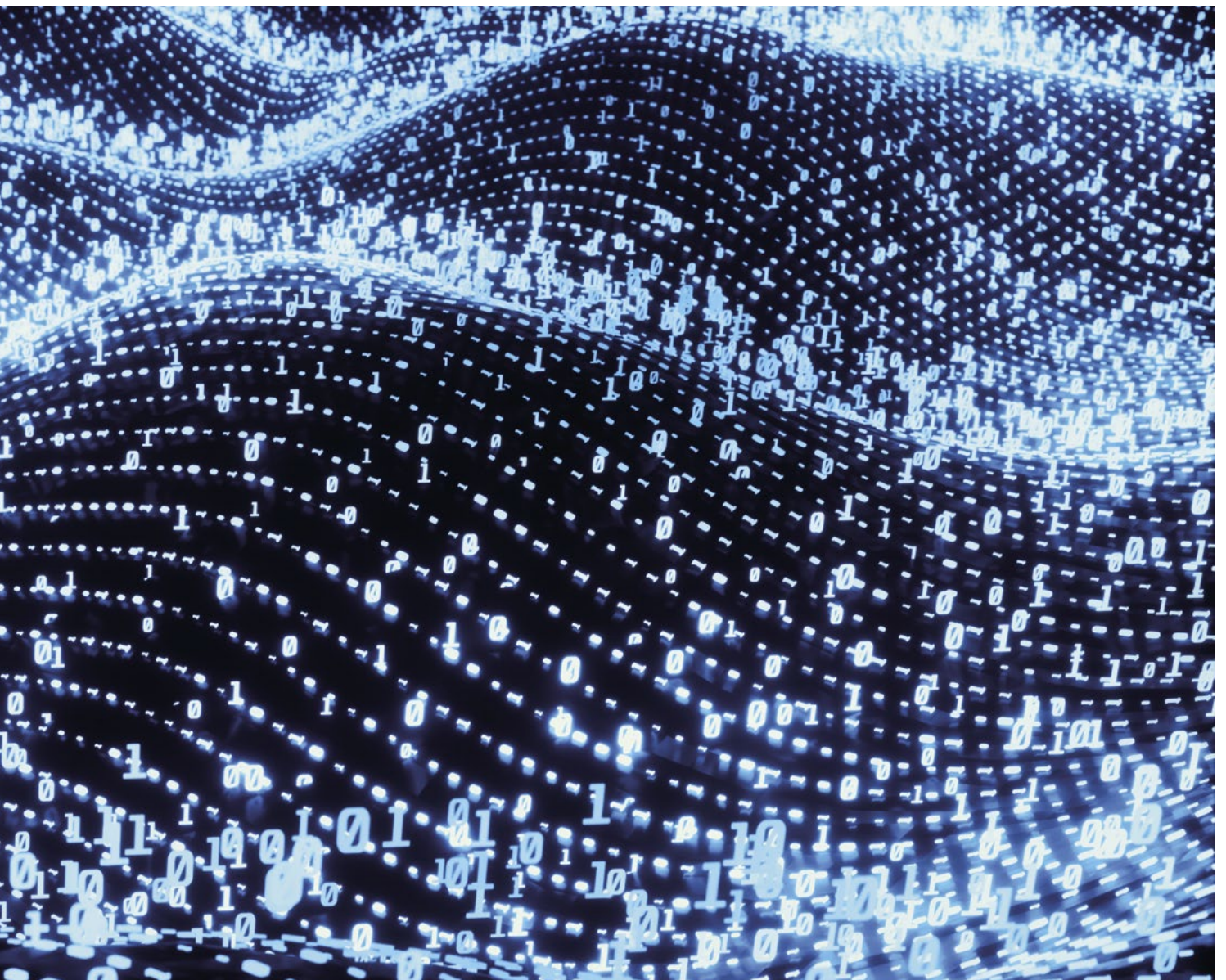




ECS RF Inhibition Solutions



RF Inhibition Product Range

Product Development Timeline

LEGACY PRODUCTS

ANALOGUE

DART Range

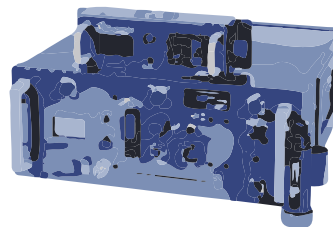
10/20W / Static
Specific Threats



DDS

FALCON PLUS

Vehicle borne / 120W C-RCIED
GSM/VHF/UHF channels



KESTREL Family

10W Manpack
portable



The Threat

The ability to counter terrorist threats and to provide communication security continues to be one of the highest global priorities. Remote Controlled IEDs and the proliferation of mobile communications mean that **RF Inhibitors** are in increasing demand by **Defence, Security and Policing** organisations. By using sophisticated threat analysis with the very latest technology, **Enterprise Control Systems (ECS)** can provide a sophisticated defeat capability to current and emerging threats.

