i-LEAD Industry Day – 2020 2nd Edition

Practitioners' Needs & Gaps

Drug Crime | **Financial Inv & Virtual Currencies** | **Public Order** | **Crime Scene Recording & Documentation** | **Digital Forensics**

This document highlights the outcomes gathered from a series of Practitioner Workshops organised and conducted by the i-LEAD team. Please review the material and note in the **Industry Days 2.0 application** the areas that your solution or service would be able to support.

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Common Trends

The table below captures some of the common technologies related to the different crimes. However, we urge readers to review the entire document if possible, as the table is not exhaustive - it is only intended to provide a high-level overview of the repeated trends in the needs and gaps.

Crime Scence	Technology / Practical Needs								
		Artificial Intelligence	VPN Detection	GPS Trackers	Audio Devices	Drones	Password Cracking	Shared Platforms	Facial Recognition
	Drug Crime	✓	✓	✓	✓	✓		✓	✓
	Financial Inv & Virtual Currencies	✓	✓				✓	✓	
	Public Order	✓		✓	✓	✓		✓	✓
	Crime Scene Recording	✓			✓	✓		✓	
	Digital Forensics	✓	✓				✓	✓	✓

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DRUG CRIME		
Short Description	**Description**	**Area**
Surveillance	Surveillance technologies are a priority for reducing drug trafficking. The key areas mentioned by the practitioners have been divided into 5 separate topics**: vessels at sea, drones, audio, disposable trackers and interception of mobile phones**. **VESSELS AT SEA** - At present, there is no 'real-time' monitoring of sea vessels, as any satellite imageries obtained are at least 3-hour post detection of a suspect vessel. Drug trafficking investigators would like to have a global maritime system with vessel positioning that they could access less than 1-hour post detection. This end-user priority should also be extended so that maritime data in relation to the vessel under investigation should be available, such as crew details, intended routes and schedules. **DRONES** - Practitioners stated the need for improved mobile surveillance techniques, in particular, the use of drones for capturing information could have a significant positive impact in the fight against drug trafficking. Ideally, future drone technology should have improved capabilities that are non-detectable and include enhanced imaging technologies such as a Remote Video System (RVS). Additionally, practitioners require sensor capability (electrical and physical) so that persons of interest can be detected, monitored and tracked in real-time and at a distance regardless of the environmental conditions and situations. Artificial Intelligence and Facial Recognition technologies were additional capabilities put forward by practitioners. However, it was recognised that new drone capabilities would require a greater power and a longer battery life; i.e. months; maintaining continuous surveillance over a longer period of time and over a greater distance. This is necessary to avoid sending officers into the field and putting them at risk of detection by the criminals. The practitioners also stated that the cost of these capabilities should be kept to a minimum so that it was available to all LEAs with a variety of budgetary means. **AUDIO** - Practitioners would like to be able to capture clear audio evidence covertly, at a distance (500mtrs) and through walls, to avoid having to go into a building to set up listening devices. Furthermore, improved efficiency of micro-array recording would also be of benefit to obtain surround sound recording throughout a room, and better know the positioning of those talking, be more accurate of who is talking and omitting background noise. Practitioners would also like to utilise automated lip-reading technology and sound vibrations, during investigations and that they would welcome development in both these areas in order to assist in a surveillance situation and be used as evidence in a court of law.	Technology

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	DISPOSABLE TRACKERS - Practitioners would like to have a long life, low-cost single-use GPS tracker that can be fixed to all types of vehicles. This would be of great value to the investigator as there would be no need to retrieve the device once it has been used, which would reduce the chance of being detected by the criminal. **INTERCEPTION OF MOBILE PHONES -** Practitioners agreed that an International Mobile Subscriber Identity Catcher (IMSI-Catcher) would reap great benefits in the surveillance of drug trafficking criminals. Having this capability would mean that once the targets phone was in range and connected to the IMSI the police officer could better locate and track the person of interest using Radio Frequency (RF) Mapping. Police Officers would also like to be able to infect a target's mobile phone in order to 'eaves-drop' and gain information on future previous drug trafficking activities. Both of these priorities would provide stand-off surveillance for LEAs. Moreover, LEAs would like to work more closely with mobile phone companies so that they can assist with drug trafficking investigations.	
Detection	Detection is a high priority for LEAs and encompasses several different areas, including the detection of concealed drugs within containers, vehicles, buildings and people. For example, an 'electronic sniffer', a device that could identify a substance using a rapid chemical process such as chromatography. Once detected, the practitioners would welcome the ability to have real-time in-field analysis and rapid automated screening of suspicious substances.	Technology
Accessing Information	The drug trafficking investigator would like to have: • Better links into OSINT and improved tooling, including that of being able to decrypt mobile devices and apps, • Improved search of the internet and patrol the dark-web, • Possibilities to interrogate blockchain and crypto-currencies and use SIGINT to process signals of interest and extract relevant data. • Additionally, practitioners would like the capability to exploit and hack into a vehicle's computer.	Technology
Sharing Information	Practitioners expressed the desire for an ability to share information with colleagues from other agencies, countries and across borders in real-time using a dedicated sharing platform. It was emphasised by the LEA practitioners that there is a common fight against drug trafficking across the EU, and that the sharing of open-source information (not intelligence or evidential) would be beneficial to all and sharing good practices would save money and time. Furthermore, sharing information regarding prior knowledge of logistic organisations and shipping companies would also be of use to identify deviations of transportation trends that may indicate potential criminal activity.	Technology

