The counter UAS directory by *Unmannedairspace.info*

The following directory is a listing of available counter-UAS systems, networks and components and is supplied free of charge to unmannedairspace.info website visitors for information purposes only. The directory is under constant review and will be updated and enlarged. Information is supplied directly by suppliers, with data edited to remove unverifiable claims. The publisher accepts no responsibility for the information supplied. Website sources for the data plus further contact information are given alongside product and services descriptions.

Company	Product	Description	Website
Aaronia	**RR Drone/radar detection system**	The RF Drone or Radar Detection System is based on the Aaronia IsoLOG 3D Tracking Array Antenna, a rugged or remote-controllable Spectran V5 Real-time Spectrum Analyzer and a new Software Plugin for the RTSA Suite Software. All parts allow a 24/7 monitoring and recording (full gapless data-streaming with up to 4TB/day). Each Sector/Antenna gets its own real-time view and is based on RF and µW detection. All views are combined to a 360° view including a 360° picture or 360° live video of the surrounding area/landscape. This gives full control over any RF emissions happening around. The system can provide an optical or audio alert if critical values are exceeded and can collect data and compare them to find out irregularities. It can be used as a "single-spot" version, which is directly available. Or it is possible to combine several systems to monitor larger areas, governmental offices, military base camps, industrial areas etc.	http://www.aaronia.com/products/solutions/Aaronia-Drone-Detection-System/?gclid=Cj0KEQjw7dfKBRCdkKrvmfKtyeoBEiQAch0egblrt30bMy2GKvEK_J5HBtPnIHBcVsyCXJ380cPQnlQaAlYl8P8HAQ

Accipter	**NM1-8A Drone Radar System**	The Accipiter® NM1-8A Drone Radar System is a software-definable, 2D surveillance radar designed to detect, track and alert to the presence of drones. The system includes one radar sensor integrated into a NEMA-4 rated environmental enclosure, which houses the radar sensor electronics, digital radar processors, radar remote controller, radar data manager, power management and data communications components. The Radar System includes a high-resolution, X-band transceiver with 8' array antenna with the sensitivity to detect and track drones as small as birds, and capabilities to identify behaviour and issue alerts. It is well suited for use at civil and military airports to alert to the presence of drones in the airspace. It is a software-definable surveillance radar specially designed to detect and track vessels from small pleasure craft to large vessels, as well as low-flying aircraft of all sizes, including small ultralights, drones and general aviation aircraft. The system includes one radar sensor integrated into a NEMA-4 rated environmental enclosure, which houses the radar sensor electronics, digital radar processors, radar remote controller, radar data manager, power management and data communications components. The radar sensor is selectable from leading X-band and S-band manufacturers, with antennas ranging from 4' to 21' in length. The Accipiter® NM1-8A is well suited for use along inland and coastal water borders for both maritime and air domain awareness, and land borders for air domain awareness applications.	https://www.accipiterradar.com/products/aviation-safety-security-2/drone-uas-detection-tracking-and-alerting/

Advanced Radar Technologies	**Drone Sentinel**	ART Drone Sentinel is a high performance anti drone and small unmanned aerial vehicle integrated surveillance system. ART Midrange, a radar sensor, has been optimized for very low radar cross section airborne threat detection and tracking. The early detection, warning and tracking functionality provided by the radar is complemented by an optronic platform that features day and night classification capabilities. Both sensors are integrated in the same physical assembly that can be fast and conveniently deployed using a single mast. ART Drone Sentinel also includes an intuitive GIS-powered multi-sensor command and control software suite that provides a common operative picture for unsurpassed airspace situational awareness. The widespread availability of low cost fully automatic micro drones has redefined the security risks of critical infrastructures, national borders and military bases. ART Drone Sentinel is a single mast solution that provides round the clock, 360 degrees anti-drone surveillance with what the company says is the fastest update rate in the market (1 Hz). ART Drone Sentinel performance has been experimentally validated with representative targets under the supervision of a key European end-user. ART Drone Sentinel detects, tracks and classifies micro quadcopters and micro fixed-wing UAVs with radar cross sections below 0.005 m2 at 2000 meter range. In addition, the system can provide simultaneous ground based target detection & tracking. Designed to improve the efficiency of its end users (Border Guards/CIP Security Services/Public Law Enforcement Services), ART Drone Sentinel features fully automatic operation (suitable for non-trained operators), remote management and is cost effective both for large and small scale deployments.	http://www.advancedradartechnologies.com/products-services/art-drone-sentinel
Aero-environment	**Switchblade**	The Switchblade is designed to provide the warfighter with a back-packable, non-line-of-sight precision strike solution with minimal collateral effects. It can rapidly provide a powerful, but expendable miniature flying intelligence, surveillance and reconnaissance (ISR) package on a beyond line-of-sight (BLOS) target within minutes. This miniature, remotely-piloted or autonomous platform can either glide or propel itself via quiet electric propulsion, providing real-time GPS coordinates and video for information gathering, targeting, or feature/object recognition. The vehicle's small size and quiet motor make it difficult to detect, recognize and track even at very close range. The Switchblade is fully scalable and can be launched from a variety of air and ground platforms. Switchblade is operated from AeroVironment's ground control system (GCS) with a communications range of greater than 10 km. The common GCS interfaces with AeroVironment air vehicles reducing the level of training required and decreasing the time and cost involved.	https://www.avinc.com/uas/view/switchblade

Airspace Systems Inc	**Drone security system**	The company uses machine vision and deep learning to detect anomalies in the sky and classify rogue drones. Once engaged, the flight system anticipates and reacts to a drone's every move, in real time. The capture system then safely disables and retrieves drones to limit collateral damage.	https://airspace.co/#home
AMTEC	**ALS12SKY-Mi5/Skynet**	The ALS12SKY-Mi5 is a 12 gauge anti-drone round designed to be rapidly deployed against commercially available drones being utilized for illegal purposes; i.e. illegal surveillance and contraband delivery. Upon firing through a 12ga rifled choke barrel, the five tethered segments separate with centrifugal force and create a five (5') foot wide 'capture net' to effectively trap the drone's propellers causing it to fail.	https://www.lesslethal.com/products/12-gauge/als12skymi-5-detail

AntiDrone/ **Prime Consulting & Technologies**	**Mini, short-range, medium-range and long-range counter UAV systems**	Mini-range counter UAV systems can be used for protection of relatively small installations or when the requirements to drone detection are not very demanding. The system includes the minimum set of equipment for detection of UAVs at short distances that do not exceed 200 meters. The mini anti-drone system includes a server, video cameras (the quantity may vary from four cameras for separately situated buildings to up to 32 cameras for large installations, for example, football stadiums) as well as proprietary software. The software is based on special algorithms that help to identify drones and distinguish them from birds to minimize false alarms. The system provides 24/7 perimeter monitoring and whenever a drone is detected it sends an alert by SMS or an application installed on the mobile devices of the security personnel. It is also possible to use the system with a perimeter surveillance radar.The radar provides the coordinates of the target, the camera points at it and the software determines whether it's a drone, a bird or any other object. The mini anti-UAV system can be upgraded and optionally used together with RF detectors (like DroneWatcher) to detect the drone control signals. Small-range anti-UAV systems provide protection from drones in the range from 200 m to 1 km. Small-range anti-drone systems are designed for the protection of facilities of private and business sector and include equipment for drone detection and neutralization at distance and height of up to 1 km. The main components of the small-range counter-drone system include perimeter surveillance radars, acoustic sensors and video cameras for drone detection and identification as well as mobile jamming system for drone neutralization. The small-range counter-UAV system can be customized and upgraded with enhanced features by means of additional equipment, such as RF detectors, jammer pan-tilt mount, portable computer with video analytics system, illuminator, mobile tower (with integrated power system), stationary jamming system, communications system, additional lighting system, drone capture net, anti-drone laser and thermal cameras. Medium-range counter-UAV systems include anti-drone solutions for drone detection and neutralization at distances from 1 km to 4 km. Medium-range anti-UAV systems are used for the protection of medium-size facilities of business or government sector and include solutions for UAV detection and neutralization at distance of up to 4 km and height of up to 1 km (depends of the size of the target).The main equipment used in the medium-range anti-drone system includes drone detection radar, video cameras, long-range video tracking system, visual command centre software, computer with video analytics system for drone detection and identification as well as stationary jamming system for drone counteraction. The medium-range anti-UAV system is highly customizable and can be	https://anti-drone.eu/

		enhanced with additional features that improve the system performance and efficiency. Thus, the system can be integrated with some optional equipment, such as RF detectors, perimeter surveillance radars, acoustic sensors, thermal cameras, illuminator, mobile tower (with integrated power system), mobile jamming system, pan-tilt mount, communications system, additional lighting system, anti-drone laser and drone capture net. Long-range anti-UAV systems include anti-drone equipment and solutions for drone detection and neutralization at distances from 4 km to 25 km. Anti-drone solutions used in the long-range systems provide drone detection at distances of up to 25 km and height of up to 7 km as well as neutralization at distance of up to 4 km (depends of the size of the target). The standard set of equipment for long-range anti-UAV system consists of long-range drone detection radar, perimeter surveillance radars, RF detectors, long-range video tracking system, visual command centre software, computer with video analytics system, long range acoustic devices as well as stationary jamming system with pan-tilt mount.	

