Intelligence Network & Secure Platform for Evidence Correlation and Transfer

D6.8: Dissemination – Period 3

Publications release 3 and Dissemination and Events report for Period 3.

Grant Agreement No	833276	**Acronym**	INSPECTr
Full Title	Intelligence Network & Secure Platform for Evidence Correlation and Transfer		
Start Date	01/09/2019	**Duration**	42 months
Project URL	inspectr-project.eu		
Deliverable	D6.8		
Work Package	WP6		
Contractual due date	28/02/2023	**Actual submission date**	28/02/2023
Nature	R	**Dissemination Level**	PU
Lead Beneficiary	NUID UCD (CCI)		
Responsible Author	Ray Genoe (CCI)		
Contributions from	Jane Clancy (CCI), John Limaxis (ILS) and Tony Kavanagh (AGS)		

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Revision history (including peer reviewing & quality control)

Version	Issue Date	% Complete	Changes	Contributor(s)
V0.1	09.08.22	2	Initial Deliverable Structure	Ray Genoe
V0.2	25.10.22	20	Conferences and Publications	Ray Genoe
V0.3	05.12.22	40	Website and Newsletter Information	Jane Clancy
V0.4	13.01.23	85	Pre-review additions to all chapters	Ray Genoe, Jane Clancy
V0.5	27.02.23	99	Peer-review comments addressed, Final additions 4.4, 5.16, 5.17, 8.	Ray Genoe, Jane Clancy
V1.0	28.02.23	100	Final edits	Ray Genoe, Jane Clancy

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Glossary of terms and abbreviations used

Abbreviation/Term	Description
AGS	An Garda Síochána (project partner)
AI	Artificial Intelligence
CASE	Cyber-investigation Analysis Standard Expression
CERIS	Community for European Research and Innovation for Security
CNR	Consiglio Nazionale delle Ricerche (project partners)
CoE	Council of Europe
CoU	Community of Users (EU Commission Group)
EAFS	European Academy of Forensic Science
GN	The French Gendarmerie (project partners)
i-LEAD	Innovation - Law Enforcement Agencies Dialogue (EU project)
ILS	Inlecom Systems (project partner)
INSPECTr	Intelligence Network & Secure Platform for Evidence Correlation and Transfer
KPI	Key Performance Indicator
LEA	Law Enforcement Agency
LLs	Living Labs - A collaborative approach to iterative design and testing with end-users
NLP	Natural Language Processing
PHS	Norwegian Police University College, Politihøgskolen (project partners)
TRI	Trilateral Research (project partner)
UCD / CCI	UCD Centre for Cybersecurity and Cybercrime Investigation (project coordinators)

1 Introduction

Communication is of key importance to any research and innovation project. It enables engagement with stakeholders from the outset of a project, allowing them to observe and steer its direction, and to feel part of the project while anticipating the dissemination of its results.

This is particularly true of the INSPECTr project, which intends to address ongoing issues with LEA investigative procedures and technical limitations. INSPECTr aims to enhance LEA capabilities for free, through data fusion, automated analysis, cross-border collaboration and proactive policing. This ambitious project will not only provide a technical solution to managing big data issues, it will also provide new techniques for correlating evidence with cases in other jurisdictions, detecting criminal networks and making predictions based on criminal trends.

In dissemination period 1, a clear dissemination strategy was developed to align with our project objectives and underlined by the ethical, legal, and social considerations of the project. This strategy provides a framework for all communication and dissemination activities ensuring all our interactions are focused and fruitful. The aim was to communicate regularly through targeted blogs, newsletters, and articles, to collaborate through webinars, meetings, and round-tables, to disseminate the project to as wide an audience as possible to amplify its impact, and to publish in academic journals to develop trust in the project methodologies and practices.

In dissemination period 2, the activities increased due to the exciting developments of the project tools. INSPECTr project coordinators and partners held workshops for external stakeholders, participated in several major international conferences, and exceeded the scientific publications target set for the entire duration of the project. The INSPECTr project website was further developed to provide more information to users.

Dissemination period 3, which is the subject of this report, saw the increase of communication with appropriate stakeholders through workshops, webinars and competitive events that showcased the technologies developed during the project. The primary goal was to ensure that stakeholders were made aware of the potential of the platform and to ensure future adoption and investment in seeing the full realisation of the proof-of-concept results.

This report will highlight the latest activities conducted in Period 3 - February 2022 to February 2023. Included in the report are the targetted Key Performance Indicators (KPIs) for each type of activity along with detailed descriptions of how each type of activity was designed to impact stakeholders and promote the project's results.

1.1 Mapping INSPECTr Outputs

The purpose of this section is to map INSPECTr Grant Agreement commitments, both within the formal Deliverable and Task description, against the project's respective outputs and work performed.

Table 1: Adherence to INSPECTr GA Deliverable & Tasks Descriptions

INSPECTr GA Component Title	INSPECTr GA Component Outline	Respective Document Chapter(s)	Justification
DELIVERABLE			
D6.8: Dissemination – Period 3	*Publications release 3 and Dissemination and Events report for Period 3*	*Sections 2-7*	*The report provides a comprehensive view on the dissemination activity on the project to date, including plans for publications to be submitted after the project.*
TASKS			
ST6.3.1 Building the INSPECTr project identity and brand	*At the start of the project, its unique identity will be created, via several activities:* a) *INSPECTr Logo* b) *The project website.* c) *Dissemination material*	*Sections 2-3*	Detailed information about these are recapped in section 2 and section 3 outlines our website updates.
ST6.3.2 Publications	*minimum of 3 press releases and publications, 6 newsletters, success stories and factsheets and 5 technical articles and policy briefs.*	*Sections 4-7*	These sections describe our media, newsletter and scientific publications and policy briefs.
ST6.3.3 Dissemination	*Dissemination to LEA Communities with a KPI to reach a pan-European network of 100+ LEA actors.*	*Sections 4-5*	This period saw a huge increase in the number of stakeholder conferences, workshops and webinars.
ST6.3.4 Events	*Presentation of INSPECTr in at least 3 European LEA events*	*Section 5*	This period included a number of stakeholder events.
ST6.3.5 Partner with CEPOL	*Partner with CEPOL for the hosting of INSPECTr information and training webinars. Minimum six webinars over the project lifetime, reaching an audience of 100+ LEAs per webinar.*	*Section 5.16*	6 webinars (the 5th was a double session) are described in this section, which showcased many of the technologies developed during the project.
ST6.3.6 Liaison with Council of Europe	*Explore opportunities for regional dissemination of INSPECTr with ten CoE supported countries.*	*Section 5.14*	This section describes our engagement with 11 CoE countries

1.2 Deliverable Overview

This deliverable is the third of three outputs of Task 6.3, "Dissemination", performed within Work Package 6 "LEA Capacity Building Programme, Adoption Actions and Policy Recommendations".

The report provides a detailed description of the current dissemination activities conducted by the project consortium, from Month 30 until the end of the project.

This is the final of three reporting periods for dissemination on the project.

- D6.6: Dissemination – Period 1 (M18).
    - Logo, project Website, Dissemination Templates, and posters and publications first release for Period 1.
- D6.7: Dissemination – Period 2 (M30).
    - Publications release 2 and Dissemination and Events report for Period 2.
- **D6.8: Dissemination – Period 3 (M42).**
    - **Publications release 3 and Dissemination and Events report for Period 3.**

1.3 Report Structure

The structure of this report is as follows.

Section 2 provides a recap on the activities conducted during dissemination periods 1 and 2.

Section 3 describes the updates to the project website, which is one of our main dissemination drivers.

Section 4 describes the content of our quarterly newsletters.

Section 5 lists the conferences and workshop attended by consortium partners, where INSPECTr was presented.

Section 6 lists the academic publications, which have been accepted or are submitted but pending acceptance.

Section 7 lists the additional press releases and policy briefs published during this period.

2 Brief Overview of Dissemination Activities from Period 1 and 2

Dissemination Period 1 Overview

During Dissemination Period 1, the main focus of the INSPECTr project was the creation of the brand and developing an online presence. This was achieved through the website, inspectr-project.eu, and partner contributions to respective blogs and websites.

Type of Dissemination	Title	Description
Project Descriptions	200/500/1000 Characters	These variable length descriptions have been created for public dissemination purposes and can be used by the consortium partners for promoting the project.
Media	INSPECTr Branding - Creation of Project Flyer	A Resource providing a concise overview of the project's main objectives, goals, and technical innovations.
Media	INSPECTr Branding - Creation of Project Brochure	A Resource providing a concise overview of the project's main objectives, goals, and technical innovations.
Media	INSPECTr Branding - Creation of Project Poster	A Resource providing a concise overview of the project's main objectives, goals, and technical innovations.
Media	Creation of INSPECTr Website	The INSPECTr project website and its related activities is to act as a central anchor for project communications and as a repository for project results.
News Article	Enterprise Ireland "Horizon 2020 - Supporting the Fight Against Cybercrime"	Introducing the INSPECTr Project and providing an overview of the benefits of H2020 projects.
Scientific Article	Journal of Information and Security Applications Volume 62, "Distilling blockchain requirements for digital investigation platforms"	This article proposes utilising a blockchain ledger for investigative actions and associated metadata.
Article	European Law Enforcement Research Bulletin - "How the LEA cluster benefits its member projects"	The article describes and analyses a cluster of EU-funded security projects, each of which includes law enforcement agencies (LEAs) among its partners.
Workshop	January 2020 - H2020 – Societal Challenge 7 "Secure Societies"	EU Commission, Brussels, Belgium
Workshop	January 2020 - Workshop on Research Data in Fighting Crime and Terrorism	Albert Borschette Centre, Brussels, Belgium
Workshop	February 2020 - Inhope and EU Commission Focus Group	Albert Borschette Centre, Brussels, Belgium

Workshop	June 2020 - EC ELSI Webinar	EU Commission, Brussels, Belgium
Workshop	June 2020 - EU-H2020 Joint Projects Webinar	Facilitated by The SMILE Project
Workshop	September 2020 - CoU Workshop: "Human and societal aspects of the pandemic and beyond: domestic violence, child sexual abuse, infodemic"	EU Commission, Brussels, Belgium
Workshop	September 2020 - COPKIT Webinar: Analysing language to extract information from darknet advertisements	Facilitated by COPKIT.eu
Workshop	October 2020 - CoU Workshop on Forensics: Explosives, Conventional Forensics, Digital Forensics	EU Commission, Brussels, Belgium
Workshop	Involvement of Practitioners in FCT Security Research Projects	EU Commission, Brussels, Belgium
Workshop	January 2021 - INSPECTr Workshop on Ethical Integration and Online Data	Facilitated by Trilateral Research
Workshop	January 2021 - INSPECTr Workshop on Ethical AI	Facilitated by Trilateral Research
External Websites	https://www.ucd.ie/cci/projects/inspectr/ http://www.ebostechnologies.com/new-h2020-project-inspectr-kicks-off http://www.ebostechnologies.com/ebos-joins-workshop-to-design-the-architecture-of-the inspectr-platform-to-help-in-the-prediction-detection-and-prevention-of-crime https://www.trilateralresearch.com/work/inspectr/ https://www.ccdriver-h2020.com/cluster https://www.trilateralresearch.com/creating-clusters-to-develop-sustainable-data-driven policing-solutions-adopting-an-ethical-approach/	External websites who sought permission to host and publish information and blogs on the INSPECTr project.

Dissemination Period 2 Overview

The project's dissemination activities increased significantly during this reporting period. Through attendance at conferences and webinars, hosting workshops and meetings, and publishing articles, blogs, and newsletters, the INSPECTr project has been introduced to a variety of internal and external stakeholders.

Type of Dissemination	Title	Description
Media	INSPECTr Newsletter First Edition March 2021	The first INSPECTr Newsletter served as a general introduction to the H2020 project funding, the INSPECTr project's goals and objectives, and early project activities.

Media	INSPECTr Newsletter Second Edition June 2021	The second INSPECTr Newsletter provided a Blog on the Ethical approaches taken within the project, providing insights into the project's ethical underpinnings and also provided a summary of all activities and events during the last quarter.
Media	INSPECTr Newsletter Third Edition September 2021	The third INSPECTr Newsletter's Blog provided a detailed explanation of the selection of the CASE language in the INSPECTr platform and the reasons for its use. It also outlined all the project events and activities during the last quarter.
Media	INSPECTr Newsletter Fourth Edition December 2021	The fourth INSPECTr Newsletter provided a Blog on the topic of Artificial Intelligence (AI) as an assistive technology for LEAs and covered various topics such as the history of the AI research field, NLP, image processing and how ELSI requirements are at the forefront of the project's activities. There was also a summary provided of the other events and project activities engaged in during the last quarter.
Media	INSPECTr Website	The INSPECTr website continued to be developed and enhanced with a steady increase in site visits recorded as more information about the project became available.
Scientific Paper	INTAP Conference 2021 - "Iterative Learning for Semi-automatic Annotation Using User Feedback"	This paper presented how an interactive semi-automatic annotation tool using an incremental learning approach reduces human effort. The automatic models used to assist the annotation are incrementally improved based on user corrections to better annotate the next data.
Scientific Paper	EAFS 2022 - "Automatic Generation of Parsers for Web Forums"	This paper presented the work done on the automatic creation of parsers for web forums and markets.

Scientific Paper	EAFS 2022 - "Authorship Identification in Web Forums"	This paper proposed a method and a framework for authorship identification in web forums. The suggested model is a combination of both linguistic features and embeddings to identify specific writing styles. The model is based on cosine similarity and yield an average accuracy of up to 99.4% when using 200 forum comments or posts per author. The framework also shows specific similarities in writing styles whether they are lexical or syntactic.
Workshop	March 2021 - Magneto Project Final Event	Facilitated by the Magneto Project
Workshop	May 2021 – INSPECTr Project External Stakeholders Workshop	This workshop was facilitated by and was organised to seek valuable input from LEAs with extensive experience in device triage or preliminary analysis, digital forensics, online intelligence gathering, or data analytics. Participants were invited to complete a survey about current investigative practices and challenges, our proposed improvements, and the training needs of law enforcement.
Workshop	June 2021 - FCT Workshop on Digital Forensics	EU Commission, Brussels, Belgium
Workshop	June 2021 - INSPECTr Workshop on Gender and AI	Facilitated by Trilateral Research
Workshop	June 2021 - Cyber Ireland Workshop for SMEs	Facilitated by Cyber Ireland
Workshop	June 2021 - ILEAnet Public Workshop about Standardisation in Security Research - ILEANET project	Two presentation were made by the INSPECTr project, one discussing how the project focusses on ensuring interoperability across various LEA tools, links between cases, and an ability to transfer evidence, and the adoption of CASE which provides a standard language (ontology) to represent the information collected, ensuring interoperability between the different tools and organisations.
Workshop	September 2021 - Copkit Project Final Event	Facilitated by the Copkit Project
Workshop	October 2021 - Europol Innovation Lab First Demo Series	INSPECTr Consortium Partner GN (French Gendarmerie) presented several innovative tools they created including two developed within the INSPECTr project. Europol has since merged their existing approach with

		the GN INSPECTr developed NLP annotator tool demoed at this event.
Workshop	November 2021 - Octopus Lightning Talks, Council of Europe	Two presentations were made by INSPECTr, the first being an introduction to the platform, and the second being a presentation on AI as an Investigative Tool.
Conference	December 2021 - CEPOL Research and Science Conference	Abstracts were submitted for this Conference but due to the ongoing COVID-19 pandemic it was postponed.
Webinar	January 2022 Freetool 3 Showcase - CEPOL	This Freetool 3 webinar was attended by over 600 European law enforcement officers from 42 countries and organisations. It showcased the current suite of tools to interested LEAs and also demonstrated how FREETOOL's evidence visualisation, digital forensic and intelligence gathering tools are being enhanced through integration with the INSPECTr platform.

3 Website Updates

The INSPECTr website acts as a central anchor for project communications and a repository for project results, making them easily findable by any reader knowing the project name. It aims to provide a clear and concise summary of the project, its participants, and its aims and provide regular updates on the project's activities.

As the project continues to mature, the site structure and content is being developed to accommodate the increasing number of project results and resources.

3.1 Website Structure

Project Information

The project information area on the website summarises the principal objective of the project, the origin of the project data, knowledge discovery techniques and our statement on the project's ethics and societal impact. We also provide clear information on the project award information, stating where the project receives its funding, the unique EU grant agreement ID, and information on the duration of the action.

Project Updates

This area of the website provides an update on the meetings and conferences that have been held and attended.

- The **Project Meetings** list includes the INSPECTr project monthly meetings, the law enforcement steering group monthly meetings and other formal meetings of the project such as Project General Assemblies.
- In the **Workshops and Conference** section we list events organised or attended by members of the consortium to disseminate the INSPECTr brand and also present project outputs to EU agencies, other EU projects and external stakeholders.
- We had also included our **Academic Publications** and **Project Deliverables** in this section. However, towards the end of 2022, as our project results and resources become more numerous and more fully developed, we have housed these in a new area of the website called

Results and Resources. Our Results and Resources hosts dissemination media such as our project brochure and flyer, academic publications, and the project's public deliverables.

Privacy Statements

We also make available our research data privacy statements and website privacy statements and terms of use. These statements are regularly reviewed in line with the project's ongoing development and other emerging regulatory developments.

Latest News

This area of the website is where we provide news articles, press releases and media publications.

Recent Articles and Publications:

- **Enterprise Ireland**: In June 2020 former Project Coordinator of the INSPECTr project, Cheryl Baker, spoke with Enterprise Ireland in an article entitled 'Supporting the Fight Against Cybercrime'. Cheryl spoke about the opportunities provided by Horizon 2020 for more highly funded, longer term research-orientated projects such as INSPECTr. INSPECTr aims to develop a shared intelligent platform and a novel process for gathering, analysing, prioritising and presenting key data to help in the prediction, detection and management of crime in support of multiple agencies at local, national and international level. Cheryl Baker also acknowledged the expert guidance and support offered to her by Enterprise Ireland during the project's application process.
- **EU Researcher Article**: In July 2022 Ray Genoe, Project Coordinator, spoke with EU Researcher about the INSPECTr Project in a publication entitled 'An Intelligent Platform for Effective Policing'. Ray spoke about the problems for police officers who face the arduous, and time-consuming task of gathering evidence from digital devices and how prohibitively expensive the many different tools and training can be that support these activities. In developing 'a one stop shop' in an intelligent platform that offers the same interface to all the available tools, current costs and training requirements will be reduced. The INSPECTr platform will also be easily extensible with new features being able to be added quickly to reflect changing demands. The platform will be made freely available to law enforcement agencies.

