chatbot-based solution can improve the customer experience in Member States and other stakeholders of the systems, and efficiency of the L1 service desk, which is experiencing a strain on capacity. The solution is expected to contain a core chatbot components to facilitate communication and (in future) downstream actions.

The solution aims to address a current operational strain on service desk due to high volumes of tickets/ issues, which is expected to be increased with implementation of new systems (e.g. ETIAS, EES, ECRIS-TCN, future interoperability components) and to increase efficiency by faster resolution of queries and reach better service quality by consistency and self-improving feedback loops.

#	Action	Timeline	Owner	Contributor Unit/Sector	Contributor Persons (internal resources)	Resource (man- days)/year	Resource (€)	External support (studies)	Status	SPD
8.2	Development of the chatbot interface to improve efficiency for L1 service desk	2025-2027?	SOU	ARCS/CABS/IMU	5-7	300		Y	Not started	Depending on the timeline
8.3	Development of an automated triage solution for managing and (partial) resolution of incoming tickets/issues	2025-2027?	SOU	ARCS/CABS/IMU	5-7	300		Y	Not started	Depending on the timeline

## 9. AI Testing Lab

eu-LISA aims to establish the AI Testing Lab to facilitate the development and implementation of AI-based solutions, in accordance with the data protection rules and with a view to further strengthen both internal AI capabilities as well as those of the relevant stakeholders. The AI Testing Lab is meant to provide an environment to test and evaluate solutions implemented within the eu-LISA environment. In the medium to long-term view, the AI Testing Lab could be further exploited to support the testing of AI solutions developed/procured by the Member States. This will be a good opportunity for eu-LISA to advance its own capabilities and those of its stakeholders, gaining awareness of existing technologies, implementation challenges and opportunities within and outside the organisation.

The first step towards establishing the AI testing lab will be a feasibility study, in which the scope of the service portfolio, as well as the operating model will be defined. The second step, will be the creation of an Expert Group involving experts from Member State authorities, the Commission, and relevant JHA agencies. The final step will be the creation of the testing lab.

The testing lab will be established in close collaboration between eu-LISA, DG HOME, Europol, and Frontex. Potential synergies with the EU Innovation Hub for Internal Security may be sought in the future to enable best use of the already existing networks and relevant capabilities. In addition, the established Testing Lab will interact with the Testing Labs of the Member States and relevant JHA agencies (where those exist) in order to develop synergies and optimise the use of resources.

The scope of the Testing Lab will be defined on the basis of the results of the feasibility study.

#	Action	Timeline	Owner	Contributor Unit/Sector	Contributor Persons (internal resources)	Resource (man- days)/year	Resource (€)	External support (studies)	Status	SPD
9.1	<p>Conduct a feasibility study with the following objectives:</p> <p>a. Define the scale and scope of the Testing Lab;</p> <p>b. Define the service portfolio of the Testing Lab;</p> <p>c. Analyse the possibilities and constraints from the legislative point of view;</p> <p>d. Analyse resource implications of different options for the Testing Lab;</p> <p>e. Conduct a cost/benefit analysis</p>	2023?	TTU/CABS	PSU (ARCS, PDMS), IMU, FPU	5-7	30	400k	Y	Not started	2023?
9.2	<p>Set up an Expert Group on the Testing Lab</p> <p>The purpose of the Expert Group is to discuss the scope, set-up, requirements, resource implications of the Testing Lab and steer the feasibility study performed by the contractor.</p> <p>Governance arrangements for the expert group, as well as its exact composition will be defined in a separate document</p>	2023-2024?	TTU/CABS	PSU (ARCS, PDMS), IMU	5-7	10	NA	Y	Not started	2023 2024
9.3	Establishment of the Testing Lab	2024-2025	TTU/CABS	PSU (ARCS, PDMS), IMU	7-10	100	TBC	Y	Not started	2024 2025

## 10. AI Training Activities

eu-LISA also aims to have internal AI training programs in place in order to enhance the expertise of its staff and be able to cope with the challenges resulting from AI implementation, and help the Agency gradually build internal capacity and capabilities in AI. The table below shows the the possible content and structure of the training curriculum.

