

WELCOME TO THE 3RD
CEASEFIRE PROJECT
NEWSLETTER!



CEASEFIRE

Introduction

The EC-funded R&I project **Ceasefire**, a 3-year Horizon Europe Innovation Action launched in October 2022, has been designed to improve the crime-fighting ability of European nations using modern technology. It brings together 21 expert partners from across Europe, including industrial partners, Law Enforcement Agencies (LEAs) and research universities or institutions, while focusing on combatting *firearms trafficking*. Ceasefire is coordinated by the *Centre for Research and Technology – Hellas* (CERTH, Greece).

Coordinating the Ceasefire endeavour

On July 4-5, 2023, the Ceasefire consortium held its **3rd physical plenary meeting in Lisbon, Portugal**, organized by the project partner **PSP (Polícia de Segurança Pública)**.

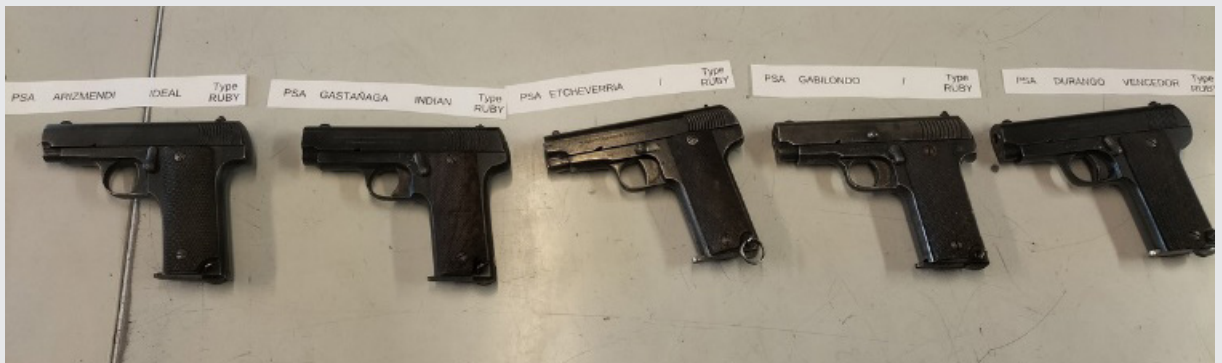
Ceasefire participants exchanged ideas, reviewed their progress and coordinated their efforts towards further advancing the development of the Ceasefire system. The discussions focused on enhancing collaboration and innovation to tackle the project's ambitious goals of facilitating the struggle against firearms trafficking, using advanced Artificial Intelligence (AI).



Gathering visual firearms data

One of the goals of Ceasefire is to enable to the **automatic identification of firearms found in crime scenes through mobile AI**, a task led by project partner INPT (*Institut National Polytechnique de Toulouse*). The envisioned outcome will be a portable AI algorithm able to process photographs of firearms and identify them.

Given the massive quantities of data needed for AI training, the creation of a relevant database of firearms photographs began in earnest during the second half of 2023, at the Toulouse forensics laboratory SNPS.



More than 2,000 gun models are available for this purpose. Following a specific protocol, the weapons are photographed and filmed one by one from a multitude of different viewpoints. Frames are then extracted from the resulting videos. These large quantities of images are subsequently fed to the AI algorithm being trained. Thus, the latter learns the appearance of each model and is then able to identify the model of a weapon from a photograph.

An application for LEAs is being developed and will incorporate this functionality to enable rapid identification of weapons during a search.

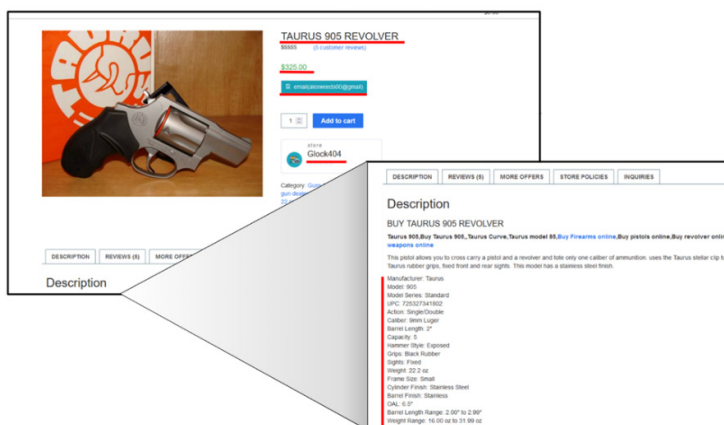


Sifting through on-line discussions related to firearms trafficking

Ceasefire incorporates transformative AI technologies, such as Natural Language Understanding (NLU), to develop an innovative **on-line firearms trafficking analysis tool** for LEAs.

Under the leadership of project partner and coordinator CERTH, this tool exploits NLU to enable the Ceasefire system to unravel the complexities of **human-written text** across the vast expanses of on-line content. Thus, it emerges as a vital asset for analyzing **Darknet marketplaces**, extracting essential firearm details, user information, and shipping data from diverse listings. This allows Ceasefire to automatically sift through vast amounts of e-commerce data, honing in on firearm-related details amid the expansive data landscape.

The tool, which has been under development for the past year, seamlessly integrates with information extraction, **discerning specific patterns within text**. It goes beyond mere identification of firearm-related information, understanding the nuances of language and extracting contextual details that significantly bolster LEA efforts. In the Dark Web, it can efficiently extract specific data points and offering valuable insights.