Aveillant	**Gamekeeper**	The Gamekeeper holographic radar is able to detect, track and classify small Unmanned Air Systems (sUAS) in full three dimensions to a range of 5km. With no moving parts, it continuously "floodlights" the entire field of view providing location and velocity of every object detected. Automatic classification separates UAS from other road, air and sea targets, including birds. Gamekeeper is a software defined radar. As UAS change, the software in deployed Gamekeeper units can be updated with new algorithms and features developed by Aveillant. Gamekeeper's high speed update rate (4x per second) provides live output, enabling an operator to observe target behaviour. Standard data output format ensures ease of compatibility and integration with additional sensors, countermeasures and C2 systems. Gamekeeper has no moving parts, minimising maintenance and operating costs, and simplifying installation. Aveillant can provide remote monitoring and maintenance, along with regular software updates, maximising system availability.	http://www.aveillant.com/products/gamekeeper-16u
Batelle	**Drone Defender**	Battelle DroneDefender systems are non-kinetic cUAS solutions developed to instantaneously defend airspace against commercial drones without compromising safety or risking collateral damage. The systems quickly disrupt an adversary's control of a drone, neutralizing it so that no remote action, including detonation, can occur, minimizing drone damage and risk to public safety. The system comprises a: • Handheld Unit – The DroneDefender handheld units are portable, intuitive and man-in-the-loop. The system employs two different defences to disrupt unwanted UAS—remote control disruption and GPS disruption. Learn more about the handheld version. • Ground-based Unit – The DroneDefender ground-based system leverages the technology developed for the handheld system for a more capable cUAS solution. The remote control defeat capability can be paired with a detection and tracking system and integrated with almost any 360° positioner. By mounting the disruption capability on a mechanical positioner, the ground-based DroneDefender system utilizes significantly amplified power, increased antenna gains, and the precision aim-point of the positioner to neutralize UAS threats at much greater distances than the handheld version.	https://www.battelle.org/government-offerings/national-security/aerospace-systems/counter-UAS-technologies

Blighter	**AUDS**	AUDS is a smart-sensor and effector package capable of remotely detecting small UAVs and then tracking and classifying them before providing the option to disrupt their activity. The system may be used in remote or urban areas to prevent UAVs being used for terrorist attacks, espionage or other malicious activities against sites with critical infrastructure. The AUDS Team brings together three leading British companies, each with the unique capabilities required to create an effective counter UAV system. Blighter's A400 series air security radars are able to DETECT small UAVs in all weather conditions, 24 hours a day flying in urban areas or near to the horizon. The Chess Dynamics Hawkeye Deployable System (DS) and EO Video Tracker, featuring both a long range colour camera and a high sensitivity Thermal Imager (TI), along with state-of-the-art video tracking technology, is able to TRACK the UAV and, combined with radar target information, classify the target. The operator is then able to make a timely and informed decision to use the Enterprise Control Systems ('ECS'), smart RF inhibitor to selectively interfere with the C2 channels on the UAV allowing the system to DISRUPT the UAV's mission. The smart RF inhibitor uses directional antennas to achieve maximum range of operation with minimum collateral effect	http://www.blighter.com/products/auds-anti-uav-defence-system.html
Boeing	**Counter-electronics High Power Microwave Advanced Missile Project (CHAMPS)**	In October 2012 Boeing and the U.S. Air Force Research Laboratory (AFRL) Directed Energy Directorate, Kirtland Air Force Base, N.M., successfully tested the Counter-electronics High-powered Microwave Advanced Missile Project (CHAMP) during a flight over the Utah Test and Training Range. CHAMP, which renders electronic targets useless, is a non-kinetic alternative to traditional explosive weapons that use the energy of motion to defeat a target. During the test, the CHAMP missile navigated a pre-programmed flight plan and emitted bursts of high-powered energy, effectively knocking out the target's data and electronic subsystems. CHAMP allows for selective high-frequency radio wave strikes against numerous targets during a single mission.	http://www.boeing.com/features/2012/10/bds-champ-10-22-12.page
BSS Holland	**DroneBlocker**	DroneBlocker is a full-stack counter-Wifi-UAV solution, from detection to neutralization. For Wi-Fi drones (Parrot Bebop, ArDrone, 3DR Solo) and hybrid Radiofrequency/Wi-Fi drones (some DJI Phantom, Yuneec Typhon, Blade Q350), DroneBlocker offers capabilities from detection, localization, identification to neutralization – connection breaking and in some cases remote control over the drone.	http://www.bssholland.com/product/counter-wifi-uav-solution-drone-blocker/
CACI	**CORIAN**	CORIAN is a configuration of CACI's SkyTrackerTM UAS tracking solution tailored to meet the U.S. Army's evolving OCONUS mission needs. This system detects, identifies, tracks, and mitigates UAS by exploiting their radio signals. The system not only exploits UAS but also locates their ground operators. CORIAN is configured for the Army to host multiple EW capabilities to non-kinetically defeat UAS at long range. This	https://www.caci.com/west17/pdf/cyber_electronic_warfare_sensor_suite.pdf

		software-defined system enables rapid integration of capabilities against new and evolving targets.	
Cerbair	**Counter UAS system**	The Cerbair system, fixed or mobile, combines several Radio Frequency and Optical sensors in order to adapt the solution to the level of risk, site configuration and budget. Detection characteristics: Sensor frequencies detected - 2,4GHz / 5 GHz; range up to 3km; detection angle: 90°; Ethernet connection / POE. Video sensor: High resolution: 5MP; Range up to 150m; Detection angle: 90°; Near-infrared at night; Ethernet Connection / POE. Visualizing drone intrusions in real time is possible thanks to powerful algorithms: Detection rate: 90%; Optical real-time tracking of the drone flightpath; Evidence collection (HD picture, video recording of the intrusion); Drone model recognition; Simplified integration on existing system via API. Threat resolution: Alerts configured for a rapid and adapted intervention (visual, sound, text message etc…) - Passive actions: evacuate people to a safe place, interrupt a conversation, search the site, block the drone's line of sight etc; Counter-measures to neutralize the drone by forcing its landing: jamming (flight commands and geolocation) or capturing it with a net thrower.	http://www.cerbair.com/2017/solution.php?lang=en&gclid=Cj0KEQjw7dfKBRCdkKrvmfKtyeoBEiQAch0egWgTCwNVDclUrHSmbHVVh1roN9upQ3lk1HLj3AS8viMaAlWr8P8HAQ
Chess Dynamics	**Hawkeye Deployable System and EO**	The Chess Dynamics Hawkeye Deployable System (DS) and EO Video Tracker, featuring both a long range colour camera and a high sensitivity Thermal Imager (TI), along with state-of-the-art video tracking technology, is able to TRACK the UAV and, combined with radar target information, classify the target	http://www.chess-dynamics.com/hawkeye-deployable-systems/
Chenega International	**dronesafeguard**	dronesafeguard is a mix of layered C-UAV solutions that seek to interdict intruder drones as far out as possible from the facility, asset or person being protected. This is "protection in depth" and it relies on progressively interleaved C-UAV systems and sub systems to: detect, track, respond and then defeat the drone risk threat before physical, asset, cyber or reputational damage is inflicted. Developed with synergia.	https://chenegainternational.com/media/1195/counteruav_cic.pdf

Citadel Defense Company	**DFU 3000 Drone Defense System**	The DFU 3000 Drone Defense System can detect drones at 1.2km and engage at 800 metres. Citadel has filed a series of patent applications covering the proprietary technologies that have created the integrated DFU 3000 system. Available in static, manpack or mobile configurations, the system offers both passive monitoring and one-button operation, according to the company, and the systems gives 360° coverage, a capability to defeat multiple drones – up to five at a time – and a small form factor and footprint (the unit weighs just 5.9kg). The DFU 3000 Drone Defense System is aimed at a broad range of user applications, from surveillance and counter-narcotics missions to infrastructure and crowd protection.	https://www.citadelthreatmanagement.com
Dedrone	**Drone Tracker**	Dedrone provides an automatic, integrated, and self-contained platform that delivers drone classification and countermeasures to secure against drone threats and their operators 24/7. The company says DroneTracker is the only modular system on the market that can be customized to address site-specific threats, adapted for easy integration to an existing security program, and accommodates building structures, landscapes, and other exterior conditions." Dedrone's DroneTracker platform provides a complete airspace monitoring and management solution through a convenient browser-based interface. DroneTracker allows users to readily configure multiple sensors, active and passive countermeasures, and alerts for automatic, 24/7 operation. The software continuously displays real-time airspace information and classifies drones using Dedrone's DroneDNA advanced analysis and pattern recognition capabilities. Defensive measures against hostile drones can be activated automatically, with security service providers notified as appropriate. Dedrone automatically classifies, issues alerts, and records evidence to identify and assess potential threats, and can automatically trigger offensive or defensive countermeasures if needed.	https://www.dedrone.com/en/dronetracker/drone-protection-software
Deflt Dynamics	**DroneCatcher**	Project DroneCatcher started in 2015 when Dutch Police, Military Police and others called for solutions for the protection against unmanned mobile systems. DroneCatcher is a compact mechanically-operated net system designed and integrated in small unmanned helicopter. From the flying platform a net is fired on a hostile drone. The net can be equipped with a parachute to avoid endangering people on the ground. The demonstrator is now operational and the project is on-going as a defence customer has awarded a budget for further development.	http://www.delftdynamics.nl/index.php/en/

