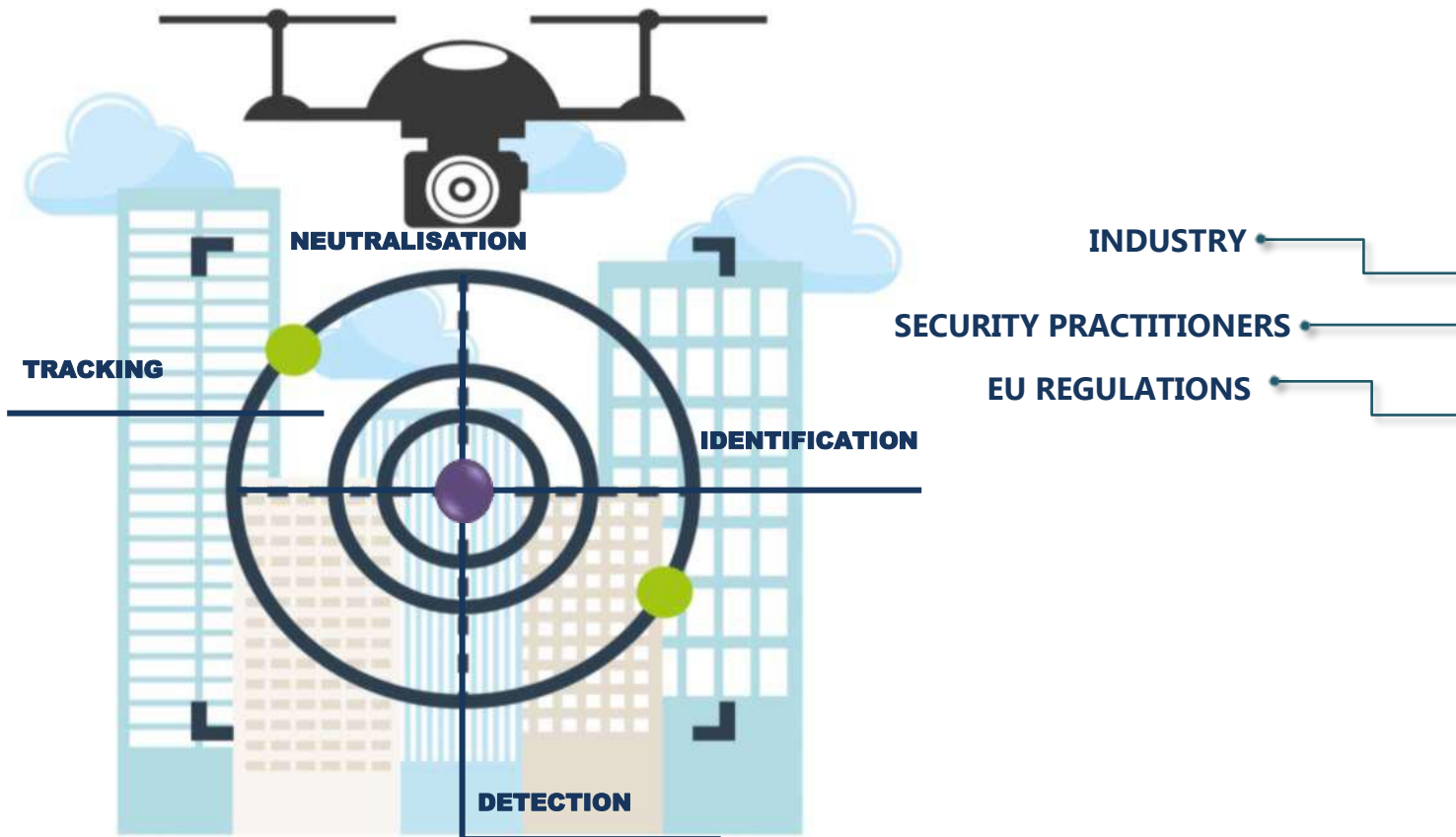




C-UAS Industry Day

30th June 2021, online

PUBLIC REPORT



DETECTION | IDENTIFICATION | NEUTRALISATION | TRACKING

Table of content

- 1. **Event overview** 3
- 2. **Technology presenters** 4
 - GRADIANT..... 5
 - Rinicom Intelligent Solutions Ltd..... 6
 - ROBIN RADAR SYSTEMS BV 7
 - DroneShield 8
 - OpenWorks Engineering Ltd..... 9
 - Delft Dynamics B.V 10
 - Blighter Surveillance Systems Ltd..... 11
 - H.P. Wuest GmbH..... 12
 - Droptec GmbH..... 13
 - TELEFONICA..... 14
 - ELETTRONICA SPA 15
 - AEORUM..... 16
- 3. **Conclusions and next steps** 17

