ASSETs+
Alliance for Strategic Skills addressing Emerging Technologies in Defence

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PROPOSAL:

The use of statistical methods and big data to fight organized crime

Participant #1
- **Name: Antonio Ferrándiz Aibar**
- **Centro Universitario de la Guardia Civil – Universidad Carlos III de Madrid**
- **Country: Spain**

Participant #2
- **Name: Jesús Eguino Blanco**
- **Centro Universitario de la Guardia Civil – Universidad Carlos III de Madrid**
- **Country: Spain**

The use of statistical methods and big data to fight organized crime.

1. Introduction and historical context.

In 2010, the European Multidisciplinary Platform Against Criminal Threats (**EMPACT**) was created with the aim of promoting and ensuring a common fight against organised crime within the European Union. Some of its main innovations were the cooperation between the Member States and the use of a comprehensive approach against these threats by using a three-level system for the development of its cycles.

At this point, the combination and coordination of political, strategic and operational policies and the establishment of successive four-year cycles stablishing priorities that are effectively transformed into operational actions have made from EMPACT the European Union flagship instrument to fight organised crime.

After 12 years the involvement of the Member States and the European Law Enforcement Agencies has clearly increased, thousands of victims of human trafficking have been rescued and millions of euros and assets related to firearms trafficking and criminal groups, as well as tons of different drugs, have been seized. The participation of third states has also been a milestone in the fight against some threats, such as firearms trafficking from the Balkan countries. Considering that after three four-year cycles, we have achieved that the involvement of third countries evolves from two, initially, to more than twenty, during the fourth cycle, and that the number of Operational Action Plans has also increased from eight to fifteen as a result of the adaptation to the evolution and diversification of criminal threats, we can conclude that we are following the right path in the fight against organised crime.

Taking into account the economic factor, it is relevant to consider the EU Financial regulation, in which its article 191 stablishes the “principle of non-cumulative award and prohibition of double funding”. On the one hand, this principle reinforces the need of stablishing clear priorities and Operational Action Plans in order to guarantee the optimal use of resources. On the other hand, it is important to reconsider the use of EMPACT budget throughout these years, in which there has not been an increase in the available resources; not all of it has been spent but, at the same time, there are significant differences between the quantity consumed between the different priorities. This is an important factor if we take into account that all the Operational Action Plans are founded more or less with the same number of resources, which have caused the need to develop several transfer mechanisms and a wide range of funding schemes in order to make possible for EMPACT stakeholders and coordinators optimize the results.

Last but not least, making an approach over the fourth cycle for the period 2022-2025, the Council of the European Union has set the following priorities: **high-risk criminal networks** (1 OAP); **cyber-attacks** (1 OAP); **trafficking in human beings** (1 OAP); **child sexual exploitation** (1 OAP); **migrant smuggling** (1 OAP); **drugs trafficking**, divided into “cannabis, cocaine and heroin” (1 OAP) and “synthetic drugs and NPS” (1 OAP); **fraud, economic and financial crimes**, divided into online fraud (1 OAP), excise fraud (1 OAP), MTIC (VAT) fraud (1 OAP), intellectual property crime (1 OAP) and money laundering (1 OAP); **organised property crime** (1 OAP); **environmental crime** (1 OAP) and **firearms trafficking** (1 OAP). Moreover, the will of making EMPACT a permanent instrument, forced the Council to conclude the need to increase the EMPACT budget and the Commission finally

accepted to make a fifteen-million-euro increase for the period 2022-2025.

2. The use of technology and statistics to fight against crime.

It is not necessary to focus on complex investigations to realize that fight against crimes has evolved during the last decades as well as technology has. Fifteen years ago, officers wrote reports of their investigations and operations as well as it is done now, but the flow of information between agencies and between units inside the same agency was almost non-existent or reserved for cases in which national security was endangered.