Department 13	**MESMER®**	D13's MESMER® Counter Drone System is a patented, low power, non-jamming, non-line of sight, non-kinetic drone mitigation solution. MESMER® provides a safe and effective method of protecting personnel and infrastructure from dangerous drones. The key differentiator for MESMER® is its ability to manipulate weaknesses in all digital radio protocols. This allows MESMER® to put into effect sophisticated automated detection and mitigation strategies to stop, redirect, land or take control of drones across a range of national security and defence scenarios. The patented technology is built on open source software architecture, which ensures that MESMER® can be seamlessly integrated into existing security and surveillance systems. The MESMER® v1.0 system has three key components: • General purpose computer server running Linux OS. Multiple Ethernet ports are utilized for intra-system communication. • Software Defined Radios (SDR). MESMER® utilizes commercially available SDRs for RF signal reception and generation. SDRs can generate arbitrary waveforms which are used for drone detection, identification, and mitigation. • RF Front End. Provides signal conditioning on both receive and transmit channels, and allows MESMER® to perform optimally in a real-world environment. The system can be operated using a graphical user interface: a tablet with a touch screen, or a standard desktop monitor with a keyboard and mouse. The system can also be operated in auto-mitigation mode that does not require operator intervention to initiate a drone mitigation.	https://department13.com/mesmer/
DeTect	**Harrier/Drone Watcher**	DeTect is a leader in advanced bird radar technologies for real-time aircraft birdstrike avoidance, wind energy bird mortality risk assessment and mitigation, and industrial bird control with over 140 of its MERLIN bird radars operating in the US, Canada, Europe, Africa and Asia. The radar processing technology in MERLIN, developed specifically for reliable detection and tracking of small, non-cooperative, low radar-cross section, non-linearly moving targets, is also used in DeTect's HARRIER Security and Surveillance Radar for airspace and marine security applications including drone and UAV detection and defence, Ground Based Sense-and-Avoid (GBSAA) and virtual air traffic control. In 2012. In 2016, DeTect has expanded its drone surveillance capabilities with the launch of its DroneWatcher system that includes an Android application, DroneWatcher APP, that makes a smartphone or tablet into a short range drone detector. DroneWatcher also includes an advanced radiofrequency (RF) sensor, DroneWatcher RF, for longer range detection, tracking, identification and interdiction of drones and small UAVs. Combined, the HARRIER Drone Surveillance Radar and	http://www.detect-inc.com/

		DroneWatcher APP and RF provide a high level of multi-layer comprehensive, multi-layer drone defence.	
Deutsche Telecom	**Magenta**	Together with partners from industry, Deutsche Telekom has developed the Magenta cyber-shield – a detection and alert system for drones. It uses technology developed by the leading partner Dedrone based in Kassel as well as frequency scanners from Rhode & Schwarz, microphone arrays from Squarehead and radar devices from Robin Radar Systems.	https://www.telekom.com/en/media/media-information/archive/magenta-drone-defense-shield-445192
DFS	**Magenta**	See Deutsche Telecom	https://www.dfs.de/dfs_homepage/en/Press/Press%20releases/2017/06.07.2017.-%20DFS%20Deutsche%20Flugsicherung%20and%20Deutsche%20Telekom%20cooperate%20on%20drone%20safety/
Diehl Defence	**Guardion**	The GUARDION drone defense system combines the scalable solutions customized to very specific customer requirements to reliably detect and defend against threats posed by the unauthorized use of drones. GUARDION is offered as an integrated product. It has a proven track record of reliable protection in various applications. GUARDION focuses on integrating electronic detection, verification and countermeasures and connecting them to a position mapping and command and control tool. The HPEMcounterUAS effectors from Diehl Defence, R&S®ARDRONIS from Rohde & Schwarz and the TARANIS® command and control and position mapping system developed by ESG have proven their capabilities in operational use.	http://www.diehl.com/en/nc/diehl-defence/press/reliable-protection-against-drones-esg-diehl-defence-and-rohde-schwarz-cooperate.html

Drone Defence	**NetGun X1**	The Net Gun X1 is a simple to use, cost effective active deterrent that allows law enforcement officers to capture unwanted drones up to 15m. It can be specified with two different types of capture net allowing the user the choice depending on the situation they face. It is small, lightweight and compact meaning that more units can be deployed to tackle unwanted drones. Capturing the drone allows the security operative to regain control of the situation and ensures that it can be handed over to forensic experts who may be able to ascertain the identity of the operator.	http://www.dronedefence.co.uk/net-gun-x1
Drone Security Defence	**Counter UAS System**	The Drone Security Defence counter-UAS system offers a 360 degree detection for small UAS up to 15km distance, using a wide range of sensors. Once the drone is detected the system identifies the operator's profile, tracks the flight, gathers identification information for possible prosecution and then returns the drone to the take-off point. At the heart of the system, say the developers, is "search/identify/react" software which can be tailored to different organisational needs, including integration with other existing systems. The system is available as an automatic or semi automatic network which allows the operator to have as much or as little input as required.	www.dronesecuritydefence.com
DroneShield	**DroneGun, DroneSentry, Drone Sentinel, DroneCannon**	DroneGun provides a safe countermeasure against a wide range of drone models. It allows for a controlled management of drone payload such as explosives, with no damage to common drones models or surrounding environment due to the drones generally responding via a vertical controlled landing on the spot, or returning back to the starting point (assisting to track the operator). The DroneGun MkII drone countermeasure product is a second generation version and is a rifle-style handheld jammer device, effective at the standard frequencies of consumer and commercial drones globally. An optional GPS-jamming capability is also available to customers where lawful. The product offers a number of improvements over the first generation of DroneGun, including a substantially ruggedised design, lighter weight, and improved jamming algorithms. DroneSentinel provides the fully integrated sensor suite of DroneSentry without the DroneCannon RF countermeasure capability. With integrated data from all available sensors, users can rapidly detect and assess potential threats. An intuitive user interface provides live and historical data from all sensors, and broadcasts configurable alerts based on user-defined criteria. DroneSentry integrates DroneShield's suite of sensors and countermeasures in a unified platform deployable in permanent or temporary installations. Incorporating	https://www.droneshield.com/

		RadarOne radar, WideAlert acoustic sensors, RFOne RF detectors, and DroneHeat and DroneOpt cameras (with integrated DroneBeam), Sentry correlates available data for users and provides maximum situational awareness and the quickest response to airborne threats. DroneSentry also includes the DroneCannon RF countermeasure, providing an end-to-end detection and response capability.	
DSNA Services	**UWAS**	See JCPX	http://dsnaservices.com/
DSNA Services	**Hologarde**	Hologarde comprises: • A pioneering 3D innovative radar, that has already proven its ability to detect and track small (0.01m2) drones up to 5 km. The software developed for this radar analyses the movement signature of the target, in order to differentiate it against other objects in its range (like planes, helicopters, drones, and even birds). • Radio frequency sensor able to detect the protocol of data exchange between the drone and the remote-pilot. Combined with the radar, RF technology allows confirmation that the target is a drone and not a bird. • Long-range HD infrared cameras (full HD with thermal for night vision) use the geographical coordinates directly fed from the radar to target the mobile, and zoom at long distance in order to identify and provide visual confirmation of drones. These three accurate and proven technologies are connected to a Command Control Center (CCC).	http://hologarde.com/
ESG	**Guardion**	The GUARDION drone defence system combines the scalable solutions customized to very specific customer requirements to reliably detect and defend against threats posed by the unauthorized use of drones. GUARDION is offered as an integrated product. It has a proven track record of reliable protection in various applications. GUARDION focuses on integrating electronic detection, verification and countermeasures and connecting them to a position mapping and command and control tool. The HPEMcounterUAS effectors from Diehl Defence, R&S®ARDRONIS from Rohde & Schwarz and the TARANIS® command and control and position mapping system developed by ESG have proven their capabilities in operational use.	https://www.esg.de/en/division/defence-public-security/drone-defence-and-unmanned-aircraft-systems-uas/