ECS's combat proven capability is attributed to the ability to design all products in-house, with emphasis on long-term reliability through proven quality management processes. Our engineering team are dedicated to product development, ensuring that **ECS** consistently produces leading designs and is able to react quickly to changing threats.

ECS has many years of experience in the design and manufacture of a wide range of RF Inhibitors and has utilised analogue and **Direct Digital Synthesis (DDS)** technologies. Combining our legacy experience with emerging technology **ECS** is now delivering **Software Defined Radio (SDR)** Jamming Systems technology to **Counter – Unmanned Aerial Systems (C-UAS)** and Counter Remotely Controlled Improvised Explosive Devices (C-RCIEDs). The employment of **RC-IEDs** has proliferated globally in recent years and **ECS** systems have been successfully employed in several operational theatres.



DEFENCE



SECURITY



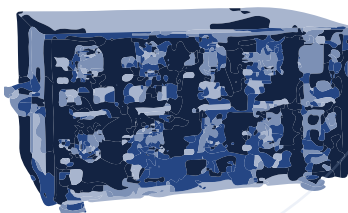
INTELLIGENCE

LEGACY PRODUCTS

DDS

GRIFFIN

Vehicle borne / 500W
20-2400 MHz

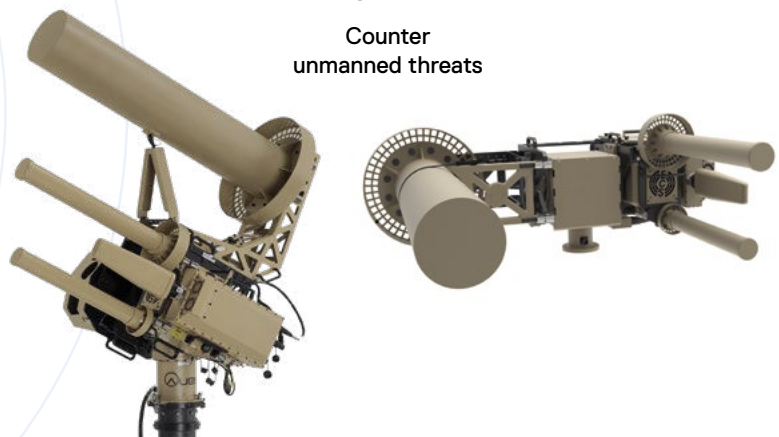


LATEST PRODUCTS

SDR

CLAW

Counter
unmanned threats



Threat Protection






RC-IED's account for the largest proportion of military and civilian casualties in today's asymmetric warfare environment. This threat has resulted in continuous demand for ECS's RF Inhibitors from the Iraq and Afghanistan conflicts onwards. ECS's RF Inhibitors utilise software fills based on sophisticated threat-analysis for operations in multiple electronic threat environments.

RF Inhibition Product Range

- DART:** A portable **analogue** inhibitor systems designed for fast deployment in a ruggedised briefcase envelope.
- FALCON PLUS:** A wideband Software configurable **DDS** vehicle-mounted C-RCIED RF Inhibition system for vehicle protection.
- KESTREL:** A multi-unit Software configurable **DDS** lightweight (7kg) manpack C-RCIED RF Inhibitor, enabling rapid dismounted deployment.
- GRIFFIN:** A wideband Software configurable **DDS** vehicle-mounted C-RCIED RF Inhibition system to protect VVIPs and vehicle convoys.
- CLAW:** The latest iteration of **ECS's** layered RF Inhibition capability is an advanced SDR multiband directional C-UAS RF Inhibitor package. **Claw** enables inhibition of five Command and Control (C2) links between the target UAS and its operator.

AUDS is the World's First Fully Integrated Capability

Since 2014, ECS has collaborated with its multiple partners to offer an integrated and proprietary anti-UAV Defence System, **AUDS**.

