India's first monthly e-magazine for Drones

DRONES WORLD

VOL 03 ■ ISSUE 6
JANUARY 2023

₹ 250

Mr. Utkarsh Singh
Founder & CEO
Dronamaps

Mr. Prateek Srivastava,
Founder & MD,
DroneAcharya

www.dronesworldmag.in

Invitation to exhibit at

4th INTERNATIONAL DRONE EXPO

www.droneinternationalexpo.com

26–27 July 2023

An international expo on

Drones | Counter Drones
Lidar | Geospatial
Air Taxi | Components Mfg.

Book Space

info@droneinternationalexpo.com
Mob/Whatsapp: +91-8285009906

DRONES WORLD

VOL 03 | ISSUE 6 | JANUARY 2023

Editor-in-Chief ◆ B. Kartikeya

EDITORIAL

Associate Editor ◆ Rohith Reddy

DRONE CORRESPONDENTS ◆ Prakash Tirandas, B. Ravi, Rahul Verma

CREATIVE HEAD ◆ Design Garage

PHOTOGRAPHER ◆ Krishanth

MARKETING

Head Marketing ◆ Dr Pranay Kumar, +91 80836 30500 pranay@futureaviation.in

(NORTH & WEST)

Manager, Marketing ◆ Rohith Reddy

FOR EUROPE ADVERTISEMENTS:
Jubin Josepsh
Tel : +33 758933925
jubin.joseph@bluespacegroup.com
SUBSCRIPTION : Sony

EDITIORIAL & ADVERTISING OFFICES
DRONES WORLD
No 27, Rd Number 2a, Tirumala Hills , Asmangad, Hyderabad, Telangana 500036, India Tel: 09444499221
For all magazine related enquires
E-mail: dronesworldmag@gmail.com

DRONES WORLD is published by - B. Kartikeya

B. KARTIKEYA

Hello my dear readers,

High roads… High hopes… High fly into the sky… I`m so high, of course with emotions. Hurrah! What an year it was, the 2022 despite the imperfections that we had to experience. With all my happiness and joy I wish you a very happy and prosperous New Year 2023.

Entering the New Year, as like ever, we brought you fantastic and new stylish design makeover of your favourite Drones World Magazine. To keep you update frequently we have decided to shift from Bi Monthly to Monthly E Magazine. We haven't stopped with that, Drones Directory 2023 has launched. Thank you for the overwhelming response. Few more surprises are waiting for our readers in 2023. In this issue, we have covered the essential bits of global news, innovations, Anti-Drones, trails, sensors & new products.

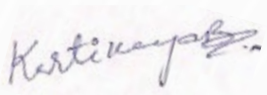
We brought you a special interview with Prateek Srivastava, Founder & MD, DroneAcharya Aerial Innovations Ltd which provides a complete ecosystem of drone solutions for multi-sensor drone surveys, data processing of Drone and high-configuration hardware for drone delivery, drone-in-a-box solutions for automated survey and surveillance, and drone pilot training, along with GIS data processing. Turning the pages, you can find another conversation we had with Utkarsh Singh Founder and CEO of Dronamaps.

Watch out for us at Aero India 2023 as we would always love to interact with you amazing people. Don't hesitate to approach us for promotional activities for Aero India. It's a boon for Drone Startups to showcase their abilities and capabilities to attract investors and governments around the world. We wish to see the whole unmanned industry as the winner of the decade.

We appreciate the support & admiration you gave to Drones World in 2022 and we anticipate the same level of trust and enthusiasm towards our magazine in 2023. We hope we are able to raise the bar and reach new heights in 2023.

With that, I take your leave this month. More when we meet again in our next issue.

Till then, stay safe, God bless.



Mobilicom's SkyHopper Micro Chosen by Tier-1 Drone Manufacturer for Integration into its Drone Platform

Mobilicom Limited a provider of cybersecurity and smart solutions for drones, robotics, and autonomous platforms announced that its recently launched SkyHopper Micro, a new micro bi-directional data link specifically designed to enable mass deployment of fleets of mini-to-small-sized drones, has been chosen by a Tier-1 drone manufacturer, a global leader in its field with an installed base of customers, for integration into its drone platform.

Launched in October 2022, the SkyHopper Micro, designed for mass deployment of mini-and-small-sized drone fleets, caters to the growing demand for high-use applications including commercial inspections, disaster relief, defense, and intelligence. Equipped with Mobilicom's ICE cybersecurity software, SkyHopper Micro provides superior security for drone and communication channels, encrypting all data that is transmitted and collected. The secure communications system features an advanced proprietary encryption mechanism and is compatible with a wide range of flight controllers, mission software, and payloads.

SkyHopper Micro was selected by this leading Tier-1 drone manufacturer due to its superior performance both in line-of-sight (LOS) and urban non-LOS conditions and its lightweight miniature size, making it ideal for integration into mini-and-small-sized drones. SkyHopper Micro also complies with the National Defense Authorization Act (NDAA), a key requirement for U.S. government agencies.

The Tier-1 drone manufacturer completed the engineering process, integrating the SkyHopper Micro into its mini-drone systems and ground control system (GCS). Following comprehensive testing and verification, the platform was successfully field and flight tested in the U.S. and Europe.

"We believe the potential of this SkyHopper Micro program is immense due to large-scale deployments planned by this Tier-1 drone manufacturer. These small-sized, often single-use drones have high deployment and replacement rates, driving demand for Mobilicom's products," stated Mobilicom CEO Oren Elkayam.

"The extensive use of tactical and miniature drones, especially for intelligence and kamikaze in the Ukraine – Russia conflict has accelerated current demand. We believe such solutions will be deployed worldwide by armies as part of their miniature munition drone strategy," Elkayam concluded.

MissionGO and the Matador UAS Consortium Complete a Week of UAS Proof of Value Operations

"The work being done by 2THEDGE and Texas Tech University Health Sciences Center is proving uncrewed aircraft can be implemented today for immediate and significant improvement for many individuals and communities throughout the Texas Panhandle region," says Chris Corgnati, President of MissionGO. "MissionGO is thrilled to share our experience and aircraft to the community here to assist in proving the value of UAS operations."

The successful completion of nine operations in Lubbock, TX last week marks a turn in uncrewed aircraft systems (UAS) for West Texas and beyond. The Matador Uncrewed Aerial System (UAS) Consortium, co-developed by Texas Tech University Health Sciences Center and 2THEDGE, LLC, is an industry & university partnership improving rural communities through BVLOS UAS Operations. MissionGO joined the Consortium for these operations, bringing their team of aviation experts and a portion of their UAS fleet, including MissionGo's signature aircraft, the MGV100.

MissionGO, a leader in uncrewed aircraft systems production and operations, played a critical role in five of the nine operations including multiple STEM presentations featuring medical staff from UMC and local high schools, Shallowater and Frenship, infrastructure inspections of Sandia Labs wind turbines and solar panels with the Texas Tech Wind Institute, and a 10.5+ mile flight over a WATCO rail line. The team also participated in panel discussions with local college students about the future possibilities for UAS in the medical and infrastructure industries and led an aerial demonstration for dozens local executives concluding the week of flight operations.

In addition to the operations completed by MissionGO, other members of the Matador UAS Consortium also successfully completed a long range organ delivery flight with an Optionally Piloted Aircraft (OPA) – during which MissionGO sister company, MediGO, provided the real-time tracking and sensor information – long-range clinic run, and bridge inspections, as well as a flu vaccine and Thanksgiving meal kit delivery to a rural community where the average distance to a local grocery

Veterans Health Administration and Verizon test 5G MEC and drones

Verizon Public Sector has been collaborating with the Veterans Health Administration's National Center for Collaborative Healthcare Innovation (NCCHI) and the Veterans Affairs Palo Alto Health Care System (VAPAHCS) in the development and testing of 5G MEC and drones designed to improve safety and efficiency.

From the curation of advanced sensor-enabled drones, to technical integrations, and FAA-compliant pilot training, early work has validated the potential to enhance operations including safety, security and physical infrastructure monitoring.

"This collaborative work is designed to enhance the safety of our patients and staff in the event of emergencies by leveraging cutting-edge technologies for improved situational awareness, strategic coordination, and response times. On a more routine basis, the advanced sensors, combined with the agility of the aerial perspective, can also expand our ability to proactively monitor vital hospital infrastructure," said Dr. Thomas Osborne, Director of the National Center for Collaborative Healthcare Innovation (NCCHI) and Chief Medical Informatics.

As part of the overall safety initiative, Verizon and VHA are also evaluating the technologies' ability to improve search and rescue performance in situations such as patient elopement.

"Our combined 5G MEC and drone partnership with the Veterans Affairs Palo Alto Health Care System is the next step in the VA's innovation journey, and it represents how other federal agencies can adopt next-generation technologies to help improve the way they serve their constituents," said Maggie Hallbach, Senior Vice President, Public Sector at Verizon. "5G is reshaping how VHA operates and cares for its patients, and Verizon Public Sector is uniquely positioned to deliver the technology and network to support the VA's mission to provide top quality care for our nation's veterans."

VHA and Verizon have also developed a comprehensive capabilities roadmap that include partnership with other agencies as well as the inclusion of additional cutting-edge enhancements. These include autonomous operations capabilities, to expand the capacity of staff in emergencies, while also allowing responsiveness beyond traditional visual line of sight.

"While some continue to talk about the promise of 5G, Verizon is working with strategic partners like VHA to bring the technology to life," said Joel Daniels, 5G Healthcare Innovation and Enterprise Solutions Program Lead for the VA on the Verizon Public Sector team. "This demonstration at the VA's campus in Palo Alto is indicative of the innovative products and technologies we are bringing to market, in this case helping VA leaders meet the strategic objectives that make up their 5G strategy."

Hidden Level's Drone Tracking System Ready-Made for New FAA Rules

Federal Aviation Administration regulations will begin to require all unmanned aircraft to transmit identification and location information. Hidden Level›s Airspace Monitoring Service (AMS) technology is uniquely positioned to track, monitor, and validate drones whether or not they comply with the new FAA rules.

The regulations are in response to the explosive growth of unmanned aircraft systems, or drones, since 2013. The FAA reported over 865,000 registered drones in May 2022 and estimates that number will grow to 1.4 million by 2024.

To prevent collisions with passenger airplanes and other aircraft, the FAA is mandating all drones operating in U.S. airspace have Remote Identification (RID) capability. Remote ID provides agencies like the FAA, law enforcement, and other federal agencies a greater situational awareness to be able to identify when a drone appears to be flying in an unsafe manner or where it is not allowed to fly. Remote ID also lays the foundation of the safety and security groundwork needed for more complex drone operations. The regulations require all drones made or sold in the United States after December 2022 to support RID, and that all drone pilots (including those who fly for fun, business, or public safety) must register and operate their drone in accordance with the final rule on remote ID, beginning Sept. 16, 2023.

"That allows Hidden Level's AMS to detect any drones failing to broadcast RID data or transmitting false information, and report it almost instantaneously," Cole said. "That capability is essential to any organization, whether it's a city, a stadium or a company facility, that is trying to ensure safety and security."

Hidden Level's drone monitoring technology was designed to keep up with the rapid technological advancements to drones such as Remote Identification. In 2019, the company released a white paper identifying potential gaps in RID and published a technology blog identifying additional factors that should be addressed with a comprehensive RID solution.

"When it comes to integrating the FAA's broadcast Remote Identification in drone tracking systems, Hidden Level is way ahead of the game," said Jeff Cole, CEO and co-founder of Hidden Level. "Our AMS not only receives RID signalling in its coverage area but also verifies it, addressing two significant gaps in the RID system." Those gaps appear when a drone intentionally or unintentionally fails to broadcast RID information, or if it intentionally or unintentionally broadcasts false RID information. Hidden Level's AMS technology uses a local network of passive RF sensors installed on buildings, rooftops and cell towers, which detects the movements of drone aircraft in the area. That allows it to track drones even without a RID broadcast, resolving the first gap. The Hidden Level AMS also checks and validates RID signals by correlating fine angle estimates from its sensors on the received RID broadcast messages with the drone position information included in the messages.

Southern Company and MSU flight lab partnership reaches new heights

Southern Company's Aerial Services and Mississippi State University's Raspet Flight Research Lab recently reached a milestone on a joint research project that will help expand Southern Company›s use of unmanned aircraft systems (UAS) to map critical infrastructure, assess weather-related damage and conduct routine utility inspections.

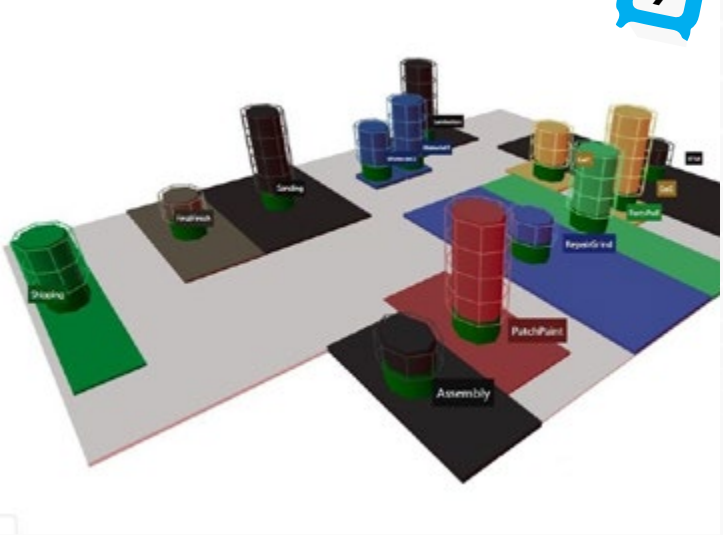
At a proof-of-concept demonstration in Bay Minette, Ala., and the team showcased the capabilities of a large UAS with integrated sensors to gather data that will contribute to the research project, flying 28 miles of transmission assets that included approximately 400 structures. The team also used a helicopter with a high-resolution camera to capture footage and evaluate its sensor technology and to look at potentially transferring the technology to the large drone in the future.

"This research work is a game-changer," said Mississippi Power President and CEO Anthony Wilson, who chairs the Mississippi State University Foundation. «The data and knowledge we gain through this partnership will help improve safety and reliability, reduce costs and enable us to respond quicker should incidents in our system occur.

The collaboration between Southern Company and MSU will enable the use of larger, more sophisticated drones in pursuing beyond visual line of sight (BVLOS) operations approval from the Federal Aviation Administration (FAA) for the Southern Company system's inspection and mapping efforts.

Next steps for the team are to determine on-board sensor systems that would enable drones to detect and avoid other aircrafts in surrounding airspace and enhance capabilities for communicating with drones from further distance.

"We are proud of the continued research partnership with Southern Company," said MSU Vice President for Research and Economic Development Julie Jordan. "Through investment in this technology, Southern Company is leading the way for broad scale industry adoption. This flight operation and remote sensing research illustrates the profound safety benefits UAS offer to the utility industry and supports not only Southern Company but the industries and citizens that rely on their services."



HNA.Live Launches AI and 3D Cloud Solution for Manufacturers

HNA Live, a data analytics company serving manufacturing and real estate industries, has selected CLEA, AI/IOT platform from SECO MIND USA LLC (https://secomind.ai) for their innovative cloud solution that combines AI and 3D technology to optimize manufacturing facility productivity.

Manufacturing 4.0 is transforming the way manufacturers manage and optimize their operations, from product design and production to distribution and customer satisfaction. HNA LIVE offers granular, privacy-protected, real-time insights into the performance efficiencies and bottlenecks of operations, safety, and quality in the manufacturing space.

"The digital transformations are notoriously difficult to scale up across networks of factories, the pressure to succeed is intense. With CLEA we can rapidly enable manufacturers to capture benefits across the entire manufacturing value chain" — Cooper Mojsiejenko, Chief Executive Officer at HNA Live.

HNA Live makes use of LIDAR and other data collection technologies to precisely measure and create 3D models for manufacturing whether its plant movement, working parts in process, or a building's entire operation. HNA.Live's cutting-edge technology provides more accurate real-time 3D modeling for a manufacturer's business strategy.

"CLEA enables connecting and cloud managing any hardware for smart control, monitoring, and actionable insights. HNA Live is enabling manufacturers to increase production capacity, reduce material losses, improve delivery lead times, and reduce their environmental impact. We are very excited to be part of their journey", — Ajay Malik, CEO of SECO Mind USA

"CLEA enables connecting and cloud managing any hardware for smart control, monitoring, and actionable insights. HNA Live is enabling manufacturers to increase production capacity, reduce material losses, improve delivery lead times, and reduce their environmental impact. We are very excited to be part of their journey"
Ajay Malik, CEO of SECO Mind USA

FARO Zone 3D Forensic Scene Analysis Software Delivers New Photogrammetry Capabilities

FARO® Technologies, Inc. a global leader in 4D digital reality solutions announced the release of a new edition of FARO Zone 3D Software to the public safety market, equipping crime, crash, fire, and security professionals with critical new capabilities they need. These include: advanced graphics; customizable vehicle modeling; and the ability to measure from photographs through photogrammetry integrations.

The announced release of FARO Zone 3D Software provides public safety professionals with a multi-modal, capture-device agnostic software program that can diagram, document, and analyze forensic scenes utilizing data from drones, 3D laser scanners, 2D photos and other traditional measurement devices, leaving no customer and no data collection method behind.

"This edition of FARO Zone 3D Software is the most versatile yet for data input and processing — making the most comprehensive scene documentation software on the market even better," said Noreen Charlton, Software Product Marketing Manager at FARO. "Public safety professionals can take images from almost any capture device — drones, photographs, laser scanners from a variety of manufacturers, hand-measured data and more — then model crime and crash scenes in 3D and virtually walk jurors through a forensic scene with an exceptional level of realism."

Aiding in achieving that realism, which is critical to solving and proving cases in the courtroom, Charlton points to a significant feature in this release of FARO Zone 3D software- improved point cloud capability. FARO Zone 3D software is available in two versions, Zone 3D Expert and Zone 3D Pro. With Zone 3D Expert, which incorporates a new proprietary photogrammetry engine, FotoPoints, users can convert photographs into point cloud data. This means, for the first time we are enabling users to take accurate measurements from 2D photos or 3D data. Also for the first time, users of 3D Pro can import point cloud data into the software for inclusion into forensic scene analysis.

These tools provide the functionality to accurately reconstruct any scene with multiple sources of data, to create factual diagrams, photo-realistic visuals, and give users the ability to create animations in a combined point cloud and panoramic image environment. Additionally, the camera lock feature allows a user to freeze a camera view to edit a drawing without changing the view. This can also be used to align an overlay image or video with a point cloud. Along with a large library of existing features, FARO Zone 3D software is the most comprehensive public safety tool for documentation, training, analysis and presentation.

Matternet Receives FAA Production Certificate for its M2 Drone Delivery System

Matternet, the developer of the world's leading drone delivery system announced that it has been granted a Production Certificate by the Federal Aviation Administration (FAA) for its Matternet M2 drone. This follows the announcement earlier this year that the M2 aircraft achieved FAA standard Type Certification, a first of its kind for an unmanned aircraft.

The Production Certificate acknowledges that Matternet has established a quality management and manufacturing capability to produce aircraft that conform to the approved Type Design. This will enable Matternet to manufacture, test and issue airworthiness certificates for M2 drones moving forward. The Matternet M2 drone will be produced at the company's Mountain View, California facility.

"Receiving an FAA Production Certificate is yet another milestone establishing Matternet as the first – and currently only – company able to produce certified delivery drone systems in the United States," said Andreas Raptopoulos, founder and CEO of Matternet. "The aircraft produced under this Certificate will be the very ones that lead a transformation of how we deliver time-sensitive materials, especially in critical industries like health care."

Matternet is currently focused on expanding its U.S. operations, especially within the health sector where unmanned delivery can be a significant solution to challenges faced by health systems increasingly stretched thin and facing demands for new efficiencies. For instance, the Matternet drone delivery system can enable the fast, on-demand and routine delivery of biological lab samples to offsite testing facilities. This helps ensure that health care professionals and patients get answers more quickly all while creating more efficient processing of laboratory tests – which are often unevenly distributed and burden costlier, overnight lab staff with high-volume tests.

