

## Customs and Border Protection Makes Major Drone Purchases <sup>2</sup>

US Customs and Border Protection Buys Drones: Awards Bulk Order to 5 Drone Companies, including Vantage Robotics.

Small unmanned aerial systems (SUAS) provider **Vantage Robotics** recently announced that a bulk order of its Vesper drones was filed on September 30th by the U.S. Customs and Border Protection (CBP) agency under a blanket purchase agreement (BPA) formed last December. At \$540,000, the agreement covers Vantage's Vesper drones, accessories, and training.

The CBP has a Blanket Purchase Agreement (BPA) with five drone companies, including Vantage Robotics. This Vesper order is part of that BPA, which has a total estimated value of \$90 million over a five-year period. Additionally, Vantage is one of five drone manufacturers on the Department of Defense's "Blue UAS" list.

The Vesper SUAS grants airborne intelligence, surveillance, reconnaissance (ISR), and tracking capability, improving situational awareness for CBP missions. The drone also provides unrivaled endurance, stealth and sensor performance with a customizable architecture, resulting in a flexible system that can be adapted to suit the needs of various mission and end user requirements.

"We are proud to support the Border Patrol mission" said Vantage CEO Tobin Fisher. "The Vesper's ability to fly three times quieter than other drones in its class and for longer distances gives CBP agents a big advantage. Its low-light camera is superior to all other drones in its class, including Chinese drones, giving it unbeatable performance in all conditions."



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## The Changing Threat Landscape: How Criminal Use of Drones – and Counter Drone Technology – is Evolving <sup>1</sup>

As the commercial drone industry scales up, so does the need for security solutions. The counter drone industry goes hand in hand with commercial UAS, enabling legitimate commercial use by securing any sensitive areas. In this post, the Chief Marketing Officer at one of the leading global counter drone technology firms predicts what the industry can expect in 2023.

With every passing year, drones have become more capable and more accessible. Drones can be found in almost every sphere of public life — from industry and agriculture to entertainment, law enforcement, military operations and critical infrastructure.

This trend shows no sign of slowing down. Drones are, and will continue to be, an increasingly prominent fixture in our personal and working lives. As a result, governments must figure out a way to allow drone users and manufacturers to continue innovating, while also mitigating the potential harms of malicious and/or careless usage.

Fortunately, 2023 promises to deliver much-needed clarity on this front. We'll see progress towards the creation of a coherent regulatory framework for how governments (both local and national) can deploy and use counterdrone technologies. There will also be continued innovation from the counter Uncrewed Aerial Systems (cUAS) industry as it seeks to protect commercial and government people and property where the risk of drone-based disruption is high.

Alongside these overwhelmingly positive developments, we'll also see malicious actors adjust their strategies to circumvent existing counterdrone measures. As malicious drone users become increasingly sophisticated, government entities and private sector organizations will face pressure to adapt.

To find out more about what this changing threat landscape will look like, and how industry and government can counter it, read on for Dedrone's top seven predictions for 2023.

### DJI's Market Loss is Bad Actors' Gain

It's clear that DJI will continue to enjoy the largest market share of flying drones for the near future, but it is losing ground to rivals both within China and elsewhere. The non-DJI market share is clearly gaining ground in both commercial and hobbyist use. With more non-DJI / DIY drones produced, bad actors will leverage these Uncrewed Aerial Vehicles (UAVs) to evade detection by AeroScope sensors. AeroScope can only sense DJI drones and is blind to all other drone manufacturers

Consequently, open-air venues, airports, correctional facilities, and other locations will require some form of drone detection that does not solely rely on AeroScope. This means that sensor-fusion capabilities will become essential for a robust cUAS solution. This approach is the only way to provide true air domain awareness and protection to facilities with open-air components, for the security of event-goers, passengers, pilots, correctional inmates, etc. And as more venues look to develop airspace security, expect cUAS vendor applications for SAFETY Act certifications to skyrocket.

