C-UAS Industry Day

30th June 2021, online

PUBLIC REPORT

NEUTRALISATION

TRACKING

IDENTIFICATION

DETECTION

INDUSTRY

SECURITY PRACTITONERS

EU REGULATIONS
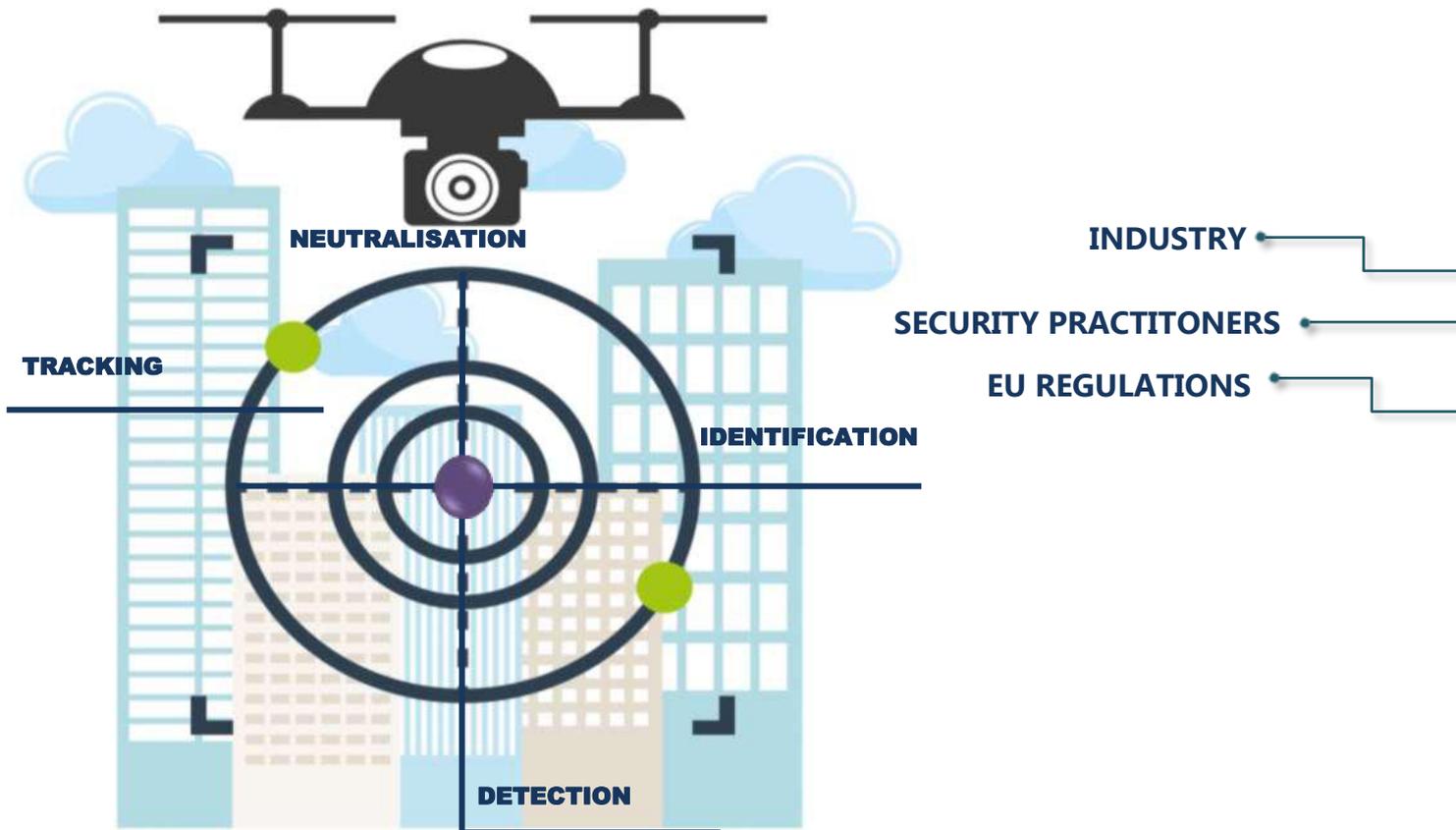
DETECTION | IDENTIFICATION | NEUTRALISATION | TRACKING

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1. Event overview

The C-UAS Industry Day was organised by the Counter-Unmanned Aerial Systems Technology Interest Group (C-UAS TIG), which is part of the European Network of Law Enforcement Technology Services (ENLETS). The ENLETS' main goal is to operationally strengthen Law Enforcement (Police) with the use of modern Technology and Development by exchanging information, experience and knowledge on a practical communication level. Find more about ENLETS here.