For the past four years, Matternet has also been among a select group of companies providing the aircraft and support technology for on-demand air carrier operations under an exemption granted under the FAA's Part 135 framework for revenue on-demand air carrier operations. This allowed carriers to operate drone networks while these systems were evaluated. Now with both Type Certification and a Production Certificate, Matternet is the first company in the U.S. with an approved and in-production aircraft that has been deemed airworthy and eligible for commercial delivery operations.

Matternet expects that its first M2 drones produced under this Production Certificate will enter service beginning December 2022.

First flight for uncrewed firefighting helicopter at New York UAS test site

Rotor Technologies' uncrewed helicopter prototype achieved first flight on 2 December, 2022 at the FAA's New York UAS test site after receiving experimental certification on 30 November, 2022.

The flight prototype, officially designated "R22S6–01" and unofficially dubbed Birdy McBirdface, is one of two identical prototypes certified by the FAA for R&D and field testing. The prototype helicopter is based on the Robinson R22, a light helicopter that is commonly used for flight training and agricultural work. In a conventional crewed configuration, the R22 can carry around 170lbs of useful payload; Rotor's uncrewed configuration can carry 400lbs of payload for more than 3 hours, says the company press release.

The initial flight on 2 December, 2022 verified the functioning of Rotor's flight controls, engine controls, and teleoperations systems. The pilot was located in a ground control station and directly manipulated the flight controls throughout the flight, providing real-time inputs to stabilize the helicopter. Communications from the helicopter and control station were transmitted over multiple digital radio links, while a wired tether provided a fail-safe backup.

The prototype was operated in low hover within visual line of sight of the pilot. The longest flight of the day was a little over 3 minutes long. These flights gathered data to support flight controls development and flight envelope expansion.

Rotor's team of MIT scientists is combining flight control algorithms, computer vision, and satellite communications to create CloudPilot, an operating system that will make aircraft operations safer and easier. Using CloudPilot, a pilot can "teleoperate" a helicopter from anywhere in the world. The system uses commercial Low Earth Orbit satellite constellations such as SpaceX's StarLink to transfer data over long distances with minimal delay. Proprietary VR technology gives pilots better visibility than the cockpit, enabling operations at night and in low visibility and preventing accidents caused by pilot disorientation and human error.

CloudPilot will initially be used to combat wildfires, where helicopters drop water or fire retardant to slow the spread of fires and provide aerial logistics for firefighters on the ground. Rotor is working with US Federal and State agencies to conduct field tests in 2023.

Healthcare innovator, Spright, joins the GEC in announcing Health@GEC

Spright, a medical aviation company, is leveraging their expertise in aviation and culture of innovation to bring drone-based, life-saving solutions to healthcare.

As a Guinness Enterprise Centre (GEC) Healthcare Innovator, Spright has the opportunity to bring real solutions to healthcare partners. More than a drone technology company, Spright is an end-to-end service partner that develops and executes the right drone program that fits each unique business objectives. Spright is a division of Air Methods – the preferred partner for US hospitals and one of the largest community-based providers of air medical services, with nearly 40 years of air medical experience.

There are gaps in access and care in healthcare, and Spright offers partners quantifiable results in terms of speed and efficiency, and to solve the day-to-day challenges of their unique business.

Children's Health Ireland, St James's Hospital and its Academic Health Science Campus have announced a formal collaboration with the Guinness Enterprise Centre on Monday, December 5th. This collaboration centres on innovation in the health system, entrepreneurship & innovation training and clinical collaboration to foster optimal patient outcomes. Sprights President, Joseph Resnik, and Director of Strategic Programs, Steve Flynn, were speakers on the event panel as a client in the Health@GEC cluster.

Hermeus Selects P&W F100 Engine as Key Component of Hypersonic Propulsion System

Hermeus has selected the Pratt & Whitney F100 turbofan to integrate into its larger hypersonic engine. Securing an off-the-shelf turbine engine will save Hermeus billions of dollars in research and development costs and years of schedule. Pratt & Whitney's F100 turbofan, which is used in the F-15 and F-16 aircraft, will act as the turbine portion of Hermeus' turbine-based combined cycle engine named Chimera II.

"The F100 is a legendary turbine engine that will fit within our larger engine architecture extremely well," said Hermeus CTO Glenn Case. "We chose it for its reliability, performance, and because it's currently in production. We're thrilled to have Pratt & Whitney as a partner on our journey to making hypersonic flight a reality."

Chimera II will power Hermeus' aircraft, Darkhorse, a hypersonic uncrewed aerial system designed for defense and intelligence customers. The aircraft has multi-mission flexibility and is fully reusable. This engine contract keeps the Darkhorse program on track for engine testing in 2024.

"The F100 engine recently celebrated 50 years of service and 30 million flight hours, demonstrating its dependability and capabilities," said Chris Johnson, VP of Fighter and Mobility Programs at Pratt & Whitney. "Pratt & Whitney's participation with Hermeus' Darkhorse program is a great example of creating innovative partnerships in aviation and will play a crucial role in addressing our national security challenges."

Matternet Launches World's Longest Urban Drone Delivery Route Connecting Hospitals and Laboratories in Zurich, Switzerland

Matternet, the developer of the world's leading drone delivery system, announced it has begun test operations on a five-kilometer BVLOS (beyond-visual-line-of-sight) route over the city of Zurich, Switzerland. This route is the world's longest drone delivery route over a major city and will be used to transport diagnostic samples between the Triemli and Waid Hospitals – both a part of Stadspital Zürich, a municipal central hospital owned by the city of Zurich.

"Launching this new service for Stadspital Zürich is an important moment for Matternet, but also for the future of both health care and logistics services," said Andreas Raptopoulos, founder and CEO of Matternet. "Leveraging the longest urban BVLOS route to transport biological samples for diagnostic testing on-demand changes the way that hospitals and hospital systems can approach patient care, all while creating new efficiencies that can improve patient experiences and ensure that they keep pace with the demands of the 21st century."

> Switzerland has established itself as one of the most advanced countries in the world for scaled drone delivery operations," added Raptopoulos. "And this new route in Zurich – built on the foundation of five years of successful operations in Switzerland – will help us create insights into developing a city-wide medical network that can become a template for similar networks in Europe, the U.S., and beyond.

Using Matternet's unmanned aircraft, transportation between the two hospitals and their laboratories takes just seven minutes. This test is demonstrating the potential for drones to provide fast, on-demand delivery for individual urgent shipments, without congesting Zurich roads or emitting CO2. Matternet drones transport medical items with secure end-to-end chain of custody and operate autonomously with remote supervision through Matternet's Mission Control center in Zurich.

Currently, hospitals rely on ground transport to deliver samples to laboratories for testing. This usually means that large batches are sent via car or van, which can result in significant delays. This approach also creates a major burden for lab staff with huge influxes of tests received at once instead of a steady flow throughout the day. Additionally, for urgent, single-patient diagnostic tests, hospitals also rely on vehicle-based couriers, which can be even slower and less efficient.

Matternet is actively working on drone delivery networks that can fill urgent logistics needs in health care and help transition on-demand ecommerce to a sustainable mode of transport. In the U.S., the company recently received Type Certification and a production certificate from the Federal Aviation Administration (FAA) for their M2 drone, making them the first company to have FAA clearance to build and fly their own commercial delivery drone in that country.

Walmart's Drone Delivery Takes Flight in Texas with DroneUp

Santa's sleigh may not be the only thing seen flying in the skies of Texas. Walmart's drone delivery service is now available for select customers in the Dallas-area. The new delivery option will be fulfilled from 11 stores, making it easier than ever for customers to grab those last-minute gifts. No assistance from Rudolph needed.

This marks the first time customers in Texas can take advantage of Walmart's drone delivery, following the retailer's earlier announcement of plans to expand its DroneUp network to reach four million additional households across 6 states, including Texas. From last minute meal solutions to a package of Christmas cookies, Walmart has successfully executed thousands of same-day drone deliveries to date.

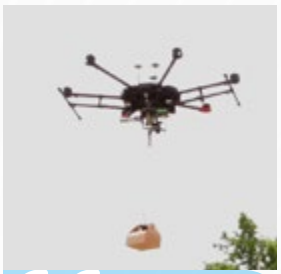
"Drone delivery makes it possible for our customers to shop those last-minute or forgotten items with ease, in a package that's frankly really cool. Being on the forefront of that innovation at Walmart is something we're proud of," said Vik Gopalakrishnan, vice president, innovation & automation, Walmart U.S. "It may seem like a futuristic option, but it's giving our customers what they've always wanted, and that's time back to focus on what is most important to them."

Here's how it works: Customers living within a mile of a participating store can place orders through www.droneupdelivery.com between the hours of 8:00 a.m. - 8:00 p.m. local time. Drones can deliver more than 10,000 eligible Walmart items up to ten pounds, including fragile items like eggs, in as little as 30 minutes. There are no order minimums and the delivery fee is just $3.99. With use of promo code FreeDeliveryTX, customers using drone delivery for the first time will have the delivery fee waived. Once the items are packaged and loaded into the drone, the order is then delivered using a cable that gently lowers the package into the customer's yard.

Zipline and the Government of Rwanda Announce a New Partnership to Serve the Entire Country with Instant Logistics

Zipline, the global leader in instant logistics and deliveries announced a new partnership with the Government of Rwanda that aims to complete nearly 2 million instant deliveries and fly more than 200 million autonomous kilometers in Rwanda by 2029.

Under the new partnership, Rwanda will triple its delivery volume by adding new delivery sites in rural and urban locations throughout the country and opening up Zipline's service to other government entities. In doing so, Rwanda is bringing innovative and environmentally friendly logistics and delivery to the country, and it will be the first country in the world with the ability to make autonomous instant deliveries to its entire population.



> zipline
> Instant logistics has saved thousands of lives and is solving some of the world's most important problems – hunger and malnutrition, road congestion and environmental pollution, and lack of access to healthcare," said Daniel Marfo, Senior Vice President and Head of Zipline's Africa business and operations. "We are honored to expand our relationship with our first customer to support additional sectors of government and create more impact together.

What started with blood six years ago now includes medicine, medical supplies and nutrition and animal health products. This new partnership expands that foundation to support the country's financial, e-commerce and tourism industries. In fact, any agency within the government, including the Ministry of Agriculture and Animal Resources, the Ministry of Information Communication Technology, the Rwanda Development Board, the Rwanda Medical Supply, and the National Child Development Agency, can use Zipline's instant logistics and delivery system.

"With this new agreement, we will be incorporating Zipline into many aspects of our national operations from providing a reliable healthcare supply chain, to addressing malnutrition, to creating an unforgettable eco-tourism experience. Rwanda is an innovation hub and we're thrilled to be the first country in the world to launch a national drone delivery service," said Clare Akamanzi, Chief Executive Officer of the Rwanda Development Board.

From its distribution centers in Muhanga and Kayonza, Zipline delivers 75% of the country's blood supply outside of Kigali. Because of Zipline's instant delivery network, more than 400 hospitals and clinics get blood, medication and the supplies they need within minutes of ordering, giving them the ability to treat both everyday medical conditions and emergencies. In fact, using data from Rwandan public hospitals, researchers from the University of Pennsylvania found an 88% reduction of in-hospital maternal deaths due to postpartum hemorrhage as a result of Zipline's logistics and delivery system. Simply put: more mothers are alive because they were at a medical facility that relies on Zipline's instant delivery network. This year alone, the Ministry of Agriculture delivered more than 500,000 doses of animal health vaccines and more than 8,000 units of swine semen to vets and farmers using Zipline. Access to animal husbandry products has increased the fertility rate among farmers using Zipline deliveries by 10 percent, compared to the national average. Farmers can raise more pigs with a healthier genetic profile, grow their businesses, and ultimately provide better access to protein for communities and improve population health.

Dronedek Looks to the Future of Delivery and Sees Autonomy

The future of package delivery will be autonomous and tech-driven and consumers should start preparing now to reap its benefits, predicts Dronedek Founder and Chief Executive Officer Dan O'Toole.

"We have reached a place where consumers want things delivered better, faster, fresher and cheaper," says O'Toole. "Getting the most for the least is what it's all about. Paying less, not having to leave, having the quality and freshness, right now, is where we want to be."

Meeting this consumer demand will speed autonomous delivery, he said, adding that he is optimistic consumers will quickly adapt to the new opportunities.

"Consumers are often skeptical of new technology, and autonomous delivery is no different, but had consumers not already been ready to adapt in earlier times, we'd still be delivering packages by horse and buggy," he said.

O'Toole plans to have Dronedek mailboxes of the future available for subscription service in the first quarter of 2023. Dronedek mailboxes are secure devices that can accept deliveries of every kind – human, robotic or drone.

TOP 4 BENEFITS OF AUTONOMOUS DELIVERY:

1) No more worry about package theft, damage or inaccurate delivery: Dronedek mailboxes provide a climate-controlled, secure receptacle to store deliveries until consumer retrieve them whether they're delivered by drone, robot or human. They're controlled by app so sensitive deliveries can be safely shipped and stored.

2) No noise or privacy issues: Most consumer concerns about autonomous delivery have already been addressed. Dronedek is working with partners to reduce drone noise, and laws already exist to address privacy and safety.

3) Safety will increase: Autonomous delivery will improve safety around the country. Both aerial drones and unmanned autonomous vehicles have significant operational time under their belts and have proven safer than manned operations in the same scenarios.

4) A cleaner environment: Autonomous delivery is better for the environment. For every 1 percent of shipped items being delivered autonomously to a Dronedek in the US, 3,000 trucks will no longer be needed. That means fewer greenhouse gases, road repair, lower fuel costs, fewer accidents, fewer injuries, fewer deaths and lower insurance costs.

"I am so optimistic about the future," adds O'Toole. "Better, faster, fresher, cheaper are all metrics that deliver on the promise of autonomy."

GA-ASI Flies New Multi-Use NATO Pod on MQ-9

General Atomics Aeronautical Systems flew the new NATO Pod for the first time on Nov. 23, 2022. The NATO Pod is a joint development between GA-ASI and Sener Aeroespacial of Spain. The NATO Pod is built by Sener Aeroespacial in Europe to meet NATO airworthiness standards, while increasing configuration and payload options for MQ-9A and MQ-9B Remotely Piloted Aircraft produced by GA-ASI. The new product is designed for international customers that are interested in rapidly integrating sovereign payload capabilities to achieve specific mission objectives. The test flight was performed at the Yuma Proving Grounds using a GA-ASI owned MQ-9A aircraft.

NATO Pod development was driven by GA-ASI's desire to provide customers with a customizable, multi-use pod for carriage of sovereign, cross-domain Intelligence, Surveillance and Reconnaissance (ISR) sensors for MQ-9A and MQ-9B RPA systems. GA-ASI is working with Sener and other European suppliers to integrate their sensor capabilities within this new pod. The NATO Pod is a flexible, scalable, certifiable enclosure with the structural features to host wide-ranging mission systems. The pod meets DEF STAN and STANAG certification standards for airworthiness, including lightning protection and bird impact.

The NATO Pod interfaces with common MQ-9 aircraft power and navigation interfaces, including the platform datalink connection to the Ground Control Station (GCS). Customer system integration is based on using a common set of interfaces to the aircraft and GCS systems.

"This is a truly momentous product design and implementation effort," said GA-ASI Vice President of Mission Payloads and Exploitation, Satish Krishnan. "We've worked closely with Sener to meet requirements and keep our combined teams in sync to achieve this great outcome. Our successful test flight allows us to begin marketing this new capability to our international partner nations as a way to rapidly add sovereign payload capability."

This industrial cooperation effort introduces European manufacturing of GA-ASI designed mission hardware and opens the door to customer-specified mission payloads – including technologies that are built outside the U.S. – for deployment on MQ-9A and MQ-9B. The NATO Pod that was tested featured a payload built by Arpège S.A.S. France.

Rafael Orbe, Defence General Director at Sener Aeroespacial, said: "This first flight is the fruit of a long collaboration between GA-ASI and Sener and we are proud to have contributed to the success of the project. We look forward to continuing the good work together, which we are sure will bring us more successes in the future."

Falco Xplorer Completes 1st Flight Campaign, a Decisive Step towards Certification of the Drone

Leonardo has successfully completed the first phase of flight testing for its Falco Xplorer drone. The system is now ready for the second phase of the campaign, which will lead to the certification of the largest uncrewed aircraft ever built by the company.

In the uncrewed sector, the company's "Be Tomorrow 2030" plan lays out its aim to consolidate a leading position in Europe, with Leonardo owning the domain technology and expertise required to offer a complete uncrewed system including the platform, sensors, mission system and ground control station. Moreover, Leonardo continues to reinforce its position in this market through participation in a number of major international collaborative programmes.

The Falco Xplorer is the first MALE (Medium Altitude Long Endurance)-class uncrewed system to exclusively use European technology. It is designed to deliver persistent surveillance over wide areas of interest and can carry multiple sensors weighing up to a total 350kg. The Xplorer is the latest entry in Leonardo's Falco family of uncrewed systems, which also includes the Falco Evo. The tactical-class Evo is operated by a number of international customers and has accumulated thousands of flight hours around the world, including in civil airspace.

The recent flight testing and certification activities of the Falco Xplorer took place at the Trapani Birgi military airport in Sicily with the support of the Italian Air Force's 37°Stormo wing. During the flight tests, 37°Stormo provided all essential airport services including air traffic assistance, fire prevention and flight safety. This ensured that the flight campaign was conducted in complete safety and in accordance with sector regulations. The Falco Xplorer performed all planned flights on schedule and completed a range of complex functional tests, confirming the maturity of the platform. The behaviour of the aircraft in a number of phases of the flight envelope was also validated.

Leonardo will now move forward with a second test campaign which will take place under the supervision of the Directorate for Aeronautical Armaments and Airworthiness (DAAA). This will certify the Falco Xplorer's 'fitness to fly' according to NATO standard STANAG 4671 and involve a series of increasingly complex flights. The system's most advanced capabilities will be validated, together with the military authority, including automatic take-off and landing and satellite communications for beyond-line-of-sight operations. The Xplorer's sensor suite will also be assessed. Made entirely in-house, the baseline suite consists of the company's LEOSS electro-optical turret, Gabbiano TS-80 UL multimode radar, an Automatic Identification System for the monitoring of maritime traffic and the SAGE electronic intelligence system. The Falco Xplorer utilises Leonardo's flexible ATOS mission system, which has an open architecture to allow for the integration of additional sensors, including from third parties.

Certification will enable the Falco Xplorer to fly over populated areas, significantly expanding its scope and allowing it to operate in support of public safety and civil protection missions.

Aerial Vantage Receives FAA BVLOS Waiver for Drone-Based Precision Agriculture Analytics

Aerial Vantage has received Federal Aviation Administration (FAA) approval of a waiver allowing it to conduct advanced remote sensing missions using unmanned aircraft systems (UAS, or drones) over a large ranch in Florida. The Part 107 beyond visual line of sight (BLVOS) waiver will allow Aerial Vantage to fly as high as 1,000 feet, with visual observers ensuring cleared airspace exists beyond the view of the remote pilot.

The waiver was developed in collaboration with aircraft partner Censys Technologies and obtained with assistance from the North Carolina Department of Transportation through its participation in the FAA's BEYOND program. Aerial Vantage is a partner in that program, one of eight teams selected by the FAA to pave the way for routine commercial and government drone use in the National Airspace System.

The implications could be far-reaching once Aerial Vantage can reliably demonstrate safe operations

under the waiver. While operations are currently restricted to flights over the company's partner ranch in Florida, Aerial Vantage intends to pursue agricultural, emergency response, and infrastructure missions in North Carolina as a BEYOND partner.

Flight operations under this waiver began in early October 2022 and are authorized for up to two years. Collecting aerial imagery with drone flights and applying analytics to the imagery will address multiple use cases, from better understanding invasive plant species and pasture renovations to capturing livestock inventories, estimating timber volume, monitoring excavation activities, and counting wildlife.

Outcomes will include proof of concept and flight operations data for small UAS operations up to 1,000 feet and more efficient collection of a large quantity of aerial imagery across large swaths of a working ranch.