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FINANCIAL INVESTMENT & VIRTUAL CURRENCIES		
Short Description	**Description**	Area
Better Collaboration with service providers (VPNs)	Gaining information from Virtual Private Network (VPN) service providers by LEAs across Europe varies from one country to the next, with some countries having legislation in place so that obtaining information from service providers is much easier. However, even with good relationships and legislation in place the data provided is limited. Practitioners expressed a need that VPN providers should be able to provide any data that they hold including; originating IP address and machine and systems data. LEAs having access to this data would mean that they would be able to investigate a suspect/device and create improved intelligence, and also link and cross reference against other data sets. To enable this capability, it is clear that new legislation is required across Europe and an improved mutual trust between LEAs and VPN providers, additionally access to the information needs to be standardised across all Member States to ensure optimum exploitation and sharing of the data and intelligence obtained. Presently there is no technology available for overt financial investigations, and is very limited for covert around VPNs other than actual hacking tactics. Practitioners also stated that information gathering from the providers should be in real-time and auditable; and research and development for this discipline should concentrate on these areas.	Legislation
Platform for sharing information with colleagues	Some of the practitioners use the European Platform for Experts; however, there is no consistency to this as it is deemed not user-friendly. The practitioners stated that they require a future proof platform that is easy to use, secure and where they can have forum chats and exchange 'live' operational information/documentation via a desk top or remotely (mobile). It must be future proof and the ownership and management of such a platform should be by a trusted organisation that ensure security of 'sensitive data' exchange including video conferencing facilities.	Technology
Multi-disciplined personnel	With these types of crimes, it is important to have cybercrime expertise as well as financial expertise. It is not realistic to expect investigators to have both. Therefore, it is necessary to have hybrid teams where the right expertise is brought together.	Personnel
European Working Group	In order to connect, communicate, build trust, improve knowledge and help each other on a European level, it is important to meet on a frequent basis. The practitioners looked towards ENLETS as a possible platform for a working group that would meet on a quarterly basis. The practitioners discussed a number of items in relation to this topic; including having a trusted group which could include the FBI to	Technology

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	share potential threats, intelligence, trends and good practice statistics. However, it was felt that there should be a secretariat to ensure that management of such a group would have administrational support.	
'Stop the money' capability	Practitioners agreed that there should be a capability to quickly 'stop the money' of criminals which would include the closing of bank accounts, freezing accounts and seizing money at home and abroad. To have this facility, LEAs need to build good relationships with banks - the UK model would be one to emulate (this is also used in Portugal and France).	Legislation
Collaboration of LEAs in Europe and the rest of the world	Business Email Compromise (BEC) is a global issue and practitioners discussed a way in which they could collaborate more and obtain information from non-EU countries. In general, it was put forward that agencies such as EUROPOL and INTERPOL could assist in this requirement, and that European LEAs should build better relationships amongst each other. This would enable faster freezing of bank accounts abroad, without the need for legal assistance, e.g. a request from a public prosecutor. Additionally, it was put forward that it would be of benefit if warrants from one country could be used in another - 'cross border warrants'.	Legislation