AI Interest Points @ eu-LISA	Basic Training Level 1	Intermediate Training Level 2	Advanced Training Level 3	Expert Training Level 4
Potential audience	All staff	Technical staff	Management & technical staff	Technical staff
AI in the development of large-scale JHA IT systems (including application/systems' design, monitoring & processing + usage of data lakes/warehouses, AI hubs)	<ul style="list-style-type: none"> <li>Fundamentals of AI &amp; ML (introduction) - learn about machine learning and its growing role in business;</li> <li>AI Capabilities, Functionalities &amp; Usage;</li> <li>Neural Networks &amp; Deep Learning (introduction);</li> <li>Key AI applications, functionalities &amp; usage: Natural Language Processing, Computer Vision, Robotics etc.;</li> <li>AI and ethics (e.g. bias, discrimination, ethics of automated decision-making) – for this we can also provide references to already existing online courses;</li> <li>Legal/regulatory aspects of AI.</li> </ul>	<ul style="list-style-type: none"> <li>Computer Vision &amp; Natural Language Processing (use cases and applications);</li> <li>Understand/Identify the flow from data collection to AI: capturing data, organising data, cleaning data, crunching data, building predictive models/patterns, design AI autonomous systems;</li> <li>Use of ML, the role of data and the importance of implementation (including roadmap/plan);</li> <li>Neural Networks &amp; Deep Learning (extended information)</li> </ul>	<ul style="list-style-type: none"> <li>Get familiarised with the main tools to apply AI/ML, since enterprise-ready solutions to data scientists' tools</li> <li>Understand the output of a ML model (statistics) and how to improve it</li> <li>Identify where, how and what AI solutions could be applied to specific contexts</li> <li>Understand the infrastructure requirements for deploying different types AI/ML (i.e. compute requirements; data storage requirements depending on the approach and data used)</li> </ul>	<ul style="list-style-type: none"> <li>Develop/create the flow from data collection to AI: select the proper data, organising data, cleaning data, crunching data, building predictive models/patterns, design AI autonomous systems;</li> </ul>
AI in infrastructure & service management (including operations & monitoring)				
Conversational Agents, Virtual Assistants & Chatbots				
AI in IT systems security (e.g. against cyber-attacks)				
AI in Data Center Infrastructure and facilities (energy performance monitoring, cooling, etc...)				
AI in object and subject recognition (e.g. biometrics, goods classification in alarms, etc.)				
AI in predictive analytics, forecasting, big data analytics.				
AI Research (focused on the above areas)				

#	Action	Timeline	Owner	Contributor	Resource (man-days)/year or session	Estimated number of trainees	Resource (€)	External support (Service provider)	Status	SPD
10.1	Training Level 1	Q4 2021 – Q3 2022	L&D/CABS	PSU (ARCS, PDMS)	10	40-50 trainees	According to training packages (10-15k)	Y	Not started	2022
10.2	Training Level 2	Q4 2021 – Q3 2022	L&D/CABS	PSU (ARCS, PDMS)	10	30-40 trainees	According to training packages (20-35k)	Y	Not started	2022
10.3	Training Level 3	2022	L&D/CABS	PSU (ARCS, PDMS)	10	20-30 trainees	According to training packages (30-45k)	Y	Not started	2022
10.4	Training Level 4	2022	L&D/CABS	PSU (ARCS, PDMS)	10	10-20 trainees	According to training packages (up to 50k)	Y	Not started	2022

# High-level timeline for the implementation of actions

AI Roadmap - high-level plan		2021				2022				2023				2024				2025			
	Activity	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4			
A1	Centre of Excellence for AI in the JHA domain	MS1																			
A2	VisaChat Project	MS2	MS3/MS4																		
A3	AI in ETIAS/CRRS			MS5		MS6				MS7											
A4	AI in sBMS			MS8																	
A5	European Security Data Space for Innovation					MS9															
A6	Supporting the development of AI in the justice domain	MS10																			
A7	WGAI and transversal activities																				
A8	Internal AI PoCs																				
A9	AI testing lab																				
A10	Training activities on AI		MS15			MS16					MS13	MS12			MS11			MS14			
Milestones																					
MS1	AI CoE set-up report - scope/strategy/operating model	end Q4																			
MS2	Target architecture for the VisaChat	end Q4																			
MS3	VisaChat PoC report		early Q1																		
MS4	Solution delivery report		late Q1																		
MS5	Feasibility study on the use of AI in ETIAS/CRRS/VIS							late Q2													
MS6	Definition of requirements for AI in ETIAS/CRRS finalised									late Q4											
MS7	CRRS - EIO													late Q4							
MS8	Implementation of AI within the sBMS finalised			late Q2																	
MS9	Feasibility study on the EU data space completed									late Q4											
MS10	Publication of the report on AI in the justice domain	late Q4																			
MS11	Initiation of the internal PoCs														Q1						
MS12	Completion of the feasibility study on the AI Testing Lab															end Q2					
MS13	Setting-up of an expert group for the AI testing lab																				
MS14	Establishing of the testing lab											Q1						end Q4			
MS15	Defining the training portfolio		early Q1																		
	Procurement of training services matching the portfolio & launch																				
MS16	of trainings				late Q3																