> This waiver grants us a meaningful change in our ability to provide precision agriculture data on a larger scale to the industry
>
> Aerial Vantage Director of Flight Operations Bill Keating

Draganfly's New Commander 3 XL Drone Proven for US Agriculture Sector Following Purchase by Agtegrity

Draganfly Inc an award-winning, industry-leading drone solutions, and systems developer, is pleased to announce that Agtegrity, an agronomy consulting firm that works with California farmers on soil fertility and pest management is standardizing on the Commander 3 XL drone platform.

The Commander 3 XL is a high-endurance, weather-resistant, multirotor UAV designed for easy assembly and rapid deployment. This innovative North American-made drone can stay airborne for 50 minutes. It has a 24-mile flight range and supports a maximum airspeed of 45 miles. This drone supports automated and manual flight operations, making it the ideal choice for the agriculture sector.

"We live and operate among vast spreads of land controlled by the US government," said Curtis Pate, Owner of Agtegrity. "We wanted to find a drone solution that would provide us with the best ROI and help the overall growth of our business. Extended flight time and a PPK (Post Processed Kinematic) option were priorities in our search. That's when we found the Swiss Army Knife of drones: Draganfly's Commander 3XL. The improved flight times of this platform will lead to better production. The platform's versatility will enable us to multitask between our imagery mapping and heavier payloads. We look forward to the arrival of the Commander 3 XL." "The Commander 3 XL was developed as an all-in-one solution to improve how businesses operate," said Cameron Chell, President and CEO of Draganfly. "Draganfly has a legacy as a global leader in designing commercial drones for agriculture, and we are thrilled that our new Commander 3 XL platform is being adopted by Agtegrity and others. The Commander 3 XL will help empower our partners in assessing inventory, managing their fields, monitoring how environmental factors impact crop yields, and ultimately maximizing production."

DJI MAVIC 3

Drone Nerds to Carry the DJI Mavic 3 Multispectral— an Advanced Agricultural Drone Solution

Drone Nerds has added the DJI Mavic 3 Multispectral—DJI's new enterprise drone designed for precision farming and agriculture—to its enterprise solutions Lineup.

Featuring an advanced RGB camera, as well as an integrated multispectral camera, this drone helps advance agriculture operations. Its goal is to help improve the quality and efficiency of crop production, all while reducing the costs of crop monitoring and analysis.

The Mavic 3 Multispectral is a necessary platform solution for various applications in the fields—it's ideal for precision agriculture and environmental monitoring. Compared to traditional agricultural drones and sensors, the Mavic 3 Multispectral has greater portability, weighing just 951 grams.

With the RGB and multispectral imaging system, the M3M uses a two-in-one camera system; the RGB camera has a 4/3-inch CMOS and 20MP image sensor and a mechanical shutter with a maximum speed of 1/2000, and high-speed continuous filming at 0.7 seconds. The four-lens multispectral camera offers accurate directional information.

The Mavic 3M can perform high-precision aerial surveys, crop growth monitoring, and natural resource surveys on mountain forests and orchards. With its RTK module, the M3M can achieve centimeter-level positioning; with full synchronization of the RTK, drone, and camera, the M3M accurately obtains the position information of the imaging center of each camera, enabling the M3M to perform without ground control points. It has a battery life of up to 43 minutes, to complete the surveying and mapping operations of an area as vast as 2 square kilometers in a single flight. It also has omnidirectional obstacle sensing, detecting obstacles in all directions, as well as O3 video transmission, which integrates two channels of transmitting signals and four channels of receiving signals, and supports an ultra-long transmission distance of 15 kilometers.

With the built-in DJI Cloud API, based on the MQTT protocol in Pilot 2, users can connect Mavic 3M to a third-party cloud platform to collect information, live video, photo data, and other information. Users can also develop exclusive control apps for intelligent monitoring and much more by using the Mobile SDK 5 (MSDK5).

Each of the four multispectral cameras of can capture 5 million pixels and are able to sense these four wavelengths:

- Green (G): 560nm ± 16nm
- Red (R): 650 nm ± 20 nm
- Red edge (RE): 730 nm ± 20 nm
- Near-infrared (NIR) 860 nm ± 26 nm

"The Mavic 3 Multispectral is going to change the way precision farming works. We are excited to add this to our platform solutions for the agriculture sector—the portability of the flagship Mavic 3 combined with the capabilities of an RGB and multispectral camera offer an easy-to-use solution for everyday farming monitoring

States Jeremy Schneiderman, Drone Nerds CEO

Inuitive debuts sensor modules to address challenges of AMR, AGV systems

Inuitive, a vision-on-chip processor company, announced the launch of its latest sensor modules: the M4.5S and the M4.3WN. Designed to easily integrate into robots and drones systems, both sensor modules are built around the NU4000 vision-on-chip (VoC) processor and integrates depth sensing and image processing with AI and VSLAM capabilities in order to provide robotic devices with human-like visual understanding.

The M4.5S provides robots with enhanced depth from stereo sensing along with AI-based obstacle detection and object recognition. It features the widest field of view in the industry at 88×58 degrees, shortest minimum-sensing-range of 9 cm, and wide dynamic operating temperature range of up to 50 degrees Celsius. The M4.5S is a highly power efficient platform that is designed to function as a self-sufficient depth sensor module and shorten time to market for commercial robotic systems with industrial design fix and limitations.

The Company's other newly launched sensor module, the M4.3WN, features accurate tracking and VSLAM navigation based on fisheye cameras and an IMU together with depth sensing and on-chip AI processing. This enables free navigation, localisation, path planning, and static and dynamic obstacle avoidance the main challenges for AMR and AGV systems. The M4.3WN is specially designed in a metal case to best serve in industrial environment conditions.

"Our new all-in-one sensor modules expand our portfolio targeting the growing market of autonomous mobile robots. Together with our category-leading Vision-on-Chip processor, we now enable robotic devices to look at the world with human-like visual understanding," says Shlomo Gadot, CEO and co-founder of Inuitive. "Inuitive is fully committed to continuously developing the best performing products for our customers and becoming their supplier of choice.

The M4.5S and the M4.3WN sensor modules' primary processing unit is the Inuitive all-in-one NU4000 processor. Both modules are equipped with depth and RGB sensors that are controlled and timed by the NU4000. Data generated by the sensors and processed in real-time at a high frame rate by the NU4000, is then used to generate depth information for the host device.

Immervision Partners With ModalAI to Offer a Complete Drone Vision Solution

Immervision, the world's leading developer of advanced vision systems combining optics, image processing, and sensor fusion technology announced its partnership with ModalAI, Inc., a Blue UAS Framework manufacturer of autonomous drone and robot technology. This collaboration will lead to an advanced 'ready-to-fly' vision system for drone manufacturers.

This complete solution incorporates the Immervision Imvisio-ML and the VOXL 2 platform to provide the full image pipeline, from the optics to the hardware platform running the autonomous navigation software. Thanks to its 190 degrees Field of View and its low-light capability, the solution increases the perception and improves the performance of machine vision applications, running on its Qualcomm QRB5165 processor. The VOXL 2 computing platform, combined with the Imvisio-ML camera module, enhances mission critical navigation beyond visual line-of-sight to support safer, more reliable flight.

"ModalAI is excited to strengthen our partnership with Immervision. The VOXL 2 drone autopilot offers superior computing capability for the UAS industry. Coupled with Immervision's camera module, VOXL 2 can enable smaller drones to unlock autonomous perception and navigation in low-light environments," stated Chad Sweet, CEO and co-founder of ModalAI, Inc.

"As we see more demand for autonomous navigation for drones, it became necessary to extend the drones operating range from bright daylight to challenging low-light conditions," explains Jean-Sébastien Landry, Director, Product Management, Immervision. "Working with the VOXL 2 platform, this complete solution offers optimal performance for GPS-denied navigation, location, mapping and obstacle avoidance in all lighting and environmental conditions." Both companies are part of the Defense Innovation Unit (DIU) Blue UAS Framework, which accelerates commercial technology with the aim of providing trusted, advanced capabilities to UAV drone users.

Omnitron Sensors Solves Reliability, Size, Cost Issues with LiDARs

Omnitron Sensors, the pioneer in MEMS sensing technology for high-volume, low-cost markets validated its process for a fast, rugged, low-cost micro electromechanical systems (MEMS) scanning mirror, a new optical subsystem that meets the most demanding requirements of the LiDARs used in automotive advanced driver assistance systems (ADAS), drones and robotics.

Targeting a LiDAR subsystems market predicted by Yole Intelligence to reach $2.3B by 2026[i], Omnitron's MEMS mirror will produce a 2-3X larger field of view than other MEMS mirrors used in long-range LiDARs. As a step-scanning mirror, Omnitron's device is designed for rugged high-vibration automotive and aerial environments—a competitive advantage over the spinning mirrors offered by other vendors. In addition, Omnitron's MEMS mirror is built to outperform older optical subsystems, including voice coils, spinning polygons, and Galvos—all of which are slower, bulkier, 10x-100x more expensive, and prone to failure.

"Our executive team has spent decades in sensor design, working on projects at Google (X) Wing avionics, Google Quantum, Tesla Model 3, US Navy Research Labs, and Lumedyne—which Google acquired during my tenure," said Eric Aguilar, co-founder and CEO, Omnitron Sensors. "With so much untapped potential in MEMS sensors still before us, we saw how changing the process technology and packaging techniques—which we call a new topology for MEMS—produces measurable improvements in size, cost, robustness, reliability, manufacturability and time to market. Our MEMS scanning mirror for LiDARs proves out our IP, solving the most serious issues that plague today's LiDARs for autonomous navigation. And based on the positive market reception we have received, we're meeting a vital need for long-lasting, high-performing, rugged and cost-effective LiDAR platforms."

With its MEMS process verified through fabrication, Omnitron Sensors is gaining the attention of investors. In Q4 2021, L'ATTITUDE Ventures invested $1.6M in seed-round funding to Omnitron and named the company L›ATTITUDE Latino Startup of the Year. "Shaped by Eric Aguilar's vision and technical acumen, Omnitron›s foundational IP in MEMS also has the potential to become a key enabler of robust and reliable smart-everything devices. These varied attributes illustrate why L›ATTITUDE believes in Omnitron›s growth potential.

> "I've spent 20 years in the wireless chip and sensors space, so I recognize an impressive technology when I see it," said Sol Trujillo, general partner of L'ATTITUDE Ventures, an investment firm noted for its steadfast support of talented Latino/Latina entrepreneurs. "Omnitron's starting point—the delivery of a step-scanning mirror with the potential to transform LiDARs for autonomous cars, drones, and mobile devices—is definitely impressive.

Velodyne Lidar Signs Multi-Year Agreement with GreenValley International

Velodyne Lidar, Inc. announced a multi-year agreement to provide its lidar sensors to GreenValley International for handheld, mobile and unmanned aerial vehicle (UAV) 3D mapping solutions, including in GPS-denied environments. Velodyne is already shipping sensors to GreenValley as part of this agreement.

GreenValley uses Velodyne's Puck lidar sensors to provide perception and navigation capabilities that enable their systems to utilize SLAM (simultaneous localization and mapping) in their mobile mapping solutions. The ability to scan without GPS by using lidar allows foresters, archaeologists, civil engineers and surveyors to build robust datasets without preparations ahead of time or complex post-processing software. Velodyne's power-efficient, versatile sensors allow GreenValley to incorporate their technology into a variety of form factors, from backpacks to drones/UAVs to handheld mobile devices that can be used in a wide range of indoor and outdoor environments, regardless of temperature, lighting or precipitation.

"Adopting Velodyne's industry-leading lidar sensors has enabled GreenValley to innovate and provide various industries with cutting-edge, reliable 3D mapping solutions," said Dr. Qinghua Guo, CEO of GreenValley International. "Velodyne's lidar sensors currently power select models in our aerial and handheld mapping catalog. We have received extremely positive end user feedback, and we are excited about our future collaborations." "GreenValley is transforming various industries with its innovative and reliable lidar-powered 3D mapping solutions," said Dr. Ted Tewksbury, CEO of Velodyne Lidar. "Enabled by Velodyne's lidar sensors, GreenValley's aerial and mobile mapping product catalog has greatly improved data processing efficiency, saving time and reducing costs for customers worldwide."

TDK's new robust and accurate Industrial motion sensors bring fault tolerance and software synergy to high performance navigation applications

TDK Corporation extends the SmartIndustrial™ line of robust and accurate motion sensors and announces the availability of InvenSense IIM-46234 and IIM-46230 new high-performance fault-tolerant inertial measurement units (IMU) targeted at navigation applications that require accurate, stable, and best-in-class bias instability at an affordable price. IIM-46234 and IIM-46230 are modules that include multiple 6-axis sensors, each of which can measure three dimensions of linear acceleration and three dimensions of rotational rate. The calibration of these devices over the full temperature range (-40 °C to 85 °C), guarantees best performance not typical in standard IMUs, which often have deteriorating performance as temperatures increase or decrease. It also provides stable measurements across all temperatures to minimize errors in position and angle for navigation applications.

The modules also include a microcontroller that provides multiple options for communication and sensor fusion.

As these products offer precise measurements, even in harsh environments with high vibrations and wide temperature variations, this product family is well-suited for a variety of navigation applications, including high-end real-time kinematic positioning (RTK) and GNSS/INS units, precision agriculture, construction machinery, and industrial robots. An example application is an industrial autonomous vehicle or drone that requires best-in-class dead reckoning performance in case of GPS signal loss.

"These types of high-end IMU modules have been cost-prohibitive in the past. We now provide a solution that combines performance and affordability for customers developing navigation systems for drones, industrial autonomous vehicles, and navigation units," said Camilo Delgado, Director of Product Marketing & Industrial Motion Sensor Business.

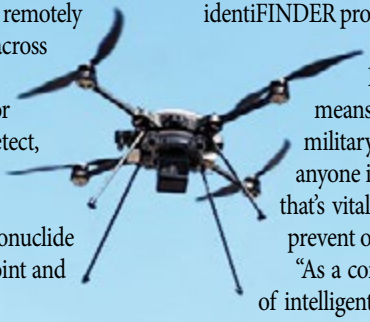
This new product family also integrates TDK's unique SensorFT™ feature for fault tolerance, which combines the multi-IMU hardware design with TDK's proprietary fault detection and recovery software, to deliver built-in redundancy and early warning capabilities. A system that includes IIM-4623X sensors could provide customers with advanced warnings, enabling preventative maintenance to avoid operational disruption.

The IIM-46234 and IIM-46230 products are available at most global distribution partners. Product demonstrations are available at our main booth #B3.560 at Electronica in Munich, Germany.

Teledyne FLIR Defense Launches MUVE R430 Drone Payload for Remote Radiation Detection

Teledyne FLIR Defense, part of Teledyne Technologies Incorporated announced at CBRNE Convergence the launch of its new MUVE™ R430 drone sensor payload used to remotely detect and identify radiation sources and radiological hazards across a wide range of use scenarios.

The MUVE™ R430 is an advanced radiation detector purpose-designed for unmanned aerial systems (UAS) to detect, locate, measure, map, and identify radioactive sources from above. Using the same field-proven technology and algorithms as Teledyne FLIR's acclaimed identiFINDER® series of radionuclide identification devices, the R430 enables users to quickly pinpoint and accurately identify sources of radioactivity from a distance.



The Teledyne FLIR SkyRanger® R70 and R80D SkyRaider™ UAS serve as the initial deployment airframes for the new sensor payload. The R430 is integrated into the drone's Mission Control Software and provides both visible and audible alerts of radioactivity. Using a familiar interface, R430 operators can easily create contamination maps, examine a dangerous source, and perform assessments in hard-to-reach places and environments, all while keeping at a safe distance. Ready to deploy in minutes, MUVE R430 balances size and weight, which makes it a versatile platform for diverse situations, including wide-area hazmat surveys, emergency response, and environmental monitoring.

"MUVE R430 brings the pedigree of our professionally trusted identiFINDER product line to the skies," said Dr. David Cullin, vice president of technology and product management at Teledyne FLIR Defense. "Using a drone to remotely detect radiation means faster decision-making, safer conditions for civilian or military responders, and the likelihood of a better outcome for anyone in harm's way. The R430 delivers full situational awareness that's vital if and when a radiation event occurs – and could even prevent one.

"As a company, we continue to invest strategically in our full line of intelligent sensing technologies – for handheld devices as well as manned and unmanned platforms – to offer customers a complete mission solution," Cullin added.

The R430 marks the third offering in Teledyne FLIR's MUVE™ series of remote sensor payloads. In June, the company introduced the MUVE B330 drone payload that can be used to detect deadly biological agents and other airborne biohazards. It joined the MUVE C360 multi-gas detector, used to provide real-time continuous monitoring of chemical hazards, which can be deployed on both Teledyne FLIR as well as commercial UAS systems and robots.

BREAKING BAD (MYTHS): UNMANNED (UNCREWED) SYSTEMS

UNMANNED JUST BY A FEW

Rahul Verma

Every day it seems that technology takes another leap, and unmanned systems are no exception. From self-driving cars to delivery drones, unmanned systems are the future. They perform missions and operations by sea, in the air, and on land devoid of human involvement. They will transform the future of many diverse industries as they offer greater flexibility, perform dangerous missions, lower operating costs, and boost ease for users. Such is the impact that the word unmanned was identified as being gender-based and non-representative of all genders. With ladies joining National Defense Academy to serve our Nation, simply put, it is outdated in today's context. As a result, the word "unmanned" is replaced with "uncrewed", in respect to the autonomous and remotely operated vehicles.

Presently, a constraining factor in how these Uncrewed Systems are used is that they require more people to man the UAS than most people realize. For example, based on the data available in the Open Source, USAF's ISR or Strike drones require between 168 and 190 people to maintain one combat air patrol (CAP), or the ability to sustain persistence coverage of a specific area. This breaks down to approx 30 percent with the pilots, or mission control element and sensor operators to control from a remote site via satellite communications, planners, and maintenance or administrative personnel; 30 percent in the launch recovery element, or pilots and sensor operators to control from the launch site via line-of-sight communications, and maintenance or administrative personnel; and 40 percent in processing, exploitation, and dissemination, or the video and signals intelligence analysts, and maintenance or administrative personnel.

Aim of military's strategy is to make these systems more efficient and less costly to replace human beings with greater autonomy in how RPAs operate. The idea of autonomous drones is justifiably alarming to many, especially in making life or death decisions to drop bombs. This fear, however, should be tempered somewhat by the fact that fewer than 10 percent of military unmanned aircraft are capable of weaponising as on date. Currently, it takes multiple operators to manage the flight and sensor operation functions for all the MALE and HALE class of UAS. While it will be critical to retain a "human in the loop" to regulate operations and to take critical decisions such as those connected to weapons release, the efficient use of autonomy technology will enable a single pilot to manage multiple air vehicles. This goal can be accomplished by assigning decisions like ATOL (automatic takeoff and landing), waypoint navigation and sensor based situational awareness to the mission computer. Whether called Unmanned Aerial Systems (UAS), Remotely Piloted Vehicles (RPV) or simply Unmanned Aerial Vehicles (UAV) or now onward Uncrewed Systems, this is an era of growing dominance of unmanned platforms. People operating these machines under distinct external environments construct a complex structure of interdependent influences. The most complicated component is the human factor, mainly how people perform and interact with each other.