Due to the COVID restrictions, the C-UAS Industry Day was organised in an online formula.

C-UAS Industry Day in numbers

50 participants attending the event

LEA's representatives from **19** European countries

12 C-UAS technologies presented

The goal of C-UAS INDUSTRY DAY was presenting available counter-drone technological solutions for Law Enforcement Agencies. Moreover, the aim was to provide an atmosphere and environment for collaboration and discussion about counter UAS technology and the needs of Law Enforcement. Together with LEAs and Industry, we strive to forge mutually beneficial relations between industry experts and law enforcement specialists in counter drones matters.

Focus areas

The event covers the entire chain of countering unmanned aircraft systems in **built-up areas**.
Therefore, the solutions that cover the following threat areas were presented:

- **DETECTION**
- **IDENTIFICATION**
- **TRACKING**
- **NEUTRALISATION**

Hosts and presenters

The C-UAS Industry Day was hosted by:

Steven Ormston
Polish Platform
for Homeland Security

Dr. Jarmo Puustinen
Ministry of the Interior, Finnland
C-UAS TIG Leader

During the event, there were two accompanying presentations on the ENLETS network and counteracting drones in the perspective of the European Commission, which was presented by:

- **Patrick Padding -**ENLETS Core Group Leader
- **Lars Huybrechts -** DG HOME D.2 Counter-Terrorism

2. Technology presenters

With the one-day event and to avoid skip any technology presentation, the organisers decided to schedule 20 minutes time slots for presenters. The timeslot consisted of 15 minutes of presentation and 5 minutes Q&A session. The breaks between presentations were limited and the activity time was maximised.

The agenda of the event looked as follow:

C-UAS Industry Day

30th June 2021, time: 9:30 – 15:30 CET, online
Organiser: ENLETS COUNTER UAS's TIG
Target Group: LEA's (registration needed in advance)

AGENDA*

9:30 – 9:40	Opening the meeting, welcome speech			
9:40 – 9:55	ENLETS network		12:16 – 12:36	DroneCatcher
9:55 – 10:05	C-UAS in European Commission perspective		12:39 – 12:59	Blighter A800 3d Drone Detection Radar
Presentation of the technology			12:59 – 13:30	LUNCH BREAK
10:08 – 10:28	Gradiant		13:30 – 13:50	H.P. Wuest GmbH Jamming Solution
10:31 – 10:51	SkyPatriot		13:53 – 14:13	Dropster C-UAS net-pistol
10:54 – 11:14	Robin Radar sensors ELVIRA®, IRIS®		14:16 – 14:36	TELEFONICA
11:14 – 11:30	COFFEE BREAK		14:39 – 14:59	ADRIAN
11:30 – 11:50	DroneShield		15:02 – 15:22	AEORUM
11:53 – 12:13	SkyWall		15:22 – 15:30	Summarising and closing

*Between the presentations of the technology 3 minutes to switch presenters are planned.

GRADIANT

Galician Research and Development Center for Advanced Telecommunications

COMPANY DESCRIPTION

Gradiant is an ITC provided with a highly-skilled task force of over a hundred people located in Spain. We incorporate our vision and knowledge of telecommunication technologies into the processes and products that companies develop. We bring our expertise from the point of view of connectivity, intelligence and security to work hand in hand with the industry from our surroundings.

PRESENTED TECHNOLOGY SOLUTION

Counter UAS by Gradiant can automatically detect, classify, track and neutralize drones within a security perimeter, thus guaranteeing infrastructure and people protection.Our system is modular, scalable and decentralized and can operate 24/7, either autonomously or commanded by an operator.Our Counter UAS integrates complementary detection, analysis and neutralization technologies in 4 independent modules and has been deployed in real scenarios.

GRADIANT's system is specially conceived for security and defence at airports, prisons or correctional facilities, government buildings, for the security of recreational or sporting events; and to be used by armies or security forces. Counter UAS by Gradiant guarantees security against drone attacks in a security perimeter, avoiding potential damage to critical infrastructures or civilians.