PUBLIC ORDER		
Short Description	**Description**	**Area**
Tracking and monitoring of known offenders using Facial Recognition	During the workshop, practitioners stated that facial recognition was not being utilised to its full potential, and that there was a great opportunity to capitalise on this type of technology within public order operations. The practitioners postulated that facial recognition could be used to identify people who had previously been identified as an offender, and one who had the potential to cause disorder and incite others to do the same. However, practitioners were aware of the potential risks of using this technology, and that is the possibility to alienate those law-abiding citizens who had no inclination or desire to cause disorder. Therefore, it was stated by the community that any business case or research put forward to facial recognition systems with a public order arena should take into account the social and ethical implications prior to its use.	Technology
Drones and Artificial Intelligence	Many Law Enforcement Agencies across Europe presently use drones within public order scenarios. However, the practitioners agreed on a major pitfall - a lack of ability to integrate all the information collated from the drones (and other sources) into one system, impacting on strategic and operational decision-makers. Practitioners also expressed a desire for drones to have an 'artificial intelligence' capability that could provide a prediction or indication of an outbreak of public disorder during large scale	Technology

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	events. For example; with the use of algorithms it could be possible to determine if a crowd or a person was acting in an irregular manner or using language, movements or voices that was a precursor to violence.	
Tasking and Decision Making, plus Artificial Intelligence	The use of Artificial Intelligence (AI) within decision making is being used more and more across many business sectors, especially in areas where large amounts of data need to be gathered and analysed. AI can process more data than any person and can make better and faster predictions without the bias and emotions of a human being. Furthermore, via the collected data, AI can identify patterns, and this can be done faster and more accurately than by humans. Therefore, the use of AI in public order scenarios, to analyse the large amounts of data sets in real-time, would be of great benefit. This capability would allow the public order police officer to deploy personnel and equipment to the right place and at the right time; having the potential to diffuse a hostile situation before it occurred. **This would require existing systems to be more integrated and feed into one repository rather than buying a new system, that forces could not afford.**	Technology
Communications Strategy when policing public order events (Automated System)	Practitioners agreed that following a large scale public order operation, there is often too much information to consider, assess and analyse. Having the ability to filter out the most important information would be of great benefit and less time consuming for Law Enforcement Agencies. Presently radio technology and cellular networks provide a suitable means of communication; however, police officers need to have more control over what information is important and what is inconsequential. Having an automated system that distinguishes between the two would be of great value and would also mitigate an overloading of systems. Furthermore, the group added that communication systems are set up to deal with 'normality' and not for major public order incidents. Therefore, to have a system that could 'identify' when large amounts of transmissions occurred and then alter its status to deal with this, would be of great benefit. It was recognised by the group that some of the issues experienced are not all technology-related and could be reduced by adopting an improved and more efficient communications strategy, having better-defined requirements and thinking differently how communications are managed. There were concerns amongst the group related to the introduction of 5G and the impact this will have on policing. The next generation of mobile internet connectivity will bring new challenges, especially as it will provide a means of faster sharing of information, thus bringing new and interesting challenges to Law Enforcement Agencies. Additionally, the group agreed that 'lessons learnt' post public order events in relation to communications should be shared with colleagues across Europe in order that improvements are made easier and faster.	Technology

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Police and Public Partnerships (Communication)	The group decided that one of the priorities for the Public Order Community was to be able to communicate with the public more effectively and to ensure that any messages conveyed are accurate and unambiguous. The importance for the police to have and maintain a positive dialogue with the public during public order events is crucial to contributing to the event running smoothly and avoiding disruption and disorder. Social media is being used more and more for getting messages out to the public about their local police force, however this could also be used as a vehicle for getting information out to the public during events such as football matches, and other major events. For example, providing information about road and street closures, routes of travel and traffic bulletins. The group agreed that engagement via social media should begin well in advance of an event and to bring on board influential persons within the community to build trust. However, they added that this should not be instead of face to face conversations but to enhance police/public communications.	Technology
Public Order Training and Best Practices	The practitioners attending the Public Order workshop put forward that there needs to be more exchange of information on working practices and to work alongside each other to gain an understanding of the challenges faced in different countries during operations. They stated that more novel ways of delivering training in the future should be investigated, e.g. YouTube, e-learning and translation of training programmes into different languages, and perhaps that the CEPOL's on-line training courses could be a good starting point. The group stated that they would like to build the network and share ideas and lessons learnt more efficiently using an on-line platform. Practitioners pointed out research shows that more focus on low-level tactics would reduce high-level public order activity and that more training in this area would be of great benefit. However, there remains a need for high-level training in preparedness for these types of operations and that although these didn't happen very often, training should be continuous and regular to maintain the appropriate skill, knowledge and ability.	Training and Continuous Professional Development

