



# AI-Enabled Platforms for Protection against Advanced Threats

DroneShield (ASX:DRO)

27 February 2023

*Image: DroneGun counterdrone system*

# Record 2022, with Strong Outlook for 2023



- **All-time record revenue and cash receipts achieved in 2022, with a strong outlook for 2023\***
  - Revenue increases approximately 60% over previous record year, to \$16.9 million
  - Cash receipts at a record \$15.6 million
  - Strong cash balance of approximately \$20.5 million as of 27 February 2023
  - Rapidly improving P&L of (\$949k) for FY22, an 82% improvement over FY21
- **Two all-time record \$11 million orders received in December and January, from two different Government customers**
  - These sales will be fulfilled from existing stock and working capital, via favourable payment terms
- **Recommendation by the US DoD for rollout across its bases nationwide, expected to commence this year**
- **The first U.S. airport deployment, deployments at Davos and IRONMAN Texas**
- **Multiple \$1 million+ deployments with the U.S., European and other Government customers**
- **\$3.7 million investment from Epirus Inc, a U.S. defense technology unicorn developing software-defined directed energy systems**
- New partnerships with Teledyne FLIR, Nearmap, Allen Vanguard and XRG, while strengthening and making additional sales through existing partnerships with BT, Trakka and Thales
- Launch of a dedicated testing facility in Australia
- Favourable macro environment for DroneShield with rapidly rising counterdrone, defence and security spending globally

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



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Business Overview

*Image: RfPatrol™ during customer evaluation*



# 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 for Protection 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 with SaaS
- Tier 1 customers across military, intelligence community, Government and critical infrastructure
- \$200m+ pipeline

## Artificial Intelligence in Electronic Warfare

- Executing on a 2 year \$3.8m contract with Australian DoD, following on the initial \$600k contract in 2020
- Follow-up contract expected in 2023
- Potential to take the work to the US DoD
- 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 does a counterdrone system work?



## Step 1

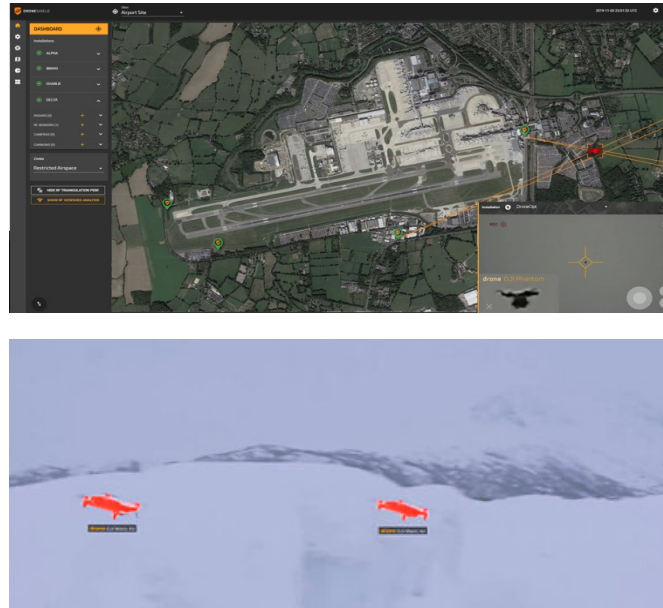
### Detect



- 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

# Investment Highlights



1

World leading proprietary **AI platform** for protection against drones

2

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

3

Sales pipeline of over **\$200m with over 90 standalone qualified projects** at different stages

