

STARLIGHT

Sustainable Autonomy and Resilience for
LEAs using AI against High Priority Threats

Newsletter Issue #2, November 2023



MESSAGE FROM THE PROJECT COORDINATOR

Welcome to the second edition of our newsletter as we bid our farewell to the STARLIGHT project's second year, filled with significant achievements and progress.

The project has made notable strides in developing innovative tools to bolster European Law Enforcement Agencies (LEAs), ensuring they are ethical, transparent, and accountable.

We are grateful for the collaboration and support from all contributors that are playing a crucial role in the project's success.

Over the past year, our team has been actively participating in seminars and workshops, sharing knowledge, and receiving constructive feedback from the community.

October was a month filled with significant events and milestones for STARLIGHT. We had the pleasure of participating in the Security Research Event (SRE) 2023 in Brussels, where we showcased our latest developments and engaged with fellow researchers and security practitioners.

This was followed by our third ToolFest and the first Physical Pilot in Brussels, where our technical partners had the opportunity to demonstrate their tools, offering a valuable showcase for our technological advancements.

The feedback received from our partner LEAs during these events has been extremely valuable, providing direction for the further refinement and enhancement of our tools.



As we move into the project's third year, we are inspired by your continuous support and are eager to share our key milestones, aspirations, and partnerships in this edition.

Our aim is to continue fostering collaboration between researchers and security practitioners driving the project forward and ensuring the rapid adoption of our AI-driven solutions.

This interaction will continue to facilitate the fast and effective uptake and adoption of our AI solutions.

I encourage you to stay connected with us through email, social media, and our project website to receive the latest updates and participate in our shared journey towards a safer and more secure Europe.

Thank you for your ongoing support.

Warm regards,
Nizar Touleimat

PAGE TWO



HIGHLIGHTS OF YEAR TWO

In our second year, we were actively involved in a diverse range of activities as part of our project. We are pleased to share an overview of these engaging events with you.

January 25th and 26th, 2023: Joint conference on "Ethical and Legal Aspects of AI for Law Enforcement" in Brussels, Belgium.

February 7th and 8th, 2023: Seminar on Modern Technologies for Combating Terrorism Financing in Athens, Greece.

February 15th, 2023: Final AIDA Workshop in Rome, Italy.

February 24th, 2023: Information Day for the AIDA Project in Athens, Greece.

March 23rd, 2023: CERIS seminar on Artificial Intelligence for Security Purposes in Brussels, Belgium.

March 28th to 30th, 2023: General Assembly and 1st ToolFest in San Sebastian, Spain.

May 29th to 31st, 2023: RISE-SD in Rhodes, Greece.

June 15th, 2023: STARLIGHT 2nd ToolFest, online event.

June 21st and 22nd, 2023: ALIGNER 5th public workshop in Sankt Augustin, Germany.



PAGE THREE



June 22nd, 2023: The Second Edition of the Cyber Journey—the European Edition in Cagliari, Italy.

July 7th, 2023: "Cybersecurity of AI and AI for Cybersecurity" webinar organised in conjunction with CLAIRE.

July 27th, 2023: INFINITY final demonstration event at Sheffield Hallam University in Sheffield, United Kingdom.

September 4th and 5th, 2023: SPIE Conference on Artificial Intelligence for Security and Defence Applications in Amsterdam, Netherlands.

September 13th–15th, 2023: 18th International Conference on Critical Information Infrastructure Security (CRITIS2023) in Helsinki, Finland.

September 19th, 2023: popAI final event in Brussels, Belgium.

October 24th and 25th, 2023: Security Research Event (SRE) 2023 and 3rd ToolFest in Brussels, Belgium.

October 26th, 2023: First Physical Pilot at the Belgian Federal Police in Brussels, Belgium.

October 26th, 2023: Second Anti-FinTer Policy Seminar in Brussels, Belgium.



MAIN ACHIEVEMENTS IN YEAR TWO

In **Work Package 2 (WP2): STARLIGHT Framework specification for trustworthy, accountable, responsible and transparent AI in support of LEAs**, EUROPOL leads the effort to formulate a vision for the utilisation of AI within law enforcement. They have been actively involved in the first, second, and third rounds of CODEV cycles, commencing with small-scale ones to showcase the potential and viability of AI applications. WP2 identifies promising use cases and conducts thorough assessments of outcomes.