Elbit Systems	**ReDrone**	ReDrone is an advanced anti-drone protection system designed to detect, identify, track and neutralize different types of drones at a designated airspace. The system is capable of pinpointing both the drone and its operator's directions. The advanced detection system provides 360-degree perimeter protection and complete, up-to-the-minute situational awareness. It can also deal with several drones simultaneously. After detecting a target, the ReDrone system disrupts the drone's communication with its operator, blocks its radio and video signals and GPS positioning data, and sends it off track, preventing it from carrying out an attack.	http://elbitsystems.com/pr-new/elbit-systems-reveals-redrone-advanced-anti-drone-protection-neutralization-system/
ELTA North America	**Counter-unmanned aerial systems**	N/a	http://eltanorthamerica.com/
Fortem	**Drone Hunter**	N/a	http://www.fortemtech.com/dronehunter.html
GEW Technologies	**SkyScan2**	The SkyScan2 is meant to be used by front-line security forces to detect threat emitters and provide real-time information to control centre commanders. This information can be critical in assessing the security scenario and gaining tactical advantage. While locating emitters, concurrent monitoring is also provided. The SkyScan2 can also be used for communication surveillance and information gathering during high risk events.	http://www.gew.co.za/spectrum-monitoring/products/skyscan-2/
Gradiant	**Counter UAS system**	Gradiant's technology aims to address traditional surveillance limitations using a solution based on the fusion of different sensors. At this moment, the system is working with two complementary technologies: radio frequency (RF) detection and video processing; but the system has been designed to have the opportunity to include new sensors in the fusion layer to increase the probability of detection (radar, acoustic, etc). This system is not only capable of detect, identify and locate the drone attacks but also neutralize it. The RF detection module is based on smart spectrum analysis using signal intelligence (SIGINT) techniques, which allow the detection and identification of the signals exchanged by the UAV and the ground station. This solution does not only locate the UAV but it also locates the ground station. The video processing module is based on commercial-of-the-self (COTS) both visible and infrared cameras and a video processing smart software tool for UAV detection and location. It is important to highlight that both systems are passive, this feature has some advantages as: it cannot be detected by the attacker, it does not generate electromagnetic pollution, and the power consumption is low compared with active solutions like radar, so it is feasible to board it into mobile units and powered with battery.	https://www.gradiant.org/

Gryphon Sensors	**Skylight, Mobile Skylight, R1400 3-D Active Electronically Scanned Array (AESA) air surveillance radar, S1200 2-D Active Electronically Scanned Array (AESA) direction finder, Skylight Airspace Monitor Interface**	Gryphon Sensors Skylight system uses multiple ground-based sensors to detect cooperative and non-cooperative targets in the airspace, providing intelligent situational awareness for integration and security. Skylight combines multiple technologies to provide the most comprehensive, clear airspace picture. Featuring an array of self-contained sensors, it serves as a complete mobile command center for many applications. Contained in a van, Mobile Skylight features 4×4 off-road capability and can be taken anywhere without a commercial driver's license. Gryphon Sensors R1400 is a 3-D Active Electronically Scanned Array (AESA) air surveillance radar designed specifically for the detection of small, low-flying targets. The R1400 provides rapid, precise detection and tracking of airborne targets, including small unmanned aircraft systems (UAS), general aviation, birds and other cooperative or non-cooperative targets of interest. It provides accurate target position and velocity in a configurable hemispherical volume of coverage: 360 degrees in azimuth and 90 degrees in elevation. The S1200 is a 2-D Active Electronically Scanned Array (AESA) direction finder that monitors the signals in the relevant frequency bands for the rapid and precise detection and tracking of small unmanned aircraft systems (sUAS). It uses an extensive library of drone control signal profiles in order to detect and classify these types of signals. This passive sensor reliably and automatically detects the remote control of a commercial microdrone within a 5 km radius. The company also offers a variety of high-resolution, slew-to-cue, optical tracking cameras used to get eyes on the target. Used for visual identification and optical tracking, this sensor is especially useful in the classification of non-cooperative targets like birds, general aviation, etc. It uses both thermal and EO lenses to view airborne targets up to 3km in range — with 360° pan and 180° tilt rotations. The SAMI (Skylight Airspace Monitor Interface) is the glue that brings the sensors together to give a complete airspace picture.	http://gryphonsensors.com/
Hensoldt	**Xpeller Counter UAV System**	Xpeller is able to protect sensitive areas against illicit intrusions of small drones, ranging from individual buildings through big events to airports and military camps. Xpeller uses radars, optical, RF and other sensors to detect and identify the drone and assess its threat potential at ranges from a few hundred meters up to several kilometers. Once the threat has been identified, a jammer interrupts the link between drone and pilot and/or its navigation. The modular system concept relies on the selection of individual devices from the Xpeller tool kit depending on customer requirements and local conditions, thus offering best value for money.	https://www.hensoldt.net/solutions/air/electronic-warfare/xpeller-counter-uav-system/

Hex Horus	**C-UAS operations and consultancy**	The company operates C-UAS equipment and portable systems, maintain persistent detection, provide early warning, and conduct demonstrations during CUAS training exercises. It serve in the form of dedicated air guards or air sentries utilizing an array of CUAS equipment including but not limited to: CORIAN, SKY-VIEW, MADS-K, LIDS, DRAKE and DRONE DEFENDER.	http://hexhorus.com/
HGH Infrared Systems	**Spynel**	HGH Infrared Systems has developed an improved version of the Spynel-S and Spynel-X long-range detection systems to meet the high demand for drone and micro-drone detection. The units can now be equipped with a Visible Channel, a Laser Range Finder, or both. This option is called V-LRF and aims to facilitate the recognition phase of the threat detected by the sensor's panoramic detection system. The user will be able to use a x30 continuous optical zoom thanks to the full HD Visible Channel to detect very small flying objects. The other option is an eyesafe Laser Range Finder, which provides the user with accurate data regarding the distance of the detected threat, on land, sea or in the air.	https://www.hgh-infrared.com/News/News/HGH-Infrared-Systems-to-launch-Spynel-s-Visible-Channel-and-Laser-Range-Finder-at-DSEI-2017-in-London
IAI	**Drone Guard**	To detect low signature, low-level and low-speed airborne targets, ELTA has adapted to this specific mission its 3D radars, which include the ELM-2026D, ELM-2026B and ELM-2026BF for short (10km), medium (15km) and long (20 km) ranges, respectively, with special drone detection and tracking algorithms, as well as adapting them with EO sensors for visual identification of the target. In order to disrupt the hostile UAV, ELTA has developed advanced adaptive jamming systems which can be used in concert with its detection and identification sensors, or as a continuously operated stand-alone system. The jamming disrupts the drone's flight and can either cause it to return to its point-of-origin ('Return Home' function) or to shut down and make a crash landing. Drone Guard systems have been extensively and successfully tested against a variety of different drones and scenarios, including simultaneous multiple drone penetrations or attacks.	http://www.iai.co.il/2013/32981-46509-en/MediaRoom.aspx

JCPX	**UWAS**	UWAS is a complete solution designed to detect, identify, track, and neutralize drones. Developed in collaboration with DSNA Services, the system comprises a radar, night and day cameras and a counters measures. The system provides a solution for defence of strategic targets covering a radius of up to 5 km. The UWAS System is an end-to-end system designed to provide effective airspace defence against hostile drones (Micro and Nano UAVs) used by terrorists to perform aerial attacks, collect intelligence, and other intimidating activities. First, the threat is detected and identified. The data is combined and correlated and alerts the operator of the hostile UAV. When the threat reaches the neutralization area, the hostile drone is neutralized by activation of several counter measures. The system is coming with an easy user friendly interface, no specific training required, no specialised operators needed. UWAS has 360° circular coverage and is designed to detect, track, and neutralize drones classified as threats flying in No-Fly zones. UWAS has a very fast response time, it causes minimal collateral interruptions to the surrounding urban environment, with maximum safety to friendly aircraft. The UWAS System is operational under all weather conditions, 24 hours a day.	http://jcpx-development.com/
Kelvin Hughes	**SharpEye**	Kelvin Hughes SharpEye™ SxV radar is highly sensitive and has been optimised for the detection of drones, quadcopters, UASs and UAVs. The company provides complete radar based solutions for border and perimeter security and SharpEye™ with its ability to detect small low aerial targets even in clutter conditions makes it the ideal sensor to detect and provide early warning of the operation of drones. Systems can be a single SharpEye™ SxV mobile radar or part of a multi radar and electro optic camera system deployed via the company's Single Mast Solution (SMS) for mobile and semi-permanent requirements. With a SharpEye™ radar as the primary detection sensor, security agencies are able to monitor and intercept threats from drones in remote and difficult to access locations and also easily move locations. Complete single or multi node situational awareness can be developed through a Detect, Recognise, Identify and Classify methodology and the evolving picture controlled using the Kelvin Hughes control and interface software CxEye™. At DSEI 2017 Kelvin Hughes demonstrated the next evolution of its drone detection and tracking technology. The SMS-D ('D' meaning drone) is a dedicated drone detection and tracking system now featuring a thermal camera and video tracker that acquires the drone target using the initial radar detection information. The benefit of this is once the thermal camera and video tracker has acquired the target it will enable a visual identification and track. Further benefit comes from the combination of the camera mounted on a pan and tilt system that provides a means to precisely calculate the altitude of the UAV. The SMS-	https://www.kelvinhughes.com/security/uav-drone-detection