Nowadays, the existing software and institutions guarantee that information is shared in an effective way and it makes possible to check elements, names, car plates, areas and, what is more important, the relation among them. All this data is not isolated anymore, if you look for a car by using its plate number, you will be able to see when and where it was stopped at a checkpoint, which people were inside, who was driving it and its possible relation with a crime or other fact.

Moreover, these applications not only allow you to keep more information in, but also to administrate it in a better way, by the implementation of efficient interfaces which allow its user to make an intuitive and visual use of it. If a Law Enforcement Supervisor wants to check which areas have suffered a higher number of crimes during a specific period of time, they will have the option to apply a wide number of filters relating nationalities, seriousness of the crime, existence of casualties, the name of the police units or agencies involved in the investigation… and the result will be a heat map of the area and an automatic summary with the conclusions of the search. This makes much easier the selection of priorities, the prevention and reaction of crimes and the elaboration of reports and quality analysis in order to improve the rates and to elaborate the official statistics.

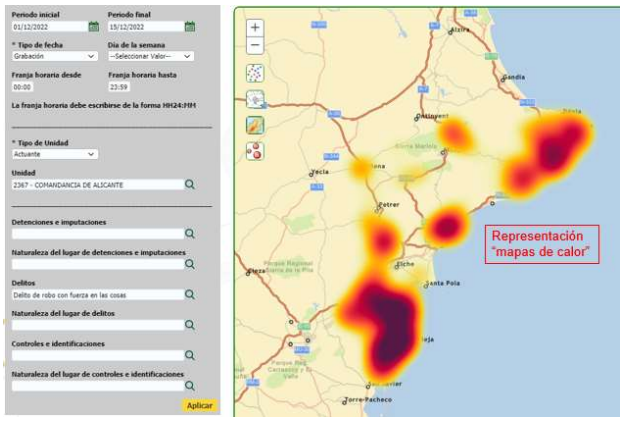


Image 1: Heat map of criminal activity in a region.

Image 2: Heat map of national criminal activity.

It is also interesting to take into consideration that public safety not only involves civil servants and law enforcement agencies, but also general public and society. It is obvious that there are confidential or restricted pieces of information that must not be published, but there are some other factors which citizens like, and have the right, to know: what are they paying taxes for and the results caused by the policies implemented by their authorities. We must consider that security is not only a matter of numbers and that other subjective aspects such as previous victimization or the presence of police forces play an important psychological

role. However, it is important to show citizens the truth of the criminal data and to relate it with demographical and social factors in order to show and legitimate the actions implemented to show them.

At this point, in Spain, the Ministry of Internal Affairs offers through its public web page a variety of graphs in which we can appreciate the criminal rates and filter the available by type of crime, autonomous community or even province, year of occurrence, nationality of the authors or victims and other criteria.

It is interesting to see that some of these graphs include thousands of data for cyber-attacks and intellectual property crimes, which are two of the fifteen EMPACT Operational Action Plans set by the European Council for the current period. As an example, we will include the graphs showing the distribution of all the types of crimes or **known** facts related with cybersecurity in 2021, which is a basic and non-specific overview, and also, as an example of a more detailed investigation, the result of filtering how many men from Ecuador whose age was between 26 and 40 were arrested for these crimes during 2021 **(image 5)**.

Tabla | Gráfico | Mapa

	2021
TOTAL NACIONAL	
TOTAL grupo penal	305.477
ANDALUCÍA	
TOTAL grupo penal	42.493
ARAGÓN	
TOTAL grupo penal	8.461
ASTURIAS (PRINCIPADO DE)	
TOTAL grupo penal	6.906
BALEARS (ILLES)	
TOTAL grupo penal	8.294
CANARIAS	
TOTAL grupo penal	10.875
CANTABRIA	
TOTAL grupo penal	3.782
CASTILLA Y LEÓN	
TOTAL grupo penal	16.680
CASTILLA - LA MANCHA	
TOTAL grupo penal	11.657
CATALUÑA	

Image 3: Number of known facts related to cybersecurity crimes in each autonomous community.

