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DRONE GUARDIAN

COUNTER UAS DEFENSE SYSTEM

DETECT. TRACK. DEFEAT.

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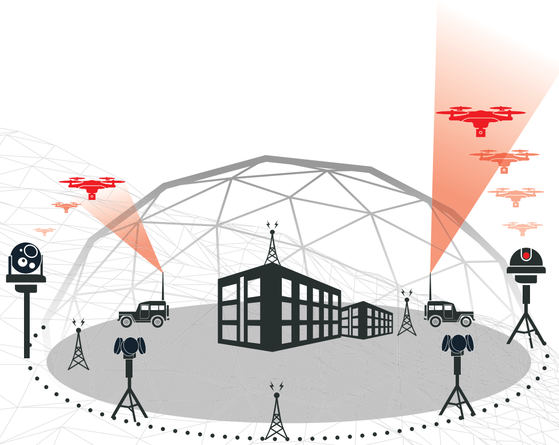
Drone Guardian provides reliable detection and neutralisation of drone threats. The detection, tracking and defeat of Unmanned Aerial System (UAS) or drone threats is a complex problem for which no single sensor or defeat solution has been shown to provide reliable performance across the full range of 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.

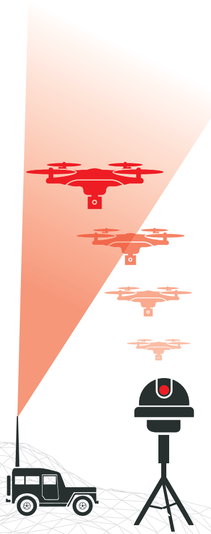


DEVELOPED FOR THE MOST DEMANDING OPERATIONS

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.

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:

- Be highly portable
- Offer maximum 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.

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.

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

The C2 component provides fully automated cueing of sensors and effectors based on accurate and reliable threat detection and characterisation.

EW countermeasures are included in the baseline system which can be configured to operate as a ‘directed’ capability or to provide omni-directional drone jamming, either automatically or under operator control.

The versatile and flexible user interface provides situational awareness as well as the ability for selected users to configure and view diagnostics for the system.

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 HMI will permit the operator to initiate jamming in the appropriate mode and band(s) or configure the system to activate jamming automatically.

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 25 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 – DIRECTION FINDING

A single Direction Finding (DF) RF detection sensor is required to provide Lines of Bearing (LOB) of the drone platform, together with characterisation of the platform or link type used. This data will be correlated with the other sensor detections by the Drone Guardian C2 system to provide a composite situation picture of drone activity.

DRONE DETECTION RADAR

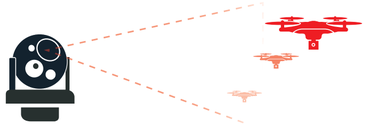
The Drone Guardian system includes a best-of-breed COTS drone detection radar provided by one of our solution partners. The drone detection radar comprises an array of four mast mounted Multi-Mission Hemispheric Radars (MHR). This MHR array will provide 360° detection around the Drone Guardian installation to a maximum instrumented range of 40km. Each MHR device uses a multiple AESA (Active Electronically Scanned Array) antenna optimized for the detection, classification and tracking of UASs.

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.

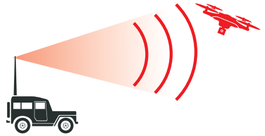
The choice of S-Band operation for the radar is based on the need to provide the longer range detection of very small UAS targets which is required to deploy effective countermeasures.



EO/IR CAMERA

The Drone Guardian system includes an advanced image tracking and image analytics engine to provide image-based drone detection, identification and classification that operates on the images from both fixed and Pan-Tilt and Zoom (PTZ) camera systems.

The images acquired by the Drone Guardian EO/IR cameras are analysed using the L3Harris WESCAM Advanced Video Engine (WAVE); a high performance embedded computing engine design to support advanced image processing and using a state-of-the-art Graphics Processing Unit (GPU). The MX-RSTA features a reliable, high performance video tracker that greatly simplify the target acquisition processes.



EW COUNTERMEASURES

The Drone Guardian effector system is the BROADSHIELD® High-Power Compact System (HCS), which is L3Harris’s latest generation, high-power, active jammer. This field-proven military technology has been used in conflict zones around the world to provide effective protection of people and assets. BROADSHIELD® HCS uses waveform generation techniques employing digital signal processing, together with high-power amplification to generate advanced jamming signals for communications-denial and counter-drone applications across a continuous frequency range of 20MHz to 6GHz.

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-UAS defensive system in the world.

PARTNER OF CHOICE

We are dedicated to helping our customers to make mission critical decisions with confidence.

For almost 35 years, we’ve established a strong software engineering pedigree in the development and through-life management of complex information systems, data fusion solutions and mission configurable communications.

We have the expertise and agility to meet time-critical operational requirements and with a proven record of assured delivery, we collaborate with customers to help them to generate actionable intelligence that can neutralise the most demanding threats in the most challenging operational scenarios.


DETECT. TRACK. DEFEAT.

FAST. FORWARD.

DRONE GUARDIAN Counter UAS Defense System

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L3Harris Technologies is an agile global aerospace and defense technology innovator, delivering end-to-end solutions that meet customers' mission-critical needs. The company provides advanced defense and commercial technologies across air, land, sea, space and cyber domains.

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