Additionally, by combining NLU with other AI methods, such as **intent recognition**, automatic decoding of motives behind on-line discussions and the addition of layers of context to firearm-related conversations becomes possible. Understanding a user's intent, whether it's making an offer, a request, or proposing a firearm-related exchange, ensures that the Ceasefire system remains adaptive and targeted within the diverse landscape of on-line discussions.

In harnessing the power of Natural Language Understanding (NLU) methods to navigate the intricacies of human language/text, the Ceasefire system emerges as a formidable asset in the ongoing battle against on-line firearms trafficking. Through its advanced capabilities, the project's innovative tool can efficiently gather **actionable insights**, providing LEAs with a proactive and comprehensive approach to combating this illicit activity. The system's remarkable ability to swiftly analyze vast datasets and filter crucial information ensures that LEAs receive timely and relevant intelligence. As the project progresses, we anticipate the release of a refined prototype for these cutting-edge tools in the coming months, marking a significant milestone in the ongoing efforts to enhance global security and combat illegal firearms trade.

Interrelating criminal events

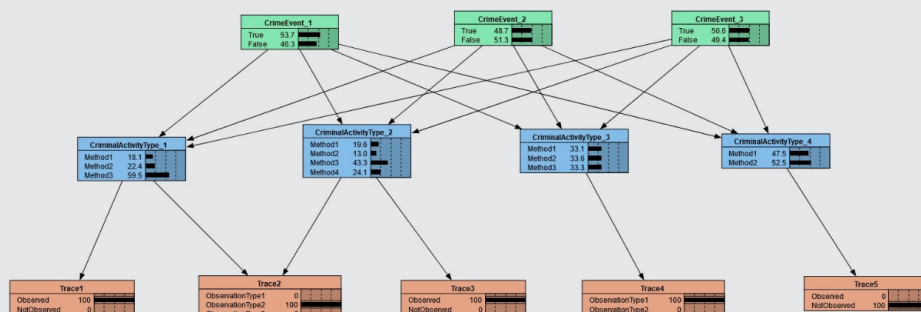
One of the Ceasefire tools aiming at supporting LEAs in fighting firearms trafficking is a component helping officers to **relate criminal events to each other**, developed by project partner TNL (*Thales Nederland*). An example of criminal event could be a posting offering a firearm for sale that can be found on Darknet markets. When seeing such a posting, LEA officers may be interested in obtaining a list of similar offers.

In another possible use, the officer **could search for relevant events based on his or her real-world observations**. For instance, if officers are encountering firearms during an investigation in the real world and they suspected it may have been bought (or will be sold) on Darknet markets, officers may be interested in searching the available collected data for potential correlations. When queried, the system could return a list of postings collected in the past ranked by relevance, so as to avoid a lengthy manual search on a large number of cases.

It is not easy to define the notion of relevance when searching for events or of similarity between events. Ceasefire is proposing several alternatives, including one in which the relevance is related to the “similarity” of the criminal **activities** that occurred during criminal events. From a technical standpoint, the developed approach relies on the use of AI methods such as Probabilistic Graphical Networks (PGMs).

TNL has built a first prototype of this tool, focusing on activities related to shipment of firearms. Ceasefire end-users have already provided feedback, with a refined prototype expected to be delivered in the coming months. The outputs of this tool will complement the correlations between firearms trafficking-related incidents that are being computed by the algorithms of project partner EXUS.

A possible representation of criminal activities and traces with the levels “crime” (green), “activity” (blue) and “trace” (orange).



Harmonising national firearms focal points and firearms investigation

In November 2023, project partners TRI (*Trilateral Research*) and IANUS (*IANUS Consulting*) finalized a comprehensive report on the challenges and opportunities related to firearms trafficking investigations and the operation of National Firearms Focal Points (NFFPs). They explored **practices in the investigations of firearms trafficking**, and analysed the **functioning of EU NFFPs**.

The report utilises policy analysis, a survey, and several expert interviews with Ceasefire LEA partners. It presents the analysis of all relevant European and international policies and regulations in four key areas: cross-border cooperation, lawful evidence collection, information exchange and data sharing, prosecution of crimes and referral to identified criminal aspects.

The report's findings demonstrate that EU cooperation in tackling firearms trafficking is progressing due to a range of international and EU policy initiatives. However, this advancement comes with challenges mainly related to a lack of standardisation in data collection practices, variations in how regulations are enforced, limitations in economic and human resources, and issues with information exchange among others. The report contains a detailed mapping of the authorities involved in NFFPs and provides some initial recommendations on how to harmonise NFFPs functioning. The results will be used in the upcoming months to create policy recommendations on how to harmonise the operation of EU NFFPs and how to improve the coordinated efforts in firearms trafficking investigations. A **public version of this report** will be released in the first semester of 2024.

The future

Ceasefire work is progressing quickly along the lines of various complementary axes: innovative AI tools, criminological analysis, policy recommendations and technical development of the Ceasefire system are expected to further accelerate within 2024.

The project's dissemination channels will host regular updates on these critical aspects.

Ceasefire links

CEASEFIRE Web site:

<https://ceasefire-project.eu/>

CEASEFIRE LinkedIn:

<https://www.linkedin.com/company/ceasefireproject/>

CEASEFIRE Facebook:

<https://www.facebook.com/people/Ceasefire-Project/100089862614779/>



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