



# AI-Enabled Platforms for Protection against Advanced Threats

DroneShield (ASX:DRO)

July 2023

*Image: DroneShield RfPatrol in deployment protecting the U.S. Presidential motorcade*

# Rapid Momentum



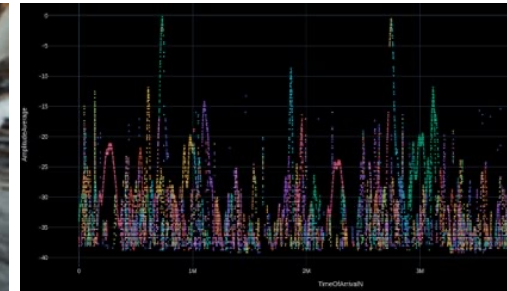
- Record contracts and rapidly growing cash receipts
  - \$33 million US Government sale announced 16 July, expected to be fully delivered and paid this calendar year
  - \$9.9 million 2-year R&D contract announced 4 July, following on the earlier \$3.8 million contract from same customer
  - All-time record 2Q23 cash receipts of \$8.2 million, ▲200% over 2Q22
  - \$15.3 million cash receipts for 1H23, ▲200% over 1H22
  - Expecting \$2.4 million in R&D Tax Incentive (as cash payment) in the current 3Q23 quarter
- Strong cash balance of \$42.4 million as of 30 June, no debt or convertibles
- Record \$62 million contracted backlog and pipeline of over \$200 million\*
  - \$65m+ inventory build under way, substantially completed by end of current quarter
- Recommendation by the U.S. DoD for rollout across its bases nationwide, expected to commence this year
- \$3.7 million investment from Epirus Inc, a U.S. defense technology unicorn developing software-defined directed energy systems
  - Integration with Epirus completed in June 2023
- Substantially completed expansion of the team to enable build, delivery and support of materially larger orders
- Favourable macro environment for DroneShield with rapidly rising counterdrone, defence and security spending globally
  - The Ukraine conflict continues to highlight the use of drones on battlefield, which will continue driving increasing C-UAS orders even after the eventual ceasefire

\* There is no assurance that any of the Company's sales opportunities will result in sales.

# Explosive Growth Based on a Strong Foundation



2014-2017 Building the Foundation	2018-2022 "Green Shoots"	2023 Explosive Growth	2024-2028 Transforming to Next Level
<ul style="list-style-type: none"> <li>• Setting up in Australia and US</li> <li>• ASX IPO (raising \$7m)</li> <li>• R&amp;D and productizing the initial product family:                             <ul style="list-style-type: none"> <li>- DroneGun Mk1 and Mk2</li> <li>- Acoustic detection sensors</li> </ul> </li> <li>• Team grows to 11 staff</li> <li>• Global partner network setup</li> <li>• C-UAS market in infancy</li> <li>• Customers demos, trials and initial smaller orders</li> <li>• From nil to \$300k/year annual revenue</li> </ul>	<ul style="list-style-type: none"> <li>• Multiple \$1m+ orders</li> <li>• \$3.8m 2-year R&amp;D contract</li> <li>• \$9.6m and \$17m capital raises, \$3.7m Epirus investment</li> <li>• Completing the product line-up:                             <ul style="list-style-type: none"> <li>- DroneGun Tactical</li> <li>- RfPatrol Mk1 and Mk2</li> <li>- DroneSentry-X</li> <li>- Refinement of DroneSentry</li> <li>- Introducing SaaS model</li> </ul> </li> <li>• First-ever ACMA licence to manufacture jammers</li> <li>• Team grows to 60 staff</li> <li>• From \$1m to \$17m annual revenue</li> </ul>	<ul style="list-style-type: none"> <li>• \$33m U.S. Govt sale</li> <li>• \$9.9m 2-year R&amp;D contract</li> <li>• \$40m capital raise</li> <li>• 85 staff in Sydney and Virginia</li> <li>• Exploding market, with Ukraine highlighting the need for C-UAS products</li> <li>• \$62m order backlog</li> <li>• \$200m pipeline</li> </ul>	<ul style="list-style-type: none"> <li>• 5-year target*:                             <ul style="list-style-type: none"> <li>- \$300-\$500m annual revenue</li> <li>- 50% of revenue in SaaS and software R&amp;D</li> </ul> </li> <li>• This revenue is expected to be supported by 120-150 staff</li> </ul>



\* There is no assurance that any of the Company's sales opportunities will result in sales.

# Executive Summary



<b>DroneShield Overview</b>	<ul style="list-style-type: none"><li>• Founded in 2014 and listed on the ASX in 2016, DroneShield provides <b>Artificial Intelligence platforms for protection against drones</b></li><li>• <b>Hardware and software</b> to detect and safely neutralise small drones used for warfare, terrorism, contraband delivery, and airport disruptions</li><li>• <b>Key customers</b> include military, intelligence community, Homeland Security, law enforcement, critical infrastructure, prisons and airports globally</li></ul>
<b>Business Model</b>	<ul style="list-style-type: none"><li>• <b>Three streams of revenue:</b> hardware (drone detection and defeat devices), SaaS (device software updates) and R&amp;D</li><li>• Sales through an <b>experienced in-house veteran salesforce with distribution partners across over 100 countries</b></li><li>• SaaS is expected to become a <b>significant proportion of overall revenue</b> over the next 5 years</li><li>• R&amp;D contracts are adjacent to the core technology, and contribute advanced capability in-house, and attracting and upskilling talent</li></ul>
<b>SaaS via Proprietary AI Software Engines</b>	<ul style="list-style-type: none"><li>• <b>RFAI™</b> (radiofrequency spectrum engine), <b>DroneOptID™</b> (optical AI engine), <b>SFAI™</b> (sensorfusion AI engine)</li><li>• The engines undertake real-time, at the edge, <b>detection and identification of drones</b> and other potential threats</li><li>• The result is an <b>increase in detection responsiveness, lower false positives</b> and an <b>increase in the speed</b> at which new threats are detected, classified and tracked by DRO systems</li><li>• Customers receive <b>regular software updates</b> via enrolling in a SaaS model at the time of purchase of their systems</li><li>• All hardware except for radars and cameras fully developed in-house, with no reliance on third party IP</li></ul>
<b>Addressable Market</b>	<ul style="list-style-type: none"><li>• <b>International addressable markets</b> in counterdrone estimated at approximately <b>US\$10 billion</b> worldwide</li><li>• Rapidly improving and easily available drone technology is <b>driving demand for counterdrone solutions</b></li><li>• <b>Current geopolitical conflicts make extensive use of drones by all sides</b></li></ul>
<b>Growth Strategy</b>	<ul style="list-style-type: none"><li>• Today, over <b>75% of revenues is derived from defence</b></li><li>• Defence, intelligence community and border security will continue to be the key focus, however there is a <b>major opportunity for growth</b> into civilian airports, critical infrastructure, prisons, stadiums and corporates</li></ul>

# DroneShield Investment Highlights



## Leader in Counterdrone

World leading provider of state-of-the-art counterdrone solutions and electronic warfare systems used in a diverse array of critical end markets

## Proprietary AI-Based Platform

Full-scale hardware and SaaS offering used to detect, assess, and safely counteract threats from unmanned aerial systems (“UAS”)

## Large and Growing Market

Leverage to the global defence and security technology sector; \$10bn counterdrone addressable market, in addition to electronic warfare and defence AI markets