		D therefore is able to operate as a 2D sensor system providing 3D target information whereby the radar provides the range and bearing. This data can be outputted to a third party counter measure system.	
Leonardo	**Falcon Shield**	At DSEi 2015, Finmeccanica – Selex ES unveiled its Counter-Unmanned Air Vehicle (C-UAV) system, named Falcon Shield. Falcon Shield provides users with a multi-spectral threat sensing capability and, through the integration of an electronic attack capability, a multi-layered threat response. This response introduces a capability to take control of a remotely-piloted drone and land it safely (a command-link control intervention capability) prior to the need to defeat the threat by simple jamming or kinetic solutions. Consequently, the potential for undesired collateral effects is greatly minimised. Falcon Shield is derived from Selex ES's heritage associated with the provision of short-range defence solutions against a variety of airborne threats. Falcon Shield makes use of Selex ES's high-performance, passive electro-optical and electronic surveillance sensors, combined with scenario specific radar. These provide a fully integrated threat detection, identification and tracking capability which enables Falcon Shield to operate in environments that range from wide area through to high-clutter, 'urban canyons'. Incorporated within the Falcon Shield system is Selex ES's electronic attack capability that provides users with the ability to disrupt or take control of the threat. Because Falcon Shield is inherently flexible, this electronic attack capability can be complemented by the integration of additional, optional kinetic effectors. Ease of use is provided through use of the Selex ES Vantage Command, Control & Situation Awareness (C2SA) framework. This delivers an intuitive user interface and automated threat detection & tracking functions, including automated handover between detection and identification sensors.	http://www.leonardocompany.com/en

Liteye	**AUDS**	The AUDS Technology Team brings together three leading British companies each with the unique capabilities required to create AUDS. The Blighter Surveillance Systems Blighter A400 series Air Security radar is able to DETECT small UAVs in all weather conditions 24 hours a day. The Chess Dynamics EO/IR camera system, with state-of-the-art video tracking technology, is able to TRACK the UAV and, combined with radar target information, classify the target. The operator is then able to make a timely and informed decision to use the Enterprise Control Systems Ltd, ECS, smart RF inhibitor to selectively interfere with the C2 channels on the UAV allowing the system to DISRUPT the UAV's mission. AUDS is a second-generation system that detects, tracks, identifies, and defeats UAS threats. The AUDS system utilizes state-of-the-art radar, precision thermal and daylight cameras, advanced video tracking, and non-kinetic defeat capabilities. AUDS is a TRL-9 level system, and is in full production. The next generation of the system is well underway and was due to begin testing and qualifications in August 2017.	http://liteye.com/counter-uas.html
Lockheed Martin	**Icarus**	Built from internal investments, the ICARUS™ system can identify and intercept commercially available drones. Its multi-spectral sensor system detects and characterizes incoming drones within seconds, before using cyber electromagnetic activity to disable it or allowing the operator to take control of the drone and move it to a safe area.	http://lockheedmartin.com/us/innovations/061416-webt-laser-swarms-drones.html
Lockheed Martin/ Procerus	**Indago**	Lockheed Martin/Sikorsky's Indago quadrotor will be paired with the MyDefence Communication KNOX counter-unmanned aerial system (C-UAS) system under a new development agreement between the companies. Collaborative development will take place at MyDefence in Denmark. The project is part of an industrial cooperation programme in Denmark with Sikorsky, a Lockheed Martin company. Project goals include pairing the Indago with the KNOX system to achieve rapid response aerial surveillance capabilities. This solution will allow users to quickly and effectively detect adversaries and record evidence that could be used for prosecution. The pairing of the KNOX and Indago systems would be especially useful to secure areas such as critical infrastructure, prisons and private property.	http://www.lockheedmartin.com/us/products/procerus/indago-uas.html
Lockheed Martin	**ATHENA**	ATHENA is a transportable, ground-based system that serves as a low-cost test bed for demonstrating technologies required for military use of laser weapon systems. Lockheed Martin funded ATHENA's development with research and development investments. It uses the company's 30-kilowatt Accelerated Laser Demonstration Initiative (ALADIN) that provides great efficiency and lethality in a design that scales to higher power levels. ATHENA is powered by a compact Rolls-Royce turbo generator.	http://news.lockheedmartin.com/2017-09-20-Upgraded-Lockheed-Martin-Laser-Outguns-Threat-in-Half-the-Time

Marduk	**Shark**	Shark is currently understood to encompass a network of systems providing a wide-area defensive capability, with an electro-optical system cued to a target following the initial detection by another sensor, following which it is tracked by Shark and ultimately engaged by laser effectors – initially up to 10 kW – to temporarily or permanently 'blind' the optronics payload of a UAV.	http://marduk.ee/
Miltronix	**Multi-mode radars**	The company's range of multi-function, multi-mode radars have the capability to effectively and efficiently detect and track all kinds of UAVs, including those with low RCS. They can detect a UAV with an RCS of 0.1 m Sq at 25 Km. These radars are equally capable of detecting and tracking fixed wing and rotary wing aircraft targets with an RCS of 2 m Sq at 50 Km.	http://miltronix.co.uk/portfolio/4d-multi-function-multi-mode-uav-detection-tracking-air-surveillance-radar-system-2/
Lokmas	**Stupor anti-drone gun**	Russia's Lokmas Stupor anti drone gun has a range of 500m and electromagnetic and optical-electronic suppression systems interrupts the operation of control channels, data transmission and navigation. In addition, the gun is equipped with a laser emitter of visible range, which allows the user to partially or completely disorganize the process of video filming, which is conducted from the drone.	http://antikopter.ru/perenosnoy-kompleks-elektromagnitnogo-i-optiko-elektronnogo-podavleniya-bespilotnykh-letatelnykh-apparatov-grazhdanskogo-naznacheniya-pkp-bpla).
Meritis	**Integrated drone defence system**	Meritis Integrated Drone Defence systems are designed to cover the tactical approach drone detection, identification and disruption sector. All products are designed to be modularly integrated depending on customer requirements. Detection and identification systems are based on the SR-9000S drone detection radar, the ADS-2000 acoustic drone detection system and the SC-1000T/SC-1500T camera systems. The jammer units are the RTX-300P2/P6 portable units, the RTX-2000 M6 mobile units and the RTX-3000X stationary units. Integration products include the SWC2U command and control dashboard, the MC3 mobile command and control Cube unit and the SkyCleaner drone gun	http://www.meritis.ch/DroneDefEN.html

My Defence	**Watchdog, Wolfpack, Wingman, Pitbull, KNOX**	MyDefence products detect and counter commercially available drones (LSS – Low, Slow, Small), by integrating sensors and deterrents. The information is passed through the meshed network and display alerts in any command and control (C2) system (i.e. ATAK) MyDefence "Watchdog" networked sensor offers long range detection for i.e. perimeter protection and the "Wolfpack" is a 360 degree directional detection sensor for point defence and rapid deployment protection. The WINGMAN is a small handheld (wearable) drone detector. The WINGMAN works as a stand-alone product, and can optionally interface with other radios for information relay. The WINGMAN is claimed to be the smallest UAS detector on the market. The intelligent jamming device "PITBULL" will in the near future be integrated with the WINGMAN. The PITBULL is the intelligent response to the LSS (Low, Slow, Small) drone as it is an automated response to the threat. Through the intelligent server solution IRIS, the company has developed a system which detect and counter commercially available drones, by integrating sensors and deterrents from MyDefence and others. It display alerts on the graphical user interface and is able to integrate in to any system architecture. The KNOX alarm sounds when an unknown drone is detected in the area of interest. Additionally, KNOX is able to detect and identify drones and protect the area by disturbing the device communication at the precise wireless frequency of the drone without interfering with other mobile signals.	http://www.counter-uav.org/counter-uav-solutions.html
Nammo	**Programmable ammunition**	Nammo produces a range of programmable ammunition aimed at addressing the threat of ISIS-controlled weaponised commercial drones. This makes it possible for any larger gun to fire shells that can be programmed to explode with pinpoint accuracy, either before, above or inside a target, says the company. Adaptable to several weapon platforms, including 40 mm grenade launchers, 30 mm guns, 120 mm tank ammunition and M-72 rockets, this makes the technology ideal for dealing with a number of different threats, including drones.	https://www.nammo.com/newsroom/#/news/keeping-soldiers-safe-from-drones-how-nammo-can-help-257674
NASA	**Safeguard**	The Safeguard system monitors and enforces conformance to a set of rules defined prior to flight (e.g., geospatial stay-out or stay-in regions, speed limits, altitude limits). Safeguard operates independently of the UAS autopilot and is strategically designed in a way that can be realized by a small set of verifiable functions to simplify compliance with regulatory standards for commercial aircraft. A framework is described that decouples the system from any other devices on the UAS as well as introduces complementary positioning source(s) for applications that require integrity and availability beyond what the Global Positioning System (GPS) can provide. Additionally, the high level logic embedded within the software is presented, as well	https://ntrs.nasa.gov/search.jsp?R=20160012239