Extensive interactions have taken place among EUROPOL, LEAs, and technical partners through an array of activities, including virtual and face-to-face workshops, dedicated visits where community representatives from different LEAs visited various locations, and the organisation of innovative workshops. These activities have contributed to the design of the STARLIGHT framework, the supervision of co-development cycles, and the consolidation of the AI community. WP2 maintains continuous communication with the LEAs involved in the project to understand the latest AI gaps and best practices. Interviews are conducted to update LEA practices and gap analysis reports. EUROPOL also gathers input from LEAs regarding their evolving user requirements.

Feedback from LEAs and technical leaders on past CODEV work has been collected. The elicitation and formalisation of user requirements are fundamental aspects of the project, and EUROPOL's leadership involves periodic meetings, facilitating interaction among partners and users to promote discussions, brainstorm solutions, and co-create results, often through collaborative workshops. These workshops provide a favourable and constructive environment for gathering requirements, resolving issues, and identifying short and mid-term goals.

WP3: STARLIGHT community building and management of the project focuses on bringing together the STARLIGHT community to work towards a common goal. WP3 has been aligning and refining the various approaches and methodologies that have been developed since the start of the project. Their goal is to create a smooth process that starts with identifying the specific needs of law enforcement agencies and ends with delivering precise tools tailored to address those needs. This continuous loop ensures that feedback from law enforcement is used to refine the tools, making them more effective and user-friendly.

Earlier this year, a crucial meeting at EUROPOL laid the foundation for this collaborative journey. At this meeting, the roles and responsibilities of each partner were clearly defined. Then, in September, a dedicated workshop in Vienna focused on how to transition our prototypes into fully-fledged, market-ready solutions.

As we move forward, the WP3 team is excited to apply this refined methodology to upcoming projects and to make it a core part of STARLIGHT and a blueprint for future European initiatives.

In **Work Package 4 (WP4): Ethical, Legal, Societal & privacy impact & assessment**, the Katholieke Universiteit Leuven (KUL), in collaboration with the Netherlands Organisation for Applied Scientific Research (TNO), provided policy and data-compliance guidance to STARLIGHT partners concerning the use of databases identified in WP5.



The deployment of the AP4AI tool in a co-development (CODEV) cycle is progressing well, due to the collaboration between Cybercrime Research Institute GMBH (CRI) and the Centre of Excellence in Terrorism, Resilience, Intelligence and Organised Crime Research (CENTRIC), with support from other partners.

Moreover, the Center of Security Studies (KEMEA) has been focusing on the TRL Calculator to assess the state-of-the-art legal and ethical subsection in preparation for the WP10 pilot.

PLUSETHICS has been working to mitigate algorithmic biases through collaboration with the Lithuanian Cybercrime Center of Excellence for Training, Research & Education (L3CE), TNO, the Centre for Research & Technology, Hellas (CERTH), the AIT Austrian Institute of Technology GMBH (AIT), the French Alternative Energies and Atomic Energy Commission (CEA), and Universidad Politécnica de Madrid (UPM) on the Assessment List for Trustworthy Artificial Intelligence (ALTAI) functionalities.

WP5: European Training/Testing Datasets fostering AI in support of LEAs made considerable advancements, with an array of new datasets and data-centric tools coming to the fore. Our achievements include the development of five collection and annotation tools, five anonymisation tools, and eight synthetic data generation tools, the majority of which are now primed for utilisation by LEAs.

Furthermore, over 100 pre-existing or public datasets have been scrutinised from legal and ethical standpoints; ten new datasets have been amassed or annotated; five datasets have been anonymised; and eight datasets have been generated.

Our rigorous testing has ensured that our privacy-preserving data handling protocols are robust, catering to both balanced and unbalanced data sets. Moreover, seven datasets have been meticulously assessed, with particular attention paid to bias.

Last but not least, WP5 have devised a benchmark framework, establishing uniform tool performance reporting structures that will facilitate comprehensive comparison and benchmarking of the tools in question.



WP6: AI-based multi-source data sensing and understanding is committed to developing innovative methods and tools for optimal content acquisition and efficient data extraction. Significant progress has been made on all WP6 tasks over the past year with a focus on prioritised functionalities to meet the needs of LEAs in the CODEV cycles.

During the first CODEV cycle, two main functionalities were chosen and presented at the General Assembly in San Sebastian. For the second cycle, in addition to those, three more functionalities were introduced, with results to be showcased at the next GA. Additionally, over 20 WP6 tools were showcased at the third ToolFest, with six tools making their mark in the first Pilot during the SRE 2023 in Brussels.