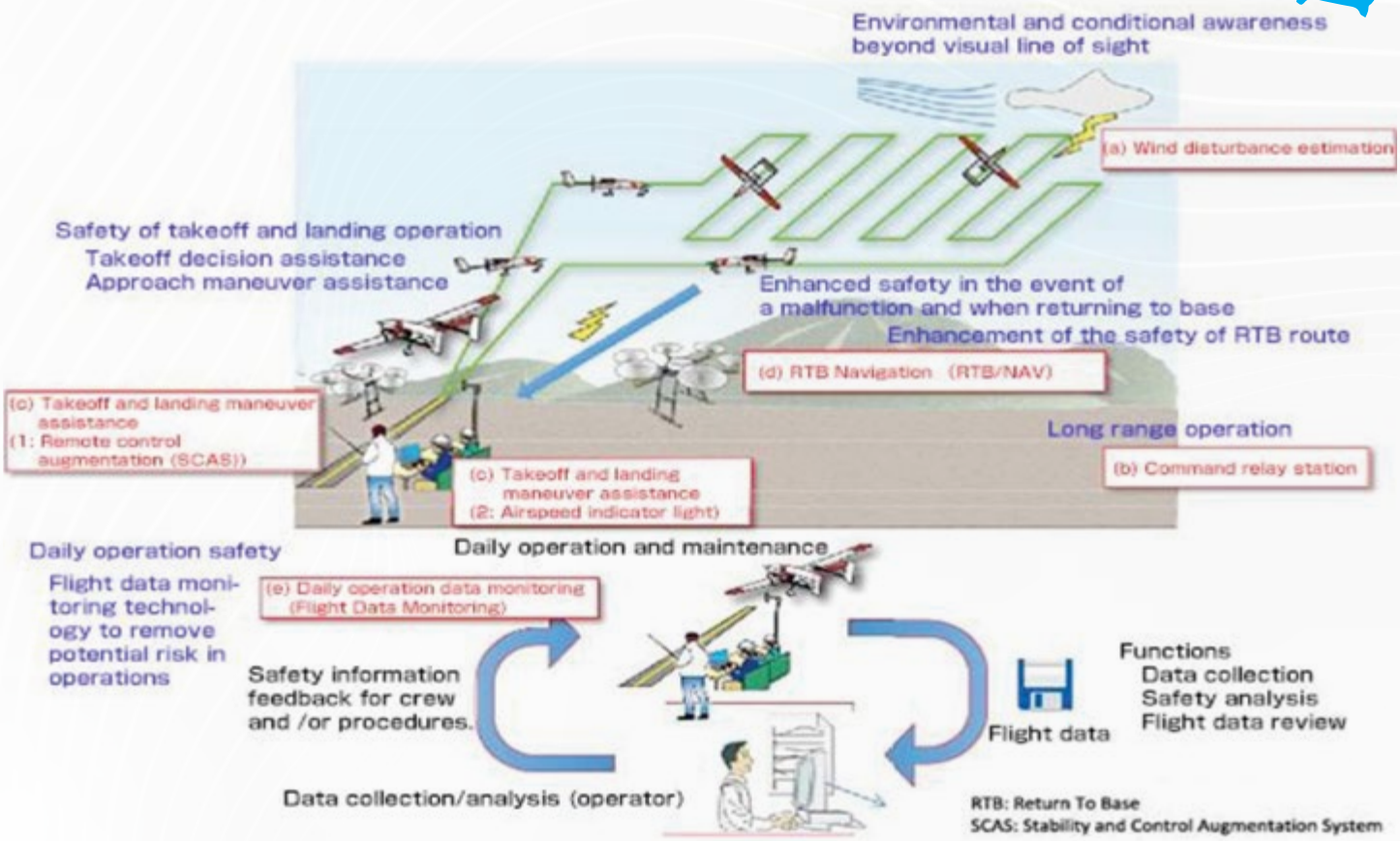
THIS ARTICLE AIMS TO BREAK A FEW OF THE URBAN LEGENDS SURROUNDING THESE SYSTEMS

(a) "There ain't any risk to human life" – False

UAVs operate in proximity to other infrastructure and use the same airspace as manned flights, so unsafe operation certainly may lead to catastrophic results involving humans.

(b) "Crashing a drone is not that costly" – False

Unmanned systems have become advanced, multimillion dollar platforms. They are by no means expendable and we must streamline our operations to minimize platform loss.



(c) "They practically fly themselves" – False

UAV operation involves a coordinated team of interdisciplinary professionals. From maintenance and mission planning to command and control, team work is essential for mission success. UAV operators are a new breed of "techno-warriors", who must possess an array of valuable skills, above all working as an integrated team.

(d) "There is no stress" – False

Although fighting from the safety of remote command posts, "techno-warriors" carry the burden of responsibility for expensive equipment, sense the regular organizational stress, and are even susceptible to the psychological effects of combat. They see, hear and understand the effects of using the deadly tools at their disposal.

(e) "Automation means less errors" – False

As in piloted aviation, highly advanced autonomous machines pose unique challenges for decision makers and operators. Monotonous environment, fatigue and over-reliance on automation are examples of factors leading to failure.

The terms "unmanned" and "autonomous" are misleading. Humans are at the core of operations and human lives are affected. Examination of many accidents and incidents in UAV operations reveals that the human factor is the dominant factor which contributed or failed to prevent the mishap. With up to 95% of maritime accidents due to human error, autonomous vessels offer the tantalizing possibility of greatly reduced risk to ship owners, as well as significant cost efficiencies from reduced wage costs, estimated at 30% and greater fuel efficiency. This is going to be exponentially increase with increased operational capacities and hence, more Cockpit Resource Management or Crew Resource Management.

CRM training is just as relevant to the world of UAS as it is to the manned aviation, and some challenges are even intensified, as the crew is more diversified and physically dispersed than in traditional aviation. Beyond the risk to human lives, the crash of a expensive platform could lead to the termination of a contract, damage the reputation of the manufacturer or even cause it to company to fail. The US Federal Aviation Administration (FAA) ordered an almost complete equalization between UAS and manned aviation, from an unequivocal definition of the Pilot In Command (PIC), to the adoption of proper management patterns in 2012, such as the "Sterile Cockpit Rule". The directives include mandatory CRM training for UAS crewmembers. The field of Unmanned/Uncrewed is experiencing a positive process of alignment with the world of manned aviation with regard to statutes, procedures, standards and organizational culture, including an on-going ambition for an excellent level of efficiency and safety. While there is a large extant literature examining the formulation and implementation of regulations for unmanned aircraft operations, these are usually done from technical, legal, or societal perspectives. However, remember that the most affected stakeholders are the unmanned aircraft users themselves (e.g., through compliance costs or the inability to undertake certain operations).

Technologies for Enhancing the flight safety of small UAS (concept) Courtesy JAXA

Arabian Development & Marketing Company Inks Deal with Sabrewing Aircraft to Purchase 53 "Rhaegal-A" VTOL Air Cargo Drones

In a joint announcement between Arabian Development and Marketing Corporation (ADMC) and Sabrewing Aircraft Company, Inc., the two companies stated that ADMC had ordered 53 of the record-breaking heavy-lift cargo uncrewed aerial vehicle (UAV). This event comes on the heels of Sabrewing's Rhaegal-A "Alpha" aircraft's first world record breaking flight.

"We had a phenomenal response to our first flight announcement," said Ed De Reyes, CEO of Sabrewing. "We are meeting our customers' requests of carrying large volumes of cargo while lifting heavy payloads of weight."

This September, Sabrewing announced that it had flown its first flight with a record-breaking 829 pound/374 kg payload – the most for any commercial cargo UAV. According to De Reyes, the Rhaegal-A has continued to fly and lift heavy payloads as part of its final development program.

> De Reyes added, "On our very first flight, we carried a payload that beat the highest planned payload capacity of the closest competitor by almost 500 pounds, and with over four times more volume than the closest competitors. Since our first payload was only about one-third of what we can carry, we knew it was going to attract a lot of customers who have the need to carry a ton or more of cargo in a large cargo bay."

ADMC currently has 128 orders for Sabrewing's Rhaegal-B "Bravo" aircraft that is capable of lifting 5,400 pounds/2,450 kg vertically and up to 10,000 pounds/4,535 kg conventionally. Both the "Alpha" and "Bravo" models are capable of taking off vertically. They are the only cargo UAV capable of taking off both vertically and conventionally (as a fixed-wing aircraft).

De Reyes continued, "Because we already have the molds, hardware, software and avionics from our first aircraft, we've completed the majority of the development work on the Alpha model aircraft. We were looking for a launch customer to start production. ADMC found customers who were interested in buying and leasing the cargo UAV. We had an overwhelming response to our first flight, and interest skyrocketed from day one of the announcement."

Ayman Zeibak, General Manager of ADMC, noted, "We are the first launch customer for the Bravo aircraft, ordering 128 of Sabrewing's Rhaegal-B "Bravo" aircraft valued at over €768 million. We now have a mix of highly versatile aircraft to lease to our African and Middle Eastern customers."

Zeibak noted, "The Sabrewing Alpha is just the right size for some of the smaller air cargo companies who don't have contracts with FedEx, DHL or another major carrier, but have the need to carry 1000 kilos of bulk cargo to remote locations on a regular basis."

Spright and Dufour Aerospace Announce Purchase for up to 140 Aero2 Unmanned Tilt-wing Aircraft

Spright, the drone division of Air Methods, the leading provider of helicopter emergency medical services, and Dufour Aerospace, the innovative Swiss eVTOL company, announced the purchase by Spright of 40 Aero2 with options for additional 100 aircraft. The cooperation and sales agreement over up to 140 Aero2 aircraft represents the largest commitment by an operator to date for the Aero2 design, and one of the largest civilian unmanned aerial vehicle purchases in U.S. history.

"Dufour Aerospace has developed an impressive Swiss Army Knife for unmanned air mobility that will meet our anticipated future needs. With today's announcement, we demonstrate our commitment to their vision and to their technological approach, in which we are proud to be the first operator in the U.S.," said President of Spright Joseph Resnik. "This is a multi-year and multimillion-dollar commitment by Spright and it will enable us to serve the critical goods distribution markets efficiently."

The Dufour Aero2 aircraft expands Spright's opportunity to serve the healthcare community by carrying heavier payload over longer distances. This translates to more patient samples, larger tissue specimens and organs, and heavier supplies and equipment being transported with the on-demand speed and efficiency that is unique to drone delivery.

Dufour Aerospace is developing the next generation of eVTOL aircraft, with a focus on the emergency medical services market and movement of time-sensitive, critical cargo. The company has two designs: the Aero2 is designed for unmanned, remotely piloted operations; and the Aero3, a manned, 8-seat aircraft designed specifically for air ambulance and HEMS operations. Each design features a tilt-wing that combines the best of helicopters and airplanes: vertical take-off and landing on even the smallest spots and energy-efficient longer-range flight at high speeds.

> We are delighted by the confidence shown by Spright in Dufour Aerospace, evidenced by today's purchase announcement for the Aero2," said Thomas Pfammatter, CEO of Dufour Aerospace. "Our partnership, which extends far beyond unit sales of Aero2, is a significant milestone for us in our development of tilt-wing, unmanned and manned products for advanced air mobility. Spright's commitment shows that there is great market potential for Aero2 for safe and efficient medium and long-range operations with unmanned aerial vehicles.

American Dronemaker Skydio Asserts Docked Drone Leadership

Skydio, the leading U.S. drone manufacturer and world leader in autonomous flight technology, announced the launch of its new product line, which includes Skydio Dock and Skydio Dock Lite, powered by Skydio's new Remote Ops software.

Dock and Dock Lite are the smallest, lightest, and smartest cloud-connected base stations for drones available on the market today. Built on powerful AI models, Skydio's Dock solutions give customers complete remote and autonomous visibility into tasks like site inspection and monitoring, mapping, and situational awareness – indoors and outdoors – from anywhere in the world.

Until today, enterprise and commercial users have had to rely on big, expensive, manual drone-in-a-box solutions that depend on manual flight by on-site pilots. Skydio drones housed in Dock and Dock Lite can fly safely with a single off-site operator, or autonomously, at a fraction of the cost, size, and complexity of existing solutions. Further, Skydio Remote Ops software enhances the drone's AI-powered autonomy so operators can effortlessly perform streamlined missions.

"The concept of remotely operated drones is incredibly compelling," said Adam Bry, CEO of Skydio. "It has attracted a gaggle of activity from startups and established manual drone companies, but it's never going to work the way customers want - let alone scale to address real world applications solving the needs of today - unless you can trust the drone to fly itself. And making drones smart enough to fly themselves is our core focus. Skydio Dock and Skydio Dock Lite, combined with our Remote Ops software, deliver autonomous capabilities for our customers, whether they are monitoring their warehouses, inspecting a security perimeter, or assessing infrastructure following a natural disaster--finally realizing the promise of efficient, scalable remote operations."

Skydio Dock, Skydio Dock Lite and Skydio Remote Ops are announced with the participation of Skydio's Early Access customers and partners, including the North Carolina Department of Transportation, Southern Company, Caltrans, the Oracle Innovation Lab, and Obayashi Construction (Japan).

> "(With this technology) we're able to monitor construction progress in more efficient ways than we previously could. We're capturing imagery, videos, and live streaming a feed back to our resident engineers for real-time data. It's a big cost saver for us, and we look forward to implementing it around the state for multiple applications and use cases."
>
> Thomas Walls, North Carolina Department of Transportation UAS Operations Manager.

Kratos, USAF Further Advance Capabilities in Successful XQ-58A Valkyrie Block 2 Flight Focused on Operational Aspects

Kratos Defense & Security Solutions a leading National Security Solutions provider and industry-leading provider of high-performance, jet-powered unmanned aerial systems, announced that it has recently completed a successful flight of its production XQ-58A Valkyrie aircraft for the Block 2 Valkyrie Maturation Program. The program team includes the Air Force Research Laboratory (AFRL), Yuma Proving Ground, and Kratos.

The test flight performed at Yuma Proving Ground proved XQ-58A's extended capabilities by flying longer, higher, at a heavier mission weight, and at a longer range than the platform has previously been approved for (based on prior government range limitations) and demonstrated. This flight was conducted with another of the Block 2 Valkyrie aircraft produced in the company-initiated 12-lot build and was the first flight for this tail number.

The flight was conducted with and demonstrated encrypted communications with redundant radios/communications ("comms") packages for range and operational missions remote from government ranges. For the final test point, the aircraft navigated to the landing site in a simulated loss of communications scenario. It landed within the target zone, demonstrating key autonomous capability for the end of mission phase of flight and recovery of the aircraft without RF comms. This capability will help mitigate the possibility of enemy detection and tracking of RF comms emissions as the system returns to "base".

This flight test was a key milestone in Kratos' support of AFRL's Autonomous Collaborative Enabling Technologies (ACET) portfolio. ACET is focused on developing Autonomous Collaborative Platforms (ACP) such as Collaborative Combat Aircraft (CCA). The advanced capabilities proven on this flight make the XQ-58 ready for future ACP experimentation.

Steve Fendley, President of Kratos Unmanned Systems Division, said, "The Kratos/AFRL team is pushing the envelope in these truly uncharted waters, continuing to evolve the capability and drive affordability in the CCA class where mission capability and effectiveness is achieved through a combination of individual and distributed CCA capability plus mass of aircraft. Wargames and analyses consistently report that mass is the solution to enable winning in today's conflict arena and that a lower count of exquisite systems consistently fails. Kratos is laser-focused on the disruptive, affordable (enabled by simple and elegant) solution set."

The XQ-58A Valkyrie was initially developed in cooperation with AFRL on the Low Cost Attritable Strike Demonstrator (LCASD) Program with multiple follow-on programs and projects for several customers and applications. These multiple program applications continue with the Block 2 Valkyrie Maturation Program and other programs related to production, specific mission applications, and operational development of the XQ-58A family of affordable, high-speed, tactical UAVs.

Eric DeMarco, President and CEO of Kratos Defense & Security Solutions, said, "While I appreciate the digital simulations and modeling we read about regularly, I am convinced that, much like how our target system aircraft support military training and weapons development with actual flights and shots, Kratos' regular and envelope-pushing development flights and mission preparation flights are what will ultimately deter our enemies and enhance the readiness of our military. The USAF/Kratos Made-in-America Valkyrie is the right system, at the right price, at the right time, and we stand ready with active production lines and a family of low cost, high performance, jet drone systems to provide affordable mass to the U.S. and its Allies today. At Kratos, affordability is a technology. We are moving at the speed of relevance and are disrupting the existing defense procurement model by providing rapidly developed, innovative systems, rather than simply PowerPoints, renditions, or models with unknown ultimate cost, performance, and delivery dates to transform our country's procurement model to address today's real-world threats."

Skypersonic Delivers Drones, Rover, and Piloting Platform to NASA's Simulated Mars Missions

Skypersonic – a subsidiary of Red Cat Holdings announces that it recently delivered to NASA the hardware and software for a rover and drone system that the crew members of NASA's Simulated Mars Missions will use to remotely explore Martian-like terrain around Earth – all from their 1,700-square-foot simulated Martian habitat at the Johnson Space Center in Houston, Texas.

In the Simulated Mars Missions CHAPEA, crew members will spend one year living and working in a habitat at Johnson Space Center that has been designed and built to simulate life on the Red Planet. The Skypersonic drones and rover will be taken to an area on Earth that is similar to Martian terrain – such as a desert or mountainous region – where they will be controlled remotely by crew members in Houston. The exercise is designed to test the ability of astronauts on Mars to remotely explore the planet with drones and rovers.

The hardware and software delivered to Houston were proven in August 2022, when NASA personnel stationed at the Johnson Space Center controlled the Skypersonic drones and rover on the Martian-like environment of Mt. Etna, an active volcano thousands of miles away in Italy. Not only was the surface of the volcano like that of Mars, but there is no GPS signal on Mt. Etna, which gave NASA personnel insight into how the technology would perform on a Martian surface. Because its proprietary remote piloting technology doesn't rely on GPS, Skypersonic allows pilots, and the drones or rovers they control, to be located virtually anywhere in the world – or out of this world.

NASA personnel trained on piloting the recently delivered drones with Skypersonic's Martian Simulator, a computer-simulation of the Martian environment based on actual photographs and video of the surface of Mars.

> "This recent delivery is the latest milestone in our five-year contract with NASA to provide drone and rover hardware, software, and support to the Simulated Mars Missions. We look forward to working closely with the Simulated Mars Missions crews in the coming years to develop and test the prototype of the first drones and rovers to be used by humans on Mars. The challenges are great – extremely thin atmosphere, dramatically cold temperatures, a largely unknown environment – but I am confident we will prevail and advance the science of our industry in the process," said Skypersonic CEO Giuseppe Santangelo.

D-Fend Solutions Closes Multiple U.S. Federal Government Security Deals in 3Q22

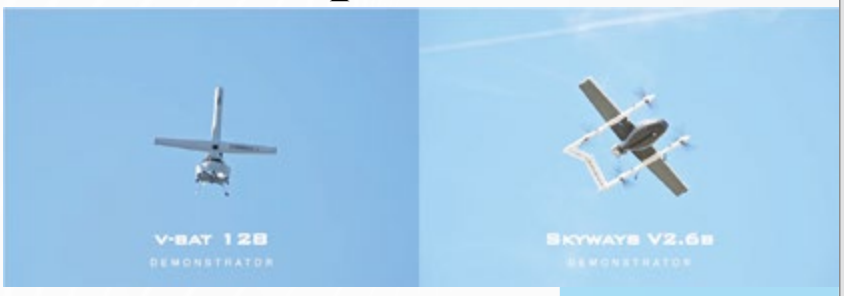
D-Fend Solutions, the leader in radio frequency (RF), cyber-based, non-kinetic, non-jamming, counter-drone takeover technology, is proud to announce that this past quarter, 3Q2022, it sold over $3 million in EnforceAir counter-drone security systems and components to various United States federal security agencies.

The agencies span across a range of sectors and applications in U.S. defense, homeland security and law enforcement, with the contracts distributed across multiple high-profile departments and agencies.

"We are pleased to provide our solutions to our customers across multiple Federal agencies who employ the most advanced C-UAS technology, for their varied environments and use cases, in a manner that is non-disruptive while preserving continuity," said S. Danny Rajan, General Manager, US, D-Fend Solutions. "This is not only a great accomplishment for D-Fend Solutions, but also for the protection of sensitive sites, activities and environments that could be at risk from dangerous drone incidents or attacks."

D-Fend Solutions' technology, built into its flagship EnforceAir C-UAS system, has been recognized as best-in-class and deployed by government agencies and airports around the world. EnforceAir users benefit from protection against rogue drones across a variety of at-risk sectors including military, public safety, airports, major event and critical infrastructure environments.

Navy Successfully Demonstrated Unmanned Cargo Delivery Systems for Ship at Sea



The Naval Air Warfare Center Aircraft Division (NAWCAD) recently demonstrated multiple unmanned systems in a first-of-its-kind mission to move supplies to ships at sea without the use of manned aircraft during an event at Naval Air Station Patuxent River in St. Inigoes, Maryland.