4

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

5

**\$16.9m in 2022 revenue**, another record year, as the **business is at inflection point**

6

**Repeat customers** constitute majority of sales



# Executive Summary



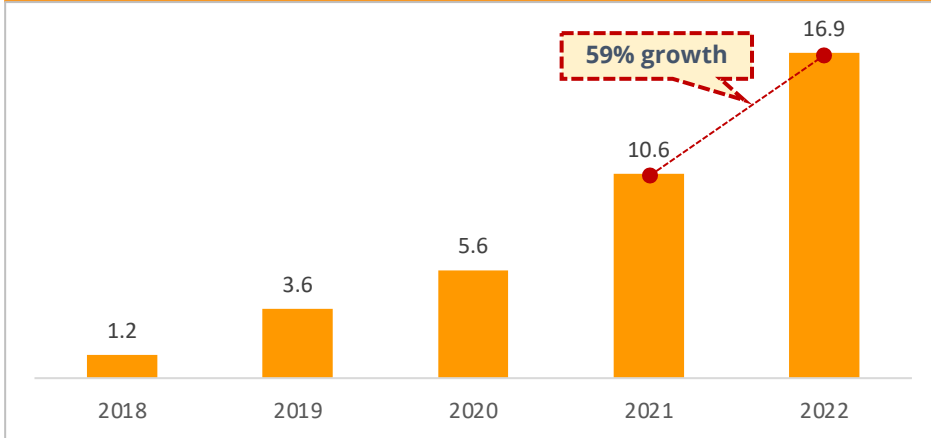
<b>DroneShield Overview</b>	<ul style="list-style-type: none"><li>• Founded in 2014 and listed on the ASX in 2016, DroneShield (ASX:DRO) provides <b>Artificial Intelligence platforms</b> for <b>protection against drones</b></li><li>• <b>Hardware and software solutions</b> that detect and safely neutralise small drones used for high-tech warfare, terrorism, contraband delivery, and airport disruptions</li><li>• <b>Key customers</b> include military, intelligence community, Homeland Security, law enforcement, critical infrastructure, and airports globally</li></ul>
<b>Financial Highlights</b>	<ul style="list-style-type: none"><li>• Record <b>\$16.9 million revenue</b> for 2022, with expected strong 2023</li><li>• <b>\$19 million contracted backlog of orders</b> as of 27 February 2023, expected to be fulfilled and paid in 2023</li><li>• \$20.5 million bank balance as at 27 February 2023</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 contracts</li><li>• Sales through an <b>experienced in-house veteran salesforce with distribution partners across over 100 countries</b></li><li>• Regular software updates for hardware products and DroneSentry-C2™ (Command-and-Control software) as a standalone subscription product is expected to lead to a <b>significant proportion of SaaS revenue</b> over the next 5 years</li><li>• <b>R&amp;D contracts are expected to increase</b>, representing an opportunity to develop advanced capability in-house, and attracting and upskilling talent</li></ul>
<b>Proprietary AI Technology</b>	<ul style="list-style-type: none"><li>• Underpinning all hardware products are the Company's <b>proprietary AI-enabled threat awareness software engines RFAI™ and DroneOptID™</b>, and the sensorfusion engine</li><li>• The software engines utilise proprietary techniques to undertake <b>real-time, at the edge, detection and identification of drones</b> and other potential threats in the ISR and Electronic Warfare fields</li><li>• The result is a dramatic <b>increase in detection responsiveness, lower false positives</b> and a <b>significant 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 designed and developed in-house, with no reliance on third party IP</li><li>• Delivering on a <b>\$3.8 million contract to provide Electronic Warfare (“EW”)</b> capabilities to detect “never seen before threats” to the <b>Australian DoD</b></li></ul>
<b>Addressable Market</b>	<ul style="list-style-type: none"><li>• <b>Large international addressable markets</b> in counterdrone and related EW and tracking systems 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>, and approximately <b>15% of revenue</b> comes from the <b>intelligence community</b></li><li>• Defence, the intelligence community and border security will continue to be the key focus for DRO, however there is a <b>major opportunity for continued expansion</b> into other markets including civilian airports, prisons, stadiums and corporates</li></ul>
<b>Key execution priorities</b>	<ul style="list-style-type: none"><li>• <b>US sales:</b> converting trial and integration successes into large multi-million-dollar contracts</li><li>• <b>Australia sales:</b> expanding on the initial \$3.8 million Electronic Warfare contract into the next, and larger, contract</li><li>• <b>Technology:</b> rapidly scaling the AI engine software for SaaS deployments</li><li>• <b>M&amp;A:</b> continue to review and successfully implement appealing acquisition options. \$3.7 million investment into DRO by Epirus in Nov 2022, a US tech unicorn</li></ul>