On the drone side, there will be a realization that drone hardware is equally – if not more – important than drone software. Most drone manufacturers have directed their efforts into AI and CV (computer vision) technology to enhance customer user experience but ruggedized and military-grade airframes will be needed as use cases shift from consumer/hobbyist to serious industrial and even military applications

### Beyond Visual Line of Sight Becomes a Widespread Reality

In addition to the need for regulation and government action around the threat drones can pose, we also expect to see Drone-as-a-First-Responder (DFR) pilot programs emerging around the world, pushing the US regulations around Beyond Visual Line Of Sight (BVLOS) to develop more quickly. DFRs are already in limited use in the US and have shown positive results across many use cases from being able to provide live visual data at an incident before responders even arrive, documenting crime scenes, searching for missing persons, and more.

Currently, BVLOS flight is prohibited in U.S. airspace without going through FAA's rigorous waiver process. While the FAA has made recommendations in 2022 that point to a more positive reception for BVLOS, it's still in the recommendation stage. Since the FAA is still in the rulemaking process, the technology is surpassing regulation and progress is being held slowed.

The continuous technological progress of drone capabilities and slow to move regulation underscores the need for local law enforcement to have mobile drone detection options which can address the concerns around BVLOS – to avoid any collisions and identify unauthorized drones amongst the many authorized ones. With the ability for drone pilots who are bad actors to be further away from their targets, there are now even more vectors of approach and vulnerabilities exposed.

Read more at <https://dronelife.com/2022/12/18/the-changing-threat-landscape-how-criminal-use-of-drones-and-counter-drone-technology-is-evolving/>

## Cleo Robotics Wins Army Contract for TacDronut<sup>4</sup>

Dronut developer Cleo Robotics has been awarded a \$2.5M contract by the U.S. Army's Rapid Capabilities and Critical Technologies Office (RCCTO) for the delivery of a number of prototype Tactical Dronut (TacDronut) systems for Intelligence, Surveillance and Reconnaissance (ISR) capability.

The contract was awarded following the technology's selection during an Army Innovation Day competition evaluation of groundbreaking technologies.

"Partnering with a company like Cleo Robotics allows the Army RCCTO to bring disruptive capabilities to the warfighter," said Robert Monto, Jr., deputy director of Critical Technologies Office (CTO) and Advanced Concepts and Experimentation (ACE) of the Army RCCTO. "Working through our Innovation Day process paired this approach to a unit of action."

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Based on Cleo's Dronut, the TacDronut is a rugged portable sUAS that suits the needs of Soldiers requiring a drone capable of operating within enclosed spaces. Capable of enduring impact without taking damage and operating in both GPS enabled and GPS denied environments, the Dronut features a highly capable and adaptable onboard intelligence and sensor payload. Following the prototype's successful demonstration with the 82nd Airborne Division, the Army will transition the TacDronut as an ISR capability for the dismounted Soldier.

"The TacDronut sUAS project was selected as part of the Army RCCTO Advance Concepts and Experimentation (ACE) office's Army mission to rapidly develop, test, and transition advanced technologies to address high priority items for the Warfighter," said Army RCCTO ACE office project lead Nathan Rozza. "This project's goal is to improve air platform kinematics in support of indoor and outdoor short-range operations in complex environments to help mitigate operational gaps involving the clearing of buildings, potential tunnels, and other enclosed spaces that are incredibly challenging for our Warfighters."

"We developed the Dronut specifically to operate in challenging environments and provide lifesaving intelligence and information, so the TacDronut program is a natural progression for this technology," said Cleo Robotics founder and CEO Omar Eleryan. "This endorsement by the U.S. Army is a great testament to the groundbreaking technology we're building, and we're thrilled to be working with the Army RCCTO team and Soldiers from an elite group like the 82nd Airborne Division."



With hundreds of reconnaissance and attack drones flying over Ukraine each day, the fight set off by a land grab befitting an 18th-century emperor has transformed into a digital-age competition for technological superiority in the skies — one military annals will mark as a turning point.