## High Quality Sales Pipeline

Sales pipeline of over \$200m with over 80 qualified projects at different stages; over \$60m in contracted orders currently being fulfilled

## Recurring Customer Base

Best-in-class customer base including the Australian Department of Defence, US DoD, US State Department and others

## Rapidly Scaling Financial Profile

The business is at an inflection point, with a record \$15.2m in 1H23 cash receipts

## Fully Funded for Growth

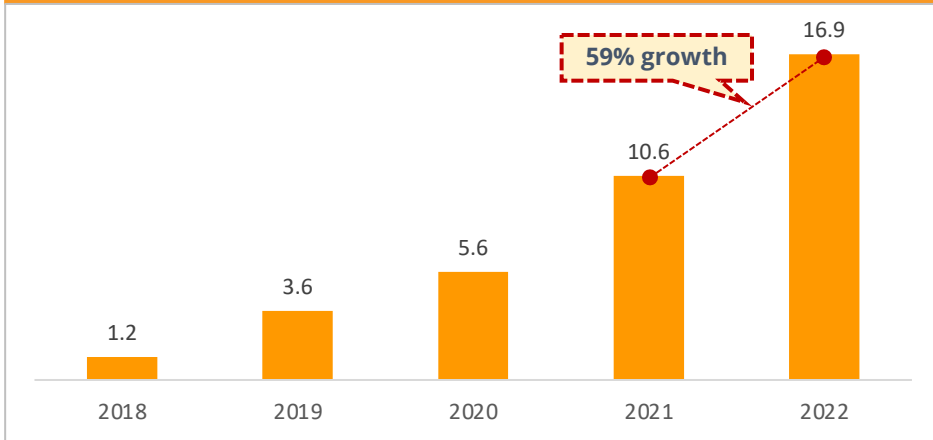
Fully funded for growth with \$40m raised in March 2023; spending geared towards rapid scaling of inventory and operations to meet high demand

# Continued Rapid Growth (\$m, Dec YE)

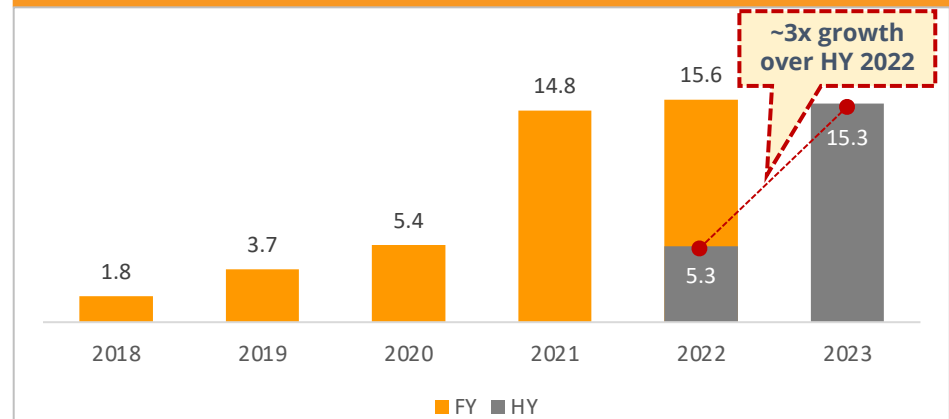


## The business stands at an inflection point

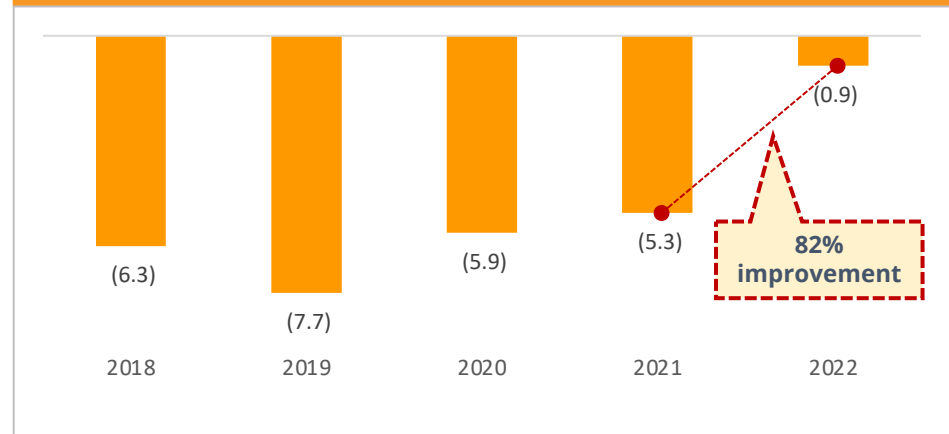
### Strong Revenue Growth



### Rapid Cash Receipt Growth (Sales + Grants)



### Rapidly Improving P&L





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Business Overview

# Why is the Malicious Use of Drones a Threat?



The widespread adoption of drone technology has increased the risk and prevalence of disruptive use



## Payload Delivery

- **Attacks:** Dropping harmful / explosive payloads (including chemical or biological substances) or creating damage via collision
- **Smuggling:** Moving contraband into sensitive zones such as prisons



## Intelligence Gathering

- **Directing Attack:** Reporting enemy target location on the battlefield to direct forces
- **Spying and Tracking:** Obtaining video, images and track movements of personnel
- **Surveillance:** Using drone images and other payload data to enable reconnaissance



## Nuisance Activity

- **Infrastructure Disruption:** Using drones to jeopardise the safe operation of major facilities such as airports



## Cyber and Ransom Attacks

- **Corporates, Ships, Facilities:** Hack into control networks via proximity intrusion with a drone, and demand ransom or cause terrorist attack



# AI-Enabled Platforms Protect Against Advanced Threats



Multiple platforms in adjacent technologies and customers with a common theme of AI-based threat protection

## Counterdrone

- Global leader with multiple differentiators in a rapidly growing counterdrone market
- Hardware sales paired with SaaS offering
- Tier 1 customers across military, intelligence community, Government and critical infrastructure
- \$200m+ pipeline
- \$62m order backlog

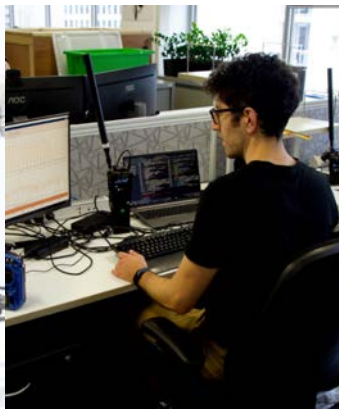
## Artificial Intelligence in Electronic Warfare

- Executing on a 2-year \$9.9m contract with Five Eyes DoD, following on the earlier \$3.8m contract in 2021
- Land, Sea/sonar, Air, Space and Joint Forces applications
  - DroneShield's AI software is well positioned to solve Defence "big data" challenges

## Artificial Intelligence in computer vision and sensor fusion

- Completed 1-year initial \$800k contract with Australian DoD in late 2022
- Expecting follow-up work