The demo, held in collaboration with the Small Tactical Unmanned Aircraft Systems program (PMA-263), employed unmanned vehicles to transport cargo weighing less than 50 lbs., which accounts for 90% of Navy logistics deliveries.

"We are seeing an increase in manned and unmanned logistics," said Col. Victor Argobright, PMA-263 program manager. "For the Marine Corps, the Commandant is enthusiastic about where we are going with unmanned logistics, and is beginning conversations about operations and contested environments. The Navy is currently identifying areas where unmanned logistics would be a critical enabler to operations at sea, and the Blue Water Maritime Logistics UAS is a great demonstration of this emerging requirement."

During the event, industry partners Skyways Air Transportation, Inc., and Martin UAV operated their unmanned systems through long-range flights from ship-to-ship, ship-to-shore, and shore-to-ship situations, carrying a variety of objects to mimic critical supplies. Both systems successfully delivered cargo over 200 nautical miles onto a moving ship underway.

NAWCAD acquired the original Blue Water UAS prototype in 2019 to demonstrate long-range unmanned naval ship-to-ship and ship-to-shore cargo transport. Navy test pilots and engineers have since worked with industry partners to develop a system that best meets maritime requirements.

> "[For the future], we are looking at continued long-term experimentation, how the fleet operates, and how we get the technology out to our Sailors," said Tony Schmidt, NAWCAD's Experimentation Office director. The unmanned systems under consideration are capable of vertical take-off-and-landing to operate from most naval ships at sea and stations ashore, as well as systems that do not require dedicated launch and recovery equipment.

Elbit to Supply Watchkeeper X Tactical UAS for the Romanian Ministry of National Defense

Elbit Systems Ltd. announced that it was awarded a framework contract with a maximum value of approximately $410 million (approximately 1.89 billion Lei) to supply up to seven "Watchkeeper X" tactical unmanned aircraft systems (UAS) for the Romanian Ministry of National Defense, with a validity of five years. No specific purchase order under the contract was awarded yet.

The Watchkeeper X UAS is the UK export variant of the British army made by UAV Tactical Systems Limited ("U-TacS"), Elbit Systems' UK subsidiary, and is a derivative of the Hermes UAS family. The Watchkeeper X' compatibility with NATO standards enables essential interoperability with NATO and other allied forces.

Bezalel (Butzi) Machlis, President and CEO of Elbit Systems, commented: "This contract demonstrates the sustained demand for Elbit Systems' UAS. We look forward to further strengthening Elbit Systems' relationship with the Romanian Government. As part of the contract execution, Elbit Systems plans to establish infrastructure and industrial cooperation with U-TacS, Aerostar and Elbit Systems' subsidiaries in Romania to produce the UAS in Romania. We also appreciate the continued support and collaboration with the Israeli and UK governments and our business partners on the Watchkeeper program. "

MQ-9A Leased to India by GA-ASI Complete 10,000 Flight Hours in 2 Years

MQ-9A Leased to India by GA-ASI Complete 10,000 Flight Hours in 2 Years

General Atomics Aeronautical Systems, Inc. MQ-9A Remotely Piloted Aircraft that is on lease from GA-ASI to India's Navy completed its 10,000th flight hour in support of India national security missions. The 10,000-flight hour mark has been achieved by two MQ-9As being operated by the Indian Navy during a period of almost exactly two years, with the maiden flight of MQ-9A taking place on November 21, 2020.

"The Indian Armed Forces have been impressed by the MQ-9A's over-the-horizon ISR support for surface units and Indian warships, as well as the exceptional endurance and operational availability of the platform," said GA-ASI CEO Linden Blue. "Our MQ-9As have helped the Indian Navy to cover over 14 million square miles of operating area."

The MQ-9As are supplied to India by GA-ASI as part of a Company-Owned, Company-Operated (COCO) lease agreement. GA-ASI is the world's leading manufacturer of RPA systems, radars, and electro-optic and related mission systems solutions. MQ-9As are operated by the United States, the United Kingdom, France, Italy, the Netherlands, and Spain. GA-ASI's newer MQ-9B variant has been acquired by the UK and on order for Belgium. The MQ-9B maritime surveillance configuration (SeaGuardian®) recently began operations in support of the Japan Coast Guard.

Altaport Launches Automation Platform for Flying Taxis

In preparation for the forthcoming launch of electric vertical take-off and landing (eVTOL) vehicles, also known as "flying taxis," Altaport, Inc. has built the world's first vertiport automation system (VAS) to facilitate the future of travel by automating ground infrastructure operations. The Altaport platform controls a range of activities on behalf of ground infrastructure managers, including resource management and scheduling, ground movement safety monitoring, passenger management, and fee collection. With Altaport, infrastructure managers can drive efficiency, revenue optimization, and safety at their landing facilities, all while reducing staff workload.

Altaport, launched within the Philo Ventures startup studio, was co-founded by former Airbus and Google employees who saw the need to prepare today's ground infrastructure for the future of high-volume eVTOL and cargo drone traffic. "The industry is severely unprepared for the demand to come," said Cory Cozzens, Altaport co-founder and Philo Ventures founding partner. "We're only a couple years away from the introduction of eVTOLs, but most landing infrastructure managers are still using archaic toolsets to manage their operations."

eVTOLs are expected to begin initial commercial flights by 2024, and forecasts by Nasa, McKinley, Morgan Stanley, and others predict that the advanced air mobility (AAM) market will grow into a $9 trillion market by 2050 — with an individual vertiport serving over 100 autonomous flights per hour, in coordination with a network of as many as 300 vertiports within a single metropolitan area. A robust, interoperable vertiport operating and communications system is vital to managing the magnitude of interactions to come between vertiports and operators, as outlined in NASA's July 2021 report titled "Vertiport Automation Software Architecture and Requirements."

Altaport's platform both reflects and builds upon the system outlined in NASA's VAS whitepaper. "We've spent more than a decade building and launching operations that are highly reflective of what future AAM operations will look like, giving us unique insight into the challenges and opportunities that such operations present," said Cozzens. "The Altaport team has combined the learnings from those experiences with the technical standards established by the industry to date to build the leading vertiport automation platform. When the first eVTOLs begin commercial operations, Altaport will be prepared to serve landing locations around the world."

Altaport's platform is currently used at numerous major heliports throughout Brazil, playing an important role in the development of tomorrow's AAM landing network. "We are thrilled to see existing ground infrastructure managers use our platform," said Altaport co-founder Robert Carroll. "Adopting Altaport's technology early will enable landing locations to effectively prepare for the transition to electric and hybrid-electric aviation."

While helping heliports streamline their operations today, the partnerships also give the Altaport team an opportunity to gather invaluable real-time feedback within an environment that is highly analogous to the future AAM operations network. "Altaport's VAS platform will play a critical role in establishing and growing a safe and efficient eVTOL ecosystem," said Grant Fisk, co-founder of Volatus Infrastructure. "We believe their VAS is a key piece in the Volatus vertiport package, which is why we partnered with Altaport early on. We particularly appreciate how their work with heliports today is going to directly translate to and benefit the eVTOL world."

DRONEACHARYA® AERIAL INNOVATIONS

Drones World Editor Kartikeya in Conversation with **Mr. Prateek Srivastava, Founder & MD, DroneAcharya**

Q Before we start, we would be happy to share your story to our readers. Wouldn't it be a great way if they can hear it from you?

A I have been fortunate to be surrounded by GIS and Remote Sensing scientists and scholars my entire life, so making a career in the same path came naturally to me. My journey started off as an intern at ISRO and getting a chance of being a part of some noteworthy projects. I then moved on as a Research Associate at Asian Institute of Technology, Thailand, and GIS Specialist at CEPT University. My keen interest in technology coupled with my affinity towards Entrepreneurship led me to take up Business Development roles in Geokno, Infinium Solutionz and Genesys. Once I joined PrecisionHawk, I was able to let my Business acumen and passion for Business Development and Management shine through. This led me to start my own companies that were focused on Drones and their applications in Surveying and Industrial Solutions, namely Terra Drone India (Group company of Terra Drone Corporation, World's No. 1 Drone Service provider) and DroneAcharya Aerial Innovations, which is today the only Drone startup up to have gone public and is hitting the upper circuit ever since the day we went public!

Q Congratulations on your IPO success, can you share your views on utilization of raised funds in near future? Any plans on Drone Manufacturing?

A Thank You. We have had a massive success with the IPO being oversubscribed 262 times. Post the IPO, Our stock made its debut on the market for Rs 102 on the BSE, which is significantly higher than the public issue price of Rs 54. The stock reached Rs. 107 per share, representing a gain of 98% in minutes after the listing. Currently we have hit the upper circuit ever since our shares made its debut in the market and as of 6th January, 2023, the value has risen to Rs. 182.50. This itself has been a record in the history of BSE SME. With the newly acquired capital, we plan to purchase drones, sensors, and processing equipment. We are working toward the goal of entering the drone manufacturing industry in the near future. We plan to manufacture niche products like drone-in-a-box, tethered drones, swarm drones etc.

Q What are the various products and services that DroneAcharya has in offer currently?

A DroneAcharya offers Drone As a Service (DaaS),

comprehensive GIS (geographic information system) based data processing and analytics and GIS based algorithm and web and mobile application development. We provide services at every level of a project's development, beginning with conducting specialized drone surveys and ending with final delivery and hand holding of the client. Our services include not just 3D modeling and GIS mapping, but also drone delivery, drone filming, live video feed, and activation of drones for emergency scenarios like search and rescue and crowd control. Adding to our suite of services, we provide a wide variety of focused training programmes for drone pilots, GIS analysts, and Python programmers. With our help, our customers can fulfill all their data needs for any endeavor. In addition to the market in India, we will also be focusing on Southeast Asia, the Middle East, the United States of America, and Central Asia. We are developing drone-centric courses throughout Europe in an effort to corner that continent's market. Our flagship courses include A1, A2, and A3 Drone Pilot Training Course regulated by the European Union Aviation Safety Agency (EASA), as well as GIS, Python and Entrepreneurship courses for drones.

Q How many drone pilots are required in India as of now & how many pilots you are planning to train in next 2 years?

A Today, there is a vast gap in the demand and availability of trained professionals, and we are talking not just about DGCA certified drone pilots, but also skilled talent related to drones like drone building, repair and maintenance, data processing and analysis. According to Shri Jyotiraditya Scindia, the Union Minister for Civil Aviation, the country will require around one lakh drones pilots in the coming years. In order to realize this goal, DroneAcharya aims to have a lion's share in educating and certifying as many students and pilots as possible and contribute to make India a drone hub by the year 2030. In the space of just nine months, our RPTO at Pune, which is located in the company's headquarters, trained 221 drones pilots. In addition, we have an RPTO in the state of Gujarat, which is affiliated with the well regarded Rashtriya Raksha University in Gandhinagar. As a matter of fact, we have already begun our fair share of activities, partnering with Tata STRIVE, NSDC (National Skill Development Corporation) and Whistling Woods International and starting operations, to extend our expertise and knowledge to different parts of the country. We may draw a parallel; with telecom / IT industry where the peripheral of the drome courses is much larger and one can imagine the magnanimity of the requirement

Q Emerging technologies like block chain, IoT, Artificial Intelligence have found many usages in different fields. What can you comment on them in Drone Industry?

A Technologies like blockchain, the Internet of Things (IoT), and artificial intelligence (AI) are on the cusp of major breakthroughs. These technologies are adaptable, and can be used in the drone sector as well as others. Unmanned aerial vehicles (UAVs), sometimes known as drones, can be used in a flying Internet of Things (IoT)/Internet of Drones (IoD) environment to carry out and automate a variety of functions, including but not limited to: environmental monitoring; disaster management; aerial photography; monitoring and tracking of enemy at borders; and many others. The development of these technologies is simplifying and facilitating the operation of drones.

Q How do you see India as an upcoming market? Which market according to you is the best; Defence or Civilian?

A Currently, the military is the principal user of drones. Drones are a standard issue item for modern militaries everywhere, serving multiple functions including target decoys, combat operations, R&D, and surveillance. Due to their high convenience in decreasing losses and allowing the execution of high profile and time-sensitive missions, Unmanned Aerial Vehicles will continue to be utilized in diverse military operations. Nonetheless, commercial drone use is on the rise and the topic of the day, with businesses across a variety of sectors beginning to incorporate them into their operations. Only a

select group of companies from Europe, Asia, and North America can claim to be the undisputed leaders in this market at this early time. With the declining cost of modification, the potential for new applications with commercial drones is expanding rapidly. In the near future, modern drones will be used for commonplace chores like drone - based fertilization of agriculture fields, monitoring of traffic events, surveying of inaccessible areas, and even pizza delivery.

Q What are your development plans for 'DroneAcharya' for the next 5 years and into the next decade?

A The scope and depth of our efforts in the business has allowed DroneAcharya to make a positive impact. Soon, we hope to begin manufacturing and assembling drones for package delivery and other tethered applications. In addition to this, we are planning to establish ourselves as a center for the maintenance and repair of drones. When compared to the large number of firms that focus on the production and assembly of drones, the number of organizations that offer repair and maintenance services is extremely limited.

Q What is your message to youngsters who wish to take Drone Industry as their career?

A Drones, or unmanned aerial vehicles, are rapidly altering the job market by creating new opportunities in a variety of fields. Considering the anticipated rising demand for drone operators in India over the next few years, a career in drone technology may be a useful option for young people. India's share of the worldwide drone industry this year is estimated to be 4.25 percent, with a total market value of $28.47 billion. Drone technology is significantly contributing to the mapping industry through initiatives like the Central government's flagship programmes Atmanirbhar Bharat and Swamitva Yojana. It is becoming common practice to use drones to deliver packages. There has been a significant increase in the need for qualified professionals in the drone business as a result of all these government programmes and the increasing demand for drones in every industry. Young people should take advantage of every opportunity to learn about drones and seek a job in the field. In light of the Honorable Prime Minister's goal of making India a drone hub by 2030, young people in India have an excellent opportunity.

Digital Global Systems RF Detection Integrated Into Indra CROW Counter-UAS

Indra Sistemas, S.A, a leading global technology engineering company for the aerospace, defense, and mobility sectors, has integrated leading-edge RF detection from Digital Global Systems (DGS) into its CROW counter-UAS platform. With DGS RF detection, CROW adapts to the specific needs of the environment being protected; integrates and combines use of different sensors and countermeasures; with the possibility of redundant use of sensors in terms of both number and location.

Advancements in wireless and computer processing have enabled devices to become smaller and more capable. Just as innovation has delivered increased capability, Radio Frequency-enabled devices significantly increase vulnerability and risk. Cyber and physical security strategies must now include components that address threats from RF-enabled devices. DGS CLEARSKY™ provides anomalous signal detection and multiple geolocation techniques for any signal of interest in the 70 MHz to 6 GHz range. Anomalous signals include:

Fernando Murias, Chairman and CEO of DGS, stated, "We recognize Indra as a global leader in the defense industry. They are rigorous about selecting components for CROW and we are thrilled to be included in this leading-edge solution for drone threat management."

Unintentional interference

Intentional signal interruption (jamming)

Communications devices encroaching on a protected area

UAVs (aka "drones")

SkySafe Partners with Robotics Centre to bring Cloud Based Counter-Drone Technology to Canada

SkySafe, an airspace security and management technology company, announced that its groundbreaking Cloud based counter-drone technology is now detecting drone flights in Canada, thanks to their partnership with Robotics Centre. SkySafe Cloud is unique in that it offers customers a way to detect, track, and analyze the drones in their airspace, without having to buy and maintain expensive hardware. As the only company in the world to build, own, and operate city-wide sensor networks, SkySafe offers airspace awareness via a subscription to their Cloud based application.

"As more and more drones enter the airspace, there are more incidents occurring from the work of careless or criminal drone operators," said Grant Jordan, SkySafe's CEO. "Drones are dropping contraband into prisons, smuggling drugs across borders, and disrupting open-air events, just to name a few examples. We're excited to bring airspace awareness to Canada, so unauthorized or dangerous drones can be identified, and threats can be mitigated." SkySafe has been testing and deploying counter drone capabilities to military and public safety customers, both domestic and abroad, since 2015. They offer comprehensive defense against the threat of drones by applying advanced radio frequency (RF) technology, reverse engineering, and deep threat analysis.

Charles Barlow, Co-Founder and CEO at Robotics Centre said, "SkySafe is a great partner for Robotics Centre. It's been exciting to see the technology go live in Ottawa, and we'll be focusing on expanding its reach throughout Canada." Robotics Centre was established in 2009 and is an Ottawa-based company with offices in Sapporo, Japan, and Riyadh, Saudi Arabia. They work with Government, SAR, and Industrial clients to create integrated unmanned systems solutions to address a wide range of challenges.

> "We're really pleased to be partnering with Robotics Centre on the Cloud product expansion," continued Jordan. "They've been a great partner for many years and our expansion of the Cloud product in Canada is the perfect next step."

SKY-HERO and AARDVARK Tactical Announce World's First NDAA-Compliant Interior sUAS Platform

AARDVARK Tactical and Sky-Hero are pleased to announce the release of the world's first National Defense Authorization Act (NDAA)-compliant interior use tactical sUAS, LOKI Mk2US. The Mk2US is built to comply with the rigorous standards set forth in the NDAA and the recent Department of Defense black-listing of certain Chinese-made drone parts and technologies.

In response, Sky-Hero, the world's leading manufacturer of interior tactical robotics, redesigned and resourced the LOKI Mk2 to eliminate all of the covered Chinese components and replace them with European or American items.

Speaking about this new drone, Yves Coppye, CEO of Sky-Hero, stated: "We have been asked by many of our top users around the world to ensure that all major components are built by NATO countries. After two years of work, we are pleased to announce that we have reengineered and redesigned these components and located American or European sources for them."

Jon Becker, AARDVARK's CEO, echoed this by stating: "We are extremely excited to see Sky-Hero release an NDAA-compliant version of LOKI. While there are a number of products on the market that claim to be American, in reality, the large majority of drones are simply built with Chinese-made parts and at best assembled in the U.S. LOKI Mk2US has always been made by NATO allies and now every NDAA-covered component will be too."

The LOKI Mk2US will begin shipping in Q1 of 2023. LOKI Mk2 is sold exclusively in North America by AARDVARK. Visit LOKI.AARDVARKTactical.com to learn more.

Sky-Hero, the world's leading manufacturer of interior tactical robotics, redesigned and resourced the LOKI Mk2 to eliminate all of the covered Chinese components and replace them with European or American items.

AARDVARK

Bluvec Selects Draganfly to Create Joint Solutions Enabling Specific Military and Civil UAS Threat Detection and Intervention

Draganfly Inc an award-winning, industry-leading drone solutions and systems developer, is pleased to announce that Bluvec a pioneer developer of Deep Signal Inspection (DSI) technology and a leading supplier of counter-drone technology in the industry has selected Draganfly to create joint solutions enabling specific Military and Civil UAS Threat Detection Intervention.

Bluvec is a trusted counter-UAS system provider that manufactures and develops UAS detection and intervention equipment. Draganfly and Bluvec will collaborate to develop joint solutions for counter-drone technology to improve threat detection management and intervention, particularly at crucial infrastructures such as airports, energy facilities, and civil air defense.

Bluvec's counter-UAS platform will be integrated with Draganfly's Commander 3XL UAV to create a unique, innovative solution that will extend the range of Bluvec's existing products and introduce additional capabilities such as remote situational reconnaissance, patrol and intervention. The Commander 3 XL is an easy-to-deploy, modular multirotor UAV with the ability to carry up to 10 kg as part of its interchangeable payload system.

Draganfly, in addition, will also be a distributor of Bluvec solutions and will act as a collaborator to help grow the global adoption of critical counter-UAV infrastructure.

> "The global importance of counter-drone technology is crucial and has immediate real-world use cases," said President and CEO Cameron Chell. "We are excited to have been selected by Bluvec and to collaborate with Bluvec in developing next-generation threat-detection management and infrastructure to help protect crucial infrastructures in times of crisis."