Presented solutions:

SMARTEAR+	SMARTEYE+	REPULSE
Drone detection, identification and tracking module based on radiofrequency.	Module for identification and tracking based on computer vision	Protection system against drones that operates creating an invisible shield with a radius of excess of 1km (vertically and horizontally) where drones cannot operate

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Rinicom Intelligent Solutions Ltd

COMPANY DESCRIPTION

Rinicom Intelligent Solutions Ltd (RIS) is a spin-out from Rinicom Ltd, aiming to utilise unique experience and experience in developing AI and video analytics solutions for security applications. In short time since incorporation, Rinicom's C-UAV products with embedded AI solutions have gained recognition on the market and Rinicom has a number of worldwide real life installations with high-profile customers.

PRESENTED TECHNOLOGY SOLUTION

SkyPatriot is a versatile AI-enhanced optical drone detection system capable of operating standalone or integrated with radar or RF sensors. It detects, tracks and classifies drones, birds, aircrafts, vehicles and human and recent addition to the system allows estimations of weight of drone payload. Rinicom's AI algorithm is camera agnostic and can operate with 3rd party cameras, making SkyPatriot scalable for various operational scenarios.

SkyPatriot is very versatile. It can operate standalone or as a part of the bigger C-UAV system. Numerous installations include large international airports, Remote Towers, Military bases, Prisons, Critical Infrastructure (governmental building, power stations). It works both in urban and in rural environments.

To optimise return on C-UAV investment, Rinicom together with OSL are developing algorithms that could expand capabilities of C-UAV system for the detection and classification of other targets (such as humans, vehicles) in the predefined areas.

Classification

- InSight

Detection, Classification and Tracking

- Sector 180/360
- Sector30
- Hunter

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ROBIN RADAR SYSTEMS BV

COMPANY DESCRIPTION

A Netherlands-based technology leader in tracking and classification of small objects. Robin's mission is to provide actionable information that increases safety and security. They do that by combining affordable sensors with smart software. Demand for high-performing drone detection and intervention methods continues to increase - therefore Robin's purpose-built drone detection radars, ELVIRA® and IRIS®, can automatically distinguish birds from drones.

PRESENTED TECHNOLOGY SOLUTION

ELVIRA® radar delivers a capability and price level that meets the needs of the professional security market, on a global scale. It is the primary choice of Governments, Police, Airports, Prisons and other critical infrastructures for the protection against drone intrusions.

IRIS® adds 60-degree target elevation coverage, increased performance and comes in a small and lightweight package. It is well-placed in both the global security and defence market.

Both IRIS® and ELVIRA® cover a full 360-degrees and come with a standard instrumented range of five kilometres.

Both solutions offered by Robin are suited applications to prevent: near misses and collisions between planes and drones at airports, disturbance at public events, weapon and drug smuggling into prisons, espionage or damage to critical infrastructures, cyber security breach, ensure privacy and safety on super yachts, espionage and disruption of government employees and VIP's as well as damage to harbours and ports. Both radars can easily be integrated into a sensor network.

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DroneShield

COMPANY DESCRIPTION

DroneShield (ASX:DRO) is an Australian publicly listed company with its head office in Sydney and teams in the US and UK. It is specialising in C-UAS, Electronic Warfare, RF sensing, Artificial Intelligence and Machine Learning, Sensor Fusion, rapid prototyping and MIL-SPEC manufacturing. DroneShield's capabilities are used to protect law enforcement, military, Government, critical infrastructure, commercial and VIPs throughout the world.

PRESENTED TECHNOLOGY SOLUTION

DroneShield provides a complete range of patrol, vehicle-based and fixed site C-UAS solutions. RfPatrol and DroneGun are patrol products, DroneSentry-X is the vehicle product, and DroneSentry is the fixed site product.

The typical setting ranges across patrol, convoy, forward deployment and fixed site security C-UAS solutions. For example, the Australian Federal Police uses DroneShield's products for event security, airport security, and other temporary and permanent applications.

BODY-WORN & HANDHELD SOLUTIONS

Effective detection and mitigation solutions for Counter-Drone and the threat smart doorbells pose to agents.

- **RF PATROL** – used to detect the presence and protocol of smart doorbells
- **DRONEGUN** – used to disable drones and smart doorbells

VEHICLE MOUNTED SOLUTIONS

Vehicle / convoy protection

- **DRONESENTRY-X** – can be installed on a vehicle, maritime vessel, aerial platform, temporary or fixed site system.