### Synergies between counterdrone and non-drone applications



# How a Counterdrone System Works



## Step 1

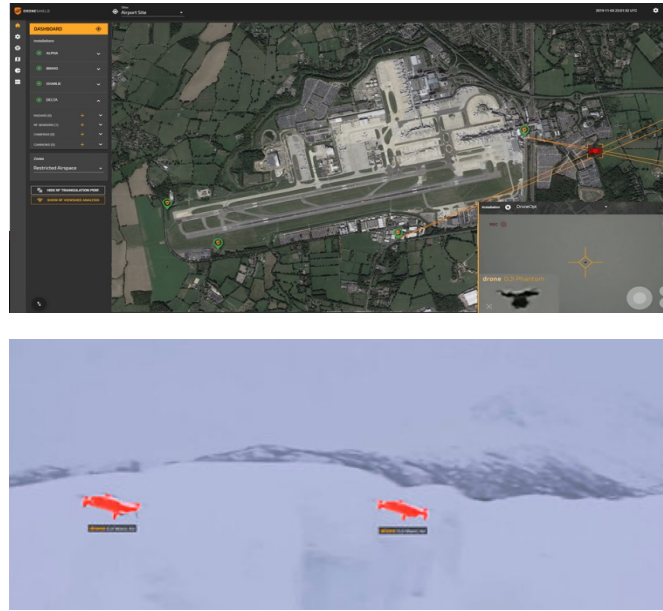
### Detect



- State of the art, multi-sensor drone **detection** products provide optimal detection and identification of drones and other UAS threats

## Step 2

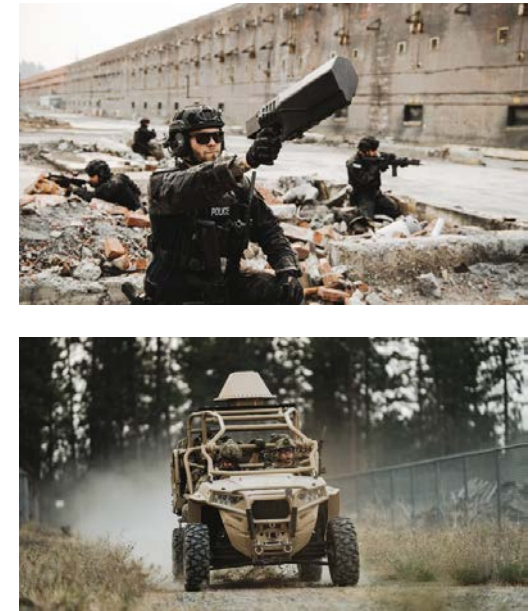
### Assess



- Machine learning and AI based detection and classification software is used to undertake near-real time tracking and **assessment** of drones and UAS threats

## Step 3

### Respond



- **Respond** / defeat technologies offer intelligent, responsive, non-kinetic jamming for the controlled management of threats

# Geopolitical Environment Providing Market Tailwinds



- Increased expenditure by Western Governments in response to the war in Ukraine
  - US DoD increasing 2023 budget to over US\$800bn, a record peacetime amount<sup>1</sup>
  - Germany increasing spending to over 2% of GDP (from 1.53% in 2021), including a new EUR100bn fund to modernise military<sup>2</sup>
  - Poland have announced a record 2023 Defence budget at 3% of GDP<sup>3</sup>
  - Australia is currently under a Defence Strategic Review, with expectations to increase the Defence spend and allocate an increasing budget to asymmetric, high-tech and greyzone warfare
- In Australia, the Government is seeking to rapidly grow sovereign defence capability, with several key focus areas directly matching DRO expertise, being counter-robotics, Electronic Warfare, battlefield surveillance (ISR) and defence technology capabilities more generally
- Record Defence and Security budgets, combined with a demonstrated use of drones by both sides in Ukraine for payload delivery, directing artillery strikes, collecting field intelligence and general use, has put increasing focus on both drone and counterdrone systems for all major militaries
- DroneShield is one of very few fielded and proven counterdrone systems with **US DoD recommendations** and based in Australia and US, hence well positioned to supply to Western allies
- Combined, these factors are expected to lead to meaningful and consistent order flow for DroneShield across near and medium term



Ukrainian men practice attaching a bomb to a drone



Iranian Shahed drones used by the Russian military

<sup>1</sup> <https://news.am/eng/news/711941.html>

<sup>2</sup> <https://www.reuters.com/business/aerospace-defense/germany-hike-defense-spending-scholz-says-further-policy-shift-2022-02-27/>

<sup>3</sup> <https://www.trade.gov/market-intelligence/polands-defense-spending>



**DRONESHIELD**  
Layered Counter-UAS Solutions  
DETECT &  
DEFEAT

kaléo

Cynalytica



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Addressable Market

*Image: US Department of Defense conference*

# Counterdrone: Diverse Array of Critical End Markets



Rapidly improving and easily available drone technology is driving demand for counterdrone solutions