Edgesource Corporation Launches EdgesourceX to Bring Counter-sUAS Capabilities to the Commercial Sector

Edgesource Corporation, a small business celebrating their 25-year anniversary delivering innovative solutions to the public sector, announced today that it has launched EdgesourceX, a commercial provider of Counter-Small Unmanned Aircraft Systems (C-sUAS) capabilities. EdgesourceX is committed to building trusted and scalable C-sUAS solutions to protect businesses, organizations, and individuals from the threats posed by drones.

With more than 870,000 drones registered with the FAA, first responders and security leaders at hospitals, arenas and critical infrastructure sites are struggling to manage their impact. Whether the pilots are careless hobbyists or have criminal intent, the risks from unauthorized drones run the gamut from attacks and collisions to espionage and invasion of privacy.

FOR INSTANCE:

ARENAS: Last season, the NFL tracked 1,400 incursions by drones while flight restrictions were in place, and an unauthorized drone forced a stop in play during this year's MLB National League Division Series.

PUBLIC SAFETY AND HEALTHCARE: Drones have been known to interfere with the flight paths of both search and rescue operations and medevac helicopters.

CRITICAL INFRASTRUCTURE: In September, the FBI warned of the risk posed by drones to critical infrastructure sites after unauthorized drones were spotted over Louisiana chemical facilities.

INDIVIDUAL PRIVACY: In spite of California privacy laws specifically prohibiting drones from taking pictures over private property, celebrities continue to be plagued by rogue drones. Proven on the battlefield, a version of Edgesource's Counter-sUAS technology is now available to commercial customers. These products include:

WINDTALKERX: A cost-effective, easy-to-deploy, and scalable solution that detects small UAS systems more than 20 miles away (35 kilometers+) and pinpoints the location of operators to ensure the security advantage.

DOWDINGX: A simple, elegant map interface that is easy to use, Dowding gives you real-time visibility into drone activity and automatically detects threats and their origins.

These technologies were developed in the Edgesource Ornith Labs™, an Innovation Center of Excellence with an elite team of C-sUAS research, development, test and evaluation (RDT&E) specialists who provide rapid prototyping, and top-tier training and support for government and commercial customers. This technology will enable industries that need it most to monitor drone activity in order to protect their people, assets, and businesses.

"With years of experience providing innovative and efficient solutions and services to the U.S. government, we are now authorized to bring our Counter-sUAS solutions developed for the demands of the battlefield to the private sector," said Chris Lansburgh, president of Edgesource. "Drone purchases have skyrocketed, and organizations are grappling with the security risks, whether harm is intended or not. This technology will allow critical infrastructure, first responders, stadium officials, and high-profile individuals, among others, to manage their risk and privacy while protecting their air space."

"The prevalence of drones and their use require a balance between privacy, security, and utility, and WindtalkerX and DowdingX are two key technologies that expand the umbrella of protection we provide our customers," said Joe Urbaniak, COO of Edgesource.

"Being able to support our customers for 25 years and helping them to achieve their respective missions has been very rewarding," said Tom Wilbanks, chairman and founder of Edgesource. "It illustrates the level of commitment, drive to innovate, and pragmatic approach to working directly with our customers to deliver results. We are excited to now offer some of these solutions to the commercial sector."

BAE Systems Demonstrates the Effectiveness of APKWS® Against Agile, High-Speed Military Drones

BAE Systems completed additional ground-to-air test firings to prove the effectiveness of 70mm rockets guided by APKWS® guidance kits against Class-2 unmanned aerial systems (UAS) that weigh roughly 25-50 pounds and can travel at speeds exceeding 100 miles per hour. During the demonstration in Southern Arizona, five APKWS-guided counter-UAS rockets were fired from a containerized weapon system and destroyed all targets, including fast-moving drones. The test results further demonstrate APKWS guidance kits' ability to enable low-cost, precision strikes against airborne threats.

The 70mm rockets can destroy Class-2 aerial drones by combining standard motors and warheads with APKWS guidance kits and proven proximity/point-detonation fuzes. The resulting precision munition is a low-cost, supersonic, lock-on-after-launch strike weapon with a large 10-pound warhead that can destroy large drones in a matter of seconds with or without direct contact. Combat-proven APKWS-guided rockets are highly effective against a variety of soft and armored stationary and moving targets. They can be fired by many different platforms, including jets, helicopters, trucks, boats, and weapon stations, and stowed APKWS guidance kits protect seeker optics from adjacent rocket fire, unlike nose-mounted seeker optics. APKWS guidance kits are the only U.S. government program of record for 70mm laser-guided rockets. The kits are available to all U.S. armed forces, as well as U.S. allies via Foreign Military Sales.

> Militarized drones are becoming more prevalent in conflicts around the world, and we're giving our customers an efficient way to counter them without wasting expensive missiles," said Greg Procopio, director of Precision Guidance and Sensing Solutions at BAE Systems. "Our tests demonstrate that APKWS guidance kits have the flexibility to engage a variety of targets to meet the evolving mission needs of the warfighter.

Austrian Armed Forces and Rheinmetall Successfully Test Anti-small Drone System C-sUAS

The Austrian Armed Forces and Rheinmetall have successfully tested the leased Counter-small Unmanned Aerial System (C-sUAS), which had been delivered in May 2022, as part of a realistic exercise. Rheinmetall's deployable C-sUAS system is currently being evaluated by the Austrian Armed Forces alongside other systems as part of the Countering Emerging Air Threats (C-EAT) project. Following the successful tests, the Austrian Armed Forces have now extended the lease contract by seven months.

After the training on the system had been completed, the operational capability of the Rheinmetall C-sUAS system was now to be tested as intensively as possible under real conditions. For this purpose, a sophisticated test programme was developed, which included both test and realistic attack flights by small drones. The aim was to detect and clearly verify these drones as early as possible using a broadly based sensor mix. A possible fight against these enemy drones was demonstrated by means of jammers. A special highlight was the introduction of the target queuing device by tablet from the higher-level command and control system to the jammer operator.

The large number of drones used - from commercially available drones to models with jet propulsion to self-built drones controlled according to the LTE mobile radio standard - clearly showed that modern drone defence can only be efficiently managed in a network. The Austrian armed forces had selected Rheinmetall's C-sUAS system and loaned it out for a six-month period of testing and evaluation. In May 2022 Rheinmetall Air Defence AG shipped the latest version of its rapidly deployable counter-small unmanned aerial system (C-sUAS) to the Austrian military. This lease contract has now been extended.

> A successful and intensive test week provided a multitude of important insights and experiences," said Matthias Diem, Vice President Counter Drones and Aviation Markets. "From our point of view, the exercise was an instructive example of how innovation-oriented armed forces, together with industry, can gain the necessary insights to develop and adapt tomorrow's technologies for possible new threats from the air at an early stage. A big thank you goes to the Air Force and Anti-Aircraft Defence School in Langenlebarn for the great organisation and execution of this forward-looking exercise.

Dedrone Integrates Axis Communications' Camera to Deliver Multi-Sensor Airspace Security Solution

Dedrone, the market leader in smart airspace security announced that it has formed a partnership with Axis Communications to incorporate Axis network cameras into Dedrone's counterdrone command and control (C2) platform, DedroneTracker. With Axis camera integration, Dedrone is now the first counter-UAS (cUAS) company to provide proven artificial intelligence (AI) - and machine learning (ML)-driven multi-sensor fusion to autonomously detect, track, and identify drones (DTI) with multi-target and multi-camera capability. This airspace security system has already been successfully tested at several locations including Consolidated Edison's New York City energy facilities.

Consolidated Edison and Dedrone will speak at ISC East, the leading event for the Northeast's security and public safety community, on Wednesday, November 16, 11:30 a.m. - 12:15 p.m. The session will explore how to build a threat assessment and a living security strategy that can rapidly respond to new threats as they arise.

"ConEdison demands a high level of intelligence and autonomy to ensure the safety, security and business continuity of our NYC Energy Center," said Scott Gross, Facility Security Officer at ConEdison. "We selected Dedrone because it allows us to integrate our already existing Axis PTZ (pan, tilt, zoom) cameras into DedroneTracker, enabling the PTZs to provide an additional layer of situational awareness for faster drone risk assessment and better payload inspection." Gross continued, "Knowing what the drone is, what it's carrying, and where it is, are all essential to good security strategy. Our successful implementation here in the challenging urban environment of NYC proves the Dedrone and Axis solution can be successful at all our locations throughout the five boroughs and Westchester County." Axis' PTZ cameras, when integrated with Dedrone software, offer both wide-area coverage and high-resolution video. The cameras feed into Dedrone's AI/ML sensor-fusion system, leveraging the DedroneDNA drone library, to accurately differentiate between drones and non-drones and then identify the drone model. Dedrone's C2 platform, DedroneTracker, continuously and autonomously examines potential targets in the background, then identifies potentially threatening drones, allowing the operator to track and mitigate as needed.

Our partnership with Axis offers a robust, multi-layered airspace security solution for complex urban environments, such as New York City," said Ben Wenger, Chief Revenue Officer of Dedrone. "We pride ourselves on the ability of our C2 platform to offer high-quality DTI management while easily integrating with best-in-class technology like Axis' network cameras to give customers the best solution for every scenario.

Rafael's Drone Dome Recommended by US DOD

The U.S. Department of Defense's (DoD) Joint Counter-small Unmanned Aircraft Systems Office (JCO) named and recommended for C-sUAS As A Service (CaaS) the DRONE DOME system, provided via Rafael Systems Global Sustainment (RSGS), earlier this month. This is following a series of demonstrations of the system completed at Yuma Proving Ground, Arizona, in April of this year.

DRONE DOME successfully demonstrated its C-UAS capabilities, which included accurate detection, identification and soft-kill capabilities against a variety of drone targets and is now eligible and has been recommended to compete for future CaaS contract opportunities. Throughout the demonstration, DRONE DOME utilized an RPS-42 radar, an EO/IR system, and an RF detection & mitigation system. Several of these components are already integrated into US systems and are globally deployed. Additionally, DRONE DOME has a configurable architecture that can be adapted for different operational demands and to confront a variety of threats.

About DRONE DOME: DRONE DOME is an innovative end-to-end, combat-proven counter-Unmanned Aerial System (C-UAS), providing all-weather, 360-degree rapid defense against hostile drones. Fully operational and globally deployed, DRONE DOME offers a modular, robust infrastructure comprised of Detection and Classification by electronic sensors, Defeating by kinetic (Laser) and electronic (Jammer) effectors, and unique artificial intelligence algorithms within Multi sensors/Multi effectors, open architecture Command and Control (C2), to effectively secure threatened air space.

DRONE DOME's artificial intelligence capabilities provide a more precise picture of the incoming threat. This additional information allows the system to both detect and identify specific threat elements more accurately and engage and neutralize the target faster and more efficiently. The system's flexibility across military and civil applications offers advanced protection for maneuvering forces, sensitive facilities, border protection, as well as increasingly vulnerable civilian targets like airports and other public facilities.

Eric L. Brown, Chief Technology Officer for Rafael Systems Global Sustainment: "We are proud to see this advanced RAFAEL technology being successfully demonstrated by our American partners on American soil. The decision by the JCO further illustrates the effectiveness and the relevance of the DRONE DOME system in confronting emerging threats in a rapidly changing aerial domain.

Ondas Holdings Provides Update on Definitive Merger Agreement to Acquire Airobotics

Ondas Holdings Inc a leading provider of private wireless, drone and automated data solutions through its wholly owned subsidiaries, Ondas Networks Inc. ("Ondas Networks") and American Robotics, Inc. ("American Robotics" or "AR"), announced that on December 18, 2022 the shareholders of AIRBOTICS Ltd. (AIRO) ("Airobotics") approved the proposed acquisition of Airobotics by Ondas. The transaction is expected to close by the end of January 2023 and will result in Airobotics becoming a wholly owned subsidiary of Ondas.

In addition, the Company received approval from the Israel Securities Authority ("ISA") and the Tel Aviv Stock Exchange ("TASE") for its dual listing application. Upon closing of the proposed acquisition of Airobotics, the Company expects its common stock to be dual listed on Nasdaq and TASE.

"We believe Airobotics' Optimus System, together with American Robotics' market-leading Scout SystemTM, will allow us to target high growth opportunities and reinforce our position at the forefront of the drone industry. With our approved dual listing, we also look forward to expanding our shareholder base and introducing our mission critical technology to a broader investor audience.

"Airobotics recent announcement of the expanded installation of Urban Drone Infrastructure in the city of Dubai highlights the maturity and reliability of the Optimus Systems for high-valued urban use cases. This fleet has the potential to grow to more than 20 systems over the next several years and we see additional demand for commercial fleet deployments in other markets. By leveraging our technology with Airobotics' robust government and commercial customer pipeline, we can more effectively deploy drones on a larger scale. We are excited to work with the Airobotics team, bringing the world class talent and expertise of American Robotics and Airobotics under a single roof.

Eric Brock, Chairman and CEO of Ondas.

> We're pleased to have gained the support of Airobotics shareholders and complete this important milestone within our proposed acquisition, which we believe will be a transformative event for the broader drone landscape

COMSovereign Announces the Sale of its Sky Sapience Drone Subsidiary

COMSovereign Holding Corp a U.S.-based developer of 4G LTE Advanced and 5G communication systems and solutions announced an agreement to sell its Israel-based, Sky Sapience ("SKS") tethered drone unit to Titan Innovations ("Titan") for total cash consideration of $1.8 million.

Titan Innovations, based in Israel, is a developer of specialized, fully integrated unmanned systems and solutions designed for civilian and military applications. Titan provides its customers with comprehensive systems engineering and integration services including software and control expertise in the field of robotics, autonomy, navigation, and communication with hardware sourced from leading global manufacturers. Under terms of the transaction, Titan will acquire Sky Sapience which includes all business assets and intellectual property.

Yahav Regev, CEO of Titan Innovations added, "Sky Sapience's proprietary fiber optic tether technology makes it an ideal platform for military, borders, and civilian applications, The company will expand the variety of companies and the capabilities of the group in the international market. Combined with our deep expertise in advanced hardware and software technologies inside our ecosystem, we believe that the SKS platform will enable us to remain at the forefront of autonomous systems development for our customers, enabling them to meet their unique mission requirements."

> We are pleased to have reached an agreement for the sale of SKS as we continue to refocus the business around our core wireless connectivity technologies and solutions. In addition to refining our focus on wireless connectivity, this transaction aligns with the goals of our transition plan by reducing the complexity of the Company, decreasing our go-forward operating expenses, and improves our balance sheet

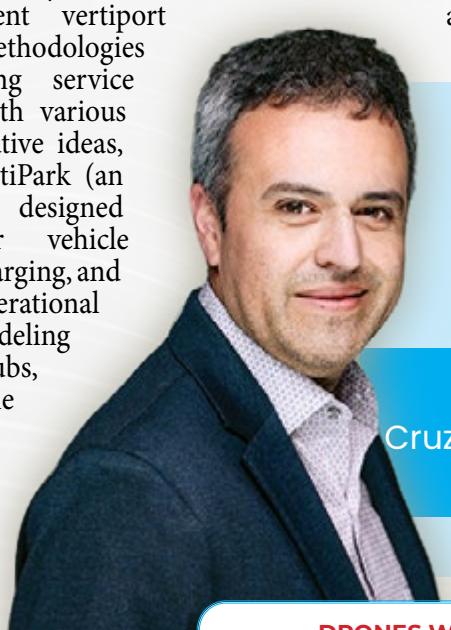
David Knight, CEO and President of COMSovereign Holding Corp.

Skyway Acquires AAiM High Consulting

Skyway Technologies Corp. announces its acquisition of AAiM High Consulting LLC for an undisclosed amount to capture the ever-growing vertiport planning market.

AAiM High's core business of providing key research and development vertiport planning methodologies as a consulting service has brought forth various new and innovative ideas, such as the VertiPark (an eVTOL airfield designed exclusively for vehicle maintenance, charging, and storage) and operational simulation modeling of large VertiHubs, with over one hundred hourly operations. By modeling long-term, aggressive growth scenarios, projects can demonstrate their full potential growth capabilities.

Skyway's acquisition of AAiM High gives the company a strategic position in expanding its operational services for vertiports while offering the most advanced planning services for Urban Air Mobility directly to its customers and communities. The company sees it as another source of revenue by acquiring the consulting firm's clientele along with much-needed industry research by marketing a much broader service to the aviation and construction industry.



Clifford Cruz, CEO of Skyway.

> It's important for vertiport projects to understand and demonstrate the intricacies and complexities of a vertical airfield designed for high traffic use. Providing the best service when it comes to vertiport planning efforts will not only boost consumer experience ratings but will also boost industry confidence.

Aeronautical Engineering & Research Organization (AERO)

AERO

Get Attractive Scholarships @ AERO-CET

CAREER IN AVIATION AND SPACE ENGINEERING

Gateway To Excellence

DELIVERING QUALITY EDUCATION SINCE 2001

*T&C Apply

ADMISSION NOTIFICATION FOR ACADEMIC YEAR 2023-2024

Aircraft Maintenance Engineering with B.Sc. In Aeronautics

DGCA — MINISTRY OF CIVIL AVIATION — University of Mumbai

AJEENKYA D Y PATIL UNIVERSITY
THE INNOVATION UNIVERSITY
School of Engineering

- B.Tech Aerospace Engineering
- B.Tech Aeronautical Engineering
- B.Tech Avionics Engineering

Eligibility :10+2 / 3 Years Diploma in Engineering

Aerospace & Aviation Sector Skill Council

Short Term Diploma Programs

- Air Hostess /Cabin Crew /Aviation Management
- Air Fares & Ticketing Management /
- Airport Ground Staff Training

Eligibility: 10+2 Any Stream

SCHOLARSHIP EXAMINATION (AERO-CET)

Register now @ www.cet.aero.edu.in

For any Assistance and support

9822013633 | 9922508671 | 9607950658 | 9011036204

admission@sgipune.in | www.cet.aero.edu.in

Shastri Campus, S. No 85, NDA Road, Shivane, Pune 23

Drones World Editor Kartikeya in coversation with

Mr. Utkarsh Singh
Founder & CEO
Dronamaps

Q Tell us about your experience in the field of UAVs and what were your fields of expertise before venturing into UAVs?

A DronaMaps specialises in analytics from drone based maps. As a Command and Control Center solution, DronaMaps is powered with drones and AI/ML on satellite and drone data. We generate actionable insights using Change Detection Technology on satellite maps and augmented with inputs from drones, mobile phones, disparate MIS and GIS data sources. Our contribution to Artificial Intelligence was recognized by Economic Times in a ceremony chaired by Steve Wozniak. During the Covid-19 Crisis, DronaMaps volunteered our platform to seven states across India acting as a command and control center.
As alumni of Johns Hopkins, the deployment was inspired by Hopkins Covid-19 dashboards, but ended up providing deeper analytics like patient tracking, healthcare infrastructure tracking, containment and hotspot analysis, predictions on spatial and epidemiological spread of the disease at a locality level for almost 130 districts across India.
A little about us: Ayushi Mishra, Forbes 30 under 30 (Asia), is a Biomedical Engineer and holds an MS Engineering Management from Johns Hopkins University. Her first startup was a mobile health platform to scale peer support and therapy. It is funded by NIH and RockHealth Foundation. Her experience and education armed her with skills required for data fusion and analytics.
Utkarsh Singh, the CEO and founder of the company bought the first drone to film his cofounder Ayushi Mishra's graduation walk at Hopkins. Utkarsh Singh is BS computer science and had worked with the technology at Hopkins. He specialises in 3D reconstruction and studied under Prof Michael Kazhdan

who laid the foundation of Poisson surface reconstruction that is in reconstruction algorithms today. After coming to India and holding the device in our hands and understanding the extent of its capabilities was an eye opening experience for us. Utkarsh brought a drone back with him to India and worked on the Sawan Jhula mela in Ayodhya. The festival involves the influx of 3 million people in a small city and therefore the creation of a temporary urban infrastructure to hold them. Swarms of drones created a 3D map for informing the analysis like exit routes, depth analysis for condoning off the dangerous areas of the river from the public etc. https://medium.com/dronamaps/ayodhya-3million-people-3-days-7c299c371d8c
This was the beginning of DronaMaps: The scale of impact possible with what are perceived to be off the shelf commodity drones is what drew us to this idea.
They firmly believe in the use of technology as a tool to better the human condition. At DronaMaps. We have two core specialisations: reconstruction of drone data and precision agriculture. We have used off shelf $1500 drones as swarms to map entire rural clusters with cost efficiencies of 17 cents per acre. Bringing drones, metaverse, AI/ML, data fusion to the most rugged conditions possible is our dream. Over time we have built a core team for execution, in 2018, Poonam Gupta, came in as a key addition to our capabilities with over a decade of experience in the GIS industry and 8 years in ESRI. She added the scaling structures of operations and execution to the technical capabilities of the founding team. She built crucial business ties with major industry leaders to help us scale to different geographies.