1. Event overview

The C-UAS Industry Day was organised by the Counter-Unmanned Aircraft Systems Technology Interest Group (C-UAS TIG), which is part of the European Network of Law Enforcement Technology Services (ENLETS). 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



The goal of the C-UAS INDUSTRY DAY was to present available counter-drone technological solutions to 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 drone 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, Finland
C-UAS TIG Leader



During the event, there were two accompanying presentations - one on the ENLETS network and another on counteracting drones from the perspective of the European Commission. These were presented by:

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

2. Technology presenters

Within the one-day event, the organisers decided to schedule 20 minutes time slots for presenters – maximising the number of presenters. The timeslot consisted of 15 minutes 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 follows:

C-UAS Industry Day		AGENDA*	
30th June 2021, time: 9:30 – 15:30 CET, online Organiser: ENLETS COUNTER UAS's TIG Target Group: LEA's (registration needed in advance)			
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 provider with a highly-skilled task force of over a hundred people located in Spain. It incorporates its vision and knowledge of telecommunication technologies into the processes and products that companies develop. Gradiant brings its expertise from the point of view of connectivity, intelligence, and security to work hand in hand with the industry from its surroundings.

TECHNOLOGY SOLUTION PRESENTED

Counter UAS by Gradiant can automatically detect, classify, track and neutralise drones within a security perimeter, thus guaranteeing infrastructure and people protection. Its system is modular, scalable and decentralised and can operate 24/7, either autonomously or commanded by an operator. Gradiant's Counter UAS integrates complementary detection, analysis and neutralisation 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 protection against drone attacks in a security perimeter, avoiding potential damage to critical infrastructures or civilians.

Presented solutions:

SMARTEAR+

Drone detection, identification and tracking module based on radiofrequency.

SMARTEYE+

Module for identification and tracking based on computer vision.

REPULSE

Protection system against drones that operates creating an invisible shield with a radius of over 1km (vertically and horizontally) where drones cannot operate.

CONTACT PERSON:

Iago Gomez Alonso

igomez@gradiant.org

<https://www.gradiant.org/en/>

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 a short time since their 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.

TECHNOLOGY SOLUTION PRESENTED

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 humans and recent addition to the system allows it to estimate the weight of a drone payload. Rinicom’s AI algorithm is camera-agnostic and can operate with third 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 buildings, power stations). It works both in urban and rural environments.

To optimise return on C-UAV investment, Rinicom - together with OSL - are developing algorithms that could expand the capabilities of C-UAV system in 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

CONTACT PERSON:
Garik Markarian
garik@rinicom.com
www.rinicom.ai



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. The 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.

TECHNOLOGY SOLUTION PRESENTED

ELVIRA® radar delivers the 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, increases 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 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, cybersecurity breach, espionage and disruption of government employees and VIP's, damage to harbours and ports as well as ensure privacy and safety on superyachts. Both radars can be easily integrated into a sensor network.

CONTACT PERSON:

Bil Haraka

bill.haraka@robinradar.com

<https://www.robinradar.com/>

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.

TECHNOLOGY SOLUTION PRESENTED

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

CONTACT PERSON:

Red McClintock
red.mcclintock@dronesield.com
www.dronesield.com

DETECTION

IDENTIFICATION

TRACKING

NEUTRALISATION



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.

TECHNOLOGY SOLUTION PRESENTED

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 on 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>

CONTACT PERSON:

James Cross

james.cross@openworksenineering.com

www.openworksenineering.com

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 specialising 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 smartly combining computer and sensor technology. Delft Dynamics is involved in many national and international RD&T projects.

TECHNOLOGY SOLUTION PRESENTED

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** (standalone 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>

CONTACT PERSON:

Arnout de Jong

a.j.dejong@delftdynamics.nl

www.delftdynamics.nl

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.

TECHNOLOGY SOLUTION PRESENTED

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 a 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.

