



CEASEFIRE



Advanced versatile artificial intelligence technologies and interconnected cross-sectoral fully-operational national focal points for combating illicit firearms trafficking



The EC-funded Horizon Europe CEASEFIRE project (2022-2025), improves the crime-fighting ability of European nations using modern technology. It brings together 7 companies, 5 research organizations and 9 Law Enforcement Agencies (LEAs) from all over Europe.

Coordinator:

Centre for Research and Technology – Hellas (CERTH, Greece)

Consortium:

14 Countries, 21 Partners

Duration:

36 Months

Start Date:

October 2022

Use-Cases:

5

Type:

Innovation Action

Goal:

Combat firearms trafficking using advanced Artificial Intelligence (AI) and Information & Communication Technologies (ICT)

The challenges

Trafficking of illicit firearms funds and arms organized crime. LEAs trying to combat firearms trafficking face difficult challenges that were not even conceivable just a few years ago.

- Modern criminals use illegal, hard-to-monitor and volatile **Dark Web** marketplaces.
- **Cryptocurrency** transactions provide anonymity in illegal exchanges.
- Involved parties coordinate via the regular “**Surface**” **Web** and social media.
- **3D printing** technology allows easy digital distribution of weapon **blueprints**.
- Modern criminal groups utilize **regular post and courier services**, concealing guns among illicit goods within mailed parcels.
- **In-the-field identification of seized weapons** is a real challenge for LEAs:
 - Extremely high diversity in firearm appearance.
 - Possible erasure of serial numbers by criminals.
 - Lack of specialized LEA practitioner training.

The pillars

CEASEFIRE exploits AI and digital technologies to assist LEAs. It is structured around 5 key pillars:



Pillar 1. Develop **innovative, advanced, AI-powered technologies** to boost LEA authorities in tackling firearms trafficking criminal activities.



Pillar 2. Enhance **trans-national, cross-disciplinary, multi-agency, operational cooperation and information exchange** among LEAs.



Pillar 3. **Conduct criminological analysis** of the phenomenon and **ensure compliance** with European legal/ethical norms.



Pillar 4. **Foster the adoption of advanced technologies** in current operational environments, through **hackathons, training activities and pilot studies**.



Pillar 5. Engage in **intense dissemination, community building and exploitation planning** activities.

The technologies

The digital tools contained in the CEASEFIRE system are powered by advanced algorithms.



Web Crawling. Configurable and AI-assisted Web crawlers allow LEA users to easily retrieve data relevant to firearms trafficking from on-line sources.



Computer Vision. Automatic analysis of various types of images, ranging from regular photographs to 3D printing blueprints or X-ray scans of mailed parcels.



Natural Language Processing. Automatic analysis of various text snippets (e.g., taken from on-line forums), language translation, etc.



Graph Analytics. Graph modelling and analysis powers various CEASEFIRE functionalities:

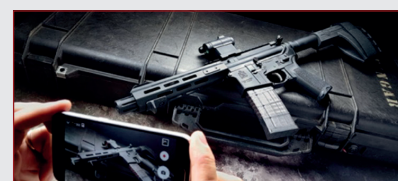
- Automated cryptocurrency transactions analysis.
- Data fusion and correlation estimation.
- Reconstruction of criminal networks.

Use-cases and tools

Use-Case #1: Real-time systematic firearms incident and intelligence information collection and exchange.



Use-Case #2: On-the-spot firearm seizure registration and cross-border data search.



A CEASEFIRE digital application enhances the **intelligence picture** of LEAs on firearms trafficking at a pan-European level. Based on periodic **retrieval of information** from on-line news articles and advanced AI, such as **Natural Language Processing**, it automates organization of incidents in a structured manner and in near-real-time, while facilitating **risk indicators, red flags** and inter-LEA **exchange of strategic intelligence**.

A CEASEFIRE tool assists LEA officers in crime scenes during **firearms seizures**. An officer takes photographs using a **mobile device**, which then **analyzes the photos** to identify the characteristics (e.g., model, caliber, serial number location) of seized firearms using advanced AI, such as Deep Neural Networks for **computer vision**. The mobile app can transmit reports to the central CEASEFIRE system database for **further cross-analysis**.

Use-Case #3: Firearms purchase on Dark Web marketplaces.

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Use case #5: 3D-printed firearm blueprints distribution.



A set of interrelated CEASEFIRE digital tools allows detection of **Dark Web transactions involving firearms** or related **cryptocurrency payments**, identification of Web user **discussions about firearms**, as well as **monitoring the distribution of blueprints for 3D-printed firearms** in on-line forums.

State-of-the-art **Web crawling, computer vision, Natural Language Processing** and **graph analytics** methods power automatic **analysis of suspicious images** that may depict relevant objects, automatic analysis of text from Dark Web marketplaces and Web forums, **recognition of patterns/correlations** concerning illicit firearms tracking within **cryptocurrency transaction graphs**, as well as targeted **automatic retrieval** of relevant data from on-line sources.

Use-Case #4: Mail order and courier service firearms trafficking detection using scanning technologies.



A CEASEFIRE digital tool supports customs officers who use **scanning equipment** to take **X-ray images of mailed parcels**. A friendly **desktop application** performs **on-demand detection** of firearms, firearm components and ammunition on these X-ray images using advanced AI, such as Deep Neural Networks for **computer vision**. The application can transmit reports to the central CEASEFIRE system database for **further cross-analysis**.

Summary

Illegal arms trafficking is a major challenge for European society and law enforcement. CEASEFIRE represents a concerted EC-funded effort towards facing this threat, by putting state-of-the-art technology to good use.

CEASEFIRE Website:

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

CEASEFIRE LinkedIn:

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

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

CEASEFIRE X/Twitter:

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CEASEFIRE Youtube:

<https://www.youtube.com/@CeasefireProject>

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Any relevant stakeholder (LEAs, security-related EU/national/international bodies and initiatives, related EC-funded research projects, SMEs active in security products/services, etc.) are welcome to join the CEASEFIRE community, in order to receive regular updates, news and invitations from the wider security ecosystem!

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101073876.

You can subscribe easily at <https://ceasefire-project.eu/community/>.

All personal information are kept internally within CEASEFIRE, adhering to the highest privacy standards.



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