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CRIME SCENE RECORDING & DOCUMENTATION		
Short Description	**Description**	**Area**
Dedicated Sharing Platform	Practitioners need a dedicated, easy to use sharing platform where information and data could be easily exchanged, regardless of the data format, in real-time with colleagues and other LEAs. The ability to be able to access and upload data to a sharing platform from mobile/tablet devices at the crime scene was also important.	Technology
LEA Storage Capabilities	Due to recent advancements in technology, a huge amount of data can now be collected and recorded at crime scenes. These large volumes of data are creating issues with how to store it, process it, access it and retain it for future use. LEAs current storage capabilities seem inadequate to deal with the vast amount of data that is needing to be stored. Practitioners would like LEA data to be stored centrally on a network and capable of being easily accessed and shared on a shared platform.	Technology
Single Entry Point Platform for the Chain of Custody	Practitioners would like to see an integrated, electronic, single entry point platform for the chain of custody. All physical evidence and data would be barcoded and scanned directly at the crime scene, using a tablet, so that all data and evidence had a digital signature. This electronic chain of custody would then be used for the duration of the investigation.	Technology
3D Modelling Equipment	The laser scanners currently used at crime scenes are large, expensive and can take a long time to analyse a crime scene. Detailed 3D modelling is often required in complex crime scenes; but, a more basic laser scanner which could produce a rudimentary 3D model much more quickly at the scene would be helpful for less complex scenes. This 3D image could then be transmitted live from the crime scene to other colleagues and LEAs. Ideally, the scanner would be small and cost-effective. The software and scanner should also be easier to use so that all CSIs could be trained to operate it.	Technology
Tablet Device for Use at Crime Scenes	A small, cost-effective and secure tablet device with the following capabilities: • Information inputted via speech and converted to text • Capable of live capture and visualisation capture • 360º video live streaming through a secure channel • Ability to transfer data from the crime scene to cloud storage • Able to access information from cloud storage • Ability to share information on a shared platform • Sketch software which can be used with other software on the device • The ability for evidence to be barcoded and scanned using the tablet (the single entry point system outlined above).	Technology

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Drones/Robotics	Drones with enhanced functionalities (i.e. sensors) could increase their usefulness at crime scenes. The ability for a drone to locate traces at a crime scene and footprints and fingerprints, for instance, is desirable. Practitioners did consider that the development of robotics which could perform the first assessment of such crime scenes would be desirable.	Technology
Training	A lack of training and materials for the new technologies may be contributing to the unwillingness of some CSIs to engage with them. Practitioners would, therefore, like to see more structured training programmes rolled out in their respective LEAs.	Training and Continuous Professional Development

DIGITAL FORENSICS		
Short Description	**Description**	**Area**
Password Cracking and Encryption Recovery	The practitioners agreed that common problems within digital forensics are the challenges with regards to encryption of devices and password cracking. Decryption is a time-consuming process and so to be able to do this task quicker and more efficiently would be of great value. It is foreseen by digital forensic practitioners that there will be more and more different types of encrypted devices in the future, especially with the introduction of 5G. Additionally, the storage size within devices is becoming larger and therefore, able to hold more data; that is to say, more potential evidence that can be used within criminal proceedings. Also, the 'cracking' of passwords is equally as crucial to investigate the data within a device. Presently the dictionary of words used as passwords is not adequate, and this needs to be built upon and shared amongst practitioners. It was put forward that the construction of 'smart dictionary' algorithms that could create glossaries of terms and words from the details of a case would be an advantage for the investigator. It is both these areas of work that the practitioners believe would benefit from funded research and development.	Technology
Artificial Intelligence and Machine Learning	As the workload, time constraints and challenges of the Digital Forensic Practitioner increases to attain a successful conviction, more and more police forces are looking towards the exploitation of Artificial Intelligence and/or Machine Learning to fight criminal activity better. The tools used by the Digital Forensic Investigator are very often not fit for purpose, with no present solutions for big data and triage of big data, which is getting increasingly complex. The 'splitting' of tasks between several tools; commercial and open-source, causes significant problems and therefore, a multi-functional and integrated tool or platform would improve all areas of the work.	Technology