Military



Government Facilities



Law Enforcement



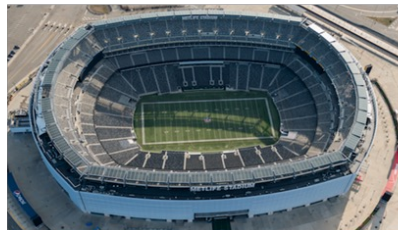
Protective Details



Airports



Stadiums



Commercial Venues



Energy Production



High Profile Events



Shipping / LNG Ports



Rescue / Fire Response



Correctional Facilities

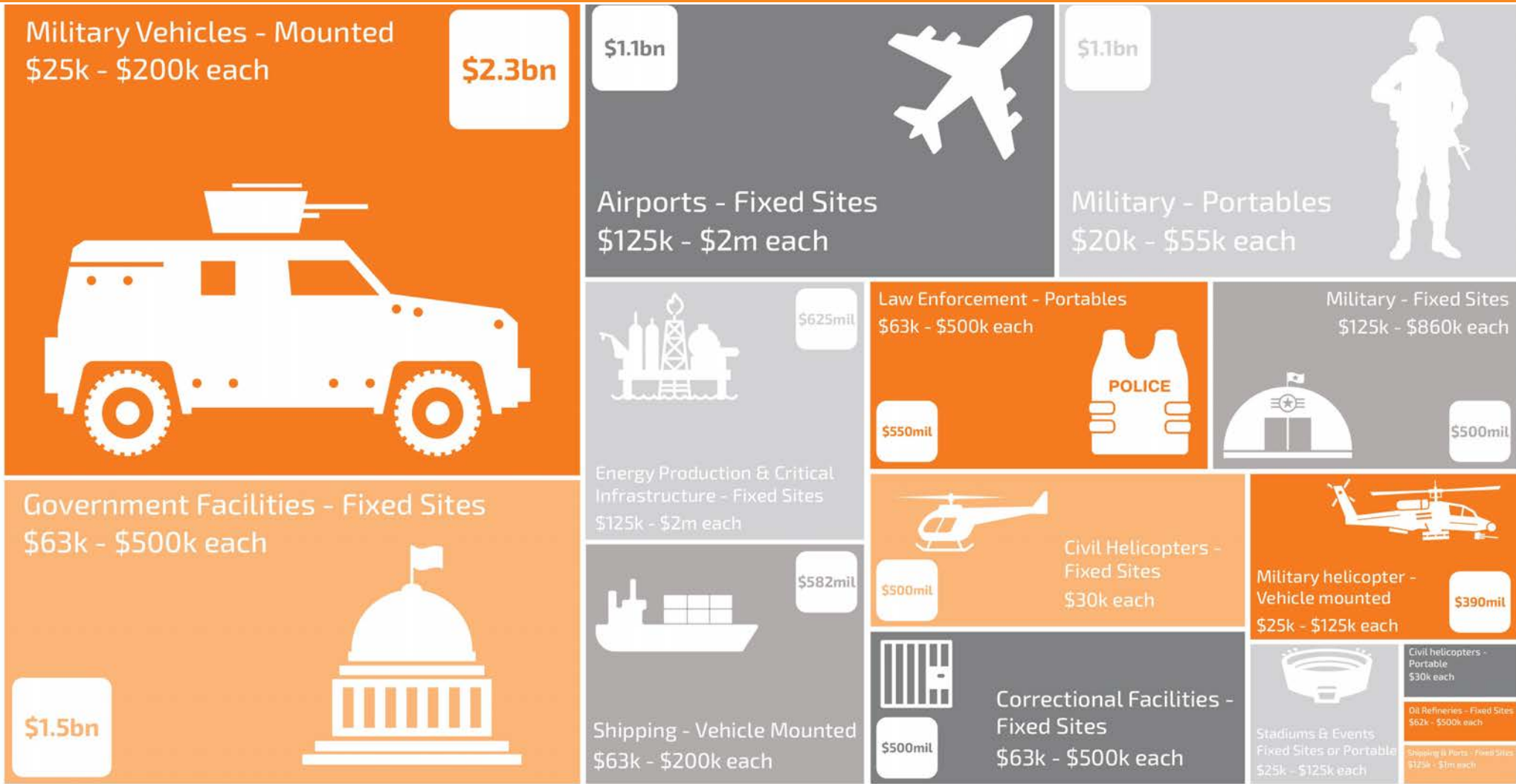


Sources:

Markets and Markets: <https://www.marketsandmarkets.com/Market-Reports/anti-drone-market-177013645.html>

Factors & Factors: <https://www.globenewswire.com/en/news-release/2021/08/27/2287713/0/en/Global-Counter-UAV-Market-Size-Share-Expected-to-Reach-USD-2-041-09-Million-by-2026-Facts-Factors.html>

# US\$10bn Total Addressable Market



Sources: <https://www.DroneShield.com/counterdrone-market>



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DroneShield Capability and Product Overview

# DroneShield: Complete Hardware and Software Offering



**High IP, yet mass-production hardware, with a software subscription platform and Electronic Warfare work**

- Company-owned production facility, supplemented by outsourced manufacturers, to ensure ability to manage large hardware orders
- The focus is on software subscriptions, with hardware fleet serving as an enabling platform

## Hardware with Embedded Software and Associated Services

### Dismounted & Body-Worn Counterdrone Solutions



DroneGun Mk3



DroneGun Mk4



DroneGun Tactical

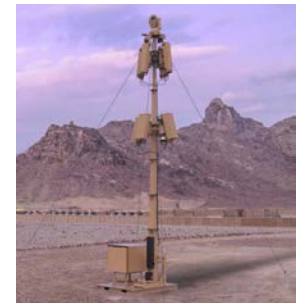


RfPatrol Mk2

### Vehicle / Ship / Fixed Site Counterdrone Solutions



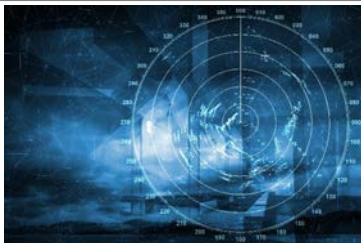
DroneSentry-X



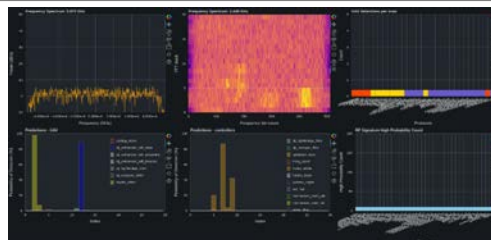
DroneSentry

## Software (SaaS and R&D contracts)

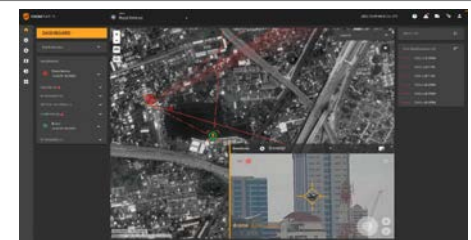
### Electronic Warfare and SIGINT



### RFAI (Radiofrequency AI engine)



### DroneSentry-C2 and DroneOptID







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Competitor Analysis

# DroneShield's Counterdrone Competitive Advantage






C-UAS market pioneer, with a culture of systematic innovation and understanding of channels to market




## Market leading, differentiated technology...

- ✓  Multi-sensor detection, ID and tracking
- ✓  Best-in-breed detection range
- ✓  Best-in-breed defeat range




## ...across multiple platforms...

- ✓  Body-worn
- ✓  Vehicle/Ship mounted
- ✓  Fixed site

## ...underpinned by AI-powered SaaS...

- ✓  Proprietary software integrated across product suite
- ✓  Difficult to replicate
- ✓  Experienced development team for quarterly software updates

## ... and backed by high barriers to entry

- ✓  Experienced in-house veteran sales team
- ✓  Relationships and pipeline with global defence partners and clients in over 100 countries
- ✓  Deep in-house world-leading technology talent (65+ engineers)

# Competitor Analysis

DroneShield is the only global provider of its own individual sensors, all integrated into a complete system, fully in-house



	DRONESHIELD	ANDURIL	CACI	LITEYE Black Sage	Dedrone Aerial Armor	ELECTRONIC WARFARE	Radio Hill — Home of the Dronebuster —	BLUEHALO	SRC
<b>Country of Origin</b>									
<b>Integrator</b>	✓	✓	✓	✓	✓	-	-	-	-
<b>In-House Detect</b>									
<b>Dismounted</b>	✓	-	-	-	-	-	-	-	-
<b>Vehicle Mounted</b>	✓	-	✓	-	-	-	-	✓	✓
<b>Fixed Site</b>	✓	✓	✓	-	✓	-	-	✓	✓
<b>In-House Defeat</b>									
<b>Dismounted</b>	✓	-	-	✓	✓	✓	✓	-	-
<b>Vehicle Mounted</b>	✓	-	-	-	-	-	-	✓	-
<b>Fixed Site</b>	✓	✓	-	✓	-	-	-	✓	✓
<b>Commentary</b>									
<b>Platform information</b>	<ul style="list-style-type: none"> <li>✓ Most extensive product range in the market</li> <li>✓ Large in-house IP portfolio</li> <li>✓ Market leading performance</li> </ul>	<ul style="list-style-type: none"> <li>✓ Integrator-only via its Lattice platform</li> <li>✓ Acquired Copius Imaging sensing technology</li> </ul>	<ul style="list-style-type: none"> <li>• Substantially an integrator</li> <li>• Acquired AVT, a smaller integrator</li> </ul>	<ul style="list-style-type: none"> <li>• Highlander Partners (Texas PE) acquired both Liteye and Black Sage</li> <li>• System integrators/C2 suppliers</li> </ul>	<ul style="list-style-type: none"> <li>• Lower-performance technology</li> <li>• Focus on prison and police</li> <li>• Dedrone acquired Aerial Armor Jan 2023</li> </ul>	<ul style="list-style-type: none"> <li>• Handheld Dronekiller jammer gun</li> <li>• Lacks a full product suite</li> </ul>	<ul style="list-style-type: none"> <li>• Handheld DroneBuster jammer gun</li> <li>• Lacks a full product suite</li> </ul>	<ul style="list-style-type: none"> <li>• Titan RF detect-and-defeat (via Citadel acquisition)</li> <li>• LOCUST laser defeat</li> <li>• Acquired Verus Mar 2023</li> </ul>	<ul style="list-style-type: none"> <li>• Offer an expensive, competing product to DroneSentry</li> <li>• Lacks a full product suite</li> </ul>
<b>Detection</b>	RF, EO / IR, Radar	RF, EO / IR, Radar	RF, EO / IR, Radar	RF, EO / IR, Radar	RF, EO / IR, Radar	-	-	RF	EO / IR, RF, Radar
<b>Defeat</b>	RF smart jamming	Drone on drone – Anvil product	-	Catching net, RF jamming	RF jamming	RF jamming	RF jamming	RF jamming, Laser	RF jamming
<b>Geography Focus</b>	Global	USA, UK, Australia	USA	USA	Global	USA	Global	USA	USA
<b>In-House Technology Portfolio</b>	RF, EW, waveforms, AI, sensorfusion, computervision	Sensor integration	EO / IR sensors, gimbals, RF	Sensor integration	RF	Waveforms	RF	RF, Laser	RF, EW, radar