WP7: AI-based tools supporting enhanced LEAs' investigation and intelligence capabilities is centred on providing LEAs with cutting-edge AI tools. These tools aim to transform minimal data into valuable insights, monitor suspicious activities within illegal networks, predict potential threats, automate online operations, and support decision-making for optimal knowledge use.

Our approach includes multidimensional data fusion, advanced intelligence exploration, monitoring illegal activities, behavioural analysis, early illicit activity prediction, extensive temporal and geospatial analysis, recommendation tools for clear decision support, autonomous online agents, and integrating robotics swarm intelligence into operational planning.

We have made significant advances, contributing to several scientific publications and showcasing our tools' capabilities at internal events.

Our collaborative development cycles have successfully incorporated LEA requirements into our tools, ensuring they are both effective and relevant to their needs.

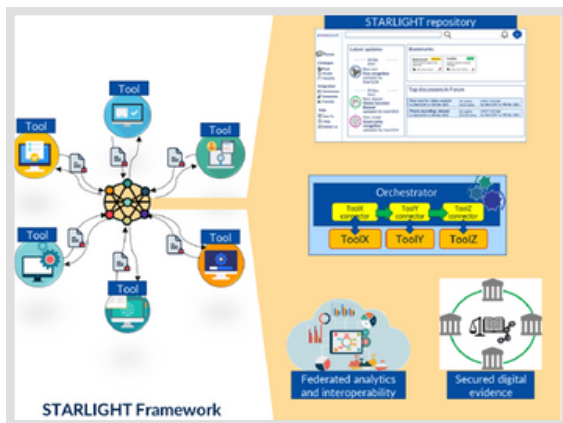
In **WP8: AI-based tools supporting enhanced LEAs' investigation and intelligence capabilities** our primary focus is on enhancing Threat Intelligence (ThINT) capabilities to understand and mitigate potential cybersecurity threats.

This is crucial for law enforcement authorities, equipping them with the necessary tools to stay ahead of cybercriminals, gather vital evidence, safeguard critical infrastructure, and collaborate with various stakeholders to bolster cybersecurity and public safety. AI plays a pivotal role in sifting through extensive datasets to provide actionable threat intelligence. This integration of AI not only expands the scope of threat monitoring but also significantly improves accuracy by filtering relevant information.

Notably, emerging threats are now targeting AI systems, highlighting the urgent need for comprehensive threat-risk assessments by law enforcement authorities. Such assessments are crucial to gauging the level of risk associated with systems that integrate AI.

In light of this, WP8 of STARLIGHT is diligently working to enhance tools such as ThINT from partner Engineering Ingegneria Informatica S.p.A. (ENG) and Dark Web Monitor from CFLW Cyber Strategies BV (CFLW). Additionally, we are in the process of developing a new threat risk assessment framework.

WP9: STARLIGHT Framework for trustworthy, accountable, responsible and transparent LEA AI solutions focuses on providing a centralised framework to cater to the diverse needs of LEAs.

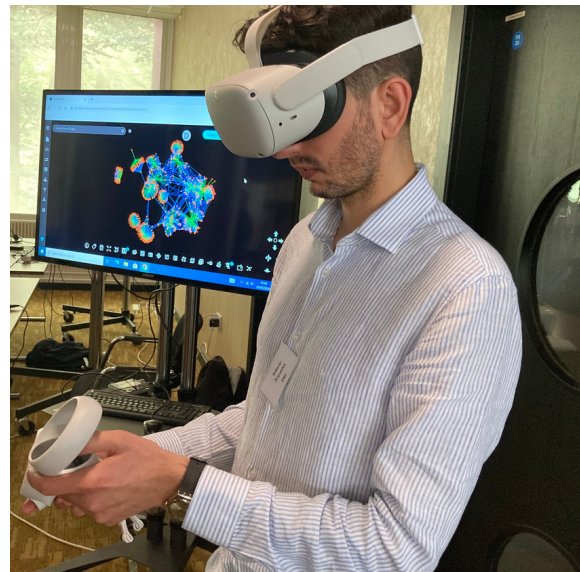


This framework includes a **Repository**, which acts like a marketplace, allowing technical partners to upload AI-based tools, models, and datasets. LEAs can then access these resources and engage in discussions through a dedicated forum.