 <p>ECS has the in-house capability to integrate the Claw RF Inhibition system into multiple C-UAS detect and track systems.</p> <p>AUDS is a ground-based, smart-sensor and effector package capable of detecting UAS then tracking and classifying them before providing the option to disrupt their activity.</p>	<p>DETECT</p>  <p>TRACK</p>  <p>DEFEAT</p> 	
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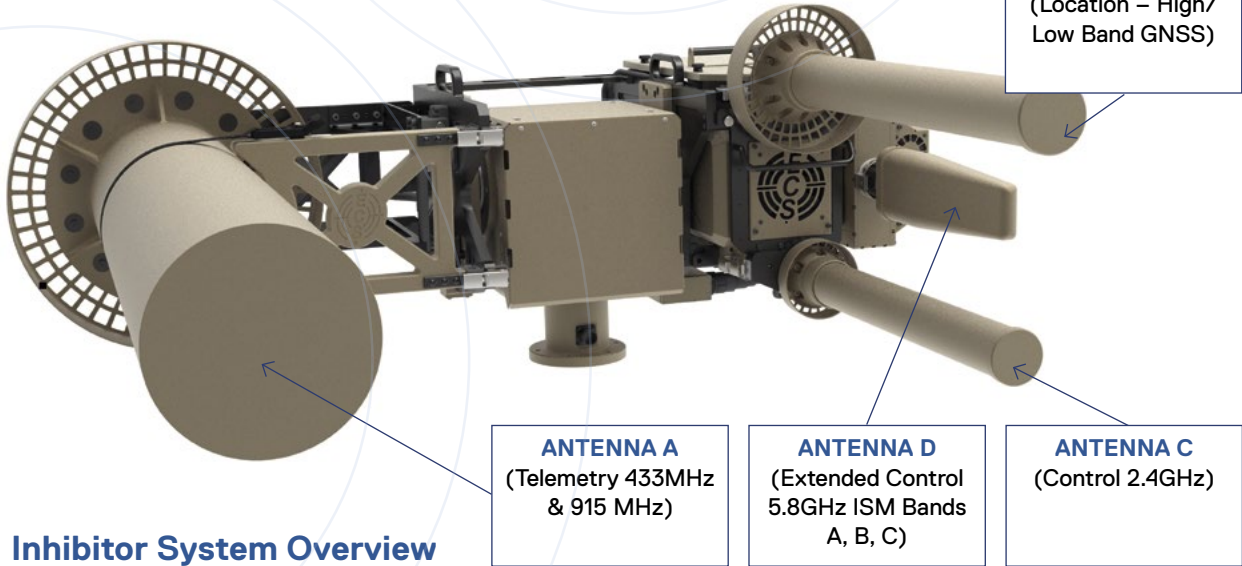
AUDS is a patent pending system that detects, tracks and neutralises UAS engaged in hostile airborne surveillance and defeats, malicious activity. The **AUDS** system combines electronic scanning radar detection and classification, Electro-Optic tracking and the **Claw** directional inhibition system operating across 5 frequency bands (GNSS, 433 MHz ISM, 915 MHz ISM, 2.4 GHz and 5.8 GHz ISM/WiFi).

AUDS is a ground based, smart sensor and effector package, capable of detecting UAS at long range then tracking and classifying them before providing the option to disrupt their activity.

ECS supplies the Defeat technology, under its **Claw** RF Inhibition system that includes advanced SDR source multiband RF Inhibitors with coaxially mounted directional antennas, which selectively defeat the target UAS C2 channels.

Blighter Surveillance Systems provides the A400 **Air Security Radar Detection** over 360 degree azimuth and 20 degree elevation. The static panels are electronically steered providing continuous 360 degree detection at a 2 second update rate.

Chess Dynamics focuses on electro-optical Tracking and Identification system element including an HD daylight camera and cooled thermal imager, mounted on a high accuracy positioner.



Inhibitor System Overview

The **Claw** Directional Inhibitor is a self-contained inhibitor system that combines the (RF) power with a high-gain multi-band directional antenna system.

The **Claw** Inhibitor comprises of dual mast-mount units covering the 433MHz, GNSS, 915MHz, 2.4GHz and 5.8GHz ISM frequency bands with RF output powers to the antennas of up to 83W. With an aggregated RF output power to the antennas of up to 150W.

The **Claw** system disrupts the control, navigation and telemetry links used by UAS and can be customised for end-user requirements.

Claw is a secure fully self-contained, compact system with no external signal processing or Power Amplification modules required, which insulates the solution from third-party interference and aids integration into multiple sensor systems.