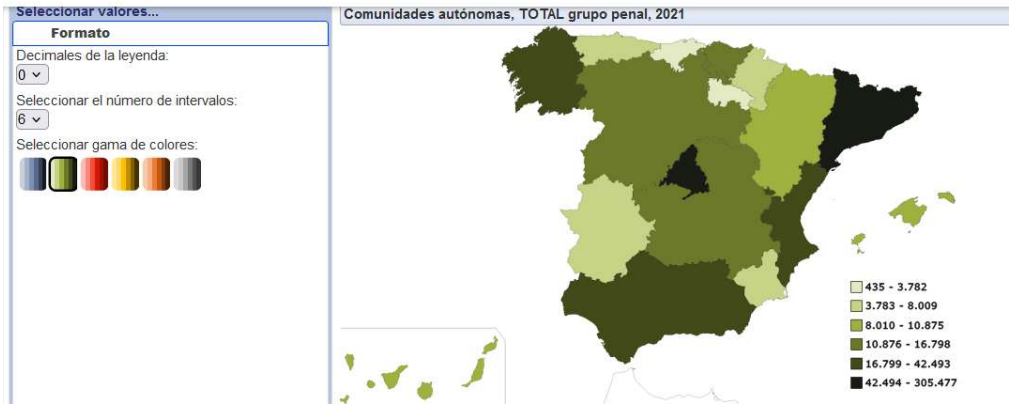


Image 4: Graphic representation of the number of known facts related to cybersecurity crimes in each region.

Tabla | Gráfico | Mapa

	2021 De 26 a 40 años Masculino
TOTAL NACIONAL	
ECUADOR	20

Image 5.

This information may not seem relevant itself and that is why we have emphasized that it must be only seen as an example of the opportunities and the potential that a simple software offers to any user with an ordinary access to the internet. Another relevant fact that may seem hidden is that before showing the result of the third picture, a simple number, the user has previously made a selection of areas, gender, nationality, type of crimes, age group and period of time:

Image 6: Filters available before obtaining the result of image 5.

If we calculate the total amount of combinations we can make is higher than 500.000. If we can do all this combinations just with the public information published by one of the Ministries of one of the Member States, how many conclusions could we make if we develop a software that is able to analize millions of data provided by the different Ministries and by all the Member States?

The use of big data in Law Enforcement and security environments is an ever-increasing method to prevent crimes, not only by national agencies but also by European ones such as Frontex, in its constant fight to protect European borders. Most threats, independently of their type, share common traits that are not simple to relate but that can be predicted by analising the factors that have coexisted during the previous attacks. And this is our main aim, promoting the development of a program with the ability of detecting and creating alerts of the possible threats related to the criminal threats stablished for each EMPACT period. Synthesizing data analysis and continuous monitoring to optimize the results in the priorities set by the European Council.

We are aware of the difficulties of obtaining and filtering information from many States, but we do not have to start from an empty niche, some multinational companies have already developed similar technologies and some of them are even used by Ministries of Member States.

For example, the American multinational SAS Institute has developed a technology which allows the implementation of similar actions to the ones that we are willing to propose. We will use this program to show the potential benefits that could be obtained by applying this technology to the existing methods.

3. Development of our proposal.

Nowadays, the amount of information which is provided every day to the different data bases has introduced a new issue in the way that current programs are not able to manage that huge quantity of data.

To solve that problem, we suggest the use of big data. This emergent tecnology is mostly being used in the financial sector because of its advantages in speed, its continious development and its capability of self-learning.

These benefits have a lot to do in the security area. All the different members of the EU have different data bases whith a massive flow of information. Introducing a software based on big data could be the solution to various problems, such as losing remarkable details, classifying the information or having a better knowledge of what is happening in every moment. All that can be made just interpreting data.