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

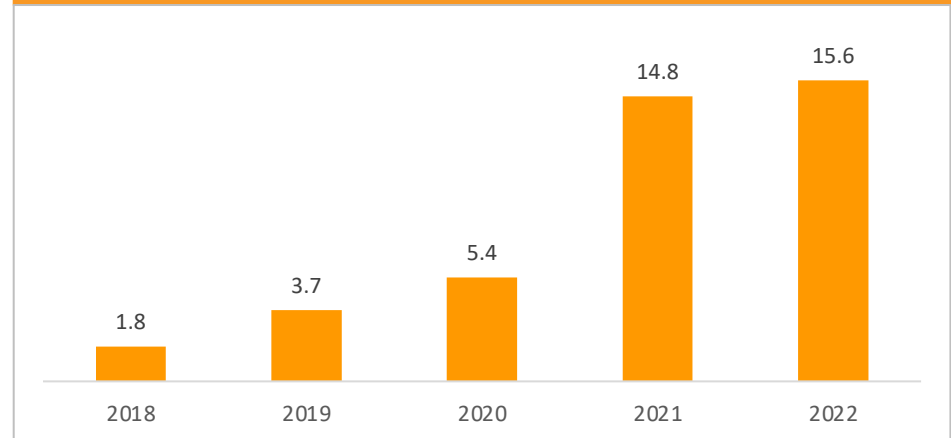


Rapidly improving financials, as the business stands at an inflection point into 2023

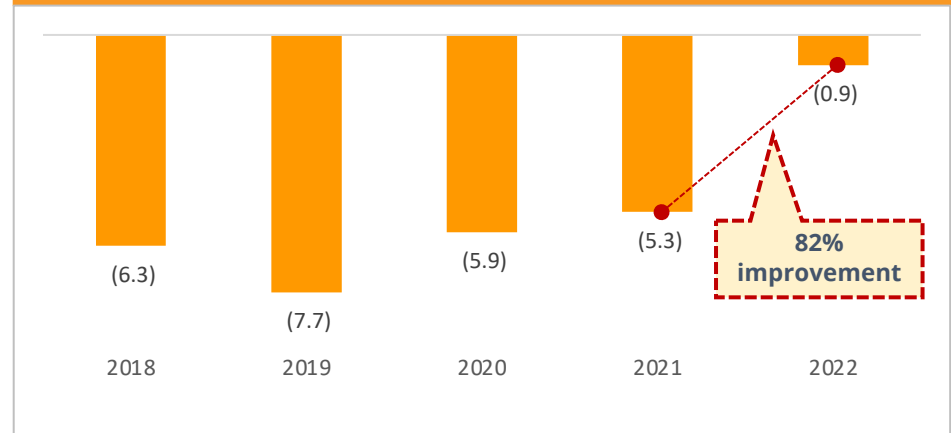
## Strong Revenue Growth



## Rapid Cash Receipt Growth (Sales + Grants)



## Rapidly Improving P&L



# Epirus Investment and Partnership



- In November 2022, DroneShield announced a strategic partnership with Epirus, which included a \$3.7 million investment at 20c 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