Another integral part of the framework is the **Orchestrator**, which facilitates the execution of tool pipelines, streamlining the data processing for LEAs and enabling them to retrieve final results efficiently.

The framework is further enhanced by **Distributed Analytics** and **Secured Digital Evidence**, which provide a means for analysing data from different LEA entities without compromising privacy. This approach is essential for computing federated statistics on datasets used to train tools.

Moreover, the **Secured Digital Evidence** layer ensures a digital Chain of Custody approach, meticulously tracking access to digital evidence and imposing strict access rules.



In its second year, **WP10: Pilot demonstration and user evaluation in operational environments**, has seen significant progress. Building on the groundwork laid with WP2 and WP4 in the first year, we have successfully outlined the operational scenarios necessary for execution, demonstration, and user evaluation.

A notable milestone during this period was the planning and execution of the 1st Physical Pilot. This event saw eight AI tools being demonstrated and tested by participating LEAs, following the four scenarios described in two use cases, namely Counterterrorism and Cybersecurity-Cybercrime.

Following this pilot, we will soon initiate the evaluation process, involving both LEAs and technical partners, to gain valuable insights for refining and modifying the tools for upcoming pilot rounds.

Additionally, we have successfully conducted three Tool Fests in March, June, and October, with more scheduled for the future. These events provide an excellent platform for hands-on demonstrations of the novel AI tools developed within the project.

Lastly, we are pleased to announce that the first customised STARLIGHT version of the TRL Calculator is now ready for use by both LEAs and technical partners to assess the tools' Technology Readiness Level (TRL).

WP11, Fostering the adoption of AI in support of the EU LEAs, is instrumental in the dissemination and communication of the STARLIGHT project, using platforms such as social media, newsletters, and events to engage with various stakeholders including policymakers, industry experts, and the general public.

Activities under WP11 include producing two videos demonstrating the practical applications of AI tools, publishing the project's annual newsletter, and providing regular social media updates. Participation in key industry conferences and workshops, as well as collaboration activities with other projects in the AI cluster, such as popAI and ALIGNER, further enhances the project's visibility.

The awareness campaign of WP11 is designed to engage users in discussions and activities, targeting specific audiences based on their needs. This is achieved through a multi-modal campaign approach, consisting of a series of strategic events.

Progress to date includes the development of a conceptual framework, a matrix of target groups, and an awareness activity worksheet. Collaborative workshops with WP leaders have been conducted to synchronise efforts across the project.

Future tasks include reviewing results, planning actions for specific target groups, mapping cross-task activities, and outreach to external audiences.



OPTIMISING LAW ENFORCEMENT WITH AI

Advanced Threat-Risk Assessment and Intelligence Tools for Modern Challenges

ELJO HASPELS
TECHNOLOGY DIRECTOR, CFLW CYBER STRATEGIES

In today's rapidly evolving landscape of crime, law enforcement agencies face an unprecedented range of digital threats. As criminal activities increasingly shift to the online realm, proactive measures become ever more vital. Threat Intelligence tools are pivotal in strengthening our defences, providing timely insights into potential threats, and enabling law enforcement to stay one step ahead in the ever-changing landscape of criminal behaviour.

The Power of AI-Driven Tools

AI-driven Threat Intelligence tools are proficient in data analysis, combing through vast amounts of data to detect patterns, anomalies, and correlations in real-time. These tools arm law enforcement with actionable insights into potential threats, expediting the investigative process and allowing for early intervention to disrupt criminal activities before they escalate.

Ethics and Responsible Use of AI

It is crucial that AI tools are used responsibly, navigating the ethical complexities of technological advancements. As law enforcement agencies integrate AI into their frameworks, a commitment to responsible and transparent practices is paramount. This commitment fosters public trust and ensures the security of AI tools against malicious attacks.

Risk Assessment Tools Developed by the Consortium

Consortium partners have developed two tools to assess the risks associated with using AI systems: qAIScore and AIRMF. qAIScore supports a qualitative multicriteria analysis based on the ALTAI List. The tool supports users, via a user interface, to manage multiple assessments simultaneously and allows for assessors to register all their scores and comments on the different assessment elements.

AIRMF is a cybersecurity risk management framework for systems with AI components, with a focus on quantitative measures. This tool can be viewed as an AI-focused extension of existing frameworks.

It supports users in assessing the risks of different components at different levels, with a focus on quantifying the assessment where possible.