Newsletter:

We also publish our INSPECTr quarterly Newsletters in this area of the website and currently have seven newsletters available for reading and download with the final newsletter of the project, Newsletter Edition Eight, due for publication. The Newsletters disseminate our cumulative project activities for the last quarter. More detailed information on Newsletter content and data on number of downloads to date is provided in the next section of this deliverable.

Blogs:

The final area of our Latest News section is the INSPECTr project 'Blogs'**.** We provide a quarterly Blog as part of the Newsletter, and these are also published on the website. We have covered various areas of the project's development since establishing this regular Blog. We initially posted Ethics based Blogs reflecting how vital it was for the project to establish a robust ethical framework early in the project. As the project developed Blogs on technology and innovation started to be included and more recently we have reported on the activities being undertaken in the mocked use case Living Labs Experimentation Phases. Our final Blog covers the INSPECTr Project Webinar Series, hosted by CEPOL, in February 2023.

List of INSPECTr Blogs

- INSPECTr Ethics Workshops January 2021 focussing on (i) integration of publicly available data, typically online data, and (ii) artificial intelligence systems.
- INSPECTr Ethics Workshop June 2021 focussing on Gender and AI.
- INSPECTr Ethics Workshop on Complying with Ethical and Legal Standards in the INSPECTr Project.
- INSPECTr Ethics Workshop on The Ethical Approach to Research in the INSPECTr Project.
- Explanation of CASE Language and Reasons for its Adoption for the INSPECTr Platform.
- Handling of Standardised Evidence (CASE) by the Platform.
- Artificial Intelligence (AI) Research Methodology and Application.
- Natural Language Processing (NLP).
- Image Processing in INSPECTr.
- Ethical, Legal, and Societal Impact Assessment Overview.
- Introduction to INSPECTr Living Labs Experimentation.
- Update on INSPECTr Living Labs Experimentation Phase 3.
- Update on INSPECTr Platform Development during Living Labs Experimentation Phases 3.5, 4 and 5.
- INSPECTr Project Webinar Series, hosted by CEPOL, in February 2023

Results and Resources

The newly developed Results and Resources area of the INSPECTr website is the most recent addition to the website structure. As we develop more numerous project resources and more project outputs come on stream we have gathered these into one repository for project results, ensuring ease of access to project results for visitors to the site.

Project Resources: We have developed the following project resources available for viewing and downloading from the website:

- INSPECTr Project Flyer.
- INSPECTr Brochure.
- INSPECTr Fact Sheet.
- INSPECTr Banner.
- INSPECTr Project Video.

Public Deliverables: We have made available the currently approved public deliverables as a resource. As more public deliverables are approved by the Commission, we will ensure these too are added.

- D2.1 Initial Legislative compliance relating to law-enforcement powers and evidence requirements.
- D2.3 Reference Digital Forensics Domain Model.
- D2.4 e-Codex infrastructure evaluation in the context of deployment in LLs.
- D6.6 Dissemination – Period 1.
- D8.1 INSPECTr Research ethics and data protection.
- D8.2 First Report on Ethical Governance.
- D8.5 Ethical, Legal and Social requirements for the INSPECTr platform and tools.

Academic Publications: We have made abstracts available for our Academic Publications to date and upload the pre-print papers as they become available. The project has more publications at differing stages in the publications process and these will be added to the website as a resource once they have received formal acceptance.

Information on these papers and publications is included in Section 6 of the deliverable.

Contact Us

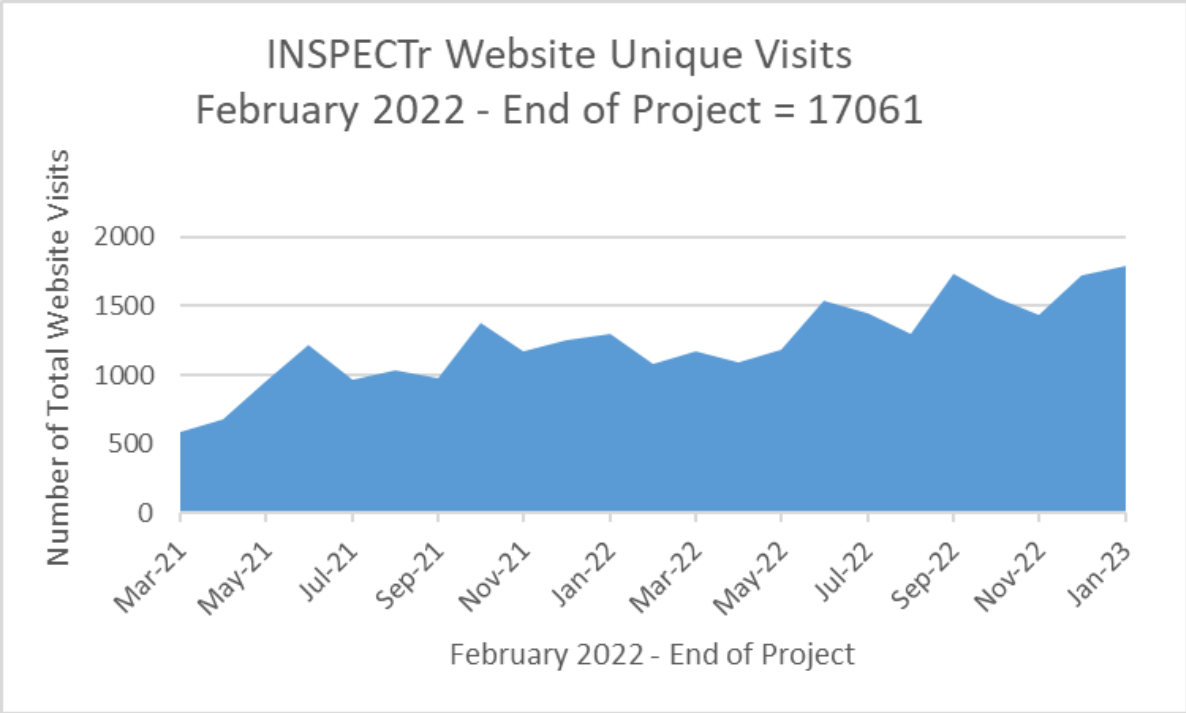
This area of the website provides the contact details of the INSPECTr Coordinator including contact numbers and e-mail address.

3.2 INSPECTr Website KPIs

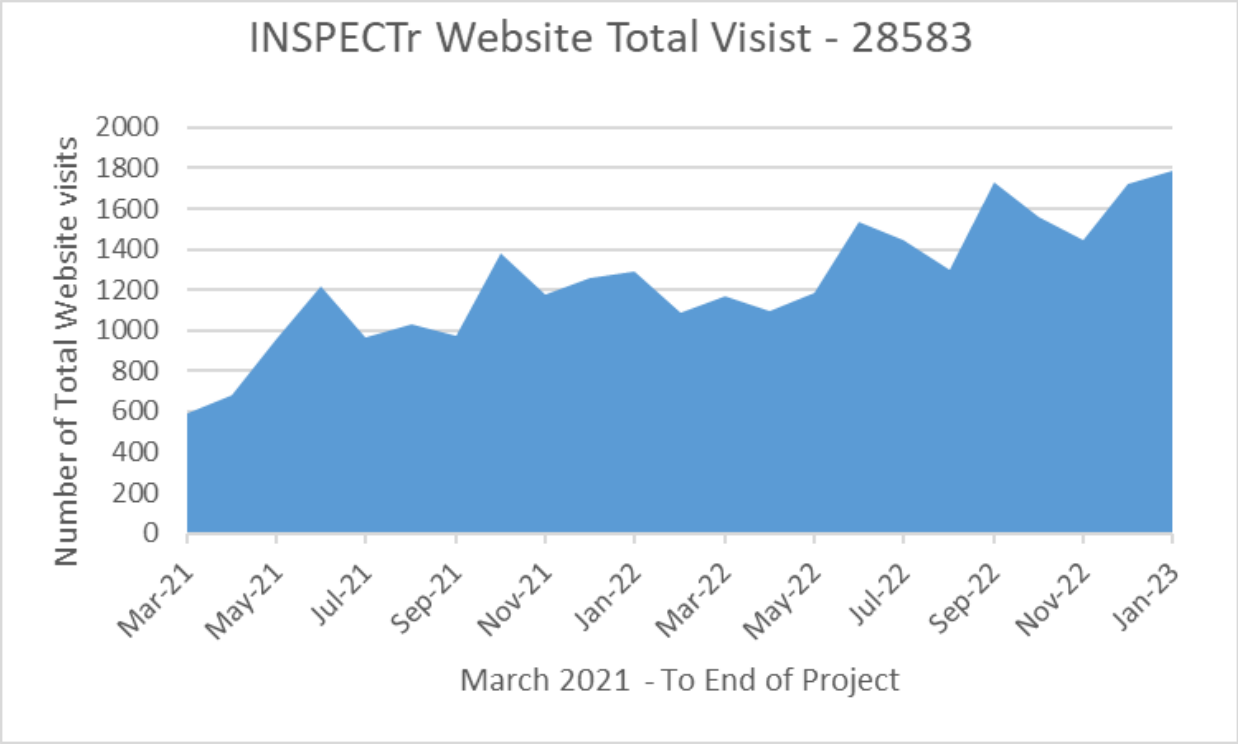
The INSPECTr website has shown a steady improvement in the numbers of visitors to the site since it was first published. The current total number of visits stands at 28,583 which greatly exceeds the target KPI of 6000 visits.

Website Unique Visits February 2022 –January 2023 (12 Month Period)	17061
Website Unique Visits Total (recorded from March 2021)	28583

INSPECTr Website Visits for Period 3: February 2022 to End of Project



INSPECTr Website Total Number of Visits during Project: Statistics gathered from March 2021



4 Newsletters

The INSPECTr newsletter is published online quarterly and provides communication to targeted readers including project stakeholders, LEAs, policy makers, prosecutors and researchers, about the INSPECTr project's recent and planned activities. News and insights are provided regarding the project's latest innovations and developments.

A Newsletter Summary Table can be found in Annex 1.

4.1 INSPECTr Newsletter Fifth Edition, March 2022

The fifth edition of the INSPECTr newsletter opened with our standard presentation of the principal objective of the INSPECTr project. This is important to clearly state at the beginning of each Newsletter as a reader accessing the Newsletter via the project website, rather than via a subscriber mailing list, may not necessarily open Edition One first, and so it is vital to deliver the main project objective in each edition.

In previous editions of the Newsletter, we had been covering topics such as the ethical standards adopted in INSPECTr's Ethics-By-Design approach, our decision to use the CASE language, a standardised ontology for the interoperability, exchange and analysis of investigative information, and an introduction to AI as an assistive technology for LEAs.

In the fifth newsletter an extensive Blog was provided to introduce readers to the INSPECTr living labs experimentation, whereby living labs would provide experimentation and test bench environments to test the requirements, accuracy, and user acceptance of the platform. The Blog talked about the early milestones in the project such as defining the common processes and baseline resources in LEA living labs to produce a detailed requirements pipeline. It also introduced key approaches regarding the ingestion and homogenisation of data with increased levels of automatisation and how the use of various knowledge discovery techniques will allow the investigator to visualise and bookmark important evidential material and export it to an investigative report. This technique will aim to improve knowledge discovery across exhibit analysis within a case, between separate cases and ultimately between inter-jurisdictional investigations. INSPECTr also aims to use its own tools outputs developing a toolbox of data enrichment analysers or 'Gadgets'. Free forensic tools will be fed into the storage layers of the platforms and will be accessible via the Case Management System.

The Blog then moved on to present how the project planned to test the technology whilst respecting data privacy and GDPR. The decision was taken early to use mocked data for the experimentation. This use of mocked data, developed in the form of three mocked data use cases by our Law Enforcement Partners, allowed for testing, bugs and issues fixing, and the ability for open discussions to be held between our LEA and technology partners without any contravention of ethical considerations. Following completion of the three mocked use cases Living Lab 1 and Living Lab 2 experimentation phases allowed for live experimentation and the gathering of feedback from our LEA testers. This feedback would inform future platform development. The issues raised were tracked and categorised into headings of minor, major and critical and technical development continued in preparation for Living Lab 3.

The newsletter also included a summary of all other project activities between January 2022 – March 2022 including the list of regularly scheduled INSPECTr project meetings held by the Consortium, The Europol Cyberbits release of March 2022 that included information about the INSPECTr project and INSPECTr project's concept, basic architecture and principal objectives and also the presentation of INSPECTr to the 9th Annual Meeting of the Expert Group on Drugs Online held in CoE Headquarters in Strasbourg.

Finally, the newsletter listed the planned meetings and planned dissemination opportunities and activities for the next quarter.

4.2 INSPECTr Newsletter Sixth Edition, July 2022

The sixth edition of the INSPECTr newsletter opened with our standard presentation of the principal objective of the INSPECTr project.

This edition of the newsletter continued on from the Blog of Edition 5 by discussing the findings and results of the next phase of the Living Lab Experimentation, Phase 3. Living Lab Phase 3 was an extremely important event as it was the first time post Covid19 that the developers and law enforcement participants had been able to meet together in person to undertake testing and evaluation. This proved an extremely fruitful activity as both groups were able to easily interact with one another in a live rather than remote setting, and work together to find effective solutions, and for some of those solutions to be immediately effective. Other bugs and issues not immediately fixed would continue to receive attention after the living lab and also issues that had possibly not been flagged before this living lab were also able to begin receiving attention. It was agreed that a positive outcome of this lab was that it facilitated a more immediate view for our LE partners of how the platform could fit for Law Enforcement as potential users of the platform.

Following the Blog, the newsletter provided a comprehensive list of dissemination news as there had been a lot of activity in this quarter. This reflected the opening up of conferences for in-person attendance, with the easing of COVID-19 travel restrictions.

EAFS22 Conference in Stockholm, Sweden:

- The Gendarmerie presented a method and framework for **Authorship Identification in Web Forums** using a **Stylometry** technique, **Natural Language Processing for Social Network Analysis** demonstrating the build of a full data pipeline capable of analysing social media posts, and a paper on an **Automatic Web Parser**, a tool for automatically creating parsers for web forums and markets.
- PHS presented a workshop **on Cross-evidence Crime Analysis Platform for Evidence Correlation and Transfer** wherein it was demonstrated how the output of miscellaneous digital forensic software can be homogenised, ingested and enriched so that crime analysts can discover, and validate the hypotheses using visualisation like timelines, comparisons and cross-correlation.
- CCI, NUID and ILS also presented on how the EU funded **INSPECTr** project will integrate a range of high-tech approaches, including big-data analytics, cognitive machine learning and blockchain technologies into a shared intelligence platform to improve digital investigations and forensic capabilities and reduce the complexity and cost of cross-border collaboration.

CEPOL Research and Science Conference 2022 in Vilnius:

- CNR presented how a judicial case cross-check system needs to provide a tool to search for case-related information and identify links among cases under investigation in other members states. The most promising one to achieve this aim, and the one adopted for use in the INSPECTr project, is '**CASE'** standing for **Unified Cyber Ontology / Cyber-investigation Analysis Standard Expression**. CASE provides a structured specification for representing information that are analysed and exchanged during investigations involving digital evidence.
- CCI/NUID presented on **LEA Capacity Building as a Driver for the Adoption of European Research** which discussed how the development of a robust capacity building program, being included in the INSPECTr project, ensures that LEAs can confidently use the system and that they fully understand both the pitfalls and the potential of the platform. In keeping with the project's ethics-by-design approach, the training program produced by INSPECTr will have a strong emphasis on security and the fundamental rights of citizens while addressing the gaps in capabilities and training within the EU LEA community. The paper presented provided a description of the process of how the project applies curriculum design, based on the findings

of its research and continued engagement with LEA and technical partners throughout the life cycle of the project.

- CCI/NUID also presented an overview of the INSPECTr project's goal of providing a solution to the many issues faced by law enforcement agencies, by producing and integrating a range of high-tech approaches into a shared intelligence platform that will provide digital investigations and forensic capabilities and reduce complexity and the cost of cross-border collaboration.

University of Lausanne Conference 2022:

- An overview of the INSPECTr project including demonstrations of some of the tools was presented at this Conference by the French Gendarmerie.

DFRWSUSA 2022:

- The CASE ontology, and how this continues to be applied and developed in the INSPECTr project was the chosen topic to be presented at the DFRWSUSA 2022 research conference by CCI NUID. DFRWSUSA is a premier research conference for digital forensics in USA, EU and APAC.

The newsletter also included a summary of all other project activities between May 2022 –July 2022 including the list of regularly scheduled INSPECTr project meetings held by the Consortium including the project monthly meeting and law enforcement steering group monthly meeting, and the second Project General Assembly held in UCD in June 2022.

Finally, the newsletter listed the planned meetings and planned dissemination opportunities and activities for the next quarter.

4.3 INSPECTr Newsletter Seventh Edition, November 2022

The seventh edition of the INSPECTr newsletter opened with our standard presentation of the principal objective of the INSPECTr project. This edition of the newsletter continued on from the Blogs of Edition 5 and 6 by reporting on the next phases of the project's Living Lab Experimentation, Phases 3.5, 4 and 5.

During LL 3.5 practical tasks were carried out by our LEA testers covering activities such as:

- Populating tables with Tokens, Countries, and Crime Types
- Checking available INSPECTr analysers (gadgets) and related data types
- Searching existing artifacts and running INSPECTr analysers (to run reports)
- Examining the INSPECTr analyser generated reports
- Selecting items in the report related to a mocked use case (Terror, CSAM, or Fraud) and creating new artifacts as appropriate.

As well as testing the platform LEA testers were tasked with providing live feedback regarding issues encountered during the testing process.

The development team met in Athens in October 2022 to have a focussed meeting addressing the current development needs of the evolving platform including the Case Management System, Widgets, Platform Security, AI Tools, Knowledge Graphs and the Publish/Subscribe component. The development team also continued to troubleshoot issues raised as feedback from previous Living Labs in readiness for the next phase of testing.

Living Lab 4 followed early in November 2022 where LEA testers were invited to test the latest version of the framework locally in Dublin. They were asked to carry out a step-by-step list of tasks:

- Create new admin and user accounts in the CMS
- Ingest mocked data sets, and run INSPECTr analysers on them
- Examine the INSPECTr analyser generated reports for investigative purposes
- Run the SIREN digital visualisation component of the INSPECTr platform

LEA testers were also asked to report on issues encountered during the testing process and examples of the issues reported were:

- issues finding investigative links in the use case mocked data
- digital visualisation of evidence in the SIREN component
- running of analysers on some nodes.