FIXED SOLUTIONS

Permanent / semi-permanent: geo-location, identification and countermeasures

- **OPTICAL** – deep learning visual detections
- **RFONE** – long-range RF sensing
- **DRONECANNON** – multi-band intelligent jammer

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(side navigation tabs: DETECTION, IDENTIFICATION, TRACKING, NEUTRALISATION)

OpenWorks Engineering Ltd

OPENWORKS

COMPANY DESCRIPTION

OpenWorks develops technology and products for security and counter terrorism authorities. SkyWall drone capture systems and autonomous optical detection and tracking technology are deployed as part of integrated systems. The SkyWall systems are already in use with law enforcement and military organisations, deployed at nuclear sites, airports and critical infrastructure, including the Pentagon.

PRESENTED TECHNOLOGY SOLUTION

SkyWall Net Capture systems are operationally-deployed and provide the ability to physically capture a drone in a net, they are completely unique. The SkyWall Autonomous Optics products make use of the latest developments in deep-learning neural network classification to quickly and reliably classify, track and ID a target. They achieve industry leading tracking performance by controlling the camera motion using AI.

SkyWall physical capture is deployed in conjunction with electronic counter-measures for a layered defence, or in environments where electronic attack cannot be deployed. The SkyWall systems are already deployed at sites such as international airports, nuclear sites and other critical infrastructure, such as the Pentagon and Heathrow Airport. They have been deployed in close protection at events such as the G7 and with the US President events.

Clicking in the link below you can see SkyAI and SkyTrack detection and tracking functions:
https://www.youtube.com/watch?v=_8UVsFXdbCY

Under this link you can see SkyWall net capture functions:
https://www.youtube.com/watch?v=eOpZDv3BztE&feature=youtu.be

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Delft Dynamics B.V.

COMPANY DESCRIPTION

Delft Dynamics B.V. is an innovative, high tech company founded in The Netherlands in February 2006. The company is specialized in developing and building drones: small unmanned helicopters and multicopters that can be used as stable, easy to control sensor platforms. This is accomplished by combining computer and sensor technology in a smart way. Delft Dynamics is involved in many national and international RD&T projects.

PRESENTED TECHNOLOGY SOLUTION

After detection, by e.g. a radar, RF-scanner, vision or an acoustic system, DroneCatcher is able to quickly approach hovering or moving threats. With the use of multiple on board sensors, the net gun can be locked on the target. Due to DroneCatcher's automatic tracking capabilities, the drone will be swiftly caught by shooting a net. After the catch, DroneCatcher can carry the captured drone on a cable to a harmless place and release it there. If the caught drone is too heavy to be carried, it can be dropped with a parachute to ensure low impact on the ground. Therefore the DroneCatcher system is ideal in built-up areas, because there is no collateral damage at all.

Innovations DroneCatcher 2.0

- **DroneBox** (stand-alone or vehicle integrated system)
- **Releasable Tether** (infinite detection, safe and immediate response)
- **Further optimized AI** (faster detection and tracking)
- **Autonomous deployment** (fully automated chase & catch)
- **Integration with other systems** (radar, rf, vision, acoustics, etc.)
- **Extra on-board sensors** (cameras, radar, rf scanner / jammer, etc.)

Under the following link you can see the DroneCatcher's functions and way of operating:
https://www.youtube.com/watch?v=h3aJ4KKxpWs

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Blighter Surveillance Systems Ltd

COMPANY DESCRIPTION

Blighter Surveillance Systems is a world leading designer and manufacturer of electronic-scanning radars and surveillance solutions. Its solid state radars are deployed in 35 countries to deliver round the clock protection along borders, for coastal facilities, at military bases, and to guard critical national infrastructure such as airports, oil and gas facilities and palaces. Blighter specialises in radar as part of Counter-UAS systems.

PRESENTED TECHNOLOGY SOLUTION

A400 Series Air Security Radars are medium-range air security radars for detection of covert air targets. They detect and report micro, mini or standard drone types as well as ground and coastline targets.

AUDS (Anti-UAV Defence System) is a strategic C-UAS system, designed to disrupt and neutralise UAVs engaged in hostile airborne surveillance or other malicious activities. AUDS combines e-scan radar target detection, electro-optical tracking/classification and directional RF inhibition capability

Blighter's A800 3D drone detection radar is a tri-mode e-scan radar, based on the latest monopulse antenna technology. It has the unique ability to use its optimised air security modes to search for small drones. At the same time, it can use its ground/sea surveillance modes to search for surface targets over land/water. The A800 performs its air, ground and sea detect functions all at once, allowing tri-mode operation with simple user setup.