# Geopolitical Environment



- 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>





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Addressable Market

Image: DroneSentry™ system



# Counterdrone: Multi-Billion Dollar Market by 2024



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

**Military**



**Government Facilities**



**Law Enforcement**



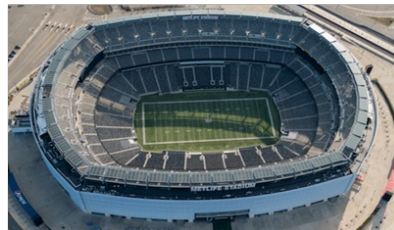
**Protective Details**



**Airports**



**Stadiums**



**Commercial Venues**



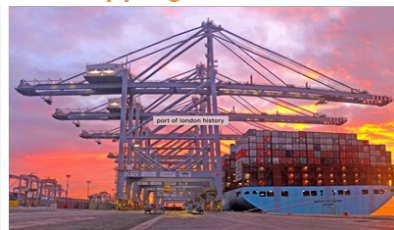
**Energy Production**



**High Profile Events**



**Shipping / LNG Ports**



**Rescue / Fire Response**



**Correctional Facilities**

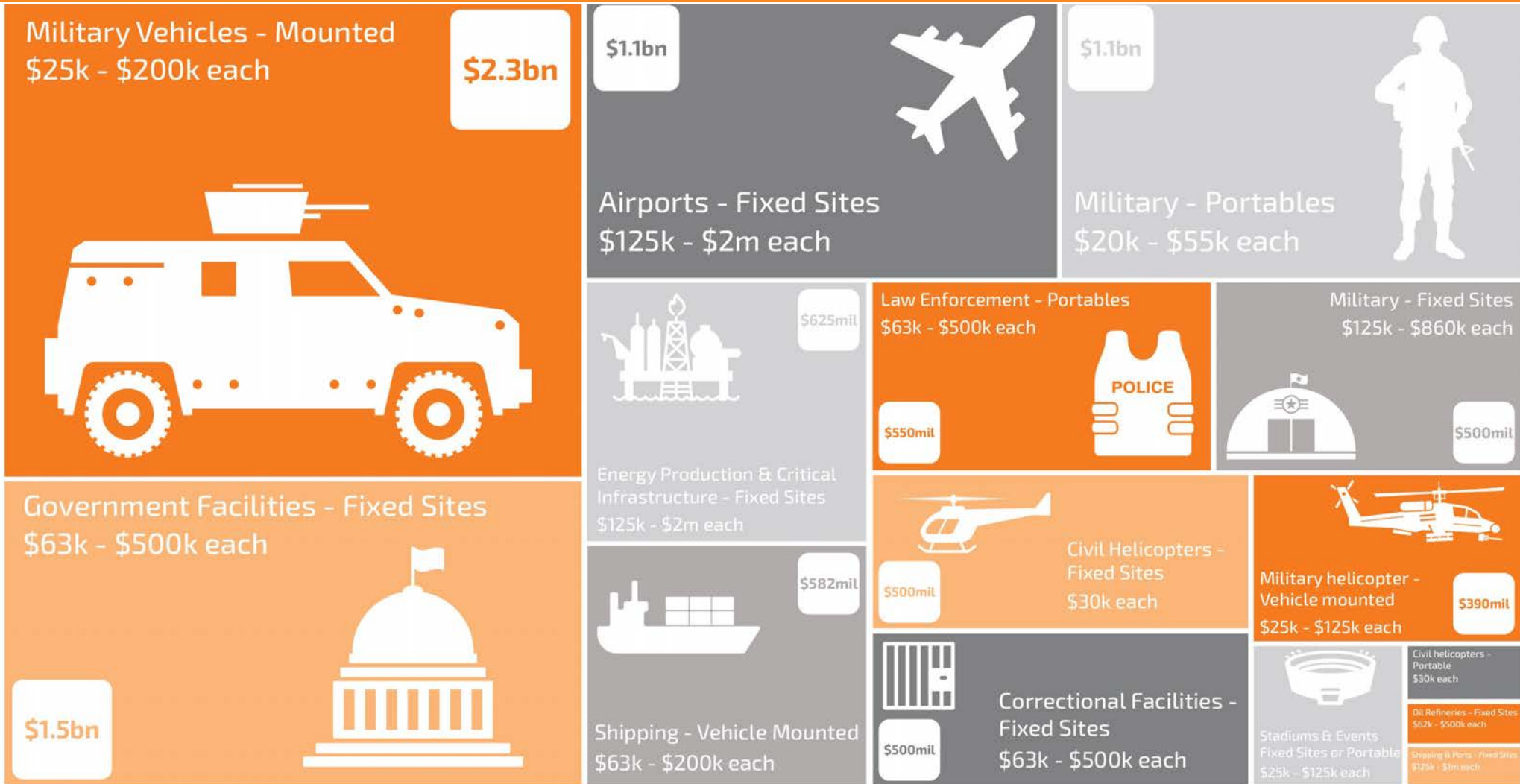


Sources:  
Markets and Markets: <https://www.marketsandmarkets.com/Market-Reports/anti-drone-market-177013645.html>