These issues received attention by the INSPECTr development team as they were presented during the Living Lab and continue to provide direction for subsequent software upgrades and usability improvements for end-users.

Living Lab 5 was also held during this cycle of Living Labs. In this Living Lab GN presented a live demonstration of some of the INSPECTr Platform's AI tools including the Gendarmerie's crime forecasting tool in which the tool uses past criminal reports' data like geolocation, date and type of crime to predict future tension zones and displays them using heatmaps. This allows LEAs to distribute resources according to the zones of tension and better manage them in time and space. GN also presented tools such as speech recognition, OCR and image annotator tools.

All of the above feedback, generated throughout the Living Labs experimentation phases 3.5, 4 and 5, continues to inform the development team of the current technical capabilities of the platform and acts as a conduit for reporting on improvements required to continue platform development in line with the needs of LEA future end-users.

Following the Blog, the newsletter provided a comprehensive list of dissemination news.

iLEAD 6th – 8th September 2022. Presentation by INSPECTr Consortium member French Gendarmerie (Judicial Police of the National Gendarmerie (PJGN)

- As part of the INSPECTr project, the Judicial Police of the National Gendarmerie (PJGN) has been working on the development of an AI toolkit that groups various services. During the iLEAD event two solutions were presented by GN being those of Stylometry and NLP annotator.

French Gendarmerie AI Platform: GN winning the first place in Europol Innovation Award! The platform was chosen as the most innovative project by Europol.

- The artificial intelligence tools platform has been created to simplify the work of police officers and provide them access to state-of-the-art AI tools. To avoid any black box effect, it has been fully developed in-house by the French Gendarmerie. The platform integrates over 10 tools, each of which have been designed to meet the needs of law enforcement agencies. Many of these tools are already available through Europol. A typical use case of the platform would be to combine multiple tools for the purpose of tracking offenders online, who may be active in multiple dark web forums.

CERIS Annual Event 2022 - 27th-28th September 2022 – Fighting Crime and Terrorism/Resilient Infrastructure

- DG HOME organised a workshop in Brussels to bring together law enforcement practitioners, local authorities, infrastructure operators, policy makers and researchers to discuss the lessons drawn from FCT and INFRA projects, reach recommendations, and determine their

most effective implementation strategies in the future research and innovation activities. This event was attended by Dr Ray Genoe, INSPECTr Project Coordinator.

International Conference Innovation in Law Enforcement Prague, 2nd – 4th November 2022

- INSPECTr partner the French Gendarmerie, as finalists of the Europol's Innovation Award, were invited to attend the International Conference Innovation in Law Enforcement and present their work. GN presented the AI platform was presented and the presented tools raised a great deal of interest from the conference participants. Europol also manifests high level of interest in incorporating even more of the platform tools into Europol's tool repository.

Workshop at the European Public Prosecutor's Office (EPPO) in Luxembourg on 10th November 2022

- This workshop aimed to discuss the data management strategy for their Case Information Management System (CIMS). INSPECTR project partner Fabrizio Turchi of CNR attended this workshop.
- EPPO is primarily focused on their CIMS to support cross-border investigations and are therefore interested in better understanding the UCO/CASE ontology and verify if part of the derived model can be integrated in their model and furthermore are interested in INSPECTr because it has been developing a real platform for cross-border investigations relying on the UCO/CASE model.
- At the EPPO workshop questions were asked about the backward compatibility of UCO/CASE. In other words, EPPO wanted to know if the ontology is capable to handle "hot" extensions of the data model without interfering with the applications based on the old versions. Fabrizio answered that the current 1.0.0 version can maintain this compatibility because it's highly probable that new versions will extend the previous models so the applications should continue to be valid without interruption even if they won't use the additional features until they won't be updated.
- Two presentations were also made by Fabrizio Turchi, the first one being on CASE and the second one on an application being developed within a separate project for the preparation of the E-Package containing the elements of evidence expressed in CASE to facilitate the evidence exchange among Judicial Authorities in the Member States, relying on e-EDES and e-CODEX.
- Regarding the INSPECTr project the main goals were illustrated being those of parsing, homogenisation and ingestion of commercial tool reports, providing data analytics (additional storage requirements), maintaining the chain of evidence (traceability and provenance) the integrity has been maintained by blockchain, enhancing cross-border collaboration to discover linked cases, and to exchange elements of digital evidence. It was also highlighted that the standardisation is a key concept within the project and from the outset, INSPECTr opted for the open-source UCO/CASE ontology to serve as a standard for interchange, interoperability, and analysis of investigative information with a set of parsers for commercial tools having been developed to convert the XML reports generated by the tools into UCO/CASE.

INSPECTr Website Project Resources and Project Results Pages

- There had been further developments regarding the INSPECTr website. A new Project Results and Project Resources website area has been developed to provide ease of access to project results such as approved public project deliverables and academic papers and also a newly developed project resources area for media such as brochures and flyers that have been developed to further inform our project audiences.

The newsletter also included a summary of all other project activities between August 2022 – October 2022 including the list of regularly scheduled INSPECTr project meetings held by the Consortium, and a list of the planned meetings and dissemination opportunities and activities for the next quarter.

4.4 INSPECTr Newsletter Eighth Edition, February 2023

The eight edition of the INSPECTr newsletter opened with our standard presentation of the principal objective of the INSPECTr project. This edition of the newsletter included a report on the final phase of the project's Living Lab Experimentation, Phase 6. It also provided a comprehensive Blog on the CEPOL hosted INSPECTr Project Webinar Series that ran between Monday 13th February 2023 and Friday 17th February 2023. Further updates were provided on other recent dissemination activities and regular project meetings. This was the final newsletter of the project.

Final Phase of Living Labs Experimentation – Living Lab 6 – Monday 30th January 2023 – Friday 3rd February 2023.

Living Lab experimentation has continued to be an integral part of the INSPECTr platform's development throughout the project. The final experimentation phase, Living Lab 6, was run over a five-day period, Monday 30th January 2023 – Friday 3rd February 2023.

Local Installation of LEA Nodes: This was the first Living Lab where INSPECTr LEAs were able to run the experimentation exercises on their own locally installed and networked LEA node. Each LEA node had been shipped to the respective LEA and a training session held to familiarise the local LEA IT and network teams with the features of the INSPECTr platform and its capabilities. This training forms part of the capacity building programme of the project and will be available as a training resource for future LEAs who wish to utilise the platform.

Context: In previously held Living Labs LEA developed Use Cases that used mocked data had been used for testing and feedback. For Living Lab 6 a slightly different approach was taken with LEA testers asked to work on set specific tasks to test pre-set scenarios. This was to ensure that all the developed features of the platform were tested, and feedback could be collected on them. Although it had been envisaged earlier in the project that the final Living Lab would use some real case closed data, this was not in fact the case. However, if there was sufficient time before the end of the project it remained a possibility that some scaled down LEA testing of real case closed data could be conducted separately. Any LEA testing real case closed data will have completed all documentation required to ensure full GDPR compliancy, if any of this required documentation was incomplete testing of real case closed data would not be permitted.

LL6 Structure: Each day commenced with an introductory training session on what the day would entail followed by a progression through the set exercises and would end with a section in which feedback would be provided by the LEAs involved in the testing. The Development Team were online and fully engaged throughout each day to work with the LEAs to support with querying, troubleshooting, and fixes in this live testing environment.

<table>
<tr><th colspan="2">INSPECTr Living Lab 6 – 30th January 2023 – 3rd February 2023</th></tr>
<tr><td>Day 1: Triage and Digital Forensic Tools
Part 1: Create Investigations in the CMS
Part 2: Data Ingestion and Preparation
Part 3: Triage and Digital Forensics</td><td>Day 2: Artificial Intelligence and Machine Learning Tools
Part 1: Cortex – Image Processor Gadgets
Part 2: Exercises with the Tools: AI Toolbox
Part 3: Exercises with the Tools: NLP Gadgets</td></tr>
<tr><td>Day 3: SIREN Demo
Part 1: SIREN Overview of INSPECTr Data Model and Dashboards
Part 2: SIREN Demo
Part 3-4: Practical Exercise and Solution
Part 5: Working With SIREN
Part 6-7: Second Practical Exercise and Solution and Wrap Up</td><td>Day 4: Data Discovery and Information Exchange:

To query other agencies on the PubSub network, on whether they have come across the same image as in the INSPECTr platform, by using a hash of it when creating a query.
Part 1 – Sending a Query Exercise
Part 2 – Receiving a Query Exercise
Part 3 – Receiving a Reply</td></tr>
<tr><td colspan="2">Day 5: Other Features
Part 1: Blockchain – What is the Blockchain / What is a hash?
Part 2: SKG – INSPECTr platform is ontology based. An ontology represents information in a subject area using fully structured and related concepts in some graph form.
Part 3: LEA Databases – SIREN - Importing from an external datasource.
Part 4: OSINT Tools – A practical OSINT exercise was carried out where LEAs were asked to firstly enable their gadgets in Cortex, and then asked to create an investigation, add artefacts, and analyse.
Part 5: Evidence Visualisation – INSPECTr Project’s approach to evidence visualisation using the INSPECTr Electronic Evidence Visualisation Library.
A database of templates describing several electronic evidence structure data types in a common language.
A binary parser that translates input raw data, by means of the templates.
A user interface including a hex-browser (binary visualiser) and a templates editor.
Both the tool and the database will be open-source.
Useful resource not only for trainees and trainers but also for LEA experts who need:
to find evidence in complex data structures and to explain their findings to a non-technical audience
to cross-check the results of other forensic tools.</td></tr>
</table>

Series of CEPOL Webinars to Demonstrate the INSPECTr Platform and Features

In February 2023 the INSPECTr project presented a series of lunchtime webinars, courtesy of CEPOL, with the target audience being Law Enforcement Officers, Judicial Authorities, and EU Public Security Entities fighting cybercrime.

The main goal of the INSPECTr project is to create a proof-of-concept platform, but future development will aim to improve the technology towards operational use so that it will be adopted by European LEAs. The platform can be used for a wide range of LEA activities, such as digital forensics and open source intelligence gathering. However, it also addresses major issues that LEAs experience, such as big data management and collaboration with other jurisdictions. The aim of this webinar series was to inform the target audience on how the INSPECTr platform can be accessed, installed, and configured, how to use INSPECTr gadgets for the acquisition and processing of digital evidence and intelligence sources, and to demonstrate the platform's case management system and analytics services. Comprehensive practical demonstrations were presented throughout the week-long webinar series. Access to the recordings of the webinar series is available to those registered on the LEEd platform, CEPOL's online education and training platform.

1. Project Overview, Platform Setup and Usage

This webinar described the platform and outlined how the needs of LEAs can be continually addressed at low cost.

INSPECTr provides:

- Fusion of outputs for commercial tools.
- Integrated tools for digital forensics and intelligence gathering.
- Assistance via AI/ML driven cognitive approaches.
- Proactive policing techniques for detecting and forecasting crime.
- Extra-jurisdictional collaboration: correlation and discovery of evidence.
- Full chain of custody and stack using blockchain ledger and services.

The project has been focussing on major LEA investigative issues which typically often come from having to deal with the huge volumes of data that places huge pressure on LEAs. Digital forensics units have to process data across a broad range of crimes, not just those concerning cybercrime. There is also a broad range of tools being utilised within forensic units for various purposes which often produce different outputs. This makes performing homogenised analytics on the data very difficult. There are also budgetary restrictions to be considered regarding purchasing, training, and licenses, all of which can create backlogs and bottlenecks in processing, and legal, technical, and bureaucratic obstacles in the way of LEAs wishing to work cooperatively together across borders. To ensure that the INSPECTr platform has developed to meet the needs of law enforcement, the INSPECTr law enforcement partners have been involved in the research and design and development of the platform from the outset and were key in the co-creation of three mocked use cases, and for providing invaluable input in the 6 phases of platform experimentation, testing and feedback cycles that have informed development.

The INSPECTr project has been developed with linkage to other projects:

- **FREETOOL project** – The Freetool project has a suite of tools that have been developed by law enforcement and are free for law enforcement only.
- **CASE Ontology -** Cyber-investigation Analysis Standard Expression (CASE) is an ontology that is used to standardise the output of INSPECTr tools. CASE is essentially JSON linked data that provides a lot of things LEAs need like chain of custody and chain of evidence. CASE allows all tools to output the same language which can then be fed into the INSPECTr analytics system. While integrated free tools are required to produce CASE output, the outputs of existing commercial tools like UFED and AXIOM are also parsed by INSPECTr, to be CASE compatible, resulting in a full LEA toolset that is potentially fully compliant.
- **SIREN -** The SIREN platform is the INSPECTr analytics platform allowing for data to be presented in a human readable format.

- **eCODEX** is used to connect LEA nodes and is key to supporting the discovery of evidence between platforms.

System Architecture

LEA Nodes - Each LEA node is a server that can be purchased at low cost, and each has the INSPECTr platform deployed to it. This includes all of the tools, services, and storage layers, which are free and without requiring any commercial licence.

INSPECTr Gadgets (analysers)

INSPECTr's docker orchestrator is based on Cortex, an existing platform for running security incident repsonse tools. We have developed some modifications to this platform and have developed libraries to provide more functionality. We have a blockchain for immutable logging and we also have data standardisation for analysis, chain of custody and chain of evidence using the CASE ontology. For storage we have Elastic storage for JSON information, and we have Hadoop for storage of binary files, and we have neo4J which allows us to examine the relationships between information. The deployment strategy used by INSPECTr makes it easy to add new tools, fix bugs and respond to feature requests. Investigator access to the dockerised tools can be controlled using Cortex, in order to comply with local policies and legal requirements. This session concluded with a demonstration of how to set up an investigation in the case management system (CMS) and create data within datasets that can start the investigation. Once an artifact was added, the gadgets available to that specific datatype were displayed.

2. Featured Tools and Basic Data Visualisation

The second webinar presented how INSPECTr provides a range of free tools and commercial tool parsers in a single homogenised environment.

OSINT Tools - The platform provides a selection of useful tools for gathering information from online sources. Many of these were demonstrated during this session, which was based around a network intrusion investigation. In addition to processing artifacts in the CMS, the reports produced from the gadgets were showcased, as was the ability to import new artifacts from the reports, for further processing. This provided a simple example of how the CMS could be used to conduct a full investigation into a suspicious IP address using the OSINT gathering tools.

Triage and Digital Forensics Integrated with INSPECTr System - INSPECTr Blockhasher aims to address challenges in LEA units and offer the improvements of identification of target devices (digital triage/preliminary analysis), which can then be prioritised for full forensic analysis. Improvements have been made in the speed of how a device can be prioritised for further examination by providing fast, simple, data classification at block level thus avoiding delays and bottlenecks of full file extraction and hash matching to known files of interest. Data minimisation and storage requirements have also been a focus of development, as only target files will be extracted and validated.

Deepthought was initially developed as part of the FREETOOL project and was selected for integration with the INSPECTr platform. This has since been integrated into each INSPECTr node as a Gadget. Deepthought reads an entire forensic disk, obtains a listing of all the files and then recovers them. The files are then stored onto the actual internal storage and makes them available in the CMS for further processing. It also does further analysis on all the files obtained by providing metadata such as location data, modified times, etc. The processing of large forensic images takes time, but the advantage here is that the process will run in the background, uninterrupted by other systems.

Commercial Tool Report Parsing - There are a number of commercial tool reports currently being processed by Gadgets; currently Axiom, UFED, Oxygen and XAMN. As these tools produce reports in various formats, they must be parsed by INSPECTr gadgets in order to homogenise their data. This will

allow the artifacts produced to be subjected to further processing while also supporting the analysis and correlation of evidential data . A lot of new entities were added to the CASE ontology in order to allow for this, by feeding INSPECTr requirements back into the CASE community.

Report Parsing - As well as commercial forensic reports the platform lends itself to adding other types of parsers due to the nature of gadgets. If LEAs have a script or unusual file type, it is foreseeable that a gadget can be added to deal with a unique filetype, thus gadgetising any process for parsing or processing of files. For example, automatic number plate recognition logs and credit card statements can be used in the system, due to additional parsers being developed for these types of file formats, at the requests of our LEA partners.

3 Data Standardisation, Chain of Evidence/Custody and Analytics

The third webinar presented how the INSPECTr platform provides a range of free tools and commercial tool parsers in a single homogenised environment enabling all tools in the platform to report using the CASE (JSON-LD) format.

With standardisation being a key concept within the project, from the outset the INSPECTr project opted for the open-source UCO/CASE ontology to serve as a standard for interchange, interoperability, and analysis of investigative information. To perform digital investigations effectively, there is a pressing need to harmonise how information relevant to cyber-investigations is represented and exchanged. CASE provides a structured specification for representing information that are analysed and exchanged during investigations involving digital evidence. Moreover, CASE enables the merge of information from different data sources and forensic tool outputs to allow more comprehensive and cohesive analysis. Standardising how cyber-information is represented addresses the current problem of investigators when they receive relevant information from different sources in a variety of formats. Finally, the standard maintains provenance at all phases of cyber-investigation lifecycles, including chain of custody and chain of evidence.

An investigation generally involves many different tools and data sources, effectively creating separate storerooms of information. Manually pulling together information from these various data sources and tools is time-consuming, and error prone. Tools that support CASE can extract and ingest data, along with their context, in a standard format that can be automatically combined into a unified collection to strengthen correlation and analysis. This offers new opportunities for searching, contextual analysis, pattern recognition, machine learning, and visualisation. Furthermore, organisations involved in joint investigations can share information using CASE.

Despite the challenges, standardisation is key to LEAs and other potential stakeholders in the investigative digital age scenario for integrating and validating the tools LEA are using; providing unified, even federated, data analytics; evidential integrity, secure and reliable exchange; providing interoperability with other projects/platforms; encouraging vendor compliance. If LEAs are currently using commercial vendors, we hope that soon they too will support CASE as this will be better for everyone, enabling the ability to perform cross-checks more easily across multiple different tools and formats and removing the need for users to be locked into specific tools.

