

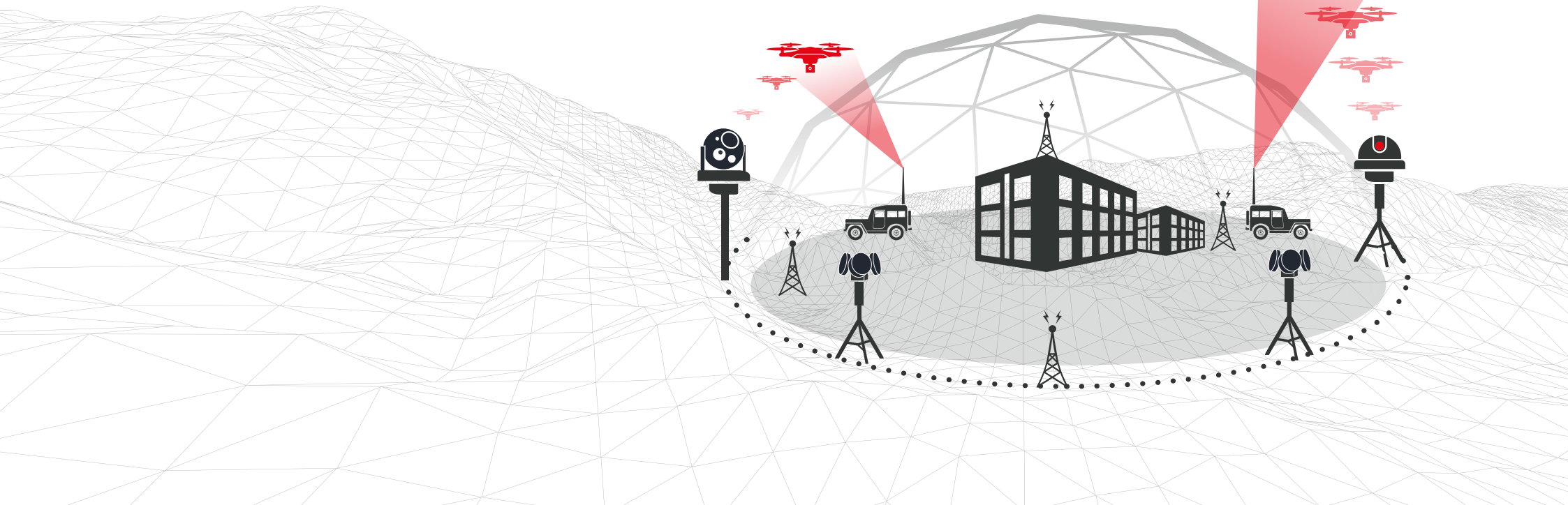


L3HARRIS®

FAST. FORWARD.

DRONE GUARDIAN

Counter-sUAS defence system



DETECT. TRACK. IDENTIFY. DEFEAT.





L3HARRIS

DRONE GUARDIAN

Counter-sUAS defence system

Note: throughout this document, 'small' denotes sub-20 kg aircraft that are NATO Class I or below, covering a range of mini and micro UAS threats.

INTRODUCTION	1 - 2
SYSTEM OVERVIEW	3 - 4
SUB-SYSTEMS: TECHNICAL OVERVIEW	5 - 6
SENSORS	7 - 8
SUMMARY	9
PARTNER OF CHOICE	10