		as the steps being taken toward verification and validation (V&V) of proper functionality.	
NNIIRT	**1L121-E radar**	Air defence radar	http://www.nniirt.ru/
Northrop Grumman	**MAUI/DRAKE**	Northrop Grumman's Mobile Application for UAS Identification (MAUI) is a mobile acoustic sensor that operates on Android cell phones and uses the phone's microphone to detect Group 1 drones, defined as UASs weighing less than 20 pounds, flying lower than 1,200 feet and flying slower than 100 knots. The MAUI software-based approach leverages commercial off-the-shelf mobile devices to provide beyond-line-of-sight detection and identification of UAS threats in high noise environments. The company's Drone Restricted Access Using Known EW (DRAKE) is a radio-frequency negation system that delivers a nonkinetic, selective electronic attack of Group 1 drones. DRAKE demonstrates the feasibility of repurposing mature counter-improvised explosive device technology for interoperable, counter-UAS missions while protecting friendly force communications.	http://news.northropgrumman.com/news/releases/northrop-grumman-demonstrates-counter-uas-technologies-at-black-dart-exercise
Northrop Grumman	**G/ATOR**	A highly mobile multi-mission radar system designed to fully support worldwide expeditionary requirements, Northrop Grumman's AN/TPS-80 G/ATOR system provides multi-faceted detection and tracking capabilities to enable engagement of a wide range of hostile threats, and offers robust air traffic control capabilities to ensure the safety of Marines worldwide. Operational capabilities enhanced by Northrop Grumman's proven Active Electronically Scanned Array (AESA) radar technology give the AN/TPS-80 G/ATOR system the ability to perform multi-mission tasks at significantly lower operation and maintenance costs compared to existing radar systems. In addition to providing a broad range of optimized radar capabilities, AN/TPS-80 G/ATOR provides automatic adaptability via a scalable open system architecture. G/ATOR's multi-network capability ensures compatibility with additional U.S. Department of Defense command and control systems.	http://www.northropgrumman.com/Capabilities/gator/Pages/default.aspx

Northrop Grumman	**JCREW**	The Joint Counter Radio-Controlled Improvised Explosive Device (RCIED) Electronic Warfare (JCREW) system is a software-programmable jammer that provide protection from device-triggered improvised explosive devices (IEDs), such as those carried by UAS. Northrop Grumman developed mounted, dismounted and fixed-site variants to protect vehicles, warfighters, and permanent structures for the Navy and the U.S. Air Force.	https://news.northropgrumman.com/news/releases/northrop-grumman-awarded-95-million-jcrew-production-contract
Numerica	**Track Manager, Python Simulator**	Numerica Track Manager provides real-time correlation and fusion of measurement and track data for superior situational awareness in benign and electronic attack environments. • Integrates all data sources into one track file, minimizing dual tracks, swaps and spurious tracks. • Supports most radars, including primary and secondary surveillance, 3D air defence and approach radars. • Easily scales up from one sensor to many sensors and very large track loads. • High-performance, multi-hypothesis algorithms provide highly accurate, real-time integrated track outputs. • Adaptable architecture can be expanded through add-on modules that provide enhanced capabilities for diverse missions and use cases. The company's Python simulation infrastructure with high fidelity radar models for rapid performance assessment of complicated network-centric tracking systems is an open architecture, distributed discrete event simulation environment used for conducting Monte Carlo simulations of various multi-component systems. Scalable in that it supports parallel computation across multiple processes, cores, and nodes within a computing framework. Provides the middleware for constructing simulations, including both publish/subscribe and service request/response messaging patterns. Enables simulations to be broken down into the smallest logical components, allowing components can be reused and integrated using minimal interfaces. Supports existing models for DoD radars, tracking components, and truth target generators, to enable various multi-target, multi-sensor, multi-platform tracking studies. Distinguished from other simulators in its lightweight, flexible, interfacing capability. The Python infrastructure allows components in various software languages to be integrated.	http://www.numerica.us/defense/unmanned-systems/#collision-avoidance-system

Orbital ATK	**T-REX**	Orbital ATK exhibited its Tactical-Robotic Exterminator (T-REX) at DSEI 2017 in London, an integrated version of the Liteye/AUDS UAS detection and identification system mounted on board a Stryker vehicle combined with 30mm cannon. The full suite of systems includes a Blighter A400 Series Air Security Radar; Hawkeye DS and Electro-Optical Video Tracker; Directional RF Inhibitor, giving the T-REX, operator the choice of non-lethal, or lethal UAS disruption capabilities. T-REX also features the Orbital ATK's XM914 Chain Gun with advanced ammunition to defeat Class 1 and 2 UAS.	
OpenWorks Engineering	**Skywall 100, Skywall 300**	SkyWall offers those exposed to the drone threat the ability to physically capture an aircraft and control its descent to the ground. The SkyWall system is a combination of a compressed gas powered smart launcher and an intelligent programmable projectile. The first system being released is SkyWall100; a man-portable handheld launcher that is highly mobile and a cost effective way of dealing with the drone threat. In September 2017 OpenWorks launched SkyWall300, an updated version of the SkyWall100 hand-held drone capturing system, which has been deployed by major government authorities and protected President Barack Obama during his visit to Berlin last year. SkyWall300 is an automatic version with an air powered system that launches the same range of net capture projectiles used with the SkyWall100 handheld system. It integrates with external drone detection and command and control systems to allow for maximum ease of use. It automatically tracks any drone prior to giving the remote operator the ability to command the system to capture the target.	https://openworksengineering.com/skywall
Quantum Aviation	**Drone Protect**	DroneProtect® offers clients a tailored and scalable capability to enhance situational awareness using technology specifically targeting the unique signature of drones and delivered at price points to suit all budgets. Using a combination of radio and wi-fi signal detection with electro-optical cameras and if required, bespoke radar, DroneProtect® provides detection, alerting and when suitably specified, tracking of threats using a simple and intuitive operating system, pushing alerts to any remote smart device, laptop or PC.DroneProtect® detects analogue and digital control signals including encrypted systems such as DJI Lightbridge. The system blends RF, optical and radar data to offer a holistic threat picture.	http://quantumaviation.co.uk/drone-protect/

QinetiQ	**Obsidian**	The Obsidian radar system detects, identifies and tracks small/micro UAVs that could pose a threat to operational security. By combining staring antenna array technology and QinetiQ's Pallisade ™ surveillance management system, complete information on UAS threats can be collected, analysed quickly and then distributed to key personnel through secure wifi distributed channels. The antenna array detects potential threats instantly, without having to scan, while also being able to distinguish very slow moving objects and filter out objects such as bird, ensuring information is unequivocal.	https://www.qinetiq.com/en-gb/what-we-do/land-and-critical-infrastructure
Rada Electronic Industries	**Multi-mission hemispheric radars**	RADA's Compact and Multi-Mission Hemispheric Radars are software-defined, AESA, configurable radar platforms which offer a wide range of operational missions at a very high performance-to-price ratio. Among the missions are Active Protection, Hostile Fire Detection, Counter-UAV, all-threat air surveillance, 3D perimeter surveillance, and more. RADA offers a family of tactical multi-mission radar system platforms that primarily differs in antenna sizes, resulting in maximal detection ranges. By combining those radar platforms with a mission application, RADA provides tailor made operational solutions for a wide range of detection distances and targets.	http://www.rada.com/capabilities-3/land-radars-2.html
Radio Hill Technologies	**Dronebuster**	The Dronebuster is an RF jamming device. This means the device is designed to interrupt the control of the drone by overwhelming the control frequency. This causes the drone to stop and hover, or return to the operator, depending upon the model of the drone. The drone operator has no control while the frequency is being overwhelmed with RF energy. The Dronebuster can take this one step further and also overwhelm the GPS signal, which will cause the drone to land or fall out of the sky. The Dronebuster™ is a cost effective tool for security teams and first responders to use during fluid, ambiguous, fast-paced encounters. The system allows security teams and law enforcement to efficiently deal with a drone approaching a Forward Operating Base, hovering over a large crowd, snooping into secure/private areas, or flying in restricted airspace. With the Dronebuster™, the operator has the tools to intercept the drone command link and command the drone to descend or go home. All the operator must do is aim the Dronebuster™ at the drone and toggle the switch. The LE, or law enforcement model of the Dronebuster allows State and local law enforcement and first responders to clear nuisance drones without forcing them to land. This model will interfere with both communications and video downlinking protocols. It will not however, interfere with GPS navigation signals. In many cases, the drone will simply 'go home.' For all non US Government entities: This device has not been authorized as required by the rules of the Federal Communications Commission. This device is not, and may not be, offered for sale or lease, or sold or	http://www.radiohilltech.com/

		leased, until authorization is obtained. The sale of the Dronebuster LE model is awaiting rules changes at the FCC that will allow for its use by State and local law enforcement.	
Rafael Advanced Defense Systems	**Drone Dome**	Drone Dome is an interception system that uses a laser beam to locate and destroy hostile drones.	http://www.rafael.co.il/4312-en/Marketing.aspx http://www.globes.co.il/en/article-rafael-unveils-laser-based-drone-interception-system-1001193645
Rajant	**Swarming counter-UAS**	According to press reports from the October 2017 AUSA event Rajant Corporation is one of the companies developing a Mobile Ad Hoc Networking (MANET) counter-UAS system under evaluation with the US Army's Program Manager for Counter-Rockets, Artillery and Mortars (PM CRAM). Rajant's concept is for a swarm of approximately 20 vertical take off/landing UAVs which are launched when RAM and UAS targets are detected. The platforms are networked by secure broadband communications via the company's Kinetic Mesh radio system.	
Raytheon	**Phalanx**	A self-contained package, the Phalanx weapon system automatically carries out functions usually performed by multiple systems: search, detection, threat evaluation, tracking, engagement and kill assessment. The Block 1B version of the system adds control stations that allow operators to visually track and identify targets before engagement. The 1B variant's configuration augments the Phalanx system's proven anti-air warfare capability by adding a forward looking infrared sensor. It allows the system to be used against helicopters and high-speed surface craft at sea while the land-based version helps identify and confirm incoming dangers	http://www.raytheon.co.uk/capabilities/products/phalanx/