In past conflicts, drones were typically used by one side over largely uncontested airspace to locate and hit targets — for example, in U.S. operations in Afghanistan and the Middle East.

In the battle between Russia and Ukraine, drones are integrated into every phase of fighting, with extensive fleets, air defenses and jamming systems on each side. It is a war fought at a distance — the enemy is often miles away — and nothing bridges the gap more than drones, giving Russia and Ukraine the ability to see, and attack, each other without ever getting close.

Ukrainian forces have also used drones to strike targets far from the fighting — in Crimea, which Russia illegally annexed in 2014, and in Russia's Belgorod border region, according to multiple Ukrainian officials who spoke on the condition of anonymity to discuss sensitive matters but declined to say what type of drones were used. Russia has repeatedly struck Ukraine's critical civilian infrastructure with self-detonating drones — a cheap substitute for high-precision missiles.

Drones have become so critical to battlefield success that at times they are used to take out other drones.

In early September, just days before Ukraine launched an offensive to expel Russian forces from its northeastern Kharkiv region, a Ukrainian reconnaissance drone flew through a gap between two jamming systems near the Russian border. It crossed into Russia and turned north across the Belgorod region, where Russia bases equipment to support its war in eastern Ukraine.

The drone spotted a base for Moscow's own unmanned aerial vehicles (UAVs), according to overhead images captured by the Ukrainians that were later reviewed by The Washington Post.

## Russia & Ukraine: Full-Scale Drone War<sup>3</sup>

**KHARKIV, Ukraine** — A war that began with Russian tanks rolling across Ukraine's borders, World War I-style trenches carved into the earth and Soviet-made artillery pounding the landscape now has a more modern dimension: soldiers observing the battlefield on a small satellite-linked monitor while their palm-size drone hovers out of sight.

In one frame, a Russian Orlan-10, with a trademark propeller on its nose, could be seen sitting in the field beside a house. Then in an "after" photo, the house had a hole in its roof, and an ambulance could be seen driving up. A Ukrainian attack drone had followed the same route as the reconnaissance drone — and delivered a strike on the fleet of enemy "eyes."

The attack, which has not been previously reported, dealt a blow to the Russian forces' ability to see the Ukrainian offensive coming and to counterattack.

Meanwhile, the Ukrainians deployed reconnaissance UAVs to mark the coordinates of Russian command posts, artillery batteries, electronic warfare systems and ammunition depots. Then, as Western-provided multiple-launch rocket systems fired on those targets, drones were flying again, redirecting the rocket fire in real time or confirming that it hit the mark. At times, combat drones delivered the blow themselves.

The Ukrainian strikes weakened the Russians and set the stage for Ukrainian soldiers to advance. When they did, drones were again hovering, allowing the operation's commander to monitor the troops' progress on a live stream. "We had the full picture of the fight," said Col. Gen. Oleksandr Syrsky, commander of the Ukrainian ground forces.

The result was a stunning Russian retreat. "Two main developments are going to impact future war," said Samuel Bendett, a military analyst at the Virginia-based research group CNA. "The proliferation and availability of combat drones for longer-ranged, more-sophisticated operations, and the absolute necessity to have cheap tactical drones for close-support operations."

In Ukraine, that future is now.

### Army of Drones<sup>7</sup>

More than anything, drones put eyes on the battlefield. And to see the enemy's moves, the Ukrainian military last spring created a unit of reconnaissance drone

teams called "Ochi" — Ukrainian for "eyes." Four-person teams are now spread across the eastern front, flying UAVs every day except when it rains.

In September, members of one such team squinted at their small handheld monitor and snickered. On the screen, they could make out several people in military uniform and a cart, in a cornfield across the Oskil River in a part of the Kharkiv region then occupied by Russians.