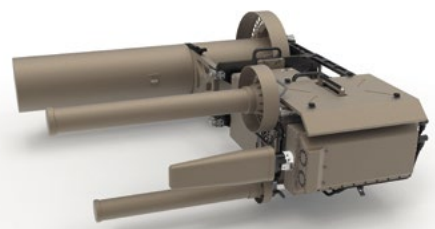
The Claw System comprises the following:

- Directional antenna enclosures
- Two SDR directional inhibitor units
- Either 2 AC, or 1 DC Power Supply Units
- **Claw** positioning head

Antenna Design

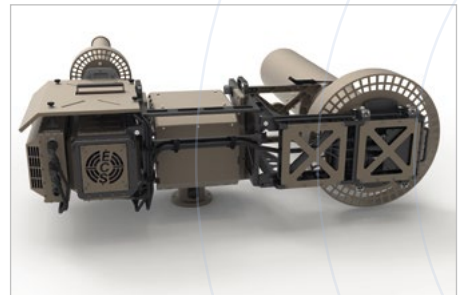
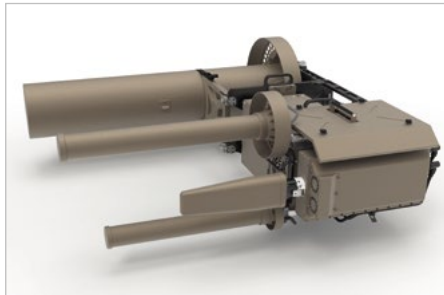
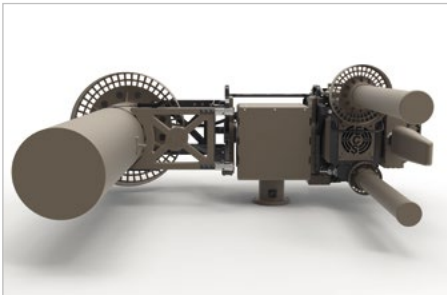
High-gain, narrow beamwidth, antennas maximise the power density at the target threat device whilst minimising disruption of co-located systems.

In-house development allows bandwidth, polarisation and gain to be tailored to changes in threat devices identified in the field.