SIREN Platform Overview - The SIREN platform is a component of the overall INSPECTr investigation platform used for data exploration and visualisation. It is a modern investigative intelligence platform that will read the JSON-LD produced by CASE and present it in a human readable format. SIREN uses a data schema (ontology) to coherently coordinate business intelligence style dashboards with best-in-class full text search, knowledge graph link exploration, domain specific visualisations and more. A data model is created by a user specifying multiple cross-index relations. When a query is sent to Elasticsearch requiring data from multiple indices, Siren Federate uses the relations in the data model to construct the appropriate join queries. Based on the data model dashboards and visualisations can be created to show and connect all distributed data created from jobs created by INSPECTr gadgets,

thus allowing the CASE ontology to be represented in a really understandable way. SIREN investigate is the front end and this whole platform sits within the INSPECTr node. This is where you can build relations between datasets, build and view dashboards for visualisations, and can analyse and explore data. It visually represents data that has been processed via the CMS and when you start off the gadgets the output of those can have all the data represented in a much richer visual environment. Additionally, it not only represents the data that has been directly processed, but because we operate/interoperate with the output of many vendors such as UFED/ AXIOM, it means that INSPECTr can represent those in a unified way and there is a centralised analytics platform where all of these can be viewed together, rather than having to use different pieces of software. Every device is displayed together, and we can cross-reference devices and do searches on groups of devices. SIREN Federate can also connect to existing data sources and pull data, not just the data pushed through the CMS, therefore providing linkage to a law enforcement agency's own pre-existing data. A demonstration followed of SIREN's formal representation of the entities and relationships that exist in a domain, creation of connections between artifacts created from gadgets that were run in the CMS of INSPECTr, and how it therefore provides a ready-to-go container for law enforcement forensic analysis.

4. Integrated AI/ML Tools

This webinar covered INSPECTr Visual (Image Processing), INSPECTr AI Framework, AI Toolbox and SIREN AI.

There are several image processing gadgets available in the CMS; for example Nudedetector, Nudeclassifier, Facial Recognition, Deepface, Childclassifier and Optical Character Recognition (OCR). While the goal of all INSPECTr tools is to generate CASE, there isn't currently a full representation for machine learning in the CASE ontology. It is a difficult format to deal with as there are so many different types of machine learning models, and so many disparate outputs. In order to resolve this issue, we have used the rules of the CASE ontology to generate and create our own structures to generate this information. The models themselves are stored locally, and held in the local docker registry to avoid the overheads of fetching large volumes of data when needed.

Image Processing Architecture - The Cortex is at the back end of the CMS, where all the analyses happens when we execute a gadget. It pulls all of its docker images from the local registry on demand. We also use FastDeploy and Machinery for this framework, which is essentially another type of docker orchestrator specifically for interacting with ML modes. SIREN can then be used for providing the 'big picture' of all the returned information contained in all the analyses, presenting the information in a more understandable and usable manner, and so making analysis of all the information easier. Processing of machine learning can be resource intensive, sometimes requiring a lot of GPU/CPU resources, and so we use the INSPECTr visual stack to queue all the data for processing, to avoid all the files having to run at the same time. However, this has not negatively impacted the processing time. Any model being developed and trained requires further feedback and development for it to remain accurate.

There is an important ethical side to Machine Learning to be considered. For example, it must be ensured that the data being used for training models has received ethical scrutiny, to avoid bias or prejudice. It must also be ensured that datasets were gained with correct permissions, and that the information covers a wide base of the source materials.

AI Toolbox Architecture - The AI toolbox is a set of specific purpose tools that have direct access to functionalities used internally and are for specific and occasional use. LEAs do not need to use them automatically, but they can be used if you wish to during your investigations. This is a micro services-based approach with a simplified user interface for easy access and REST Microservices can be used by existing systems. This platform is a very large sub-set of the French Gendarmerie's that won the Europol most innovative project of 2022 award. While designed for use by individual law enforcement

officers, the system can also be used to provide services, such as language translation, to legacy systems. There is a micro-service where you send information and it gives you the answer, thereby increasing the effectiveness of such LEA systems.

The collection of AI Enrichment Platform Tools was introduced and demonstrated, and practical examples provided of how each of these tools can be applied.

- **Multilingual Neural Machine Translation** – a service that can be completely offline, installed in your own internal network and adding and retraining models being completely possible.
- **OCR** – this follows the same model as the INSPECTr visual. It goes a bit beyond the OCR as it extracts all the information of the file, e.g. in the case of a PDF it extracts the entire text.
- **Entities and Semantic Links Detection** – you can request entity recognition annotation and add new classes, using these to train your model, and then create the available links and relations for further analysis.
- **Speech to Text** – the tool performs automatic speech recognition, detects the language, and can translate, and has a high accuracy rate, even when the recording sound quality is poor.
- **Stylometry** – identifying a user's way/style of interacting, who may be active across different platforms, based upon the way they write.
- **Knowledge Discovery** – a way to analyse relations existing between data. It is an exploratory tool to help better understand the data that you have in a simple and fast way so that you can pursue the most relevant parts.
- **Other models** are in process of being added, such as **object detection** and **scene detection**.

Using the INSPECTr framework, it is relatively easy to add additional own models, if LEA require further services. Many of the tools demonstrated here are also available via Europol's innovation lab.

5. Evidence Discovery and Exchange, Other Features and Future Exploitation

Evidence Discovery and Exchange: We have so far looked at how digital forensic tools can extract media from evidential material and how machine learning and AI tools can provide cognitive processing of the media, which in turn enables the investigator to query the metadata obtained. In the fifth webinar we look at the transfer-messaging part of the INSPECTr system, that enables one LEA to be able to highlight something to other LEAs on the network of INSPECTr nodes, thereby providing the ability to discover information between INSPECTr nodes. The CASE standard common language will be used to structure and support the automated normalisation, combination, correlation, and validation of information. Additional constraints and privacy considerations highlighted by law enforcement feedback would need to be integral in the Publish/Subscribe (pub/sub) engine's configuration.

Pub/Sub Request Engine – Sending a Request Using Hashes -In this "mocked" example the image classifiers have examined images recovered from a USB device and their combined outputs (nude detection and age detection) have identified possible Child Sexual Abuse Material (CSAM). At this point others in the INSPECTr network can be asked if they too have seen this file as part of their own investigations. To maintain data privacy and reduce exposure to such media, a hash of the file can be used in a query to other nodes. The Pub/Sub query is created to ask, "have you seen this hash anywhere across your investigations?". If one of the members has encountered the hash, then they have also seen the same image in an investigation.

A demonstration followed of the practical steps of how a Pub/Sub request could be created and sent, how these can be managed via the Information Request Management Engine (IRME), how to select where the request is sent i.e. to which LEAs, how to include messages, how to add time-outs in which to receive responses, and also how to amend the status of the query as it is progressing through the system. Importantly, it was also demonstrated how a strict approvals process from admins/superiors is required throughout the entire process.

Rules Engine: There is a Traffic Light Protocol (TLP) system in-built that takes place for each incoming message. In the background there is a rule engine to check if it is OK to exchange information on these types of crimes, with the various LEAs in the network. Then, depending on the rules in the rules engine, which depend on what bilateral agreements may be in in place between different LEAs and countries, we will get a response on whether the exchange of information is allowed or not. If it is not allowed by the rules engine, then it is not possible to proceed. The final step is for an administrative approval to take place, before routing the request to other nodes.

eCodex: A secure and encrypted routing mechanism, and the main component of the Pub/Sub.

- The Pub/Sub component exchanges data using **eCodex**, a secure, encrypted, and automated routing mechanism.
    - Uses **eDelivery** to exchange documents and data among different systems via a common protocol.
- **eCodex** provides the technical infrastructure to connect different legal systems and ensure fast access to justice past borders.
- Solution deployed as a "black-box" on Windows.
- However a Linux version has recently been released, which will be used in the future.

Important to Note: **Requests can only come from an investigation already in the case management system**. Due to the way we have implemented **CASE**, **Blockchain** and **INSPECTr Gadgets**, we have data being created in an investigation that is fully recorded, in terms of who has placed it there, and who has control over seeing it. Furthermore, a lot of thought has gone into how we allow the investigator to find out information from other countries. For example, the legal agreements that must be observed and the administrative controls in place, are all designed to avoid potential misuse by an investigator.

The Blockchain Structure - The blockchain structure provides an undisputable time series of different datapoints with each one connecting to the previous one. It is a chain of blocks and when a new block is added, all members on the network receive the data point. Having the previous block's hash, they calculate the new block's hash. This is important, as due to this chain of hashes, tampering cannot go undetected irrespective of how far back the tampered data is.

Whenever new data is added on the platform, a request is sent to the Storage Service to "write". The Storage Service logs this request to its logging system sending it to a central logging platform and also takes a hash of this log sending it to the local Blockchain ledger for storage. When you see a log in the central logging platform you also have the hash of that log. The ledger also sends every Nth hash created to the public Ethereum ledger, thus providing a second layer of guarantee, and making it impossible to alter the log without detection during audit.

By using the connections of all these things, Logging, Blockchain and Pub/Sub, we will be able to provide an indisputable log of activity. For example, imagine a seized device has an email sent from it by a suspect under investigation for terrorism offences. The investigator recovered this email via a given tool at a certain time, the artefact and attachment was analysed by the various other AI tools and, once terror related activities were detected, a pub/sub query was created and directed to LEA members on the network, this request was approved, and an LEA responded to this pub/sub query on the network. All these things are recorded in the storage system, and all backed by the blockchain ledger.

Knowledge Graphs

- The graph representation of information recorded in data that is connected.
- Stored in Graph Databases (neo4j) or RDF/triple stores.
- INSPECTr uses **neo4j** for information stored in graph form and is part of the storage service.

Ontologies - An ontology represents information of a particular subject area using a graph form. It does what a knowledge graph does connecting different pieces of information together on a particular subject. We are using the CASE ontology in the INSPECTr platform, and this ontology connects, in a specific structured standardised graph, the information relating to investigations of digital evidence. It can record investigative actions and data sources thus providing chain of custody allowing us to not only know what was found but also to record information on who initiated the processing, which tool was used to find it, and from which piece of evidence.

SKG – The SKG sits inside the graph database and knowledge graph creation and has a native graph approach for consuming CASE data. Its functionality is interlinked with CASE, via the case_builder libraries developed in the project. Modifications can be made to the graph by implementing proof of concept modifications to the CASE ontology, and this change in the graph is backed by a CASE like file that can be stored in the system and can be reported like any other CASE file; i.e., logged to the blockchain ledger. The Graph has version control, and you can get the structure/from of the graph as it was at any given point. When new things are added in neo4j, the storage system is informed, and logs are written into the blockchain.

Pub/Sub: While the Pub/Sub is useful for discovery of data on other nodes, the entire process will be built around existing processes for conducting joint investigations between law enforcement. We do not intend to replace Mutual Legal Assistance Treaty (MLAT) or European Investigation Orders (EIO) but we want to speed up the discovery of information across borders and jurisdictions, so an LEA can decide who they want to pursue an MLAT/EIO with. In the future the **knowledge graph** might lend itself to not just putting together two law enforcement investigations bureaucratically or legally onto one investigation, but actually merge data together in a manner that would enhance both sides of the investigation.

Future Intentions: All that has been presented has been to inform the audience about what we have been working with. The overall aim and intention is for all of the above to be seamless and some more work is still required for this to be a mature approach that is useful for LEAs. CASE has been evolving while we have been engaged in the project and it has been difficult to provide a definitive solution while the ontology is going through major updates, many of which have been triggered by our work in INSPECTr. Graph is very, very powerful and so the idea is that we can query a graph rather than a traditional database that would take time and processing, and with using graph we can ask queries and have those answered much more natively. All of the above has been extremely interesting to develop and present in terms of what is possible in the system in the way we are using the data and what may be possible for INSPECTr to do in the future.

ELSI Ethical Oversight of the INSPECTr Project

All of the above activity and development of the project has been controlled by active ethical governance of the project, the ongoing sensitisation of the Consortium to make them aware of important issues, and dealing with challenges as they are presented through collaboration to seek solutions.

Why Ethical, Legal and Society aspects are important:

- Part of **responsible research** and innovation, especially in Horizon 2020 projects and working with LEAs.
- **Ethics**: Technology has an important place in the world and needs to be monitored closely to ensure it is developed properly.
- **Legal**: Due to the nature of the project and intended use of the platform it is important for us to demonstrate and facilitate legal compliance.

- **Societal aspects**: Many people have worries about technology, so we need to create structures and processes to reassure people, avoid misuse, and make technologies that are societally acceptable.

Active ethical governance has taken the form of ELS Impact Assessments, making recommendations in mitigating risks and seizing opportunities to go beyond the baseline, implementing ethical and privacy considerations in the development process of the technology, looking at the organisational processes of using those technologies, and adapting the entire approach specifically to law enforcement.

Main Challenges and Solutions:

- **Appropriate data protection regime**
  - General Data Privacy Regulations (GDPR) and the Law Enforcement Directive.
  - Our conclusion was that GDPR was the most appropriate data protection regime for this type of research. However, the Law Enforcement Directive (LED) could also be used in certain situations.
- **Ethical and lawful data use, especially LEA data**
  - Many discussions were held on datasets and what types of processing might be appropriate in the circumstances.
- **Exploitation Risks**
  - Detailed discussions were held on potential misuse of INSPECTr-like technologies by nefarious actors, reckless users, or well-intentioned people who are unaware of issues, and how these can change over time.
  - A risk assessment was conducted in order to address those potential issues.
- **Limited awareness by end-uses of the ethical and legal issues posed by AI**
  - Developed ethics and legal guidance to cover both the general issues faced by the LEA end-users and also specific guidance for INSPECTr tools.
- **Data Anonymisation**
  - This can be used for decreasing risk for sensitive data and this was discussed with some of the partners and some of the knowledge coming out of that has contributed to a standardisation processes.
- **AI Act**
  - Examining impact of a forthcoming European Union AI Act on technologies like INSPECTr. This is still in development and in flux, so this has been a challenge, but we have tried to 'future-proof' INSPECTr as far as possible.
- **DPIAs and CP-As**
  - Law Enforcement data that is not connected directly to law enforcement investigations can be very difficult to deal with from a legal and ethical perspective. In order to have the possibility to use real closed case data in the later stages of the project for testing purposes, we completed Data Protection Impact Assessments (DPIAs) with participating law enforcement agencies. These were accompanied by Control-Processor agreements (CP-As), which were a legal mechanism to allow some technical partners access to LEA data in some circumstances to provide technical support if needed.
  - Highly detailed templates were developed, which are appropriate for law enforcement agencies for determining where the closed case files are stored and who owns them, holding discussions with data protection officers and data protection authorities, and recognising and mitigating any possible or potential risks to data suspects.

Privacy and security have been front and foremost of the technological development in the project. We have been working to ensure that we can demonstrate this compliance and show INSPECTr to be

a responsible project in the way it uses data for testing. The vast majority of INSPECTr technologies have met all relevant requirements and we also consider that we have made good progress towards the INSPECTr platform utilising only 'trustworthy' and 'responsible' AI.

Future Exploitation Discussion and Closing

The project has been quite a challenge to respect all the ethical and data privacy concerns while so much development has been in process, but we have looked at lots of way we can enhance law enforcement processes and existing technologies, whilst meeting the issues and challenges law enforcement are facing, and also future proofing the project. Discovery of evidence across different jurisdictions, the use of AI tools, and even some OSINT tools may cause concerns for LEAs. It was key to have the LEAs behind us, being focussed across the entire picture, while we were developing the technology and INSPECTr features and ensuring the correct controls around access to the tools, while ensuring full chain of custody and full chain of evidence on all of the tools available.

We have presented a lot of technologies and tools during the week's presentations. However, there were a lot of things we did not have time to present such as online data preservation, web scraping tools, proactive policing techniques for detecting and forecasting crime based on historical data, and so there is a lot more to come from the INSPECTr project.

We set out to develop something that is free for LEAs in keeping with the coordinator's (UCD Centre for Cybersecurity and Cybercrime Investigation) historical ethos of working on EC funded projects to produce free tools and outputs for LEAs across all of Europe. Our next task is to consider what future funding may be available to ensure we can continue to bring the INSPECTr platform forward from the current proof-of-concept, into operational use. Even some individual components of the platform could be valuable as stand-alone projects, that would benefit LEAs. For this we need a lot of LEA support behind us and need every consideration from every corner of Europe factored into the final development phase of this platform and its technologies.

Following the Blog, the newsletter provided information on other recent INSPECTr dissemination.

ECTEG LEA Experts Meeting in Budapest 6th-9th February 2023

40 attendees (mostly LEA experts in digital forensics / cybercrime) attended an event in Budapest that featured the INSPECTr platform. Participants were invited to see the platform in action in one of the workshops and provide feedback on its operational viability.

During 2 sessions, lasting over 3 hours, Ray Genoe (UCD CCI) provided a demo of an OSINT and a Digital Forensics investigation. In addition to the intelligence gathering tools and digital forensic tools, this provided an opportunity to showcase the new Blockhasher triage tool, the case management system, the analytic dashboards and the AI/ML tools for automated image classification and facial recognition.

Feedback from participants was hugely positive, with participants particularly impressed with:

- The deployment processes for the platform and tools
- The administrative controls for the tools
- The benefits of the platform compared to currently available tools
- The Blockhashing solution to digital forensics triage
- The integrated digital forensic tools and report parsers
- The suite of AI tools available

The newsletter also included a summary of all other project activities between November 2022 – February 2023 including the list of regularly scheduled INSPECTr project meetings held by the Consortium, and the final Project General Assembly held on Friday 24th February 2023.

CERIS - Spotlight on the fight against Child Sexual Abuse held on 21st February 2023 in Brussels

This workshop presented by DG HOME, aimed to bring together practitioners, local authorities, policymakers and researchers to discuss latest insights and lessons learned from ongoing EU-funded projects related to the prevention and detection of Child Sexual Abuse, and was attended by the INSPECTr Project Coordinator, Dr Ray Genoe. The aim of this workshop was to strive to ensure that recent research findings carried out can be fully exploited by informing policymakers and other stakeholders, particularly on evidence-based policy responses.

Final Project General Assembly held on Friday 24th February 2023

The project's final general assembly was held on Friday 24th February 2023 and was a hybrid event of both in-person and on-line attendance. The meeting covered the next key reporting milestones to be observed by all partners regarding the final financial and technical reporting of the project. There was also a detailed review of the status of all work package tasks and deliverables undertaken. This was followed by a demonstration of the INSPECTr platform highlighting the many features that had been developed to support European law enforcement. The meeting concluded with an exploration of the possibilities and opportunities that may exist for further development of the current proof-of-concept INSPECTr platform to one that is a fully operational platform, free-for-LEAs.