The A800 radar acts as the key long-range detect element in C-UAS integrated systems. The 3D detection capability allows such systems to cue long range camera systems and electronic countermeasures systems onto the detected targets much more quickly than has previously been possible. Blighter radars are very easily integrated into C-UAS systems using Blighter's SDK, and have previously been integrated with the most popular VMS/PSIM products.

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H.P. Wuest GmbH

COMPANY DESCRIPTION

HP Marketing & Consulting Wüst GmbH, Germany was founded in 1982 and is a private owned company based close to Hamburg. It is specialized in developing, manufacturing and marketing jamming solutions all over the world for 39 years. H.P. Wuest GmbH owns Nato Stock number for its convoy jammers, self-protection jammers, Counter Drone jammers and EOD jammers.

PRESENTED TECHNOLOGY SOLUTION

H.P. Wuest GmbH offers different kinds of field proven C-UAS jammers: HP 47 Series owns a unique helical antenna with several drone frequencies in one antenna. Advantage is horizontal and vertical polarization and high gain which means less weight and long jamming range. Operator will not be harmed. NSN available. H.P. Wuest GmbH also owns modular C-UAS jammer with open interface to communicate with command and control system. Directional with pan& tiilt or omni antennas.

H.P. Wuest GmbH offers stand-alone solution (e.g. HP 47 drone gun) or integrated in system solution HP 1107 with directional antenna or HP 3050 T omni directional antenna. The company also offers portable case or trolley versions (HP 3055T+ or HP 3962h) with LAN functionality and directional or omni directional solution. Additional separate battery packs are available. The technical solutions offered by H.P. Wuest GmbH were used during G7 and G20 Summits, World Economic Forum in Davos and many more.
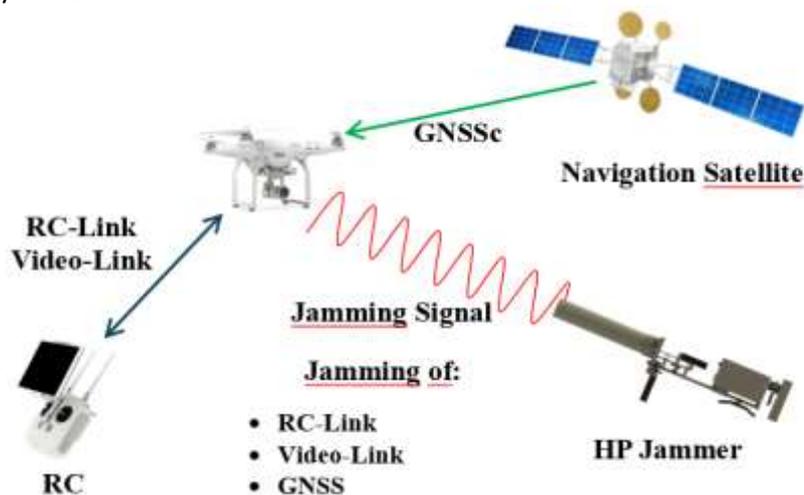
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Droptec GmbH

COMPANY DESCRIPTION

Droptec is a Swiss company located in the centre of Europe and is the manufacturer of the counter-UAV net pistol Dropster - a quick and reliable to use last resort defence solution against rogue UAV's.

PRESENTED TECHNOLOGY SOLUTION

The Dropster Net Pistol uses gas pressure, produced from Blank cartridges, to shoot off a resistant net onto UAV's in order to entangle with the rotors of the UAV and block its thrust. Currently the system covers a guaranteed range of 30m, but Droptec is working on a 50m-cartridge variant, which will be ready to sell by the end of 2021.

Law enforcement and security officers can respond directly to a threat with the Dropster in a reasonable way and up to 30m guaranteed. The 30m-cartridge is ideal for correctional facilities to prevent contraband, spying or sabotage acts from UAV's. Ideally in combination with a detection system or even a jammer where possible. Typical application areas of the solution offered by Droptec are: property, personal and event protection.

The Dropster counter drone system is classified as a firearm of Category B in Switzerland and can be sold only with a weapon transmission contract.

Droptec offers training in handling the Dropster and shooting training for standing and moving targets. The courses are mainly addressed to security staff. During the training the participants receive basic information and skills to safely deploy the Dropster in an emergency as part of their protective role. The training also includes the general safety rules in dealing with weapons and manipulation drills and target practice.

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TELEFONICA

Telefónica Ingeniería de Seguridad

COMPANY DESCRIPTION

Telefónica is a company that is aware of the new challenges posed by today's society. This is why it offers the means to facilitate communication between people, providing them with the most secure and state of the art technology in order for them to live better, and to achieve whatever they resolve.