Note: Competitor analysis based on publicly available information



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Key Execution Priorities and Growth Strategy

# Strategy | Continue Leadership in Counterdrone, Grow Adjacent Capabilities and SaaS



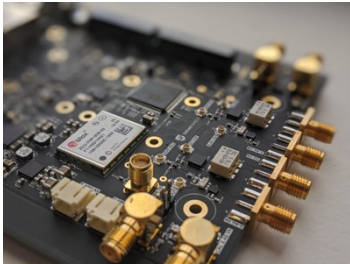
## Three-part Strategy



### Continue Leadership in the Counterdrone/Unmanned Threat Sector

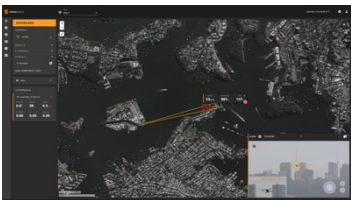
- The counterdrone market is growing rapidly, especially in the US
- DroneShield is well positioned as the industry pioneer, with on-the-ground US team, and Australia being part of the Five Eye intelligence alliance (US, UK, Australia, NZ and Canada)

### Grow Adjacent Capabilities



- **Electronic Warfare (EW):** executing on the third, \$9.9m contract with a Five Eyes Department of Defence
  - EW includes obtaining intelligence of the radiofrequency signals on the battlefield and applying directed energy to jam, degrade, disrupt or neutralise an adversary capability
- **Command-and-Control and Tracking Systems:** providing a central display/control for numerous assets deployed in the field by military, law enforcement and Government agencies
- **Optical Detection and Tracking:** using proprietary AI algorithms to enhance optical/thermal camera capabilities to detect, identify and track objects for military, law enforcement, Government, airport and prisons

### Grow SaaS (Software as a Service) element



- Existing counterdrone detection products include a meaningful ongoing subscription, which will continue to grow with the number of deployed devices in the field – DroneShield provides quarterly software updates
- Adjacent capabilities are purely or mostly software based, either with subscription or longer term R&D cashflows (including counterdrone training and simulation market)

# Contact Details



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Appendices

*Image: Middle Eastern Defence agency brief at IDEX*

# Counterdrone Detection Solutions



DroneShield uses multi-sensor drone detection for optimal results, unaffected by time of day or weather

	Radio frequency	Radar*	Cameras*	Acoustic*
Imagery				
Overview	<ul style="list-style-type: none"> <li>• Foundational layer</li> <li>• Detects drone comms protocols (via conventional RF library or an AI engine)</li> </ul>	<ul style="list-style-type: none"> <li>• Motion tracker - emits signals which are then reflected back to the radar by targets</li> </ul>	<ul style="list-style-type: none"> <li>• Electro-Optical (EO), Infrared (IR) and Thermal</li> <li>• Video analytics and image capture identification of drone activity</li> </ul>	<ul style="list-style-type: none"> <li>• Compares noise of drone blades or motor to a database of acoustic signatures</li> </ul>
Advantages	<ul style="list-style-type: none"> <li>✓ No interference with other sensors</li> <li>✓ Tracks multiple targets</li> <li>✓ Passive – cannot be “seen”</li> <li>✓ Low false alarm rate</li> <li>✓ Direction-finding capability</li> <li>✓ Long ranges</li> <li>✓ Cost effective</li> </ul>	<ul style="list-style-type: none"> <li>✓ Picks up drones without RF emissions</li> <li>✓ Tracks multiple targets</li> </ul>	<ul style="list-style-type: none"> <li>✓ Best used for verification, classification and tracking of a target detected by other sensors</li> <li>✓ Potential identification of payloads</li> <li>✓ Provides “eye on target”</li> </ul>	<ul style="list-style-type: none"> <li>✓ Passive, cost effective</li> <li>✓ Supporting sensor, filling gaps from other sensors</li> </ul>
Disadvantages	<ul style="list-style-type: none"> <li>✗ Doesn't pick up RF-silent drones</li> <li>✗ Requires firmware updates</li> </ul>	<ul style="list-style-type: none"> <li>✗ False alarms (birds etc)</li> <li>✗ Is “seen” as emits energy</li> <li>✗ Longer range detection is expensive</li> <li>✗ Struggles with hovering drones</li> </ul>	<ul style="list-style-type: none"> <li>✗ Not well suited for detection on its own due to field-of-view vs distance trade-off</li> <li>✗ Short ranges</li> </ul>	<ul style="list-style-type: none"> <li>✗ Short range</li> <li>✗ False alarms</li> <li>✗ Cannot locate or track</li> <li>✗ Requires signature database updates</li> </ul>







\* Third party hardware, integrated into DroneShield combined multi-sensor solution, with differentiated offering via AI-powered software layers



# Counterdrone Defeat Solutions



**DroneShield uses smart jamming which has advantages over other technologies, particularly, in its use across civil and military applications, and does not compete against large Defence Primes**

	<b>Safe – “soft kill”</b> <i>No intentional damage to the drone</i>		<b>Exotic Tech, Limited Reliability</b>	<b>Kinetic – “hard kill”</b> <i>Physical force used with potential for destructive damage</i>	
	<b>DroneShield Offering</b> <b>Smart Jamming</b>	<b>Spoofing/Cyber</b>	<b>Counter-Drone Drones</b>	<b>Projectile Fire Kinetic Systems</b>	<b>Directed Energy (Laser or Microwave)</b>
Imagery			 		
Overview	<ul style="list-style-type: none"> <li>Radio waves force a drone to fly back, hover, or land</li> </ul>	<ul style="list-style-type: none"> <li>Hijacks the control of a drone</li> </ul>	<ul style="list-style-type: none"> <li>“Kamikaze” or “catching” drones</li> </ul>	<ul style="list-style-type: none"> <li>Remote weapons systems shoot down drones</li> </ul>	<ul style="list-style-type: none"> <li>Lasers and high-power microwave systems “dazzle” or destroy a drone</li> </ul>
Advantages	<ul style="list-style-type: none"> <li>✓ Universal effectiveness</li> <li>✓ 360-degree defeat coverage</li> <li>✓ Effective against swarms</li> <li>✓ Civil and military environments</li> </ul>	<ul style="list-style-type: none"> <li>✓ Allows for the re-routing and re-direction of malicious drone flight paths</li> <li>✓ Applications in both civil and military environments</li> </ul>	<ul style="list-style-type: none"> <li>✓ “Catching” the drone is available to a wider range of customers</li> </ul>	<ul style="list-style-type: none"> <li>✓ Effective against Govt-grade drones</li> <li>✓ Established technology for military operations</li> </ul>	<ul style="list-style-type: none"> <li>✓ Effective against Govt-grade drones</li> <li>✓ Systems can be mounted on naval vessels for complex defence systems</li> </ul>
Disadvantages	<ul style="list-style-type: none"> <li>✗ Potential for collateral interference (for a “dirty” jammer)</li> </ul>	<ul style="list-style-type: none"> <li>✗ Not effective against all drones</li> <li>✗ Higher chance of collateral damage</li> </ul>	<ul style="list-style-type: none"> <li>✗ Generally slow to deploy</li> <li>✗ Not effective against swarms</li> </ul>	<ul style="list-style-type: none"> <li>✗ Collateral damage</li> <li>✗ Unsuitable for use in a civil environment</li> </ul>	<ul style="list-style-type: none"> <li>✗ In early stages</li> <li>✗ Only available for military applications</li> </ul>