4.5 Newsletter KPIs

Our target KPI was at least 200 subscribers at the end of the first year, rising to at least 500 by the end of the project. We made the decision early in the project to move away from a subscription model for the Newsletter as we consider that dissemination for the Newsletter via the project website increases ease of open access to updates on project news. Readers can also access a full library of the currently published newsletters. The pandemic also had an impact on our decision, since the development work continued but dissemination opportunities were rare.

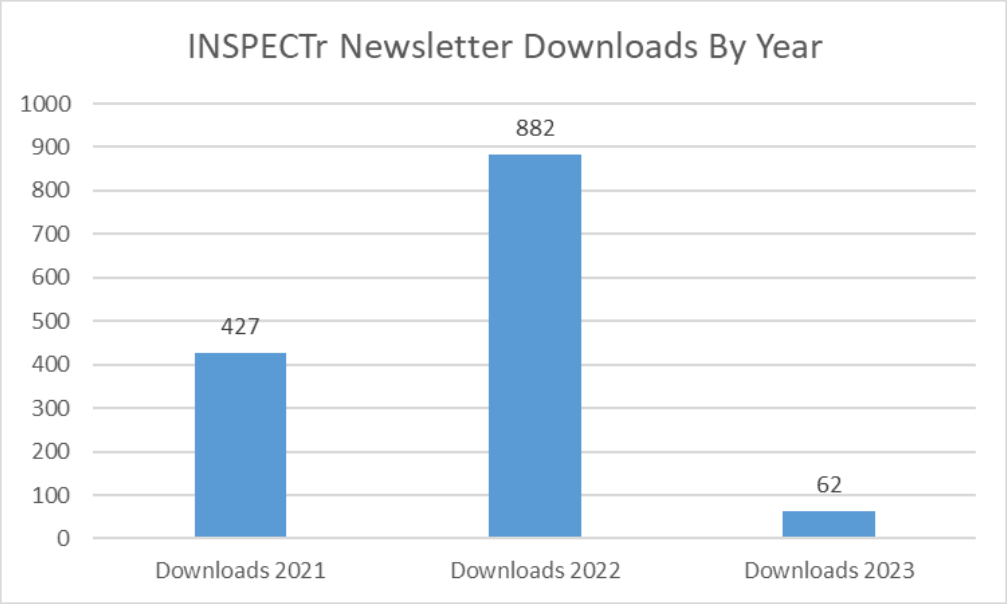
A facility to subscribe to receive the Newsletter via e-mail continues to exist as a service and we have received subscriber requests from:

- The Ministry of the Netherlands
- Portuguese Police
- Ministry of Public Romania
- Swedish Police
- Europol
- Ministry of the Interior France
- National Directorate of the Intelligence and Customs Investigations France
- Forensic Police Section Switzerland
- European Public Prosecutor's Office Luxembourg
- SCU Special Crime Unit NC3 Denmark
- 19 CoE subscribers from across 11 European countries
- Portuguese Public Security Police

The INSPECTr project newsletter continues to show steady improvement as our number of readers accessing the newsletter via the INSPECTr website steadily grows. We have also recently included links to our INSPECTr project newsletter on the CCI departmental website in UCD which we consider will be a valuable additional outlet for news about the project and its activities. However, we have no visibility on the statistics for the departmental website, so the following information is limited to email subscribers and the project website.

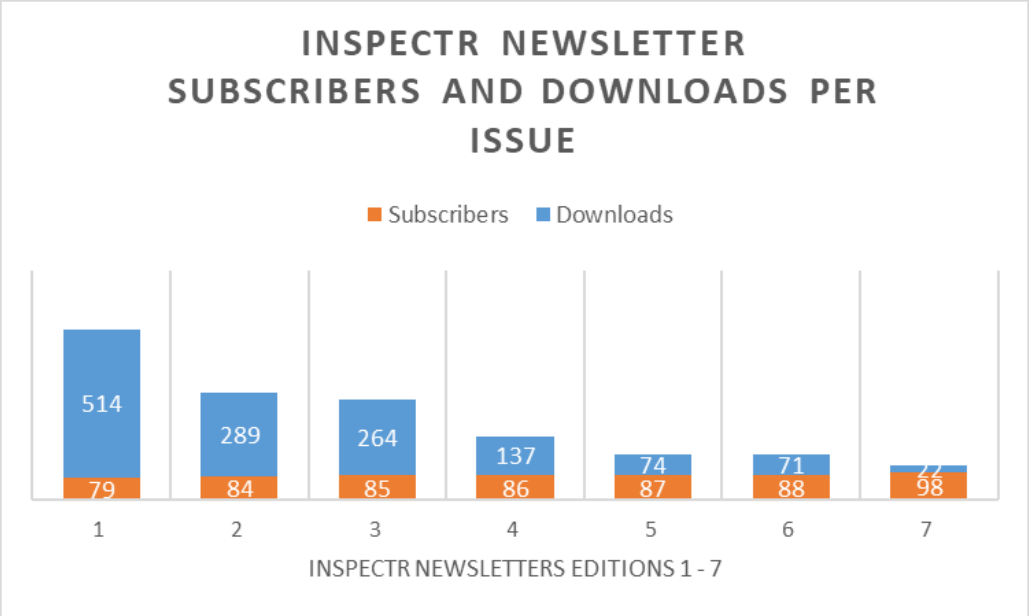
INSPECTr Newsletter Downloads - April 2021 to End of Project

Newsletter Downloads April 2021 – December 2021	427
Newsletter Downloads January 2022 – December 2022	882
Newsletter Downloads January 2023	62
Total Newsletter Downloads	**1371**



In addition to the Newsletters being downloaded from the INSPECTr website, there are a total of 98 subscribers currently receiving the Newsletter by signing up to our mailing list.

Newsletter Downloads January 2022 – January 2023



5 Conferences and Workshops

This section, and activity outlined in previous reports, covers the majority of subtasks in the Dissemination task for INSPECTr, including:

- Dissemination to LEA Communities to reach over 100 actors
- Presentation and demonstration of INSPECTr in at least three European LEA events
- Partner with CEPOL for the hosting of INSPECTr information and training webinars
- Liaison with Council of Europe on dissemination of INSPECTr to non-EU LEAs

A summary table of stakeholder events can be found In Annex 2.

5.1 9th Annual Meeting of the Expert Group on Drugs Online, April 2022

UCD @ Council of Europe Pompidou Group, 13th April 2022.

On the 13th of April 2022, the Secretariat of the Pompidou Group hosted its 9th annual meeting of the expert group on 'Drugs Online' at the Council of Europe headquarters in Strasbourg.

Key discussion points of the meeting were:

- the close and effective cooperation with international bodies, the private sector, judiciary, and law enforcement in tackling the marketing and distribution of 'drugs online' is an ever-growing need
- the multidisciplinary structure and professional cooperation with all partners is a key element to the success of this cooperation format.

The focus of the 2022 meeting was on online drug trafficking trends and modus operandi, tools for law enforcement cooperation, encryption technologies, instant messaging applications and case studies. The meeting brought together 36 experts from 18 different countries and 5 international organisations. For the first time, Trinidad and Tobago participated as observer in meeting.

The INSPECTr presentation to the group focussed on the INSPECTr Concept & Basic Architecture View and its principal objectives. The presentation was very well received with post presentation discussions taking place with numerous agencies.

5.2 Conférence publique de l'Ecole des sciences criminelles, May 2022

GN @ University of Lausanne, 12 May 2022

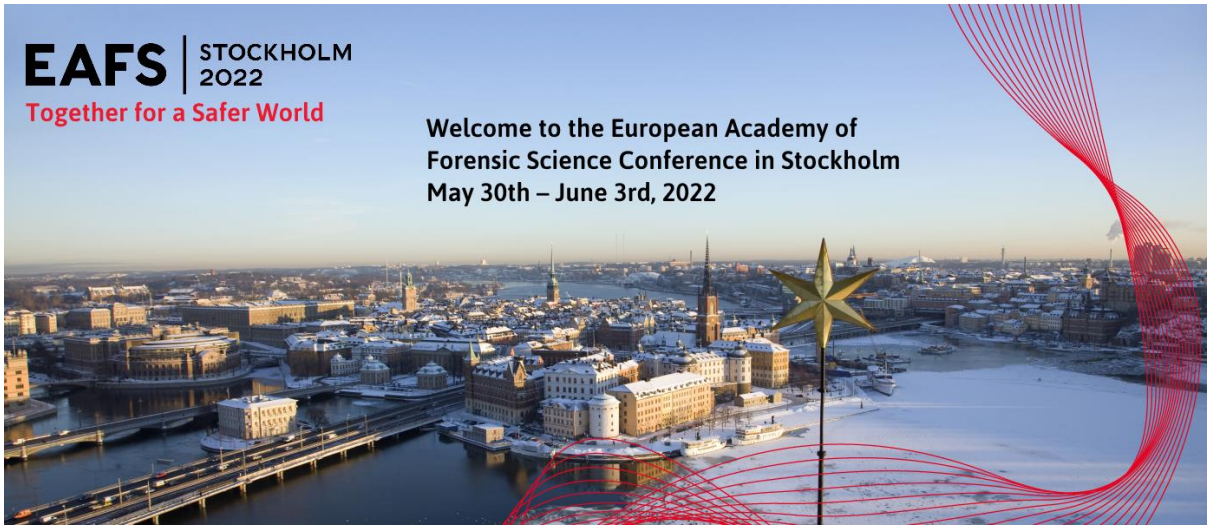
Title: Algorithmic methods to aid criminal investigation, Dr. Daniel Camara.

Abstract: The increase in available information has an impact on all aspects of society, and the processes criminal investigation are no exception. Access to recent technologies and digitization systematics of everyday life influence different aspects of the inquiry process. Those phenomena have greatly increased the amount of information available for investigation. It results in a set of new possibilities for analysing and correlating data, to which investigators had never thought of before. Today, law enforcement authorities can have access to a wide range of information that allows them

to carry out more precise analyses and finer points of criminal activity. However, this increase in information presents a challenge. An ordinary investigation can produce more investigative material than an investigator would be able to manually process in a lifetime. A few years ago, the difficulty was to find traces that could advance the investigation. Today, investigators are overwhelmed by the volume of traces and need help in filtering out what might be relevant and useful. The fact that a significant part of the information available is unstructured data limits the use of technologies traditionally applied.

At this conference, we will discuss the challenges and opportunities of increasing the quantity of digital data for the judicial police authorities. We will show how technologies, such as time series analysis and deep learning, can be used to assist investigators in their activities. We live in exciting times: new methods and technologies are being developed, others have yet to be developed to make it possible to structure the available information and to find the relationships hidden among the volume of data.

5.3 EAFS 2022, May 2022



Title: Cross-evidence crime analysis

Author/Presenter: Yves Vandermeer (PHS), Panos Protopapas (ILS)

Abstract: The workshop demonstrated how the output of miscellaneous digital forensic software can be homogenised, ingested and enriched so that crime analysts can discover and validate the hypothesis using visualisation like timeline, comparisons, cross-correlation. Based on a provided mocked crime scenario and related documentation, the workshop will start from pre-generated reports from smartphones, and computers part of a mocked crime scenario dataset. Participants would compare the original report with the homogenised version and add some non-IT information. Participants then use the interactive visualisation of the data to check two investigation hypotheses with the available evidence.

Title: Natural Language Processing for Social Network Analysis

Author/Presenter: Daniel Camara, Mohammed Belahcen (GN)

Abstract: In this workshop, participants will take part in the demonstration of a full data pipeline that analyses social media posts. Participants will learn the theoretical and practical aspects of how to perform sentiment analysis, detect hate speech and radical or extremist content on forums on social media posts and measure similarities between them. In the workshop different methods for data exploration and data analysis will also be discussed. Participants will be able to see how it works and understand different natural language processing methods that could be useful during investigative activities. In a didactic and easy-to-follow way and through a collaborative tool, participants will be able to follow and try the methods during the workshop. The objective is to provide the fundamentals of a simple, but complete, data analysis pipeline in python. Participants are not required to have advanced computer programming skills, although some basic skills would be helpful in understanding how some methods work.

Title: Introduction to INSPECTr (European Day Exhibition Workshop)

Author/Presenter: Ray Genoe, Robert Dowdall (UCD)

Abstract: The EU-funded INSPECTr project will integrate a range of high-tech approaches, including big data analytics, cognitive machine learning and blockchain technologies into a shared intelligence platform that will improve digital investigations and forensic capabilities, and reduce the complexity and cost of cross-border collaboration.

The platform has been designed through extensive collaboration with the law enforcement community, will incorporate privacy and ethics by design principles, and will take into account relevant national and international legislation.

After the project, the platform will be freely available to the law enforcement community and adoption will be enhanced through training courses, webinars and workshops. Exploitation of the project deliverables will also be freely available to LEAs to further improve the platform beyond the scope of the project, through additional research and development activities.

This workshop will present the living lab approach adopted by the project and discuss the social, ethical, legal and technical challenges faced by the consortium. Also provided will be a demonstration of the platform's capabilities. The outputs of commercial forensic tools will be combined with the outputs of integrated "free" tools for analysis and correlation. In addition to showcasing various AI

approaches to cybercrime investigation, including cross-case correlation, the workshop will illustrate our approach to evidence discovery and exchange with other jurisdictions.

5.4 Speech to Text Hackathon, May 2022

The INSPECTr/PJGN team participated in the Hackathon Artificial Intelligence For Security and Sustainable Development on the 13-15 May 2022 at Issy-les-Moulineaux (Paris region). The French Gendarmerie, the United Nations Environment Program and the French Agency for Development sponsored the hackathon. More than 60 teams participated on the three days of competition, each team composed of at most five people. Among the participants were students in the artificial intelligence field, startups and professionals in the data analysis field. Two challenges were proposed, speech to text for security and the classification of documents linked to the seventeen United Nations' goals for a Sustainable environment. The INSPECTr/PJGN team was the only one that completed the two challenges and arrived in third place for the speech-to-text challenge.

5.5 CEPOL Research and Science Conference, June 2022

UCD and CNR @ Mykolas Romeris University, Vilnius, Lithuania, 8-10 June, 2022.

The CEPOL conference was held in Mykolas Romeris University, Lithuania in June 2022. CEPOL invited contributions about policing and enforcing the law in the digital age, with a focus on emerging forms of criminal behaviour and new tools and methods in development to counter these crimes.

This was a key dissemination target of the project, and as a result the consortium prepared and submitted a number of publications and presentations.

The following abstracts were submitted for consideration in the proceedings, which would later be published in the European Law Enforcement Research Bulletin.

Paper Title	Lead Author	Conference Track
LEA Capacity Building as a Driver for the Adoption of European Research	Michael Whelan (UCD)	Capacity Building
Developing of a Judicial Cases Cross-Check system for case searching and correlation using a standard for the Evidence.	Fabrizio Turchi (CNR)	Cross agency/border

The abstracts for these papers are described later in the "Publications" section of this report. In addition to these, we also submitted a panel presentation on the following topic.

INSPECTr: Intelligence Network and Secure Platform for Evidence Correlation and Transfer

Author/Presenter: Ray Genoe, Michael Whelan (UCD)

Abstract: Cybercrime is a borderless crime that leverages technology and the internet to exploit businesses, communities and individuals. Law enforcement officers responsible for investigating cybercrime need to be equally able to access cutting edge technology to combat these crimes and to bring down criminal networks. This talk presents the EU-funded INSPECTr project as a solution to many of the issues faced by law enforcement agencies. INSPECTr produces and integrates a range of high-tech approaches, including big data analytics, cognitive machine learning and blockchain technologies into a shared intelligence platform that will improve digital investigations and forensic capabilities, and reduce the complexity and cost of cross-border collaboration. The platform is being designed through extensive collaboration with the law enforcement community, incorporates privacy and ethics by design principles, and takes into account relevant national and international legislation. After the project, the platform will be freely available to the law enforcement community and adoption will be enhanced through training courses, webinars and workshops. Exploitation of the project deliverables will also be available to LEAs who wish to further improve the platform, beyond the scope of the project, through additional research and development activities.

5.6 DFWRS 2022, July 2022

UCD @ Digital Forensic Research Workshop 2022, 13th July 2022.

This virtual event was aligned to US timezones but attended by a global audience. During the workshops, Robbie Dowdall (UCD) presented our work on CASE integration in INSPECTr and the challenges/benefits to data analysis, evidence provenance, and inter-jurisdictional discovery and exchange. The presentation was well-received and provided a great opportunity to showcase a real-world application of the CASE ontology.

5.7 Europol Excellence Awards in Innovation, October 2022

On 4 October, Europol awarded the Europol Excellence Awards in Innovation at the annual European Police Chiefs Convention 2022. The French Gendarmerie won "The Excellence Award for the most innovative project" for the creation of an Artificial Intelligence Tools Platform. The platform provides a suite of advanced criminal analysis tools specifically developed to enable police officers to benefit from artificial intelligence when processing criminal information. Many of the platform's tools were developed as part of the INSPECTr project and are now available via the Europol Innovation Lab Tool repository.

Europol received more than 70 nominations from law enforcement organisations across 14 countries in Europe, of which two were selected: one award for the most innovative law enforcement project and one award for the most innovative law enforcement operation.

The winners of the two awards were carefully assessed and selected by a dedicated panel, which included the European Commissioner for Home Affairs Ylva Johansson, the Police Chiefs of France, the Czech Republic and Sweden, and Europol's Executive Director.

https://www.europol.europa.eu/media-press/newsroom/news/europol-excellence-awards-in-innovation-2022

5.8 CERIS Annual Event, September 2022

Fighting Crime and Terrorism/Resilient Infrastructure: DG HOME organised a workshop in Brussels to bring together law enforcement practitioners, local authorities, infrastructure operators, policy makers and researchers to discuss the lessons drawn from FCT and INFRA projects, reach recommendations, and determine their most effective implementation strategies in the future research and innovation activities. The aim of this workshop was to facilitate the sharing of experiences and research findings in order to identify current achievements, possible synergies, and strengthen collaboration on a European level. This event was attended by Dr Ray Genoe, Coordinator of the INSPECTr Project.

5.9 i-Lead Industry and Research Days, September 2022

The event was organised by the i-LEAD project, with the Central Unit of the National Police of the Netherlands (NPN) as coordinator, the Polish Platform for Homeland Security leading organisational matters, in collaboration with ENLETS, EUROPOL's Innovation Lab, and the European Clearing Board.