RF Inhibition C-UAS

ECS Claw System and Directional Inhibitor Units

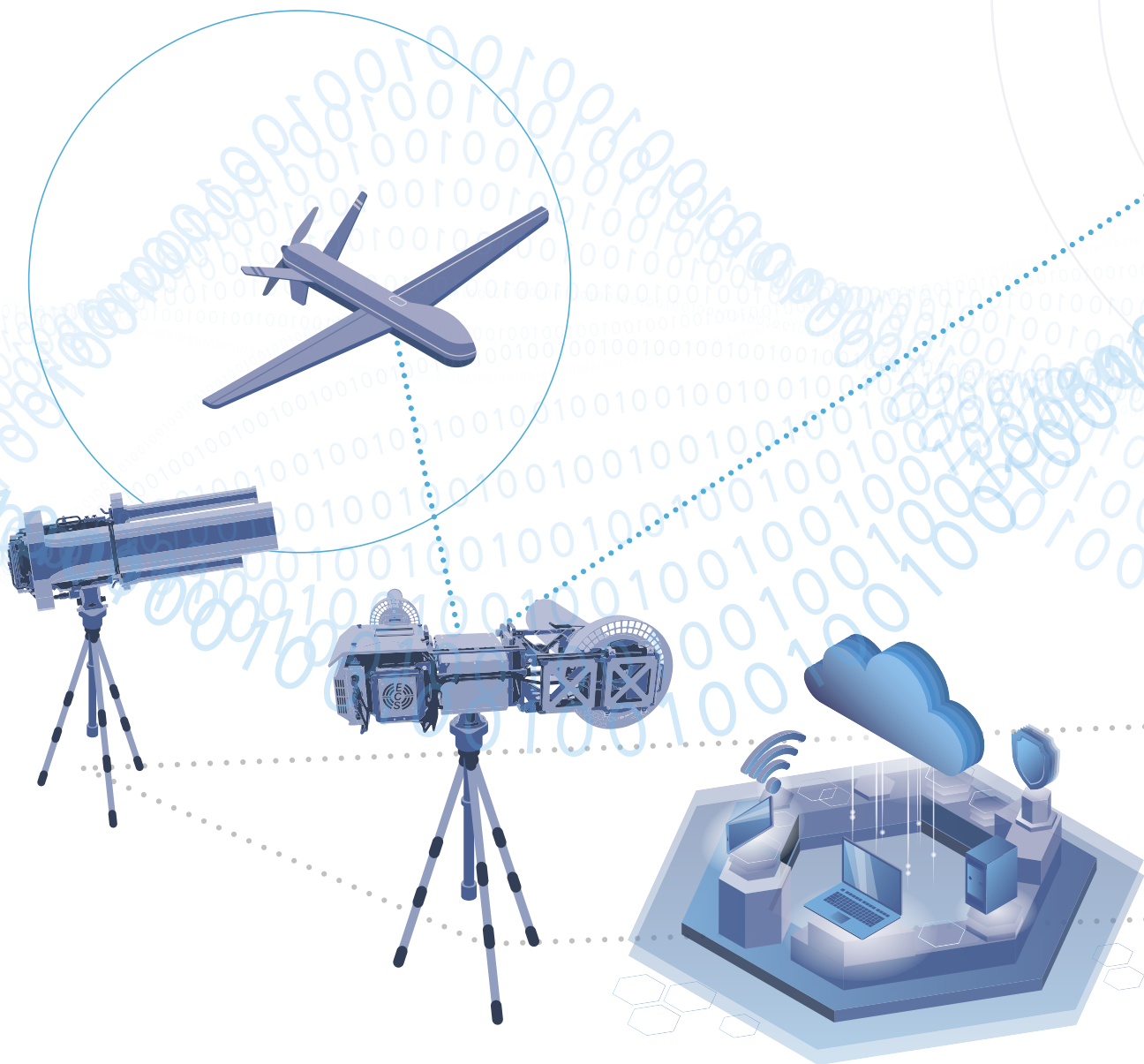


Differentiators	Key Attributes
Custom System Design	<ul style="list-style-type: none"> • RF Inhibition designed to focus specifically on the UAS threat and the C2 links used by UAS • Designed for Military, Security and Critical National Infrastructure (CNI) operational environment • Designed for integration into multi-element detect, track and defeat systems
Directionality and Waveform Polarisation	<ul style="list-style-type: none"> • A directional, not omni-directional, effect • Addresses a target detected by any sensor type (Radar, RF, Optical) • Inhibition waveform attributes optimised for UAS C2 defeat • Software Defined Radio (SDR) source • Waveform polarisation optimised to defeat agile airborne platforms • Inhibition effect delivered at range (at a low power consumption)
Frequency Selectivity and Spectral Cleanliness	<ul style="list-style-type: none"> • Specifically targets the operational frequency of the UAS C2 system • Selectable in discrete or operated simultaneously on all bands • Precise band occupancy with minimal detrimental harmonic effect
Power Control and Duration	<ul style="list-style-type: none"> • Low power consumption whilst still delivering extended range performance • Inhibition initiated only when required and for minimum necessary duration so is not 'always-on' • Designed with precision feedback to enable highly repeatable, stable output across extremes of temperature • Dynamic power control feature

ECS RF Inhibitor Technology

RF Intelligent Protection

Claw RF Inhibitors can be easily integrated into multi layered air defence systems delivering a comprehensive **RF defeat** capability.



Primary C² station



Critical National Infrastructure

Why Claw?



With military and security customers demanding performance to counter the increasing threat of malicious or hostile drone activity. Operationally proven with over 2000 confirmed defeats, the Claw RF Inhibitor provides more range, accuracy, and agility than any RF Inhibiting system, defeating drone attack in excess of 9km, keeping critical infrastructure and people safe.

Claw's unparalleled record for long range drone defeat is in part because it is powered by an ECS designed **SDR**, ensuring real time, reactive and targeted power allocation within **400MHz** to **6GHz** frequency range providing intelligent RF Inhibition ensuring spectral cleanliness limiting collateral damage.

The **Claw** targeted power comes courtesy of the quintuple band antenna system, developing up to **2350W** of directed energy to defeat UAV RF data links. The high-gain, narrow beamwidth, **400MHz – 6GHz** antennas maximise the power density at the target threat device whilst minimising disruption of co-located weapon and communications systems.

Interoperability is one of the major successes of the **Claw** RF Inhibitor's sensor agnostic modular design. It could not be easier for an integrator looking for a layered approach, to seamlessly harmonise with third party multisensory C2 drone detection and kinetic systems, to provide ultimate **operational flexibility**.

Proven to be robust and reliable through operational deployments, **Claw** benefits from **multiple mounting positions**, allowing it to be integrated onto fixed and manned or robotic mobile platforms. So, whether the requirement is to permanently protect CNI, repel incursion across borders, or defence of VVIPs on a platform of your choice, **Claw** is the ideal choice for your RF defeat solution. Because the system is a **fully ECS design**, minor modifications can easily be made and reworked in our mechanical workshop, if required.

Selected and used worldwide, **Claw** delivers a world class RF Inhibition Capability for C-UAS.



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