# Drones - A Critical and Growing Threat Vector



## Russia launches 'kamikaze' drone attack on Kyiv, killing 4 and hitting civilian infrastructure

By Victoria Butenko, Olga Voitovych and Yulia Kesaleva, CNN  
Updated 3:09 PM EDT, Mon October 17, 2022



## Ultimate Heliport briefly shut down due to illegal drone activity

Written by defenceWeb - 4th May 2021



The Ultimate Heliport in the Waterfall precinct in Midrand was shut down for an hour on Monday after

## THE WALL STREET JOURNAL

## Russia Hits Ukraine's Kyiv Region With Drone Attack

Ukraine's air-force command says it downed six Iranian-made drones over the south

## found hovering over Ratnuchak- Watechak military areas in Jammu

ight and the other at 2.40 am, officials said. Both em.

## Saudi Arabia Plants After

TRENDING

"Sidharth Shukla Sent Money During Lockdown": Pratyusha Banerjee's Father

"If We Die ...": What Afghan Resistance Leader, Killed, Had Told NDTV

Inside Rishi Kapoor's Birth Anniversary Party: The Cake Stole The Show



Multiple drones hit northeast of Erbil, no casualties: sources

## Drugs and weapons were given to the windows of the Donacona prison

## Drone activity at Augusta Correctional Center in Craigsville causes lockdowns

Middle East

## Fire extinguished on oil tanker off Syria after suspected drone attack

Reuters

## IDF Shoots Down Hamas Drone That Crossed Into Israeli Territory

by I24 News



A drone that Israeli troops recovered in southern Israel that the military said crossed Israeli airspace from the Gaza Strip two days earlier, on August 13, 2021. Photo: Israel Defense Forces.

CRIME / COURTS

## Drug cartels attack enemies and spread terror with weaponized drones in US, Mexico

Karol Suárez  
Published 6:01 a.m., ET May 24, 2021

## Police hunt drone pilots in unprecedented Gatwick Airport disruption

By Sheena McKenzie and Gianluca Mezzofiore, CNN  
Updated 0050 GMT (0850 HKT) December 21, 2018



News & buzz



'Almost intentional': Doctor reacts to Tru vaccine...



Analysis: Blow to Me and Harry with UK w ruling but...

## Drone Attack Damages Hangar at US-Coalition Air Base in Iraq

By Edward Yeranian  
May 08, 2021 01:54 PM

# Benefits and Applications of Safe, Layered, Counterdrone Systems over Kinetic Systems



Safe counterdrone systems have many advantages over kinetic counter-drone systems, which are only practical for deployment in war-like scenarios

## Avoidance of Collateral Damage



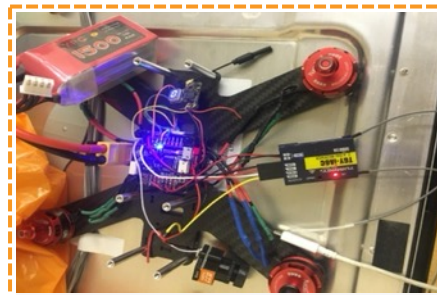
- DroneShield safe defeat solutions force drones to pre-set emergency protocols causing the drone to fly back to its starting point, hover, or land, safely neutralizing the threat
- Alternatively, kinetic solutions could see a destroyed drone fall on crowds of people or inflict “friendly fire” from projectiles

## Evidence for Legal Prosecution



- A drone which has been forced to land can be collected by local law enforcement to track the whereabouts of its controller
- As drones are usually accompanied by an image recording device, this can be used as legal evidence to prosecute offenders

## Intelligence Gathering



- Drones can often carry sensitive instruments or technology
- When forced to land, this technology can be exploited by military personnel to aid in intelligence gathering operations

## Multi-Platform with Scale Benefits



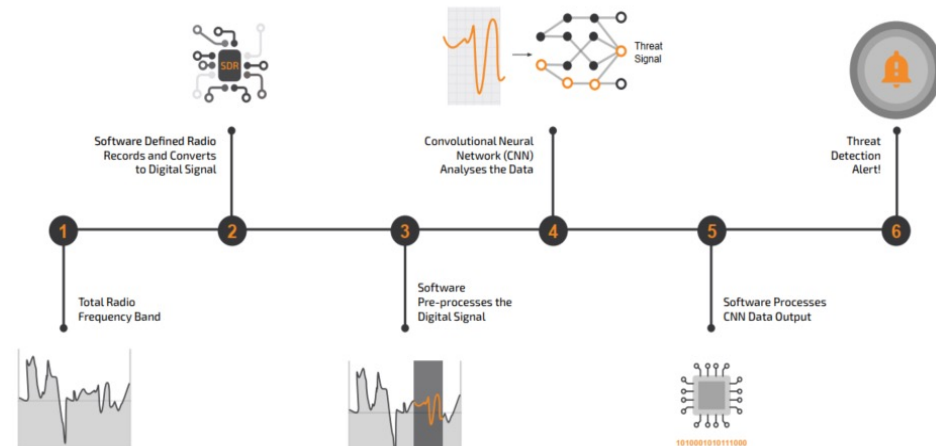
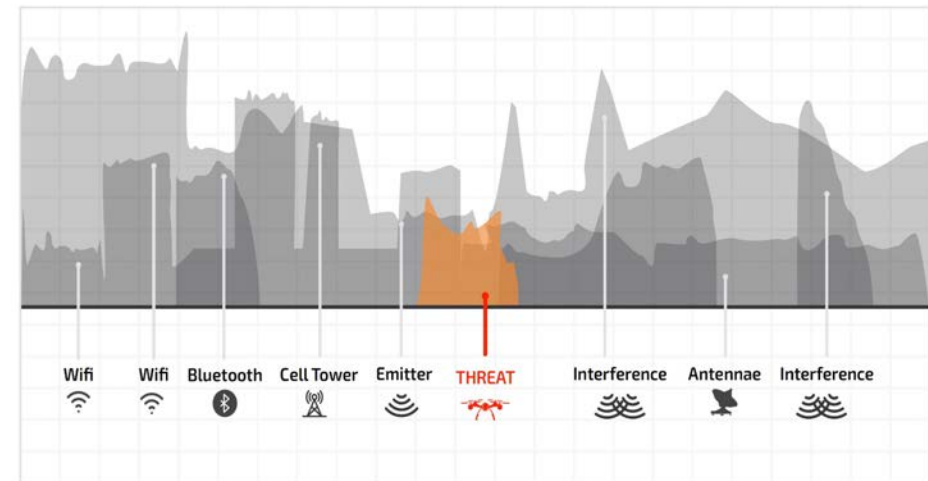
- Safe solutions can be carried on-the-man, mounted on light skinned vehicles and provide continuous passive protection unconstrained by ammunition stores
- Kinetic counter-drone solutions are often mounted on heavy, remote weapon stations and constrained by magazine depth