CONTACT PERSON:

James Long

James.Long@blighter.com

www.blighter.com

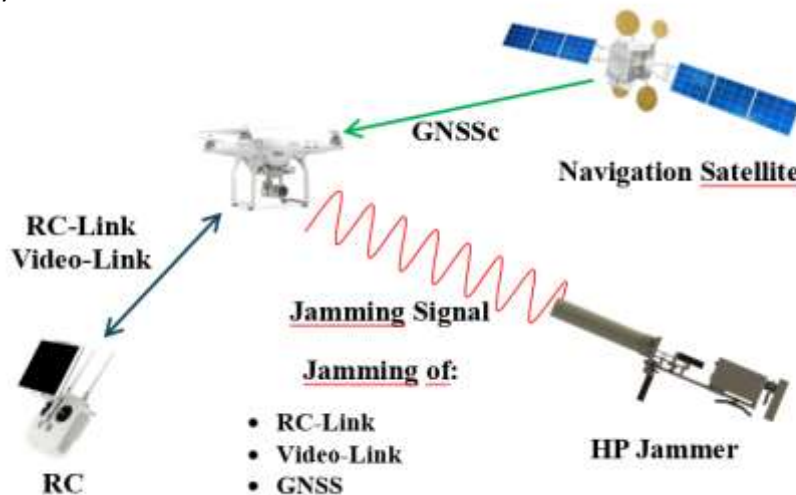
COMPANY DESCRIPTION

HP Marketing & Consulting Wüst GmbH, Germany was founded in 1982 and is a privately owned company based close to Hamburg. It is specialising 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.

TECHNOLOGY SOLUTION PRESENTED

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. The advantage of this solution is horizontal and vertical polarization and high gain, which means less weight and long jamming range. The solution does not pose any harm to the operator. H.P. Wuest GmbH also owns modular C-UAS jammer with open interface to communicate with command and control system. The solution is directional with pan & tilt 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.



CONTACT PERSON:

Steffen Wicker
swicker@hp-jammer.de
www.hp-jammer.de

COMPANY DESCRIPTION

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

TECHNOLOGY SOLUTION PRESENTED

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.

CONTACT PERSON:

Tom Lardelli

t.lardelli@droptec.ch

www.droptec.ch/product

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 so they can live better, and - achieve whatever they resolve.

TECHNOLOGY SOLUTION PRESENTED

The SENDES ecosystem is, for the moment, unique in Spain and consists of a radiofrequency system for inhibition and a detection system. This autonomous system is specially designed for the negligent use of drones; neutralizing the detected threats. It allows detecting a multitude of drones through the radio electric spectrum and neutralizing them, 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

CONTACT PERSON:

Miguel Álvaro Fernández

miguel.alvarofernandez@telefonica.com

<http://ingenieriadeseuridad.telefonica.com/>



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.

TECHNOLOGY SOLUTION PRESENTED

ADRIAN is a field proven, military-grade system, already operated by security authorities and Armed Forces. Its mission is to provide an 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. Today, ADRIAN leverages the benefits of many years of improvements, field trials and feedback 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

CONTACT PERSON:

Alessio Campana
Alessio.Campana@elt.it
www.elt-roma.com

AEORUM



COMPANY DESCRIPTION

Located in the Technology Park of Andalusia, Aeorum is a Spanish company specialised 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 reliable, fast and accurate decisions in complex situations through new preventive surveillance tools. The objective? Managing the security in a more efficient way.

TECHNOLOGY SOLUTION PRESENTED

Aeorum offers a scalable, flexible and automated solutions, 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 enables 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 especially sensitive areas in which a drone must not be allowed to fly over.



CONTACT PERSON:

Manuel Ruiz de Quintanilla

manuel@aeorum.com

<https://aeorum.com/>

3. Conclusions and next steps

Given the interaction limitations of online events, the overall result of the Industry Day was highly satisfying.

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

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

Special thanks are due to the Polish Platform for Homeland Security, which organised and hosted the event. Also, I would like to thank Mr. Lars Huybrechts, who represented EC DG HOME D.2 Counter-Terrorism Unit and presented C-UAS matters from EC's perspective. Moreover, I would like to thank the ENLETS Core Group Leader, Mr. Patrick Padding, who presented the ENLETS network. Finally, a warm 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 Q4 2021. The goal of the next event will be to deepen the knowledge about selected technology solutions.

Jarmo Puustinen,
the ENLETS C-UAS TIG Leader