"They're stealing the locals' corn," said one of the Ukrainian drone operators, who for security reasons spoke on the condition that he be identified by his call sign, "Bars." A few Russian troops weren't worth an artillery strike, but the drone would keep watching in case they returned to a base.

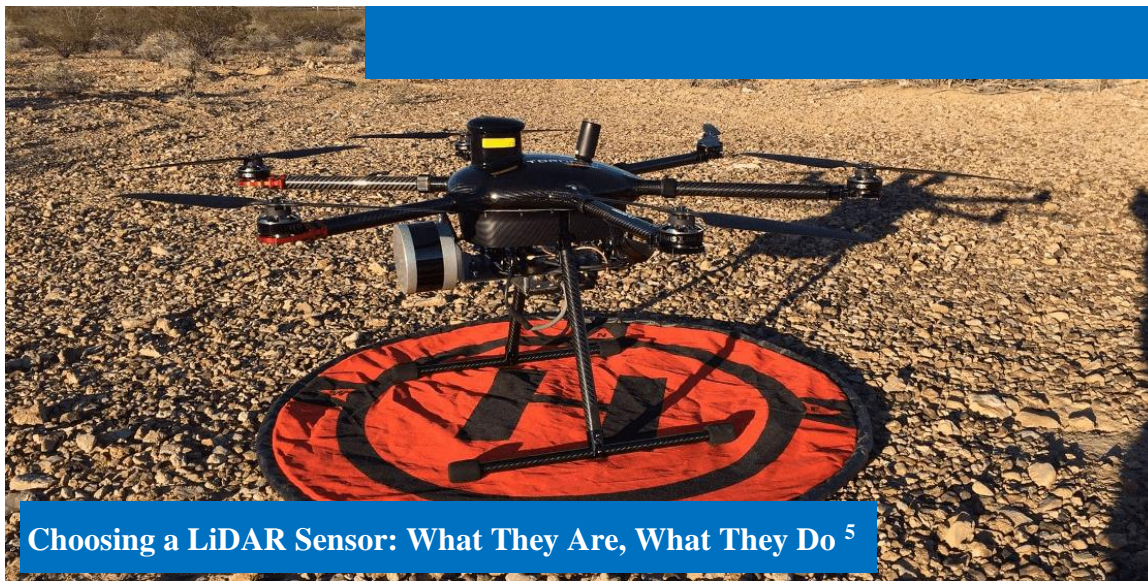
Driving an unarmored car, an Ochi team picks a spot near the front line, plugs in backup drone batteries to a generator and fires up a Starlink internet connection, so everything they see can be streamed to nearby brigades.

Their drone, a Matrice 300 quadcopter weighing about eight pounds, and its accompanying parts, including monitors, costs about \$40,000 — making it one of the cheapest tools of war.

It is these commercial drones — often small, relatively inexpensive and now ubiquitous — that make the war in Ukraine unique, providing unprecedented visibility and sharpening the accuracy of normally inexact artillery fire.

Military-grade combat drones such as the Turkish-made Bayraktar TB2 used by Ukraine, or the Iranian-made Shahed-136 deployed by Russia, are playing an expanded if more traditional role. But the most popular drone used by each side can fit in your hand — more a bug than a bird.

Read the rest of the article in [The Washington Post](https://www.washingtonpost.com/world/2022/12/02/drones-russia-ukraine-air-war/) at the following link: <https://www.washingtonpost.com/world/2022/12/02/drones-russia-ukraine-air-war/>



## Choosing a LiDAR Sensor: What They Are, What They Do <sup>5</sup>

More LiDAR sensors for drones are hitting the market, with promises of accurate 3D models and terrain maps. How do drone professionals approach choosing a LiDAR sensor? The deep dive on the options: what they are, and what they do. 2022 is clearly the year of LiDAR.

At all of the UAS shows in the USA, Mexico, Canada, and EU, the hot topic is LiDAR in 2022, and 2023 is ramping up to be more of the same, with significant growth.