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	One practitioner stated that "Even with good computing power, commercial forensics tools fail when they have to deal with a large amount of data. The solution to this is the integrated use of several tools, commercial and open-source, splitting, if possible, the data to be analysed in smaller blocks and correlating the results, under the penalty of losing some relevant information and spending more time in case analysis". Therefore, one of the solutions to this would be for the Digital Forensic Officer to employ Artificial Intelligence. The use of a 'less manual' technology with more proficient thinking capability would enhance the way large amounts of data is dealt with and provide the Officer with an optimised evidence extraction tool. The areas in which Artificial Intelligence could be used, for example, is speeding up the reviewing of data and potential evidence from multiple devices including images/videos; to differentiate between relevant and non-relevant data sets and to identify crucial evidence at the earliest opportunity. Other areas in which Artificial Intelligence could be utilised are the mapping of connections between people of interest; building timelines of the activities of potential criminals; analysing context from conversations and integrating data from multiple sources. It was speculated that it might even be possible to apply Artificial Intelligence to identify and transplant a component part of a device that has been maliciously or accidentally destroyed, and that has the potential to assist in the investigation of a crime.	
Training and Expertise ⌂	The Digital Forensic Practitioners attending the workshop were all keen to express the need for a more formal approach to the discipline and in the words of one of the practitioners, 'to provide a more professional service to the Criminal Justice System and have less ad-hoc processes and procedures'. Furthermore, it was seen that the key to this requirement was to have a structured education programme, and during the discussions, it was put forward that the discipline would greatly benefit from having a dedicated centre of training for the Digital Forensic Technician for which education grants would be available. The practitioners stated that at present it is difficult to take on and keep good staff and it was believed that this is partly due to the discipline not having a framework of learning and ongoing standards of competency. Additionally, highly knowledgeable staff were leaving digital forensics as their expertise could earn them more money in other business sectors. Regarding the type and mode of training tools, the practitioners put forward a number of solutions, these being; e-learning and classroom-based training and practical exercises. However, as there are thousands of Digital Forensic Officers around Europe who require training, it was proposed that the use of Virtual Reality technologies could provide an online solution.	Training and Continuous Professional Development

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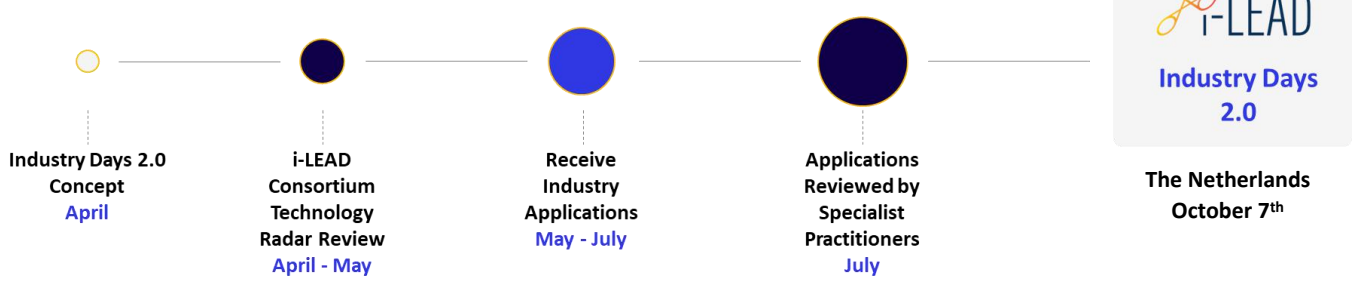
Sharing Data and Information	During the discussions amongst the practitioners, it was found that there were two aspects to the sharing of data/information. The first being the sharing of information amongst the community of practitioners in relation to the promotion of good practices and procedures, problem-solving, etc. and the second being sharing evidential data - including data in relation to criminal investigations. **Sharing data** - With regards the sharing of data, it was believed that due to the lack of efficient data sharing, opportunities for the sharing of evidence and intelligence nationally and internationally, were being missed; and therefore the opportunities for the successful convictions of perpetrators of crime. To have a networked intelligence and evidence sharing capability for Law Enforcement Agencies would be of substantial benefit to the investigative process and should include the technology to share reports, images and intelligence for review and evaluation. **Sharing Information** - The community require registered forensic experts to have a facility that gives them the opportunity to chat in real-time and to share experiences with each other. They required the functionality to be able to discuss and assess the 'tools' used by the Digital Forensics Officer and to make more informed decisions when considering using or buying such tools. Being able to discuss the pros and cons of different commercially available and open-source tools would be a great asset and save time and effort. Both of the issues highlighted above could be improved via an on-line platform (community information sharing) and a centralised server for collection, analysis, dissemination and management of data, (evidential and intelligence sharing). Both of these, it was suggested should have remote accessibility for officers and have an easy to use interface.	Technology

Contact Details

steven.ormston@ppbw.pl
www.i-lead.eu

Twitter - @i_LEAD_Project

The Polish Platform for Homeland Security organises i-LEAD Industry Days; if you have any questions or aspects you would like to discuss, please reach out to steven.ormston@ppbw.pl.



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