Q What are the various products and services that Dronamaps has in offer currently?

A DronaMaps offers enterprise deployments with a dynamically updating geodatabase with drones. This is typically used for governance, mining, construction and precision agriculture. The different use cases can be picked by our clients based on our existing set of templates for over 20 use cases. We have seen customers use our command centers as a way to integrate siloed data coming from drones, several mobile applications, management information systems etc into one unified database with high resolution data forming the core of visualisation and analytics.

Q What would you say are the main opportunities and challenges for Drone Industry in India?

A India, like Tanzania with the World Bank, has released an initiative to collect drone based maps for the entire country and we have a thriving drone hardware and services ecosystem. This is a great step being led by liberalisation of both drone and geospatial policy. However, the problem of using the collected data effectively still persists, the drone maps are stored in hard drives or cloud and even if a client had specialist teams to provide the analytics, off the shelf algorithms not trained on geospatially complex Indian datasets do not provide reliable accuracies for governance or large scale applications. At DronaMaps we tried to solve this problem by providing an unlimited enterprise pipeline for reconstruction of drone imagery and extraction of actionable analytics for it. Once we create data fusion with other modalities, this forms a basis for ground truthing at regular intervals with drone data for governance applications or precision agriculture. We eliminate the need for multiple platforms to reconstruct and analyse drone data, in addition, we try to go a step further with multimodal data absorption to ensure that drone data becomes part of existing processes.

Q Anything else you would like to comment on the Drone sector potential and growth in the country?

A To be world leaders in a strategic sector like drone technology, we have taken the first steps by letting the startups

flourish with PIL schemes backing them. This aids the manufacturing sector heavily. In addition, after the liberalisation of drone and geospatial policy, there is increasing willingness from both public and private players to adopt the technology. We need to be able to leverage this momentum in time to provide solutions at scale. Currently, the biggest challenge of the drone industry in India is hitting scale. In addition, we need to look beyond the drone hardware, delivery, analytics, are all applications that are extremely valuable. Drone Analytics Market size was valued at USD 9.24 Billion in 2021 and is projected to reach USD 69.82 Billion by 2030, growing at a CAGR of 24.4% from 2022 to 2030 globally. If you combine the turnover of all three parts of the drone sector, the estimate is that by 2026, it will stand at $1.8 billion for India.

Ayushi Mishra, Co founders of DRONAMAPS

Q What is that one fascinating thing you like in today's Drone industry? One thing that you equally hate or disapprove of?

A The most fascinating part of the drone industry is the range of solutions out there in the market in both hardware and services.
The spirit of experimentation and innovation is a huge part of this industry built by youngsters who really want to contribute to the deep technology and strategic sector. Making the country stronger from within. The only struggle is that because of the sensitive dual use technology being deployed, the road to commercialisation and scale is wrought with struggle both in terms of business model and product market fit. Most startups would need support for that. In our case, it has been several entities like MEITY startup hub, NASSCOM CoE, Nexus, IITb SINE, FITT Delhi, AGNII, Reliance Jio Gennext, SAP, ESRI who have played a part in providing us with the infrastructure to help us contribute and scale.

Q Where do you see Dronamaps in the next five or ten years?

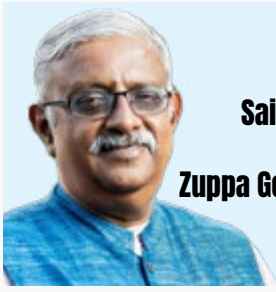
A We see ourselves as the foremost analytics player on 3D reconstructed drone data in the country. In ten year's time, we wish to provide these capabilities on edge with deeply integrated drone systems that are entirely automated. That means, the Drones find their way and fly at the push of a button, data computes on edge: uploads itself
Integrates with all other formats of inputs, to blend with the existing workflows, this information gets updated real time on Dashboards which parse through the noise to enable decision making on actionable data. This would need complete automation of the hardware, operations, and analytics.

Q What advice would you give someone (young generation) who is considering a career in Drones Industry?

A Focus on the fundamentals of a technology business, look for a problem to solve and create value while doing it. I do realise the problem in applying this adage to emerging technology is that often the problem statement, the actual execution process, or even the deliverables are not clear to the startups in the drone industry or even the buyers. Which means there is a process of discovery, however, govern your innovation process with strict KPIs of progress. Most young startups entering the business start from clubs in college to create hardware or provide a service. However, the drone industry in India is also reaching a point of maturity where these are getting commoditized or already have dominating players. It would be worthwhile to research the arch of the evolution of the industry and find a space to fit in. If you are entering an emerging market, always be two steps ahead of what exists in the market, either that or bring mind boggling scale which does need proportionate resources.

Drone Pilot Skilling key to unlocking the Indian vision of Global Drone Hub

The last decade of the 1900's saw the emergence of India as a global IT and ITES major.



Sai Pattabiram
MD,
Zuppa Geo Nav Tech

A deeper look into this phenomenon that completely revolutionized the country's demographics in terms of the individual citizens disposable income and in turn propelled an unprecedented exponential growth across all sectors of the economy from real estate to automotive to FMCG to luxury goods to travel can be traced down to mass skilling to meet the employment demand of the IT and ITES sectors.

India will need around 1 lakh drone pilots in coming years: Civil aviation minister Jyotiraditya Scindia

The Indian drone ecosystem needs a repeat of this to happen to evolve into a global Drone Hub. This is only possible if Drone piloting skill development can be as democratized as it was for training of IT coders and BPO employees that propelled the IT and the ITES industries during the late 1900's and early 2000's.

The need to scale Drone Pilot training holds the key to unlocking the employment potential the industry because it is the only way of getting more drone users on the ground who will in turn increase use cases and there by scale the drone service sector which in turn will enhance manufacturing as well as other support services.

Two factors directly contributed to the rapid scaling of skill development as far as IT and ITES were concerned

Mass Proliferation of Basic Training facilities with training centres proliferating even tier 2 and 3 towns and cities

Low entry level cost of training.

Hence if Drone Pilot training has to repeat the success of IT and ITES industries both these factors have to be possible.

In its current form and state the

Drone Pilot Skilling program is not designed to achieve scale at the level that is essential for India to achieve its desired outcome.

Regulatory structure restricting Scaling of Drone Pilot training:

Currently the training structure requires a Drone pilot to be trained and certified on the same class of Drone that they are required to operate.

This amounts to saying that the pilot of a Multi engine Jet Airliner should start and complete training on a Multi Engine Jet aircraft to be licenced.

This condition in the training structure is not in line with any other accepted and standardized training practice followed in any industry including aerospace where mandatory basic flight training on a single engine trainer aircraft is the very first step in the career of a commercial pilot.

Hence this anomaly in Drone Training requires to be addressed by getting it to align with proven, accepted, standardized training practices from other sectors including aerospace of which drones are an integral part.

Restructuring of Remote Pilot Training Systems into two layers is an absolute essential to make it scalable and affordable across the country

Basic Flight Training on any category of drone including Micro across the country like that established by NIIT, APTECH, SSI etc in the case of the early days of the IT Boom .

Category specific training for higher level drones like that followed for Commercial Pilot training based on type of Drone.

Structuring drone training across two layers will have the following advantages:

Basic level flight training can be achieved at lower cost using micro drones thus requiring a lower capital outlay and there by a lower entry level cost per trainee.

The need for a lower capital requirement will ensure that more number of basic Drone Pilot Training schools can be set up.

Creation of multiple District level basic flight training schools will unlock economies of scale for all stake holders from component manufacturers to RPTO's to Service providers given the availability of more drone pilots.

Such a structure will be in line with current practices across domains like Driver Training, Commercial Pilot training etc where basic operation skills dove tail into higher level skill development resulting in a scalable training model.

Creation of a two layered training structure will facilitate mass skill development in terms of drone pilot training from which higher-level training can evolve.

The current price and availability of drones at economical rates is a also a significant roadblock to facilitate scaling of "Drone Pilot Training ".

Mass deployment at low costs and ease of use are absolute essentials as far as delivering training at scale is concerned with the Ideal price per training drone being around Rs 1 lac per drone with complete end to end support in terms of both parts' availability and technology support.

Ajeet Mini Trainer drone under final stages of Type Certification by DGCA is a drone that has the potential to address this training need and democratize it across the country.

More such drones like Ajeet capable of being produced at scale are crucial for India to reach its vision of being a global drone hub.

CONCLUSION

In conclusion realization of the Indian vision of evolving into a global drone hub requires immediate action in terms of alignment of the regulation as far as drone pilot training is concerned with established practices of a two layered training structure of Basic and advanced level flight training that will reduce the cost of training making it affordable for mass deployment like it happened in the last decade of 1900's resulting in the national Boom in IT and ITES jobs.

Connecting the Skies: Drone Pilots Network Bridges the Gap between Pilots and Drone Companies

The world has advanced incredibly when it comes to technological development. India too has ambitious plans for the future of drone technology and the leaders of the country see it as a promising sector with vast potential for growth and innovation. In light of the Digital India initiative, India is moving forward to achieve the aim of our Honourable Prime Minister Shri, Narendra Modi to make India a global drone hub by 2030.

As the drone industry continues to soar in India, it's an exciting time to be a part of this fast-growing and innovative industry. Hence, the industry has endless opportunities for everyone. From Drone piloting, and engineering to business development the drone industry offers a wide range of exciting career paths for those who have the skills and passion to succeed. Hence, the demand for drone services is rapidly increasing and with a wealth of untapped potential and strong backing from Government initiatives, the sky is the limit for the opportunities it opens for your professional growth.

Mr. Vishal Modi along with his Co-founders - Yash Tanwar and Gajendra Singh realised the potential of the Drone industry a bit early and could foresee the scope of employment opportunities it can offer in the fourth revolution. Hence, they toyed with a unique idea to bridge the gap and connect drone pilots to drone companies on one platform.

With this in mind, they launched India's first & largest platform 'Drone Pilots Network' in the year 2020. To make employment opportunities accessible, the platform (www.dronepilots.co.in) enables pilots to register themselves on the platform for free. The platform is one of a kind because it lists down both full-time and freelancing gigs at one platform for Drone Pilots. Moreover, the objective of the Drone Pilots Network is to connect Pilots to employers from nearby locations so that it becomes easy for both of them to provide suitable services as per the requirement of the employer. Therefore, Yash Tanwar, highlights "We aim is to provide a platform to the individuals (Drone Pilots) in nearby locations and help them expand their income sources by doing small side hassles."

The platform has gained huge popularity in a short period because it connects drone pilots with companies and individuals willing to hire certified drone pilots to fulfil their project requirements. However, the pilots can create their portfolio on the platform to showcase their work experience and area of expertise and help the employers to select the right candidate for their project. In addition to this, the platform helps drone companies to hire pilots from their nearby locations without wasting their time in an endless process. Moreover, a pilot from the nearest location will help him save unnecessary expenses and reduce the language barrier between them.

Training Institutes across the globe are joining hands with Drone Pilots Network and are willing to sign a Memorandum of Understanding (MoU) with the team to expand the network. Furthermore, the drone training institutes can create their profiles showcasing the facilities and offers they run for the pilots and increase the enrolment rate for their institute. One of the unique features of Drone Pilots Network is its rating system. The moment a pilot completes the job. The platform provides the option. for both the employer and the pilot to share a rating according to the experience while working together. It helps to add credibility and build a reputation within the community.

"We are continuously collaborating with training institutes and global drone companies in the same business to provide better work opportunities to drone pilots located even in remote areas. With our platform we enable the companies to share the project requirement on our platform and qualified drone pilots can quote their charges to complete the project from anywhere in India," says Gajendra Singh one of the Co-founders of Drone Pilots Network. The purpose is to provide employment opportunities and take technology to remote areas of the country.

As the drone industry continues to grow in India, platforms like Drone Pilot Network are becoming invaluable resources for professionals to explore opportunities without migrating to metropolitan cities to build their careers. Whether you are a seasoned drone pilot looking for part-time work or a company looking for the right fit for your project requirement Drone Pilots Network is a platform worth exploring! Therefore, there is an urgent need for budding entrepreneurs to understand the potential of the drone industry and start building avenues for the youth and empower them to promote drones as a service and work towards a larger goal of making India a global drone hub by 2030.

Contact Number- +91 9828870101
Email-admin@dronepilots.co.in Website- www.dronepilots.co.in

Academy of Carver Aviation Pvt. Ltd.

Carver Aviation
Success is a reality

Plot No P-50, MIDC Industrial Area,
Near Baramati Airport
Pune - 413133
Maharashtra

Marut DroneTech Private Limited

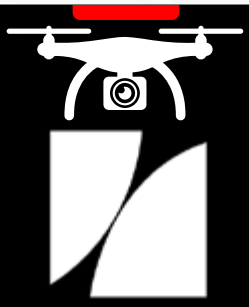
MARUT
- DRONES -

3 Branches in Hyderabad.
Become a best Certified Drone Pilot.
Hyderabad – 500032
Telangana India

prem@marutdrones.com
www.marutdrones.com

+91 99858 55494

DRONAMAPS



Plot No1, Udyog Vihar Phase 1, Dundahera Village, Sector 20, Gurugram, Haryana 122022

www.dronamaps.com

07042434285

Garuda Aerospace Private Limited

Garuda aerospace

24/46, KB Dasan Road Alwarpet, Chennai

info@garudaaerospace.com
www.garudaaerospace.com

M: +91 9500088664
Certified DGCA Drone Pilot Training

DroneAcharya Aerial Innovations Ltd.

DRONEACHARYA
AERIAL INNOVATIONS

Gaud Dara Teh: Haveli
Pune - 412205
Courses Offered
DGCA Certified Drone Pilot Drone Building, Drone data processing

www.droneacharya.com

+91 989 000 3590

CSL Infotech

CSL INFOTECH

A-310, GTM Forest and Lavana, Mohkampur Dehradun

brijmohan@csl-infotech.com
www.csl-infotech.com

One-Stop Platform for Geospatial, Lidar, Solar Permit and CAD Services.

PRØPER AVIONIX

PROPERAVIONIX
EXPERIENCE PHYSICS

8-226/1/503, Kakatiya Majestic, Shilpa Nagar, Nagaram, Hyderabad, Telangana – 500083

info@properavionix.com
M: +91 6302857915

www.properavionix.com

Nebula Cloud

NebulaCloud

105, S-28/2, DLF Phase 3 Gurgaon 122002

venkata.ganugula@nebulacloud.in
M: +91 9953240019

www.nebulacloud.ai

Dronetech Solutions Private Limited

AEROBOTT

318, Kuber Complex, opposite Laxmi Industrial Estate, Off Link-road, Andheri West , Mumbai – 400053

info@aerobott.com
www.aerobott.com

ASIM Navigation India Pvt. Ltd

asim
A Navigation & Communication Venture.

RZ-1/4A, Upper Ground Floor, Vijay Enclave, New Delhi -110045

info@asimindia.com
www.asimindia.com

Leader in India Communication & Technology

GarudaUAV

GarudaUAV
A Dorf Ketal - Trentar Company

Assotech Business Cresterra: Unit NO 910 to 913, Floor 9th, Tower 2, Plot No 22, Sector 135, Noida, Uttar Pradesh 201304

sales@garudauav.com
www.garudauav.com

M: +91 7827972197

Drone survey & inspection

UrbanMatrix

URBAN MATRIX

1 st Floor, No 8, Jagivan Ramnagar Hulimangala , Jigani Hobli, Anekal, Bengaluru, 560105

contact@urbanmatrix.co.in
www.urbanmatrix.co.in

+91 77959 85092

TriCAD Design Consultants (P) Ltd

TriCAD Design Consultants (P) LTD
An ISO 9001 - 2015 Company
Geomatics Technology Solutions for the Millennium and Beyond

7-2-1813/5/A/1, S – 307, SVSS Nivas, Main Road, CZECH Colony, Opp: Gokul Theater, Hyderabad, Telangana-500018, India.

PH: 040 2381 7292

marketing@tricadinfo.com
www.tricadinfo.com

Marvel Geospatial Solutions Private Limited

MARVEL GEOSPATIAL SOLUTIONS PVT LTD

Shapoor Hall, 5-9-22/1/B, Shapoorwadi, Ground Floor, Adarsh Nagar, Hyderabad-500063

M: +91 7995471117

info@marvelgeospatial.com
www.marvelgeospatial.com

DRONESTARK TECHNOLOGIES (OPC) LIMITED

DS DRONE STARK

A1, A wing, Ground floor, Trade Star, J.b. Nagar, Andheri East,Mumbai.

M: +91-7760908383

rohan@dronestark.com
www.dronestark.com

Garudalytics Private Limited

GARUDALYTICS
Think Location

B10-1404, My Home Avatar, Puppalaguda, Hyderabad

info@garudalytics.com
www.garudalytics.in

+91-9888482312

Xenhester Innovation Pvt Ltd

XENHESTER
INNOVATION PVT. LTD.

GISC, B/h Admin Building AVPTI Campus, Tagore Rd, Rajkot, Gujarat 360001

(+91) 81600 65862

support@xenhester.com
www.xenhester.com

IG Drones

IG DRONES™

2 nd Floor, Devsha Business Park D-215, D Block, Sector 63, Noida, Delhi NCR 201301

sales@igdrones.com
www.igdrones.com

+91 9990500337

ThinkAerial

Think Aerial

112, Bussa Industrial Estate, Shankar Rao Naram Path, near Peninsula Corporate Park, Lower Parel West, Mumbai,400013

www.thinkaerial.com

+91 8097739224

Bralco Additive Private Limited

BRALCO
Advanced Materials Pte Ltd

#803, Avdhesh House, SG Highway, Ahmedabad-380054.

Phone: +91-9104571220

dr.hardik@bralcoadvancedmaterials.com
Website: www.bralcoadvancedmaterials.com

Propeller Technologies

iPropeller Technologies
Research & Development Pvt Ltd.

30 Kalyanasundaram Nagar, 1st Cross, Karu-mandabam, Trichy- 620001

+91 7540040071

info@propeller technologies.in
www.propeller technologies.in

ISPAGRO ROBOTICS PVT. LTD.

iSPAGRO

Software Technology Parks of India (STPI), Blueberry Hill, Haripadadavu Road, Derebail, Mangaluru, Karnataka 575008

Email ID: info@ispagro.in
www.ispagro.in

Mobile : +91 7349543275

ASCOM SYSTEMS

ASCOM

DJI ENTERPRISE DEALER INDIA

B 303 Hind Saurashtra Ind Estate, Marol Metro Station, Nr Nikon Showroom, Andheri East, MUMBAI-400059

sales@flycams.in
www.flycams.in

+91 9819350262

AMX Innovations Pvt.Ltd

AMX

#132, 4th floor, Chitrapur Bhavan, 15th Cross, Malleshwaram, Bangalore - 560055

info@amxdrones.com
www.amxdrones.com

Ph no - +91-8867858563

DATAPKT Pvt. Ltd

DATAPKT AVIATION

648, 6TH FLOOR, JMD MEGAPOLIS, SOHNA ROAD, SECTOR 48, GURUGRAM, 122018

Call us: +91 8448559100

consult@datapkt.com
www.datapkt.com

Passenger Drone Research Pvt. Ltd.