# DroneShield AI Software Sees Through Noise – Radiofrequency Spectrum



World leading proprietary RF AI platform for protection against advanced threats, such as drones

- Drones operate in arguably the densest parts of the Radio Frequency (“RF”) Spectrum with “noise” coming from all kinds of other emitters including Wi-Fi, Bluetooth, cell towers and antennas
  - Consequently, counter-drone detection technology needs to be able to pull a signal out of all the other “noise”, while still maintaining a low false alarm rate
  - Achieving this using traditional techniques, especially in a very cluttered environment, is very difficult – if not impossible
- Consequently, DroneShield has developed a cutting-edge spectrum awareness capability using proprietary Artificial Intelligence techniques through its RFAI™ engine
- The RFAI™ engine receives quarterly updates (intra-quarter updates also available) which get pushed to the devices deployed across the globe in a variety of ways suitable for the security of the end user



# DroneOptID AI Software – Optical and Thermal Spectrum Counterdrone Surveillance



## DroneShield's DroneOptID AI engine detects and tracks complex threats such as drones in cluttered environments

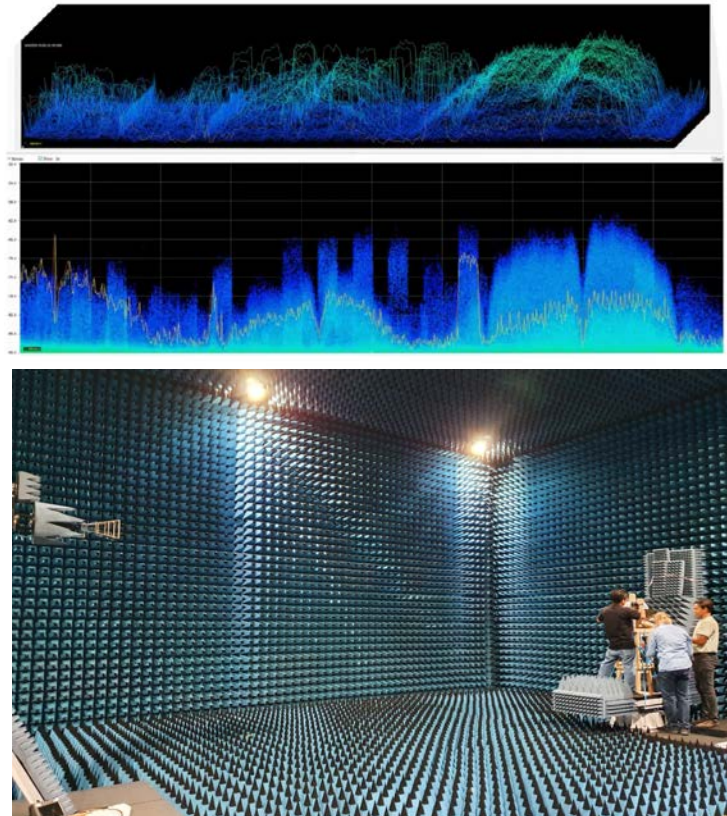
- Drones are small, fast-moving objects, hard to detect with naked eye more than 50m away, against complex background
- Cameras on their own cannot detect and track drones at any meaningful distance, due to
  - the trade-off between the camera Field-of-View (FoV) and Depth. A wide FoV would only see drone at a close distance. A narrow FoV means only looking at a tiny part of the area
  - Even once an object is detected, separating drones from birds is difficult, especially for fixed wing drones
- To enable cameras to accurately detect and track drones and other objects, DroneShield has developed a proprietary AI engine DroneOptID™, in conjunction with University of Technology Sydney, with DroneShield retaining the IP
  - DroneOptID uses the latest in Computer Vision technology to detect, identify and track drones in real time, cutting through all the other “noise”
  - The software takes geographical and environmental data from other sensors in order to slew and validate a drone threat. Once the drone is in the field of view of the camera, using proprietary DroneShield algorithms, the DroneOptID software uses motion tracking and machine learning techniques to identify and track the target





## DroneShield is favourably exposed to the fast-growing Electronic Warfare business segment













- **Electronic warfare (EW)** is any action involving the use of the electromagnetic spectrum (EM spectrum) or directed energy to control the spectrum, attack an enemy, or impede enemy assaults
- The purpose of electronic warfare is to deny the opponent the advantage of—and ensure friendly unimpeded access to—the EM spectrum
- Demand for smart EW technologies to jam, degrade, disrupt or neutralise an adversary capability are rapidly growing and are an essential part of modern warfare
- Given the overlap with DroneShield’s counter-drone AI technology and the minimal Australian based competition in EW technology, DroneShield is in the box seat to exert dominance in this rapidly growing area
- In July 2023, DroneShield received a \$9.9 million, 2-year R&D contract with the Five Eyes Department of Defence
  - Contract was awarded on a sole source basis
- Additional, and larger, contracts are expected, as DroneShield builds up its AI capabilities in the EW and Signals Intelligence arena



# Seasoned Senior Team



»» DroneShield's experienced team carries a solid track record of delivering growth