Two presentations from INSPECTr were delivered at the event, which introduced participants to various aspects of the AI tools developed by the Gendarmerie:

- *Iterative textual annotation using user feedback,* Meryem Guemimi and Daniel Camara (GN)
- *Stylometry: Authorship Identification in Web Forums,* Mohamed Belahcen and Daniel Camara (GN)

Over 100 people attended this meeting between the 6th and 8th of September, where representatives from 15 countries interacted and participated actively. Practitioners from 44 LEAs were among those in attendance.

5.10 International Conference Innovation in Law Enforcement, November 2022

INSPECTr partner the French Gendarmerie, as finalists of the Europol's Innovation Award, were invited to attend the International Conference Innovation in Law Enforcement, held in Prague 2nd-4th November 2022, and present their work. The AI platform was presented, and the presented tools raised a great deal of interest from the conference participants. Europol also manifests high level of interest in incorporating even more of the platform tools into Europol's tool repository.

5.11 Workshop at the European Public Prosecutor's Office, November 2022

This workshop aimed to discuss the data management strategy for their Case Information Management System (CIMS). INSPECTR project partner Fabrizio Turchi of CNR attended this workshop.

EPPO is primarily focused on their CIMS to support cross-border investigations. They automatically extract relevant data from a variety of documents (most of them financial), either not structured or poorly structured, and move them in a model exploited by the CIMS to find cross-references between different investigative cases. Therefore, they are interested in better understanding the UCO/CASE ontology and verify if part of the derived model can be integrated in their model. CASE (Cyber-investigation Analysis Standard Expression) was also designed for this purpose, and they should map their data to determine coverage and gaps. Furthermore, they are interested in INSPECTr because it has been developing a real platform for cross-border investigations relying on the UCO/CASE model.

Questions were asked about the backward compatibility of UCO/CASE. In other words, EPPO wanted to know if the ontology is capable to handle "hot" extensions of the data model without interfering with the applications based on the old versions. Fabrizio answered that the current 1.0.0 version can maintain this compatibility because it's highly probable that new versions will extend the previous models so the applications should continue to be valid without interruption even if they won't use the additional features until they won't be updated.

Two presentations followed, the first one being on CASE and the second one on an application being developed within a separate project for the preparation of the E-Package containing the elements of evidence expressed in CASE to facilitate the evidence exchange among Judicial Authorities in the Member States, relying on e-EDES and e-CODEX.

Regarding the INSPECTr project the main goals were illustrated being those of parsing, homogenisation and ingestion of commercial tool reports, providing data analytics (additional storage requirements), maintaining the chain of evidence (traceability and provenance) the integrity has been maintained by blockchain, enhancing cross-border collaboration to discover linked cases, and to exchange elements of digital evidence. It was also highlighted that the standardisation is a key concept within the project and from the outset, INSPECTr opted for the open-source UCO/CASE ontology to serve as a standard for interchange, interoperability, and analysis of investigative information with a set of parsers for commercial tools having been developed to convert the XML reports generated by the tools into UCO/CASE. At the moment the tools that have received consideration have been: UFED (Cellebrite), AXIOM (Magnet Forensic), XAMN (MSAB), OXYGEN (MH Service). Finally, the data have been ingested in a Storage System based on Elastic Search for subsequent data analysis.

5.12 Gendarmerie Prix de la Transformation Awards, November 2022

The Gendarmerie has an internal, yearly award, for the most innovative internal projects. It is called "Prix de la transformation" Or "Transformation award". It is the most important award internally given to projects that have changed or has the potential to change and improve the Gendarmerie. It is not an award that has much visibility outside the French Ministry of Interior. However, in addition to receiving the award for the work conducted in the INSPECTr project, the outcome of this award is that these AI components of INSPECTr can be deployed to all of the French Gendarmerie.

The link for the official LinkedIn post (in French) is:

https://www.linkedin.com/posts/service-de-la-transformation_agir-plateformeia-suffrage-activity-7001981494655131648-8GKw

5.13 AGOPOL Online Conference, November 2022

This conference focused on "Diffusion of Policing in the Algorithmic Society" and INSPECTr was represented by Trilateral, who delivered the following presentation.

Title: Can Privacy and Ethics-by-Design by Adapted for Law Enforcement Technologies?

Author/Presenter: Joshua Hughes & David Barnard-Wills (TRI)

Abstract: The impacts that technologies have on us as individuals and on society at large can be significant. It is, therefore, important that technologies are designed and developed in appropriate ways. This is particularly the case with law enforcement technologies due to the exceptional place that law enforcement plays in our societies, especially where data-analysis tools are used to reveal private information about suspects. Two design approaches that can assist in appreciating and mitigating risks raised by law enforcement technologies are Privacy-by-Design and Ethics-by-Design. However, these approaches are primarily focussed on commercial technologies where the end-users are the focus of attention. Yet, with law enforcement technologies, the end user is likely to be a law enforcement officer, such as a detective or crime data analyst, but the focus of attention from Privacy and Ethics-by-Design approaches is the subject of a criminal investigation. How should these approaches be adapted to deal with this change in focus? Another key issue is the lawful ability of law enforcement to uncover private details of individuals present in their investigations, how should Privacy and Ethics-by-Design be implemented in a situation where conventional standards of privacy do not apply, and the standards of what behaviours might be ethical and acceptable are different? This paper seeks to answer these questions and provide an outlook as to how privacy and ethics-by-design approaches can be adapted and applied in the situation of researching and developing data-analysis technologies for law enforcement investigations.

https://www.algorithmic-governance.com/post/agopol-online-conference-diffusion-of-policing-in-the-algorithmic-society

5.14 Council of Europe Workshop, December 2022

This event was hosted in Dublin on the 7th of December and delivered by Ray Genoe and Robbie Dowdall (UCD). During the workshop, 24 participants were introduced to the INSPECTr project and provided with a detailed demonstration of the platform's capabilities. The 11 countries represented included Albania, Armenia, Azerbaijan, Georgia, Kosovo, Moldova, Montenegro, Republic of Srpska (Bosnia and Herzegovina), Serbia, Turkey and Ukraine.

All participants showed great interest in the project and stayed long after the scheduled time to ask follow-up questions about the platform and its capabilities. Every participant signed up for the newsletter subscription so they could keep abreast of the latest news and developments.

5.15 ECTEG Experts Workshop, February 2023

40 attendees (mostly LEA experts in digital forensics / cybercrime) attended an event in Budapest that featured the INSPECTr platform. Participants were invited to see the platform in action in one of the workshops and provide feedback on its operational viability.

During 2 sessions, lasting over 3 hours, Ray Genoe (UCD CCI) provided a demo of an OSINT and a Digital Forensics investigation. In addition to the intelligence gathering tools and digital forensic tools, this provided an opportunity to showcase the new Blockhasher triage tool, the case management system, the analytic dashboards and the AI/ML tools for automated image classification and facial recognition.

Feedback from participants was hugely positive, with participants particularly impressed with:

- The deployment processes for the platform and tools
- The administrative controls for the tools
- The benefits of the platform compared to currently available tools
- The Blockhashing solution to digital forensics triage
- The integrated digital forensic tools and report parsers
- The suite of AI tools available

5.16 CEPOL Webinar Series, February 2023

CEPOL kindly agreed to showcase the INSPECTr project during a webinar series which served as an end-of-project showcase for the work conducted in INSPECTr and how it will benefit LEAs in future.

The aim of the webinar series was for LEAs to understand the proof-of-concept technologies presented by INSPECTr, the benefits to lawful investigations and the potential for further exploitation of this platform, which will be freely available to LEAs. The objectives were listed as:

- To discuss the challenges faced by the project
- To increase awareness about emerging research for LEAs
- To promote adoption of the platform and technologies
- To encourage future research into operational use of the technologies

By the end of this webinar series, the audience will be able to:

- Understand how to access the platform
- Exhibit a detailed understanding of how to install and configure an INSPECTr node
- Use INSPECTr Gadgets for the acquisition and processing of digital evidence and intelligence sources.
- Demonstrate an understanding of the platforms case management and analytics services
- Comprehend the full set of AI/ML tools in INSPECTr

- Understand the data privacy processes that support evidence discovery and the technology behind evidence exchange
- List the main features of the platform and how LEA can further exploit the technology

All of this information was provided to LEAs by the CEOPL coordination team and the flyer below was used to advertise the event, which ran from the 13th to the 17th of February. The target groups were LEA officers, judicial authorities, EU public security entities fighting cybercrime.

A total of 6 webinars were provided by members of the INSPECTr consortium from UCD CCI, CNR, PHS, GN, SIREN, TRI and ILS. Each webinar provided an in-depth analysis of the challenges faced by law enforcement, with solutions as to how INSPECTr addressed the issues. The programme included:

- Webinar 1 - Project Overview, Platform Setup and Usage
- Webinar 2 - Featured Tools and Basic Data Visualisation
- Webinar 3 - Data Standardisation, Chain of Evidence/Custody and Analytics
- Webinar 4 - Integrated AI/ML Tools
- Webinar 5 - Evidence Discovery and Exchange
- Webinar 6 – Advanced features and future exploitation

The final webinar included a guest speaker from EACTDA, to discuss the Tools4LEA project which is relevant for the exploitation of technologies to advance their suitability for operational use.

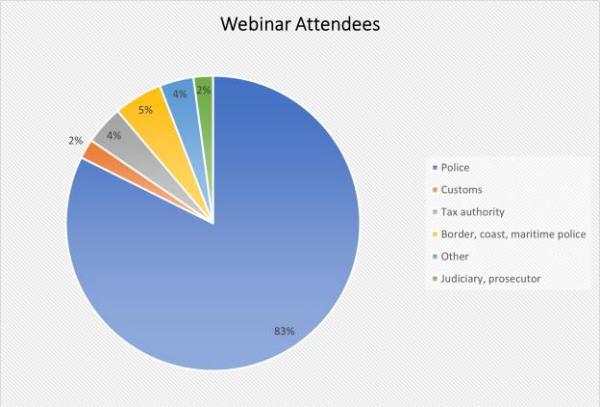
The feedback from each webinar was generally positive and is elaborated in further detail in Deliverable 6.11. As a general overview the number of attendees and their satisfaction rates are as follows:

Webinar 1 - Project Overview, Platform Setup and Usage

- Number of attendees: 158
- Satisfaction rate: 93.20%
- Countries represented: 25
- Male: 128
- Female: 28
- Other: 2

Webinar 2 - Featured Tools and Basic Data Visualisation

- Number of attendees: 151
- Satisfaction rate: 95.29%
- Countries represented: 23
- Male: 126
- Female: 24
- Other: 1

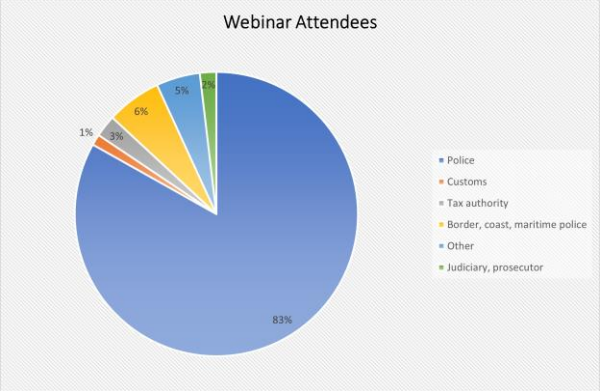


Webinar 3 - Data Standardisation, Chain of Evidence/Custody and Analytics

- Number of attendees: 108
- Satisfaction rate: 90.63%
- Countries represented: 23
- Male: 87
- Female: 20
- Other: 1

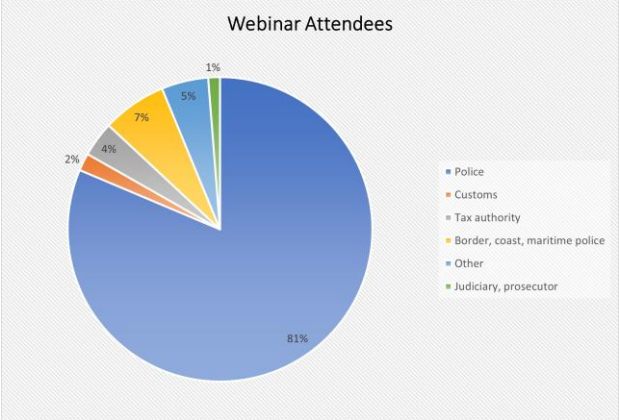
Webinar 4 - Integrated AI/ML Tools

- Number of attendees: 125
- Satisfaction rate: 91.78%
- Countries represented:
- Male: 103
- Female: 21
- Other: 1



Webinar 5/6 - Evidence Discovery and Exchange, advanced features and future exploitation

- Number of attendees: 124
- Satisfaction rate: 92.65%
- Countries represented:
- Male: 101
- Female: 22
- Other: 1



Note: webinar 5 and 6 were run in sequence for an extended session (2.75 hours, rather than 1.5 hours for other webinars).

5.17 CERIS Workshop Presented by DG Home, February 2023

This workshop was held as a Spotlight on the fight against Child Sexual Abuse. This workshop, presented by DG HOME, aimed to bring together practitioners, local authorities, policy makers and researchers to discuss latest insights and lessons learned from ongoing EU-funded projects related to the prevention and detection of Child Sexual Abuse.

The aim of this workshop was to strive to ensure that recent research findings carried out can be fully exploited by informing policy makers and other stakeholders, particularly on evidence-based policy responses.

Dr. Ray Genoe, coordinator of the INSPECTr project, was invited to be a speaker at the breakout session on the detection of Child Sexual Abuse Material (CSAM), since the INSPECTr project was developing numerous tools and technologies to support this field of investigation. While many projects, including INSPECTr, are focussed on AI supported technologies for image and video processing, none were addressing the needs of triage/preliminary analysis or the discovery of evidence between jurisdictions for uncovering CSAM distribution networks.

The publish/subscribe process was briefly described but a huge amount of interest was directed to the Blockhasher tool developed by UCD CCI during the project. In fact there was so much interest that some additional time was carved out of the agenda to provide a demonstration of the tool to the audience, which included representatives from Europol who are dedicated to combating CSA crimes.

The Blockhasher provides automated triage of digital evidence, so that it can be prioritised for full forensic analysis. This will go a long way to reducing backlogs in digital forensic units, who struggle to process the vast array of devices being seized during such investigations. The automated process is much faster than the current “extract-and-hash” process when dealing with known (bad) files, and can be used by non-technical operators without being exposed to the upsetting nature of the content retrieved. Embracing a data-minimisation principle, the tool simply extracts target files from almost any storage device, thereby also addressing the digital evidence storage issues currently faced by many LEAs.

6 Scientific Publications

INSPECTr is one of the most important initiatives in Europe aimed at developing new forensic tools, techniques and methodologies, based on common practices, standards, protocols and interoperability requirements. Therefore, in addition to our conference and workshop dissemination activities, we have targeted 6 journal submissions with 3-4 accepted for publication.

In addition to the journal publication accepted in Dissemination Period 2, the following sections describe the additional publications that were accepted (3), a book chapter that has been published and a number of additional papers (3) that are currently being drafted.

6.1 Accepted Publications

Conference Proceedings: CEPOL Research and Science Conference, Vilnius, Lithuania, 2022

Authors: Michael Whelan and Ray Genoe (UCD)

Title: LEA Capacity Building as a Driver for the Adoption of European Research

Abstract: *The INSPECTr project aims to produce a proof of concept that will demonstrate solutions to many of the issues faced by institutional procedures within law enforcement agencies (LEAs) for combating cybercrime. Unlike other H2020 projects, the results of INSPECTr will be freely available to stakeholders at the end of the project, despite having a low technology readiness level. It is imperative that LEAs fully understand the legal, security and ethical requirements for using disruptive and advanced technologies, particularly with a platform that will provide AI assisted decision making, facilitate intelligence gathering from online data sources and redefine how evidential data is discovered in other jurisdictions and exchanged. However INSPECTr will also require the support of stakeholders beyond the scope of the project, in order to drive further development and investment towards market-readiness. The development of a robust capacity building program has been included in the project to ensure that LEAs can confidently use the system and that they fully understand both the pitfalls and the potential of the platform.*

During our training needs analyses, various European instruments, standards and priorities are considered, such as CEPOL's EU Strategic Training Needs Assessment, the course development standards established by ECTEG and Europol's Training Competency Framework. With this research and through consultation with internal and external stakeholders, we define the pathways of training for the INSPECTr platform in which we aim to address the various roles in European LEAs and their requirements for the effective delivery and assessment of the course. In tandem with the project's philosophy of ethics-by-design, the training program produced by INSPECTr will have a strong emphasis on security and the fundamental rights of citizens while addressing the gaps in capabilities and training within the EU LEA community. In this paper we will describe the process we apply to curriculum design, based on the findings of our research and our continued engagement with LEA and technical partners throughout the life-cycle of the project.

Conference Proceedings: CEPOL Research and Science Conference, Vilnius, Lithuania, 2022

Authors: Fabrizio Turchi and Gerardo Giardiello (CNR)

Title: Developing of a Judicial Cases Cross-Check system for case searching and correlation using a standard for the Evidence

Abstract: *In a recent EU publication, a report commissioned by the European Union related to the Cross-border Digital Criminal Justice environment, a set of specific business needs have been identified. Some of the most relevant ones have been:*

- *The interoperability across different systems needs to be ensured.*
- *The stakeholders need to easily manage the data and ensure its quality, allowing them to properly make use of it (e.g. use the data as evidence in a given case).*
- *The stakeholders investigating a given case should be able to identify links between cross-border cases. Therefore, solutions are needed to allow the stakeholder to search and find relevant information they need for the case they are handling.*

The study presents a set of solutions to address the highlighted needs, including:

- *Judicial Cases Cross-Check (Evidence standard representation is suitable)*
- *A Judicial Cases Cross-Check system should provide a tool being able to search for case-related information and identify links among cases that are being investigated in other Member States or by JHA agencies and EU bodies.*

To facilitate the development of the above solution, a standard representation of the metadata and data of the Evidence should be adopted. In particular the ontology UCO/CASE, dedicated to the digital forensic domain, seems the most promising one to this aim. UCO/CASE, that stands for Unified Cyber Ontology / Cyber-investigation Analysis Standard Expression, provides a structured specification for representing information that are analysed and exchanged during investigations involving digital evidence. To perform digital investigations effectively, there is a pressing need to harmonise how information relevant to cyber-investigations is represented and exchanged. CASE enables the merge of information from different data sources and forensic tool outputs to allow more comprehensive and cohesive analysis. All these metadata represented in a standard format, could be provided to any potential stakeholder using a decentralised repository of metadata along with a suitable level of confidentiality and integrity.