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.dronesshield.com/counterdrone-market>



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**DroneShield Capability and Product Overview**

*Image: DroneSentry-X™ at the Canadian Government Agency evaluation*

# DroneShield Capability Overview



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

## Hardware with Embedded Software and Associated Services

### Dismounted & Body-Worn Counterdrone Solutions



DroneGun MKIII



DroneGun Tactical



RfPatrol

### Vehicle / Ship / Fixed Site Counterdrone Solutions



DroneSentry-X



DroneSentry

## Software (SaaS and R&D contracts)

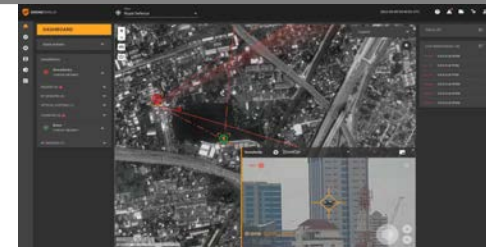
### Electronic Warfare and SIGINT



### RFAI (Radiofrequency AI engine)



### DroneSentry-C2 and DroneOptID







- DroneShield has its own 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



# 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

	Safe - "soft kill"		Kinetic - "hard kill"		
	Smart jamming	Spoofing/Cyber	Counter-drone drones	Projectile fire kinetic systems	Directed energy (Laser or microwave)
<b>DRO offering</b>			Exotic tech, limited reliability	Large Defence Primes dominance area	
<b>Impact</b>	No intentional damage to the drone		Physical force used with potential for destructive damage		
<b>Imagery</b>					
<b>Overview</b>	<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>
<b>Advantages</b>	<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>
<b>Disadvantages</b>	<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>