PRESENTED TECHNOLOGY SOLUTION

The SENDES ecosystem is, for the moment, unique in Spain and consists of a radio frequency system for inhibition and the detection system. This autonomous system is specially designed for the negligent use of drones; neutralizing the threats detected. It allows detecting a multitude of drones through the radio electric spectrum and neutralizing them, without without affecting other electronic devices.

The SENDES ecosystem is made up by the following elements:

- **DAU technology**: Detection systems
- **SJ technology** : Neutralization systems
- **SENDES Gate**: User interface
- **SENDES Core**: System intelligence
- **Servers** in either client's or ASDT's infrastructure

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ELETTRONICA SPA

COMPANY DESCRIPTION

Established in 1951, ELETTRONICA is a World Leader in Electronic Warfare with a complete portfolio of state-of-the-art solutions to satisfy the most challenging requirements of modern operational scenarios. The solutions designed and manufactured by ELETTRONICA cover a wide range of applications and missions: ELINT, COMINT (SIGINT), ISR, INFRARED, SELF PROTECTION, ELECTRONIC ATTACK.

PRESENTED TECHNOLOGY SOLUTION

ADRIAN is a field proven, military-grade system, already operated by security authorities and Armed Forces. Its mission is to provide effective response against LSS (Low-Small-Slow) unauthorized/hostile Mini and Micro UAV. It offers surveillance, recognition and jamming capabilities. ADRIAN can be used for the protection of bases, HQ, FOB, convoy and vessels. ADRIAN today leverages the benefits of many years of improvements, field trials and feedbacks from the End User Community.

ADRIAN is built upon a flexible system architecture which makes it tailorable against different operational applications and configurations (fixed, mobile, naval) and can be easily integrated with external systems such as higher level C2 Centres. GROUND VERSION: Protection of Critical Infrastructures MOBILE VERSION: Protection of Special Events.

CONCEPT OF OPERATION

SURVEILLANCE WITH MULTI-SPECTRAL SENSORS SUITE

- detection
- tracking
- classification
- identification

THREAT EVALUATION

- alarms
- threat libraries

NEUTRALIZATION

- soft kill

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AEORUM

COMPANY DESCRIPTION

Located in the Technology Park of Andalusia, Aeorum is a Spanish company specialized in technological developments with a solid path in the sector, started in 2009. From the first moment, all Aeorum's efforts have been aimed at a common goal: contribute to the making of reliable, fast and accurate decisions in complex situations through new preventive surveillance tools. The objective? Managing the security in a more efficient way.

PRESENTED TECHNOLOGY SOLUTION

Aeorum offers scalable, flexible and automated solution, commanded from remote locations. Dronecaptor reliably detects and neutralizes unauthorized drones (UAVs) combining multiple sensors, automatically analysing all the information received from each of them. It permits actions coordinated against multiple threats and multiple sites. Dronecaptor is tailored for complex environments.

Dronecaptor enabless one or several command centres, to access the real-time information generated by the sensors deployed in different facilities. All the data is analysed in real-time and, in case a rogue drone is detected, the system proposes the best way to neutralize the threat taking into account the counter-drone devices deployed. It can also operate autonomously in specially sensitive areas in which a drone must not be allowed to fly over.

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3. Conclusions and next steps

The Industry Day was an online event, given the limitations of the interaction of this form of events, the overall result was very satisfactory.

The highlights of the event were the significant number of participants that attended and actively took part in the question and answers sessions, plus, the engagement of the technology presenters. The presentations were very interesting and practical for LEAs, and presenters used their time efficiently.

The modest amount of feedback received following the event was very positive. The participants expressed the need for such events, addressed to LEAs, to be cyclical.

Special thank you are due to the ENLETS C-UAS TIG Leader for overseeing the organisation of the event. Moreover for the Polish Platform for Homeland Security, which organised and hosted the event. Also, we would like to thank you Mr. Lars Huybrechts, who represented EC DG HOME D.2 Counter-Terrorism Unit and presented C-UAS matters from EC's perspective. Moreover, to the ENLETS Core Group Leader, Mr. Patric Padding, who presented the ENLETS network. Finally, thank you to everyone who took part and supported the event in some way.

The next session for the C-UAS Industry Day is planned for Q 4 2021. The goal of the next event will be to deepen the knowledge about selected technology solutions.