Raytheon	**High-Power Microwave weapon**	Demonstrated in 2013. Raytheon is one of several defence contractors chosen by the Office of Naval Research to develop a high-powered laser weapon capable of hitting fast-moving targets at a distance under the Ground Based Air Defense Directed Energy On the Move programme	http://www.raytheon.co.uk/news/feature/laser_tech.html
Robin Radar Systems	**Elvira**	"Elvira®" is Robin Radar System's purpose built Drone Detection Radar, specifically designed to meet these challenges. Elvira® combines smart software with affordable radar that are specifically built for drone detection. By doing so, Robin Radar Systems achieved a quality and price level that meets the needs of professional security markets on a global scale.	https://www.robinradar.com/drone-detection/
Rohde & Schwarz	**Guardion**	The GUARDION drone defence system combines the scalable solutions customized to very specific customer requirements to reliably detect and defend against threats posed by the unauthorized use of drones. GUARDION is offered as an integrated product. It has a proven track record of reliable protection in various applications. GUARDION focuses on integrating electronic detection, verification and countermeasures and connecting them to a position mapping and command and control tool. The HPEMcounterUAS effectors from Diehl Defence, R&S®ARDRONIS from Rohde & Schwarz and the TARANIS® command and control and position mapping system developed by ESG have proven their capabilities in operational use.	https://www.rohde-schwarz.com/uk/home_48230.html
Saab	**Giraffe radars**	Saab's Enhanced Low, Slow and Small (ELSS) system is a capability that enables the company's Giraffe range of air surveillance and air defence systems to distinguish between UAVs and birds with accuracy. Its Giraffe portfolio now includes the ground based long-range Giraffe 8A, as well as sea and land versions of the Giraffe 4A, the short-range Giraffe 1X and medium-range Giraffe AMB. Giraffe radars are equipped to detect stealth-cloaked aircraft, and that they also feature industry-leading jamming resistance measures.	http://saabgroup.com/Media/news-press/news/2015-09/giraffe-radar-shows-enhanced-anti-uas-skills/
SafeSky	**Counter UAV system**	The company develops and builds field-deployed mobile counter-drone systems aimed at detecting, identifying, tracking and intercepting commercial drones outfitted to attack military personnel. In July 2017 the US Navy Special Warfare Command signed a $1.5 million deal for a CUAV from the company.	https://www.skysafe.io/

SCG	**DroneRIFLE, DroneRanger,DroneJammer**	SCG's Drone-Defense Jammer is a high performance application specific jammer, automatically controlled and managed by ART HMI software. The company also manufactures a complete range of counter-UAS products.	https://scgroup-ltd.com
Search Systems	**SparrowHawk**	SparrowHawk is a Counter UAV (C-UAV) system designed to capture and recover intact a rogue UAV and its payload safely. SparrowHawk will stop fully autonomous UAVs and glide attack UAVs up to 20kg, both rotary and fixed wing, and can be re-armed in just a few seconds for repeat sorties. Batteries can also be swapped in seconds, minimising downtime. The SparrowHawk system is portable, reliable, quick to deploy and easy to operate. It comprises a SparrowHawk multi-copter UAV, weighted entanglement system, parachute, compressed air firing system complete with inbuilt safety mechanisms, EO and IR camera aiming and target selection system. Fast computerised battery charging is included in each system.	http://searchsystems.eu/sparrowhawk/
Sensofusion	**AIRFENCE**	AIRFENCE has been designed with over three years of military testing with real world tactical scenarios. At its core, it can automatically detect, locate, track and take over UAV controls all on full auto. In addition, AIRFENCE can locate the operator with pin point accuracy in real time. How it works: • RF Detection - Software defined radios that can detect UAVs • High Range of Detection - 6 mile (10km) range with a single AIRFENCE unit • Alarm System - Custom configuration to enable early warning and critical warning notifications in real time • Easy to Scale - Scale horizontally by simply adding more units • Triangulation - AIRFENCE uses triangulation as an additional method to detect UAVs • Manual or Automated Response - AIRFENCE can be preprogrammed to run on full auto, or can be configured to "take action" manually • Mobile Notifications - Configure AIRFENCE to send mobile push notifications when UAVs are detected • Over-the-Air Updates - Real time software updates allow the system to continuously adapt to evolving threats • MAPS-AIRFENCE is capable of showing the real time location of the detected UAV's on a map. Sensofusion maps can be configured for offline access.	https://www.sensofusion.com/
SESP	**Drone Defeater**	SESP Group's Drone Defeater depowers Unmanned Aerial Vehicles and Secures the perimeter, transforming any field base into a protected fortress. The Drone Defeater severs the connection between drone and pilot. SESP's UAV jamming solution packs intense reservoirs of power to establish the strongest and broadest possible perimeter of security. Seamlessly integrated into any SUV, or as standalone	http://sesp.com/dronedefeater/

		equipment, the Drone Defeater floods the skies with blocking waves, rejecting the penetration of any enemy drone	
Silent Sentinel	**Oculus**	High resolution cameras such as the OCULUS HERITAGE are Silent Sentinel's contribution to the joint development of a counter drone detection capability with Kelvin Hughes. The cameras can detect and identify a PHANTOM-sized drone well beyond 750-1,000m and slave high resolution cameras to the appropriate vector for detailed observation.	http://silentsentinel.com/oculus-heritage.html
Skydroner	**Skydroner 500, 1000**	SkyDroner 500 is designed for urban installation with a detection range of up to 500m. It is ideal in providing total building surveillance in a city environment. SkyDroner 500 can be deployed at the rooftop to provide 24 hours monitoring of surrounding drone activities. SkyDroner 1000 has an effective detection range up to 1000m. It is designed to perform long range surveillance of drone activities in a desert environment. The system is built to meet IP65 standard and operated up to 60 degrees with minimum maintenance. The SkyDroner Central Control Unit has been designed: to alert officer of approaching drone; to indicate progressive distance of the anonymous drone; to provide video footage for easy verification; to identify and indicate type of drone; to record date/time of an event; to generate incident reports	http://www.skydroner.com/product

Spotter RF	**UAVX**	UAVX helps commercial facilities and large-scale venues actively monitor and secure their premises, protecting them from unwelcome drones and UAVs. The UAVX precisely detects, tracks and classifies small drones, such as the DJI Phantom, using SpotterRF's compact surveillance radar (CSR), artificial intelligence, and long-range video tracking. UAVX offers comprehensive protection from terrorists, vandals and disruptors. Key features • Permanent or temporary installation • Spotter RF radar • Day and thermal cameras • Automatic target classification (Artificial Intelligence) • Optional RF Jammer • 350m quadcopter detection range • Up to 750m optical video tracking range • 1/6 the price of competitive radar counter UAV system	https://spotterrf.com/uavx_counter_uav_drone_system/
Squarehead technology	**Acoustic automatic drone detection systems**	N/a	http://static1.1.sqspcdn.com/static/f/1431009/26372567/1436356569230/SQH-Orelia+consortium+July+2015.pdf?token=mwgHfh8KwpvCno6RU1XGdo7CaVA%3D