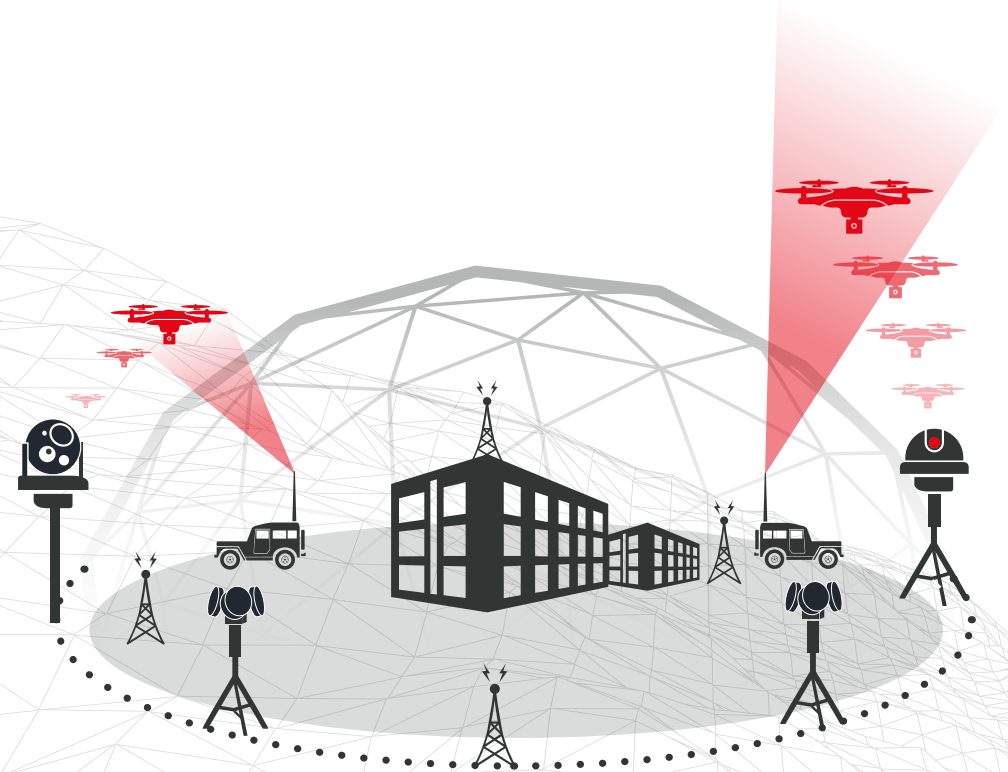
DRONE GUARDIAN

DETECT. TRACK. IDENTIFY. DEFEAT.

Drone Guardian provides reliable detection and neutralisation of drone threats. The detection, tracking and defeat of small Unmanned Aircraft System (sUAS) or drone threats is a complex problem for which no single sensor or defeat solution has been shown to provide reliable performance across the full range of required operational environments. Systems based upon single sensor systems, such as radar or EO/IR or RF detection, have all been deployed with varying degrees of success in different operational situations.

INFORMATION ADVANTAGE

The advantage of the L3Harris Drone Guardian approach is to deploy a multiple sensor capability from a range of world class vendors to build a complete picture of the operating area. The system utilises proven multi-sensor correlation techniques; this approach provides significant enhancement in the overall system probability of detection and a reduced false alarm rate, as well as increased assurance in the system performance.



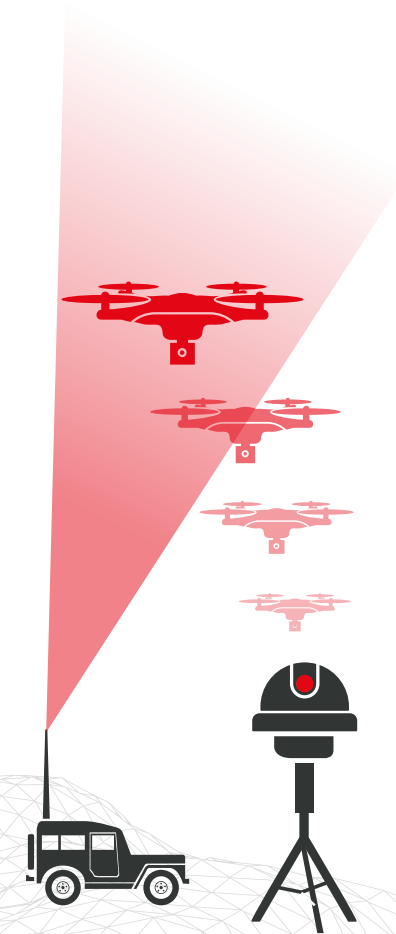


DEVELOPED FOR THE MOST DEMANDING OPERATIONS

Drone Guardian is underpinned by core Command & Control (C2) software and Electronic Warfare countermeasures developed over many years by L3Harris and proven to meet the most demanding military operational requirements of the Ground Based Air Defense (GBAD) and EW domains. Designed for minimal or no constant monitoring by operators, the easy-to-use C2 interface ensures no increase in security manpower as well as minimal training; an ideal solution for security control room operation.

ENABLING BEST-IN-BREED CHOICE

Drone Guardian provides an open and flexible architecture facilitating the integration of best-in-breed Military-off-the-Shelf (MOTS) and Commercial-off-the-Shelf (COTS) sensors and effectors. The proposed sensors and effectors are cost-effective and have been proven to deliver the required performance against the developing threat from drones. Crucially, Drone Guardian allows an independent choice of sensors and effectors with ready replacement or enhancement as the threat continues to evolve.