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Competitor Analysis






# DroneShield's competitive counterdrone 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 (40+ engineers)

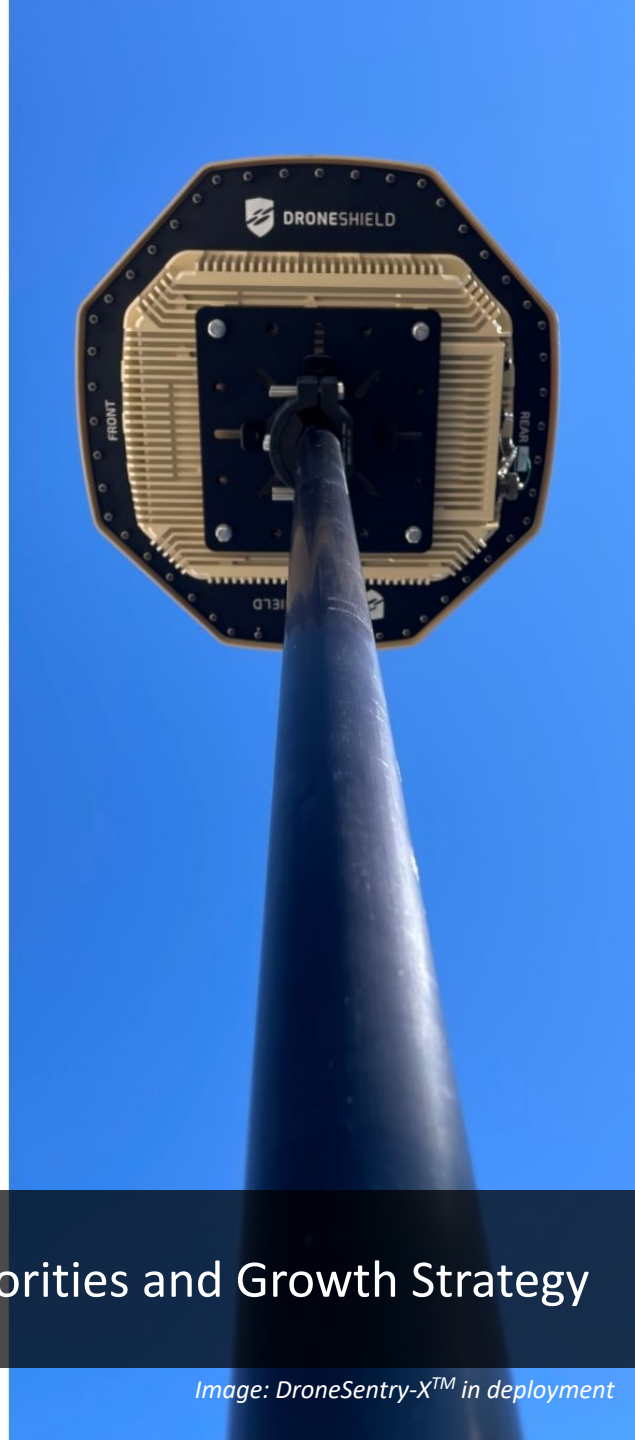
# Competitor analysis

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



Country of origin										
<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>• Substantially an integrator</li> </ul>	<ul style="list-style-type: none"> <li>• Lower-performance technology</li> <li>• Focus on prison and police</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 detect-and-defeat- a halfway solution between a portable and vehicle product</li> <li>• LOCUST laser defeat</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

*Image: DroneSentry-X™ in deployment*



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



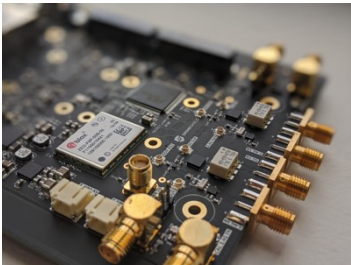
## Three-part Strategy



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

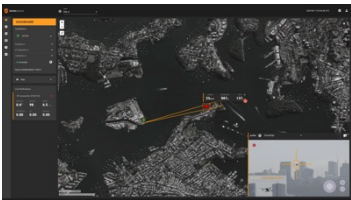
- The counterdrone market is growing rapidly, especially in the US
- DroneShield is well positioned as the industry pioneer, with on-the-ground US team, and Australia being part of the Five Eye intelligence alliance (US, UK, Australia, NZ and Canada)

### Grow Adjacent Capabilities



- **Electronic Warfare (EW):** currently delivering on the second, \$3.8m contract with the Australian Defence Force
  - 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



**Email:** [info@dronesshield.com](mailto:info@dronesshield.com)

## **Sydney, NSW (Headquarters)**

Level 5, 126 Phillip St  
Sydney, NSW 2000  
Australia

**Phone:** +61 2 9995 7280

## **Warrenton, Virginia**

7140-B Farm Station Rd,  
Warrenton, VA 20187  
USA

**Phone:** +1 (540) 215-8383





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Appendices



# Drones - A Critical and Growing Threat Vector



## Otago Daily Times

cloudy Dunedin 18 | 8 Monday, 6 September 2021 Send us news & photos

News Sport Life & Style Entertainment Business Regions Fea

### Friday, 23 April 2021

## Helicopter pilot horrified at close drone encounter

courier journal

Sports Life Opinion USA TODAY Obituaries E-Edition Legals

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

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

World Africa Americas Asia Australia China Europe India Middle East United Kingdom Edition

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

By Edward Yeranian  
May 08, 2021 01:54 PM

## Forbes

Aug 3, 2021, 09:05am EDT | 18,681 Views

## Drone Striking World Trade Center Is A Wake-Up Call

David Hambling Contributor @ Aerospace & Defense  
I'm a South London-based technology journalist, consultant and author

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Powered by Trinity Audio

New York Post reports that a small drone has slammed into a building at the World Trade Center complex. No terrorist threat is suspected, but the incident is a wake-up call to the potential threat posed by such drones.

Middle East

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

## 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.

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

Written by defenceWeb - 4th May 2021



The Ultimate Helicopters in the Waterfall precinct in Midrand was shut down for an hour on Monday after drones were observed flying in the helicopter flight path.

On 3 May shortly after 08:00, an Ultimate Helicopters employee reported seeing two drones operating directly in the helicopter flight path of Ultimate Helicopters while it was in work. Ultimate Helicopters

STOCK MARKET

Home > Nation

## Army opens fire on two drones found hovering over Ratnuchak-Kaluchak military areas in Jammu

One drone was spotted at 11:45 pm on Sunday night and the other at 2:40 am, officials said. Both were destroyed.