SRC	**Silent Archer**	SRC's Silent Archer counter-unmanned aircraft system (UAS) technology is comprised of TRL 8/9 radar and electronic warfare (EW) systems, camera and a 3-D user display to defeat hostile drones, whether a lone target or a UAS swarm. Combined, these systems provide spatial, frequency and optical surveillance capabilities to detect, track, classify and identify the airborne threat. Once the UAS threat is identified, various low-cost, low-risk electronic methods are utilized to disrupt the UAS, such as jamming the communications links between the operator and the aircraft. The Silent Archer technologies work together to provide a complete, end-to-end counter-UAS solution for applications such as: • Force protection in contested environments • Critical infrastructure protection • Security for VIPs and high profile events • Urban environment surveillance SRC has successfully demonstrated the ability for Silent Archer anti-drone technology to detect, track, identify and defeat UAS at U.S. government-sponsored counter-UAS test events like JIAMDO's Black Dart, the Army Warfighting Assessment (AWA), Network Integration Evaluation (NIE), and Maneuvers and Fires Integrated Exercise (MFIX). An open architecture and sensor-agnostic design of Silent Archer technologies support a variety of optional systems and functionality, such as: • Direction finding unit (Provides line-of-bearing information to the UAS and their operators) • Wireless networking (For communicating between systems and command and control (C2) centres)	https://www.srcinc.com/what-we-do/counter-uas/
Steel Rock	**NightFighter**	The company makes digital a long range counter UAV system and an analogue long-range protable rifle system. Three-band and five-band variants are available.	https://www.sruav.co.uk/counter-uav-solutions
Synergia	**dronesafeguard**	dronesafeguard is a mix of layered C-UAV solutions that seek to interdict intruder drones as far out as possible from the caility, asset or person being protected. This is "protection in depth" and it relies on progressively interleaved C-UAV systems and sub systems to: detect, track, respond and then defeat the drone risk threat before physical, asset. syber or reputational damage is inflicted. Developed with Chenega International.	http://synergia.biz/
Telaforce	**Drone detection and protection system**	The technology, according to TelaForce, can identify and locate unmanned aircraft flying in restricted or protected airspace, with the added benefit of being able to track back to their operators on the ground. TelaForce also claims it can operate in any weather condition, through continuous, automated monitoring.	http://telaforce.com/

Thales	**ECOsystem**	Joining forces to satisfy the growing need for UTM, Thales and Unifly will leverage Thales's expertise in air traffic management, system integration and cyber security as well as Unifly's dedicated focus on drone management to provide the premier UTM application. The solution will incorporate Unifly's Validation Engine, a sophisticated software application that conducts real-time validation of drone flight plans, into Thales ECOsystem, a decision support platform for improved aviation operations.	https://www.thalesgroup.com/en/ecosystem
ThalesRaytheon Systems	**AN/MPQ-64F1 Improved Sentinel**	The AN/MPQ-64F1 Improved Sentinel is a three-dimensional, phased-array system that operates in the X-band frequency range. Its primary mission is to automatically detect, track, identify, and report airborne threats, including helicopters, high speed attack aircraft, cruise missiles and unmanned aerial vehicles (UAVs). The Improved Sentinel is the standard for the alerting and cueing of targets to support a variety of weapons, including Stinger missile based SHORAD weapon systems, VSHORAD missile systems and air defense guns. This advanced tactical radar detects and tracks threat aircraft at several times the range of short-range weapons, providing early warning to ground crews and supporting maximum-range engagement of threats	http://www.thalesraytheon.com/fileadmin/tmpl/Products/pdf/Improved_Sentinel_Radar_Data_Sheet_-_April_2011.pdf
Theiss UAV Solutions	**EXCIPIO**	Theiss UAV Solutions, LLC has released the EXCIPIO, a patent pending non-electronic, non-destructive Anti-Drone system. The EXCIPIO (Latin for "I Capture") is an interception and neutralizing system that allows for surgical removal of a potential threat. Though the initial system concept was focused on intercepting and neutralizing an airborne UAS (or "Drone"), the conceptual applications have expanded to include manned aircraft, ground vehicles, people, and animals (whether airborne or on the ground).The EXCIPIO Aerial Netting System can be mounted to a variety of fixed wing or rotorcraft platforms for use. The EXCIPIO is launched when a threat target has been identified and then flies to intercept the target. When the EXCIPIO has reached the threat target, it fires a net upon the target when commanded by the EXCIPIO System operator. Once the target has been "netted," the EXCIPIO can either release the net with the neutralized target ensnared (utilizing a small drag chute to slow the fall of the neutralized target) or keep the net tethered to the System for the purpose of relocating the net and neutralized target to a desired location before releasing them to the ground.	http://www.theissuav.com/researchanddevelopment/

TCI	**Blackbird**	TCI's Drone Detection technology provides field-proven, fully automated detection and geolocation of drones and their radio controllers. It can be deployed interactively by an operator, or automatically for unattended operation (providing low cost of ownership). The system scans the RF spectrum looking for the RF signature of drones and radio controllers. When a drone or controller is detected, the system geolocates the target and provides a notification. Local operators receive notifications by visual and audible alarm. Remote personnel can be notified by other mechanisms, including email and instant text message. Security personnel can then observe the location of both the drone and the controller on the integrated map and track the target's movements. Knowing the location of the drone's controller helps authorities pinpoint the operator for a safe and effective intervention.	https://www.tcibr.com/tci-blackbird-integrated-drone-detection-and-geolocation-system-counter-uas-system/
Trustcomes	**DroneBlocker**	N/a	https://www.trustcoms.com/en/droneblocker
UAV Vision	**CM202U**	The company designs and manufactures high performance, lightweight, gyro stabilized camera payloads for ISR applications. The advanced CM202 gyro-stabilised, multi-sensor camera ISR payload is engineered to offer customisation and the low SWaP gimbal is suitable for integration on a UAV, manned aircraft, fixed land system or mobile land vehicle. The CM202U is a multi-sensor, gyro-stabilised gimbal for counter UAS operations. The entire system is man-portable and robust, and includes object tracking capability, low power consumption, direct drive motors for accurate positioning, Static Target Detection Algorithm, and Moving Target Detector Algorithm.	http://www.uavvision.com/mission/counter-uas
Vector Solutions	**Artemis**	The ARTEMIS Drone Defense Solution is a fully autonomous, portable device designed to detect and defeat the majority of commonly proliferated group 1 and 2 commercial drone systems. Through passive interrogation of known drone control frequencies utilizing an automated spectrum analyzer and proprietary HUNTER algorithm, the ARTEMIS identifies potential targets; implements control measures and forces the drone into its pre-programmed loss-of-link profile. The ARTEMIS targets only the drone control frequency and does not interfere with any other frequency in the spectrum. By precisely isolating the drone controller and cross-referencing a known control database, the system yields maximum effectiveness with no false positives. While the majority of current drone systems operate via remote control and generally in the same spectrum, next generation threats become much more robust. In order to combat autonomous drones operating solely on GPS signals or outside of the normal	http://vectorsolutions.us/counter-drone/

		operating spectrum, the company relies on a portable threat defence tool capable of defeating autonomous drones.	
Vaereos	**Counter drone methodology**	Vaeros implements a methodology for counter-drone operations that focuses on four key areas: technology foraging, situational awareness, active detection and response, and training and education.	http://vaeros.org/capabilities/uas-counter-uas-testbed/
Van Cleve	**DroneRanger**	DroneRANGER's key components are a 360° scanning radar and a positioning system on which images (visual and thermal) and radio frequency (RF) jammers are integrated. The radar detects the drones and the RF jammers block radio frequencies, thus neutralizing the drones. Components comprise: • Co-Aligned Radar, Thermal, Near-IR, & Visible Cameras • Safety& Security for Valuable Properties & Remote Assets • Photonic Deterrence Bore Sighted to Cameras • Automatic Wide Area Protection • 24 Hour All Weather Operation – Day or Night • Low Power for Remote Installations • Interfaces to Central Station Monitor • iPad / iPhone View, Command, & Control • Elegant Installation& Operation Features: • 1.7 Mile Line-of-Sight Operation • Radar& Camera Detection • Authoritative Photonic Deterrence • Embedded Processor & DVR • 20 foot Mast, Integrated Lowering System • IP Ethernet Communication	https://www.vcasecurity.com/

Whitefox Defence	**DroneFox Tactical, DroneFox Fortify**	The company's counter-sUAS technology is adaptable and customizable to fit into whatever form factor best fits the mission problem set. DroneFox Tactical and DroneFox Fortify apply this advanced proprietary technology to create two distinct solutions for mobile operations and protection of vulnerable facilities. DroneFox Tactical is engineered for mobility and ease of deployment. It is encased in a portable, SWaP-C optimized form factor and responds to drone threats dynamically based on operator feedback or automatically based on preset conditions. DroneFox Fortify provides continuous, automatic protection of vulnerable facilities and critical infrastructure;full integration capabilities with existing security systems and nforces a customizable geofence around a restricted airspace	https://www.whitefoxdefense.com/
Zala Aero Group	**REX 1 counter UAS gun**	Zala Aero Group, a Kalashnikov company, has presented its REX 1 counter-UAS gun at the Army 2017 forum in Russia. According to the company: "The weapon is equipped with a block of suppression, which drowns in the radius of five kilometers signals of the US satellite navigation system GPS, Russia's GLONASS, China's BeiDou and Europe's Galileo. Also, the device is capable of blocking GSM, 3G, LTE signals at a kilometer distance and interfering with frequencies of 900 Mhz, 2.4 GHz, 5.2 – 5.8 GHz. The REX 1 disables the drone but does not damage it physically – the aircraft loses its connection with the control panel and smoothly lands…To put the device in combat readiness, just press one button. The weapon is equipped with a fastening system, so that it can additionally be equipped with sights, lights, designators, as well as objective control devices….The weight of REX 1 is 4.2 kg, while the model has a built-in battery that provides continuous operation of the device for three hours."	http://zala.aero/rex-1/