LiDAR is a “Light Detection And Ranging” sensor, utilizing a laser, position-controlled mirror, an IMU (Inertial Measurement Unit) and internal processing to record geolocation data.

A LiDAR sensor emits a pulse of light towards the target (ground) The light is reflected from the surface/earth (a point) and returned to the sensor. The receiver detects the returning signal and calculates the distance the light has traveled. Using the position of the sensor, mirror, IMU, the direction in which the light was sent and the distance calculated. Following this return and calculations, the 3D position where the

signal was returned may be determined. With millions of reflections striking a terrestrial surface and returning to the LiDAR sensor, these contact “points” are used to generate the 3D model or ortho re-creating the target area in a digital environment.

Because LiDAR sensors generate their own signal pulse, illumination from other sources (for example, the sun), many LiDAR operator/pilots capture data at night. As long as there is nothing interfering between sensor and surface it is therefore possible to collect data below cloud cover (or in the dark). LiDAR can offer extremely flexible access to areas requiring scans, given the ability to fly at night, or when cloud cover has a negative impact on a site where photogrammetry may not be possible due to lighting conditions.

LiDAR sensors were previously relegated to fixed wing or rotary aircraft due to weight and cost, now accessible by any mid or heavy-lift UAS.

With ever-increasing flight efficiency coupled with reduced weight and cost of LiDAR sensors, there are several aircraft and LiDAR systems available at

affordable price points to suit virtually any budget. While LiDAR may not yet be for casual pilots, commercial pilots report near-immediate full ROI with LiDAR due to the current scarcity of complete systems.

Sensors may be purchased as a complete/total solution with aircraft, support software, and payload, or owners of medium lift systems may purchase LiDAR sensors separately to mount on whatever aircraft they’re familiar and comfortable with. For example, there are many LiDAR payloads available for the DJI Matrice 300 platform, Inspired Flight, Freefly, Yuneec, Maptek, Microdrones, and other systems.

LiDAR packages may be stand-alone, combined with separate RGB cameras for photogrammetry, or assembled with both in one housing. For example, the highly popular GeoCue 515 package not only offers a Hesai XT32 LiDAR sensor, it also includes two 20MP RGB cameras for coloring the pointcloud, or for photogrammetry deliverables.

Read the complete article at <https://dronelife.com/2022/12/12/choosing-a-lidar-sensor-what-they-are-what-they-do/>

## EYE ON IT



### DJI Mini 3 Portable Camera Drone <sup>6</sup>

Today, drone and camera technology leader DJI unveiled the DJI Mini 3 ultra-lightweight camera drone.

The pocket-sized DJI Mini 3 can be taken anywhere, and at under 249 grams it is exempt from most drone regulations in several parts of the world. Its 1/1.3-inch camera sensor records in 4K/30fps HDR and takes 12MP photos with True Vertical Shooting to create content optimized for social media platforms.

DJI Mini 3’s Intelligent Flight Battery grants it a max flight time of up to 38 minutes, which can be extended by up to 51 minutes with the Intelligent Flight Battery Plus. DJI O2 digital video transmission provides a 720p/30fps live feed from up to 10 km away, with powerful anti-interference technology guaranteeing a stable connection throughout the flight. Mini 3 has a wind resistance at up to 10.7 m/s, allowing it to hover and maintain a stable image in various conditions. DJI Mini 3 also features QuickShots, a suite of pre-programmed flight and filming paths for both landscape and vertical shooting.

DJI Mini 3 supports a myriad of intelligent functions designed to help the user get started quickly. Users can initiate flight with Auto Takeoff, and use the The Return to Home (RTH) function to instruct the aircraft to automatically return to its starting location in various situations. Mini 3 also combines GNSS with the downward vision system and the infrared sensing system to enable stable and accurate hovering.

DJI’s protection plan, DJI Care Refresh, is also available for Mini 3, covering accidental damage and providing replacements.