Threat Intelligence Tools

STARLIGHT partners have also developed two threat intelligence tools. The Dark Web Monitor automates the collection and classification of illicit content on the Dark Web, allowing law enforcement to filter content based on relevance and urgency. Assigning tags to dark websites based on their textual content to classes such as carding and drug and narcotics makes monitoring specific parts of the dark web focused and proportional. Given that crimes evolve, it is ensured that there is an expert in the loop to evaluate content for which the AI is not confident.



The **Threat Intelligence module (ThINT)** identifies potential threats from a variety of sources, including social media and the dark web, using state-of-the-art natural language processing algorithms and deep learning techniques. It meticulously analyses the content of textual data, sifting through vast volumes of information. The tool has been developed to provide essential support to LEAs in proactively identifying potential threats originating from the web and focusing their investigative efforts on the most relevant and urgent cases.

Looking Ahead

During the remainder of the project, partners will continue to refine these tools to ensure law enforcement agencies can responsibly utilise AI for threat-risk assessment and threat intelligence.



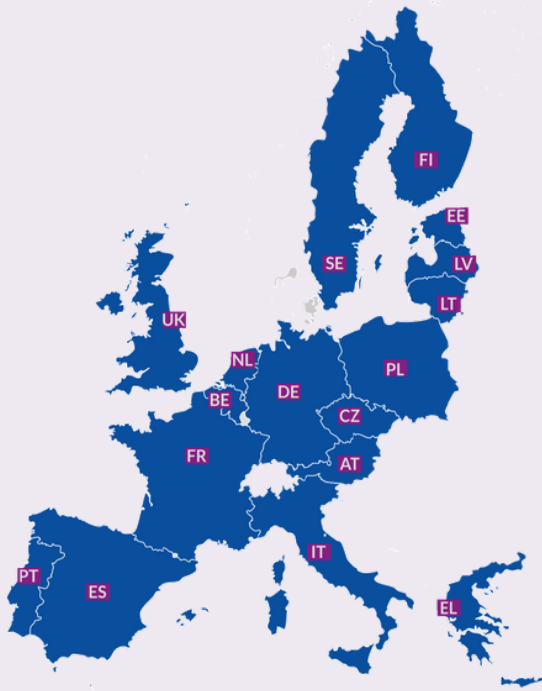
OPEN ACCESS SCIENTIFIC PUBLICATIONS IN YEAR TWO OF THE PROJECT

Pham, L., Ngo, D., Salovic, D., Jalali, A., Schindler, A., Nguyen, P. X., Tran, K., & Vu, H. C. (2023). "Lightweight Deep Neural Networks for Acoustic Scene Classification and an Effective Visualization for Presenting Sound Scene Contexts." *Applied Acoustics*, 211, 109489. doi: 10.1016/j.apacoust.2023.109489.

Jalali, A., Graser, A., & Heistracher, C. (2023). "Towards eXplainable AI for Mobility Data Science." *arXiv preprint arXiv:2307.08461*.

Graser, A., Jalali, A., Lampert, J., Weißefeld, A., & Janowicz, K. (2023). "Deep Learning From Trajectory Data: A Review of Neural Networks and the Trajectory Data Representations to Train Them." *Workshop on Big Mobility Data Analysis BMDA2023* in conjunction with *EDBT/ICDT 2023*.

Jalali, A., Haslhofer, B., Krigstein, S., & Rauber, A. (2023, July). "Predictability and Comprehensibility in Post-Hoc XAI Methods: A User-Centered Analysis." In *Science and Information Conference* (pp. 712-733).



Project Details

- **Project title:** Sustainable Autonomy and Resilience for LEAs using AI against High priority Threats.
- **Starting date:** 01/10/2021.
- **Duration in months:** 48.
- **Topic:** SU-AI02-2020, Secure and resilient Artificial Intelligence technologies, tools and solutions in support of Law Enforcement and citizen protection, cybersecurity operations and prevention and protection against adversarial Artificial Intelligence.

Strategic Goals



- Improve the widespread **UNDERSTANDING** of AI across LEAs.
- Provide opportunities to LEAs to **EXPLOIT** AI tools and solutions.
- Ensure that LEAs can **PROTECT** their own AI systems.
- Raise LEAs' expertise and capacity to **COMBAT** the misuse of AI-supported crime and terrorism.
- **BOOST** AI for LEAs in Europe.

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Consortium