SYSTEM OVERVIEW

DESIGNED FOR FLEXIBILITY

The Drone Guardian system is designed to:

- > Offer impressive flexibility
- > Enable configuration of system components
- > Support installation in a vehicle or to a fixed location
- > Meet the unique requirements of each deployment

COUNTERING THE EVER EVOLVING THREAT

The Drone Guardian system uses an open and flexible architecture to ensure that the system is easily extensible and upgradable as the threats continue to evolve or as enhanced sensor/effector technologies continue to develop to counter the threat.





SYSTEM DESIGN PRINCIPLES



Radar detection/tracking and RF direction-finding detectors provide the bulk of high quality data required to make high-confidence threat declarations, particularly when correlated using combat-proven C2 techniques.



Through proven fusion and correlation capability the C2 component provides fully automated cueing of sensors and effectors based on accurate and reliable threat detection and characterisation.



Advanced EO/IR cameras provide additional confirmation of drone activity, which can be used to correlate with higher quality track information and can also be used for the collection of evidence.



Compatible with SAPIENT and ASTERIX, Drone Guardian's open architecture enables integration with a diverse range of radars, cameras, RF sensors, RF jammers and PSIM systems to meet the operational need.



Optional directional and omni-directional multi-band jamming provides defeat against individual drone threats as well as drone swarms.



Underpinned by intuitive, easy-to-use C2 software, the system operates in the background and requires very low manpower, minimising both the training and operational burden.

SUB-SYSTEMS TECHNICAL OVERVIEW

DRONE GUARDIAN COMMAND AND CONTROL

The Drone Guardian Command and Control (C2) component is scalable and future-proof, enabling new and improved sensor and effector technologies to be integrated easily.

The component comprises the following two major sub-systems:



Human Machine Interface

This sub-system provides the operational interface for the user.



C2 Server

This sub-system provides the core sensor and information correlation capability of the solution.

SYSTEM BENEFITS:

- > A flexible C2 platform at the heart of the system, capable of accommodating multi-mission operations.
- > Integration of multiple sensors using data correlation to ensure earliest possible detection of threats.
- > Multiple target detection, identification and tracking to support complex decision-making.
- > High probability of detection, classification and identification, due to the inherent capability of multi-sensor correlation.
- > Low false alarm rate to improve operational efficiency.
- > Integrated management of effector systems, with the ability to cue/slew and/or digitally task multiple active defense systems.
- > Ability to exchange target tracks with other external systems.
- > A flexible component architecture to accommodate future threat and technology changes.



HUMAN MACHINE INTERFACE

The Drone Guardian HMI has been developed over many years by L3Harris and is proven to meet the most demanding military operational requirements. The HMI has been designed with the operator in mind to enable flexible configuration, to provide accurate and timely situational awareness and to support decisive action.

As well as providing complete situational awareness, the Drone Guardian system can be integrated with L3Harris' BROADSHIELD® and CORVUS® ICN EW solutions to generate jamming signals across the 20 MHz to 6 GHz range for both comms-denial and counter-drone, providing defeat capability as needed.

C2 SERVER

The C2 server provides the integration of data from the various sensors. Information correlation of the sensor data is based on L3Harris' advanced technology developed over the past 35+ years in the ground-based air defense and space environments.

Use of advanced data correlation at the C2 component means that detections and tracks from different system sensors that correspond to the same object can be reliably combined together before they are displayed to an operator. In this way duplicate detections can be eliminated and false alarms can be minimised by requiring confirmation of a detection by more than one sensor, this greatly simplifies the cognitive burden on the operator. Automatic jamming can be configured to be initiated by the C2 server for threats that are confirmed by one or more of detection sensors.

DRONE GUARDIAN SENSORS



RF DETECTION

Multiple dispersed radio frequency (RF) sensors from a scalable, distributed network of nodes can be correlated with other detections to provide a complete picture of the operational environment.



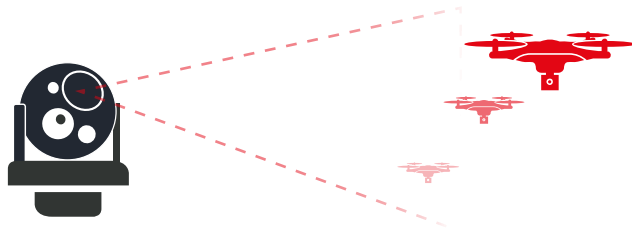
RADAR

By harnessing our leading-edge, rapidly re-deployable radar capability, Drone Guardian makes the detection and tracking of multiple autonomous drones or sUAS threats easy.