The INSPECTr project (inspectr-project.eu) opted for the open-source UCO/CASE ontology to serve as a standard for interchange, interoperability, and analysis of investigative information.

Conference Proceedings: Intelligent Technologies and Applications, 4th International Conference, INTAP 2021, Grimstad, Norway, October 11–13, 2021

Authors: Meryem Guemimi, Daniel Camara (GN); Ray Genoe (UCD)

Title: Iterative Learning for Semi-automatic Annotation Using User Feedback

Abstract: *With the advent of state-of-the-art models based on Neural Networks, the need for vast corpora of accurately labelled data has become fundamental. However, building such datasets is a very resource-consuming task that additionally requires domain expertise. The present work seeks to alleviate this limitation by proposing an interactive semi-automatic annotation tool using an*

incremental learning approach to reduce human effort. The automatic models used to assist the annotation are incrementally improved based on user corrections to better annotate the next data. To demonstrate the effectiveness of the proposed method, we build a dataset with named entities and relations between them related to the crime field with the help of the tool. Analysis results show that annotation effort is considerably reduced while still maintaining the annotation quality compared to fully manual labelling.

Book Chapter: Applied Artificial Intelligence and Robotics for Government Processes

Authors: Pauline Rousseau, Dimitris Kotzinos, Daniel Camara (GN)

Title: Classification of Complaints for Criminal Intelligence Purposes

Abstract: *The increase in the volume of available data is changing how people perceive their own fields and how the people may interact with this surplus of information. Public security is not different; Law Enforcement Agencies (LEAs) now have available a large quantity of information to help them fight criminality. One challenging problem is to classify/predict criminal activities. The differentiation over two different complaints may only be clear through the careful analysis of complaints' open text fields, e.g., the modus operandi, where it is described the specificity of the perpetrated crime. Sometimes the intention behind a crime is not evident unless it is correlated to other crimes and patterns get extracted from them. This chapter shows that it is possible to classify criminal data using machine learning-based methods and that open text fields, such as the modus operandi, may play a fundamental role in the performance of the classification.*

6.2 Pending Acceptance

The following paper was submitted but requires some amendments before it will be accepted for publication. We intend working on this after the project finishes.

Journal: Journal of Quantitative Criminology, Springer, 2023.

Authors: Mohamed Belahcen, Daniel Camara (GN); Ray Genoe (UCD)

Title: Stylometry: Authorship Identification in Web Forums using Natural Language Processing

Abstract: This paper presents a method and a framework for authorship identification in social media and web discussion forums. The intention is to link seemingly unassociated user accounts to a single person attempting to mask their identity. In web forums, it is common to use different accounts to, for example, try to influence discussions. Another case, more specific to law enforcement, is to post in different forums for criminal purposes and with different usernames to hide their identities. The investigation of these types of activities, when used to conduct a criminal act, would greatly benefit from authorship identification.

6.3 Pending Submission

Title: Can Privacy and Ethics-by-Design by adapted for law enforcement technologies?

Author: Joshua Hughes (TRI)

Abstract: The impacts that technologies have on us as individuals and on society at large can be significant. It is, therefore, important that technologies are designed and developed in appropriate ways. This is particularly the case with law enforcement technologies due to the exceptional place that law enforcement plays in our societies, especially where data-analysis tools are used to reveal private information about suspects. Two design approaches that can assist in appreciating and mitigating risks raised by law enforcement technologies are Privacy-by-Design and Ethics-by-Design. However, these approaches are primarily focussed on commercial technologies where the end-users are the focus of attention. Yet, with law enforcement technologies, the end user is likely to be a law enforcement officer, such as a detective or crime data analyst, but the focus of attention from Privacy and Ethics-by-Design approaches is the subject of a criminal investigation. How should these approaches be adapted to deal with this change in focus? Another key issue is the lawful ability of law enforcement to uncover private details of individuals present in their investigations, how should Privacy and Ethics-by-Design be implemented in a situation where conventional standards of privacy do not apply, and the standards of what behaviours might be ethical and acceptable are different? This paper uses experiences from the INSPECTr project to begin answering these questions and provide an outlook as to how privacy and ethics-by-design approaches can be adapted and applied in the situation of researching and developing data-analysis technologies for law enforcement investigations.

Title: Impersonal Data Treatment: Towards Unbiased AI

Author: Daniel Camara (GN)

Abstract: The issue of bias is always present when we discuss the treatment of data for public safety. Are specific genders treated equally? Are the minorities treated differently than the rest of the population? These are valid questions and show a certain mistrust society has over state institutions. It is understandable; trust is something hard to give, particularly when our own liberty is at risk. To avoid any bias on the data treatment when making data correlations, the INSPECTr project's approach is to treat all data in an impersonal way. INSPECTr does not know or even care about the semantics behind each field. For example, the "sex of the victim" field is treated as a categorical field, with its own specific statistics. The similarities are established through the values of the fields and the different distributions these have. At no time does the correlation algorithm take into account the semantics of the field. In fact, everything is designed so that the framework does not care for it.

In the first place, the framework evaluates the data, and detects the type of the fields. The types taken into account are: date, date-time, categorical, float, long and short texts. Each one of these types is treated differently, but uniformly inside its category, which guarantees fair treatment among fields. For example, the suspect's date of birth is treated the same way as the date of infraction. The initial analysis also has a nice side effect: it simplifies the insertion of new data sources into the system. LEAs that want to plug in a new data source, just need to create a profile and framework that will adapt to treat the new data source.

The second phase is a feature engineering that is made to improve the expressiveness of the fields. For example, new elements are created for date fields to represent the day of the week, the month of the year, season, etc. The implemented methods for data discovery and investigations correlation take these fields, and their specific statistics, to provide helpful information for the users of INSPECTr system.

Title: Blockhashing for Triage in Digital Investigations (early draft)

Author: Ray Genoe (UCD)

Abstract: The BlockHasher has been designed to address the requirement for preliminary analysis of devices, to assist in the prioritisation of images for forensic processing. Forensic processing is a notorious bottleneck in the workflow of digital investigations and this tool can be used to quickly identify potential "smoking gun" evidence on devices. When presented with a file or forensic image, the BlockHasher can examine each block of data and compare it to the known set in the database. An overview of the input data is then presented to the user, indicating the categories of data that may be present. In addition to the known dataset, users can also choose to upload a temporary set of blockhashes. This can be useful for investigations where new types of media are known and are specific to the case. For example, a stolen document or a shared explicit image. Given the nature of the tool, false positives are expected and therefore the results are simply an indication of the media that may be present. However, the authors also present a method for validating and extracting certain categories of information, which eliminates false positives for a given category.

7 Other Publications

This section describes the latest dissemination activities for increasing awareness about the project through public media releases and publications for the law enforcement community. The goal of this activity is to encourage LEA adoption of the platform and increase the public's background knowledge on digital forensics topics, including the need for cross-jurisdiction evidence sharing in a manner which meets data protection and ethical concerns. We have achieved our initial target of 3 press releases and publications, 2 of which are described below. The other was a press release issued in Dissemination Period 1.

7.1 Europol Cyberbits

At Europol, generating cyber intelligence involves collecting information on cybercrime from a wide array of public, private and open sources, and then processing and analysing that information. The objective is to enrich and expand the store of law-enforcement data and thus help make the fight against cybercrime as effective as possible. To this end, Europol has developed a number of cyber-intelligence products[1].

One such product is Cyber Bits, which provides short intelligence notifications on cyber-related topics. These notifications are designed to raise awareness and trigger discussions on further actions. Cyber Bits notifications fall into four categories:

- trends: updates on emerging patterns and on new modi operandi, tools and techniques that cyber criminals use
- knowledge: guidance on different aspects of cybercrime such as infrastructure, tools and modus operandi
- technology: news on technical developments that could have an impact on the work of law enforcement authorities, and that can spawn more in-depth reports if it is felt that the initial findings warrant this
- tools: news on tools that have been developed at the request of a focal point within Europol, a Member State or a European Cybercrime Centre (EC3) stakeholder.

In Q1 of 2022, the INSPECTr consortium were asked to provide details about FREETOOLs and how they were being integrated into the INSPECTr platform. The edition of Cyber Bits was restricted to LEA only and released on 31/03/2022 via Europol LEA networks to over 700 LEA officers.

[1] https://www.europol.europa.eu/operations-services-and-innovation/services-support/information-exchange/intelligence-analysis/cyber-intelligence

7.2 EU Research Article

The INSPECTr consortium was approached to submit an article for EU Researcher Magazine in 2022. EU Research is a dissemination journal focusing on pioneering frontier research. The magazine is published quarterly and distributed throughout 33 countries in Europe to over 50,000 readers.

The aim of the journal is to promote research projects to a relevant audience in government, the private sector as well as academia. In turn this will lead to enquiries of interest, global exposure and dissemination for the projects involved. It is hosted online, thereby indefinitely reaching a global web audience. It is read by the key people in national and European governments that control policy and research funding, leading scientific research institutes and major companies across industries in the private sector.

The information below provides further details about the article, and is followed by the article itself.

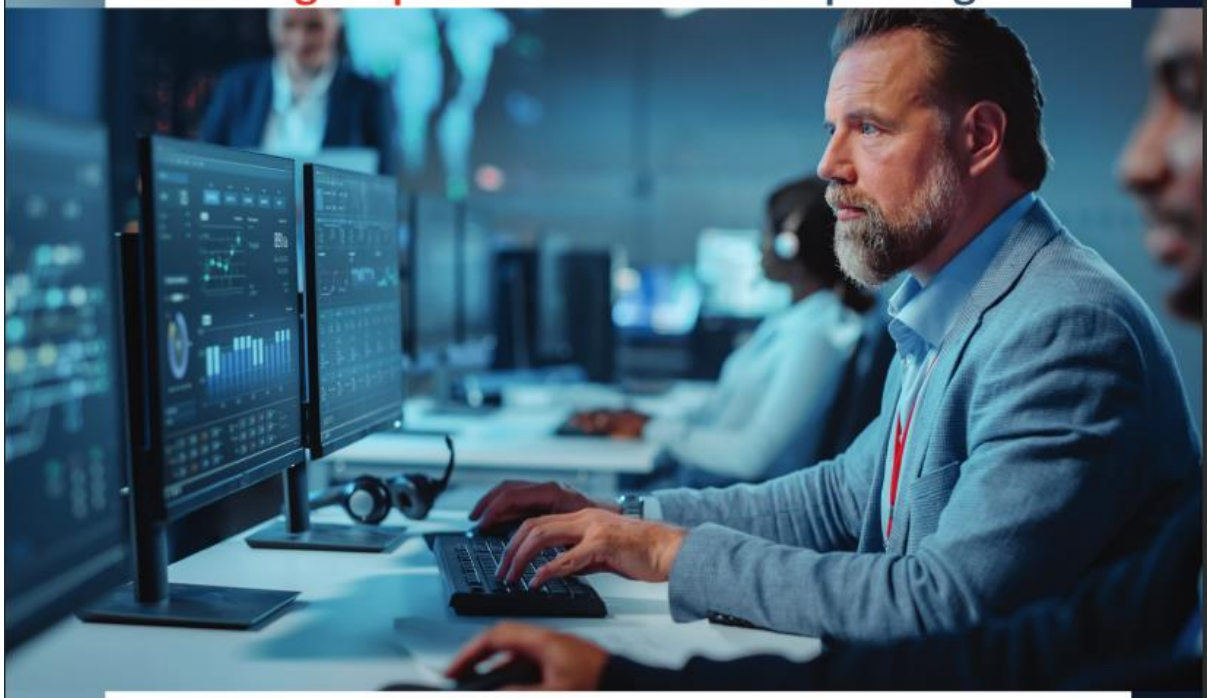
Title: An intelligent platform for effective policing

Issue: Summer 2022 **Pages:** 39-41

URL (at time of writing): http://www.euresearcher.com/14/eu-research-live

ISSN Number: EU research (Print) ISSN 2752-4728 EU research (Online) ISSN 2752-4736

An intelligent platform for effective policing



Evidence gathered from digital devices plays an important role in modern criminal investigations, yet it is not always easy to gather and analyse relevant data. Researchers in the INSPECTr project are developing intuitive, easy to use tools and an intelligent platform that will help law enforcement agencies combat crime more effectively, as **Dr Ray Genoe** explains.

Evidence gathered from digital devices like phones, computers and tablets often plays an important role in modern criminal investigations, both for cybercrimes and non-cybercrimes. The police commonly search through a suspect's devices for information relevant to an investigation, yet this can require a lot of time and resources. "Many law enforcement practitioners use up to 50 different tools to investigate a cybercrime. One tool might be for a certain type of mobile device, another for computer forensics, and so on," outlines Dr Ray Genoe, Director of the Centre for Cybersecurity and Cybercrime Investigation, part of University College Dublin.

There are a number of problems associated with this approach, one of which is the cost of purchasing licenses for these tools and training staff in how to use them. "One of those tools could easily cost a single officer thousands of Euros a year, while the training costs could run to tens of thousands," says Dr Genoe.

INSPECTr project

As the Principal Investigator of the INSPECTr project, a research initiative funded under the Horizon 2020 programme that brings together 18 partners from across Europe, Dr Genoe is working to address this, and many more issues. The aim in the project is to develop intuitive, easy to use tools that will be made freely available to law enforcement agencies (LEAs) and integrated on an intelligent platform. "The only outlay would be on hardware," explains Dr Genoe. One significant challenge for researchers is to develop a common data format. "None of the tools currently used speak the same language, in terms of the reports that they output. Some of them might create PDF reports, others could produce XML with customised namespaces. What LEAs need is a common data format, to assist with processing the huge volumes of data coming to them from disparate sources," says Dr Genoe. "Once you have good analytic tools available, you can do time-filter analysis and cross-device and cross-case correlations, due to the common data format and analytical processes."

A common data format will also make it easier to discover evidence that may be held in other jurisdictions, which is an important issue when dealing with cross-border crime. Dr Genoe and his colleagues are working with the CASE ontology, which enables more detailed analysis of the evidence gathered, including for example the provenance of that evidence. "That's very appropriate for court presentations and for validating your findings and chain of evidence," he outlines, "and it is supported in INSPECTr by an immutable blockchain ledger that records every interaction with the tools on the platform"

One area where national linguistic differences have to be considered is in how the evidence that's presented is interpreted. "We are working on a number of tools for that. For example, we're working with partners who are developing what we would call multi-lingual natural language processing (NLP)," continues Dr Genoe. "We use NLP for a number of things, such as parsing legal documents."

Anonymity plays a strong role in protecting criminals online. One of the topics Dr Genoe is looking at with the AI tools is how to determine authorship, and whether linguistic markers can be used to assess whether two seemingly different individuals are actually the same person. "By analysing linguistic markers and the interactions between various authors, we can determine whether a criminal network has reappeared on another forum," he outlines.

Many LEAs also encounter huge volumes of data during the course of an investigation, yet it is not easy to manually process all of the documents, messages, pictures and videos, a context in which AI tools can play an important role. "NLP and media processing tools, will help LEAs to make sense of the available data," says Dr Genoe.

There is also a forecasting element to the project's work, with AI tools being used for intelligence-led policing. Similarly to how a business might scan the market to identify trends, LEAs can use AI tools to process historical data and anticipate problems before they occur. "For example, robberies might be known to increase in a specific residential area at a particular time of year. This can help guide decisions on where to deploy police at a particular time, thereby increasing public security," says Dr Genoe.

A key feature of the INSPECTr platform is the ability to discover and exchange data, which is crucial given the cross-border nature of much cybercrime. Rather than physically exchanging a hard drive with a counterpart from another jurisdiction, the platform will provide the ability to exchange data with their peers in other countries on a technical level, which Dr Genoe says represents an important advance."Information needs to be discoverable in other jurisdictions," he stresses. This however needs to be controlled, and data must be discovered and exchanged in a way that is compliant with the relevant legislation. "We're putting controls in place to ensure data privacy is respected and that the tools are used in a way that complies with legislation controls, while still enhancing the capacity of LEAs to investigate

The College of Science at University College Dublin (UCD) makes a substantial contribution to cutting edge research and education based on latest insight and pedagogy. This allows UCD Science to offer an extensive portfolio ranging from discovery to application, contributing to the global scientific community, to society and the economy alike. UCD is in the top 1% worldwide for impact of research publications in numerous scientific fields, including the field of computer science.

crime effectively," continues Dr Genoe. "Data exchange should occur after existing protocols have been observed, such as Mutual Legal Assistance Treaty (MLAT) approval."

Ethical protocols

Researchers are looking into how to manage the ethical and legal considerations around these types of issues through data protection impact assessments and data-sharing agreements. Once it is clearer how exactly the platform can be used in different jurisdictions, Dr Genoe believes it will bring significant benefits to LEAs. "The first point is the reduced training requirements for investigators. They will only have to learn one tool, which is our platform, because the interface to all of the other tools will be the same. It's a kind of one-stop shop for all your tools," he explains. This would be much more efficient than using multiple different tools. "If you want to use a certain tool on a certain day, you simply click, and it goes off and automates the process. Then it presents you with results in a format that you'd expect," continues Dr Genoe. "Then you can go over to your analytics and expect to access the data with an analytics system that is capable of filtering through all of the data in a familiar and intuitive manner."

to LEAs, Dr Genoe says they should not be used to reduce data or make decisions independently."An AI system should offer suggestions to a human, and make those suggestions explainable. The data should be presented to a human user," he says. "This way the issue of bias can be reduced and the ethical use of AI tools can be enhanced, while also reducing the risk of over-reliance on AI."

The aim is to replace what were previously manual processes with an automated approach that leads to standardised outputs which are easier to analyse, allowing staff to focus their energies on other work.

Looking to the future

The platform is also very extensible, so new features can be quickly deployed to reflect changing demands. "We've utilised technologies that are sufficiently flexible to enable the rapid deployment of new features. If there's something more that law enforcement need, they could put in a request,"says Dr Genoe. The project partners include both research organisations and LEAs, who play an important role in guiding research and providing feedback. "We operate a living lab environment, which is a way of co-designing and co-creating with your end-users, which in our case is the LEAs," explains Dr Genoe. "We have monthly meetings with LEAs, where we can show them specific features."

The first point is the **reduced training requirements** for investigators. They will only have to learn one tool, which is our platform, because **the interface to all of the other tools will be the same.** It's a kind of one-stop shop for all your tools.