Vitthal, Madhu-Vijay Colony, Behind Nandan Sweets, College Road, Nashik - 422005, INDIA

+91 90110-00540

info@pdrl.in
www.pdrl.in

UAV Garage

UAVGARAGE

H-103, Nerul Station Complex Nerul (W), Navi Mumbai - 400706

+91 7777 059 888

sales@uavgarage.com
www.uavgarage.com

One stop destination for quality Drone/UAV Parts.

Coratia Technologies Pvt. Ltd

CORATIA TECHNOLOGIES
Applied Innovations

Room No. TI-013, National Institute of Technology, Rourkela, Odisha 769008

089840 07355

contact@coratia.com
www.coratia.com

ML Infomap

ML INFOMAP

124-A Katwaria Sarai,

New Delhi 110016, India

post@mlinfomap.com
www.mlinfomap.com

011 - 41688592

Okulo Aerospace Private Limited

okulo aerospace

No 76, 77, Sai Enclave Layout Halehalli Main Road, Halehalli, TC Palya, Krishnarajapura, Bengaluru-36

info@okuloareospace.com
www.okuloaerospace.com

Spatialhawk Geoinformatics Pvt Ltd

spatialhawk
Empowering Geointelligence

3rd floor, Lingampally Rd, opp. Vidyaniketan High School, Tara Nagar, Chanda Nagar,Serilingampalle (M), Telangana 500019

+91-9620968207

spatialhawk.gst@gmail.com
www.spatialhawk.com

AltBird Robotics Pvt Ltd

ALTBIRD

info@altbird.com
www.altbird.com

Altbird - +91-9820028840 / 9892027864

Asteria Aerospace Limited

asteria aerospace

2nd and 3rd Floor, Tellus Spaces, Khata No. 58/2782/7, Yelahanka New Town, Bengaluru 560064

sales@asteria.co.in
www.asteria.co.in

Call: +917353036888

CDSpace Robotics Pvt Ltd

CDSpace

1st Floor 55/5 Jeelani Punjatan Estate, Thanisandra Main Rd, above Jannat Enterprises, Bellahalli, Bengaluru,560064

info@cdspace.in
www.cdspace.in

+91-8088188974

DGCA Certified Drone for Mapping.

Hella Infratech

HELLA INFRATECH

Plot No C, Opal Square IT Park, Office No. 204, 1, SG Barve Rd, Wagle Industrial Estate, Thane West, Thane

089288 47575

www.hellainfratech.com

Equinox's Drones Pvt Ltd

Equinox's Drones

Gopalan Signature Mall, 2nd, Tower, Old Madras Rd, Nagavarapalya, Bengaluru, Karnataka 560093

info@equinoxsdrones.com
www.equinoxsdrones.com

+919990279996

Dhaksha Unmanned Systems

DUMS

No.253, 10th Street, Sidco Industrial Estate, Ambattur, Chennai - 600 098.

+91 94449 25948

sales@teamdhaksha.com
www.teamdhaksha.com

AgriGator (DH-AG-H1) - Petrol Engine Agri Spraying Drone

General Aeronautics Pvt Ltd

General Aeronautics

F-86, First Floor, ITI Vinyas Building, ITI Campus, Doorvaninagar, Krishnarajapura, Bangalore, Karnataka 560016

+91 80-25654206

info@generalaeronautics.com
www.generalaeronautics.com

DTOWN ROBOTICS PVT LTD

DTOWN ROBOTICS

Unmanned air and ground vehicle manufacturers for defense agriculture transportation where humans meet robots

contact: 91-8445369890
91- 9690829531

address: g-294, sector 63, noida, uttar pradesh

LIGHTNING DRONES INDIA

Drone Thermography · Electrical Asset Patrolling
PV Module Thermography
Structural Inspection
Wind Turbine Blade Monitoring
Telecom Tower Scanning
Chimney Inspection

info@lightningdrones.in

www.lightningdrones.in

+91 9970 185 558
+91 7020 334 149.

Garud Survey Pvt Ltd

GARUD SURVEY

109, MIIC, JLN Marg, Jaipur, Rajasthan, 302017, INDIA

+91 7733911999

info@garudsurvey.com
www.garudsurvey.com

Drone Pilots Network

DRONE PILOTS NETWORK

+91 9828870101

www.dronepilots.co.in
admin@dronepilots.co.in

IoTechWorld Avigation Pvt. Ltd.

Building Drone Ecosystem

Plot No. 1643, Sector 52, Gurugram-122001, Haryana, INDIA

sales@iotechworld.com
www.iotechworld.com

Toll Free No. 01244824950

Agribot is India's First Approved Agriculture Drone.

CRYSTAL BALL

CRYSTAL BALL

India's first Certified mapping drone

SR@crystalball.ai
www.crystalball.ai

Atom Aviation services Pvt Ltd
Address: E 523, 3 rd floor, Ramphal chowk, Dwarka sec 7, New Delhi, 110077
Email Id: Divya@atomaviation.com
Website: www.atomaviation.com
Mobile No: 9654450079

Daybest Research Private
Address: Daybest Research Private Limited, Office No. 202, Anjani Tower, Near Hotel Laal Bag Inn, Telibandha, Raipur, CG-492007
Email Id: devesh@daybest.in
Website: www.daybest.in
Mobile No: +91 99990 25824

Sai Engineers,
Address: B 404, Relicon Vishwa, JSPM Road, Narhe, Pune 411041
Contact No: 9665063870
Email Id:saiengineers145 @gmail.com
Website: www.saiengineers.in/

Aerial Survey and Services (OPC) Pvt Ltd
Address: Plot No: 571-33, Gajanan Residency Project, Anantapur, Bhubaneswar - 752101
Email Id: saerialsurvey@yandex.com
Website: www. yandex.com
Mobile No: +91-7008906657 / +91-9776332581

Fligen Systems Pvt Ltd
Address: Sai Satyam Park, Khandve Nagar, Wagholi, Pune, Maharashtra 412207
Email Id: aditya@fligensystems.com
Website: www.fligensystems.com
Mobile No: 9146078078

ZUPPA OEG GEN5 TECHNOLOGIES PRIVATE LIMITED

ZUPPA OEG GEN 5
TECHNOLOGIES PVT LTD

"AJEET MINI TRAINER RPA"

India's Leading Lower Priced Drone for CAT1 Rotorcraft Assembly and Practical Flight Training Classes
R1 & R2 A and R1 & R2 F.

ZUPPA OEG GEN5 Technologies Private Limited.

A, Third Floor, Gokul Arcade,2 & 2A, Sardar Patel Road, West Wing, Adyar, Chennai – 600 020.

Mail ID : sales@ajeetdrones.com I www.ajeetdrones.com

Phone : +91 99520 81655

MARVEL GEOSPATIAL SOLUTIONS PVT LTD

An ISO 9001:2015 Certified Company

LOOK NO FURTHER!

WE PROVIDE DRONES AND DRONE SERVICES UNDER ONE ROOF

M1 DRONE

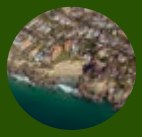
700 MM
Size [Diagonal)

40+ MIN
Endurance

10÷ KM
Transmission Range

3.5 KG
Take Off Weight

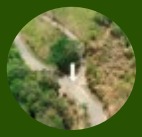
BEST SUITED FOR



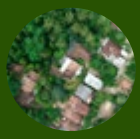
Mapping

3D Modelling

Asset Monitoring



Change detection



Land Surveying

Surveillance

Terrain modelling

Site inspection

OUR ALLIED DATA SERVICES

- Aerial LIDAR surveying
- Data processing
- GIS
- Photogrammetry
- BIM
- Point cloud classification

GET IN TOUCH WITH US FOR YOUR REQUIREMENTS

sales@marvelgeospatial.com
+91 7995471117
www.marvelgeospatial.com

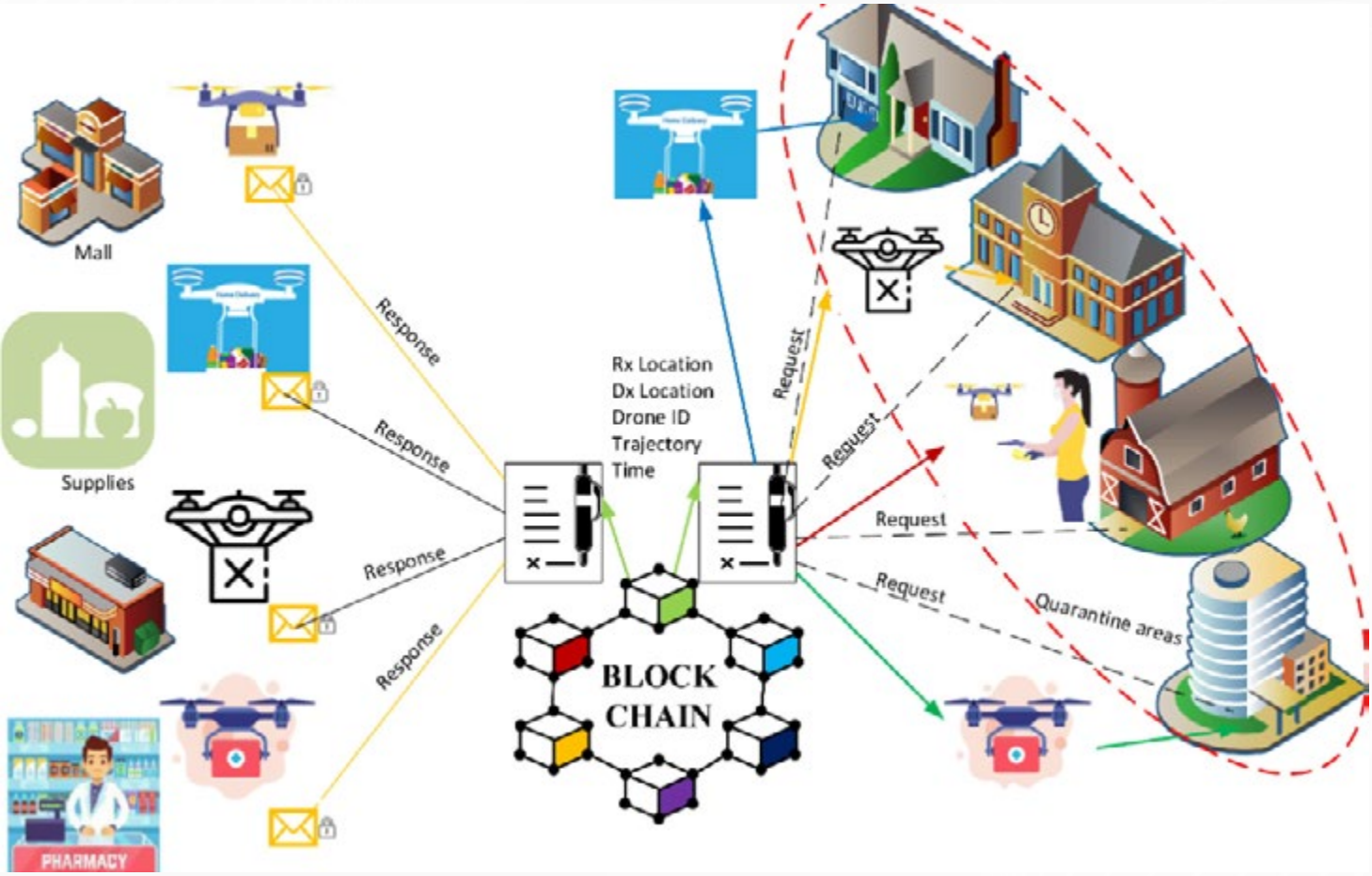
- India
- USA
- UAE
- UK


WE ARE
HIRING
NOT FIRING @
DRONEACHARYA®
AERIAL INNOVATIONS
85+ OPENING | 6 COUNTRIES | 9 OFFICES
UNLIMITED LEARNING!!
www.droneacharya.com


DRONEACHARYA®
AERIAL INNOVATIONS
WE ARE
HIRING
Join Our Team
PROJECT LEAD
EXPERIENCE - 2 YEARS
PROJECT IN BRAZIL.
MUST KNOW PORTUGUESE, ENGLISH AND HINDI / MARATHI
TECHNICAL SKILLS : SHOULD HAVE AT LEAST 2 YEARS EXPERIENCE IN PROJECT MANAGEMENT
LOCATION : PUNE AND SÃO PAULO
JOINING : IMMEDIATE
Send us your CV at -
talent@droneacharya.com
Point your camera here to keep yourself updated!
visit our site
www.droneacharya.com


DRONEACHARYA®
AERIAL INNOVATIONS
WE ARE
HIRING
JOIN OUR TEAM
POSITIONS
Mobile Application Developer (3+ Yrs of Exp)
Back-end Developer (3+ Yrs of Exp)
Machine Learning Engineer (1+ year)
LOCATION
Pune
IMMEDIATE JOINING
SEND US YOUR RESUME AT
talent@droneacharya.com | www.droneacharya.com

Creating a drone superhighway using Blockchain Technology



Overview & Background

Internet of Things (IoT)-inspired drone environment is having a greater influence on daily lives in the form of drone-based smart electricity monitoring, traffic routing, and personal healthcare. However, communication between drones and ground control systems must be protected to avoid potential vulnerabilities and improve coordination among scattered UAVs in the IoT context. In the current concept note, a distributed UAV scheme is proposed that uses blockchain technology and a network topology similar to the IoT and cloud server to secure communications during data collection and transmission and reduce the likelihood of attack by maliciously manipulated UAVs.

Rationale

UTM entities communicate among themselves through a wireless channel. The communication link between the UAV and the ground control station is unencrypted, which makes this link highly prone to several attacks. The possible attacks on the data communication link can be listed as follows:

1. Denial of Service (DoS/ DDoS): Denial of Service attacks compromises UTM availability, in particular by flooding the network with fake requests, thereby the network becomes interrupted, making the UTM system appear unavailable and preventing other legitimate packets from being sent. Correspondingly, the drone cannot receive authorized control messages and data, which leads to failed missions. In a DDoS attack, a large number of unauthorized packets are transmitted over the communication

links by an adversary to the UAV or the GCS that can cause network congestion preventing proper communication between the UAV and the GCS.

2.Traffic analysis attack: Traffic analysis attack is a passive attack, which is performed by a third party to examine the UTM traffic to get useful information from the UTM components and network. The traffic contains sensitive data exchanged between UTM nodes like mission plan, location, and telemetry data.

3.Eavesdropping: When the connection between UAVs and GCS is not secured or encrypted, an attacker can eavesdrop on the exchanged messages between these. Correspondingly, the attacker can extract information (e.g., control and command data, location of drones, and flying speed) from the exchanged messages. Eavesdropping is a passive attack; however, the extracted information via eavesdropping can be used as a foundation for active attacks such as hijacking that controls the UAVs and has a large impact on UAV missions.

4.Identity spoofing: When the MAVLink is not encrypted, authentication credentials of the drone or GCS can be captured by the third party. Then, the third party can use the authentication credentials to send messages to the receivers.

5.False location update: When the communication between UAVs and GCS is not secure enough, the attack can use the data link to send false UAV location data to GCS that can cause wrong trajectory and failed UAVs missions.

Emerging issues in Drone industry that are addressed using blockchain

1.Geofencing: dynamic geofencing refers to the virtual geographical fences usually imposed, maintained, and updated by an airspace authority. A hybrid method where parts of the airspace traffic is controlled by a central authority while others are decentralized with the help of blockchain principles. They separate the two parts using dynamic geofencing. In the decentralized zones, participating

Dr Pranay Kumar
National Gold Medalist
(GoI & GoB – 2013 – 2014)
Special Editor &
Head of Marketing
Future Aviation
Media Pvt Ltd

drones reserve a volume of air to conduct their missions. The reservation is logged in a transaction on a public ledger and is approved if the requested volume is idle at the time of the mission.

2.Route de-confliction: In principle, route de-confliction refers to the mutual planning of flight paths of UAVs in space and time to ensure minimum or no conflicts. We proposed the design of a permissioned blockchain for the collision avoidance and recovery of UAVs. Also, the flight altitude is specified to reduce the collision risk by minimizing the number of drones flying at the same height. To ensure that the drone is following the coordinates of the specified route, we use a smart contract to log drone movement and location information during the entire mission. If any of those attributes violates the specified flight route, a negative point is added to the drone's reputation.

3.Safety: Safety refers to maintaining a good physical condition of a cyber-physical system while in operation. Not only the physical condition of the participating drones shall be preserved, but also the safety of the public residing under the national airspace. This is one of the ultimate goals of a UAV traffic management system that is achieved

using different techniques such as route de-confliction, collision Avoidance, and geofencing.

4.Confidentiality: refers to protecting information from being accessed by unauthorized users. Like other networks, UAV networks are prone to confidentiality attacks such as data sniffing, eavesdropping, and replay attacks. The goal of the work is to ensure that the monitoring data are kept confidential and secure. We propose the use of a private blockchain with smart contracts to log the events and actions throughout the task.

5.Reliability: Improving the reliability of UAV traffic management is a crucial prerequisite to attracting large-scale commercial applications such as package delivery, transportation, and network coverage.

Conclusion & Key Recommendation

With the prevalence of Aerospace Technologies, the regulations of cybersecurity are becoming smarter, assured, and long-lasting. Modern communication network technologies have enormous growth in the cyber threats and masquerading attacks to steal data. Hence concepts and mechanisms are built and made into regulations for a safer environment. Unmanned aerial vehicles (UAVs), often known as drones, are becoming increasingly common, posing new problems in areas such as monitoring, agriculture, weather prediction, surveillance and other fields. This includes a large number of devices that, owing to a lack of energy or a system shutdown, might occasionally send incorrect signals and must be monitored autonomously by drones in remote regions. Our idea is to implement blockchain-based platform for controlling drone operations while ensuring trust and security for end customers.

Give something special to your friends, colleagues, neighbours, relatives, teachers, anyone with reason to appreciate you, by helping us send them great offers which will also help to increase the reach of your favourite publication, DRONES WORLD.

Term	News-stand Price
1 Year (12 issues)	Rs. 3000/-
2 Year (24 issues)	Rs. 6000/-

* Courier Charges Extra

SUBSCRIBE NOW

YES ! I would like to subscribe/renew my subscription to DRONES WORLD (Rs.250 cover price)

Name : .....

Address : .....

.....

City : ..... Pin : ..... State : .....

Country : ..... Email : ..... Job title : .....

Industry : ..... Company : .....

Tel : ..... Mobile : .....

My cheque / DD no. : ..... Date : ..... Drawn in favour of aviation update .....

For Rs. ..... Drawn on ..... Is enclosed herewith.

Or, please charge my credit card : visa master card amex for rs.

Card number :

Card mumber's name : ..... Date of birth : ..... Card expiry date : .....

Signature : ..... Date : .....

PLEASE MAIL THIS COUPON TO :

DRONES WORLD, No 27, Rd Number 2a, Tirumala Hills , Asmangad, Hyderabad, Telangana 500036, India

Tel: 09444499221, +91 80836 30500

E-mail : dronesworldmag@gmail.com, pranay@futureaviation.in

Please add Rs.20/- for cheques not drawn on a Hyderabad bank. Subscription rates subject to change without prior notice. in case of gift subscription. please provide mailing details separtely

DRONE EXPO 2023

Exhibition & Conference

5th - 7th OCTOBER 2023
BOMBAY EXHIBITION CENTRE, GOREGAON MUMBAI

BOOK YOUR SPACE NOW

HALL NO-4

ORGANISED BY

SERVICES INTERNATIONAL
BUILDING B2B PLATFORMS

Institution of Fire Engineers India
Founded 1973

MEDIA PARTNERS

FIRE & SAFETY | RESCUE MANAGEMENT | LIFE SAFETY & SECURITY | Focus Personal Protective Equipment | DV | SER

FIREWORLD | SAFE SECURE Real Time Information for the Safety, Security & Fire Professionals | SECURE asia | DRONES WORLD | AVIATION UPDATE

ASSOCIATED EVENTS

INTERNATIONAL FIRE INDIA 2023 EXHIBITION & CONFERENCE | SAFETYEX exhibition | DISASTER RESPONSE & MANAGEMENT EXHIBITION & CONFERENCE

Contact Us: Pallavi : +91-8800490372 | E-mail: info@droneexpo.in

www.droneexpo.in