To coincide with the new release, the aerial photography and videography community [SkyPixel](#) is launching a campaign that will provide pilots with the opportunity to create and share content using Mini 3. Through the SkyPixel Product Tryout program, users can post why they should receive Mini 3 or who they would gift it to, and SkyPixel will select users to receive Mini 3 for a limited time to create content for a chance to win prizes.

## This Month’s Q&A Drone Tips

**Q: MYTH:** “There are no laws that regulate drones.”

**A: FACT:** All aircraft, manned or unmanned, are regulated by the Federal Aviation Administration (FAA) to protect the safety of people and aircraft in the air, and for the safety of people and property on the ground. In fact, the FAA has broad authority to regulate any aircraft operation in the national airspace system (including drones). Violations of FAA rules and regulations can lead to severe penalties, including steep fines and prison sentences. Furthermore, many existing common law and criminal codes (trespassing, battery, privacy, wiretapping, etc.) already apply to drone operations.

**Q: MYTH:** “Hobbyists and recreational flyers are exempt from FAA authority and the law.”

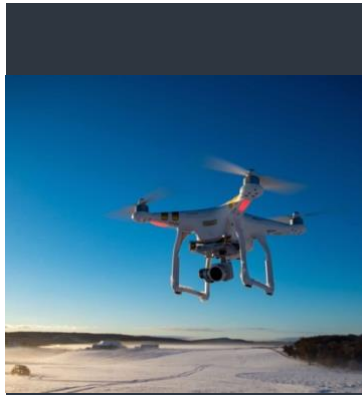
**A: FACT:** Hobby and model aircraft are still considered “aircraft” by the FAA and are very much regulated by the FAA. Section 336 of the FAA Modernization and Reform Act of 2012 codified specific requirements for hobbyists and model aircraft operators to ensure safe and responsible operation.

**Q: MYTH:** “Drones will be flying around our property, houses and everywhere.”

**A: FACT:** The FAA rules and regulations that will continue to evolve for unmanned aircraft will be very restrictive, and will carry the weight of federal law with severe penalties for violations. FAA rules are based primarily on safety for both people and aircraft already in the air and for the safety of people and property on the ground. Most of the feared imagined scenarios are already illegal because they would also be unsafe. If we look at the history of FAA regulations, aircraft have always been required to stay away from built-up areas (buildings and structures) and people and crowds. There are additional “line of sight” requirements for operators. Unsafe activity will not be permitted by the FAA.

**Q: MYTH:** “Law enforcement can easily operate drones today.”

**A: FACT:** The FAA considers law enforcement operation of any aircraft (manned or unmanned) to be covered under “public aircraft” rules.



### Drone Quotes to Remember.

“Drones, with their agility and small size, seem perfect for search and rescue operations” ~ Grant Imahara

“We live in a time of astounding technological advancements. There are deep-sea drones and live-streaming virtual reality” ~ Jenna Wortham

“People talk about drones like they’re a bad thing, but they forget there are people behind them. It’s a lot easier to blame the technology than to accept that people are a cancer on this planet”~ David Hewlett

## Upcoming Local Events

- InterDrone 2023 – Rio Hotel, Las Vegas, NV – Date TBD
- International LiDAR Mapping Forum – Denver, CO – February 6-8, 2023
- UAV Technology – Hilton Arlington, Washington DC – February 6-8, 2023
- Auvsi Xponential 2023 – The Colorado Convention Center, Denver, CO – May 8-12, 2023
- 7<sup>th</sup> Energy Drone & Robotics Summit 2023 – Woodlands Waterway Marriot, Houston, TX – June 12-14, 2023
- Japan Drone – International Convention Complex – June 26-28, 2023
- Commercial UAV Expo Europe – Caesars FORUM, Las Vegas, NV – September 4-6, 2023
- Commercial UAV Expo Americas – Caesars FORUM, Las Vegas, NV – September 5-7, 2023
- Drone X – Excel London – September 26-27, 2023



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