 <p><b>Peter James</b> Independent Non-Executive Chairman</p> <ul style="list-style-type: none"> <li>• Peter joined DroneShield's Board of Directors in 2016</li> <li>• Over 30 years of experience in the Technology, Telco and Media Industries</li> <li>• Chairman of ASX-listed companies including Macquarie Telecom</li> <li>• Chair of Nearmap, when sold to Thoma Bravo for \$1bn in December 2022</li> </ul>	 <p><b>Oleg Vornik</b> CEO and Managing Director</p> <ul style="list-style-type: none"> <li>• Oleg joined DroneShield in 2015, and the Board of Directors in January 2017</li> <li>• Responsible for overseeing DroneShield's market strategy</li> <li>• Senior executive experience includes Royal Bank of Canada, Brookfield, Deutsche Bank and ABN AMRO</li> </ul>	 <p><b>Jethro Marks</b> Independent Non-Executive Director</p> <ul style="list-style-type: none"> <li>• Jethro joined DroneShield's Board of Directors in January 2020</li> <li>• CEO and co-founder of the Mercury Retail Group</li> <li>• Extensive commercial experience in successfully scaling a multinational business</li> </ul>	 <p><b>Carla Balanco</b> CFO and Joint Company Secretary</p> <ul style="list-style-type: none"> <li>• Carla joined DroneShield in mid-2018</li> <li>• Instrumental in scaling the company's financial management systems</li> <li>• Experience working in Chartered, Commercial and Business Development roles</li> </ul>	 <p><b>Red McClintock</b> Sales Director</p> <ul style="list-style-type: none"> <li>• Red served 23 years as an officer in the Royal Australian Navy</li> <li>• Prior to joining DroneShield, Red worked for five years with BAE Systems as a Business Development and Account Manager</li> </ul>	 <p><b>Tom Branstetter</b> U.S. Director of Business Development</p> <ul style="list-style-type: none"> <li>• U.S. Navy veteran and former Navy SEAL</li> <li>• Focus across DoD and other federal agencies</li> <li>• Tom holds a Bachelor of Arts degree in Entrepreneurship</li> </ul>
 <p><b>Angus Bean</b> Chief Technology Officer</p> <ul style="list-style-type: none"> <li>• Angus joined DroneShield in early 2016</li> <li>• Merges the fields of mechanical hardware, electronics, software, digital interface and technology</li> <li>• Experience as the development lead for Australia's largest industrial design and engineering consultancy</li> </ul>	 <p><b>Lawrence Marychurch</b> Vice President, Design</p> <ul style="list-style-type: none"> <li>• Lawrence joined DroneShield in 2018 and has a background in Industrial Design</li> <li>• Manages a team of industrial designers and mechanical engineers as well as DroneShield's in-house production team</li> <li>• Responsible for DroneShield's wide base of Australian and international component suppliers</li> </ul>	 <p><b>Paul Cenoz</b> Counsel and Joint Company Secretary</p> <ul style="list-style-type: none"> <li>• Paul joined DroneShield in 2023. He is admitted to practice law in California and NSW.</li> <li>• Prior to DroneShield, Paul held executive roles at high growth scale-ups, successfully building businesses in the US and Australia. He was COO and General Counsel of OSINT Combine in Sydney</li> </ul>	 <p><b>Matt McCrann</b> U.S. CEO</p> <ul style="list-style-type: none"> <li>• Experienced business development executive</li> <li>• Over 15 years of experience in the Defense and National Security sector</li> <li>• Served in the US Navy as an Intelligence Analyst and a member of NSA/CSS's Cryptologic Direct Support Element</li> </ul>	 <p><b>Raffael Battner</b> Operations Manager</p> <ul style="list-style-type: none"> <li>• Over 15 years of experience in Manufacturing and Operations Management</li> <li>• Prior management positions in deep-tech start-ups as well as corporate organisations delivering products and projects into the automotive, telecommunications and industrial market</li> </ul>	 <p><b>Carl Norman</b> Vice President, Embedded Systems</p> <ul style="list-style-type: none"> <li>• Carl is an experienced embedded product engineer who joined DroneShield early in 2019</li> <li>• Over 25 years of experience in electronic product design, manufacturing and project management</li> <li>• Background in RF products, analogue, embedded and high speed digital systems</li> </ul>

# Industry and Media Recognition



## ASX-listed DroneShield wins US Defence contract



**Matthew Cranston**  
United States correspondent

Oct 5, 2022 - 6:04am

Washington | ASX-listed anti-drone technology company DroneShield has won a \$1.8 million contract with the US Department of Defence and says the win will open doors to [significantly larger contracts](#) with the world's biggest military.

In what is the company's largest US sale to date, DroneShield will provide dozens of DroneGun MKIIIs – a two kilogram pistol that sends a signal which neutralises an attacking drone or drone swarm.

## DroneShield (ASX:DRO) selected for ISREW panel

ASX News, Technology  
ASX:DRO MCAP \$71.36M



**Julia Seymour**  
Markets Presenter/Reporter  
julia.seymour@themarket Herald.com.au  
07 September 2022 15:23 (AEDT)

### RELATED QUOTES



## THE AUSTRALIAN

Friday, May 5, 2023 Today's Paper Mind Games

All sections HOME THE NATION WORLD BUSINESS COMMENTARY SPORT ARTS ALL

HOME NATION DEFENCE

### Defence Strategic Review: Diggers 'naked' to drone attacks

EXCLUSIVE  
By BEN PACKHAM  
FOREIGN AFFAIRS AND DEFENCE  
CORRESPONDENT  
Follow @benpackham

8:38PM MAY 4, 2021  
6 COMMENTS



DroneShield's DroneGun in use with the US Army

## Shares soar as US government buys up Aussie company's anti-drone tech

**Nick Bonnyady**  
Technology writer

Jul 17, 2023 - 5:13pm

Save Share

Shares in ASX-listed defence technology company DroneShield have soared 19 per cent, after it struck a \$33 million deal to sell equipment to the United States Department of Defence, underscoring the importance of the versatile unmanned vehicles to modern warfare.

### RELATED QUOTES

Symbol	Price
DRO	\$0.220

DroneShield makes systems that stop drones from communicating with



### DroneShield Launches Regional NSW Testing Facility



### Aussie 'drone gun' bringing Mexican cartels down to earth

3m - 1 min read



### Homegrown defence company helping Ukraine take out Russian drones

afr.com - 1 min read

DroneShield Technology Fast 50 Australia

[www.DroneShield.com](http://www.DroneShield.com) DRONESHIELD



# Epirus Investment and Partnership



- In November 2022, DroneShield announced a strategic partnership with Epirus, which included a \$3.7 million investment at 20c (market price at the time) for a 4.1% stake
- Epirus is a high-growth U.S. technology unicorn, developing software-defined directed energy systems that enable unprecedented counter-electronics effects and power management solutions to optimize power efficiency in defense and commercial applications
- This includes the Leonidas™ solid-state, software-defined high-power microwave (HPM) technology to enable unmatched counter-electronics effects for a range of use cases
- Epirus was founded in California in 2018 and has raised approximately US\$300 million (approximately \$450 million) in funding since inception
- DroneShield and Epirus share a number of attractive synergies across technology and customer bases, and are both a part of the SAIC consortium, which has been recommended by JCO (part of U.S. Army) for counterdrone rollout across U.S. Department of Defense bases nationwide
- Epirus has deep linkages into a range of US Government agencies, which is expected to benefit DroneShield's US sales and create additional revenue streams
- Integration with Epirus completed in June 2023



# Capital Structure



## Capital Structure (approximately 10,000 shareholders)

DRO Shares on Issue	586,903,611
DRO Options on Issue <sup>1</sup>	35,740,000
<b>Fully Diluted Shares on Issue</b>	<b>622,643,611</b>
Fully Diluted Equity Value <sup>2</sup>	\$208.6m
Cash <sup>3</sup>	\$42.4m
Debt <sup>3</sup>	\$nil
<b>Fully Diluted Enterprise Value</b>	<b>\$166.2m</b>

<sup>1</sup> Options issued at various strike price and maturities. For full information please refer to ASX releases

<sup>2</sup> At 33.5c per share, as at 24 July 2023

<sup>3</sup> As at 30 June 2023

## Director and Employee Shareholdings

Oleg Vornik, CEO and Managing Director	5,027,022 shares 10,000,000 options <sup>2</sup>	2.41% <sup>1</sup>
Peter James, Independent Non-Executive Chairman	3,817,522 shares 5,000,000 options <sup>2</sup>	1.42% <sup>1</sup>
Jethro Marks, Non-Executive Director	750,000 shares 1,000,000 options <sup>2</sup>	0.28% <sup>1</sup>
Other Employees	25,402,620 shares 14,040,000 options <sup>2</sup>	6.33% <sup>1</sup>

<sup>1</sup> On a fully diluted basis

<sup>2</sup> Options issued at various strike price and maturities. For full information please refer to ASX releases

## Research Coverage



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- b) involve known and unknown risks and uncertainties that could cause actual events or results to differ materially from estimated or anticipated events or results reflected in such forward looking statements; and
- c) may include, among other things, statements regarding estimates and assumptions in respect of prices, costs, results and capital expenditure, and are or may be based on assumptions and estimates related to future technical, economic, market, political, social and other conditions.

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