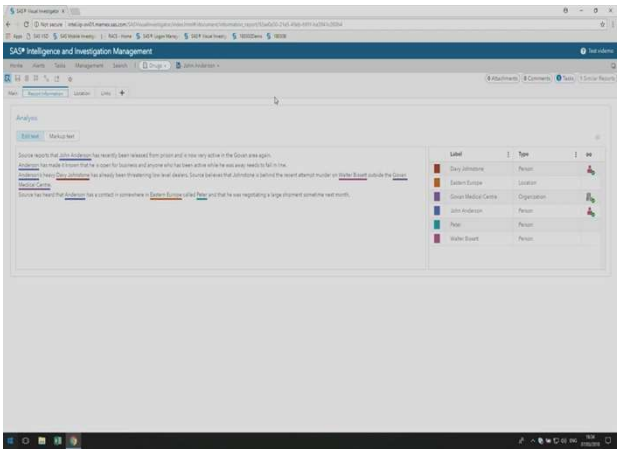
The main aim of our proposal is introducing a software which classifies the information in terms of danger and which is able to be configurable for different organizations. It should be capable of analysing general and specific searches, that way the users have infinite posibilities in terms of being provided with information for all the different cases.

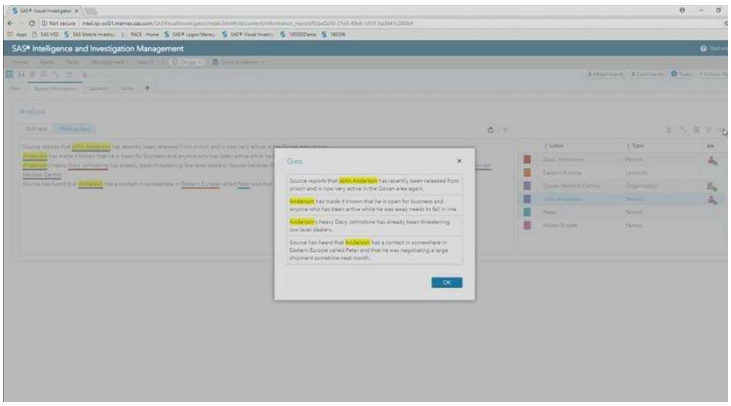
To develop our idea, we will use some of the opportunities that the technology developed by SAS Institute provides as a representation of our idea converted into a reality. This does not mean that we think that the solution could simply consist on purchasing their product without applying any modifications or adaptations, but we consider that some of the tools they have implemented and, specially the simplicity of its use combined with the efficiency of its visual and graphic results play an important role in the creation of these type of programs.

To begin with, this program allows to analyse data obtained from different programs, texts, files or even social media; we find that this is very important because, even if it may seem naïve, some of the most relevant pieces of information are discovered in social media. In our days, people have got used to publish almost everthing do, the location of their working place, the places they visit, the dates when they visit them, etc. That way people from very varied guilds have taken advantage of these situation: every summer the Spanish Police Agencies start an operation in order to encourage people not to publish the dates they leave their houses during their holidays in order to avoid burglaries or squatting. But that does not only happen to regular citizens who may be not familiar with selfprotection or aware about crimes: at the beginning of the Russian invasion in Ukraine, several Russian platoons were defeated just because some of their soldiers decided to post pictures of their locations in their Instagram account. These images were analysed by Ukrainian experts and forces were dispatched to that area. We cannot expect that a professional criminal makes a mistake in an evident field for the investigation, but why do not we try to follow them by the trace they or their families leave on their social media? We must take into account that a significant percentage of this information is public, so there will not be any legal or ethical problem in the way this information has been obtained.