There is however potential for these tools to be misused, an issue of which Dr Genoe is well aware. The regulations in this area may vary across different parts of Europe, an issue that has been taken into account in the project. "For example, one of our tools can be used for the preservation of online media content. It can be used in certain jurisdictions, but not in others," he outlines. "An administrative officer has to make a decision as to whether this tool can be available to a police officer." Similarly, regional differences may render the tools ineffective in certain jurisdictions. "We're going to provide a machine-learning framework where we'll provide default models, which can then be re-trained for different regions," explains Dr Genoe. "Furthermore, the AI tools in INSPECTr will simply prioritise media, and a human is required to make final decisions."

These tools are designed to prioritise the data to be presented to a human user rather than to make automated decisions themselves. While AI tools can bring significant benefits

These LEAs have developed three highly realistic use cases, on which all aspects of the platform will be tested, including digital forensics, open-source intelligence gathering and evidence exchange. These use cases are highly realistic scenarios, some of which involve multiple different jurisdictions. "They're based on what LEAs are seeing out in the field. They're very relevant, and they're constantly being tweaked to address any changes that LEAs are seeing," says Dr Genoe. The aim in the project is to reach technology readiness level (TRL) 6, essentially demonstrating a proof-of-concept, with Dr Genoe keen to explore the possibility of continuing the research and ultimately bringing the platform to practical application. "We'd like to take the recommendations and findings from LEAs on this project, and move forwards with further funding to make this a fully operational tool, at TRL 9," he concludes.

INSPECTr

Intelligence Network and Secure Platform for Evidence Correlation and Transfer

Project Objectives

The principal objective of INSPECTr will be to develop a shared intelligent platform and a novel process for gathering, analysing, prioritising and presenting key data to help in the prediction, detection and management of crime in support of multiple agencies at local, national and international level.

Project Funding

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement No 833276.

Project Partners

https://inspectr-project.eu/index.html#partners

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INSPECTr

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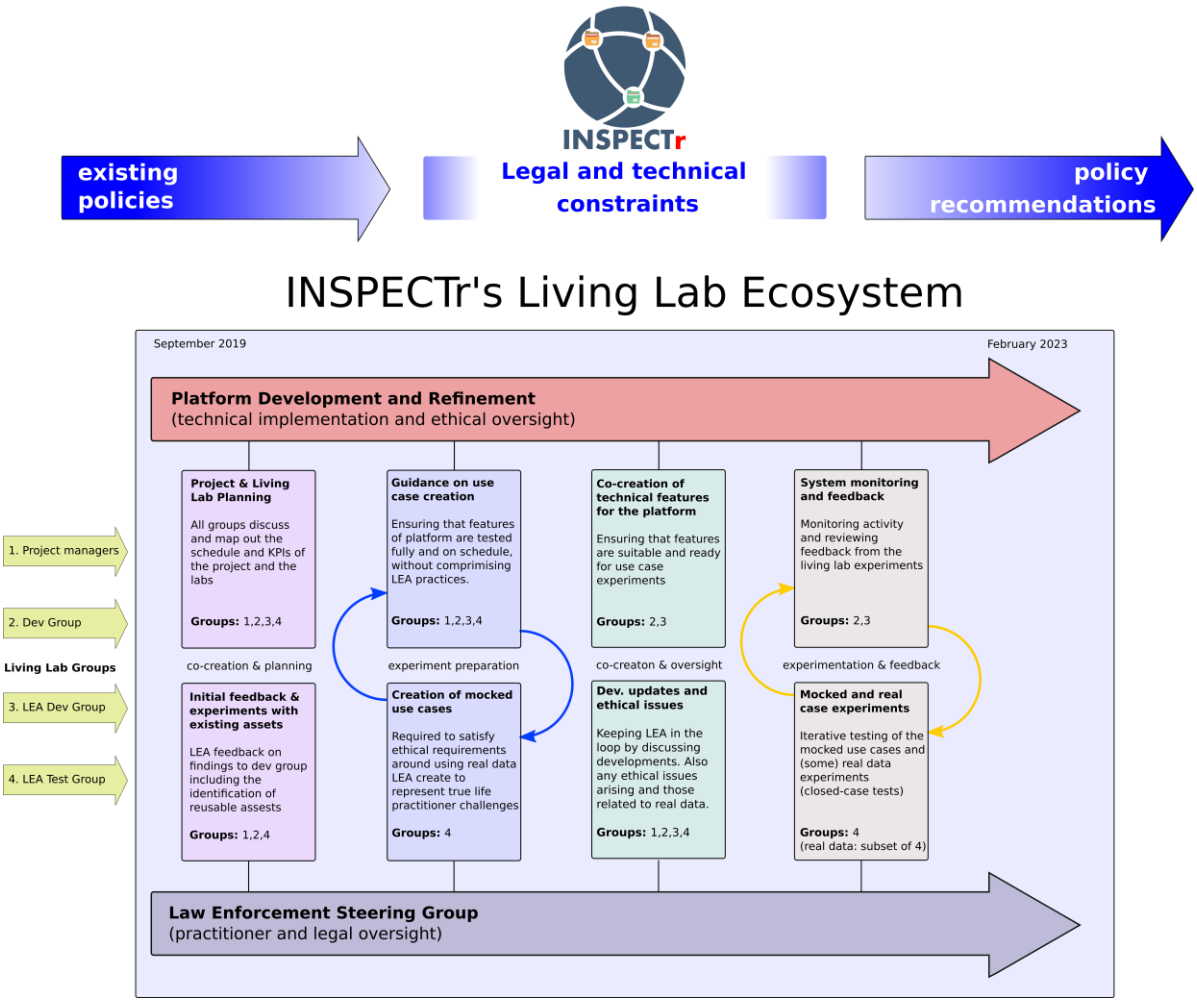
7.3 Policy Recommendations

The INSPECTr project has consulted LEA from the outset, and they have been involved in every aspect of the iterative design and testing phases within our "Living Lab" ecosystem. As the project has developed, the consortium was able to identify technical solutions to some of their challenges. However some issues faced will require a more policy based solution from the EU, so we have made some policy recommendations which we hope will help LEA and future research projects in the field. The two policy recommendations are summarised below and fully elaborated in Deliverable 6.11.



7.3.1 The Standardisation of Digital Evidence

During the INSPECTr project we strived for data harmonisation in order to fully utilise the reports and analytic capabilities produced by our platform. During the project's dissemination activities and stakeholder engagement, we repeatedly observed the issue of numerous tools and platforms being developed through EU research that are incompatible with each other and with vendor-based solutions to cybercrime investigations.

Over the past number of years the Cyber-Investigation Analysis Standard Expression (CASE) ontology has received widespread support and is maturing into a suitable candidate for providing an approach to data standardisation that is suitable for LEA investigations. Despite being the basis for data

standardisation in the INSPECTr platform, we believe that more focus should be made into harmonising the outputs from both vendor-based commercial tools and future research into LEA technologies to support investigations.

Our recommendations include:

- The adoption of the CASE ontology as standard output format for all investigative tools.
- Encouraging the use of CASE output in all vendor developed investigative tools.
- The use of CASE output for all investigative tools and platforms developed for law enforcement using EU funding.

Further details are provided in section 5.2.1 of Deliverable 6.11.

7.3.2 Data Protection Regulations for LEA Research Projects

European Commission projects in the security domain are encouraged to include law enforcement agencies (LEAs), and to use 'real' data from closed cases in projects (data from ongoing cases likely poses an overwhelming ethics risk) for the testing (and potential training) of new technologies, including artificial intelligence (AI) technologies. However, the data protection framework applicable to the processing of closed case data for research purposes is not at all clear.

The GDPR is intended to regulate the processing of personal data in 'general' situations, and the LED is intended to govern such processing for law enforcement purposes. Normally, scientific research would come under the GDPR, and there is a 'special regime' within the GDPR to regulate this. However, in security research, processing can take place for both research and law enforcement purposes simultaneously. This leads to a question about which regime the processing should be regulated by.

The lack of clarity could lead to organisations (primarily LEAs) processing data under one legal framework, whereas they should be processing under a different framework (and could also lead to 'shopping' for a governance regime that is least onerous). For individual organisations, this lack of clarity can affect the ability of organisations to comply with data protection legislation when they participate in security research projects. For collaborative research projects, it can create difficulties for collaboration between LEAs as research partners where data is exchanged.

Our data protection policy recommendation is for a cross-European organisation, such as the European Data Protection Board, to clarify the legal framework applicable to research using personal data, especially for use of highly sensitive law enforcement data in security research. There is substantial fragmentation in the implementation of Member State law creating compliance risks and it is imperative to clarify where processing by LEAs for research purposes could fall into either the General Data Protection Regulation (2016/279, 'GDPR') or Law Enforcement Directive (2016/680, 'LED') regime.

Further details about this recommendation are provided in section 5.2.2 of Deliverable 6.11.

8 Conclusion

This report has highlighted the extensive dissemination activities conducted in the INSPECTr project to raise awareness about the technologies developed and to gain further insight into the challenges faced by law enforcement agencies. This will prove to be essential for the future adoption of the platform and should gain more support for further development projects.

While consultation with consortium LEAs has provided the guidance required for development of the INSPECTr platform, it was imperative to also engage with external stakeholders to ensure that the technology developed would take into consideration the various policies and procedures throughout the EU LEA community and even beyond the borders of the EU.

We feel that we have achieved that goal, while producing policy recommendations that will support LEA into future research projects and with greater harmonisation and interoperability between investigative tools and collaboration between agencies in different jurisdictions.

Annex 1: INSPECTr Newsletter Summary Table

Edition Number	Title	Publication Date	Summary of Content
1	INSPECTr Newsletter First Issue (March 2021)	12/05/2021	Introductions to the Project and Consortium, the features of the INSPECTr Platform, and the project's involvement with the LEA community.
2	INSPECTr Newsletter Second Issue (June 2021)	10/08/2021	Blog provided on the Ethical Oversight of the project and updates provided on external and internal activities.
3	INSPECTr Newsletter Third Issue (Sep 2021)	22/10/201	Blog provided on the Standardisation in the CASE Language and the Handling of Standardised Evidence. Updates provided on external and internal activities.
4	INSPECTr Newsletter Fourth Issue (Dec 2021)	02/02/2022	Blog provided on AI as an Assistive Technology for LEAs, and ELSI Impact Assessment Overview of the Project. Updates provided on external and internal activities.
5	INSPECTr Newsletter Fifth Issue (April 2022)	31/05/2022	Blog on the Introduction to INSPECTr Living Labs Experimentation. Updates provided on external and internal activities.
6	INSPECTr Newsletter Sixth Issue (July 2022)	31/08/2022	Blog on an Update on INSPECTr Living Labs Experimentation Phase 3. Updates provided on external and internal activities.
7	INSPECTr Newsletter Seventh Issue (Nov 2022)	09/12/2022	Blog on INSPECTr Platform Development During Living Labs Experimentation Phases 3.5, 4, and 5. Updates provided on external and internal activities.
8	INSPECTr Newsletter Eighth Issue (Feb 2023)	28/02/2023	Blog on CEPOL Webinar Series held to present the final developments of the features of the INSPECTr Platform and provide updates on both the final external and internal activities of the project under its current funding cycle.

Annex 2: Stakeholder Workshops Summary

Date	Event	Stakeholders	Summary of Content
April 2022	CoE: 9th Annual Meeting of the Expert Group on Drugs Online	36 international experts working cooperatively with key partners of: -Private Sector -Judiciary -Law Enforcement	The focus of the 2022 meeting was on online drug trafficking trends and modus operandi, tools for law enforcement cooperation, encryption technologies, instant messaging applications and case studies. The INSPECTr project concept and basic architecture was demonstrated.
May 2022	(ISEP): Artificial Intelligence Hackathon Speech to Text	-French Gendarmerie -United Nations Environment Programme -French Agency for Development -Students in the AI field -Startup Companies -Professionals in the data analysis field	This was a three day event where teams participated to solve challenges in the area of Speech to Text for Security and the Classification of Documents linked to 17 UN goals for a Sustainable Environment. The GN INSPECTr team completed both tasks and came third overall.
May 2022	University of Lausanne Conference facilitated by School of Criminal Sciences	-Staff and Students of the School of Criminal Sciences, Lausanne University	The INSPECTr project presented “Algorithmic Methods to Aid Criminal Investigation”, presenting the challenges and opportunities of increasing the quantity of digital data for the judicial police authorities. Technologies were presented, such as time series analysis and deep learning, and how they can be used to assist investigators in their activities.
May 2022	EAFS 2022	-Swedish Police Authority -Law Enforcement Practitioners -ENFSI -Researchers -Managers -Forensic Science Community -EU Agencies -Academia -Industry	The Conference themes were those of Digital Transformation Forensic process, Forensic Data Science, Forensic Human Factor, Forensic Social Responsibility and Forensic Technology Innovation. INSPECTr Project workshops were delivered on “Cross-evidence crime analysis”, “Natural Language Processing for Social Network Analysis”, and there

		-International Organisations	was a presentation delivered on the INSPECTr Project Platform.
June 2022	CEPOL Research and Science Conference 2022	-Law Enforcement Practitioners -Affiliated Postgrad Researchers -Academic Scholars	The conference was convened to inform on the impact new ground-breaking technologies like Artificial Intelligence and other advanced tools will have on the work of Law Enforcement Agencies across Europe and beyond. The key focus of the event was how best to prepare for the fast developing "Digital Age". The INSPECTr project submitted papers on "LEA Capacity Building as a Driver for the Adoption of European Research" and "Developing of a judicial Cases Cross-Check system for case searching using a standard for the Evidence". The INSPECTr platform was also presented as a solution to many of the issues faced by law enforcement agencies.
July 2022	DFRWS-USA 2022	Legitimate interest in digital forensic research including: -Practitioners -Researchers -Developers	DFRWS' approach is to address emerging challenges in digital forensics by fostering transdisciplinary approaches. The INSPECTr project's work on CASE integration in INSPECTr was presented at this Conference including the challenges/benefits to data analysis, evidence provenance, and inter-jurisdictional discovery and exchange.
Sept 2022	iLEAD Industry and Research Days	-Law Enforcement Practitioners from across 44 LEAs -Technical Providers -Researchers	i-LEAD aims to identify the needs and priorities of police forces to make recommendations on relevant resources that can satisfy those needs and enhance their work capabilities. Two INSPECTr presentations were delivered by the INSPECTr partner, French Gendarmerie, "Iterative Textual Annotation Using User Feedback"

			and "Stylometry: Authorship Identification in Web Forums".
Sept 2022	Europol: Excellence in Innovation Awards 2022	-European Law Enforcement Agencies from across 14 countries in Europe	The French Gendarmerie, partner in the INSPECTr project, won "The Excellence Award for the most innovative project" for the creation of an Artificial Intelligence Tools Platform. The platform provides a suite of advanced criminal analysis tools specifically developed to enable police officers to benefit from artificial intelligence when processing criminal information. Many of the platform's tools were developed as part of the INSPECTr project and are now available via the Europol Innovation Lab Tool repository.
Sept 2022	CERIS 2022: Fighting Crime and Terrorism/Resilient Infrastructure	-Law Enforcement Practitioners -Local Authorities -Infrastructure Operators -Policy Makers -Researchers	The aim of this workshop was to facilitate the sharing of experiences and research findings in order to identify current achievements, possible synergies, and strengthen collaboration on a European level.
Nov 2022	Europol: International Conference in Innovations in Law Enforcement	-Law Enforcement Practitioners	The AI platform developed within the INSPECTr project was presented with the presented tools raising a great deal of interest from the Conference participants, including Europol's further interest in incorporating more of the platform's tools into Europol's tool repository.
Nov 2022	EPPO: Workshop at the European Public Prosecutor's Office	-EU Institutions, bodies and agencies -Judicial Cooperation and Law Enforcement networks -International Organisations	EPPO is primarily focused on their CIMS to support cross-border investigations. This workshop aimed to discuss the data management strategy for their Case Information Management System (CIMS). In the INSPECTr project the UCO/CASE ontology has been selected to serve as a standard and EPPO were interested in better understanding the UCO/CASE ontology and verify if part of the derived model could be integrated in their model. EPPO

			were also interested in INSPECTr because it has been developing a real platform for cross-border investigations relying on the UCO/CASE model.
Nov 2022	Gendarmerie Prix de la Transformation Awards 2022	-French Law Enforcement -French Ministry of Interior	This award is for the most innovative internal projects in the Gendarmerie, for projects that have changed or have the potential to change and improve the Gendarmerie. As well as winning the award, the outcome of this award is that the AI components developed as part of the INSPECTr project can be deployed to all of the French Gendarmerie.
Nov 2022	AGOPOL Online Conference	-Academic -Researchers	This Conference focussed on the diffusion of policing in the algorithmic society with policing practices having arrived at a new stage of digital transition in late modern societies. A paper was presented by the INSPECTr project by Trilateral Research entitled “Can Privacy and Ethics-by-Design be Adapted for Law Enforcement Technologies?”
Dec 2022	CoE Workshop	-Council of Europe Delegation	A workshop on the INSPECTr platform and its capabilities was presented in UCD to a delegation of 24 participants from the Council of Europe, representing 11 countries. The demonstration was well received, and it was followed by a lengthy post-demonstration Q&A session and new subscriptions being taken up to receive the INSPECTr Project Newsletter.
Feb 2023	ECTEG Experts Meeting	-LEA Experts in Digital Forensics -LEA Experts in Cybercrime	An ECTEG Experts workshop was held in Budapest that featured the INSPECTr platform. Participants were invited to use the platform and provide feedback on its operational viability.

Feb 2023	CERIS - Spotlight on the fight against Child Sexual Abuse.	-Law Enforcement Practitioners –Local Authorities –Policymakers –Researchers	This workshop presented by DG HOME, aimed to bring together practitioners, local authorities, policymakers and researchers to discuss latest insights and lessons learned from ongoing EU-funded projects related to the prevention and detection of Child Sexual Abuse. It also afforded the opportunity for networking, awareness raising, and exchanges of opinion by all representative attendees.
Feb 2023	CEPOL Webinar Series: INSPECTr Dissemination Event	-Law Enforcement Practitioners -EU Agencies	A showcase on the INSPECTr platform was held via CEPOL to demonstrate the development and capabilities of the platform to LEA end-users. • Webinar 1: Project Overview, Platform Setup and Usage • Webinar 2: Featured Tools, Data Standardisation and Chain of Evidence • Webinar 3: Data visualisation and Analytics • Webinar 4: Integrated AI/ML Tools • Webinar 5: Evidence Discovery and Exchange, Other Features and Future Exploitation