The radar can be configured in real-time by the operator or C2 system to provide a wide range of capabilities:

- > Real-time control of scanning modes
- > “Spotlight” examination of specific tracks while scanning is continued
- > Control of radar operation modes
- > Management of hundreds of simultaneous tracks

In contrast with many other radars deployed for drone tracking the Drone Guardian radar system has been developed specifically for the UAS threat and one of the key discriminators is the extended elevation coverage of this radar, which reduces significantly the risk that the UAS threat can over-fly the coverage of the radar system.

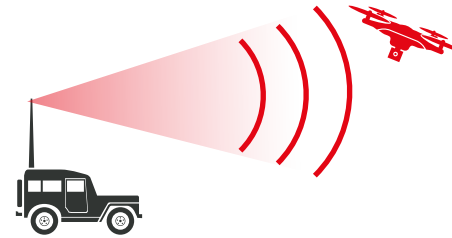


ELECTRO-OPTICS

The Drone Guardian system includes an advanced tracking and analytics engine able to provide image-based:

- > Drone detection
- > Identification
- > Classification

Images are analysed using a machine learning algorithm capable of classifying drone types



EW COUNTERMEASURES

Through non-kinetic L3Harris BROADSHIELD® and CORVUS® electronic warfare countermeasures as well as multiple kinetic effectors, Drone Guardian further enables the safe and reliable defeat of drones and drone swarms as needed. The power and frequency range of such jammers are configurable to allow compliance with any applicable regulations and to avoid interference with other equipment.

ADDITIONAL SENSORS

Due to Drone Guardian's open and flexible architecture a variety of alternative and additional sensor and effector technologies can be integrated facilitating the integration of existing, locally preferred, or best-in-breed COTS sensors.

DRONE GUARDIAN SUMMARY

SOPHISTICATED USER-FRIENDLY SYSTEMS

Drone Guardian provides reliable detection, tracking, identification and 'soft' neutralisation of drone threats, integrating world class, best of breed sensor and effector capabilities. Drone Guardian's flexibility enables the integration of current or future technologies to meet new and emerging threats as they are identified.

All system components are highly mature and have a proven pedigree in their own right. Their specific integration makes Drone Guardian the most sophisticated user friendly counter-sUAS defensive system in the world.



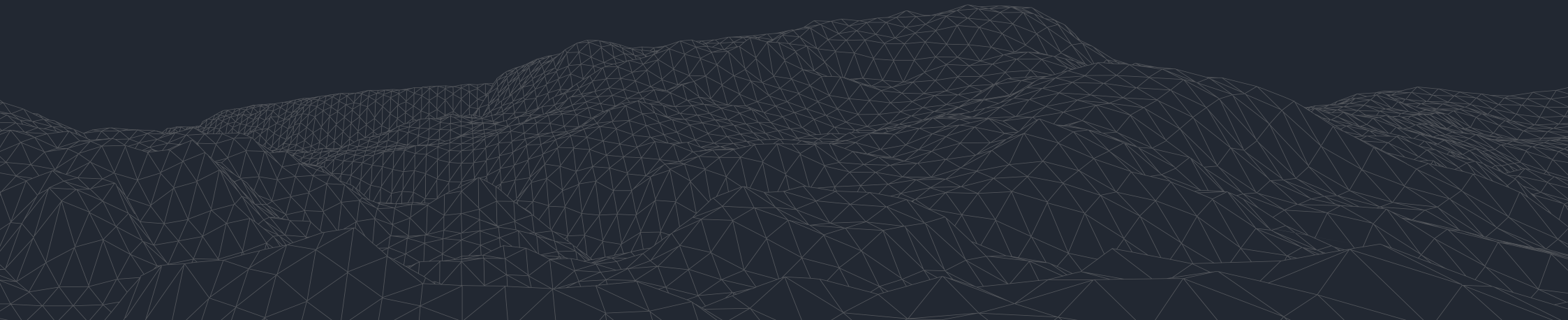
PARTNER OF CHOICE

Currently in-service protecting mission-critical infrastructure in the UK, Drone Guardian is implemented by experienced and dedicated experts that specialise in site survey, optimised sensor location and the delivery of comprehensive, integrated systems.

Established over more than 35 years, our strong, proven pedigree in software development means we're perfectly positioned to optimise the delivery, implementation and ongoing support of complex information systems and data fusion solutions that are ready for the threats of today and the future.



DETECT. TRACK. IDENTIFY. DEFEAT.



FAST. FORWARD.

DRONE GUARDIAN Counter sUAS Defence System 08/2023

© 2023 L3Harris Technologies, Inc.

L3Harris Technologies is the Trusted Disruptor for the global aerospace and defence industry. With customers' mission-critical needs always in mind, our more than 50,000 employees deliver end-to-end technology solutions connecting the space, air, land, sea and cyber domains.