Another advantage of this software is the simple way you can filter information within a text. Every user can develop a selection of filters, spending no more time than a couple of

minutes, in a similar way to the one we used as an example in images number 5 and 6 and the program will automatically select all the related data from that text. You can select names, areas, public enterprises, specific locations such as hospitals… and you will obtain in a visual way, using lists with different colours, the fragments of the text where those data were mentioned. Afterwards, it will also give you the opportunity to make relations among them and to add extra information such as phone numbers, nicknames or social media addresses, all of that in order to make a continuous brainstorming of potentially related data.





Images 7 and 8: example of SAS Institute software text analysis and division into subtexts.

Leaving aside the technical capacities of the program and making a more aesthetic approach, this type of technology also includes interactive and visual interfaces that create visual and simple visualizations of the information. For example, you can plot the results on a map so that the investigator has a clearer idea about the factors that are playing important roles in their investigation, but, at the sime time, you can make this map dynamic, selecting a filter in time and making possible to watch the spatiotemporal evolution of those factors. In conclusion, we think that this type of posibilities combine complex techonological processes with the simpleness required to make an efficient investigation at a user level.

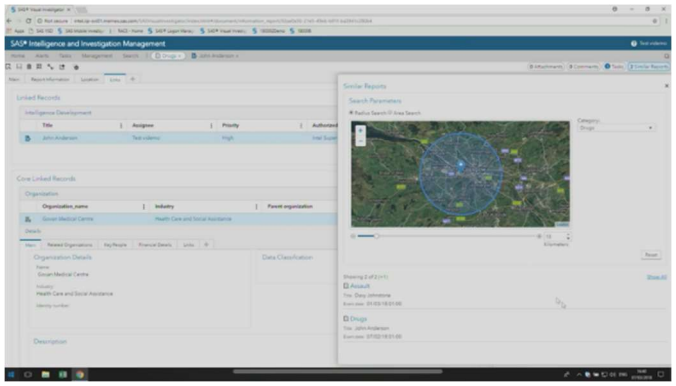


Image 9: map representation in SAS Institute software.

This program is just a tiny introduction of what big data is capable of doing, the aim of security forces of the different countries is to maintain a safe environment a there is not a better way than prevention. That is the reason why data analisis is so important, having the knowledge of the procedures that criminals use, the areas of most criminal activity, among others, introduces a huge advantage for the security of the different countries.

The main point of the use of data analysis is the idea that criminal acts are not unique. How to find the match between them is the work of experts who have studied criminal conducts for years. That is the reason why introducing a system which self-learns and which is configurable opens lots of possibilities in terms of crime prevention.

4. Implementation in the European Union.

During all our proposal we have listed priorities, we would like to introduce our idea of how to use a software based on big data to solve these different situations.

As it has been stated, the software should be totally configurable and able to do both, general and specific searches. This brings huge possibilities in the way that all fields would be covered with just a tool; and its efficiency would be the same for all its capabilities.

4.1 Cyber-attacks. With today's modern age all the works and sensible information are stored in computers. This does not mean that our program could fight against an attack of a hacker but that is not its aim. In this field it could read millions of profiles or posts in different internet forums or social media. The software will be provided with the information from all cyber-crimes in the EU that way it could find patterns to predict when and how an attack is being planned. Obviously, this will not be a rigorous scientific prediction, but at least it will make the organization to be on alert.

On the other hand, what if we are attacked and we were not able to prevent it. Well as said the software should answer to specific searches, just with a few clicks the organizations will obtain different profiles that are suitable of making that type of attack. When int comes to security the time is a factor which cannot be set aside, so it is clear that if a software is able to read a huge amount of information, interpret it in the way the user wants and get conclusion withing seconds will be a huge advantage for the fight against crime.

4.2 Human beings, drugs and firearms trafficking. Another of the priorities for this current cycle is the fight against trafficking. It is pretty clear that the state members have the information in order to dispute these crimes but two main problems come into play, the time and the interpretation. All of them have another thing in common they need of the cooperation of different countries because they take part not only in but also outside the borders of a single country.