## Saudi Arabia Plants Aftermath

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



# 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



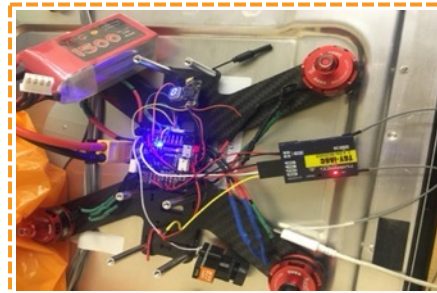
- DronesShield safe defeat solutions force drones to pre-set emergency protocols causing the drone to fly back to its starting point, hover, or land, allowing for the safe defeat of drones
- Alternatively, kinetic solutions could see a destroyed drone fall on crowds of people or inflict “friendly fire”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

## 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



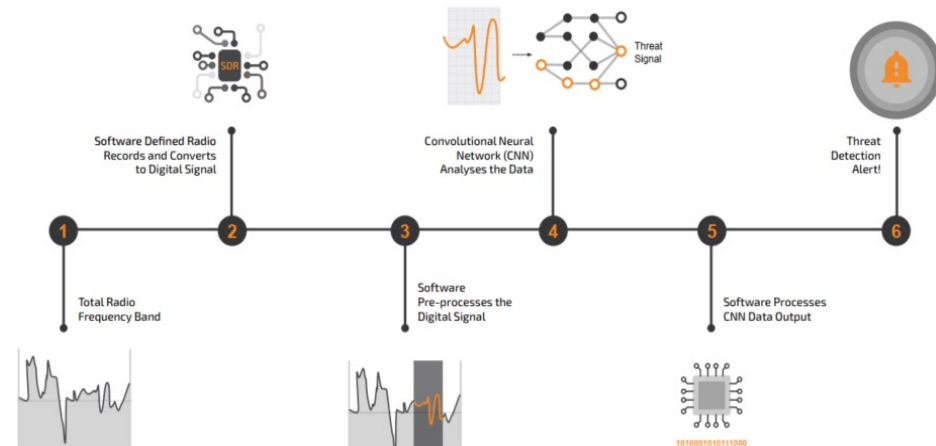
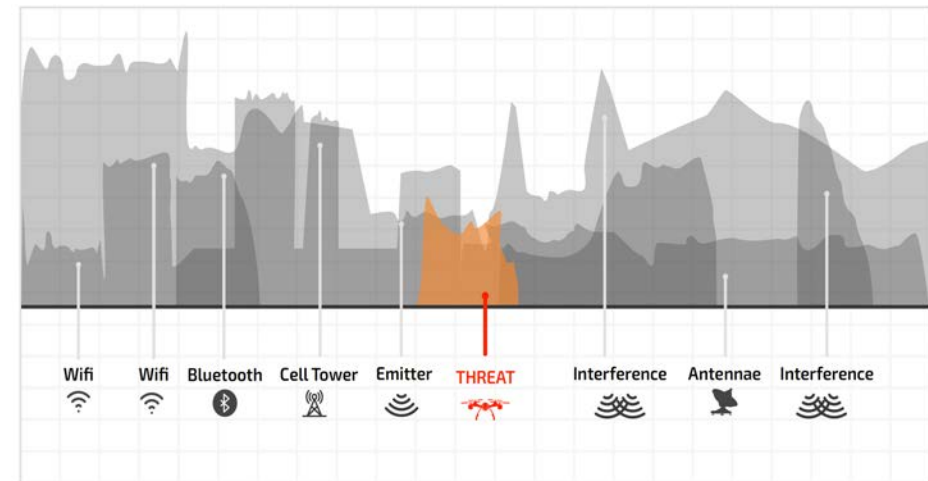
- Safe solutions can be carried on-the-man, mounted on light skinned vehicles and provide continuous passive protection unconstrained by ammunition stores
- Kinetic counter-drone solutions are often mounted on heavy, remote weapon stations and constrained by magazine depth