Big data introduces a solution in the way that a single program could alert the different agencies from two or more countries and make them cooperate. Furthermore, the program could classify the different roads into most or less commonly used by the dealers or smugglers. It could also show which areas or

countries have more amount of these cases and that way solve the problem from its root.

4.3 Response to major changes and VUCA scenarios. On March 2022, the Council of the European Union was forced to develop a text alerting the Member States about the predictable increase in criminal activities and organised crime as a result of the situation of the War in Ukraine. In this document, the Council encouraged the participation of EMPACT and its cooperation with other European agencies such as Frontex making use of continuous monitoring; reinforcing our idea of the importance of the use of these technologies at an operational level.

It is important to develop contingence plans for these types of situations in which changes take place in a disordered and extremely quickly way. Most of the Military Major States nowadays study and plan these situations, also known as VUCA environment, which is the acronym for Volatile, Uncertain, Complex and Ambiguous. The idea of these scenarios is that several objectives or priorities can get easily endangered in a very short period of time. The Council listed, at least, ten out of the fifteen Operational Action Plans for this EMPACT period that could be in jeopardy during the development of the war in Ukraine.

But the benefits of this proposal are not only appliable for direct fight against crime; they are also effective for the operations regarding the evacuation and welcoming non-combatant population and refugees, making possible to enhance the coordination and selection of the information hubs; analysis of the data provided by organisations such as the EU Asylum Agency, which is not directly related to law enforcement; and risk analysis to prevent human trafficking. In this way, we can also cover, directly and indirectly, more priorities of the European Union for these scenarios.

Making an effective analysis of the potential risks, criminal routes, neighbouring states and suspects will allow the OAP Drivers and Action Leaders to implement swift action, making a doubly effective response: first, we will continue our fight against organised crime but we will also avoid that mafia type organisations related to trafficking of human beings, drugs, firearms and child abuse take advantage of the effects of the war over the civilian population.

Those are just a few of the different uses that the program should have, as an international organization the EU should not be settled in outdated programs which for sure work but are not efficient enough these days. Big data brings a huge number of possibilities to evolve not only in terms of security, which is the main asset, but also to be pioneers in development.

With the use of the current information the EU is able to obtain, it is just about how to manage it. We have introduced a method to establish priorities based on EMPACT resolutions and also a technology which is up to date. Multiple enterprises are developing their own software and for the state members the ideal should not be just buying one which has already been created but to develop their own one with the help of private businesses or public resources.

Knowledge, ideas and technology are not cheap but the EU as an organization with lots of resources, should in some way invest in efficiency and currently in terms of data analysis there is nothing, not just as good, but close enough to the capabilities of big data.

In terms of ethical, economic and environmental impact our proposal respects and stimulates in some way a better view of these aspects. First of all, in the ethical side the information provided should respect all the different legal establishments from all the members and the information used should not be more than the one which respects the privacy of citizens. It is not about creating a control of the behaviour of the people, such as happens in China, only criminal activities should be supervised and added to the data bases.

Moreover, these days the number of economic resources given to organisations such as EMPACT has increased, also the different OAPs only use a small percentage of all the budget they have assigned. As mentioned in the introduction there are protocols which transfer parts of those budgets between the different plans. In conclusion, obtaining the number of resources which will be needed to develop a software with the characteristics we have proposed is completely affordable.

Last but not least, the environmental impact will be none or insignificant. In fact, making a long-term analysis, a program as proposed will reduce and optimize the number of journeys the employees are meant to do, just because all the information is being handled by the same program in all the different states.

To end up, if we agree on the idea that EMPACT should be the European flagship against organised crime, bringing up a program based on their studies and resolutions and with all the capabilities of an emerging and brand-new technology as are big data and continuous monitoring, will improve the results and allow to increase the seize of assets, drugs and firearms from illegal organisations.

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Antonio Ferrándiz and Jesús Eguino
CUGC – UC3M Students
Aranjuez (Madrid), 10th February 2023

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