# 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
- Further development is currently under way, funded by the Australian Department of Defence



# Artificial Intelligence in Electronic Warfare



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 2021, DroneShield received a \$3.8 million, 2-year R&D contract with the Australian Department of Defence
  - Contract was awarded on a sole source basis. Importantly, the contract was not in counter-drone, but EW and Signals Intelligence, an adjacent area utilising an existing DroneShield skillset, but with much wider applications.
- Additional, and larger, contracts are expected with the Australian Department of Defence, as DroneShield builds up its AI capabilities in the EW and Signals Intelligence arena



# Seasoned senior sales and engineering teams



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 April 2016</li> <li>Over 30 years of experience in the Technology, Telecommunications and Media Industries</li> <li>Chairman of ASX-listed companies including Macquarie Telecom and Nearmap</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 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>Hedley Boyd-Moss</b> Vice President, Engineering</p> <ul style="list-style-type: none"> <li>30 years of global RF and Electronic engineering</li> <li>Working knowledge of regulatory compliance standards</li> <li>Specialist knowledge in areas such as antenna manufacturing and RF communication modulation techniques</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>Lyle Halliday</b> Chief Operating Officer</p> <ul style="list-style-type: none"> <li>Lyle is an experienced Systems Engineer with a background in medical device product development</li> <li>Responsible for implementation of processes to ensure customer expectations</li> <li>Engineering experience spans electrical, mechanical, manufacturing and software</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

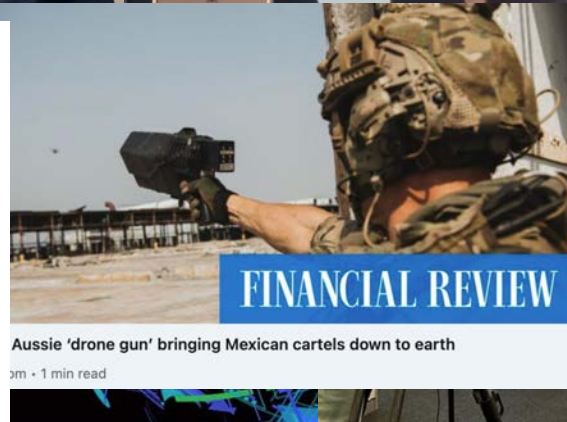


**Julia Seymour**  
Markets Presenter/Reporter  
julia.seymour@themarket Herald.com.au  
07 September 2022 15:23 (AEDT)

### RELATED QUOTES



DroneShield Launches Regional NSW Testing Facility



Aussie 'drone gun' bringing Mexican cartels down to earth



DroneShield Technology Fast 50 Australia



Homegrown defence company helping Ukraine take out Russian drones





# Capital Structure



## Capital Structure (approximately 9,500 shareholders)

DRO Shares on Issue	487,308,651
DRO Options on Issue <sup>1</sup>	35,755,001
<b>Fully Diluted Shares on Issue</b>	<b>523,063,652</b>
Fully Diluted Equity Value <sup>2</sup>	\$183.1m
Cash <sup>3</sup>	\$20.5m
Debt <sup>3</sup>	\$nil
<b>Fully Diluted Enterprise Value</b>	<b>\$162.6m</b>

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

<sup>2</sup> At 35c per share, as at 24 February 2023

<sup>3</sup> As at 27 February 2023

## Director and Employee Shareholdings

Oleg Vornik, CEO and Managing Director	8,077,022 shares 10,250,000 options <sup>2</sup>	3.50% <sup>1</sup>
Peter James, Independent Non-Executive Chairman	6,301,688 shares 5,132,500 options <sup>2</sup>	2.19% <sup>1</sup>
Jethro Marks, Non-Executive Director	666,666 shares 1,083,334 options <sup>2</sup>	0.33% <sup>1</sup>
Other Employees	22,938,954 shares 13,416,667 options <sup>2</sup>	6.95% <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

**BELL POTTER**

**PELTON**  
CAPITAL



Image: RfPatrol™ at the Rheinmetall and Team SABRE (Safran, Nova Systems, BAE Systems) stands at Land Forces 2022



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